LU-20-00027 RECEIVED 03/11/2022 City of Lakewood

EXHIBIT 3

15 DEC 2021

Table of Contents

APPENDICES

List of Tables

List of Figures

LU-20-00027 RECEIVED 03/11/2022 City of Lakewood

EXECUTIVE SUMMARY

PROJECT NEED

The primary intent of this master plan is to accommodate a set of facility improvements to the existing Western State Hospital (WSH) campus in Lakewood, Washington. Many of the existing facilities are aging and no longer comply with federal standards for the care of mental health patients.

The approach to behavioral health care has also evolved, meaning that many of the WSH facilities are no longer well-suited to the provision of core services. Significantly, the State has adopted a new approach to behavioral health care, recognizing that the needs of "forensic commitment" patients (those accused of a crime) are different than those of "civil commitment" patients (those determined by the courts to be a potential danger to themselves or the public, but not accused of a crime).

A core goal of the new state policy is to distribute services for civil commitment patients throughout the state, so that patients can be near family and community support. The model for this care is a combination of community hospitals and residential treatment facilities of 16 to 48 beds each.

As new civil commitment facilities become available in western Washington, civil patient capacity at WSH will be reduced. Under this model, Western State Hospital itself will concentrate on treatment of forensic-commitment patients.

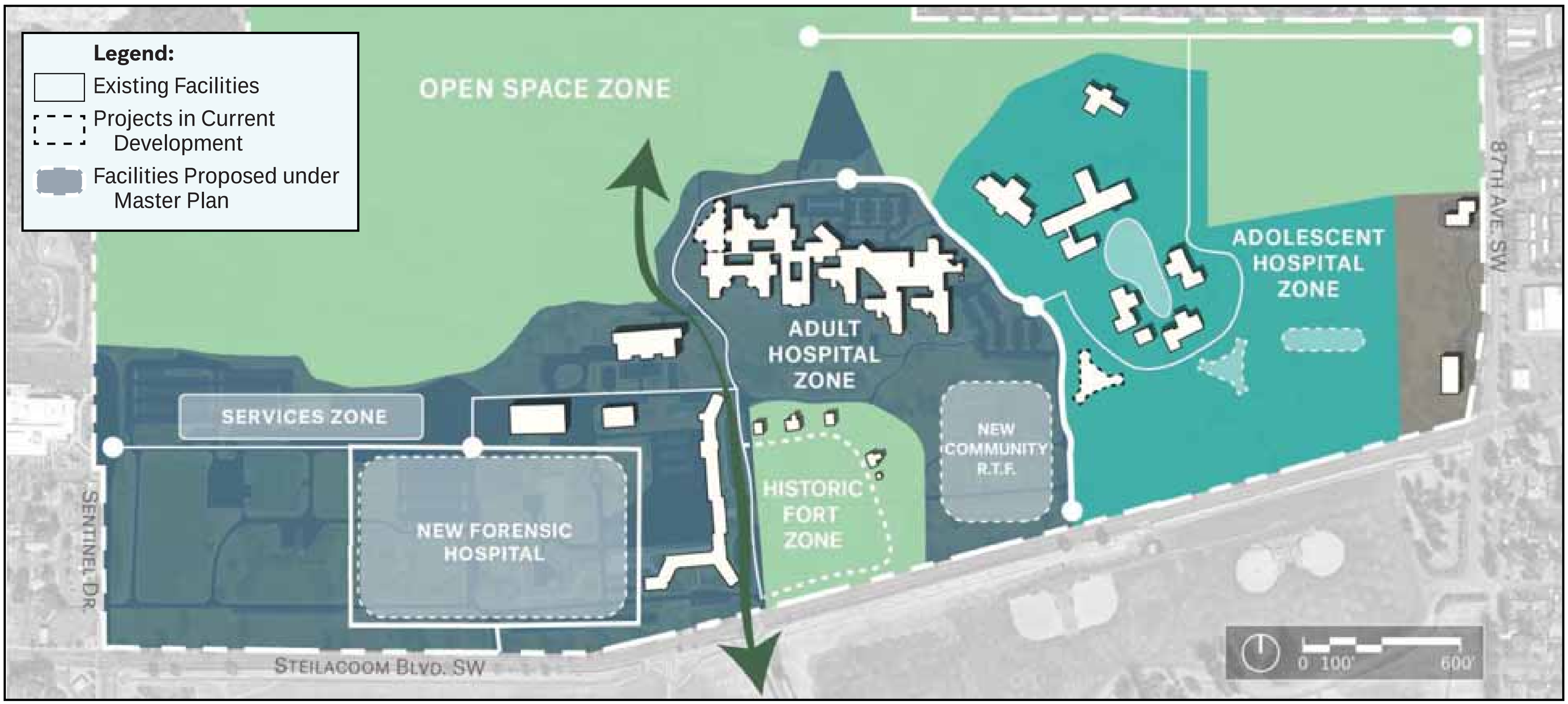

Figure 1: Campus Framework, Developed Areas

PROJECT DESCRIPTION

To address the needs described above, the master plan for WSH calls for a new 350-bed forensic hospital. This will include demolition of several existing buildings that are out-moded. At the CSTC, a second 18-bed residential cottage will be developed, as well as a treatment and recreation center. Minor additions to existing CSTC facilities will and classrooms to the high school and administrative space.

The WSH master plan also allocates space for a new community residential treatment facility (RTF) of 48 beds, as one possible site within the western Washington region identified for such a facility. The siting of this residential facility on the WSH campus is not a certainty. The facility would likely be 3 buildings of 16 beds each.

Taken together, the changes in WSH and CSTC facilities will support the patient projections shown in "Table 1: Existing & Projected Bed Counts". The development of specific projects and their effect on overall capacity at the WSH Site is shown in "Table 2: Site Capacity, New Construction & Demolitions".

While these two tables show similar and related information, the difference between them is:

- Table 1 indicates the actual patient population that is projected.
- Table 2 shows how many beds would be in the Hospital's inventory at any point in time - recognizing that there will be times that new facilities are on-board but previously existing bed spaces are not yet demolished.

Through a combination of demolitions and renovations, DSHS will manage capacity on the Western State Hospital campus, to ensure that bed capacity remains under key thresholds identified in this planning process. The planned projects, renovations and demolitions are further described in the section "Facilities Development" on page 27.

Table 1: Existing & Projected Bed Counts*

Date Range	2019-21	2021-23	2023-25	2025-27	2027-29	2029-31
M.P. Year:	Base	1-2	3-4	5-6	7-8	9-10
Bed Type						
Center for Forensic Services (CFS) - Buildings 21, 27, 28, 29	387	445†	415	180	180	180
Civil Commitment - Buildings 17, 19, 20, 21, 27 & 29	470	415	325	95	95	143
Child Study & Treatment Center (CSTC) Adolescent Services	65‡	65	83	83	83	83
New Forensic Hospital	n/a	n/a	n/a	350	350	350
New Community Residential Treatment Facility	n/a	n/a	n/a	n/a	n/a	48§
Total:	922	925	853	768	768	864

* See "Western State Hospital Goals" on page 20 for further description of goals and needs.
† Includes 58 new beds in Building 28, approved prior to the master plan.
‡ An 18-bed residential cottage for the CSTC facility has been developed concurrently with the preparation of this master plan.
§ The residential treatment facility may be sited at WSH, or may be located at another site in the western Washington region.

Table 2: Site Capacity, New Construction & Demolitions

Date Range	2019-21	2021-23	2023-25	2025-27	2027-29	2029-31
Master Plan Year:	Base	1-2	3-4	5-6	7-8	9-10
Additions:						
New Forensic Hospital	-		-	+ 350	-	-
New Community RTF	-	-	-	-	-	+ 48
CSTC Cottages	+18*	-	-	+ 18	-	-
Renovations:						
Building 28		+ 58†		-118‡		
Building 29		-55§				
Buildings 17, 19, & 20 ¶			-45			
Demolitions:						
Building 21			-167			
Buildings w/o beds**: 9, 10, 11, 12, 13, 14a, 14b, 15, 16a, 23, 24, 25, 26, 30, 31, 44						
Total Site Bed Capacity:	922	925	713	963	963	1,011

* An 18-bed residential cottage for the CSTC is in development, approved separately from this master plan.
† The addition to Building 28 was approved separately from the master plan update.
‡ Treatment wards to be repurposed as admin or program support space.
§ Treatment wards to be repurposed as a Treatment & Recovery Center
¶ As part of the overall effort to reduce civil commitment patients on the campus, a combination of demolitions and renovations of residential capacity achieve the reduction shown here. See "Renovations" on page 29 for more information.
** See also "Table 8: Facility Status under Master Plan" on page 31

DEVELOPMENT PATTERN AND PRINCIPLES

The overall development pattern of the master plan is shown in Figure 1. The plan is defined by several key physical planning principles and goals:

1. Transform The Model Of Care
   - Develop a new forensic hospital, supporting contemporary treatment approaches
   - Shift civil commitment patients to modern treatment facilities distributed throughout the region
2. Improve Campus Efficiencies
   - Move Toward a More Zoned Campus based on Program Areas
   - Modernize Campus Infrastructure
   - Improve Site Access and Way-finding

The plan recognizes City of Lakewood zoning of the northwestern portion of the campus as Open-Space/Recreation, and supports the conservation and visitation of the Historic Fort Steilacoom in the south-center portion of the site.

INFRASTRUCTURE & SUPPORTING SYSTEMS

In support of the primary program-based investments, infrastructure and circulation improvements are planned, including:

- Improved internal circulation for cars and other modes of travel
- Potential shifts in the vehicular access points to the campus to reduce congestion and direct site access to entries along Steilacoom Boulevard
- Parking to be updated, expanded, and re-allocated to meet demand and reduce past informal parking practices on open space areas
- Upgrades to the sewer system and rainwater management infrastructure
- Improved gas and electricity service, as well as investments aligned with the State's zero net energy policy
- Improved public access to extant facilities associated with Historic Fort Steilacoom
- Continued access to open space and recreational lands on the northern area of the site
- Protection of natural resources on and bordering the site
- Evaluation of the potential for conversion of water service from the existing on-site system to the Lakewood Water District system

APPROVALS PROCESS

This campus master plan has been prepared for submission to the City of Lakewood for approval, consistent with the state Growth Management Act and policies stemming from that Act at the local, county, and regional level. Primary requirements of these policies are addressed in the section "Planning Regulatory Context" on page 5.

Western State Hospital, the Child Study and Treatment Center, and the new Residential Treatment Facility are recognized as "Essential Public Facilities" under these policies. As a state facility, the requirements of the State Environmental Protection Act (SEPA) apply to these state facilities.

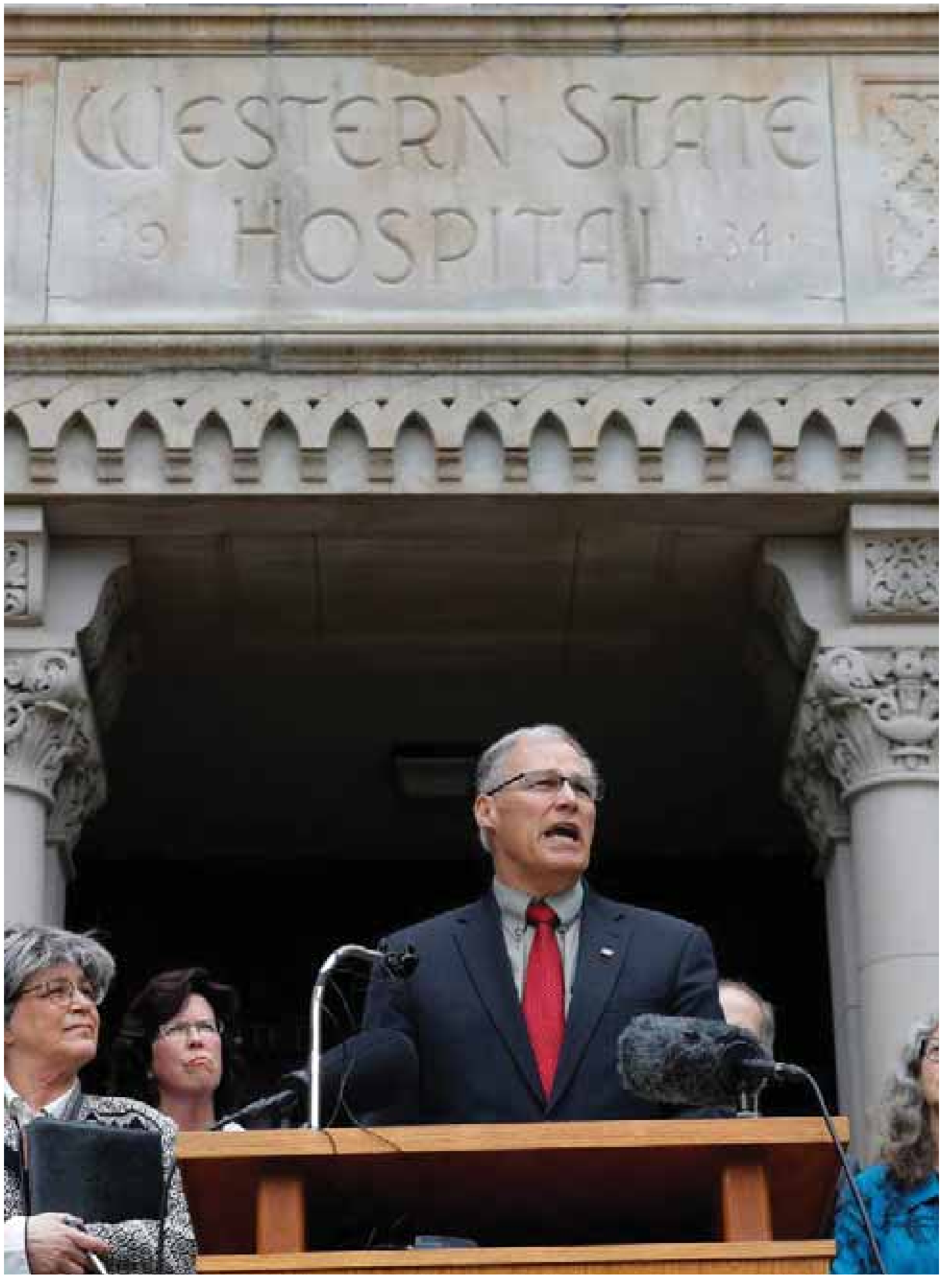

Figure 2: Governor Inslee at Western State Hospital

The governor announced the State's new approach to behavioral health care at the Hospital in May 2018

PLANNING CONTEXT

Introduction

In May of 2018, Governor Jay Inslee came to Western State Hospital (WSH) to make a significant policy statement, launching a major shift in how the State of Washington will manage behavioral health going forward.

This policy shift recognizes that the needs for patients committed on a 'civil' basis are different than the needs of patients with a 'forensic' commitment. The Department of Social and Health Services (DSHS) - with other state agencies and community partners - is charged with developing new facilities to be distributed throughout the state to serve the civil commitment patients.

Under the new policy, WSH itself is to be modernized with new facilities. This master plan identifies facilities investments needed to modernize the WSH campus recognizing that many of the legacy facilities are poorly suited to contemporary treatment practices and the significant recent investments in the existing campus.

PURPOSES OF THE MASTER PLAN

This master plan for the WSH campus is both an internal document for DSHS to guide facility investments and a land use plan for coordination with local and regional jurisdictions.

Washington's Growth Management Act (GMA) requires county and municipal governments to engage in comprehensive planning, and requires that planning be integrated with state agencies. State agencies are specifically required to comply with local comprehensive plans*.

WSH is located in Pierce County and the City of Lakewood (see "Figure 3: Regional Vicinity" on page 2). This plan has been developed to comply with the current adopted plans of those jurisdictions. Coordination with regional plans is also addressed (see "Planning Regulatory Context" on page 5 for more detail).

* RCW 36.70A.103 This code section also clarifies that local compliance does not affect the state's authority to site essential public facilities.

DSHS Mission, Vision, & Values

Mission

As a Department we are tied together by a single mission: to transform lives. Each administration within DSHS has a refined focus on this mission. Individually we have the following missions:

- Aging and Long-term Support Administration – to transform lives by promoting choice, independence and safety through innovative services.
- Behavioral Health Administration – to transform lives by supporting sustainable recovery, independence and wellness.
- Developmental Disabilities Administration – to transform lives by creating partnerships that empower people.
- Economic Services Administration – to transform lives by empowering individuals and families to thrive.
- Facilities, Finance and Analytics Administration – to transform lives by promoting sound management of Department resources.
- Office of the Secretary – to transform lives by helping those who serve succeed.

Values

DSHS is also tied together by the following set of values:

- Honesty and Integrity – because leadership and service require a clear moral compass.
- Pursuit of Excellence – because it is not enough to get the job done, we must always challenge ourselves to do it better.
- Open Communication – because excellence requires teamwork and a strong team is seen, heard and feels free to contribute.
- Diversity and Inclusion – because only by including all perspectives are we at our best and only through cultural competency can we optimally serve our clients.
- Commitment to Service – because our challenges will always exceed our financial resources, our commitment to service must see us through.

Vision

- People are healthy.
- People are safe.
- People are supported.
- Taxpayer resources are guarded.

Figure 3: Regional Vicinity

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Historic Preservation Initiatives

Multiple organizations are working to preserve and interpret the history of the Fort Steilacoom/WSH site.

- The **Historic Fort Steilacoom Association (HFSA)** is dedicated to preservation of elements of the fort itself. The Association operates the Fort Steilacoom Museum, focusing on the four extant cottages and associated grounds - a portion of the former parade grounds- immediately east of Circle Drive. The HFSA seeks to create a visitor center in this area to expand its interpretive efforts.
- A committee of WSH staff manages elements considered by DSHS to be of historical significance to the hospital.
- The **Grave Concerns Association** is engaged in the Western State Hospital Cemetery Restoration Project, which is located at Fort Steilacoom Park, south of Steilacoom Boulevard and east of Lake Waughop. This site is the burial site of patients associated with the hospital. By contrast, the smaller cemetery on the WSH grounds is associated with early American settlers in the area.

Registrations

The WSH grounds and surrounding area are listed on the National Register of Historic Places (NRHP) and Washington Heritage Register (WHR) as the Fort Steilacoom Historic District.

The structures listed as 'Primary" in the NRHP listing are:

- "Ft. Steilacoom Officers Row" — the four surviving 1-story cottages constructed in 1857.
- State Hospital Buildings — specifically, the morgue and bakery, dating from 1887-89.

Additional structures are listed as 'Secondary" in the NRHP listing, including several proposed for demolition/removal in this master plan.

The 2008 Cultural Landscape Assessment identified multiple facilities of the hospital as 'Contributing' to the historic character of the WSH campus, and recommends a period of significance dating up to 1961.

HOSPITAL HISTORY

Western State Hospital has grown over its history, in response to both growing demand and changes in treatment practices.

The site that houses Western State Hospital was developed for agriculture by Euro-American settlers. The U.S. government developed Fort Steilacoom beginning in 1849 (see sidebar "Site History: Timeline" on page 4). Several facilities are extant from the Fort's era and are identified as an historic resource. In 2008 a cultural landscape assessment* was prepared, followed in 2011 by a resource management plan† detailing the status of historic resources and identifying priorities for preservation.

The hospital was established in the 1870's, growing in cycles over the decades. The most prominent building - Administration Building #2 - was built in the 1930's, replacing a prior building on the same site. The Administrative Building faces the parade grounds of the former fort.

In recent years, WSH has been challenged to adapt to contemporary models of care, in part due to the out-dated facilities. The State has committed to reinvesting in behavioral health care through a combination of distributed residential treatment facilities and new hospital facilities for forensic care patients.

Physical growth has included the addition of multiple support facilities to the west of the main administration building, and later companion facilities have been developed in separate clusters to the east. These include the Child Study & Treatment Center (CSTC), as well an "East Campus" cluster at Buildings 28 & 29.

* Western State Hospital Cultural Landscape Assessment

† Western State Hospital Cultural Resource Management Plan, by MSGS Architects

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Site History: Timeline

Pre-1840s	Steilacoom tribe active in the area
1840s	Early Euro-American settlers
1849-68	Site used as Fort Steilacoom
1871	Hospital established by Washington Territory as "Insane Asylum"
1870s	WSH patients and staff clear nearby lands for agriculture, establishing vegetable gardens and orchards and starting a farming operation that would last until 1965.
1886-87	Administration Building #1 built
1889	Washington statehood; the facility is renamed Western State Hospital
1880s-90s	Significant growth in facilities
1914-16	Rock wall and gates built on south of campus
1930s-40s	Expansion utilizing WPA & CCC, including infrastructure upgrades, i.e. wells and pipe system.
1934-35	Main wing of Administration Building #2 built, with WPA grant, replacing earlier Administration Building on the site. Additional wings added over time.
1950s-60s	Expansion to west to meet growing need for additional wards. Former Military Cemetery remains relocated to S.F. Presidio, to accommodate commissary expansion.
1965	On-site Farm closed after declining use.
1982	Building 29 constructed for geriatric patients
2000	CFS Building 28 constructed

Figure 4: Administration Building, circa 1892
(Source: Pacific Coast Architecture Database commons.wikimedia.org)

Figure 5: Fort Steilacoom circa 1960
(Source: fortwiki.com, Creative Commons)

CITY OF LAKEWOOD

The Western State Hospital campus lies within the City of Lakewood. The City's Development Code includes the following provisions that are particularly relevant to this master plan:

- Comprehensive Plan (Future Land Use) Designation: Public & Semi-Public Institutional, and;

  Designation of the surrounding Oakbrook/Fort Steilacoom area as a Center of Local Importance (CoLI), which recognizes the role of civic facilities such as the hospital, Pierce College - Fort Steilacoom, and the historic Fort Steilacoom lands, among other uses.

- Zoning Designation: Public/Institutional (PI): Mental Health facilities require a Conditional Use permit under Lakewood Zoning (18A.40.060.A).

- Essential Public Facilities proposals are required to include (per 18A.40.060.B.2):
  - Documentation of Need
  - Consistency with Sponsor's Plans
  - Consistency with Other Plans
  - Minimum Site Requirements
  - Alternative Site Selection
  - Distribution of Essential Public Facilities
  - Public Participation
  - Consistency with Local Land Use Regulations
  - Compatibility with Surrounding Land Uses
  - Proposed Impact Mitigation

- Lakewood Zoning includes "Additional Siting Criteria for Mental Health Facilities" (18A.40.060.B.4). These include:
  - Provisions for infrastructure and services
  - Protection of Critical Areas
  - Provision of Usable Open Space
  - Transportation and Circulation, including sidewalks
  - Measures for the safety of the general public

  Each of these considerations are addressed in the corresponding section of this master plan document.

- EPFs on lands zoned PI and over 20 acres in aggregate are required by Lakewood Zoning to be governed by a master plan (18A.40.060.B.5).

  Policies related to a master plan for an essential public facility include:
  - Requirement to provide an Operational Characteristics Description
  - Requirement for a Compatibility Study
  - Adaptive Reuse of facilities would require an amendment to the adopted master plan
  - Provision for multi-modal transportation
  - Provision of utility infrastructure, roads and emergency services
  - Public safety and safety of visitors and staff
  - Protection of critical areas and provision of usable open space

Compatibility of Uses

Lakewood's Development Code requires that the following criteria be addressed as part of a Compatibility Study for an Essential Public Facility (18A.40.060.B.6.):

a. The purpose of the proposed essential public facility civic use

b. An operational characteristics description of the proposed essential public facility civic use and an operational characteristics description of the existing use or uses

c. An evaluation of the potential effects of the proposed essential public facility civic use upon the existing use or uses

d. An evaluation of the potential effects of the proposed essential public facility civic use upon the adjacent properties

e. An evaluation of the potential effects of the proposed essential public facility civic use upon at-risk or special needs populations, including but not limited to children and the physically or mentally disabled and

f. Identification of any applicable mitigation measures designed to address any potential effects identified through the evaluation required herein

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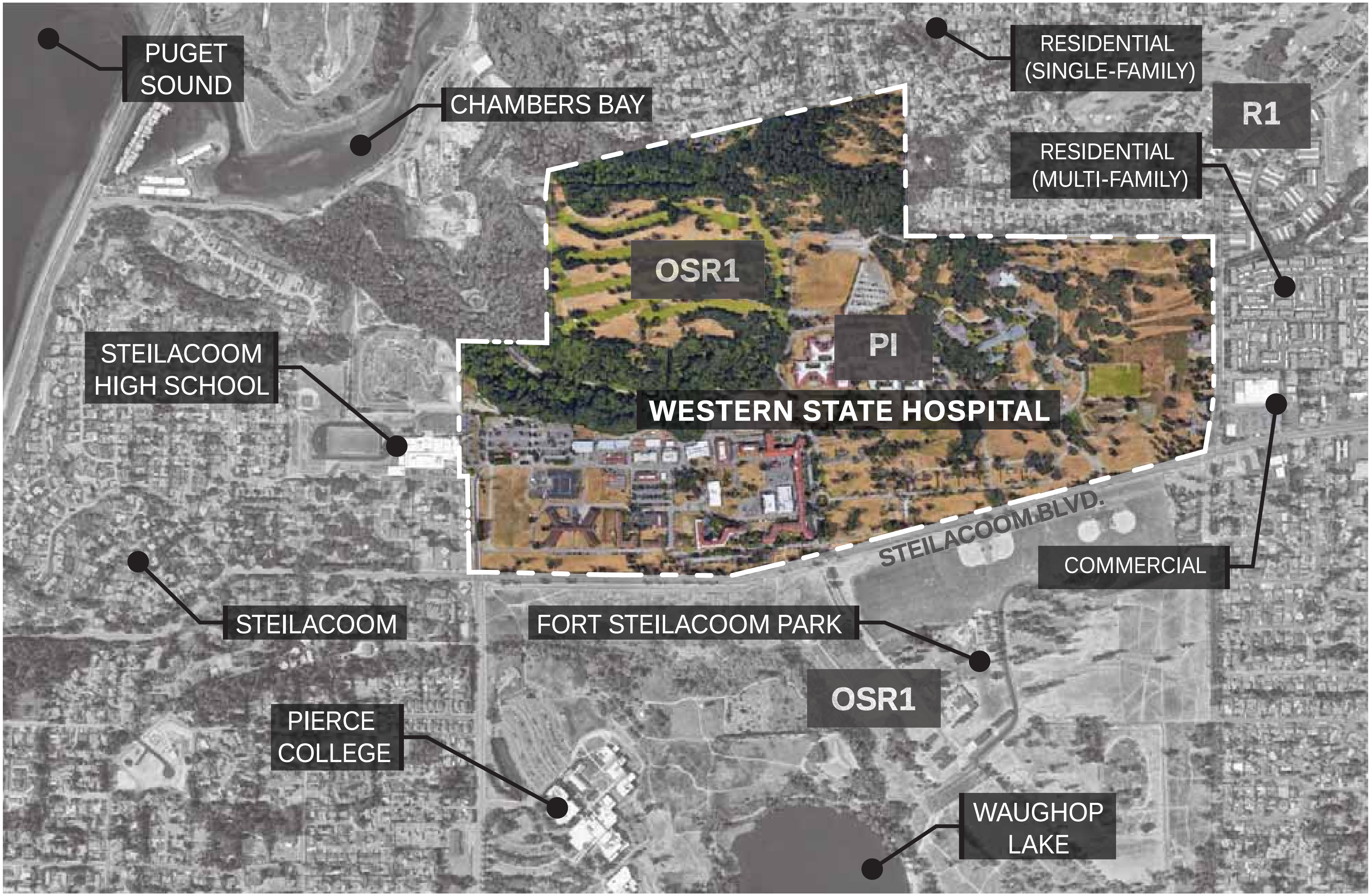

Figure 6: Site Context & Surrounding Uses

Each of these six criteria are addressed below:

a. Purpose of the Proposed use:

The master plan does not propose a change in the general use of the site, but does propose modernized facilities to improve care within the facilities. The Goals and Purpose of the developments under the plan are to modernize existing facilities, addressing deferred maintenance, and adapting to new models of care for behavioral health.

In the process, multiple facility improvements will be made, including:

- Demolition of several buildings
- Improved circulation and parking
- Improved access to historic facilities of pubic interest
- Improved security measures

These are more fully described in the sections “Goals & Project Needs” on page 20 and “Facilities Development” on page 27.

b. Operational Characteristics

These are fully described in the section “Operational Characteristics Description” on page 32.

c. Potential Effects on Existing Uses

The proposed uses are explicitly to modernize the Hospital’s facilities. The new facilities will be fully integrated with those existing facilities that will remain.

d. Potential Effects on Adjacent Properties

Given the age of the hospital, the surrounding uses have changed through economic expansion and local planning over its history. Current surrounding uses are indicated in Figure 6 on page 6.

The effects from this plan and related projects should be neutral to positive on surrounding areas. Programs provided will be internal to the WSH campus.

Travel to and from the campus will be similar to current patterns, with potential improvements from potential changes in entry points (see item f, below).

e. Potential Effects on At-Risk & Special Needs Populations

The Hospital’s purpose and program directly serve a segment of Washington’s special needs population, specifically those with behavioral health needs. The investments being proposed are being made to improve the delivery of those services.

With regard to children, the WSH site includes the Child Study & Treatment Center (CSTC), which provides services to minors with behavioral health treatment needs.

f. Applicable Mitigation Measures

The modernization of the facilities is largely “self-mitigating”, in the sense that consolidation of programs into a contemporary facility with enhanced security will further reduce any potential effects of the WSH operations on the surrounding community.

Regular staff access to the campus from the east (87th Ave.) and west (Sentinel Drive), will be reduced by access control, and changes to the access points from Steilacoom Blvd. are suggested to reduce congestion along that route.

PIERCE COUNTY

Pierce County also has regulatory jurisdiction affecting WSH planning. The primary planning policy for the County is the ***Countywide Planning Policies for Pierce County, Washington***. One key section of that policy addresses the “Siting Of Essential Public Capital Facilities of a Countywide Or Statewide Significance”.

Key provisions of the Essential Public Facilities (EPF) policy dictate that:

- EPFs must have a useful life of 10 years or more and must serve the entire County, multiple counties, or the whole state (Policy EPF-1.1.)
- County and local implementing policies shall require that: *“the state provide a justifiable need for the public facility and for its location in Pierce County based upon forecasted needs and a logical service area, and the distribution of facilities in the region and state.”* (Policy EPF-3.1.)
- *“A requirement that the state establish a public process by which the residents of the County and of affected and ‘host’ municipalities have a reasonable opportunity to participate in the site selection process.”* (Policy EPF-3.2.)

KEY EVALUATION CRITERIA

As identified in Pierce County requirements (Policy EPF-4), a master plan for Essential Public Facilities should address the following. For each item, the reader is directed to the pertinent information.

- Specific facility requirements:
  - Minimum acreage

    See “Facilities Development” on page 27
  - Accessibility; transportation needs and services

    See “Access, Circulation, & Transportation” on page 35
  - Supporting public facility and public service needs and the availability thereof

    See “Utilities & Infrastructure” on page 43
  - Health and safety

    Behavioral Health is a primary function of the facility, See “Western State Hospital Goals” on page 20 for a description of care. For safety and security measures, refer to “Site Security” on page 41
  - Site design

    See “Figure 14: Campus Framework” on page 23, “Figure 17: Master Plan Development” on page 26 and ““Open Space & Landscape” on page 39.
  - Zoning of site

    Public/Institutional See Figure 9 on page 12
  - Availability of alternative sites; community-wide distribution of facilities

    For a discussion of site selection criteria, see “Facility Siting” on page 21
  - Natural boundaries that determine routes and connections

    These are described in “Hospital History” on page 3 and illustrated in “Figure 9: Western State Hospital Lands” on page 12
- Impacts of the facility:
  - Land use compatibility

    The site is specifically zoned for Public/Institutional uses
  - Existing land use and development in adjacent and surrounding areas; existing zoning of surrounding areas; existing Comprehensive Plan designation for surrounding areas

    See”Figure 6: Site Context & Surrounding Uses” on page 6
  - Present and proposed population density of surrounding area

    The residential areas to the north and east of the site are single-family and low-rise multi-family estimated to range in density from 4 to 15 units per gross acre.
  - Environmental impacts and opportunities to mitigate environmental impacts

    A summary of potential impacts is included in the SEPA checklist, included with this report. See “Appendix 8: SEPA Checklist”
  - Effect on agricultural, forest or mineral lands, critical areas and historic, archaeological and cultural site

    No agricultural, forest or mineral lands are impacted by this campus redevelopment. Parts of the site are within the Fort Steilacoom Historic District, which is on the National Register of Historic Places as well as the Washington Heritage Register. See “Documentation of Listed Structures” on page 31.
  - Effect on areas outside of Pierce County

    WSH serves needs throughout the western portion of the state, and will continue to do so for forensic patient services. The State is studying a revised care model for civil commitment patients that would distribute services to multiple localities, throughout the state. That process is proceeding in parallel to this planning process.
  - Effect on designated open space corridors

    The currently designated open space is not proposed for development in this plan. The plan proposes increasing public access to connect between open space areas to the south - Fort Steilacoom Park - and the ravine to the north, which in turn connects to Chambers Bay.
  - “Spin-off” (secondary and tertiary) impacts

    The only potential “spin-off” from the modernization investments on the WSH campus would be the increased distribution of facilities serving civil commitment patients. As described in the program, one community treatment facility of 48 beds may be accommodated on the campus, while others would be developed in other communities around the state.
  - Effect on the likelihood of associated development being induced by the siting of the facility

Since staffing is not projected to grow significantly, a growth inducement impact is not expected. Staff spending in the community is anticipated to remain fairly constant, as the plan does not propose significant new amenities on campus that would shift patterns of behavior.

- Impacts of the facility siting on urban growth area designations and policies:
  - Urban nature of facility

    The hospital's services are an urban use, and there are direct benefits to patient care by being near the state's major population centers. The ability of family and friends to readily visit patients is a factor in their care and recovery.
  - Existing urban growth near facility site

    Surrounding uses include single-family and multi-family housing to the east and northeast, commercial development along Steilacoom Boulevard to the east, open space and a campus of Pierce College to the south, and Steilacoom High School to the northwest. All of these uses post-date the hospital's presence on the site and its last major period of growth.
  - Compatibility of urban growth with the facility

    The proposed uses in the area surrounding the hospital are similar to existing adjacent uses.
  - Compatibility of facility siting with respect to urban growth area boundaries

    The facility is being sited on the existing WSH campus, generally infilling over existing structures and sites of existing buildings to be demolished. There is no shift in siting relative to the urban growth area boundaries.
  - Timing and location of facilities that guide growth and development.

    The projected timing of the WSH facilities are indicated in Table 1 on page iv.

REGIONAL PLANNING

The Puget Sound Regional Council (PSRC) provides coordination across the region, focusing on growth management, economic development and transportation.

PSRC policy documents include:

- Vision 2050, draft plan (Summer 2019)

  The draft plan identifies Lakewood as one of 16 "core cities", a category of major cities second only to the largest "metropolitan cities" in their influence on the economy
- Vision 2040 - the fully adopted regional growth strategy, preceding the current Vision 2050 process
- Regional Transportation Plan (adopted 2018), prioritizing transportation investments

PSRC's draft Vision 2050 plan extends policies from the Vision 2040 plan calling for growth to be concentrated in established urban areas, protection of existing open space and sprawl reduction.

STATE OF WASHINGTON

Land Use in Washington is governed primarily by the Growth Management Act (GMA). This law establishes the requirements for planning by cities and counties, and requires that agencies of the state comply with local comprehensive plans and development regulations.(RCW 36.70A.103).

State law also addresses the siting of Essential Public Facilities, requiring that "each county and city ... shall include a process for identifying and siting essential public facilities" (RCW 36.70A.200).

Additional requirements derive from the State Environmental Protection Act (SEPA), specifically to assess the potential impacts of planned development on natural systems and related infrastructure. A SEPA checklist is included in "Appendix 8: SEPA Checklist".

Executive Order 21-02 - replacing E.O. 05-05 and effective April, 2021 - requires that "Agencies shall consult with DAHP and affected tribes on the potential effects of projects on cultural resources proposed in state-funded construction or acquisition projects..."

COORDINATION WITH OTHER JURISDICTIONS & AGENCIES

Entities that will be affected by this plan were contacted as the plan took shape, to hear their issues of interest or concern, and these meetings will continue through the master plan review process. These meetings are summarized in "Appendix 1: Stakeholder Meetings" and updates to this appendix will be provided as additional meetings are held.

Figure 7: Western State Hospital, aerial view

SITE OVERVIEW

The full WSH campus site is about 288 acres in size. Table 3 on page 12 details the site area by parcel number and City zoning designation. As a legacy of the site's gradual evolution, the WSH campus includes many facilities from different eras and functions.

The total building area serving DSHS programs is 1,435,000 gross square feet (GSF). Table 4, along with Figure 11 and Figure 12 list the existing facilities on the campus, including their current function and year built. This master plan addresses replacement and/or renovation of those facilities that have significant deferred maintenance, and especially those that are poorly suited to providing restorative care to patients.

OPEN SPACE AREAS

The northwestern area of the site includes open spaces of varying types. The former golf course is zoned for open space uses and the ravine to its south is an area of sensitive lands with steep slopes around the gulch that holds Garrison Springs, site of a fish hatchery dating from the 1970s.

FORT STEILACOOM LANDS

While much of Fort Steilacoom laid on lands south of what is now Steilacoom Boulevard, the area immediately east of the main Administration Building includes a core cluster of historic cottages dating from the original fort settlement. The Historic Fort Steilacoom Association has stated a preference to restore this area to be an open parade grounds type of environment. This initiative would remove roads from the area. This objective is reflected in the planning for the hospital's facilities and circulation planning.

Three other key historic facilities are extant west of the Administration Building: i) a settlers' cemetery, ii) a morgue structure immediately south of the cemetery and iii) a former bakery/butchery structure from the early hospital era.

COTTAGE ROW

Two sets of cottages exist to the east of the Administration building:

- A set of four dating from the Fort Steilacoom era (1850s) and organized in a partial crescent around a central open space and allée of trees

  This group is managed by the Historic Fort Steilacoom Association along with other areas associated with the fort. The hospital and DSHS are collaborating with the society on the preservation of these facilities.

- A cottage dating from the 1930s, the last remaining from a former row of cottages along Cottage Row to the east of the Fort-era structures

  This latter group were built to house hospital staff, and had been vacant and are no longer contributing to the hospital's functions. The last of them will be demolished under this plan.

EAST CAMPUS EDGE

Two independent facilities are on campus lands facing 87th Avenue SW:

- A fire station operated by West Pierce Fire & Rescue
- Oakridge Community Facility, operated by the Department of Children, Youth and Families

These lands are leased and are not part of the WSH campus master plan.

Figure 8: Fort Steilacoom cottages on the WSH campus

Table 3: Western State Hospital Parcels & Land Area

Zoning	Tax Parcel Number	Land Acres
PI*	220321022	215.71
OSR	220283027	29.75
	220321007	36.73
	220283026	6.15
All OSR		72.63
Total		**288.34**

* Includes approximately 25 acres in Sensitive Areas/Steep Slopes

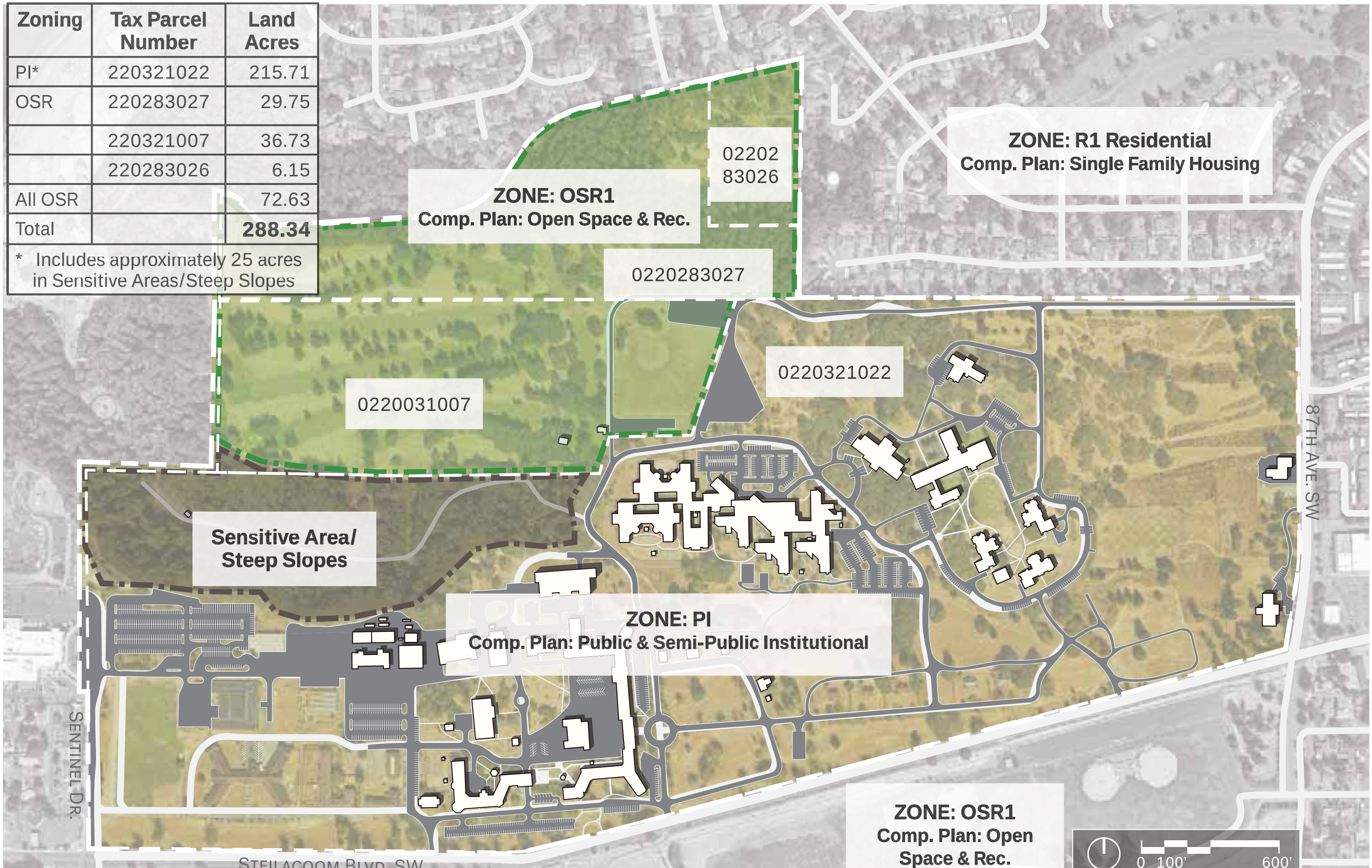

Figure 9: Western State Hospital Lands

The boundary between the OSR zone and the Public/Institutional Zone is as defined by the Lakewood Zoning Map. This is understood to be the southern and southeastern edges of Tax Parcel 0220321007. The boundaries of the Sensitive Area surrounding Garrison Creek are the predominant break in slope at the head of the slopes on the south and north of the creek. On the east, the boundary is 20 feet west of the existing road.

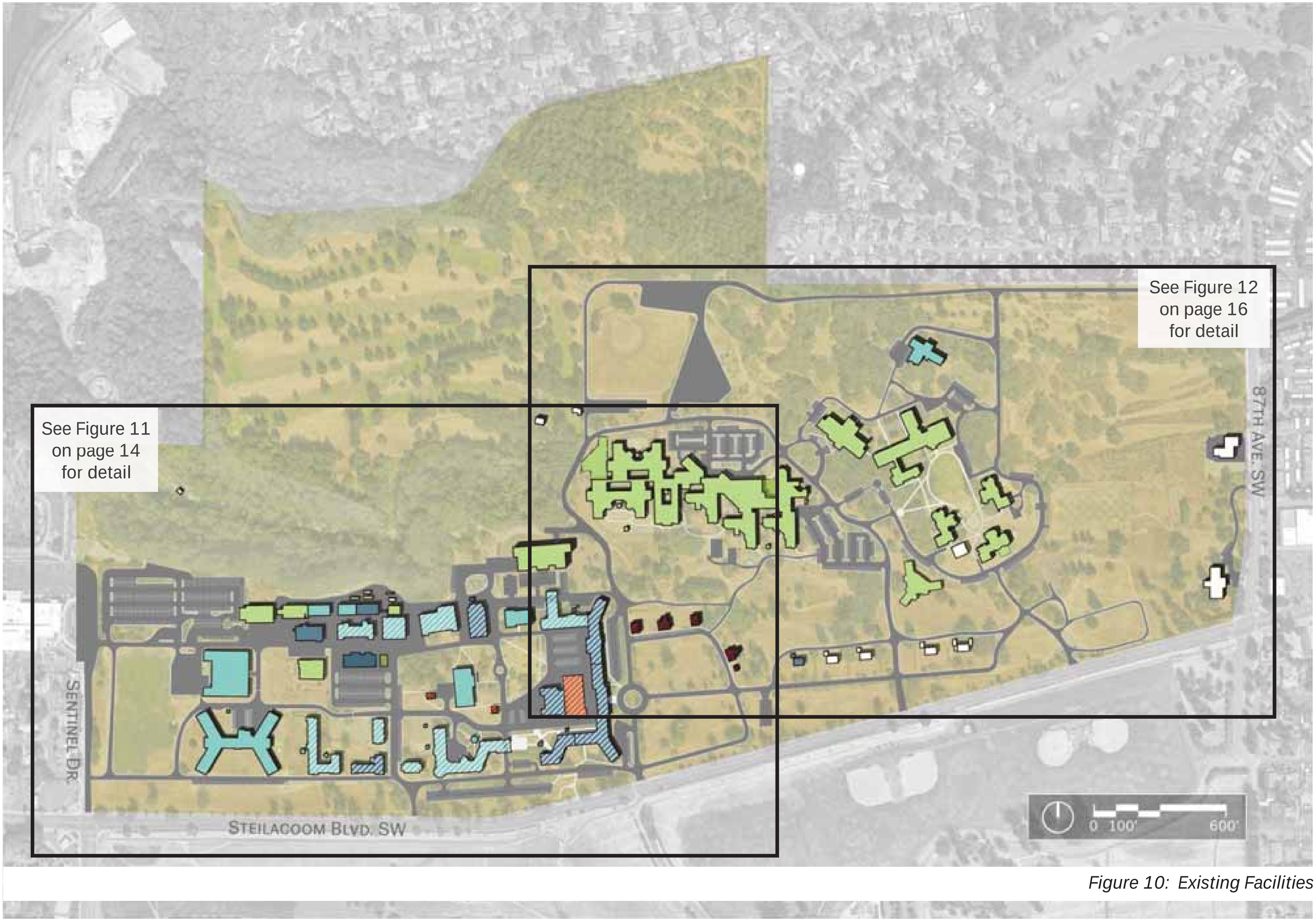

Figure 10: Existing Facilities

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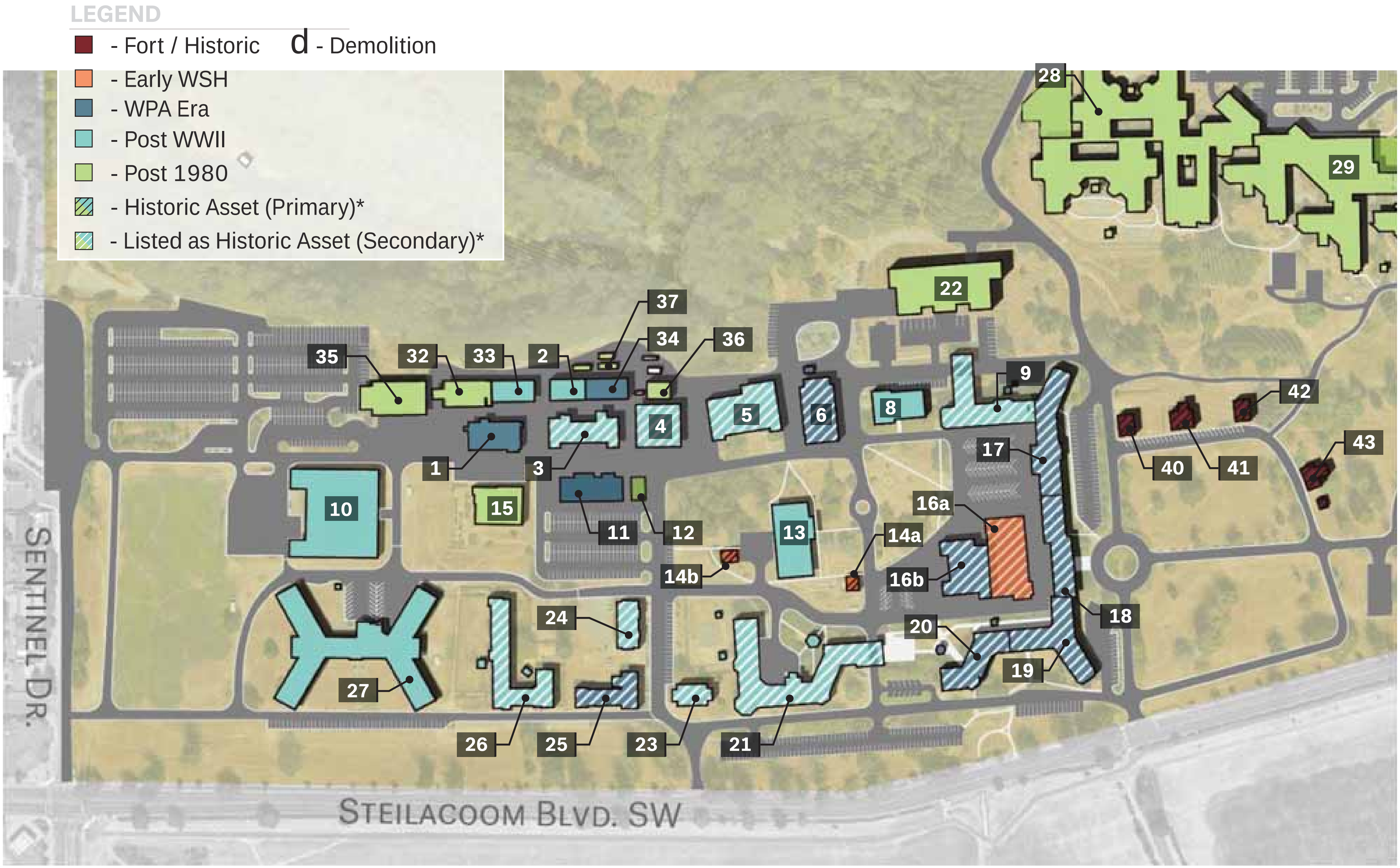

* Facilities listed as historic assets are as determined in the listing of the Fort Steilacoom Historic District for the National Register of Historic Places and/or the **Western State Hospital Cultural Landscape Assessment.** See "Documentation of Listed Structures" on page 31.

Figure 11: Existing Facilities, West Campus

Table 4: Existing Buildings

Bldg.	Building Use	Built	GSF
1	MOD Maintenance Office	1937	7,623
2	MOD Storage	1958	3,936
3	MOD Plumbing, Garage, Glass, Sign, Paint & Machine Shops	1917	9,382
4	MOD Boiler House	1917	26,376
5	MOD Laundry & Grounds Shop	1917	19,892
6	Art Center, Infinity Center, Beauty/Barber Shop, *etc.*	1933	31,797
8	Library, Key Shop & Staff Offices	1948	25,448
9	Staff Offices	1948	114,327
10	Staff Development Training Center & HMH Carpentry	1960	41,227
11	Commissary	1934	22,620
12	MOD Storage	1986	1,560
13	Pharmacy & Central Services	1975	15,235
14A	Vacant - Historic Bakery	1904	880
14B	Vacant - Historic Morgue	1888	1,516
15	Green House & Industrial Hygienist	2000	1,826
16A	Main Kitchen & HMH Java Site	1908	33,275
16B	Staff Offices, Fashion Center & Laundry Folding	1930	18,180
17	Patient Wards & Treatment Mall	1934	44,091
18	Communications Center & Administration Offices	1938	36,662
19	Patient Wards C1 - C3	1938	46,633
20	Patient Wards C4 - C6	1934	44,328
21	Patient Wards S1 - S10	1948	149,865
22	Patient Support Center	2019	48,190
23	Chapel	1925	7,492
24	Employee Health, Infection Prevention & Patient Financial Services	1937	11,149
25	North West Justice, Legal Services & Department of Assigned Council	1938	22,001
26	Vacant - Not in Use	1945	75,644
27	WSH: Patient HMH Wards W1N & W1S and Fort Steilacoom Residential Treatment Facility	1960	37,980

Bldg.	Building Use	Built	GSF
28	Center for Forensic Services Patient Wards F1 - F8 & Treatment Mall	2000	202,160
28	Patient Wards F9 & F10	2020	40,742
29	Patient Wards E1 - E8, Treatment Mall & Clinic	1982	186,628
30	Connex Container: Emergency Management Supplies	2016	160
31	Connex Container: Emergency Management Supplies	2016	160
32	Inventory Control Warehouse	1985	6,161
33	MOD Life, Health & Safety Shop	1979	5,600
34	MOD Carpentry Shop	1972	5,641
35	Maintenance Materials Warehouse & HMH Program	1982	12,000
36	MOD Main Chiller Plant	1994	2,079
37	Prime Mover Enclosure: Generator No. 1	1994	476
38	Prime Mover Enclosure: Generator No. 2	1994	476
40	HFSA Cottage No. 1	1855	2,602
41	HFSA Cottage No. 2	1855	3,400
42	HFSA Cottage No. 3	1855	2,600
43	HFSA Cottage No. 4	1855	3,450
44*	Vacant: Cottage No. 5	1934	1,350
FP	Fuel Pump Station	1993	32
Child Study & Treatment Center (CSTC) Facilities			
50	CSTC Administration & Elementary School	1995	36,105
51	CSTC High School	1992	19,816
52	CSTC Residential Unit (Camano)	1987	11,209
53	CSTC Residential Unit (Orcas)	1987	11,984
54	CSTC Residential Unit (Ketron)	1987	10,484
55	CSTC Residential Unit (San Juan)	2020	19.360
56	Maintenance	1961	9,394
	Total Facilities in planning area		1,493,204
Facilities owned/operated by others			
ORCF	Oakridge Community Facility		
WPFS	West Pierce Fire & Rescue, Station #24		

* Cottages 6-10 - totaling 7,108 GSF - were demolished in 2021.

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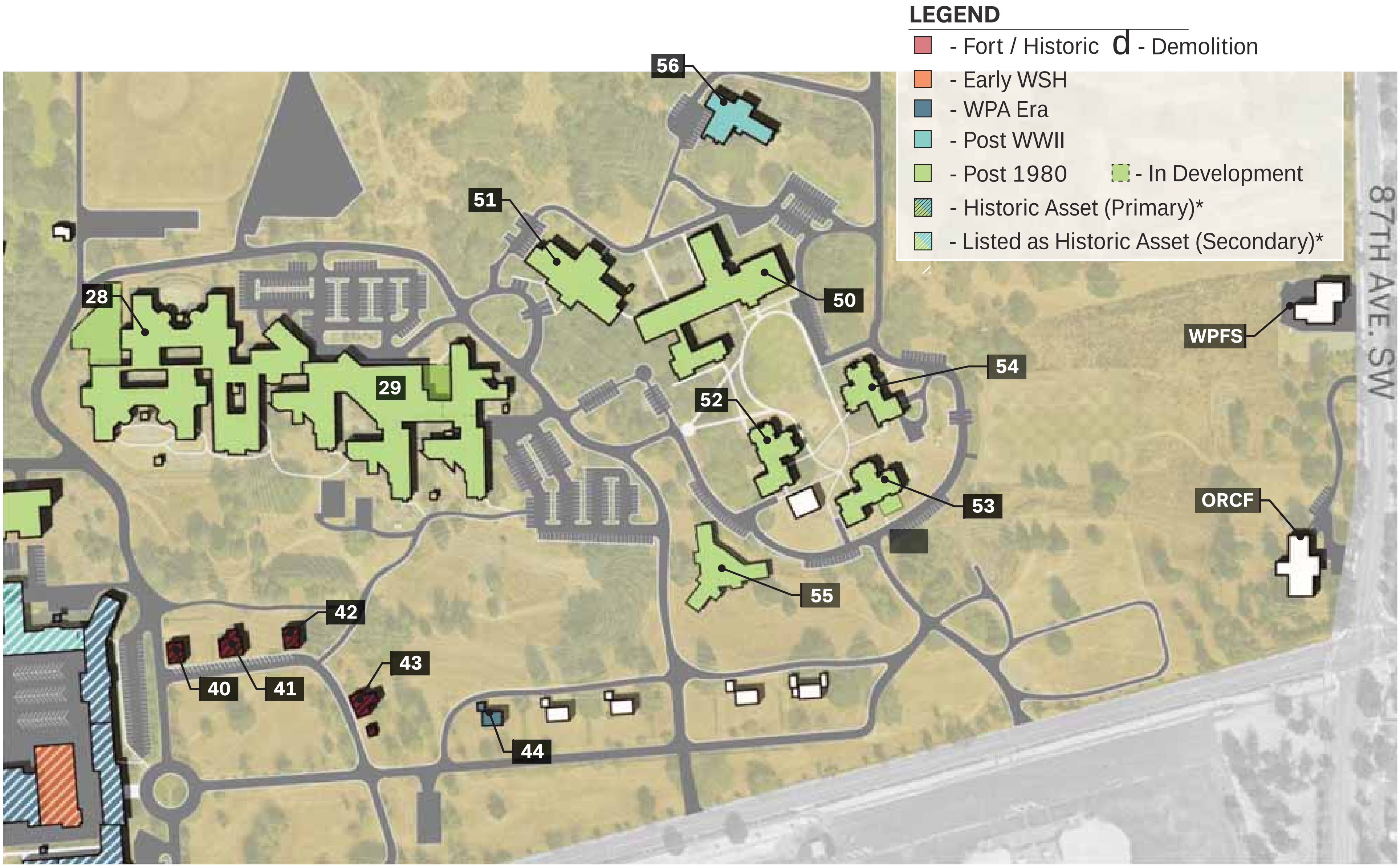

* Facilities listed as historic assets are as determined in the listing of the Fort Steilacoom Historic District for National Register of Historic Places and/or the **Western State Hospital Cultural Landscape Assessment.** See "Documentation of Listed Structures" on page 31

Figure 12: Existing Facilities, East Campus

Table 5: Patient Bed Count, by Ward & Building data is as of Fall 2019

Bldg	Center	Physical Ward	Logical Ward	Service Type	Beds
17	PTRC*	C7	WS56	Rehabilitation	30
17	PTRC	C8	WS77	Acute	30
19	PTRC	C2	WS63	Rehabilitation	30
19	PTRC	C3	WS31	Acute	30
20	PTRC	C5	WS41	Acute	30
20	PTRC	C6	WS25	Acute	30
21	CFS†	S4	WS83	Transitional/Extended	15
21	CFS	S10	WS82	Rehabilitation	30
21	PTRC	S3	WS76	Rehabilitation	30
21	PTRC	S7	WS73	Rehabilitation	32
21	PTRC	S8	WS72	Rehabilitation	30
21	PTRC	S9	WS74	Rehabilitation	30
27	HMH‡	W1N	WS47	Rehabilitation	15
27	HMH	W1S	WS45	Rehabilitation	15
27	FSCRP§	W2N	WS47	Rehabilitation	15
27	FSCRP	W2S	WS45	Rehabilitation	15

* Psychiatric Treatment and Recovery Center
† Center for Forensic Services
‡ Habilitative Mental Health
§ Fort Steilacoom Competency Restoration Program

Bldg	Center	Physical Ward	Logical Ward	Service Type	Beds
28	CFS	F1	WS48	Admission	29
28	CFS	F2	WS14	Admission	29
28	CFS	F3	WS85	Admission/Acute	31
28	CFS	F4	WS61	Acute	31
28	CFS	F5	WS50	Admission	29
28	CFS	F6	WS18	Rehabilitation	29
28	CFS	F7	WS62	Rehabilitation	31
28	CFS	F8	WS16	Rehabilitation	31
29	CFS	E1	WS51	Rehabilitation	30
29	PTRC	E2	WS81	Rehabilitation	27
29	CFS	E3	WS09	Admission	21
29	CFS	E4	WS78	Admission	21
29	PTRC	E5	WS05	Admission	30
29	PTRC	E6	WS08	Rehabilitation	26
29	PTRC	E7	WS70	Rehabilitation	28
29	PTRC	E8	WS59	Rehabilitation	27
Bldg	**Center**	**Cottage Name**		**Service Type**	**Beds**
52	CSTC	Camano		Children	15
53	CSTC	Orcas		Children	16
54	CSTC	Ketron		Children	16
55	CSTC	San Juan		Children	18
Total Bed Count					**922**

PATIENT POPULATIONS & CARE APPROACH

Washington's two state psychiatric hospitals today serve patients with differing backgrounds and needs. Patients are served in two primary categories:

Civil Commitment Patients

Individuals determined by the Court system to be a danger to themselves or others may be civilly committed to the state hospitals for care and treatment. These individuals have not been accused of a crime.

Forensic Commitment Patients

Forensic patients are those patients that have been accused of a crime. In the process of a prosecution, the Courts may commit an individual to the state hospital for a competency evaluation to stand trial. If found competent, the individual is returned to jail to stand trial. If found not competent, the individual stays in the hospital until competency is restored.

Another population of forensic patients are those who have been found by the Courts to be not guilty by reason of insanity (NGRI). These individuals are committed to the state hospitals for care and treatment.

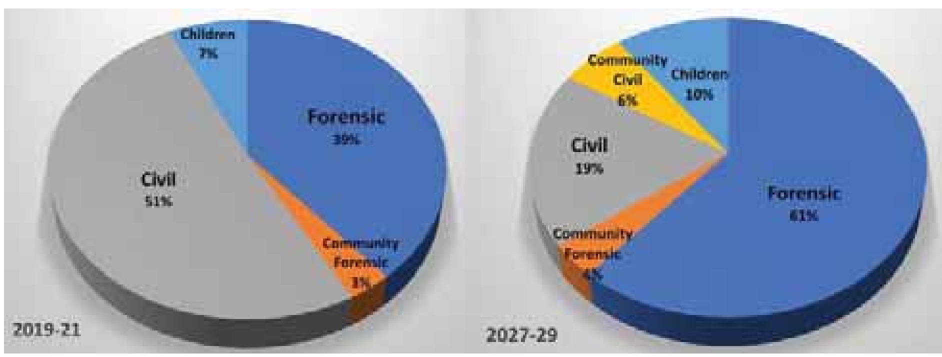

Figure 13: Mix of patients by type

Models of Care

Civil patients receive care in Buildings 17, 19-21, 27 and 29. The environment of care differs from building to building, but generally consists of 25-30 bed units connected end to end.

The organization of the facilities lend themselves to an archaic custodial model of care, where large numbers of patients are housed with limited opportunity for on-unit therapy. For those farther from the Treatment Mall, access to program space becomes more challenging and often results in an inadequate amount of active therapy. Thus, length of stay is often longer than can be achieved with a more contemporary model of care.

Forensic patients reside and receive treatment in a secure environment in Buildings 28 and 29. Inpatient Units are typically comprised of 30 beds supported by 2 group activity spaces and a porch. A generous amount of circulation space surrounds the Nurse Station allowing a high degree of direct observation but little opportunity for staff and patient interaction. All 30 patients share the same limited amount of social space, resulting in a high social density and/or many patients remaining in their rooms, disengaged.

The only significant place for therapy in the forensic hospital is the Treatment Mall. This portion of Building 28 is strategically located between the residential units of 28 and 29. It offers a variety of program space including a gym, fitness rooms, classrooms and multi-purpose rooms.

Child Study & Treatment Center (CSTC)

The Child Study and Treatment Center (CSTC) provides culturally competent care to children and youth with severe psychiatric, emotional, and behavioral disorders complicated by medical, social, legal, and developmental issues. CSTC treats the most complicated and challenged kids. Some of the challenges addressed are psychiatric disorders, ADHD, Bipolar, learning disorders, behavior disorders, sexually inappropriate behavior, aggressive behavior, and conditions where there is the potential for self-harm or physical harm to others.

Although it is not the norm, CSTC also treats some kids with autism. Many of the kids have more than one of these challenges. Almost all have demonstrated an increasing display of the potential to be unsafe for themselves and others. This aggressive behavior tends to continue to escalate. Without appropriate training and treatment, it poses a clear and ever present danger.

Children are placed at CSTC through the Children's Long-term Inpatient Program (CLIP). CLIP is the only publicly funded, longer-term inpatient program for youth in Washington State where youth ages 5-17 years old may be voluntarily committed and those from 13-17 years old may be involuntarily committed. CSTC is under the authority of the Behavioral Health Administration (BHA) within the Department of Social and Health Services (DSHS).

CSTC provides a variety of programming and treatments. The psychiatric treatment/therapy program is based on the most current evidence-based practices including, but not limited to:

- Cognitive Behavioral Therapy (CBT)
- Dialectical Behavioral Therapy, and
- Trauma-Focused CBT.

Additionally, CSTC provides life and relationship skills development, family, recreational, and other specialized therapies. Clinical services include psychiatric/medical oversight, medication management, and 24-hour nursing services.

Licensed as a hospital, CSTC welcomes families, guardians, and community supporters to participate in treatment and discharge planning so children can successfully return to their family home or community-based foster placement.

While at CSTC, patients attend school year-round on campus through educational programs offered by the Clover Park School District (CPSD). The hospital counselors work alongside teachers and para-educators to maintain a safe, therapeutic learning environment. CPSD works with families and homeschool districts to make sure the student's transition into their next school is successful following discharge from the hospital.

Patient Release Procedures

The process for release of patients from facilities on the Western State Hospital campus varies by population. See "Appendix 7: Patient Release Procedures" for a description of release procedures for adult patients.

Children at the CSTC are discharged when they meet discharge criteria established as part of their care and treatment. Their discharge placement can range broadly from their family home to a structured group home or other residential setting.

EXISTING INFRASTRUCTURE

This section provides a brief summary of existing services and known constraints that should be addressed in implementing this plan. Systems are further described and proposed solutions addressed in "Utilities & Infrastructure" on page 43.

- **Electrical** service to the WSH campus is provided by Tacoma Power via two feeder connections, fed from separate utility substations, as shown in Figure 26 on page 45.
- **Natural gas** is provided to the Western State Hospital campus by Puget Sound Energy (PSE). There are three feeds to the campus, shown in Figure 26 on page 45. Each building provided with a natural gas connection is individually metered by the utility.
- **Steam Heat**: Boilers in Building 4 provide steam to most of the campus for heating, domestic water, and process loads. Facilities currently served by steam heat are indicated in Figure 26 on page 45.
- **Water Supply**: Western State Hospital currently acts as its own Water District; all of the water supplied to and used by the campus is owned, operated, and maintained by Western State Hospital, from groundwater wells on Fort Steilacoom; see "Figure 26: Utility Services & Opportunities" on page 45.
- **Sanitary Sewer**: The campus sewer system is privately owned and maintained, and discharges to the public sewer system operated by the Town of Steilacoom. The Town's collection system feeds via pump to the Pierce County Wastewater Plant, located along Chambers Creek.
- **Rainwater:** Currently, catch basins flow to a combination of campus retention ponds and the gulch above Garrison Springs.

Goals & Project Needs

DSHS GOALS

As a result of the State's policy directive, a core goal for DSHS is to provide more of the state's services to civil commitment patients through distributed models, both private and state-run. These facilities are projected to be a combination of small Residential Treatment Facilities (RTFs) of 16 or 48 beds per facility. During this master planning process, DSHS initiated a predesign study for up to three of these facilities.

The distributed Residential Treatment Facilities will provide stabilization of individuals in psychiatric crisis or experiencing an episode of acute mental illness. These RTFs provide clinical and therapeutic services to people on a short-stay basis and connect them to the continuum of psychiatric services upon discharge.

The model relieves the pressure on local emergency departments to address the emergent needs of people in distress who require short, focused, person-centered care so that they can re-enter their communities as quickly as possible.

The Residential Treatment Facilities provide care to those individuals who are managing their mental illness but still require the support that a structured residential environment can offer. This type of facility may provide social services in-house, but facilitates its residents' outpatient psychiatric care. By living in a residential setting with a small number of peers, people are able to exercise their coping skills and connect with others in a more manageable group size.

The distributed facilities for civil commitment patients will be coupled with reinvestment in Western State Hospital's campus and facilities, which will continue to serve forensic commitment patients and a limited number of civil commitment patients. This approach recognizes the significant investments that have been made in the current site over the years.

ESTABLISHING HOSPITAL DEMAND

In establishing the demand for services at the hospital, DSHS follows state laws and protocols, including the "bed need model" established by Engrossed Substitute House Bill 1109 (Chapter 415, Laws of 2019). Projections of demand are inherently dynamic and responsive to fluctuations in need as a result of the patient commitment process which includes evaluations, court hearings and other factors.

ESHB 1109 directed that the bed need models incorporate factors such as:

- The capacity in state hospitals as well as contracted facilities which provide similar levels of care
- Referral patterns
- Lengths of stay
- Wait lists
- Other factors (e.g., capacity utilization rates) identified as appropriate for predicting the number of beds needed to meet the demand for civil and forensic state hospital services.

WESTERN STATE HOSPITAL GOALS

The primary goal of the 2020 master plan is to prepare for the investments in new and renovated facilities anticipated by the governor and legislature's policy directives. To support this goal, several objectives have been identified:

1. Establish a planning framework for the entire campus, recognizing the multiple functions accommodated on the site.
2. Identify a site for a hospital facility to serve forensic commitment patients, replacing the existing outmoded facilities.
3. Accommodate a potential 48-bed Residential Treatment Facility to serve civil commitment patients.
4. Accommodate a second new cottage and a treatment/recreation facility for the Child Study and Treatment Center (CSTC).

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FACILITY SITING

The decision to site the new replacement facility on the current campus was made based on several key considerations:

Washington State Demographics

The current State population of 7.67 Million is expected to increase to 8.90 Million by 2040. Over half of the State population resides along the I-5 corridor between Olympia to the South and Everett to the North. The counties with the highest population in Washington are King and Pierce. A 2015 report from the Washington State Institute for Public Policy found that the prevalence rates for mental health conditions in the state are among the highest in the U.S., with 7% of the population meeting the criteria for "serious" mental illness. The WSH Lakewood Campus is located within this population center, close to where patients and their immediate family members live.

Replacement Cost

The State of Washington has made significant investment in WSH facilities, infrastructure and operations over its history. Replacing the property, facilities and programs in-kind would result in costs ranging from $1.76 to $1.83 Billion, including:

- Land value, 80 acres @ $300,000/acre*: $24 million
- Replacement structures, construction cost 1.3 million GSF @ $880/GSF: $1,144 million
- Associated project costs, 25% to 30%: $286-$343 million
- Escalation @ 3.5 %/year for 6 years: $328-$341 million

Qualified Physicians and Staff

The highest concentration of qualified physicians and staff (3,600) in the State needed for the care of the patient population reside in the 1-5 corridor, between Olympia and Everett. They are supported by the highest concentration of education institutions that provide training and certification for mental health professionals.

History

A hospital for individuals with mental illness was established at this location in 1871, 18 years before Washington became a state and 125 years before Lakewood incorporated as a city.

Community Benefit

The operation of the Western State Hospital facilities provides the following benefits to the local community:

5 The WSH Campus has reduced its size over time from a total of 762 acres to 286 acres today, donating over 470 acres to the City of Lakewood and Pierce College for public parks and educational facilities.

6 WSH employs over 2,800 people, most residing in the City of Lakewood and Pierce County.

7 WSH's annual operating budget is $225 million and has a staff payroll that exceeds $14 million per month.

* Based on review of industrially zoned lands in the Pierce County area (Pierce County GIS), and assumes that land could be re-zoned to meet project goals. If appropriate industrial lands could not be secured, other lands could have significantly higher acquisition costs.

PROJECT PROGRAM

The program for projected facilities is summarized in Table 6.

As described above, the new forensic hospital will be the major change on the campus, and a Residential Treatment Facility is included in the allowed project under the master plan, although that facility may be sited elsewhere in the state.

In addition to projects for the hospital under this master plan, Table 6 includes:

- "San Juan Cottage A", in the Child Study and Treatment Center (CSTC). This project has been approved prior to this master plan (permit number BP-0035). Given this prior approval, it is not included in the development totals for this master plan.
- A projected Visitor Center for the Historic Fort Steilacoom Association. This project would be developed by the HFSA, but is included in the plan totals as it is on the WSH campus.

Reduction in Civil Commitment Capacity

In parallel to the development of new facilities for the forensic hospital and in alignment with legislative directives, DSHS is projecting a reduction of 180 beds for civil commitment patients at WSH by April 1, 2023.

This reduction will manage the quantity and type of development on the campus and will be achieved through a combination of renovations and demolitions - see "Renovations" on page 29.

Table 6: Summary of New Program Elements

Program Element	Bed #	Change in GSF
Projects in Development		
CSTC San Juan Cottage A*	***18***	***19,360***
Above figures are counted separately from the program under the master plan.		
Addition to Building 28†	58	40,472
MASTER PLAN PROJECTS		
New Construction		
Renovations to Building 28	-118	0
Building 29: Gymnasium at TRC	-	approx. 5,700‡
CFS: **New Forensic Hospital**	350§	approx. 571,000
Community Residential Treatment Facility	48	60,000
CSTC Cottage	18	18,000
CSTC Treatment/Recreation Facility	0	30,000
CSTC High School - 2 new classrooms	0	2,400
CSTC Admin. & Elementary School	0	16,000
Demolitions¶		
Building 21	-167	-126,574
Others, w/o inpatient beds	n/a	approx. -325,500
WSH projects under master plan, net:	**296**	**approx. +217,630**
Uses on site by others		
Fort Steilacoom Visitor Center	n/a**	4,000

* This project has been submitted for a permit as BP-0035

† This project was submitted prior to the master plan, under separate approval.

‡ Gymnasium/recreation

§ Maximum bed count for this proposed project.

¶ See Table 8 on page 31 for list of buildings projected for demolition.

** This use is not related to Hospital or DSHS operations. It would be developed and operated by the Historic Fort Steilacoom Association.

Figure 14: Campus Framework

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Figure 15: Functional Zones

Guiding Principles

Several high-level principles have informed the planning for the next generation of investments at Western State Hospital.

TRANSFORM THE MODEL OF CARE

Providing a new facility that serves contemporary standards of care is a central consideration in the redevelopment of the campus. Western State Hospital is committed to establishing a forensic service that embodies the recovery model of care. This model is person-centered; care staff and the patient work together, often with the involvement of family, to develop a specific and holistic treatment plan for each individual suffering from mental illness.

In addition to acceptance of medical treatment that can alleviate some of the symptoms of mental illness, the patient is guided through multiple therapies that assist in the acquisition and exercising of coping skills. The path to recovery belongs only to each individual patient.

The hospital's delivery of the recovery model of care can and should, within the constraints of the justice system, lead to the return of the individual to the community with the goal of leading a fulfilling life.

Figure 16: Connecting to Nature

Views of plants, daylight, and fresh air all support a restorative environment.

IMPROVE CAMPUS EFFICIENCIES

In the process of modernizing the approach to behavioral health care at WSH, this master plan seeks to address inherent inefficiencies that have resulted from prior *ad hoc* site development.

Primary functional areas of the overall Western State Hospital campus have been identified as part of this planning process. These are intended to cluster uses with similar needs and issues together in order to enhance security and reduce a sprawling distribution of services.

The areas are shown on Figure 15 on page 24 and provide several benefits:

- Delineation of open space areas along the northern campus edge. These open spaces are of three types:
  - Lands zoned as "Open Space/Recreation" by the City of Lakewood
  - Lands with steep slopes along Garrison Springs
  - Lands that are zoned for Institutional development, but are not proposed for development under this master plan
- Separation of the campus areas serving adult populations - the western and central areas - from the youth-serving facilities at the CSTC area.
- Recognition of the Pioneer Cemetery and historic Fort Steilacoom facilities as unique resources on the WSH campus grounds.

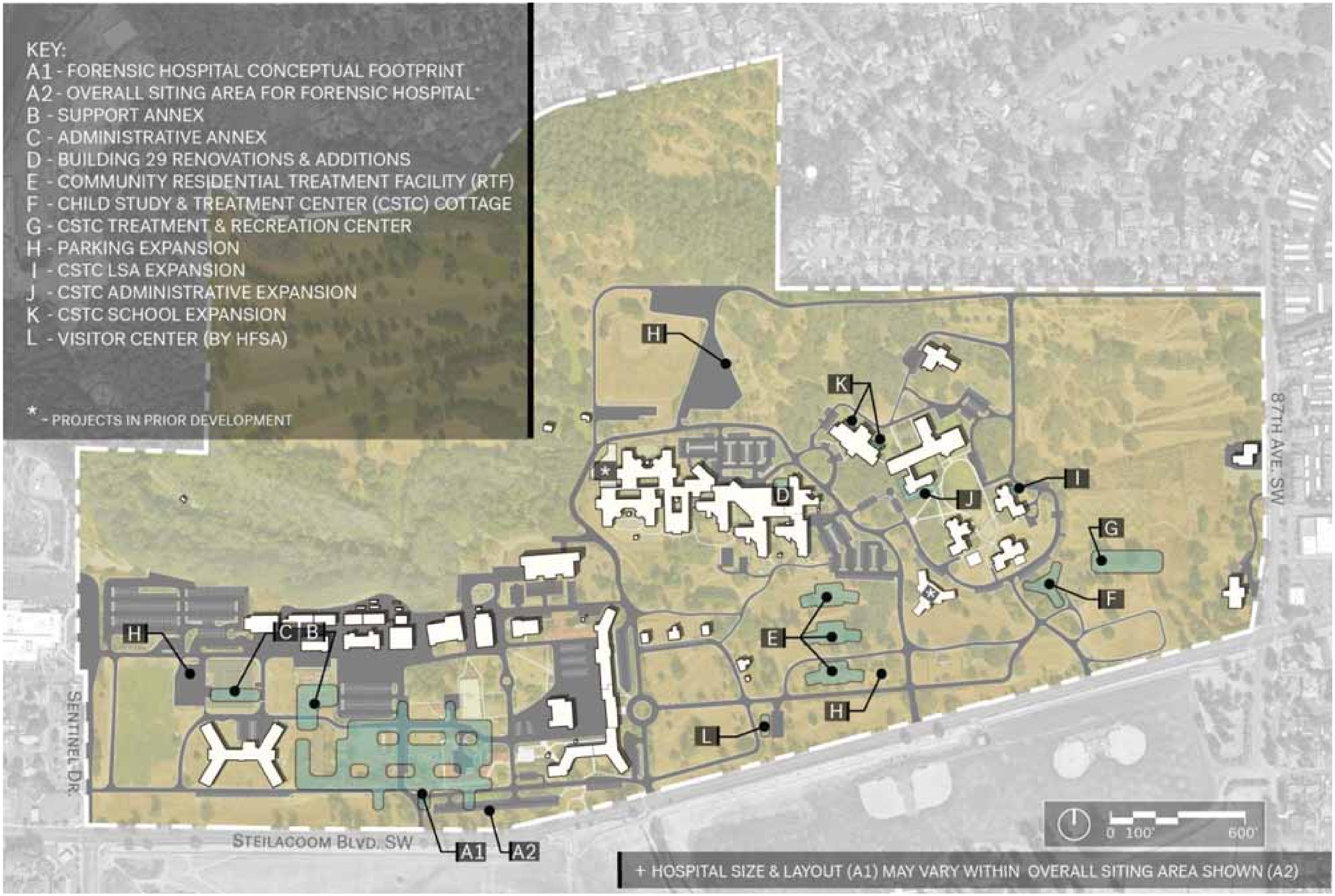

Figure 17: Master Plan Development

In order to modernize the WSH facilities, a combination of new and renovated facilities are projected under this master plan. Development standards for new development are indicated in Table 7 on page 29.

NEW FACILITIES

The largest and most transformative development on the campus will be the development of a new 350-bed forensic hospital in the western campus area. This will be developed to contemporary standards with a focus on treatment over incarceration.

The new forensic hospital will be a free-standing facility in which all residential and treatment services are provided in one building. The new construction will also include administrative and support services.

The newly constructed Patient Support Center will continue to provide nutrition and pharmacy services to this new forensic building as well as other treatment buildings on campus. The new building will be designed in conformance with all applicable Codes and FGI* Guidelines for the Design and Construction of Hospitals. The building and its program will adhere to the CMS† Conditions of Participation.

NEW HOSPITAL AND MODERNIZED CARE

The new hospital building will support WSH's commitment to the recovery model of care. It will be comprised of 25-bed inpatient units that are subdivided into smaller apartments of 8-9 patient bedroom pods, each with their own social spaces. The organization of the units will allow care staff to observe and engage patients in a variety of spaces of differing character.

By creating a greater number of smaller social spaces, patients have more opportunity to choose where to be and with whom they want to socialize, and thus experience a lower social density. This factor of choice - in addition to access to nature, personal privacy and the opportunity to control one's own environment - is proven to reduce the incidence of violence and aggression.

* Facility Guideline Institute, an independent, not-for-profit organization developing guidance for the planning, design, and construction of hospitals and health care facilities.

† Centers for Medicare & Medicaid Services, an agency of the Department of Health and Human Services (HHS)

Figure 18: Courtyards for Daylight & Views

Internal Courtyards of varying scales will allow daylight into core areas, views of nature, and recreational opportunities that meet security requirements.

Within the new forensic hospital, in-patient units are connected by neighborhood zones which offer a multitude of consultation, therapy, and activity spaces that allow patients to emerge from their residential area to join neighboring patients in a different environment. These neighborhoods are where recovery work takes place.

Beyond the comfort of the neighborhood is the downtown which offers the unique real-life places where patients can demonstrate their recently acquired skills for coping with their illnesses and prepare for life in the community. The new facility takes advantage of its building perimeter to enclose outdoor courtyards for patient use. There will be no significant amount of security fence visible from the surrounding public ways.

Figure 19: Massing Approach
Preliminary studies illustrate the design intent, including residential wings that would shape courtyard areas and reduce the scale of the building.

CONFIGURATION ALTERNATIVES

Through this master planning process as well as a pre-design study‡ for the forensic hospital, multiple sites and building configurations have been tested. While the building footprint shown in this plan represents the principles and size of the hospital, the final design may vary from the specific footprint shown.

Consistent with LMC 18A.30.150, "Minor Modifications to Approved Conditional Use Permits," building configurations that are equivalent in program and massing shall be considered as minor modifications to this master plan. With regard to location, the LMC provides that:

> "The minor modifications shall not relocate a building, parking area, street or other use or built feature in such a way that visual, light, noise, vibration or other impacts as experienced from surrounding properties and public rights-of-way are intensified, and shall not reduce any required yard, setback, buffer or open space below the area or dimensions established by code or conditions of CUP approval, whichever is more restrictive;" (18A.30.150.B.)

As the hospital design is finalized, it will adhere to the "Development Standards for New Construction" on page 29 and is expected to fall within the parameters defined above for a minor modification.

POTENTIAL RESIDENTIAL TREATMENT FACILITY (RTF)

In addition to the new forensic hospital, land is identified that would be appropriate for a Residential Treatment Facility to serve civil commitment patients. As described further in "Goals & Project Needs", facilities of this type are to be developed state-wide, and will typically have 16, 32, or 48 beds.

Table 7: Height Limits & Setbacks, New Construction	
Maximum Height of New Construction	up to 5 stories, and less than 100 ft.
Minimum Setbacks from Street Frontages	
Steilacoom Boulevard SW	75 ft.
Sentinel Dr.	100 ft.
87th Avenue SW (no projects proposed along this frontage at this time)	general alignment with existing structures, 45 ft. +/-

DEVELOPMENT STANDARDS FOR NEW CONSTRUCTION

Consistent with the City of Lakewood's Public/Institutional Zoning designation, new facilities developed at the WSH campus will follow provisions of the City of Lakewood's Development Standards (LMC 18A.70.A "Community Design, Landscaping and Tree Preservation, Commercial Uses and Zones"), except where provisions are explicitly overridden by this section of the master plan .

Exceptions to Community Design, Landscaping & Tree Preservation Standards

The following provisions are specific to the WSH aster Plan:

1. Heights and Setbacks for development under this master plan shall comply with "Table 7: Height Limits & Setbacks, New Construction".
2. Development at WSH shall follow the tree preservation goals to the greatest extent feasible while meeting project needs. See "Tree Retention & Protection" on page 39 for objectives specific to this master plan.
3. The design of facilities shall follow contemporary best practices for architectural design, scale and composition, including place-making, sustainable design and daylighting. This approach is in lieu of prescriptive requirements of 18A.70.040.2.

RENOVATIONS

Two existing facilities at the East Campus - **Buildings 28 and 29** - are proposed for significant renovation. Building 28 is operated under the Center for Forensic Services, while Building 29 houses both forensic and civil commitment patients. Together, these two buildings provide patient wards, treatment malls, and a clinic. The renovations are primarily to better serve patients found to be not guilty by reason of insanity (NGRI), as well as patients with special needs and security requirements.

Renovations to Buildings 17, 19 and 20 will convert residential wards to other uses, to manage overall site capacity and address unmet needs for staff support, storage and similar uses

Additionally, minor renovations to portions of the Administration Building are expected, to serve administrative functions of the hospital. These will not result in a change of use for the facility and are likely to be phased.

‡ The pre-design study is available on the DSHS website: www.dshs.wa.gov/sites/default/files/FFA/capital/Projects/2020_0821_WSH Predesign Report_reduced.pdf

Figure 20: Anticipated Building & Parking Demolitions

DEMOLITIONS

Several outmoded facilities are proposed for demolition, both to clear land for the new facilities and to address deferred maintenance on older facilities of marginal useful value. These are indicated in Figure 20 on page 30 and summarized in Table 8 on page 31.

DOCUMENTATION OF LISTED STRUCTURES

The Cultural Resources Assessment considers four generally distinct eras as part of the historic assessment:

- Aboriginal — pre-historic to ongoing
- Exploration and settlement — 1830s to 1849
- Fort Steilacoom — 1849 to 1868
- Western State Hospital — 1871 to 1961

The National Register of Historic Places (NRHP) listing for the Fort Steilacoom Historic District identifies as "primary resources" the extant structures from the fort era - the four cottages on the parade grounds - and two buildings from the 19th Century associated with the early hospital era - the Morgue and Bakery.

The four cottages at the parade grounds are maintained under this master plan, as is the Settlers' Cemetery and the parade grounds landscape. The bakery and morgue will be demolished.

Several structures that are proposed for demolition in this master plan are listed in the NRHP listing as secondary resources, and are identified as "Contributing" to the Hospital era in the Cultural Landscape Assessment. These secondary resources include (see Figure 11 and Figure 12):

- The last extant cottage, remaining from of a row of five 1930s-era cottages to the east of Officer's Row
- "Powerhouse, Heating Plant and Utility Structure" (Building 4)
- "South Hall and Wards D, E, F, G, and W-I" (1940's)
- "Nurses' Dormitory and Geriatrics Building" (1945)

As described elsewhere, site structures that may be removed in whole or in part include the rock wall along Steilacoom Blvd. and the pedestrian tunnel under that roadway.

Mindful of the *Secretary of the Interior's Standards for the Treatment of Historic Properties*, DSHS will take appropriate action prior to demolition of any of these structures.

Table 8: Facility Status under Master Plan

#	Facility Name/Function	Area
New Construction		(estimated)*
-	Forensic Hospital	571,000
-	Residential Treatment Facility (48-bed)	60,000
-	Future Cottage (CSTC)	18,000
-	Gymnasium Addition at TRC, Bldg. 29	5,700
-	CSTC Treatment/Recreation	30,000
-	CSTC Admin. & Elem. School Addition	16,000
-	CSTC High School, 2 Classroom Add.	2,400
-	CSTC Ketron Addition	1,300
-	*Historic Fort Visitor Center*†	*4,000*
	Total New Construction	= 704,400
Demolition		
9	Staff Offices	96,121
10	Training Center/Carpentry	41,227
11	Commissary	22,350
12	CMO Storage	1,560
13	Pharmacy & Central Services	15,235
14a	Bakery	880
14b	Morgue	1,516
15	Green House	1,826
16a	Main Kitchen & HMH Java Site	33,275
21	Patient Wards	126,574
23	Chapel	7,492
24	Health/Financial Services	11,149
25	Legal Services	15,555
26	not in use	75,644
30 & 31	Connex Containers	(2x160) = 320
44	Cottage	1,350
	Total Demolitions	= 452,074

* New Construction areas are based on preliminary facility planning.
† The Fort Visitor Center is a non-hospital facility, to be operated by others.

OPERATIONAL CHARACTERISTICS DESCRIPTION

As noted in "Planning Regulatory Context" on page 5, a description of the WSH facilities' operational characteristics is required for approval by the City of Lakewood. The following are the criteria to be addressed in that description, with notes on the criterion and references to other sections with relevant information.

1 Description of proposed use/project application.
   - Modernization of WSH facilities through a combination of building replacements and renovations, addressing facility conditions and changes in behavioral health care practices.
   - The largest project will be a new 350-bed forensic hospital on the western area of the current WSH campus. See "Figure 17: Master Plan Development" on page 26.
   - Space for a 48-bed community residential treatment facility is reserved. The State is identifying sites for these facilities, to be distributed around the state, where patients can have access to family and other community support.
   - A new 18-bed residential cottage or the Child Study and Treatment Center (CSTC).
   - A new treatment/recreation center for CSTC.
   - Land is identified for a potential Visitor Center for the Historic Fort Steilacoom Association.
   - A full description of the project elements can be found in the section "History" on page 21.

2 Extent and type of proposed improvements to the site and/or interior or exterior building remodeling to existing building(s) (i.e. additions to buildings, interior building improvements or alterations, landscaping, proposed signs, additional parking spaces, etc.).
   - Refer to "Table 8: Facility Status under Master Plan" on page 31, "Figure 17: Master Plan Development" on page 26, and "Figure 20: Anticipated Building & Parking Demolitions" on page 30.

3 Proposed number of full and part-time employees.
   - Current staffing is 2,800 full-time equivalents (FTE) across multiple shifts. At build-out, staffing is projected to be up to 3,035 (3,155 with an RTF) with 2,700 FTE on site at any given time; see question 5.

4 Proposed number of students on the site at any one time if application is for a day care or educational facility.
   - Not applicable

5 Maximum numbers of employees on the site at any one time.

Staffing of the hospital varies by shift, as indicated below. Also, staffing levels can fluctuate based on services and the needs of patients. These figures are estimates based on the bed counts indicated in the program, which exceeds the current census. Maximum staff on site at one time would be periods of about 1 hour when the day and swing shifts would overlap, for a total of 2,695.

Shift	Staff FTE (Hospital + CSTC)	Potential RTF
Day	2,040	80
Swing	655	25
Night	340	15

6 Proposed hours, days, place and manner of operation.
   - The facilities on the WSH campus operate continuously, with services to residential patients. This pattern is in alignment with existing operations on the site.

7 Type of products or services proposed to be available on the site.
   - The services of the site are behavioral health care treatment and related services.

8 Number of commercial vehicles proposed to be parked or stored on the site.

Currently, there are approximately 150 commercial or fleet vehicles on the campus, and future numbers are expected to fluctuate around that figure by +/- 10%. They are of several types:
   - Maintenance vehicles (currently 82)
   - Vehicles assigned to on-site departments (currently 45)
   - Motor pool vehicles for regional use by staff (currently 19)

9 Traffic (vehicular trips to and from site per day) generated by the use, including deliveries and client-related trips (i.e. any proposed shipping and receiving activities, projected employee trip generation, projected customer trip generation).
   - See "Vehicular access & circulation" on page 35.

10 Total square footage of the floor area of the tenant space.

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- There are no significant tenant spaces on the campus. Some administrative offices are used by the Courts and the Historic Fort Steilacoom Association. No change in this current use is proposed under this plan.

11 Proposed type of equipment/machinery to be used by the business or stored on site (i.e., office equipment, manufacturing equipment, construction equipment).

- General maintenance equipment for landscape and facilities maintenance is currently used. No significant change in these operations are anticipated.

12 Proposed use of outdoor space on lot (i.e., outdoor storage, outdoor display and sales of merchandise, parking/open space, recreation space).

- As part of the treatment process, future facilities are expected to have courtyards for patients to recreate and socialize outdoors. These will most likely be fully or partially enclosed by contiguous buildings, as appropriate for treatment and security needs.
- Existing recreation uses such as the play field at the CSTC facility are to remain and may have minor improvements.
- The intent of the master plan is to welcome the general public onto areas of interest on the campus grounds, including the Fort Steilacoom area and the former golf course - working with the City, the County, and others as new uses for that site are proposed.

13 If more than one tenant on the site, provide the square footage of each tenant space, business names of tenants, and type of business.

- Western State Hospital's facilities are the primary use of the site.
- The Historic Fort Steilacoom Association maintains a cluster of historic cottages on the site.
- Oakridge Community Facility operates under a ground lease with the Department of Children, Youth, and Families.
- West Pierce Fire & Rescue operates a fire station on the eastern end of the property.
- Facilities for all of these uses are identified in Table 4 on page 15.

14 Previous use of property.

- Fort Steilacoom was the first Euro-American use of the site and some buildings are extant from that era.
- The hospital has been on the site since the 19th Century, although its facilities and site uses have changed over time.
- See "Hospital History" on page 3 for more detail.

15 Existing number of parking spaces.

- Existing and proposed parking is detailed in Table 10 on page 37.

16 Surrounding uses and businesses next to proposed business/project site.

- Surrounding uses are noted in Figure 6 on page 6.
- Specific adjacent businesses and institutions include:
  - Oakridge Community Facility (on WSH lands, but independently operated).
  - Steilacoom High School, located across Sentinel Drive to the west.
  - Pierce College at Fort Steilacoom, south of Steilacoom Boulevard.
  - Fort Steilacoom Park - south of Steilacoom Boulevard.
  - Oakbrook neighborhood - north of the site.

17 Operational characteristics or functions that create emission of gases, dust, odors, vibration, electrical interference, smoke, noise, air pollution, light, glare, odor or dust in a manner likely to cause offense or irritation to neighboring residents.

- There are no industrial processes on the site that would contribute to these types of impacts.
- Over the long-term, it is expected that energy loads will be shifted to electrical rather than boiler-based heating and cooling, reducing carbon emissions.

18 Site and building design features that minimize land use impacts, such as traffic, aesthetics, etc. or environmental impacts such as noise, vibration, dust or air pollution, glare, odor and dust, etc.

- The scale of new construction will be similar to the scale of existing facilities on the site, with landscaped setbacks from the campus edges.
- Parking is generally away from the campus edges, limiting the potential for glare from parked cars.
- Supporting facilities and service areas are internal to the site, away from campus edges, reducing incidental noise impacts off site.

19 Storage, distribution, production and/or operations that involve the use of toxic or flammable materials.

- Materials used on campus include typical housekeeping cleaning and maintenance supplies and fuel for emergency generators.

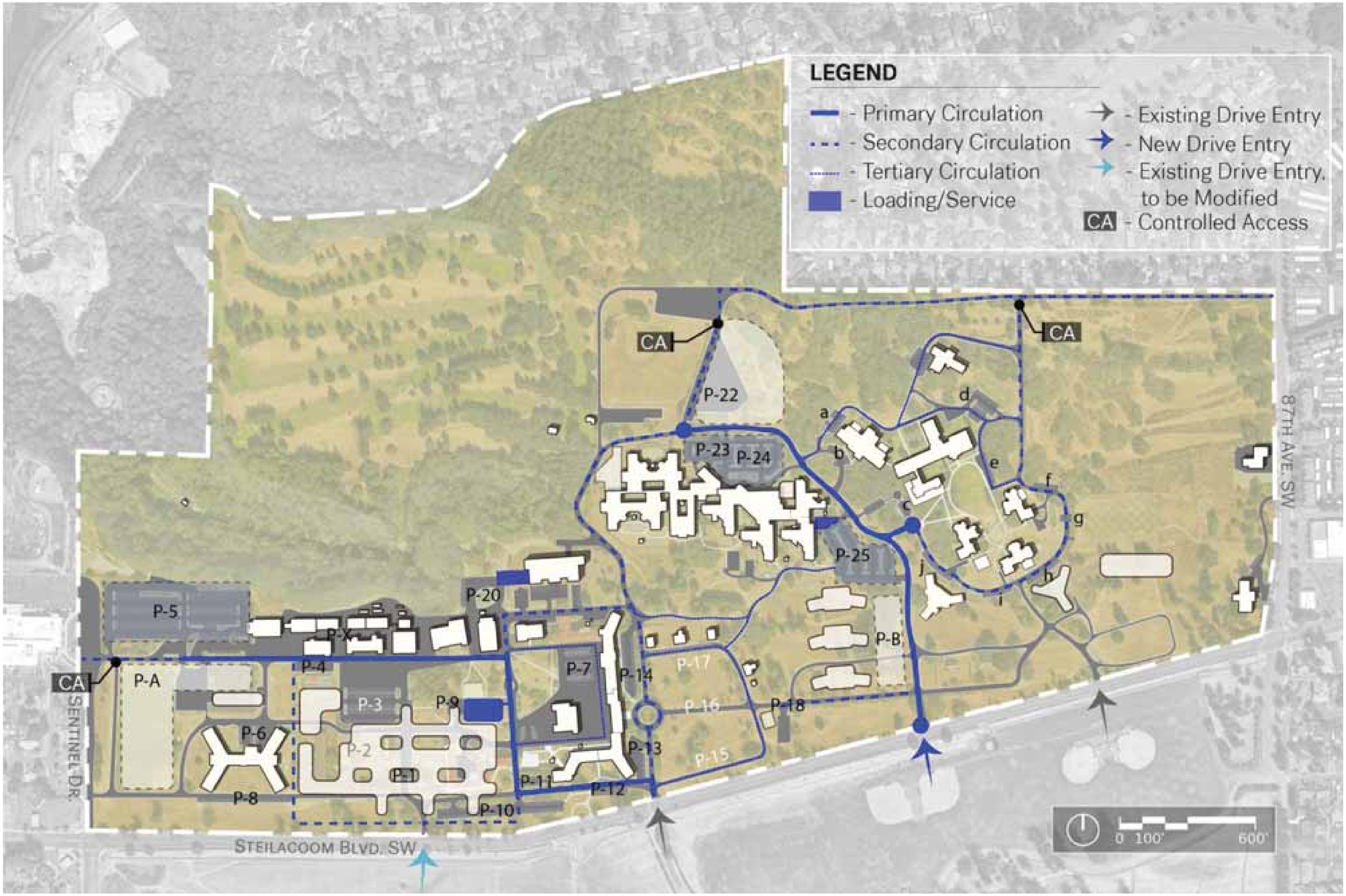

Figure 21: Circulation & Parking

MODES OF TRAVEL TO WESTERN STATE HOSPITAL

The majority of staff and visitors to Western State Hospital currently arrive by private vehicle. WSH participates in the State's Commute Trip Reduction (CTR) program, providing information on commute options to all new hires and various forms of outreach to build awareness of the program.

Alternatives to drive-alone travel include:

- Public transit service: **Pierce Transit** operates regularly scheduled buses, as well as van-pool support and para-transit services. Route 212 serves the site, with stops along Steilacoom Boulevard, and service west to the Steilacoom ferry landing and east to the Lakewood Transit Center.

  Transfers at Lakewood provide connections to the rest of Pierce Transit's service area, including Tacoma, Gig Harbor, and Puyallup.

  Approximately 900 employees receive an employer purchased transit pass for Pierce Transit, while 2,023 receive an ORCA pass, for use on the larger regional transit network.
- Carpooling: WSH provides ride-matching services - both internal and regional - as well as dedicated carpool parking based on demand (see "Table 10: Parking Inventory" on page 37).
- Bicycle and pedestrian network: While the bicycling network around the WSH campus is incomplete, there are paths that would serve local trips well. A trail system in Fort Steilacoom Park - including a multi-use path paralleling Steilacoom Blvd. - help connect the campus to Steilacoom and central Lakewood.

  Pierce Transit provides bike racks on all of their buses, providing support for blended bus/bike commuting for longer commutes.

Other programs in place to support commute trip reduction include:

- An internal circulator system for internal campus trips
- A guaranteed ride home program, to support carpool riders who may need to work late or leave early for unscheduled circumstances

VEHICULAR ACCESS & CIRCULATION

The projected traffic volumes are expected to decline as a result of the master plan, as summarized in Table 9 on page 36. These are based on the projected bed counts described in the program.

This master plan proposes several improvements to the vehicular circulation system, to address the following objectives:

- Relocation of vehicular entries to reduce congestion risk on Steilacoom Boulevard.

  Moving the eastern Steilacoom Blvd. entry westward will increase separation from the intersection at 87th Av. SW and help separate CSTC-bound trips from those accessing the adult forensic facilities to the west.
- Simplification of the on-site circulation system, to improve way-finding and reduce internal traffic and taking advantage of changes in the campus security system, *i.e.*, with main routes not needing to enter secured areas to cross the site.
- Collaborate with the Historic Fort Steilacoom Association on removal of roads and parking within the core Fort area, east of the main Administration Building.

Steilacoom Boulevard Projects and WSH Access

In preparation of this plan, the City of Lakewood has shared its plans to improve Steilacoom Boulevard. The initial phase, including the WSH frontage has been funded and the plans are being finalized. DSHS and WSH will coordinate with the City to refine the plans to address the revisions to the site access, with the goal of doing all required work on the frontage in one iteration.

VEHICULAR PARKING

Table 10 summarizes both existing and planned parking areas. Lots that will be removed to accommodate planned development will be offset with new spaces.

Currently, most of the staff parking demand is accommodated in parking lots, but there is also a significant amount of informal parking on lawn areas. An objective of this plan is to provide parking that is well distributed

Table 9: Projected Trips & Change from Existing Conditions*

	Projected	Change from Existing
Average Daily Trips	5,709	-5%
AM trips, 6:30 - 7:30	782	-5%
AM trips, 7:00 - 8:00	639	-5%
PM trips, 2:15 - 3:15	721	-5%
PM trips, 4:00 - 5:00	345	-5%

* Per TSI, Traffic Impact Analysis Amendment Memo, WSH Master Plan, July 31, 2020, Tables 2 & 3. See Appendix 3B

and will meet the needs of staff and visitors. Parking will be provided in lots developed to City of Lakewood standards and near facilities with significant staffing.

- In addition to the existing lot on the west campus, a new lot will be built north of the new forensic hospital.
- A lot will be provided adjacent to the potential residential treatment facility.

As shown in Table 10 on page 37, parking capacity is projected to exceed the maximum parking counts listed in the Lakewood Zoning Code (18A.80.030,F "Parking Standards Table"*). As identified in the Zoning Code, a hospital has a minimum of ½ parking space per bed and a maximum of 1 space/bed.

The reason for the space count shown in Table 10 is related to operational factors. Staff of an incoming shift overlap their time on-site with the prior shift that is ending. This facilitates staff communication and provides continuity of patient care. The maximum space count indicated in the LMC would serve the largest shift, but it does not provide for this period of overlap. This has been a contributing factor to the past practice of staff parking in areas not designated for parking.

* Per LMC 18A.80.030.D., the Parking Standards Table applies to Commercial, Office and Industrial uses. The table has been used as a guideline for this planning study.

SERVICE & LOADING

Service access to the site will be accommodated at the main entries from Steilacoom Boulevard, as well as a service entry from Sentinel Drive to the west. Distribution facilities and loading areas for primary facilities are indicated in the circulation diagram, Figure 21 on page 34.

PATHS & PEDESTRIAN CIRCULATION

Currently, the WSH campus has some dedicated pedestrian paths between major facilities. Many pedestrians also choose to walk along the roadways on the site. Given the numerous building access points within the central quadrangle of the campus, pedestrian circulation within this area connects to the larger campus system at limited points.

With the change in service model and security approach (see "Site Security" on page 41), there will be opportunities to develop a more deliberate path system. The WSH master plan proposes a path network to connect major facilities while reducing the potential for pedestrian/vehicular conflict along primary roadways.

Pedestrian Tunnel, Steilacoom Boulevard

The pedestrian tunnel that crosses under Steilacoom Boulevard was built in approximately 1916 and served to connect the southern Fort lands and the hospital area once the road was built. It is in right-of-way but has had significant investment by DSHS in the 2000s.

It is proposed that DSHS and the City coordinate on its management and jointly determine if it will continue to have value through the upcoming improvements to Steilacoom Boulevard. If a decision is made to remove the tunnel, it will be documented as appropriate for contributing historic resources. If the tunnel is left in place, DSHS and the City will seek a maintenance agreement that clarifies their respective roles and responsibilities.

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Table 10: Parking Inventory

Area	Tag*	General	ADA	Fleet	Spaces		Status Under Master Plan	Net
					2020†	Future		
EXISTING PARKING LOTS								
Hosp	P-1	39	2	0	41	0	Demo	-41
Hosp	P-2	29	2	0	31	0	Demo	-31
Hosp	P-3	116	6	0	123	123	Modify	0
Hosp	P-4	15	1	16	32	32	Maintain	0
Hosp	P-5	350	3	0	355	355	Maintain	0
Hosp	P-6	12	2	0	16	16	Maintain	0
Hosp	P-7	68	2	3	73	73	Maintain	0
Hosp	P-8	22	0	0	22	22	Maintain	0
Hosp	P-9	5	0	0	0	0	Demo	-5
Hosp	P-10	93	2	0	99	99	Modify	0
Hosp	P-11	7	4	2	15	15	Modify	0
Hosp	P-12	5	8	1	16	16	Maintain	0
Hosp	P-13	11	4	3	21	21	Maintain	0
Hosp	P-14	22	6	10	41	41	Maintain	0
Hosp	P-15	25	0	0	25	0	Demo	-25
Hosp	P-16	17	0	0	17	0	Demo	-17
Hosp	P-17	39	0	0	39	0	Demo	-39
Hosp	P-18	26	0	0	26	26	Maintain	0
Hosp	P-22	175	0	0	175	220	Expand, pave	45
Hosp	P-23	34	0	9	43	43	Maintain	0
Hosp	P-24	65	23	13	108	108	Maintain	0
Hosp	P-25	118	6	0	126	126	Maintain	0
SVC	P-X	0	0	150	150	150	Maintain	0
CSTC	a	19	1	0	20	20	Maintain	0
CSTC	b	8	1	0	9	9	Maintain	0
CSTC	c	19	1	0	20	20	Maintain	0
CSTC	d	41	0	0	41	41	Maintain	0
CSTC	e	10	2	0	12	12	Maintain	0
CSTC	f	11	1	0	12	12	Maintain	0
CSTC	g	6	0	0	6	6	Maintain	0
CSTC	h	18	0	0	18	18	Maintain	0
CSTC	i	6	1	0	7	7	Maintain	0
CSTC	j	18	1	2	21	21	Maintain	0
NEW PARKING LOTS								
Hosp	P-A	-	tbd	-	n/a	400	New	400
RTF	P-B	-	tbd	-	n/a	160	New	160
TOTALS								
-	-	**1,442**	80	168	1,598	**2,045**	-	**447**

* Parking lots are shown in Figure 21 on page 34

† 2020 Total includes "General", ADA & Fleet spaces - as listed - as well as Carpool, electric vehicle charging and short-term visitor spaces not itemized here.

Figure 22: Parking Shifts

This plan seeks to remove parking from the Fort Steilacoom parade grounds and lawn areas, adding parking near major facilities.

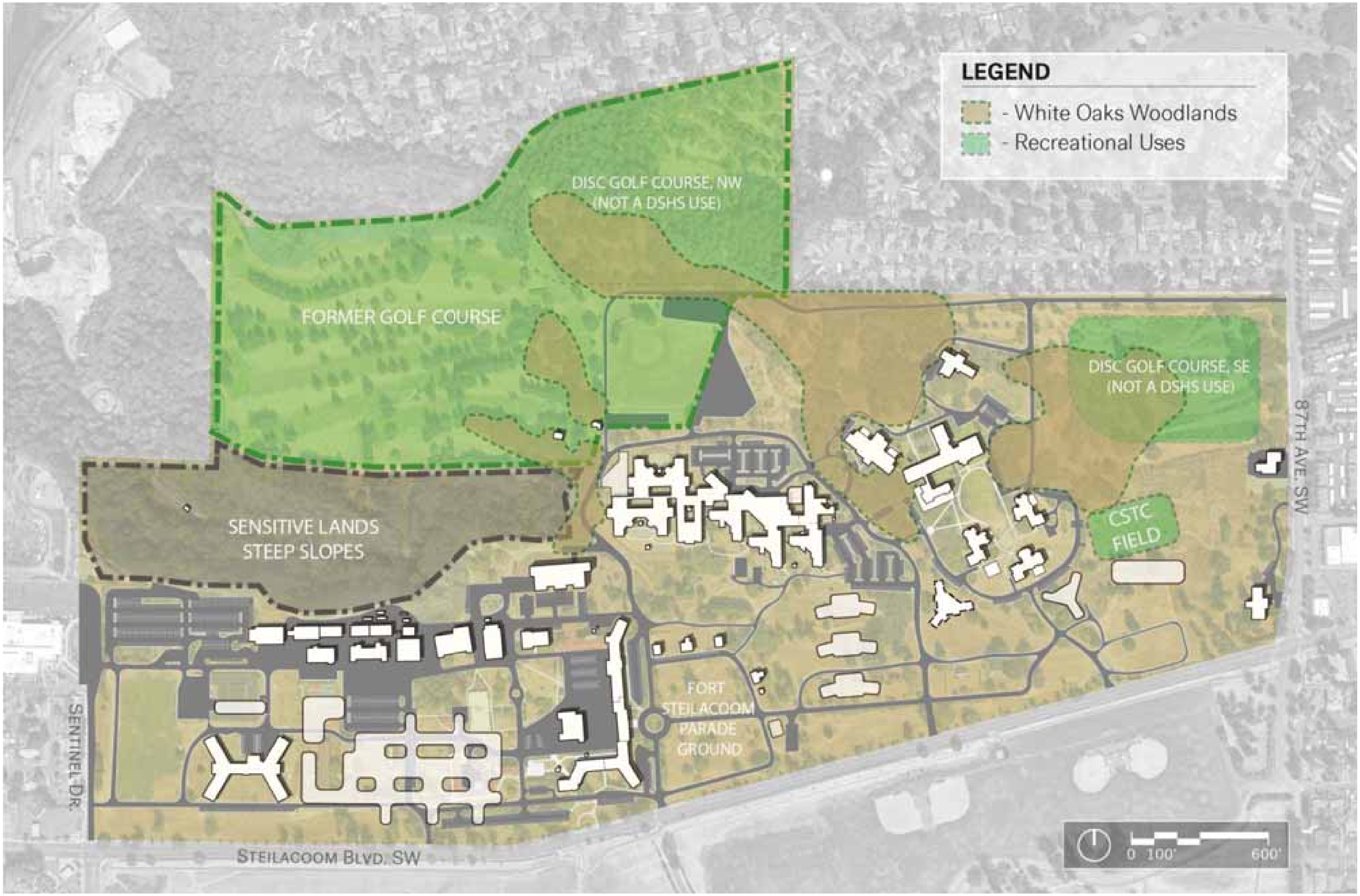

Figure 23: Landscape & Open Spaces

RECREATIONAL USES

The former golf course is zoned by the City of Lakewood as Open Space and Recreation, Type 1 (OSR1). This category is intended for passive recreation and limits any development to uses that are accessory to recreation. This area has historically been accessible to the public and this master plan does not propose to alter that.

Other areas on the site are used for recreation, either by patients of WSH or by others. For example, the CSTC facility includes a playfield to the east of the building complex for use by patients of the facility. In recent years, a disc golf course has been established by a local club on hospital property; DSHS seeks to formalize that use with a new lease of the former golf course.

OPEN SPACE & TREATMENT

Managed open space supports treatment practices. Outdoor walks and recreation for patients provide many wellness benefits. The campus grounds are at times utilized for supervised walks.

While specific design is yet to be developed, the new forensic hospital will include courtyards and other appropriate open areas for patient activities. These will allow regular access to outdoor areas by patients.

HISTORICAL LANDSCAPE ELEMENTS

The WSH site has a unique character that reflects the pre-settlement period, historic site development, and current development. There are large groves of Oregon White Oaks and individual Oregon White Oaks spread across the site that have been growing since pre-settlement times. There are also many large Douglas-fir trees across the site that are second growth trees, the old growth Douglas-firs would have been logged at the time of settlement. The old-growth oaks still exist because there was not a market for their wood. There are also many native Madrone trees growing across the site. The Madrone trees are faster growing and shorter lived that the Oaks and Firs and the oldest would be around 100 years old.

With the development of the site rows of trees were planted along roads and hedges were planted between sites to delineate and organize spaces.

This combination of existing old growth trees and the rows of street trees and hedges significantly contribute to the unique character of the site.

Some elements of the landscape have been identified in the Cultural Landscape Assessment report as contributing to the historic character of the Fort Steilacoom Historic District. The primary elements of concern are:

- The former settler cemetery
- The parade grounds east of Circle Drive and partially enclosed by the Fort-era cottages.

These facilities are not impacted by proposed projects under this master plan. DSHS and WSH will continue to collaborate with the Historic Fort Steilacoom Association on measures to protect and restore the parade grounds, in relation to that organization's preservation and interpretation mission.

Steilacoom Boulevard Frontage: Rock Wall & Pedestrian Tunnel

The rock wall that lines the site north of Steilacoom Boulevard may be removed, in whole or in part to accommodate new access points, support street improvements, and achieve other project goals. The wall will be documented appropriately prior to its demolition. Additionally, the tunnel under Steilacoom Boulevard may be removed as part of improvements to that corridor.

SENSITIVE LANDS

The ravine between the existing hospital and the former golf course has steep slopes and supports the Garrison Springs fish hatchery. No development is proposed in these areas.

TREE RETENTION & PROTECTION

The new forensic hospital has been sited in a previously developed area of the site, significantly reducing the potentiality impact on trees relative to other areas studied.

The identified oak tree stands on the site are indicated in Figure 23 on page 38. Facilities anticipated in this master plan have been sited to reduce impacts on the oaks to the greatest extent possible. Impacts on the mature oaks can be further reduced in implementation of the plan:

Open Space & Landscape (continued)

- As site-specific designs are prepared, care should be taken to avoid development of hardscapes and building footprints under the drip line of the oaks.
- Irrigation plans for future landscaped areas near the oak stands should avoid over-watering of the root zone.

The Western State Hospital site has significant groves of large existing trees, many of them are older than the 19th century settlement of the site. These significant trees contribute to the character of the site and to the City of Lakewood and are subject to the City of Lakewood Municipal Code 18A.50.320 'Significant Tree Preservation'.

The Lakewood Municipal Code (LMC) considers any Quercus garryana (Oregon White Oak) over 6 inch diameter (measured at 4.5' above ground) and any conifers or other deciduous tree species over 9 inch diameter to be 'Significant Trees' that are protected under the LMC.

During construction, all significant trees are to be protected by approved tree fencing located at the drip-line of the trees. There is to be no disturbance to the soil within the tree drip-line or materials store within the drip-line.

A tree retention plan locating all significant trees by species, caliper of each tree, and all tree drip-lines accurately located is required for project permitting. Any significant trees to be removed will need to be replaced according to a formula provided in the Code.

Western State Hospital is dedicated to fostering an environment of safety and security for its patients, staff, and neighboring communities. In recent years, WSH has sought to strengthen its partnerships with the Lakewood Police Department and the Steilacoom Police Department to include joint exercises.

ADULT FORENSIC FACILITIES

Forensic patients will be housed in the new forensic hospital and the existing facilities in Buildings 28 and 29. The existing facilities will house patients found not guilty by reason of insanity (NGRI). All facilities for forensic patients are secured at the building perimeter with controlled locked perimeter doors, with vestibules and internal compartmentalization of sub-areas.

The proposed new forensic hospital will include modern security features, integrated with the approach to patient care. Modern design principles for psychiatric facilities include using aesthetically-pleasing walls and courtyards rather than fences, and inclusion of design features into the walls, making them more difficult to scale.

In addition to their security benefits, these design principles also help create more therapeutic facilities that are inviting, aesthetically appealing, and safe. Features like open, well-lit spaces will allow in daylight while using window features that are resistant to breakage.

In addition, the new facility will use key cards and magnetic locks. Key cards and the magnetic locks themselves may be deactivated should a key card become lost or unaccounted for, or if isolation of an area is required. Key cards also allow staff to move swiftly through doors to respond more quickly when needed.

The new facility will offer patients all of their treatment, services, and living arrangements in one facility so there will be minimal need for patients to be escorted across the campus. When patient transport is required, it will be managed with vehicle sallyports, as will deliveries.

The forensic hospital's built-in security features, along with significant security improvements at WSH in general over the past four years - such as fencing, windows, and additional cameras - will result in significantly lower risks of any escapes or unauthorized leaves from the new hospital.

CHILD STUDY & TREATMENT CENTER (CSTC)

As described in the section “Patient Populations & Care Approach” on page 18, the CSTC is a licensed hospital providing culturally competent care to children and youth with severe psychiatric, emotional, and behavioral disorders complicated by medical, social, legal, and developmental issues. CSTC includes families, guardians, and community supporters as participants in the treatment and discharge planning of patients.

CSTC is a locked 24/7 facility which provides a secure placement for patients. The CSTC portion of the WSH campus is not fenced, but the grounds are observed via electronic and general observation.

Staff members are well-trained in the areas of safety and security. Security checks are completed by staff members every 30 minutes to ensure that there have been no elopements. CSTC patients do not have independent grounds privileges and are constantly monitored while on the grounds.

Community outings take place with appropriate staff to patient ratios and contingency plans. Patients' behavior and community readiness are assessed before each outing into the community. Staff members are trained to observe for signs of behavioral escalation and intervene when necessary, both verbally and physically as a last resort.

CSTC utilizes Western State Hospital Security when necessary.

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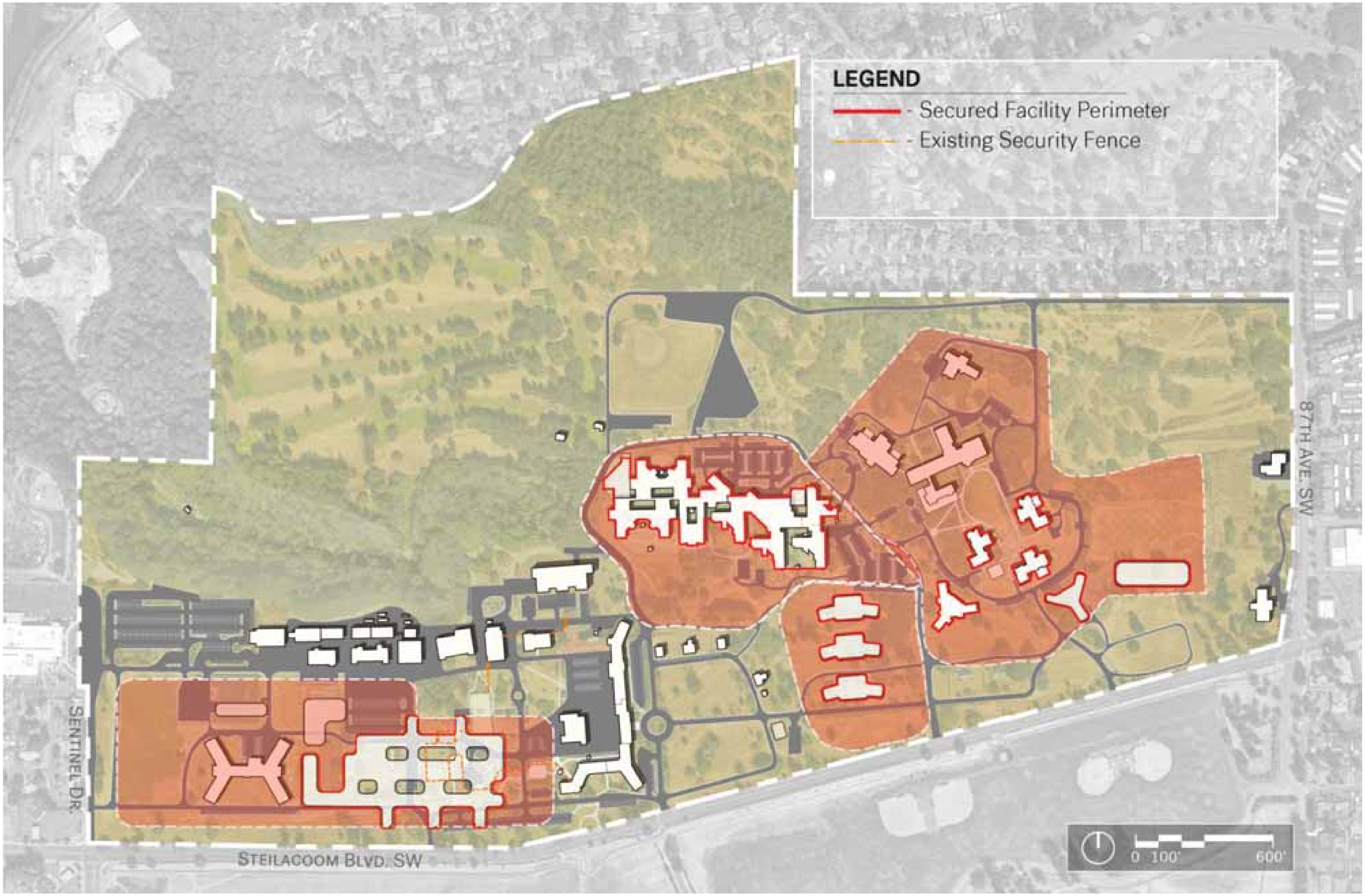

Figure 24: Site Security Approach

ENERGY SYSTEMS

Facilities built under this master plan are required to comply with the state's Net Zero Policy (see sidebar). The core requirement is that facilities be "net zero capable" for energy use. It is recommended that DSHS further explore strategies to migrate from gas-fired steam for thermal conditioning, and factor this transition into projections of gas and electrical demand.

ELECTRICAL SERVICE

Electrical service to the WSH campus is provided by Tacoma Power. The existing campus distribution system has two (12.47kV) feeder connections, fed from separate utility substations, as shown in Figure 26 on page 45.

Capacity

Each substation has a nominal capacity of 8MW with a short term thermal rating of 16MW. The conductors that feed that campus have a nominal rating of 4MW each. Tacoma Power has indicated that up to 1 MW of additional demand could be accommodated on each feeder, but that loads in excess of that would require a detailed study of the system*.

A 2018 Campus Essential Electrical Systems assessment of the on-site DSHS distribution system indicated that a substantial portion of the campus essential electrical system is at the end of its useful life. The report recommends replacement of existing equipment to maintain operational redundancies including life safety systems.

Future Demand

With development under this plan - and assuming a similar blend of gas/electrical fuel split as the campus currently uses - campus electrical use is projected to grow by 55%, with an estimated additional 1 to 2 MW of load on the Tacoma Power grid. There are no infrastructure upgrade projects currently planned for the two substations.

Therefore, if the campus growth does increase demand by more than the 1-2MW preliminary estimate, a new switch and/or new feeder at one or both of the utility substations may be required. Additionally, campus electrical upgrades and modification would likely be required downstream of the utility meter to support future growth. Future campus growth and redevelopment should integrate the 2018 report recommendations.

* The system study would require a fee to be paid by Western State Hospital.

STEAM DISTRIBUTION & THERMAL CONDITIONING

The boilers in Building 4 - fueled by natural gas - provide steam to most of the campus for heating, domestic hot water, and process loads. Facilities served are indicated in Figure 26. Given the age of the steam system, the State's Net Zero policy, and limits on the gas feed to the boiler room (see below), this master plan assumes that future buildings will not utilize the central steam plant.

In the long-term, DSHS seeks to migrate all facilities from the steam boiler facility and retire it. It is recommended that strategies such as ground-source heat pumps ("geo-exchange") be studied as part of that overall campus conversion. At this time, there is not a specific schedule for doing that.

NATURAL GAS

Puget Sound Energy (PSE) is the natural gas supplier to the WSH campus.

System & Capacity

Three gas feeds serve the campus, shown in Figure 26 on page 45. Their current capacities are:

1 A high-pressure (>60psig) service from Sentinel Drive SW to the campus steam system boilers in Building #4. The current demand on this feed is around 37 Therm/hour. This high-pressure line is at capacity and PSE recommends reducing demand on the line.

Depending on how DSHS approaches the State's Net Zero Policy, the demand on the campus steam system and therefore on this feeder line can be reduced significantly.

Washington's Net Zero Policy

Executive Order 18-01, signed by Governor Inslee, requires that facilities be developed as net zero capable, and that renewable energy sources to achieve net zero should be developed when feasible. The order applies to state-owned facilities including new construction or major renovations at WSH.

"...all newly-constructed state-owned (including lease-purchase) buildings shall be designed to be zero energy or zero energy-capable and include consideration of net-embodied carbon. In unique situation where a cost effective zero-energy building is not yet technically feasible, building shall be designed to exceed the current state building code for energy efficiency to the greatest extent possible."

Meeting this goal at WSH will require investment in sources of thermal and electrical energy from non—fossil fuel sources. Examples of sources include:

Thermal Demand *(i.e.*, space heating & cooling, domestic hot water heating):

- Solar thermal
- Bio fuels

Electrical demand:

- On-site solar photovoltaic or wind generation
- Grid-based solar and wind production

A primary strategy for meeting net zero goals is migration from gas-fired equipment to electrical equipment, when performance and efficiencies can be achieved. Examples of High-Efficient Electric Based Thermal/Domestic Systems are: heat recovery chillers, thermal storage, ground source heat pumps, water-to-water heat pumps

Therefore, a result of meeting the net zero policy mandate over time could be an increase in electrical demand. It is recommended that DSHS develop scenarios to meet the Net Zero policy at WSH in conjunction with providing future demand to Tacoma Power.

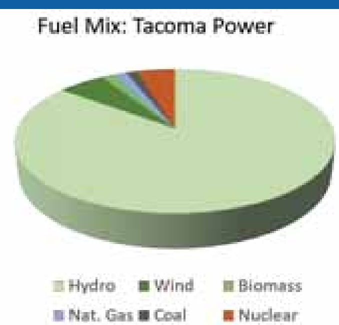

Figure 25: Tacoma Power fuel mix

The fuel mix is is mostly hydropower. This will help the WSH campus to meet the Net Zero mandate

Data Source: mytpu.org/about-tpu/services/power

2 The second service is an intermediate pressure (<60psig) feed from Steilacoom Boulevard near the current eastern driveway and serving the CSTC cluster (Buildings #50-56). The current estimated demand on this feeder is 3 Therm/hour with an estimated future demand of 6 Therm/hour.

PSE has indicated this feed has no additional capacity, and noted that any modifications to the piping network from this feed could trigger a requirement for a complete natural gas service renovation to comply with current codes.

3 The third service is also an intermediate pressure (<60psig) feed from Steilacoom Boulevard on the western end of campus serving Building #10. The current estimated demand on this feeder is 1 Therm/hour with an estimated future demand of 16 Therm/hour.

Future Demand

Based on the master plan building area growth projections, it is expected the natural gas demand may increase by 30% for the campus as a whole, assuming a more traditional building system design. Options for achieving an all-electric net zero capable building(s) or campus would reduce natural gas.

Puget Sound Energy has indicated the Far West Drive SW high-pressure utility distribution pipe and each of three campus feeds are near capacity. However, the Steilacoom Boulevard intermediate pressure utility distribution pipe has sufficient capacity to support campus growth.

While the two feeds from Steilacoom Boulevard are at capacity, the utility has indicated the intermediate pressure distribution main in that street has sufficient capacity for increased demand if a new service is brought onto campus.

Based on master plan development/expansion on the west side of campus, in particular, the current service would need replacement. Additionally, care should be taken for the routing of new services and avoid crossing over/under existing natural gas lines.

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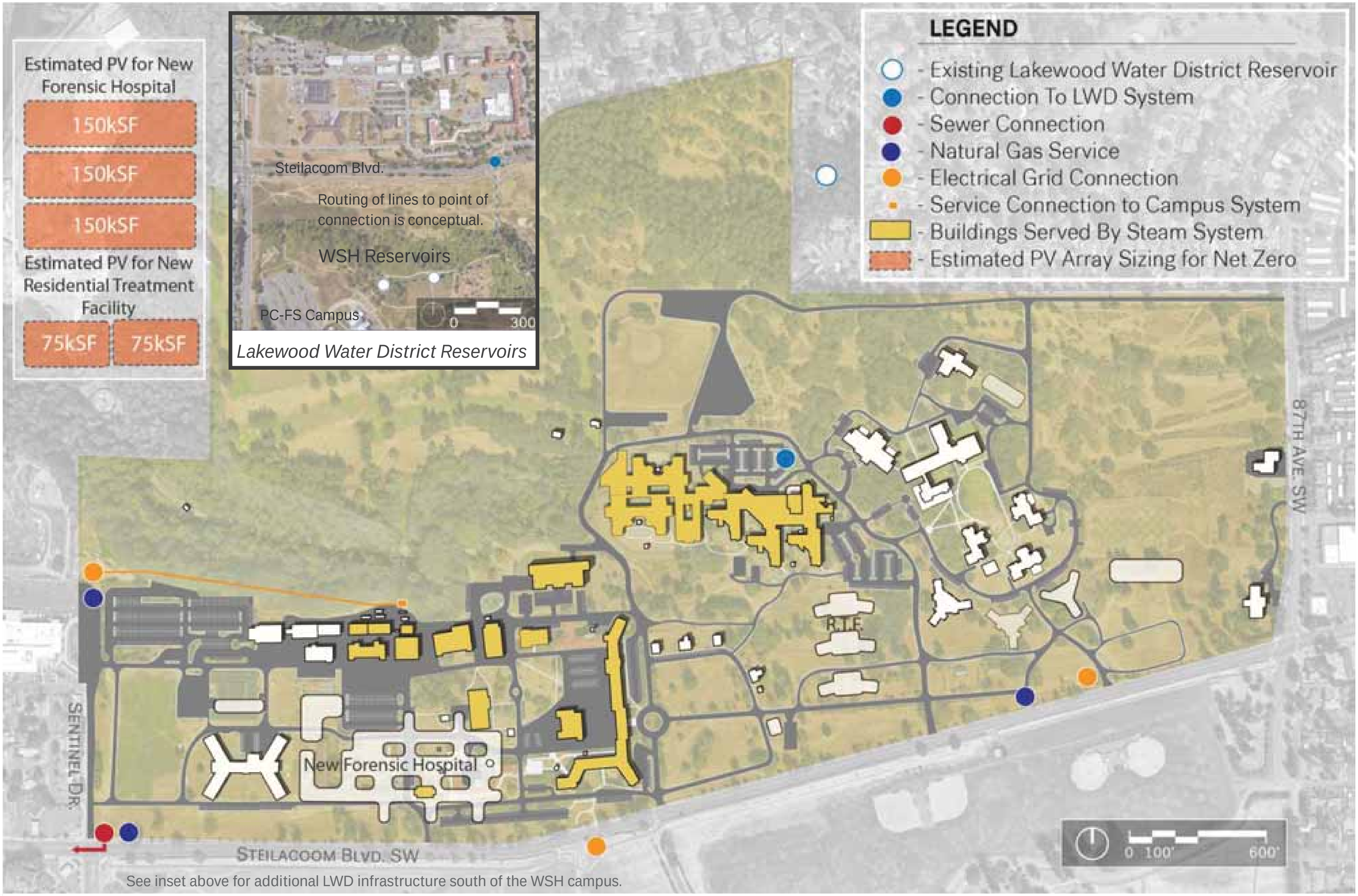

Figure 26: Utility Services & Opportunities

WATER SYSTEMS

WATER SUPPLY

Groundwater has met the needs of Fort Steilacoom and the hospital since the start of American settlement on the site that is now WSH. WSH maintains its water rights and wells to meet present needs. The campus system includes two wells with storage tanks and a network of supply lines.

Existing water main sizes vary from 4 inches to 8 inches and are made from various materials, as they have been extended over time. Fire suppression - including fire hydrants and sprinkler systems - and domestic services are tapped from these private water mains.

Lakewood Water District (LWD) and DSHS have had preliminary discussions regarding the potential to incorporate Western State Hospital into the LWD service area, either partially or entirely[†].

LWD has "connection-ready" services extended to each of the campus supply lines in the event the well supply is either unavailable or unsafe. These connection points would be utilized if a decision is made to fully connect the campus to the District's system.

Discussions on conversion of the overall system are on-going, although DSHS' intent is that new major facilities - the new forensic hospital and potential residential treatment facility - would be connected to LWD service.

Prior to assuming any of Western State Hospital's existing infrastructure into their purview, LWD would need to confirm the condition of the existing water infrastructure, including wells, storage facilities, and supply lines. Depending on results of these evaluations, LWD may incorporate only some of the existing water lines and the campus may elect to build new water infrastructure as part of a developer extension agreement.

If the District's service is extended to the WSH campus, the following criteria would apply:

- Provide at least two points of connection to the off-campus system, with interconnection on the campus.
- Upgrade the on-campus system wherever it will be part of the LWD main distribution network.
- Provide a through-campus connection to the existing LWD reservoir east of the former golf course site.
- Provide appropriate metering and backflow prevention at all points where the LWD mains will connect to WSH-maintained distribution lines.

SANITARY SEWER

The campus sewer system is privately owned and maintained and discharges to the public sewer system operated by the Town of Steilacoom. The Town's collection system feeds via pump to the Pierce County Wastewater Plant located along Chambers Creek.

Based on conversations with both WSH operations staff and Steilacoom Public Works, the internal collection system has adequate capacity, particularly since some new developments will replace existing developments, thus offsetting some of the additional capacity requirements. Determining the existing sewage flow through this campus sewer system is complicated since there are presently few water meters to provide a baseline for water use information. Also, many of the existing buildings are old enough, are varied in use, and have unique uses which make standard engineering estimates unreliable for this campus. As an assumed baseline, Steilacoom Public Works is charging Western State Hospital 1,500 REU's (residential equivalent units) each month.

The connection to the Steilacoom sewer system is at the southwest corner of the WSH campus, as indicated in Figure 26 on page 45. This connection is being upgraded, including the addition of a meter. Western State Hospital, in agreement with Steilacoom Public Works, will soon install a flume on the last section of private sewer main to measure the actual sewer flow discharging to the public sewer system. This data will allow for updated data on actual collection from the hospital campus.

Future development will require additional sewer capacity charges and will based on the calculated sewer demand from Pierce County Public Works and Utilities "Documented Water Use Data". The total future sewer capacity will be the current sewer capacity of the current campus development plus the sewer demand for any proposed developments and minus the removed buildings.

Pierce County Public Works has encouraged WSH to provide additional water monitoring on the campus, to support water conservation and support more accurate sewer demand estimates. WSH will evaluate enhanced water metering and monitoring as part of future projects.

† Lakewood Water District is an independent district - e.g., not a city agency - and secures its water fully from groundwater sources.

Any new developments which include food preparation facilities will need to include grease interceptors between the source of grease waste and the sewer main. These interceptors typically include exterior concrete vaults that will capture and store grease.

RAIN WATER

Western State Hospital is situated on gravely-sandy soils with medium to high infiltration rates. Currently, catch basins on campus are piped and flow to a combination of campus retention facilities or direct discharge to Chambers Creek. Infiltration systems range from 'formal' designed systems with a defined storage capacity sized per specific development requirements or 'informal' systems consisting of downspouts spilling onto the ground, for some older facilities.

Proposed developments will need to provide infiltration systems designed to address both treatment and infiltration requirements of the Stormwater Management Manual for Western Washington and other applicable regulations as administered by the City of Lakewood. Existing storm systems will not need to be replaced unless they are determined to be undersized for runoff discharging from new, upstream developments.

Proposed systems may include open infiltration ponds (where space allows) and underground storage pipes, vaults, and/or trenches. Ideally, infiltration systems will be located near the development, but site-specific features may dictate other locations on campus are more suitable. The gravely nature of the native soils will be conducive for on-site stormwater management systems such as bio-retention areas or porous pavements, particularly for stormwater discharging from 'clean' areas such as roofs or plaza areas.

Runoff from pollution-generating surfaces (i.e. parking lots and access drives) will need to be routed to a water quality treatment facility to remove particulates before discharging to the native soils. Typical water quality treatment systems include bio-retention areas, cartridge media filters, or below-grade concrete storage vaults.

Specific engineering of future systems will be included at the project level. Site-specific geotechnical analysis will be required to determine infiltration rates in the native soil and location requirements (such as setback distances from sensitive areas).

Acknowledgments

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APPENDICES

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Appendix 1: Stakeholder Meetings

MEETING SUMMARIES

HISTORIC FORT STEILACOOM

The WSH planning team met with the Historic Fort Steilacoom Association (HFSA) on August 20, 2019 to discuss the draft campus plan. The HFSA confirmed that Buildings 40-43 are associated with the Fort's historic period. They also noted that there is a small replica structure near Building 44, representing a munitions storage building from the Fort era.

They requested that the following be considered or addressed in the campus plan:

- HFSA leadership would prefer that the stone wall south of the Fort parade ground be removed - as it dates from the Hospital era - and be replaced with a fence of the style from the Fort era.
- They also would prefer that the line of trees along Steilacoom Boulevard be removed, as they also post-date the Fort era.
- Unmanageable parking in the parade grounds area is a significant problem for the Fort and visitor experience.
- The HFSA would like to see the east-west road and parking eliminated from the area within the crescent of the existing cottages removed, both to address the concern above and to allow for historic reenactments on the parade grounds.
- HFSA has developed an early vision for a visitor center along the southeastern edge of the parade grounds, of approximately 3,000 SF
- The Association also is evaluating a plan to demarcate the location/ footprint of former Fort structures, in the ground plane.

An update meeting was held with HFSA on September 21, 2021.

TOWN OF STEILACOOM

The Town Council of Steilacoom was briefed at a regular public meeting on March 3, 2020. An update meeting was held on September 21, 2021.

PIERCE COLLEGE AT STEILACOOM

Western State Hospital and DSHS staff met with College leadership on September 28, 2021.

STEILACOOM HISTORICAL SCHOOL DISTRICT

Western State Hospital and DSHS staff met with District leadership on July 9, 2021.

OPEN PUBLIC MEETINGS:

Two public meetings were hosted by WSH/DSHS:

- An in-person Open House at Custer Elementary School in Lakewood, August 31, 2021
- A Virtual Open House: (due to concerns related to COVID-19) September 9, 2021

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Appendix 2: Policy Brief - Transforming Washington's Behavioral Health Care System

This policy publication describes the transformation of Washington's Health Care System that underlies the reinvestment in Western State Hospital, as well as other facilities throughout the state.

Washington State Department of Social and Health Services

Community-Based Treatment

Transforming Lives

Governor Inslee's Five-Year Plan and Vision to Transform Washington's Behavioral Health Systems

"We are trying to provide 21st century medical care using a 19th century model of care. Large institutions were popular in 1918, but in 2018, we know smaller hospitals closer to home are far more effective for patients. Through a combination of mostly state-run options, we will be able to serve nearly all our civil patients in smaller facilities that are much closer to home and much more able to sustain the kind of supports that ensure patients get the right care at the right time."- Gov. Jay Inslee (Policy Brief. December 2018. https://ofm.wa.gov/sites/default/files/public/budget/statebudget/highlights/budget19/Behavioral_Health_policyBrief_0.pdf)

Supporting the Governor's Vision

Two years ago, Governor Inslee laid out his vision to provide services in local communities for people with acute mental illness. Serving people in their home communities is essential to this plan. To do this, this transformation requires development of a continuum of services that can prevent or divert people from being committed to the state hospitals and can support people in their recovery after treatment in a hospital is complete.

The interest by Governor Inslee and the Legislature is spurred by Washington's rank of 47th in the nation in capacity for appropriate mental health services. Compared to the rest of the country, Washington has a high prevalence of mental illness and low access to care. Within two years, the state will need almost 370 more civil beds than our current capacity.

The state is at the beginning of a major reform of the entire mental health service delivery model. Other state agencies and the University of Washington also have been funded and charged with the responsibility to increase the number of psychiatric services in our communities, as well as support services such as housing.

DSHS' Commitment to Community-Based Treatment

The Legislature supported Governor Inslee's concept and, in the 2019 Session, enacted a budget and provided direction to the **Department of Social and Health Services to begin development of three small community-based/behavioral health residential treatment facilities.**

These facilities would provide a range of services to people as they move through the treatment regimen: evaluation and treatment, 90-day to 180-day intensive treatment, and a step-down program to ready people for their return to home and work. The department is required to submit to the Legislature a "preliminary predesign" of these facilities by December 31, 2019.

The department is at the early stages of this development process. We have several geographic areas that we are researching to determine suitability based on access to a qualified staff pool; existence of other community services and supports; availability of land and utilities and; suitability for neighboring homes, businesses, and industries.

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Civil and Forensic Bed Capacity Investments

Capacity Investments

Forensic	Date Online	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27
WSH Forensic	current	330								
WSH Forensic (Building 27)	8/19/2019		30							
WSH Forensic (2 Ward-Gero to Forensic swap E3&E4)	6/1/2020		42							
WSH 2 Ward Addition (30002765)	4/1/2021				30		30			
WSH - Forensic Beds (TBD beds off-line *)			Estimate not available at this time							
New Forensic Center (40000385: up to 350 bed hospital)									350	
ESH Forensic	current	125								
ESH Forensic (Wards 1N3)	5/1/2020		25							
ESH Forensic (Wards 3N3)	6/1/2020		25							
Yakima closes no later than 12/31/21 (settlement)	current	24			(24)					
Maple Lane closes no later than 7/1/24 (settlement)	current	30						(30)		
Subtotal		509	122	-	6	-	30	(30)	350	-
Total Forensic Beds		**509**	**631**	**631**	**637**	**637**	**667**	**637**	**987**	**987**

Civil	Date Online	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27
ESH Civil	current	192								
WSH Civil	current	527								
WSH Forensic (2 Ward-Gero to Forensic swap E3&E4)	8/19/2019 offline		(60)							
ESH/WSH Civil beds (TBD beds off-line *)			Estimate not available at this time							
(91000075) 16 Bed Civil BH Community Facilities						16				
(91000074) 48 Bed Civil BH Community Facilities (1 of 2) - 90/180						16				
(91000077) 48 Bed Civil BH Community Facilities (2 of 2) - 90/180							16			
48 Bed Civil BH Community Facilities (1 of 2) - 90/180						16				
48 Bed Civil BH Community Facilities (2 of 2) - 90/180							16			
48 Bed Civil BH Community Facilities (1 of 2) - E&T/Step Down						16				
48 Bed Civil BH Community Facilities (2 of 2) - E&T/Step Down							16			
Aging and Long-Term Support Administration - AFH, AL, ARC, NH		56	39	37						
Aging and Long-Term Support Administration - Non-Citizen			5	5						
Aging and Long-Term Support Administration - ESF		62	46	48						
Aging and Long-Term Support Administration - Supportive Housing		58	30	30						
Aging and Long-Term Support Administration - Specialized Dementia			50	50						
Developmental Disabilities Administration - SOLA Investments***		17	11	13						
Developmental Disabilities Administration - Group Training Homes	7/1/2021				6					
Health Care Authority - Freestanding E&T Facilities/Certified E&T Beds		905								
Health Care Authority - Community 90/180 Beds			71	48						
Health Care Authority - Intensive BH Treatment Facilities			16	32						
Health Care Authority - Mental Health Drop-In Facilities				18						
Commerce Capital for MultiCare (HCA)	1/1/2024 (?)						136			
UW Teaching Hospital (150 beds)	1/1/2024						150			
Subtotal		1,817	208	281	6	64	334	-	-	-
Total Civil Beds		**1,817**	**2,025**	**2,306**	**2,312**	**2,376**	**2,710**	**2,710**	**2,710**	**2,710**
Total Capacity Beds		**2,326**	**2,656**	**2,937**	**2,949**	**3,013**	**3,377**	**3,347**	**3,697**	**3,697**

*** FY19 17 DDA beds funded by the 2017-19 Mental Health Initiative. FY20 and FY21 total reflect clients placed, not beds. Clients are phased in.

*Total number of beds taken off-line will need to be estimated at a later date.

Table above summarizes current and future bed capacity funded through FY21 (Operating Budget), with funded capital project listed through FY27.

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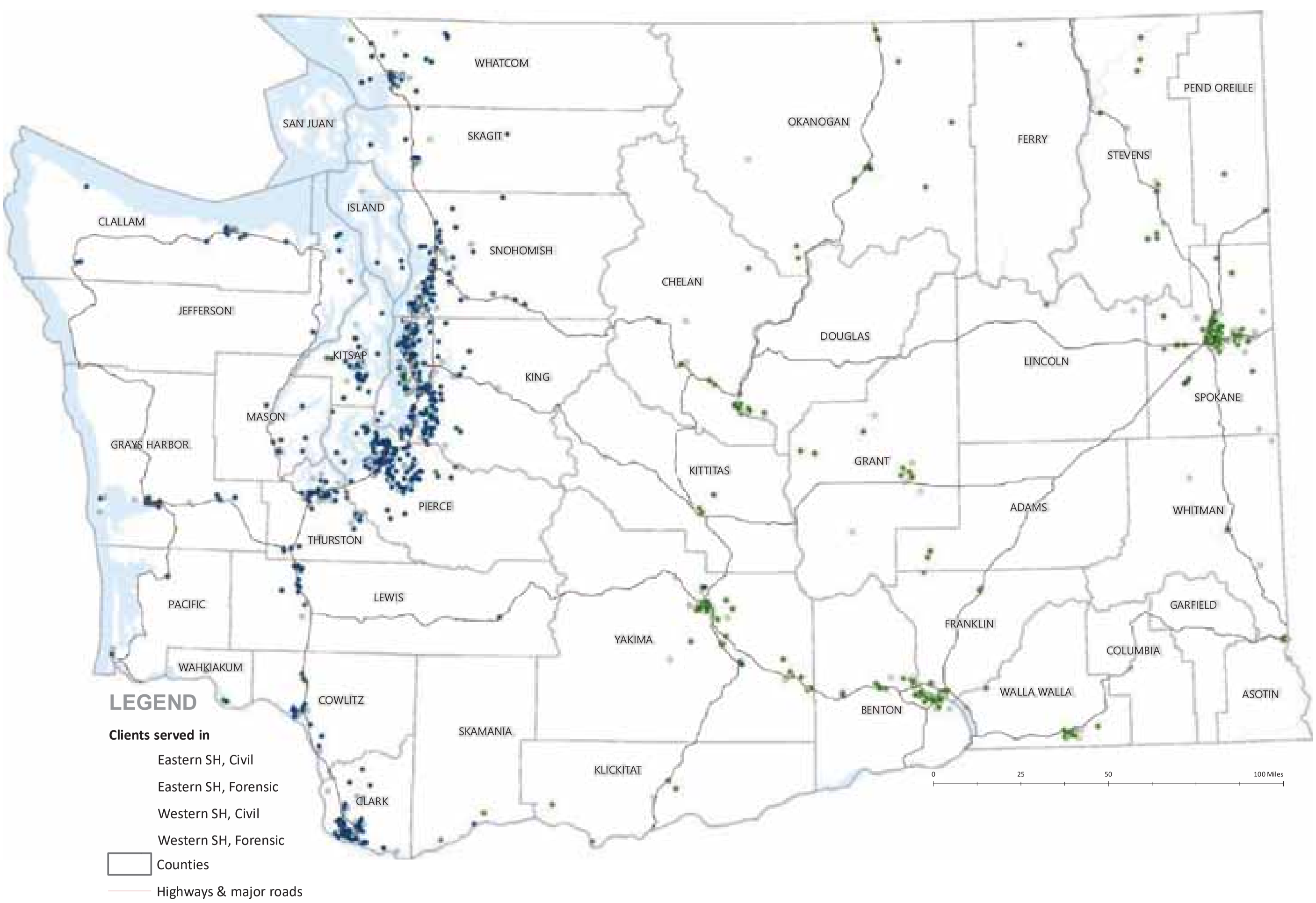
Persons Served at State Hospitals, CY 2018



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Washington State Department of Social and Health Services

Potential Use Scenario

Transforming Lives

New State Hospitals at Western State Hospital Central Campus

(Legislative District 28)

Western State Hospital, Central Campus, Lakewood, WA
250 - 350 Bed Forensic Hospital
16 - 48 Civil Commitment State-Owned Facility

Western State Hospital, Bldg. 28

Western State Hospital in Lakewood, WA is a state-owned campus of 215 acres. The Governor's 2019-21 biennial budget proposed evolving the state psychiatric hospitals into Forensic Centers of Excellence and closing the hospitals to civil commitment admissions by the end of 2023. The 2019-21 Enacted Budget supported his vision and provided funding for predesign of a 250-350 new forensic hospital at WSH. Development of community placements also is required in order to move civilly committed people out of WSH.

With some renovations, a 48-bed facility for other civil capacity could be housed in the existing Building 28, which is part of the current Center for Forensic Services (CFS). This building currently houses eight 30-bed wards and was built in 2001. This smaller facility could share services such as kitchen and laundry with the forensic hospital.

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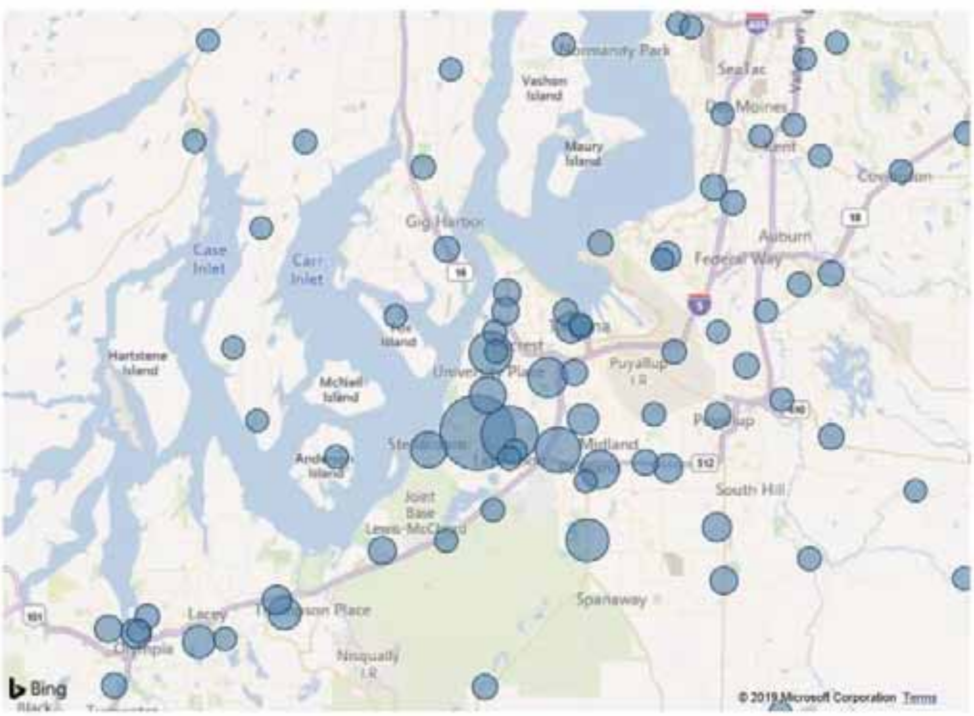
Pros & Cons for Western State Hospital Location

Pros	Cons
• Forensic/Civil zoning for central campus • Already zoned – quicker startup • Site already owned by state • Centrally located in Western WA along I-5 corridor • New kitchen that can be used for new hospitals • Existing staff – concentration of expertise, opportunity to realign staff with services • Planning underway to move civil patients to other facilities • Less impact to existing forensic patients • Longtime community presence • Possibility of using Lakewood water	• Significant building demolition required • Relocate or design around cemetery • Civil patient census will need to be decreased before demolition and construction. This is in the infancy stages • Spaghetti of utilities that will need to be addressed • Building 27 is in the way until at least 2022 • Underground surprises (dumps, foundations, archeological significance) • Closer to Steilacoom High School

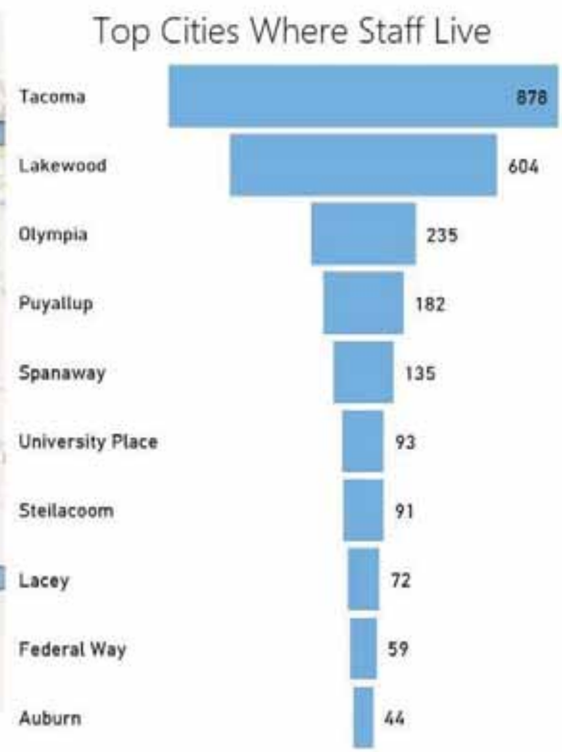
Economic Impact of Western State Hospital Campus

Total Staff

2819



Source: DSHS Data Generated by HRD on 08/06/2019



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Washington State Department of Social and Health Services

Transforming Lives

Potential Use Scenario

Fircrest School Campus

(Legislative District 32)

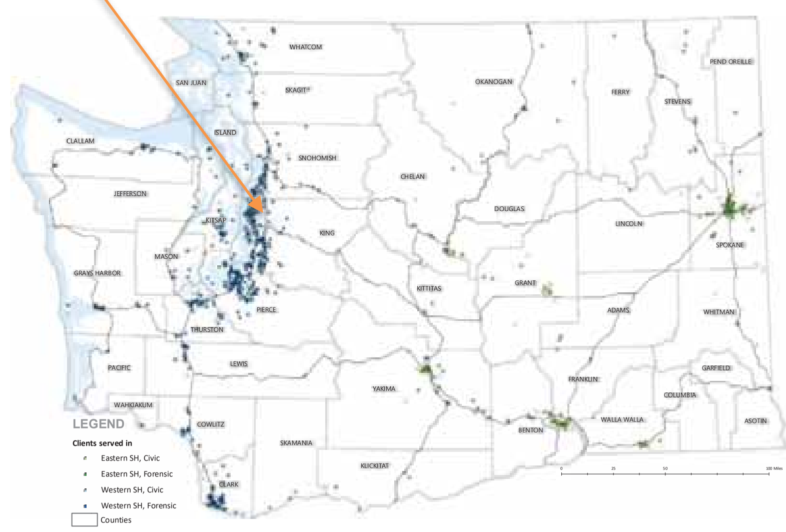
48-Bed State Owned, Mixed Use Community Civil Capacity located at Fircrest Campus, north of Seattle, WA

Fircrest School Campus.

The Governor's 2019-21 Biennial Budget proposed major investments to transform the way state-owned, state-operated civil commitments are served.

The Legislature supported Governor Inslee's concept and, in the 2019 Session, enacted a budget and provided direction to the Department of Social and Health Services to begin development of three small community-based/behavioral health residential treatment facilities.

Fircrest School Campus is state-owned. It is in Shoreline, just north of Seattle. There are two plots that might be suitable for a 48-bed facility at the south end of the campus.

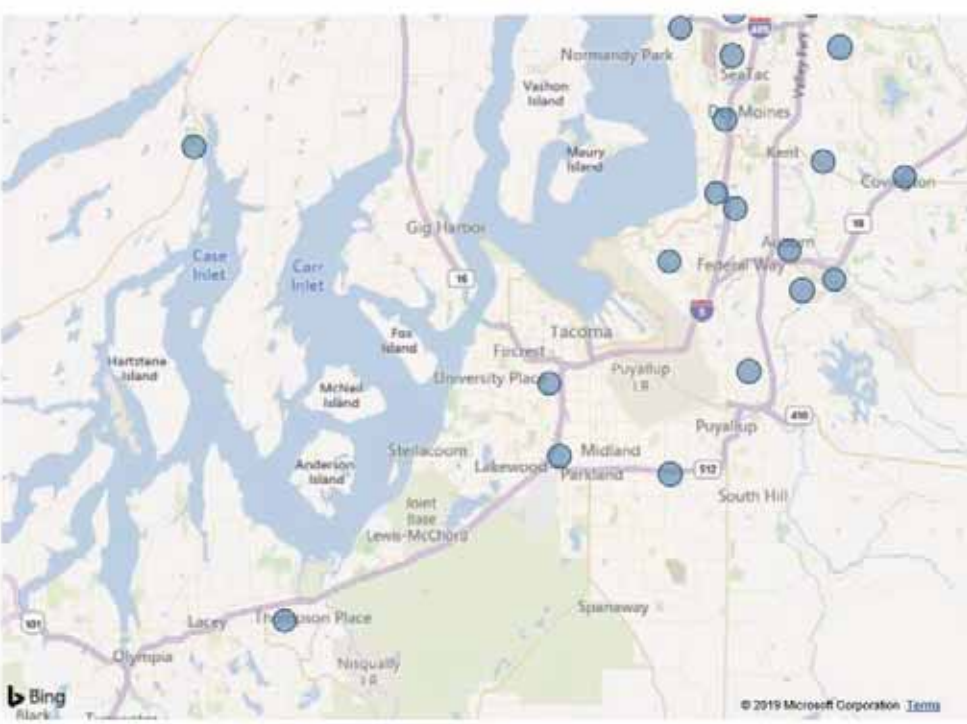


In addition to the site being state-owned, another advantage is the proximity to the UW medical school and to Seattle's medical industry. A disadvantage is the relatively small developable area as well as intense interest in the campus from other public and private parties.

Pros & Cons for Fircrest School Location

Pros	Cons
• Availability of professional staff • Close to WSH patients • Close to I-5 • Relationship with UW Medical School • Campus support from Fircrest (maintenance, laundry, etc.)	• Small, narrow parcels of land • Maybe 16 to 48 bed facilities • Premium pay for professional staff • Close to park and high school • Re-zone property

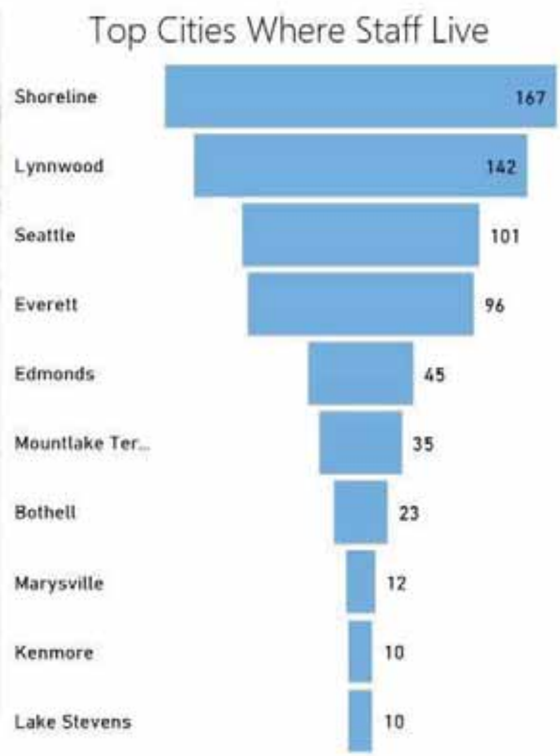
Economic Impact of Fircrest School



Source: DSHS Data Generated by HRD on 08/06/2019

Total Staff

727



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Washington State Department of Social and Health Services

Transforming Lives

Potential Use Scenario

Echo Glen Children's Center Campus

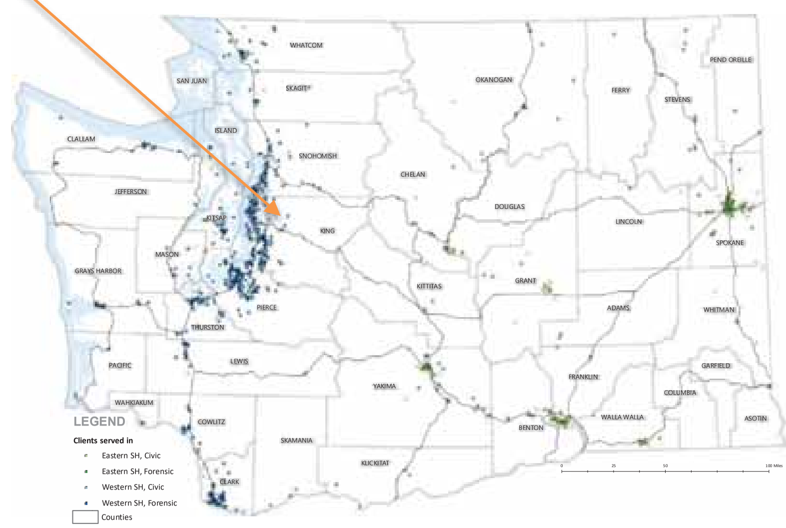
(Legislative District 5)

16-Bed or 48-Bed State Owned Community Civil Facility located at EGCC, Snoqualmie, WA

Echo Glen Children's Center Campus including surrounding DNR land

The Governor's 2019-21 Biennial Budget proposed major investments to transform the way state-owned, state-operated civil commitments are served.

The Legislature supported Governor Inslee's concept and, in the 2019 Session, enacted a budget and provided direction to the Department of Social and Health Services to begin development of three small community-based/behavioral health residential treatment facilities.



Echo Glen Children's Center campus is a state-owned site that is located in Snoqualmie, WA. It is approximately 25 miles east of Seattle and is adjacent to I-90.

In addition to the site being state-owned, another advantage is the existing relationship between the UW medical school and the Juvenile Rehabilitation program at EGCC. This relationship could be expanded for a civil psychiatric hospital. The site is also close to the medical industry in Seattle. A disadvantage might be the hilly topography. The site likely would require utilities, roads, and grading work be done.

CONTACTS: Judy Fitzgerald, 360.902.8174 judy.fitzgerald@dshs.wa.gov • Sean Murphy, 360.902-8155, sean.murphy@dshs.wa.gov
Prepared by DSHS Facilities, Finance, and Analytics Administration, Central Budget Office • September 2019

Pros & Cons for Echo Glen Children's Center Location

Pros	Cons
• Lots of land around Echo Glen • Close to Seattle and Bellevue • Convenient access to I-90 and I-5 • CERPI undeveloped lands • Relationship with UW Medical School already established • Cost of living relatively low, could help draw staff to the area • Close to 25-bed community hospital • Close to medical services in Issaquah	• Difficult to access site – one way in and one way out • Much of the area is wetlands • Lack of utilities • Topography contains hills and swamps • Zoning may be an issue • More inclement weather since it is closer to mountains

Location Selection Criteria

The following criteria were used when considering locations.

Location and Proposed Configuration		Dr. & Staff Availability	Current Site Conditions	Time to Completion	Local Political Considerations	Local Prof. Partnerships
Western State Hospital	250 - 350 Forensic Beds 48 Civil beds (bldg. 28)	↑	↑	→	↑	→
Fircrest School Campus	48 Civil Beds	↑	→	→	↓	↑
Arlington	16 - 48 Civil Beds	→	↓	→	→	→
Clark County	16 - 48 Civil Beds	↑	↓	↑	→	↑
Echo Glen	16 - 48 Civil Beds	↑	→	→	↑	↑
Maple Lane	16 - 48 Civil Beds	↓	→	→	→	↓

Doctor and Staff Availability proximity to major freeways and metropolitan areas where doctors and staff reside.
Current Site Conditions could include ownership of the site, availability of utilities and other support services.
Time to Completion includes time for zoning, community meetings, site preparation, construction, etc.
Local Political Considerations include zoning, community involvement
Local Professional Partnerships the possibility of forming a partnership with major university mental health program.

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Washington State Department of Social and Health Services

Transforming Lives

Potential Use Scenario
Arlington, WA
(Legislative District 39)

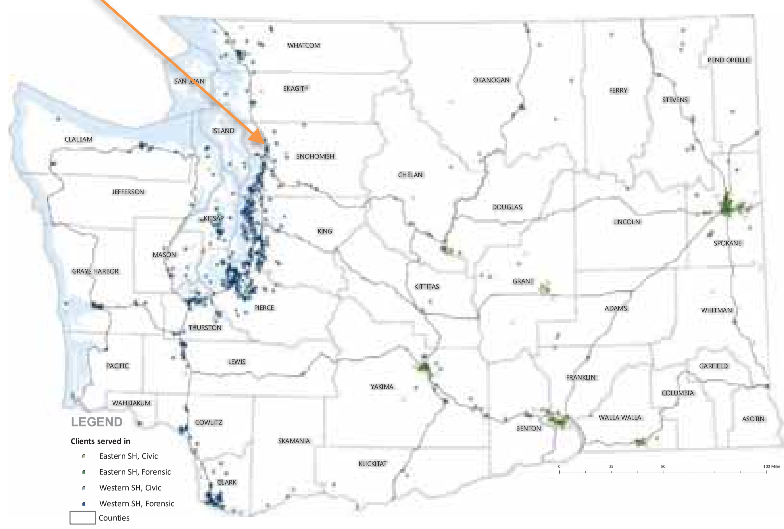
16-Bed or 48-Bed State Owned Community Civil Facility located in Arlington, WA

Arlington area. Parcel outlined in T-shape configuration is approximately 260 acres.

The Governor's 2019-21 Biennial Budget proposed major investments to transform the way state-owned, state-operated civil commitments are served.

The Legislature supported Governor Inslee's concept and, in the 2019 Session, enacted a budget and provided direction to the Department of Social and Health Services to begin development of three small community-based/behavioral health residential treatment facilities.

Arlington is located approximately 20 miles north of Everett, off I-5 and is within proximity of medical services in Everett. Paine Field, newly opened to commercial flights, is also nearby.



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Pros & Cons for Arlington WA Location

Pros	Cons
• Close to Everett and Marysville • Possible land partnership with WSDOT and Snohomish County PUD • Site is 260 acres of DNR land, of that 60-80 acres are available • Proximity to Everett Clinic • Close to Paine Field in Everett • City is already amenable to a new SCC SCTF facility	• Commute north may be difficult due to traffic • Do we need to build? Utilities, Roads, Water, Sewer? • Zoning may be an issue

Location Selection Criteria

The following criteria were used when considering locations.

Advantage Neutral Disavantage

Location and Proposed Configuration		Dr. & Staff Availability	Current Site Conditions	Time to Completion	Local Political Considerations	Local Prof. Partnerships
Western State Hospital	250 - 350 Forensic Beds 48 Civil beds (bldg. 28)	Advantage	Advantage	Neutral	Advantage	Neutral
Fircrest School Campus	48 Civil Beds	Advantage	Neutral	Neutral	Disadvantage	Advantage
Arlington	16 - 48 Civil Beds	Neutral	Disadvantage	Neutral	Neutral	Neutral
Clark County	16 - 48 Civil Beds	Advantage	Disadvantage	Advantage	Neutral	Advantage
Echo Glen	16 - 48 Civil Beds	Advantage	Neutral	Neutral	Advantage	Advantage
Maple Lane	16 - 48 Civil Beds	Disadvantage	Neutral	Neutral	Neutral	Disadvantage

Doctor and Staff Availability proximity to major freeways and metropolitan areas where doctors and staff reside.
Current Site Conditions could include ownership of the site, availability of utilities and other support services.
Time to Completion includes time for zoning, community meetings, site preparation, construction, etc.
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Potential Use Scenario

Clark County, WA

(Legislative Districts: 14, 17, 18, or 49)

16-Bed or 48-Bed State Owned Community Civil Facility located in Clark County, WA

Clark County. Red outlined areas are DNR land for possible location.

The Governor's 2019-21 Biennial Budget proposed major investments to transform the way state-owned, state-operated civil commitments are served.

The Legislature supported Governor Inslee's concept and, in the 2019 Session, enacted a budget and provided direction to the Department of Social and Health Services to begin development of three small community-based/behavioral health residential treatment Facilities.

Vancouver is one of the fastest growing areas in Washington. Its proximity to Portland Oregon's metro area and significant medical industry make it a good location for siting a civil facility.

Siting facilities on state-owned land could reduce the project development time by 12 months. This is because location selection, purchase, and zoning issues are avoided. Clark County, in southwest Washington, presents various state-owned potential sites for a 16-bed or 48-bed civil facility.

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Pros & Cons for Clark County Location

Pros	Cons
• DNR land availability • Large parcels • Close to I-5 and I-205 • Close to Portland for staff	• Property prices are higher • Cost of living is increasing • No state presence in this area

Location Selection Criteria

The following criteria were used when considering locations.

Advantage Neutral Disavantage

Location and Proposed Configuration		Dr. & Staff Availability	Current Site Conditions	Time to Completion	Local Political Considerations	Local Prof. Partnerships
Western State Hospital	250 - 350 Forensic Beds 48 Civil beds (bldg. 28)	Advantage	Advantage	Neutral	Advantage	Neutral
Fircrest School Campus	48 Civil Beds	Advantage	Neutral	Neutral	Disadvantage	Advantage
Arlington	16 - 48 Civil Beds	Neutral	Disadvantage	Neutral	Neutral	Neutral
Clark County	16 - 48 Civil Beds	Advantage	Disadvantage	Advantage	Neutral	Advantage
Echo Glen	16 - 48 Civil Beds	Advantage	Neutral	Neutral	Advantage	Advantage
Maple Lane	16 - 48 Civil Beds	Disadvantage	Neutral	Neutral	Neutral	Disadvantage

Doctor and Staff Availability proximity to major freeways and metropolitan areas where doctors and staff reside.
Current Site Conditions could include ownership of the site, availability of utilities and other support services.
Time to Completion includes time for zoning, community meetings, site preparation, construction, etc.
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Transforming Lives

Potential Use Scenario

Maple Lane Campus
Centralia, WA

(Legislative District 20)

16 -Bed or 48-Bed State Owned Community Civil Facility located on the Maple Lane Campus, Centralia, WA

Maple Lane Campus, Centralia, WA

The Governor's 2019-21 Biennial Budget proposed major investments to transform the way state-owned, state-operated civil commitments are served.

The Legislature supported Governor Inslee's concept and, in the 2019 Session, enacted a budget and provided direction to the Department of Social and Health Services to begin development of three small community-based/behavioral health residential treatment facilities. Maple Lane Campus, in Centralia, Washington has been identified as a potential site.

Within minutes of the I-5 corridor, Maple Lane is located approximately 20 miles south of Olympia and 100 miles north of Portland.
The campus is currently used as a Competency Restoration facility in partnership with Wellpath.

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Pros & Cons for Maple Lane Location

Pros	Cons
• Large parcels • Close to I-5 • Close to Olympia • Close to Portland • Property prices are lower	• No state presence in this area • No Maintenance and Administrative staff/support

Location Selection Criteria

The following criteria were used when considering locations.

↑ Advantage → Neutral ↓ Disavantage

Location and Proposed Configuration		Dr. & Staff Availability	Current Site Conditions	Time to Completion	Local Political Considerations	Local Prof. Partnerships
Western State Hospital	250 - 350 Forensic Beds 48 Civil beds (bldg. 28)	↑	↑	→	↑	→
Fircrest School Campus	48 Civil Beds	↑	→	→	↓	↑
Arlington	16 - 48 Civil Beds	→	↓	→	→	→
Clark County	16 - 48 Civil Beds	↑	↓	↑	→	↑
Echo Glen	16 - 48 Civil Beds	↑	→	→	↑	↑
Maple Lane	16 - 48 Civil Beds	↓	→	→	→	↓

Doctor and Staff Availability proximity to major freeways and metropolitan areas where doctors and staff reside.
Current Site Conditions could include ownership of the site, availability of utilities and other support services.
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WESTERN STATE HOSPITAL MASTER PLAN

Appendix 3A: Transportation Impact Analysis

TSI
Transportation Solutions, Inc.

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Western State Hospital
Master Plan Update

Traffic Impact Analysis

January 31, 2020

Prepared for:
Western State Hospital,
SRG Partnership, Inc.
&
City of Lakewood

JEFFREY P K BEE
STATE OF WASHINGTON
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REGISTERED
PROFESSIONAL ENGINEER
1/31/2020

Table of Contents

List of Tables

List of Figures

Appendices

Abbreviations

DSHS	Departments of Social and Health Services
WSH	Western State Hospital
EIS	Environmental Impact Statement
CFS	Center for Forensic Services
Civil	Civil Commitment
CSTC	Child Study and Treatment Center
FHWA	Federal Highways Administration
WSDOT	Washington State Department of Transportation
MUTCD	Manual of Uniform Traffic Control Devices
HCM	Highway Capacity Manual
LOS	Level-of-Service
V/C	Volume-to-Capacity
Blvd.	Boulevard
Ave.	Avenue
St.	Street
Rd.	Road
Dr.	Drive
Pl.	Place
Ln.	Lane
Ct.	Court

Executive Summary

This Traffic Report summarizes the traffic impacts associated with an update of the Master Plan for WSH.

Over the next 10 years, the DSHS is proposing to reduce the overall number of patient beds at WSH. For the Master Plan, the number civil patient beds will reduce from 530 to 153, the number forensic patient beds will increase from 330 to 533, the number of CSTC patient beds will increase from 47 to 65, and a new 48 bed community hospital would be added to the campus.

The Master Plan proposes to vacate the South St. driveway off Sentinel Dr. SW and remove and relocate the existing CSTC Entrance driveway off Steilacoom Blvd. SW to a new location on Steilacoom Blvd. SW. Build-out of the Master Plan is intended to enhance access to the campus to and from Steilacoom Blvd. SW and to reduce traffic impacts on Sentinel Dr. SW and 87th Ave SW via Golf Course Rd. New traffic signals are also proposed at Chapel Gate Dr. and CSTC Entrance. Also, the existing signal at Circle Dr. is proposed to be removed and the intersection reconfigured.

Future traffic conditions were forecast for year 2030.

Proposed Action

The proposed changes are forecast to generate:

- 731 AM trips, between 6:30 and 7:30 AM, a 12% reduction from the campus' current trip generation.
- 603 AM trips, between 7:00 and 8:00 AM, an 11% reduction from the campus' current trip generation.
- 673 PM trips, between 2:15 and 3:15 PM, a 12% reduction from the campus' current trip generation.
- 325 PM trips, between 4:00 and 5:00 PM, a 12% reduction from the campus' current trip generation.
- 5,407 average weekday daily trips, a 12% reduction from the campus' current trip generation.

The technical analysis focuses on the AM (7:00 AM to 9:00 AM) and PM (4:00 PM to 6:00 PM) peak hour periods.

Level-of-Service/Operations

Currently, the CSTC Entrance driveway off Steilacoom Blvd. SW is computed to operate at LOS E (AM peak hour) and LOS F (PM peak hour) and outside of the City of Lakewood's LOS standards.

In the future No Action, the Chapel Gate Dr. and CSTC Entrance driveways off Steilacoom Blvd. SW are forecast to operate outside of the City of Lakewood's LOS standards:

- Chapel Gate Dr. LOS F (PM peak hour).
- CSTC Entrance. LOS F (AM and PM peak hours)

In the future with the Proposed Action, the Chapel Gate Dr. and CSTC Entrance driveways off Steilacoom Blvd. SW are forecast to operate similar to the No Action conditions.

When signalized, both driveways are forecast to operate at LOS B or better and the traffic conditions around the campus meet the City of Lakewood standards.

Circulation

Revised on-campus circulation patterns are not forecast to adversely impact traffic on the campus.

With the Proposed Action, a new forensic hospital would be built on the west side of the campus west of Chapel Gate Dr. This will shift more traffic to the Chapel Gate Dr. driveway.

Use of the central area of the campus will be reduced and less traffic is anticipated to use the Circle Dr. driveway.

The relocation of the CSTC Entrance off Steilacoom Blvd. SW allows for direct access to the new community hospital and expanded services at the CTSC and east WSH campus buildings. The new access location is also more midblock from Circle Dr. and 87th Ave SW, allowing for more spacing between the intersections.

The primary patient discharge route is anticipated to shift to the new CSTC Entrance. The primary service vehicles route is anticipated to be via Sentinel Dr. SW.

Safety

There were no existing safety deficiencies identified after review of the historical collision data. Improved access to the campus would reduce the potential safety risks with the revised traffic patterns on the campus.

Non-Motorized Impacts

On-campus pedestrian facilities will be upgraded to support campus activities.

The City of Lakewood and Town of Steilacoom are planning non-motorized improvements on Steilacoom Blvd. SW. The City of Lakewood's scope and timing for constructions of improvements on Steilacoom Blvd. SW including curb, gutter, sidewalk, sharrows, turn lanes, street lighting, drainage and overlay is undefined.

The Proposed Action is not forecast to change or adversely impact the current transit network.

Recommendations

The recommendations based on the Proposed Action are similar to those for the No Action.

- Circulation. Improve the campus's internal circulation by increasing the spacing between internal roadways and intersections and driveways.
- Access. Improve access to the campus by enhancing traffic flow to and from Steilacoom Blvd. SW via:
  - Install traffic control signals at Chapel Gate Dr. and at CSTC Entrance, with the intent to concentrate more traffic to these campus accesses and reduce traffic impacts on Sentinel Dr., 87th Ave. SW and Golf Course Rd. Traffic control signal installation requires certain "warrants" to be satisfied and these are discussed later in this document.
  - Widen Steilacoom Blvd. SW to provide left turn pockets and acceleration lanes to improve left turn maneuvers to and from the campus. Left turn lanes would enhance site access by providing a "pocket" off of the mainline for vehicles to queue in before making a left turn to the campus. Acceleration lanes, in the form of a center turn lane, would allow staged left turn maneuvers (left turn out of campus to turn lane to merge with opposing traffic volume). Widening requires right-of-way acquisition.
  - Remove the existing signal at Circle Drive and Steilacoom Blvd SW, and repurposing the intersection to be right-in and right-out only restricted. This will decentralize access at Circle Dr. and refocus traffic to the Chapel Gate Dr. and CSTC Entrance driveways.
  - An alternative to a traffic signal is a roundabout. Roundabouts do not create fixed stops and do not have adopted "warrant" criteria. Roundabouts do involve additional right-of-way.
  - Close or add gates (restrictions) to existing main campus access off Sentinel Dr. and Golf Course Rd. West St. could be gated and restricted for service vehicles only. Kids First Pl. could also be gated, for fire and emergency vehicle access to the site only. Also, vehicle access to campus' other secondary entrances off Golf Course Rd. could be restricted. By restricting or eliminating these access, the

    campus traffic would be forced to access the site off Steilacoom Blvd SW, which would mitigate neighborhood concerns with campus traffic impacting the high school and residents.
  - The Proposed Action includes new buildings nearer to the Chapel Gate Dr. and CSTC Entrance where enhanced accessibility would allow support improvements to driveway traffic control off Steilacoom Blvd SW.
- Support. DSHS should provide their support for non-motorized and turn lane improvements on Steilacoom Blvd. SW, planned by both the Town of Steilacoom and City of Lakewood. The Proposed Action to support improvements by the Town of Steilacoom and City of Lakewood.
- Parking. Consolidate, mark, pave and manage parking areas to reduce parking sprawl on campus. Designate areas for staff based on the location and function of employees. The Proposed Action is consolidating parking and parking designations will be addressed with building-out of the site.

Introduction

This report describes the traffic impacts associated with an update of the Master Plan for WSH. The purpose of this report is to identify potentially significant and adverse traffic impacts and, where appropriate, outline programmatic and/or physical improvements to minimize or eliminate those impacts.

The study area for this analysis focuses on the public roadways and intersections fronting the WSH campus.

Project Location and Existing Use

WSH is located at 9601 Steilacoom Blvd. SW, in the City of Lakewood, WA.

Figure 1 shows the campus and surrounding roadway network.

The main campus is bordered by Steilacoom Blvd. SW and Fort Steilacoom Park, to the south; the former Fort Steilacoom Golf Course and Golf Course Rd., to the north, Sentinel Dr. SW/Farwest Dr. SW and Steilacoom High School, to the west; and 87th Ave. SW, to the east. Sentinel Dr. SW/Farwest Dr. SW separates the City of Lakewood from the Town of Steilacoom.

The site is zoned "Public/Institutional (PI)" by the City of Lakewood.

Project Description

The campus includes two major zones: Adult Hospital Zone and Adolescent Hospital Zone. Figure 1 shows the campus divided into four sub-zone: Adult Hospital West, Adult Hospital Central, Adult Hospital East, and Adolescent Hospital Zone. The Oakridge Group Home and West Pierce Fire and Rescue Station (No. 24) are on the campus but are under separate ownerships and are not connected to the campus by internal roadways.

The DSHS is proposing to reduce the number of civil patients on campus and expand both forensic and child services over a 10-year period. The Master Plan includes demolishing about 264,825 sq. ft. of existing building area, adding about 720,740 sq. ft. of new building area to the campus, including upgrading the existing central campus area and historic For Steilacoom Fort, and constructing a new community hospital on the campus.

Table 1 summarizes the number of patient beds of the existing and proposed for the future campus, broken down by bed type.

Table 1: Existing and Proposed Number of Beds

Bed Type	Existing Baseline	Near Term (1-5 years)[1]	Mid Term (6-10 years)[1]
Center for Forensic Services (CFS)	360	458	533
Civil Commitment (Civil)	500	348	153
Child Study and Treatment Center (CSTC)	47	65	65
New CFS Hospital	0	0	350
New Community Hospital	0	0	48
Oakridge Group Home[2]	16	16	16
Total	923	887	815

1. Master Plan
2. Not part of main campus

A conceptual site plan included as Figure 2.

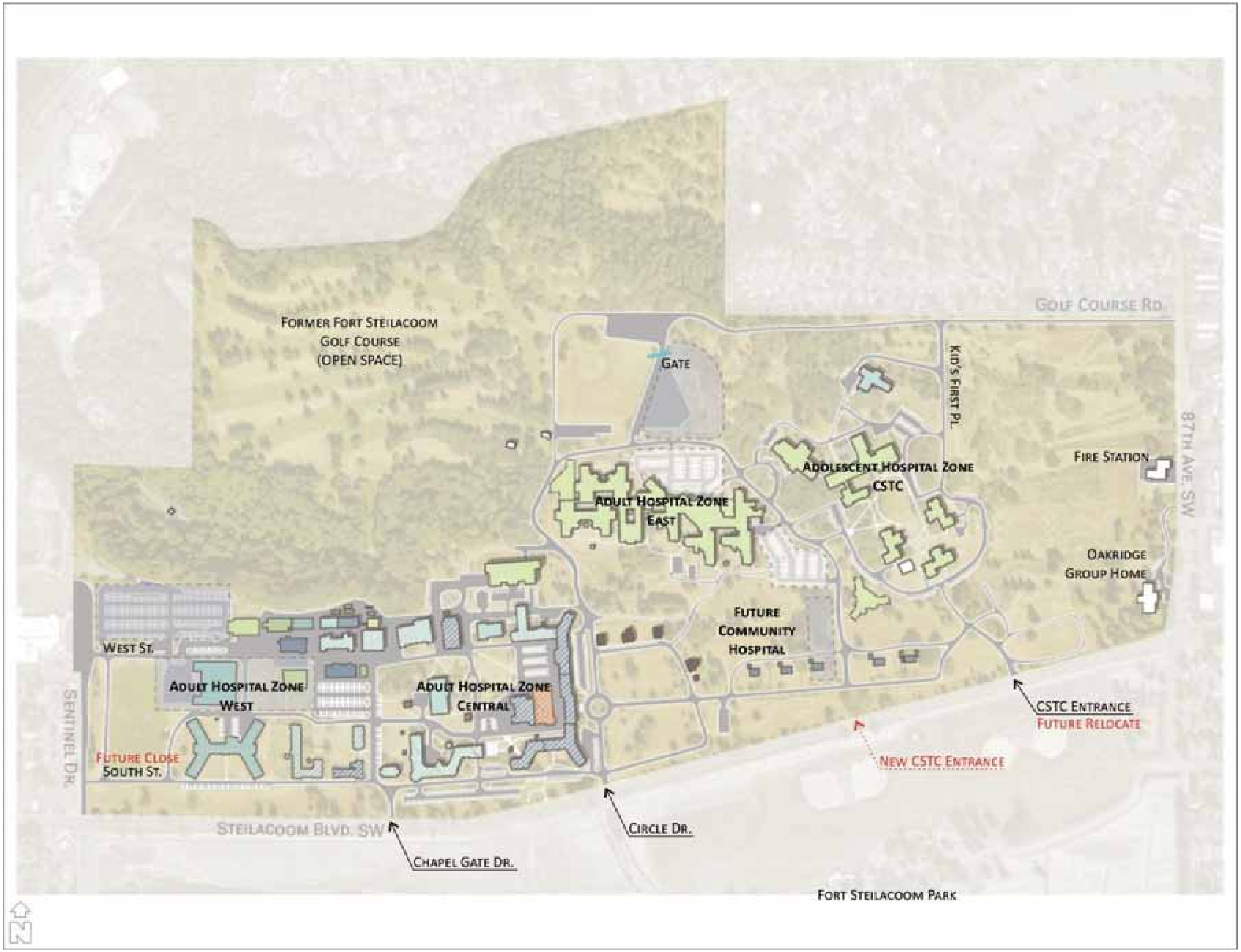


Figure 1: Vicinity Map

Figure 2: Conceptual Site Plan

In additional to reducing the total number of beds on the campus, DSHS has also expressed their desire to increase accessibility to Steilacoom Blvd. SW. Site access enhancements on Steilacoom Blvd SW include improving traffic control at Chapel Gate Dr., removal of the existing signal and restricting turning movements at Circle Dr., and relocating the existing CSTC Entrance further east and improving traffic control. Traffic control improvements may include signalization. Additionally, the South St. driveway on Sentinel Dr. would be vacated and use of the 87th Ave. SW as an access-way to/from the campus' existing gravel lot is contemplated as being permanently gated and closed.

These access enhancements are intended to encourage more campus vehicle traffic on and off Steilacoom Blvd. SW as opposed to Sentinel Dr. and 87th Ave. SW.

Campus Accesses

The existing main campus includes six major driveways off the public roadway network:

- Two driveways off Sentinel Dr., at West St. and South St.
- Three driveways off Steilacoom Blvd. SW, at Chapel Gate Dr., Circle Dr. and CSTC Entrance
- Two driveways off Golf Course Rd., at Kid's First Pl. and at WSH's gravel lot

Gated accesses include South St. off Sentinel Dr. and the WSH's gravel lot off Golf Course Rd.

Internal roadways connect between the major campus areas.

Oakridge Group Home and the fire station are adjacent uses to the campus; however, both are operated independently of the campus. There are not internal roadway connections between the campus and Oakridge Group Home and the fire station.

Parking

The existing campus parking is dispersed around the campus grounds. The future Master Plan includes consolidating parking areas and improving visitor, staff, maintenance and service vehicle parking, adding pavement markings and signing. The future parking supply will meet the needs of the campus.

Study Area

This focuses on the following study intersections:

- Sentinel Dr. / Farwest Dr. SW and West St. (campus access)
- Sentinel Dr. / Farwest Dr. SW and South St. (campus access)
- Farwest Dr. SW and Steilacoom Blvd. SW
- Chapel Gate Dr. and Steilacoom Blvd. SW (campus access)
- Circle Dr. and Steilacoom Blvd. SW (campus access)
- CSTC Entrance and Steilacoom Blvd. SW (campus access)
- 87th Ave. SE and Steilacoom Blvd. SW
- 87th Ave. SE and Oakridge Group Home (standalone campus access)
- 87th Ave. SE and Golf Course Rd.
- Kids First Pl. and Golf Course Rd. (campus access)

Existing Traffic Conditions

The following describes the existing transportation system and its operational characteristics.

Major Roadway Network

- Steilacoom Blvd. SW is classified as a Principal Arterial in the City of Lakewood. West of Farwest Dr. SW, the roadway has a 3-lane cross-section with a center turn lane. Fronting WSH, the roadway has a 4-lane cross-section with no center turn lane. East of 87th Ave. SW, the roadway has a 5-lane cross-section with a center turn lane. The posted speed limit is 35-mph. Fronting WSH, signalized intersections are at Farwest Dr. SW, Circle Dr., and 87th Ave. SW. Both sides of Steilacoom Blvd. SW are lined with curb and gutter. A shared-use path is on the Fort Steilacoom Park side of Steilacoom Blvd. SW.
- Farwest Dr. SW/Sentinel Dr. is classified as a Minor Arterial in the Town of Steilacoom. North of Steilacoom Blvd. SW, Farwest Drive SW becomes Sentinel Dr. approaching Steilacoom High School. Farwest Dr. SW has a 5-lane cross-section and a posted speed limit of 35-mph south of Steilacoom Blvd. SW. Sentinel Dr. is 2-lanes wide and has posted 20-mph school zone speed signs. On Sentinel Dr. SW, curb, gutter and sidewalk extend from Steilacoom Blvd. SW to the high school. The intersection of Farwest Dr. SW and Sentinel Dr. SW is signalized at Steilacoom Blvd. SW.
- 87th Ave. SW is classified as a Minor Arterial at Steilacoom Blvd. SW and a Collector Arterial to the north of Golf Course Rd. Near Steilacoom Blvd. SW, the roadway has a 5-land cross-section that transitions into a 3-lane section near Oakridge Group Home and later transitions into a 2-lane roadway at Onyx Dr. SW, north of Golf Course Rd. The posted speed limit is 30-mph and the roadway include curb, gutter and sidewalk on both sides.
- Golf Course Rd. is an access road between the former Fort Steilacoom Golf Course, which closed in September 2018, and 87th Ave. SW. Golf Course Rd. is stop sign controlled at 87th Ave. SW. The roadway is paved but includes no pavement markings or marked pedestrian facilities. Disc golf players currently use the open field areas accessible off Golf Course Rd. There are pullouts for parking alongside the roadway to the east of Kids First Pl. and the CSTC campus.

Traffic Volumes

Year 2019 traffic volumes were collected by Traffic Count Consultants, Inc., an independent traffic data collection firm.

Pneumatic tube counters were located to capture daily traffic volumes at seven of the eight campus accesses and on Steilacoom Blvd. SW near the Chapel Gate Dr. and CSTC Entrance between May 28 and May 30, 2019. Figure 3 illustrates the calibrated daily traffic volumes around and at the campus.

Tube counters were not located at the gated WSH gravel lot access since the access was closed during the initial field reviews, WSH management indicated that this access is opened periodically to support campus traffic flows. It is noted that the former Steilacoom Golf Course and public land area surrounding Golf Course Rd. is currently used for disc golf course and other recreational activities.

The AM and PM peak hour periods are defined as the highest 4 consecutive 15-minute traffic volume intervals between 7 and 9 AM and between 4 and 6 PM. These periods represent conditions when traffic volumes on the local roadways are typically at their highest and correspond, in general, to traditional peak commute times.

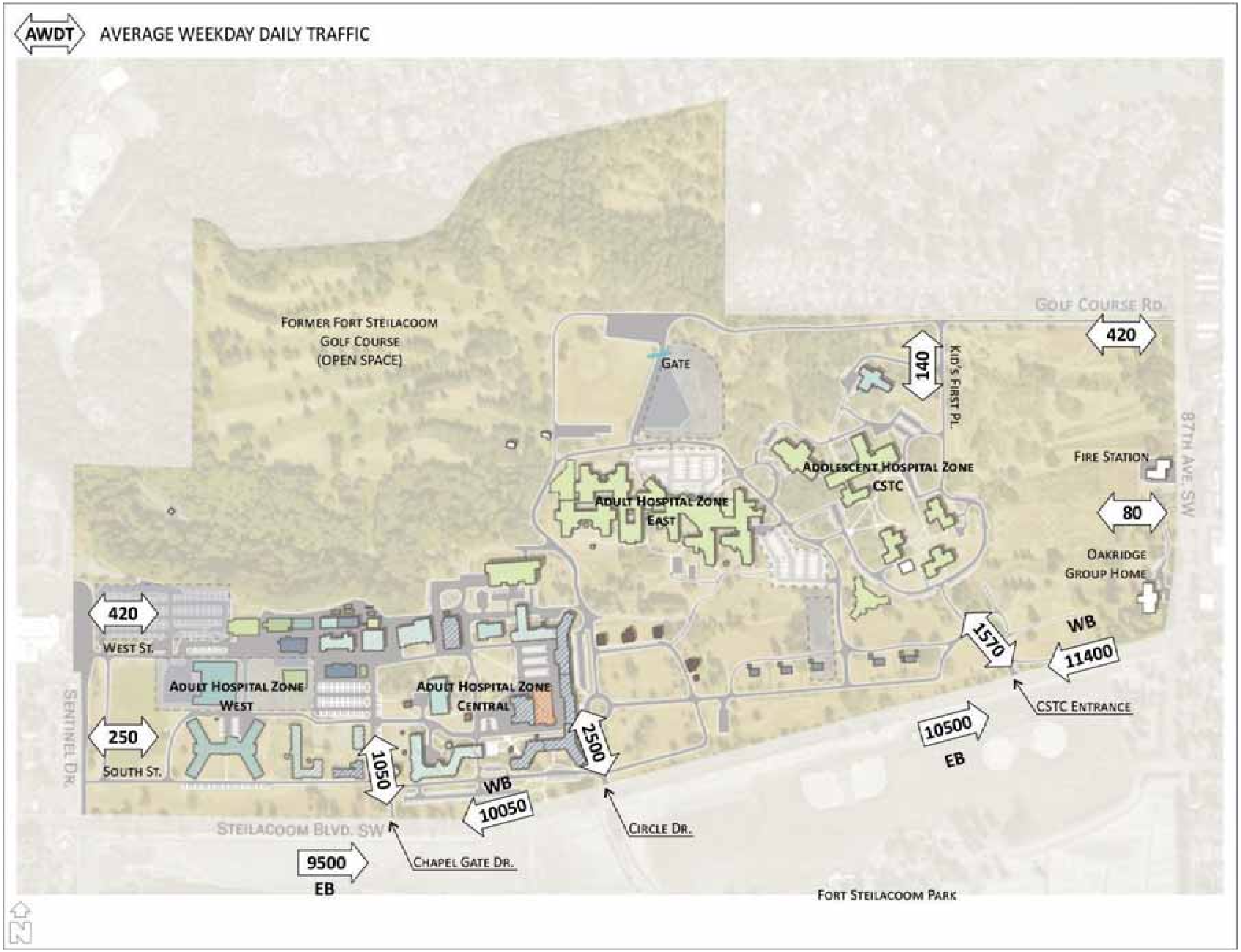


Figure 3: Average Weekday Daily Traffic Volumes

AM and PM peak hour intersection turning movement volumes were collected at the study intersections on Thursday, May 30, 2019 and Thursday, July 20, 2019. The driveway and intersection turning movement volumes were calibrated to be consistent with the daily traffic volumes. The raw count data is attached. Figure 4 illustrates the existing AM and PM peak hour traffic volumes at the study intersections and driveways.

Level-of-Service

Study area LOS was evaluated using the Synchro computer program and HCM 2010 methodology. Table 2 summarizes the intersection level-of-service and delay categories.

Table 2: Intersection Level-of-Service and Delay Categories

LOS	Signalized Intersection Delay	Stop-Controlled Intersection Delay
A	≤ 10 seconds	≤ 10 seconds
B	10-20 seconds	10-15 seconds
C	20-35 seconds	15-25 seconds
D	35-55 seconds	25-35 seconds
E	55-80 seconds	35-50 seconds
F	> 80 seconds	> 50 seconds

The City of Lakewood's level-of-service standards are as follows:

- Maintain LOS D with a V/C ratio threshold of 0.90 during weekday PM peak hour conditions on all arterial streets and intersections in the city, including state highways of statewide significance except as otherwise identified.
- Maintain LOS D during weekday PM peak hour conditions at all arterial street intersections in the city, including state highways of statewide significance except as otherwise identified.
- Maintain LOS F with a V/C ratio threshold of 1.10 in the Steilacoom Blvd. corridor between 88th St. SW and 83rd Ave. SW.
- Maintain LOS F with a V/C ratio threshold of 1.30 on Gravelly Lake Dr. between I-5 and Washington Blvd. SW and Washington Blvd. SW, west of Gravelly Lake Dr.
- The City may allow two-way and one-way stop-controlled intersections to operate worse than the level-of-service standards. However, the City requires that these instances be thoroughly analyzed from an operational and safety perspective.

Intersection Level of Service

Table 3 summarizes the existing peak hour intersection operations and the output is included in the Appendix.

The study intersections are calculated to operate at LOS D or better and satisfy the City of Lakewood's LOS threshold, except the CSTC Entrance at Steilacoom Blvd. SW. The southbound stop-controlled approach at CSTC Entrance is calculated to operate at LOS F, in the AM peak hour, and LOS E, in the PM peak hour.

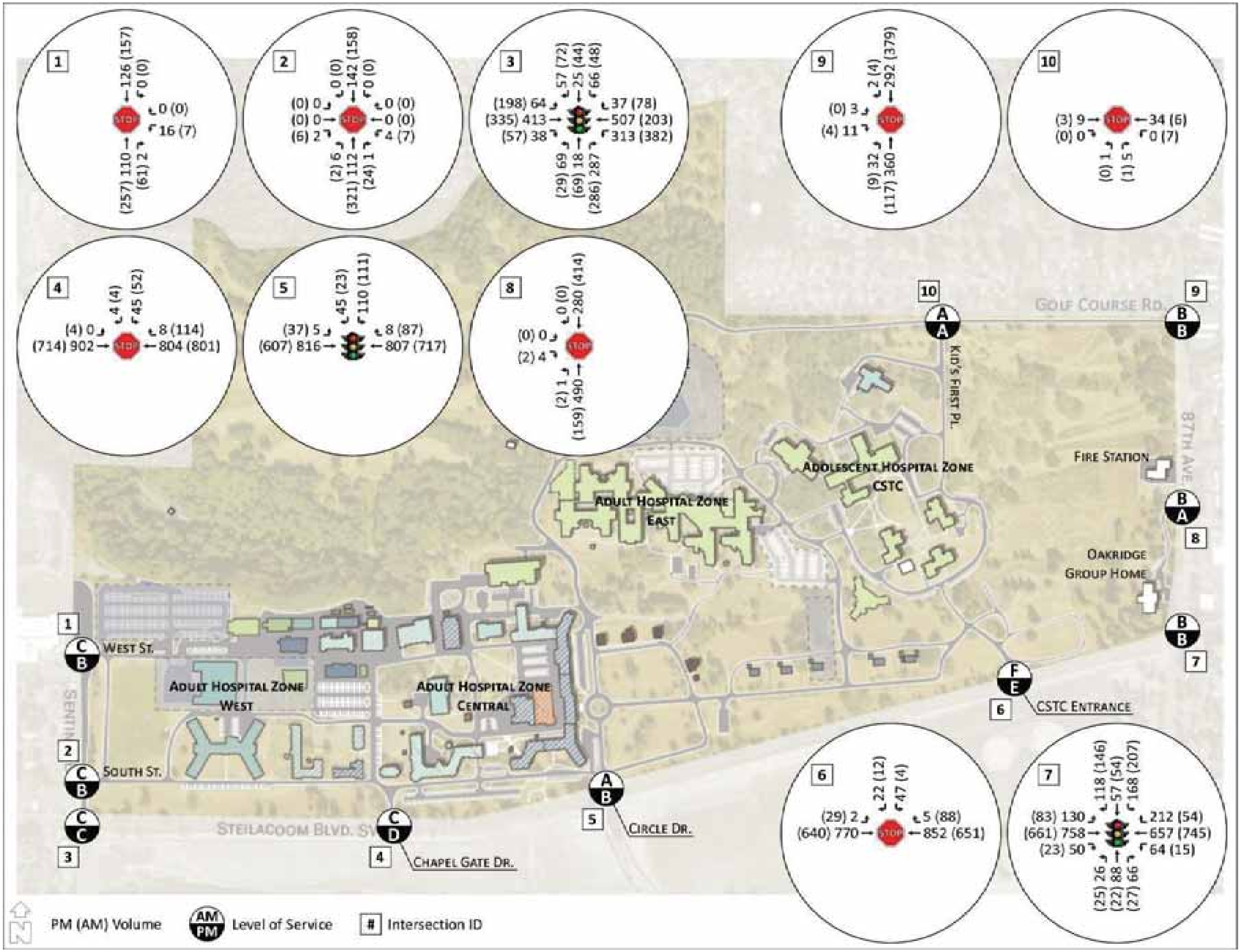


Figure 4: Existing AM and PM Peak Hour Traffic Volumes

Table 3: Existing AM and PM Peak Hour Intersection LOS

Intersection	Control	AM Peak Hour		PM Peak Hour	
		LOS	Delay	LOS	Delay
Sentinel Dr. / West St.	WB Stop	C	19.1	B	11.3
Sentinel Dr. / South St.	WB Stop	C	22.1	B	10.8
Farwest Dr. / Steilacoom Blvd.	Signal	C	28.3	C	33.4
Chapel Gate Dr. / Steilacoom Blvd.	SB Stop	C	15.2	D	32.8
Circle Dr. / Steilacoom Blvd.	Signal	A	5.3	B	14.6
CSTC Entrance / Steilacoom Blvd.	SB Stop	F	52.7	E	39.9
87th Ave. / Steilacoom Blvd.	Signal	B	16.6	B	19.1
87th Ave. / Oakridge Group Home	EB Stop	B	10.9	A	9.9
87th Ave. / Golf Course Rd.	EB Stop	B	10.9	B	10.6
Kids First Pl. / Golf Course Rd.	NB Stop	A	8.3	A	8.4

Arterial Level of Service

Table 4 summarizes the existing peak hour arterial LOS on Steilacoom Blvd. SW. The arterial capacity is from the City of Lakewood's Comprehensive Plan EIS and the LOS is expressed as a V/C ratio. The arterial volumes on Steilacoom Blvd. SW in the vicinity of the campus satisfies the V/C threshold from the City of Lakewood.

Table 4: Existing Arterial LOS on Steilacoom Blvd. SW

Direction	Capacity[1]	Maximum Volume[2]	V/C Ratio
Eastbound	1,825	992	0.54
Westbound	1,825	933	0.51

1. City of Lakewood Comprehensive Plan Final EIS – June 2000
2. Maximum PM peak hour volume in one direction

Vehicle Queuing (Stacking)

Existing vehicle queues were computed at the existing study intersections using the HCM 2010 95th-percentile queue equations to identify existing vehicle queue impacts around the campus. 95th-percentile queues are typically used for traffic design and are a statistical calculation of the vehicle queue length that has a 5% probability of occurring during the analysis hour. Table 5 summarizes the queue output.

- The 95th-percentile queues are noticeable, but the intersection and driveway spacing on Steilacoom Blvd. SW are more than sufficient to support the computed queues.
- The westbound left turn queue on Steilacoom Blvd. SW approaching Farwest Drive. SW is computed to exceed the 200-foot storage pocket in both the AM and PM peak hours, by up to 150 feet. Overall, the westbound approach queues, overall, do not extend into the adjacent Chapel Game Dr. intersection.
- The southbound queue at Chapel Gate Dr. approaching Sentinel Dr. SW is computed to be up to 40 feet.
- The southbound queue at Circle Dr. approaching Steilacoom Blvd. SW is computed to be 80 feet. The Circle Dr. and internal Front St. intersection is located approximately 25 feet north of the signalized intersection. Peak hour queues were observed to frequently extend through the internal intersection from Steilacoom Blvd. SW.
- The southbound queue at CSTC Entrance approaching Sentinel Dr. SW is computed to be up to 55 feet.
- The eastbound left turn queue Steilacoom Blvd. SW approaching 87th Ave. SW is computed to fit within the 200-foot storage pocket in both the AM and PM peak hours.
- The AM peak hour southbound left turn queue on 87th Ave. SW approaching Steilacoom Blvd. SW is computed to exceed the 125-foot storage pocket, by 40 feet or roughly two vehicle lengths.

Table 5: Existing Steilacoom Blvd. SW 95th-Percentile Queue Analysis

Intersection	Mvmt.	AM Peak Hour			PM Peak Hour			Storage (feet)
		Q-V/L[1]	Q-feet[2]	V/C	Q-V/L[1]	Q-feet[2]	V/C	
Farwest Dr. / Steilacoom Blvd.	WB L	14.0	350	0.77	12.9	325	0.74	200
	WB T	6.3	160	0.25	11.9	300	0.45	1,380
	WB TR	6.3	160	0.26	12.2	305	0.45	1,380
	SB L	2.7	70	0.26	4	100	0.51	125
	SB TR	7.1	180	0.68	5.1	130	0.69	140
Chapel Gate Dr. / Steilacoom Blvd.	SB App.	0.1	5	0.05	1.6	40	0.36	
Circle Dr. / Steilacoom Blvd.	EB LT	3.3	85	0.36	10.1	255	0.58	1,000
	EB T	3.0	75	0.40	9.1	230	0.63	1,000
	WB T	4.2	105	0.47	9.2	230	0.60	1,955
	WB TR	4.2	105	0.47	9.6	240	0.60	1,955
	SB LT	2.1	55	0.50	3.1	80	0.21	25
CSTC Entrance / Steilacoom Blvd.	SB App.	2.1	55	0.47	1.4	35	0.34	
87th Ave. / Steilacoom Blvd.	EB L	2.9	75	0.78	5.3	135	0.79	200
	EB T	7.7	195	0.42	9.8	245	0.51	685
	EB TR	7.9	200	0.42	10	250	0.51	685
	SB L	6.6	165	0.58	0.7	20	0.48	125
	SB TR	1.6	40	0.19	1.6	40	0.18	550
	SB R	4.6	115	0.59	3.6	90	0.42	250

1. queue expressed as vehicles per lane
2. queue lengths are converted to fee with approximately 25 feet per vehicle and are rounded to the nearest multiple of "5"

Traffic Circulation

- Figure 5 shows the existing major traffic circulation routes on the campus.
- Figure 6 shows the existing patient admissions and discharge route to and from the WSH campus.
- Figure 7 shows the existing on-campus shuttle routes.
- Figure 8 shows the existing service routes.

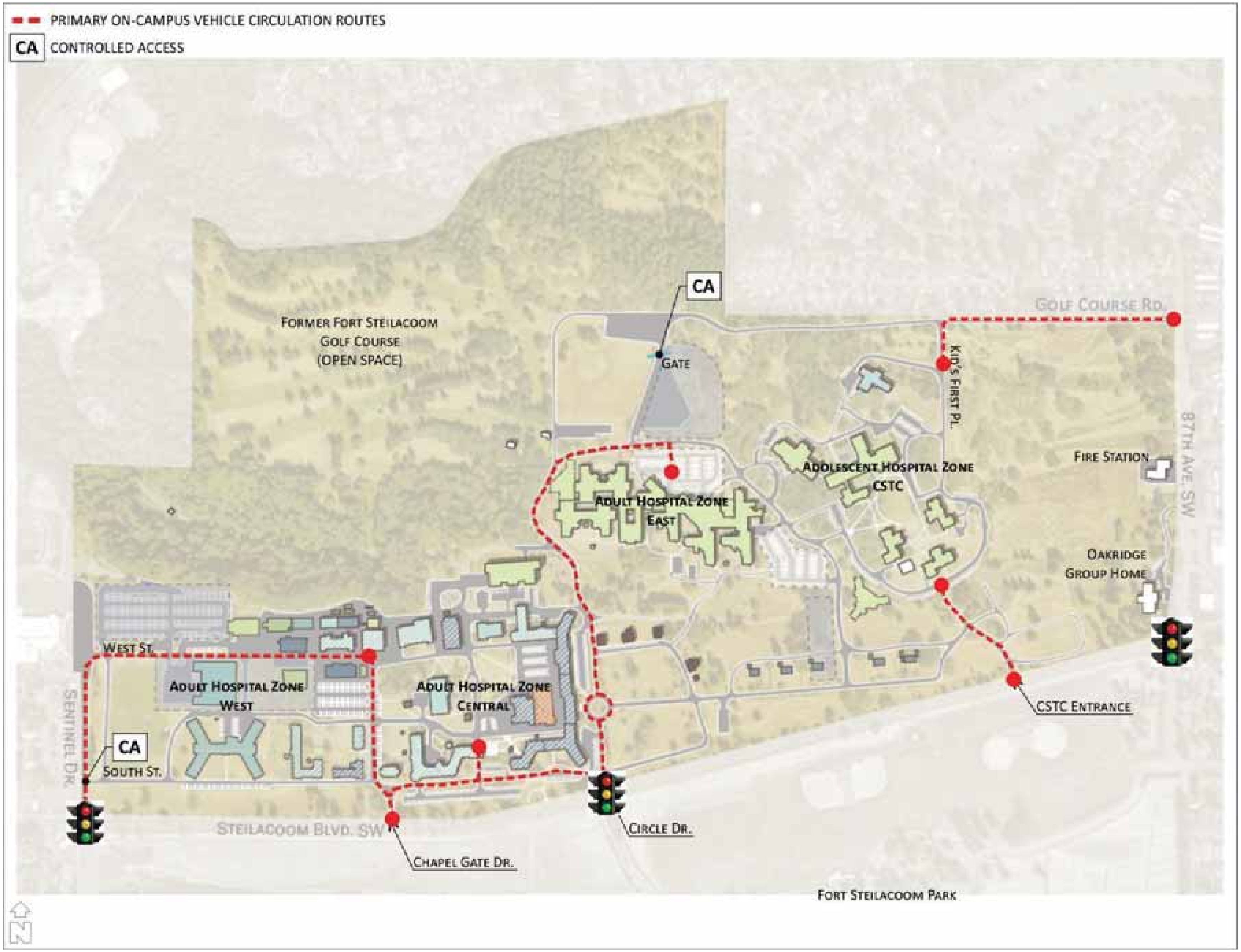


Figure 5: Existing On-Campus Primary Vehicle Circulation Routes

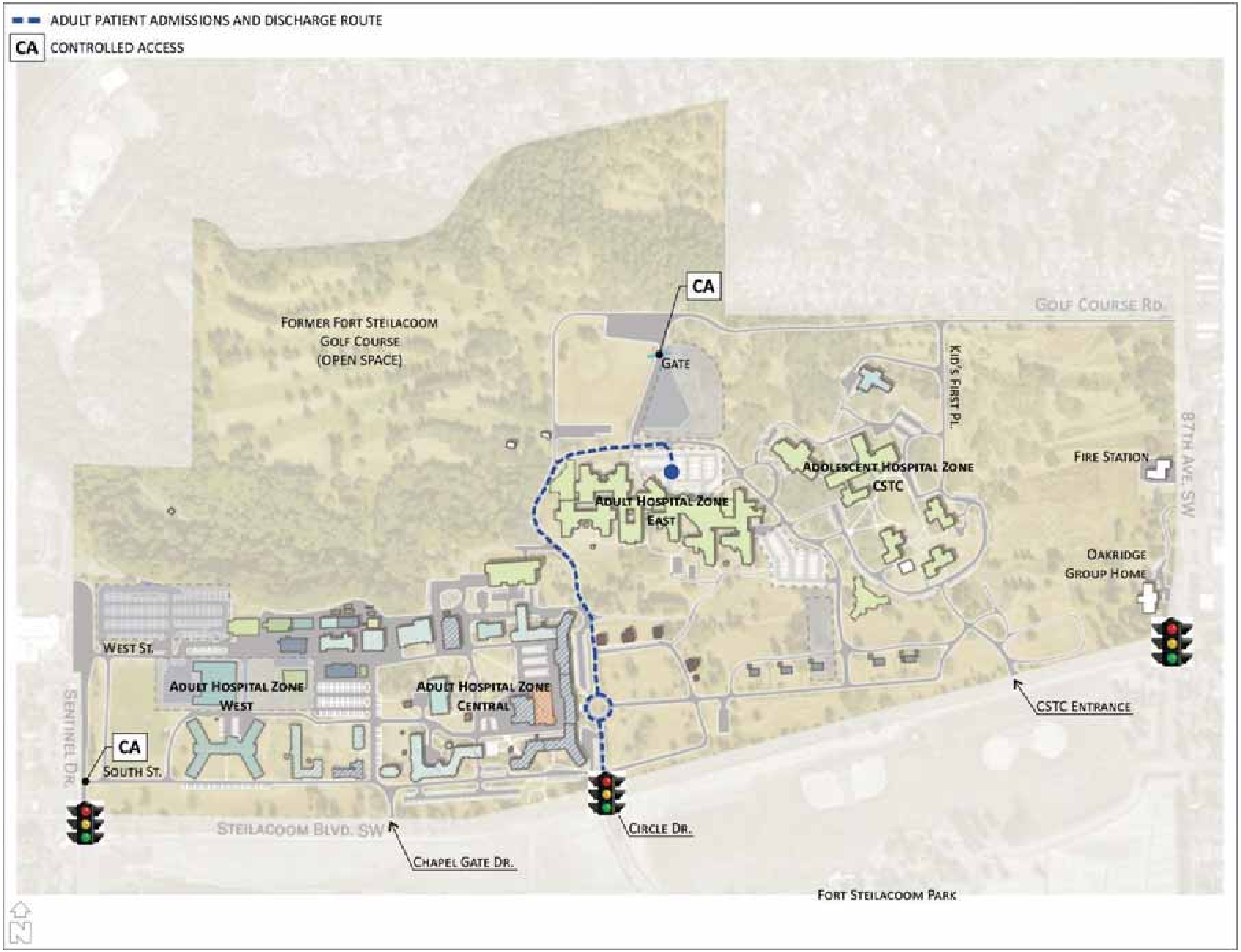


Figure 6: Existing Patient Admissions and Discharge Route

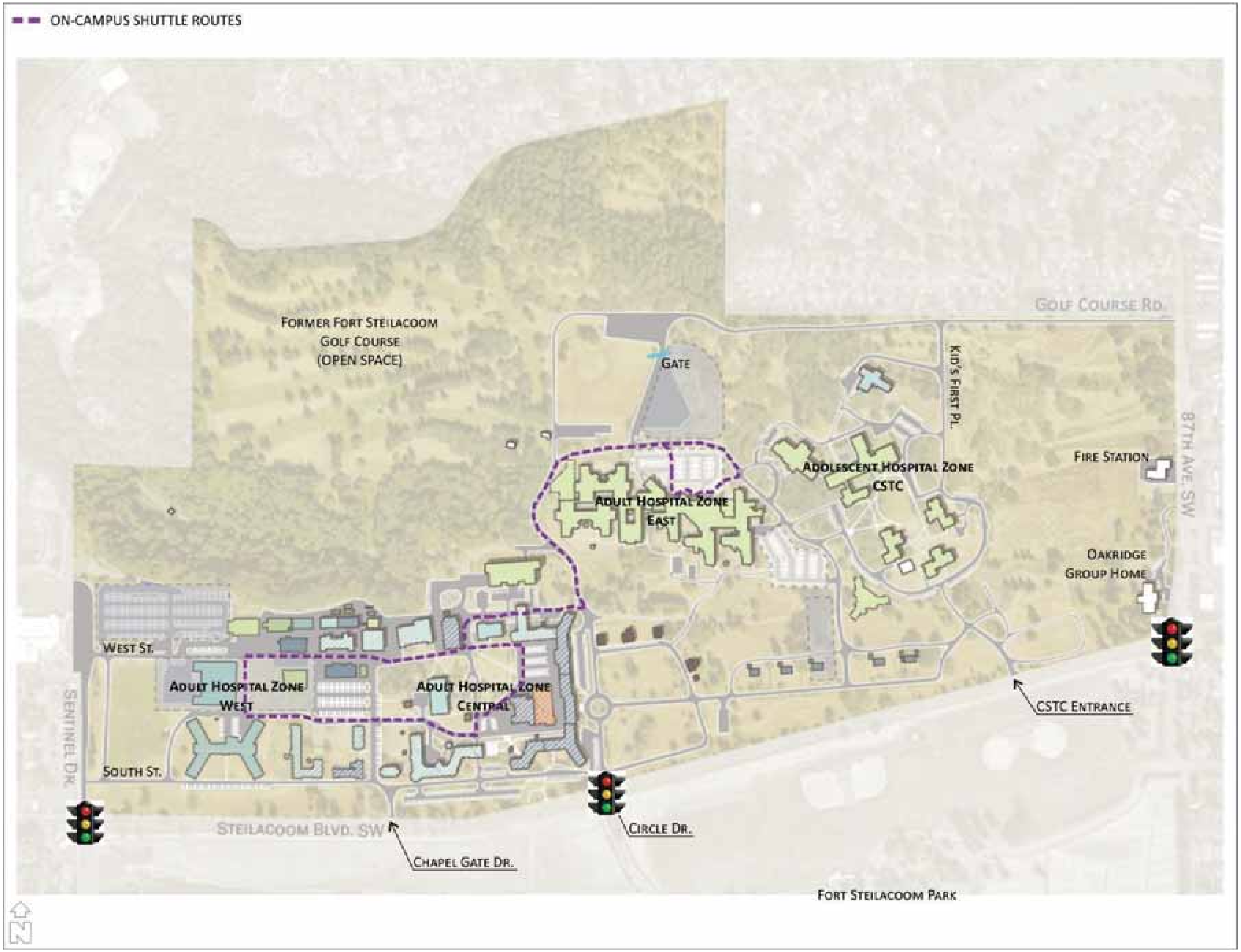


Figure 7: Existing On-Campus Shuttle Route

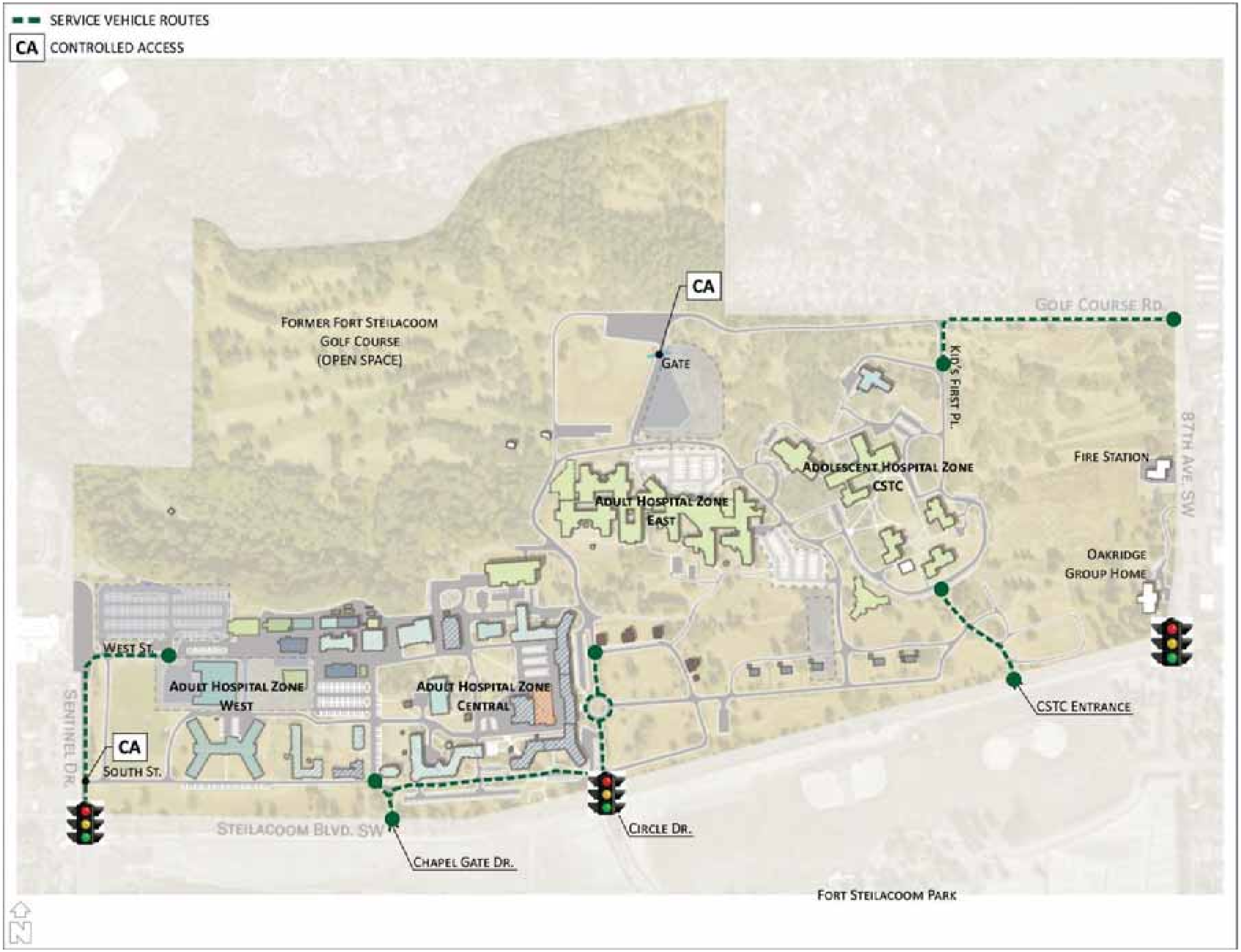


Figure 8: Existing Service Routes

Safety

A 6-year crash history was provided by the WSDOT for the area surrounding the campus on Sentinel Drive, Steilacoom Blvd SW, 87th Ave SW, and Golf Course Road Table 6 summarizes the crash history by year and resulting crash rates. Table 7 summarizes the crashes by location and by crash type.

Table 6: Crash History per Year

Location	Number of Crashes Reported per Year					Avg. Crashes	Est. AWDT [1]	Crash Rate
	2013	2014	2015	2016	2017			
Intersection								**MEV [2]**
87th Ave. at 82nd Street	0	0	0	1	0	0.20	6,000	0.09
87th Ave. at 83rd Street Ct.	0	1	1	0	1	0.60	6,000	0.27
87th Ave. at Oakridge Group Home	0	2	0	0	0	0.40	7,700	0.14
Steilacoom Blvd. at Farwest Drive	4	12	3	4	2	5.00	18,900	0.72
Steilacoom Blvd. at Chapel Gate Dr.	1	0	2	0	1	0.80	17,000	0.13
Steilacoom Blvd. at Circle Dr.	1	3	0	2	2	1.60	18,000	0.24
Steilacoom Blvd. at CSTC Entrance	0	0	0	0	1	0.20	17,700	0.03
Steilacoom Blvd. at 87th Ave.	3	1	3	3	5	3.00	23,900	0.34
Segment								**MVM [3]**
87th Ave. north of 82nd St.	0	0	1	0	0	0.20	6,000	1.29
87th Ave.: 82nd Street to 83rd St.	0	0	0	0	0	0.00	6,000	0.00
87th Ave.: 83rd Street to Steilacoom Blvd.	0	3	0	0	1	0.80	7,700	1.77
Sentinel Dr. north of Steilacoom Blvd.	0	1	0	0	0	0.20	2,700	4.76
Steilacoom Blvd.: Farwest to Chapel Gate	2	5	5	4	0	3.20	16,500	1.91
Steilacoom Blvd.: Chapel Gate to Circle Dr.	3	2	3	0	0	1.60	16,800	1.32
Steilacoom Blvd.: Circle Dr. to CSTC Entry	0	0	0	1	1	0.40	17,500	0.16
Steilacoom Blvd.: CSTC Entry to 87th Ave.	0	0	0	1	3	0.80	17,600	0.82
Golf Course Rd. west of 87th Ave.	0	0	0	0	1	0.20	500	1.10

1. Estimated Average Weekday Daily Traffic
2. Crashes per Million Entering Vehicles
3. Crashes per Million Vehicle Miles Traveled

Table 7: Crash History by Type

Location	Rear-End	Fixed Object	Opp. Dir. Left [1]	Side-swipe	Entering at Angle	Ped. / Bike	Other
Intersection							
87th Ave. at 82nd Street	0	1	0	0	0	0	0
87th Ave. at 83rd Street Ct.	1	0	0	0	2	0	0
87th Ave. at Oakridge Group Home	0	1	0	0	0	1	0
Steilacoom Blvd. at Farwest Drive	11	3	8	1	1	0	1
Steilacoom Blvd. at Chapel Gate Dr.	1	0	0	0	2	0	1
Steilacoom Blvd. at Circle Dr.	4	1	1	0	2	0	0
Steilacoom Blvd. at CSTC Entrance	0	0	1	0	0	0	0
Steilacoom Blvd. at 87th Ave.	5	1	3	4	2	0	0
Segment							
87th Ave. north of 82nd St.	0	0	0	0	0	1	0
87th Ave.: 82nd Street to 83rd St.	0	0	0	0	0	0	0
87th Ave.: 83rd Street to Steilacoom Blvd.	2	1	0	0	0	1	0
Sentinel Dr. north of Steilacoom Blvd.	1	0	0	0	0	0	0
Steilacoom Blvd.: Farwest to Chapel Gate	9	3	0	2	0	0	2
Steilacoom Blvd.: Chapel Gate to Circle Dr.	2	2	0	3	0	0	1
Steilacoom Blvd.: Circle Dr. to CSTC Entry	1	0	0	0	0	0	1
Steilacoom Blvd.: CSTC Entry to 87th Ave.	1	1	0	2	0	0	0
Golf Course Rd. west of 87th Ave.	0	0	0	0	0	0	1

1. Reported as "Opposite Direction - One Left - One Straight" and not "Entering at Angle"

Between 2013 and 2017 there were 96 collisions reported and 69% of those crashes resulted in property damage only. In 2015 there was one fatality reported on Steilacoom Blvd. SW with a vehicle in the eastbound direction colliding with the rock wall along the roadway.

Overall, the number of reported crashes peaked in 2014, with 30 total crashes reported. Compared to the other years, where the annual number of crashes ranged from 14 to 18 per year.

In general, intersections with crash rates of 1.00 crashes per million entering vehicles and roadway segments with crash rates of 10.00 crashes per million vehicle miles traveled are considered as high crash locations. None of the study area intersections or roadway segments meeting these crash rate thresholds.

The study area crashes included: rear-end (40%), fixed object (15%), opposite direction (14%), sideswipe (12%), entering at angle (9%), pedestrian or bicyclist (3%) and other (7%). On Steilacoom Blvd. SW the low rock walls on both sides of the roadway and lack of a center lane or turn lane factors into the types of crashes reported, with rear ends, opposite direction, sideswipes, entering at angle crashes.

Non-Motorized Conditions

Sentinel Dr. SW includes sidewalks on both sides of the roadway from Steilacoom Blvd. SW to the high school. There is one east-west crossing at the south end of the southmost high school driveway.

A shared-use path is along the Fort Steilacoom Park side of Steilacoom Blvd. SW. A tunnel under Steilacoom Blvd. SW provides direct access between the campus to the park. The signalized intersection at Circle Dr. includes marked crosswalks on the north and west legs of the intersection.

87th Ave. SW includes sidewalks and bicycle lanes on both sides of the roadway from Steilacoom Blvd. SW to Onyx Dr. SW, just north of Golf Course Rd.

There are no marked pedestrian facilities on Golf Course Rd.

Transit Conditions

Pierce Transit Route 212 Steilacoom provides weekday and weekend services along Steilacoom Blvd. SW and to Pierce College. Weekday headways are about 50 minutes in length. Transit stops are located at Farwest Dr. SW, between Chapel Gate Dr. and Circle Dr. and at 87th Ave. SW.

Future No Action

This section summarizes the future traffic conditions prior without improvement and modifications to the existing campus. The future "No Action" condition represents a baseline condition against which to measure specific impacts related to the proposed Master Plan.

Horizon Year

The Master Plan represents a 10-year build-out plan for WSH. For this analysis the horizon year is 2030.

The Comprehensive Plans from the City of Lakewood Comprehensive Plan and Town of Steilacoom were reviewed to estimate traffic growth in the study area. On Steilacoom Blvd. SW, the traffic volumes were forecast to grow by less than 0.5% per year, based on information from the Town of Steilacoom.

To be conservative, between now and 2030 traffic volumes around the WSH campus is estimated to grow at a rate of 1.0% annually. The growth rate includes both regional and local traffic growth.

The No Action analysis does not assume any growth on the campus and at the high school.

Transportation Improvements

The City of Lakewood's Six-Year 2020-2025 Transportation Improvement Plan (TIP) identifies the following transportation facility improvements near the campus:

- 302.0024 Steilacoom Blvd. SW – Farwest Dr. SW to Phillips Rd. SW. Acquire right-of-way to design and construct curb, gutter, sidewalk, sharrows, turn lanes, street lighting, drainage and overlay. Right-of-way acquisition and design are funded, and construction is not. With the exception of design, the project is anticipated to be complete by 2021. (Lakewood TIP)
- 302.0117 Roundabout 87th Ave. SW, Dresden Ln. SW and Fort Steilacoom Park Entrance. Constructs roundabout, with curb, gutter, sidewalk, sharrows, street lighting, drainage, roadway reconstruction and signage at the park entrance on 87th Ave. SW. This project is not currently funded. (Lakewood TIP)

The Town of Steilacoom's Six-Year Transportation Improvement Plan 2019 to 2024 and Comprehensive Plan identify the following transportation facility improvements near the campus:

- Steilacoom Blvd. SW Non-Motorized Improvements. Design and construct curb, gutter, sidewalk and bike lanes on Steilacoom Blvd. SW from Puyallup St. to Farwest D. SW. The project is fully funded, and completion is anticipated in 2019. (Steilacoom TIP/Comprehensive Plan)

Transportation facility improvements are incorporated into the analyses of future traffic conditions.

Traffic Volumes

Figure 9 illustrates the future no action traffic volumes.

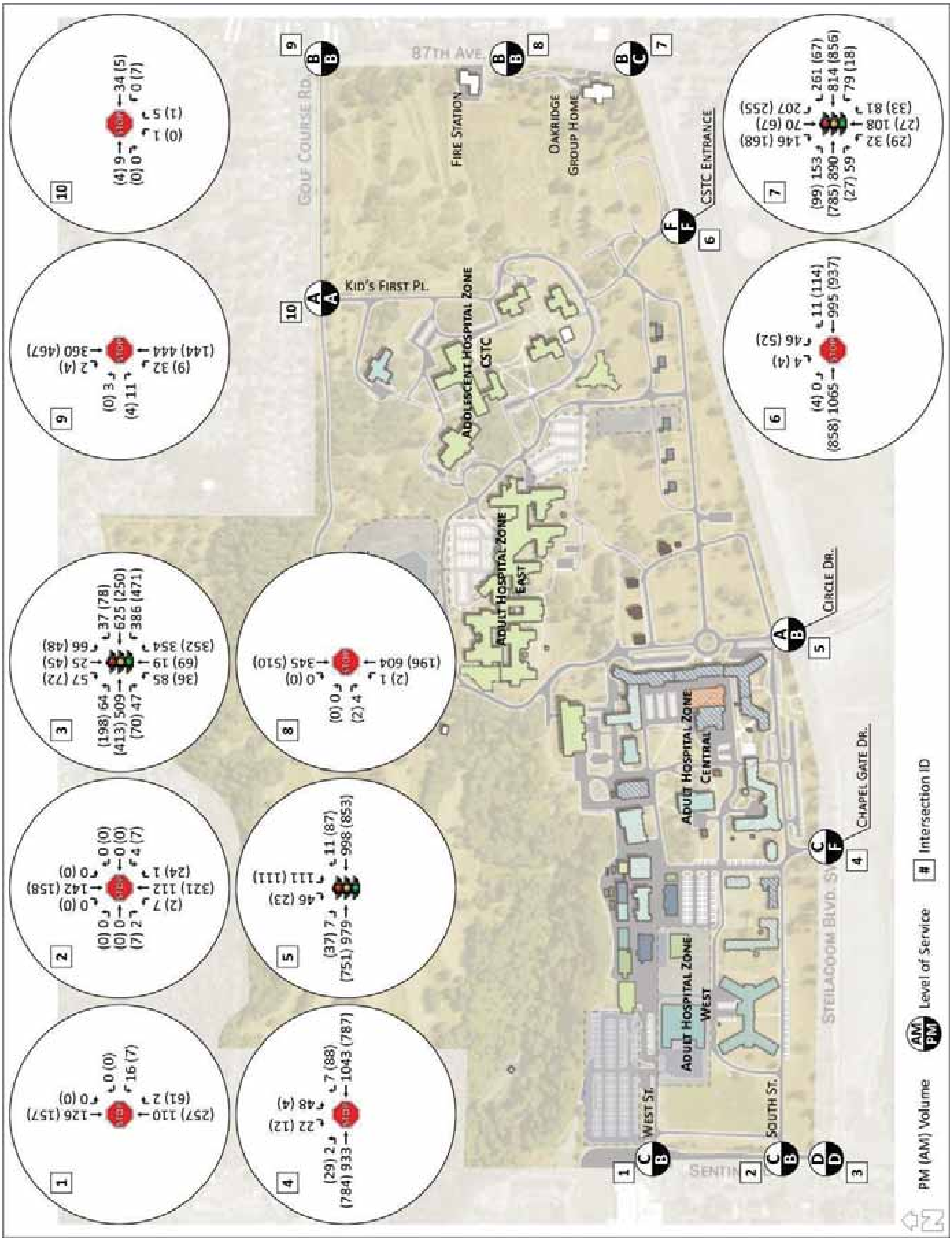


Figure 9: Future No Action AM and PM Peak Hour Traffic Volumes

Level of Service

Intersection Level of Service

Table 8 summarizes the future no action study intersection LOS.

Table 8: Future No Action AM and PM Peak Hour Intersection LOS

Intersection	Control	AM Peak Hour				PM Peak Hour			
		Existing		No Action		Existing		No Action	
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Sentinel Dr. / West St.	WB Stop	C	19.1	C	19.1	B	11.3	B	11.3
Sentinel Dr. / South St.	WB Stop	C	22.1	C	18.8	B	10.8	B	10.8
Farwest Dr. / Steilacoom Blvd.	Signal	C	28.3	D	36.9	C	33.4	D	41.5
Chapel Gate Dr. / Steilacoom Blvd.	SB Stop	C	15.2	C	18.3	D	32.8	F	60.1
Circle Dr. / Steilacoom Blvd.	Signal	A	5.3	A	5.3	B	14.6	B	14.4
CSTC Entrance / Steilacoom Blvd.	SB Stop	F	52.7	F	100	E	39.9	F	74.8
87th Ave. / Steilacoom Blvd.	Signal	B	16.6	B	19.3	B	19.1	C	21.8
87th Ave. / Oakridge Group Home	EB Stop	B	10.9	B	11.8	A	9.9	B	10.4
87th Ave. / Golf Course Rd.	EB Stop	B	10.9	B	11.7	B	10.6	B	11.3
Kids First Pl. / Golf Course Rd.	NB Stop	A	8.3	A	8.4	A	8.4	A	8.5

In the future, the additional non-WSH traffic volumes result in increases in control delay at the study intersections. The study intersections are forecast to operate at LOS D or better and satisfy the City of Lakewood's LOS threshold, except the Chapel Gate Dr. and CSTC Entrance driveways off Steilacoom Blvd. SW.

- In the AM peak hour, the Chapel Gate Dr. stop-controlled approach to Steilacoom Blvd. SW is calculated to operate at LOS C (existing) and LOS C (No Action). In the PM peak hour, the approach is calculated to operate at LOS D (existing) and LOS F (No Action).
- In the AM peak hour, the CSTC Entrance stop-controlled approach to Steilacoom Blvd. SW is calculated to operate at LOS F (existing) and LOS F (No Action). In the PM peak hour, the approach is calculated to operate at LOS E (existing) and LOS F (No Action).

Arterial Level of Service

Table 9 summarizes the future No Action peak hour arterial LOS on Steilacoom Blvd. SW. The future arterial volumes on Steilacoom Blvd. SW in the vicinity of the campus satisfy the City of Lakewood's V/C threshold.

Table 9: No Action Arterial LOS on Steilacoom Blvd. SW

Direction	Capacity[1]	Existing V/C	No Action Vol.[2]	No Action V/C
Eastbound	1,825	0.54	1,178	0.65
Westbound	1,825	0.51	1,154	0.63

1. City of Lakewood Comprehensive Plan Final EIS – June 2000
2. Maximum PM peak hour volume in one direction

Vehicle Queuing (Stacking)

Vehicle queues were computed using the HCM 2010 95th-percentile queue equations to evaluate future vehicle queue impacts around the campus. Table 10 summarizes the queue output.

Table 10: Future No Action Steilacoom Blvd SW Queues

Intersection	Mvmt.	AM Peak Hour			PM Peak Hour			Storage (feet)
		Q-V/L[1]	Q-feet[2]	V/C	Q-V/L[1]	Q-feet[2]	V/C	
Farwest Dr. / Steilacoom Blvd.	WB L	22.3	560	0.95	12.8	320	0.97	200
	WB T	7.8	195	0.29	14.5	365	0.55	1,380
	WB TR	7.8	195	0.30	14.9	375	0.55	1,380
	SB L	2.8	70	0.26	4.0	100	0.51	125
	SB TR	7.4	185	0.69	5.1	130	0.69	140
Chapel Gate Dr. / Steilacoom Blvd.	SB	0.2	5	0.06	2.7	70	0.54	
Circle Dr. / Steilacoom Blvd.	EB LT	4.2	105	0.42	11.6	290	0.63	1,000
	EB T	4.0	100	0.74	10.8	270	0.68	1,000
	WB T	5.1	130	0.52	11.1	280	0.66	1,955
	WB TR	5.2	130	0.52	11.5	290	0.66	1,955
	SB LT	2.4	60	0.54	3.3	85	0.23	25
CSTC Entrance / Steilacoom Blvd.	SB	3.4	85	0.68	2.4	60	0.53	
87th Ave. / Steilacoom Blvd.	EB L	4.1	105	0.78	7.0	175	0.80	200
	EB T	9.6	240	0.51	12.0	300	0.60	685
	EB TR	9.6	240	0.51	12.3	310	0.60	685
	SB L	8.9	225	0.73	2.9	75	0.61	125
	SB TR	2.0	50	0.22	2.1	55	0.22	550
	SB R	5.4	135	0.63	4.6	115	0.51	250

1. queue expressed as vehicles per lane
2. queue lengths are converted to fee with approximately 25 feet per vehicle and are rounded to the nearest multiple of "5"

The 95th-percentile queues are noticeable, but the intersection and driveway spacing on Steilacoom Blvd SW are more than sufficient to support the computed queues.

- The westbound left turn queue on Steilacoom Blvd. SW approaching Farwest Dr. SW is computed to exceed the 200-foot storage pocket in both the AM and PM peak hours, by up to 360 feet. The peak hour westbound left turn V/C ratios are greater than 0.90 suggesting that the left turn movement is nearing capacity. Overall, the westbound approach queues, overall, do not extend into the adjacent Chapel Game Dr. intersection.
- The southbound queue at Chapel Gate Dr. approaching Sentinel Dr. SW is computed to be up to 70 feet.
- The southbound queue at Circle Dr. approaching Steilacoom Blvd. SW is computed to be 90 feet. The Circle Dr. and internal Front St. intersection is located approximately 25 feet north of the signalized intersection. Peak hour queues are forecast to continue to extend through the internal intersection from Steilacoom Blvd. SW.
- The southbound queue at CSTC Entrance approaching Sentinel Dr. SW is computed to be up to 85 feet.
- The eastbound left turn queue on Steilacoom Blvd. SW approaching 87th Ave. SW is computed to fit within the 200-foot storage pocket in both the AM and PM peak hours.
- The southbound left turn queue on 87th Ave. SW approaching Steilacoom Blvd. SW is computed to exceed the 125-foot storage pocket in the AM peak hour, by 100 feet or four vehicle lengths.

Traffic Circulation

The on-campus circulation is not forecast to substantially change in the future with the proposed No Action.

Safety

The crash frequency is forecast to increase proportional to the future traffic volumes.

Non-Motorized Conditions and Transit Conditions

The on-campus circulation and the non-motorized and transit conditions are not forecast to substantially change between now and 2030 with the No Action conditions.

Recommendations

The following outlines recommendations for the future No Action condition.

- Circulation. Improve the campus's internal roadway circulation by increasing the spacing between internal roadways and intersections and driveways.
- Access. Improve access to the campus by enhancing traffic flow to and from Steilacoom Blvd. SW via:
  - Install a traffic control signal at Chapel Gate Dr., with the intent of concentrating more traffic to this access and reducing traffic impacts on Sentinel Dr. The FHWA recommends that a traffic control signal meet certain "warrants", which are discussed later in this document.
  - Shift CSTC Entrance east and signalize the driveway, to increase the spacing between the CSTC Entrance and 87th Ave. SW and with the intent of concentrating more traffic to this access and reducing traffic impacts on 87th Ave. SW. The FHWA recommends that a traffic control signal meet certain "warrants", which are discussed later in this document.
  - Widen Steilacoom Blvd. SW to provide left turn pockets and acceleration lanes to improve left turn maneuvers to and from the campus. Left turn lanes would enhance site access by providing a "pocket" off of the mainline for vehicles to queue in before making a left turn to the campus. Acceleration lanes, in the form of a center turn lane, would allow staged left turn maneuvers (left turn out of campus to turn lane to merge with opposing traffic volume). Widening requires right-of-way acquisition.
  - An alternative to widening, is to reduce the number of lanes on Steilacoom Blvd. SW, this is often referred to as a "road diet". The lane reduction would create a three-lane cross-section with wide shoulders and bicycle lanes and a center turn lane. The FHWA recommends a feasibility study for a road diet of four- to three-lane roadway where the ADT is greater than 20,000 vehicles.
  - As alternative to traffic signals, install a single-lane (or multilane) roundabout. Unlike a signal, roundabouts have less of an impact on travel times since they are not creating designated stops for the mainline traffic flow. Roundabouts also do not have adopted "warrant" criteria.
  - Remove the existing signal at Circle Drive and Steilacoom Blvd SW, and repurposing the intersection to be right-in and right-out only restricted. This will decentralize access at Circle Dr. and refocus traffic to the Chapel Gate Dr. and CSTC Entrance driveways.
  - Close or add gates (restrictions) to existing main campus access off Sentinel Dr. and Golf Course Rd. West St. could be gated and restricted for service vehicles only. Kids First Pl. could also be gated, for fire and emergency vehicle access to the site only. Also, vehicle access to campus' other secondary entrances off Golf Course Rd. could be restricted. By restricting or eliminating these access, the campus traffic would be forced to access the site off Steilacoom Blvd SW, which would mitigate neighborhood concerns with campus traffic impacting the high school and residents.
- Support. DSHS should provide their support for non-motorized and turn lane improvements on Steilacoom Blvd. SW, planned by both the Town of Steilacoom and City of Lakewood.
- Parking. Consolidate, mark, pave and manage parking areas to reduce parking sprawl on campus. Designate areas for staff based on the location and function of employees

Trip Generation, Distribution and Assignment

This section describes the trip generation and PM peak hour trip distribution and travel assignment forecasts for the proposed Master Plan, or "Action" condition. The following analysis is consistent with the trip generation methodology from the traffic concurrency request and concurrency findings output.

Trip Generation

Trips generated by build-out of the Master Plan were forecast from the existing campus' driveway volumes. Trip rates were computed based on the number of vehicle trips generated per bed. Table 11 summarizes the trip forecast for the Proposed Action.

Table 11: Proposed Action Trip Generation Forecast

	"No Action" # of Beds[1,2]	"No Action" Trips	% (In/Out)	Rate (Trips/Bed)	"Action" # of Beds[1]	"Action" Trips	Trip Difference
AM Generator (6:30-7:30 AM)	907	828	66/34	0.91	799	727	(101)
AM Peak Hour (7:00-8:00 AM)	907	677	67/33	0.75	799	599	(78)
PM Generator (2:15-3:15 PM)	907	764	41/59	0.84	799	671	(93)
PM Peak Hour (4:00-5:00 PM)	907	366	16/84	0.40	799	320	(46)
Daily Trips	907	6,046	48/52	6.67	799	5,329	(717)

1. See Table 1
2. Excludes Oakridge Group Home, which is not proposing to change from its current 16 bed capacity.

Overall, the Proposed Action reduces the number of patient beds on the campus; and thus, is forecast to generate less trips compared to the current campus (No Action).

Campus Area Breakdown

Overall, the Proposed Action reduces the patient capacity of the main campus. Services in the existing civil and forensic care would be consolidated from 860 patient beds (No Action) to 336 patient beds (Proposed Action). Future conditions also include a new forensic hospital for 350 patients, expansion of the CSTC from 47 beds (No Action) to 65 beds (Proposed Action), and addition of new community hospital with 48 patient beds.

Tables 12 and 13 summarize the AM and PM peak hour trips generated by the major campus accesses.

Table 12: AM Peak Hour Trips Generation by Campus Area

Campus Area	Existing Campus			Proposed Action		
	In	Out	Total	In	Out	Total
Sentinel Drive Driveway(s)	85	14	99	70	15	85
Steilacoom Blvd West Driveway (Chapel Gate)	117	16	133	109	15	124
Steilacoom Blvd Central Driveway (Circle Drive)	124	134	258	95	106	201
Steilacoom Blvd Driveway East (CSTC)	118	56	174	117	61	178
87th Ave SW at Golf Course Road	11	2	13	10	1	11
Total	455	222	677	401	198	599

Table 13: PM Peak Hour Trips Generation by Campus Area

Campus Area	Existing Campus			Proposed Action		
	In	Out	Total	In	Out	Total
Sentinel Dr. Driveway(s)	3	20	23	3	20	23
Steilacoom Blvd. West Driveway (Chapel Gate Dr.)	9	70	79	15	60	75
Steilacoom Blvd. Central Driveway (Circle Dr.)	18	157	175	17	125	142
Steilacoom Blvd. East Driveway (CSTC)	11	50	61	16	59	75
87th Ave. SW at Golf Course Rd.	19	9	28	0	5	5
Total	60	306	366	51	269	320

Peak Hour Trip Assignment

Campus generated trips were distributed based on the traffic volumes at the campus driveways and on Steilacoom Blvd. SW and 87th Ave. SW.

This analysis assumes the future campus will generate similar peak hour trip patterns compared to existing conditions. With the Proposed Action:

- South St. driveway off Sentinel Dr. SW is vacated;
- CSTC Entrance is relocated about 800 feet to the west of its current location to be roughly midblock on Steilacoom Blvd. SW between Circle Dr. and 87th Ave. SW; and
- use of the gated access to the gravel lot off Golf Course Rd. is restricted with traffic redistributed to Steilacoom Blvd. SW.

Figure 10 illustrates the AM and PM peak hour trips of the existing campus (No Action).

Figure 11 illustrates the net new AM and PM peak hour trips with the Proposed Action.

With the Proposed Action, the overall campus the volumes in the study area reduced. Certain driveways are projected to see increases in traffic based on the locations of new buildings and certain driveways are projected to see decreases in traffic based on buildings being removed and activities being consolidated on the campus.

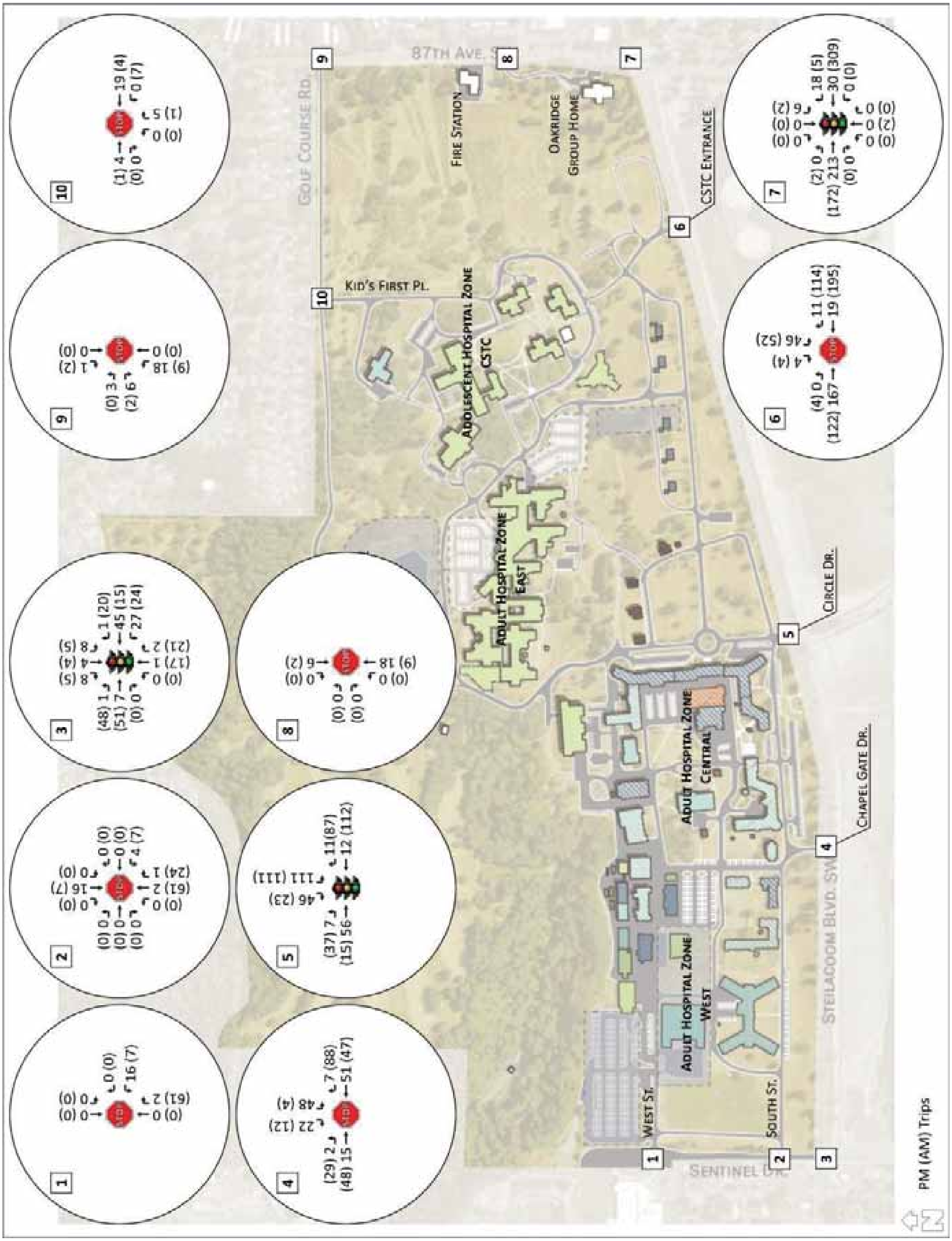


Figure 10: Existing Campus AM and PM Peak Hour Campus Trips

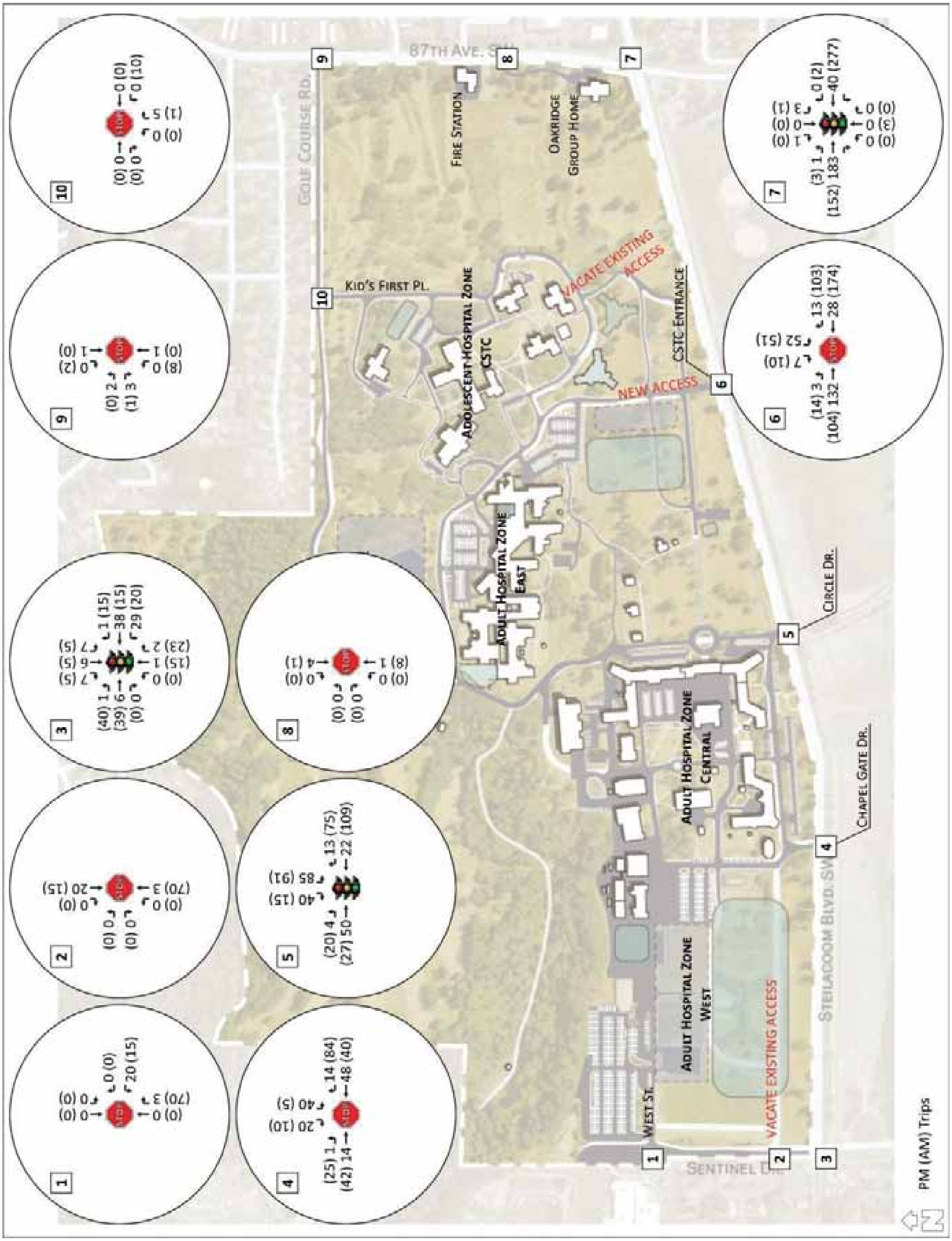


Figure 11: Net New AM and PM Peak Hour Campus Trips

Proposed Action

This section summarizes the future traffic conditions with built-out of the Proposed Action.

With the Proposed Action, the existing CSTC Entrance is proposed to be relocated to the east on Steilacoom Blvd. SW at roughly midway between the existing Circle Dr. intersection and 87th Ave. SW. Additionally, the existing South St. driveway off Sentinel Dr. SW would be closed.

Traffic Volumes

Future AM and PM peak hour traffic volumes with the Proposed Action were forecast by adding the net new trips generated with the proposal to the future No Action volumes. The future AM and PM peak hour traffic volumes with the Proposed Action are illustrated in Figure 12.

Level of Service

Intersection Level of Service

Table 8 summarizes the future no action study intersection LOS.

Future with-Project study intersection level-of-service is summarized in Table 14.

Table 14: Proposed Action AM and PM Peak Hour Intersection Level-of-Service

Intersection	Control	AM Peak Hour				PM Peak Hour			
		No Action		Proposed Action		No Action		Proposed Action	
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Sentinel Dr. / West St.	WB Stop	C	19.1	C	20.0	B	11.3	B	11.3
Sentinel Dr. / South St.	WB Stop	C	18.8	Closed		B	10.8	Closed	
Farwest Dr. / Steilacoom Blvd.	Signal	D	36.9	D	36.0	D	41.5	D	41.7
Chapel Gate Dr. / Steilacoom Blvd.	SB Stop	C	18.3	C	19.9	F	60.1	F	51.1
Circle Dr. / Steilacoom Blvd.	Signal	A	5.3	A	5.1	B	14.4	B	14.5
CSTC Entrance / Steilacoom Blvd.	SB Stop	F	100	F	94.1	F	74.8	F	83.6
87th Ave. / Steilacoom Blvd.	Signal	B	19.3	B	19.3	C	21.8	C	21.8
87th Ave. / Oakridge Group Home	EB Stop	B	11.8	B	11.7	B	10.4	B	10.4
87th Ave. / Golf Course Rd.	EB Stop	B	11.7	B	11.7	B	11.3	B	11.1
Kids First Pl. / Golf Course Rd.	NB Stop	A	8.4	A	8.3	A	8.5	A	8.4

The study intersections are forecast to operate at LOS D or better and satisfy the City of Lakewood's level-of-service threshold, except the Chapel Gate Drive and CSTC Entrance driveways on Steilacoom Blvd SW.

- In the AM peak hour, the Chapel Gate Dr. stop-controlled approach to Steilacoom Blvd. SW is calculated to operate at LOS C (No Action) and LOS C (Proposed Action). In the PM peak hour, the approach is calculated to operate at LOS F (No Action) and LOS F (Proposed Action).
- In the AM peak hour, the CSTC Entrance stop-controlled approach to Steilacoom Blvd. SW is calculated to operate at LOS F (No Action) and LOS F (Proposed Action). In the PM peak hour, the approach is calculated to operate at LOS F (No Action) and LOS F (Proposed Action).

Consolidation of services on the campus, even with the expansion results in reducing the number of trips generated and vehicle delays at the West Street, South Street, Chapel Gate Drive and Circle Drive driveways.

Build-out of the proposed WSH East Zone and expansion of services in the CSTC Zone increase the number of trips generated and vehicle delays at the CSTC Entrance and Kids First Place driveways.

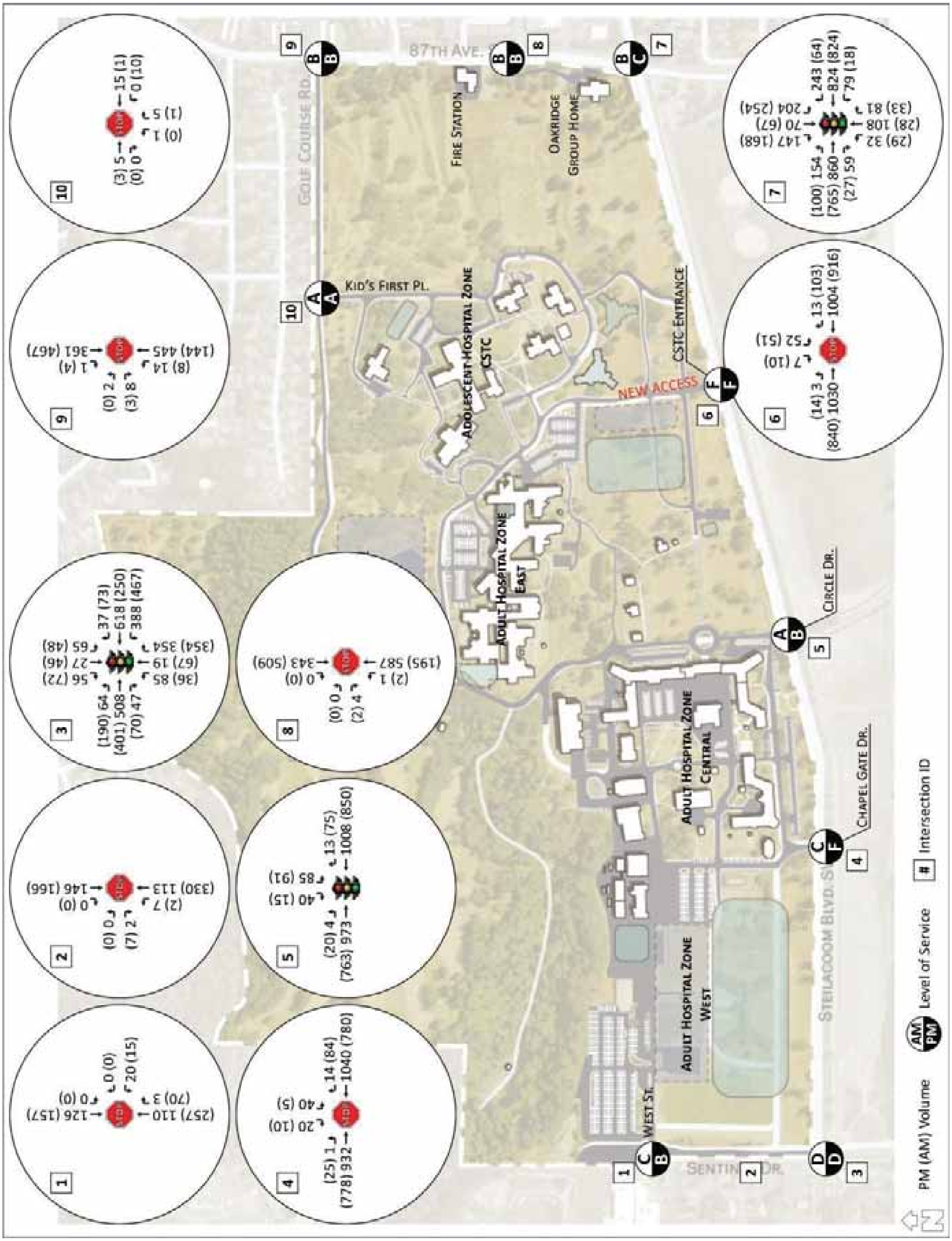


Figure 12: Future Proposed Action AM and PM Peak Hour Traffic Volumes

Arterial Level-of-Service

Table 15 summarizes the future Proposed Action peak hour arterial level-of-service on Steilacoom Blvd SW. The future arterial volumes on Steilacoom Blvd SW in the vicinity of the campus satisfies the volume-to-capacity threshold from the City of Lakewood.

Table 15: Proposed Action Arterial Level-of-Service on Steilacoom Blvd SW

Direction	Capacity[1]	No Action V/C	Action Vol.[2]	Action V/C
Eastbound	1,825	0.65	1,145	0.63
Westbound	1,825	0.63	1,150	0.63

1. City of Lakewood Comprehensive Plan Final EIS – June 2000
2. Maximum PM peak hour volume in one direction

With the Proposed Action, the volumes on Steilacoom Blvd SW and corresponding volume-to-capacity ratios are less than in the No Action conditions.

Vehicle Queuing (Stacking)

Vehicle queues were computed using the HCM 2010 95th-percentile queue equations to evaluate future vehicle queue impacts around the campus. Table 16 summarizes the queue output.

Table 16: Proposed Action Steilacoom Blvd SW Queues

Intersection	Mvmt.	AM Peak Hour			PM Peak Hour			Storage (feet)
		Q-V/L[1]	Q-feet[2]	V/C	Q-V/L[1]	Q-feet[2]	V/C	
Farwest Dr. / Steilacoom Blvd.	WB L	21.7	545	0.94	13.0	325	0.98	200
	WB T	7.6	190	0.29	14.4	360	0.54	1,380
	WB TR	7.7	195	0.29	14.7	370	0.54	1,380
	SB L	2.8	70	0.69	3.9	100	0.50	125
	SB TR	7.5	190	0.68	5.1	130	0.69	140
Chapel Gate Dr. / Steilacoom Blvd.	SB	0.2	5	0.06	2.0	50	0.45	
Circle Dr. / Steilacoom Blvd.	EB LT	4.3	110	0.41	11.5	290	0.63	1,000
	EB T	3.9	100	0.46	10.7	270	0.67	1,000
	WB T	5.0	125	0.51	11.5	290	0.67	1,250
	WB TR	5.1	130	0.51	11.9	300	0.67	1,250
	SB LT	1.8	45	0.42	2.6	65	0.19	25
CSTC Entrance / Steilacoom Blvd.	SB	3.5	90	0.68	3.0	75	0.61	
87th Ave. / Steilacoom Blvd.	EB L	4.2	105	0.78	7.1	180	0.80	200
	EB T	9.4	235	0.50	11.7	295	0.58	1,550
	EB TR	9.7	240	0.50	11.9	300	0.58	1,550
	SB L	8.9	225	0.73	2.6	65	0.60	125
	SB TR	2.0	50	0.22	2.1	55	0.22	550
	SB R	5.4	135	0.63	4.7	120	0.52	250

3. queue expressed as vehicles per lane
4. queue lengths are converted to fee with approximately 25 feet per vehicle and are rounded to the nearest multiple of "5"

The 95th-percentile queues are noticeable, but the intersection and driveway spacing on Steilacoom Blvd SW are more than sufficient to support the computed queues.

- The westbound left turn queue on Steilacoom Blvd. SW approaching Farwest Dr. SW is computed to exceed the 200-foot storage pocket in both the AM and PM peak hours, by up to 345 feet. Compared to the No Action condition, the Proposed Action queues are similar. With the Proposed Action, the peak hour westbound left turn V/C ratios are greater than 0.90 suggesting that the left turn movement is nearing capacity. Overall, the westbound approach queues, overall, do not extend into the adjacent Chapel Game Dr. intersection.

- The southbound queue at Chapel Gate Dr. approaching Sentinel Dr. SW is computed to be up to 50 feet.
- The southbound queue at Circle Dr. approaching Steilacoom Blvd. SW is computed to be 65 feet. The Circle Dr. and internal Front St. intersection is located approximately 25 feet north of the signalized intersection. Peak hour queues are forecast to continue to extend through the internal intersection from Steilacoom Blvd. SW.
- The southbound queue at CSTC Entrance approaching Sentinel Dr. SW is computed to be up to 90 feet.
- The eastbound left turn queue on Steilacoom Blvd. SW approaching 87th Ave. SW is computed to fit within the 200-foot storage pocket in both the AM and PM peak hours.
- The southbound left turn queue on 87th Ave. SW approaching Steilacoom Blvd. SW is computed to exceed the 125-foot storage pocket in the AM peak hour, by 100 feet or four vehicle lengths.

Traffic Circulation

- Figure 13 shows the shows the major traffic circulation routes with the Proposed Action. Changes include deemphasizing use of Circle Dr. and Golf Course Rd, closure of the South St. driveway off Sentinel Dr. SW and enhancing use of the Chapel Gate Dr. and relocated CSTC Entrance driveways.
- Figure 14 shows the patient admissions and discharge route to and from the WSH campus with the Proposed Action. Changes include ingress and egress proposed from the relocated CSTC Entrance to deemphasize use of the Circle Dr.
- It is not yet clear whether the on-campus shuttle service will change or continue with the Proposed Action; and therefore, no new routing is being proposed.
- Figure 15 shows the primary service vehicle routes to the WSH campus with the Proposed Action. The major service vehicle routes are intended to shift to the periphery of the campus via Sentinel Dr. SW.

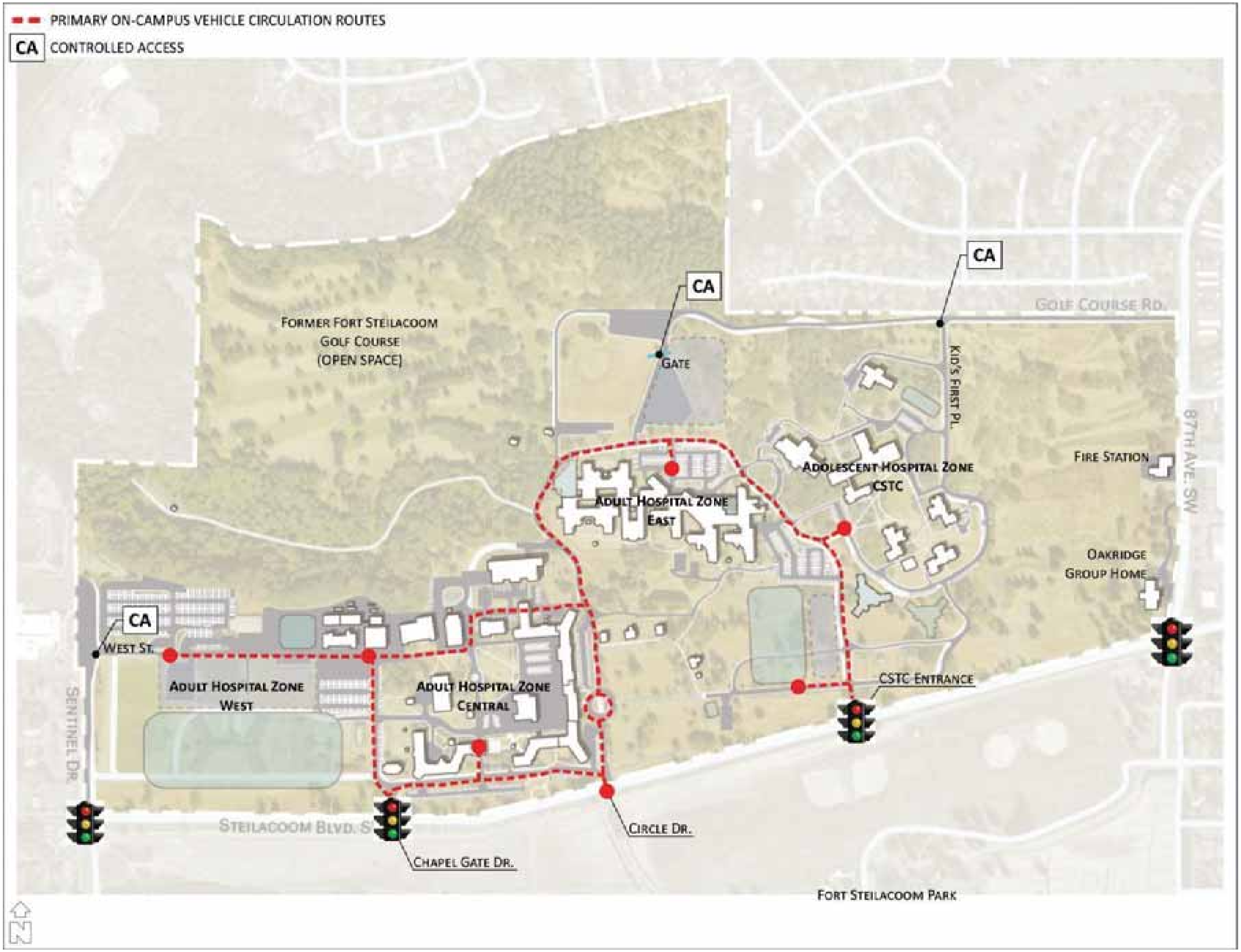


Figure 13: Proposed Action On-Campus Primary Vehicle Circulation Routes

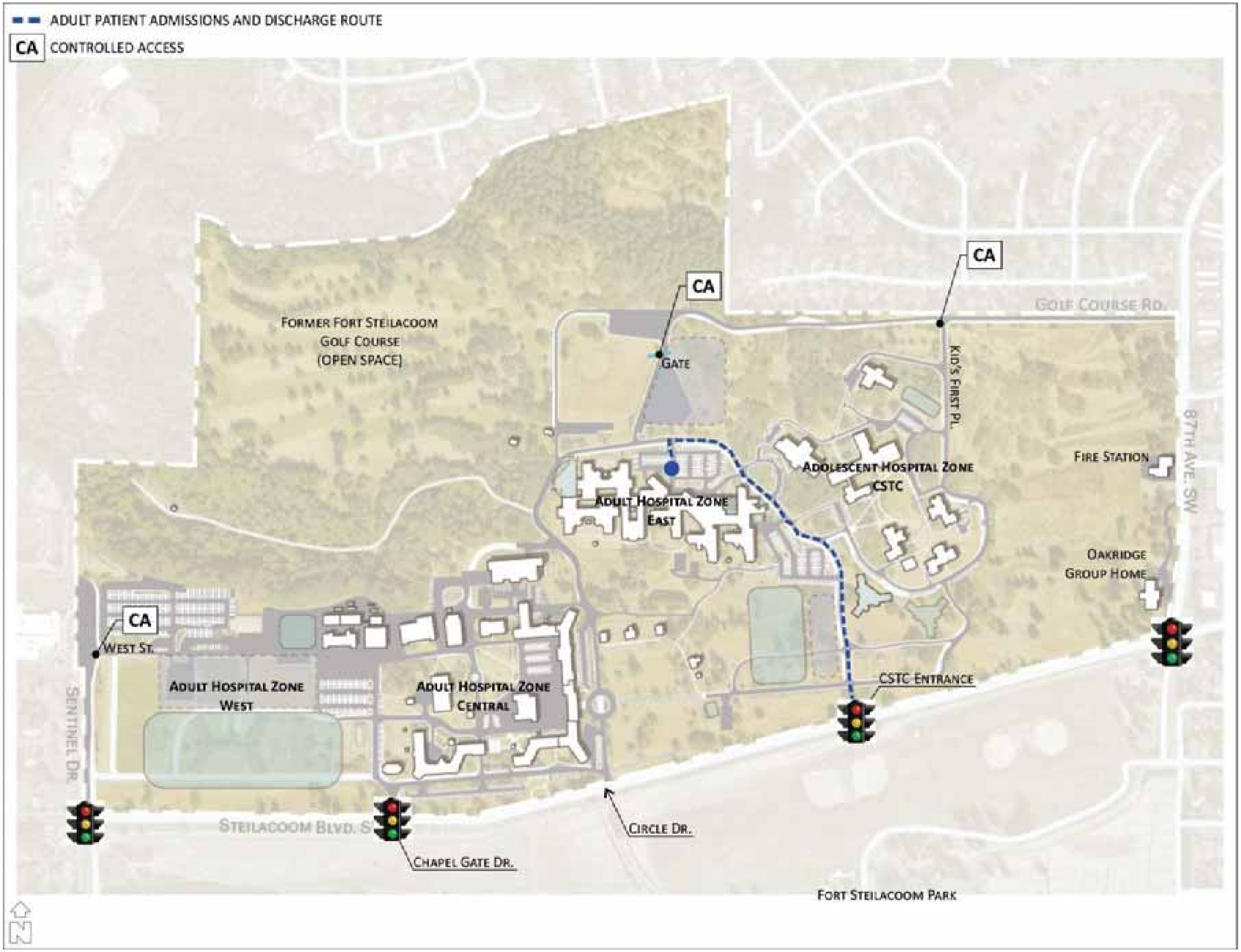
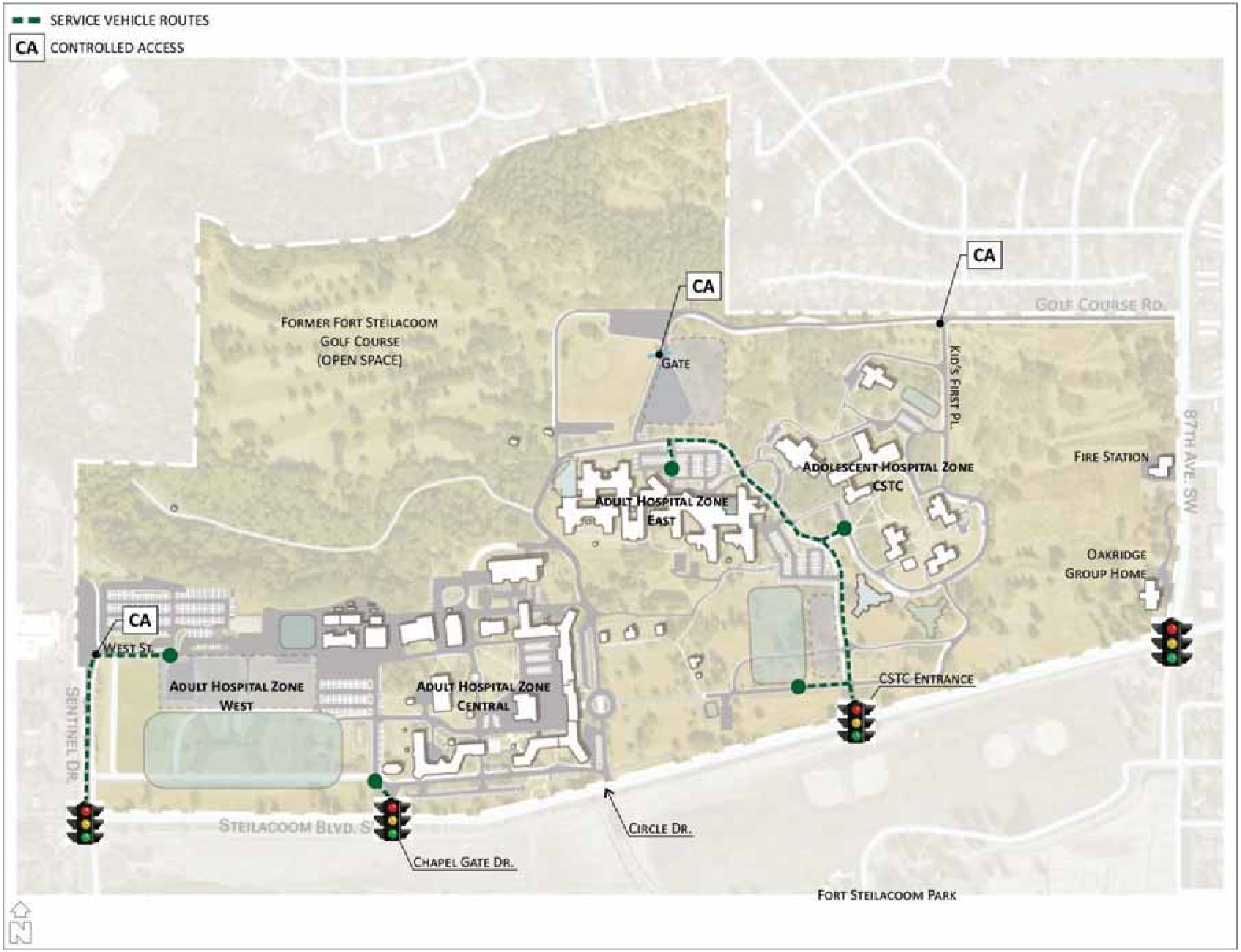


Figure 14: Proposed Action Patient Admissions and Discharge Route

Figure 15: Proposed Action WSH Primary Service Vehicle Routes



Safety

The overall future crash frequency is anticipated to be proportional to the forecasted changes in the traffic volumes and patterns around the site.

Review of the 2013-2017 crash history identified no reported crashes on 87th Ave. SW at Golf Course Rd. or on Sentinel Dr. SW at West St. or South St. At the main campus accesses off Steilacoom Blvd. SW, there were no trends or crash incidents to suggest any significant safety issue(s).

With the Proposed Action, crash incidents at the three campus driveways off Steilacoom Blvd. SW. on were reviewed in further detail to provide recommendations for enhancing access to the campus off Steilacoom Blvd SW. Reported incidents at the main campus accesses on Steilacoom Blvd. SW include:

<u>Chapel Gate Drive</u>
- 2 lefts-out of Chapel Gate
- 1 rear-end on Steilacoom
- 1 vehicle strikes deer on Steilacoom Blvd SW

<u>Circle Drive</u>
- 1 left-in to Circle Drive
- 2 left-out of Circle Drive
- 4 rear-ends on Steilacoom
- 1 right-in strikes tree at Circle Drive

<u>CSTC Entrance</u>
- 1 left-out of CSTC Entrance

Most of the left-turn collisions appear to involve service or delivery vehicles, classified in the collision reports as "*pickup, panel truck, or vannette under 10,000 lb*" maneuvers into or out of the driveways.

To reduce the campus' traffic impacts on 87th Ave. SW and Sentinel Dr., DSHS is proposing to enhance access to the main campus off Steilacoom Blvd. SW. Enhancement-improvements options to consider include:

1A. Widen the Steilacoom Blvd. SW to accommodate left-turn pockets for vehicles making left-turns into the campus. Turn pockets, allow left turning vehicles to queue separate from the major eastbound traffic flow while drivers wait for a gap in the opposing traffic to turn into the campus. The left turn pockets would reduce the rear-end crash potential on Steilacoom Blvd. SW.

1B. Add a center lane to Steilacoom Blvd. SW. This may include a center turn lane with medians. A center lane allows vehicles turning left from the site to enter the center lane and accelerate to merge into the eastbound traffic flow. This movement option can reduce delays and queue impacts onsite and it is generally safer for the driveway only have to discern one direction of traffic at a time.

2. Signalize the Chapel Gate Dr. and CSTC Entrance. Signalizing the driveways creates more direct access to the campus and allows for improved exiting traffic flows. By signalizing the driveways, the existing Circle Dr. signal could be removed, and the driveway could further be restricted to right-turns in and right-turns out only. Signal warrants are discussed in more detail later in this report.

It was understood that there were potential historical impacts along Steilacoom Blvd. SW that may limit the ability to widening the roadway. If viable, a widening the roadway with a center lane (Option 1B) allows for both left turn pockets and acceleration lanes.

The signals option (Option 2) will stop traffic on Steilacoom Blvd. SW combined with left turn pockets (Option 1A), would further enhance access to the campus. A drawback of the additional traffic signals is that they will increase the travel time on Steilacoom Blvd. SW.

Non-Motorized and Transit Conditions

On-campus pedestrian facilities will be upgraded to support campus activities.

As noted above the City of Lakewood and Town of Steilacoom are planning non-motorized improvements on Steilacoom Blvd. SW. The City of Lakewood's scope and timing for constructions of improvements on Steilacoom Blvd. SW including curb, gutter, sidewalk, sharrows, turn lanes, street lighting, drainage and overlay is undefined.

The Proposed Action is not forecast to change or adversely impact the current transit network.

Recommendations

The recommendations based on the Proposed Action are similar to those for the No Action.

- Circulation. Improve the campus's internal circulation by increasing the spacing between internal roadways and intersections and driveways.
- Access. Improve access to the campus by enhancing traffic flow to and from Steilacoom Blvd. SW via:
  - Install traffic control signals at Chapel Gate Dr. and at CSTC Entrance, with the intent to concentrate more traffic to these campus accesses and reduce traffic impacts on Sentinel Dr., 87th Ave. SW and Golf Course Rd. Traffic control signal installation requires certain "warrants" to be satisfied and these are discussed later in this document.
  - Widen Steilacoom Blvd. SW to provide left turn pockets and acceleration lanes to improve left turn maneuvers to and from the campus. Left turn lanes would enhance site access by providing a "pocket" off of the mainline for vehicles to queue in before making a left turn to the campus. Acceleration lanes, in the form of a center turn lane, would allow staged left turn maneuvers (left turn out of campus to turn lane to merge with opposing traffic volume). Widening requires right-of-way acquisition.
  - Remove the existing signal at Circle Drive and Steilacoom Blvd SW, and repurposing the intersection to be right-in and right-out only restricted. This will decentralize access at Circle Dr. and refocus traffic to the Chapel Gate Dr. and CSTC Entrance driveways.
  - An alternative to a traffic signal is a roundabout. Roundabouts do not create fixed stops and do not have adopted "warrant" criteria. Roundabouts do involve additional right-of-way.
  - Close or add gates (restrictions) to existing main campus access off Sentinel Dr. and Golf Course Rd. West St. could be gated and restricted for service vehicles only. Kids First Pl. could also be gated, for fire and emergency vehicle access to the site only. Also, vehicle access to campus' other secondary entrances off Golf Course Rd. could be restricted. By restricting or eliminating these access, the campus traffic would be forced to access the site off Steilacoom Blvd SW, which would mitigate neighborhood concerns with campus traffic impacting the high school and residents.
  - The Proposed Action includes new buildings nearer to the Chapel Gate Dr. and CSTC Entrance where enhanced accessibility would allow support improvements to driveway traffic control off Steilacoom Blvd SW.
- Support. DSHS should provide their support for non-motorized and turn lane improvements on Steilacoom Blvd. SW, planned by both the Town of Steilacoom and City of Lakewood. The Proposed Action to support improvements by the Town of Steilacoom and City of Lakewood.
- Parking. Consolidate, mark, pave and manage parking areas to reduce parking sprawl on campus. Designate areas for staff based on the location and function of employees. The Proposed Action is consolidating parking and parking designations will be addressed with building-out of the site.

Signal Warrants

The MUTCD, published by the FHWA, includes the national guidance for supporting the installation of traffic control signals. The MUTCD outlines criteria to support the installation of a new traffic signal.

This following evaluates traffic volume conditions based on MUTCD Warrant 1, Eight-Hour Vehicular Volume, Warrant 2, Four-Hour Vehicular Volume, and Warrant 3, Peak Hour, as applied to the Chapel Gate Dr., Circle Dr. and CSTC Entrance driveways. The warrants were developed using the daily traffic volume data.

This analysis assumes that the volumes generated to/from the Circle Dr. intersection with Steilacoom Blvd. SW are reduced and that the driveway is restricted to right-in/right-out movements only, consistent with the recommendations in the previous section. Reducing the traffic impacts at Circle Dr., shifts more traffic to the Chapel Gate Dr. and CSTC Entrance driveways. The peak hour volume shift is illustrated in Figure 16.

Warrant 1, Eight-Hour Vehicular Volume

The eight-hour vehicular volume warrant criteria and analysis is provided in the charts included in Tables 17-19. The analysis incorporates conditions assuming the 85th-percentile vehicle speeds on Steilacoom Blvd. SW are above 40 mph. The analysis shows that with the forecasted conditions the warrant criteria are not met for eight consecutive hours of a typical day.

Warrant 2, Four-Hour Vehicular Volume

The four-hour vehicular volumes are evaluated Figure 18. The analysis incorporates conditions assuming the 85th-percentile vehicle speeds on Steilacoom Blvd. SW are above 40 mph. The analysis shows that with the forecasted conditions the four-hour warrant criteria are met at the Chapel Gate Dr. campus driveway, using the 70% volume conditions.

The warrant criteria are met for only three consecutive hours at the CSTC Entrance campus driveway.

Warrant 3, Peak Hour

The vehicular volume portion of the peak hour warrant is evaluated in Figure 19. The analysis incorporates conditions assuming the 85th-percentile vehicle speeds on Steilacoom Blvd. SW are above 40 mph. The analysis shows that with the forecasted conditions the peak hour volume portion of the warrant is satisfied at both the Chapel Gate Dr. and the CSTC Entrance campus driveways using the 100% volume conditions.

The peak hour warrant conditions are unique and also require analysis for excessive delays. The delay criteria of the warrant will not be satisfied based on the forecasted traffic conditions.

Warrant Conclusions

Warrant 2, the four-hour vehicular volumes warrant is nearly satisfied for the future conditions. Additional campus access restrictions to further limit use of Golf Course Rd. and Sentinel Dr. SW to access to the campus could allow the traffic conditions to support the warrant criteria.

The four-lane cross-section on Steilacoom Blvd. SW could support the signalized access controls to increase safety for left turning vehicles along this section of the roadway. Additionally, while the pedestrian volumes were low, the addition of signalized access, would allow additional controlled crossings of Steilacoom Blvd. SW to Fort Steilacoom Park to promote the park’s usage.

A LOS of service analysis with traffic control signals at Chapel Gate Dr. and CSCT Entrance driveways is provided as Table 20.

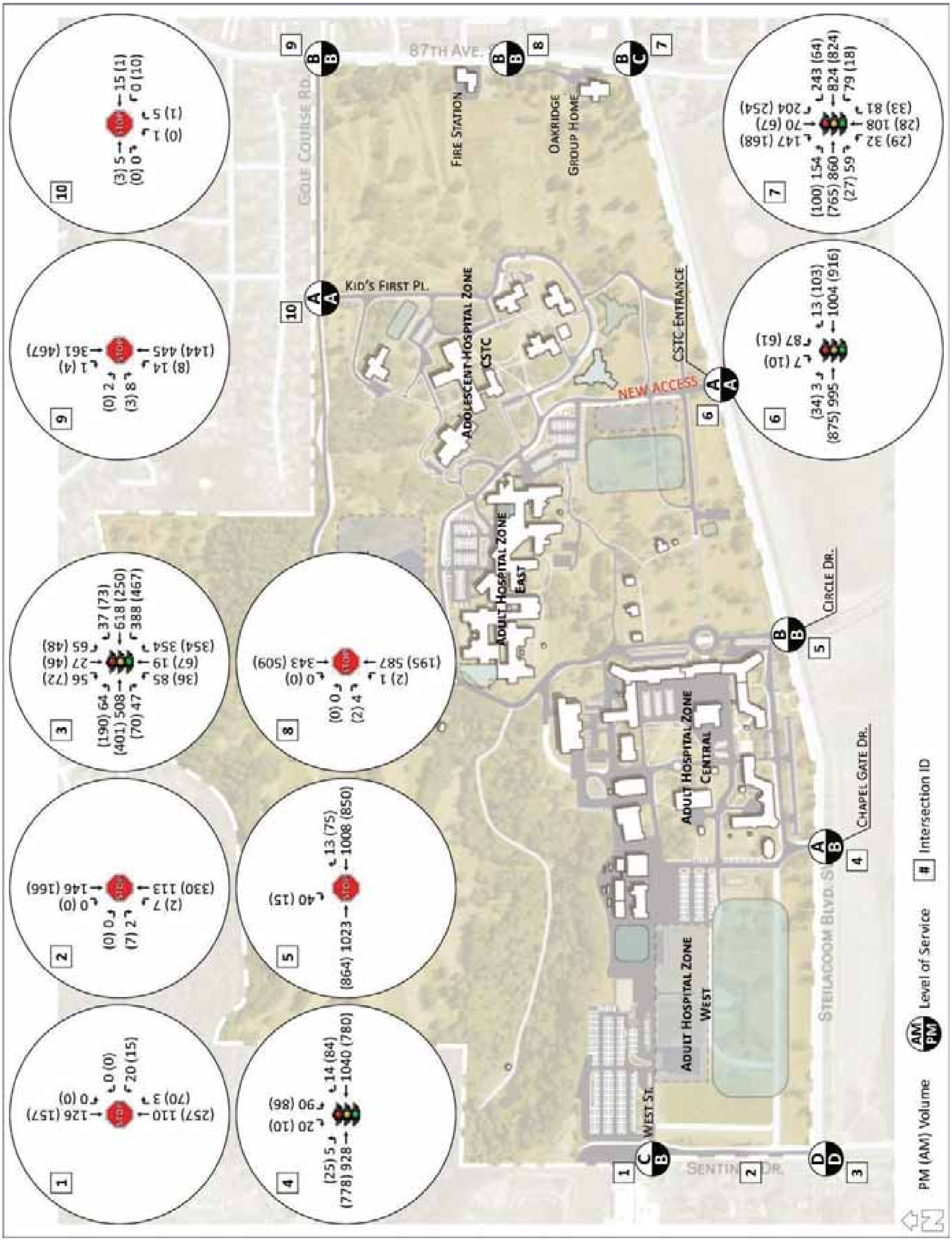


Figure 16: 2030 Proposed Action – Volume Reduction at Circle Dr.

Table 17: 2030 Proposed Action Warrant 1 – Chapel Gate Dr.

	Condition A			Condition A			Condition A			Condition A		
	MINOR	MAJOR	Met	MINOR	MAJOR	Met	MINOR	MAJOR	Met	MINOR	MAJOR	Met
	100%	100%	Y/N?	80%	80%	Y/N?	70%	70%	Y/N?	56%	56%	Y/N?
	150	600		120	480		105	420		84	336	
12 AM	0%	16%	N	0%	20%	N	0%	23%	N	0%	29%	N
1 AM	0%	8%	N	0%	10%	N	0%	12%	N	0%	15%	N
2 AM	0%	7%	N	0%	8%	N	0%	9%	N	0%	12%	N
3 AM	0%	11%	N	0%	13%	N	0%	15%	N	0%	19%	N
4 AM	4%	21%	N	5%	26%	N	6%	29%	N	8%	37%	N
5 AM	6%	83%	N	7%	103%	N	8%	118%	N	10%	148%	N
6 AM	30%	167%	N	38%	209%	N	43%	239%	N	54%	298%	N
7 AM	23%	265%	N	29%	331%	N	33%	379%	N	41%	473%	N
8 AM	14%	212%	N	18%	265%	N	20%	303%	N	26%	379%	N
9 AM	26%	200%	N	32%	250%	N	37%	286%	N	46%	358%	N
10 AM	20%	180%	N	25%	225%	N	29%	257%	N	36%	322%	N
11 AM	34%	202%	N	43%	253%	N	49%	289%	N	61%	362%	N
12 PM	50%	217%	N	63%	271%	N	72%	310%	N	90%	387%	N
1 PM	46%	209%	N	57%	261%	N	66%	298%	N	82%	373%	N
2 PM	70%	264%	N	88%	330%	N	100%	377%	Y	125%	472%	Y
3 PM	136%	266%	Y	170%	332%	Y	195%	379%	Y	243%	474%	Y
4 PM	100%	287%	Y	125%	359%	Y	143%	410%	Y	179%	513%	Y
5 PM	42%	294%	N	52%	367%	N	59%	420%	N	74%	525%	N
6 PM	19%	218%	N	23%	272%	N	27%	311%	N	33%	388%	N
7 PM	17%	184%	N	22%	230%	N	25%	262%	N	31%	328%	N
8 PM	9%	152%	N	11%	190%	N	12%	217%	N	15%	272%	N
9 PM	10%	109%	N	13%	136%	N	14%	156%	N	18%	195%	N
10 PM	33%	79%	N	41%	99%	N	47%	113%	N	59%	142%	N
11 PM	30%	40%	N	38%	50%	N	43%	57%	N	54%	71%	N
	Condition B			Condition B			Condition B			Condition B		
	MINOR	MAJOR	Met	MINOR	MAJOR	Met	MINOR	MAJOR	Met	MINOR	MAJOR	Met
	100%	100%	Y/N?	80%	80%	Y/N?	70%	70%	Y/N?	56%	56%	Y/N?
	75	900		60	720		53	630		42	504	
12 AM	0%	11%	N	0%	14%	N	0%	16%	N	0%	19%	N
1 AM	0%	6%	N	0%	7%	N	0%	8%	N	0%	10%	N
2 AM	0%	4%	N	0%	5%	N	0%	6%	N	0%	8%	N
3 AM	0%	7%	N	0%	9%	N	0%	10%	N	0%	13%	N
4 AM	9%	14%	N	11%	17%	N	12%	20%	N	15%	25%	N
5 AM	11%	55%	N	14%	69%	N	16%	79%	N	20%	99%	N
6 AM	60%	111%	N	75%	139%	N	85%	159%	N	108%	199%	Y
7 AM	46%	177%	N	57%	221%	N	65%	253%	N	82%	316%	N
8 AM	29%	141%	N	36%	177%	N	41%	202%	N	51%	252%	N
9 AM	52%	134%	N	65%	167%	N	73%	191%	N	92%	238%	N
10 AM	40%	120%	N	50%	150%	N	57%	172%	N	72%	215%	N
11 AM	69%	135%	N	86%	169%	N	97%	193%	N	123%	241%	Y
12 PM	100%	145%	Y	125%	181%	Y	142%	207%	Y	179%	258%	Y
1 PM	92%	139%	N	115%	174%	Y	130%	199%	Y	164%	249%	Y
2 PM	140%	176%	Y	176%	220%	Y	199%	252%	Y	251%	315%	Y
3 PM	272%	177%	Y	340%	221%	Y	385%	253%	Y	486%	316%	Y
4 PM	201%	192%	Y	251%	239%	Y	284%	274%	Y	358%	342%	Y
5 PM	83%	196%	N	104%	245%	Y	118%	280%	Y	148%	350%	Y
6 PM	37%	145%	N	47%	181%	N	53%	207%	N	67%	259%	N
7 PM	34%	122%	N	43%	153%	N	49%	175%	N	61%	219%	N
8 PM	17%	101%	N	22%	127%	N	24%	145%	N	31%	181%	N
9 PM	20%	73%	N	25%	91%	N	28%	104%	N	36%	130%	N
10 PM	66%	53%	N	82%	66%	N	93%	76%	N	118%	95%	N
11 PM	60%	26%	N	75%	33%	N	85%	38%	N	108%	47%	N

Assumes Circle Dr. volumes are reduced, and driveway is restricted to rights-in and rights-out

Condition A (100%) criteria satisfied if met for 8-hours of an average day -or-
Condition B (100%) criteria satisfied if met for 8-hours of an average day -or-
Conditions A & B (80%) criteria satisfied if met for 8-hours of an average day

WARRANT MET: NO

Condition A (70%) criteria satisfied if met for 8-hours of an average day -or-
Condition B (70%) criteria satisfied if met for 8-hours of an average day -or-
Conditions A & B (56%) criteria satisfied if met for 8-hours of an average day
* 85th percentile speed on the Steilacoom Blvd. SW exceeds 40 mph
WARRANT MET: NO

Table 18: 2030 Proposed Action Warrant 1 – Circle Dr.

	Condition A			Condition A			Condition A			Condition A		
	MINOR	MAJOR	Met	MINOR	MAJOR	Met	MINOR	MAJOR	Met	MINOR	MAJOR	Met
	100%	100%	Y/N?	80%	80%	Y/N?	70%	70%	Y/N?	56%	56%	Y/N?
	150	600		120	480		105	420		84	336	
12 AM	1%	17%	N	2%	22%	N	2%	25%	N	3%	31%	N
1 AM	0%	9%	N	1%	11%	N	1%	12%	N	1%	15%	N
2 AM	1%	7%	N	2%	9%	N	2%	10%	N	3%	12%	N
3 AM	2%	12%	N	3%	15%	N	3%	18%	N	4%	22%	N
4 AM	1%	23%	N	2%	28%	N	2%	33%	N	2%	41%	N
5 AM	6%	89%	N	7%	112%	N	8%	128%	N	10%	160%	N
6 AM	16%	192%	N	20%	241%	N	23%	275%	N	29%	344%	N
7 AM	17%	285%	N	21%	357%	N	24%	408%	N	30%	510%	N
8 AM	5%	222%	N	6%	278%	N	7%	317%	N	9%	396%	N
9 AM	5%	206%	N	7%	258%	N	8%	295%	N	10%	368%	N
10 AM	5%	187%	N	6%	234%	N	7%	267%	N	9%	334%	N
11 AM	9%	213%	N	11%	266%	N	12%	304%	N	15%	381%	N
12 PM	12%	232%	N	15%	289%	N	17%	331%	N	21%	413%	N
1 PM	10%	219%	N	13%	274%	N	15%	313%	N	19%	391%	N
2 PM	19%	288%	N	24%	360%	N	27%	412%	N	34%	515%	N
3 PM	28%	283%	N	35%	353%	N	40%	404%	N	50%	505%	N
4 PM	19%	299%	N	24%	373%	N	27%	427%	N	34%	533%	N
5 PM	8%	300%	N	10%	375%	N	12%	428%	N	15%	535%	N
6 PM	9%	224%	N	11%	280%	N	12%	320%	N	15%	400%	N
7 PM	2%	185%	N	3%	232%	N	3%	265%	N	4%	331%	N
8 PM	3%	155%	N	3%	193%	N	4%	221%	N	5%	276%	N
9 PM	2%	112%	N	3%	140%	N	3%	160%	N	4%	200%	N
10 PM	12%	97%	N	15%	121%	N	17%	138%	N	21%	172%	N
11 PM	12%	47%	N	15%	58%	N	18%	67%	N	22%	83%	N
	Condition B			Condition B			Condition B			Condition B		
	MINOR	MAJOR	Met	MINOR	MAJOR	Met	MINOR	MAJOR	Met	MINOR	MAJOR	Met
	100%	100%	Y/N?	80%	80%	Y/N?	70%	70%	Y/N?	56%	56%	Y/N?
	105	420		84	336		53	630		42	504	
12 AM	3%	12%	N	4%	15%	N	4%	17%	N	5%	21%	N
1 AM	1%	6%	N	1%	7%	N	1%	8%	N	1%	10%	N
2 AM	3%	5%	N	4%	6%	N	4%	7%	N	5%	8%	N
3 AM	5%	8%	N	6%	10%	N	6%	12%	N	8%	15%	N
4 AM	2%	15%	N	3%	19%	N	3%	22%	N	4%	27%	N
5 AM	12%	60%	N	15%	75%	N	17%	85%	N	21%	106%	N
6 AM	33%	128%	N	41%	160%	N	46%	183%	N	58%	229%	N
7 AM	33%	190%	N	42%	238%	N	47%	272%	N	60%	340%	N
8 AM	10%	148%	N	12%	185%	N	14%	211%	N	18%	264%	N
9 AM	11%	137%	N	14%	172%	N	15%	196%	N	20%	245%	N
10 AM	10%	125%	N	13%	156%	N	14%	178%	N	18%	223%	N
11 AM	17%	142%	N	22%	178%	N	25%	203%	N	31%	254%	N
12 PM	23%	154%	N	29%	193%	N	33%	220%	N	41%	276%	N
1 PM	21%	146%	N	26%	182%	N	29%	209%	N	37%	261%	N
2 PM	38%	192%	N	48%	240%	N	54%	275%	N	68%	343%	N
3 PM	57%	188%	N	71%	236%	N	80%	269%	N	101%	337%	Y
4 PM	38%	199%	N	48%	249%	N	54%	284%	N	69%	356%	N
5 PM	16%	200%	N	20%	250%	N	23%	286%	N	29%	357%	N
6 PM	17%	149%	N	21%	187%	N	24%	213%	N	30%	267%	N
7 PM	4%	123%	N	5%	154%	N	6%	176%	N	8%	220%	N
8 PM	5%	103%	N	7%	129%	N	8%	147%	N	10%	184%	N
9 PM	5%	75%	N	6%	93%	N	6%	107%	N	8%	133%	N
10 PM	24%	64%	N	30%	80%	N	34%	92%	N	43%	115%	N
11 PM	25%	31%	N	31%	39%	N	35%	44%	N	44%	55%	N

Assumes Circle Dr. volumes are reduced, and driveway is restricted to rights-in and rights-out

Condition A (100%) criteria satisfied if met for 8-hours of an average day -or-
Condition B (100%) criteria satisfied if met for 8-hours of an average day -or-
Conditions A & B (80%) criteria satisfied if met for 8-hours of an average day

WARRANT MET: NO

Condition A (70%) criteria satisfied if met for 8-hours of an average day -or-
Condition B (70%) criteria satisfied if met for 8-hours of an average day -or-
Conditions A & B (56%) criteria satisfied if met for 8-hours of an average day
* 85th percentile speed on the Steilacoom Blvd. SW exceeds 40 mph
WARRANT MET: NO

Table 19: 2030 Proposed Action Warrant 1 – CSTS Entrance

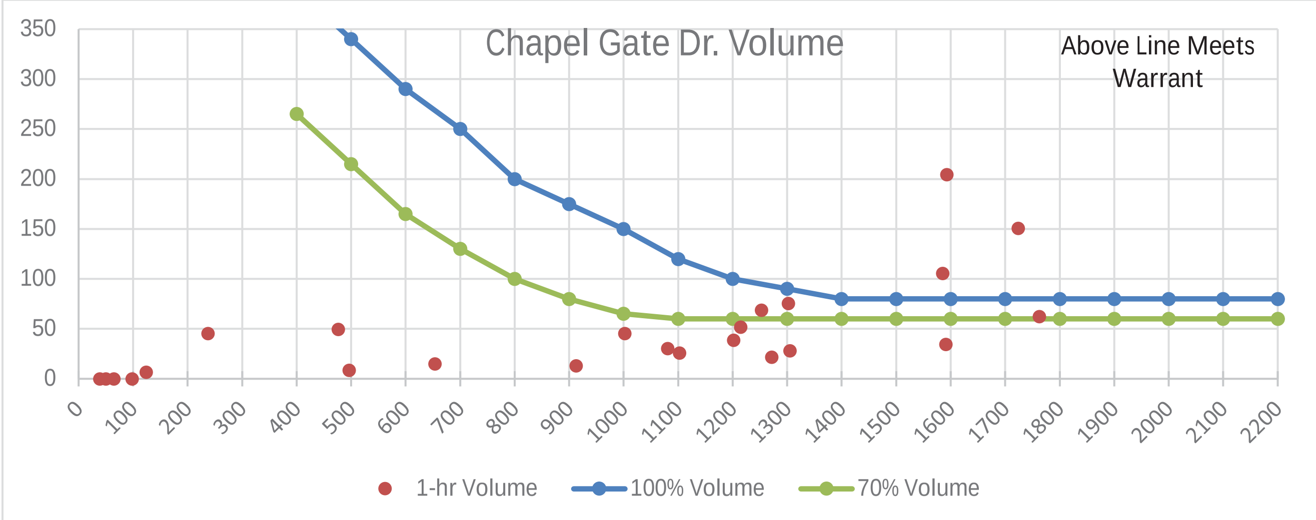
	Condition A			Condition A			Condition B			Condition B		
	MINOR	MAJOR	Met	MINOR	MAJOR	Met	MINOR	MAJOR	Met	MINOR	MAJOR	Met
	100%	100%	Y/N?	80%	80%	Y/N?	100%	100%	Y/N?	80%	80%	Y/N?
	150	600		120	480		75	900		60	720	
12 AM	0%	19%	N	0%	23%	N	0%	27%	N	0%	33%	N
1 AM	0%	9%	N	0%	11%	N	0%	12%	N	0%	16%	N
2 AM	0%	7%	N	0%	9%	N	0%	10%	N	0%	13%	N
3 AM	0%	14%	N	0%	17%	N	0%	20%	N	0%	25%	N
4 AM	0%	25%	N	0%	31%	N	0%	36%	N	0%	44%	N
5 AM	5%	96%	N	6%	120%	N	7%	137%	N	9%	172%	N
6 AM	21%	218%	N	26%	272%	N	30%	311%	N	37%	389%	N
7 AM	47%	306%	N	58%	382%	N	66%	437%	N	83%	546%	N
8 AM	20%	232%	N	25%	290%	N	28%	332%	N	35%	414%	N
9 AM	22%	212%	N	27%	265%	N	31%	303%	N	39%	379%	N
10 AM	21%	194%	N	26%	242%	N	30%	277%	N	37%	346%	N
11 AM	35%	224%	N	44%	280%	N	50%	320%	N	63%	399%	N
12 PM	43%	246%	N	54%	308%	N	62%	351%	N	78%	439%	N
1 PM	24%	229%	N	30%	286%	N	34%	327%	N	42%	409%	N
2 PM	79%	312%	N	98%	390%	N	112%	446%	Y	140%	558%	Y
3 PM	103%	300%	Y	129%	375%	Y	148%	428%	Y	185%	536%	Y
4 PM	54%	310%	N	67%	387%	N	77%	443%	N	96%	554%	N
5 PM	31%	306%	N	39%	382%	N	44%	437%	N	55%	546%	N
6 PM	26%	231%	N	32%	288%	N	37%	330%	N	46%	412%	N
7 PM	18%	187%	N	22%	233%	N	25%	267%	N	31%	333%	N
8 PM	16%	157%	N	19%	196%	N	22%	224%	N	28%	280%	N
9 PM	7%	115%	N	9%	144%	N	10%	164%	N	13%	206%	N
10 PM	63%	114%	N	79%	142%	N	90%	162%	N	113%	203%	Y
11 PM	51%	54%	N	63%	67%	N	72%	77%	N	90%	96%	N
	Condition A			Condition A			Condition B			Condition B		
	MINOR	MAJOR	Met	MINOR	MAJOR	Met	MINOR	MAJOR	Met	MINOR	MAJOR	Met
	70%	70%	Y/N?	56%	56%	Y/N?	70%	70%	Y/N?	56%	56%	Y/N?
	105	420		84	336		53	630		42	504	
12 AM	0%	12%	N	0%	15%	N	0%	18%	N	0%	22%	N
1 AM	0%	6%	N	0%	7%	N	0%	8%	N	0%	10%	N
2 AM	0%	5%	N	0%	6%	N	0%	7%	N	0%	9%	N
3 AM	0%	9%	N	0%	11%	N	0%	13%	N	0%	16%	N
4 AM	0%	17%	N	0%	21%	N	0%	24%	N	0%	30%	N
5 AM	5%	64%	N	6%	80%	N	7%	92%	N	9%	114%	N
6 AM	21%	145%	N	26%	182%	N	30%	208%	N	37%	259%	N
7 AM	47%	204%	N	58%	255%	N	66%	291%	N	83%	364%	N
8 AM	20%	155%	N	25%	193%	N	28%	221%	N	35%	276%	N
9 AM	22%	141%	N	27%	177%	N	31%	202%	N	39%	253%	N
10 AM	21%	129%	N	26%	162%	N	30%	185%	N	37%	231%	N
11 AM	35%	149%	N	44%	186%	N	50%	213%	N	63%	266%	N
12 PM	43%	164%	N	54%	205%	N	62%	234%	N	78%	293%	N
1 PM	24%	153%	N	30%	191%	N	34%	218%	N	42%	273%	N
2 PM	79%	208%	N	98%	260%	N	112%	298%	Y	140%	372%	Y
3 PM	103%	200%	Y	129%	250%	Y	148%	286%	Y	185%	357%	Y
4 PM	54%	207%	N	67%	258%	N	77%	295%	N	96%	369%	N
5 PM	31%	204%	N	39%	255%	N	44%	291%	N	55%	364%	N
6 PM	26%	154%	N	32%	192%	N	37%	220%	N	46%	275%	N
7 PM	18%	124%	N	22%	156%	N	25%	178%	N	31%	222%	N
8 PM	16%	105%	N	19%	131%	N	22%	149%	N	28%	187%	N
9 PM	7%	77%	N	9%	96%	N	10%	110%	N	13%	137%	N
10 PM	63%	76%	N	79%	95%	N	90%	108%	N	113%	135%	Y
11 PM	51%	36%	N	63%	45%	N	72%	51%	N	90%	64%	N

Assumes Circle Dr. volumes are reduced, and driveway is restricted to rights-in and rights-out

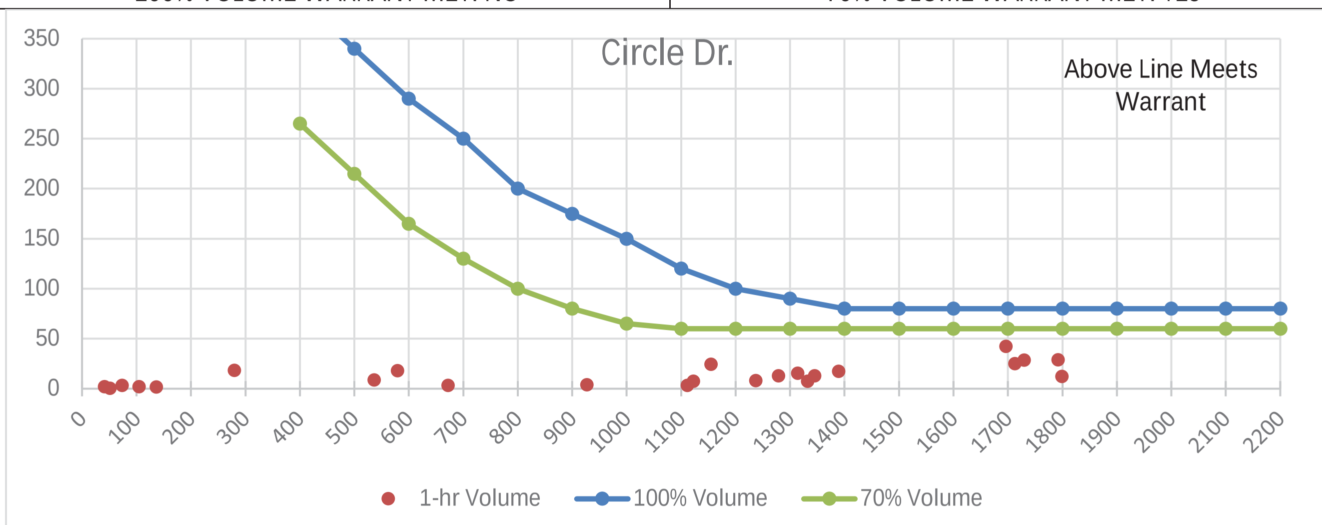
Condition A (100%) criteria satisfied if met for 8-hours of an average day -or-
Condition B (100%) criteria satisfied if met for 8-hours of an average day -or-
Conditions A & B (80%) criteria satisfied if met for 8-hours of an average day

WARRANT MET: NO

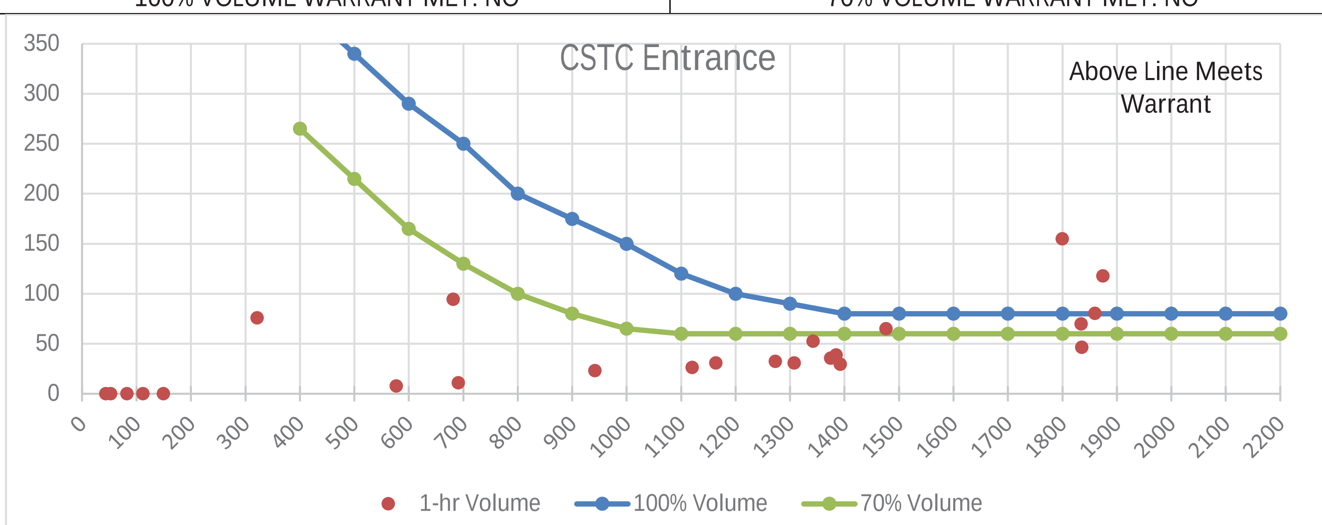
Condition A (70%) criteria satisfied if met for 8-hours of an average day -or-
Condition B (70%) criteria satisfied if met for 8-hours of an average day -or-
Conditions A & B (56%) criteria satisfied if met for 8-hours of an average day
* 85th percentile speed on the Steilacoom Blvd. SW exceeds 40 mph
WARRANT MET: NO



100% VOLUME WARRANT MET: NO	70% VOLUME WARRANT MET: YES

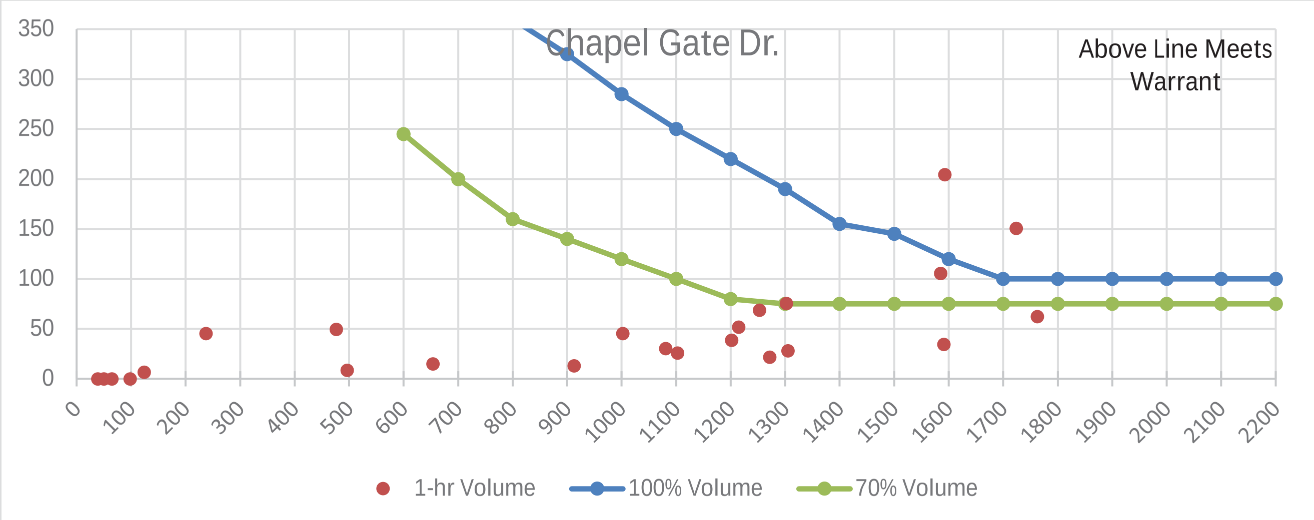


100% VOLUME WARRANT MET: NO	70% VOLUME WARRANT MET: NO

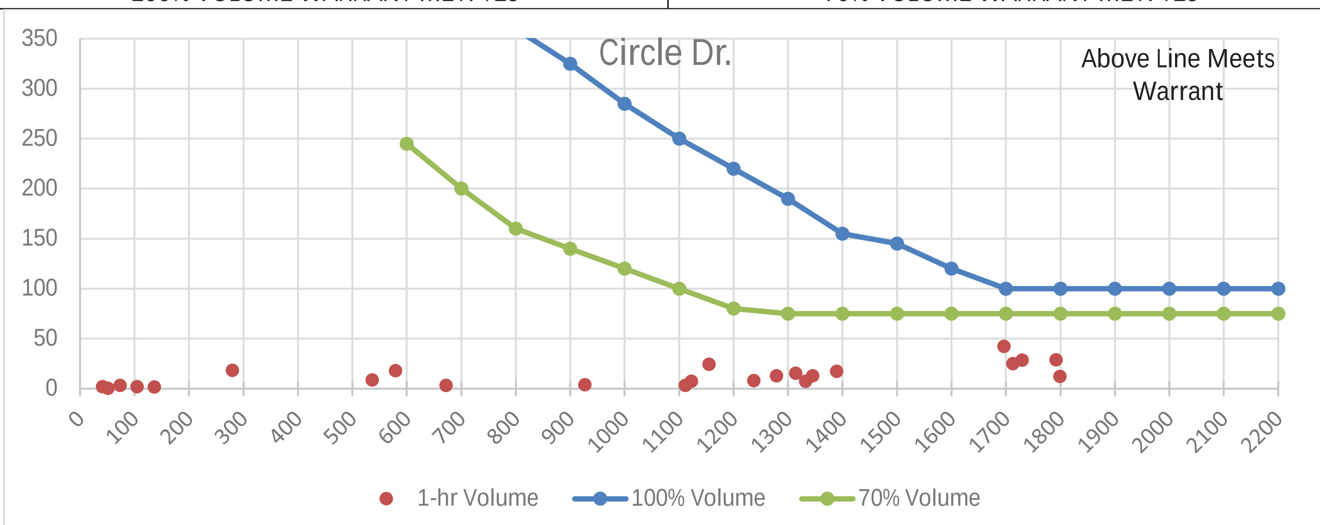


100% VOLUME WARRANT MET: NO	70% VOLUME WARRANT MET: NO

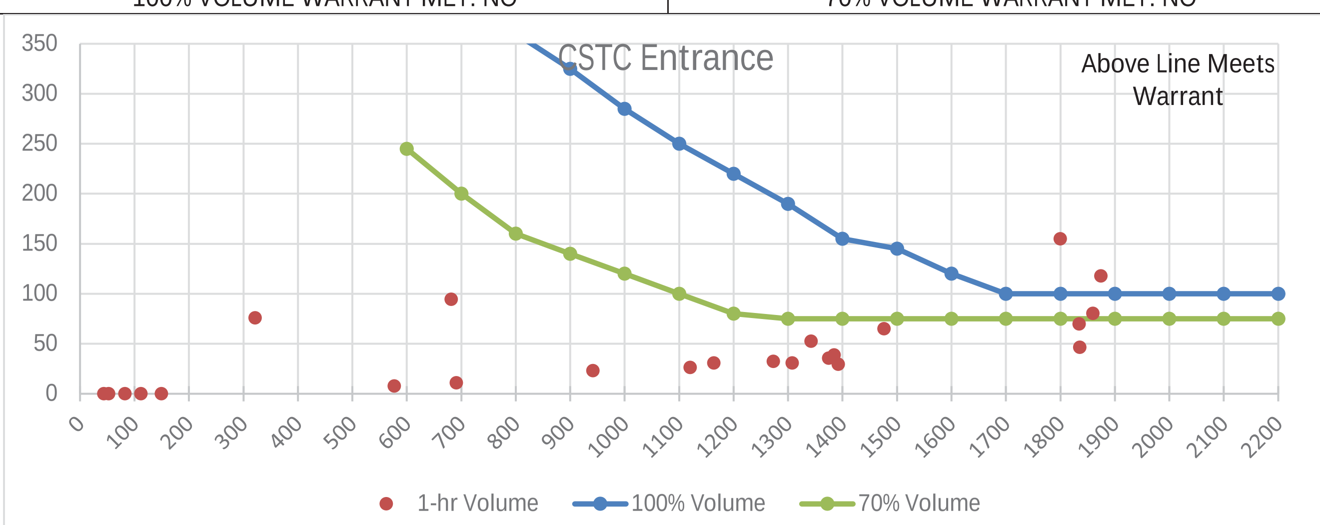
Figure 17: Four-Hour Vehicular Volume Warrant Analysis



100% VOLUME WARRANT MET: YES	70% VOLUME WARRANT MET: YES



100% VOLUME WARRANT MET: NO	70% VOLUME WARRANT MET: NO



100% VOLUME WARRANT MET: YES	70% VOLUME WARRANT MET: YES

Figure 18: Peak Hour Volume Warrant Analysis

Table 20: Proposed Action AM and PM Peak Hour Intersection Level-of-Service with Access Changes

Intersection	Control	AM Peak Hour				PM Peak Hour			
		Proposed Action		Access Change		Proposed Action		Access Change	
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Sentinel Dr. / West St.	WB Stop	C	20.0	C	20.0	B	11.3	B	11.3
Sentinel Dr. / South St.	WB Stop	Closed		Closed		Closed		Closed	
Farwest Dr. / Steilacoom Blvd.	Signal	D	36.0	D	36.0	D	41.7	D	40.1
Chapel Gate Dr. / Steilacoom Blvd.	Signal	C	19.9	A	4.9	F	51.1	B	11.0
Circle Dr. / Steilacoom Blvd.	SB Stop	A	5.1	B	12.3	B	14.5	B	13.0
CSTC Entrance / Steilacoom Blvd.	Signal	F	94.1	A	4.7	F	83.6	A	4.8
87th Ave. / Steilacoom Blvd.	Signal	B	19.3	B	19.3	C	21.8	C	21.8
87th Ave. / Oakridge Group Home	EB Stop	B	11.7	B	11.7	B	10.4	B	10.4
87th Ave. / Golf Course Rd.	EB Stop	B	11.7	B	11.7	B	11.1	B	11.1
Kids First Pl. / Golf Course Rd.	NB Stop	A	8.3	A	8.3	A	8.4	A	8.4

With removal of the traffic signal at Circle Dr., conversion of the Circle Dr. driveway to right-in/right-out movements only, shift in traffic volumes to the Chapel Gate Dr. and CSTC Entrance driveways, and installation of traffic signals at the Chapel Gate Dr. and CSTC Entrance driveways, the study intersection LOS improve and all meet the City of Lakewood's LOS thresholds.

Appendix

TRAFFIC COUNT CONSULTANTS, INC.

Team@tc2inc.com
(253) 770-1407

LAKEWOOD, WASHINGTON
WEST ST E/O
SENTINEL DR
LOC# 01 V TSI19016TM

Site Code: 01

Date Start: 28-May-19
Date End: 30-May-19

Start	27-May-19		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
12:00 AM	*	*	0	1	1	3	1	1	*	*	*	*	*	*	1	2
01:00	*	*	0	0	2	2	0	0	*	*	*	*	*	*	1	1
02:00	*	*	0	0	2	0	0	0	*	*	*	*	*	*	1	0
03:00	*	*	0	0	0	0	1	1	*	*	*	*	*	*	0	0
04:00	*	*	1	0	1	0	1	0	*	*	*	*	*	*	1	0
05:00	*	*	17	0	19	0	19	1	*	*	*	*	*	*	18	0
06:00	*	*	22	1	26	3	25	1	*	*	*	*	*	*	24	2
07:00	*	*	**42**	11	**55**	**15**	**56**	**16**	*	*	*	*	*	*	**51**	**14**
08:00	*	*	19	3	28	8	24	8	*	*	*	*	*	*	24	6
09:00	*	*	17	2	14	10	10	6	*	*	*	*	*	*	14	6
10:00	*	*	13	9	7	5	11	7	*	*	*	*	*	*	10	7
11:00	*	*	10	**13**	9	12	9	8	*	*	*	*	*	*	9	11
12:00 PM	*	*	16	13	**30**	11	15	9	*	*	*	*	*	*	**20**	11
01:00	*	*	13	6	22	14	21	8	*	*	*	*	*	*	19	9
02:00	*	*	**18**	13	21	9	**22**	10	*	*	*	*	*	*	20	11
03:00	*	*	8	28	7	24	9	23	*	*	*	*	*	*	8	25
04:00	*	*	6	**36**	9	**33**	4	**30**	*	*	*	*	*	*	6	**33**
05:00	*	*	0	6	1	7	6	16	*	*	*	*	*	*	2	10
06:00	*	*	2	4	3	5	3	4	*	*	*	*	*	*	3	4
07:00	*	*	2	4	4	1	6	13	*	*	*	*	*	*	4	6
08:00	*	*	2	1	3	1	2	8	*	*	*	*	*	*	2	3
09:00	*	*	0	1	3	3	4	7	*	*	*	*	*	*	2	4
10:00	*	*	5	2	7	5	2	3	*	*	*	*	*	*	5	3
11:00	*	*	3	2	1	3	3	5	*	*	*	*	*	*	2	3
Lane	0	0	216	156	275	174	254	185	0	0	0	0	0	0	247	171
Day	0		372		449		439		0		0		0		418	
AM Peak	-	-	07:00	11:00	07:00	07:00	07:00	07:00	-	-	-	-	-	-	07:00	07:00
Vol.	-	-	42	13	55	15	56	16	-	-	-	-	-	-	51	14
PM Peak	-	-	14:00	16:00	12:00	16:00	14:00	16:00	-	-	-	-	-	-	12:00	16:00
Vol.	-	-	18	36	30	33	22	30	-	-	-	-	-	-	20	33

Comb. Total	0	372	449	439	0	0	0	418
ADT	ADT 420	AADT 420						

TRAFFIC COUNT CONSULTANTS, INC.

Team@tc2inc.com
(253) 770-1407

LAKEWOOD, WASHINGTON
SOUTH ST E/O
SENTINEL DR
LOC# 02 V TSI19016TM

Site Code: 02

Date Start: 28-May-19
Date End: 30-May-19

Start	27-May-19		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN
12:00 AM	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
01:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
02:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
03:00	*	*	0	0	0	2	0	0	*	*	*	*	*	*	0	1
04:00	*	*	0	0	0	0	1	0	*	*	*	*	*	*	0	0
05:00	*	*	3	2	7	6	3	6	*	*	*	*	*	*	4	5
06:00	*	*	**11**	**44**	10	**20**	11	**24**	*	*	*	*	*	*	11	**29**
07:00	*	*	10	10	**14**	20	**12**	18	*	*	*	*	*	*	**12**	16
08:00	*	*	6	14	8	20	1	16	*	*	*	*	*	*	5	17
09:00	*	*	11	28	11	10	10	14	*	*	*	*	*	*	11	17
10:00	*	*	5	6	4	6	9	22	*	*	*	*	*	*	6	11
11:00	*	*	8	4	10	10	10	8	*	*	*	*	*	*	9	7
12:00 PM	*	*	10	6	12	0	7	**4**	*	*	*	*	*	*	10	3
01:00	*	*	10	8	9	8	8	4	*	*	*	*	*	*	9	7
02:00	*	*	**15**	**14**	11	**12**	**19**	4	*	*	*	*	*	*	**15**	**10**
03:00	*	*	15	2	**15**	4	15	0	*	*	*	*	*	*	15	2
04:00	*	*	6	0	13	2	9	2	*	*	*	*	*	*	9	1
05:00	*	*	2	8	5	8	2	2	*	*	*	*	*	*	3	6
06:00	*	*	2	0	1	0	1	0	*	*	*	*	*	*	1	0
07:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
08:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
09:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
10:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
11:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
Lane	0	0	114	146	130	128	118	124	0	0	0	0	0	0	120	132
Day	0		260		258		242		0		0		0		252	
AM Peak	-	-	06:00	06:00	07:00	06:00	07:00	06:00	-	-	-	-	-	-	07:00	06:00
Vol.	-	-	11	44	14	20	12	24	-	-	-	-	-	-	12	29
PM Peak	-	-	14:00	14:00	15:00	14:00	14:00	12:00	-	-	-	-	-	-	14:00	14:00
Vol.	-	-	15	14	15	12	19	4	-	-	-	-	-	-	15	10

	27-May-19	Tue	Wed	Thu	Fri	Sat	Sun	Week Average
Comb. Total	0	260	258	242	0	0	0	252

ADT ADT 253 AADT 253

TRAFFIC COUNT CONSULTANTS, INC.
Team@tc2inc.com
(253) 770-1407

LAKEWOOD, WASHINGTON
CHAPEL GATE DR N/O
STEILACOOM BLVD
LOC# 03N V TSI19016TM

Site Code: 03N

Date Start: 28-May-19
Date End: 30-May-19

Start Time	27-May-19 IN	OUT	Tue IN	OUT	Wed IN	OUT	Thu IN	OUT	Fri IN	OUT	Sat IN	OUT	Sun IN	OUT	Week Average IN	OUT
12:00 AM	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
01:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
02:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
03:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
04:00	*	*	3	0	4	1	5	3	*	*	*	*	*	*	4	1
05:00	*	*	18	5	32	5	26	4	*	*	*	*	*	*	25	5
06:00	*	*	**115**	20	**117**	27	120	21	*	*	*	*	*	*	**117**	23
07:00	*	*	97	16	104	21	**121**	16	*	*	*	*	*	*	107	18
08:00	*	*	44	13	45	12	40	10	*	*	*	*	*	*	43	12
09:00	*	*	30	20	31	12	33	18	*	*	*	*	*	*	31	17
10:00	*	*	20	18	21	17	18	14	*	*	*	*	*	*	20	16
11:00	*	*	15	**28**	20	**30**	21	**24**	*	*	*	*	*	*	19	**27**
12:00 PM	*	*	**36**	30	34	32	31	35	*	*	*	*	*	*	34	32
01:00	*	*	29	27	23	50	23	32	*	*	*	*	*	*	25	36
02:00	*	*	31	63	**48**	49	**44**	49	*	*	*	*	*	*	**41**	54
03:00	*	*	12	**85**	12	**90**	16	**95**	*	*	*	*	*	*	13	**90**
04:00	*	*	4	76	8	61	6	70	*	*	*	*	*	*	6	69
05:00	*	*	3	25	4	32	8	29	*	*	*	*	*	*	5	29
06:00	*	*	9	19	5	18	3	13	*	*	*	*	*	*	6	17
07:00	*	*	0	8	2	12	9	12	*	*	*	*	*	*	4	11
08:00	*	*	2	2	8	6	1	6	*	*	*	*	*	*	4	5
09:00	*	*	3	4	4	2	5	7	*	*	*	*	*	*	4	4
10:00	*	*	17	30	14	31	23	23	*	*	*	*	*	*	18	28
11:00	*	*	0	25	3	17	2	21	*	*	*	*	*	*	2	21
Lane	0	0	488	514	539	525	555	502	0	0	0	0	0	0	528	515
Day	0		1002		1064		1057		0		0		0		1043	
AM Peak	-	-	06:00	11:00	06:00	11:00	07:00	11:00	-	-	-	-	-	-	06:00	11:00
Vol.	-	-	115	28	117	30	121	24	-	-	-	-	-	-	117	27
PM Peak	-	-	12:00	15:00	14:00	15:00	14:00	15:00	-	-	-	-	-	-	14:00	15:00
Vol.	-	-	36	85	48	90	44	95	-	-	-	-	-	-	41	90
Comb. Total	0		1002		1064		1057		0		0		0		1043	

ADT	ADT 1,041	AADT 1,041

TRAFFIC COUNT CONSULTANTS, INC.
Team@tc2inc.com
(253) 770-1407

LAKEWOOD, WASHINGTON
CIRCLE DR N/O
STEILACOOM BLVD
LOC# 04 V TSI19016TM

Site Code: 04

Date Start: 28-May-19
Date End: 30-May-19

Start	27-May-19		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
12:00 AM	*	*	3	9	5	18	3	11	*	*	*	*	*	*	4	13
01:00	*	*	2	7	2	14	1	3	*	*	*	*	*	*	2	8
02:00	*	*	3	8	3	10	2	11	*	*	*	*	*	*	3	10
03:00	*	*	4	14	7	14	5	17	*	*	*	*	*	*	5	15
04:00	*	*	12	10	11	11	14	9	*	*	*	*	*	*	12	10
05:00	*	*	47	34	56	53	71	44	*	*	*	*	*	*	58	44
06:00	*	*	**180**	**124**	**181**	108	**174**	122	*	*	*	*	*	*	**178**	**118**
07:00	*	*	113	107	125	**111**	121	**125**	*	*	*	*	*	*	120	114
08:00	*	*	62	41	66	35	62	37	*	*	*	*	*	*	63	38
09:00	*	*	45	41	45	28	45	41	*	*	*	*	*	*	45	37
10:00	*	*	24	31	24	40	27	38	*	*	*	*	*	*	25	36
11:00	*	*	23	59	38	75	28	65	*	*	*	*	*	*	30	66
12:00 PM	*	*	60	78	52	81	49	87	*	*	*	*	*	*	54	82
01:00	*	*	48	48	50	65	44	78	*	*	*	*	*	*	47	64
02:00	*	*	**92**	145	**95**	153	110	143	*	*	*	*	*	*	**99**	147
03:00	*	*	15	**187**	19	**206**	40	**212**	*	*	*	*	*	*	25	**202**
04:00	*	*	13	155	14	157	27	144	*	*	*	*	*	*	18	152
05:00	*	*	8	89	12	89	6	61	*	*	*	*	*	*	9	80
06:00	*	*	11	55	10	55	20	64	*	*	*	*	*	*	14	58
07:00	*	*	8	21	15	35	6	16	*	*	*	*	*	*	10	24
08:00	*	*	11	20	13	22	13	20	*	*	*	*	*	*	12	21
09:00	*	*	13	16	16	23	21	17	*	*	*	*	*	*	17	19
10:00	*	*	79	114	80	128	**116**	90	*	*	*	*	*	*	92	111
11:00	*	*	4	69	7	82	10	92	*	*	*	*	*	*	7	81
Lane	0	0	880	1482	946	1613	1015	1547	0	0	0	0	0	0	949	1550
Day	0		2362		2559		2562		0		0		0		2499	
AM Peak	-	-	06:00	06:00	06:00	07:00	06:00	07:00	-	-	-	-	-	-	06:00	06:00
Vol.	-	-	180	124	181	111	174	125	-	-	-	-	-	-	178	118
PM Peak	-	-	14:00	15:00	14:00	15:00	22:00	15:00	-	-	-	-	-	-	14:00	15:00
Vol.	-	-	92	187	95	206	116	212	-	-	-	-	-	-	99	202

Comb. Total	0	2362	2559	2562	0	0	0	2499
ADT	ADT 2,494	AADT 2,494						

TRAFFIC COUNT CONSULTANTS, INC.

Team@tc2inc.com
(253) 770-1407

LAKEWOOD, WASHINGTON
CSTC ENTRANCE N/O
STEILACOOM BLVD
LOC# 05N V TSI19016TM

Site Code: 05N

Date Start: 28-May-19
Date End: 30-May-19

Start Time	27-May-19 IN	27-May-19 OUT	Tue IN	Tue OUT	Wed IN	Wed OUT	Thu IN	Thu OUT	Fri IN	Fri OUT	Sat IN	Sat OUT	Sun IN	Sun OUT	Week Average IN	Week Average OUT
12:00 AM	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
01:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
02:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
03:00	*	*	1	1	0	0	1	0	*	*	*	*	*	*	1	0
04:00	*	*	5	0	9	1	5	0	*	*	*	*	*	*	6	0
05:00	*	*	48	1	45	4	48	5	*	*	*	*	*	*	47	3
06:00	*	*	**171**	30	**159**	22	**175**	20	*	*	*	*	*	*	**168**	24
07:00	*	*	142	**42**	135	**45**	139	**45**	*	*	*	*	*	*	139	**44**
08:00	*	*	73	19	86	14	80	19	*	*	*	*	*	*	80	17
09:00	*	*	26	13	28	19	24	21	*	*	*	*	*	*	26	18
10:00	*	*	22	21	16	9	27	20	*	*	*	*	*	*	22	17
11:00	*	*	36	41	25	38	38	34	*	*	*	*	*	*	33	38
12:00 PM	*	*	59	34	69	30	64	42	*	*	*	*	*	*	64	35
01:00	*	*	40	24	36	31	41	23	*	*	*	*	*	*	39	26
02:00	*	*	**133**	76	**126**	73	**147**	76	*	*	*	*	*	*	**135**	75
03:00	*	*	20	**97**	22	**104**	18	**100**	*	*	*	*	*	*	20	**100**
04:00	*	*	17	61	15	71	12	52	*	*	*	*	*	*	15	61
05:00	*	*	11	21	8	24	7	30	*	*	*	*	*	*	9	25
06:00	*	*	6	24	16	23	11	25	*	*	*	*	*	*	11	24
07:00	*	*	12	16	9	16	11	17	*	*	*	*	*	*	11	16
08:00	*	*	7	17	10	12	16	15	*	*	*	*	*	*	11	15
09:00	*	*	8	10	14	14	9	7	*	*	*	*	*	*	10	10
10:00	*	*	57	43	62	48	69	61	*	*	*	*	*	*	63	51
11:00	*	*	1	74	4	60	2	49	*	*	*	*	*	*	2	61
Lane	0	0	895	665	894	658	944	661	0	0	0	0	0	0	912	660
Day	0		1560		1552		1605		0		0		0		1572	
AM Peak	-	-	06:00	07:00	06:00	07:00	06:00	07:00	-	-	-	-	-	-	06:00	07:00
Vol.	-	-	171	42	159	45	175	45	-	-	-	-	-	-	168	44
PM Peak	-	-	14:00	15:00	14:00	15:00	14:00	15:00	-	-	-	-	-	-	14:00	15:00
Vol.	-	-	133	97	126	104	147	100	-	-	-	-	-	-	135	100

	27-May-19	Tue	Wed	Thu	Fri	Sat	Sun	Week Average
Comb. Total	0	1560	1552	1605	0	0	0	1572

ADT   ADT 1,572   AADT 1,572

TRAFFIC COUNT CONSULTANTS, INC.

Team@tc2inc.com
(253) 770-1407

LAKEWOOD, WASHINGTON
OAKRIDGE GROUP HOME ENT W/O
87TH AVE SW
LOC# 06 V TSI19016TM

Site Code: 06

Date Start: 28-May-19
Date End: 30-May-19

Start	27-May-19		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
12:00 AM	*	*	1	1	1	1	1	1	*	*	*	*	*	*	1	1
01:00	*	*	0	2	0	1	0	1	*	*	*	*	*	*	0	1
02:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
03:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
04:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
05:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
06:00	*	*	1	0	1	0	1	0	*	*	*	*	*	*	1	0
07:00	*	*	3	3	4	3	2	2	*	*	*	*	*	*	3	3
08:00	*	*	**14**	**6**	**13**	**4**	**10**	**7**	*	*	*	*	*	*	**12**	**6**
09:00	*	*	3	2	2	2	3	0	*	*	*	*	*	*	3	1
10:00	*	*	1	0	2	3	0	3	*	*	*	*	*	*	1	2
11:00	*	*	1	0	3	2	3	5	*	*	*	*	*	*	2	2
12:00 PM	*	*	**5**	5	2	**10**	2	**5**	*	*	*	*	*	*	**3**	**7**
01:00	*	*	2	1	**6**	2	2	0	*	*	*	*	*	*	3	1
02:00	*	*	1	1	2	2	1	1	*	*	*	*	*	*	1	1
03:00	*	*	3	4	1	8	1	2	*	*	*	*	*	*	2	5
04:00	*	*	1	**6**	0	4	1	4	*	*	*	*	*	*	1	5
05:00	*	*	3	3	0	2	**3**	3	*	*	*	*	*	*	2	3
06:00	*	*	1	2	1	4	0	1	*	*	*	*	*	*	1	2
07:00	*	*	0	0	0	0	1	1	*	*	*	*	*	*	0	0
08:00	*	*	1	1	2	1	3	2	*	*	*	*	*	*	2	1
09:00	*	*	1	1	1	0	1	1	*	*	*	*	*	*	1	1
10:00	*	*	0	0	0	1	0	1	*	*	*	*	*	*	0	1
11:00	*	*	1	0	2	0	2	1	*	*	*	*	*	*	2	0
Lane	0	0	43	38	43	50	37	41	0	0	0	0	0	0	41	43
Day	0		81		93		78		0		0		0		84	
AM Peak	-	-	08:00	08:00	08:00	08:00	08:00	08:00	-	-	-	-	-	-	08:00	08:00
Vol.	-	-	14	6	13	4	10	7	-	-	-	-	-	-	12	6
PM Peak	-	-	12:00	16:00	13:00	12:00	17:00	12:00	-	-	-	-	-	-	12:00	12:00
Vol.	-	-	5	6	6	10	3	5	-	-	-	-	-	-	3	7
Comb. Total	0		81		93		78		0		0		0		84	
ADT	ADT 84		AADT 84													

LAKEWOOD, WASHINGTON
GOLF COURSE RD SW W/O
87TH AVE SW
LOC# 07 V TSI19016TM

TRAFFIC COUNT CONSULTANTS, INC.

Team@tc2inc.com
(253) 770-1407

Site Code: 07

Date Start: 28-May-19
Date End: 30-May-19

Start	27-May-19		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
12:00 AM	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
01:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
02:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
03:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
04:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
05:00	*	*	3	2	1	1	0	0	*	*	*	*	*	*	1	1
06:00	*	*	3	0	4	3	3	1	*	*	*	*	*	*	3	1
07:00	*	*	7	8	10	4	11	4	*	*	*	*	*	*	9	5
08:00	*	*	18	5	8	3	10	1	*	*	*	*	*	*	12	3
09:00	*	*	8	3	12	12	11	9	*	*	*	*	*	*	10	8
10:00	*	*	**21**	**15**	**18**	11	7	**16**	*	*	*	*	*	*	**15**	**14**
11:00	*	*	12	15	11	**14**	**12**	13	*	*	*	*	*	*	12	14
12:00 PM	*	*	13	29	**18**	15	15	8	*	*	*	*	*	*	15	17
01:00	*	*	11	13	11	18	20	10	*	*	*	*	*	*	14	14
02:00	*	*	10	14	14	23	12	25	*	*	*	*	*	*	12	21
03:00	*	*	12	**31**	16	**34**	18	**49**	*	*	*	*	*	*	15	**38**
04:00	*	*	**16**	24	16	21	27	19	*	*	*	*	*	*	**20**	21
05:00	*	*	10	14	10	19	**37**	15	*	*	*	*	*	*	19	16
06:00	*	*	12	15	12	13	14	17	*	*	*	*	*	*	13	15
07:00	*	*	10	7	6	17	3	17	*	*	*	*	*	*	6	14
08:00	*	*	1	13	8	10	8	36	*	*	*	*	*	*	6	20
09:00	*	*	0	7	2	8	2	10	*	*	*	*	*	*	1	8
10:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
11:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
Lane	0	0	167	215	177	226	210	250	0	0	0	0	0	0	183	230
Day	0		382		403		460		0		0		0		413	
AM Peak	-	-	10:00	10:00	10:00	11:00	11:00	10:00	-	-	-	-	-	-	10:00	10:00
Vol.	-	-	21	15	18	14	12	16	-	-	-	-	-	-	15	14
PM Peak	-	-	16:00	15:00	12:00	15:00	17:00	15:00	-	-	-	-	-	-	16:00	15:00
Vol.	-	-	16	31	18	34	37	49	-	-	-	-	-	-	20	38
Comb. Total	0		382		403		460		0		0		0		413	
ADT	ADT 415		AADT 415													

TRAFFIC COUNT CONSULTANTS, INC.

Team@tc2inc.com
(253) 770-1407

LAKEWOOD, WASHINGTON
KIDS FIRST PL S/O
GOLF COURSE RD
LOC# 08 V TSI19016TM

Site Code: 08

Date Start: 28-May-19
Date End: 30-May-19

Start	27-May-19		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
12:00 AM	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
01:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
02:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
03:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
04:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
05:00	*	*	0	1	0	0	0	1	*	*	*	*	*	*	0	1
06:00	*	*	2	2	3	3	1	0	*	*	*	*	*	*	2	2
07:00	*	*	4	4	**4**	2	**6**	2	*	*	*	*	*	*	**5**	3
08:00	*	*	**5**	4	4	0	4	1	*	*	*	*	*	*	4	2
09:00	*	*	4	3	4	8	3	**7**	*	*	*	*	*	*	4	6
10:00	*	*	1	**7**	3	4	3	7	*	*	*	*	*	*	2	6
11:00	*	*	2	4	4	**10**	4	7	*	*	*	*	*	*	3	**7**
12:00 PM	*	*	**3**	10	**5**	7	**6**	6	*	*	*	*	*	*	**5**	8
01:00	*	*	3	6	2	6	4	3	*	*	*	*	*	*	3	5
02:00	*	*	1	6	4	13	2	16	*	*	*	*	*	*	2	12
03:00	*	*	0	**27**	2	**24**	0	**39**	*	*	*	*	*	*	1	**30**
04:00	*	*	2	11	2	13	2	8	*	*	*	*	*	*	2	11
05:00	*	*	1	3	1	4	3	5	*	*	*	*	*	*	2	4
06:00	*	*	1	1	0	0	1	0	*	*	*	*	*	*	1	0
07:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
08:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
09:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
10:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
11:00	*	*	0	0	0	0	0	0	*	*	*	*	*	*	0	0
Lane	0	0	29	89	38	94	39	102	0	0	0	0	0	0	36	97
Day	0		118		132		141		0		0		0		133	
AM Peak	-	-	08:00	10:00	07:00	11:00	07:00	09:00	-	-	-	-	-	-	07:00	11:00
Vol.	-	-	5	7	4	10	6	7	-	-	-	-	-	-	5	7
PM Peak	-	-	12:00	15:00	12:00	15:00	12:00	15:00	-	-	-	-	-	-	12:00	15:00
Vol.	-	-	3	27	5	24	6	39	-	-	-	-	-	-	5	30
Comb. Total	0		118		132		141		0		0		0		133	
ADT	ADT 130		AADT 130													

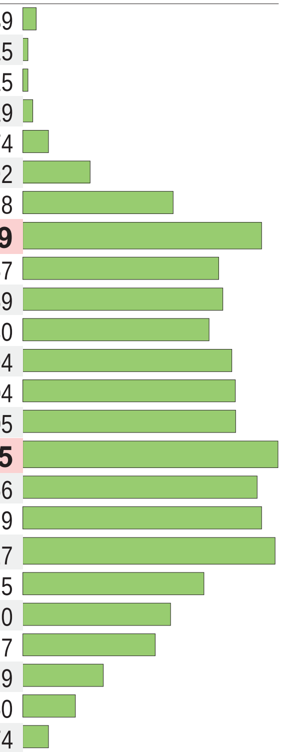
TRAFFIC COUNT CONSULTANTS, INC.
Team@tc2inc.com
(253) 770-1407

LAKEWOOD, WASHINGTON
STEILACOOM BLVD SW W/O
CHAPEL GATE DR
LOC# 03W V TSI19016TM

Site Code: 03W

Date Start: 28-May-19
Date End: 30-May-19

Start Time	Mon 27-May-19	Tue 28-May-19	Wed 29-May-19	Thu 30-May-19	Fri 31-May-19		Average Day		Sat 01-Jun-19	Sun 02-Jun-19		Week Average		
12:00 AM	*	37	45	36	*		39		*	*		39		
01:00	*	21	9	15	*		15		*	*		15		
02:00	*	16	14	16	*		15		*	*		15		
03:00	*	30	24	32	*		29		*	*		29		
04:00	*	77	79	67	*		74		*	*		74		
05:00	*	179	192	206	*		192		*	*		192		
06:00	*	412	429	444	*		428		*	*		428		
07:00	*	**651**	**707**	**679**	*		**679**		*	*		**679**		
08:00	*	538	590	543	*		557		*	*		557		
09:00	*	539	597	571	*		569		*	*		569		
10:00	*	568	522	501	*		530		*	*		530		
11:00	*	602	604	576	*		594		*	*		594		
12:00 PM	*	618	583	611	*		604		*	*		604		
01:00	*	578	629	608	*		605		*	*		605		
02:00	*	695	**741**	**738**	*		**725**		*	*		**725**		
03:00	*	651	690	658	*		666		*	*		666		
04:00	*	643	671	724	*		679		*	*		679		
05:00	*	**696**	727	729	*		717		*	*		717		
06:00	*	520	505	519	*		515		*	*		515		
07:00	*	396	395	468	*		420		*	*		420		
08:00	*	338	417	377	*		377		*	*		377		
09:00	*	203	213	272	*		229		*	*		229		
10:00	*	131	147	171	*		150		*	*		150		
11:00	*	64	84	75	*		74		*	*		74		
Day Total	0	9203	9614	9636	0		9482		0	0		9482		
% Avg. WkDay	0.0%	97.1%	101.4%	101.6%	0.0%									
% Avg. Week	0.0%	97.1%	101.4%	101.6%	0.0%		100.0%		0.0%	0.0%				
AM Peak	-	07:00	07:00	07:00	-	-	07:00	-	-	-	-	07:00	-	-
Vol.	-	651	707	679	-	-	679	-	-	-	-	679	-	-
PM Peak	-	17:00	14:00	14:00	-	-	14:00	-	-	-	-	14:00	-	-
Vol.	-	696	741	738	-	-	725	-	-	-	-	725	-	-
Grand Total	0	9203	9614	9636	0		9482		0	0		9482		



ADT	ADT 9,484	AADT 9,484

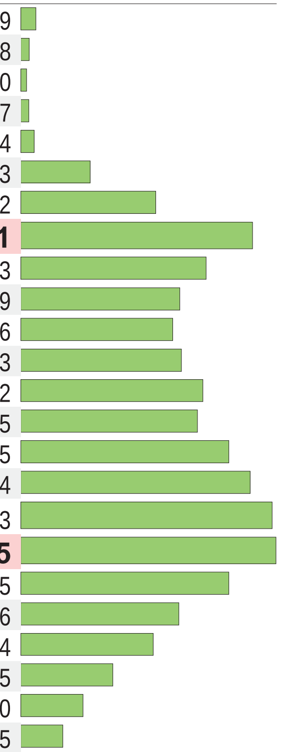
TRAFFIC COUNT CONSULTANTS, INC.
Team@tc2inc.com
(253) 770-1407

LAKEWOOD, WASHINGTON
STEILACOOM BLVD SW E/O
CHAPEL GATE DR
LOC# 03E V TSI19016TM

Site Code: 03E

Date Start: 28-May-19
Date End: 30-May-19

Start Time	Mon 27-May-19	Tue 28-May-19	Wed 29-May-19	Thu 30-May-19	Fri 31-May-19		Average Day		Sat 01-Jun-19	Sun 02-Jun-19		Week Average		
12:00 AM	*	45	49	52	*		49		*	*		49		
01:00	*	25	30	30	*		28		*	*		28		
02:00	*	19	23	19	*		20		*	*		20		
03:00	*	26	28	26	*		27		*	*		27		
04:00	*	40	47	44	*		44		*	*		44		
05:00	*	201	228	239	*		223		*	*		223		
06:00	*	412	429	454	*		432		*	*		432		
07:00	*	**741**	**736**	**747**	*		**741**		*	*		**741**		
08:00	*	585	597	597	*		593		*	*		593		
09:00	*	488	533	506	*		509		*	*		509		
10:00	*	508	481	468	*		486		*	*		486		
11:00	*	529	496	513	*		513		*	*		513		
12:00 PM	*	574	616	556	*		582		*	*		582		
01:00	*	552	629	515	*		565		*	*		565		
02:00	*	645	666	683	*		665		*	*		665		
03:00	*	711	720	770	*		734		*	*		734		
04:00	*	**767**	822	821	*		803		*	*		803		
05:00	*	763	**830**	**851**	*		**815**		*	*		**815**		
06:00	*	708	636	651	*		665		*	*		665		
07:00	*	471	526	520	*		506		*	*		506		
08:00	*	408	424	441	*		424		*	*		424		
09:00	*	281	290	314	*		295		*	*		295		
10:00	*	164	181	256	*		200		*	*		200		
11:00	*	117	150	138	*		135		*	*		135		
Day Total	0	9780	10167	10211	0		10054		0	0		10054		
% Avg. WkDay	0.0%	97.3%	101.1%	101.6%	0.0%									
% Avg. Week	0.0%	97.3%	101.1%	101.6%	0.0%		100.0%		0.0%	0.0%				
AM Peak	-	07:00	07:00	07:00	-	-	07:00	-	-	-	-	07:00	-	-
Vol.	-	741	736	747	-	-	741	-	-	-	-	741	-	-
PM Peak	-	16:00	17:00	17:00	-	-	17:00	-	-	-	-	17:00	-	-
Vol.	-	767	830	851	-	-	815	-	-	-	-	815	-	-
Grand Total	0	9780	10167	10211	0		10054		0	0		10054		



ADT	ADT 10,053	AADT 10,053

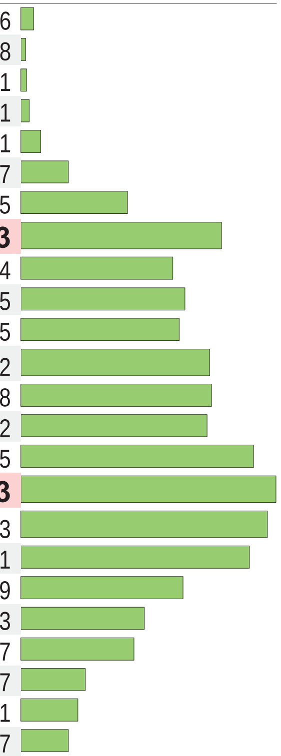
TRAFFIC COUNT CONSULTANTS, INC.
Team@tc2inc.com
(253) 770-1407

LAKEWOOD, WASHINGTON
STEILACOOM BLVD SW W/O
CSTC ENTRANCE
LOC# 05W V TSI19016TM

Site Code: 05W

Date Start: 28-May-19
Date End: 30-May-19

Start Time	Mon 27-May-19	Tue 28-May-19	Wed 29-May-19	Thu 30-May-19	Fri 31-May-19		Average Day		Sat 01-Jun-19	Sun 02-Jun-19		Week Average		
12:00 AM	*	39	55	43	*		46		*	*		46		
01:00	*	24	16	15	*		18		*	*		18		
02:00	*	22	19	22	*		21		*	*		21		
03:00	*	31	25	38	*		31		*	*		31		
04:00	*	72	75	66	*		71		*	*		71		
05:00	*	161	168	173	*		167		*	*		167		
06:00	*	370	367	389	*		375		*	*		375		
07:00	*	669	**738**	**702**	*		**703**		*	*		**703**		
08:00	*	515	552	535	*		534		*	*		534		
09:00	*	557	589	579	*		575		*	*		575		
10:00	*	577	551	536	*		555		*	*		555		
11:00	*	**676**	669	640	*		662		*	*		662		
12:00 PM	*	673	644	686	*		668		*	*		668		
01:00	*	611	695	650	*		652		*	*		652		
02:00	*	791	829	825	*		815		*	*		815		
03:00	*	**865**	**926**	889	*		**893**		*	*		**893**		
04:00	*	834	866	**890**	*		863		*	*		863		
05:00	*	789	812	803	*		801		*	*		801		
06:00	*	564	567	577	*		569		*	*		569		
07:00	*	412	411	476	*		433		*	*		433		
08:00	*	355	440	396	*		397		*	*		397		
09:00	*	196	207	279	*		227		*	*		227		
10:00	*	173	207	223	*		201		*	*		201		
11:00	*	151	176	174	*		167		*	*		167		
Day Total	0	10127	10604	10606	0		10444		0	0		10444		
% Avg. WkDay	0.0%	97.0%	101.5%	101.6%	0.0%									
% Avg. Week	0.0%	97.0%	101.5%	101.6%	0.0%		100.0%		0.0%	0.0%				
AM Peak	-	11:00	07:00	07:00	-	-	07:00	-	-	-	-	07:00	-	-
Vol.	-	676	738	702	-	-	703	-	-	-	-	703	-	-
PM Peak	-	15:00	15:00	16:00	-	-	15:00	-	-	-	-	15:00	-	-
Vol.	-	865	926	890	-	-	893	-	-	-	-	893	-	-
Grand Total	0	10127	10604	10606	0		10444		0	0		10444		



ADT	ADT 10,446	AADT 10,446

TRAFFIC COUNT CONSULTANTS, INC.
Team@tc2inc.com
(253) 770-1407

LAKEWOOD, WASHINGTON
STEILACOOM BLVD SW E/O
CSTC ENTRANCE
LOC# 05E V TSI19016TM

Site Code: 05E

Date Start: 28-May-19
Date End: 30-May-19

Start Time	Mon 27-May-19	Tue 28-May-19	Wed 29-May-19	Thu 30-May-19	Fri 31-May-19		Average Day		Sat 01-Jun-19	Sun 02-Jun-19		Week Average		
12:00 AM	*	51	57	57	*		55		*	*		55		
01:00	*	28	39	32	*		33		*	*		33		
02:00	*	25	26	17	*		23		*	*		23		
03:00	*	31	34	36	*		34		*	*		34		
04:00	*	62	77	68	*		69		*	*		69		
05:00	*	294	325	344	*		321		*	*		321		
06:00	*	729	725	783	*		746		*	*		746		
07:00	*	**936**	**954**	**942**	*		**944**		*	*		**944**		
08:00	*	680	705	713	*		699		*	*		699		
09:00	*	548	592	562	*		567		*	*		567		
10:00	*	535	510	507	*		517		*	*		517		
11:00	*	580	531	563	*		558		*	*		558		
12:00 PM	*	675	708	637	*		673		*	*		673		
01:00	*	609	687	582	*		626		*	*		626		
02:00	*	**815**	**836**	**855**	*		**835**		*	*		**835**		
03:00	*	666	676	724	*		689		*	*		689		
04:00	*	740	802	777	*		773		*	*		773		
05:00	*	762	828	842	*		811		*	*		811		
06:00	*	717	642	664	*		674		*	*		674		
07:00	*	486	545	528	*		520		*	*		520		
08:00	*	411	446	448	*		435		*	*		435		
09:00	*	301	312	340	*		318		*	*		318		
10:00	*	294	317	388	*		333		*	*		333		
11:00	*	96	130	114	*		113		*	*		113		
Day Total	0	11071	11504	11523	0		11366		0	0		11366		
% Avg. WkDay	0.0%	97.4%	101.2%	101.4%	0.0%									
% Avg. Week	0.0%	97.4%	101.2%	101.4%	0.0%		100.0%		0.0%	0.0%				
AM Peak	-	07:00	07:00	07:00	-	-	07:00	-	-	-	-	07:00	-	-
Vol.	-	936	954	942	-	-	944	-	-	-	-	944	-	-
PM Peak	-	14:00	14:00	14:00	-	-	14:00	-	-	-	-	14:00	-	-
Vol.	-	815	836	855	-	-	835	-	-	-	-	835	-	-
Grand Total	0	11071	11504	11523	0		11366		0	0		11366		

ADT	ADT 11,366	AADT 11,366

Prepared for: **Transportation Solutions, Inc.**

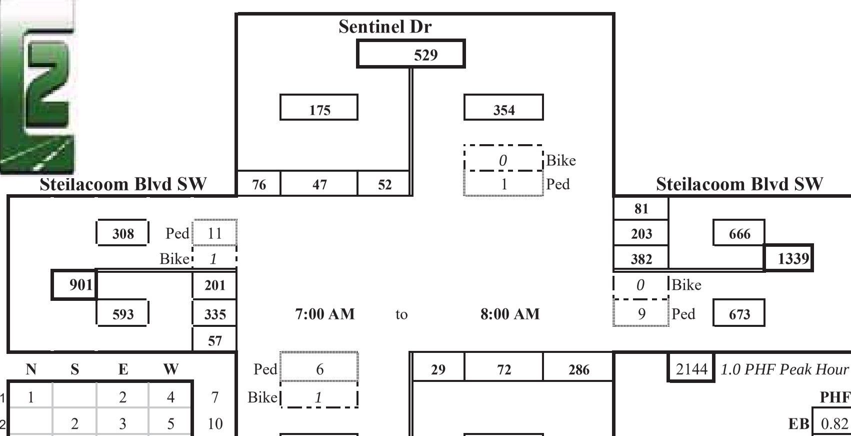
Traffic Count Consultants, Inc.

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

WBE/DBE

Intersection: Sentinel Dr/Farwest Dr SW & Steilacoom Blvd SW
Location: Lakewood, Washington
Date of Count: Thurs 5/30/2019
Checked By: Jess

Time Interval Ending at	From North on (SB) Sentinel Dr T	L	S	R	From South on (NB) Farwest Dr SW T	L	S	R	From East on (WB) Steilacoom Blvd SW T	L	S	R	From West on (EB) Steilacoom Blvd SW T	L	S	R	Interval Total
7:15 A	2	8	7	17	2	9	10	67	5	104	69	19	9	52	76	14	452
7:30 A	8	23	17	28	4	9	42	99	3	82	41	36	4	84	62	13	536
7:45 A	4	18	19	28	2	6	18	61	5	80	44	13	1	53	115	13	468
8:00 A	2	3	4	3	0	5	2	59	3	116	49	13	1	12	82	17	365
8:15 A	2	3	1	2	3	11	5	46	4	67	33	4	5	12	100	20	304
8:30 A	2	3	4	4	2	9	3	53	1	66	51	4	1	11	77	22	307
8:45 A	1	6	8	9	3	4	4	33	5	80	62	3	2	8	74	15	306
9:00 A	0	7	3	4	1	9	4	60	1	104	76	3	1	5	84	19	378
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	21	71	63	95	17	62	88	478	27	699	425	95	24	237	670	133	3116
	Peak Hour: 7:00 AM to 8:00 AM																
Total	16	52	47	76	8	29	72	286	16	382	203	81	15	201	335	57	1821
Approach	175				387				666				593				1821
%HV	9.1%				2.1%				2.4%				2.5%				3.0%
PHF	0.64				0.65				0.87				0.82				0.85



2144 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	0.82	2.5%
WB	0.87	2.4%
NB	0.65	2.1%
SB	0.64	9.1%
T Int.	0.85	3.0%

Check
In: 1821
Out: 1821

PEDs Across:	N	S	E	W	
INT 01	1		2	4	7
INT 02		2	3	5	10
INT 03		1	2	2	5
INT 04		3	2		5
INT 05		2	2	1	5
INT 06		2	4		6
INT 07	1	4	1	1	7
INT 08	1	4			5
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	3	18	16	13	**50**

Bicycles From:	N	S	E	W		N U's	S U's	E U's	W U's
INT 01		1		1	2		0		
INT 02					0		0		
INT 03					0		0		
INT 04					0		0		
INT 05				2	2		1		
INT 06					0		0		
INT 07	1				1		0		
INT 08					0		0		
INT 09					0				
INT 10					0				
INT 11					0				
INT 12					0				
	1	1	0	3	5	0	1	0	0

Special Notes

Prepared for: **Transportation Solutions, Inc.**

Traffic Count Consultants, Inc.

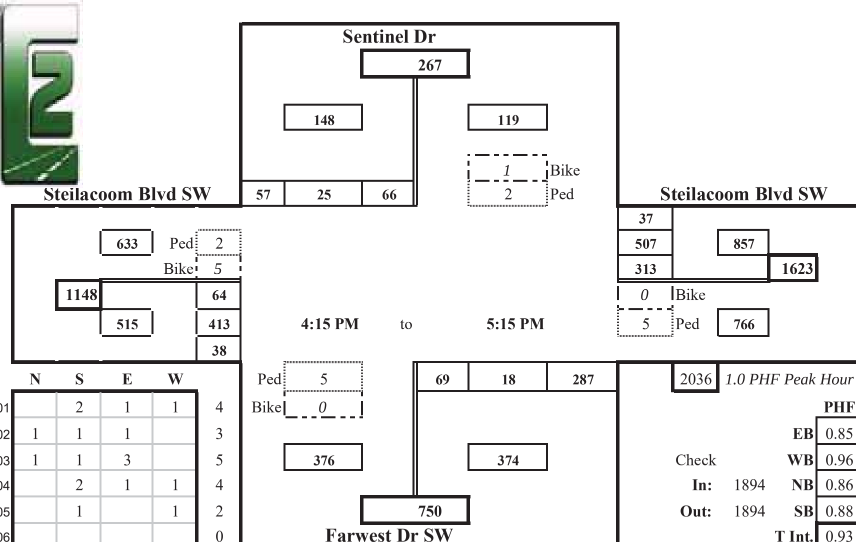
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Sentinel Dr/Farwest Dr SW & Steilacoom Blvd SW | **Date of Count:** Thurs 5/30/2019

Location: Lakewood, Washington | **Checked By:** Jess

Time Interval	From North on (SB) Sentinel Dr				From South on (NB) Farwest Dr SW				From East on (WB) Steilacoom Blvd SW				From West on (EB) Steilacoom Blvd SW				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	11	9	20	3	15	4	63	2	71	115	6	0	2	84	13	413
4:30 P	0	12	4	14	1	16	4	69	1	84	131	8	1	1	81	14	438
4:45 P	0	22	4	10	2	15	2	73	1	73	132	9	1	7	102	9	458
5:00 P	0	16	10	16	0	24	8	54	1	75	122	12	2	21	123	8	489
5:15 P	1	16	7	17	2	14	4	91	3	81	122	8	1	35	107	7	509
5:30 P	0	19	1	12	0	13	4	52	0	75	126	9	1	7	100	10	428
5:45 P	0	8	0	9	2	17	5	56	1	83	129	17	1	22	96	12	454
6:00 P	1	9	5	6	1	13	6	68	1	84	114	21	0	55	108	5	494
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	2	113	40	104	11	127	37	526	10	626	991	90	7	150	801	78	3683
	Peak Hour: 4:15 PM to 5:15 PM																
Total	1	66	25	57	5	69	18	287	6	313	507	37	5	64	413	38	1894
Approach	148				374				857				515				1894
%HV	0.7%				1.3%				0.7%				1.0%				0.9%
PHF	0.88				0.86				0.96				0.85				0.93



2036 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	0.85	1.0%
WB	0.96	0.7%
NB	0.86	1.3%
SB	0.88	0.7%
T Int.	0.93	0.9%

Check
In: 1894
Out: 1894

PEDs Across:	N	S	E	W	
INT 01		2	1	1	4
INT 02	1	1	1		3
INT 03	1	1	3		5
INT 04		2	1	1	4
INT 05		1		1	2
INT 06					0
INT 07		3	1	2	6
INT 08		1		3	4
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	2	11	7	8	28

Bicycles From:	N	S	E	W	
INT 01					0
INT 02					0
INT 03				2	2
INT 04	1			2	3
INT 05				1	1
INT 06		1	3	1	5
INT 07					0
INT 08	2		4	2	8
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	3	1	7	8	19

Special Notes

Prepared for: **Transportation Solutions, Inc.**

Traffic Count Consultants, Inc.

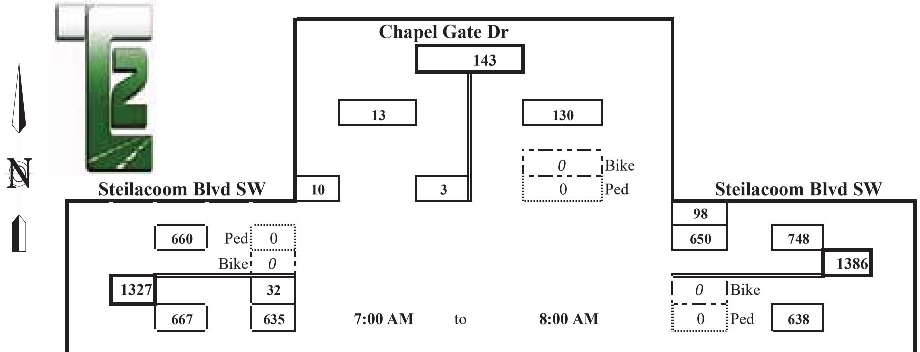
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Chapel Gate Dr & Steilacoom Blvd SW **Date of Count:** Thurs 5/30/2019

Location: Lakewood, Washington **Checked By:** Jess

Time Interval	From North on (SB) Chapel Gate Dr				From South on (NB) 0				From East on (WB) Steilacoom Blvd SW				From West on (EB) Steilacoom Blvd SW				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	0	0	0	5	0	0	0	0	5	0	184	18	2	8	137	0	352
7:30 A	0	2	0	1	0	0	0	0	4	0	164	33	5	10	171	0	381
7:45 A	0	1	0	2	0	0	0	0	4	0	128	26	4	10	183	0	350
8:00 A	1	0	0	2	0	0	0	0	4	0	174	21	1	4	144	0	345
8:15 A	1	3	0	1	0	0	0	0	3	0	106	11	5	4	143	0	268
8:30 A	1	4	0	0	0	0	0	0	1	0	125	5	3	3	131	0	268
8:45 A	0	2	0	0	0	0	0	0	5	0	140	8	2	5	110	0	265
9:00 A	0	1	0	0	0	0	0	0	2	0	184	7	0	2	154	0	348
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	3	13	0	11	0	0	0	0	28	0	1205	129	22	46	1173	0	2577
	Peak Hour: 7:00 AM to 8:00 AM																
Total	1	3	0	10	0	0	0	0	17	0	650	98	12	32	635	0	1428
Approach	13				0				748				667				1428
%HV	7.7%				n/a				2.3%				1.8%				2.1%
PHF	0.65				n/a				0.93				0.86				0.94



1524 *1.0 PHF Peak Hour Volume*

PEDs Across:	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04					0
INT 05					0
INT 06	NO PEDS				0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	0	0	**0**

Special Notes

Bicycles From:	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04					0
INT 05					0
INT 06	NO BIKES				0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	0	0	0

	PHF	%HV
EB	0.86	1.8%
WB	0.93	2.3%
NB	n/a	n/a
SB	0.65	7.7%
T Int.	0.94	2.1%

Check

In: 1428

Out: 1428

Conditions:

TSI19016TM_02a

Prepared for: **Transportation Solutions, Inc.**

Traffic Count Consultants, Inc.

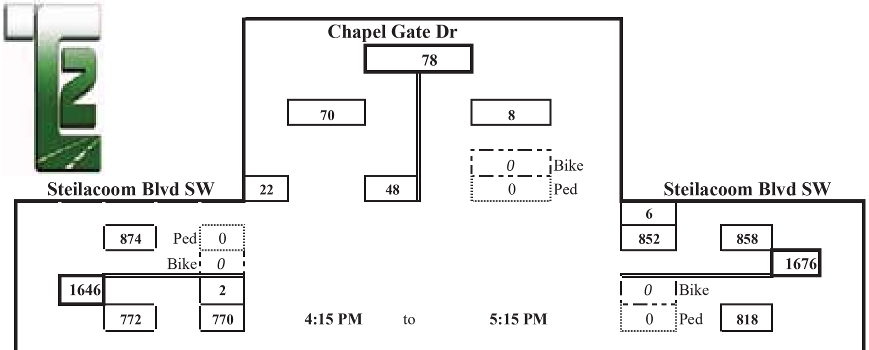
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Chapel Gate Dr & Steilacoom Blvd SW **Date of Count:** Thurs 5/30/2019

Location: Lakewood, Washington **Checked By:** Jess

Time Interval	From North on (SB) Chapel Gate Dr				From South on (NB) 0				From East on (WB) Steilacoom Blvd SW				From West on (EB) Steilacoom Blvd SW				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	22	0	2	0	0	0	0	2	0	188	2	2	0	156	0	370
4:30 P	0	19	0	5	0	0	0	0	1	0	228	1	2	0	162	0	415
4:45 P	0	14	0	10	0	0	0	0	1	0	206	0	2	0	208	0	438
5:00 P	0	6	0	3	0	0	0	0	1	0	200	0	2	1	194	0	404
5:15 P	0	9	0	4	0	0	0	0	3	0	218	5	1	1	206	0	443
5:30 P	0	6	0	2	0	0	0	0	0	0	196	0	1	1	178	0	383
5:45 P	0	6	0	3	0	0	0	0	1	0	239	0	2	0	161	0	409
6:00 P	0	0	0	2	0	0	0	0	1	0	206	1	0	0	178	0	387
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	0	82	0	31	0	0	0	0	10	0	1681	9	12	3	1443	0	3249
	Peak Hour: 4:15 PM to 5:15 PM																
Total	0	48	0	22	0	0	0	0	6	0	852	6	7	2	770	0	1700
Approach	70				0				858				772				1700
%HV	n/a				n/a				0.7%				0.9%				0.8%
PHF	0.73				n/a				0.94				0.93				0.96



1772 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	0.93	0.9%
WB	0.94	0.7%
NB	n/a	n/a
SB	0.73	n/a
T Int.	0.96	0.8%

Check
In: 1700
Out: 1700

Conditions:

PEDs Across:	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04					0
INT 05					0
INT 06	NO PEDS				0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	0	0	**0**

Special Notes

Bicycles From:	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04					0
INT 05					0
INT 06	NO BIKES				0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	0	0	0

TSI19016TM_02p

Prepared for: **Transportation Solutions, Inc.**

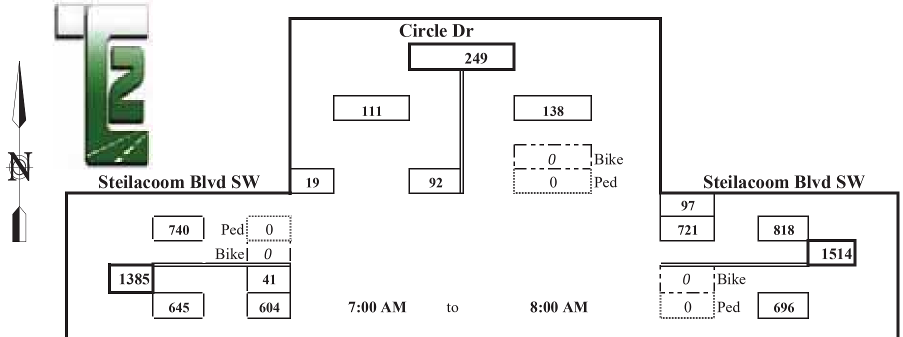
Traffic Count Consultants, Inc.

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

WBE/DBE

Intersection: Circle Dr & Steilacoom Blvd SW **Date of Count:** Thurs 5/30/2019
Location: Lakewood, Washington **Checked By:** Jess

Time Interval	From North on (SB) Circle Dr				From South on (NB) 0				From East on (WB) Steilacoom Blvd SW				From West on (EB) Steilacoom Blvd SW				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	0	70	0	15	0	0	0	0	5	0	183	28	2	7	134	0	437
7:30 A	0	9	0	2	0	0	0	0	4	0	204	24	4	8	167	0	414
7:45 A	0	8	0	2	0	0	0	0	4	0	141	27	5	13	174	0	365
8:00 A	0	5	0	0	0	0	0	0	6	0	193	18	1	13	129	0	358
8:15 A	0	5	0	0	0	0	0	0	3	0	119	10	5	8	133	0	275
8:30 A	0	4	0	0	0	0	0	0	1	0	129	17	3	12	127	0	289
8:45 A	0	6	0	2	0	0	0	0	5	0	145	8	2	4	100	0	265
9:00 A	0	5	0	1	0	0	0	0	2	0	190	12	0	9	148	0	365
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	0	112	0	22	0	0	0	0	30	0	1304	144	22	74	1112	0	2768
	Peak Hour: 7:00 AM to 8:00 AM																
Total	0	92	0	19	0	0	0	0	19	0	721	97	12	41	604	0	1574
Approach	111				0				818				645				1574
%HV	n/a				n/a				2.3%				1.9%				2.0%
PHF	0.33				n/a				0.90				0.86				0.90



1748 *1.0 PHF Peak Hour Volume*

PEDs Across:	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04					0
INT 05					0
INT 06	NO PEDS				0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	0	0	0

Special Notes

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

Check
In: 1574
Out: 1574

	PHF	%HV
EB	0.86	1.9%
WB	0.90	2.3%
NB	n/a	n/a
SB	0.33	n/a
T Int.	0.90	2.0%

Conditions:

TSI19016TM_03a

Prepared for: **Transportation Solutions, Inc.**

Traffic Count Consultants, Inc.

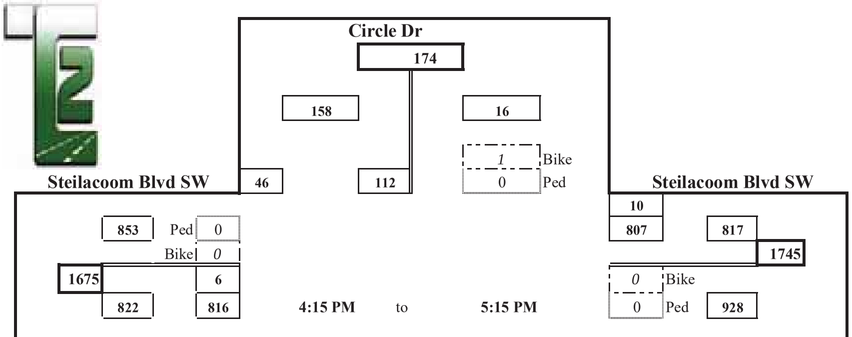
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Circle Dr & Steilacoom Blvd SW **Date of Count:** Thurs 5/30/2019

Location: Lakewood, Washington **Checked By:** Jess

Time Interval	From North on (SB) Circle Dr				From South on (NB) 0				From East on (WB) Steilacoom Blvd SW				From West on (EB) Steilacoom Blvd SW				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	34	0	11	0	0	0	0	2	0	180	5	1	2	178	0	410
4:30 P	0	32	0	15	0	0	0	0	1	0	216	5	2	0	185	0	453
4:45 P	0	38	0	17	0	0	0	0	1	0	190	3	2	3	220	0	471
5:00 P	0	16	0	8	0	0	0	0	1	0	184	2	2	2	196	0	408
5:15 P	0	26	0	6	0	0	0	0	3	0	217	0	1	1	215	0	465
5:30 P	0	14	0	3	0	0	0	0	0	0	207	2	1	1	182	0	409
5:45 P	0	6	0	4	0	0	0	0	1	0	225	1	2	0	162	0	398
6:00 P	0	12	0	4	0	0	0	0	1	0	201	1	0	0	180	0	398
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	0	178	0	68	0	0	0	0	10	0	1620	19	11	9	1518	0	3412
	Peak Hour: 4:15 PM to 5:15 PM																
Total	0	112	0	46	0	0	0	0	6	0	807	10	7	6	816	0	1797
Approach	158				0				817				822				1797
%HV	n/a				n/a				0.7%				0.9%				0.7%
PHF	0.72				n/a				0.92				0.92				0.95



1884	1.0 PHF Peak Hour Volume

	PHF	%HV
EB	0.92	0.9%
WB	0.92	0.7%
NB	n/a	n/a
SB	0.72	n/a
T Int.	0.95	0.7%

Check
In: 1797
Out: 1797

Conditions:

PEDs Across:	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04					0
INT 05					0
INT 06	NO PEDS				0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	0	0	0

Special Notes

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

TSI19016TM_03p

Prepared for: **Transportation Solutions, Inc.**

Traffic Count Consultants, Inc.

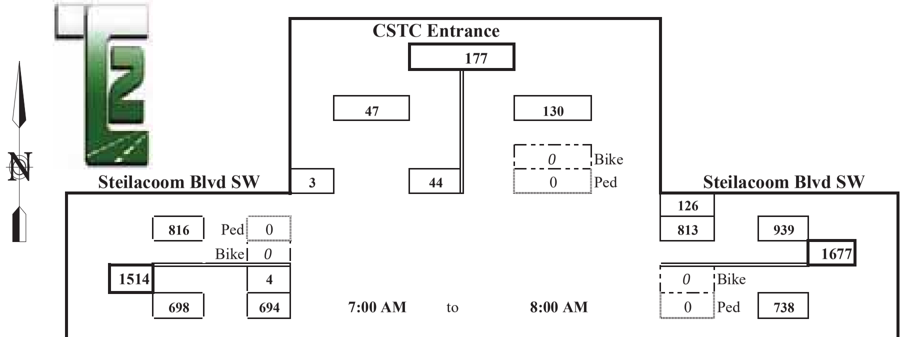
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: CSTC Entrance & Steilacoom Blvd SW **Date of Count:** Thurs 5/30/2019

Location: Lakewood, Washington **Checked By:** Jess

Time Interval	From North on (SB) CSTC Entrance				From South on (NB) 0				From East on (WB) Steilacoom Blvd SW				From West on (EB) Steilacoom Blvd SW				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	0	33	0	2	0	0	0	0	4	0	211	28	4	1	207	0	482
7:30 A	0	6	0	1	0	0	0	0	4	0	241	27	3	0	169	0	444
7:45 A	0	4	0	0	0	0	0	0	4	0	161	31	5	3	176	0	375
8:00 A	0	1	0	0	0	0	0	0	4	0	200	40	2	0	142	0	383
8:15 A	0	4	0	0	0	0	0	0	3	0	131	34	5	0	136	0	305
8:30 A	0	4	0	0	0	0	0	0	2	0	149	25	3	1	134	0	313
8:45 A	0	2	0	0	0	0	0	0	5	0	167	16	2	0	109	0	294
9:00 A	1	3	0	0	0	0	0	0	2	0	192	8	0	1	143	0	347
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	1	57	0	3	0	0	0	0	28	0	1452	209	24	6	1216	0	2943
	Peak Hour: 7:00 AM to 8:00 AM																
Total	0	44	0	3	0	0	0	0	16	0	813	126	14	4	694	0	1684
Approach	47				0				939				698				1684
%HV	n/a				n/a				1.7%				2.0%				1.8%
PHF	0.34				n/a				0.88				0.84				0.87



1928 *1.0 PHF Peak Hour Volume*

PEDs Across:	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04					0
INT 05					0
INT 06	NO PEDS				0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	0	0	**0**

Special Notes

Bicycles From:	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04					0
INT 05					0
INT 06	NO BIKES				0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	0	0	0

		PHF	%HV
	EB	0.84	2.0%
Check	WB	0.88	1.7%
In: 1684	NB	n/a	n/a
Out: 1684	SB	0.34	n/a
	T Int.	0.87	1.8%

N U's	S U's	E U's	W U's
			0
			0
			0
			0
			0
			0
			0
			1
0	0	0	1

Prepared for: **Transportation Solutions, Inc.**

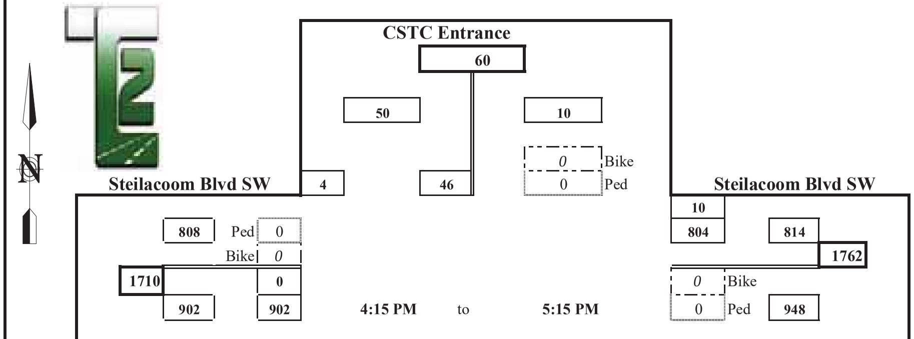
Traffic Count Consultants, Inc.

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

WBE/DBE

Intersection: CSTC Entrance & Steilacoom Blvd SW
Location: Lakewood, Washington
Date of Count: Thurs 5/30/2019
Checked By: Jess

Time Interval	From North on (SB) CSTC Entrance				From South on (NB) 0				From East on (WB) Steilacoom Blvd SW				From West on (EB) Steilacoom Blvd SW				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	14	0	1	0	0	0	0	2	0	193	5	1	0	218	0	431
4:30 P	0	11	0	2	0	0	0	0	1	0	211	4	2	0	207	0	435
4:45 P	0	18	0	1	0	0	0	0	1	0	186	1	1	0	247	0	453
5:00 P	0	7	0	0	0	0	0	0	1	0	185	2	3	0	215	0	409
5:15 P	0	10	0	1	0	0	0	0	3	0	222	3	1	0	233	0	469
5:30 P	0	7	0	0	0	0	0	0	1	0	204	0	1	0	199	0	410
5:45 P	0	11	0	0	0	0	0	0	0	0	219	3	2	0	172	0	405
6:00 P	0	4	0	1	0	0	0	0	1	0	199	1	0	0	194	0	399
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	0	82	0	6	0	0	0	0	10	0	1619	19	11	0	1685	0	3411
	Peak Hour: 4:15 PM to 5:15 PM																
Total	0	46	0	4	0	0	0	0	6	0	804	10	7	0	902	0	1766
Approach	50				0				814				902				1766
%HV	n/a				n/a				0.7%				0.8%				0.7%
PHF	0.66				n/a				0.90				0.91				0.94



1876 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	0.91	0.8%
WB	0.90	0.7%
NB	n/a	n/a
SB	0.66	n/a
T Int.	0.94	0.7%

Check
In: 1766
Out: 1766

PEDs Across:	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04					0
INT 05					0
INT 06	NO PEDS				0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	0	0	**0**

Bicycles From:	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04					0
INT 05					0
INT 06		NO BIKES			0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	0	0	0

	N U's	S U's	E U's	W U's
INT 01			1	0
INT 02			0	1
INT 03			0	0
INT 04			0	0
INT 05			0	0
INT 06			0	0
INT 07			0	0
INT 08			0	0
Total	0	0	1	1

Special Notes

TSI19016TM_04p

Prepared for: **Transportation Solutions, Inc.**

Traffic Count Consultants, Inc.

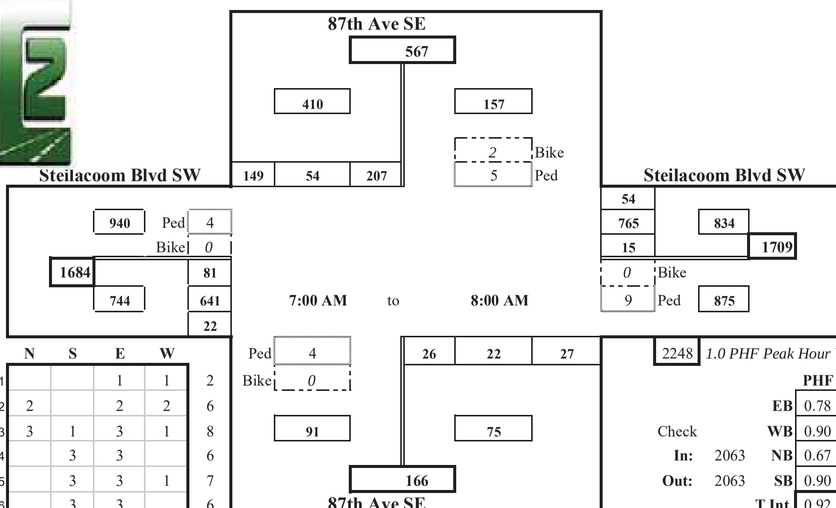
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: 87th Ave SE & Steilacoom Blvd SW **Date of Count:** Thurs 5/30/2019

Location: Lakewood, Washington **Checked By:** Jess

Time Interval	From North on (SB) 87th Ave SE				From South on (NB) 87th Ave SE				From East on (WB) Steilacoom Blvd SW				From West on (EB) Steilacoom Blvd SW				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	0	52	22	40	0	8	2	4	5	2	187	5	4	27	207	6	562
7:30 A	3	54	13	40	0	3	2	4	3	5	211	16	3	22	147	6	523
7:45 A	0	52	12	32	1	11	7	10	5	3	172	15	5	15	162	9	500
8:00 A	1	49	7	37	0	4	11	9	3	5	195	18	2	17	125	1	478
8:15 A	1	43	8	22	1	6	10	7	8	8	140	29	5	20	118	1	412
8:30 A	3	57	5	35	2	3	12	6	2	11	152	22	5	24	111	6	444
8:45 A	2	65	23	36	0	0	3	5	6	14	141	21	2	12	93	4	417
9:00 A	0	37	8	34	0	4	4	10	2	11	157	28	1	17	132	0	442
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	10	409	98	276	4	39	51	55	34	59	1355	154	27	154	1095	33	3778
Peak Hour: 7:00 AM to 8:00 AM																	
Total	4	207	54	149	1	26	22	27	16	15	765	54	14	81	641	22	2063
Approach	410				75				834				744				2063
%HV	1.0%				1.3%				1.9%				1.9%				1.7%
PHF	0.90				0.67				0.90				0.78				0.92



2248 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	0.78	1.9%
WB	0.90	1.9%
NB	0.67	1.3%
SB	0.90	1.0%
T Int.	0.92	1.7%

Check
In: 2063
Out: 2063

Conditions:

PEDs Across:	N	S	E	W	
INT 01			1	1	2
INT 02	2		2	2	6
INT 03	3	1	3	1	8
INT 04		3	3		6
INT 05		3	3	1	7
INT 06		3	3		6
INT 07		3	2	1	6
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	5	13	17	6	41

Special Notes

Bicycles From:	N	S	E	W	
INT 01					0
INT 02	1				1
INT 03					0
INT 04	1				1
INT 05		1			1
INT 06					0
INT 07	2				2
INT 08		2	1		3
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	4	3	1	0	8

Prepared for: **Transportation Solutions, Inc.**

Traffic Count Consultants, Inc.

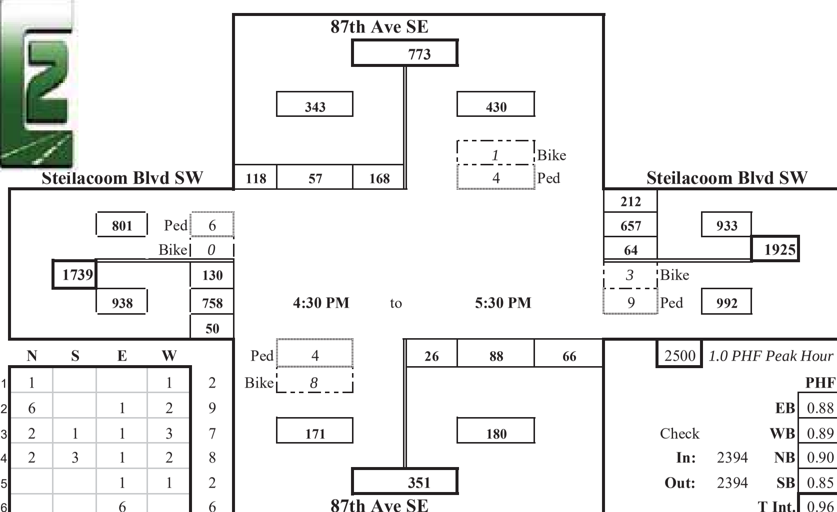
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: 87th Ave SE & Steilacoom Blvd SW **Date of Count:** Thurs 5/30/2019

Location: Lakewood, Washington **Checked By:** Jess

Time Interval	From North on (SB) 87th Ave SE				From South on (NB) 87th Ave SE				From East on (WB) Steilacoom Blvd SW				From West on (EB) Steilacoom Blvd SW				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	2	36	20	31	2	5	16	17	0	17	162	57	2	22	200	8	591
4:30 P	1	51	7	27	0	2	11	6	1	9	187	56	2	32	182	6	576
4:45 P	1	40	15	28	0	9	23	11	2	16	150	47	0	34	218	13	604
5:00 P	0	38	12	37	0	4	21	15	2	14	146	48	4	28	181	13	557
5:15 P	1	32	13	27	0	10	20	17	1	15	186	60	1	34	199	12	625
5:30 P	0	58	17	26	0	3	24	23	1	19	175	57	3	34	160	12	608
5:45 P	0	42	16	23	0	9	15	14	0	14	190	60	2	34	138	11	566
6:00 P	0	47	11	30	0	15	21	24	1	24	155	47	0	40	150	8	572
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	5	344	111	229	2	57	151	127	8	128	1351	432	14	258	1428	83	4699
	Peak Hour: 4:30 PM to 5:30 PM																
Total	2	168	57	118	0	26	88	66	6	64	657	212	8	130	758	50	2394
Approach	343				180				933				938				2394
%HV	0.6%				n/a				0.6%				0.9%				0.7%
PHF	0.85				0.90				0.89				0.88				0.96



2500 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	0.88	0.9%
WB	0.89	0.6%
NB	0.90	n/a
SB	0.85	0.6%
T Int.	0.96	0.7%

Check

In: 2394

Out: 2394

Conditions:

PEDs Across:	N	S	E	W	
INT 01	1			1	2
INT 02	6		1	2	9
INT 03	2	1	1	3	7
INT 04	2	3	1	2	8
INT 05			1	1	2
INT 06			6		6
INT 07		2	3		5
INT 08	4		5	1	10
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	15	6	18	10	49

Bicycles From:	N	S	E	W	
INT 01					0
INT 02				1	1
INT 03			1		1
INT 04		1			1
INT 05		5	1		6
INT 06	1	2	1		4
INT 07	2	2	2		6
INT 08			2		2
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	3	10	7	1	21

Special Notes

TSI19016TM_05p

Prepared for: **Transportation Solutions, Inc.**

Traffic Count Consultants, Inc.

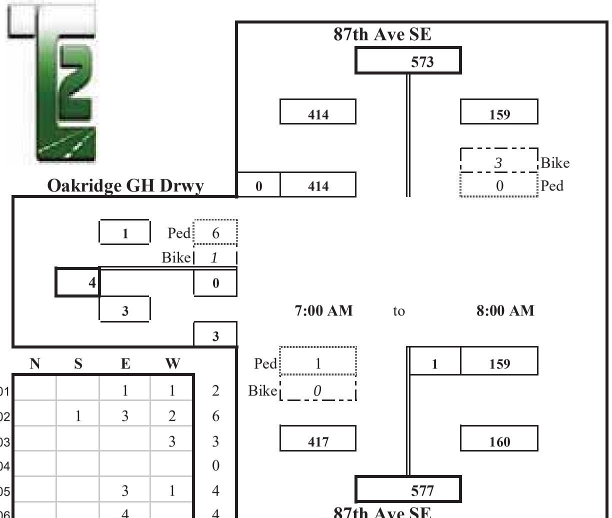
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: 87th Ave SE & Oakridge Group Home Drwy **Date of Count:** Thurs 5/30/2019

Location: Lakewood, Washington **Checked By:** Jess

Time Interval	From North on (SB) 87th Ave SE				From South on (NB) 87th Ave SE				From East on (WB) 0				From West on (EB) Oakridge GH Drwy				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	0	0	120	0	2	0	32	0	0	0	0	0	0	0	0	2	154
7:30 A	2	0	106	0	4	1	40	0	0	0	0	0	0	0	0	0	147
7:45 A	0	0	96	0	1	0	41	0	0	0	0	0	0	0	0	0	137
8:00 A	1	0	92	0	0	0	46	0	0	0	0	0	0	0	0	1	139
8:15 A	1	0	59	0	3	1	54	0	0	0	0	0	0	0	0	0	114
8:30 A	0	0	66	0	1	1	46	0	0	0	0	0	0	0	0	1	114
8:45 A	2	0	86	0	1	2	29	0	0	0	0	0	0	0	0	2	119
9:00 A	0	0	44	1	0	3	24	0	0	0	0	0	0	0	0	2	74
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	6	0	669	1	12	8	312	0	0	0	0	0	0	0	0	8	998
	Peak Hour: 7:00 AM to 8:00 AM																
Total	3	0	414	0	7	1	159	0	0	0	0	0	0	0	0	3	577
Approach	414				160				0				3				577
%HV	0.7%				4.4%				n/a				n/a				1.7%
PHF	0.86				0.87				n/a				0.38				0.94



PEDs Across:	N	S	E	W	
INT 01			1	1	2
INT 02		1	3	2	6
INT 03				3	3
INT 04					0
INT 05			3	1	4
INT 06			4		4
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	1	11	7	**19**

Special Notes

Bicycles From:	N	S	E	W	
INT 01	1				1
INT 02				1	1
INT 03	1				1
INT 04	1				1
INT 05		1			1
INT 06					0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	3	1	0	1	5

616 *1.0 PHF Peak Hour Volume*

			PHF	%HV
		EB	0.38	n/a
Check		WB	n/a	n/a
In:	577	NB	0.87	4.4%
Out:	577	SB	0.86	0.7%
		T Int.	0.94	1.7%

Conditions:

TSI19016TM_06a

Prepared for: **Transportation Solutions, Inc.**

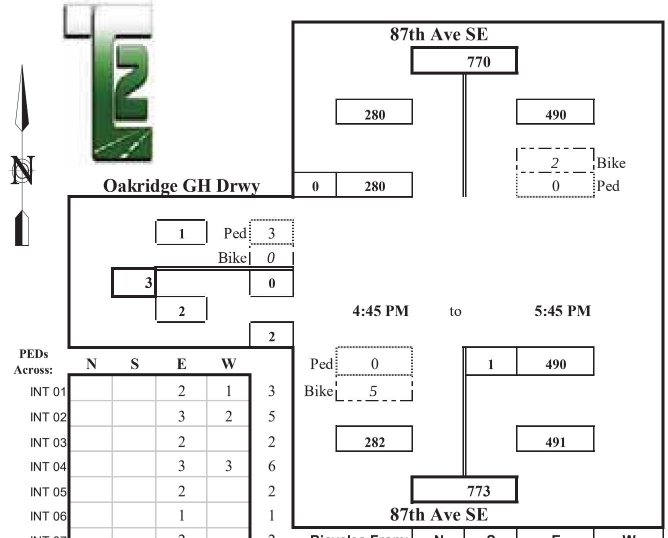
Traffic Count Consultants, Inc.

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

WBE/DBE

Intersection: 87th Ave SE & Oakridge Group Home Drwy
Location: Lakewood, Washington
Date of Count: Thurs 5/30/2019
Checked By: Jess

Time Interval	From North on (SB) 87th Ave SE				From South on (NB) 87th Ave SE				From East on (WB) 0				From West on (EB) Oakridge GH Drwy				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	2	0	82	0	1	2	92	0	0	0	0	0	0	0	0	1	177
4:30 P	1	0	56	0	0	0	110	0	0	0	0	0	0	0	0	1	167
4:45 P	1	0	71	0	0	0	102	0	0	0	0	0	0	0	0	2	175
5:00 P	0	0	71	0	1	0	116	0	0	0	0	0	0	0	0	0	187
5:15 P	1	0	51	0	0	0	135	0	0	0	0	0	0	0	0	1	187
5:30 P	0	0	83	0	0	0	127	0	0	0	0	0	0	0	0	1	211
5:45 P	0	0	75	0	0	1	112	0	0	0	0	0	0	0	0	0	188
6:00 P	0	0	79	0	0	2	106	0	0	0	0	0	0	0	0	0	187
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	5	0	568	0	2	5	900	0	0	0	0	0	0	0	0	6	1479
	Peak Hour: 4:45 PM to 5:45 PM																
Total	1	0	280	0	1	1	490	0	0	0	0	0	0	0	0	2	773
Approach	280				491				0				2				773
%HV	0.4%				0.2%				n/a				n/a				0.3%
PHF	0.84				0.91				n/a				0.50				0.92



PEDs Across:	N	S	E	W	
INT 01			2	1	3
INT 02			3	2	5
INT 03			2		2
INT 04			3	3	6
INT 05			2		2
INT 06			1		1
INT 07			2		2
INT 08			5	1	6
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	20	7	27

Special Notes

Bicycles From:	N	S	E	W	
INT 01	1	1			2
INT 02					0
INT 03					0
INT 04					0
INT 05	1	2			3
INT 06	1	1			2
INT 07		2			2
INT 08	1				1
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	4	6	0	0	10

844 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	0.50	n/a
WB	n/a	n/a
NB	0.91	0.2%
SB	0.84	0.4%
T Int.	0.92	0.3%

Check
In: 773
Out: 773

Conditions:

Prepared for: **Transportation Solutions, Inc.**

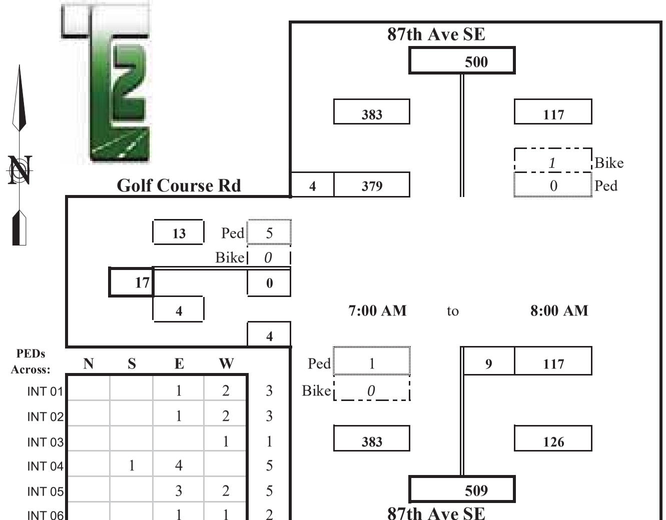
Traffic Count Consultants, Inc.

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

WBE/DBE

Intersection: 87th Ave SE & Golf Course Rd
Location: Lakewood, Washington
Date of Count: Thurs 5/30/2019
Checked By: Jess

Time Interval	From North on (SB) 87th Ave SE				From South on (NB) 87th Ave SE				From East on (WB) 0				From West on (EB) Golf Course Rd				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	0	0	114	1	2	2	27	0	0	0	0	0	0	0	0	2	146
7:30 A	2	0	95	0	4	2	33	0	0	0	0	0	0	0	0	0	130
7:45 A	0	0	85	1	1	4	26	0	0	0	0	0	0	0	0	0	116
8:00 A	1	0	85	2	0	1	31	0	0	0	0	0	0	0	0	2	121
8:15 A	1	0	64	0	4	1	50	0	0	0	0	0	0	0	0	1	116
8:30 A	1	0	68	1	1	1	47	0	0	0	0	0	0	0	0	0	117
8:45 A	2	0	79	0	1	2	31	0	0	0	0	0	0	0	0	0	112
9:00 A	0	0	75	0	0	2	29	0	0	0	0	0	0	0	0	0	106
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	7	0	665	5	13	15	274	0	0	0	0	0	0	0	0	5	964
	Peak Hour: 7:00 AM to 8:00 AM																
Total	3	0	379	4	7	9	117	0	0	0	0	0	0	0	0	4	513
Approach	383				126				0				4				513
%HV	0.8%				5.6%				n/a				n/a				1.9%
PHF	0.83				0.90				n/a				0.50				0.88



584 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	0.50	n/a
WB	n/a	n/a
NB	0.90	5.6%
SB	0.83	0.8%
T Int.	0.88	1.9%

Check
In: 513
Out: 513

Conditions:

PEDs Across:	N	S	E	W	
INT 01			1	2	3
INT 02			1	2	3
INT 03				1	1
INT 04		1	4		5
INT 05			3	2	5
INT 06			1	1	2
INT 07				1	1
INT 08			3	2	5
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	1	13	11	25

Special Notes

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

TSI19016TM_07a

Prepared for: **Transportation Solutions, Inc.**

Traffic Count Consultants, Inc.

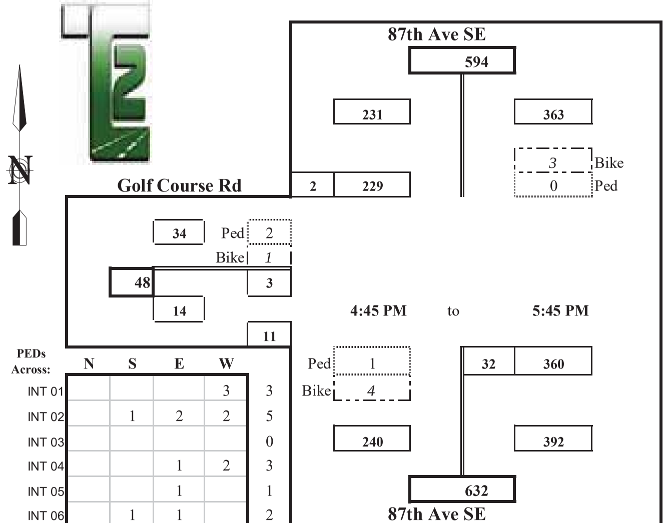
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: 87th Ave SE & Golf Course Rd **Date of Count:** Thurs 5/30/2019

Location: Lakewood, Washington **Checked By:** Jess

Time Interval	From North on (SB) 87th Ave SE				From South on (NB) 87th Ave SE				From East on (WB) 0				From West on (EB) Golf Course Rd				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	1	0	62	0	1	6	78	0	0	0	0	0	0	1	0	4	151
4:30 P	1	0	54	0	0	4	96	0	0	0	0	0	0	0	0	2	156
4:45 P	1	0	55	0	0	9	85	0	0	0	0	0	0	1	0	4	154
5:00 P	0	0	58	0	1	9	82	0	0	0	0	0	0	1	0	5	155
5:15 P	1	0	47	1	0	10	93	0	0	0	0	0	0	0	0	1	152
5:30 P	0	0	65	0	0	8	92	0	0	0	0	0	0	1	0	3	169
5:45 P	0	0	59	1	0	5	93	0	0	0	0	0	0	1	0	2	161
6:00 P	0	0	59	0	0	8	74	0	0	0	0	0	0	0	0	6	147
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	4	0	459	2	2	59	693	0	0	0	0	0	0	5	0	27	1245
	Peak Hour: 4:45 PM to 5:45 PM																
Total	1	0	229	2	1	32	360	0	0	0	0	0	0	3	0	11	637
Approach	231				392				0				14				637
%HV	0.4%				0.3%				n/a				n/a				0.3%
PHF	0.89				0.95				n/a				0.58				0.94



PEDs Across:	N	S	E	W	
INT 01				3	3
INT 02		1	2	2	5
INT 03					0
INT 04			1	2	3
INT 05			1		1
INT 06		1	1		2
INT 07			1		1
INT 08				1	1
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	2	6	8	16

Special Notes

Bicycles From:	N	S	E	W	
INT 01		1			1
INT 02	1				1
INT 03				1	1
INT 04	1				1
INT 05	1	1		1	3
INT 06		1			1
INT 07	1	2			3
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	4	5	0	2	11

676 *1.0 PHF Peak Hour Volume*

				PHF	%HV
			EB	0.58	n/a
Check			WB	n/a	n/a
	In:	637	NB	0.95	0.3%
	Out:	637	SB	0.89	0.4%
			T Int.	0.94	0.3%

Conditions:

TSI19016TM_07p

Prepared for: **Transportation Solutions, Inc.**

Traffic Count Consultants, Inc.

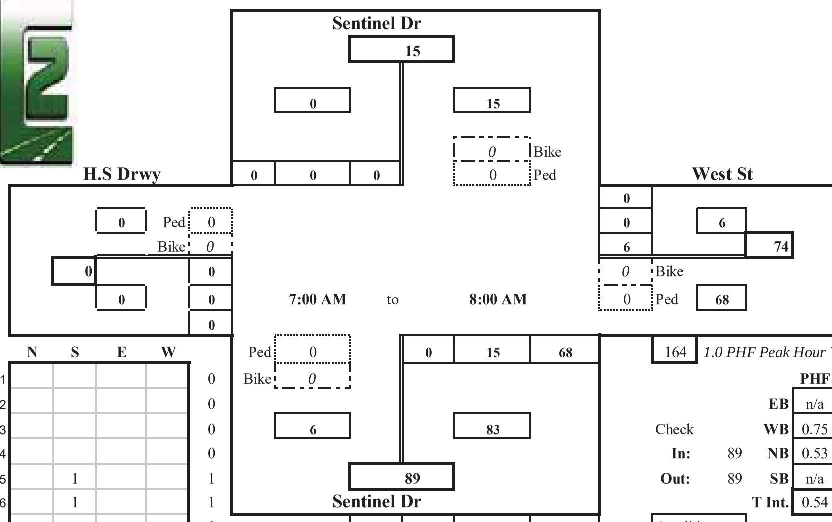
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Sentinel Dr & West St/H.S Drwy — **Date of Count:** Thurs 6/20/2019

Location: Lakewood, Washington — **Checked By:** Jess

Time Interval	From North on (SB) Sentinel Dr				From South on (NB) Sentinel Dr				From East on (WB) West St				From West on (EB) H.S Drwy				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	0	0	0	0	1	0	1	12	0	1	0	0	0	0	0	0	14
7:30 A	0	0	0	0	1	0	0	9	0	1	0	0	0	0	0	0	10
7:45 A	0	0	0	0	0	0	1	21	1	2	0	0	0	0	0	0	24
8:00 A	0	0	0	0	0	0	13	26	1	2	0	0	0	0	0	0	41
8:15 A	0	0	1	0	0	0	3	1	0	1	0	0	0	0	0	1	7
8:30 A	0	0	0	0	0	0	0	5	1	4	0	0	0	0	0	0	9
8:45 A	0	0	0	0	1	0	0	2	0	1	0	0	0	0	0	0	3
9:00 A	0	0	0	0	1	0	3	4	1	1	0	0	0	0	0	0	8
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	0	0	1	0	4	0	21	80	4	13	0	0	0	0	0	1	116
	Peak Hour: 7:00 AM to 8:00 AM																
Total	0	0	0	0	2	0	15	68	2	6	0	0	0	0	0	0	89
Approach	0				83				6				0				89
%HV	n/a				2.4%				33.3%				n/a				4.5%
PHF	n/a				0.53				0.75				n/a				0.54



164 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	n/a	n/a
WB	0.75	33.3%
NB	0.53	2.4%
SB	n/a	n/a
T Int.	0.54	4.5%

Check

In: 89

Out: 89

Conditions:

PEDs Across:	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04					0
INT 05		1			1
INT 06		1			1
INT 07					0
INT 08		3			3
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	5	0	0	5

Special Notes

Bicycles From:	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04					0
INT 05					0
INT 06	NO BIKES				0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	0	0	0

Prepared for: **Transportation Solutions, Inc.**

Traffic Count Consultants, Inc.

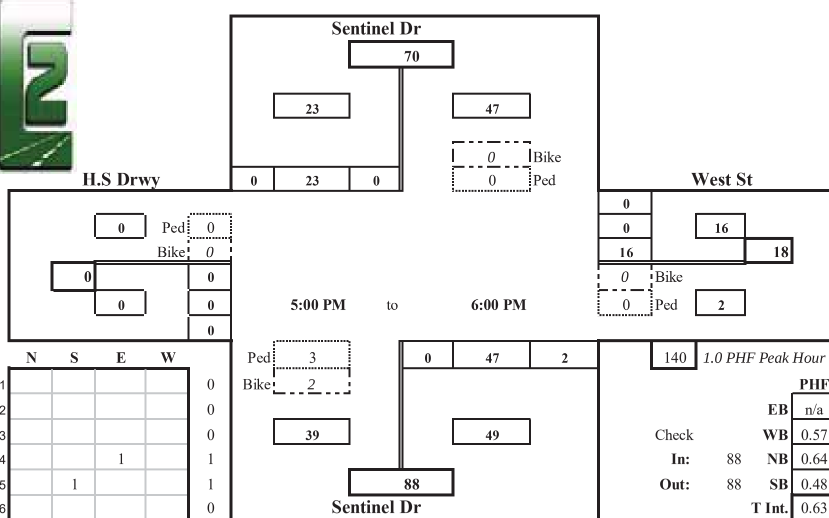
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Sentinel Dr & West St/H.S Drwy | **Date of Count:** Thurs 6/20/2019

Location: Lakewood, Washington | **Checked By:** Jess

Time Interval	From North on (SB) Sentinel Dr				From South on (NB) Sentinel Dr				From East on (WB) West St				From West on (EB) H.S Drwy				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	0	2	0	0	0	3	1	0	16	0	0	0	0	0	0	22
4:30 P	0	0	0	0	0	0	1	0	0	16	0	0	0	0	0	0	17
4:45 P	0	0	1	0	2	0	3	4	0	17	0	0	0	0	0	0	25
5:00 P	0	0	0	0	0	0	1	2	2	4	0	0	0	0	0	0	7
5:15 P	0	0	1	0	0	0	2	1	0	7	0	0	0	0	0	0	11
5:30 P	0	0	8	0	0	0	13	0	0	3	0	0	0	0	0	0	24
5:45 P	0	0	2	0	0	0	14	0	0	2	0	0	0	0	0	0	18
6:00 P	0	0	12	0	0	0	18	1	0	4	0	0	0	0	0	0	35
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	0	0	26	0	2	0	55	9	2	69	0	0	0	0	0	0	159
	Peak Hour: 5:00 PM to 6:00 PM																
Total	0	0	23	0	0	0	47	2	0	16	0	0	0	0	0	0	88
Approach	23				49				16				0				88
%HV	n/a				n/a				n/a				n/a				0.0%
PHF	0.48				0.64				0.57				n/a				0.63



140 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	n/a	n/a
WB	0.57	n/a
NB	0.64	n/a
SB	0.48	n/a
T Int.	0.63	0.0%

Check

In: 88

Out: 88

Conditions:

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

Special Notes

Bicycles From:	N	S	E	W	
INT 01	1	1	1		3
INT 02					0
INT 03					0
INT 04		1			1
INT 05					0
INT 06					0
INT 07		1			1
INT 08		1			1
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	1	4	1	0	6

Prepared for: **Transportation Solutions, Inc.**

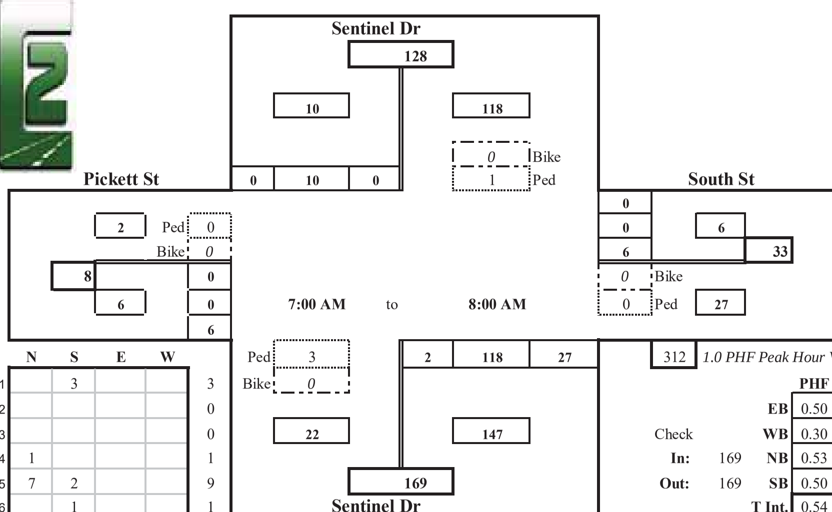
Traffic Count Consultants, Inc.

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

WBE/DBE

Intersection: Sentinel Dr & South St/Pickett St | **Date of Count:** Thurs 6/20/2019
Location: Lakewood, Washington | **Checked By:** Jess

Time Interval	From North on (SB) Sentinel Dr				From South on (NB) Sentinel Dr				From East on (WB) South St				From West on (EB) Pickett St				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	1	0	1	0	1	0	13	6	0	5	0	0	0	0	0	1	26
7:30 A	0	0	2	0	1	0	16	10	0	0	0	0	0	0	0	1	29
7:45 A	1	0	2	0	0	0	27	6	0	0	0	0	1	0	0	1	36
8:00 A	1	0	5	0	1	2	62	5	0	1	0	0	0	0	0	3	78
8:15 A	0	0	2	0	0	1	11	2	0	0	0	0	0	0	0	1	17
8:30 A	1	0	4	0	0	0	7	0	0	1	0	0	0	0	0	1	13
8:45 A	0	0	0	0	1	0	4	4	0	0	0	0	0	0	0	0	8
9:00 A	1	0	3	0	1	0	8	3	0	0	0	0	0	0	0	0	14
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	5	0	19	0	5	3	148	36	0	7	0	0	1	0	0	8	221
	Peak Hour: 7:00 AM to 8:00 AM																
Total	3	0	10	0	3	2	118	27	0	6	0	0	1	0	0	6	169
Approach	10				147				6				6				169
%HV	30.0%				2.0%				n/a				16.7%				4.1%
PHF	0.50				0.53				0.30				0.50				0.54



312 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	0.50	16.7%
WB	0.30	n/a
NB	0.53	2.0%
SB	0.50	30.0%
T Int.	0.54	4.1%

Check
In: 169
Out: 169

Conditions:

PEDs Across:	N	S	E	W	
INT 01		3			3
INT 02					0
INT 03					0
INT 04	1				1
INT 05	7	2			9
INT 06		1			1
INT 07					0
INT 08		4			4
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	8	10	0	0	18

Special Notes

Bicycles From:	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04					0
INT 05					0
INT 06	NO BIKES				0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	0	0	0

Prepared for: **Transportation Solutions, Inc.**

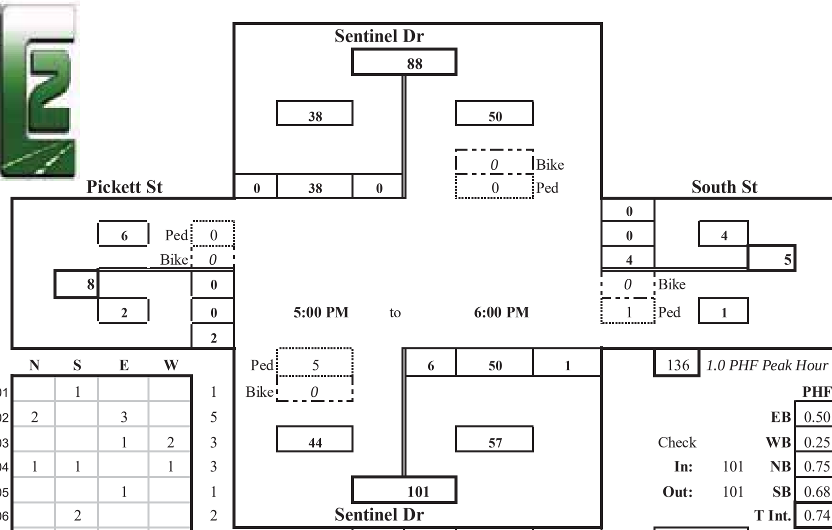
Traffic Count Consultants, Inc.

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

WBE/DBE

Intersection: Sentinel Dr & South St/Pickett St **Date of Count:** Thurs 6/20/2019
Location: Lakewood, Washington **Checked By:** Jess

Time Interval	From North on (SB) Sentinel Dr				From South on (NB) Sentinel Dr				From East on (WB) South St				From West on (EB) Pickett St				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	0	19	0	0	1	4	1	0	1	0	0	0	0	0	1	27
4:30 P	0	0	16	0	0	1	1	1	0	3	0	0	0	0	0	0	22
4:45 P	0	0	19	0	2	0	7	0	0	3	0	0	0	0	0	1	30
5:00 P	2	0	3	0	0	1	2	1	0	3	0	0	0	0	0	1	11
5:15 P	0	0	8	0	0	0	5	1	0	4	0	0	0	0	0	0	18
5:30 P	0	0	10	0	0	2	13	0	0	0	0	0	0	0	0	1	26
5:45 P	0	0	6	0	0	3	14	0	0	0	0	0	0	0	0	0	23
6:00 P	0	0	14	0	0	1	18	0	0	0	0	0	0	0	0	1	34
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	2	0	95	0	2	9	64	4	0	14	0	0	0	0	0	5	191
	Peak Hour: 5:00 PM to 6:00 PM																
Total	0	0	38	0	0	6	50	1	0	4	0	0	0	0	0	2	101
Approach	38				57				4				2				101
%HV	n/a				n/a				n/a				n/a				0.0%
PHF	0.68				0.75				0.25				0.50				0.74



136 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	0.50	n/a
WB	0.25	n/a
NB	0.75	n/a
SB	0.68	n/a
T Int.	0.74	0.0%

Check
In: 101
Out: 101

Conditions:

PEDs Across:	N	S	E	W	
INT 01		1			1
INT 02	2		3		5
INT 03			1	2	3
INT 04	1	1		1	3
INT 05			1		1
INT 06		2			2
INT 07		2			2
INT 08		1			1
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	3	7	5	3	18

Special Notes

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

Prepared for: **Transportation Solutions, Inc.**

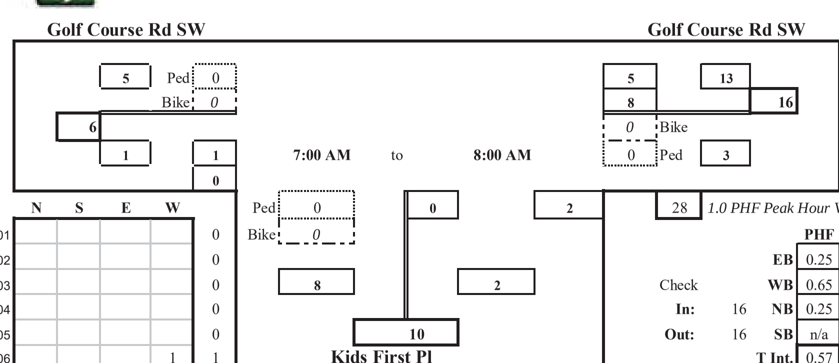
Traffic Count Consultants, Inc.

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

WBE/DBE

Intersection: Kids First Pl & Golf Course Rd SW
Location: Lakewood, Washington
Date of Count: Thurs 6/20/2019
Checked By: Jess

Time Interval	From North on (SB) 0				From South on (NB) Kids First Pl				From East on (WB) Golf Course Rd SW				From West on (EB) Golf Course Rd SW				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	0	0	0	0	0	0	0	2	0	3	2	0	0	0	0	0	7
7:30 A	0	0	0	0	0	0	0	0	0	2	1	0	0	0	1	0	4
7:45 A	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	3
8:00 A	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
8:15 A	0	0	0	0	0	0	0	1	0	2	1	0	0	0	1	0	5
8:30 A	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
8:45 A	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	3
9:00 A	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	4
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	0	0	0	0	0	0	0	4	0	15	8	0	0	0	2	0	29
	Peak Hour: 7:00 AM to 8:00 AM																
Total	0	0	0	0	0	0	0	2	0	8	5	0	0	0	1	0	16
Approach	0				2				13				1				16
%HV	n/a				n/a				n/a				n/a				0.0%
PHF	n/a				0.25				0.65				0.25				0.57



28 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	0.25	n/a
WB	0.65	n/a
NB	0.25	n/a
SB	n/a	n/a
T Int.	0.57	0.0%

Check
In: 16
Out: 16

Conditions:

PEDs Across:	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04					0
INT 05					0
INT 06				1	1
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	0	1	1

Special Notes

Bicycles From:	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04					0
INT 05					0
INT 06	NO BIKES				0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	0	0	0

Prepared for: **Transportation Solutions, Inc.**

Traffic Count Consultants, Inc.

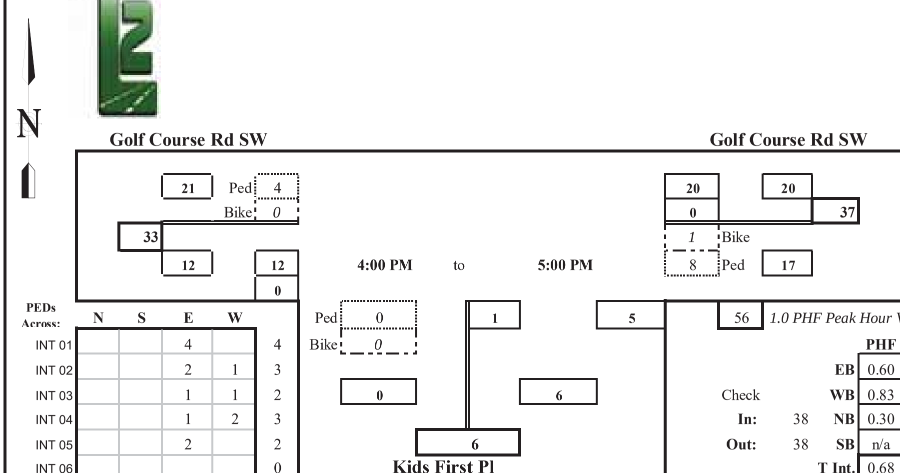
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Kids First Pl & Golf Course Rd SW **Date of Count:** Thurs 6/20/2019

Location: Lakewood, Washington **Checked By:** Jess

Time Interval	From North on (SB) 0				From South on (NB) Kids First Pl				From East on (WB) Golf Course Rd SW				From West on (EB) Golf Course Rd SW				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	0	0	0	0	1	0	4	0	0	6	0	0	0	3	0	14
4:30 P	0	0	0	0	0	0	0	1	0	0	6	0	0	0	2	0	9
4:45 P	0	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	5
5:00 P	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5	0	10
5:15 P	0	0	0	0	0	0	0	2	0	0	8	0	0	0	2	0	12
5:30 P	0	0	0	0	0	0	0	1	0	0	5	0	0	0	2	0	8
5:45 P	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	3
6:00 P	0	0	0	0	0	0	0	0	0	0	2	0	1	0	10	0	12
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	0	0	0	0	0	1	0	8	0	0	37	0	1	0	27	0	73
	Peak Hour: 4:00 PM to 5:00 PM																
Total	0	0	0	0	0	1	0	5	0	0	20	0	0	0	12	0	38
Approach	0				6				20				12				38
%HV	n/a				n/a				n/a				n/a				0.0%
PHF	n/a				0.30				0.83				0.60				0.68



56 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	0.60	n/a
WB	0.83	n/a
NB	0.30	n/a
SB	n/a	n/a
T Int.	0.68	0.0%

Check In: 38 Out: 38

Conditions:

PEDs Across:	N	S	E	W	
INT 01			4		4
INT 02			2	1	3
INT 03			1	1	2
INT 04			1	2	3
INT 05			2		2
INT 06					0
INT 07			1		1
INT 08			2		2
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	13	4	17

Special Notes

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

Prepared for: **Transportation Solutions, Inc.**

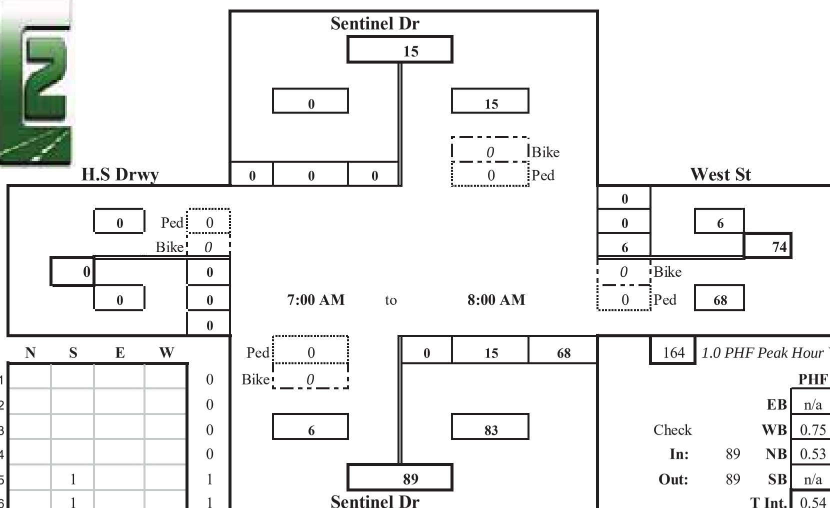
Traffic Count Consultants, Inc.

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

WBE/DBE

Intersection: Sentinel Dr & West St/H.S Drwy
Location: Lakewood, Washington
Date of Count: Thurs 6/20/2019
Checked By: Jess

Time Interval	From North on (SB) Sentinel Dr				From South on (NB) Sentinel Dr				From East on (WB) West St				From West on (EB) H.S Drwy				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	0	0	0	0	1	0	1	12	0	1	0	0	0	0	0	0	14
7:30 A	0	0	0	0	1	0	0	9	0	1	0	0	0	0	0	0	10
7:45 A	0	0	0	0	0	0	1	21	1	2	0	0	0	0	0	0	24
8:00 A	0	0	0	0	0	0	13	26	1	2	0	0	0	0	0	0	41
8:15 A	0	0	1	0	0	0	3	1	0	1	0	0	0	0	0	1	7
8:30 A	0	0	0	0	0	0	0	5	1	4	0	0	0	0	0	0	9
8:45 A	0	0	0	0	1	0	0	2	0	1	0	0	0	0	0	0	3
9:00 A	0	0	0	0	1	0	3	4	1	1	0	0	0	0	0	0	8
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	0	0	1	0	4	0	21	80	4	13	0	0	0	0	0	1	116
	Peak Hour: 7:00 AM to 8:00 AM																
Total	0	0	0	0	2	0	15	68	2	6	0	0	0	0	0	0	89
Approach	0				83				6				0				89
%HV	n/a				2.4%				33.3%				n/a				4.5%
PHF	n/a				0.53				0.75				n/a				0.54



164 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	n/a	n/a
WB	0.75	33.3%
NB	0.53	2.4%
SB	n/a	n/a
T Int.	0.54	4.5%

Check
In: 89
Out: 89

Conditions:

PEDs Across:	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04					0
INT 05		1			1
INT 06		1			1
INT 07					0
INT 08		3			3
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	5	0	0	5

Special Notes

Bicycles From:	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04					0
INT 05					0
INT 06	NO BIKES				0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	0	0	0

Prepared for: **Transportation Solutions, Inc.**

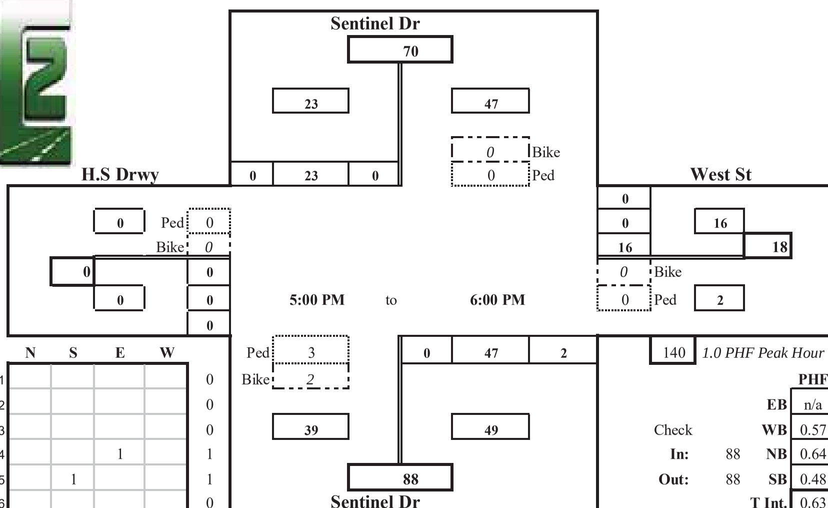
Traffic Count Consultants, Inc.

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

WBE/DBE

Intersection: Sentinel Dr & West St/H.S Drwy
Location: Lakewood, Washington
Date of Count: Thurs 6/20/2019
Checked By: Jess

Time Interval Ending at	From North on (SB) Sentinel Dr T	L	S	R	From South on (NB) Sentinel Dr T	L	S	R	From East on (WB) West St T	L	S	R	From West on (EB) H.S Drwy T	L	S	R	Interval Total
4:15 P	0	0	2	0	0	0	3	1	0	16	0	0	0	0	0	0	22
4:30 P	0	0	0	0	0	0	1	0	0	16	0	0	0	0	0	0	17
4:45 P	0	0	1	0	2	0	3	4	0	17	0	0	0	0	0	0	25
5:00 P	0	0	0	0	0	0	1	2	2	4	0	0	0	0	0	0	7
5:15 P	0	0	1	0	0	0	2	1	0	7	0	0	0	0	0	0	11
5:30 P	0	0	8	0	0	0	13	0	0	3	0	0	0	0	0	0	24
5:45 P	0	0	2	0	0	0	14	0	0	2	0	0	0	0	0	0	18
6:00 P	0	0	12	0	0	0	18	1	0	4	0	0	0	0	0	0	35
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	0	0	26	0	2	0	55	9	2	69	0	0	0	0	0	0	159
	Peak Hour: 5:00 PM to 6:00 PM																
Total	0	0	23	0	0	0	47	2	0	16	0	0	0	0	0	0	88
Approach	23				49				16				0				88
%HV	n/a				n/a				n/a				n/a				0.0%
PHF	0.48				0.64				0.57				n/a				0.63



140 *1.0 PHF Peak Hour Volume*

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

Special Notes

Bicycles From:	N	S	E	W	
INT 01	1	1	1		3
INT 02					0
INT 03					0
INT 04		1			1
INT 05					0
INT 06					0
INT 07		1			1
INT 08		1			1
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	1	4	1	0	6

Check
In: 88
Out: 88

	PHF	%HV
EB	n/a	n/a
WB	0.57	n/a
NB	0.64	n/a
SB	0.48	n/a
T Int.	0.63	0.0%

Conditions:

Prepared for: **Transportation Solutions, Inc.**

Traffic Count Consultants, Inc.

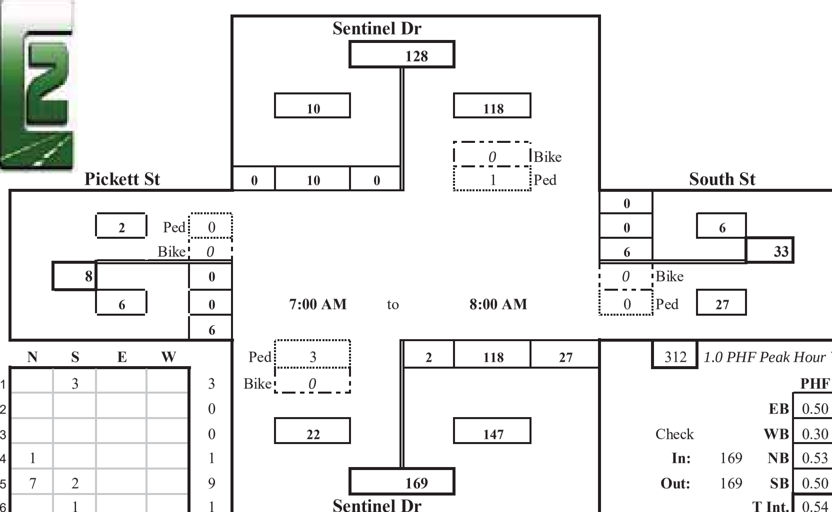
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Sentinel Dr & South St/Pickett St **Date of Count:** Thurs 6/20/2019

Location: Lakewood, Washington **Checked By:** Jess

Time Interval Ending at	From North on (SB) Sentinel Dr T	L	S	R	From South on (NB) Sentinel Dr T	L	S	R	From East on (WB) South St T	L	S	R	From West on (EB) Pickett St T	L	S	R	Interval Total
7:15 A	1	0	1	0	1	0	13	6	0	5	0	0	0	0	0	1	26
7:30 A	0	0	2	0	1	0	16	10	0	0	0	0	0	0	0	1	29
7:45 A	1	0	2	0	0	0	27	6	0	0	0	0	1	0	0	1	36
8:00 A	1	0	5	0	1	2	62	5	0	1	0	0	0	0	0	3	78
8:15 A	0	0	2	0	0	1	11	2	0	0	0	0	0	0	0	1	17
8:30 A	1	0	4	0	0	0	7	0	0	1	0	0	0	0	0	1	13
8:45 A	0	0	0	0	1	0	4	4	0	0	0	0	0	0	0	0	8
9:00 A	1	0	3	0	1	0	8	3	0	0	0	0	0	0	0	0	14
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	5	0	19	0	5	3	148	36	0	7	0	0	1	0	0	8	221
	Peak Hour: 7:00 AM to 8:00 AM																
Total	3	0	10	0	3	2	118	27	0	6	0	0	1	0	0	6	169
Approach	10				147				6				6				169
%HV	30.0%				2.0%				n/a				16.7%				4.1%
PHF	0.50				0.53				0.30				0.50				0.54



312 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	0.50	16.7%
WB	0.30	n/a
NB	0.53	2.0%
SB	0.50	30.0%
T Int.	0.54	4.1%

Check

In: 169

Out: 169

Conditions:

PEDs Across:	N	S	E	W	
INT 01		3			3
INT 02					0
INT 03					0
INT 04	1				1
INT 05	7	2			9
INT 06		1			1
INT 07					0
INT 08		4			4
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	8	10	0	0	18

Special Notes

Bicycles From:	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04					0
INT 05					0
INT 06		NO BIKES			0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	0	0	0

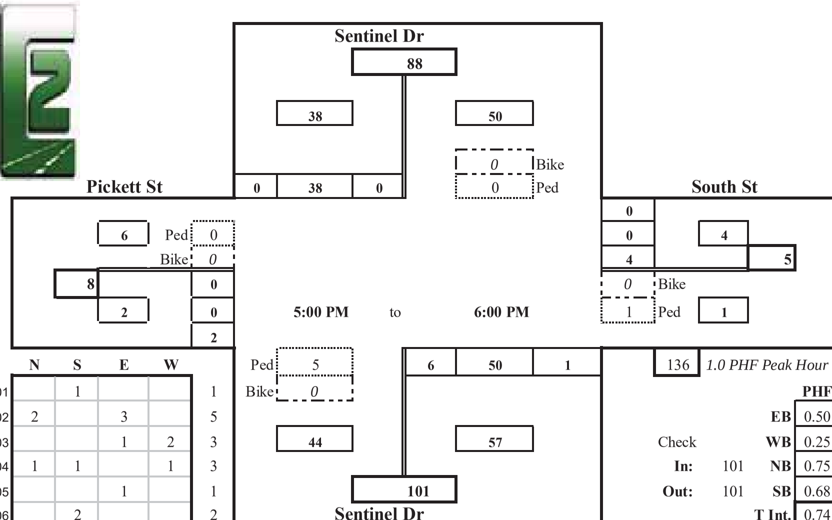
Prepared for: **Transportation Solutions, Inc.**

Traffic Count Consultants, Inc.

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

Intersection: Sentinel Dr & South St/Pickett St
Location: Lakewood, Washington
Date of Count: Thurs 6/20/2019
Checked By: Jess

Time Interval	From North on (SB) Sentinel Dr				From South on (NB) Sentinel Dr				From East on (WB) South St				From West on (EB) Pickett St				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	0	19	0	0	1	4	1	0	1	0	0	0	0	0	1	27
4:30 P	0	0	16	0	0	1	1	1	0	3	0	0	0	0	0	0	22
4:45 P	0	0	19	0	2	0	7	0	0	3	0	0	0	0	0	1	30
5:00 P	2	0	3	0	0	1	2	1	0	3	0	0	0	0	0	1	11
5:15 P	0	0	8	0	0	0	5	1	0	4	0	0	0	0	0	0	18
5:30 P	0	0	10	0	0	2	13	0	0	0	0	0	0	0	0	1	26
5:45 P	0	0	6	0	0	3	14	0	0	0	0	0	0	0	0	0	23
6:00 P	0	0	14	0	0	1	18	0	0	0	0	0	0	0	0	1	34
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	2	0	95	0	2	9	64	4	0	14	0	0	0	0	0	5	191
	Peak Hour: 5:00 PM to 6:00 PM																
Total	0	0	38	0	0	6	50	1	0	4	0	0	0	0	0	2	101
Approach	38				57				4				2				101
%HV	n/a				n/a				n/a				n/a				0.0%
PHF	0.68				0.75				0.25				0.50				0.74



136 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	0.50	n/a
WB	0.25	n/a
NB	0.75	n/a
SB	0.68	n/a
T Int.	0.74	0.0%

Check
In: 101
Out: 101

Conditions:

PEDs Across:	N	S	E	W	
INT 01		1			1
INT 02	2		3		5
INT 03			1	2	3
INT 04	1	1		1	3
INT 05			1		1
INT 06		2			2
INT 07		2			2
INT 08		1			1
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	3	7	5	3	18

Special Notes

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

TSI19016TM_09p

Prepared for: **Transportation Solutions, Inc.**

Traffic Count Consultants, Inc.

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

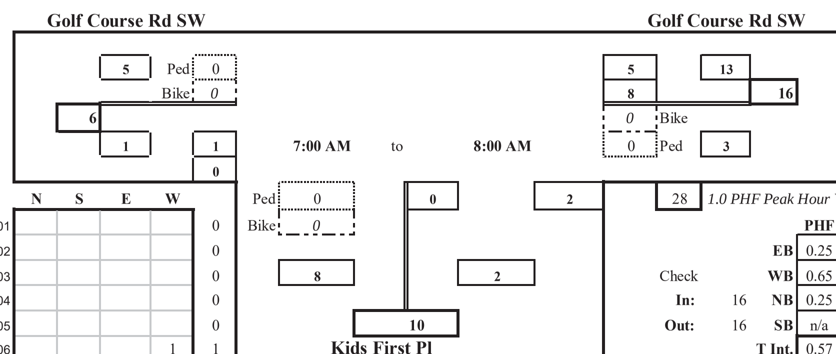
WBE/DBE

Intersection: Kids First Pl & Golf Course Rd SW | **Date of Count:** Thurs 6/20/2019

Location: Lakewood, Washington | **Checked By:** Jess

Time Interval	From North on (SB) 0				From South on (NB) Kids First Pl				From East on (WB) Golf Course Rd SW				From West on (EB) Golf Course Rd SW				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	0	0	0	0	0	0	0	2	0	3	2	0	0	0	0	0	7
7:30 A	0	0	0	0	0	0	0	0	0	2	1	0	0	0	1	0	4
7:45 A	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	3
8:00 A	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
8:15 A	0	0	0	0	0	0	0	1	0	2	1	0	0	0	1	0	5
8:30 A	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
8:45 A	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	3
9:00 A	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	4
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	0	0	0	0	0	0	0	4	0	15	8	0	0	0	2	0	29
Peak Hour: 7:00 AM to 8:00 AM																	
Total	0	0	0	0	0	0	0	2	0	8	5	0	0	0	1	0	16
Approach	0				2				13				1				16
%HV	n/a				n/a				n/a				n/a				0.0%
PHF	n/a				0.25				0.65				0.25				0.57

N



28 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	0.25	n/a
WB	0.65	n/a
NB	0.25	n/a
SB	n/a	n/a
T Int.	0.57	0.0%

Check
In: 16
Out: 16

Conditions:

PEDs Across:	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04					0
INT 05					0
INT 06				1	1
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	0	1	1

Special Notes

Bicycles From:	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04					0
INT 05					0
INT 06	NO BIKES				0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	0	0	0

Prepared for: **Transportation Solutions, Inc.**

Traffic Count Consultants, Inc.

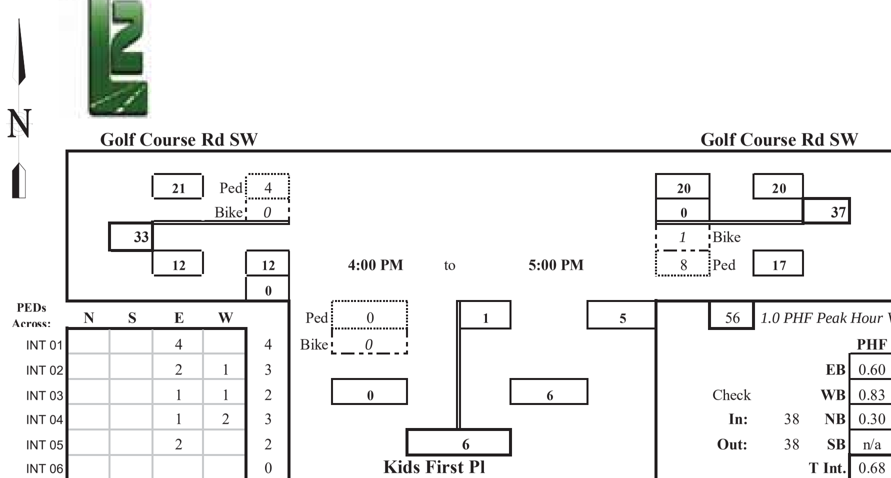
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Kids First Pl & Golf Course Rd SW **Date of Count:** Thurs 6/20/2019

Location: Lakewood, Washington **Checked By:** Jess

Time Interval	From North on (SB) 0				From South on (NB) Kids First Pl				From East on (WB) Golf Course Rd SW				From West on (EB) Golf Course Rd SW				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	0	0	0	0	1	0	4	0	0	6	0	0	0	3	0	14
4:30 P	0	0	0	0	0	0	0	1	0	0	6	0	0	0	2	0	9
4:45 P	0	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	5
5:00 P	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5	0	10
5:15 P	0	0	0	0	0	0	0	2	0	0	8	0	0	0	2	0	12
5:30 P	0	0	0	0	0	0	0	1	0	0	5	0	0	0	2	0	8
5:45 P	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	3
6:00 P	0	0	0	0	0	0	0	0	0	0	2	0	1	0	10	0	12
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	0	0	0	0	0	1	0	8	0	0	37	0	1	0	27	0	73
	Peak Hour: 4:00 PM to 5:00 PM																
Total	0	0	0	0	0	1	0	5	0	0	20	0	0	0	12	0	38
Approach	0				6				20				12				38
%HV	n/a				n/a				n/a				n/a				0.0%
PHF	n/a				0.30				0.83				0.60				0.68



PEDs Across:	N	S	E	W	
INT 01			4		4
INT 02			2	1	3
INT 03			1	1	2
INT 04			1	2	3
INT 05			2		2
INT 06					0
INT 07			1		1
INT 08			2		2
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	13	4	17

Special Notes

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

	PHF	%HV
EB	0.60	n/a
WB	0.83	n/a
NB	0.30	n/a
SB	n/a	n/a
T Int.	0.68	0.0%

Check
In: 38
Out: 38

Conditions:

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	0	257	61	0	157
Future Vol, veh/h	7	0	257	61	0	157
Conflicting Peds, #/hr	0	0	0	50	50	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	54	54	54	54	54	54
Heavy Vehicles, %	33	0	2	2	0	0
Mvmt Flow	13	0	476	113	0	291

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	874	583	0	0	639	0
Stage 1	583	-	-	-	-	-
Stage 2	291	-	-	-	-	-
Critical Hdwy	6.73	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.73	-	-	-	-	-
Critical Hdwy Stg 2	5.73	-	-	-	-	-
Follow-up Hdwy	3.797	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	283	516	-	-	955	-
Stage 1	502	-	-	-	-	-
Stage 2	693	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	269	491	-	-	910	-
Mov Cap-2 Maneuver	269	-	-	-	-	-
Stage 1	478	-	-	-	-	-
Stage 2	693	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	269	910	-
HCM Lane V/C Ratio	-	-	0.048	-	-
HCM Control Delay (s)	-	-	19.1	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	6	7	0	0	2	321	24	0	158	0
Future Vol, veh/h	0	0	6	7	0	0	2	321	24	0	158	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	50	50	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	54	92	54	92	54	54	54	54	92
Heavy Vehicles, %	2	2	2	0	2	0	2	2	0	0	33	2
Mvmt Flow	0	0	7	13	0	0	2	594	44	0	293	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	913	985	293	967	963	666	293	0	0	688	0	0
Stage 1	293	293	-	670	670	-	-	-	-	-	-	-
Stage 2	620	692	-	297	293	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.1	6.52	6.2	4.12	-	-	4.1	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.1	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.1	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.5	4.018	3.3	2.218	-	-	2.2	-	-
Pot Cap-1 Maneuver	254	248	746	236	256	463	1269	-	-	916	-	-
Stage 1	715	670	-	450	455	-	-	-	-	-	-	-
Stage 2	476	445	-	716	670	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	253	236	746	223	243	441	1269	-	-	872	-	-
Mov Cap-2 Maneuver	253	236	-	223	243	-	-	-	-	-	-	-
Stage 1	714	670	-	428	432	-	-	-	-	-	-	-
Stage 2	475	423	-	710	670	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.9	22.1	0	0
HCM LOS	A	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1269	-	-	746	223	872	-	-
HCM Lane V/C Ratio	0.002	-	-	0.009	0.058	-	-	-
HCM Control Delay (s)	7.8	0	-	9.9	22.1	0	-	-
HCM Lane LOS	A	A	-	A	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.2	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	198	335	57	382	203	78	29	69	286	48	44	72
Future Volume (veh/h)	198	335	57	382	203	78	29	69	286	48	44	72
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		0.97	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
Adj Sat Flow, veh/h/ln	1845	1845	1900	1863	1863	1900	1863	1863	1863	1743	1743	1900
Adj Flow Rate, veh/h	233	394	67	449	239	92	34	81	336	56	52	85
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	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, %	3	3	3	2	2	2	2	2	2	9	9	9
Cap, veh/h	570	900	152	583	960	359	344	361	599	216	76	125
Arrive On Green	0.11	0.30	0.30	0.19	0.38	0.38	0.19	0.19	0.19	0.13	0.13	0.13
Sat Flow, veh/h	1757	2992	504	1774	2521	944	1774	1863	1541	1660	586	958
Grp Volume(v), veh/h	233	229	232	449	166	165	34	81	336	56	0	137
Grp Sat Flow(s),veh/h/ln	1757	1752	1744	1774	1770	1695	1774	1863	1541	1660	0	1545
Q Serve(g_s), s	9.7	11.3	11.5	17.9	6.9	7.2	1.7	3.9	18.5	3.3	0.0	9.1
Cycle Q Clear(g_c), s	9.7	11.3	11.5	17.9	6.9	7.2	1.7	3.9	18.5	3.3	0.0	9.1
Prop In Lane	1.00		0.29	1.00		0.56	1.00		1.00	1.00		0.62
Lane Grp Cap(c), veh/h	570	527	524	583	674	645	344	361	599	216	0	201
V/C Ratio(X)	0.41	0.44	0.44	0.77	0.25	0.26	0.10	0.22	0.56	0.26	0.00	0.68
Avail Cap(c_a), veh/h	622	527	524	724	674	645	362	381	615	416	0	387
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	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.6	30.3	30.4	19.0	22.8	22.9	35.7	36.6	26.2	42.2	0.0	44.7
Incr Delay (d2), s/veh	0.2	2.6	2.7	3.0	0.9	1.0	0.0	0.1	0.6	0.2	0.0	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	8.2	9.8	9.9	14.0	6.3	6.3	1.5	3.7	12.6	2.7	0.0	7.1
LnGrp Delay(d),s/veh	21.8	32.9	33.1	22.1	23.6	23.8	35.7	36.7	26.8	42.4	0.0	46.2
LnGrp LOS	C	C	C	C	C	C	D	D	C	D		D
Approach Vol, veh/h		694			780			451			193	
Approach Delay, s/veh		29.2			22.8			29.2			45.1	
Approach LOS		C			C			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		25.9	25.4	37.4		19.0	16.8	46.0				
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0				
Max Green Setting (Gmax), s		22.0	29.0	27.0		27.0	15.0	41.0				
Max Q Clear Time (g_c+I1), s		20.5	19.9	13.5		11.1	11.7	9.2				
Green Ext Time (p_c), s		0.2	0.5	2.6		0.5	0.1	3.1				
Intersection Summary												
HCM 2010 Ctrl Delay			28.3									
HCM 2010 LOS			C									

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	29	640	651	88	4	12
Future Vol, veh/h	29	640	651	88	4	12
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	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	8	8
Mvmt Flow	31	681	693	94	4	13

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	787	0	-	0	1143	394
Stage 1	-	-	-	-	740	-
Stage 2	-	-	-	-	403	-
Critical Hdwy	4.14	-	-	-	6.96	7.06
Critical Hdwy Stg 1	-	-	-	-	5.96	-
Critical Hdwy Stg 2	-	-	-	-	5.96	-
Follow-up Hdwy	2.22	-	-	-	3.58	3.38
Pot Cap-1 Maneuver	828	-	-	-	185	588
Stage 1	-	-	-	-	417	-
Stage 2	-	-	-	-	626	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	828	-	-	-	174	588
Mov Cap-2 Maneuver	-	-	-	-	174	-
Stage 1	-	-	-	-	392	-
Stage 2	-	-	-	-	626	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	15.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	828	-	-	-	369
HCM Lane V/C Ratio	0.037	-	-	-	0.046
HCM Control Delay (s)	9.5	0.3	-	-	15.2
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	37	607	717	87	111	23		
Future Volume (veh/h)	37	607	717	87	111	23		
Number	7	4	8	18	1	16		
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		
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1900	1900		
Adj Flow Rate, veh/h	41	674	797	97	123	26		
Adj No. of Lanes	0	2	2	0	0	0		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90		
Percent Heavy Veh, %	2	2	2	2	0	0		
Cap, veh/h	175	1715	1682	205	244	52		
Arrive On Green	0.53	0.53	0.53	0.53	0.17	0.17		
Sat Flow, veh/h	77	3325	3271	387	1454	307		
Grp Volume(v), veh/h	372	343	444	450	150	0		
Grp Sat Flow(s),veh/h/ln	1707	1610	1770	1795	1773	0		
Q Serve(g_s), s	0.0	3.8	4.7	4.7	2.3	0.0		
Cycle Q Clear(g_c), s	3.5	3.8	4.7	4.7	2.3	0.0		
Prop In Lane	0.11			0.22	0.82	0.17		
Lane Grp Cap(c), veh/h	1038	852	937	950	298	0		
V/C Ratio(X)	0.36	0.40	0.47	0.47	0.50	0.00		
Avail Cap(c_a), veh/h	1385	1218	1339	1358	1163	0		
HCM Platoon Ratio	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	0.00		
Uniform Delay (d), s/veh	4.1	4.2	4.4	4.4	11.2	0.0		
Incr Delay (d2), s/veh	0.2	0.3	0.4	0.4	1.3	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	3.3	3.0	4.2	4.2	2.1	0.0		
LnGrp Delay(d),s/veh	4.3	4.5	4.8	4.8	12.6	0.0		
LnGrp LOS	A	A	A	A	B			
Approach Vol, veh/h		715	894		150			
Approach Delay, s/veh		4.4	4.8		12.6			
Approach LOS		A	A		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				20.2		9.5		20.2
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				22.5		19.5		22.5
Max Q Clear Time (g_c+I1), s				5.8		4.3		6.7
Green Ext Time (p_c), s				9.4		0.3		9.1
Intersection Summary								
HCM 2010 Ctrl Delay			5.3					
HCM 2010 LOS			A					

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	714	801	114	52	4
Future Vol, veh/h	4	714	801	114	52	4
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	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	0	0
Mvmt Flow	5	821	921	131	60	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1052	0	-	0	1408	526
Stage 1	-	-	-	-	987	-
Stage 2	-	-	-	-	421	-
Critical Hdwy	4.14	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.22	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	657	-	-	-	132	502
Stage 1	-	-	-	-	326	-
Stage 2	-	-	-	-	636	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	657	-	-	-	130	502
Mov Cap-2 Maneuver	-	-	-	-	130	-
Stage 1	-	-	-	-	321	-
Stage 2	-	-	-	-	636	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	52.7
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	657	-	-	-	137
HCM Lane V/C Ratio	0.007	-	-	-	0.47
HCM Control Delay (s)	10.5	0.1	-	-	52.7
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	83	661	23	15	745	54	25	22	27	207	54	146
Future Volume (veh/h)	83	661	23	15	745	54	25	22	27	207	54	146
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	0.98		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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	90	718	25	16	810	0	27	24	29	225	59	159
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
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, %	2	2	2	2	2	2	1	1	1	1	1	1
Cap, veh/h	115	1694	59	35	1557	0	201	213	186	386	307	269
Arrive On Green	0.06	0.49	0.49	0.02	0.44	0.00	0.03	0.12	0.12	0.08	0.17	0.17
Sat Flow, veh/h	1774	3489	121	1774	3632	0	1792	1787	1563	1792	1787	1565
Grp Volume(v), veh/h	90	364	379	16	810	0	27	24	29	225	59	159
Grp Sat Flow(s),veh/h/ln	1774	1770	1841	1774	1770	0	1792	1787	1563	1792	1787	1565
Q Serve(g_s), s	3.1	8.2	8.2	0.5	10.2	0.0	0.0	0.7	1.0	0.0	1.7	5.7
Cycle Q Clear(g_c), s	3.1	8.2	8.2	0.5	10.2	0.0	0.0	0.7	1.0	0.0	1.7	5.7
Prop In Lane	1.00		0.07	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	115	859	894	35	1557	0	201	213	186	386	307	269
V/C Ratio(X)	0.78	0.42	0.42	0.46	0.52	0.00	0.13	0.11	0.16	0.58	0.19	0.59
Avail Cap(c_a), veh/h	188	859	894	145	1557	0	293	827	723	387	830	727
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.3	10.2	10.2	29.8	12.5	0.0	28.0	24.1	24.3	24.3	21.8	23.4
Incr Delay (d2), s/veh	4.3	1.5	1.5	3.6	1.2	0.0	0.1	0.1	0.1	1.5	0.1	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	2.9	7.7	7.9	0.5	9.0	0.0	0.8	0.7	0.8	6.6	1.6	4.6
LnGrp Delay(d),s/veh	32.6	11.8	11.7	33.3	13.7	0.0	28.1	24.2	24.4	25.8	21.9	24.2
LnGrp LOS	C	B	B	C	B		C	C	C	C	C	C
Approach Vol, veh/h		833			826			80			443	
Approach Delay, s/veh		14.0			14.1			25.6			24.7	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.6	11.8	5.7	34.3	6.3	15.0	8.5	31.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	28.4	5.0	28.5	5.0	28.5	6.5	27.0
Max Q Clear Time (g_c+I1), s	2.0	3.0	2.5	10.2	2.0	7.7	5.1	12.2
Green Ext Time (p_c), s	0.1	0.1	0.0	6.7	0.1	0.8	0.0	6.1

Intersection Summary	
HCM 2010 Ctrl Delay	16.6
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	2	2	159	414	0
Future Vol, veh/h	0	2	2	159	414	0
Conflicting Peds, #/hr	0	1	6	0	0	6
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	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	4	1	0
Mvmt Flow	0	2	2	169	440	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	619	447	446	0	-	0
Stage 1	446	-	-	-	-	-
Stage 2	173	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	455	616	1125	-	-	-
Stage 1	649	-	-	-	-	-
Stage 2	862	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	449	612	1119	-	-	-
Mov Cap-2 Maneuver	530	-	-	-	-	-
Stage 1	644	-	-	-	-	-
Stage 2	857	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.9	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1119	-	612	-	-
HCM Lane V/C Ratio	0.002	-	0.003	-	-
HCM Control Delay (s)	8.2	0	10.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	4	9	117	379	4
Future Vol, veh/h	0	4	9	117	379	4
Conflicting Peds, #/hr	0	1	5	0	0	5
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	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	5	10	133	431	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	592	440	441	0	-	0
Stage 1	439	-	-	-	-	-
Stage 2	153	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	469	617	1119	-	-	-
Stage 1	650	-	-	-	-	-
Stage 2	875	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	460	613	1114	-	-	-
Mov Cap-2 Maneuver	534	-	-	-	-	-
Stage 1	640	-	-	-	-	-
Stage 2	871	-	-	-	-	-

Approach	EB		NB		SB
HCM Control Delay, s	10.9		0.6		0
HCM LOS	B				

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1114	-	613	-	-
HCM Lane V/C Ratio	0.009	-	0.007	-	-
HCM Control Delay (s)	8.3	0	10.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	4.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1	0	7	4	0	1
Future Vol, veh/h	1	0	7	4	0	1
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	54	54	54	54	54	54
Heavy Vehicles, %	17	0	0	0	0	2
Mvmt Flow	2	0	13	7	0	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	2	0	35	2
Stage 1	-	-	-	-	2	-
Stage 2	-	-	-	-	33	-
Critical Hdwy	-	-	4.1	-	6.4	6.22
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.318
Pot Cap-1 Maneuver	-	-	1634	-	983	1082
Stage 1	-	-	-	-	1026	-
Stage 2	-	-	-	-	995	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1634	-	975	1082
Mov Cap-2 Maneuver	-	-	-	-	975	-
Stage 1	-	-	-	-	1026	-
Stage 2	-	-	-	-	987	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.6	8.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1082	-	-	1634	-
HCM Lane V/C Ratio	0.002	-	-	0.008	-
HCM Control Delay (s)	8.3	-	-	7.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	0	110	2	0	126
Future Vol, veh/h	16	0	110	2	0	126
Conflicting Peds, #/hr	0	0	0	20	20	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	63	63	63	63	63	63
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	25	0	175	3	0	200

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	397	197	0	0	198	0
Stage 1	197	-	-	-	-	-
Stage 2	200	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	612	849	-	-	1387	-
Stage 1	841	-	-	-	-	-
Stage 2	838	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	600	833	-	-	1361	-
Mov Cap-2 Maneuver	600	-	-	-	-	-
Stage 1	825	-	-	-	-	-
Stage 2	838	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.3	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	600	1361	-
HCM Lane V/C Ratio	-	-	0.042	-	-
HCM Control Delay (s)	-	-	11.3	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	0	112	1	0	142
Future Vol, veh/h	4	0	112	1	0	142
Conflicting Peds, #/hr	0	0	0	20	20	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	74	74	74	74	74	74
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	5	0	151	1	0	192

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	364	172	0	0	172	0
Stage 1	172	-	-	-	-	-
Stage 2	192	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	639	877	-	-	1417	-
Stage 1	863	-	-	-	-	-
Stage 2	845	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	627	860	-	-	1390	-
Mov Cap-2 Maneuver	627	-	-	-	-	-
Stage 1	847	-	-	-	-	-
Stage 2	845	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	627	1390	-
HCM Lane V/C Ratio	-	-	0.009	-	-
HCM Control Delay (s)	-	-	10.8	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	413	38	313	507	37	69	18	287	66	25	57
Future Volume (veh/h)	64	413	38	313	507	37	69	18	287	66	25	57
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		0.99	1.00		0.98	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
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1881	1881	1881	1881	1881	1900
Adj Flow Rate, veh/h	69	444	41	337	545	40	74	19	309	71	27	61
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	329	805	74	453	1203	88	629	660	796	139	39	89
Arrive On Green	0.04	0.24	0.24	0.15	0.36	0.36	0.35	0.35	0.35	0.08	0.08	0.08
Sat Flow, veh/h	1792	3304	304	1792	3375	247	1792	1881	1568	1792	506	1143
Grp Volume(v), veh/h	69	239	246	337	288	297	74	19	309	71	0	88
Grp Sat Flow(s),veh/h/ln	1792	1787	1821	1792	1787	1836	1792	1881	1568	1792	0	1649
Q Serve(g_s), s	3.3	13.4	13.6	15.6	14.2	14.3	3.2	0.8	14.0	4.4	0.0	6.0
Cycle Q Clear(g_c), s	3.3	13.4	13.6	15.6	14.2	14.3	3.2	0.8	14.0	4.4	0.0	6.0
Prop In Lane	1.00		0.17	1.00		0.13	1.00		1.00	1.00		0.69
Lane Grp Cap(c), veh/h	329	436	444	453	637	654	629	660	796	139	0	128
V/C Ratio(X)	0.21	0.55	0.55	0.74	0.45	0.45	0.12	0.03	0.39	0.51	0.00	0.69
Avail Cap(c_a), veh/h	334	436	444	474	637	654	629	660	796	421	0	387
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	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.6	38.0	38.0	25.9	28.4	28.4	25.3	24.5	17.6	50.9	0.0	51.7
Incr Delay (d2), s/veh	0.1	4.9	4.9	5.2	2.3	2.3	0.4	0.1	1.4	1.1	0.0	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	2.9	11.7	11.9	12.9	11.9	12.2	3.0	0.7	10.4	4.0	0.0	5.1
LnGrp Delay(d),s/veh	30.7	42.9	42.9	31.1	30.7	30.7	25.6	24.5	19.0	52.0	0.0	54.1
LnGrp LOS	C	D	D	C	C	C	C	C	B	D		D
Approach Vol, veh/h		554			922			402			159	
Approach Delay, s/veh		41.4			30.8			20.5			53.2	
Approach LOS		D			C			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		45.4	22.7	33.0		13.9	9.7	46.0
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		22.0	19.0	27.0		27.0	5.0	41.0
Max Q Clear Time (g_c+I1), s		16.0	17.6	15.6		8.0	5.3	16.3
Green Ext Time (p_c), s		0.4	0.1	3.3		0.4	0.0	4.2

Intersection Summary	
HCM 2010 Ctrl Delay	33.4
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	770	852	7	48	22
Future Vol, veh/h	2	770	852	7	48	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	96	96	96	96	96	96
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	2	802	888	7	50	23

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	895	0	-	0	1297	448
Stage 1	-	-	-	-	892	-
Stage 2	-	-	-	-	405	-
Critical Hdwy	4.12	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.21	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	760	-	-	-	156	564
Stage 1	-	-	-	-	366	-
Stage 2	-	-	-	-	648	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	760	-	-	-	155	564
Mov Cap-2 Maneuver	-	-	-	-	155	-
Stage 1	-	-	-	-	364	-
Stage 2	-	-	-	-	648	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	32.8
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	760	-	-	-	201
HCM Lane V/C Ratio	0.003	-	-	-	0.363
HCM Control Delay (s)	9.8	0	-	-	32.8
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	1.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	816	807	11	111	46
Future Volume (veh/h)	7	816	807	11	111	46
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1881	1900	1900	1900
Adj Flow Rate, veh/h	7	859	849	12	117	48
Adj No. of Lanes	0	2	2	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	1	0	0
Cap, veh/h	66	1365	1412	20	557	228
Arrive On Green	0.39	0.39	0.39	0.39	0.45	0.45
Sat Flow, veh/h	7	3572	3702	51	1228	504
Grp Volume(v), veh/h	463	403	420	441	166	0
Grp Sat Flow(s),veh/h/ln	1868	1626	1787	1872	1742	0
Q Serve(g_s), s	0.0	11.6	10.9	10.9	3.3	0.0
Cycle Q Clear(g_c), s	11.5	11.6	10.9	10.9	3.3	0.0
Prop In Lane	0.02			0.03	0.70	0.29
Lane Grp Cap(c), veh/h	794	637	699	733	790	0
V/C Ratio(X)	0.58	0.63	0.60	0.60	0.21	0.00
Avail Cap(c_a), veh/h	977	799	878	920	790	0
HCM Platoon Ratio	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	0.00
Uniform Delay (d), s/veh	14.3	14.3	14.0	14.0	9.6	0.0
Incr Delay (d2), s/veh	0.7	1.1	0.8	0.8	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	10.1	9.1	9.2	9.6	3.1	0.0
LnGrp Delay(d),s/veh	14.9	15.4	14.9	14.8	10.2	0.0
LnGrp LOS	B	B	B	B	B	
Approach Vol, veh/h		866	861		166	
Approach Delay, s/veh		15.1	14.9		10.2	
Approach LOS		B	B		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				27.2		30.8		27.2
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				28.5		20.5		28.5
Max Q Clear Time (g_c+I1), s				13.6		5.3		12.9
Green Ext Time (p_c), s				9.1		0.4		9.4

Intersection Summary		
HCM 2010 Ctrl Delay		14.6
HCM 2010 LOS		B

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	902	804	11	46	4
Future Vol, veh/h	0	902	804	11	46	4
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	94	94	94	94	94	94
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	0	960	855	12	49	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	867	0	-	0	1341	434
Stage 1	-	-	-	-	861	-
Stage 2	-	-	-	-	480	-
Critical Hdwy	4.12	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.21	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	779	-	-	-	146	576
Stage 1	-	-	-	-	379	-
Stage 2	-	-	-	-	594	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	779	-	-	-	146	576
Mov Cap-2 Maneuver	-	-	-	-	146	-
Stage 1	-	-	-	-	379	-
Stage 2	-	-	-	-	594	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	39.9
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	779	-	-	-	155
HCM Lane V/C Ratio	-	-	-	-	0.343
HCM Control Delay (s)	0	-	-	-	39.9
HCM Lane LOS	A	-	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	758	50	64	657	212	26	88	66	168	57	118
Future Volume (veh/h)	130	758	50	64	657	212	26	88	66	168	57	118
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	0.99		0.96	0.99		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
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1900	1900	1900	1881	1881	1900
Adj Flow Rate, veh/h	135	790	52	67	684	0	27	92	69	175	59	123
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	1	1	1
Cap, veh/h	171	1548	102	96	1476	0	305	280	188	362	333	290
Arrive On Green	0.10	0.45	0.45	0.05	0.41	0.00	0.03	0.14	0.14	0.08	0.19	0.19
Sat Flow, veh/h	1792	3404	224	1792	3668	0	1810	2027	1364	1792	1787	1557
Grp Volume(v), veh/h	135	415	427	67	684	0	27	81	80	175	59	123
Grp Sat Flow(s),veh/h/ln	1792	1787	1841	1792	1787	0	1810	1805	1586	1792	1787	1557
Q Serve(g_s), s	4.8	10.8	10.8	2.4	9.1	0.0	0.8	2.6	3.0	5.1	1.8	4.6
Cycle Q Clear(g_c), s	4.8	10.8	10.8	2.4	9.1	0.0	0.8	2.6	3.0	5.1	1.8	4.6
Prop In Lane	1.00		0.12	1.00		0.00	1.00		0.86	1.00		1.00
Lane Grp Cap(c), veh/h	171	813	837	96	1476	0	305	249	219	362	333	290
V/C Ratio(X)	0.79	0.51	0.51	0.69	0.46	0.00	0.09	0.32	0.37	0.48	0.18	0.42
Avail Cap(c_a), veh/h	211	813	837	178	1476	0	390	751	660	362	746	650
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.9	12.7	12.7	30.4	13.9	0.0	23.0	25.4	25.6	22.0	22.4	23.5
Incr Delay (d2), s/veh	11.8	2.3	2.2	3.3	1.0	0.0	0.0	0.3	0.4	0.4	0.1	0.4
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	5.3	9.8	10.0	2.3	8.2	0.0	0.7	2.4	2.4	0.7	1.6	3.6
LnGrp Delay(d),s/veh	40.7	14.9	14.9	33.7	15.0	0.0	23.0	25.7	26.0	22.4	22.5	23.9
LnGrp LOS	D	B	B	C	B		C	C	C	C	C	C
Approach Vol, veh/h		977			751			188			357	
Approach Delay, s/veh		18.5			16.6			25.4			22.9	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.6	13.5	8.0	34.2	6.4	16.7	10.7	31.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	27.2	6.5	28.2	5.0	27.3	7.7	27.0
Max Q Clear Time (g_c+I1), s	7.1	5.0	4.4	12.8	2.8	6.6	6.8	11.1
Green Ext Time (p_c), s	0.0	1.4	0.0	6.0	0.0	1.3	0.0	6.1

Intersection Summary	
HCM 2010 Ctrl Delay	19.1
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	4	1	490	280	0
Future Vol, veh/h	0	4	1	490	280	0
Conflicting Peds, #/hr	0	0	3	0	0	3
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	1	1	0
Mvmt Flow	0	4	1	533	304	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	842	307	307	0	-	0
Stage 1	307	-	-	-	-	-
Stage 2	535	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	337	738	1265	-	-	-
Stage 1	751	-	-	-	-	-
Stage 2	591	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	335	736	1261	-	-	-
Mov Cap-2 Maneuver	449	-	-	-	-	-
Stage 1	748	-	-	-	-	-
Stage 2	589	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.9	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1261	-	736	-	-
HCM Lane V/C Ratio	0.001	-	0.006	-	-
HCM Control Delay (s)	7.9	0	9.9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	0.5					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	11	32	360	292	2
Future Vol, veh/h	3	11	32	360	292	2
Conflicting Peds, #/hr	0	1	2	0	0	2
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	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	3	12	34	383	311	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	765	315	315	0	-	0
Stage 1	314	-	-	-	-	-
Stage 2	451	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	374	730	1257	-	-	-
Stage 1	745	-	-	-	-	-
Stage 2	646	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	360	728	1255	-	-	-
Mov Cap-2 Maneuver	473	-	-	-	-	-
Stage 1	718	-	-	-	-	-
Stage 2	645	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.6	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1255	-	653	-	-
HCM Lane V/C Ratio	0.027	-	0.023	-	-
HCM Control Delay (s)	7.9	0	10.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	4	0	0	19	1	5
Future Vol, veh/h	4	0	0	19	1	5
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	68	68	68	68	68	68
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	6	0	0	28	1	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	6	0	34	6
Stage 1	-	-	-	-	6	-
Stage 2	-	-	-	-	28	-
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	-	-	1628	-	984	1083
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	1000	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1628	-	984	1083
Mov Cap-2 Maneuver	-	-	-	-	984	-
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	1000	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1065	-	-	1628	-
HCM Lane V/C Ratio	0.008	-	-	-	-
HCM Control Delay (s)	8.4	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	0	257	61	0	157
Future Vol, veh/h	7	0	257	61	0	157
Conflicting Peds, #/hr	0	0	0	50	50	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	54	54	54	54	54	54
Heavy Vehicles, %	33	0	2	2	0	0
Mvmt Flow	13	0	476	113	0	291

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	874	583	0	0	639	0
Stage 1	583	-	-	-	-	-
Stage 2	291	-	-	-	-	-
Critical Hdwy	6.73	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.73	-	-	-	-	-
Critical Hdwy Stg 2	5.73	-	-	-	-	-
Follow-up Hdwy	3.797	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	283	516	-	-	955	-
Stage 1	502	-	-	-	-	-
Stage 2	693	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	269	491	-	-	910	-
Mov Cap-2 Maneuver	269	-	-	-	-	-
Stage 1	478	-	-	-	-	-
Stage 2	693	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	269	910	-
HCM Lane V/C Ratio	-	-	0.048	-	-
HCM Control Delay (s)	-	-	19.1	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	0	321	24	0	158
Future Vol, veh/h	7	0	321	24	0	158
Conflicting Peds, #/hr	0	0	0	50	50	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	54	54	54	54	54	54
Heavy Vehicles, %	0	0	2	0	0	33
Mvmt Flow	13	0	594	44	0	293

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	959	666	0	0	688	0
Stage 1	666	-	-	-	-	-
Stage 2	293	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	288	463	-	-	916	-
Stage 1	515	-	-	-	-	-
Stage 2	762	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	274	441	-	-	872	-
Mov Cap-2 Maneuver	274	-	-	-	-	-
Stage 1	490	-	-	-	-	-
Stage 2	762	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.8	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	274	872	-
HCM Lane V/C Ratio	-	-	0.047	-	-
HCM Control Delay (s)	-	-	18.8	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	198	413	70	471	250	78	36	69	352	48	45	72
Future Volume (veh/h)	198	413	70	471	250	78	36	69	352	48	45	72
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		0.97	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
Adj Sat Flow, veh/h/ln	1845	1845	1900	1863	1863	1900	1863	1863	1863	1743	1743	1900
Adj Flow Rate, veh/h	233	486	82	554	294	92	42	81	414	56	53	85
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	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, %	3	3	3	2	2	2	2	2	2	9	9	9
Cap, veh/h	511	733	123	581	995	305	354	372	695	215	77	123
Arrive On Green	0.12	0.24	0.24	0.24	0.37	0.37	0.20	0.20	0.20	0.13	0.13	0.13
Sat Flow, veh/h	1757	2994	502	1774	2668	819	1774	1863	1542	1660	594	952
Grp Volume(v), veh/h	233	283	285	554	193	193	42	81	414	56	0	138
Grp Sat Flow(s),veh/h/ln	1757	1752	1744	1774	1770	1717	1774	1863	1542	1660	0	1546
Q Serve(g_s), s	10.8	16.1	16.2	24.7	8.5	8.7	2.1	4.0	22.0	3.3	0.0	9.4
Cycle Q Clear(g_c), s	10.8	16.1	16.2	24.7	8.5	8.7	2.1	4.0	22.0	3.3	0.0	9.4
Prop In Lane	1.00		0.29	1.00		0.48	1.00		1.00	1.00		0.62
Lane Grp Cap(c), veh/h	511	429	427	581	660	640	354	372	695	215	0	200
V/C Ratio(X)	0.46	0.66	0.67	0.95	0.29	0.30	0.12	0.22	0.60	0.26	0.00	0.69
Avail Cap(c_a), veh/h	545	429	427	614	660	640	354	372	695	407	0	379
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	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.9	37.5	37.6	22.5	24.3	24.4	36.2	36.9	23.3	43.2	0.0	45.8
Incr Delay (d2), s/veh	0.2	7.8	8.0	24.2	1.1	1.2	0.1	0.1	1.0	0.2	0.0	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	9.0	13.6	13.6	22.3	7.8	7.8	1.9	3.7	14.9	2.8	0.0	7.4
LnGrp Delay(d),s/veh	26.2	45.2	45.6	46.7	25.5	25.6	36.2	37.0	24.3	43.4	0.0	47.4
LnGrp LOS	C	D	D	D	C	C	D	D	C	D		D
Approach Vol, veh/h		801			940			537			194	
Approach Delay, s/veh		39.8			38.0			27.1			46.3	
Approach LOS		D			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		27.0	32.0	32.0		19.3	17.8	46.1
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		22.0	29.0	27.0		27.0	15.0	41.0
Max Q Clear Time (g_c+I1), s		24.0	26.7	18.2		11.4	12.8	10.7
Green Ext Time (p_c), s		0.0	0.3	2.6		0.5	0.1	3.9

Intersection Summary			
HCM 2010 Ctrl Delay			36.9
HCM 2010 LOS			D

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	29	784	787	88	4	12
Future Vol, veh/h	29	784	787	88	4	12
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	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	8	8
Mvmt Flow	31	834	837	94	4	13

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	931	0	-	0	1363	466
Stage 1	-	-	-	-	884	-
Stage 2	-	-	-	-	479	-
Critical Hdwy	4.14	-	-	-	6.96	7.06
Critical Hdwy Stg 1	-	-	-	-	5.96	-
Critical Hdwy Stg 2	-	-	-	-	5.96	-
Follow-up Hdwy	2.22	-	-	-	3.58	3.38
Pot Cap-1 Maneuver	731	-	-	-	132	527
Stage 1	-	-	-	-	350	-
Stage 2	-	-	-	-	572	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	731	-	-	-	122	527
Mov Cap-2 Maneuver	-	-	-	-	122	-
Stage 1	-	-	-	-	322	-
Stage 2	-	-	-	-	572	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	18.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	731	-	-	-	288
HCM Lane V/C Ratio	0.042	-	-	-	0.059
HCM Control Delay (s)	10.1	0.4	-	-	18.3
HCM Lane LOS	B	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	37	751	853	87	111	23		
Future Volume (veh/h)	37	751	853	87	111	23		
Number	7	4	8	18	1	16		
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		
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1900	1900		
Adj Flow Rate, veh/h	41	834	948	97	123	26		
Adj No. of Lanes	0	2	2	0	0	0		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90		
Percent Heavy Veh, %	2	2	2	2	0	0		
Cap, veh/h	158	1827	1821	186	228	48		
Arrive On Green	0.56	0.56	0.56	0.56	0.16	0.16		
Sat Flow, veh/h	63	3339	3335	332	1454	307		
Grp Volume(v), veh/h	453	422	517	528	150	0		
Grp Sat Flow(s),veh/h/ln	1707	1610	1770	1804	1773	0		
Q Serve(g_s), s	0.0	5.0	5.8	5.8	2.5	0.0		
Cycle Q Clear(g_c), s	4.5	5.0	5.8	5.8	2.5	0.0		
Prop In Lane	0.09			0.18	0.82	0.17		
Lane Grp Cap(c), veh/h	1081	904	994	1013	278	0		
V/C Ratio(X)	0.42	0.47	0.52	0.52	0.54	0.00		
Avail Cap(c_a), veh/h	1299	1135	1247	1271	1083	0		
HCM Platoon Ratio	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	0.00		
Uniform Delay (d), s/veh	4.1	4.2	4.3	4.3	12.4	0.0		
Incr Delay (d2), s/veh	0.3	0.4	0.4	0.4	1.6	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	4.2	4.0	5.1	5.2	2.4	0.0		
LnGrp Delay(d),s/veh	4.3	4.5	4.8	4.8	14.0	0.0		
LnGrp LOS	A	A	A	A	B			
Approach Vol, veh/h		875	1045		150			
Approach Delay, s/veh		4.4	4.8		14.0			
Approach LOS		A	A		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				22.4		9.5		22.4
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				22.5		19.5		22.5
Max Q Clear Time (g_c+I1), s				7.0		4.5		7.8
Green Ext Time (p_c), s				10.6		0.3		10.1
Intersection Summary								
HCM 2010 Ctrl Delay			5.3					
HCM 2010 LOS			A					

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	858	937	114	52	4
Future Vol, veh/h	4	858	937	114	52	4
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	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	0	0
Mvmt Flow	5	986	1077	131	60	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1208	0	-	0	1646	604
Stage 1	-	-	-	-	1143	-
Stage 2	-	-	-	-	503	-
Critical Hdwy	4.14	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.22	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	573	-	-	-	92	446
Stage 1	-	-	-	-	270	-
Stage 2	-	-	-	-	578	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	573	-	-	-	90	446
Mov Cap-2 Maneuver	-	-	-	-	90	-
Stage 1	-	-	-	-	265	-
Stage 2	-	-	-	-	578	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	100
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	573	-	-	-	95
HCM Lane V/C Ratio	0.008	-	-	-	0.678
HCM Control Delay (s)	11.3	0.1	-	-	100
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	99	785	27	18	856	67	29	27	33	255	67	168
Future Volume (veh/h)	99	785	27	18	856	67	29	27	33	255	67	168
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	0.98		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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	108	853	29	20	930	0	32	29	36	277	73	183
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
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, %	2	2	2	2	2	2	1	1	1	1	1	1
Cap, veh/h	138	1669	57	41	1499	0	179	208	182	379	330	289
Arrive On Green	0.08	0.48	0.48	0.02	0.42	0.00	0.03	0.12	0.12	0.10	0.18	0.18
Sat Flow, veh/h	1774	3492	119	1774	3632	0	1792	1787	1562	1792	1787	1566
Grp Volume(v), veh/h	108	432	450	20	930	0	32	29	36	277	73	183
Grp Sat Flow(s),veh/h/ln	1774	1770	1841	1774	1770	0	1792	1787	1562	1792	1787	1566
Q Serve(g_s), s	3.8	10.8	10.8	0.7	13.1	0.0	0.0	0.9	1.3	2.0	2.2	6.9
Cycle Q Clear(g_c), s	3.8	10.8	10.8	0.7	13.1	0.0	0.0	0.9	1.3	2.0	2.2	6.9
Prop In Lane	1.00		0.06	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	138	846	880	41	1499	0	179	208	182	379	330	289
V/C Ratio(X)	0.78	0.51	0.51	0.48	0.62	0.00	0.18	0.14	0.20	0.73	0.22	0.63
Avail Cap(c_a), veh/h	181	846	880	139	1499	0	263	796	696	379	799	700
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.9	11.5	11.5	30.7	14.4	0.0	29.8	25.3	25.5	25.3	22.1	24.0
Incr Delay (d2), s/veh	10.9	2.2	2.1	3.2	1.9	0.0	0.2	0.1	0.2	6.2	0.1	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	4.1	9.6	9.9	0.7	11.0	0.0	1.0	0.8	1.0	8.9	2.0	5.4
LnGrp Delay(d),s/veh	39.8	13.7	13.6	33.9	16.3	0.0	30.0	25.4	25.7	31.5	22.2	24.9
LnGrp LOS	D	B	B	C	B		C	C	C	C	C	C
Approach Vol, veh/h		990			950			97			533	
Approach Delay, s/veh		16.5			16.7			27.0			28.0	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.8	11.9	6.0	35.0	6.5	16.3	9.5	31.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	28.4	5.0	28.5	5.0	28.5	6.5	27.0
Max Q Clear Time (g_c+I1), s	4.0	3.3	2.7	12.8	2.0	8.9	5.8	15.1
Green Ext Time (p_c), s	0.1	0.2	0.0	7.5	0.0	1.0	0.0	6.4

Intersection Summary	
HCM 2010 Ctrl Delay	19.3
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	2	2	196	510	0
Future Vol, veh/h	0	2	2	196	510	0
Conflicting Peds, #/hr	0	1	6	0	0	6
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	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	4	1	0
Mvmt Flow	0	2	2	209	543	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	762	550	549	0	-	0
Stage 1	549	-	-	-	-	-
Stage 2	213	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	376	539	1031	-	-	-
Stage 1	583	-	-	-	-	-
Stage 2	827	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	371	535	1025	-	-	-
Mov Cap-2 Maneuver	468	-	-	-	-	-
Stage 1	578	-	-	-	-	-
Stage 2	822	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.8	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1025	-	535	-	-
HCM Lane V/C Ratio	0.002	-	0.004	-	-
HCM Control Delay (s)	8.5	0	11.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	0.2					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	4	9	144	467	4
Future Vol, veh/h	0	4	9	144	467	4
Conflicting Peds, #/hr	0	1	5	0	0	5
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	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	5	10	164	531	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	723	540	541	0	-	0
Stage 1	539	-	-	-	-	-
Stage 2	184	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	393	542	1028	-	-	-
Stage 1	585	-	-	-	-	-
Stage 2	848	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	385	539	1023	-	-	-
Mov Cap-2 Maneuver	475	-	-	-	-	-
Stage 1	576	-	-	-	-	-
Stage 2	844	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.7	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1023	-	539	-	-
HCM Lane V/C Ratio	0.01	-	0.008	-	-
HCM Control Delay (s)	8.6	0	11.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	3.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	4	0	7	5	0	1
Future Vol, veh/h	4	0	7	5	0	1
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	54	54	54	54	54	54
Heavy Vehicles, %	17	0	0	0	0	2
Mvmt Flow	7	0	13	9	0	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	7	0	42	7
Stage 1	-	-	-	-	7	-
Stage 2	-	-	-	-	35	-
Critical Hdwy	-	-	4.1	-	6.4	6.22
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.318
Pot Cap-1 Maneuver	-	-	1627	-	974	1075
Stage 1	-	-	-	-	1021	-
Stage 2	-	-	-	-	993	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1627	-	966	1075
Mov Cap-2 Maneuver	-	-	-	-	966	-
Stage 1	-	-	-	-	1021	-
Stage 2	-	-	-	-	985	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.2	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1075	-	-	1627	-
HCM Lane V/C Ratio	0.002	-	-	0.008	-
HCM Control Delay (s)	8.4	-	-	7.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	0	110	2	0	126
Future Vol, veh/h	16	0	110	2	0	126
Conflicting Peds, #/hr	0	0	0	20	20	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	63	63	63	63	63	63
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	25	0	175	3	0	200

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	397	197	0	0	198	0
Stage 1	197	-	-	-	-	-
Stage 2	200	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	612	849	-	-	1387	-
Stage 1	841	-	-	-	-	-
Stage 2	838	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	600	833	-	-	1361	-
Mov Cap-2 Maneuver	600	-	-	-	-	-
Stage 1	825	-	-	-	-	-
Stage 2	838	-	-	-	-	-

Approach	WB		NB		SB	
HCM Control Delay, s	11.3		0		0	
HCM LOS	B					

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	600	1361	-
HCM Lane V/C Ratio	-	-	0.042	-	-
HCM Control Delay (s)	-	-	11.3	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	0	112	1	0	142
Future Vol, veh/h	4	0	112	1	0	142
Conflicting Peds, #/hr	0	0	0	20	20	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	74	74	74	74	74	74
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	5	0	151	1	0	192

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	364	172	0	0	172	0
Stage 1	172	-	-	-	-	-
Stage 2	192	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	639	877	-	-	1417	-
Stage 1	863	-	-	-	-	-
Stage 2	845	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	627	860	-	-	1390	-
Mov Cap-2 Maneuver	627	-	-	-	-	-
Stage 1	847	-	-	-	-	-
Stage 2	845	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	627	1390	-
HCM Lane V/C Ratio	-	-	0.009	-	-
HCM Control Delay (s)	-	-	10.8	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	509	47	386	625	37	85	19	354	66	25	57
Future Volume (veh/h)	64	509	47	386	625	37	85	19	354	66	25	57
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		0.99	1.00		0.98	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
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1881	1881	1881	1881	1881	1900
Adj Flow Rate, veh/h	69	547	51	415	672	40	91	20	381	71	27	61
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	286	775	72	426	1229	73	624	656	811	139	39	89
Arrive On Green	0.04	0.23	0.23	0.17	0.36	0.36	0.35	0.35	0.35	0.08	0.08	0.08
Sat Flow, veh/h	1792	3300	307	1792	3427	204	1792	1881	1568	1792	506	1143
Grp Volume(v), veh/h	69	296	302	415	350	362	91	20	381	71	0	88
Grp Sat Flow(s),veh/h/ln	1792	1787	1820	1792	1787	1844	1792	1881	1568	1792	0	1649
Q Serve(g_s), s	3.3	17.4	17.5	19.0	18.0	18.0	4.0	0.8	17.9	4.4	0.0	6.0
Cycle Q Clear(g_c), s	3.3	17.4	17.5	19.0	18.0	18.0	4.0	0.8	17.9	4.4	0.0	6.0
Prop In Lane	1.00		0.17	1.00		0.11	1.00		1.00	1.00		0.69
Lane Grp Cap(c), veh/h	286	420	427	426	641	661	624	656	811	139	0	128
V/C Ratio(X)	0.24	0.70	0.71	0.97	0.55	0.55	0.15	0.03	0.47	0.51	0.00	0.69
Avail Cap(c_a), veh/h	290	420	427	426	641	661	624	656	811	421	0	387
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	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.4	40.3	40.4	29.3	29.4	29.4	25.7	24.7	18.0	50.9	0.0	51.7
Incr Delay (d2), s/veh	0.2	9.5	9.5	36.3	3.3	3.2	0.5	0.1	2.0	1.1	0.0	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	3.0	14.8	15.1	12.8	14.5	14.9	3.7	0.8	12.8	4.0	0.0	5.1
LnGrp Delay(d),s/veh	31.6	49.9	49.9	65.6	32.7	32.7	26.2	24.7	19.9	52.0	0.0	54.1
LnGrp LOS	C	D	D	E	C	C	C	C	B	D		D
Approach Vol, veh/h		667			1127			492			159	
Approach Delay, s/veh		48.0			44.8			21.3			53.2	
Approach LOS		D			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		45.1	24.0	32.0		13.9	9.7	46.3
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		22.0	19.0	27.0		27.0	5.0	41.0
Max Q Clear Time (g_c+I1), s		19.9	21.0	19.5		8.0	5.3	20.0
Green Ext Time (p_c), s		0.3	0.0	3.2		0.4	0.0	5.2

Intersection Summary	
HCM 2010 Ctrl Delay	41.5
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	933	1043	7	48	22
Future Vol, veh/h	2	933	1043	7	48	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	96	96	96	96	96	96
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	2	972	1086	7	50	23

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1093	0	-	0	1580	547
Stage 1	-	-	-	-	1090	-
Stage 2	-	-	-	-	490	-
Critical Hdwy	4.12	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.21	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	640	-	-	-	102	486
Stage 1	-	-	-	-	288	-
Stage 2	-	-	-	-	587	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	640	-	-	-	101	486
Mov Cap-2 Maneuver	-	-	-	-	101	-
Stage 1	-	-	-	-	286	-
Stage 2	-	-	-	-	587	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	60.1
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	640	-	-	-	134
HCM Lane V/C Ratio	0.003	-	-	-	0.544
HCM Control Delay (s)	10.6	0	-	-	60.1
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	2.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	979	998	11	111	46
Future Volume (veh/h)	7	979	998	11	111	46
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1881	1900	1900	1900
Adj Flow Rate, veh/h	7	1031	1051	12	117	48
Adj No. of Lanes	0	2	2	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	1	0	0
Cap, veh/h	65	1523	1581	18	501	206
Arrive On Green	0.44	0.44	0.44	0.44	0.41	0.41
Sat Flow, veh/h	6	3573	3714	41	1228	504
Grp Volume(v), veh/h	555	483	519	544	166	0
Grp Sat Flow(s),veh/h/ln	1867	1626	1787	1874	1742	0
Q Serve(g_s), s	0.0	13.8	13.4	13.4	3.6	0.0
Cycle Q Clear(g_c), s	13.7	13.8	13.4	13.4	3.6	0.0
Prop In Lane	0.01			0.02	0.70	0.29
Lane Grp Cap(c), veh/h	878	710	781	819	711	0
V/C Ratio(X)	0.63	0.68	0.66	0.66	0.23	0.00
Avail Cap(c_a), veh/h	978	799	878	921	711	0
HCM Platoon Ratio	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	0.00
Uniform Delay (d), s/veh	13.0	13.1	13.0	13.0	11.2	0.0
Incr Delay (d2), s/veh	1.1	2.0	1.6	1.5	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	11.6	10.8	11.1	11.5	3.3	0.0
LnGrp Delay(d),s/veh	14.2	15.1	14.6	14.5	12.0	0.0
LnGrp LOS	B	B	B	B	B	
Approach Vol, veh/h		1038	1063		166	
Approach Delay, s/veh		14.6	14.5		12.0	
Approach LOS		B	B		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				29.8		28.2		29.8
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				28.5		20.5		28.5
Max Q Clear Time (g_c+I1), s				15.8		5.6		15.4
Green Ext Time (p_c), s				9.5		0.4		9.8

Intersection Summary		
HCM 2010 Ctrl Delay		14.4
HCM 2010 LOS		B

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1065	995	11	46	4
Future Vol, veh/h	0	1065	995	11	46	4
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	94	94	94	94	94	94
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	0	1133	1059	12	49	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1071	0	-	0	1632	536
Stage 1	-	-	-	-	1065	-
Stage 2	-	-	-	-	567	-
Critical Hdwy	4.12	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.21	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	652	-	-	-	94	494
Stage 1	-	-	-	-	297	-
Stage 2	-	-	-	-	537	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	652	-	-	-	94	494
Mov Cap-2 Maneuver	-	-	-	-	94	-
Stage 1	-	-	-	-	297	-
Stage 2	-	-	-	-	537	-

Approach	EB		WB		SB
HCM Control Delay, s	0		0		74.8
HCM LOS					F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	652	-	-	-	101
HCM Lane V/C Ratio	-	-	-	-	0.527
HCM Control Delay (s)	0	-	-	-	74.8
HCM Lane LOS	A	-	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	153	890	59	79	814	261	32	108	81	207	70	146
Future Volume (veh/h)	153	890	59	79	814	261	32	108	81	207	70	146
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	0.99		0.96	0.99		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
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1900	1900	1900	1881	1881	1900
Adj Flow Rate, veh/h	159	927	61	82	848	0	33	112	84	216	73	152
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	1	1	1
Cap, veh/h	198	1535	101	105	1427	0	288	300	204	352	339	296
Arrive On Green	0.11	0.45	0.45	0.06	0.40	0.00	0.03	0.15	0.15	0.08	0.19	0.19
Sat Flow, veh/h	1792	3404	224	1792	3668	0	1810	2020	1373	1792	1787	1558
Grp Volume(v), veh/h	159	487	501	82	848	0	33	99	97	216	73	152
Grp Sat Flow(s),veh/h/ln	1792	1787	1841	1792	1787	0	1810	1805	1588	1792	1787	1558
Q Serve(g_s), s	5.9	13.9	13.9	3.1	12.6	0.0	1.0	3.3	3.8	5.1	2.3	5.9
Cycle Q Clear(g_c), s	5.9	13.9	13.9	3.1	12.6	0.0	1.0	3.3	3.8	5.1	2.3	5.9
Prop In Lane	1.00		0.12	1.00		0.00	1.00		0.86	1.00		1.00
Lane Grp Cap(c), veh/h	198	806	830	105	1427	0	288	268	236	352	339	296
V/C Ratio(X)	0.80	0.60	0.60	0.78	0.59	0.00	0.11	0.37	0.41	0.61	0.22	0.51
Avail Cap(c_a), veh/h	204	806	830	172	1427	0	360	726	639	352	722	629
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.4	14.0	14.0	31.4	16.0	0.0	23.1	25.9	26.1	24.3	23.1	24.6
Incr Delay (d2), s/veh	18.4	3.3	3.2	4.6	1.8	0.0	0.1	0.3	0.4	2.3	0.1	0.5
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	7.0	12.0	12.3	2.9	10.8	0.0	0.9	3.0	3.0	2.9	2.1	4.6
LnGrp Delay(d),s/veh	47.7	17.4	17.3	36.0	17.8	0.0	23.1	26.2	26.5	26.6	23.2	25.1
LnGrp LOS	D	B	B	D	B		C	C	C	C	C	C
Approach Vol, veh/h		1147			930			229			441	
Approach Delay, s/veh		21.5			19.4			25.9			25.5	
Approach LOS		C			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.6	14.6	8.5	35.0	6.8	17.3	12.0	31.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	27.2	6.5	28.2	5.0	27.3	7.7	27.0
Max Q Clear Time (g_c+I1), s	7.1	5.8	5.1	15.9	3.0	7.9	7.9	14.6
Green Ext Time (p_c), s	0.0	1.7	0.0	6.6	0.0	1.6	0.0	6.6

Intersection Summary	
HCM 2010 Ctrl Delay	21.8
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	4	1	604	345	0
Future Vol, veh/h	0	4	1	604	345	0
Conflicting Peds, #/hr	0	0	3	0	0	3
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	1	1	0
Mvmt Flow	0	4	1	657	375	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1037	378	378	0	-	0
Stage 1	378	-	-	-	-	-
Stage 2	659	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	258	673	1192	-	-	-
Stage 1	697	-	-	-	-	-
Stage 2	518	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	256	671	1189	-	-	-
Mov Cap-2 Maneuver	383	-	-	-	-	-
Stage 1	694	-	-	-	-	-
Stage 2	516	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1189	-	671	-	-
HCM Lane V/C Ratio	0.001	-	0.006	-	-
HCM Control Delay (s)	8	0	10.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	11	32	444	360	2
Future Vol, veh/h	3	11	32	444	360	2
Conflicting Peds, #/hr	0	1	2	0	0	2
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	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	3	12	34	472	383	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	926	387	387	0	-	0
Stage 1	386	-	-	-	-	-
Stage 2	540	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	301	665	1183	-	-	-
Stage 1	691	-	-	-	-	-
Stage 2	588	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	288	663	1181	-	-	-
Mov Cap-2 Maneuver	415	-	-	-	-	-
Stage 1	663	-	-	-	-	-
Stage 2	587	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.3	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1181	-	588	-	-
HCM Lane V/C Ratio	0.029	-	0.025	-	-
HCM Control Delay (s)	8.1	0	11.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	9	0	0	34	1	5
Future Vol, veh/h	9	0	0	34	1	5
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	68	68	68	68	68	68
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	13	0	0	50	1	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	13	0	63	13
Stage 1	-	-	-	-	13	-
Stage 2	-	-	-	-	50	-
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	-	-	1619	-	948	1073
Stage 1	-	-	-	-	1015	-
Stage 2	-	-	-	-	978	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1619	-	948	1073
Mov Cap-2 Maneuver	-	-	-	-	948	-
Stage 1	-	-	-	-	1015	-
Stage 2	-	-	-	-	978	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1050	-	-	1619	-
HCM Lane V/C Ratio	0.008	-	-	-	-
HCM Control Delay (s)	8.5	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	15	0	257	70	0	157
Future Vol, veh/h	15	0	257	70	0	157
Conflicting Peds, #/hr	0	0	0	50	50	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	54	54	54	54	54	54
Heavy Vehicles, %	33	0	2	2	0	0
Mvmt Flow	28	0	476	130	0	291

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	882	591	0	0	656	0
Stage 1	591	-	-	-	-	-
Stage 2	291	-	-	-	-	-
Critical Hdwy	6.73	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.73	-	-	-	-	-
Critical Hdwy Stg 2	5.73	-	-	-	-	-
Follow-up Hdwy	3.797	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	280	511	-	-	941	-
Stage 1	497	-	-	-	-	-
Stage 2	693	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	267	487	-	-	896	-
Mov Cap-2 Maneuver	267	-	-	-	-	-
Stage 1	473	-	-	-	-	-
Stage 2	693	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	267	896	-
HCM Lane V/C Ratio	-	-	0.104	-	-
HCM Control Delay (s)	-	-	20	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	330	0	0	166
Future Vol, veh/h	0	0	330	0	0	166
Conflicting Peds, #/hr	0	0	0	50	50	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	54	54	54	54	54	54
Heavy Vehicles, %	0	0	2	0	0	33
Mvmt Flow	0	0	611	0	0	307

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	968	661	0	0	661	0
Stage 1	661	-	-	-	-	-
Stage 2	307	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	284	466	-	-	937	-
Stage 1	517	-	-	-	-	-
Stage 2	751	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	270	444	-	-	892	-
Mov Cap-2 Maneuver	270	-	-	-	-	-
Stage 1	492	-	-	-	-	-
Stage 2	751	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	892	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	401	70	467	250	73	36	67	354	48	46	72
Future Volume (veh/h)	190	401	70	467	250	73	36	67	354	48	46	72
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		0.97	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
Adj Sat Flow, veh/h/ln	1845	1845	1900	1863	1863	1900	1863	1863	1863	1743	1743	1900
Adj Flow Rate, veh/h	224	472	82	549	294	86	42	79	416	56	54	85
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	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, %	3	3	3	2	2	2	2	2	2	9	9	9
Cap, veh/h	506	731	126	583	1018	293	355	373	692	216	78	123
Arrive On Green	0.11	0.25	0.25	0.24	0.38	0.38	0.20	0.20	0.20	0.13	0.13	0.13
Sat Flow, veh/h	1757	2979	514	1774	2714	780	1774	1863	1542	1660	601	946
Grp Volume(v), veh/h	224	276	278	549	190	190	42	79	416	56	0	139
Grp Sat Flow(s),veh/h/ln	1757	1752	1741	1774	1770	1724	1774	1863	1542	1660	0	1547
Q Serve(g_s), s	10.3	15.5	15.7	24.3	8.3	8.5	2.1	3.9	22.0	3.3	0.0	9.4
Cycle Q Clear(g_c), s	10.3	15.5	15.7	24.3	8.3	8.5	2.1	3.9	22.0	3.3	0.0	9.4
Prop In Lane	1.00		0.30	1.00		0.45	1.00		1.00	1.00		0.61
Lane Grp Cap(c), veh/h	506	430	427	583	664	647	355	373	692	216	0	201
V/C Ratio(X)	0.44	0.64	0.65	0.94	0.29	0.29	0.12	0.21	0.60	0.26	0.00	0.69
Avail Cap(c_a), veh/h	548	430	427	620	664	647	355	373	692	408	0	380
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	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.0	37.2	37.2	22.4	24.0	24.1	36.0	36.8	23.4	43.1	0.0	45.7
Incr Delay (d2), s/veh	0.2	7.2	7.4	21.7	1.1	1.2	0.1	0.1	1.0	0.2	0.0	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	8.6	13.1	13.2	21.7	7.6	7.7	1.9	3.6	15.0	2.8	0.0	7.5
LnGrp Delay(d),s/veh	26.2	44.4	44.7	44.1	25.1	25.3	36.1	36.9	24.4	43.3	0.0	47.3
LnGrp LOS	C	D	D	D	C	C	D	D	C	D		D
Approach Vol, veh/h		778			929			537			195	
Approach Delay, s/veh		39.3			36.3			27.2			46.1	
Approach LOS		D			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		27.0	31.7	32.0		19.3	17.4	46.3
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		22.0	29.0	27.0		27.0	15.0	41.0
Max Q Clear Time (g_c+I1), s		24.0	26.3	17.7		11.4	12.3	10.5
Green Ext Time (p_c), s		0.0	0.3	2.6		0.5	0.1	3.8

Intersection Summary		
HCM 2010 Ctrl Delay		36.0
HCM 2010 LOS		D

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	25	778	780	84	5	10
Future Vol, veh/h	25	778	780	84	5	10
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	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	8	8
Mvmt Flow	27	828	830	89	5	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	919	0	-	0	1343	460
Stage 1	-	-	-	-	875	-
Stage 2	-	-	-	-	468	-
Critical Hdwy	4.14	-	-	-	6.96	7.06
Critical Hdwy Stg 1	-	-	-	-	5.96	-
Critical Hdwy Stg 2	-	-	-	-	5.96	-
Follow-up Hdwy	2.22	-	-	-	3.58	3.38
Pot Cap-1 Maneuver	738	-	-	-	136	532
Stage 1	-	-	-	-	354	-
Stage 2	-	-	-	-	580	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	738	-	-	-	127	532
Mov Cap-2 Maneuver	-	-	-	-	127	-
Stage 1	-	-	-	-	330	-
Stage 2	-	-	-	-	580	-

Approach	EB		WB		SB
HCM Control Delay, s	0.6		0		19.9
HCM LOS					C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	738	-	-	-	258
HCM Lane V/C Ratio	0.036	-	-	-	0.062
HCM Control Delay (s)	10.1	0.3	-	-	19.9
HCM Lane LOS	B	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	20	763	850	75	91	15		
Future Volume (veh/h)	20	763	850	75	91	15		
Number	7	4	8	18	1	16		
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		
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1900	1900		
Adj Flow Rate, veh/h	22	848	944	83	101	17		
Adj No. of Lanes	0	2	2	0	0	0		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90		
Percent Heavy Veh, %	2	2	2	2	0	0		
Cap, veh/h	135	1883	1836	161	239	40		
Arrive On Green	0.56	0.56	0.56	0.56	0.16	0.16		
Sat Flow, veh/h	28	3462	3385	289	1510	254		
Grp Volume(v), veh/h	460	410	507	520	119	0		
Grp Sat Flow(s),veh/h/ln	1795	1610	1770	1812	1780	0		
Q Serve(g_s), s	0.0	4.8	5.6	5.6	1.9	0.0		
Cycle Q Clear(g_c), s	4.6	4.8	5.6	5.6	1.9	0.0		
Prop In Lane	0.05			0.16	0.85	0.14		
Lane Grp Cap(c), veh/h	1120	898	987	1010	281	0		
V/C Ratio(X)	0.41	0.46	0.51	0.51	0.42	0.00		
Avail Cap(c_a), veh/h	1376	1145	1258	1288	1096	0		
HCM Platoon Ratio	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	0.00		
Uniform Delay (d), s/veh	4.1	4.2	4.3	4.3	12.0	0.0		
Incr Delay (d2), s/veh	0.2	0.4	0.4	0.4	1.0	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	4.3	3.9	5.0	5.1	1.8	0.0		
LnGrp Delay(d),s/veh	4.4	4.5	4.8	4.7	13.0	0.0		
LnGrp LOS	A	A	A	A	B			
Approach Vol, veh/h		870	1027		119			
Approach Delay, s/veh		4.4	4.8		13.0			
Approach LOS		A	A		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				22.1		9.5		22.1
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				22.5		19.5		22.5
Max Q Clear Time (g_c+I1), s				6.8		3.9		7.6
Green Ext Time (p_c), s				10.4		0.3		10.0
Intersection Summary								
HCM 2010 Ctrl Delay			5.1					
HCM 2010 LOS			A					

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	14	840	916	103	51	10
Future Vol, veh/h	14	840	916	103	51	10
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	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	0	0
Mvmt Flow	16	966	1053	118	59	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1171	0	-	0	1627	586
Stage 1	-	-	-	-	1112	-
Stage 2	-	-	-	-	515	-
Critical Hdwy	4.14	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.22	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	592	-	-	-	95	459
Stage 1	-	-	-	-	281	-
Stage 2	-	-	-	-	570	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	592	-	-	-	89	459
Mov Cap-2 Maneuver	-	-	-	-	89	-
Stage 1	-	-	-	-	265	-
Stage 2	-	-	-	-	570	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	94.1
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	592	-	-	-	103
HCM Lane V/C Ratio	0.027	-	-	-	0.681
HCM Control Delay (s)	11.3	0.3	-	-	94.1
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	765	27	18	824	64	29	28	33	254	67	168
Future Volume (veh/h)	100	765	27	18	824	64	29	28	33	254	67	168
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	0.98		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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	109	832	29	20	896	0	32	30	36	276	73	183
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
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, %	2	2	2	2	2	2	1	1	1	1	1	1
Cap, veh/h	139	1669	58	41	1498	0	179	208	182	379	330	289
Arrive On Green	0.08	0.48	0.48	0.02	0.42	0.00	0.03	0.12	0.12	0.10	0.18	0.18
Sat Flow, veh/h	1774	3489	122	1774	3632	0	1792	1787	1562	1792	1787	1566
Grp Volume(v), veh/h	109	422	439	20	896	0	32	30	36	276	73	183
Grp Sat Flow(s),veh/h/ln	1774	1770	1841	1774	1770	0	1792	1787	1562	1792	1787	1566
Q Serve(g_s), s	3.8	10.4	10.4	0.7	12.5	0.0	0.0	1.0	1.3	2.0	2.2	6.9
Cycle Q Clear(g_c), s	3.8	10.4	10.4	0.7	12.5	0.0	0.0	1.0	1.3	2.0	2.2	6.9
Prop In Lane	1.00		0.07	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	139	846	881	41	1498	0	179	208	182	379	330	289
V/C Ratio(X)	0.78	0.50	0.50	0.48	0.60	0.00	0.18	0.14	0.20	0.73	0.22	0.63
Avail Cap(c_a), veh/h	181	846	881	139	1498	0	263	796	695	379	798	700
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.9	11.4	11.4	30.8	14.2	0.0	29.8	25.3	25.5	25.4	22.1	24.0
Incr Delay (d2), s/veh	11.3	2.1	2.0	3.2	1.8	0.0	0.2	0.1	0.2	6.1	0.1	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	4.2	9.4	9.7	0.7	10.5	0.0	1.0	0.9	1.0	8.9	2.0	5.4
LnGrp Delay(d),s/veh	40.1	13.5	13.4	34.0	16.0	0.0	30.0	25.4	25.7	31.4	22.2	24.9
LnGrp LOS	D	B	B	C	B		C	C	C	C	C	C
Approach Vol, veh/h		970			916			98			532	
Approach Delay, s/veh		16.4			16.4			27.0			27.9	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.9	11.9	6.0	35.0	6.5	16.3	9.5	31.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	28.4	5.0	28.5	5.0	28.5	6.5	27.0
Max Q Clear Time (g_c+I1), s	4.0	3.3	2.7	12.4	2.0	8.9	5.8	14.5
Green Ext Time (p_c), s	0.1	0.2	0.0	7.3	0.0	1.0	0.0	6.4

Intersection Summary	
HCM 2010 Ctrl Delay	19.3
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	2	2	195	509	0
Future Vol, veh/h	0	2	2	195	509	0
Conflicting Peds, #/hr	0	1	6	0	0	6
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	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	4	1	0
Mvmt Flow	0	2	2	207	541	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	758	548	547	0	-	0
Stage 1	547	-	-	-	-	-
Stage 2	211	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	378	540	1033	-	-	-
Stage 1	584	-	-	-	-	-
Stage 2	829	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	373	536	1027	-	-	-
Mov Cap-2 Maneuver	470	-	-	-	-	-
Stage 1	579	-	-	-	-	-
Stage 2	824	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.7	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1027	-	536	-	-
HCM Lane V/C Ratio	0.002	-	0.004	-	-
HCM Control Delay (s)	8.5	0	11.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	3	8	144	467	4
Future Vol, veh/h	0	3	8	144	467	4
Conflicting Peds, #/hr	0	1	5	0	0	5
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	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	3	9	164	531	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	721	540	541	0	-	0
Stage 1	539	-	-	-	-	-
Stage 2	182	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	394	542	1028	-	-	-
Stage 1	585	-	-	-	-	-
Stage 2	849	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	386	539	1023	-	-	-
Mov Cap-2 Maneuver	475	-	-	-	-	-
Stage 1	576	-	-	-	-	-
Stage 2	845	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.7	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1023	-	539	-	-
HCM Lane V/C Ratio	0.009	-	0.006	-	-
HCM Control Delay (s)	8.6	0	11.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	5.4					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	3	0	10	1	0	1
Future Vol, veh/h	3	0	10	1	0	1
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	54	54	54	54	54	54
Heavy Vehicles, %	17	0	0	0	0	2
Mvmt Flow	6	0	19	2	0	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	6	0	46	6
Stage 1	-	-	-	-	6	-
Stage 2	-	-	-	-	40	-
Critical Hdwy	-	-	4.1	-	6.4	6.22
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.318
Pot Cap-1 Maneuver	-	-	1628	-	969	1077
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	988	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1628	-	957	1077
Mov Cap-2 Maneuver	-	-	-	-	957	-
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	976	-

Approach	EB	WB	NB
HCM Control Delay, s	0	6.6	8.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1077	-	-	1628	-
HCM Lane V/C Ratio	0.002	-	-	0.011	-
HCM Control Delay (s)	8.3	-	-	7.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	0	110	3	0	126
Future Vol, veh/h	20	0	110	3	0	126
Conflicting Peds, #/hr	0	0	0	20	20	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	63	63	63	63	63	63
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	32	0	175	5	0	200

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	398	198	0	0	200	0
Stage 1	198	-	-	-	-	-
Stage 2	200	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	611	848	-	-	1384	-
Stage 1	840	-	-	-	-	-
Stage 2	838	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	599	832	-	-	1358	-
Mov Cap-2 Maneuver	599	-	-	-	-	-
Stage 1	824	-	-	-	-	-
Stage 2	838	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.3	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	599	1358	-
HCM Lane V/C Ratio	-	-	0.053	-	-
HCM Control Delay (s)	-	-	11.3	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection						
Int Delay, s/veh	0					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	113	0	0	146
Future Vol, veh/h	0	0	113	0	0	146
Conflicting Peds, #/hr	0	0	0	20	20	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	74	74	74	74	74	74
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	153	0	0	197

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	370	173	0	0	173	0
Stage 1	173	-	-	-	-	-
Stage 2	197	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	634	876	-	-	1416	-
Stage 1	862	-	-	-	-	-
Stage 2	841	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	622	859	-	-	1389	-
Mov Cap-2 Maneuver	622	-	-	-	-	-
Stage 1	846	-	-	-	-	-
Stage 2	841	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	1389	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	508	47	388	618	37	85	19	354	65	27	56
Future Volume (veh/h)	64	508	47	388	618	37	85	19	354	65	27	56
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		0.99	1.00		0.98	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
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1881	1881	1881	1881	1881	1900
Adj Flow Rate, veh/h	69	546	51	417	665	40	91	20	381	70	29	60
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	288	775	72	427	1228	74	624	655	810	140	42	87
Arrive On Green	0.04	0.23	0.23	0.17	0.36	0.36	0.35	0.35	0.35	0.08	0.08	0.08
Sat Flow, veh/h	1792	3300	307	1792	3424	206	1792	1881	1568	1792	539	1115
Grp Volume(v), veh/h	69	295	302	417	347	358	91	20	381	70	0	89
Grp Sat Flow(s),veh/h/ln	1792	1787	1820	1792	1787	1843	1792	1881	1568	1792	0	1654
Q Serve(g_s), s	3.3	17.4	17.5	19.0	17.8	17.8	4.0	0.8	18.0	4.3	0.0	6.0
Cycle Q Clear(g_c), s	3.3	17.4	17.5	19.0	17.8	17.8	4.0	0.8	18.0	4.3	0.0	6.0
Prop In Lane	1.00		0.17	1.00		0.11	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	288	420	427	427	641	661	624	655	810	140	0	129
V/C Ratio(X)	0.24	0.70	0.71	0.98	0.54	0.54	0.15	0.03	0.47	0.50	0.00	0.69
Avail Cap(c_a), veh/h	292	420	427	427	641	661	624	655	810	421	0	388
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	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.4	40.3	40.4	29.4	29.3	29.3	25.7	24.7	18.0	50.9	0.0	51.7
Incr Delay (d2), s/veh	0.2	9.5	9.5	37.3	3.3	3.2	0.5	0.1	2.0	1.0	0.0	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	3.0	14.8	15.1	13.0	14.4	14.7	3.7	0.8	12.8	3.9	0.0	5.1
LnGrp Delay(d),s/veh	31.6	49.8	49.8	66.7	32.6	32.5	26.2	24.8	19.9	51.9	0.0	54.1
LnGrp LOS	C	D	D	E	C	C	C	C	B	D		D
Approach Vol, veh/h		666			1122			492			159	
Approach Delay, s/veh		47.9			45.3			21.3			53.1	
Approach LOS		D			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		45.0	24.0	32.0		14.0	9.7	46.3
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		22.0	19.0	27.0		27.0	5.0	41.0
Max Q Clear Time (g_c+I1), s		20.0	21.0	19.5		8.0	5.3	19.8
Green Ext Time (p_c), s		0.3	0.0	3.2		0.4	0.0	5.2

Intersection Summary	
HCM 2010 Ctrl Delay	41.7
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	932	1040	14	40	20
Future Vol, veh/h	1	932	1040	14	40	20
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	96	96	96	96	96	96
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	1	971	1083	15	42	21

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1098	0	-	0	1579	549
Stage 1	-	-	-	-	1091	-
Stage 2	-	-	-	-	488	-
Critical Hdwy	4.12	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.21	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	637	-	-	-	102	485
Stage 1	-	-	-	-	288	-
Stage 2	-	-	-	-	588	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	637	-	-	-	102	485
Mov Cap-2 Maneuver	-	-	-	-	102	-
Stage 1	-	-	-	-	287	-
Stage 2	-	-	-	-	588	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	51.1
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	637	-	-	-	138
HCM Lane V/C Ratio	0.002	-	-	-	0.453
HCM Control Delay (s)	10.7	0	-	-	51.1
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	973	1008	13	85	40
Future Volume (veh/h)	4	973	1008	13	85	40
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1881	1900	1900	1900
Adj Flow Rate, veh/h	4	1024	1061	14	89	42
Adj No. of Lanes	0	2	2	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	1	0	0
Cap, veh/h	64	1524	1573	21	479	226
Arrive On Green	0.44	0.44	0.44	0.44	0.41	0.41
Sat Flow, veh/h	3	3584	3706	48	1170	552
Grp Volume(v), veh/h	551	477	525	550	132	0
Grp Sat Flow(s),veh/h/ln	1874	1626	1787	1873	1736	0
Q Serve(g_s), s	0.0	13.6	13.6	13.6	2.8	0.0
Cycle Q Clear(g_c), s	13.5	13.6	13.6	13.6	2.8	0.0
Prop In Lane	0.01			0.03	0.67	0.32
Lane Grp Cap(c), veh/h	879	708	778	816	710	0
V/C Ratio(X)	0.63	0.67	0.67	0.67	0.19	0.00
Avail Cap(c_a), veh/h	982	799	878	920	710	0
HCM Platoon Ratio	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	0.00
Uniform Delay (d), s/veh	13.1	13.1	13.1	13.1	11.0	0.0
Incr Delay (d2), s/veh	1.1	1.9	1.7	1.7	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	11.5	10.7	11.5	11.9	2.6	0.0
LnGrp Delay(d),s/veh	14.1	15.0	14.8	14.8	11.5	0.0
LnGrp LOS	B	B	B	B	B	
Approach Vol, veh/h		1028	1075		132	
Approach Delay, s/veh		14.5	14.8		11.5	
Approach LOS		B	B		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				29.8		28.2		29.8
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				28.5		20.5		28.5
Max Q Clear Time (g_c+I1), s				15.6		4.8		15.6
Green Ext Time (p_c), s				9.7		0.3		9.6

Intersection Summary		
HCM 2010 Ctrl Delay		14.5
HCM 2010 LOS		B

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	1030	1004	13	52	7
Future Vol, veh/h	3	1030	1004	13	52	7
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	94	94	94	94	94	94
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	3	1096	1068	14	55	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1082	0	-	0	1629	541
Stage 1	-	-	-	-	1075	-
Stage 2	-	-	-	-	554	-
Critical Hdwy	4.12	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.21	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	646	-	-	-	94	491
Stage 1	-	-	-	-	293	-
Stage 2	-	-	-	-	545	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	646	-	-	-	93	491
Mov Cap-2 Maneuver	-	-	-	-	93	-
Stage 1	-	-	-	-	289	-
Stage 2	-	-	-	-	545	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	83.6
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	646	-	-	-	103
HCM Lane V/C Ratio	0.005	-	-	-	0.609
HCM Control Delay (s)	10.6	0.1	-	-	83.6
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	154	860	59	79	824	243	32	108	81	204	70	147
Future Volume (veh/h)	154	860	59	79	824	243	32	108	81	204	70	147
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	0.99		0.96	0.99		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
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1900	1900	1900	1881	1881	1900
Adj Flow Rate, veh/h	160	896	61	82	858	0	33	112	84	212	73	153
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	1	1	1
Cap, veh/h	199	1532	104	105	1426	0	287	300	204	351	339	296
Arrive On Green	0.11	0.45	0.45	0.06	0.40	0.00	0.03	0.15	0.15	0.08	0.19	0.19
Sat Flow, veh/h	1792	3396	231	1792	3668	0	1810	2020	1373	1792	1787	1558
Grp Volume(v), veh/h	160	472	485	82	858	0	33	99	97	212	73	153
Grp Sat Flow(s),veh/h/ln	1792	1787	1840	1792	1787	0	1810	1805	1588	1792	1787	1558
Q Serve(g_s), s	5.9	13.3	13.3	3.1	12.8	0.0	1.0	3.3	3.8	5.1	2.3	6.0
Cycle Q Clear(g_c), s	5.9	13.3	13.3	3.1	12.8	0.0	1.0	3.3	3.8	5.1	2.3	6.0
Prop In Lane	1.00		0.13	1.00		0.00	1.00		0.86	1.00		1.00
Lane Grp Cap(c), veh/h	199	806	830	105	1426	0	287	268	236	351	339	296
V/C Ratio(X)	0.80	0.58	0.58	0.78	0.60	0.00	0.12	0.37	0.41	0.60	0.22	0.52
Avail Cap(c_a), veh/h	204	806	830	172	1426	0	358	726	638	351	721	628
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.4	13.8	13.8	31.4	16.1	0.0	23.1	25.9	26.1	24.2	23.2	24.6
Incr Delay (d2), s/veh	18.6	3.1	3.0	4.6	1.9	0.0	0.1	0.3	0.4	2.1	0.1	0.5
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	7.1	11.7	11.9	2.9	10.9	0.0	0.9	3.0	3.0	2.6	2.1	4.7
LnGrp Delay(d),s/veh	48.0	16.9	16.9	36.0	18.0	0.0	23.2	26.3	26.5	26.2	23.3	25.1
LnGrp LOS	D	B	B	D	B		C	C	C	C	C	C
Approach Vol, veh/h		1117			940			229			438	
Approach Delay, s/veh		21.3			19.5			25.9			25.4	
Approach LOS		C			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.6	14.6	8.5	35.0	6.8	17.3	12.0	31.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	27.2	6.5	28.2	5.0	27.3	7.7	27.0
Max Q Clear Time (g_c+I1), s	7.1	5.8	5.1	15.3	3.0	8.0	7.9	14.8
Green Ext Time (p_c), s	0.0	1.7	0.0	6.7	0.0	1.6	0.0	6.4

Intersection Summary	
HCM 2010 Ctrl Delay	21.8
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	4	1	587	343	0
Future Vol, veh/h	0	4	1	587	343	0
Conflicting Peds, #/hr	0	0	3	0	0	3
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	1	1	0
Mvmt Flow	0	4	1	638	373	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1016	376	376	0	-	0
Stage 1	376	-	-	-	-	-
Stage 2	640	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	266	675	1194	-	-	-
Stage 1	699	-	-	-	-	-
Stage 2	529	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	264	673	1191	-	-	-
Mov Cap-2 Maneuver	390	-	-	-	-	-
Stage 1	696	-	-	-	-	-
Stage 2	527	-	-	-	-	-

Approach	EB		NB		SB	
HCM Control Delay, s	10.4		0		0	
HCM LOS	B					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1191	-	673	-	-
HCM Lane V/C Ratio	0.001	-	0.006	-	-
HCM Control Delay (s)	8	0	10.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	8	14	445	361	1
Future Vol, veh/h	2	8	14	445	361	1
Conflicting Peds, #/hr	0	1	2	0	0	2
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	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	2	9	15	473	384	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	890	388	387	0	-	0
Stage 1	387	-	-	-	-	-
Stage 2	503	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	316	665	1183	-	-	-
Stage 1	691	-	-	-	-	-
Stage 2	612	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	309	663	1181	-	-	-
Mov Cap-2 Maneuver	434	-	-	-	-	-
Stage 1	678	-	-	-	-	-
Stage 2	611	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.1	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1181	-	600	-	-
HCM Lane V/C Ratio	0.013	-	0.018	-	-
HCM Control Delay (s)	8.1	0	11.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	5	0	0	15	1	5
Future Vol, veh/h	5	0	0	15	1	5
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	68	68	68	68	68	68
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	7	0	0	22	1	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	7	0	29	7
Stage 1	-	-	-	-	7	-
Stage 2	-	-	-	-	22	-
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	-	-	1627	-	991	1081
Stage 1	-	-	-	-	1021	-
Stage 2	-	-	-	-	1006	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1627	-	991	1081
Mov Cap-2 Maneuver	-	-	-	-	991	-
Stage 1	-	-	-	-	1021	-
Stage 2	-	-	-	-	1006	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1065	-	-	1627	-
HCM Lane V/C Ratio	0.008	-	-	-	-
HCM Control Delay (s)	8.4	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	15	0	257	70	0	157
Future Vol, veh/h	15	0	257	70	0	157
Conflicting Peds, #/hr	0	0	0	50	50	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	54	54	54	54	54	54
Heavy Vehicles, %	33	0	2	2	0	0
Mvmt Flow	28	0	476	130	0	291

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	882	591	0	0	656	0
Stage 1	591	-	-	-	-	-
Stage 2	291	-	-	-	-	-
Critical Hdwy	6.73	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.73	-	-	-	-	-
Critical Hdwy Stg 2	5.73	-	-	-	-	-
Follow-up Hdwy	3.797	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	280	511	-	-	941	-
Stage 1	497	-	-	-	-	-
Stage 2	693	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	267	487	-	-	896	-
Mov Cap-2 Maneuver	267	-	-	-	-	-
Stage 1	473	-	-	-	-	-
Stage 2	693	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	267	896	-
HCM Lane V/C Ratio	-	-	0.104	-	-
HCM Control Delay (s)	-	-	20	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	330	0	0	166
Future Vol, veh/h	0	0	330	0	0	166
Conflicting Peds, #/hr	0	0	0	50	50	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	54	54	54	54	54	54
Heavy Vehicles, %	0	0	2	0	0	33
Mvmt Flow	0	0	611	0	0	307

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	968	661	0	0	661	0
Stage 1	661	-	-	-	-	-
Stage 2	307	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	284	466	-	-	937	-
Stage 1	517	-	-	-	-	-
Stage 2	751	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	270	444	-	-	892	-
Mov Cap-2 Maneuver	270	-	-	-	-	-
Stage 1	492	-	-	-	-	-
Stage 2	751	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	892	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	401	70	467	250	73	36	67	354	48	46	72
Future Volume (veh/h)	190	401	70	467	250	73	36	67	354	48	46	72
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		0.97	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
Adj Sat Flow, veh/h/ln	1845	1845	1900	1863	1863	1900	1863	1863	1863	1743	1743	1900
Adj Flow Rate, veh/h	224	472	82	549	294	86	42	79	416	56	54	85
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	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, %	3	3	3	2	2	2	2	2	2	9	9	9
Cap, veh/h	506	731	126	583	1018	293	355	373	692	216	78	123
Arrive On Green	0.11	0.25	0.25	0.24	0.38	0.38	0.20	0.20	0.20	0.13	0.13	0.13
Sat Flow, veh/h	1757	2979	514	1774	2714	780	1774	1863	1542	1660	601	946
Grp Volume(v), veh/h	224	276	278	549	190	190	42	79	416	56	0	139
Grp Sat Flow(s),veh/h/ln	1757	1752	1741	1774	1770	1724	1774	1863	1542	1660	0	1547
Q Serve(g_s), s	10.3	15.5	15.7	24.3	8.3	8.5	2.1	3.9	22.0	3.3	0.0	9.4
Cycle Q Clear(g_c), s	10.3	15.5	15.7	24.3	8.3	8.5	2.1	3.9	22.0	3.3	0.0	9.4
Prop In Lane	1.00		0.30	1.00		0.45	1.00		1.00	1.00		0.61
Lane Grp Cap(c), veh/h	506	430	427	583	664	647	355	373	692	216	0	201
V/C Ratio(X)	0.44	0.64	0.65	0.94	0.29	0.29	0.12	0.21	0.60	0.26	0.00	0.69
Avail Cap(c_a), veh/h	548	430	427	620	664	647	355	373	692	408	0	380
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	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.0	37.2	37.2	22.4	24.0	24.1	36.0	36.8	23.4	43.1	0.0	45.7
Incr Delay (d2), s/veh	0.2	7.2	7.4	21.7	1.1	1.2	0.1	0.1	1.0	0.2	0.0	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	8.6	13.1	13.2	21.7	7.6	7.7	1.9	3.6	15.0	2.8	0.0	7.5
LnGrp Delay(d),s/veh	26.2	44.4	44.7	44.1	25.1	25.3	36.1	36.9	24.4	43.3	0.0	47.3
LnGrp LOS	C	D	D	D	C	C	D	D	C	D		D
Approach Vol, veh/h		778			929			537			195	
Approach Delay, s/veh		39.3			36.3			27.2			46.1	
Approach LOS		D			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		27.0	31.7	32.0		19.3	17.4	46.3
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		22.0	29.0	27.0		27.0	15.0	41.0
Max Q Clear Time (g_c+I1), s		24.0	26.3	17.7		11.4	12.3	10.5
Green Ext Time (p_c), s		0.0	0.3	2.6		0.5	0.1	3.8

Intersection Summary		
HCM 2010 Ctrl Delay		36.0
HCM 2010 LOS		D

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	778	780	84	86	10
Future Volume (veh/h)	25	778	780	84	86	10
Number	7	4	8	18	1	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1759	1900
Adj Flow Rate, veh/h	27	828	830	89	91	11
Adj No. of Lanes	0	2	2	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	141	1881	1807	194	230	28
Arrive On Green	0.56	0.56	0.56	0.56	0.16	0.16
Sat Flow, veh/h	38	3441	3319	346	1462	177
Grp Volume(v), veh/h	451	404	455	464	103	0
Grp Sat Flow(s),veh/h/ln	1784	1610	1770	1802	1655	0
Q Serve(g_s), s	0.0	4.7	4.9	4.9	1.8	0.0
Cycle Q Clear(g_c), s	4.5	4.7	4.9	4.9	1.8	0.0
Prop In Lane	0.06			0.19	0.88	0.11
Lane Grp Cap(c), veh/h	1119	902	992	1010	260	0
V/C Ratio(X)	0.40	0.45	0.46	0.46	0.40	0.00
Avail Cap(c_a), veh/h	1518	1290	1417	1443	1065	0
HCM Platoon Ratio	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	0.00
Uniform Delay (d), s/veh	4.1	4.1	4.1	4.1	12.1	0.0
Incr Delay (d2), s/veh	0.2	0.3	0.3	0.3	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.2	3.8	4.3	4.3	1.6	0.0
LnGrp Delay(d),s/veh	4.3	4.5	4.5	4.5	13.0	0.0
LnGrp LOS	A	A	A	A	B	
Approach Vol, veh/h		855	919		103	
Approach Delay, s/veh		4.4	4.5		13.0	
Approach LOS		A	A		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				22.3		9.5		22.3
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				25.5		20.5		25.5
Max Q Clear Time (g_c+I1), s				6.7		3.8		6.9
Green Ext Time (p_c), s				11.1		0.2		11.0

Intersection Summary		
HCM 2010 Ctrl Delay		4.9
HCM 2010 LOS		A

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	864	850	75	0	15
Future Vol, veh/h	0	864	850	75	0	15
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	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	0	0
Mvmt Flow	0	960	944	83	0	17

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	514
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	-	-	-	0	511
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	511
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12.3
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	511
HCM Lane V/C Ratio	-	-	-	0.033
HCM Control Delay (s)	-	-	-	12.3
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	34	875	916	103	61	10
Future Volume (veh/h)	34	875	916	103	61	10
Number	7	4	8	18	1	16
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
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1900	1900
Adj Flow Rate, veh/h	39	1006	1053	118	70	11
Adj No. of Lanes	0	2	2	0	0	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	137	2022	1981	222	208	33
Arrive On Green	0.62	0.62	0.62	0.62	0.14	0.14
Sat Flow, veh/h	50	3361	3303	359	1521	239
Grp Volume(v), veh/h	541	504	580	591	82	0
Grp Sat Flow(s),veh/h/ln	1717	1610	1770	1799	1782	0
Q Serve(g_s), s	0.0	6.4	6.8	6.8	1.5	0.0
Cycle Q Clear(g_c), s	5.7	6.4	6.8	6.8	1.5	0.0
Prop In Lane	0.07			0.20	0.85	0.13
Lane Grp Cap(c), veh/h	1165	994	1092	1110	244	0
V/C Ratio(X)	0.46	0.51	0.53	0.53	0.34	0.00
Avail Cap(c_a), veh/h	1373	1211	1331	1353	902	0
HCM Platoon Ratio	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	0.00
Uniform Delay (d), s/veh	3.8	3.9	4.0	4.0	14.3	0.0
Incr Delay (d2), s/veh	0.3	0.4	0.4	0.4	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.3	5.0	6.0	6.1	1.5	0.0
LnGrp Delay(d),s/veh	4.1	4.3	4.4	4.4	15.1	0.0
LnGrp LOS	A	A	A	A	B	
Approach Vol, veh/h		1045	1171		82	
Approach Delay, s/veh		4.2	4.4		15.1	
Approach LOS		A	A		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				27.1		9.5		27.1
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				27.5		18.5		27.5
Max Q Clear Time (g_c+I1), s				8.4		3.5		8.8
Green Ext Time (p_c), s				14.0		0.1		13.7

Intersection Summary		
HCM 2010 Ctrl Delay		4.7
HCM 2010 LOS		A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↱	
Traffic Volume (veh/h)	100	765	27	18	824	64	29	28	33	254	67	168
Future Volume (veh/h)	100	765	27	18	824	64	29	28	33	254	67	168
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	0.98		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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	109	832	29	20	896	0	32	30	36	276	73	183
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
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, %	2	2	2	2	2	2	1	1	1	1	1	1
Cap, veh/h	139	1669	58	41	1498	0	179	208	182	379	330	289
Arrive On Green	0.08	0.48	0.48	0.02	0.42	0.00	0.03	0.12	0.12	0.10	0.18	0.18
Sat Flow, veh/h	1774	3489	122	1774	3632	0	1792	1787	1562	1792	1787	1566
Grp Volume(v), veh/h	109	422	439	20	896	0	32	30	36	276	73	183
Grp Sat Flow(s),veh/h/ln	1774	1770	1841	1774	1770	0	1792	1787	1562	1792	1787	1566
Q Serve(g_s), s	3.8	10.4	10.4	0.7	12.5	0.0	0.0	1.0	1.3	2.0	2.2	6.9
Cycle Q Clear(g_c), s	3.8	10.4	10.4	0.7	12.5	0.0	0.0	1.0	1.3	2.0	2.2	6.9
Prop In Lane	1.00		0.07	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	139	846	881	41	1498	0	179	208	182	379	330	289
V/C Ratio(X)	0.78	0.50	0.50	0.48	0.60	0.00	0.18	0.14	0.20	0.73	0.22	0.63
Avail Cap(c_a), veh/h	181	846	881	139	1498	0	263	796	695	379	798	700
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.9	11.4	11.4	30.8	14.2	0.0	29.8	25.3	25.5	25.4	22.1	24.0
Incr Delay (d2), s/veh	11.3	2.1	2.0	3.2	1.8	0.0	0.2	0.1	0.2	6.1	0.1	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	4.2	9.4	9.7	0.7	10.5	0.0	1.0	0.9	1.0	8.9	2.0	5.4
LnGrp Delay(d),s/veh	40.1	13.5	13.4	34.0	16.0	0.0	30.0	25.4	25.7	31.4	22.2	24.9
LnGrp LOS	D	B	B	C	B		C	C	C	C	C	C
Approach Vol, veh/h		970			916			98			532	
Approach Delay, s/veh		16.4			16.4			27.0			27.9	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.9	11.9	6.0	35.0	6.5	16.3	9.5	31.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	28.4	5.0	28.5	5.0	28.5	6.5	27.0
Max Q Clear Time (g_c+I1), s	4.0	3.3	2.7	12.4	2.0	8.9	5.8	14.5
Green Ext Time (p_c), s	0.1	0.2	0.0	7.3	0.0	1.0	0.0	6.4

Intersection Summary		
HCM 2010 Ctrl Delay		19.3
HCM 2010 LOS		B

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	2	2	195	509	0
Future Vol, veh/h	0	2	2	195	509	0
Conflicting Peds, #/hr	0	1	6	0	0	6
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	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	4	1	0
Mvmt Flow	0	2	2	207	541	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	758	548	547	0	-	0
Stage 1	547	-	-	-	-	-
Stage 2	211	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	378	540	1033	-	-	-
Stage 1	584	-	-	-	-	-
Stage 2	829	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	373	536	1027	-	-	-
Mov Cap-2 Maneuver	470	-	-	-	-	-
Stage 1	579	-	-	-	-	-
Stage 2	824	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.7	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1027	-	536	-	-
HCM Lane V/C Ratio	0.002	-	0.004	-	-
HCM Control Delay (s)	8.5	0	11.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	3	8	144	467	4
Future Vol, veh/h	0	3	8	144	467	4
Conflicting Peds, #/hr	0	1	5	0	0	5
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	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	3	9	164	531	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	721	540	541	0	-	0
Stage 1	539	-	-	-	-	-
Stage 2	182	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	394	542	1028	-	-	-
Stage 1	585	-	-	-	-	-
Stage 2	849	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	386	539	1023	-	-	-
Mov Cap-2 Maneuver	475	-	-	-	-	-
Stage 1	576	-	-	-	-	-
Stage 2	845	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.7	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1023	-	539	-	-
HCM Lane V/C Ratio	0.009	-	0.006	-	-
HCM Control Delay (s)	8.6	0	11.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	5.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	3	0	10	1	0	1
Future Vol, veh/h	3	0	10	1	0	1
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	54	54	54	54	54	54
Heavy Vehicles, %	17	0	0	0	0	2
Mvmt Flow	6	0	19	2	0	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	6	0	46	6
Stage 1	-	-	-	-	6	-
Stage 2	-	-	-	-	40	-
Critical Hdwy	-	-	4.1	-	6.4	6.22
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.318
Pot Cap-1 Maneuver	-	-	1628	-	969	1077
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	988	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1628	-	957	1077
Mov Cap-2 Maneuver	-	-	-	-	957	-
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	976	-

Approach	EB	WB	NB
HCM Control Delay, s	0	6.6	8.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1077	-	-	1628	-
HCM Lane V/C Ratio	0.002	-	-	0.011	-
HCM Control Delay (s)	8.3	-	-	7.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	0	110	3	0	126
Future Vol, veh/h	20	0	110	3	0	126
Conflicting Peds, #/hr	0	0	0	20	20	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	63	63	63	63	63	63
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	32	0	175	5	0	200

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	398	198	0	0	200	0
Stage 1	198	-	-	-	-	-
Stage 2	200	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	611	848	-	-	1384	-
Stage 1	840	-	-	-	-	-
Stage 2	838	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	599	832	-	-	1358	-
Mov Cap-2 Maneuver	599	-	-	-	-	-
Stage 1	824	-	-	-	-	-
Stage 2	838	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.3	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	599	1358	-
HCM Lane V/C Ratio	-	-	0.053	-	-
HCM Control Delay (s)	-	-	11.3	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection						
Int Delay, s/veh	0					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	113	0	0	146
Future Vol, veh/h	0	0	113	0	0	146
Conflicting Peds, #/hr	0	0	0	20	20	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	74	74	74	74	74	74
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	153	0	0	197

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	370	173	0	0	173	0
Stage 1	173	-	-	-	-	-
Stage 2	197	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	634	876	-	-	1416	-
Stage 1	862	-	-	-	-	-
Stage 2	841	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	622	859	-	-	1389	-
Mov Cap-2 Maneuver	622	-	-	-	-	-
Stage 1	846	-	-	-	-	-
Stage 2	841	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	1389	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	508	47	388	618	37	85	19	354	65	27	56
Future Volume (veh/h)	64	508	47	388	618	37	85	19	354	65	27	56
Number	7	4	14	3	8	18	5	2	12	1	6	16
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		0.99	1.00		0.98	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
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1881	1881	1881	1881	1881	1900
Adj Flow Rate, veh/h	69	546	51	417	665	40	91	20	381	70	29	60
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	288	775	72	427	1228	74	624	655	810	140	42	87
Arrive On Green	0.04	0.23	0.23	0.17	0.36	0.36	0.35	0.35	0.35	0.08	0.08	0.08
Sat Flow, veh/h	1792	3300	307	1792	3424	206	1792	1881	1568	1792	539	1115
Grp Volume(v), veh/h	69	295	302	417	347	358	91	20	381	70	0	89
Grp Sat Flow(s),veh/h/ln	1792	1787	1820	1792	1787	1843	1792	1881	1568	1792	0	1654
Q Serve(g_s), s	3.3	17.4	17.5	19.0	17.8	17.8	4.0	0.8	18.0	4.3	0.0	6.0
Cycle Q Clear(g_c), s	3.3	17.4	17.5	19.0	17.8	17.8	4.0	0.8	18.0	4.3	0.0	6.0
Prop In Lane	1.00		0.17	1.00		0.11	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	288	420	427	427	641	661	624	655	810	140	0	129
V/C Ratio(X)	0.24	0.70	0.71	0.98	0.54	0.54	0.15	0.03	0.47	0.50	0.00	0.69
Avail Cap(c_a), veh/h	292	420	427	427	641	661	624	655	810	421	0	388
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	0.67	0.67	0.67	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.4	40.3	40.4	29.4	29.3	29.3	25.7	24.7	18.0	50.9	0.0	51.7
Incr Delay (d2), s/veh	0.2	9.5	9.5	29.8	2.2	2.1	0.5	0.1	2.0	1.0	0.0	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	3.0	14.8	15.1	11.1	13.2	13.6	3.7	0.8	12.8	3.9	0.0	5.1
LnGrp Delay(d),s/veh	31.6	49.8	49.8	59.2	31.5	31.5	26.2	24.8	19.9	51.9	0.0	54.1
LnGrp LOS	C	D	D	E	C	C	C	C	B	D		D
Approach Vol, veh/h		666			1122			492			159	
Approach Delay, s/veh		47.9			41.8			21.3			53.1	
Approach LOS		D			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		45.0	24.0	32.0		14.0	9.7	46.3
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		22.0	19.0	27.0		27.0	5.0	41.0
Max Q Clear Time (g_c+I1), s		20.0	21.0	19.5		8.0	5.3	19.8
Green Ext Time (p_c), s		0.3	0.0	3.2		0.4	0.0	5.2

Intersection Summary	
HCM 2010 Ctrl Delay	40.1
HCM 2010 LOS	D

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	928	1040	14	90	20
Future Volume (veh/h)	5	928	1040	14	90	20
Number	7	4	8	18	1	16
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
Adj Sat Flow, veh/h/ln	1900	1881	1881	1900	1900	1900
Adj Flow Rate, veh/h	5	967	1083	15	94	21
Adj No. of Lanes	0	2	2	0	0	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	0	0
Cap, veh/h	73	1644	1699	24	507	113
Arrive On Green	0.47	0.47	0.47	0.47	0.35	0.35
Sat Flow, veh/h	4	3580	3704	50	1436	321
Grp Volume(v), veh/h	520	452	536	562	116	0
Grp Sat Flow(s),veh/h/ln	1872	1626	1787	1872	1772	0
Q Serve(g_s), s	0.0	10.4	11.6	11.6	2.3	0.0
Cycle Q Clear(g_c), s	10.3	10.4	11.6	11.6	2.3	0.0
Prop In Lane	0.01			0.03	0.81	0.18
Lane Grp Cap(c), veh/h	952	765	841	881	625	0
V/C Ratio(X)	0.55	0.59	0.64	0.64	0.19	0.00
Avail Cap(c_a), veh/h	1096	893	981	1028	625	0
HCM Platoon Ratio	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	0.00
Uniform Delay (d), s/veh	9.9	9.9	10.2	10.2	11.4	0.0
Incr Delay (d2), s/veh	0.5	0.8	1.1	1.0	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.1	8.2	9.9	10.3	2.2	0.0
LnGrp Delay(d),s/veh	10.4	10.7	11.3	11.2	12.1	0.0
LnGrp LOS	B	B	B	B	B	
Approach Vol, veh/h		972	1098		116	
Approach Delay, s/veh		10.5	11.3		12.1	
Approach LOS		B	B		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				28.5		22.5		28.5
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				28.0		18.0		28.0
Max Q Clear Time (g_c+I1), s				12.4		4.3		13.6
Green Ext Time (p_c), s				11.1		0.2		10.4

Intersection Summary	
HCM 2010 Ctrl Delay	11.0
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1023	1008	13	0	40
Future Vol, veh/h	0	1023	1008	13	0	40
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	95	95	95	95	95	95
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	0	1077	1061	14	0	42

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	538
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	-	-	-	0	493
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	493
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	13
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	493
HCM Lane V/C Ratio	-	-	-	0.085
HCM Control Delay (s)	-	-	-	13
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	995	1004	13	87	7
Future Volume (veh/h)	3	995	1004	13	87	7
Number	7	4	8	18	1	16
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
Adj Sat Flow, veh/h/ln	1900	1881	1881	1900	1900	1900
Adj Flow Rate, veh/h	3	1059	1068	14	93	7
Adj No. of Lanes	0	2	2	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	1	0	0
Cap, veh/h	104	2101	2167	28	236	18
Arrive On Green	0.60	0.60	0.60	0.60	0.14	0.14
Sat Flow, veh/h	2	3587	3707	47	1653	124
Grp Volume(v), veh/h	569	493	528	554	101	0
Grp Sat Flow(s),veh/h/ln	1877	1626	1787	1873	1795	0
Q Serve(g_s), s	0.0	6.1	5.9	5.9	1.8	0.0
Cycle Q Clear(g_c), s	6.1	6.1	5.9	5.9	1.8	0.0
Prop In Lane	0.01			0.03	0.92	0.07
Lane Grp Cap(c), veh/h	1229	976	1072	1123	257	0
V/C Ratio(X)	0.46	0.51	0.49	0.49	0.39	0.00
Avail Cap(c_a), veh/h	1522	1232	1354	1418	1001	0
HCM Platoon Ratio	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	0.00
Uniform Delay (d), s/veh	4.0	4.0	4.0	4.0	13.6	0.0
Incr Delay (d2), s/veh	0.3	0.4	0.4	0.3	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.6	4.9	5.2	5.4	1.7	0.0
LnGrp Delay(d),s/veh	4.3	4.4	4.3	4.3	14.6	0.0
LnGrp LOS	A	A	A	A	B	
Approach Vol, veh/h		1062	1082		101	
Approach Delay, s/veh		4.4	4.3		14.6	
Approach LOS		A	A		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				25.5		9.5		25.5
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				26.5		19.5		26.5
Max Q Clear Time (g_c+I1), s				8.1		3.8		7.9
Green Ext Time (p_c), s				12.9		0.2		13.0

Intersection Summary		
HCM 2010 Ctrl Delay		4.8
HCM 2010 LOS		A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	154	860	59	79	824	243	32	108	81	204	70	147
Future Volume (veh/h)	154	860	59	79	824	243	32	108	81	204	70	147
Number	7	4	14	3	8	18	5	2	12	1	6	16
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	0.99		0.96	0.99		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
Adj Sat Flow, veh/h/ln	1881	1881	1900	1881	1881	1900	1900	1900	1900	1881	1881	1900
Adj Flow Rate, veh/h	160	896	61	82	858	0	33	112	84	212	73	153
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	1	1	1
Cap, veh/h	199	1532	104	105	1426	0	287	300	204	351	339	296
Arrive On Green	0.11	0.45	0.45	0.06	0.40	0.00	0.03	0.15	0.15	0.08	0.19	0.19
Sat Flow, veh/h	1792	3396	231	1792	3668	0	1810	2020	1373	1792	1787	1558
Grp Volume(v), veh/h	160	472	485	82	858	0	33	99	97	212	73	153
Grp Sat Flow(s),veh/h/ln	1792	1787	1840	1792	1787	0	1810	1805	1588	1792	1787	1558
Q Serve(g_s), s	5.9	13.3	13.3	3.1	12.8	0.0	1.0	3.3	3.8	5.1	2.3	6.0
Cycle Q Clear(g_c), s	5.9	13.3	13.3	3.1	12.8	0.0	1.0	3.3	3.8	5.1	2.3	6.0
Prop In Lane	1.00		0.13	1.00		0.00	1.00		0.86	1.00		1.00
Lane Grp Cap(c), veh/h	199	806	830	105	1426	0	287	268	236	351	339	296
V/C Ratio(X)	0.80	0.58	0.58	0.78	0.60	0.00	0.12	0.37	0.41	0.60	0.22	0.52
Avail Cap(c_a), veh/h	204	806	830	172	1426	0	358	726	638	351	721	628
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.4	13.8	13.8	31.4	16.1	0.0	23.1	25.9	26.1	24.2	23.2	24.6
Incr Delay (d2), s/veh	18.6	3.1	3.0	4.6	1.9	0.0	0.1	0.3	0.4	2.1	0.1	0.5
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	7.1	11.7	11.9	2.9	10.9	0.0	0.9	3.0	3.0	2.6	2.1	4.7
LnGrp Delay(d),s/veh	48.0	16.9	16.9	36.0	18.0	0.0	23.2	26.3	26.5	26.2	23.3	25.1
LnGrp LOS	D	B	B	D	B		C	C	C	C	C	C
Approach Vol, veh/h		1117			940			229			438	
Approach Delay, s/veh		21.3			19.5			25.9			25.4	
Approach LOS		C			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.6	14.6	8.5	35.0	6.8	17.3	12.0	31.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	27.2	6.5	28.2	5.0	27.3	7.7	27.0
Max Q Clear Time (g_c+I1), s	7.1	5.8	5.1	15.3	3.0	8.0	7.9	14.8
Green Ext Time (p_c), s	0.0	1.7	0.0	6.7	0.0	1.6	0.0	6.4

Intersection Summary		
HCM 2010 Ctrl Delay		21.8
HCM 2010 LOS		C

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	4	1	587	343	0
Future Vol, veh/h	0	4	1	587	343	0
Conflicting Peds, #/hr	0	0	3	0	0	3
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	1	1	0
Mvmt Flow	0	4	1	638	373	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1016	376	376	0	-	0
Stage 1	376	-	-	-	-	-
Stage 2	640	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	266	675	1194	-	-	-
Stage 1	699	-	-	-	-	-
Stage 2	529	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	264	673	1191	-	-	-
Mov Cap-2 Maneuver	390	-	-	-	-	-
Stage 1	696	-	-	-	-	-
Stage 2	527	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1191	-	673	-	-
HCM Lane V/C Ratio	0.001	-	0.006	-	-
HCM Control Delay (s)	8	0	10.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	0.2					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	8	14	445	361	1
Future Vol, veh/h	2	8	14	445	361	1
Conflicting Peds, #/hr	0	1	2	0	0	2
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	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	2	9	15	473	384	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	890	388	387	0	-	0
Stage 1	387	-	-	-	-	-
Stage 2	503	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	316	665	1183	-	-	-
Stage 1	691	-	-	-	-	-
Stage 2	612	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	309	663	1181	-	-	-
Mov Cap-2 Maneuver	434	-	-	-	-	-
Stage 1	678	-	-	-	-	-
Stage 2	611	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.1	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1181	-	600	-	-
HCM Lane V/C Ratio	0.013	-	0.018	-	-
HCM Control Delay (s)	8.1	0	11.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	5	0	0	15	1	5
Future Vol, veh/h	5	0	0	15	1	5
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	68	68	68	68	68	68
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	7	0	0	22	1	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	7	0	29	7
Stage 1	-	-	-	-	7	-
Stage 2	-	-	-	-	22	-
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	-	-	1627	-	991	1081
Stage 1	-	-	-	-	1021	-
Stage 2	-	-	-	-	1006	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1627	-	991	1081
Mov Cap-2 Maneuver	-	-	-	-	991	-
Stage 1	-	-	-	-	1021	-
Stage 2	-	-	-	-	1006	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1065	-	-	1627	-
HCM Lane V/C Ratio	0.008	-	-	-	-
HCM Control Delay (s)	8.4	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

7 MAY 2021

Appendix 3B: Transportation Impact Analysis - Supplemental Memo

TSI
Transportation Solutions, Inc.

July 31, 2020

To: Craig Tompkins, AIA, LEED AP
SRG Partnership, Inc.

From: Jeff Hee, Transportation Solutions, Inc.

Subject: Western State Hospital Master Plan Updated Bed Matrix
Summary of Preliminary Traffic Analysis Findings

This memorandum updated the January 2020 traffic analysis findings for the Western State Hospital campus Master Plan with the current bed matrix from May 2020.

Table 1 summarizes the current bed matrix.

Table 1: Bed Matrix

	Baseline Bed Total		Master Plan Bed Total		Long-Term Bed Total
	2019 Existing	In-Development[1]	Near-Term 1 to 5 yrs.	Mid-Term 6 to 10 yrs.	Beyond 10 yrs.
Breakdown by Type					
Total Beds	862	978	923	748	814
Total Civil Beds	470	470	415	153	201
Total Forensic Beds	345	443	443	530	530
Total Adolescent Beds	47	65	65	65	83
Breakdown by Use					
Civil/Forensic Beds	815	913	858	333	333
CSTC Beds	47	65	65	65	83
New CFS Hospital Beds	0	0	0	350	350
Community RTF Beds	0	0	0	0	48
Total Beds	862	978	923	748	814

1. Build-Out already permitted on the campus

A vicinity map and Master Plan site plan are attached as Figures 1 and 2.

Trip Generation

Table 2 summarizes the daily and peak hour trip generation rates computed from the existing campus' beds.

Table 2: Existing Peak Hour and Daily Trip Generation Rates

	2019 Exist. # of Beds	2019 Existing Trips Generated[1]	2019 Existing % In/Out	Trip Rate (Trips/Bed)
AM Generator (6:30-7:30 AM)	862	828	66/34	0.91
AM Peak Hour (7:00-8:00 AM)	862	677	67/33	0.75
PM Generator (2:15-3:15 PM)	862	764	41/59	0.84
PM Peak Hour (4:00-5:00 PM)	862	366	16/84	0.40
Daily Trips	862	6,046	48/52	6.67

1. Based on traffic volumes collected at the existing Western State Campus, May/July 2019

Table 3 summarizes the trip generation forecast based on the proposed in-development, near-term, mid-term and long-term development proposal.

Table 3: Trip Generation Forecast by Build-Out Scenario

In-Development	**Trip Rate (Trips/Bed)** [1]	**In-Dev. # of Beds**	**In-Dev. Trips**	**Change from Existing**	**Near-Term # of Beds**	**Near-Term Trips**	**Change from In-Dev.**
AM Generator (6:30-7:30 AM)	0.91	978	939	+111	923	887	(52)
AM Peak Hour (7:00-8:00 AM)	**0.75**	**978**	**768**	**+91**	**923**	**725**	**(43)**
PM Generator (2:15-3:15 PM)	0.84	978	867	+103	923	818	(49)
PM Peak Hour (4:00-5:00 PM)	**0.40**	**978**	**415**	**+49**	**923**	**392**	**(23)**
Daily Trips	6.67	978	6,860	+814	923	6,474	(386)
Near-Term	**Trip Rate** [1]	**Mid-Term # of Beds**	**Mid-Term Trips**	**Change from Near-Term**	**Long-Term # of Beds**	**Long-Term Trips**	**Change from Near-Term**
AM Generator (6:30-7:30 AM)	0.91	748	718	(169)	814	782	+64
AM Peak Hour (7:00-8:00 AM)	**0.75**	**748**	**587**	**(138)**	**814**	**639**	**+52**
PM Generator (2:15-3:15 PM)	0.84	748	663	(155)	814	721	+58
PM Peak Hour (4:00-5:00 PM)	**0.40**	**748**	**318**	**(74)**	**814**	**345**	**+27**
Daily Trips	6.67	748	5,246	(1,228)	814	5,709	+463

1. Trip Rate (Trips/Bed) from Table 2

The January 2020 Traffic Impact Analysis focused on analyses of AM peak hour (7:00-8:00 AM) and PM peak hour (4:00-5:00 PM) traffic conditions, representing the times when the volume of traffic, or traffic congestion, on the local roadways are highest.

Table 4 compares the AM and PM peak hour trips generated at the major campus accesses. For reporting, the driveways on Sentinel Drive at West Street and South Street are combined and Kids First Place and access to the former golf course/existing gravel lot are combined.

Table 4: AM and PM Peak Hour Site Trips by Driveway

AM Peak Hour 7:00-8:00 AM	**Sentinel Drive**			**Chapel Gate Dr.**			**Circle Drive**			**CSTC East Drwy.**			**Golf Course Rd.**		
	In	**Out**	**Tot.**	**In**	**Out**	**Tot.**	**In**	**Out**	**Tot.**	**In**	**Out**	**Tot.**	**In**	**Out**	**Tot.**
2019 Existing	85	14	99	117	16	133	124	134	258	118	56	174	11	2	13
In-Development	85	14	99	117	16	133	151	148	299	148	72	220	15	2	17
Near-Term (1-5 yrs.)	85	14	99	117	16	133	136	140	276	134	66	200	15	2	17
Mid-Term (6-10 yrs.)	73	12	85	101	13	114	102	113	215	105	53	158	14	2	16
Long-Term (10+ yrs.)	73	12	85	101	13	114	102	113	215	138	68	206	17	3	20
PM Peak Hour 4:00-5:00 PM	**Sentinel Drive**			**Chapel Gate Dr.**			**Circle Drive**			**CSTC East Drwy.**			**Golf Course Rd.**		
	In	**Out**	**Tot.**	**In**	**Out**	**Tot.**	**In**	**Out**	**Tot.**	**In**	**Out**	**Tot.**	**In**	**Out**	**Tot.**
2019 Existing	3	20	23	9	70	79	18	157	175	11	50	61	19	9	28
In-Development	3	20	23	9	70	79	20	184	204	14	63	77	22	11	33
Near-Term (1-5 yrs.)	3	20	23	9	70	79	19	169	188	13	58	71	20	11	31
Mid-Term (6-10 yrs.)	3	17	20	8	61	69	15	131	146	11	47	58	15	10	25
Long-Term (10+ yrs.)	3	17	20	8	61	69	15	131	146	15	68	83	15	12	27

Under the proposed Master Plan, the Near-Term and Mid-Term conditions and the Long-Term condition include closing the South Street campus access.

Figures 3 through 5 illustrates the campus Existing, In-Development and Long-Term AM and PM peak hour trips. Peak hour trips were distributed to the campus based on the current distribution of campus traffic at the site accesses and based on the long-term redevelopment of the campus.

Intersection Level-of-Service

Table 5 summarizes the intersection LOS and delay analyses for the study intersections and campus driveways. The LOS and delay computations were updated to the current HCM 6 methodologies.

Future conditions include a 1% annual growth which represents background traffic growth in the study area. Traffic generated by the high school and campus were not "increased" by the growth rate.

- The campus trips were distributed based on the existing conditions. Figure 6 illustrates the existing AM (7:00-8:00 AM) and PM (4:00-5:00 PM) peak hour study intersection turning movement volumes.
- In-Development conditions represent build-out already permitted on the campus. The proposed Master Plan is forecast to generate less trips compared to the In-Development condition.
- Year 2024 In-Development conditions include traffic growth between 2019 and 2024 and assumes the In-Development conditions are still active. This baseline scenario assumes more development than the proposed Near-Term (1-5 years) Master Plan conditions and is conservative. Figure 7 illustrates the future year 2024 peak hour turning movement volumes with In-Development conditions.
- Year 2030 In-Development conditions include traffic growth between 2019 and 2030 and represent the future baseline conditions without the Master Plan. This condition replaces the "No Action" condition in the January 2020 traffic impact analysis report. Figure 8 illustrates the future year peak hour turning movement volumes with 2030 In-Development conditions.
- Year 2030 Long-Term conditions include traffic growth between 2019 and 2030 and represent the full build-out of the Master Plan plus plans for additional CSTC beds and a new community RTF facility beyond the Master Plan. The 2030 Long-Term conditions assume the South Street driveway is closed. The Long-Term condition generates up to 9% more traffic than the Master Plan's Mid-Term conditions and for analysis purposes, are conservative. Figure 9 illustrates the future year peak hour turning movement volumes with 2030 Long-Term conditions.

The campus' updated existing and proposed bed-mixes change the distribution of trips to the campus driveways compared to the January 2020 traffic impact analysis report.

An overarching goal for Master Plan is to enhance access to and from the campus via Steilacoom Blvd. SW while minimizing vehicle impacts to and from Sentinel Drive and 87th Ave. SW via Golf Course Road. To enhance, or focus, access to Steilacoom Blvd. SW, the initial Master Plan improvement is to close the South Street driveway.

Other options being considered include additional restrictions to the West Street and Golf Couse Road driveways. Implications of other access restrictions are not documented in the traffic analysis findings below and will be explored as the Master Plan is developed and phased improvements are implemented. For reference, the Sentinel Drive campus accesses generate about 14% of the campus' AM peak hour trips and about 6% of the campus' PM peak hour trips. The Golf Course Road campus accesses generate about 2% of the campus' AM peak hour trips and about 8% of the campus' PM peak hour trips for the existing and future conditions.

Table 5: AM and PM Peak Hour Intersection LOS and Delay

Intersection	Control	2019 Existing		2024 In-Dev.		2030 In-Dev.		2030 Long-Term	
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
AM Peak Hour									
Sentinel Dr. / West St.	WB Stop	C	19.1	C	19.1	C	19.1	C	19.8
Sentinel Dr. / South St.	WB Stop	C	22.1	C	18.8	C	18.8	-	-
Sentinel Dr. / Steilacoom Blvd.	Signal	C	28.1	C	29.8	C	31.7	C	31.5
Chapel Gate Dr. / Steilacoom Blvd.	SB Stop	C	15.2	C	15.9	C	16.7	C	15.9
Circle Dr. / Steilacoom Blvd.	Signal	A	5.8	A	5.9	A	5.9	A	5.8
CSTC Entrance / Steilacoom Blvd.	SB Stop	F	52.7	F	84.3	F	105.2	F	74.0
87th Ave. / Steilacoom Blvd.	Signal	B	16.6	B	17.1	B	18.0	B	17.8
87th Ave. / Oakridge Group Home	EB Stop	B	10.9	B	11.1	B	11.3	B	11.3
87th Ave. / Golf Course Rd.	EB Stop	B	10.9	B	11.1	B	11.3	B	11.3
Kids First Pl. / Golf Course Rd.	NB Stop	A	8.3	A	8.3	A	8.3	A	8.3
PM Peak Hour									
Sentinel Dr. / West St.	WB Stop	B	11.3	B	11.3	B	11.3	B	11.3
Sentinel Dr. / South St.	WB Stop	B	10.8	B	10.8	B	10.8	-	-
Sentinel Dr. / Steilacoom Blvd.	Signal	C	33.4	C	34.5	D	35.9	D	35.9
Chapel Gate Dr. / Steilacoom Blvd.	SB Stop	D	32.8	E	36.9	E	43.4	E	39.9
Circle Dr. / Steilacoom Blvd.	Signal	B	17.7	B	17.4	B	17.5	B	17.8
CSTC Entrance / Steilacoom Blvd.	SB Stop	E	39.9	F	54.8	F	66.6	F	58.9
87th Ave. / Steilacoom Blvd.	Signal	B	18.8	B	19.5	C	20.1	C	20.0
87th Ave. / Oakridge Group Home	EB Stop	A	9.9	B	10.1	B	10.2	B	10.2
87th Ave. / Golf Course Rd.	EB Stop	B	10.6	B	10.9	B	11.2	B	11.1
Kids First Pl. / Golf Course Rd.	NB Stop	A	8.4	A	8.4	A	8.4	A	8.4

The study intersections are forecast to operate at LOS D or better and satisfy the City of Lakewood's intersection LOS threshold, except the Chapel Gate Drive and CSTC Entrance driveways off Steilacoom Blvd. SW.

- Chapel Gate Drive is stop-controlled approaching Steilacoom Blvd. SW from the north. In the AM peak hour, the driveway approach is calculated to operate at LOS C, under the 2019 Existing, 2024 In-Development, 2030 In-Development, and 2030 Long-Term conditions. In the PM peak hour, the driveway approach is calculated to operate at LOS D, under the 2019 Existing condition, and LOS E, under the 2024 In-Development, 2030 In-Development, and 2030 Long-Term conditions.
- CSTC Entrance stop-controlled approaching Steilacoom Blvd. SW from the north. In the AM peak hour, the driveway is calculated to operate at LOS F, under the 2019 Existing condition, 2024 In-Development, 2030 In-Development, and 2030 Long-Term conditions. In the PM peak hour, the driveway approach is calculated to operate at LOS E, under the 2019 Existing condition, and LOS F, under the 2024 In-Development, 2030 In-Development, and 2030 Long-Term conditions.

With the Master Plan, new facilities and parking are proposed nearer to the east and west boundaries of the campus which is forecast to increase the attractiveness of the Chapel Gate Drive and new CTST Entrance driveway and decrease the attractiveness of the Circle Drive driveway. Currently, as a signalized access Circle Drive attracts most of the campuses traffic.

Improving access at the Chapel Gate Drive and CSTS Entrance driveways would attract more campus traffic to these driveways and divert traffic away from Circle Drive.

Improvement Draft Analysis

The following provides analyses of possible improvement options for consideration with the Master Plan.

With the major central campus building remaining, improvement to the existing internal roadways spacings near Circle Drive are limited. These is more land available near the Chapel Gate Drive and new CSTS Entrance driveways for internal roadway improvements. Ultimately, by making access to the campus via Circle Drive less attractive, it is understood that the traffic control signal at Circle Drive could be removed.

The January 2020 traffic impact analysis report included signals at Chapel Gate Drive and new CSTS Entrance for analysis purposes. Other access improvements would be considered, short of restricting access to these two new “primary” driveways.

Table 6 compares the 2030 Long-Term AM and PM peak hour traffic operations with:

- Current Steilacoom Blvd. SW access configurations with Chapel Gate Drive and CSTC Entrance stop-sign controlled, and Circle Drive signalized.
- Chapel Gate Drive and CSTC Entrance controlled by traffic signals and Circle Drive stop-sign controlled and restricted to right-in and right-out movements.
- Chapel Gate Drive and CSTC Entrance widened for separate left-lane and right-turn lanes outbound from the site and acceleration lanes on Steilacoom Blvd. SW to facilitate left turn egress and Circle Drive stop-sign controlled and restricted to right-in and right-out movements.

Table 6: 2030 Long-Term Peak Hour Intersection LOS and Delay Steilacoom Blvd. SW Access Enhancements

Intersection	Current Controls			New Signal Controls			Stop-Control and Accel.		
	Control	LOS	Delay	Control	LOS	Delay	Control	LOS	Delay
AM Peak Hour									
Chapel Gate Dr. / Steilacoom Blvd.	SB Stop	C	15.9	Signal	A	5.9	SB Stop	C	22.9
Circle Dr. / Steilacoom Blvd.	Signal	A	5.8	SB Stop	B	11.9	SB Stop	B	11.9
CSTC Entrance / Steilacoom Blvd.	SB Stop	F	74.0	Signal	A	5.7	SB Stop	E	42.6
PM Peak Hour									
Chapel Gate Dr. / Steilacoom Blvd.	SB Stop	E	39.9	Signal	A	6.0	SB Stop	D	29.0
Circle Dr. / Steilacoom Blvd.	Signal	B	17.8	SB Stop	B	12.3	SB Stop	B	12.3
CSTC Entrance / Steilacoom Blvd.	SB Stop	F	58.9	Signal	A	6.0	SB Stop	D	31.4

Signals at Chapel Gate and CSTC Entrance

Signalizing both Chapel Gate Drive and CSTC Entrance driveways enhances access to the campus. Delays experienced at both driveways would be significantly reduced and the improvement allows vehicles to exit the campus at a controlled intersection, which is safer than the current configurations at both driveways. With new signalized accesses, Circle Drive is recommended to be stop-sign control and restricted to right-in and right-out movements only. As a right-in and right-out driveway, it is assumed that half of the Circle Drive driveway’s trips would shift to Chapel Gate Drive and CSTC Entrance.

Table 7 summarizes a travel time analysis on Steilacoom Blvd. SW with the current and new signal controls at the campus driveways. In the AM peak hour, the eastbound through traffic delay is forecast to increase by 4.5 seconds and the westbound through traffic delay is forecast to increase by 5.9 seconds. In the PM peak hour, the eastbound through traffic delay is forecast to decrease by 7.1 seconds and the westbound through traffic delay is forecast to decrease by 7.4 seconds.

Table 7: 2030 Long-Term Peak Hour Travel Time Estimate

Intersection	Current Controls			New Signal Controls		
	Control	Delay		Control	Delay	
AM Peak Hour		**WB Thru**	**EB Thru**		**WB Thru**	**EB Thru**
Sentinel Dr. / Steilacoom Blvd.	Signal	38.4	24.5	Signal	38.4	24.5
Chapel Gate Dr. / Steilacoom Blvd.	SB Stop	0.6	0.0	Signal	5.8	5.8
Circle Dr. / Steilacoom Blvd.	Signal	5.2	5.6	SB Stop	0.0	0.0
CSTC Entrance / Steilacoom Blvd.	SB Stop	0.5	0.0	Signal	5.0	5.7
87th Ave. / Steilacoom Blvd.	Signal	12.6	14.8	Signal	12.6	14.8
Sum of Through Delay	Total	57.3	44.9	Total	61.8	50.8
PM Peak Hour		**WB Thru**	**EB Thru**		**WB Thru**	**EB Thru**
Sentinel Dr. / Steilacoom Blvd.	Signal	46.7	31.5	Signal	46.7	30.9
Chapel Gate Dr. / Steilacoom Blvd.	SB Stop	0.0	0.0	Signal	5.6	5.9
Circle Dr. / Steilacoom Blvd.	Signal	18.5	18.5	SB Stop	0.0	0.0
CSTC Entrance / Steilacoom Blvd.	SB Stop	0.0	0.0	Signal	5.8	5.8
87th Ave. / Steilacoom Blvd.	Signal	15.3	18.5	Signal	15.3	18.5
Sum of Through Delay	Total	80.5	68.5	Total	73.4	61.1

Traffic control signals, or an equivalent improvement, have capacity to attract more campus traffic to the accesses Steilacoom Blvd. SW and reduce campus traffic impacts on Sentinel Way and 87th Ave. SW via Golf Course Road. Traffic signals will require a warrant justification to support their installation.

Widen Steilacoom Blvd. SW

Widening both Chapel Gate Road and CSTC Entrance driveways for separate left and right turn lanes exiting the site will allow right-turning vehicles to exit the site quicker; however, the outbound delay for left turning vehicles would not improve.

The non-signalized enhancement option above, shows the impacts on vehicle delay with widening on Steilacoom Blvd. SW for acceleration lanes at Chapel Gate Drive and CSTC Entrance and modifying Circle Drive with right-in and right-out stop-sign control.

Acceleration lanes allow vehicles to complete a two-stage left turn maneuver by navigating out of the campus across two westbound travel lanes and then using the acceleration lanes to merge into the eastbound traffic flow. With acceleration lanes, delays experienced at both driveways are reduced. The acceleration lanes also provide safer left turn maneuver than the current access controls at both driveways. This analysis shows that even with acceleration lanes the CSTC Entrance is still forecast to operate at LOS E in the AM peak hour.

Design of the acceleration lanes will require acquisition of right-of-way along Steilacoom Blvd. SW. Also, without other improvements to access control, it is unlikely that by simply adding the acceleration lanes would enhance access to the campus and draw more traffic away from Sentinel Drive and 87th Ave. SW via Golf Course Road.

Left Turn Lane Impacts

City staff recently commented on vehicle queue impacts on Steilacoom Blvd. SW approaching Sentinel Drive from the east and on 87th Ave. SW approaching Steilacoom Blvd. SW from the north.

The westbound left turn lane on Steilacoom Blvd. SW at Sentinel Drive is 200 feet with storage for about 8 vehicles. The 2019 Existing 95th-percentile queue 11.8 vehicles (AM peak hour) and 11.5 vehicles (PM peak hour) long. Under 2019 Existing conditions the peak hour queue exceeds the left turn storage by about 4 vehicle lengths, or roughly 100 feet. The 2030 Long-Term 95th-percentile queue 14.9 vehicles (AM peak hour) and 13.7 vehicles (PM peak hour) long. Under 2030 Long-Term conditions the peak hour queue exceeds the left turn storage by up to 7 vehicle lengths, or roughly 175 feet. The intersection is forecast to operate within the City of Lakewood's LOS standards and widening to expand vehicle storage area will need occur in cooperation with the City of Lakewood since right-of-way acquisition is likely.

The southbound left turn lane on 87th Ave. SW at Steilacoom Blvd. SW is 125 feet with storage for about 5 vehicles. The 2019 Existing 95th-percentile queue 5.4 vehicles (AM peak hour) and 3.9 vehicles (PM peak hour) long. Under 2019 Existing conditions the peak hour queue exceeds the left turn storage by about half a vehicle length, or roughly 10 feet. The 2030 Long-Term 95th-percentile queue 6.5 vehicles (AM peak hour) and 4.7 vehicles (PM peak hour) long. Under 2030 Long-Term conditions the peak hour queue exceeds the left turn storage by about 1.5 vehicle lengths, or roughly 40 feet. The intersection is forecast to operate within the City of Lakewood's LOS standards and widening to expand vehicle storage area may need to occur in cooperation with the City of Lakewood if right-of-way acquisition is required.

Conclusions

This supplemental analysis updates the trip generation forecast and campus trip distribution based on the updated bed mix and development areas from the January 2020 Traffic Impact Analysis report.

The updated trip forecasts are:

	Existing	In-Development	Near-Term (1-5 yrs.)	Mid-Term (6-10 yrs.)	Long-Term (beyond 10 yrs.)
AM Peak Hour	677 trips, 455 in and 222 out	768 trips, 516 in and 252 out	725 trips, 487 in and 238 out	587 trips, 395 in and 193 out	639 trips, 430 in and 210 out
PM Peak Hour	366 trips, 60 in and 306 out	415 trips, 68 in and 347 out	393 trips, 64 in and 328 out	318 trips, 52 in and 266 out	345 trips, 56 in and 289 out
Weekday Daily	6,046 trips, 50% in and 50% out	6,860 trips, 50% in and 50% out	6,474 trips, 50% in and 50% out	5,246 trips, 50% in and 50% out	5,709 trips, 50% in and 50% out

The analysis peak hours represent the times when traffic on the adjacent roadways are highest.

The In-Development conditions represent development currently allowed on the campus. The Near-Term and Mid-Term conditions represent development proposed allowed under the proposed Master Plan. The Long-Term conditions represent future development potential, beyond the Master Plan horizon. For this analysis, the In-Development conditions represent a future baseline where the proposed Master Plan is not implemented, and the Long-Term conditions represent the future Master Plan build-out. Both conditions ensure a conservative analysis of traffic impacts.

Traffic analysis of 2019 Existing, 2024 In-Development, 2030 In-Development and 2030 Long-Term AM and PM peak hour traffic conditions shows that all of the study intersections operate at LOS D or better except the site accesses at Chapel Gate Drive and CSTC Entrance on Steilacoom Blvd. SW. Both accesses are forecast to operate at LOS E or LOS F now and in the future.

Improvements to campus accesses are recommended to enhance access at Steilacoom Blvd. SW and reduce campus traffic impacts to Sentinel Drive and 87th Ave. SW via Golf Course Road. With the Master Plan, the existing South Street driveway is proposed to be removed.

Other access restrictions on Sentinel Drive and on Golf Course Road, may be explored as improvements are allowed and completed on Steilacoom Blvd. SW.

With the proposed Master Plan, new facilities and parking are proposed at the east and west edges of the campus, which would allow traffic to shift from Circle Drive to Chapel Gate Drive and CSTC Entrance driveways.

Driveway improvements explored above include signals at Chapel Gate Drive and CSTC Entrance, widening Steilacoom Blvd. SW for acceleration lanes, and removing the signal at Circle Drive and replacing it with stop-control and right-in and right-out restrictions. Other options are open for consideration and we look forward to working with city staff to address their recommendations under the constraints on the Master Plan proposal.

If you have any questions, please feel free to contact me at your convenience.

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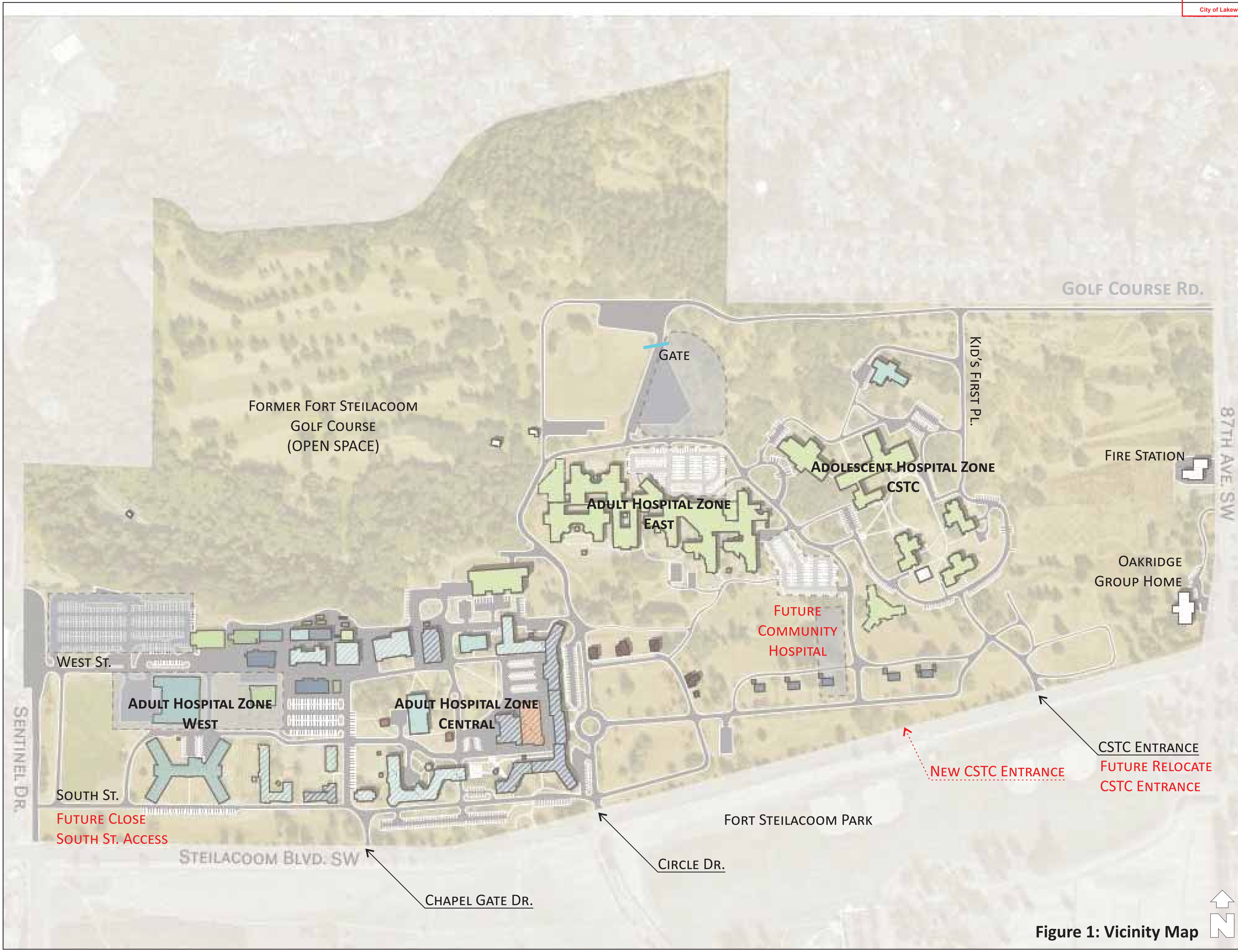

Figure 1: Vicinity Map

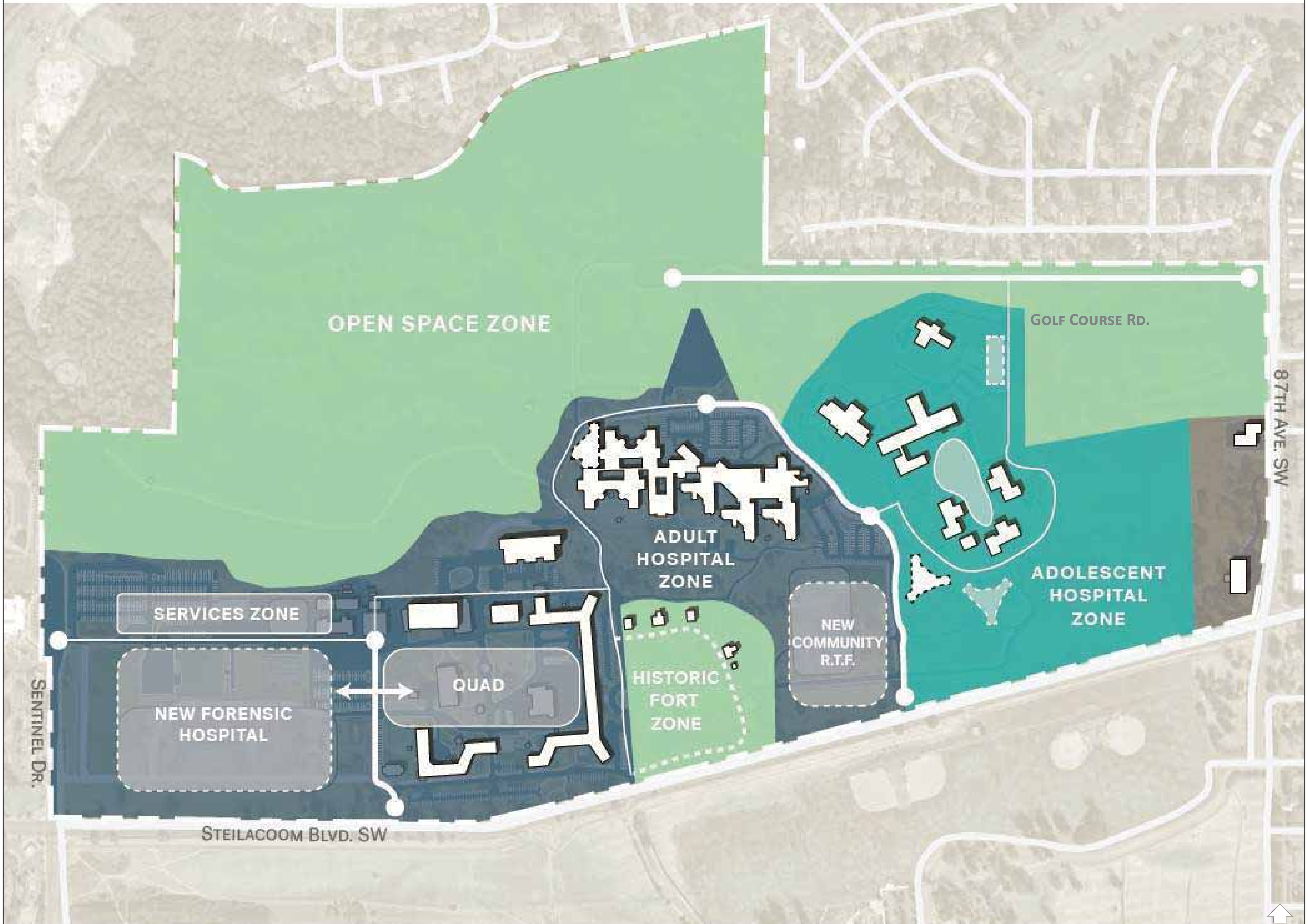

Figure 2: Master Plan Site Plan

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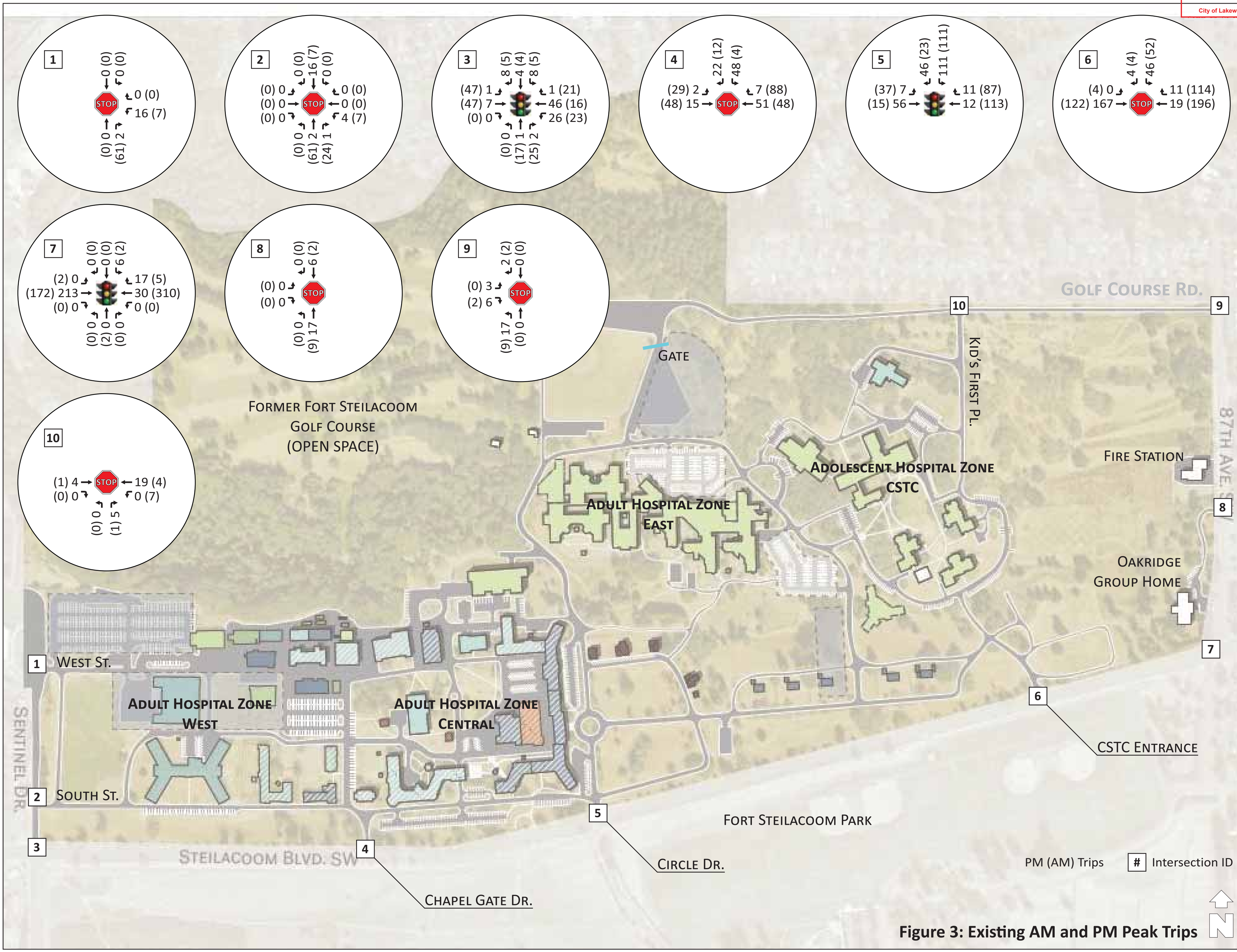

Figure 3: Existing AM and PM Peak Trips

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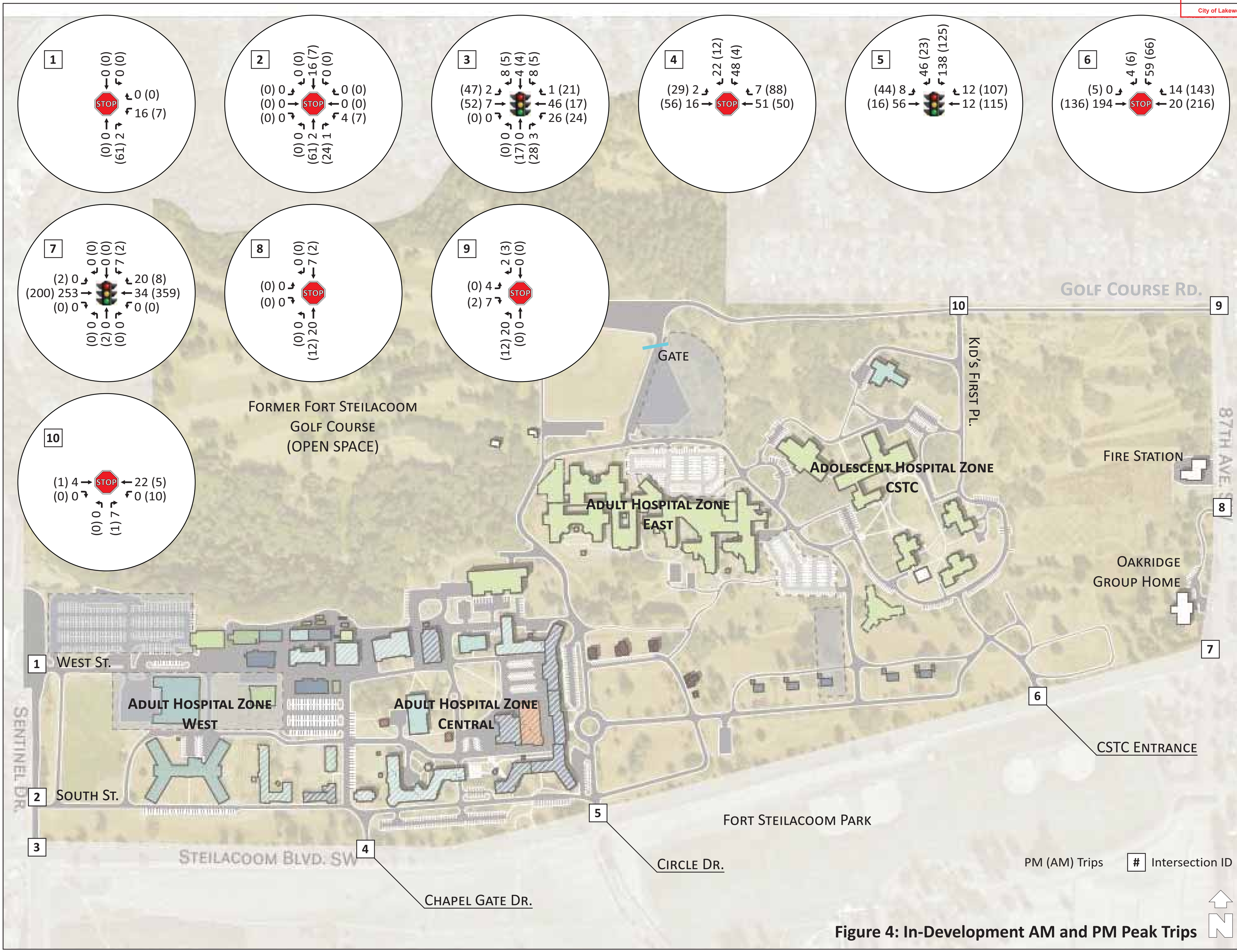


Figure 4: In-Development AM and PM Peak Trips

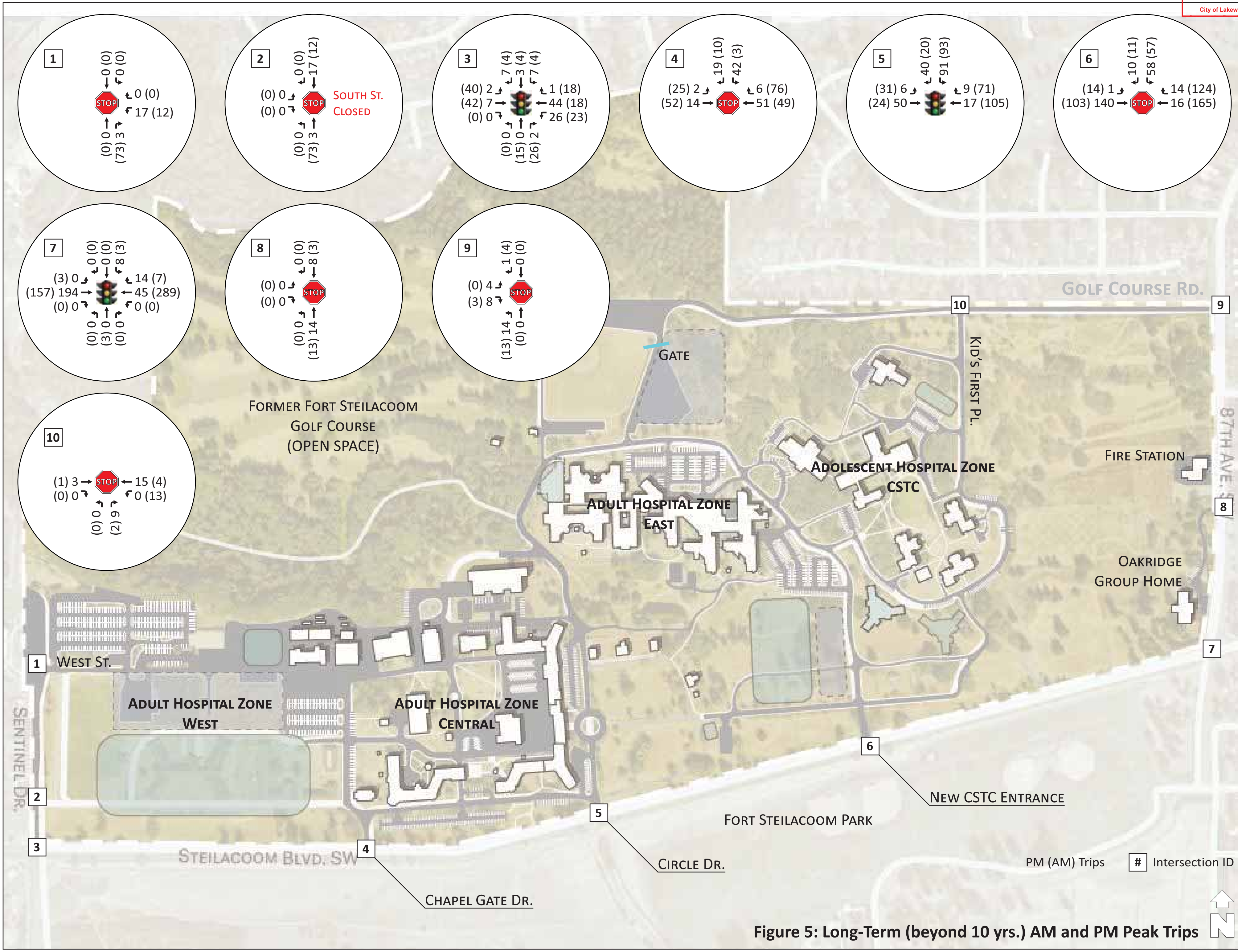


Figure 5: Long-Term (beyond 10 yrs.) AM and PM Peak Trips

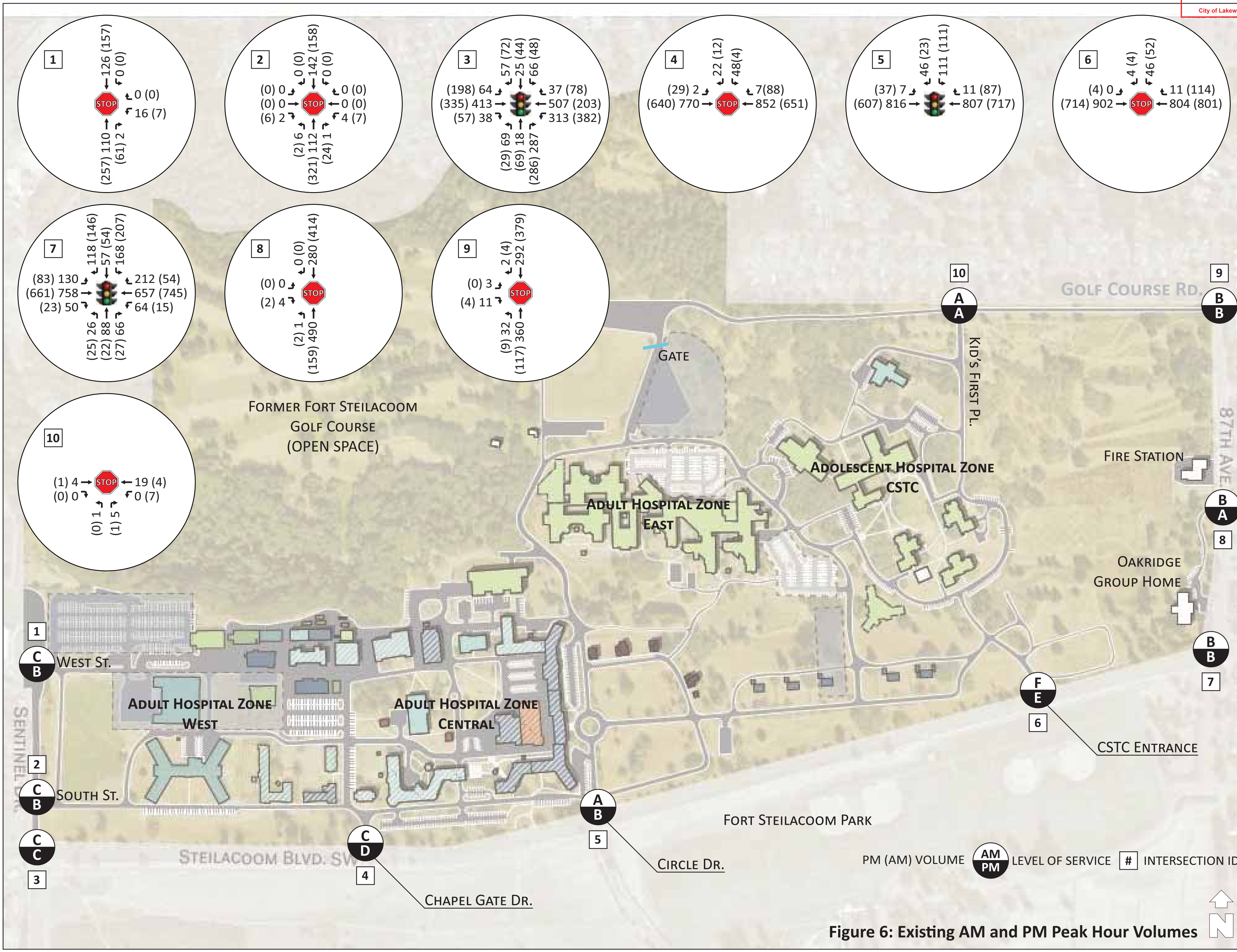


Figure 6: Existing AM and PM Peak Hour Volumes

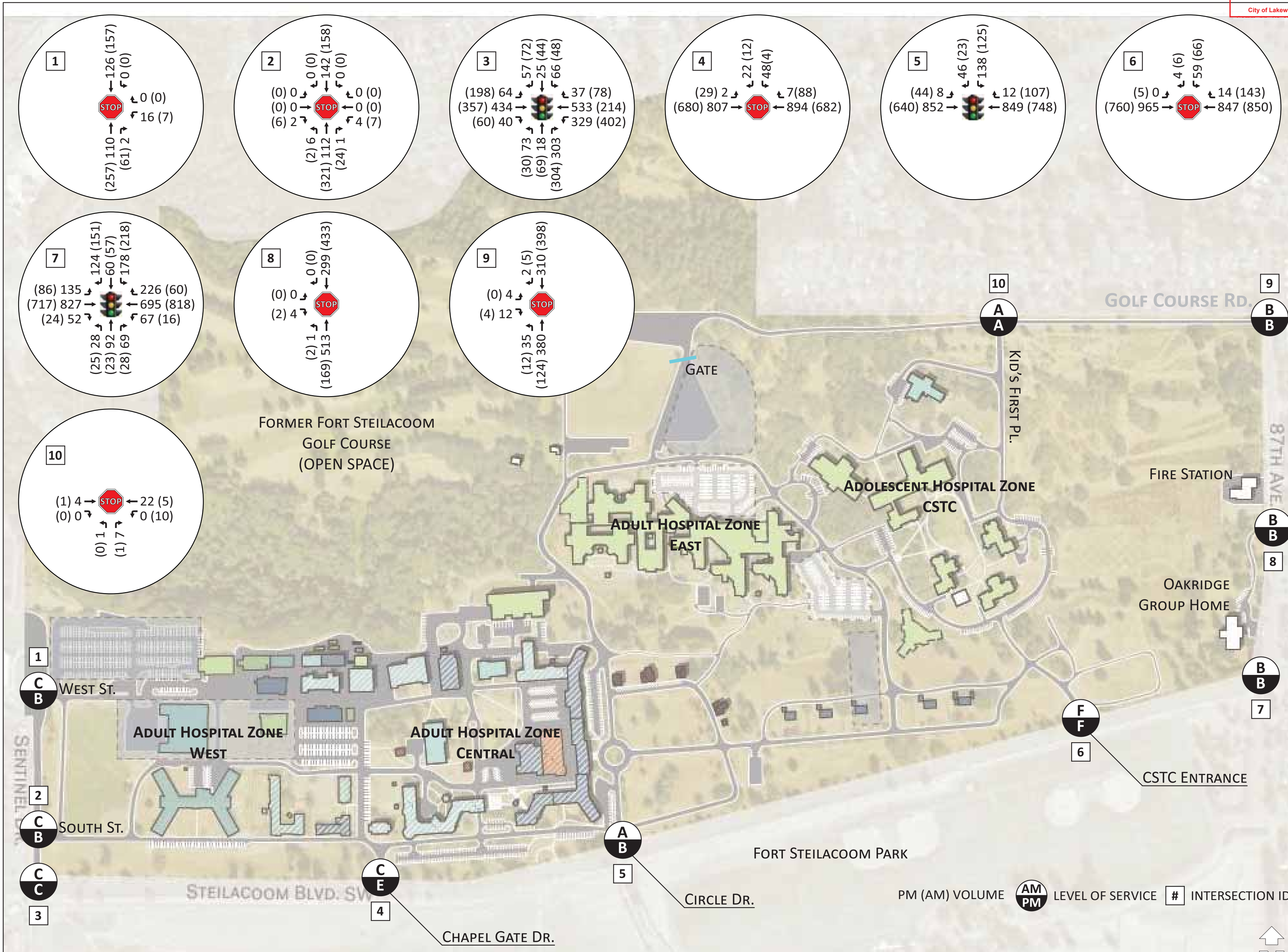


Figure 7: 2024 In-Development AM and PM Peak Hour Volumes

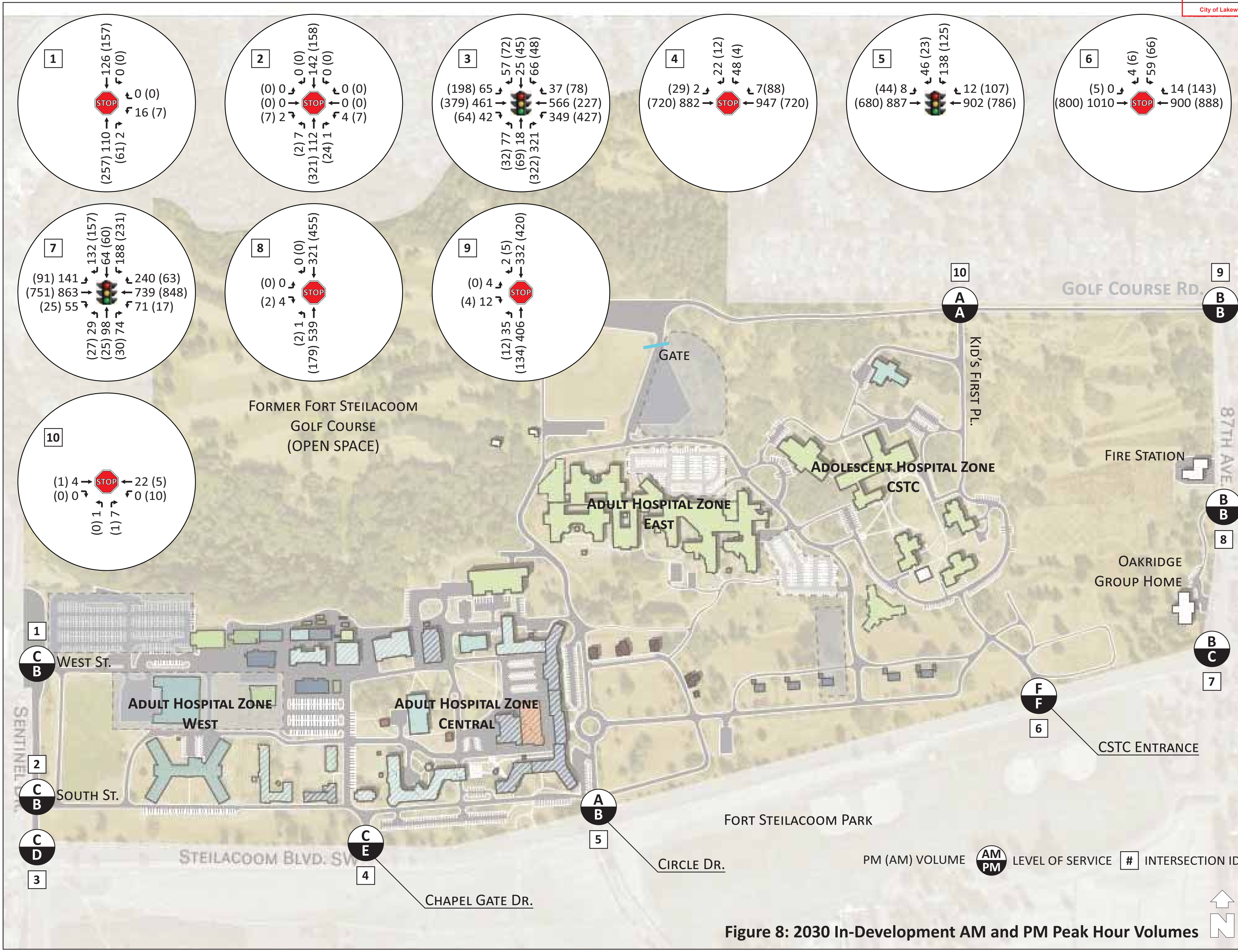


Figure 8: 2030 In-Development AM and PM Peak Hour Volumes

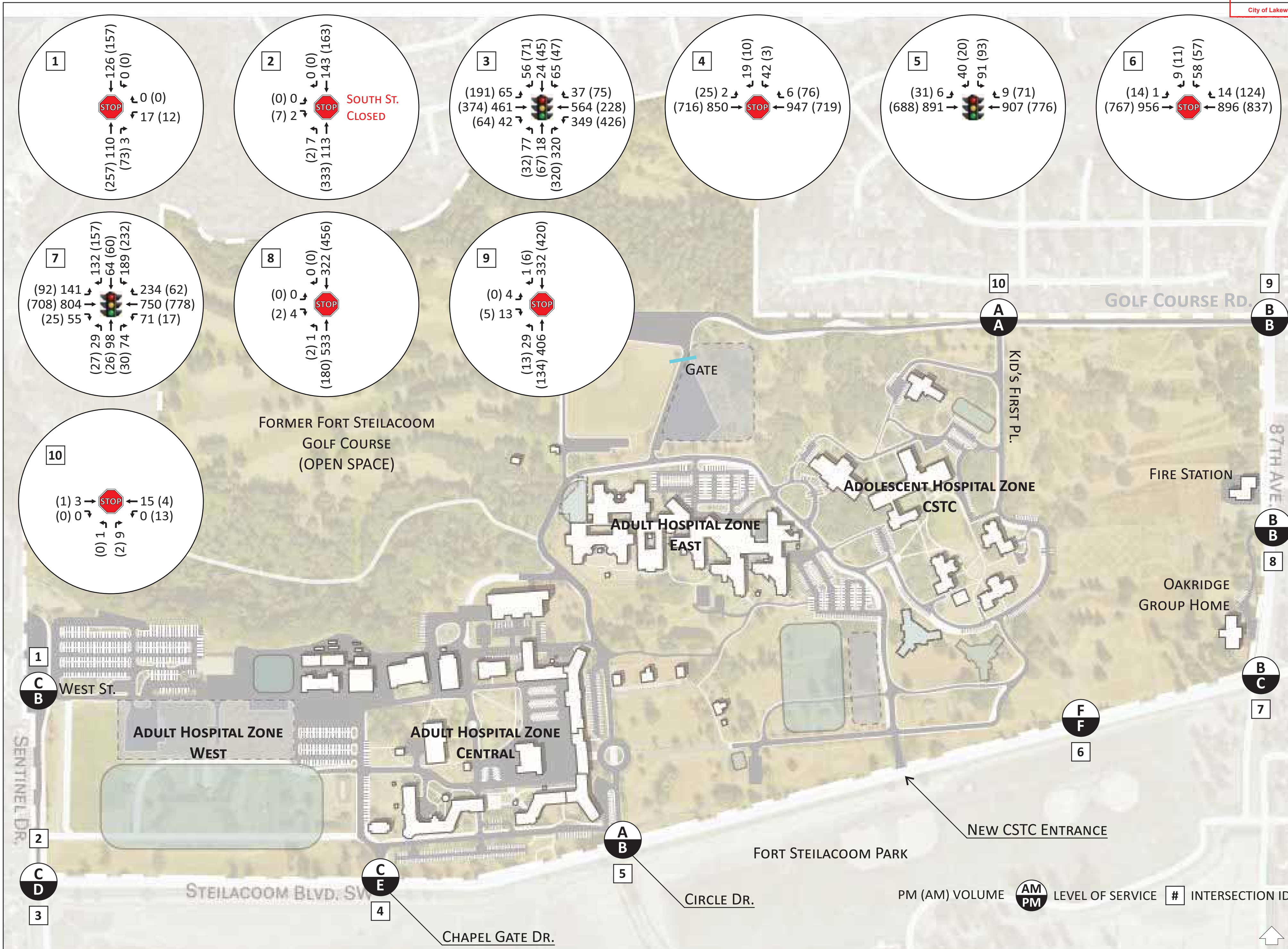


Figure 9: 2030 Long-Term AM and PM Peak Hour Volumes

Intersection						
Int Delay, s/veh	0.3					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	0	257	61	0	157
Future Vol, veh/h	7	0	257	61	0	157
Conflicting Peds, #/hr	0	0	0	50	50	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	54	54	54	54	54	54
Heavy Vehicles, %	33	0	2	2	0	0
Mvmt Flow	13	0	476	113	0	291

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	874	583	0	0	639	0
Stage 1	583	-	-	-	-	-
Stage 2	291	-	-	-	-	-
Critical Hdwy	6.73	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.73	-	-	-	-	-
Critical Hdwy Stg 2	5.73	-	-	-	-	-
Follow-up Hdwy	3.797	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	283	516	-	-	955	-
Stage 1	502	-	-	-	-	-
Stage 2	693	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	269	491	-	-	910	-
Mov Cap-2 Maneuver	269	-	-	-	-	-
Stage 1	478	-	-	-	-	-
Stage 2	693	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	269	910	-
HCM Lane V/C Ratio	-	-	0.048	-	-
HCM Control Delay (s)	-	-	19.1	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	6	7	0	0	2	321	24	0	158	0
Future Vol, veh/h	0	0	6	7	0	0	2	321	24	0	158	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	50	50	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	54	92	54	92	54	54	54	54	92
Heavy Vehicles, %	2	2	2	0	2	0	2	2	0	0	33	2
Mvmt Flow	0	0	7	13	0	0	2	594	44	0	293	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	913	985	293	967	963	666	293	0	0	688	0	0
Stage 1	293	293	-	670	670	-	-	-	-	-	-	-
Stage 2	620	692	-	297	293	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.1	6.52	6.2	4.12	-	-	4.1	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.1	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.1	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.5	4.018	3.3	2.218	-	-	2.2	-	-
Pot Cap-1 Maneuver	254	248	746	236	256	463	1269	-	-	916	-	-
Stage 1	715	670	-	450	455	-	-	-	-	-	-	-
Stage 2	476	445	-	716	670	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	253	236	746	223	243	441	1269	-	-	872	-	-
Mov Cap-2 Maneuver	253	236	-	223	243	-	-	-	-	-	-	-
Stage 1	714	670	-	428	432	-	-	-	-	-	-	-
Stage 2	475	423	-	710	670	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.9	22.1	0	0
HCM LOS	A	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1269	-	-	746	223	872	-	-
HCM Lane V/C Ratio	0.002	-	-	0.009	0.058	-	-	-
HCM Control Delay (s)	7.8	0	-	9.9	22.1	0	-	-
HCM Lane LOS	A	A	-	A	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.2	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	198	335	57	382	203	78	29	69	286	48	44	72
Future Volume (veh/h)	198	335	57	382	203	78	29	69	286	48	44	72
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		0.97	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	1856	1856	1856	1870	1870	1870	1870	1870	1870	1767	1767	1767
Adj Flow Rate, veh/h	233	394	67	449	239	92	34	81	336	56	52	85
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, %	3	3	3	2	2	2	2	2	2	9	9	9
Cap, veh/h	573	908	153	585	965	361	345	363	599	217	77	125
Arrive On Green	0.11	0.30	0.30	0.19	0.38	0.38	0.19	0.19	0.19	0.13	0.13	0.13
Sat Flow, veh/h	1767	3009	507	1781	2529	946	1781	1870	1543	1682	593	969
Grp Volume(v), veh/h	233	229	232	449	166	165	34	81	336	56	0	137
Grp Sat Flow(s),veh/h/ln	1767	1763	1753	1781	1777	1699	1781	1870	1543	1682	0	1562
Q Serve(g_s), s	9.6	11.2	11.4	17.8	6.8	7.2	1.7	3.9	18.5	3.2	0.0	9.0
Cycle Q Clear(g_c), s	9.6	11.2	11.4	17.8	6.8	7.2	1.7	3.9	18.5	3.2	0.0	9.0
Prop In Lane	1.00		0.29	1.00		0.56	1.00		1.00	1.00		0.62
Lane Grp Cap(c), veh/h	573	532	529	585	678	648	345	363	599	217	0	202
V/C Ratio(X)	0.41	0.43	0.44	0.77	0.24	0.25	0.10	0.22	0.56	0.26	0.00	0.68
Avail Cap(c_a), veh/h	627	532	529	729	678	648	365	383	615	423	0	393
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	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.5	30.1	30.2	18.9	22.7	22.8	35.6	36.5	26.2	42.1	0.0	44.6
Incr Delay (d2), s/veh	0.2	2.5	2.6	2.9	0.9	0.9	0.0	0.1	0.6	0.2	0.0	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	7.0	8.7	8.8	11.8	5.3	5.4	1.3	3.2	10.9	2.5	0.0	6.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.7	32.6	32.8	21.8	23.5	23.7	35.6	36.6	26.8	42.4	0.0	46.1
LnGrp LOS	C	C	C	C	C	C	D	D	C	D	A	D
Approach Vol, veh/h		694			780			451			193	
Approach Delay, s/veh		29.0			22.6			29.2			45.0	
Approach LOS		C			C			C			D	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		25.8	25.3	37.4		18.9	16.7	46.0				
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0				
Max Green Setting (Gmax), s		22.0	29.0	27.0		27.0	15.0	41.0				
Max Q Clear Time (g_c+I1), s		20.5	19.8	13.4		11.0	11.6	9.2				
Green Ext Time (p_c), s		0.2	0.5	1.5		0.5	0.1	1.2				
Intersection Summary												
HCM 6th Ctrl Delay			28.1									
HCM 6th LOS			C									

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	29	640	651	88	4	12
Future Vol, veh/h	29	640	651	88	4	12
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	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	8	8
Mvmt Flow	31	681	693	94	4	13

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	787	0	-	0	1143	394
Stage 1	-	-	-	-	740	-
Stage 2	-	-	-	-	403	-
Critical Hdwy	4.14	-	-	-	6.96	7.06
Critical Hdwy Stg 1	-	-	-	-	5.96	-
Critical Hdwy Stg 2	-	-	-	-	5.96	-
Follow-up Hdwy	2.22	-	-	-	3.58	3.38
Pot Cap-1 Maneuver	828	-	-	-	185	588
Stage 1	-	-	-	-	417	-
Stage 2	-	-	-	-	626	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	828	-	-	-	174	588
Mov Cap-2 Maneuver	-	-	-	-	174	-
Stage 1	-	-	-	-	392	-
Stage 2	-	-	-	-	626	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	15.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	828	-	-	-	369
HCM Lane V/C Ratio	0.037	-	-	-	0.046
HCM Control Delay (s)	9.5	0.3	-	-	15.2
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	37	607	717	87	111	23
Future Volume (veh/h)	37	607	717	87	111	23
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	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	41	674	797	97	123	26
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	192	1480	1454	177	282	60
Arrive On Green	0.46	0.46	0.46	0.46	0.19	0.19
Sat Flow, veh/h	80	3331	3283	388	1453	307
Grp Volume(v), veh/h	372	343	444	450	150	0
Grp Sat Flow(s),veh/h/ln	1709	1617	1777	1801	1772	0
Q Serve(g_s), s	0.0	3.8	4.7	4.7	1.9	0.0
Cycle Q Clear(g_c), s	3.5	3.8	4.7	4.7	1.9	0.0
Prop In Lane	0.11			0.22	0.82	0.17
Lane Grp Cap(c), veh/h	934	737	810	821	344	0
V/C Ratio(X)	0.40	0.47	0.55	0.55	0.44	0.00
Avail Cap(c_a), veh/h	1576	1414	1554	1575	1343	0
HCM Platoon Ratio	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	0.00
Uniform Delay (d), s/veh	4.8	4.8	5.1	5.1	9.1	0.0
Incr Delay (d2), s/veh	0.3	0.5	0.6	0.6	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.8	0.8	1.1	1.1	1.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	5.0	5.3	5.7	5.7	10.0	0.0
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h		715	894		150	
Approach Delay, s/veh		5.2	5.7		10.0	
Approach LOS		A	A		A	

Timer - Assigned Phs	4	6	8
Phs Duration (G+Y+Rc), s	16.2	9.5	16.2
Change Period (Y+Rc), s	4.5	4.5	4.5
Max Green Setting (Gmax), s	22.5	19.5	22.5
Max Q Clear Time (g_c+I1), s	5.8	3.9	6.7
Green Ext Time (p_c), s	4.2	0.3	5.1

Intersection Summary	
HCM 6th Ctrl Delay	5.8
HCM 6th LOS	A

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	714	801	114	52	4
Future Vol, veh/h	4	714	801	114	52	4
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	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	0	0
Mvmt Flow	5	821	921	131	60	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1052	0	-	0	1408	526
Stage 1	-	-	-	-	987	-
Stage 2	-	-	-	-	421	-
Critical Hdwy	4.14	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.22	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	657	-	-	-	132	502
Stage 1	-	-	-	-	326	-
Stage 2	-	-	-	-	636	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	657	-	-	-	130	502
Mov Cap-2 Maneuver	-	-	-	-	130	-
Stage 1	-	-	-	-	321	-
Stage 2	-	-	-	-	636	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	52.7
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	657	-	-	-	137
HCM Lane V/C Ratio	0.007	-	-	-	0.47
HCM Control Delay (s)	10.5	0.1	-	-	52.7
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	83	661	23	15	745	54	25	22	27	207	54	146
Future Volume (veh/h)	83	661	23	15	745	54	25	22	27	207	54	146
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	0.98		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	1870	1870	1870	1870	1870	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	90	718	25	16	810	0	27	24	29	225	59	159
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, %	2	2	2	2	2	2	1	1	1	1	1	1
Cap, veh/h	115	1700	59	35	1563		201	214	186	387	308	269
Arrive On Green	0.06	0.49	0.49	0.02	0.44	0.00	0.03	0.12	0.12	0.08	0.17	0.17
Sat Flow, veh/h	1781	3503	122	1781	3647	0	1795	1791	1561	1795	1791	1563
Grp Volume(v), veh/h	90	364	379	16	810	0	27	24	29	225	59	159
Grp Sat Flow(s),veh/h/ln	1781	1777	1848	1781	1777	0	1795	1791	1561	1795	1791	1563
Q Serve(g_s), s	3.1	8.1	8.1	0.5	10.1	0.0	0.0	0.7	1.0	0.0	1.7	5.8
Cycle Q Clear(g_c), s	3.1	8.1	8.1	0.5	10.1	0.0	0.0	0.7	1.0	0.0	1.7	5.8
Prop In Lane	1.00		0.07	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	115	862	897	35	1563		201	214	186	387	308	269
V/C Ratio(X)	0.78	0.42	0.42	0.46	0.52		0.13	0.11	0.16	0.58	0.19	0.59
Avail Cap(c_a), veh/h	189	862	897	145	1563		293	829	723	388	832	726
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.3	10.2	10.2	29.8	12.5	0.0	28.0	24.1	24.2	24.3	21.8	23.4
Incr Delay (d2), s/veh	4.3	1.5	1.5	3.5	1.2	0.0	0.1	0.1	0.1	1.5	0.1	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	2.4	5.3	5.5	0.5	6.6	0.0	0.7	0.5	0.7	5.4	1.3	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.5	11.7	11.7	33.3	13.7	0.0	28.1	24.2	24.4	25.8	21.9	24.2
LnGrp LOS	C	B	B	C	B		C	C	C	C	C	C
Approach Vol, veh/h		833			826	A		80			443	
Approach Delay, s/veh		14.0			14.1			25.6			24.7	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.6	11.8	5.7	34.3	6.3	15.1	8.5	31.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	28.4	5.0	28.5	5.0	28.5	6.5	27.0
Max Q Clear Time (g_c+I1), s	2.0	3.0	2.5	10.1	2.0	7.8	5.1	12.1
Green Ext Time (p_c), s	0.1	0.1	0.0	2.7	0.0	0.8	0.0	3.3

Intersection Summary	
HCM 6th Ctrl Delay	16.6
HCM 6th LOS	B

Notes

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

Intersection						
Int Delay, s/veh	0.1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	2	2	159	414	0
Future Vol, veh/h	0	2	2	159	414	0
Conflicting Peds, #/hr	0	1	6	0	0	6
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	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	4	1	0
Mvmt Flow	0	2	2	169	440	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	619	447	446	0	-	0
Stage 1	446	-	-	-	-	-
Stage 2	173	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	455	616	1125	-	-	-
Stage 1	649	-	-	-	-	-
Stage 2	862	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	449	612	1119	-	-	-
Mov Cap-2 Maneuver	530	-	-	-	-	-
Stage 1	644	-	-	-	-	-
Stage 2	857	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.9	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1119	-	612	-	-
HCM Lane V/C Ratio	0.002	-	0.003	-	-
HCM Control Delay (s)	8.2	0	10.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	4	9	117	379	4
Future Vol, veh/h	0	4	9	117	379	4
Conflicting Peds, #/hr	0	1	5	0	0	5
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	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	5	10	133	431	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	592	440	441	0	-	0
Stage 1	439	-	-	-	-	-
Stage 2	153	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	469	617	1119	-	-	-
Stage 1	650	-	-	-	-	-
Stage 2	875	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	460	613	1114	-	-	-
Mov Cap-2 Maneuver	534	-	-	-	-	-
Stage 1	640	-	-	-	-	-
Stage 2	871	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.9	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1114	-	613	-	-
HCM Lane V/C Ratio	0.009	-	0.007	-	-
HCM Control Delay (s)	8.3	0	10.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	4.5					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1	0	7	4	0	1
Future Vol, veh/h	1	0	7	4	0	1
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	54	54	54	54	54	54
Heavy Vehicles, %	17	0	0	0	0	2
Mvmt Flow	2	0	13	7	0	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	2	0	35	2
Stage 1	-	-	-	-	2	-
Stage 2	-	-	-	-	33	-
Critical Hdwy	-	-	4.1	-	6.4	6.22
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.318
Pot Cap-1 Maneuver	-	-	1634	-	983	1082
Stage 1	-	-	-	-	1026	-
Stage 2	-	-	-	-	995	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1634	-	975	1082
Mov Cap-2 Maneuver	-	-	-	-	975	-
Stage 1	-	-	-	-	1026	-
Stage 2	-	-	-	-	987	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.6	8.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1082	-	-	1634	-
HCM Lane V/C Ratio	0.002	-	-	0.008	-
HCM Control Delay (s)	8.3	-	-	7.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	0	110	2	0	126
Future Vol, veh/h	16	0	110	2	0	126
Conflicting Peds, #/hr	0	0	0	20	20	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	63	63	63	63	63	63
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	25	0	175	3	0	200

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	397	197	0	0	198	0
Stage 1	197	-	-	-	-	-
Stage 2	200	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	612	849	-	-	1387	-
Stage 1	841	-	-	-	-	-
Stage 2	838	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	600	833	-	-	1361	-
Mov Cap-2 Maneuver	600	-	-	-	-	-
Stage 1	825	-	-	-	-	-
Stage 2	838	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.3	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	600	1361	-
HCM Lane V/C Ratio	-	-	0.042	-	-
HCM Control Delay (s)	-	-	11.3	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	0	112	1	0	142
Future Vol, veh/h	4	0	112	1	0	142
Conflicting Peds, #/hr	0	0	0	20	20	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	74	74	74	74	74	74
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	5	0	151	1	0	192

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	364	172	0	0	172	0
Stage 1	172	-	-	-	-	-
Stage 2	192	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	639	877	-	-	1417	-
Stage 1	863	-	-	-	-	-
Stage 2	845	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	627	860	-	-	1390	-
Mov Cap-2 Maneuver	627	-	-	-	-	-
Stage 1	847	-	-	-	-	-
Stage 2	845	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	627	1390	-
HCM Lane V/C Ratio	-	-	0.009	-	-
HCM Control Delay (s)	-	-	10.8	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	413	38	313	507	37	69	18	287	66	25	57
Future Volume (veh/h)	64	413	38	313	507	37	69	18	287	66	25	57
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		0.99	1.00		0.98	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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	69	444	41	337	545	40	74	19	309	71	27	61
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	330	808	74	454	1206	88	630	662	795	139	39	89
Arrive On Green	0.04	0.24	0.24	0.15	0.36	0.36	0.35	0.35	0.35	0.08	0.08	0.08
Sat Flow, veh/h	1795	3310	304	1795	3382	248	1795	1885	1567	1795	506	1143
Grp Volume(v), veh/h	69	239	246	337	288	297	74	19	309	71	0	88
Grp Sat Flow(s),veh/h/ln	1795	1791	1823	1795	1791	1839	1795	1885	1567	1795	0	1649
Q Serve(g_s), s	3.3	13.4	13.5	15.6	14.2	14.3	3.2	0.8	14.0	4.4	0.0	6.0
Cycle Q Clear(g_c), s	3.3	13.4	13.5	15.6	14.2	14.3	3.2	0.8	14.0	4.4	0.0	6.0
Prop In Lane	1.00		0.17	1.00		0.13	1.00		1.00	1.00		0.69
Lane Grp Cap(c), veh/h	330	437	445	454	639	655	630	662	795	139	0	128
V/C Ratio(X)	0.21	0.55	0.55	0.74	0.45	0.45	0.12	0.03	0.39	0.51	0.00	0.69
Avail Cap(c_a), veh/h	334	437	445	475	639	655	630	662	795	422	0	387
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	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.6	37.9	38.0	25.9	28.4	28.4	25.2	24.5	17.6	50.9	0.0	51.7
Incr Delay (d2), s/veh	0.1	4.9	4.9	5.1	2.3	2.3	0.4	0.1	1.4	1.1	0.0	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	2.6	10.6	10.8	11.5	10.5	10.8	2.6	0.6	8.9	3.6	0.0	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.7	42.8	42.9	31.0	30.7	30.6	25.6	24.5	19.0	52.0	0.0	54.1
LnGrp LOS	C	D	D	C	C	C	C	C	B	D	A	D
Approach Vol, veh/h		554			922			402			159	
Approach Delay, s/veh		41.3			30.8			20.5			53.2	
Approach LOS		D			C			C			D	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		45.4	22.6	33.1		13.9	9.7	46.0				
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0				
Max Green Setting (Gmax), s		22.0	19.0	27.0		27.0	5.0	41.0				
Max Q Clear Time (g_c+I1), s		16.0	17.6	15.5		8.0	5.3	16.3				
Green Ext Time (p_c), s		0.4	0.1	1.4		0.4	0.0	2.2				

Intersection Summary			
HCM 6th Ctrl Delay			33.4
HCM 6th LOS			C

Intersection						
Int Delay, s/veh	1.3					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	770	852	7	48	22
Future Vol, veh/h	2	770	852	7	48	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	96	96	96	96	96	96
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	2	802	888	7	50	23

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	895	0	-	0	1297	448
Stage 1	-	-	-	-	892	-
Stage 2	-	-	-	-	405	-
Critical Hdwy	4.12	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.21	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	760	-	-	-	156	564
Stage 1	-	-	-	-	366	-
Stage 2	-	-	-	-	648	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	760	-	-	-	155	564
Mov Cap-2 Maneuver	-	-	-	-	155	-
Stage 1	-	-	-	-	364	-
Stage 2	-	-	-	-	648	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	32.8
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	760	-	-	-	201
HCM Lane V/C Ratio	0.003	-	-	-	0.363
HCM Control Delay (s)	9.8	0	-	-	32.8
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	1.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	816	807	11	111	46
Future Volume (veh/h)	7	816	807	11	111	46
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	0.99
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	1885	1885	1885	1885	1900	1900
Adj Flow Rate, veh/h	7	859	849	12	117	48
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	1	0	0
Cap, veh/h	66	1160	1201	17	629	258
Arrive On Green	0.33	0.33	0.33	0.33	0.51	0.51
Sat Flow, veh/h	8	3579	3710	51	1227	503
Grp Volume(v), veh/h	463	403	420	441	166	0
Grp Sat Flow(s),veh/h/ln	1871	1630	1791	1876	1741	0
Q Serve(g_s), s	0.0	12.7	11.9	11.9	3.0	0.0
Cycle Q Clear(g_c), s	12.6	12.7	11.9	11.9	3.0	0.0
Prop In Lane	0.02			0.03	0.70	0.29
Lane Grp Cap(c), veh/h	684	541	595	623	893	0
V/C Ratio(X)	0.68	0.74	0.71	0.71	0.19	0.00
Avail Cap(c_a), veh/h	976	801	880	922	893	0
HCM Platoon Ratio	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	0.00
Uniform Delay (d), s/veh	17.2	17.2	16.9	16.9	7.6	0.0
Incr Delay (d2), s/veh	1.2	2.1	1.6	1.5	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.6	7.9	7.9	8.2	1.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	18.3	19.3	18.5	18.4	8.1	0.0
LnGrp LOS	B	B	B	B	A	A
Approach Vol, veh/h		866	861		166	
Approach Delay, s/veh		18.8	18.4		8.1	
Approach LOS		B	B		A	

Timer - Assigned Phs	4	6	8
Phs Duration (G+Y+Rc), s	23.8	34.2	23.8
Change Period (Y+Rc), s	4.5	4.5	4.5
Max Green Setting (Gmax), s	28.5	20.5	28.5
Max Q Clear Time (g_c+I1), s	14.7	5.0	13.9
Green Ext Time (p_c), s	4.5	0.4	4.6

Intersection Summary	
HCM 6th Ctrl Delay	17.7
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	902	804	11	46	4
Future Vol, veh/h	0	902	804	11	46	4
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	94	94	94	94	94	94
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	0	960	855	12	49	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	867	0	-	0	1341	434
Stage 1	-	-	-	-	861	-
Stage 2	-	-	-	-	480	-
Critical Hdwy	4.12	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.21	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	779	-	-	-	146	576
Stage 1	-	-	-	-	379	-
Stage 2	-	-	-	-	594	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	779	-	-	-	146	576
Mov Cap-2 Maneuver	-	-	-	-	146	-
Stage 1	-	-	-	-	379	-
Stage 2	-	-	-	-	594	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	39.9
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	779	-	-	-	155
HCM Lane V/C Ratio	-	-	-	-	0.343
HCM Control Delay (s)	0	-	-	-	39.9
HCM Lane LOS	A	-	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	758	50	64	657	212	26	88	66	168	57	118
Future Volume (veh/h)	130	758	50	64	657	212	26	88	66	168	57	118
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	0.99		0.95	0.99		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	1885	1885	1885	1885	1885	1900	1900	1900	1885	1885	1885
Adj Flow Rate, veh/h	135	790	52	67	684	0	27	92	69	175	59	123
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	1	1	1
Cap, veh/h	171	1567	103	97	1498		295	261	175	353	319	277
Arrive On Green	0.10	0.46	0.46	0.05	0.42	0.00	0.03	0.13	0.13	0.08	0.18	0.18
Sat Flow, veh/h	1795	3411	224	1795	3676	0	1810	2025	1359	1795	1791	1555
Grp Volume(v), veh/h	135	415	427	67	684	0	27	81	80	175	59	123
Grp Sat Flow(s),veh/h/ln	1795	1791	1844	1795	1791	0	1810	1805	1578	1795	1791	1555
Q Serve(g_s), s	4.7	10.5	10.5	2.4	8.9	0.0	0.8	2.6	3.0	5.1	1.8	4.6
Cycle Q Clear(g_c), s	4.7	10.5	10.5	2.4	8.9	0.0	0.8	2.6	3.0	5.1	1.8	4.6
Prop In Lane	1.00		0.12	1.00		0.00	1.00		0.86	1.00		1.00
Lane Grp Cap(c), veh/h	171	823	847	97	1498		295	232	203	353	319	277
V/C Ratio(X)	0.79	0.50	0.50	0.69	0.46		0.09	0.35	0.39	0.50	0.19	0.44
Avail Cap(c_a), veh/h	214	823	847	181	1498		381	760	665	353	757	657
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.6	12.3	12.3	30.0	13.5	0.0	23.2	25.7	25.8	22.2	22.6	23.7
Incr Delay (d2), s/veh	11.2	2.2	2.1	3.2	1.0	0.0	0.0	0.3	0.5	0.4	0.1	0.4
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	4.4	7.3	7.5	1.9	6.0	0.0	0.6	2.0	2.0	3.9	1.3	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.7	14.5	14.4	33.2	14.5	0.0	23.3	26.0	26.3	22.6	22.7	24.1
LnGrp LOS	D	B	B	C	B		C	C	C	C	C	C
Approach Vol, veh/h		977			751	A		188			357	
Approach Delay, s/veh		17.9			16.2			25.7			23.1	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.6	12.8	8.0	34.2	6.4	16.0	10.7	31.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	27.2	6.5	28.2	5.0	27.3	7.7	27.0
Max Q Clear Time (g_c+I1), s	7.1	5.0	4.4	12.5	2.8	6.6	6.7	10.9
Green Ext Time (p_c), s	0.0	0.6	0.0	3.1	0.0	0.7	0.0	2.8

Intersection Summary	
HCM 6th Ctrl Delay	18.8
HCM 6th LOS	B

Notes

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

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	4	1	490	280	0
Future Vol, veh/h	0	4	1	490	280	0
Conflicting Peds, #/hr	0	0	3	0	0	3
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	1	1	0
Mvmt Flow	0	4	1	533	304	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	842	307	307	0	-	0
Stage 1	307	-	-	-	-	-
Stage 2	535	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	337	738	1265	-	-	-
Stage 1	751	-	-	-	-	-
Stage 2	591	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	335	736	1261	-	-	-
Mov Cap-2 Maneuver	449	-	-	-	-	-
Stage 1	748	-	-	-	-	-
Stage 2	589	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.9	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1261	-	736	-	-
HCM Lane V/C Ratio	0.001	-	0.006	-	-
HCM Control Delay (s)	7.9	0	9.9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	11	32	360	292	2
Future Vol, veh/h	3	11	32	360	292	2
Conflicting Peds, #/hr	0	1	2	0	0	2
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	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	3	12	34	383	311	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	765	315	315	0	-	0
Stage 1	314	-	-	-	-	-
Stage 2	451	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	374	730	1257	-	-	-
Stage 1	745	-	-	-	-	-
Stage 2	646	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	360	728	1255	-	-	-
Mov Cap-2 Maneuver	473	-	-	-	-	-
Stage 1	718	-	-	-	-	-
Stage 2	645	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.6	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1255	-	653	-	-
HCM Lane V/C Ratio	0.027	-	0.023	-	-
HCM Control Delay (s)	7.9	0	10.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	4	0	0	19	1	5
Future Vol, veh/h	4	0	0	19	1	5
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	68	68	68	68	68	68
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	6	0	0	28	1	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	6	0	34	6
Stage 1	-	-	-	-	6	-
Stage 2	-	-	-	-	28	-
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	-	-	1628	-	984	1083
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	1000	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1628	-	984	1083
Mov Cap-2 Maneuver	-	-	-	-	984	-
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	1000	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1065	-	-	1628	-
HCM Lane V/C Ratio	0.008	-	-	-	-
HCM Control Delay (s)	8.4	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	0	257	61	0	157
Future Vol, veh/h	7	0	257	61	0	157
Conflicting Peds, #/hr	0	0	0	50	50	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	54	54	54	54	54	54
Heavy Vehicles, %	33	0	2	2	0	0
Mvmt Flow	13	0	476	113	0	291

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	874	583	0	0	639	0
Stage 1	583	-	-	-	-	-
Stage 2	291	-	-	-	-	-
Critical Hdwy	6.73	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.73	-	-	-	-	-
Critical Hdwy Stg 2	5.73	-	-	-	-	-
Follow-up Hdwy	3.797	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	283	516	-	-	955	-
Stage 1	502	-	-	-	-	-
Stage 2	693	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	269	491	-	-	910	-
Mov Cap-2 Maneuver	269	-	-	-	-	-
Stage 1	478	-	-	-	-	-
Stage 2	693	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	269	910	-
HCM Lane V/C Ratio	-	-	0.048	-	-
HCM Control Delay (s)	-	-	19.1	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	0	321	24	0	158
Future Vol, veh/h	7	0	321	24	0	158
Conflicting Peds, #/hr	0	0	0	50	50	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	54	54	54	54	54	54
Heavy Vehicles, %	0	0	2	0	0	33
Mvmt Flow	13	0	594	44	0	293

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	959	666	0	0	688	0
Stage 1	666	-	-	-	-	-
Stage 2	293	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	288	463	-	-	916	-
Stage 1	515	-	-	-	-	-
Stage 2	762	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	274	441	-	-	872	-
Mov Cap-2 Maneuver	274	-	-	-	-	-
Stage 1	490	-	-	-	-	-
Stage 2	762	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.8	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	274	872	-
HCM Lane V/C Ratio	-	-	0.047	-	-
HCM Control Delay (s)	-	-	18.8	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	198	357	60	402	214	78	30	69	304	48	44	72
Future Volume (veh/h)	198	357	60	402	214	78	30	69	304	48	44	72
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		0.97	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	1856	1856	1856	1870	1870	1870	1870	1870	1870	1767	1767	1767
Adj Flow Rate, veh/h	233	420	71	473	252	92	35	81	358	56	52	85
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, %	3	3	3	2	2	2	2	2	2	9	9	9
Cap, veh/h	556	861	144	578	967	344	356	374	628	217	76	125
Arrive On Green	0.11	0.29	0.29	0.20	0.38	0.38	0.20	0.20	0.20	0.13	0.13	0.13
Sat Flow, veh/h	1767	3011	505	1781	2568	913	1781	1870	1543	1682	593	969
Grp Volume(v), veh/h	233	244	247	473	172	172	35	81	358	56	0	137
Grp Sat Flow(s),veh/h/ln	1767	1763	1753	1781	1777	1705	1781	1870	1543	1682	0	1562
Q Serve(g_s), s	10.0	12.5	12.7	19.4	7.3	7.6	1.7	3.9	19.7	3.3	0.0	9.1
Cycle Q Clear(g_c), s	10.0	12.5	12.7	19.4	7.3	7.6	1.7	3.9	19.7	3.3	0.0	9.1
Prop In Lane	1.00		0.29	1.00		0.54	1.00		1.00	1.00		0.62
Lane Grp Cap(c), veh/h	556	504	501	578	669	642	356	374	628	217	0	201
V/C Ratio(X)	0.42	0.49	0.49	0.82	0.26	0.27	0.10	0.22	0.57	0.26	0.00	0.68
Avail Cap(c_a), veh/h	603	504	501	693	669	642	360	378	632	417	0	387
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	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.8	32.2	32.3	20.2	23.4	23.5	35.5	36.4	25.4	42.7	0.0	45.3
Incr Delay (d2), s/veh	0.2	3.3	3.4	5.4	0.9	1.0	0.0	0.1	0.8	0.2	0.0	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	7.3	9.6	9.7	13.2	5.7	5.7	1.4	3.2	11.5	2.5	0.0	6.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.0	35.6	35.7	25.6	24.3	24.5	35.6	36.5	26.1	43.0	0.0	46.8
LnGrp LOS	C	D	D	C	C	C	D	D	C	D	A	D
Approach Vol, veh/h		724			817			474			193	
Approach Delay, s/veh		31.6			25.1			28.6			45.7	
Approach LOS		C			C			C			D	

Timer - Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		26.8	27.0	36.1		19.0	17.1	46.0
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		22.0	29.0	27.0		27.0	15.0	41.0
Max Q Clear Time (g_c+I1), s		21.7	21.4	14.7		11.1	12.0	9.6
Green Ext Time (p_c), s		0.1	0.5	1.5		0.5	0.1	1.3

Intersection Summary		
HCM 6th Ctrl Delay		29.8
HCM 6th LOS		C

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	29	680	682	88	4	12
Future Vol, veh/h	29	680	682	88	4	12
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	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	8	8
Mvmt Flow	31	723	726	94	4	13

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	820	0	-	0	1197	410
Stage 1	-	-	-	-	773	-
Stage 2	-	-	-	-	424	-
Critical Hdwy	4.14	-	-	-	6.96	7.06
Critical Hdwy Stg 1	-	-	-	-	5.96	-
Critical Hdwy Stg 2	-	-	-	-	5.96	-
Follow-up Hdwy	2.22	-	-	-	3.58	3.38
Pot Cap-1 Maneuver	805	-	-	-	170	574
Stage 1	-	-	-	-	401	-
Stage 2	-	-	-	-	611	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	805	-	-	-	159	574
Mov Cap-2 Maneuver	-	-	-	-	159	-
Stage 1	-	-	-	-	375	-
Stage 2	-	-	-	-	611	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	15.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	805	-	-	-	347
HCM Lane V/C Ratio	0.038	-	-	-	0.049
HCM Control Delay (s)	9.7	0.3	-	-	15.9
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	44	640	748	107	125	23
Future Volume (veh/h)	44	640	748	107	125	23
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	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	49	711	831	119	139	26
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	197	1503	1469	210	281	53
Arrive On Green	0.47	0.47	0.47	0.47	0.19	0.19
Sat Flow, veh/h	93	3277	3214	447	1487	278
Grp Volume(v), veh/h	391	369	473	477	166	0
Grp Sat Flow(s),veh/h/ln	1668	1617	1777	1790	1776	0
Q Serve(g_s), s	0.0	4.1	5.1	5.1	2.2	0.0
Cycle Q Clear(g_c), s	3.7	4.1	5.1	5.1	2.2	0.0
Prop In Lane	0.13			0.25	0.84	0.16
Lane Grp Cap(c), veh/h	939	762	837	843	335	0
V/C Ratio(X)	0.42	0.48	0.57	0.57	0.49	0.00
Avail Cap(c_a), veh/h	1497	1375	1511	1522	1308	0
HCM Platoon Ratio	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	0.00
Uniform Delay (d), s/veh	4.7	4.8	5.0	5.0	9.6	0.0
Incr Delay (d2), s/veh	0.3	0.5	0.6	0.6	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.8	0.8	1.2	1.2	1.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	5.0	5.3	5.7	5.6	10.7	0.0
LnGrp LOS	A	A	A	A	B	A
Approach Vol, veh/h		760	950		166	
Approach Delay, s/veh		5.1	5.6		10.7	
Approach LOS		A	A		B	

Timer - Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				17.0		9.5		17.0
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				22.5		19.5		22.5
Max Q Clear Time (g_c+I1), s				6.1		4.2		7.1
Green Ext Time (p_c), s				4.5		0.4		5.4

Intersection Summary			
HCM 6th Ctrl Delay			5.9
HCM 6th LOS			A

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	760	850	143	66	6
Future Vol, veh/h	5	760	850	143	66	6
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	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	0	0
Mvmt Flow	6	874	977	164	76	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1141	0	-	0	1508	571
Stage 1	-	-	-	-	1059	-
Stage 2	-	-	-	-	449	-
Critical Hdwy	4.14	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.22	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	608	-	-	-	114	469
Stage 1	-	-	-	-	299	-
Stage 2	-	-	-	-	616	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	608	-	-	-	112	469
Mov Cap-2 Maneuver	-	-	-	-	112	-
Stage 1	-	-	-	-	293	-
Stage 2	-	-	-	-	616	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	84.3
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	608	-	-	-	120
HCM Lane V/C Ratio	0.009	-	-	-	0.69
HCM Control Delay (s)	11	0.1	-	-	84.3
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	86	717	24	16	818	60	25	23	28	218	57	151
Future Volume (veh/h)	86	717	24	16	818	60	25	23	28	218	57	151
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	0.98		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	1870	1870	1870	1870	1870	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	93	779	26	17	889	0	27	25	30	237	62	164
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, %	2	2	2	2	2	2	1	1	1	1	1	1
Cap, veh/h	119	1696	57	36	1553		196	213	186	385	313	273
Arrive On Green	0.07	0.48	0.48	0.02	0.44	0.00	0.03	0.12	0.12	0.09	0.17	0.17
Sat Flow, veh/h	1781	3509	117	1781	3647	0	1795	1791	1561	1795	1791	1564
Grp Volume(v), veh/h	93	394	411	17	889	0	27	25	30	237	62	164
Grp Sat Flow(s),veh/h/ln	1781	1777	1849	1781	1777	0	1795	1791	1561	1795	1791	1564
Q Serve(g_s), s	3.2	9.1	9.1	0.6	11.6	0.0	0.0	0.8	1.1	0.0	1.8	6.0
Cycle Q Clear(g_c), s	3.2	9.1	9.1	0.6	11.6	0.0	0.0	0.8	1.1	0.0	1.8	6.0
Prop In Lane	1.00		0.06	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	119	859	894	36	1553		196	213	186	385	313	273
V/C Ratio(X)	0.78	0.46	0.46	0.47	0.57		0.14	0.12	0.16	0.62	0.20	0.60
Avail Cap(c_a), veh/h	187	859	894	144	1553		288	823	718	385	826	721
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.4	10.6	10.6	29.9	13.1	0.0	28.4	24.3	24.5	24.5	21.8	23.5
Incr Delay (d2), s/veh	4.1	1.8	1.7	3.4	1.5	0.0	0.1	0.1	0.2	2.2	0.1	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	2.5	6.0	6.2	0.5	7.6	0.0	0.7	0.6	0.7	5.9	1.3	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.5	12.4	12.3	33.3	14.6	0.0	28.5	24.4	24.6	26.7	21.9	24.3
LnGrp LOS	C	B	B	C	B		C	C	C	C	C	C
Approach Vol, veh/h		898			906	A		82			463	
Approach Delay, s/veh		14.4			14.9			25.8			25.2	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.8	11.8	5.8	34.4	6.4	15.3	8.6	31.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	28.4	5.0	28.5	5.0	28.5	6.5	27.0
Max Q Clear Time (g_c+I1), s	2.0	3.1	2.6	11.1	2.0	8.0	5.2	13.6
Green Ext Time (p_c), s	0.1	0.2	0.0	3.0	0.0	0.9	0.0	3.5

Intersection Summary	
HCM 6th Ctrl Delay	17.1
HCM 6th LOS	B

Notes

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

Intersection						
Int Delay, s/veh	0.1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	2	2	169	433	0
Future Vol, veh/h	0	2	2	169	433	0
Conflicting Peds, #/hr	0	1	6	0	0	6
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	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	4	1	0
Mvmt Flow	0	2	2	180	461	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	651	468	467	0	-	0
Stage 1	467	-	-	-	-	-
Stage 2	184	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	436	599	1105	-	-	-
Stage 1	635	-	-	-	-	-
Stage 2	852	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	430	595	1099	-	-	-
Mov Cap-2 Maneuver	516	-	-	-	-	-
Stage 1	630	-	-	-	-	-
Stage 2	847	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.1	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1099	-	595	-	-
HCM Lane V/C Ratio	0.002	-	0.004	-	-
HCM Control Delay (s)	8.3	0	11.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	4	12	124	398	5
Future Vol, veh/h	0	4	12	124	398	5
Conflicting Peds, #/hr	0	1	5	0	0	5
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	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	5	14	141	452	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	629	461	463	0	-	0
Stage 1	460	-	-	-	-	-
Stage 2	169	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	446	600	1098	-	-	-
Stage 1	636	-	-	-	-	-
Stage 2	861	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	435	597	1093	-	-	-
Mov Cap-2 Maneuver	516	-	-	-	-	-
Stage 1	624	-	-	-	-	-
Stage 2	857	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.1	0.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1093	-	597	-	-
HCM Lane V/C Ratio	0.012	-	0.008	-	-
HCM Control Delay (s)	8.3	0	11.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	4.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1	0	10	5	0	1
Future Vol, veh/h	1	0	10	5	0	1
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	54	54	54	54	54	54
Heavy Vehicles, %	17	0	0	0	0	2
Mvmt Flow	2	0	19	9	0	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	2	0	49	2
Stage 1	-	-	-	-	2	-
Stage 2	-	-	-	-	47	-
Critical Hdwy	-	-	4.1	-	6.4	6.22
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.318
Pot Cap-1 Maneuver	-	-	1634	-	965	1082
Stage 1	-	-	-	-	1026	-
Stage 2	-	-	-	-	981	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1634	-	953	1082
Mov Cap-2 Maneuver	-	-	-	-	953	-
Stage 1	-	-	-	-	1026	-
Stage 2	-	-	-	-	969	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.8	8.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1082	-	-	1634	-
HCM Lane V/C Ratio	0.002	-	-	0.011	-
HCM Control Delay (s)	8.3	-	-	7.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	0	110	2	0	126
Future Vol, veh/h	16	0	110	2	0	126
Conflicting Peds, #/hr	0	0	0	20	20	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	63	63	63	63	63	63
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	25	0	175	3	0	200

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	397	197	0	0	198	0
Stage 1	197	-	-	-	-	-
Stage 2	200	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	612	849	-	-	1387	-
Stage 1	841	-	-	-	-	-
Stage 2	838	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	600	833	-	-	1361	-
Mov Cap-2 Maneuver	600	-	-	-	-	-
Stage 1	825	-	-	-	-	-
Stage 2	838	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.3	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	600	1361	-
HCM Lane V/C Ratio	-	-	0.042	-	-
HCM Control Delay (s)	-	-	11.3	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	0	112	1	0	142
Future Vol, veh/h	4	0	112	1	0	142
Conflicting Peds, #/hr	0	0	0	20	20	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	74	74	74	74	74	74
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	5	0	151	1	0	192

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	364	172	0	0	172	0
Stage 1	172	-	-	-	-	-
Stage 2	192	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	639	877	-	-	1417	-
Stage 1	863	-	-	-	-	-
Stage 2	845	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	627	860	-	-	1390	-
Mov Cap-2 Maneuver	627	-	-	-	-	-
Stage 1	847	-	-	-	-	-
Stage 2	845	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	627	1390	-
HCM Lane V/C Ratio	-	-	0.009	-	-
HCM Control Delay (s)	-	-	10.8	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	434	40	329	533	37	73	17	303	66	25	57
Future Volume (veh/h)	65	434	40	329	533	37	73	17	303	66	25	57
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		0.99	1.00		0.98	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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	70	467	43	354	573	40	78	18	326	71	27	61
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	321	784	72	452	1210	84	629	660	807	139	39	89
Arrive On Green	0.04	0.24	0.24	0.16	0.36	0.36	0.35	0.35	0.35	0.08	0.08	0.08
Sat Flow, veh/h	1795	3311	304	1795	3395	237	1795	1885	1567	1795	506	1143
Grp Volume(v), veh/h	70	252	258	354	302	311	78	18	326	71	0	88
Grp Sat Flow(s),veh/h/ln	1795	1791	1824	1795	1791	1841	1795	1885	1567	1795	0	1649
Q Serve(g_s), s	3.4	14.4	14.5	16.5	15.0	15.1	3.4	0.7	14.8	4.4	0.0	6.0
Cycle Q Clear(g_c), s	3.4	14.4	14.5	16.5	15.0	15.1	3.4	0.7	14.8	4.4	0.0	6.0
Prop In Lane	1.00		0.17	1.00		0.13	1.00		1.00	1.00		0.69
Lane Grp Cap(c), veh/h	321	424	432	452	639	656	629	660	807	139	0	128
V/C Ratio(X)	0.22	0.59	0.60	0.78	0.47	0.47	0.12	0.03	0.40	0.51	0.00	0.69
Avail Cap(c_a), veh/h	324	424	432	459	639	656	629	660	807	422	0	387
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	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.1	39.0	39.0	26.4	28.6	28.7	25.4	24.5	17.3	50.9	0.0	51.7
Incr Delay (d2), s/veh	0.1	6.0	6.0	7.8	2.5	2.4	0.4	0.1	1.5	1.1	0.0	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	2.6	11.3	11.5	12.4	11.0	11.3	2.7	0.6	9.3	3.6	0.0	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.3	44.9	45.0	34.2	31.1	31.1	25.8	24.6	18.8	52.0	0.0	54.1
LnGrp LOS	C	D	D	C	C	C	C	C	B	D	A	D
Approach Vol, veh/h		580			967			422			159	
Approach Delay, s/veh		43.3			32.2			20.4			53.2	
Approach LOS		D			C			C			D	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		45.3	23.5	32.2		13.9	9.8	46.0				
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0				
Max Green Setting (Gmax), s		22.0	19.0	27.0		27.0	5.0	41.0				
Max Q Clear Time (g_c+I1), s		16.8	18.5	16.5		8.0	5.4	17.1				
Green Ext Time (p_c), s		0.4	0.0	1.4		0.4	0.0	2.3				

Intersection Summary		
HCM 6th Ctrl Delay		34.5
HCM 6th LOS		C

Intersection						
Int Delay, s/veh	1.5					
Movement	**EBL**	**EBT**	**WBT**	**WBR**	**SBL**	**SBR**
Lane Configurations						
Traffic Vol, veh/h	2	807	894	7	48	22
Future Vol, veh/h	2	807	894	7	48	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	96	96	96	96	96	96
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	2	841	931	7	50	23

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	938	0	-	0	1360	469
Stage 1	-	-	-	-	935	-
Stage 2	-	-	-	-	425	-
Critical Hdwy	4.12	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.21	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	732	-	-	-	142	546
Stage 1	-	-	-	-	347	-
Stage 2	-	-	-	-	633	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	732	-	-	-	141	546
Mov Cap-2 Maneuver	-	-	-	-	141	-
Stage 1	-	-	-	-	345	-
Stage 2	-	-	-	-	633	-

Approach	EB		WB		SB	
HCM Control Delay, s	0		0		36.9	
HCM LOS					E	

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	732	-	-	-	184
HCM Lane V/C Ratio	0.003	-	-	-	0.396
HCM Control Delay (s)	9.9	0	-	-	36.9
HCM Lane LOS	A	A	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	1.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	8	852	849	12	138	46	
Future Volume (veh/h)	8	852	849	12	138	46	
Initial Q (Qb), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	0.99	
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	1885	1885	1885	1885	1900	1900	
Adj Flow Rate, veh/h	8	897	894	13	145	48	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	
Percent Heavy Veh, %	1	1	1	1	0	0	
Cap, veh/h	66	1200	1243	18	655	217	
Arrive On Green	0.34	0.34	0.34	0.34	0.50	0.50	
Sat Flow, veh/h	9	3575	3708	53	1308	433	
Grp Volume(v), veh/h	484	421	443	464	194	0	
Grp Sat Flow(s),veh/h/ln	1868	1630	1791	1876	1750	0	
Q Serve(g_s), s	0.0	13.3	12.5	12.5	3.6	0.0	
Cycle Q Clear(g_c), s	13.1	13.3	12.5	12.5	3.6	0.0	
Prop In Lane	0.02			0.03	0.75	0.25	
Lane Grp Cap(c), veh/h	705	561	616	645	877	0	
V/C Ratio(X)	0.69	0.75	0.72	0.72	0.22	0.00	
Avail Cap(c_a), veh/h	974	801	880	922	877	0	
HCM Platoon Ratio	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	0.00	
Uniform Delay (d), s/veh	16.8	16.8	16.6	16.6	8.1	0.0	
Incr Delay (d2), s/veh	1.2	2.4	1.6	1.6	0.6	0.0	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(95%),veh/ln	8.8	8.1	8.2	8.5	2.4	0.0	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	18.0	19.3	18.2	18.1	8.7	0.0	
LnGrp LOS	B	B	B	B	A	A	
Approach Vol, veh/h		905	907		194		
Approach Delay, s/veh		18.6	18.2		8.7		
Approach LOS		B	B		A		
Timer - Assigned Phs				4		6	8
Phs Duration (G+Y+Rc), s				24.4		33.6	24.4
Change Period (Y+Rc), s				4.5		4.5	4.5
Max Green Setting (Gmax), s				28.5		20.5	28.5
Max Q Clear Time (g_c+I1), s				15.3		5.6	14.5
Green Ext Time (p_c), s				4.7		0.5	4.8
Intersection Summary							
HCM 6th Ctrl Delay			17.4				
HCM 6th LOS			B				

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	965	847	14	59	4
Future Vol, veh/h	0	965	847	14	59	4
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	94	94	94	94	94	94
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	0	1027	901	15	63	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	916	0	-	0	1423	458
Stage 1	-	-	-	-	909	-
Stage 2	-	-	-	-	514	-
Critical Hdwy	4.12	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.21	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	747	-	-	-	129	555
Stage 1	-	-	-	-	358	-
Stage 2	-	-	-	-	571	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	747	-	-	-	129	555
Mov Cap-2 Maneuver	-	-	-	-	129	-
Stage 1	-	-	-	-	358	-
Stage 2	-	-	-	-	571	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	54.8
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	747	-	-	-	136
HCM Lane V/C Ratio	-	-	-	-	0.493
HCM Control Delay (s)	0	-	-	-	54.8
HCM Lane LOS	A	-	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	827	52	67	695	226	28	92	69	178	60	124
Future Volume (veh/h)	135	827	52	67	695	226	28	92	69	178	60	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		1.00	0.99		0.95	0.99		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	1885	1885	1885	1885	1885	1900	1900	1900	1885	1885	1885
Adj Flow Rate, veh/h	141	861	54	70	724	0	29	96	72	185	62	129
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	1	1	1
Cap, veh/h	178	1571	99	99	1487		291	264	178	351	318	276
Arrive On Green	0.10	0.46	0.46	0.06	0.42	0.00	0.03	0.13	0.13	0.08	0.18	0.18
Sat Flow, veh/h	1795	3422	215	1795	3676	0	1810	2023	1361	1795	1791	1555
Grp Volume(v), veh/h	141	451	464	70	724	0	29	84	84	185	62	129
Grp Sat Flow(s),veh/h/ln	1795	1791	1846	1795	1791	0	1810	1805	1579	1795	1791	1555
Q Serve(g_s), s	5.0	11.8	11.8	2.5	9.6	0.0	0.9	2.8	3.2	5.1	1.9	4.8
Cycle Q Clear(g_c), s	5.0	11.8	11.8	2.5	9.6	0.0	0.9	2.8	3.2	5.1	1.9	4.8
Prop In Lane	1.00		0.12	1.00		0.00	1.00		0.86	1.00		1.00
Lane Grp Cap(c), veh/h	178	822	848	99	1487		291	236	206	351	318	276
V/C Ratio(X)	0.79	0.55	0.55	0.71	0.49		0.10	0.36	0.41	0.53	0.19	0.47
Avail Cap(c_a), veh/h	213	822	848	179	1487		374	755	660	351	752	653
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.6	12.7	12.7	30.2	13.9	0.0	23.2	25.8	26.0	22.8	22.8	24.0
Incr Delay (d2), s/veh	12.8	2.6	2.5	3.4	1.1	0.0	0.1	0.3	0.5	0.7	0.1	0.5
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	4.8	8.1	8.3	2.0	6.5	0.0	0.7	2.1	2.1	4.3	1.4	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.4	15.3	15.3	33.6	15.1	0.0	23.3	26.1	26.4	23.5	22.9	24.4
LnGrp LOS	D	B	B	C	B		C	C	C	C	C	C
Approach Vol, veh/h		1056			794	A		197			376	
Approach Delay, s/veh		18.8			16.7			25.8			23.7	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.6	13.0	8.1	34.4	6.5	16.0	11.0	31.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	27.2	6.5	28.2	5.0	27.3	7.7	27.0
Max Q Clear Time (g_c+I1), s	7.1	5.2	4.5	13.8	2.9	6.8	7.0	11.6
Green Ext Time (p_c), s	0.0	0.6	0.0	3.3	0.0	0.7	0.0	2.9

Intersection Summary	
HCM 6th Ctrl Delay	19.5
HCM 6th LOS	B

Notes

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

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	4	1	513	299	0
Future Vol, veh/h	0	4	1	513	299	0
Conflicting Peds, #/hr	0	0	3	0	0	3
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	1	1	0
Mvmt Flow	0	4	1	558	325	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	888	328	328	0	-	0
Stage 1	328	-	-	-	-	-
Stage 2	560	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	317	718	1243	-	-	-
Stage 1	734	-	-	-	-	-
Stage 2	576	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	315	716	1239	-	-	-
Mov Cap-2 Maneuver	433	-	-	-	-	-
Stage 1	731	-	-	-	-	-
Stage 2	574	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.1	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1239	-	716	-	-
HCM Lane V/C Ratio	0.001	-	0.006	-	-
HCM Control Delay (s)	7.9	0	10.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	12	35	380	310	2
Future Vol, veh/h	4	12	35	380	310	2
Conflicting Peds, #/hr	0	1	2	0	0	2
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	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	4	13	37	404	330	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	811	334	334	0	-	0
Stage 1	333	-	-	-	-	-
Stage 2	478	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	352	712	1237	-	-	-
Stage 1	731	-	-	-	-	-
Stage 2	628	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	337	710	1235	-	-	-
Mov Cap-2 Maneuver	455	-	-	-	-	-
Stage 1	701	-	-	-	-	-
Stage 2	627	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.9	0.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1235	-	623	-	-
HCM Lane V/C Ratio	0.03	-	0.027	-	-
HCM Control Delay (s)	8	0	10.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection						
Int Delay, s/veh	2					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	4	0	0	22	1	7
Future Vol, veh/h	4	0	0	22	1	7
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	68	68	68	68	68	68
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	6	0	0	32	1	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	6	0	38	6
Stage 1	-	-	-	-	6	-
Stage 2	-	-	-	-	32	-
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	-	-	1628	-	979	1083
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	996	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1628	-	979	1083
Mov Cap-2 Maneuver	-	-	-	-	979	-
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	996	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1069	-	-	1628	-
HCM Lane V/C Ratio	0.011	-	-	-	-
HCM Control Delay (s)	8.4	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	0	257	61	0	157
Future Vol, veh/h	7	0	257	61	0	157
Conflicting Peds, #/hr	0	0	0	50	50	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	54	54	54	54	54	54
Heavy Vehicles, %	33	0	2	2	0	0
Mvmt Flow	13	0	476	113	0	291

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	874	583	0	0	639	0
Stage 1	583	-	-	-	-	-
Stage 2	291	-	-	-	-	-
Critical Hdwy	6.73	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.73	-	-	-	-	-
Critical Hdwy Stg 2	5.73	-	-	-	-	-
Follow-up Hdwy	3.797	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	283	516	-	-	955	-
Stage 1	502	-	-	-	-	-
Stage 2	693	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	269	491	-	-	910	-
Mov Cap-2 Maneuver	269	-	-	-	-	-
Stage 1	478	-	-	-	-	-
Stage 2	693	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	269	910	-
HCM Lane V/C Ratio	-	-	0.048	-	-
HCM Control Delay (s)	-	-	19.1	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	0	321	24	0	158
Future Vol, veh/h	7	0	321	24	0	158
Conflicting Peds, #/hr	0	0	0	50	50	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	54	54	54	54	54	54
Heavy Vehicles, %	0	0	2	0	0	33
Mvmt Flow	13	0	594	44	0	293

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	959	666	0	0	688	0
Stage 1	666	-	-	-	-	-
Stage 2	293	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	288	463	-	-	916	-
Stage 1	515	-	-	-	-	-
Stage 2	762	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	274	441	-	-	872	-
Mov Cap-2 Maneuver	274	-	-	-	-	-
Stage 1	490	-	-	-	-	-
Stage 2	762	-	-	-	-	-

Approach	WB		NB		SB	
HCM Control Delay, s	18.8		0		0	
HCM LOS	C					

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	274	872	-
HCM Lane V/C Ratio	-	-	0.047	-	-
HCM Control Delay (s)	-	-	18.8	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	198	379	64	427	227	78	32	69	322	48	45	72
Future Volume (veh/h)	198	379	64	427	227	78	32	69	322	48	45	72
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		0.97	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	1856	1856	1856	1870	1870	1870	1870	1870	1870	1767	1767	1767
Adj Flow Rate, veh/h	233	446	75	502	267	92	38	81	379	56	53	85
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, %	3	3	3	2	2	2	2	2	2	9	9	9
Cap, veh/h	539	815	136	577	977	329	358	376	654	217	78	124
Arrive On Green	0.11	0.27	0.27	0.22	0.37	0.37	0.20	0.20	0.20	0.13	0.13	0.13
Sat Flow, veh/h	1767	3013	503	1781	2609	878	1781	1870	1543	1682	600	963
Grp Volume(v), veh/h	233	260	261	502	180	179	38	81	379	56	0	138
Grp Sat Flow(s),veh/h/ln	1767	1763	1753	1781	1777	1711	1781	1870	1543	1682	0	1563
Q Serve(g_s), s	10.3	13.8	14.0	21.2	7.7	8.0	1.9	4.0	20.7	3.3	0.0	9.2
Cycle Q Clear(g_c), s	10.3	13.8	14.0	21.2	7.7	8.0	1.9	4.0	20.7	3.3	0.0	9.2
Prop In Lane	1.00		0.29	1.00		0.51	1.00		1.00	1.00		0.62
Lane Grp Cap(c), veh/h	539	477	474	577	665	641	358	376	654	217	0	202
V/C Ratio(X)	0.43	0.54	0.55	0.87	0.27	0.28	0.11	0.22	0.58	0.26	0.00	0.68
Avail Cap(c_a), veh/h	582	477	474	663	665	641	358	376	654	415	0	386
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	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.0	34.2	34.2	21.2	23.8	23.9	35.7	36.5	24.6	42.9	0.0	45.5
Incr Delay (d2), s/veh	0.2	4.4	4.6	9.8	1.0	1.1	0.0	0.1	0.9	0.2	0.0	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	7.6	10.5	10.6	15.0	6.1	6.1	1.5	3.2	12.0	2.5	0.0	6.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.2	38.6	38.8	31.1	24.8	25.0	35.8	36.6	25.5	43.2	0.0	47.1
LnGrp LOS	C	D	D	C	C	C	D	D	C	D	A	D
Approach Vol, veh/h		754			861			498			194	
Approach Delay, s/veh		34.2			28.5			28.1			45.9	
Approach LOS		C			C			C			D	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		27.0	28.7	34.6		19.1	17.3	46.0				
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0				
Max Green Setting (Gmax), s		22.0	29.0	27.0		27.0	15.0	41.0				
Max Q Clear Time (g_c+I1), s		22.7	23.2	16.0		11.2	12.3	10.0				
Green Ext Time (p_c), s		0.0	0.5	1.5		0.5	0.1	1.3				

Intersection Summary			
HCM 6th Ctrl Delay			31.7
HCM 6th LOS			C

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	29	720	720	88	4	12
Future Vol, veh/h	29	720	720	88	4	12
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	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	8	8
Mvmt Flow	31	766	766	94	4	13

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	860	0	-	0	1258	430
Stage 1	-	-	-	-	813	-
Stage 2	-	-	-	-	445	-
Critical Hdwy	4.14	-	-	-	6.96	7.06
Critical Hdwy Stg 1	-	-	-	-	5.96	-
Critical Hdwy Stg 2	-	-	-	-	5.96	-
Follow-up Hdwy	2.22	-	-	-	3.58	3.38
Pot Cap-1 Maneuver	777	-	-	-	155	557
Stage 1	-	-	-	-	382	-
Stage 2	-	-	-	-	596	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	777	-	-	-	144	557
Mov Cap-2 Maneuver	-	-	-	-	144	-
Stage 1	-	-	-	-	356	-
Stage 2	-	-	-	-	596	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	16.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	777	-	-	-	324
HCM Lane V/C Ratio	0.04	-	-	-	0.053
HCM Control Delay (s)	9.8	0.3	-	-	16.7
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	44	680	786	107	125	23
Future Volume (veh/h)	44	680	786	107	125	23
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	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	49	756	873	119	139	26
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	191	1539	1512	206	275	52
Arrive On Green	0.48	0.48	0.48	0.48	0.19	0.19
Sat Flow, veh/h	88	3283	3235	428	1487	278
Grp Volume(v), veh/h	414	391	494	498	166	0
Grp Sat Flow(s),veh/h/ln	1669	1617	1777	1793	1776	0
Q Serve(g_s), s	0.0	4.5	5.4	5.4	2.3	0.0
Cycle Q Clear(g_c), s	4.0	4.5	5.4	5.4	2.3	0.0
Prop In Lane	0.12			0.24	0.84	0.16
Lane Grp Cap(c), veh/h	952	778	855	863	329	0
V/C Ratio(X)	0.43	0.50	0.58	0.58	0.50	0.00
Avail Cap(c_a), veh/h	1471	1348	1481	1495	1283	0
HCM Platoon Ratio	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	0.00
Uniform Delay (d), s/veh	4.7	4.8	5.0	5.0	9.9	0.0
Incr Delay (d2), s/veh	0.3	0.5	0.6	0.6	1.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.9	0.9	1.2	1.2	1.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	5.0	5.3	5.6	5.6	11.1	0.0
LnGrp LOS	A	A	A	A	B	A
Approach Vol, veh/h		805	992		166	
Approach Delay, s/veh		5.1	5.6		11.1	
Approach LOS		A	A		B	

Timer - Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				17.5		9.5		17.5
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				22.5		19.5		22.5
Max Q Clear Time (g_c+I1), s				6.5		4.3		7.4
Green Ext Time (p_c), s				4.8		0.4		5.6

Intersection Summary	
HCM 6th Ctrl Delay	5.9
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	800	888	143	66	6
Future Vol, veh/h	5	800	888	143	66	6
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	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	0	0
Mvmt Flow	6	920	1021	164	76	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1185	0	-	0	1575	593
Stage 1	-	-	-	-	1103	-
Stage 2	-	-	-	-	472	-
Critical Hdwy	4.14	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.22	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	585	-	-	-	103	454
Stage 1	-	-	-	-	284	-
Stage 2	-	-	-	-	600	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	585	-	-	-	101	454
Mov Cap-2 Maneuver	-	-	-	-	101	-
Stage 1	-	-	-	-	278	-
Stage 2	-	-	-	-	600	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	105.2
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	585	-	-	-	108
HCM Lane V/C Ratio	0.01	-	-	-	0.766
HCM Control Delay (s)	11.2	0.1	-	-	105.2
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	91	751	25	17	848	63	27	25	30	231	60	157
Future Volume (veh/h)	91	751	25	17	848	63	27	25	30	231	60	157
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	0.98		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	1870	1870	1870	1870	1870	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	99	816	27	18	922	0	29	27	33	251	65	171
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, %	2	2	2	2	2	2	1	1	1	1	1	1
Cap, veh/h	127	1689	56	38	1533		191	211	184	384	319	279
Arrive On Green	0.07	0.48	0.48	0.02	0.43	0.00	0.03	0.12	0.12	0.09	0.18	0.18
Sat Flow, veh/h	1781	3510	116	1781	3647	0	1795	1791	1561	1795	1791	1564
Grp Volume(v), veh/h	99	413	430	18	922	0	29	27	33	251	65	171
Grp Sat Flow(s),veh/h/ln	1781	1777	1849	1781	1777	0	1795	1791	1561	1795	1791	1564
Q Serve(g_s), s	3.4	9.8	9.8	0.6	12.5	0.0	0.0	0.8	1.2	0.4	1.9	6.3
Cycle Q Clear(g_c), s	3.4	9.8	9.8	0.6	12.5	0.0	0.0	0.8	1.2	0.4	1.9	6.3
Prop In Lane	1.00		0.06	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	127	855	890	38	1533		191	211	184	384	319	279
V/C Ratio(X)	0.78	0.48	0.48	0.47	0.60		0.15	0.13	0.18	0.65	0.20	0.61
Avail Cap(c_a), veh/h	185	855	890	142	1533		278	813	708	384	815	712
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.6	11.0	11.0	30.3	13.7	0.0	29.0	24.7	24.9	24.8	21.9	23.7
Incr Delay (d2), s/veh	6.8	2.0	1.9	3.3	1.8	0.0	0.1	0.1	0.2	3.2	0.1	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	2.9	6.6	6.8	0.5	8.1	0.0	0.7	0.6	0.8	6.4	1.4	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.4	12.9	12.9	33.6	15.4	0.0	29.1	24.8	25.0	28.0	22.0	24.6
LnGrp LOS	D	B	B	C	B		C	C	C	C	C	C
Approach Vol, veh/h		942			940	A		89			487	
Approach Delay, s/veh		15.3			15.8			26.3			26.0	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.3	11.9	5.8	34.6	6.5	15.7	9.0	31.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	28.4	5.0	28.5	5.0	28.5	6.5	27.0
Max Q Clear Time (g_c+I1), s	2.4	3.2	2.6	11.8	2.0	8.3	5.4	14.5
Green Ext Time (p_c), s	0.1	0.2	0.0	3.1	0.0	0.9	0.0	3.6

Intersection Summary	
HCM 6th Ctrl Delay	18.0
HCM 6th LOS	B

Notes

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

Intersection						
Int Delay, s/veh	0.1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	2	2	179	455	0
Future Vol, veh/h	0	2	2	179	455	0
Conflicting Peds, #/hr	0	1	6	0	0	6
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	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	4	1	0
Mvmt Flow	0	2	2	190	484	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	684	491	490	0	-	0
Stage 1	490	-	-	-	-	-
Stage 2	194	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	417	582	1084	-	-	-
Stage 1	620	-	-	-	-	-
Stage 2	844	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	411	578	1078	-	-	-
Mov Cap-2 Maneuver	501	-	-	-	-	-
Stage 1	615	-	-	-	-	-
Stage 2	839	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.3	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1078	-	578	-	-
HCM Lane V/C Ratio	0.002	-	0.004	-	-
HCM Control Delay (s)	8.3	0	11.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	4	12	134	420	5
Future Vol, veh/h	0	4	12	134	420	5
Conflicting Peds, #/hr	0	1	5	0	0	5
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	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	5	14	152	477	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	665	486	488	0	-	0
Stage 1	485	-	-	-	-	-
Stage 2	180	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	425	581	1075	-	-	-
Stage 1	619	-	-	-	-	-
Stage 2	851	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	415	578	1070	-	-	-
Mov Cap-2 Maneuver	500	-	-	-	-	-
Stage 1	607	-	-	-	-	-
Stage 2	847	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.3	0.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1070	-	578	-	-
HCM Lane V/C Ratio	0.013	-	0.008	-	-
HCM Control Delay (s)	8.4	0	11.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	4.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1	0	10	5	0	1
Future Vol, veh/h	1	0	10	5	0	1
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	54	54	54	54	54	54
Heavy Vehicles, %	17	0	0	0	0	2
Mvmt Flow	2	0	19	9	0	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	2	0	49	2
Stage 1	-	-	-	-	2	-
Stage 2	-	-	-	-	47	-
Critical Hdwy	-	-	4.1	-	6.4	6.22
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.318
Pot Cap-1 Maneuver	-	-	1634	-	965	1082
Stage 1	-	-	-	-	1026	-
Stage 2	-	-	-	-	981	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1634	-	953	1082
Mov Cap-2 Maneuver	-	-	-	-	953	-
Stage 1	-	-	-	-	1026	-
Stage 2	-	-	-	-	969	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.8	8.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1082	-	-	1634	-
HCM Lane V/C Ratio	0.002	-	-	0.011	-
HCM Control Delay (s)	8.3	-	-	7.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	0	110	2	0	126
Future Vol, veh/h	16	0	110	2	0	126
Conflicting Peds, #/hr	0	0	0	20	20	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	63	63	63	63	63	63
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	25	0	175	3	0	200

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	397	197	0	0	198	0
Stage 1	197	-	-	-	-	-
Stage 2	200	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	612	849	-	-	1387	-
Stage 1	841	-	-	-	-	-
Stage 2	838	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	600	833	-	-	1361	-
Mov Cap-2 Maneuver	600	-	-	-	-	-
Stage 1	825	-	-	-	-	-
Stage 2	838	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.3	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	600	1361	-
HCM Lane V/C Ratio	-	-	0.042	-	-
HCM Control Delay (s)	-	-	11.3	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	0	112	1	0	142
Future Vol, veh/h	4	0	112	1	0	142
Conflicting Peds, #/hr	0	0	0	20	20	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	74	74	74	74	74	74
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	5	0	151	1	0	192

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	364	172	0	0	172	0
Stage 1	172	-	-	-	-	-
Stage 2	192	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	639	877	-	-	1417	-
Stage 1	863	-	-	-	-	-
Stage 2	845	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	627	860	-	-	1390	-
Mov Cap-2 Maneuver	627	-	-	-	-	-
Stage 1	847	-	-	-	-	-
Stage 2	845	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	627	1390	-
HCM Lane V/C Ratio	-	-	0.009	-	-
HCM Control Delay (s)	-	-	10.8	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	461	42	349	566	37	77	18	321	66	25	57
Future Volume (veh/h)	65	461	42	349	566	37	77	18	321	66	25	57
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		0.99	1.00		0.98	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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	70	496	45	375	609	40	83	19	345	71	27	61
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	309	778	70	446	1222	80	626	657	810	139	39	89
Arrive On Green	0.04	0.23	0.23	0.17	0.36	0.36	0.35	0.35	0.35	0.08	0.08	0.08
Sat Flow, veh/h	1795	3315	300	1795	3410	224	1795	1885	1567	1795	506	1143
Grp Volume(v), veh/h	70	267	274	375	319	330	83	19	345	71	0	88
Grp Sat Flow(s),veh/h/ln	1795	1791	1824	1795	1791	1843	1795	1885	1567	1795	0	1649
Q Serve(g_s), s	3.4	15.4	15.5	17.7	16.0	16.1	3.6	0.8	15.8	4.4	0.0	6.0
Cycle Q Clear(g_c), s	3.4	15.4	15.5	17.7	16.0	16.1	3.6	0.8	15.8	4.4	0.0	6.0
Prop In Lane	1.00		0.16	1.00		0.12	1.00		1.00	1.00		0.69
Lane Grp Cap(c), veh/h	309	420	428	446	642	660	626	657	810	139	0	128
V/C Ratio(X)	0.23	0.64	0.64	0.84	0.50	0.50	0.13	0.03	0.43	0.51	0.00	0.69
Avail Cap(c_a), veh/h	312	420	428	446	642	660	626	657	810	422	0	387
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	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.3	39.6	39.6	27.0	28.8	28.8	25.6	24.7	17.4	50.9	0.0	51.7
Incr Delay (d2), s/veh	0.1	7.1	7.1	12.8	2.7	2.7	0.4	0.1	1.6	1.1	0.0	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	2.6	12.0	12.3	13.8	11.7	12.0	2.9	0.6	9.8	3.6	0.0	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.5	46.7	46.8	39.8	31.6	31.5	26.0	24.7	19.1	52.0	0.0	54.1
LnGrp LOS	C	D	D	D	C	C	C	C	B	D	A	D
Approach Vol, veh/h		611			1024			447			159	
Approach Delay, s/veh		45.0			34.6			20.6			53.2	
Approach LOS		D			C			C			D	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		45.1	24.0	32.0		13.9	9.8	46.2				
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0				
Max Green Setting (Gmax), s		22.0	19.0	27.0		27.0	5.0	41.0				
Max Q Clear Time (g_c+I1), s		17.8	19.7	17.5		8.0	5.4	18.1				
Green Ext Time (p_c), s		0.4	0.0	1.5		0.4	0.0	2.4				
Intersection Summary												
HCM 6th Ctrl Delay			35.9									
HCM 6th LOS			D									

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	852	947	7	48	22
Future Vol, veh/h	2	852	947	7	48	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	96	96	96	96	96	96
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	2	888	986	7	50	23

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	993	0	-	0	1438	497
Stage 1	-	-	-	-	990	-
Stage 2	-	-	-	-	448	-
Critical Hdwy	4.12	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.21	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	698	-	-	-	126	524
Stage 1	-	-	-	-	325	-
Stage 2	-	-	-	-	616	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	698	-	-	-	125	524
Mov Cap-2 Maneuver	-	-	-	-	125	-
Stage 1	-	-	-	-	323	-
Stage 2	-	-	-	-	616	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	43.4
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	698	-	-	-	164
HCM Lane V/C Ratio	0.003	-	-	-	0.445
HCM Control Delay (s)	10.2	0	-	-	43.4
HCM Lane LOS	B	A	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	897	902	12	138	46
Future Volume (veh/h)	8	897	902	12	138	46
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	0.99
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	1885	1885	1885	1885	1900	1900
Adj Flow Rate, veh/h	8	944	949	13	145	48
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	1	0	0
Cap, veh/h	66	1248	1294	18	637	211
Arrive On Green	0.36	0.36	0.36	0.36	0.49	0.49
Sat Flow, veh/h	8	3575	3712	50	1308	433
Grp Volume(v), veh/h	509	443	470	492	194	0
Grp Sat Flow(s),veh/h/ln	1867	1630	1791	1876	1750	0
Q Serve(g_s), s	0.0	13.9	13.2	13.2	3.7	0.0
Cycle Q Clear(g_c), s	13.8	13.9	13.2	13.2	3.7	0.0
Prop In Lane	0.02			0.03	0.75	0.25
Lane Grp Cap(c), veh/h	731	583	641	671	853	0
V/C Ratio(X)	0.70	0.76	0.73	0.73	0.23	0.00
Avail Cap(c_a), veh/h	975	801	880	922	853	0
HCM Platoon Ratio	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	0.00
Uniform Delay (d), s/veh	16.4	16.4	16.2	16.2	8.6	0.0
Incr Delay (d2), s/veh	1.4	2.9	2.0	2.0	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.1	8.5	8.6	8.9	2.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.8	19.3	18.3	18.2	9.2	0.0
LnGrp LOS	B	B	B	B	A	A
Approach Vol, veh/h		952	962		194	
Approach Delay, s/veh		18.5	18.2		9.2	
Approach LOS		B	B		A	

Timer - Assigned Phs	4	6	8
Phs Duration (G+Y+Rc), s	25.2	32.8	25.2
Change Period (Y+Rc), s	4.5	4.5	4.5
Max Green Setting (Gmax), s	28.5	20.5	28.5
Max Q Clear Time (g_c+I1), s	15.9	5.7	15.2
Green Ext Time (p_c), s	4.8	0.5	5.0

Intersection Summary	
HCM 6th Ctrl Delay	17.5
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1010	900	14	59	4
Future Vol, veh/h	0	1010	900	14	59	4
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	94	94	94	94	94	94
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	0	1074	957	15	63	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	972	0	-	0	1502	486
Stage 1	-	-	-	-	965	-
Stage 2	-	-	-	-	537	-
Critical Hdwy	4.12	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.21	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	711	-	-	-	115	533
Stage 1	-	-	-	-	335	-
Stage 2	-	-	-	-	556	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	711	-	-	-	115	533
Mov Cap-2 Maneuver	-	-	-	-	115	-
Stage 1	-	-	-	-	335	-
Stage 2	-	-	-	-	556	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	66.6
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	711	-	-	-	121
HCM Lane V/C Ratio	-	-	-	-	0.554
HCM Control Delay (s)	0	-	-	-	66.6
HCM Lane LOS	A	-	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	141	863	55	71	739	240	29	98	74	188	64	132
Future Volume (veh/h)	141	863	55	71	739	240	29	98	74	188	64	132
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	0.99		0.96	0.99		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	1885	1885	1885	1885	1885	1900	1900	1900	1885	1885	1885
Adj Flow Rate, veh/h	147	899	57	74	770	0	30	102	77	196	67	138
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	1	1	1
Cap, veh/h	185	1567	99	101	1474		285	269	182	347	321	278
Arrive On Green	0.10	0.46	0.46	0.06	0.41	0.00	0.03	0.13	0.13	0.08	0.18	0.18
Sat Flow, veh/h	1795	3420	217	1795	3676	0	1810	2015	1368	1795	1791	1555
Grp Volume(v), veh/h	147	471	485	74	770	0	30	90	89	196	67	138
Grp Sat Flow(s),veh/h/ln	1795	1791	1845	1795	1791	0	1810	1805	1578	1795	1791	1555
Q Serve(g_s), s	5.2	12.7	12.7	2.7	10.6	0.0	0.9	3.0	3.4	5.1	2.1	5.2
Cycle Q Clear(g_c), s	5.2	12.7	12.7	2.7	10.6	0.0	0.9	3.0	3.4	5.1	2.1	5.2
Prop In Lane	1.00		0.12	1.00		0.00	1.00		0.87	1.00		1.00
Lane Grp Cap(c), veh/h	185	820	845	101	1474		285	241	211	347	321	278
V/C Ratio(X)	0.79	0.57	0.57	0.73	0.52		0.11	0.37	0.42	0.56	0.21	0.50
Avail Cap(c_a), veh/h	211	820	845	178	1474		365	748	654	347	745	647
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.7	13.1	13.1	30.5	14.5	0.0	23.3	25.9	26.1	23.4	23.0	24.3
Incr Delay (d2), s/veh	14.5	2.9	2.8	3.7	1.3	0.0	0.1	0.4	0.5	1.3	0.1	0.5
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	5.2	8.7	8.8	2.1	7.2	0.0	0.7	2.2	2.2	4.7	1.5	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.2	16.0	15.9	34.2	15.8	0.0	23.3	26.3	26.6	24.7	23.1	24.8
LnGrp LOS	D	B	B	C	B		C	C	C	C	C	C
Approach Vol, veh/h		1103			844	A		209			401	
Approach Delay, s/veh		19.6			17.4			26.0			24.4	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.6	13.3	8.2	34.6	6.6	16.2	11.3	31.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	27.2	6.5	28.2	5.0	27.3	7.7	27.0
Max Q Clear Time (g_c+I1), s	7.1	5.4	4.7	14.7	2.9	7.2	7.2	12.6
Green Ext Time (p_c), s	0.0	0.6	0.0	3.4	0.0	0.8	0.0	3.1

Intersection Summary	
HCM 6th Ctrl Delay	20.1
HCM 6th LOS	C

Notes

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

Intersection						
Int Delay, s/veh	0					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	4	1	539	321	0
Future Vol, veh/h	0	4	1	539	321	0
Conflicting Peds, #/hr	0	0	3	0	0	3
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	1	1	0
Mvmt Flow	0	4	1	586	349	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	940	352	352	0	-	0
Stage 1	352	-	-	-	-	-
Stage 2	588	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	295	696	1218	-	-	-
Stage 1	716	-	-	-	-	-
Stage 2	559	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	293	694	1215	-	-	-
Mov Cap-2 Maneuver	415	-	-	-	-	-
Stage 1	713	-	-	-	-	-
Stage 2	557	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1215	-	694	-	-
HCM Lane V/C Ratio	0.001	-	0.006	-	-
HCM Control Delay (s)	8	0	10.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	12	35	406	332	2
Future Vol, veh/h	4	12	35	406	332	2
Conflicting Peds, #/hr	0	1	2	0	0	2
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	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	4	13	37	432	353	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	862	357	357	0	-	0
Stage 1	356	-	-	-	-	-
Stage 2	506	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	328	692	1213	-	-	-
Stage 1	713	-	-	-	-	-
Stage 2	610	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	314	690	1211	-	-	-
Mov Cap-2 Maneuver	436	-	-	-	-	-
Stage 1	683	-	-	-	-	-
Stage 2	609	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.2	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1211	-	602	-	-
HCM Lane V/C Ratio	0.031	-	0.028	-	-
HCM Control Delay (s)	8.1	0	11.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	4	0	0	22	1	7
Future Vol, veh/h	4	0	0	22	1	7
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	68	68	68	68	68	68
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	6	0	0	32	1	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	6	0	38	6
Stage 1	-	-	-	-	6	-
Stage 2	-	-	-	-	32	-
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	-	-	1628	-	979	1083
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	996	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1628	-	979	1083
Mov Cap-2 Maneuver	-	-	-	-	979	-
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	996	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1069	-	-	1628	-
HCM Lane V/C Ratio	0.011	-	-	-	-
HCM Control Delay (s)	8.4	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	0.5					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	0	257	73	0	157
Future Vol, veh/h	12	0	257	73	0	157
Conflicting Peds, #/hr	0	0	0	50	50	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	54	54	54	54	54	54
Heavy Vehicles, %	33	0	2	2	0	0
Mvmt Flow	22	0	476	135	0	291

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	885	594	0	0	661	0
Stage 1	594	-	-	-	-	-
Stage 2	291	-	-	-	-	-
Critical Hdwy	6.73	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.73	-	-	-	-	-
Critical Hdwy Stg 2	5.73	-	-	-	-	-
Follow-up Hdwy	3.797	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	279	509	-	-	937	-
Stage 1	496	-	-	-	-	-
Stage 2	693	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	266	485	-	-	892	-
Mov Cap-2 Maneuver	266	-	-	-	-	-
Stage 1	472	-	-	-	-	-
Stage 2	693	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.8	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	266	892	-
HCM Lane V/C Ratio	-	-	0.084	-	-
HCM Control Delay (s)	-	-	19.8	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	333	0	0	163
Future Vol, veh/h	0	0	333	0	0	163
Conflicting Peds, #/hr	0	0	0	50	50	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	54	54	54	54	54	54
Heavy Vehicles, %	0	0	2	0	0	33
Mvmt Flow	0	0	617	0	0	302

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	969	667	0	0	667	0
Stage 1	667	-	-	-	-	-
Stage 2	302	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	284	462	-	-	932	-
Stage 1	514	-	-	-	-	-
Stage 2	755	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	270	440	-	-	888	-
Mov Cap-2 Maneuver	270	-	-	-	-	-
Stage 1	489	-	-	-	-	-
Stage 2	755	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	888	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	191	374	64	426	228	75	32	67	320	47	45	71
Future Volume (veh/h)	191	374	64	426	228	75	32	67	320	47	45	71
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		0.97	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	1856	1856	1856	1870	1870	1870	1870	1870	1870	1767	1767	1767
Adj Flow Rate, veh/h	225	440	75	501	268	88	38	79	376	55	53	84
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, %	3	3	3	2	2	2	2	2	2	9	9	9
Cap, veh/h	534	809	137	579	995	319	360	378	655	216	78	123
Arrive On Green	0.11	0.27	0.27	0.22	0.38	0.38	0.20	0.20	0.20	0.13	0.13	0.13
Sat Flow, veh/h	1767	3006	509	1781	2644	849	1781	1870	1544	1682	605	959
Grp Volume(v), veh/h	225	257	258	501	178	178	38	79	376	55	0	137
Grp Sat Flow(s),veh/h/ln	1767	1763	1752	1781	1777	1716	1781	1870	1544	1682	0	1564
Q Serve(g_s), s	9.9	13.6	13.8	21.1	7.6	7.9	1.9	3.8	20.4	3.2	0.0	9.1
Cycle Q Clear(g_c), s	9.9	13.6	13.8	21.1	7.6	7.9	1.9	3.8	20.4	3.2	0.0	9.1
Prop In Lane	1.00		0.29	1.00		0.49	1.00		1.00	1.00		0.61
Lane Grp Cap(c), veh/h	534	474	472	579	668	646	360	378	655	216	0	201
V/C Ratio(X)	0.42	0.54	0.55	0.87	0.27	0.28	0.11	0.21	0.57	0.25	0.00	0.68
Avail Cap(c_a), veh/h	583	474	472	666	668	646	360	378	655	417	0	388
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	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.1	34.1	34.1	21.2	23.6	23.7	35.5	36.2	24.3	42.8	0.0	45.3
Incr Delay (d2), s/veh	0.2	4.4	4.5	9.5	1.0	1.1	0.0	0.1	0.8	0.2	0.0	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	7.3	10.4	10.5	14.9	5.9	6.0	1.5	3.1	11.8	2.5	0.0	6.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.3	38.4	38.7	30.6	24.5	24.7	35.5	36.3	25.1	43.0	0.0	46.9
LnGrp LOS	C	D	D	C	C	C	D	D	C	D	A	D
Approach Vol, veh/h		740			857			493			192	
Approach Delay, s/veh		34.2			28.1			27.7			45.8	
Approach LOS		C			C			C			D	

Timer - Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		27.0	28.6	34.3		19.0	17.0	46.0
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		22.0	29.0	27.0		27.0	15.0	41.0
Max Q Clear Time (g_c+I1), s		22.4	23.1	15.8		11.1	11.9	9.9
Green Ext Time (p_c), s		0.0	0.5	1.5		0.5	0.1	1.3

Intersection Summary	
HCM 6th Ctrl Delay	31.5
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	25	716	719	76	3	10
Future Vol, veh/h	25	716	719	76	3	10
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	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	8	8
Mvmt Flow	27	762	765	81	3	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	846	0	-	0	1241	423
Stage 1	-	-	-	-	806	-
Stage 2	-	-	-	-	435	-
Critical Hdwy	4.14	-	-	-	6.96	7.06
Critical Hdwy Stg 1	-	-	-	-	5.96	-
Critical Hdwy Stg 2	-	-	-	-	5.96	-
Follow-up Hdwy	2.22	-	-	-	3.58	3.38
Pot Cap-1 Maneuver	787	-	-	-	159	563
Stage 1	-	-	-	-	385	-
Stage 2	-	-	-	-	603	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	787	-	-	-	150	563
Mov Cap-2 Maneuver	-	-	-	-	150	-
Stage 1	-	-	-	-	362	-
Stage 2	-	-	-	-	603	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	15.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	787	-	-	-	344
HCM Lane V/C Ratio	0.034	-	-	-	0.04
HCM Control Delay (s)	9.7	0.3	-	-	15.9
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	31	688	776	71	93	20
Future Volume (veh/h)	31	688	776	71	93	20
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	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	34	764	862	79	103	22
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	175	1546	1538	141	276	59
Arrive On Green	0.47	0.47	0.47	0.47	0.19	0.19
Sat Flow, veh/h	57	3393	3385	302	1448	309
Grp Volume(v), veh/h	418	380	465	476	126	0
Grp Sat Flow(s),veh/h/ln	1748	1617	1777	1816	1772	0
Q Serve(g_s), s	0.0	4.3	5.0	5.0	1.6	0.0
Cycle Q Clear(g_c), s	4.0	4.3	5.0	5.0	1.6	0.0
Prop In Lane	0.08			0.17	0.82	0.17
Lane Grp Cap(c), veh/h	965	756	830	849	337	0
V/C Ratio(X)	0.43	0.50	0.56	0.56	0.37	0.00
Avail Cap(c_a), veh/h	1584	1384	1521	1555	1315	0
HCM Platoon Ratio	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	0.00
Uniform Delay (d), s/veh	4.8	4.9	5.1	5.1	9.3	0.0
Incr Delay (d2), s/veh	0.3	0.5	0.6	0.6	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.9	0.9	1.1	1.1	0.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	5.1	5.4	5.6	5.6	10.0	0.0
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h		798	941		126	
Approach Delay, s/veh		5.2	5.6		10.0	
Approach LOS		A	A		A	

Timer - Assigned Phs	4	6	8
Phs Duration (G+Y+Rc), s	16.8	9.5	16.8
Change Period (Y+Rc), s	4.5	4.5	4.5
Max Green Setting (Gmax), s	22.5	19.5	22.5
Max Q Clear Time (g_c+I1), s	6.3	3.6	7.0
Green Ext Time (p_c), s	4.7	0.3	5.3

Intersection Summary	
HCM 6th Ctrl Delay	5.8
HCM 6th LOS	A

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	14	767	837	124	57	11
Future Vol, veh/h	14	767	837	124	57	11
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	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	0	0
Mvmt Flow	16	882	962	143	66	13

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1105	0	-	0	1507	553
Stage 1	-	-	-	-	1034	-
Stage 2	-	-	-	-	473	-
Critical Hdwy	4.14	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.22	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	628	-	-	-	114	482
Stage 1	-	-	-	-	308	-
Stage 2	-	-	-	-	599	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	628	-	-	-	108	482
Mov Cap-2 Maneuver	-	-	-	-	108	-
Stage 1	-	-	-	-	293	-
Stage 2	-	-	-	-	599	-

Approach	EB		WB		SB	
HCM Control Delay, s	0.5		0		74	
HCM LOS					F	

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	628	-	-	-	124
HCM Lane V/C Ratio	0.026	-	-	-	0.63
HCM Control Delay (s)	10.9	0.3	-	-	74
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	92	708	25	17	778	62	27	26	30	232	60	157
Future Volume (veh/h)	92	708	25	17	778	62	27	26	30	232	60	157
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	0.98		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	1870	1870	1870	1870	1870	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	100	770	27	18	846	0	29	28	33	252	65	171
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, %	2	2	2	2	2	2	1	1	1	1	1	1
Cap, veh/h	128	1686	59	38	1531		191	211	184	384	319	279
Arrive On Green	0.07	0.48	0.48	0.02	0.43	0.00	0.03	0.12	0.12	0.09	0.18	0.18
Sat Flow, veh/h	1781	3502	123	1781	3647	0	1795	1791	1561	1795	1791	1564
Grp Volume(v), veh/h	100	391	406	18	846	0	29	28	33	252	65	171
Grp Sat Flow(s),veh/h/ln	1781	1777	1848	1781	1777	0	1795	1791	1561	1795	1791	1564
Q Serve(g_s), s	3.5	9.2	9.2	0.6	11.1	0.0	0.0	0.9	1.2	0.4	1.9	6.3
Cycle Q Clear(g_c), s	3.5	9.2	9.2	0.6	11.1	0.0	0.0	0.9	1.2	0.4	1.9	6.3
Prop In Lane	1.00		0.07	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	128	855	890	38	1531		191	211	184	384	319	279
V/C Ratio(X)	0.78	0.46	0.46	0.47	0.55		0.15	0.13	0.18	0.66	0.20	0.61
Avail Cap(c_a), veh/h	185	855	890	142	1531		278	812	708	384	815	711
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.6	10.8	10.8	30.3	13.3	0.0	29.0	24.8	24.9	24.8	22.0	23.8
Incr Delay (d2), s/veh	7.2	1.8	1.7	3.3	1.4	0.0	0.1	0.1	0.2	3.3	0.1	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	2.9	6.1	6.3	0.5	7.3	0.0	0.7	0.6	0.8	6.5	1.4	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.8	12.6	12.5	33.6	14.8	0.0	29.2	24.9	25.1	28.1	22.1	24.6
LnGrp LOS	D	B	B	C	B		C	C	C	C	C	C
Approach Vol, veh/h		897			864	A		90			488	
Approach Delay, s/veh		15.1			15.1			26.3			26.1	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.3	11.9	5.8	34.7	6.5	15.7	9.0	31.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	28.4	5.0	28.5	5.0	28.5	6.5	27.0
Max Q Clear Time (g_c+I1), s	2.4	3.2	2.6	11.2	2.0	8.3	5.5	13.1
Green Ext Time (p_c), s	0.1	0.2	0.0	2.9	0.0	0.9	0.0	3.4

Intersection Summary	
HCM 6th Ctrl Delay	17.8
HCM 6th LOS	B

Notes

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

Intersection						
Int Delay, s/veh	0.1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	2	2	180	456	0
Future Vol, veh/h	0	2	2	180	456	0
Conflicting Peds, #/hr	0	1	6	0	0	6
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	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	4	1	0
Mvmt Flow	0	2	2	191	485	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	686	492	491	0	-	0
Stage 1	491	-	-	-	-	-
Stage 2	195	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	416	581	1083	-	-	-
Stage 1	619	-	-	-	-	-
Stage 2	843	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	410	577	1077	-	-	-
Mov Cap-2 Maneuver	500	-	-	-	-	-
Stage 1	614	-	-	-	-	-
Stage 2	838	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.3	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1077	-	577	-	-
HCM Lane V/C Ratio	0.002	-	0.004	-	-
HCM Control Delay (s)	8.3	0	11.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	5	13	134	420	6
Future Vol, veh/h	0	5	13	134	420	6
Conflicting Peds, #/hr	0	1	5	0	0	5
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	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	6	15	152	477	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	668	487	489	0	-	0
Stage 1	486	-	-	-	-	-
Stage 2	182	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	423	581	1074	-	-	-
Stage 1	618	-	-	-	-	-
Stage 2	849	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	412	578	1069	-	-	-
Mov Cap-2 Maneuver	498	-	-	-	-	-
Stage 1	606	-	-	-	-	-
Stage 2	845	-	-	-	-	-

Approach	EB		NB		SB
HCM Control Delay, s	11.3		0.7		0
HCM LOS	B				

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1069	-	578	-	-
HCM Lane V/C Ratio	0.014	-	0.01	-	-
HCM Control Delay (s)	8.4	0	11.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	5.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1	0	13	4	0	2
Future Vol, veh/h	1	0	13	4	0	2
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	54	54	54	54	54	54
Heavy Vehicles, %	17	0	0	0	0	2
Mvmt Flow	2	0	24	7	0	4

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	2	0	57	2
Stage 1	-	-	-	-	2	-
Stage 2	-	-	-	-	55	-
Critical Hdwy	-	-	4.1	-	6.4	6.22
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.318
Pot Cap-1 Maneuver	-	-	1634	-	955	1082
Stage 1	-	-	-	-	1026	-
Stage 2	-	-	-	-	973	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1634	-	941	1082
Mov Cap-2 Maneuver	-	-	-	-	941	-
Stage 1	-	-	-	-	1026	-
Stage 2	-	-	-	-	958	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.5	8.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1082	-	-	1634	-
HCM Lane V/C Ratio	0.003	-	-	0.015	-
HCM Control Delay (s)	8.3	-	-	7.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	17	0	110	3	0	126
Future Vol, veh/h	17	0	110	3	0	126
Conflicting Peds, #/hr	0	0	0	20	20	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	63	63	63	63	63	63
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	27	0	175	5	0	200

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	398	198	0	0	200	0
Stage 1	198	-	-	-	-	-
Stage 2	200	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	611	848	-	-	1384	-
Stage 1	840	-	-	-	-	-
Stage 2	838	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	599	832	-	-	1358	-
Mov Cap-2 Maneuver	599	-	-	-	-	-
Stage 1	824	-	-	-	-	-
Stage 2	838	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.3	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	599	1358	-
HCM Lane V/C Ratio	-	-	0.045	-	-
HCM Control Delay (s)	-	-	11.3	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	113	0	0	143
Future Vol, veh/h	0	0	113	0	0	143
Conflicting Peds, #/hr	0	0	0	20	20	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	74	74	74	74	74	74
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	153	0	0	193

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	366	173	0	0	173	0
Stage 1	173	-	-	-	-	-
Stage 2	193	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	638	876	-	-	1416	-
Stage 1	862	-	-	-	-	-
Stage 2	845	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	626	859	-	-	1389	-
Mov Cap-2 Maneuver	626	-	-	-	-	-
Stage 1	846	-	-	-	-	-
Stage 2	845	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	1389	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	461	42	348	563	37	77	18	320	65	24	56
Future Volume (veh/h)	65	461	42	348	563	37	77	18	320	65	24	56
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		0.99	1.00		0.98	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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	70	496	45	374	605	40	83	19	344	70	26	60
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	311	778	70	446	1221	81	628	659	812	137	38	88
Arrive On Green	0.04	0.23	0.23	0.17	0.36	0.36	0.35	0.35	0.35	0.08	0.08	0.08
Sat Flow, veh/h	1795	3315	300	1795	3409	225	1795	1885	1567	1795	498	1149
Grp Volume(v), veh/h	70	267	274	374	317	328	83	19	344	70	0	86
Grp Sat Flow(s),veh/h/ln	1795	1791	1824	1795	1791	1843	1795	1885	1567	1795	0	1647
Q Serve(g_s), s	3.4	15.4	15.5	17.6	15.9	16.0	3.6	0.8	15.7	4.3	0.0	5.9
Cycle Q Clear(g_c), s	3.4	15.4	15.5	17.6	15.9	16.0	3.6	0.8	15.7	4.3	0.0	5.9
Prop In Lane	1.00		0.16	1.00		0.12	1.00		1.00	1.00		0.70
Lane Grp Cap(c), veh/h	311	420	428	446	642	660	628	659	812	137	0	126
V/C Ratio(X)	0.23	0.64	0.64	0.84	0.49	0.50	0.13	0.03	0.42	0.51	0.00	0.68
Avail Cap(c_a), veh/h	314	420	428	446	642	660	628	659	812	422	0	387
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	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.3	39.6	39.6	27.0	28.8	28.8	25.5	24.6	17.3	51.0	0.0	51.8
Incr Delay (d2), s/veh	0.1	7.1	7.1	12.6	2.7	2.7	0.4	0.1	1.6	1.1	0.0	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	2.6	12.0	12.3	13.7	11.6	11.9	2.9	0.6	9.8	3.6	0.0	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.5	46.7	46.8	39.5	31.5	31.5	25.9	24.6	19.0	52.1	0.0	54.2
LnGrp LOS	C	D	D	D	C	C	C	C	B	D	A	D
Approach Vol, veh/h		611			1019			446			156	
Approach Delay, s/veh		45.0			34.4			20.5			53.3	
Approach LOS		D			C			C			D	

Timer - Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		45.2	24.0	32.0		13.8	9.8	46.2
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		22.0	19.0	27.0		27.0	5.0	41.0
Max Q Clear Time (g_c+I1), s		17.7	19.6	17.5		7.9	5.4	18.0
Green Ext Time (p_c), s		0.4	0.0	1.5		0.4	0.0	2.4

Intersection Summary		
HCM 6th Ctrl Delay		35.9
HCM 6th LOS		D

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	850	947	6	42	19
Future Vol, veh/h	2	850	947	6	42	19
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	96	96	96	96	96	96
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	2	885	986	6	44	20

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	992	0	-	0	1436	496
Stage 1	-	-	-	-	989	-
Stage 2	-	-	-	-	447	-
Critical Hdwy	4.12	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.21	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	699	-	-	-	127	525
Stage 1	-	-	-	-	325	-
Stage 2	-	-	-	-	617	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	699	-	-	-	126	525
Mov Cap-2 Maneuver	-	-	-	-	126	-
Stage 1	-	-	-	-	323	-
Stage 2	-	-	-	-	617	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	39.9
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	699	-	-	-	165
HCM Lane V/C Ratio	0.003	-	-	-	0.385
HCM Control Delay (s)	10.2	0	-	-	39.9
HCM Lane LOS	B	A	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	1.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	6	891	907	9	91	40	
Future Volume (veh/h)	6	891	907	9	91	40	
Initial Q (Qb), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	0.99	
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	1885	1885	1885	1885	1900	1900	
Adj Flow Rate, veh/h	6	938	955	9	96	42	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	
Percent Heavy Veh, %	1	1	1	1	0	0	
Cap, veh/h	65	1241	1290	12	588	257	
Arrive On Green	0.35	0.35	0.35	0.35	0.49	0.49	
Sat Flow, veh/h	5	3583	3730	34	1200	525	
Grp Volume(v), veh/h	505	439	470	494	139	0	
Grp Sat Flow(s),veh/h/ln	1873	1630	1791	1879	1738	0	
Q Serve(g_s), s	0.0	13.8	13.3	13.3	2.6	0.0	
Cycle Q Clear(g_c), s	13.7	13.8	13.3	13.3	2.6	0.0	
Prop In Lane	0.01			0.02	0.69	0.30	
Lane Grp Cap(c), veh/h	728	578	636	667	851	0	
V/C Ratio(X)	0.69	0.76	0.74	0.74	0.16	0.00	
Avail Cap(c_a), veh/h	978	801	880	923	851	0	
HCM Platoon Ratio	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	0.00	
Uniform Delay (d), s/veh	16.5	16.5	16.4	16.4	8.2	0.0	
Incr Delay (d2), s/veh	1.3	2.8	2.1	2.0	0.4	0.0	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(95%),veh/ln	9.1	8.4	8.7	9.0	1.7	0.0	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	17.8	19.3	18.5	18.4	8.6	0.0	
LnGrp LOS	B	B	B	B	A	A	
Approach Vol, veh/h		944	964		139		
Approach Delay, s/veh		18.5	18.5		8.6		
Approach LOS		B	B		A		
Timer - Assigned Phs				4		6	8
Phs Duration (G+Y+Rc), s				25.1		32.9	25.1
Change Period (Y+Rc), s				4.5		4.5	4.5
Max Green Setting (Gmax), s				28.5		20.5	28.5
Max Q Clear Time (g_c+I1), s				15.8		4.6	15.3
Green Ext Time (p_c), s				4.8		0.3	5.0
Intersection Summary							
HCM 6th Ctrl Delay			17.8				
HCM 6th LOS			B				

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	956	896	14	58	10
Future Vol, veh/h	1	956	896	14	58	10
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	94	94	94	94	94	94
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	1	1017	953	15	62	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	968	0	-	0	1472	484
Stage 1	-	-	-	-	961	-
Stage 2	-	-	-	-	511	-
Critical Hdwy	4.12	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.21	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	714	-	-	-	120	534
Stage 1	-	-	-	-	337	-
Stage 2	-	-	-	-	573	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	714	-	-	-	120	534
Mov Cap-2 Maneuver	-	-	-	-	120	-
Stage 1	-	-	-	-	336	-
Stage 2	-	-	-	-	573	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	58.9
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	714	-	-	-	135
HCM Lane V/C Ratio	0.001	-	-	-	0.536
HCM Control Delay (s)	10.1	0	-	-	58.9
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	141	808	55	71	735	234	29	98	74	189	64	132
Future Volume (veh/h)	141	808	55	71	735	234	29	98	74	189	64	132
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	0.99		0.96	0.99		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	1885	1885	1885	1885	1885	1900	1900	1900	1885	1885	1885
Adj Flow Rate, veh/h	147	842	57	74	766	0	30	102	77	197	67	138
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	1	1	1
Cap, veh/h	185	1559	106	101	1474		285	269	182	347	321	278
Arrive On Green	0.10	0.46	0.46	0.06	0.41	0.00	0.03	0.13	0.13	0.08	0.18	0.18
Sat Flow, veh/h	1795	3404	230	1795	3676	0	1810	2015	1368	1795	1791	1555
Grp Volume(v), veh/h	147	443	456	74	766	0	30	90	89	197	67	138
Grp Sat Flow(s),veh/h/ln	1795	1791	1843	1795	1791	0	1810	1805	1578	1795	1791	1555
Q Serve(g_s), s	5.2	11.7	11.7	2.7	10.5	0.0	0.9	3.0	3.4	5.1	2.1	5.2
Cycle Q Clear(g_c), s	5.2	11.7	11.7	2.7	10.5	0.0	0.9	3.0	3.4	5.1	2.1	5.2
Prop In Lane	1.00		0.13	1.00		0.00	1.00		0.87	1.00		1.00
Lane Grp Cap(c), veh/h	185	820	844	101	1474		285	241	211	347	321	278
V/C Ratio(X)	0.79	0.54	0.54	0.73	0.52		0.11	0.37	0.42	0.57	0.21	0.50
Avail Cap(c_a), veh/h	211	820	844	178	1474		365	748	654	347	745	647
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.7	12.8	12.8	30.5	14.5	0.0	23.3	25.9	26.1	23.4	23.0	24.3
Incr Delay (d2), s/veh	14.5	2.5	2.5	3.7	1.3	0.0	0.1	0.4	0.5	1.4	0.1	0.5
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	5.2	8.1	8.2	2.1	7.2	0.0	0.7	2.2	2.2	4.7	1.5	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.2	15.3	15.3	34.2	15.8	0.0	23.3	26.3	26.6	24.8	23.1	24.8
LnGrp LOS	D	B	B	C	B		C	C	C	C	C	C
Approach Vol, veh/h		1046			840	A		209			402	
Approach Delay, s/veh		19.2			17.4			26.0			24.5	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.6	13.3	8.2	34.6	6.6	16.2	11.3	31.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	27.2	6.5	28.2	5.0	27.3	7.7	27.0
Max Q Clear Time (g_c+I1), s	7.1	5.4	4.7	13.7	2.9	7.2	7.2	12.5
Green Ext Time (p_c), s	0.0	0.6	0.0	3.2	0.0	0.8	0.0	3.1

Intersection Summary	
HCM 6th Ctrl Delay	20.0
HCM 6th LOS	C

Notes

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

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	4	1	533	322	0
Future Vol, veh/h	0	4	1	533	322	0
Conflicting Peds, #/hr	0	0	3	0	0	3
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	1	1	0
Mvmt Flow	0	4	1	579	350	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	934	353	353	0	-	0
Stage 1	353	-	-	-	-	-
Stage 2	581	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	297	695	1217	-	-	-
Stage 1	716	-	-	-	-	-
Stage 2	563	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	295	693	1214	-	-	-
Mov Cap-2 Maneuver	418	-	-	-	-	-
Stage 1	713	-	-	-	-	-
Stage 2	561	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1214	-	693	-	-
HCM Lane V/C Ratio	0.001	-	0.006	-	-
HCM Control Delay (s)	8	0	10.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	13	29	406	332	1
Future Vol, veh/h	4	13	29	406	332	1
Conflicting Peds, #/hr	0	1	2	0	0	2
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	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	4	14	31	432	353	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	850	357	356	0	-	0
Stage 1	356	-	-	-	-	-
Stage 2	494	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	334	692	1214	-	-	-
Stage 1	713	-	-	-	-	-
Stage 2	617	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	321	690	1212	-	-	-
Mov Cap-2 Maneuver	442	-	-	-	-	-
Stage 1	687	-	-	-	-	-
Stage 2	616	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.1	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1212	-	610	-	-
HCM Lane V/C Ratio	0.025	-	0.03	-	-
HCM Control Delay (s)	8	0	11.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	3	0	0	15	1	9
Future Vol, veh/h	3	0	0	15	1	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	68	68	68	68	68	68
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	4	0	0	22	1	13

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	4	0	26	4
Stage 1	-	-	-	-	4	-
Stage 2	-	-	-	-	22	-
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	-	-	1631	-	995	1085
Stage 1	-	-	-	-	1024	-
Stage 2	-	-	-	-	1006	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1631	-	995	1085
Mov Cap-2 Maneuver	-	-	-	-	995	-
Stage 1	-	-	-	-	1024	-
Stage 2	-	-	-	-	1006	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1075	-	-	1631	-
HCM Lane V/C Ratio	0.014	-	-	-	-
HCM Control Delay (s)	8.4	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	0	257	73	0	157
Future Vol, veh/h	12	0	257	73	0	157
Conflicting Peds, #/hr	0	0	0	50	50	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	54	54	54	54	54	54
Heavy Vehicles, %	33	0	2	2	0	0
Mvmt Flow	22	0	476	135	0	291

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	885	594	0	0	661	0
Stage 1	594	-	-	-	-	-
Stage 2	291	-	-	-	-	-
Critical Hdwy	6.73	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.73	-	-	-	-	-
Critical Hdwy Stg 2	5.73	-	-	-	-	-
Follow-up Hdwy	3.797	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	279	509	-	-	937	-
Stage 1	496	-	-	-	-	-
Stage 2	693	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	266	485	-	-	892	-
Mov Cap-2 Maneuver	266	-	-	-	-	-
Stage 1	472	-	-	-	-	-
Stage 2	693	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.8	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	266	892	-
HCM Lane V/C Ratio	-	-	0.084	-	-
HCM Control Delay (s)	-	-	19.8	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	333	0	0	163
Future Vol, veh/h	0	0	333	0	0	163
Conflicting Peds, #/hr	0	0	0	50	50	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	54	54	54	54	54	54
Heavy Vehicles, %	0	0	2	0	0	33
Mvmt Flow	0	0	617	0	0	302

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	969	667	0	0	667	0
Stage 1	667	-	-	-	-	-
Stage 2	302	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	284	462	-	-	932	-
Stage 1	514	-	-	-	-	-
Stage 2	755	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	270	440	-	-	888	-
Mov Cap-2 Maneuver	270	-	-	-	-	-
Stage 1	489	-	-	-	-	-
Stage 2	755	-	-	-	-	-

Approach	WB		NB		SB	
HCM Control Delay, s	0		0		0	
HCM LOS	A					

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	888	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	191	374	64	426	228	75	32	67	320	47	45	71
Future Volume (veh/h)	191	374	64	426	228	75	32	67	320	47	45	71
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		0.97	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	1856	1856	1856	1870	1870	1870	1870	1870	1870	1767	1767	1767
Adj Flow Rate, veh/h	225	440	75	501	268	88	38	79	376	55	53	84
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, %	3	3	3	2	2	2	2	2	2	9	9	9
Cap, veh/h	534	809	137	579	995	319	360	378	655	216	78	123
Arrive On Green	0.11	0.27	0.27	0.22	0.38	0.38	0.20	0.20	0.20	0.13	0.13	0.13
Sat Flow, veh/h	1767	3006	509	1781	2644	849	1781	1870	1544	1682	605	959
Grp Volume(v), veh/h	225	257	258	501	178	178	38	79	376	55	0	137
Grp Sat Flow(s),veh/h/ln	1767	1763	1752	1781	1777	1716	1781	1870	1544	1682	0	1564
Q Serve(g_s), s	9.9	13.6	13.8	21.1	7.6	7.9	1.9	3.8	20.4	3.2	0.0	9.1
Cycle Q Clear(g_c), s	9.9	13.6	13.8	21.1	7.6	7.9	1.9	3.8	20.4	3.2	0.0	9.1
Prop In Lane	1.00		0.29	1.00		0.49	1.00		1.00	1.00		0.61
Lane Grp Cap(c), veh/h	534	474	472	579	668	646	360	378	655	216	0	201
V/C Ratio(X)	0.42	0.54	0.55	0.87	0.27	0.28	0.11	0.21	0.57	0.25	0.00	0.68
Avail Cap(c_a), veh/h	583	474	472	666	668	646	360	378	655	417	0	388
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	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.1	34.1	34.1	21.2	23.6	23.7	35.5	36.2	24.3	42.8	0.0	45.3
Incr Delay (d2), s/veh	0.2	4.4	4.5	9.5	1.0	1.1	0.0	0.1	0.8	0.2	0.0	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	7.3	10.4	10.5	14.9	5.9	6.0	1.5	3.1	11.8	2.5	0.0	6.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.3	38.4	38.7	30.6	24.5	24.7	35.5	36.3	25.1	43.0	0.0	46.9
LnGrp LOS	C	D	D	C	C	C	D	D	C	D	A	D
Approach Vol, veh/h		740			857			493			192	
Approach Delay, s/veh		34.2			28.1			27.7			45.8	
Approach LOS		C			C			C			D	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		27.0	28.6	34.3		19.0	17.0	46.0				
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0				
Max Green Setting (Gmax), s		22.0	29.0	27.0		27.0	15.0	41.0				
Max Q Clear Time (g_c+I1), s		22.4	23.1	15.8		11.1	11.9	9.9				
Green Ext Time (p_c), s		0.0	0.5	1.5		0.5	0.1	1.3				
Intersection Summary												
HCM 6th Ctrl Delay			31.5									
HCM 6th LOS			C									

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	40	732	719	76	50	10
Future Volume (veh/h)	40	732	719	76	50	10
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	1870	1870	1870	1870	1781	1781
Adj Flow Rate, veh/h	43	779	765	81	53	11
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	8	8
Cap, veh/h	195	1401	1393	147	276	57
Arrive On Green	0.43	0.43	0.43	0.43	0.20	0.20
Sat Flow, veh/h	78	3347	3336	343	1356	281
Grp Volume(v), veh/h	429	393	419	427	65	0
Grp Sat Flow(s),veh/h/ln	1724	1617	1777	1809	1663	0
Q Serve(g_s), s	0.0	4.5	4.3	4.3	0.8	0.0
Cycle Q Clear(g_c), s	4.2	4.5	4.3	4.3	0.8	0.0
Prop In Lane	0.10			0.19	0.82	0.17
Lane Grp Cap(c), veh/h	902	695	763	777	339	0
V/C Ratio(X)	0.48	0.57	0.55	0.55	0.19	0.00
Avail Cap(c_a), veh/h	1380	1186	1303	1326	1220	0
HCM Platoon Ratio	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	0.00
Uniform Delay (d), s/veh	5.2	5.3	5.2	5.2	8.1	0.0
Incr Delay (d2), s/veh	0.4	0.7	0.6	0.6	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.9	1.0	1.0	1.0	0.4	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	5.6	6.0	5.8	5.8	8.4	0.0
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h		822	846		65	
Approach Delay, s/veh		5.8	5.8		8.4	
Approach LOS		A	A		A	

Timer - Assigned Phs	4	6	8
Phs Duration (G+Y+Rc), s	15.0	9.5	15.0
Change Period (Y+Rc), s	4.5	4.5	4.5
Max Green Setting (Gmax), s	18.0	18.0	18.0
Max Q Clear Time (g_c+I1), s	6.5	2.8	6.3
Green Ext Time (p_c), s	4.0	0.1	4.1

Intersection Summary	
HCM 6th Ctrl Delay	5.9
HCM 6th LOS	A

Intersection						
Int Delay, s/veh	0.1					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	750	776	71	0	20
Future Vol, veh/h	0	750	776	71	0	20
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	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	0	0
Mvmt Flow	0	833	862	79	0	22

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	471
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	-	-	-	0	545
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	545
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB		WB		SB
HCM Control Delay, s	0		0		11.9
HCM LOS					B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	545
HCM Lane V/C Ratio	-	-	-	0.041
HCM Control Delay (s)	-	-	-	11.9
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	721	837	124	104	11
Future Volume (veh/h)	30	721	837	124	104	11
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	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	34	829	962	143	120	13
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	162	1676	1575	234	282	31
Arrive On Green	0.51	0.51	0.51	0.51	0.18	0.18
Sat Flow, veh/h	51	3387	3197	461	1602	174
Grp Volume(v), veh/h	449	414	551	554	134	0
Grp Sat Flow(s),veh/h/ln	1736	1617	1777	1787	1789	0
Q Serve(g_s), s	0.0	4.8	6.3	6.3	1.9	0.0
Cycle Q Clear(g_c), s	4.4	4.8	6.3	6.3	1.9	0.0
Prop In Lane	0.08			0.26	0.90	0.10
Lane Grp Cap(c), veh/h	1017	821	902	907	314	0
V/C Ratio(X)	0.44	0.50	0.61	0.61	0.43	0.00
Avail Cap(c_a), veh/h	1459	1279	1406	1414	1164	0
HCM Platoon Ratio	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	0.00
Uniform Delay (d), s/veh	4.5	4.6	5.0	5.0	10.4	0.0
Incr Delay (d2), s/veh	0.3	0.5	0.7	0.7	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.0	1.0	1.4	1.4	1.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	4.8	5.1	5.7	5.7	11.4	0.0
LnGrp LOS	A	A	A	A	B	A
Approach Vol, veh/h		863	1105		134	
Approach Delay, s/veh		5.0	5.7		11.4	
Approach LOS		A	A		B	

Timer - Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				18.9		9.5		18.9
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				22.5		18.5		22.5
Max Q Clear Time (g_c+I1), s				6.8		3.9		8.3
Green Ext Time (p_c), s				5.1		0.3		6.1

Intersection Summary			
HCM 6th Ctrl Delay			5.7
HCM 6th LOS			A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	92	708	25	17	778	62	27	26	30	232	60	157
Future Volume (veh/h)	92	708	25	17	778	62	27	26	30	232	60	157
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	0.98		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	1870	1870	1870	1870	1870	1870	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	100	770	27	18	846	0	29	28	33	252	65	171
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, %	2	2	2	2	2	2	1	1	1	1	1	1
Cap, veh/h	128	1686	59	38	1531		191	211	184	384	319	279
Arrive On Green	0.07	0.48	0.48	0.02	0.43	0.00	0.03	0.12	0.12	0.09	0.18	0.18
Sat Flow, veh/h	1781	3502	123	1781	3647	0	1795	1791	1561	1795	1791	1564
Grp Volume(v), veh/h	100	391	406	18	846	0	29	28	33	252	65	171
Grp Sat Flow(s),veh/h/ln	1781	1777	1848	1781	1777	0	1795	1791	1561	1795	1791	1564
Q Serve(g_s), s	3.5	9.2	9.2	0.6	11.1	0.0	0.0	0.9	1.2	0.4	1.9	6.3
Cycle Q Clear(g_c), s	3.5	9.2	9.2	0.6	11.1	0.0	0.0	0.9	1.2	0.4	1.9	6.3
Prop In Lane	1.00		0.07	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	128	855	890	38	1531		191	211	184	384	319	279
V/C Ratio(X)	0.78	0.46	0.46	0.47	0.55		0.15	0.13	0.18	0.66	0.20	0.61
Avail Cap(c_a), veh/h	185	855	890	142	1531		278	812	708	384	815	711
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.6	10.8	10.8	30.3	13.3	0.0	29.0	24.8	24.9	24.8	22.0	23.8
Incr Delay (d2), s/veh	7.2	1.8	1.7	3.3	1.4	0.0	0.1	0.1	0.2	3.3	0.1	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	2.9	6.1	6.3	0.5	7.3	0.0	0.7	0.6	0.8	6.5	1.4	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.8	12.6	12.5	33.6	14.8	0.0	29.2	24.9	25.1	28.1	22.1	24.6
LnGrp LOS	D	B	B	C	B		C	C	C	C	C	C
Approach Vol, veh/h		897			864	A		90			488	
Approach Delay, s/veh		15.1			15.1			26.3			26.1	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.3	11.9	5.8	34.7	6.5	15.7	9.0	31.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	28.4	5.0	28.5	5.0	28.5	6.5	27.0
Max Q Clear Time (g_c+I1), s	2.4	3.2	2.6	11.2	2.0	8.3	5.5	13.1
Green Ext Time (p_c), s	0.1	0.2	0.0	2.9	0.0	0.9	0.0	3.4

Intersection Summary	
HCM 6th Ctrl Delay	17.8
HCM 6th LOS	B

Notes

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

Intersection						
Int Delay, s/veh	0.1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	2	2	180	456	0
Future Vol, veh/h	0	2	2	180	456	0
Conflicting Peds, #/hr	0	1	6	0	0	6
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	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	4	1	0
Mvmt Flow	0	2	2	191	485	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	686	492	491	0	-	0
Stage 1	491	-	-	-	-	-
Stage 2	195	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	416	581	1083	-	-	-
Stage 1	619	-	-	-	-	-
Stage 2	843	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	410	577	1077	-	-	-
Mov Cap-2 Maneuver	500	-	-	-	-	-
Stage 1	614	-	-	-	-	-
Stage 2	838	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.3	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1077	-	577	-	-
HCM Lane V/C Ratio	0.002	-	0.004	-	-
HCM Control Delay (s)	8.3	0	11.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	5	13	134	420	6
Future Vol, veh/h	0	5	13	134	420	6
Conflicting Peds, #/hr	0	1	5	0	0	5
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	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	6	15	152	477	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	668	487	489	0	-	0
Stage 1	486	-	-	-	-	-
Stage 2	182	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	423	581	1074	-	-	-
Stage 1	618	-	-	-	-	-
Stage 2	849	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	412	578	1069	-	-	-
Mov Cap-2 Maneuver	498	-	-	-	-	-
Stage 1	606	-	-	-	-	-
Stage 2	845	-	-	-	-	-

Approach	EB		NB		SB	
HCM Control Delay, s	11.3		0.7		0	
HCM LOS	B					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1069	-	578	-	-
HCM Lane V/C Ratio	0.014	-	0.01	-	-
HCM Control Delay (s)	8.4	0	11.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	5.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1	0	13	4	0	2
Future Vol, veh/h	1	0	13	4	0	2
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	54	54	54	54	54	54
Heavy Vehicles, %	17	0	0	0	0	2
Mvmt Flow	2	0	24	7	0	4

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	2	0	57	2
Stage 1	-	-	-	-	2	-
Stage 2	-	-	-	-	55	-
Critical Hdwy	-	-	4.1	-	6.4	6.22
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.318
Pot Cap-1 Maneuver	-	-	1634	-	955	1082
Stage 1	-	-	-	-	1026	-
Stage 2	-	-	-	-	973	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1634	-	941	1082
Mov Cap-2 Maneuver	-	-	-	-	941	-
Stage 1	-	-	-	-	1026	-
Stage 2	-	-	-	-	958	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.5	8.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1082	-	-	1634	-
HCM Lane V/C Ratio	0.003	-	-	0.015	-
HCM Control Delay (s)	8.3	-	-	7.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	17	0	110	3	0	126
Future Vol, veh/h	17	0	110	3	0	126
Conflicting Peds, #/hr	0	0	0	20	20	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	63	63	63	63	63	63
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	27	0	175	5	0	200

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	398	198	0	0	200	0
Stage 1	198	-	-	-	-	-
Stage 2	200	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	611	848	-	-	1384	-
Stage 1	840	-	-	-	-	-
Stage 2	838	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	599	832	-	-	1358	-
Mov Cap-2 Maneuver	599	-	-	-	-	-
Stage 1	824	-	-	-	-	-
Stage 2	838	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.3	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	599	1358	-
HCM Lane V/C Ratio	-	-	0.045	-	-
HCM Control Delay (s)	-	-	11.3	0	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	113	0	0	143
Future Vol, veh/h	0	0	113	0	0	143
Conflicting Peds, #/hr	0	0	0	20	20	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	74	74	74	74	74	74
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	153	0	0	193

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	366	173	0	0	173	0
Stage 1	173	-	-	-	-	-
Stage 2	193	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	638	876	-	-	1416	-
Stage 1	862	-	-	-	-	-
Stage 2	845	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	626	859	-	-	1389	-
Mov Cap-2 Maneuver	626	-	-	-	-	-
Stage 1	846	-	-	-	-	-
Stage 2	845	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	1389	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	461	42	348	563	37	77	18	320	65	24	56
Future Volume (veh/h)	65	461	42	348	563	37	77	18	320	65	24	56
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		0.99	1.00		0.98	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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	70	496	45	374	605	40	83	19	344	70	26	60
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	311	778	70	446	1221	81	628	659	812	137	38	88
Arrive On Green	0.04	0.23	0.23	0.17	0.36	0.36	0.35	0.35	0.35	0.08	0.08	0.08
Sat Flow, veh/h	1795	3315	300	1795	3409	225	1795	1885	1567	1795	498	1149
Grp Volume(v), veh/h	70	267	274	374	317	328	83	19	344	70	0	86
Grp Sat Flow(s),veh/h/ln	1795	1791	1824	1795	1791	1843	1795	1885	1567	1795	0	1647
Q Serve(g_s), s	3.4	15.4	15.5	17.6	15.9	16.0	3.6	0.8	15.7	4.3	0.0	5.9
Cycle Q Clear(g_c), s	3.4	15.4	15.5	17.6	15.9	16.0	3.6	0.8	15.7	4.3	0.0	5.9
Prop In Lane	1.00		0.16	1.00		0.12	1.00		1.00	1.00		0.70
Lane Grp Cap(c), veh/h	311	420	428	446	642	660	628	659	812	137	0	126
V/C Ratio(X)	0.23	0.64	0.64	0.84	0.49	0.50	0.13	0.03	0.42	0.51	0.00	0.68
Avail Cap(c_a), veh/h	314	420	428	446	642	660	628	659	812	422	0	387
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	0.79	0.79	0.79	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.3	39.6	39.6	27.0	28.8	28.8	25.5	24.6	17.3	51.0	0.0	51.8
Incr Delay (d2), s/veh	0.1	7.1	7.1	10.2	2.2	2.1	0.4	0.1	1.6	1.1	0.0	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	2.6	12.0	12.3	12.8	11.0	11.3	2.9	0.6	9.8	3.6	0.0	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.5	46.7	46.8	37.2	30.9	30.9	25.9	24.6	19.0	52.1	0.0	54.2
LnGrp LOS	C	D	D	D	C	C	C	C	B	D	A	D
Approach Vol, veh/h		611			1019			446			156	
Approach Delay, s/veh		45.0			33.2			20.5			53.3	
Approach LOS		D			C			C			D	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		45.2	24.0	32.0		13.8	9.8	46.2				
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0				
Max Green Setting (Gmax), s		22.0	19.0	27.0		27.0	5.0	41.0				
Max Q Clear Time (g_c+I1), s		17.7	19.6	17.5		7.9	5.4	18.0				
Green Ext Time (p_c), s		0.4	0.0	1.5		0.4	0.0	2.4				
Intersection Summary												
HCM 6th Ctrl Delay			35.3									
HCM 6th LOS			D									

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	853	947	6	88	19
Future Volume (veh/h)	5	853	947	6	88	19
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	1885	1885	1885	1885	1900	1900
Adj Flow Rate, veh/h	5	889	986	6	92	20
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	0	0
Cap, veh/h	143	1597	1666	10	280	61
Arrive On Green	0.46	0.46	0.46	0.46	0.19	0.19
Sat Flow, veh/h	5	3585	3744	22	1442	314
Grp Volume(v), veh/h	479	415	484	508	113	0
Grp Sat Flow(s),veh/h/ln	1874	1630	1791	1881	1771	0
Q Serve(g_s), s	0.0	4.8	5.2	5.2	1.4	0.0
Cycle Q Clear(g_c), s	4.8	4.8	5.2	5.2	1.4	0.0
Prop In Lane	0.01			0.01	0.81	0.18
Lane Grp Cap(c), veh/h	997	744	817	859	344	0
V/C Ratio(X)	0.48	0.56	0.59	0.59	0.33	0.00
Avail Cap(c_a), veh/h	1443	1139	1252	1315	1238	0
HCM Platoon Ratio	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	0.00
Uniform Delay (d), s/veh	5.1	5.1	5.2	5.2	8.9	0.0
Incr Delay (d2), s/veh	0.4	0.7	0.7	0.7	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.1	1.0	1.2	1.2	0.8	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	5.5	5.8	5.9	5.9	9.5	0.0
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h		894	992		113	
Approach Delay, s/veh		5.6	5.9		9.5	
Approach LOS		A	A		A	

Timer - Assigned Phs	4	6	8
Phs Duration (G+Y+Rc), s	16.3	9.5	16.3
Change Period (Y+Rc), s	4.5	4.5	4.5
Max Green Setting (Gmax), s	18.0	18.0	18.0
Max Q Clear Time (g_c+I1), s	6.8	3.4	7.2
Green Ext Time (p_c), s	4.2	0.2	4.6

Intersection Summary	
HCM 6th Ctrl Delay	6.0
HCM 6th LOS	A

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	940	907	9	0	40
Future Vol, veh/h	0	940	907	9	0	40
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	95	95	95	95	95	95
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	0	989	955	9	0	42

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	964	0	-	0	1455	482
Stage 1	-	-	-	-	960	-
Stage 2	-	-	-	-	495	-
Critical Hdwy	4.12	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.21	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	716	-	-	-	123	536
Stage 1	-	-	-	-	337	-
Stage 2	-	-	-	-	584	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	716	-	-	-	123	536
Mov Cap-2 Maneuver	-	-	-	-	123	-
Stage 1	-	-	-	-	337	-
Stage 2	-	-	-	-	584	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	716	-	-	-	536
HCM Lane V/C Ratio	-	-	-	-	0.079
HCM Control Delay (s)	0	-	-	-	12.3
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	4	911	896	14	104	10	
Future Volume (veh/h)	4	911	896	14	104	10	
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	1885	1885	1885	1885	1900	1900	
Adj Flow Rate, veh/h	4	969	953	15	111	11	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	
Percent Heavy Veh, %	1	1	1	1	0	0	
Cap, veh/h	142	1604	1652	26	313	31	
Arrive On Green	0.46	0.46	0.46	0.46	0.19	0.19	
Sat Flow, veh/h	3	3590	3703	57	1616	160	
Grp Volume(v), veh/h	521	452	473	495	123	0	
Grp Sat Flow(s),veh/h/ln	1878	1630	1791	1875	1790	0	
Q Serve(g_s), s	0.0	5.4	5.0	5.0	1.5	0.0	
Cycle Q Clear(g_c), s	5.3	5.4	5.0	5.0	1.5	0.0	
Prop In Lane	0.01			0.03	0.90	0.09	
Lane Grp Cap(c), veh/h	1000	746	820	858	347	0	
V/C Ratio(X)	0.52	0.61	0.58	0.58	0.35	0.00	
Avail Cap(c_a), veh/h	1444	1136	1249	1307	1248	0	
HCM Platoon Ratio	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	0.00	
Uniform Delay (d), s/veh	5.2	5.3	5.2	5.2	9.0	0.0	
Incr Delay (d2), s/veh	0.4	0.8	0.6	0.6	0.6	0.0	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(95%),veh/ln	1.2	1.2	1.2	1.2	0.9	0.0	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	5.7	6.0	5.8	5.8	9.6	0.0	
LnGrp LOS	A	A	A	A	A	A	
Approach Vol, veh/h		973	968		123		
Approach Delay, s/veh		5.8	5.8		9.6		
Approach LOS		A	A		A		
Timer - Assigned Phs				4		6	8
Phs Duration (G+Y+Rc), s				16.3		9.5	16.3
Change Period (Y+Rc), s				4.5		4.5	4.5
Max Green Setting (Gmax), s				18.0		18.0	18.0
Max Q Clear Time (g_c+I1), s				7.4		3.5	7.0
Green Ext Time (p_c), s				4.4		0.3	4.5
Intersection Summary							
HCM 6th Ctrl Delay			6.0				
HCM 6th LOS			A				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	141	808	55	71	735	234	29	98	74	189	64	132
Future Volume (veh/h)	141	808	55	71	735	234	29	98	74	189	64	132
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	0.99		0.96	0.99		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	1885	1885	1885	1885	1885	1900	1900	1900	1885	1885	1885
Adj Flow Rate, veh/h	147	842	57	74	766	0	30	102	77	197	67	138
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	1	1	1
Cap, veh/h	185	1559	106	101	1474		285	269	182	347	321	278
Arrive On Green	0.10	0.46	0.46	0.06	0.41	0.00	0.03	0.13	0.13	0.08	0.18	0.18
Sat Flow, veh/h	1795	3404	230	1795	3676	0	1810	2015	1368	1795	1791	1555
Grp Volume(v), veh/h	147	443	456	74	766	0	30	90	89	197	67	138
Grp Sat Flow(s),veh/h/ln	1795	1791	1843	1795	1791	0	1810	1805	1578	1795	1791	1555
Q Serve(g_s), s	5.2	11.7	11.7	2.7	10.5	0.0	0.9	3.0	3.4	5.1	2.1	5.2
Cycle Q Clear(g_c), s	5.2	11.7	11.7	2.7	10.5	0.0	0.9	3.0	3.4	5.1	2.1	5.2
Prop In Lane	1.00		0.13	1.00		0.00	1.00		0.87	1.00		1.00
Lane Grp Cap(c), veh/h	185	820	844	101	1474		285	241	211	347	321	278
V/C Ratio(X)	0.79	0.54	0.54	0.73	0.52		0.11	0.37	0.42	0.57	0.21	0.50
Avail Cap(c_a), veh/h	211	820	844	178	1474		365	748	654	347	745	647
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.7	12.8	12.8	30.5	14.5	0.0	23.3	25.9	26.1	23.4	23.0	24.3
Incr Delay (d2), s/veh	14.5	2.5	2.5	3.7	1.3	0.0	0.1	0.4	0.5	1.4	0.1	0.5
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	5.2	8.1	8.2	2.1	7.2	0.0	0.7	2.2	2.2	4.7	1.5	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.2	15.3	15.3	34.2	15.8	0.0	23.3	26.3	26.6	24.8	23.1	24.8
LnGrp LOS	D	B	B	C	B		C	C	C	C	C	C
Approach Vol, veh/h		1046			840	A		209			402	
Approach Delay, s/veh		19.2			17.4			26.0			24.5	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.6	13.3	8.2	34.6	6.6	16.2	11.3	31.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	27.2	6.5	28.2	5.0	27.3	7.7	27.0
Max Q Clear Time (g_c+I1), s	7.1	5.4	4.7	13.7	2.9	7.2	7.2	12.5
Green Ext Time (p_c), s	0.0	0.6	0.0	3.2	0.0	0.8	0.0	3.1

Intersection Summary	
HCM 6th Ctrl Delay	20.0
HCM 6th LOS	C

Notes

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

Intersection						
Int Delay, s/veh	0					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	4	1	533	322	0
Future Vol, veh/h	0	4	1	533	322	0
Conflicting Peds, #/hr	0	0	3	0	0	3
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	1	1	0
Mvmt Flow	0	4	1	579	350	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	934	353	353	0	-	0
Stage 1	353	-	-	-	-	-
Stage 2	581	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	297	695	1217	-	-	-
Stage 1	716	-	-	-	-	-
Stage 2	563	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	295	693	1214	-	-	-
Mov Cap-2 Maneuver	418	-	-	-	-	-
Stage 1	713	-	-	-	-	-
Stage 2	561	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1214	-	693	-	-
HCM Lane V/C Ratio	0.001	-	0.006	-	-
HCM Control Delay (s)	8	0	10.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	13	29	406	332	1
Future Vol, veh/h	4	13	29	406	332	1
Conflicting Peds, #/hr	0	1	2	0	0	2
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	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	4	14	31	432	353	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	850	357	356	0	-	0
Stage 1	356	-	-	-	-	-
Stage 2	494	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	334	692	1214	-	-	-
Stage 1	713	-	-	-	-	-
Stage 2	617	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	321	690	1212	-	-	-
Mov Cap-2 Maneuver	442	-	-	-	-	-
Stage 1	687	-	-	-	-	-
Stage 2	616	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.1	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1212	-	610	-	-
HCM Lane V/C Ratio	0.025	-	0.03	-	-
HCM Control Delay (s)	8	0	11.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	3	0	0	15	1	9
Future Vol, veh/h	3	0	0	15	1	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	68	68	68	68	68	68
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	4	0	0	22	1	13

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	4	0	26	4
Stage 1	-	-	-	-	4	-
Stage 2	-	-	-	-	22	-
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	-	-	1631	-	995	1085
Stage 1	-	-	-	-	1024	-
Stage 2	-	-	-	-	1006	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1631	-	995	1085
Mov Cap-2 Maneuver	-	-	-	-	995	-
Stage 1	-	-	-	-	1024	-
Stage 2	-	-	-	-	1006	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1075	-	-	1631	-
HCM Lane V/C Ratio	0.014	-	-	-	-
HCM Control Delay (s)	8.4	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	1.2					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	40	732	719	76	50	10
Future Vol, veh/h	40	732	719	76	50	10
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	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	8	8
Mvmt Flow	43	779	765	81	53	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	846	0	-	0	1282	423
Stage 1	-	-	-	-	806	-
Stage 2	-	-	-	-	476	-
Critical Hdwy	4.14	-	-	-	6.96	7.06
Critical Hdwy Stg 1	-	-	-	-	5.96	-
Critical Hdwy Stg 2	-	-	-	-	5.96	-
Follow-up Hdwy	2.22	-	-	-	3.58	3.38
Pot Cap-1 Maneuver	787	-	-	-	149	563
Stage 1	-	-	-	-	385	-
Stage 2	-	-	-	-	574	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	787	-	-	-	135	563
Mov Cap-2 Maneuver	-	-	-	-	254	-
Stage 1	-	-	-	-	348	-
Stage 2	-	-	-	-	574	-

Approach	EB		WB		SB	
HCM Control Delay, s	0.9		0		21	
HCM LOS					C	

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	787	-	-	-	254	563
HCM Lane V/C Ratio	0.054	-	-	-	0.209	0.019
HCM Control Delay (s)	9.8	0.4	-	-	22.9	11.5
HCM Lane LOS	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.8	0.1

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	750	776	71	0	20
Future Vol, veh/h	0	750	776	71	0	20
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	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	0	0
Mvmt Flow	0	833	862	79	0	22

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	471
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	-	-	-	0	545
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	545
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11.9
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	545
HCM Lane V/C Ratio	-	-	-	0.041
HCM Control Delay (s)	-	-	-	11.9
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.1

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	30	721	837	124	104	11
Future Vol, veh/h	30	721	837	124	104	11
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	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	2	2	0	0
Mvmt Flow	34	829	962	143	120	13

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1105	0	-	0	1517	553
Stage 1	-	-	-	-	1034	-
Stage 2	-	-	-	-	483	-
Critical Hdwy	4.14	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.22	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	628	-	-	-	~ 112	482
Stage 1	-	-	-	-	308	-
Stage 2	-	-	-	-	592	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	628	-	-	-	~ 101	482
Mov Cap-2 Maneuver	-	-	-	-	210	-
Stage 1	-	-	-	-	277	-
Stage 2	-	-	-	-	592	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	39.7
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	628	-	-	-	210	482
HCM Lane V/C Ratio	0.055	-	-	-	0.569	0.026
HCM Control Delay (s)	11.1	0.5	-	-	42.6	12.7
HCM Lane LOS	B	A	-	-	E	B
HCM 95th %tile Q(veh)	0.2	-	-	-	3.1	0.1

Notes

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

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	853	947	6	88	19
Future Vol, veh/h	5	853	947	6	88	19
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	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	5	889	986	6	92	20

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	992	0	-	0	1444	496
Stage 1	-	-	-	-	989	-
Stage 2	-	-	-	-	455	-
Critical Hdwy	4.12	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.21	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	699	-	-	-	125	525
Stage 1	-	-	-	-	325	-
Stage 2	-	-	-	-	611	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	699	-	-	-	123	525
Mov Cap-2 Maneuver	-	-	-	-	240	-
Stage 1	-	-	-	-	320	-
Stage 2	-	-	-	-	611	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	26
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	699	-	-	-	240	525
HCM Lane V/C Ratio	0.007	-	-	-	0.382	0.038
HCM Control Delay (s)	10.2	0.1	-	-	29	12.1
HCM Lane LOS	B	A	-	-	D	B
HCM 95th %tile Q(veh)	0	-	-	-	1.7	0.1

Intersection						
Int Delay, s/veh	0.3					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	940	907	9	0	40
Future Vol, veh/h	0	940	907	9	0	40
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	95	95	95	95	95	95
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	0	989	955	9	0	42

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	482
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	-	-	-	0	536
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	536
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12.3
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	536
HCM Lane V/C Ratio	-	-	-	0.079
HCM Control Delay (s)	-	-	-	12.3
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.3

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	911	896	14	104	10
Future Vol, veh/h	4	911	896	14	104	10
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	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	4	969	953	15	111	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	968	0	-	0	1454	484
Stage 1	-	-	-	-	961	-
Stage 2	-	-	-	-	493	-
Critical Hdwy	4.12	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.21	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	714	-	-	-	123	534
Stage 1	-	-	-	-	337	-
Stage 2	-	-	-	-	585	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	714	-	-	-	122	534
Mov Cap-2 Maneuver	-	-	-	-	244	-
Stage 1	-	-	-	-	333	-
Stage 2	-	-	-	-	585	-

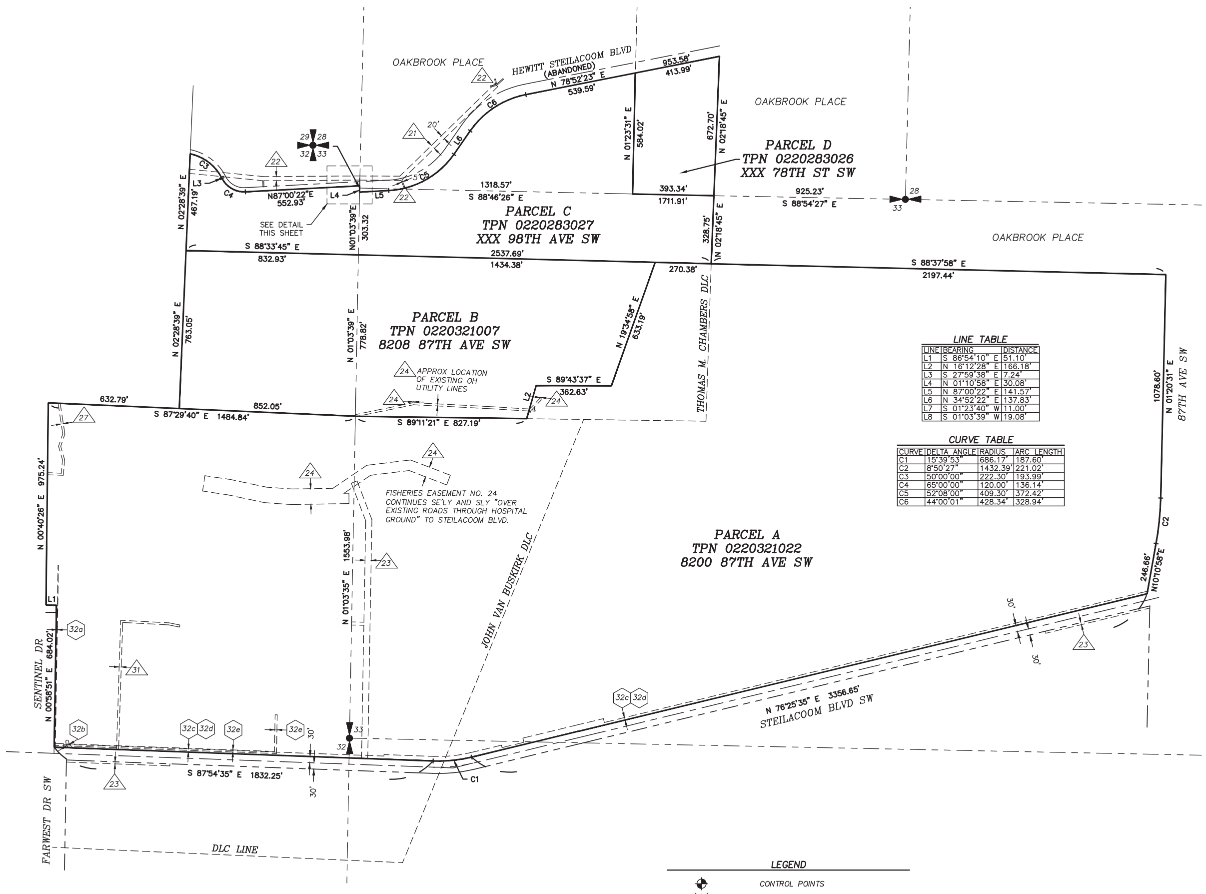
Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	29.7
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	714	-	-	-	244	534
HCM Lane V/C Ratio	0.006	-	-	-	0.453	0.02
HCM Control Delay (s)	10.1	0.1	-	-	31.4	11.9
HCM Lane LOS	B	A	-	-	D	B
HCM 95th %tile Q(veh)	0	-	-	-	2.2	0.1

Appendix 4: Property Survey

LU-20-00027 RECEIVED

TOPOGRAPHIC SURVEY
IN
SECTION 28, 29, 32, & 33, TOWNSHIP 20N, RANGE 2 EAST, W.M.



LINE TABLE

LINE	BEARING	DISTANCE
L1	S 86°54'10" E	51.10'
L2	N 16°12'28" E	166.18'
L3	S 27°59'38" E	7.24'
L4	N 01°10'58" E	30.08'
L5	N 87°00'22" E	141.57'
L6	N 34°52'22" E	137.83'
L7	S 01°23'40" W	11.00'
L8	S 01°03'39" W	19.08'

CURVE TABLE

CURVE	DELTA ANGLE	RADIUS	ARC LENGTH
C1	15°39'53"	686.17'	187.60'
C2	8°50'27"	1432.39'	221.02'
C3	50°00'00"	222.30'	193.99'
C4	65°00'00"	120.00'	136.14'
C5	52°08'00"	409.30'	372.42'
C6	44°00'01"	428.34'	328.94'

LEGAL DESCRIPTION AND RECORD DOCUMENTS:

PER STEWART TITLE GUARANTY COMPANY TITLE REPORT ORDER NO. 765139RT, DATED DECEMBER 6, 2019.

# DENOTES ITEM PER SCHEDULE B, PART II EXCEPTIONS OF TITLE REPORT IS PLOTTED HEREON, OTHERWISE ITEM IS NOT PLOTTABLE OR IS BLANKET IN NATURE.

ITEM	DATE	RECORDING NO.	PURPOSE
17	11-25-1912	371622	WAIVER OF CLAIM FOR DAMAGES AND CONSENT TO LOCATE ROAD AND THE TERMS AND CONDITIONS THEREOF.
18	9-18-1914	410088	RESERVATIONS AND OTHER MATERS CONTAINED IN DEED.
19	10-2-1914	410089	RESERVATIONS AND OTHER MATERS CONTAINED IN DEED.
20	12-17-1919	545124	RESERVATIONS AND OTHER MATERS CONTAINED IN DEED.
21	8-15-1951	1602314	EASEMENT AND THE TERMS AND CONDITIONS THEREOF GRANTED TO THE CITY OF TACOMA FOR 20 FOOT WIDE ACCESS ROAD, ANCHOR, GUY WIRES, AND THE RIGHT TO CUT AND TRIM TREES AFFECTING GRANTEE'S FACILITIES. DESCRIPTION CONTAINED IN DOCUMENT IS INSUFFICIENT TO PLOT HEREON. APPROX LOCATION OF EXISTING UTILITY LINES SHOWN HEREON.
22	7-24-1967	2198758	EASEMENT AND THE TERMS AND CONDITIONS THEREOF GRANTED TO THE CITY OF TACOMA FOR DISTRIBUTION AND TRANSMISSION LINES.
23	7-24-1967	2198758	EASEMENT AND THE TERMS AND CONDITIONS THEREOF GRANTED TO PIERCE COUNTY FOR A RIGHT-OF-WAY FOR PUBLIC ROAD FACILITIES (STORM SEWER MAIN AND AUXILIARY LINE AND "HOLDING LANES").
24	7-13-1973	2510380	EASEMENT AGREEMENT AND THE TERMS AND CONDITIONS THEREOF GRANTED TO CITY OF TACOMA FOR TRANSMISSION LINE, ANCHORS, AND GUY WIRES. EXACT LOCATION COULD NOT BE DETERMINED FROM DOCUMENT. APPROX AS-BUILT LOCATION SHOWN HEREON.
25	7-24-1975	2615674	EASEMENT AGREEMENT AND THE TERMS AND CONDITIONS THEREOF GRANTED TO STATE OF WASHINGTON DEPARTMENT OF FISHERIES FOR SALMON REARING FACILITY. EXHIBIT MAPS CONTAINED IN DOCUMENT ARE INSUFFICIENT TO PLOT EXACT LOCATION OF FACILITIES. APPROX LOCATION SHOWN HEREON.
26	8-28-1975	2621947	EASEMENT AGREEMENT AND THE TERMS AND CONDITIONS THEREOF GRANTED TO BOISE CASCADE COMPANY FOR AN ACCESS ROUTE. LOCATION OF EASEMENT IS DESCRIBED AS THE "WEST 60 FEET OF THE WESTERN STATE HOSPITAL GROUNDS FROM STEILACOOM BOULEVARD ROAD NORTH 1050 FEET." IT IS NOT CLEAR AS TO THE INTENT OF THE EXACT LOCATION AND IS NOT PLOTTED HEREON.
27	2-24-1978	2801980	EASEMENT AND THE TERMS AND CONDITIONS THEREOF GRANTED TO BOISE CASCADE CORPORATION FOR UNDERGROUND PIPELINE FOR CARRYING WASTE MATERIAL.
28	1-16-1984	8401160239	MATTERS AS DISCLOSED BY RECORD OF SURVEY.
29	8-7-1997	9708070108	MATTERS AS DISCLOSED BY RECORD OF SURVEY. SURVEY SHOWS FENCES NOT CONFORMING TO THE PROPERTY LINES ALONG THE WESTERLY PORTION OF SUBJECT PROPERTY.
30	11-22-2005	200511225007	MATTERS AS DISCLOSED BY RECORD OF SURVEY.
31	9-12-2017	201709120549	EASEMENT AND THE TERMS AND CONDITIONS THEREOF GRANTED TO PUGET SOUND ENERGY FOR ONE OR MORE UTILITY SYSTEMS. SAID EASEMENT IS A CORRECTION OF INSTRUMENT RECORDED UNDER RECORDING NO. 201610270684.
32	1-9-2018	201801095001	ALL COVENANTS, CONDITIONS, RESTRICTIONS, RESERVATIONS, EASEMENTS, OR OTHER SERVITUDES, IF ANY, BUT OMITTING RESTRICTIONS, IF ANY, BASED UPON RACE, COLOR, CREED OR NATIONAL ORIGIN, DISCLOSED BY CITY OF LAKEWOOD BOUNDARY LINE ADJUSTMENT LU17-00179. THIS SURVEY SHOWS THE FOLLOWING EASEMENTS (LISTED BELOW) WHICH ARE NOT CONTAINED IN THE ABOVE MENTIONED TITLE REPORT:

RECORD DOCUMENTS AS SHOWN ON BLA LU17-00179, AF NO. 201801095001, HOWEVER NOT CONTAINED IN SAID TITLE REPORT:

NOTE: THE FOLLOWING EASEMENTS ARE NOT CONTAINED IN THE ABOVE MENTIONED TITLE REPORT, THEREFORE, THE CURRENT STATUS IS UNCERTAIN AT THE TIME OF THIS SURVEY. IT IS RECOMMENDED THE CLIENT OBTAIN THE SERVICES OF THE TITLE COMPANY TO REVIEW AND VERIFY THE CURRENT STATUS OF THESE EASEMENTS.

32a	6-19-2007	200706190184	EASEMENT AND THE TERMS AND CONDITIONS THEREOF GRANTED TO QWEST FOR TELECOMMUNICATIONS FACILITIES.
32b	4-21-2010	201004210386	EASEMENT AND THE TERMS AND CONDITIONS THEREOF GRANTED TO CITY OF LAKEWOOD FOR ROAD IMPROVEMENTS.
32c	1-11-2007	200701110073	EASEMENT AND THE TERMS AND CONDITIONS THEREOF GRANTED TO CITY OF LAKEWOOD FOR POWER FACILITIES. NOTE: IT IS BELIEVED THE LEGAL DESCRIPTION AND EXHIBIT MAP CONTAINED IN DOCUMENT CONTAINS MATHEMATICAL ERRORS. APPROX LOCATION SHOWN HEREON.
32d	1-24-2007	200701240256	EASEMENT AND THE TERMS AND CONDITIONS THEREOF GRANTED TO CITY OF LAKEWOOD FOR POWER FACILITIES. NOTE: IT IS BELIEVED THE LEGAL DESCRIPTION AND EXHIBIT MAP CONTAINED IN DOCUMENT CONTAINS MATHEMATICAL ERRORS. APPROX LOCATION SHOWN HEREON.
32e	1-26-2007	200701261096	EASEMENT AND THE TERMS AND CONDITIONS THEREOF GRANTED TO PUGET SOUND ENERGY FOR ONE OR MORE UTILITY SYSTEMS.

NOTE: THE UNDERSIGNED SURVEYOR EXPRESSES NO LEGAL OPINION REGARDING THE STATUS OR ENCROACHMENTS OF THE ABOVE LISTED DOCUMENTS, EXPRESSES NO LEGAL OPINION REGARDING LEGAL LANGUAGE, TERMS AND CONDITIONS, AGREEMENT PERIODS OR EXPIRATIONS, OR ANY OTHER NON-SURVEY RELATED MATTERS CONTAINED IN SAID DOCUMENTS, AND ALSO EXPRESSES NO LEGAL OPINION AS TO THE OWNERSHIP OR NATURE OF ANY POTENTIAL ENCROACHMENTS SHOWN HEREON. ALL ITEMS LISTED ABOVE ARE SURVEY RELATED MATTERS ONLY. DEEDS OF TRUST, PROPERTY TAX INFORMATION, MORTGAGES AND OTHER FINANCIAL DOCUMENTS, AND OTHER NON-SURVEY RELATED MATTERS CONTAINED IN TITLE REPORT ARE NOT A PART OF THIS SURVEY.

LEGEND

CONTROL POINTS
LIGHT POLE
CATCH BASIN
WHEEL STOP
PROPERTY LINE
CENTER LINE
RIGHT OF WAY
BUILDING OVERHANG
FENCE AS NOTED
EDGE OF PAVEMENT
EDGE OF GRAVEL
SS — SANITARY SEWER
SD — STORM DRAIN
OH — OVERHEAD UTILITY
G — GAS LINE
W — WATER LINE
P — UNDERGROUND POWER
TC — UNDERGROUND TELECOMMUNICATIONS
BUILDING HATCH
CONCRETE HATCH

METHOD OF SURVEY

CONTROL SURVEY PERFORMED USING RTK METHODS WITH THE USE OF TOPCON GR5 GPS RECEIVERS. ON-SITE SURVEY PERFORMED USING CONVENTIONAL FIELD TRAVERSE METHODS WITH THE USE OF A TOPCON PS-103 TOTAL STATION.

THIS SURVEY MEETS OR EXCEEDS THOSE STANDARDS CONTAINED IN WAC 332-130-090.

BASIS OF BEARINGS

WASHINGTON STATE PLANE COORDINATES, SOUTH ZONE 4602, NAD 83/91

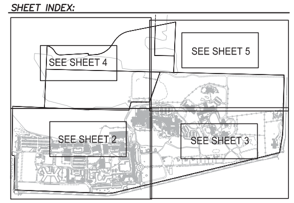
ALL DISTANCES ARE GROUND SCALE IN U.S. SURVEY FEET.

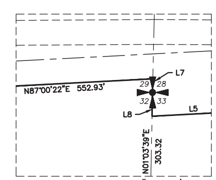
0 300 600 900

SCALE 1" = 300'

WASHINGTON STATE PLANE COORDINATE SYSTEM, SOUTH ZONE 4602, NAD 83/91

SHEET INDEX:





DETAIL SCALE 1" = 50'

SURVEYORS CERTIFICATE

I HEREBY CERTIFY THAT THIS MAP IS AN ACCURATE REPRESENTATION MADE BY ME OR UNDER MY DIRECTION.

JEREME F. CHAPMAN
PROFESSIONAL LAND SURVEYOR
CERTIFICATE NO. 45779

01/29/2020
DATE

JEREME F. CHAPMAN, STATE OF WASHINGTON, 45779, REGISTERED PROFESSIONAL LAND SURVEYOR 1/29/20

kpff
612 Woodland Square Loop SE,
Suite 100
Lacey, WA 98503
360.292.7230
www.kpff.com

TOPOGRAPHIC SURVEY
OF A PORTION OF
SEC. 28, 29, 32, & 33
TWP 20 N, R 2 E, W.M.,
AT THE REQUEST OF
WESTERN STATE HOSPITAL

SCALE: 1" = 300'
JOB: 81900132
DATE: 01/29/2020
SHEET 1 OF 5
81900132.DWG

LU-20-00027 RECEIVED

TOPOGRAPHIC SURVEY
IN
SECTION 28, 29, 32, & 33, TOWNSHIP 20N, RANGE 2 EAST, W.M.

SEE SHEET 4

0 100 200 300

SCALE 1" = 100'

NOTES

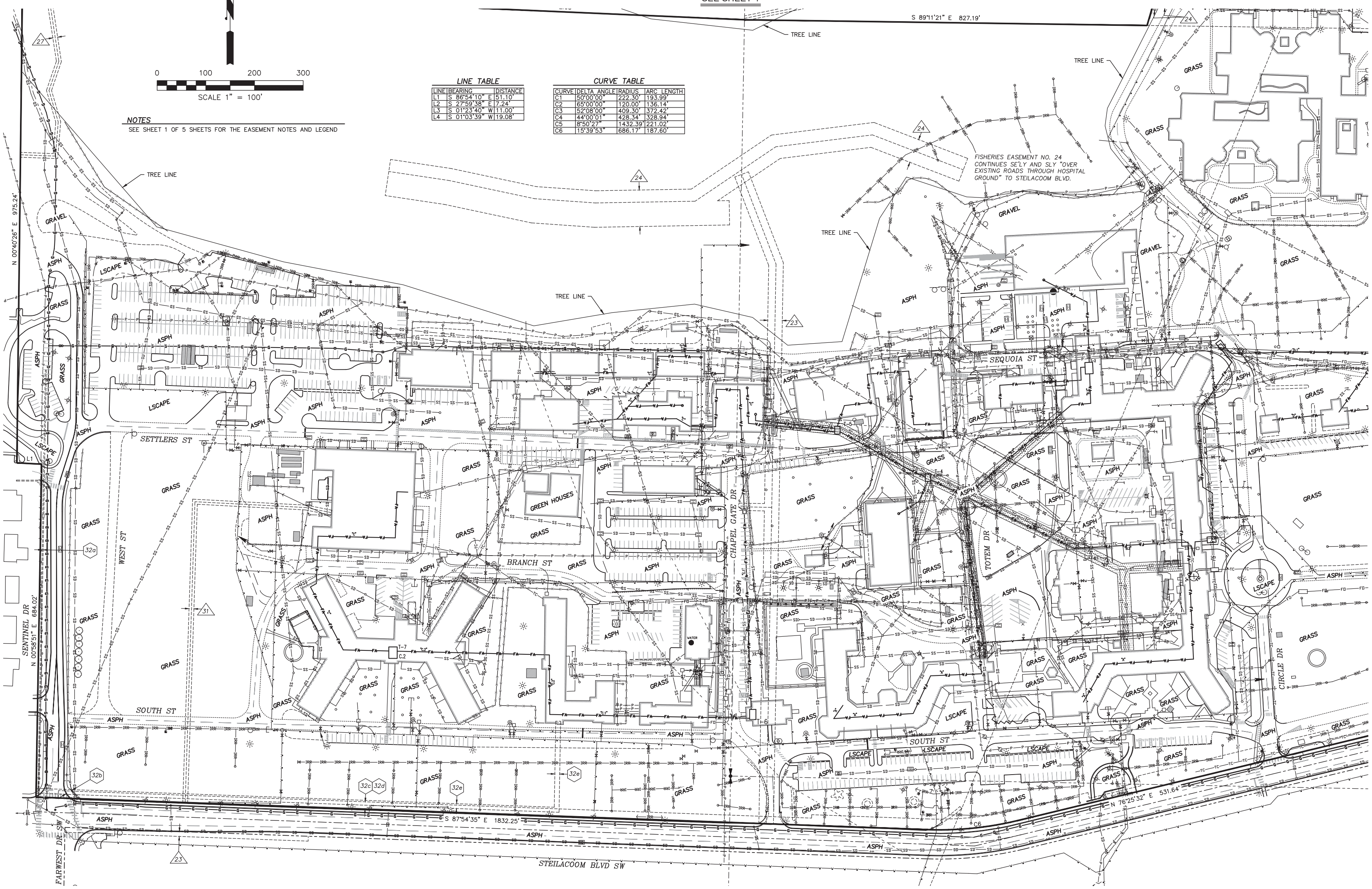
SEE SHEET 1 OF 5 SHEETS FOR THE EASEMENT NOTES AND LEGEND

LINE TABLE

LINE	BEARING	DISTANCE
L1	S 86°54'10" E	51.10'
L2	S 27°59'38" E	7.24'
L3	S 01°23'40" W	11.00'
L4	S 01°03'39" W	19.08'

CURVE TABLE

CURVE	DELTA ANGLE	RADIUS	ARC LENGTH
C1	50°00'00"	222.30'	193.99'
C2	65°00'00"	120.00'	136.14'
C3	52°08'00"	409.30'	372.42'
C4	44°00'01"	428.34'	328.94'
C5	8°50'27"	1432.39'	221.02'
C6	15°39'53"	686.17'	187.60'



SEE SHEET 3

SURVEYORS CERTIFICATE

I HEREBY CERTIFY THAT THIS MAP IS AN ACCURATE REPRESENTATION MADE BY ME OR UNDER MY DIRECTION.

JEREME F. CHAPMAN
PROFESSIONAL LAND SURVEYOR
CERTIFICATE NO. 45779

01/29/2020
DATE

JEREME F. CHAPMAN STATE OF WASHINGTON 45779 REGISTERED PROFESSIONAL LAND SURVEYOR 1/29/20

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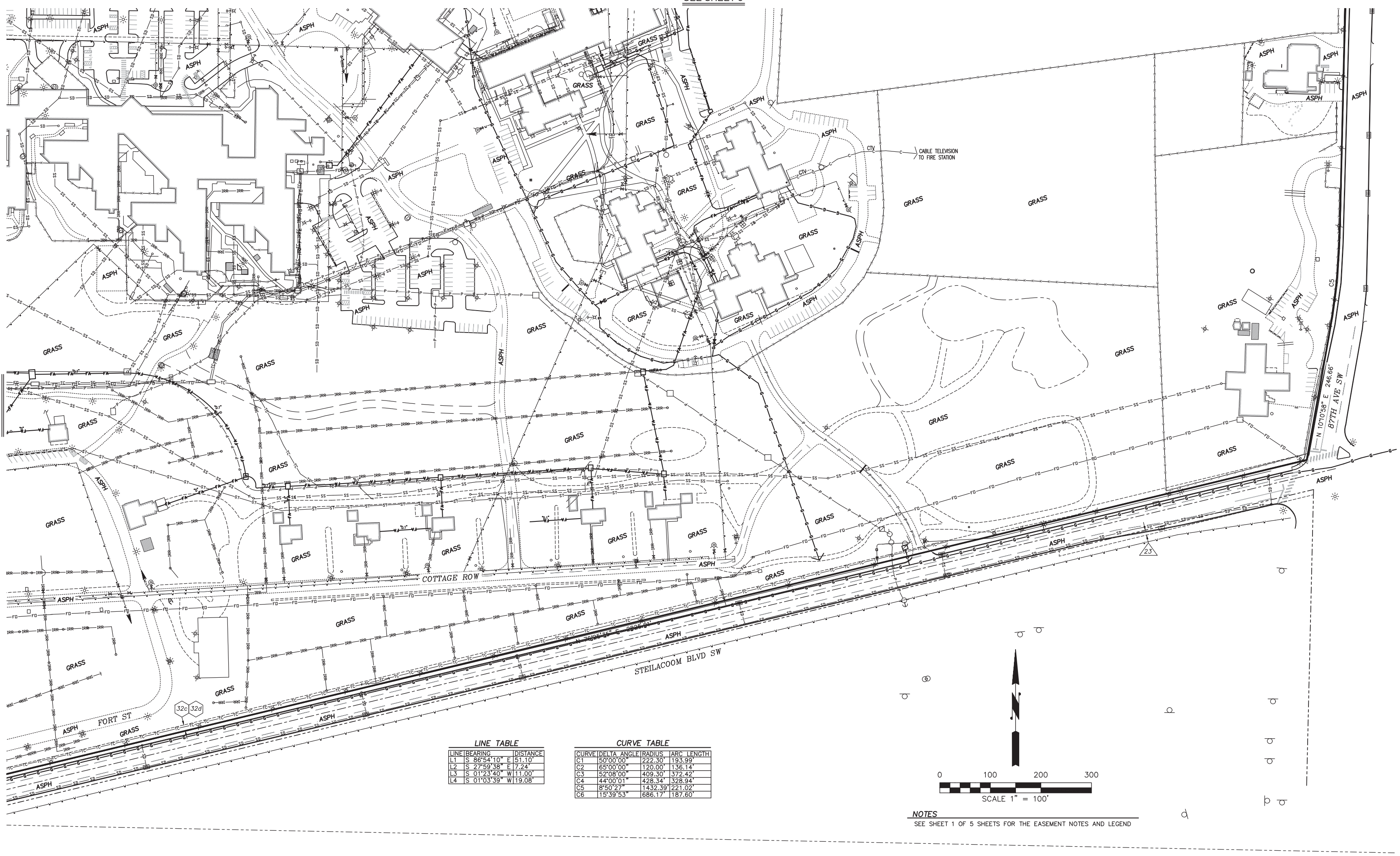
TOPOGRAPHIC SURVEY

OF A PORTION OF
SEC. 28, 29, 32, & 33
TWP 20 N, R 2 E, W.M.,
AT THE REQUEST OF
WESTERN STATE HOSPITAL

SCALE: 1" = 100'
JOB: 81900132
DATE: 01/29/2020
SHEET 2 OF 5
81900132.DWG

TOPOGRAPHIC SURVEY
IN
SECTION 28, 29, 32, & 33, TOWNSHIP 20N, RANGE 2 EAST, W.M.

SEE SHEET 5



LINE TABLE

LINE	BEARING	DISTANCE
L1	S 86°54'10" E	51.10'
L2	S 27°59'38" E	7.24'
L3	S 01°23'40" W	11.00'
L4	S 01°03'39" W	19.08'

CURVE TABLE

CURVE	DELTA ANGLE	RADIUS	ARC LENGTH
C1	50°00'00"	222.30'	193.99'
C2	65°00'00"	120.00'	136.14'
C3	52°08'00"	409.30'	372.42'
C4	44°00'01"	428.34'	328.94'
C5	8°50'27"	1432.39'	221.02'
C6	15°39'53"	686.17'	187.60'

NOTES
SEE SHEET 1 OF 5 SHEETS FOR THE EASEMENT NOTES AND LEGEND

SURVEYORS CERTIFICATE

I HEREBY CERTIFY THAT THIS MAP IS AN ACCURATE REPRESENTATION MADE BY ME OR UNDER MY DIRECTION.

JEREME F. CHAPMAN
PROFESSIONAL LAND SURVEYOR
CERTIFICATE NO. 45779

01/29/2020
DATE

JEREME F. CHAPMAN STATE OF WASHINGTON 45779 REGISTERED PROFESSIONAL LAND SURVEYOR 1/29/20

kpff
612 Woodland Square Loop SE,
Suite 100
Lacey, WA 98503
360.292.7230
www.kpff.com

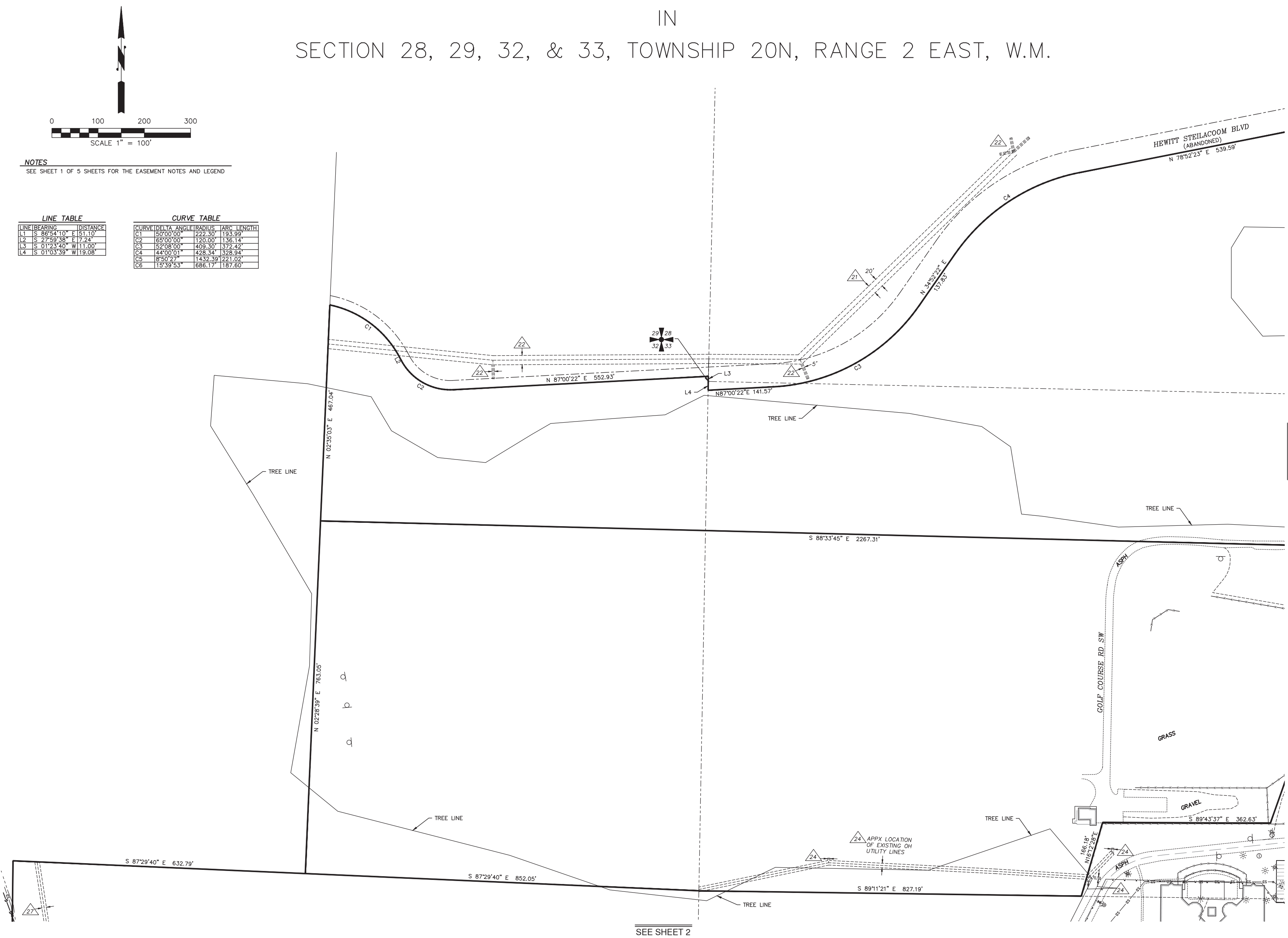
TOPOGRAPHIC SURVEY
OF A PORTION OF
SEC. 28, 29, 32, & 33
TWP 20 N, R 2 E, W.M.,
AT THE REQUEST OF
WESTERN STATE HOSPITAL

SCALE: 1" = 100'
JOB: 81900132
DATE: 01/29/2020

81900132.DWG

LU-20-00027 RECEIVED

TOPOGRAPHIC SURVEY
IN
SECTION 28, 29, 32, & 33, TOWNSHIP 20N, RANGE 2 EAST, W.M.



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SHEET 4 OF 5
81900132.DWG

TOPOGRAPHIC SURVEY
IN
SECTION 28, 29, 32, & 33, TOWNSHIP 20N, RANGE 2 EAST, W.M.

SEE SHEET 4

SEE SHEET 3

SCALE 1" = 100'

NOTES

SEE SHEET 1 OF 5 SHEETS FOR THE EASEMENT NOTES AND LEGEND

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DATE

JEREMY F. CHAPMAN
STATE OF WASHINGTON
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SHEET 5 OF 5
81900132.DWG

Appendix 5: Natural Resources Reconnaissance

PBS

February 7, 2020

Craig Tompkins, AIA
SRG PARTNERSHIP, INC
621 SW Columbia Street
Portland, Oregon 97201

Via email: ctompkins@srgpartnership.com

Regarding: Natural Resource Evaluation
Western State Hospital Master Plan Update
Lakewood, Washington
PBS Project 41189.001, Phase 0001

Mr. Tompkins,

PBS has been retained to conduct initial site investigation to support City of Lakewood SEPA permitting for master planned improvements on the Western State Hospital Campus. The site investigation consists of an evaluation of the natural resource elements typically regulated under SEPA in the soils, water, plants, and animals' sections of SEPA. The following specific resources in these categories will be addressed:

- Soils. General characteristics of the soils present at the site
- Waters. A summary of mapped floodplains, wetlands, streams and other waters on the Campus or in the vicinity
- Plants. A summary of the plants present on the Campus, with particular emphasis on wetland plants; plants that are listed under the US Endangered Species Act as Endangered, Threatened, or Candidate; have been identified as rare or sensitive; have populations of high conservation value; or are considered noxious weeds.
- Animals that are listed under the US Endangered Species Act as Endangered, Threatened, or candidate; are otherwise federally regulated; are considered priority habitats or species by Washington State Department of Fish and Wildlife; or are defined by the City of Lakewood as Critical Fish or Wildlife species.

The following memorandum introduces the site and the master plan process and describes the methods and results of the initial environmental site investigation.

1 SITE LOCATION AND DESCRIPTION

Western State Hospital (WSH) is located in the City of Lakewood, Washington (Figure 1). The City of Lakewood (City) is located in western Pierce County approximately seven miles south of the City of Tacoma, and 22 miles to the northeast of the state capital in Olympia.

The Western State Hospital Campus is located on the north side of Steilacoom Boulevard SW, extending from 87th Avenue SW on the east to Sentinel Drive on the west. The Campus extends northward from Steilacoom Boulevard SW to Golf course Road SW on the east side to approximately 79th Street SW on the west. The campus totals approximately 288 acres, and is composed of four separate tax parcels, described below.

The largest parcel (0220321022) is 215.71 acres is size, and includes the frontage of Steilacoom Boulevard SW from 87th Avenue SW westward to Sentinel Drive. This parcel contains most of the developed portions of the campus, as well as Garrison Springs and the associated forested valley slopes.

The second parcel (0220321007) is 36.73 acres in size, and extends northward from Garrison Springs. This parcel includes the majority of the Fort Steilacoom Golf Course.

The third parcel (0220283027) is 29.75 acres in size, and is located to the north of Parcel 0220321007. This parcel includes the northern ¼ of the Fort Steilacoom Golf Course, the forested valley slope to the north, and the forested disc golf course area to the east.

The last parcel (0220283026) is located at the northeastern-most corner of the site and is 6.15 acres in size. The parcel is currently part of the disc golf course.

2 MASTER PLANNING

WSH was established on the site of historic Fort Steilacoom in 1871, and is one of only two state-owned psychiatric hospital for adults in Washington. WSH provides inpatient mental health services to adults from 20 western Washington counties. The hospital provides evaluation and inpatient treatment for individuals with serious or long-term mental illness, including patients referred through their Behavioral Health Organization, the civil court system (when individuals meet the criteria for involuntary treatment under RCW 71.05), or through the criminal justice system (RCW 10.77). WSH provides more than 800 beds for these patients, and employs approximately 2,200 staff members, making it the fourth largest employer in the City of Lakewood.

DSHS is engaged in an ongoing master planning effort for the WSH campus to: incorporate changing facility needs; address the growth management issues of stakeholders (including Pierce County and the City of Lakewood); and streamline the permitting process for future projects. The initial master plan for the campus was approved by the City in 1998 and is based on a 10-year planning period. An update to the Master Plan was prepared in 2008, and the latest planning efforts were initiated in 2018. As part of the current master planning update, DSHS has evaluated several alternatives for layout of the campus, including rehabilitating existing buildings and constructing new facilities.

3 METHODS

The presence of elements of the natural environment were evaluated using a two-step process. The first step consisted of an in-office evaluation based of existing maps and documents for the vicinity. The second step consisted of a reconnaissance level field evaluation to ground-truth the in-office evaluation and identify any additional resource present. Additional details of the methods used for these two steps are described below.

In-Office Evaluation

The office evaluation consisted of a review of online sources and documents to identify the presence of or conditions that would support the presence of natural resource elements (soils, water, plants, and animals). The Study Area for the in-office evaluation included the WSH Campus and adjoining areas within 200 feet as required by Lakewood Municipal Code (LMC) 14.162.070. Specific documents reviewed included:

General site information:

- Current and recent historical aerial photographs (Google Earth, 2019)

- Climate and precipitation data (US Department of Agriculture National Resources Conservation Service [USDA NRCS] Field Office, 2019a)

Soils:
- Digital soil data for the Study Area (USDA NRCS, 2019b)

Water:
- FEMA floodplain maps (FEMA, 2019)
- Wetlands of High Conservation Value and USFWS National Wetland Inventory map (Washington Department of Natural Resources [WDNR], 2019b)
- Local critical area data from Pierce County PublicGIS (Pierce County, 2019)

Plants:
- Endangered species information (IPaC Information for Planning and Consultation; USFWS, 2019)
- Known rare plants and nonvascular species of high conservation value (WDNR, 2019b)
- County list of rare plants (WDNR, 2018)
- State noxious weed list (Washington State Noxious Weed Control Board, 2019)
- County noxious weed list (Pierce County Noxious Weed Control Board, 2019)

Animals:
- Fish Passage online mapping application (WDFW, 2019a)
- Forest Practices Application Review System mapper (WDNR, 2019a)
- Priority Habitats and Species online mapping (WDFW, 2019c)
- Salmonscape (WDFW, 2019d)
- Salmon and Steelhead Stock Inventory Assessment Program Statewide Fish Distribution (SWIFD) Map (The Northwest Indian Fisheries Commission, 2019)
- Streamnet (Pacific States Marine Fisheries Commission, 2019)

Other documents:
- Lakewood Municipal Code
- Lakewood Shoreline Management Program

Field Evaluation

Following the in-office evaluation, a reconnaissance level field evaluation was conducted. The purpose of the field evaluation was to verify date from the in-office evaluation and identify any additional resources present on the Western State Hospital Campus or in the vicinity.

The field evaluation included resources in the water, plant and animal elements of the natural environment, including wetlands, streams, and wildlife. The field evaluation was restricted to the parcels within the Western State Hospital Campus, with supplemental information collected from publicly accessible rights-of-way.

Plants

Plant communities were visually evaluated, and species were identified using botanical reference books (Cooke, 1997; Hitchcock and Cronquist, 1973; Pojar and MacKinnon, 2004; and Taylor, 1990) and web sites (Giblin et al., 2003; Pierce County Noxious Weed Control Board, 2019,WDNR, 2018 and 2019; and Washington Noxious Weed

Control Board, 2019). Plant nomenclature and wetland indicator status are consistent with the *2016 National Wetland Plant List* (Lichvar et al., 2016).

Wetlands

The wetland component of the field evaluation was conducted in accordance with the definition from the LMC 14.162.020, using the methods outlined in the US Army Corps of Engineers (USACE) *Wetlands Delineation Manual* (Environmental Laboratory, 1987), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys and Coast Supplement (Version 2.0)* (WMVC Regional Supplement) (USACE, 2010), and the *Washington State Wetlands Identification and Delineation Manual* (Ecology, 1997).

Wetlands on the WSH Campus were classified according to the habitat guidelines in *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al., 1979), and preliminary ratings were determined using the criteria the *Washington State Wetland Rating System for Western Washington* Revised (Hruby, 2014).

Streams

The presence of stream bed and bank features were identified based on the presence of an ordinary highwater mark (OHWM) consistent with the criteria listed in LMC 14.164.010. The presence of an OHWM was determined using the indicators described in *Determining the Ordinary High Water Mark for Shoreline Management Act Compliance in Washington State* (Anderson et. Al., 2016). Stream in on the WSH Campus were preliminarily rated using the criteria identified in the City of Lakewood's Shoreline Master Program (SMP) Chapter 4 Section C.

Animals (Fish and Wildlife)

The presence of fish and wildlife were identified consistent with the requirements outlined for Fish and Wildlife Habitat Conservation Areas in Pierce County Code (PCC) 18E.040.030.B and City of Lakewood Municipal Code requirements for Critical Fish and Wildlife Habitat Conservation Areas (LMC 14.154.020).

The field evaluation of the presence of terrestrial wildlife and habitats was based on the presence of visual indicators such as nests, scat, trails, and audible such as calls and vocalizations. Stream habitats were identified consistent with the criteria in *The California Department of Fish and Game Salmonid Habitat Restoration Manual* (CDFG 1998) and *Stream habitat classification and inventory procedures for northern California* (McCain et al., 1990).

4 RESULTS

The results of the office review and the field investigation are provided below. Sections for both evaluations are divided by environmental element.

Office Evaluation

The following sections document the results of the in-office evaluation.

Topography and Soils

The Campus is primarily upland terraces with slopes less than 15 percent; with the overall topography sloping gently from the southeast corner to the northwest corner. Steeper slopes (up to 70 percent in some areas) are present on the forested valley slopes to the north and south of the golf course.

Three soil mapping units were identified in the study area: Spanaway gravelly sandy loam; Everett very gravelly sandy loam; and Xerochrepts (Web Soils Survey, NRCS, 2019b). The boundaries between these soil map units are shown in Figure 2, and a summary of the characteristics is provided below in Table 1.

Table 1 Soils present in the Study Area[1]

Symbol	Map Unit Name	Slope	Landform	Parent Material	Drainage Class	Soils hydric? Hydric inclusions?
41A	Spanaway gravelly sandy loam	0 to 15%	Terraces and plains	Glacial outwash	Somewhat excessively drained	No (15% Spana, Yes)
13D	Everett very gravelly sandy loam	15 to 30%	Outwash terraces and escarpments, kames, moraines, eskers	Glacial outwash	Somewhat excessively drained	No (10% Alderwood, No but may support wetlands in some situations) (10% Indianola, No)
47F	Xerochrepts	45 to 70%	Valley sides	Sandy and gravelly outwash and/or glacial till	Well drained	No

[1] NRCS, 2019b.

Spanaway soils occur at elevations from 200 to 590 feet and are typically used for woodland, pasture, cropland, homesites, and wildlife habitat (NRCS, 2019b). Spanaway gravelly sandy loam is not considered a hydric (wetland) soil by the National Technical Committee for Hydric Soils (NTCHS).

Everett soils occur at elevations from 30 to 900 feet and are typically used for livestock grazing, timber production, and urban development (NRCS, 2019b). Everett very gravelly sandy loam is not considered a hydric soil by the NTCHS, however this soil unit does include slopes of 15 to 30 percent.

Xerochrept soils occur at elevations from 0 to 980 feet on steep valley sides; these soils are not considered hydric soils by NTCHS, however this soil unit does include slopes of 45 to 70 percent.

Wetlands

The Washington Natural Resources Heritage Program (Figure 3), using the U.S. Fish and Wildlife Service National Wetland Inventory (NWI) data, identifies two riverine wetland systems (R4SBC; riverine intermittent streambed seasonally flooded) within the study area and one palustrine wetland (PUBKx; palustrine unconsolidated bottom artificially flooded excavated) to the west of the property (WDNR, 2019b). Pierce County PublicGIS does not identify wetlands on or within the vicinity of the Site (Figure 4) (Pierce County, 2019).

Streams and other Waters

Two streams were identified within the Study Area: Garrison Springs and an Unnamed Tributary to Chambers Creek. The stream locations shown on maps from WDFW, WDNR, and Pierce County and fisheries resources are consistent with the riverine wetland systems identified in the National Wetland Inventory mapping (Figure 3).

Plants

The following sections detail the results for evaluation of plant species listed under the federal Endangered Species Act, plant species or habitats identified as rare or sensitive by the WDNR Natural Resources Heritage Program, priority habitats and species identified by WDFW; and noxious weeds identified by the Washington State and Pierce County Noxious Weed Control Boards.

Federally Listed Plants

A review of information from the USFWS IPaC database (Appendix A) identified three federally threatened or endangered plant species as potentially present in the vicinity of the project. These species are listed in Table 2 and described below.

Table 2. Federally Listed Plant Species

Common Name	Scientific Name	Federal ESA Listing Status	Critical Habitat Designated?
Golden Paintbrush	*Castilleja levisecta*	Threatened	No
Marsh Sandwort	*Arenaria paludicola*	Endangered	No
Water Howellia	*Howellia aquatilis*	Threatened	No

Golden paintbrush is listed as Threatened under the ESA and is found in native northwest grasslands. There are no current or historic populations in Pierce County (USFWS, 2000). Marsh sandwort is listed as Endangered under the ESA. This species is found in swamps, wetlands, and freshwater marshes along the coast (WDNR, 2019c). In western Washington, water howellia occurs in low-elevation wetlands and small vernal pools (WDNR, 2019c).

Rare and Sensitive Plant Species

The WDNR Natural Resources Heritage Program website identifies three rare or sensitive species as potentially present on or near the WSH Campus. Characteristics of these species are listed in Table 3 and described below.

Table 3. Rare and Sensitive Plant Species

Common Name	Scientific Name	Historic or Current presence?	Washington State Status	Potential habitat present?
White-top aster	*Seriocarpus rigidus*	Current	Sensitive	Yes
Common bluecup	*Githopsis specularioides*	Historic	Sensitive	Possible
Giant chain fern	*Woodwardia fimbriata*	Historic	Sensitive	Yes

White-top aster is found in relatively flat, open grasslands of lowlands in gravelly, glacial outwash soils (WDNR, 2019c). White-top aster is mapped as occurring in the northeast corner of the WSH Campus (Figure 3) and has been identified by WDNR as present as recently as August 13, 2010 (WDNR 2019b).

Common bluecup is historically found in the vicinity of the WSH Campus. This species is found in dry, open places in lowlands, such as grassy balds, talus slopes, and gravelly prairies. There are no recent observations of common bluecup in Pierce County, and none of the habitats that support this species are present within the Study Area.

Giant chain fern is historically found in the vicinity of the WSH Campus. This species is found in stream banks, shaded wet road banks, the edges of bogs, and wet bluffs amongst coniferous trees and adjacent to saltwater. Similar habitats are present on the Western State Hospital Campus and nearby.

Native Plants

Mapping from the WDNR Natural Resources Heritage Program identifies a single native plant community as present on or near the WSH Campus. This plant community is Oregon white oak (*Quercus garryana*) dominated or co-dominated canopies. This community occurs in four locations on the Western State Hospital Campus: two on the eastern end of the Fort Steilacoom Golf Course near Garrison Springs, and two to the east one either side of Kids First Lane. Location of these habitat area are shown on Figure 5.

Noxious, Invasive, and Non-Native Plants

No noxious weeds are mapped on the Western State Hospital Campus. Table 4 presents a list of noxious weeds and non-native plants identified in the Study Area or mapped within the vicinity.

Table 4. List of Noxious, Invasive, and Non-Native Plants

State Classification	Common Name (*Scientific Name*)
Class A Noxious Weed	Spotted knapweed (*Centaurea biebersteinii*, or *C. maculosa*) Tansy ragwort (*Senecio jacobaea*)

[1] Non-regulated noxious weed per Pierce County Noxious Weed Control Board

Future projects will meet Pierce County and City of Lakewood regulations with regard to the control of noxious and invasive weeds.

Animals

Federal and State-Listed Habitats and Species

The USFWS IPaC website (Appendix A), NOAA Fisheries ESA listings, and WDFW PHS data (Figure 6) identify several federally and state threatened or endangered species, as well as priority habitats and species in the vicinity of the project. The results are presented in Table 5.

Table 5. Listed Habitats and Species

Common Name	Scientific Name	Status	Critical Habitat Designated?
Puget Sound Chinook Salmon	*Oncorhynchus tshawytscha*	Federally Threatened	Yes
Puget Sound Steelhead	*O. mykiss*	Federally Threatened	Yes
Puget Sound-Coastal Bull Trout	*Salvelinus confluentus*	Federally Threatened	Yes
Gray wolf	*Canus lupus*	Federally Endangered (Proposed for delisting)	No
North American Wolverine	*Gulo gulo luscus*	Federally Threatened (Proposed)	No
Marbled murrelet	*Brachyramphus marmoratus*	Federally Threatened	Yes
Streaked horned lark	*Eremophila alpestris strigata*	Federally Threatened	Yes
Yellow-billed cuckoo	*Coccyzus americanus*	Federally Threatened	Proposed

Common Name	Scientific Name	Status	Critical Habitat Designated?
Oregon spotted frog	*Rana pretiosa*	Federally Threatened	Yes
Biodiversity area	N/A	State Priority Habitat	N/A
Little brown bat	*Myotis lucifugus*	State Priority Species	N/A
Slender-billed white-breasted nuthatch	*Sitta carolinensis aculeata*	State Candidate Species	N/A
Western Pond Turtle	*Actinemys marmorata*	State Endangered	N/A

Salmonscape (Figure 7) and StreamNet (Figure 8) were also reviewed for presence of anadromous fish, but no habitat was identified in either database. No invasive animals are known to be present in the Study Area.

Migratory Bird Act and the Bald and Golden Eagle Protection Act

The USFWS IPaC website (Appendix A) provided several species which are protected under the Migratory Bird Act that may be present in the Study Area. These species. The results are presented in Table 6.

Table 6. Listed Migratory Birds

Common Name	Scientific Name	Breeding Season[1]
Bald Eagle	*Haliaeetus leucocephalus*	January 1 – September 30
Black Turnstone	*Arenaria melanocephala*	Breeds elsewhere[2]
Great Blue Heron	*Ardea herodias fannini*	March – August 15
Lesser Yellowlegs	*Tringa flavipes*	Breeds elsewhere[2]
Marbled Godwit	*Limosa fedoa*	Breeds elsewhere[2]
Olive-sided Flycatcher	*Contopus cooperi*	May 20 – August 31
Red-throated Loon	*Gavia stellate*	Breeds elsewhere[2]
Rufous Hummingbird	*Selasphorous rufus*	April 15 – July 15
Western Screech-owl	*Megascops kennicottii kennicottii*	March 1 – June 30

[1] Noted by USFWS to be a liberal estimate of breeding season
[2] Indicates the species does not likely breed within project area

Critical Fish and Wildlife Species and Habitats

LMC 14.154.020 identifies a list of 11 critical fish and wildlife species and habitats, five of which are likely to occur on-site. Table 7 provides details on these critical fish and wildlife species and habitats.

Table 7. Critical Fish and Wildlife Species and Habitats

Habitats and Species of Local Importance	Description
Priority Oregon white oak woodlands	WDNR identifies four patches of either oak-dominant forest or woodland canopy, or urban oak canopy (Figure 5). The four patches are located in the northern half of the property, and total 32.61 acres.
Snag-rich areas	Snag-rich areas are likely to occur adjacent to the two streams within the Study Area.
Rivers and streams with critical fisheries	Rivers and streams with critical fisheries are known to occur in the Study Area and are discussed above.
Waters of the state, including all water bodies classified by the Washington Department of Natural Resources (DNR) water typing classification system as detailed in WAC 222-16-030, together with associated riparian areas	WDNR Forest Practices Application Mapping Tool identifies Garrison Springs and the unnamed tributary to Chambers Creek within the Study Area (Figure 9).
Lakes, ponds, streams, and rivers planted with game fish by a governmental entity or tribal entity.	Garrison Springs Hatchery may meet the requirements of this habitat of local importance, the hatchery is run by WDFW (WDFW, 2019b).

Field Evaluation

Patrick Togher (Professional Wetland Scientist) conducted the field evaluation of the project Study Area on June 27, 2019. The field evaluation was conducted from within the Western State Hospital Campus, with supplemental data collected from publicly accessible rights-of-way.

The level of effort for this field evaluation is consistent with a reconnaissance level analysis. As a result, formal delineations of wetlands and streams were not conducted, and formal presence studies were not complete for the presence of ESA species or rare plants.

Soils

No field evaluation was conducted for soils. Individual projects within the Master Plan will require preparation of a Geotechnical Memorandum or Geotechnical Report to assess soil and slope characteristics for compliance with SEPA and City of Lakewood permit requirements.

Wetlands

An evaluation of the presence of wetlands requires that the reviewer determine whether the recent rainfall reflects the normal precipitation for the area. For this evaluation, precipitation data was gathered from the Tacoma weather station #1, which is north nearest site with comprehensive precipitation records. Precipitation measurements for the three months preceding the field visit were reviewed and area summarized in Table 8. Rainfall data for June 1 – 26 of 2019 is included in the table, but was not used in the calculation of normal rainfall.

Table 8. Monthly Precipitation in Inches and "normal" ranges and means for the Tacoma #1 Station, Tacoma, Washington[1]

Month	Mean[1]	30% chance less than[1]	30% chance more than[1]	Measured Rainfall	Condition	Value	Weight	Result[2]
March	4.5	3.32	5.28	1.9	Below	1	1	1
April	3.19	2.13	3.82	2.65	Normal	2	2	4
May	2.07	1.11	2.53	0.4	Below	1	3	3
June 1-26[3]	1.52	0.95	1.84	0.14	Below			
Overall								**8**

[1] Agricultural Applied Climate System WETS Station in Tacoma#1 Weather Station, Tacoma, WA. Data for the normal range represents the period from 1983 to 2018 (USDA NRCS, 2019a).
[2] Results of 6-9 are below normal, results of 10-14 are normal, results of 15-16 are above normal.
[3] Precipitation for the portion of June prior to the field visit.

Precipitation for the three months before the field evaluation was below normal, and the rainfall for the 26 days immediately preceding the field visit were also below normal for this period. However, seeps on the site were flowing freely and streams in the vicinity were near their normal water levels. As a result, we believe that sufficient primary and secondary indicators of wetland hydrology were present to assess the presence of wetlands on the Campus.

Two wetlands (GS South and GS North) were identified within or in the immediate vicinity of the project area (Figure 9). A description of the wetlands is provided in Table 9. The table summarizes the Cowardin classification, hydrogeomorphic class, and preliminary rating and buffer width per LMC 14.162.080.

Table 9. Potential Wetlands Present at the Site with Preliminary Ratings and Buffers

Wetland	Wetland HGM Class[1]	Cowardin Classification[2]	Dominant Species Observed	Wetland Hydrology Indicators Observed	Preliminary Wetland Rating[,3,4]	Preliminary Buffer Width4[3]
GS South	Slope	Palustrine Forested (PFO)	Red alder, salmonberry, Himalayan blackberry, lady fern, giant horsetail, and English ivy	Saturation at the surface, shallow inundation/surface flows	II/III	60-225

GS North	Slope	Palustrine Forested (PFO)	Red alder, salmonberry, Himalayan blackberry, lady fern, giant horsetail, small-fruited bulrush, and English ivy	Saturation at the surface, shallow inundation/surface flows	II/III	60-225

[1] Hydrogeomorphic classification after Hruby (2014).
[2] Cowardian classification after Cowardin et al. (1979).
[3] Preliminary rating based on Washington State Wetland Rating System for Western Washington (Hruby, 2014).
[4] Local wetland ratings and buffer widths are based on City of Lakewood Municipal Code (LMC) Title 14 – Environmental Protection (LMC 14.162).

Wetlands GS North and GS South are slope wetlands associated with the Garrison Springs riparian corridor. Numerous areas of seepage were observed on the valley walls upslope of the stream during the site visit, and these areas were dominated by wetland plant species. Preliminary wetland ratings were completed with the 2014 Washington State Wetland Rating System for Western Washington, consistent with LMC 14.162.030. Both wetlands fall on the margin of the Category II/III. Buffers for wetland with these ratings range from 60-225 feet, depending on the habitat score.

Streams
The presence of the two streams identified during the in-office evaluation were confirmed during the field evaluation. These streams, Garrison Springs and an Unnamed Tributary to Chambers Creek, are shown on Figures 3, 7 and 8. A summary of the characteristics of these streams and preliminary stream rating and buffer widths are provided in Table 10.

Table 10. Potential Streams present at the Site and preliminary rating

Stream	Flows to	Preliminary Stream Rating[1,2]	Preliminary Buffer Width[2]
Garrison Springs	Chambers Creek	Perennial, Fish-bearing (Type F)	65-150
Unnamed Tributary to Chambers Creek	Chambers Creek	Perennial, Fish-bearing (Type F)	65-150

[1] Water typing based on definition per 14.165.010
[2] Local stream ratings and buffer widths are based on Lakewood's Shoreline Master Program (SMP) Chapter 4 Section C.

Garrison Springs/Garrison Creek is located in the central west portion of the Western State Hospital Campus. Garrison Springs, is a perennial stream, originating from seeps on the steep slopes on the western portion of the Campus and flowing northwest to the Garrison Springs Hatchery and the Chambers Creek Estuary on Puget Sound. Garrison Springs is approximately 5-15 feet wide at the ordinary high water mark and appeared to be channelized adjacent to the access road which leads to the hatchery. Current habitat in the stream is predominantly riffle and run type. Pools are largely limited to the areas above man-made structures on the stream. The stream substrate is primarily gravels with some fines, and the banks are somewhat incised. Mixed forest canopy and forested slope wetlands provided 100 percent canopy coverage, except where interrupted by the hatchery access road. The stream flows beneath Chambers Creek Road, entering Chambers Creek through a concrete box outfall with a steel rack that limits access.

The unnamed stream is a tributary to Chambers Creek and is located beyond the Campus northern property line. As a result, most of the stream could not be evaluated during the site assessment. However, water could be heard flowing the deep, steep sided valley located to the north of the Fort Steilacoom Golf Course. The lower reach of this stream appears to be piped beneath the abandoned industrial facility at Chambers Creek Road. Several seeps areas were also identified in this area, and a concrete pipe outfall was located on the estuary of Chambers Creek, which likely represents the terminus of this stream. Flows were present at the outfall in July 2019, indicating that flows in this stream area likely perennial. Aerial imagery shows a densely vegetated, mixed forest riparian canopy in the riparian area, extending from the disc golf area northwest to Chambers Creek Road.

Future Master Plan projects at the Campus that require State or federal funding or permits will be required to assess the presence of wetlands and streams prior to funding or permit approval. More detailed field studies would be conducted at this time.

Plants

The majority of the Campus is developed, and vegetation in these areas consists of maintained lawn area with landscape trees. Species present in this area include common domestic grasses (bent grasses [*Agrostis* sp.], bluegrasses [*Poa* sp.], fescues [*Festuca* sp.], and rye grasses [*Lolium* sp.]) and disturbance tolerant forbs (e.g. common dandelion [*Taraxicum officinale*], hairy cat's ear [*Hypocharis radicata*], sheep sorrel [*Rumex acetosella*], etc.), and landscape trees (domestic cherry and flowering plums [*Prunus* sp.], European horse-chestnut [*Aesculus hippocastanum*], Norway maple [*Acer platanoides*], and Tree-of-Heaven [*Alianthus altissima*]), with scattered native trees (Douglas fir [*Pseudotsuga menziesii*], Sitka spruce [*Picea sitchensis*], and copses of Oregon white oak.

The Fort Steilacoom Golf Course is located the northwest corner of the property, and is also maintained as grass, with scattered native coniferous trees and Oregon White Oak. The disc golf area has a similar canopy to the golf course. In the open areas, the shrub community is dominated by Scot's brook (*Cytissus scoparius*). In areas where the canopy is denser, the dominant shrub species include California dewberry (*Rubus ursinus*), dull Oregon grape (*Berberis nervosa*), evergreen blackberry (*Rubus laciniatus*), Himalayan blackberry (*Rubus armeniacus*), and snowberry (*Symphicarpos albus*).

In the two ravine areas, the vegetation consists of a mixture of native and non-native species. The dominant species present include red alder (*Alnus rubra*) and bigleaf maple (*Acer macrophyllum*) in the canopy, and California dewberry (*Rubus ursinus*), dull Oregon grape, evergreen blackberry, Himalayan blackberry, oceanspray (*Holodiscus discolor*), salmonberry (*Rubus spectabilis*), snowberry, and vine maple (*Acer circinatum*). Dominant herbaceous species present include giant horsetail (*Equisetum telmateia*), orchard grass (*Dactylis glomerata*), reed cararygrass (*Phalaris arundinacea*), Pineland sword fern (*Polystichum munitum*), and western lady fern (*Athyrium cyclosorum*).

Federally Listed Plants

The field reconnaissance did not identify any individuals of golden paintbrush, marsh sandwort or water howellia on the WSH campus. However, the protocols for identification of ESA plants require multiple field visits conducted over several years, and timed to match the emergence/flowering of the target species. Future projects in the Master Plan will need to conduct more comprehensive field studies to fully determine the presence of ESA listed plants.

Rare and Sensitive Plant Species

The field reconnaissance did not identify any individuals of white-top aster, common bluecup, or giant chain fern. However, the protocols for identification of rare and sensitive species may require multiple field visits timed to match the emergence/flowering of the target species. Considering the relatively recent identification of white-top aster (August 2010). This species should be presumed to be present, and future projects in the Master Plan will need to conduct more comprehensive field studies for the presence of rare and sensitive plant species.

Native Plants

Table 11 presents a list of the native trees, shrubs, and herbaceous species identified on the WSH Campus during the field evaluation.

Table 11. List of Native Plants on WSH Campus

Stratum	Common Name (*Scientific Name*)
Tree	Bigleaf maple (*Acer macrophyllum*) Oregon white oak (*Quercus garryana*) Red alder (*Alnus rubra*)
Shrub	California dewberry (Rubus ursinus) Dull Oregon grape (*Berberis nervosa*) Oceanspray (*Holodiscus discolor*) Salmonberry (*Rubus spectabilis*) Snowberry (*Symphicarpos albus*) Vine maple (*Acer circinatum*)
Herbaceous	Giant horsetail (*Equisetum telmateia*) Orchard grass (Dactylis glomerata) Sword fern, or Pineland sword fern (*Polystichum munitum*) Western lady fern (*Athyrium cyclosorum*)

Noxious, Invasive, and Non-Native Plants

No Class A noxious weeds were identified on the WSH Campus during the field investigation. Scattered knapweed specimens were present on the site, but were not positively identified as *C. biebersteinii*. A number of Class B and C noxious weeds were identified on the Campus. These species are listed below in Table 12.

Table 12. List of Noxious, Invasive, and Non-Native Plants

State Classification	Common Name (*Scientific Name*)
Class A Noxious Weed	Scattered knapweed specimens were present on the site, but were not positively identified as *C. biebersteinii.*
Class B Noxious Weed	Scot's broom (*Cytissus scoparius*) [1]
Class C Noxious Weed	English ivy (*Hedera helix*) Evergreen blackberry (*Rubus laciniatus*)[1] Hairy cat's ear (*Hypochaeris radicata*) Himalayan blackberry (*Rubus armeniacus*) [1] Reed canarygrass (*Phalaris arundinacea*) [1] Tree of Heaven (*Alianthus altissima*)

State Classification	Common Name (*Scientific Name*)
Non-regulated, non-native species	Bentgrasses (*Agrostis* sp.) Bluegrass (*Poa* sp.) Cherry (likely cultivar varieties of the genus *Prunus*) Common sheep sorrel (*Rumex acetosella*) Eastern redcedar (*Juniperus virginiana*) European horse-chestnut (*Aesculus hippocastanum*) Fescue grasses (*Festuca* sp.) Flowering plum (varieties of the genus *Prunus)* Lanceleaf plantain (*Plantago lanceolata*) Norway Maple (*Acer platanoides*)

[1] Non-regulated noxious weed per Pierce County Noxious Weed Control Board.

Future Master Plan projects at the Campus will need to meet Pierce County and City of Lakewood regulations with regard to the control of noxious and invasive weeds.

Animals

The only positive wildlife identifications during the field evaluation were woodpeckers (identified by their sound), squirrels (likely eastern gray squirrel [*Sciurus carolinensis*] or eastern fox squirrel [*Sciurus niger*]), and American crow (*Corvus brachyrhynchos*). However, considering the large size of the site and the presence of relatively undisturbed riparian areas in close proximity to Puget Sound, we would anticipate a variety of wildlife species that are adapted to proximity with suburban human populations, such as rats, mice, voles and similar rodents; North American raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), and passerine bird species. Deer (*Odocoileus* sp.) and coyote (*Canis latrans*) and were not observed on the Campus, but are likely present due the proximity of the riparian habitats on and near the Campus to Chambers Creek Estuary, which supports a variety of fish and wildlife species. A brief reconnaissance of the estuary area positively identified deer, great blue heron (*Ardea herodias*), and bald eagle (*Haliaeetus leucocephalus*).

Federal and State-Listed Habitats and Species

Suburban developed areas in the Puget Sound do not provide suitable, usable habitat for large terrestrial predators such as Gray wolf or North American Wolverine. Oregon spotted frog requires relatively large areas of emergent wetland that are not present on the Campus.

Exposed gravel areas to the site could provide potential habitat for streaked horned lark, but the frequency of disturbance on the Campus makes nesting by this species unlikely. Nearby marine areas could potentially provide foraging habitat for marbled murrelet. Habitat suitable for use by yellow-billed cuckoo includes large tracts of riparian habitat with small trees and shrubs suitable for nesting. Some areas of similar riparian habitat are present on the Campus and nearby. Future projects should assume that streaked horned lark, marbled murrelet, yellow-billed cuckoo or suitable habitats may be present and should conduct more detailed studies.

Streams on the Campus and nearby have long culverted sections or other man-made barriers that preclude use by listed anadromous ESA listed fish species (Chinook salmon, steelhead, and bull trout). However, these species are present in Puget Sound and likely use the nearby areas of Chambers Creek. As a result, future projects should assume the potential for impact to these species.

The riparian areas along Garrison Springs and the unnamed Tributary to Chambers Creek meet the definition of biodiversity areas and would be protected as critical areas. Similarly, habitats for little brown bat, slender-billed white-breasted nuthatch (mapped on the site) western pond turtle (mapped in the vicinity) would also need to be considered by future projects. Potential impacts to migratory birds during their breeding season would need to be considered by future projects.

Future Master Plan projects at the Campus should conduct detailed field studies to identify ESA listed, priority, and critical species and habitats in the immediate project vicinity.

5 CONCLUSIONS

We hope this memorandum has been responsive to your needs for a natural resource evaluation to support the preparation of a SEPA Checklist for the Western State Hospital Master Plan. Please feel free to contact me at 206.766.7618 or patrick.togher@pbsusa.com with any questions or comments.

Sincerely,

Digitally signed by Patrick J. Togher, PWS
Date: 2020.02.07 08:56:19 -08'00'

Patrick J Togher,
Senior Project Manager

PJT:GP:EJ

6 REFERENCES

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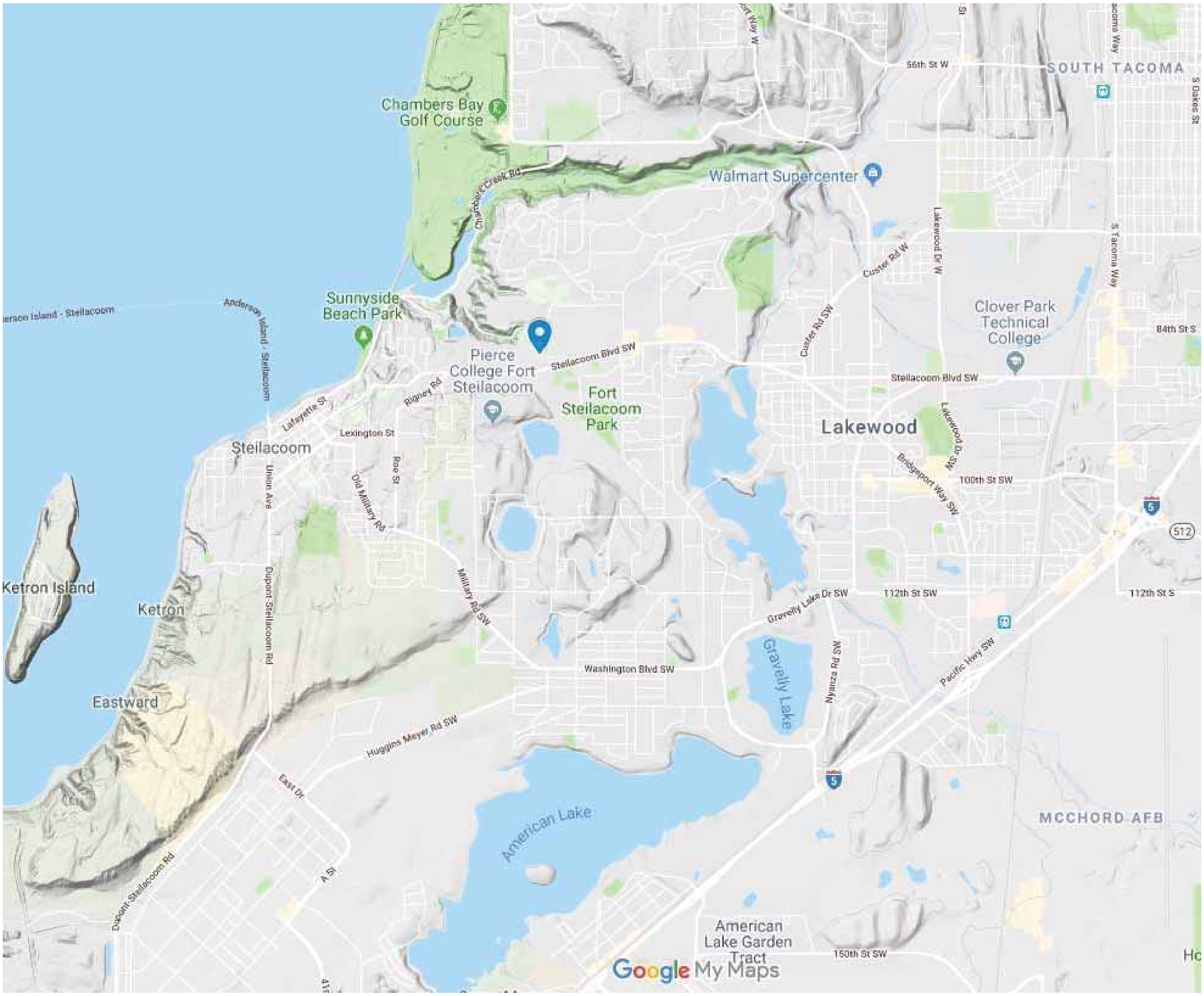
Figures



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VICINITY MAP
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FIGURE

1

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
13D	Everett very gravelly sandy loam, 15 to 30 percent slopes	3.6	0.6%
41A	Spanaway gravelly sandy loam	536.7	84.7%
47F	Xerochrepts, 45 to 70 percent slopes	76.3	12.0%
48A	Xerorthents, fill areas	11.7	1.9%
Totals for Area of Interest		**633.6**	**100.0%**

N

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WEB SOIL SURVEY MAP

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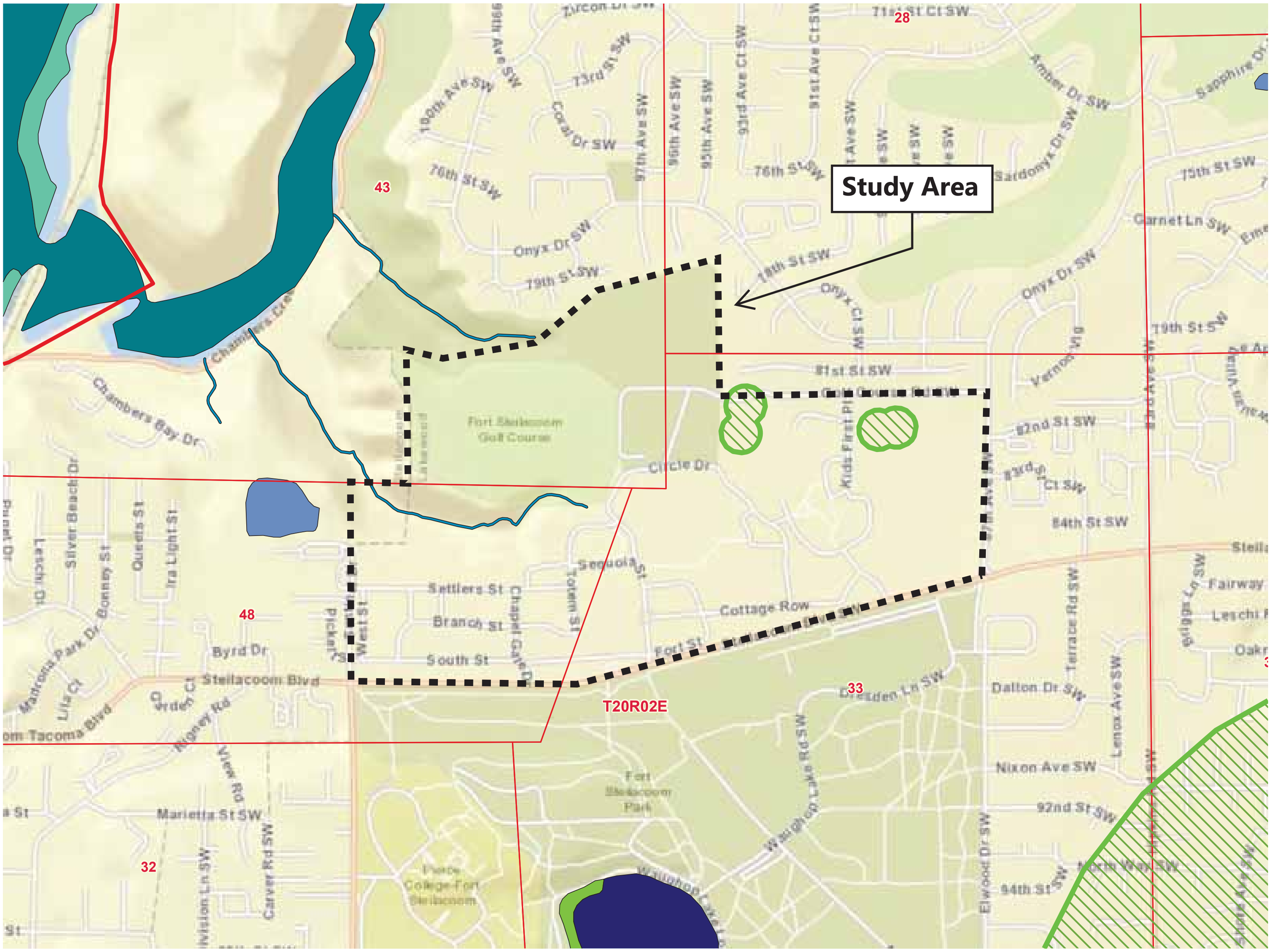
FIGURE

2



Known Rare Plants and Nonvascular Species of High Conservation Value
Counties
Townships
Sections
USFWS National Wetlands Inventory
Estuarine and Marine Deepwater
Estuarine and Marine Wetland
Freshwater Emergent Wetland
Freshwater Pond
Lake
Riverine

N

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

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NATIONAL WETLAND INVENTORY & RARE PLANTS MAP
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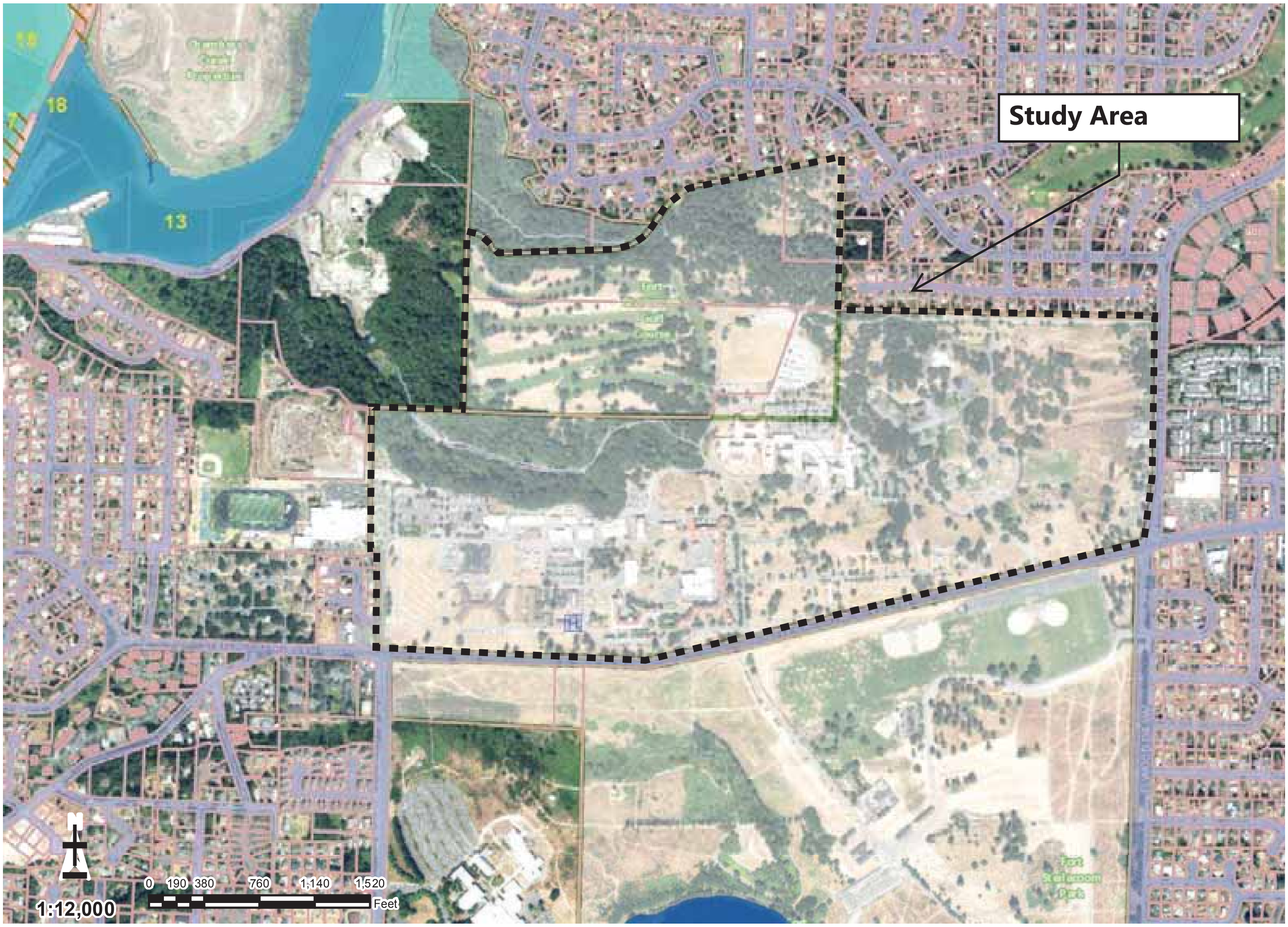
FIGURE 3



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PIERCE COUNTY PUBLICGIS MAP

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FIGURE

4

PATCH NAME, PATCH SIZE IN ACRES

PATCH A, 2.7985 AC
PATCH B, 1.9348 AC
PATCH C, 18.3011 AC
PATCH D, 9.5754 AC
PATCH TOTAL: 32.61 AC

N

SOURCE: WDNR GIS OPEN DATA, DATED FEBRUARY 28, 2019

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OREGON WHITE OAK WOODLANDS MAP
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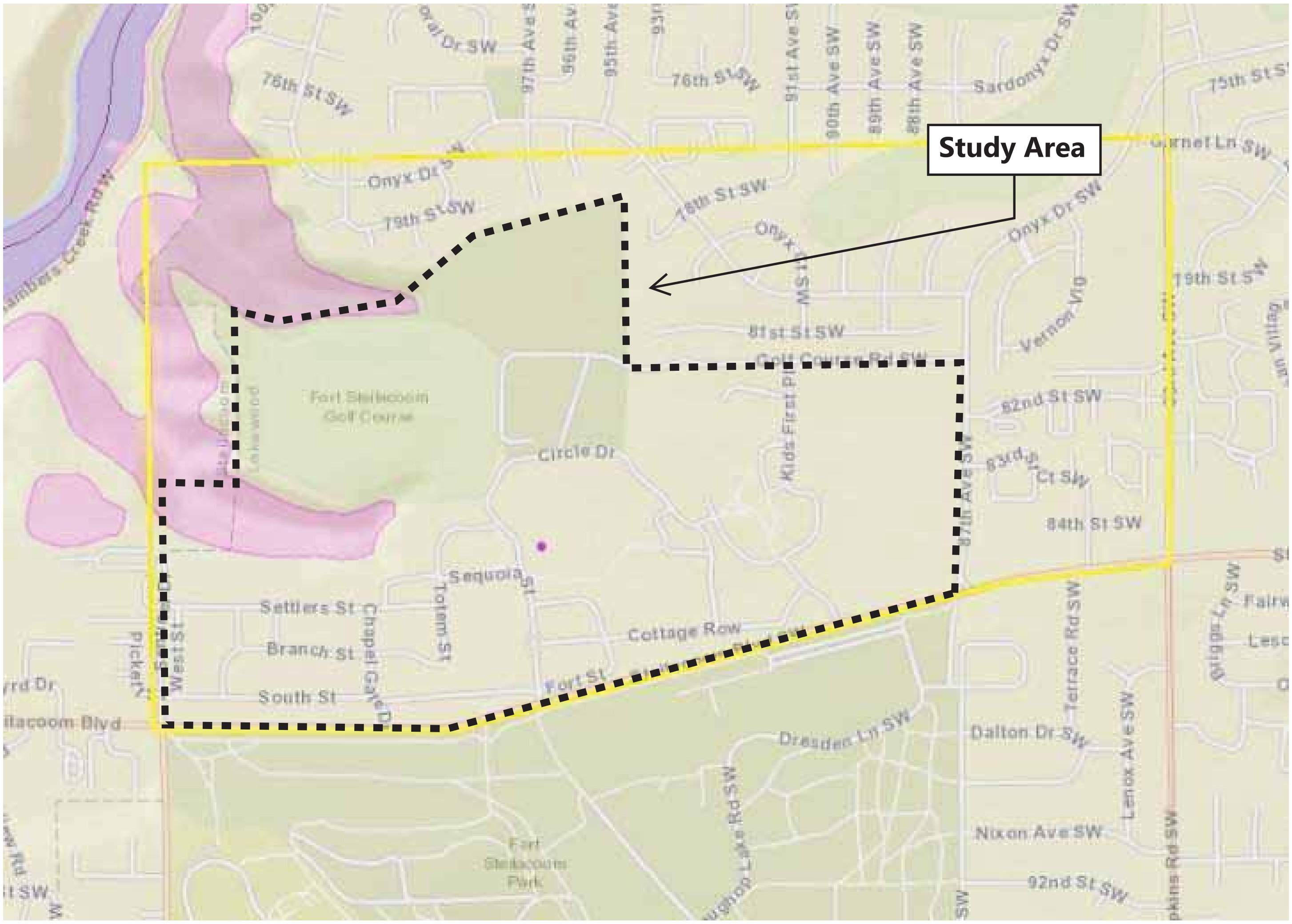
FIGURE
5



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WDFW PHS MAP
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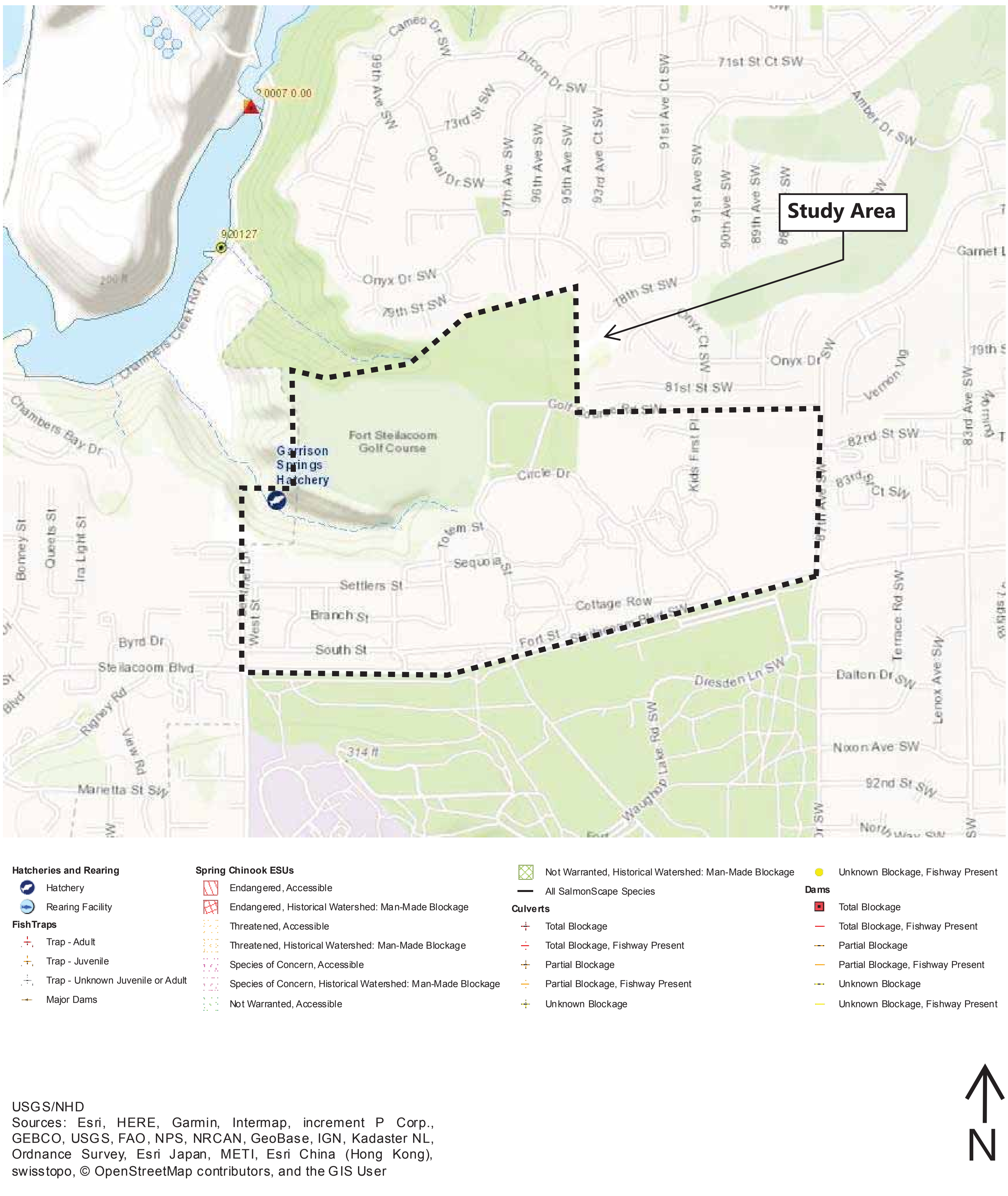
FIGURE
6

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
PRIORITY HABITATS AND SPECIES REPORT

SOURCE DATASET: PHSPlusPublic Query ID: P190625130711
REPORT DATE: 06/25/2019 1.07

Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type
Biodiversity Areas And	PUYALLUP STEEP OPEN PHSREGION 902552	Terrestrial Habitat N/A http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A N/A PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Polygons
Biodiversity Areas And	PIERCE COUNTY CANDIDATE PHSREGION 902061	Terrestrial Habitat N/A http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A N/A PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Polygons
Little Brown Bat Myotis lucifugus	WS_OccurPoint 110873 June 01, 1997	Breeding Area Biotic detection http://wdfw.wa.gov/publications/pub.php?	Map 1:12,000 <= 33	N/A N/A PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points
Slender-billed white- Sitta carolinensis aculeata	WESTERN WA STATE WS_OccurPoint 113059 January 01, 1983	Breeding Site Biotic detection	1/4 mile (Quarter	N/A Candidate PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Points
Western Pond Turtle Actinemys marmorata	WS_OccurPoint 110843 October 21, 2007	Occurrence Biotic detection http://wdfw.wa.gov/publications/pub.php?	1/8 mile	N/A Endangered PHS LISTED	Y QTR-TWP	WA Dept. of Fish and Wildlife Points
Western Pond Turtle Actinemys marmorata	WS_OccurPoint 110841 April 19, 2006	Occurrence Biotic detection http://wdfw.wa.gov/publications/pub.php?	1/8 mile	N/A Endangered PHS LISTED	Y QTR-TWP	WA Dept. of Fish and Wildlife Points
Western Pond Turtle Actinemys marmorata	WS_OccurPoint 110840	Occurrence Biotic detection http://wdfw.wa.gov/publications/pub.php?	1/8 mile	N/A Endangered PHS LISTED	Y QTR-TWP	WA Dept. of Fish and Wildlife Points

Common Name Scientific Name Notes	Site Name Source Dataset Source Record Source Date	Priority Area Occurrence Type More Information (URL) Mgmt Recommendations	Accuracy	Federal Status State Status PHS Listing Status	Sensitive Data Resolution	Source Entity Geometry Type
Western Pond Turtle Actinemys marmorata	WS_OccurPoint 110842 November 18, 2006	Occurrence Biotic detection http://wdfw.wa.gov/publications/pub.php?	1/8 mile	N/A Endangered PHS LISTED	Y QTR-TWP	WA Dept. of Fish and Wildlife Points
Western Pond Turtle Actinemys marmorata	PHSREGION 912957	Occurrence Individual occurrence http://wdfw.wa.gov/publications/pub.php?	1/4 mile (Quarter	N/A Endangered PHS LISTED	Y QTR-TWP	WA Dept. of Fish and Wildlife Polygons



USGS/NHD
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User

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SALMONSCAPE MAP
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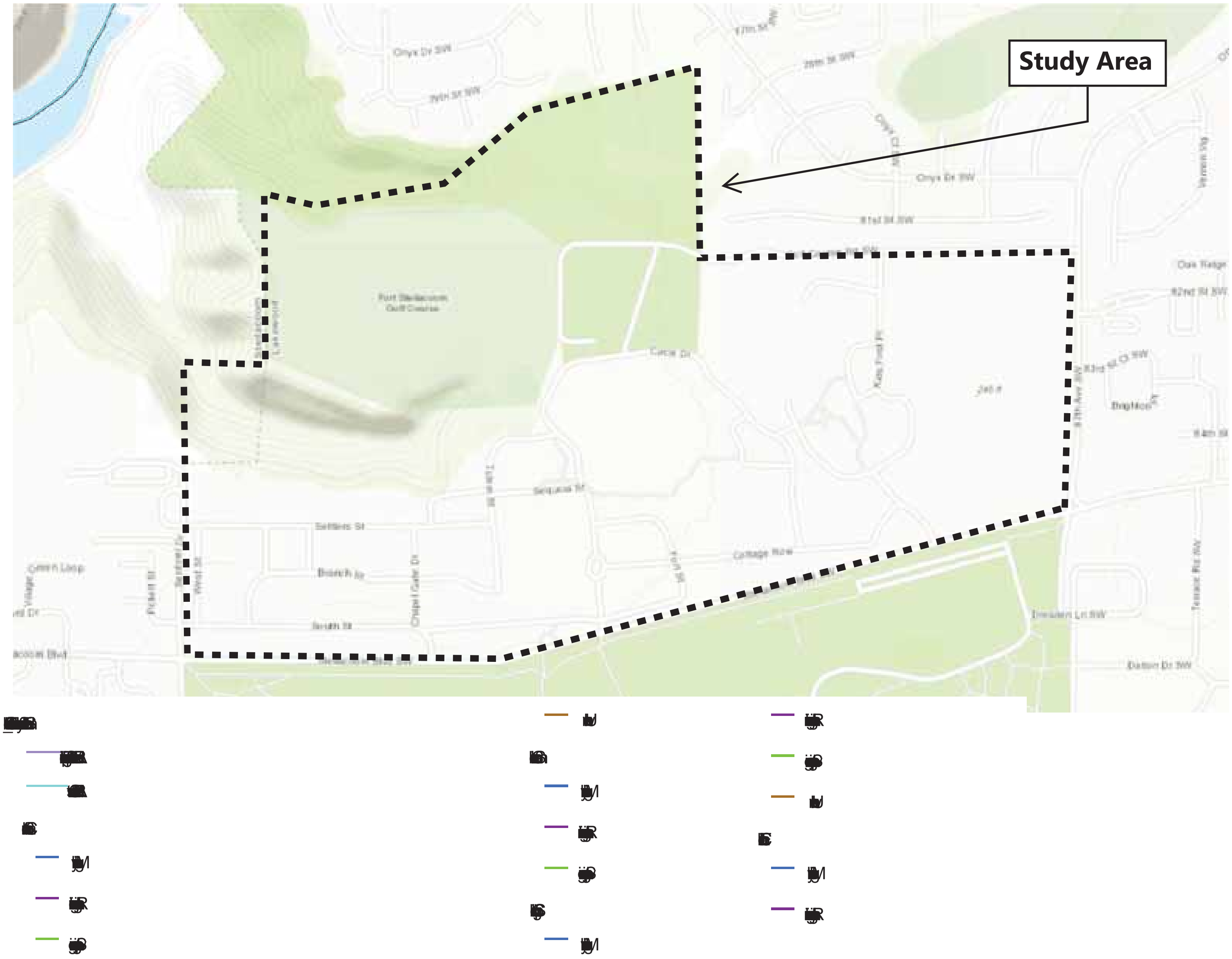
FIGURE **7**



PSMFC GIS, Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the

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STREAMNET MAP
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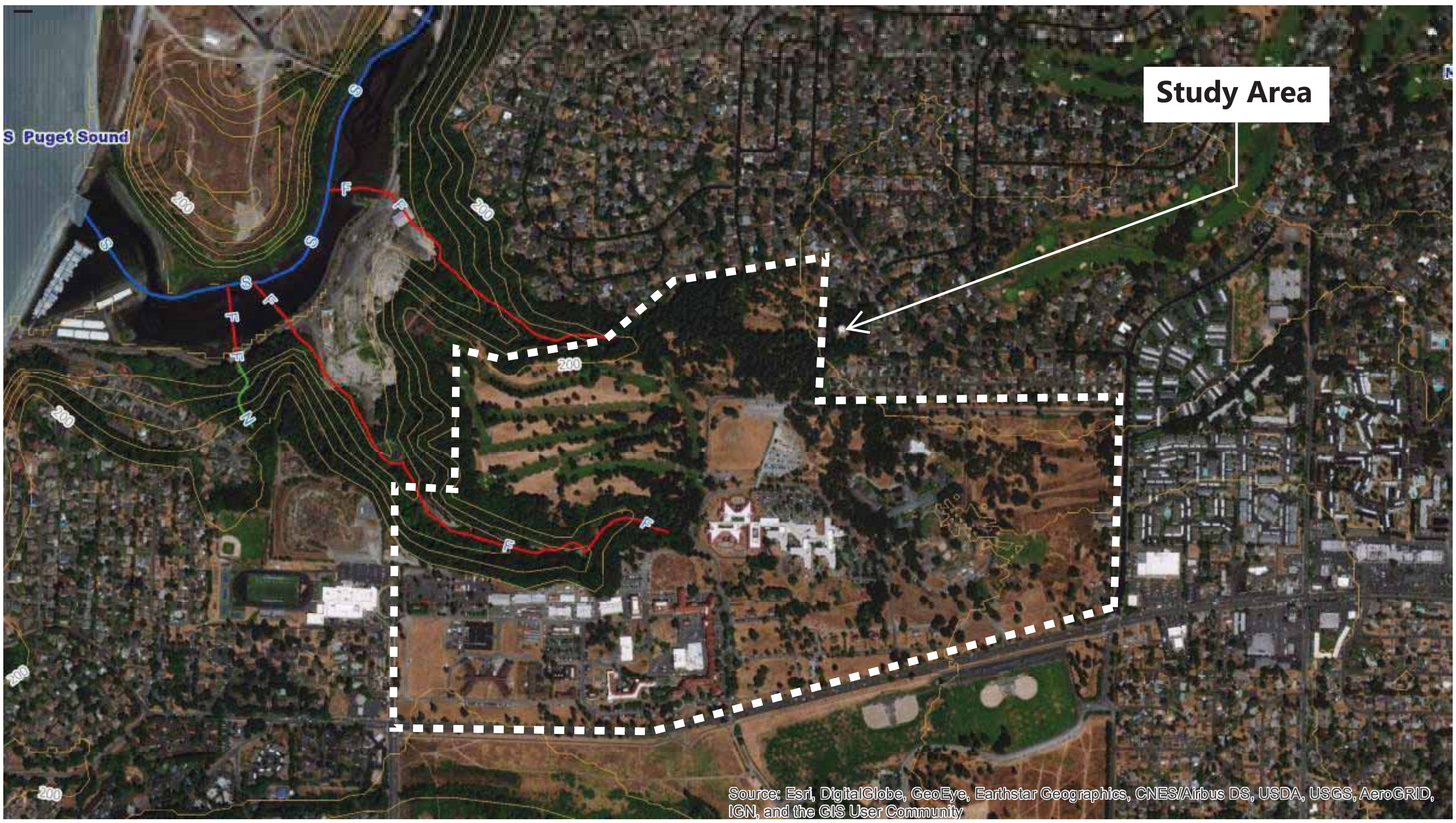
FIGURE

8



Map Symbols

~~	Harvest Boundary	U	Landing
- - -	Road Construction	*	Waste Area
∼	Stream	Y	Clumped WRTS/GRTS
	RMZ / WMZ Buffers	×	Existing Structure
Ç	Rock Pit		

N

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DNR MAPPER
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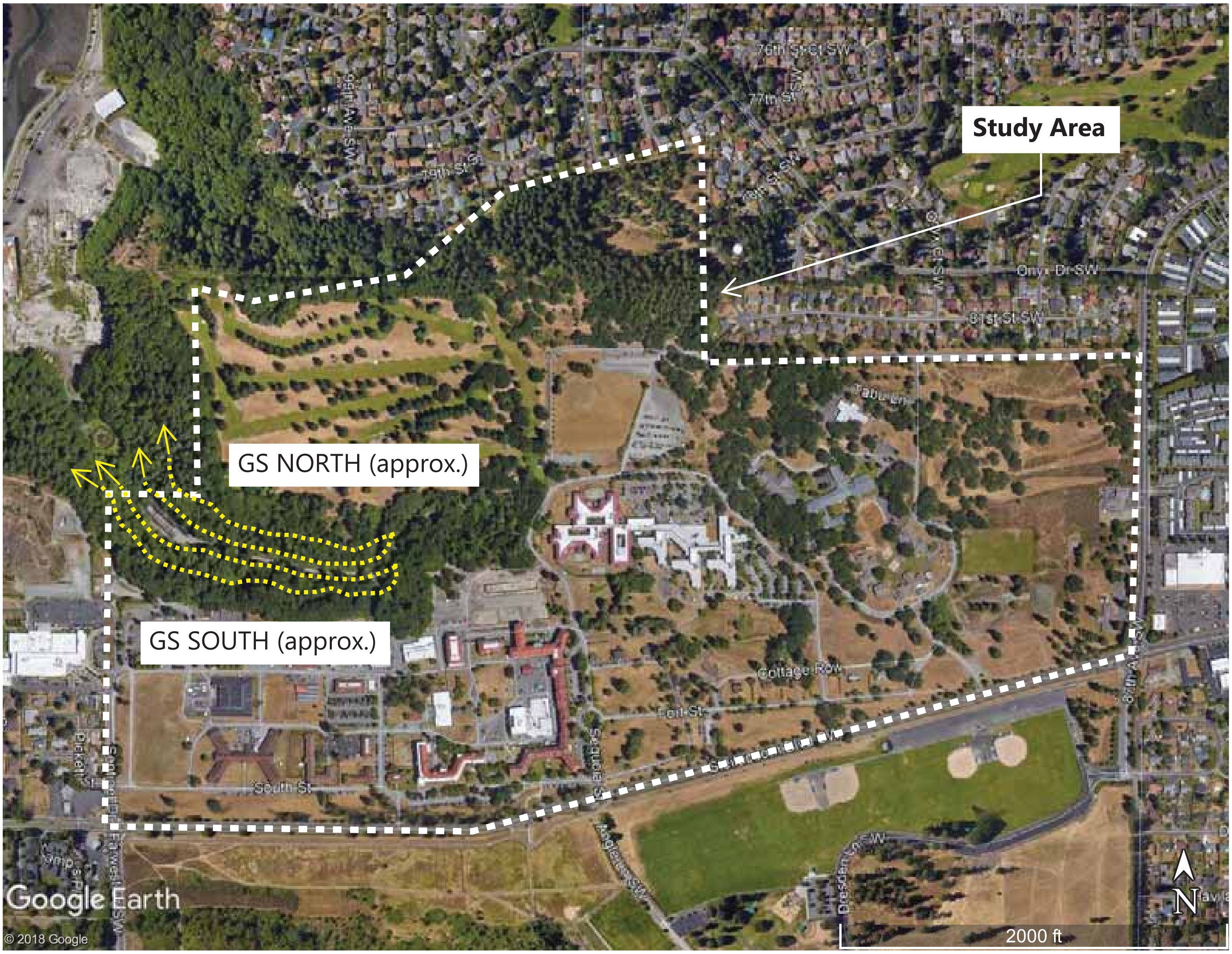
FIGURE
9



Wetland	Wetland HGM Class[1]	Cowardin Classification[2]	Dominant Species Observed	Wetland Hydrology Indicators Observed	Preliminary Wetland Rating[3,4]	Preliminary Buffer Width4[3]
GS South	Slope	Palustrine Forested (PFO)	Red alder, salmonberry, Himalayan blackberry, lady fern, giant horsetail, and English ivy	Saturation at the surface, shallow inundation/surface flows	II/III	60-225
GS North	Slope	Palustrine Forested (PFO)	Red alder, salmonberry, Himalayan blackberry, lady fern, giant horsetail, small-fruited bulrush, and English ivy	Saturation at the surface, shallow inundation/surface flows	II/III	60-225

[1] Hydrogeomorphic classification after Hruby (2014).
[2] Cowardian classification after Cowardin et al. (1979).
[3] Preliminary rating based on Washington State Wetland Rating System for Western Washington (Hruby, 2014).
[4] Local wetland ratings and buffer widths are based on City of Lakewood Municipal Code (LMC) Title 14 – Environmental Protection (LMC 14.162).

PBS

PROJECT# 41189.001

DATE July 2019

WETLAND RECONNAISSANCE MAP
Western State Hospital Master Plan Update
Natural Resource Reconnaissance Memorandum
9601 Steilacoom Blvd SW, Lakewood, WA 98498

FIGURE **10**

Appendix A
USFWS IPaC Resource List

41189.001

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Pierce County, Washington

Local office

Washington Fish And Wildlife Office

(360) 753-9440
(360) 753-9405

510 Desmond Drive Se, Suite 102
Lacey, WA 98503-1263

http://www.fws.gov/wafwo/

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

Gray Wolf Canis lupus No critical habitat has been designated for this species.	Proposed Endangered
North American Wolverine Gulo gulo luscus No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5123	Proposed Threatened

Birds

NAME	STATUS
Marbled Murrelet Brachyramphus marmoratus There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/4467	Threatened
Streaked Horned Lark Eremophila alpestris strigata There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/7268	Threatened
Yellow-billed Cuckoo Coccyzus americanus There is **proposed** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/3911	Threatened

Amphibians

NAME	STATUS
Oregon Spotted Frog Rana pretiosa There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/6633	Threatened

Fishes

NAME	STATUS
Bull Trout Salvelinus confluentus There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/8212	Threatened

Flowering Plants

NAME	STATUS

Golden Paintbrush Castilleja levisecta — Threatened
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/7706

Marsh Sandwort Arenaria paludicola — Endangered
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/2229

Water Howellia Howellia aquatilis — Threatened
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/7090

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Jan 1 to Sep 30
Black Turnstone Arenaria melanocephala This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Great Blue Heron Ardea herodias fannini This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 15 to Aug 15
Lesser Yellowlegs Tringa flavipes This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere

Marbled Godwit *Limosa fedoa* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9481	Breeds elsewhere
Olive-sided Flycatcher *Contopus cooperi* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31
Red-throated Loon *Gavia stellata* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Rufous Hummingbird *selasphorus rufus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8002	Breeds Apr 15 to Jul 15
Western Screech-owl *Megascops kennicottii kennicottii* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 1 to Jun 30

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ “Proper Interpretation and Use of Your Migratory Bird Report” before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week

of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season ( )

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

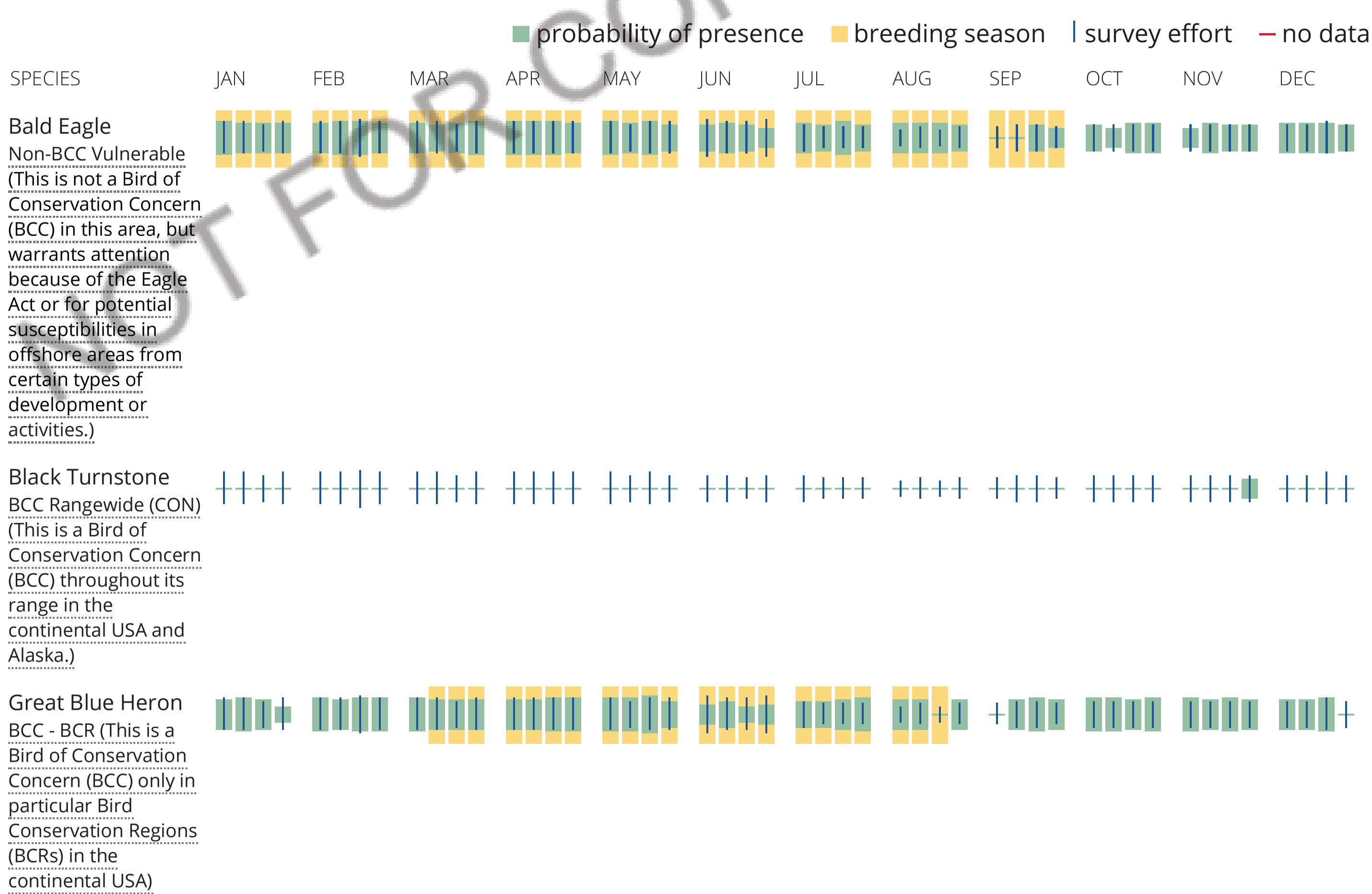
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

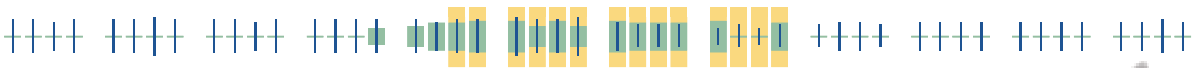
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Lesser Yellowlegs
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

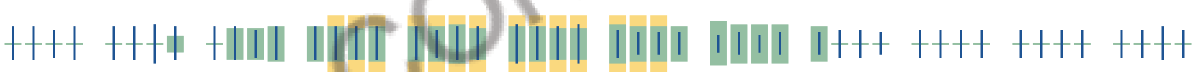
Marbled Godwit
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Olive-sided Flycatcher
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

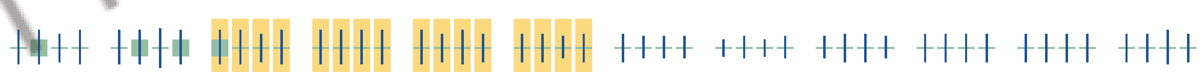


Red-throated Loon
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Rufous Hummingbird
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Western Screech-owl
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review.

Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

RIVERINE
R4SBC

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Appendix 6: Stormwater Credit Feasibility Study

PROJECT MEMO

To:	Mr. Dwight Hollar
From:	Scott Kaul, PE; Jason Isenberg, EIT
AHBL Office:	Tacoma (253) 383-2422
Date:	Sept. 12, 2012
Project:	Western State Hospital - Stormwater Credit Feasibility Study
AHBL No.:	211381.11
Subject:	Stormwater Credit Feasibility

AHBL has performed a feasibility study of the Western State Hospital Campus situated on parcels 0220321000 and 0220321007. The purpose of this study is to evaluate stormwater credit opportunities in conjunction with the City of Lakewood surface water management (SWM) credit program. Stormwater credits will enable the State of Washington to reduce annual stormwater management fees paid to the City of Lakewood. We understand that Western State Hospital is currently assessed an annual surface water management fee of $50,453. Additionally, the City of Lakewood plans to increase the fees for Parcels 0220321000 and 0220321007 in 2013 to $81,952.

To qualify for a surface water management fee credit, both quantity and quality BMP's shall be documented. Acceptable quality BMP's include bio-swales, constructed wetlands, and approved filter vaults. The City of Lakewood allows for surface water fee credits of 35% and 85% for infiltration facilities and 25% and 50% for detention facilities depending on the amount of stormwater retained/detained. If any existing surface water management facilities do not meet the credit requirements it may be beneficial to retrofit the existing facilities in order to receive the credit.

The City of Lakewood has provided AHBL a map which defines impervious areas on each parcel used to calculate stormwater fees. We reviewed this map along with record and design drawings and technical manuals obtained from the City of Lakewood and Pierce County. We conducted a site visit to document existing site conditions relative to stormwater flow control and water quality. We have created a basin map exhibit, C0.1, which outlines impervious areas tributary to identified storm facilities on the campus. This narrative summarizes our understanding of the existing stormwater basins and lists credit opportunities available to the State of Washington in relation to the Western State Hospital Campus.

1. *Legal Offender Unit West*

1.1 Basin Description:

This basin is located in the northern half of the site. It has its own dedicated storm system which collects runoff from the newest Legal Offender Unit expansion and the majority of the north parking lot and conveys it to an infiltration pond on the south side of the building. Stormwater runoff is treated via a biofiltration swale prior to discharging to the infiltration pond. There are 4.58 Ac of impervious surfaces in this basin. This equates to $6,188.64 in stormwater fees for this basin.

1.2 Investigation:

AHBL has a copy of the original design calculations supporting the size of the pond and biofiltration swale. The pond is designed to infiltrate the 100-yr storm. During our site visit, the biofiltration swale was covered with vegetation. There was little evidence of stormwater ponding in the pond.

1.3 "As-is" Credit Potential:

This basin has a defined water quality system and the pond is designed to infiltrate the 100-yr storm. The basin has the potential to achieve a credit of 85% or $5,260.34 with no improvements.

1.4 Recommended Improvements:

There are no recommended improvements for this basin.

2. ***Playground Parking***

2.1 Basin Description:

This basin is located in the north-central part of Ft. Steilacoom Park. The basin is comprised parking lot and driveway for the playground and picnic shelters. Stormwater runoff in the parking lot sheet flows to the southwest corner of the parking lot to a grass lined swale. The grass lined swale outfalls to a catch basin with a beehive grate. It appears that this catch basin is connected to an infiltration trench which extends north toward the parking lot. Stormwater runoff from the driveway is collected by at grade infiltration trenches on the north and south side of the driveway. There are approximately 0.84 Ac of impervious surfaces in this basin. This equates to $1,135.03 in stormwater fees for this basin.

2.2 Investigation:

AHBL has not found any design or record drawings for the parking lot or calculations/report for the stormwater system sizing. The actual size of the infiltration trench is unknown.

2.3 "As-is" Credit Potential:

Additional research and survey will need to be conducted to verify the size of the infiltration trench. Once that is accomplished calculations could easily be reproduced justifying max credit for the basin. This would make the basin eligible to receive a credit of $964.78/yr.

2.4 Recommended Improvements:

There are no recommended stormwater improvements for this basin.

3. ***Tunnel***

3.1 Basin Description:

This basin is located on the north side of Ft. Steilacoom Park and is comprised of the tunnel access walkways between the WSH campus and Ft. Steilacoom Park. Stormwater runoff is conveyed to one of two drywells, depending on which side of Steilacoom Blvd. it is on. The drywells are equipped with pumps for emergency overflow conditions. There is no stormwater treatment associated with this basin since there is no pollution generating surfaces. There are approximately 0.10 Ac of impervious surfaces in this basin. This equates to $135.12 in stormwater fees for this basin.

3.2 Investigation:

AHBL has acquired construction plans showing the size of the drywells. However, there are no calculations supporting the size.

3.3 "As-is" Credit Potential:

Calculations justifying the size of the drywells will need to be reproduced. If the calculations show that the drywells infiltrate up to and including the 100-yr storm, the basin is eligible to receive and 85% credit or $114.85/yr.,

3.4 Recommended Improvements:

There are no recommended improvements for this basin.

4. ***NW Parking Lot***

4.1 Basin Description:

This basin is located in the NW corner of the site. It has its own dedicated storm system which collects runoff and conveys it to an infiltration pond in the SW corner of the parking lot. There is also a fueling station in the basin that has an oil-water separator to pretreat runoff from the fueling station prior to conveying to the pond. There are 8.31 Ac of impervious surfaces in this basin. This equates to $11,228.73 in stormwater fees.

4.2 Investigation:

AHBL has a copy of the original design calculations supporting the size of the pond. The pond is designed to infiltrate the 100-yr storm. During our site visit, the pond was overgrown with vegetation. The pond appears to be functioning properly as there were no signs observed that might indicate standing water or overtopping.

4.3 "As-is" Credit Potential:

There is no defined stormwater quality system for this basin. An argument can be made that the oil/water separator in combination with the vegetation in the pond provides the necessary water quality treatment. If this is acceptable to the City, the basin could receive a credit of 85% or $9,544.42/Yr.

4.4 Recommended Improvements:

If the existing vegetation treatment argument is not acceptable to the City, a stormwater treatment system will need to be installed to achieve any credit. Our recommendations would be to define a bioinfiltration system within the pond by amending the soils in the pond. To design and install such a system would require further engineering investigation specific to this basin. The approximate cost for such a system is estimated to be $20,000 to $40,000. If it is determined that there is not sufficient room to install such a system, then installing a cartridge-based system such as Contech Engineered Solutions' Stormfilter Vaults would be required to achieve maximum credit. These types of systems are more easily retrofitted into existing storm drainage systems since they are underground. The cost to install such a system for this basin estimated to cost approximately $250,000 to $350,000 and may not be feasible.

5. ***Legal Offender Unit Central***

5.1 Basin Description:

This basin is located in the northern half of the site. It has its own dedicated storm system which collects runoff from the central portion of the Legal Offender Unit buildings, basketball courts, and access road and conveys it to an infiltration pond on the south side of the building. Stormwater treatment is not provided for this basin. There are approximately 1.17 Ac of impervious surfaces in this basin. This equates to $1,580.94 in stormwater fees for this basin.

5.2 Investigation:

AHBL has not found any reports supporting the size of this pond. During our site visit, the pond was covered with vegetation. There was little evidence of stormwater ponding in the pond.

5.3 "As-is" Credit Potential:

There is no defined stormwater quality system for this basin. An argument can be made that the vegetation in the pond provides the necessary water quality treatment. Additionally, calculations justifying the size of the pond will need to be reproduced. If this is acceptable to the City, the basin could receive a credit of 85% or $1,343.80/Yr.

5.4 Recommended Improvements:

If the existing vegetation treatment argument is not acceptable to the City, a stormwater treatment system will need to be installed to achieve any credit. Our recommendations would be to define a bioinfiltration system within the pond by amending the soils in the pond. To design and install such a system would require further engineering investigation specific to this basin. The approximate cost for such a system is estimated to be $5,000 to $10,000. If it is determined that there is not sufficient room to install such a system, then installing a cartridge-based system such as Contech Engineered Solutions' Stormfilter Vaults would be required to achieve maximum credit. These types of systems are more easily retrofitted into existing storm drainage systems since they are underground. The cost to install such a system for this basin estimated to cost approximately $50,000 to $75,000 and may not be feasible.

6. ***Legal Offender Unit East***

6.1 Basin Description:

This basin is located in the northern half of the site. It has its own dedicated storm system which collects runoff from the eastern portion of the Legal Offender Unit buildings, parking lot, and eastern access roads and conveys it to an infiltration pond on the south side of the building. Stormwater treatment is not provided for this basin. There are approximately 2.91 Ac of impervious surfaces in this basin. This equates to $3,932.08 in stormwater fees for this basin.

6.2 Investigation:

AHBL has not found any reports supporting the size of this pond. During our site visit, the pond was covered with vegetation. There was little evidence of stormwater ponding in the pond.

6.3 "As-is" Credit Potential:

There is no defined stormwater quality system for this basin. An argument can be made that the vegetation in the pond provides the necessary water quality treatment. Additionally, calculations justifying the size of the pond will need to be reproduced. If this is acceptable to the City, the basin could receive a credit of 85% or $3,342.27/Yr.

6.4 Recommended Improvements:

If the existing vegetation treatment argument is not acceptable to the City, a stormwater treatment system will need to be installed to achieve any credit. Our recommendations would be to define a bioinfiltration system within the pond by amending the soils in the pond. To design and install such a system would require further engineering investigation specific to this basin. The approximate cost for such a system is estimated to be $10,000 to $20,000. If it is determined that there is not sufficient room to install such a system, then installing a cartridge-based system such as Contech Engineered Solutions' Stormfilter Vaults would be required to achieve maximum credit. These types of systems are more easily retrofitted into existing storm drainage systems since they are underground. The cost to install such a system for this basin estimated to cost approximately $75,000 to $100,000 and may not be feasible.

7. *Firwood High School*

7.1 Basin Description:

This basin is located in the northeastern portion of the WSH campus. It has its own dedicated storm system which collects runoff from building 51 and parking lot and conveys it to an infiltration trench on the southwest side of the building. Runoff from the northwest parking lot and access road passes through an oil/water separator prior to entering the infiltration trench. Runoff from the parking lot and access loop on the west side of the building passes through a grass lined swale and oil/water separator prior to entering the infiltration trench. There are 0.99 Ac of impervious surfaces in this basin. This equates to $1,337.72 in stormwater fees for this basin.

7.2 Investigation:

AHBL has a copy of a report supporting the size of the infiltration trench. The calculations do not address the size of the swale or oil/water separators.

7.3 "As-is" Credit Potential:

Oil/water separators are not an approved water quality device. However, an argument can be made that oil/water separators along with the grass lined swale provide some amount of treatment. Calculations justifying this will need to be produced. If this is acceptable to the City, the basin could receive a credit of 85% or $1,137.06/Yr. If meeting the minimum water quality cannot be proven, the City may allow a reduced credit for this basin based on the percentage of water quality achieved.

7.4 Recommended Improvements:

If the treatment argument is not acceptable to the City, a stormwater treatment system will need to be installed to achieve maximum credit. Due to the limited space available be a cartridge-based system such as Contech Engineered Solutions' Stormfilter Vaults would likely be needed. These types of systems are more easily retrofitted into existing storm drainage systems since they are underground. To install such a system would be estimated to cost approximately $40,000 to $60,000 for this basin and may not be feasible.

8. ***CSTC***

8.1 Basin Description:

This basin is located in the northeastern portion of the site. It has its own dedicated storm system which collects runoff from the CSTC buildings and parking lot and conveys it to an infiltration pond on the east side of the basin. Stormwater treatment is not provided for this basin. There are approximately 2.85 Ac of impervious surfaces in this basin. This equates to $3,851.01 in stormwater fees for this basin.

8.2 Investigation:

AHBL has not found any reports supporting the size of this pond. During our site visit, the pond was covered with vegetation. There was little evidence of stormwater ponding in the pond.

8.3 "As-is" Credit Potential:

There is no defined stormwater quality system for this basin. An argument can be made that the vegetation in the pond provides the necessary water quality treatment. Additionally, calculations justifying the pond sizing will need to be reproduced. If this is acceptable to the City, the basin could receive a credit of 85% or $3,273.36/Yr.

8.4 Recommended Improvements:

If the existing vegetation treatment argument is not acceptable to the City, a stormwater treatment system will need to be installed to achieve any credit. Our recommendations would be to define a bioinfiltration system within the pond by amending the soils in the pond. To design and install such a system would require further engineering investigation specific to this basin. The approximate cost for such a system is estimated to be $10,000 to $15,000. If it is determined that there is not sufficient room to install such a system, then installing a cartridge-based system such as Contech Engineered Solutions' Stormfilter Vaults would be required to achieve maximum credit. These types of systems are more easily retrofitted into existing storm drainage systems since they are underground. The cost to install such a system for this basin estimated to cost approximately $80,000 to $100,000 and may not be feasible.

9. ***WSH Direct Discharge***

9.1 Basin Description:

This basin is located in the western half of the WSH campus. The impervious surfaces in this area are comprised of the PTRC and WSH support and maintenance buildings and associated roads and parking lots. Runoff from the majority of impervious surfaces in this basin are collected and conveyed to a storm sewer main on the north side of the WSH campus. This storm sewer main outlets at Chambers Creek to the north. There are approximately 21.93 Ac of impervious surfaces in this basin. This equates to $29,632.50 in stormwater fees for this basin.

9.2 Investigation:

AHBL acquired approved design plans for an upgrade to the storm sewer main at the north side of the basin. These plans show elements of the storm drainage system in this basin. No other design or record drawings were found for this basin.

9.3 "As-is" Credit Potential:

Because this system direct discharges, there is no as-is potential for credit in this basin.

9.4 Recommended Improvements:

In order to achieve credits in this basin, infiltration and treatment systems would need to be installed. Our recommendation would be to construct multiple infiltration and treatment systems to manage stormwater runoff from sub-basins within this basin. This approach would allow you to phase construction efforts in this basin. Non-pollution generating impervious surfaces could be directly connected to infiltration trenches. If space allows, runoff from pollution generating impervious surfaces could be directed to bioinfiltration facilities. In instances where space is limited we would recommend installing a cartridge-based system such as Contech Engineered Solutions' Stormfilter Vaults. A stormwater treatment and infiltration system for this basin is estimated to cost $500,000-$1,000,000 for this entire basin. Since biofinfiltration facilities are significantly cheaper that cartridge-based systems, we recommend phasing improvements in this basin to address these areas first. A more in-depth investigation of this basin is required to adequately determine these areas. If such stormwater systems are installed, this basin has the potential to receive a max credit of $25,187.63/yr.

10. ***Fire Station***

10.1 Basin Description:

This basin is located in the eastern side of the site along 87th Ave. SW. It encompasses the Lakewood Fire Station 24 building and parking lot. It appears that stormwater runoff from impervious surfaces either disburses in surrounding vegetation or is collected by the storm drainage sewer in 87th Ave. SW. There are approximately 0.82 Ac of impervious surfaces in this basin. This equates to $1,108.01 in stormwater fees for this basin.

10.2 Investigation:

AHBL has not found any reports or record drawings for a storm system for this basin.

10.3 "As-is" Credit Potential:

An argument can be made that areas of runoff are treated and meet infiltration goals. The vegetation in the pond provides the necessary water quality treatment. The site is relatively flat but it appears that approximately ½ of runoff from the basin is disbursed. A more in depth site survey would need to be conducted to verify this amount.

10.4 Recommended Improvements:

A dedicated stormwater treatment and infiltration system would need to be installed to achieve maximum credit. Due to the relatively flat topography of the site, our recommendation would be to install one or more bioinfiltration systems. If installed, this basin could achieve a credit of 85% or $941.81/Yr. To install such a system would be estimated to cost approximately $15,000 to $30,000 for this basin.

11. ***O.G.H.***

11.1 Basin Description:

This basin is located in the eastern side of the site along 87th Ave. SW. It encompasses the Oakwood Group Home buildings, driveway and parking lot. Stormwater runoff from the driveway and parking lot is collected and conveyed to an infiltration trench. Stormwater runoff from the buildings disburses in the surrounding vegetation. There is no stormwater water quality system in this basin. There are approximately 0.61 Ac of impervious surfaces in this basin. This equates to $824.25 in stormwater fees for this basin.

11.2 Investigation:

AHBL has a copy of design plans for the construction of the parking lot and driveway. The plans show the size of the infiltration trench but do not provide calculations supporting its size.

11.3 "As-is" Credit Potential:

Since there is no stormwater treatment facility for this basin, the basin is not eligible for stormwater credit without improvements.

11.4 Recommended Improvements:

In order to achieve maximum credit for this basin, a stormwater treatment system would need to be installed. A cartridge-based system such as Contech Engineered Solutions' Stormfilter Vaults would be required. These types of systems are more easily retrofitted into existing storm drainage systems since they are underground. If a treatment system is installed, the basin would be eligible to receive a credit of $700.61/yr. To install such a system would be estimated to cost approximately $35,000 to $50,000 for this basin and may not be feasible.

12. ***Ball field Parking***

12.1 Basin Description:

This basin is located northeast corner of Ft. Steilacoom Park along Steilacoom Blvd. The basin is comprised entirely of the parking lot for the ball fields. Stormwater runoff is collected by a catchbasin located in the center of the parking lot. The stormwater is then conveyed to the stormwater system in Steilacoom Blvd. There is no stormwater treatment system for this basin. There are approximately 2.14 Ac of impervious surfaces in this basin. This equates to $2,891.63 in stormwater fees for this basin.

12.2 Investigation:

AHBL has not found any design or record drawings for the parking lot.

12.3 "As-is" Credit Potential:

Since stormwater runoff is conveyed to the storm drainage system in Steilacoom Blvd., the basin is not eligible for stormwater credit without improvements.

12.4 Recommended Improvements:

In order to achieve maximum credit, a treatment and infiltration system would need to be installed. Since the parking lot drains to a central point, installing an underground treatment and infiltration system is the most likely choice. This would prevent losing any parking stalls. This could be accomplished with a cartridge-based system such as Contech Engineered Solutions' Stormfilter Vaults and an infiltration trench. These types of systems are more easily retrofitted into existing storm drainage systems since they are underground. If such a system is installed, the basin would be eligible to receive a credit of $2,457.89/yr. To install such a system would be estimated to cost approximately $60,000 to $90,000 for this basin and may not be feasible.

13. ***Park Road***

13.1 Basin Description:

This basin is located in the northeast corner of Ft. Steilacoom Park on the south side of the ball fields. The basin is comprised of a portion of the on-site road which is conveyed to a drywell. There is not stormwater treatment for this basin. Due to the relatively flat topography of the site it is difficult to determine the exact amount of impervious surface in this basin without a more in-depth survey. However, there are approximately 0.42 Ac of impervious surfaces in this basin. This equates to $567.52 in stormwater fees for this basin.

13.2 Investigation:

AHBL has not found any design or record drawings for the park roads or calculations/report for the drywell sizing.

13.3 "As-is" Credit Potential:

Since there is no stormwater treatment for the basin, it is not eligible for stormwater credit as-is.

13.4 Recommended Improvements:

Additional research and survey will need to be conducted to verify the size of the basin and drywell. A stormwater treatment system will need to be installed to achieve any credit. Installing a cartridge-based system such as Contech Engineered Solutions' Stormfilter Vaults would meet this requirement. These types of systems are more easily retrofitted into existing storm drainage systems since they are underground. This would make the basin eligible to receive a max credit of $482.40/yr. To install such a system would be estimated to cost approximately $20,000 to $30,000 for this basin and may not be feasible.

14. ***Remaining Impervious Surfaces***

14.1 Basin Description:

Additional impervious surfaces exist on the parcels which are not discussed in the above basins. These include roads for the park, WSH cottages, and golf courses; WSH cottages, service buildings for the park and golf courses; gravel parking for the golf courses, park and WSH; paved and gravel trails; and barns on the Ft. Steilacoom Park. None of these areas have a storm drainage system. Runoff from these areas is disbursed in surrounding vegetation areas. The City has assessed a total of 81.08 Ac impervious surfaces for the parcel. By subtracting impervious surfaces of the basins discussed in items 1-13 above from this number, the remaining impervious surfaces is equal to 33.41 Ac. This equates to $45,144.63 in stormwater fees.

14.2 Investigation:

AHBL has not found any as-built information for these remaining impervious surfaces.

14.3 "As-is" Credit Potential:

An argument can be made that disbursal through vegetation provides the needed treatment for the pollution generating impervious surfaces. We have discussed the possibility of this argument with City and they were agreeable. Thus, these remaining impervious surfaces could potentially receive a credit of 85% or $38,372.94/yr.

14.4 Recommended Improvements:

If this argument is not accepted by the City, then treatment would need to be provided to these pollution generating impervious surfaces to achieve maximum credit. Our recommendation would be to construct bioinfiltration systems for these areas. Due to the relatively large amount of these areas, it is difficult to provide an accurate estimate of cost for such areas without a further in-depth engineering investigation. A rough estimate to construct treatment facilities for these areas is $500,000 to $750,000.

Summary:

Within the discussions of the individual basins are discussions of "as-is" credit potential along with recommendations to achieve the maximum credit (85%). The recommendations include our opinion of probable construction costs. Please note that these costs do not include design and permitting costs.

Basins 1, 2, and 3 do not require any stormwater improvements to achieve the maximum stormwater credit. Our recommendation is to apply for credit for these basins first. The combined potential stormwater credit for these basins is $6,339.97/year.

Basins 4, 5, 6, 7, 8 and 14 may not require stormwater improvements to achieve the maximum stormwater credit. These basins will require further engineering investigation and calculations justifying the size and treatment capacity of existing vegetation. If budget allows, our recommendation is apply for stormwater credit for these basins next. These basins will require additional work and time to develop calculations supporting the stormwater credit application. The combined potential stormwater credit for these basins is $57,013.85/year.

A further in-depth engineering investigation is required for basin 9. Upon further investigation, areas requiring minimal improvements can be determined to achieve stormwater credits from this basin. Our recommendation would be to address improvements and apply for credits in this basin after the basins 1-8 and 14 have been addressed.

The remaining basins will require extensive stormwater improvements to achieve the maximum credit. Our recommendation is to construct improvements for these basins as budget allows. Based on the opinion of probable costs, it will take about 15-20 years of stormwater credit for each basin to recoup the installation cost of the associated stormwater improvement. Due to this relatively long amount of time to recoup costs, these basins may not be feasible to construct stormwater improvements.

We would be happy to assist you in applying for these credits. We have provided you an authorization of services to apply for credit for basins 1, 2, 3 under a separate cover.

If you have any questions, please feel free to contact Matt Weber at (253) 383-2422.

Scott Kaul, PE

c: Todd Sawin, AHBL
Matt Weber, AHBL

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Appendix 7: Patient Release Procedures

The information here is provided in response to questions received during the review process. Procedures are updated periodically, in response to the on-going evolution of patient care.

Civil Commitment Patients

Civil patients leave the hospital after completion of treatment and the development of a thorough discharge plan.

1 Discharge planning occurs between the patient, the treatment team, and community partners.

2 Reviews of the patient's situation prior to admission and their current level of need, help to identify what services might be considered, help the patient have a successful discharge and integration back into the community. At times, the patient may be referred to a needed resource, even if it is not in the county they lived in prior to admission.

3 A packet of information about the patient including their progress, current behaviors, medical issues, the current treatment plans, and other evaluations are provided to any facility considering providing care or housing to the patient. This allows the referred facilility staff to decide whether they can meet the behavioral, medical, and safety needs of the patient. The facility has the ability to decline a referral for any reason.

4 The patient (and/or legal guardian) also has the right to accept or decline any placement or setting for any reason. The patient also has the right to select the city they in which would like to live.

5 Discharge plans generally include: a setting/location, medical care follow up appointments or instructions, psychiatric medication management, outpatient mental health services, and/or substance use treatment.

Forensic Commitment Patients

The Behavioral Health Administration serves two populations within the forensic mental health system:

1 Individuals pleading Not Guilty by Reason of Insanity (NGRI)

2 Individuals entering the system due to criminal charges when the court has ordered a competency evaluation.

In this context, competency is the ability for the person to understand the court process and their ability to participate in their own defense as it relates to a mental disorder. The court may order competency restoration treatment when the court determines the individual lacks competency.

Hospital staff perform an assessment at the end of treatment to determine if competency has been restored. When competency is restored, the individual is returned to jail to complete the legal process. Discharge planning efforts for these individuals are determined by the courts and outside the control of DSHS. These persons would not discharge immediately to the community.

There are two other potential outcomes for these competency restoration cases when the individual is found to be "not restorable." "Not restorable" means that the person, due to their mental disorder, cannot understand or participate in the legal process. At that point, the court may dismiss their charges (although they can do so "without prejudice" which allows them to re-file the charges once the person becomes ready to transition to the community) and order that an evaluation for involuntary psychiatric treatment occur. Those evaluations are provided by DSHS.

If an individual is found to meet criteria for involuntary treatment due to danger to self or others, or due to a grave disability, the individual is moved to a civil (non-forensic) treatment program. Upon completion of treatment, he/she would go through the same discharge process as outlined above under PATIENT DISCHARGE PROCEDURES. Those individuals who do not meet the criteria for further inpatient treatment are released to the community. DSHS makes a diligent effort prior to release to connect them to resources in the community to assist with their transition. Nonetheless, DSHS cannot legally hold the person for any additional time once DSHS has made the determination that the person does not meet the criteria for involuntary civil commitment.

Individuals within the Not Guilty by Reason of Insanity program, receive similar discharge planning efforts as does the civil population. The court decides when forensic patients are released back to the community. Due to their NGRI conviction, these cases have significant amounts of oversight including a Risk Review Board, the Public Safety Review Panel, and a BHA Assistant Secretary review that occurs as the person progresses through the program. Their release is called a conditional release and DSHS continues to monitor these cases after release and can initiate a recommendation to the court that they be returned to the hospital for additional treatment if they are not meeting the conditions of their release.

Appendix 8: SEPA Checklist

This appendix includes a checklist addressing the State Environmental Protection Act (*SEPA") criteria. The text includes instructions and questions, preserving the format of the list, as well as the project team's responses. Note that figures referenced follow the narrative of the 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 NON-PROJECT PROPOSALS:

For non-project proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the SUPPLEMENTAL SHEET FOR NON-PROJECT 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

1. *Name of proposed project, if applicable:*

   Western State Hospital Master Plan

2. *Name of applicant:*

   Department of Social and Health Services

   Facilities, Financial, & Analytics Administration – Office of Capital Programs

3. *Address and phone number of applicant and contact person:*

   Bob Hubenthal, Assistant Director, Capital Facilities Management
   Department of Social and Health Services
   Facilities, Finance and Analytics Administration
   PO Box 45848
   Olympia, WA 98504
   360.902.8168 robert.hubenthal@dshs.wa .gov

   Aarón Martínez, Capital Projects Manager
   Office of Capital Programs Department of Social and Health Services
   Facilities, Finance and Analytics Administration
   PO Box45848
   Olympia, WA 98504
   360.902.8325 Aaron.Martinez@dshs.wa.gov

4. *Date checklist prepared: 20-January-2020 - revised 17-November -2020*

5. *Agency requesting checklist: City of Lakewood*

6. *Proposed timing or schedule (including phasing, if applicable):*

   The major development under this master plan - a new forensic hospital - is projected to begin in approximately 6 years. A residential treatment facility is a potential secondary use and would also be expected in the second half of the ten-year planning horizon of this master plan.

7. *Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.*

   No. The Master Plan incorporates the currently proposed additions and expansion to the existing facilities anticipated for the 10-year planning period.

8. *List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.*

   - Natural Resources Evaluation: Western State Hospital Master Plan (PBS 2019*);
   - Subsurface Exploration, Geologic Hazard, Infiltration Study, and Geotechnical Engineering Report, Western State Hospital New Patient Support Center (Associated Earth Sciences, Inc. 2017);
   - Western State Hospital Cultural Landscape Assessment (Artifacts Architectural Consulting 2008)
   - Western State Hospital Cultural Resource Management Plan (Artifacts Architectural Consulting 2011)
   - Traffic Study: Western State Hospital Master Plan (TSI 2020);
   - Utility Review: Western State Hospital Master Plan (AEI 2020)

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.*

   No applications are pending for governmental approval of other proposals affecting the WSH Campus.

10. *List any government approvals or permits that will be needed for your proposal, if known.*

    The Master Plan is not anticipated to require additional permits or approvals. Individual projects to be constructed as part of the implementation of the Master Plan will require site specific permits. The individual permits may include the following City of Lakewood permits and approvals:

    - Boundary Line Adjustment
    - Building, Electrical, Mechanical and Plumbing permits
    - Clearing and Grading
    - Construction Stormwater General Permit
    - Critical Areas Review
    - Demolition

* PBS Environmental, Natural Resource Evaluation for WSH Master Plan, October, 2019

- Drainage Review
- Land Use Modification
- Master Facilities Plan Modification
- Right-of-way
- SEPA
- Site Development Permit

The Master Plan does not anticipate impacts to wetlands, waters, habitats, or species that would require additional state or federal permits.

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.)*

Western State Hospital (WSH) provides evaluation and inpatient treatment for individuals with serious or long-term mental illness, including patients referred through their Behavioral Health Organization, the civil court system (when individuals meet the criteria for involuntary treatment under RCW 71.05), or through the criminal justice system (RCW 10.77).

Patient Population, Capacity and Staff Levels

WSH currently provides more than beds 900 for these patients, and the master plan projects that actual beds in use would drop to no more than 865 beds. However, as demolition and conversion plans may not occur immediately after existing beds are vacated, actual bed capacity could at times be higher than projected demand for services.

As detailed in the master plan document, the peak capacity for beds on the campus at any point in the ten-year planning cycle is 963 beds without the Residential Treatment Facility (RTF), or 1,011 if the RTF were to be built. Population-related impacts in this report consider up to this 1,000-bed capacity as the basis of impact analysis.

WSH also employs approximately 2,200 staff members, making it the fourth largest employer in the City of Lakewood.

Planned Development

DSHS is engaged in an ongoing master planning effort for the WSH Campus to: incorporate changing facility needs; address the growth management issues of stakeholders (including Pierce County and the City of Lakewood); and streamline the permitting process for future projects.

The initial master plan for the campus was approved by the City in 1998 and is based on a 10-year planning period. An update to the Master Plan was prepared in 2008, and the latest planning efforts were initiated in 2018.

As part of the current master planning update, DSHS has evaluated several alternatives for layout of the campus, including rehabilitating existing buildings and constructing new facilities. Siting Alternatives for the proposed new forensic hospital were documented in a pre-design study.

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.*

Western State Hospital is located in the City of Lakewood, Washington, see Figure 1. The site abuts the north side of Steilacoom Boulevard SW, extending from 87th Avenue SW on the east to Sentinel Drive on the west. The Campus extends northward from Steilacoom Boulevard SW to Golf course Road SW on the east side to approximately 79th Street SW on the west. The Public Land Survey System location is Sections 33, 43, and 48, Township 20 North, Range 2 East. The campus totals approximately 288 acres, and is composed for four separate tax parcels, described below.

- The largest parcel (0220321022) is 215.71 acres is size, and includes the frontage of Steilacoom Boulevard SW from 87th Avenue SW westward to Sentinel Drive. This parcel contains most of the developed portions of the campus, as well as Garrison Springs and the associated forested valley slopes.

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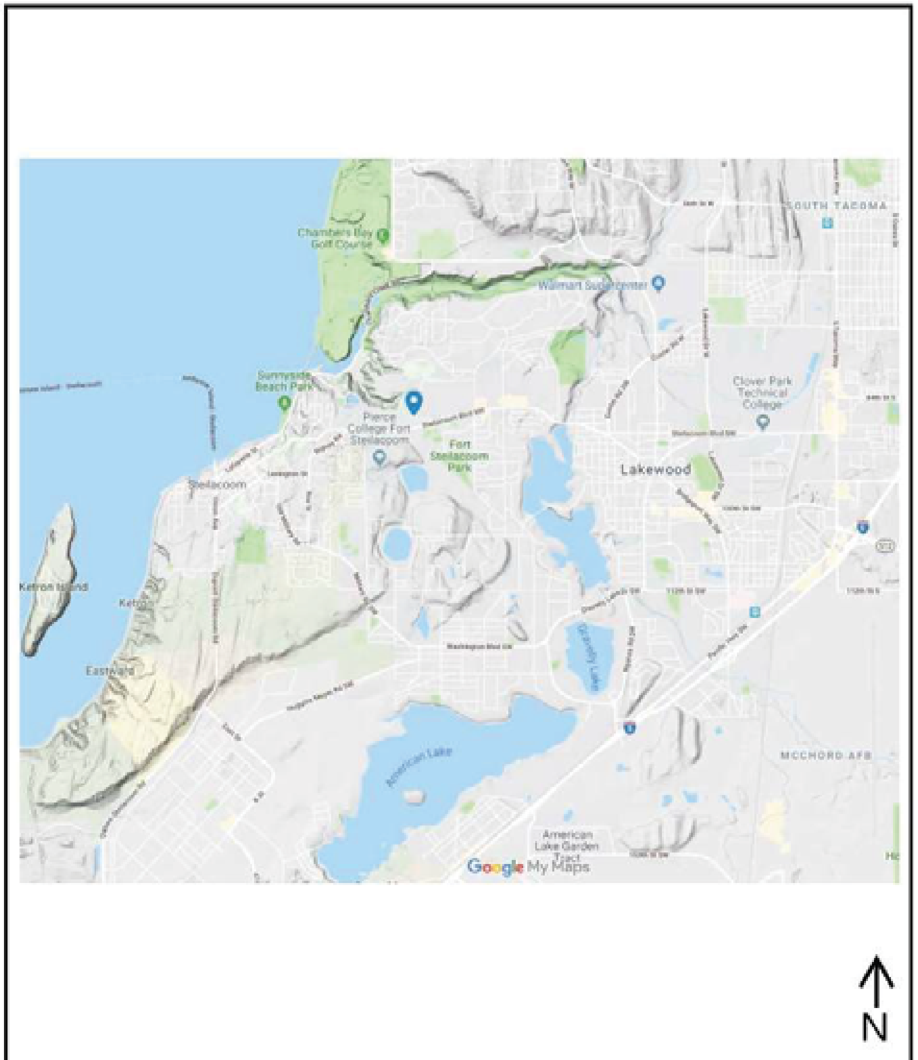

PBS

PROJECT# 41189.001	DATE July 2019	VICINITY MAP Western State Hospital Master Plan Update Natural Resource Reconnaissance Memorandum 9601 Steilacoom Blvd SW, Lakewood, WA 98498	FIGURE 1

- The second parcel (0220321007) is 36.73 acres in size, and extends northward from Garrison Springs. This parcel includes the majority of the Fort Steilacoom Golf Course, now closed.
- The third parcel (0220283027) is 29.75 acres in size, and is located to the north of Parcel 0220321007. This parcel includes the northern ¼ of the Fort Steilacoom Golf Course, the forested valley slope to the north, and the forested disc golf course area to the east.
- The last parcel (0220283026) is located at the northeastern-most corner of the site and is 6.15 acres in size. The parcel is also part of the former golf course.

B. ENVIRONMENTAL ELEMENTS

1 EARTH

a. *General description of the site:*

The Campus is primarily upland terraces with slopes less than 15 percent; with the overall topography sloping gently from the southeast corner to the northwest corner.

<u>Flat, rolling</u>, hilly, <u>steep slopes</u>, mountainous, other

b. *What is the steepest slope on the site (approximate percent slope)?*

The forested valley slopes to the north and south of the golf course contain slopes of up to 70 percent inclination, with localized sections as steep as 100 percent inclinations (Associated Earth Sciences, Inc. 2017).

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.*

Three soil mapping units were identified in the study area: Spanaway gravelly sandy loam; Everett very gravelly sandy loam; and Xerochrepts (PBS 2019). A summary of the characteristics is provided in Table 1.

Spanaway soils occur at elevations from 200 to 590 feet and are typically used for woodland, pasture, cropland, homesites, and

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Table 1: Soils present in the Study Area*:

Symbol	Map Unit Name	Slope	Landform	Parent Material	Drainage Class	Soils hydric? Hydric inclusions?
41A	Spanaway gravelly sandy loam	0 to 15%	Terraces and plains	Glacial outwash	Somewhat excessively drained	No (15% Spana, Yes)
13D	Everett very gravelly sandy loam	15 to 30%	Outwash terraces and escarpments, kames, moraines, eskers	Glacial outwash	Somewhat excessively drained	No (10% Alderwood, No but may support wetlands in some situations) (10% Indianola, No)
47F	Xerochrepts	45 to 70%	Valley sides	Sandy and gravelly outwash and/or glacial till	Well drained	No

* 1 NRCS, 2019b.

wildlife habitat (NRCS, 2019b). Spanaway gravelly sandy loam is not considered a hydric (wetland) soil by the National Technical Committee for Hydric Soils (NTCHS).

Everett soils occur at elevations from 30 to 900 feet and are typically used for livestock grazing, timber production, and urban development (PBS 2019). Everett very gravelly sandy loam is not considered a hydric soil by the NTCHS, however this soil unit does include slopes of 15 to 30 percent.

Xerochrept soils occur at elevations from 0 to 980 feet on steep valley sides; these soils are not considered hydric soils by NTCHS, however this soil unit does include slopes of 45 to 70 percent.

The Geotechnical Report prepared for a portion of the Campus indicated the area includes fill soils from 2 to 15 feet in depth, likely underlain by recessional outwash, with advance outwash at lower elevation (Associated Earth Sciences, Inc. 2017). This is consistent with the soil mapping described above.

d. *Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.*

Portions of the Garrison Creek valley slope are composed of gravelly soils subject to seepage and meet the City of Lakewood definition for Landslide Hazard Areas (Associated Earth Sciences, Inc. 2017). The valley slope on the north side of the Campus is similarly steep, and is expected to have similar characteristics to the valley slope along Garrison Creek. The Individual projects included in the Master Plan will provide site specific geotechnical studies (if appropriate) and will be designed to avoid steep areas that may contain unstable soils or landslide hazards.

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.*

The proposed Master Plan is a planning level document, and as a result does not include the level of detail necessary to calculate filling, excavation, or grading quantities. The individual projects will calculate grading quantities and disturbance areas on a site by site basis. Any fill used on the Campus will be consist of clean fill material obtained for approved sources.

f. *Could erosion occur as a result of clearing, construction, or use? If so, generally describe.*

No erosion would occur from ongoing use of the campus or as a result of the approval of the Master Plan. Individual projects in the Master Plan are expected to result in clearing, excavating, and grading that will expose soils and have the potential to result in erosion.

g. *About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?*

The Master Plan will not result in change in impervious surfaces at the WSH Campus. Full implementation of the individual projects in the Master Plan will result in a change of impervious surface from 18.9% percent to 19.6 percent with the new hospital and western parking; this would increase to 20.6 percent if the potential Residential Treatment Facility (RTF) and adjacent parking were built.

h. *Proposed measures to reduce or control erosion, or other impacts to the earth, if any:*

The individual projects within the Master Plan will include site-specific Construction Storm Water Pollution Prevention (CSWPP) and Temporary Erosion and Sediment Control (TESC) Plans. These plans will incorporate Best Management Practices such as the establishment of stable construction entrances, placement of sediment fences, installation of control measures to cover exposed earth, use of wattles and checkdams, ongoing monitoring of stormwater runoff, etc. The project Contractor will adopt those plans and will to execute and amend the plan as necessary. The implementation of robust CSWPPP and TESC plans is anticipated to successfully control the potential for erosion and ensure compliance with Department of Ecology Construction Stormwater regulations.

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.*

Implementation of the individual projects in the Master Plan would result in construction related emissions. Anticipated emission sources would include use of construction equipment, dust from excavation and grading, and chemical odors from asphalt paving operations. These construction-related emissions are expected to be temporary in nature, and of short-term in duration. We anticipate that any operational increase in emission from vehicles using the Campus after project completion will be negligible.

b. *Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.*

None.

c. *Proposed measures to reduce or control emissions or other impacts to air, if any:*

Mitigation would include reasonable precautions to avoid fugitive dust emissions, including application of water or dust-binding chemicals to bare soils during dry weather, street and vehicle cleaning to prevent mud, dirt and other debris on paved roadways and planting of paving areas that would be exposed for prolonged periods of time. Construction equipment would be maintained in good repair. After project completion, vehicular traffic is not expected to significantly increase.

3. WATER

a. *Surface Water:*

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.

Yes – two wetlands and two streams were identified on or in close proximity to the campus. Details of these surface waters are provided below.

Wetlands

Two wetlands (GS South and GS North) were identified within or in the immediate vicinity of the project area. Table 2 describes these wetlands, and summarizes the Cowardin classification, hydrogeomorphic class, and preliminary rating and buffer width per LMC 14.162.080.

Wetlands GS North and GS South are slope wetlands associated with the Garrison Springs riparian corridor. Numerous areas of seepage were observed on the valley walls upslope of the stream during the site visit, and these areas were dominated by wetland plant species. Preliminary wetland ratings were completed with the 2014 Washington State Wetland Rating System for Western Washington, consistent with LMC 14.162.030. Both wetlands fall on the margin of the Category II/III. Buffers for wetland with these ratings range from 60-225 feet, depending on the habitat score.

Table 3: Potential Streams present at the Site and Preliminary Ratings

Stream	Flows to	Preliminary Stream Rating*	Preliminary Buffer Width†
Garrison Springs	Chambers Creek	Perennial, Fish-bearing (Type F)	65-150
Unnamed Tributary to Chambers Creek	Chambers Creek	Perennial, Fish-bearing (Type F)	65-150

* Water typing based on definition per 14.165.010

† Local stream ratings and buffer widths are based on Lakewood's Shoreline Master Program (SMP) Chapter 4 Section C.

Table 2: Potential Wetlands Present at the Site with Preliminary Ratings and Buffers

Wetland	Wetland HGM Class*	Cowardin Classification†	Dominant Species Observed	Wetland Hydrology Indicators Observed	Preliminary Wetland Rating‡§	Preliminary Buffer Width
GS South	Slope	Palustrine Forested (PFO)	Red alder, salmonberry, Himalayan blackberry, lady fern, giant horsetail, and English ivy	Saturation at the surface, shallow inundation/surface flows	II/III	60-225
GS North	Slope	Palustrine Forested (PFO)	Red alder, salmonberry, Himalayan blackberry, lady fern, giant horsetail, small-fruited bulrush, and English ivy	Saturation at the surface, shallow inundation/surface flows	II/III	60-225

* Hydrogeomorphic classification after Hruby (2014).

† Cowardian classification after Cowardin et al. (1979).

‡ Preliminary rating based on Washington State Wetland Rating System for Western Washington (Hruby, 2014).

§ Local wetland ratings and buffer widths are based on City of Lakewood Municipal Code (LMC) Title 14 – Environmental Protection (LMC 14.162).

Streams

Two streams were identified within the Study Area: Garrison Springs and an Unnamed Tributary to Chambers Creek. A summary of the characteristics of these streams and preliminary stream rating and buffer widths are provided in Table 3.

Garrison Springs/Garrison Creek is located in the central west portion of the WSH Campus. Garrison Springs, is a perennial stream, originating from seeps on the steep slopes on the western portion of the Campus and flowing northwest to the Garrison Springs Hatchery and the Chambers Creek Estuary on Puget Sound. Garrison Springs is approximately 5-15 feet wide at the ordinary high water mark and appeared to be channelized adjacent to the access road which provides access to the hatchery.

Current habitat in the stream is predominantly riffle and run type. Pools are largely limited to the areas above man-made structures on the stream. The stream substrate is primarily gravels with some fines, and the banks are somewhat incised. Mixed forest canopy and forested slope wetlands provided 100 percent canopy coverage, except where interrupted by the hatchery access road. The stream flows beneath Chambers Creek Road, entering Chambers Creek through a concrete box outfall with a steel rack that limits access.

The unnamed stream is a tributary to Chambers Creek and is located beyond the Campus northern property line. As a result, most of the stream could not be evaluated during the site assessment. However, water could be heard flowing the deep, steep sided valley located to the north of the Fort Steilacoom Golf Course.

The lower reach of this stream appears to be piped beneath the abandoned industrial facility at Chambers Creek Road. Several seeps areas were also identified in this area, and a concrete pipe outfall was located on the estuary of Chambers Creek, which likely represents the terminus of this stream. Flows were present at the outfall in July 2019, indicating that flows in this stream are likely perennial. Aerial imagery shows a densely vegetated, mixed forest riparian canopy in the riparian area, extending from the disc golf area northwest to Chambers Creek Road.

Individual Master Plan projects that require State or federal funding or permits will be required to assess the presence of wetlands and streams prior to funding or permit approval. More detailed field studies would be conducted at this time.

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.

No work is proposed in or over waters. Some individual projects on the Campus may be constructed within 200 feet of Garrison Creek or associated wetlands.

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.

None.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

No.

5) *Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.*

No work is proposed within a 100-year floodplains.

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.

No waste material would be discharged 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.

The WSH Campus currently uses water from wells located in Garrison Springs. The Master Plan anticipates that in future, the WSH Campus will transfer control of these wells to the Lakewood Water District, and future water needs at the Campus will be supplied by the District.

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.

No waste material will be discharged into the ground water. Waste from the WSH Campus includes domestic sewage and hospital waste, and the currently served population includes approximately 900 patients and 2,800 employees. The WSH Campus waste needs are currently provided by the Town of Steilacoom Sewer Utility.

Under the proposed Master Plan, the type of waste would not change. The served population would include approximately 865 patients - with a maximum capacity of approximately 1,000 beds[†] - and 2,700 employees. The WSH Campus waste needs would continue to be provided by the Town of Steilacoom Sewer Utility, which has sufficient capacity for the proposed increases.

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.

Anticipated sources of stormwater runoff on the Campus include building roofs, surface parking lots, and internal roadways. Runoff will be collected and disposed of on-site using a combination of pervious pavements, porous concrete, bioretention cells, and roof drain infiltration galleries. All stormwater runoff will be managed and infiltrated on-site.

2) *Could waste materials enter ground or surface waters? If so, generally describe.*

It is unlikely that waste material would enter ground or surface waters. Waste material from project construction would be removed from the site and treated appropriately. Any toxic substances such as fuel, lubricants, hydraulic fluids, paint, solvents, and cleaning materials will be isolated from water on the site and disposed of at an appropriate off-site facility. Operation sewage waste be will be collected and piped off-site for treatment at Town of Steilacoom Sewer Utility facilities, and hospital waste will be removed from the site and properly disposed of at an approved facility. Construction related and operational stormwater will be conveyed to treatment facilities on-site.

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

Site drainage proposed in the Master Plan designed to follow the existing site drainage basins and is not expected to alter on-site drainage patterns.

d. *Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:*

The Master Plan anticipates that stormwater from the Campus will be infiltrated on site to minimize the impact on drainage patterns.

† See “Patient Population, Capacity and Staff Levels” on page A8-3

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4. PLANTS

a. *Check the types of vegetation found on the site:*

_X_ deciduous tree: alder, maple, aspen, other

_X_ evergreen tree: fir, cedar, pine, other

_X_ shrubs

_X_ grass

____pasture

____crop or grain

____ Orchards, vineyards or other permanent crops.

_X_ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other

____water plants: water lily, eelgrass, milfoil, other

____other types of vegetation

The majority of the campus is developed, and vegetation in these areas consists of maintained lawn area with landscape trees. Species present in this area include:

- common domestic grasses (bent grasses [*Agrostis sp.*], bluegrasses [Poa sp.], fescues [*Festuca sp.*], and rye grasses [Lolium sp.])
- disturbance tolerant forbs (e.g. common dandelion [*Taraxicum officinale*], hairy cat's ear [*Hypocharis radicata*], sheep sorrel [*Rumex acetosella*], etc.),
- landscape trees (domestic cherry and flowering plums [*Prunus sp.*], European horse-chestnut [*Aesculus hippocastanum*], Norway maple [*Acer platanoides*], and Tree-of-Heaven [*Alianthus altissima*]),
- scattered native trees (Douglas fir [*Pseudotsuga menziesii*], Sitka spruce [*Picea sitchensis*], and copses of Oregon white oak (*Quercus garryana*).

The Fort Steilacoom Golf Course is located the northwest corner of the property, and is also maintained as grass, with scattered native coniferous trees and Oregon White Oak.

The disc golf area (NW) has a similar canopy to the golf course. In the open areas, the shrub community is dominated by Scot's broom (*Cytissus scoparius*).

Table 4: Native Plants on the WSH Campus

Stratum	Common Name (Scientific Name)
Tree	Bigleaf maple (Acer macrophyllum) Oregon white oak (Quercus garryana) Red alder (Alnus rubra)
Shrub	California dewberry (Rubus ursinus) Dull Oregon grape (Berberis nervosa) Oceanspray (Holodiscus discolor) Salmonberry (Rubus spectabilis) Snowberry (Symphicarpos albus) Vine maple (Acer circinatum)
Herbaceous	Giant horsetail (Equisetum telmateia) Orchard grass (Dactylis glomerata) Sword fern, or Pineland sword fern (Polystichum munitum) Western lady fern (Athyrium cyclosorum)

In areas where the canopy is denser, the dominant shrub species include California dewberry (*Rubus ursinus*), dull Oregon grape (*Berberis nervosa*), evergreen blackberry (*Rubus laciniatus*), Himalayan blackberry (*Rubus armeniacus*), and snowberry (*Symphicarpos albus*).

In the two ravine areas, the vegetation consists of a mixture of native and non-native species. The dominant species present include:

- red alder (*Alnus rubra*) and bigleaf maple (*Acer macrophyllum*) in the canopy, and

Table 5: Native Plants on the WSH Campus

Common Name	Scientific Name	Federal ESA Listing Status	Critical Habitat Designated?
Golden Paintbrush	*Castilleja levisecta*	Threatened	No
Marsh Sandwort	*Arenaria paludicola*	Endangered	No
Water Howellia	*Howellia aquatilis*	Threatened	No

- California dewberry (*Rubus ursinus*), dull Oregon grape, evergreen blackberry, Himalayan blackberry, oceanspray (*Holodiscus discolor*), salmonberry (*Rubus spectabilis*), snowberry, and vine maple (*Acer circinatum*).

Dominant herbaceous species present include giant horsetail (*Equisetum telmateia*), orchard grass (Dactylis glomerata), reed cararygrass (*Phalaris arundinacea*), Pineland sword fern (*Polystichum munitum*), and western lady fern (*Athyrium cyclosorum*).

Mapping from the WDNR Natural Resources Heritage Program identifies a single native plant community as present on or near the WSH Campus. This plant community is Oregon white oak dominated or co-dominated canopies. This community occurs in four locations on the Western State Hospital Campus: two on the eastern end of the Fort Steilacoom Golf Course near Garrison Springs, and two to the east one either side of Kids First Lane.

Table 4 presents a list of the native trees, shrubs, and herbaceous species identified on the WSH Campus during the field evaluation.

b. *What kind and amount of vegetation will be removed or altered?*

Projects considered in the Master Plan are concentrated in the developed portions of the Campus. Specific areas of vegetation removal would be determined for each of the individual projects, but the total affected areas are:

- approximately 3 acres of miscellaneous lawns and landscaping in the area of the new forensic hospital
- approximately 4 acres for the potential Residential Treatment Facility, which is mostly vegetated, but also include 2 cottages to be removed
- approximately 2/3 acre for the cottage at the CSTC complex
- approximately 1/3 acre for the Treatment and Recreational Facility at CSTC

The affected vegetation will include grasses and forbs in the landscaped lawn areas (bent grass, bluegrass, fescue, rye grass, common dandelion, hairy cat's ear, sheep sorrel, etc.), and landscape trees (domestic cherry and flowering plums, European horse-chestnut, Norway maple, and Tree-of-Heaven). Native tree than may be affected include Douglas fir, Sitka spruce, and Oregon white oak.

c. *List threatened and endangered species known to be on or near the site.*

Endangered Species Act Listed Plants

A review of information from the USFWS IPaC database (Appendix A) identified three federally threatened or endangered plant species as potentially present in the vicinity of the project. These species are listed in Table 5.

Golden paintbrush is listed as Threatened under the ESA and is found in native northwest grasslands. There are no current or historic populations in Pierce County. Marsh sandwort is listed as Endangered under the ESA. This species is found in swamps, wetlands, and freshwater marshes along the coast. In western Washington, water howellia occurs in low-elevation wetlands and small vernal pools (PBS, 2019).

The field reconnaissance did not identify any individuals of golden paintbrush, marsh sandwort or water howellia on the WSH campus. However, the protocols for identification of ESA plants require multiple field visits conducted over several years and timed to match the emergence/flowering of the target species.

Individual projects in the Master Plan will conduct more comprehensive field studies to determine the presence or absence of ESA listed plants as appropriate.

Rare and Sensitive Plant Species

The WDNR Natural Resources Heritage Program website identifies three rare or sensitive species as potentially present on or near the

Table 6: Rare and Sensitive Plant Species

Common Name	Scientific Name	Historic or Current presence?	Washington State Status	Potential habitat present?
White-top aster	*Seriocarpus rigidus*	Current	Sensitive	Yes
Common bluecup	*Githopsis specularioides*	Historic	Sensitive	Possible
Giant chain fern	*Woodwardia fimbriata*	Historic	Sensitive	Yes

WSH Campus. Characteristics of these species are described listed in Table 6.

White-top aster is found in relatively flat, open grasslands of lowlands in gravelly, glacial outwash soils (WDNR, 2019c). White-top aster is mapped as occurring in the northeast corner of the WSH Campus and has been identified by WDNR as present on the WSH Campus as recently as August 13, 2010 (PBS 2019).

Common bluecup is historically found in the vicinity of the WSH Campus. This species is found in dry, open places in lowlands, such as grassy balds, talus slopes, and gravelly prairies. There are no recent observations of common bluecup in Pierce County, and none of the habitats that support this species are present on the Campus.

Giant chain fern is historically found in the vicinity of the WSH Campus. This species is found in stream banks, shaded wet road banks, the edges of bogs, and wet bluffs amongst coniferous trees and adjacent to saltwater. Similar habitats are present on the Western State Hospital Campus and nearby.

The field reconnaissance did not identify any individuals of White-top aster,common bluecup, or giant chain fern. However, the protocols for identification of rare and sensitive species may require multiple field visits timed to match the emergence/flowering of the target species. Considering the relatively recent identification of white-top aster (August 2010), this species should be presumed to be present.

Individual projects in the Master Plan will conduct more comprehensive field studies for the presence of rare and sensitive plant species.

d. *Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:*

The master plan includes recommendations to reduce impacts on protecting species such as the White Oak. Areas of cultivated landscape will generally be near building entries and within courtyards used for recreation. Open areas of the site will be maintained as open space, with minimal disturbance. e. *List all noxious weeds and invasive species known to be on or near the site.*

No Class A noxious weeds were identified on the WSH Campus during the field investigation. Scattered knapweed specimens were present on the site, but were not positively identified as C. biebersteinii, and a number of Class B and C noxious weeds were identified on the Campus. A summary of the noxious weeds and invasive species known to be on or near the site is presented in Table 7.

Individual projects in the Master Plan will meet Pierce County and City of Lakewood regulations for control of noxious and invasive weeds.

Table 7: Noxious, Invasive, and Non-Native Plants

Common Name	Scientific Name
Class A Noxious Weed	*Scattered knapweed specimens were present on the site, but were not positively identified as C. biebersteinii.*
Class B Noxious Weed	*Scot's broom (Cytissus scoparius)**
Class C Noxious Weed	*English ivy (Hedera helix)* *Evergreen blackberry (Rubus laciniatus)** *Hairy cat's ear (Hypochaeris radicata)* *Himalayan blackberry (Rubus armeniacus)** *Reed canarygrass (Phalaris arundinacea) ** *Tree of Heaven (Alianthus altissima)*
Non-regulated, non-native species	*Bentgrasses (Agrostis sp.)* *Bluegrass (Poa sp.)* *Cherry (likely cultivar varieties of the genus Prunus)* *Common sheep sorrel (Rumex acetosella)* *Eastern redcedar (Juniperus virginiana)* *European horse-chestnut (Aesculus hippocastanum)* *Fescue grasses (Festuca sp.)* *Flowering plum (varieties of the genus Prunus)* *Lanceleaf plantain (Plantago lanceolata)* *Norway Maple (Acer platanoides)*

* Non-regulated noxious weed per Pierce County Noxious Weed Control Board.

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:

birds: hawk, heron, eagle, songbirds, other:

mammals: deer, bear, elk, beaver, other:

fish: bass, salmon, trout, herring, shellfish, other

The only positive wildlife identifications during the field evaluation were woodpeckers (identified by their sound), squirrels (likely eastern gray squirrel [*Sciurus carolinensis*] or eastern fox squirrel *[Sciurus niger*]), and American crow (*Corvus brachyrhynchos*).

However, considering the large size of the site and the presence of relatively undisturbed riparian areas in close proximity to Puget Sound, we would anticipate a variety of wildlife species that are adapted to proximity with suburban human populations, such as rats, mice, voles and similar rodents; North American raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), and passerine bird species.

Deer (*Odocoileus sp*.) and coyote (*Canis latrans*) and were not observed on the Campus, but are likely present due the proximity of the riparian habitats on and near the Campus to Chambers Creek estuary, which supports a variety of fish and wildlife species. A brief reconnaissance of the estuary area positively identified deer, great blue heron (*Ardea herodias*), and bald eagle (*Haliaeetus leucocephalus*).

b. *List any threatened and endangered species known to be on or near the site.*

Table 8: Federal and State-Listed Habitats and Species

Common Name	Scientific Name	Status	Critical Habitat Designated?
Puget Sound Chinook Salmon	*Oncorhynchus tshawytscha*	Federally Threatened	Yes
Puget Sound Steelhead	*O. mykiss*	Federally Threatened	Yes
Puget Sound-Coastal Bull Trout	*Salvelinus confluentus*	Federally Threatened	Yes
Gray wolf	*Canus lupus*	Federally Endangered (Proposed)	No
Marbled murrelet	*Brachyramphus marmoratus*	Federally Threatened	Yes
Streaked horned lark	*Eremophila alpestris strigata*	Federally Threatened	Yes
Yellow-billed cuckoo	*Coccyzus americanus*	Federally Threatened	Proposed
Oregon spotted frog	*Rana pretiosa*	Federally Threatened	Yes
Biodiversity area	*N/A*	State Priority Habitat	N/A
Little brown bat	*Myotis lucifugus*	State Priority Species	N/A
Slender-billed white-breasted nuthatch	*Sitta carolinensis aculeata*	State Candidate Species	N/A
Western Pond Turtle	*Actinemys marmorata*	State Endangered	N/A

Federal and State-Listed Habitats and Species

The USFWS IPaC website (Appendix A), NOAA Fisheries ESA listings, and WDFW PHS data identify several federally and state threatened or endangered species, as well as priority habitats and species in the vicinity of the project. The results are presented in Table 8.

Salmonscape and StreamNet were also reviewed for presence of anadromous fish, but no habitat was identified in either database.

Suburban developed areas in the Puget Sound do not provide suitable, usable habitat for large terrestrial predators such as Gray wolf or North American Wolverine. Oregon spotted frog requires relatively large areas of emergent wetland that are not present on the Campus.

Table 9: Migratory Bird Species

Common Name	Scientific Name	Breeding Season*
Bald Eagle	*Haliaeetus leucocephalus*	January 1 – September 30
Black Turnstone	*Arenaria melanocephala*	Breeds elsewhere†
Great Blue Heron	*Ardea herodias fannini*	March – August 15
Lesser Yellowlegs	*Tringa flavipes*	Breeds elsewhere‡
Marbled Godwit	*Limosa fedoa*	Breeds elsewhere§
Olive-sided Flycatcher	*Contopus cooperi*	May 20 – August 31
Red-throated Loon	*Gavia stellate*	Breeds elsewhere¶
Rufous Hummingbird	*Selasphorous rufus*	April 15 – July 15
Western Screech-owl	*Megascops kennicottii kennicottii*	March 1 – June 30

* Noted by USFWS to be a liberal estimate of breeding season

† Indicates the species does not likely breed within project area

‡ *ibid*

§ *ibid*

¶ *ibid*

Exposed gravel areas to the site could provide potential habitat for streaked horned lark, but the frequency of disturbance on the Campus makes nesting by this species unlikely. Nearby marine areas could potentially provide foraging habitat for marbled murrelet. Habitat suitable for use by yellow-billed cuckoo includes large tracts of riparian habitat with small trees and shrubs suitable for nesting. Some areas of similar riparian habitat are present on the Campus and nearby. Future projects should assume that streaked horned lark, marbled murrelet, yellow-billed cuckoo or suitable habitats may be present and should conduct more detailed studies.

Streams on the Campus and nearby have long culverted sections or other man-made barriers that preclude use by listed anadromous ESA listed fish species (Chinook salmon, steelhead, and bull trout). However, these species are present in Puget Sound and likely use the nearby areas of Chambers Creek. As a result, future projects should assume the potential for impact to these species.

The riparian areas along Garrison Springs and the unnamed tributary to Chambers Creek meet the definition of biodiversity areas and would be protected as critical areas. Similarly, habitats for little brown bat, slender-billed white-breasted nuthatch (mapped on the site) western pond turtle (mapped in the vicinity) would also need to be considered by future projects.

Migratory Bird Act and the Bald and Golden Eagle Protection Act

The USFWS IPaC website (See PBS 2019) identified several species protected under the Migratory Bird Ac as potentially present in the vicinity of the Campus. These species area are listed in Table 9.

Potential impacts to these migratory birds during their breeding season would need to be considered by future projects.

Individual Master Plan projects at the Campus should conduct site specific field studies to identify ESA listed, priority, and critical species and habitats in the immediate project vicinity.

Critical Fish and Wildlife Species and Habitats

LMC 14.154.020 identifies a list of 11 critical fish and wildlife species and habitats, five of which are occur on or near the Campus. Table 10 provides details on these critical fish and wildlife species and habitats present at the WSH Campus.

c. *Is the site part of a migration route? If so, explain.*

Yes. The site is part of the Pacific Flyway for migratory birds. Fish species may also use the downstream portions of the streams may provide habitat for migratory fish species.

d. *Proposed measures to preserve or enhance wildlife, if any:*

The proposed WSH Master Plan retains approximately 48 acres of wildlife habitat in its current condition. The preserved habitat includes Oregon White Oak habitat (much of which is currently used for active and passive recreation), wetlands, streams, and riparian areas on or abutting the campus.

e. *List any invasive animal species known to be on or near the site.*

No invasive animals are known to be present on the WSH Campus.

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.*

Electricity, natural gas, gasoline and diesel fuel will be used to power construction equipment.

Individual projects are expected to use electricity (provided by Tacoma Power) to provide power to the building's electrical components and natural gas (provided by Puget Sound Energy) for heating buildings or water on the campus.

Currently many campus facilities are heated by steam from a central boiler room, with boilers fueled by natural gas. The plan recommends further study to develop strategies to reduce reliance on natural gas, in response to the State's Net Zero policy.

b. *Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.*

No. There is significant open space around the site that no built features will shade neighboring properties. Within the site, development density will allow future facilities to have building-integrated or ground-mounted photovoltaic facilities and effective solar orientation.

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:

Individual projects implemented as part of the Master Plan will include energy modeling and mechanical LEED services.

Table 10: Critical Fish and Wildlife Species and Habitats

Habitats and Species of Local Importance	Description
Priority Oregon white oak woodlands	*WDNR identifies four patches of either oak-dominant forest or woodland canopy, or urban oak canopy (Figure 5). The four patches (32.61 ac. total) were identified in the northern half of the property.*
Snag-rich areas	*Snag-rich areas are likely to occur in the stream riparian areas.*
Rivers and streams with critical fisheries	*Rivers and streams with critical fisheries on or near the Campus.*
Waters of the state, including all water bodies classified by the Washington Department of Natural Resources (DNR) water typing classification system as detailed in WAC 222-16-030, together with associated riparian areas	*WDNR Forest Practices Application Mapping Tool identifies Garrison Springs and the unnamed tributary to Chambers Creek within the Study Area (*
Lakes, ponds, streams, and rivers planted with game fish by a governmental entity or tribal entity.	*Garrison Springs Hatchery may meet the requirements of this habitat of local importance, the hatchery is run by WDFW (WDFW, 2019b).*

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.*

1) Describe any known or possible contamination at the site from present or past uses.

A campus-wide study for environmental health hazards has not yet been completed, however the site is known to be within the boundaries of the Tacoma Smelter Plume.

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.

None were identified.

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.

Transportation fuel for construction equipment will be used and may be stored on site during construction in compliance with State regulations for proper equipment storage. Other toxic chemicals that may be required for construction (such as pesticides, herbicides, fertilizers, etc.) will be stored and used in accordance with all federal, state and local regulations.

4) Describe special emergency services that might be required.

No special emergency services are anticipated to be required for the Master Plan or the individual projects implemented under the Master Plan. A safety plan which will include emergency spill responses in compliance with State regulations will be provided. The completed project will be served by typical public emergency services.

5) Proposed measures to reduce or control environmental health hazards, if any:

Master Plan projects will conduct soil sampling for arsenic and lead following the 2012 Tacoma Smelter Plume Guidance. Subsequent actions in response to testing results will comply with the Model Toxics Control Act (MTCA) cleanup requirements in (Chapter 173-340 WAC).

Site designs for the individual projects will include protective measures to isolate or remove contaminated soils from public spaces, yards, and children's play areas, and any contaminated soils will be managed and disposed of in accordance with state and local regulations, including the Solid Waste Handling Standards regulation (Chapter 173-350 WAC).

Site specific studies will also be completed to determine the presence of any other contaminants at Master Plan project sites.

b. *Noise*

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

Land uses surrounding the WSH Campus are primarily residential and park/public open space. As a result, existing noise in the vicinity is largely the result of traffic on the roads in the immediate vicinity.

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.

Short-term noise would result from the use of construction equipment such as trucks, machinery and excavation activities during daylight hours. Long-term operational noise is limited to vehicular traffic using the parking lot and access roads. Use of the parking lots and access roads would occur primarily during daylight hours and at shift changes.

3) Proposed measures to reduce or control noise impacts, if any:

Construction will only occur during daylight hours to minimize the impact of short term noise disturbances. Long-term noise disturbances will be minimized in compliance with local noise ordinances.

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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.*

The WSH Campus is currently used as a hospital facility and provides mental healthcare services for patients in western Washington State. The campus includes the Hospital facilities, support facilities for the heathcare facilities, and open space.

The proposed Master Plan will not change the use of the facility, and the proposed Master Plan incorporates a more compact facility footprint to allow for greater security. As a result, the proposed Master Plan and the subsequent project are not expected to alter the land uses on nearby properties.

The hospital is an Essential Public Facility as defined by the State, and is being developed on land zoned for this type of use.

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 non-farm or non-forest use?*

While there was some production gardening by patients of the hospital in its early history, the WSH Campus has not been used as working farmland or working forest land for over 40 years.

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:

No, the project will not affect or be affected by surrounding working farm or forest lands.

c. *Describe any structures on the site.*

There are approximately 60 buildings on the site, built up over more than a century, and totaling approximately 1,435,000 SF. These are detailed in Table 3 and Figures 11 and 12 (pp. 1-17) of the Master Plan document.

d. *Will any structures be demolished? If so, what?*

Yes, several outmoded structures are proposed for demolition, totaling up to 150,000 SF. These are described in the report and summarized in Figure 17 of the Master Plan document.

e. *What is the current zoning classification of the site?*

The WSH Campus is currently zoned Public Institutional and Open Space/Recreation (1) by the City of Lakewood.

f. *What is the current comprehensive plan designation of the site?*

The current comprehensive plan designation of the Campus includes Public Institutional and Open Space designations.

g. *If applicable, what is the current shoreline master program designation of the site?*

Not applicable; project site is not located within 200 feet of a shoreline.

h. *Has any part of the site been classified as a critical area by the city or county? If so, specify.*

Yes, portions of the WSH Campus and the abutting lands includes areas designated as geologically hazardous areas (erosion hazard and/or landslide hazard areas), critical aquifer recharge area, wetlands, and streams (Garrison Creek and a second unnamed stream located immediately to the north of the Campus). The Campus also includes several habitats and species of local importance (Priority Oregon white oak woodlands, Snag-rich areas, rivers and streams with critical fisheries, waters of the state together with associated riparian areas, and Lakes, ponds, streams, and rivers planted with game fish by a governmental entity or tribal entity).

i. *Approximately how many people would reside or work in the completed project?*

The health-care facilities are projected to serve 865 patients- and a maximum capacity of up 1,000 beds[‡] - as well as a staff of approximately 2,700.

‡ See “Patient Population, Capacity and Staff Levels” on page A8-3 for explanation of population and capacity.

j. *Approximately how many people would the completed project displace?*

Approval of the Master Plan and construction of the individual projects will not result in displacement.

k. *Proposed measures to avoid or reduce displacement impacts, if any:*

None proposed. The Master Plan and construction of the individual projects will not result in displacement.

l. *Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:*

The Master Plan helps establish a more compact layout for the major facility on the WSH campus. In combination with the other revisions to the Master Plan, the facility siting will support:

- Improved security for patients and neighbors, with fewer patients circulating between buildings;
- Preservation of open space on the Campus;
- Improved traffic flow;
- More efficient utility supply, and;
- Improved accessibility.

m. *Proposed measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance, if any:*

None proposed. The Master Plan and construction of the individual projects will not result in impacts to agricultural and forest lands.

9. HOUSING

a. *Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.*

While residential accommodations are provided for patients in treatment these accommodations are not considered general housing.

b. *Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.*

None.

c. *Proposed measures to reduce or control housing impacts, if any:*

None proposed. The Master Plan and construction of the individual projects will not result in housing impacts.

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?*

The new hospital in expected to be three stories in height, with a maximum of five stories. It would be of comparable height to existing buildings on the site.

b. *What views in the immediate vicinity would be altered or obstructed?*

The primary buildings will be on a site area that is previously developed. Existing views are not expected to be altered significantly.

c. *Proposed measures to reduce or control aesthetic impacts, if any:*

The design intent will include massing the building to create courtyards and other features that will benefit patients and reduce the apparent scale of the facility.

11. LIGHT AND GLARE

a. *What type of light or glare will the proposal produce? What time of day would it mainly occur?*

The proposed Master Plan improvements will include interior and exterior lighting fixtures attached to the building and in parking areas. Interior lighting would be on during all hours of the day, and exterior building lights, roadway and parking lot lighting would be on during evening, night and early morning hours for safety.

b. *Could light or glare from the finished project be a safety hazard or interfere with views?*

Light from the proposed Master Plan improvements is not expected to be a safety hazard or interfere with views.

c. *What existing off-site sources of light or glare may affect your proposal?*

Off-site sources of light or glare may result from adjacent street and traffic lighting; these sources are not expected may affect the WSH Campus or facilities.

d. *Proposed measures to reduce or control light and glare impacts, if any:*

Light from the proposed Master Plan improvements will be directed at pedestrian walkways, parking lots, and access roads to minimize the effects of light and glare on nearby uses and wildlife.

12. RECREATION

a. *What designated and informal recreational opportunities are in the immediate vicinity?*

The Campus and publicly accessible properties on the vicinity provide a variety of active and passive recreational opportunities including baseball, bicycling, bird watching, disc golf, running, and walking.

These recreation opportunities are available on Campus at the former ballfields and Fort Steilacoom Golf Course (accessible during daylight hours from 87th Avenue SW), and off-site at Fort Steilacoom Park (south of Steilacoom Boulevard SW) and the Chambers Creek Canyon Park (north of the Campus).

b. *Would the proposed project displace any existing recreational uses? If so, describe.*

The proposed Master Plan improvements are not expected to have permanent impacts to off-campus recreational uses would preserve the existing open space at the former Fort Steilacoom Golf Course and nearby areas currently used for disc golf. Construction of the individual projects in the Master Plan may result in temporary and short-term changes to site access to preserve the safety of recreational users and construction crews.

c. *Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:*

Access changes resulting from the proposed Master Plan improvements will be minimized to the maximum extend possible while maintaining the safety of recreational users and workers at the Campus.

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 ? If so, specifically describe.*

The WSH site presents a complex layering of historic functions with an extensive set of prehistoric, historic, and non-historic features (including archaeological sites, buildings, structures, objects, landscape elements, etc.) spread across the vast expanse of an 882-acre site. These activities encompass a broad time period from aboriginal use, Hudson Bay and early exploration by the 1830s, settlement by the 1840s, Fort Steilacoom by 1849, and hospital and institutional farm uses by 1871 (*Artifacts Architectural Consulting*, 2008).

Portions of the Campus area listed to the National Register of Historic Places (NRHP) and Washington Heritage Register (WHR) as the Fort Steilacoom Historic District on November 25, 1977. The NRHP listing was amended on December 16, 1991.

Culturally significant feature identified at the site include two prehistoric sites, Fort Steilacoom, associated cemeteries, 36 extant buildings dating from the period from the 1850's to the 1960's, and 17 additional structures including monuments and accessory buildings.

These buildings and structures are described in detail in the Western State Hospital Cultural Landscape Assessment (Artifacts Architectural Consulting 2008).

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.*

Yes. Two prehistoric sites and three historic cemeteries (military, settler, and hospital) are present in the area. Additional detail is provided in the Western State Hospital Cultural Landscape Assessment (Artifacts Architectural Consulting 2008).

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.*

WSH has retained archaeological and cultural resource specialist to prepare documents to document the archaeological and cultural history of the WSH Campus and vicinity. Documents prepared include:

- Western State Hospital Cultural Landscape Assessment (Artifacts Architectural Consulting 2008)
- Western State Hospital Cultural Resource Management Plan (Artifacts Architectural Consulting 2011)

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.*

The master plan calls for protection of the historical resources associated with the 19th Century history of the site, including the Fort Steilacoom era and the early hospital era. These include the Settlers' Cemetery, and potentially the early morgue and bakery buildings.

DSHS will work with the Fort Steilacoom Historical Association to support protection and interpretation of the extant Fort-era facilities.

For facilities from the hospital's expansion phases, DSHS will document facilities prior to any demolition or major alteration.

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.*

Steilacoom Boulevard is the primary street serving the site. To the east, 87th Avenue SW is the campus boundary and to the west, Sentinel Drive is the boundary.

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?*

Pierce Transit provides bus transit to the primary site entry. A bus route connects WSH to both central Steilacoom to the west and the Lakewood Transit Center to the east. From the transit center, transfers can be made to other destinations in Pierce Transit's service area.

c. *How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?*

The project will provide an additional 334 parking spaces, for a total of 1,993. This will allow WSH to reduce the incidence of informal parking in non-designated areas, and will better accommodate shift overlap periods.

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).*

The WSH master plan recommends changes to the internal circulation system that would lead to relocation of the primary vehicular access points. These changes are proposed to increase separation of access drives, while improving campus wayfinding. The changes are not required, but projected to be beneficial to the near-campus flow of traffic.

e. *Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.*

These will not be a significant mode of travel for staff, visitors or deliveries to the site.

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 non-passenger vehicles). What data or transportation models were used to make these estimates?*

Based on the targeted populations on the WSH campus, 5,709 trips on average would be generated to and from the site on weekdays. This represents a 6% reduction from current measured traffic. Peaks are projected as follows:

- 677 trips from 7:00-8:00 a.m., 5% down from existing
- 366 trips, from 4:00-5:00 p.m., 6% down from existing

Additional detail on the study methodology and projected travel patterns is provided in the Transportation Impact Analysis, see Appendices. The TIA also includes interim scenarios that address the impacts of potentially higher populations in interim periods over the planning timeframe.

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.*

No.

h. *Proposed measures to reduce or control transportation impacts, if any:*

WSH will continue to participate in the Commute Trip Reduction (CTR) program. Primary programs include transit passes, carpool and vanpool support, employer-provided transit passes and supporting programs such as a guaranteed ride home.

As documented in the 2019 CRT report, initiatives for near term expansion include expanding the vanpool program and further coordination with Pierce Transit.

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.*

The proposed Master Plan improvements will not result in an increased need for public services, including fire protection, police protection, public transit, health care, or schools.

b. *Proposed measures to reduce or control direct impacts on public services, if any.*

None proposed. The proposed Master Plan improvements will not result in an increased need for public services.

16. UTILITIES

a. *Circle utilities currently available at the site:* (underlined)

electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other: steam heat

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.*

Current services include: Tacoma Power (electricity) and Puget Sound Energy (natural gas); current facilities are provided water from an on-site well system; future facilities will be connected to the Lakewood Water District's system.

These systems and their capacities are further described in the master plan report; see "Utilities & Infrastructure" on page 43.

C. Signature

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: Robert J Hubenthal

Name of signee Robert J. Hubenthal

Position and Agency/Organization Capital Programs Director, WA DSHS

Date Submitted: Dec. 15, 2021

D. Supplemental sheet for non-project actions

(IT IS NOT NECESSARY to use this sheet 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?*

Operation of the WSH Campus is not expected to result in increases in discharges to ground or surface waters. Operational emissions to air result from the use of motor vehicles on the WSH Campus and operation of heating, ventilation, and air conditioning equipment, which produce minimal emissions. Similarly, the Campus operations do not produce any of toxic or hazardous substances. The WSH Campus does not use industrial machinery, so the operational noise generated on the Campus is largely the result of vehicular traffic and the operation of HVAC equipment. The associated noise levels of these machines are typically low, and are consistent with the Public Institutional land use.

The project incorporates a variety of approaches to reduce the impact of the WSH Campus to the environment, including: on-site infiltration of stormwater; implementation of Best Management Practices to control construction-related erosion and sedimentation, and to contain toxic or hazardous materials used during construction; and application of appropriate site clean-up measures for any identified -toxic or hazardous materials.

Proposed measures to avoid or reduce such increases are:

Operational measure to avoid or decrease discharges include:

- On-site stormwater treatment and infiltration;
- Application of green building technology to reduce energy needs and potential emissions;
- Implementation of operational safety standards for the storage of toxic or hazardous substances to prevent accidental release; and

2. *How would the proposal be likely to affect plants, animals, fish, or marine life?*

Removal of vegetation would be necessary in order to construct the new buildings proposed in the Master Plan. Vegetation to be removed is dominated by maintained lawns and horticultural tree species, although some Oregon white oak are present. The loss of this vegetation has the potential to affect some species of animals.

Since the project will not require work in wetland or streams, impacts to buffers will be avoided or minimized, and best management practices will be used to address stormwater issues on the site, fish and marine life would not be affected by the Master Plan improvements.

Proposed measures to protect or conserve plants, animals, fish, or marine life are:

Development of the Campus and removal of vegetation is concentrated in the previously developed portions of the Campus, which will minimize the loss of vegetation. Replacement of notable trees (particularly Oregon white oak) would be developed in consultation with the City and other stakeholders.

In addition to efforts to minimize the footprint of the new development, existing open space on the Campus would be retained. The former Fort Steilacoom Golf Course (72.6 acres) and an area use d by the community as a current disc golf course (approximately 15 acres, SE loop) would be preserved. These two active recreational uses represent about 30 percent of the campus.

3. *How would the proposal be likely to deplete energy or natural resources?*

Proposed measures to protect or conserve energy and natural resources are:

- New facilities will be developed to contemporary standards, reducing their consumption.
- Development of campus will also follow the State's Net Zero policy.
- Over the long-term, the intent is to retire the natural gas fired steam boilers in favor of more sustainable energy sources.

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?

The proposed Master Plan improvements have been located in areas that avoid impacts to streams, wetlands, and floodplains. No designated parks, wilderness areas, wild and scenic rivers, or prime farmlands are present on the Campus. No populations of threatened or endangered species or their habitats have been identified on the Campus. The Campus includes historic and culturally important features (such as architecturally or historically significant buildings and structures and historically significant trees) that would be removed in order to construct new buildings on the Campus.

Proposed measures to protect such resources or to avoid or reduce impacts are:

The Proposed Master Plan improvements will be designed and constructed in a manner that preserves and maintains environmentally sensitive areas to the maximum extent practicable while achieving the goals of this essential public facility in providing healthcare services to the residents of western Washington.

Each of the individual projects will conduct site-specific studies to identify the presence of populations of threatened or endangered species or their habitats. Proven concepts and designs would incorporate measures to avoid or minimize any potential impacts to these important resources. Similarly, the projects will incorporate measures to sensitively address architecturally or historically significant buildings and structures on Campus.

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?*

The proposed Master Plan improvements are wholly consistent with the current land use designation and zoning for the campus, and do not allow or encourage incompatible land or shoreline uses.

Proposed measures to avoid or reduce shoreline and land use impacts are:

The Master Plan based on a more compact facility design. This compact footprint allows for more efficient use of space, increased the efficiency utility services by reducing length of utility lines, and provides increased security for employees, staff, and neighbors by consolidating the facilities and incorporating interior fencing.

6. *How would the proposal be likely to increase demands on transportation or public services and utilities?*

Proposed measures to reduce or respond to such demand(s) are:

- As noted elsewhere, traffic impacts are projected to decrease over the course of the master plan's implementation.
- New facilities will be developed to current standards for energy and water efficiency.

7. *Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.*

The Master Plan will be consistent local, state, or federal laws or requirements for the protection of the environment including compliance with the planning processes for Pierce County and the City of Lakewood regarding the siting essential public facilities. This compliance will include consistency with the City's Comprehensive Plan, Master Plan, Zoning, and SEPA processes, including any public involvement components of these processes.

Individual Master Plan projects will use a similar approach, conducting any site-specific studies necessary, and revising concepts and plans to comply with all applicable permitting and regulatory requirements, including building, critical areas, SEPA (if applicable), and zoning requirements.