TRANSMITTAL

Date: September 24th, 2024

To: Mark Hofman, Community Development Director, City of Lake Forest Park

From: Kyle Cotchett, Environmental Planner; Kenny Booth, AICP, Principal

Project Name: Lake Forest Park Lakefront Improvements

Facet Project Number: 2303.0384.02

Subject: LAKE FOREST PARK LAKEFRONT IMPROVEMENTS: Pre-Application Narrative

Site Description

The project site is located at 17337, 17345, and 17347 Beach Drive NE in the City of Lake Forest Park, parcel nos. 403010-0035, 403010-0040, and 403010-0050. The parcels are rectangular in shape, totaling approximately 143,979 square feet (3.3-acres) in size, and border Lake Washington to the southeast. All parcels are within the RS-7,200 SFR zoning designation. Parcel nos. 403010-0035 and 403010-0040 have a shoreline environment designation of Shoreline Residential, while 403010-0050 is designated as Urban Conservancy. Parcel 403010-0050 is developed with the existing Lyon Creek Waterfront Preserve, including two stream bridges and viewing dock. Parcel 403010-0040 is developed with four buildings and a dock. Parcel 403010-0035 is developed with three buildings. All three parcels are almost entirely encumbered by critical areas and their corresponding buffers. According to the City's critical area maps and studies performed by Facet, the northern portion of the parcels include seismic hazard areas, while the southern portion of the parcels contain several wetlands. Additionally, Lyon Creek flows through the western portion of parcel no. 403010-0050. Its associated buffer encompasses the majority of the parcel, as well as the western portion of parcel no. 403010-0040. Please see the attached Boundary and Topographic Survey, Impact Analysis Exhibit, and Wetland and Stream Delineation Report for more information.

Project Description

The project proposes to improve public waterfront access through the transition of two recently acquired single-family residential properties (parcels 403010-0035 and -0040) into a public waterfront park. The project design aims to be respective of the natural habitat and features of the site, preserve and enhance existing features that represent the historical narrative of Lake Forest Park, and consider the current and future responsibilities of the City.

The newly acquired properties and associated improvements will be integrated with the existing Lyon Creek Waterfront Preserve to form one continuous public park. New project improvements will be focused on the two recently acquired parcels, nos. 403010-0035 and -0040, while the existing public preserve parcel will be modified to reduce public access to the creek buffer and sensitive area at the creek's outfall to Lake Washington. New project improvements will include a new parking area, access paths, play structure, nature viewing platforms, and new swimming and paddling dock. The open lawn and natural beach will be preserved in place for public use. Nine buildings are present on the site, including a primary single-family dwelling unit, open-air carport, enclosed garage, and five smaller accessory structures. The primary dwelling unit and one of the accessory units will be renovated for flexible community use. The remaining structures will be demolished, with demolition occurring as part of a separate Early Works permit package. A picnic shelter will be reconstructed within the footprint of one accessory structure. A bathhouse will be constructed within the footprint of the garage building. The two existing docks present on parcels no. 403010-0040 and 403010-0050 will be removed and consolidated into a single dock design for public water access uses. An existing footbridge crossing Lyon Creek is proposed to be relocated off the creek and reinstalled within the creek's floodplain. Further description of these elements can be found below. Please also refer to the attached Conceptual Design Site Plan (Attachment D).

The geotechnical report for the site is currently being prepared by HWA GeoSciences Inc. and is anticipated to be available mid-October.

Frontage Improvements

The project proposes to add a sidewalk connection from the end of the existing sidewalk on Ballinger Way to the new park entrance. This work will consist of a sidewalk extension on Ballinger Way, striped crossing on Beach Drive, and new sidewalk along Beach Drive terminating at the park entrance.

In addition, the project anticipates necessary upgrades to Beach Drive from Ballinger Way to the east edge of the project boundary. A concept plan showing proposed improvements is attached.

New Parking Area

New ingress/egress from Beach Drive NE will be created, with a small parking area totaling approximately ten spaces, including seven standard parking spaces and three ADA-compliant spaces. Additional parking is proposed off-site at the Lake Forest Park City Hall. The parking proposed is consistent with the recommendations of the traffic impact analysis and parking study (attached).

Portions of proposed improvements will occur within overlapping standard critical area buffers. To minimize new buffer impacts, the proposed driveways are parking areas are configured to reuse the footprint of existing hard surfaces, including compacted gravel driveways, pavements, and former structures, and to preserve existing mature canopy trees.

Play Area

A small play area will be constructed near the middle of northernmost parcel. Portions of proposed improvements will occur within overlapping standard critical area buffers and partially within the standard shoreline setback. The play area will be located and sized so as to preserve two existing mature canopy trees.

Building Renovations

Several of the existing on-site structures will be renovated, including:

- The primary dwelling unit will be renovated into an accessible flexible space intended to serve community events and activities. The existing deck associated with the structure will be expanded.
- One of the accessory structures will be renovated into an accessible flexible space proposed to serve city administration and operations.
- The existing enclosed garage structure will be demolished and roughly half of its footprint will be reused for a new park bathhouse building.
- One of the accessory structures that is nearest the water will be demolished and its footprint will be reused for an open-air picnic shelter.

New and renovated buildings will be connected by a new system of accessible paved paths. Portions of proposed improvements will occur within overlapping standard critical area buffers.

Shoreline Improvements

Two existing older dock facilities will be removed, including associated concrete shoreline armoring and creosote pilings. The existing softened portion of the shoreline will be preserved for beach access, and enhanced with strategic log, boulder, and gravel placement. A new swim buoy line will be installed and will extend along the northern property boundary of the park to separate the intended swimming area from an adjacent property.

Preserve Parcel Improvements

Within the existing Lyon Creek Waterfront Preserve (parcel 403010-0050), several enhancements will be made, including removal of an existing footbridge over Lyon Creek, a reconfiguration of trails, several new viewing platforms, removal of a boundary fence, reconfiguration of the existing stream overlook with grated decking, and new native plantings.

Recreational Dock

Both existing docks would be removed and replaced with one new structure. The design concept for the new recreational pier is for it to be multipurpose. It will include nature viewing platforms on the southwest portion, and on the southeast portion a swimming platform and a watercraft launch for paddle-craft. The dock is not intended to serve motorized watercraft. Additionally, the design proposes a swim platform east of the dock.

Questions for City Staff

1. Please confirm that SMP 330.A allows for flexibility in placing new improvements within wetlands/buffers in shoreline jurisdiction.
2. Please confirm that SMP 360.A allows for flexibility in placing new improvements within stream buffers in shoreline jurisdiction.
3. The project currently consists of three parcels that will be programmed as one public park. Should the project seek a lot consolidation as part of the project?
4. Can portions of the proposed parking area extend to within less than 25-feet from the side property line?
5. Will proposed enhancements to the existing Lyon Creek Waterfront Preserve parcel require a Shoreline Conditional Use Permit?
6. Does the City see any issues with renovations of existing structures?
7. Lot coverage does not appear to be regulated within the SMP. Please confirm if lot coverage will be regulated and to what percentage. If applied, please confirm that lot coverage limits will be calculated as the land area of all three properties combined, less any water area.
8. There is at least one groundwater well on the property. Can the groundwater well be used as a source of water for irrigation? Or, if not, please confirm the process for decommissioning.
9. Please advise on how the City will regulate/review the new public dock structure.

10. If frontage improvements will be required on Beach Drive NE as part of this project, please confirm the proposed roadway section is acceptable. In addition, please share any standard details and specifications for roadway construction, if available.
11. The project proposes a sidewalk extension from the Park entrance west down Beach Drive NE and north to the sidewalk stub on Ballinger Way NE. A sidewalk is not currently proposed east of the Park entrance, as there are no connecting sidewalk facilities on Beach Drive NE. Is a sidewalk extension to the east required?
12. Sewer: We understand that the sewer connections in the Park and along Beach Drive NE will be rerouted as part of the City's project to install a new lift station. Can the Lakefront project use the existing sewer infrastructure until that project is completed? If the desire is for the sewer utility to be upgraded with the Lakefront project, the preference would be to install a new connection to the new lift station location but continue to use the existing connection until the new lift station is installed and working.
13. Sewer: Is there a sewer easement along the sewer line that runs east/west across the southern portion of the land area and then under Lyon Creek? Are there certain offsets that need to be maintained for new amenities/utilities?
14. Fire: There is an existing hydrant in front of the Civic Club. Is this sufficient to serve the project or will another hydrant be required within the park's frontage? The design team would like to avoid adding sprinklers to the buildings.
15. Traffic:
    a. The parking study recommended fewer than the number of spaces required by code, specifically, reducing from 44 spaces to 22. Please confirm the process for approving the reduction. Is a variance required or can the reduction be made by Director approval?
    b. The plan proposes off-site parking that is located at City Hall. Please confirm the process for establishing a shared parking agreement between the park property and City Hall, and/or amending the existing shared parking agreement between the preserve and City Hall.

Attachments

A. Existing Topography and Boundary Survey
B. Impact Analysis Exhibit
C. Wetland and Stream Delineation Report
D. Concept Drawings
E. Traffic Impact Analysis

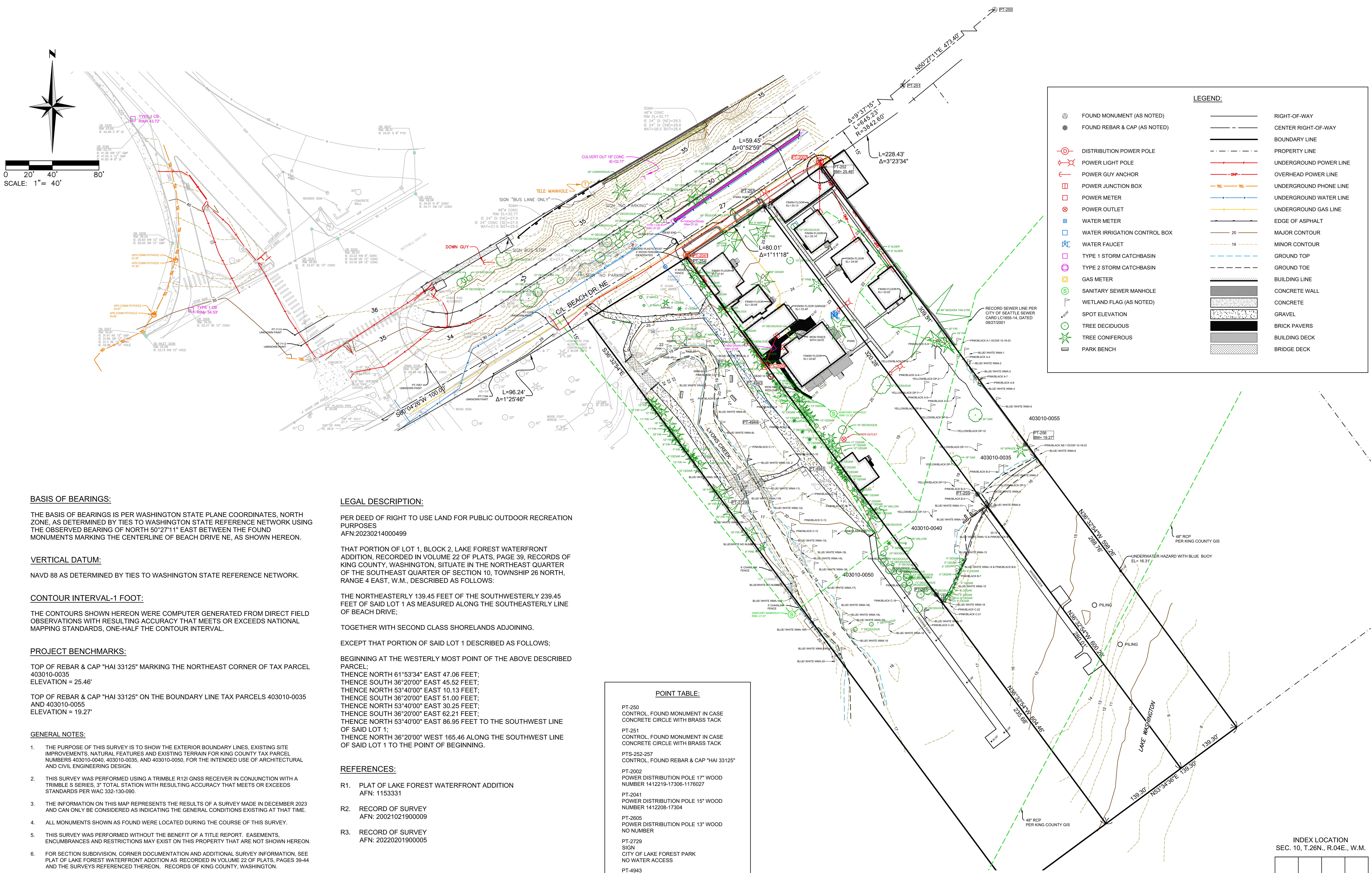
F. Proposed Frontage Improvements
G. Cultural Resource Analysis (Feb 2024) and Addendum (August 2024)

Additional Links

More information on the project can be found on the project website below:
https://lfplakefrontpark.com/

BOUNDARY AND TOPOGRAPHIC SURVEY

A PORTION OF LOT 1, BLOCK 2, LAKE FOREST WATERFRONT
WITHIN THE NE1/4 OF THE SE1/4 OF SECTION 10, TOWNSHIP 26 NORTH, RANGE 04 EAST, W.M., KING COUNTY, WASHINGTON



BASIS OF BEARINGS:

THE BASIS OF BEARINGS IS PER WASHINGTON STATE PLANE COORDINATES, NORTH ZONE, AS DETERMINED BY TIES TO WASHINGTON STATE REFERENCE NETWORK USING THE OBSERVED BEARING OF NORTH 50°27'11" EAST BETWEEN THE FOUND MONUMENTS MARKING THE CENTERLINE OF BEACH DRIVE NE, AS SHOWN HEREON.

VERTICAL DATUM:

NAVD 88 AS DETERMINED BY TIES TO WASHINGTON STATE REFERENCE NETWORK.

CONTOUR INTERVAL-1 FOOT:

THE CONTOURS SHOWN HEREON WERE COMPUTER GENERATED FROM DIRECT FIELD OBSERVATIONS WITH RESULTING ACCURACY THAT MEETS OR EXCEEDS NATIONAL MAPPING STANDARDS, ONE-HALF THE CONTOUR INTERVAL.

PROJECT BENCHMARKS:

TOP OF REBAR & CAP "HAI 33125" MARKING THE NORTHEAST CORNER OF TAX PARCEL 403010-0035
ELEVATION = 25.46'

TOP OF REBAR & CAP "HAI 33125" ON THE BOUNDARY LINE TAX PARCELS 403010-0035 AND 403010-0055
ELEVATION = 19.27'

GENERAL NOTES:

1. THE PURPOSE OF THIS SURVEY IS TO SHOW THE EXTERIOR BOUNDARY LINES, EXISTING SITE IMPROVEMENTS, NATURAL FEATURES AND EXISTING TERRAIN FOR KING COUNTY TAX PARCEL NUMBERS 403010-0040, 403010-0035, AND 403010-0050, FOR THE INTENDED USE OF ARCHITECTURAL AND CIVIL ENGINEERING DESIGN.
2. THIS SURVEY WAS PERFORMED USING A TRIMBLE R12I GNSS RECEIVER IN CONJUNCTION WITH A TRIMBLE S SERIES, 3" TOTAL STATION WITH RESULTING ACCURACY THAT MEETS OR EXCEEDS STANDARDS PER WAC 332-130-090.
3. THE INFORMATION ON THIS MAP REPRESENTS THE RESULTS OF A SURVEY MADE IN DECEMBER 2023 AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THAT TIME.
4. ALL MONUMENTS SHOWN AS FOUND WERE LOCATED DURING THE COURSE OF THIS SURVEY.
5. THIS SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF A TITLE REPORT. EASEMENTS, ENCUMBRANCES AND RESTRICTIONS MAY EXIST ON THIS PROPERTY THAT ARE NOT SHOWN HEREON.
6. FOR SECTION SUBDIVISION, CORNER DOCUMENTATION AND ADDITIONAL SURVEY INFORMATION, SEE PLAT OF LAKE FOREST WATERFRONT ADDITION AS RECORDED IN VOLUME 22 OF PLATS, PAGES 39-44 AND THE SURVEYS REFERENCED THEREON, RECORDS OF KING COUNTY, WASHINGTON.

LEGAL DESCRIPTION:

PER DEED OF RIGHT TO USE LAND FOR PUBLIC OUTDOOR RECREATION PURPOSES
AFN:20230214000499

THAT PORTION OF LOT 1, BLOCK 2, LAKE FOREST WATERFRONT ADDITION, RECORDED IN VOLUME 22 OF PLATS, PAGE 39, RECORDS OF KING COUNTY, WASHINGTON, SITUATE IN THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 10, TOWNSHIP 26 NORTH, RANGE 4 EAST, W.M., DESCRIBED AS FOLLOWS:

THE NORTHEASTERLY 139.45 FEET OF THE SOUTHWESTERLY 239.45 FEET OF SAID LOT 1 AS MEASURED ALONG THE SOUTHEASTERLY LINE OF BEACH DRIVE;

TOGETHER WITH SECOND CLASS SHORELANDS ADJOINING.

EXCEPT THAT PORTION OF SAID LOT 1 DESCRIBED AS FOLLOWS;

BEGINNING AT THE WESTERLY MOST POINT OF THE ABOVE DESCRIBED PARCEL;
THENCE NORTH 61°53'34" EAST 47.06 FEET;
THENCE SOUTH 36°20'00" EAST 45.52 FEET;
THENCE NORTH 53°40'00" EAST 10.13 FEET;
THENCE SOUTH 36°20'00" EAST 51.00 FEET;
THENCE NORTH 53°40'00" EAST 30.25 FEET;
THENCE SOUTH 36°20'00" EAST 62.21 FEET;
THENCE NORTH 53°40'00" EAST 86.95 FEET TO THE SOUTHWEST LINE OF SAID LOT 1;
THENCE NORTH 36°20'00" WEST 165.46 ALONG THE SOUTHWEST LINE OF SAID LOT 1 TO THE POINT OF BEGINNING.

REFERENCES:

R1. PLAT OF LAKE FOREST WATERFRONT ADDITION
AFN: 1153331

R2. RECORD OF SURVEY
AFN: 20021021900009

R3. RECORD OF SURVEY
AFN: 20220201900005

POINT TABLE:

PT-250
CONTROL, FOUND MONUMENT IN CASE
CONCRETE CIRCLE WITH BRASS TACK

PT-251
CONTROL, FOUND MONUMENT IN CASE
CONCRETE CIRCLE WITH BRASS TACK

PTS-252-257
CONTROL, FOUND REBAR & CAP "HAI 33125"

PT-2002
POWER DISTRIBUTION POLE 17" WOOD
NUMBER 1412219-17306-1176027

PT-2041
POWER DISTRIBUTION POLE 15" WOOD
NUMBER 1412208-17304

PT-2605
POWER DISTRIBUTION POLE 13" WOOD
NO NUMBER

PT-2729
SIGN
CITY OF LAKE FOREST PARK
NO WATER ACCESS

PT-4943
SIGN
WELCOME TO LYON PARK

PT-4945
SIGN
SMART WATERING SAVES
OUR WATER AND KEEPS IT
CLEAN FOR PEOPLE, FISH
AND OTHER WILDLIFE

APS SURVEY & MAPPING
Exceptional Service Has No Boundaries
13221 S.E. 26TH STREET, SUITE A, BELLEVUE, WA 98005
TEL: (425) 746-3200 WWW.APSSM.COM

SAMUEL R. WARD
STATE OF WASHINGTON
LS 52843
REGISTERED PROFESSIONAL LAND SURVEYOR
2/16/2024

BOUNDARY AND TOPOGRAPHIC SURVEY

LAKE FOREST PARK, 17345 & 17347 BEACH DR. NE, LAKE FOREST PARK
TAX PARCEL NUMBERS 403010-0035, 403010-0040, AND 403010-0050
FOR
DCG/WATERSHED

CITY OF LAKE FOREST PARK WASHINGTON

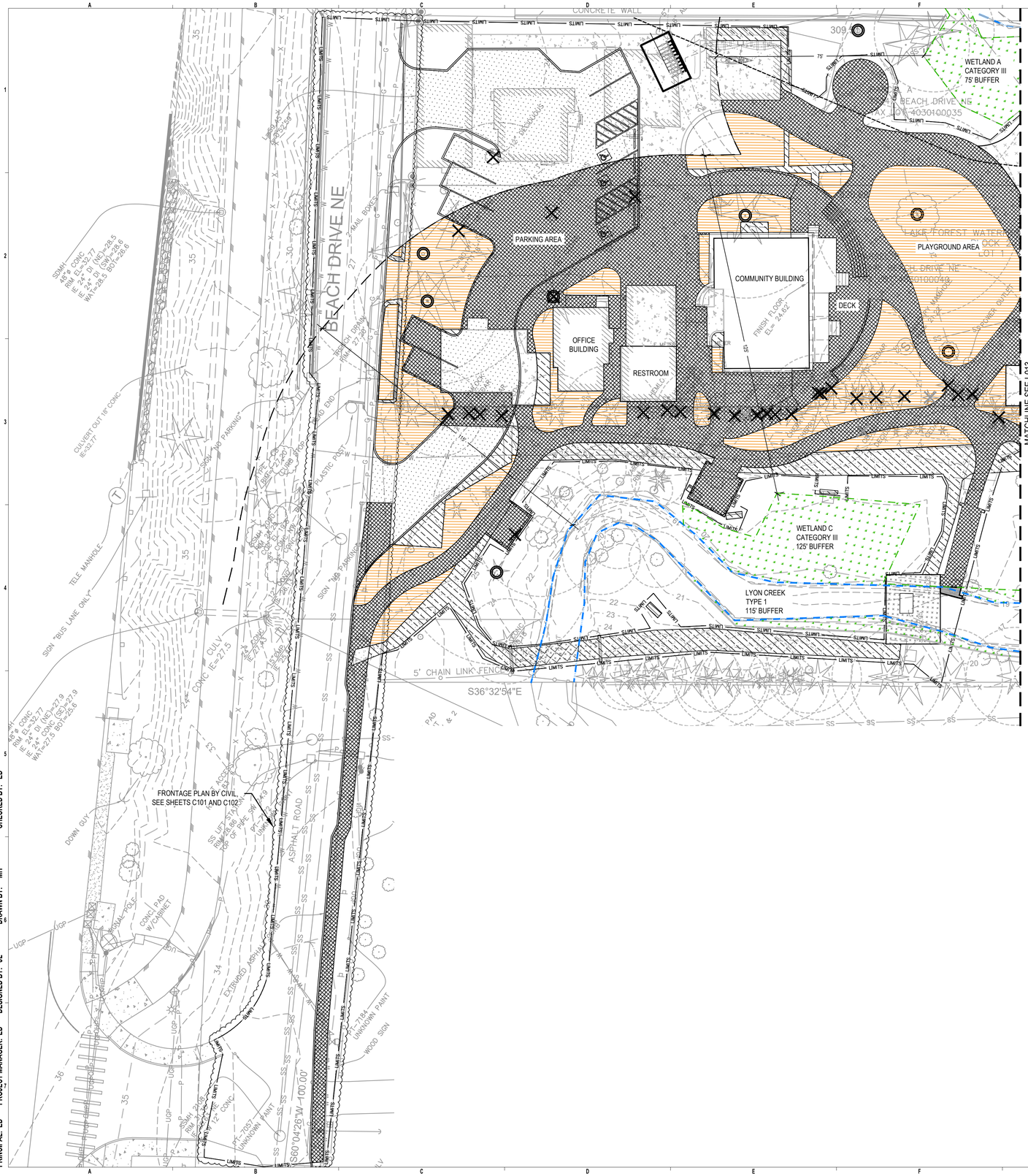
SCALE: 1"=40' | DATE: 2/16/24 | APSSM PROJECT NO.: 3126.040 | ACAD NAME: 3126040T.dwg

SURVEYED BY: JC
DRAWN BY: CR/SM
CHECKED BY: VW
APPROVED BY: SW

DATE	BY	REVISION	CK'D	APPR.

SHEET 1 OF 1

DRAWING FILE NAME: E:\APS Survey & Mapping Dropbox\Jobs Folder\APS Jobs\2019\3126 - Davido Consulting Group\3126.040 - 17345 Beach Dr. NE, Lake Forest Park\DWG\3D\3126040T.dwg PLOTTED: Feb 16, 2024 - 11:29:54am



Attachment B
Impact Analysis Exhibit

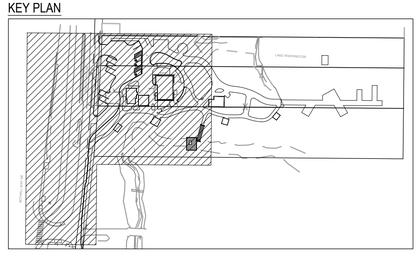
LEGEND

- LIMITS — LIMIT OF WORK
- WETLAND BOUNDARY (DELINEATED)
- WETLAND BOUNDARY (NOT-DELINEATED)
- ORDINARY HIGH WATER MARK (OHWM)
- COMBINED CRITICAL AREA BUFFER
- 50' LAKE WASHINGTON SHORELINE SETBACK
- NEW PERMANENT CRITICAL AREA IMPACT (3,930 SF)
- NEW PERMANENT BUFFER IMPACT (18,125 SF)
- EXISTING CRITICAL AREA IMPACT TO BE REMOVED (2,335 SF)
- EXISTING BUFFER IMPACT TO THE REMOVED (4,050 SF)
- NEW TEMPORARY BUFFER IMPACTS TO BE RESTORED (12,800 SF)
- EXISTING SIGNIFICANT TREES TO BE REMOVED (42 TOTAL)
- EXISTING LANDMARK TREES TO BE REMOVED (1 TOTAL)
- EXISTING NON-SIGNIFICANT TREES TO BE REMOVED (4 TOTAL)
- EXISTING NON-SIGNIFICANT TREES TO REMAIN

NOTES

1. CRITICAL AREAS WERE DELINEATED BY FACET ON OCTOBER 9 AND 31, 2023.

KEY PLAN



20' 10' 0 20' 40'
SCALE: 1" = 20'

Know what's **below.**
Call before you dig.

NO.	DATE	BY	REVISION

BASE MAP/TOPOGRAPHY PROVIDED BY OTHERS. DCG/WATERSHED CANNOT BE HELD LIABLE FOR ACCURACY. CONTRACTOR SHALL FIELD VERIFY GRADES, UTILITIES, AND ALL OTHER EXISTING FEATURES AND CONDITIONS. IF CONDITIONS ARE NOT AS SHOWN AND/OR PLANS CANNOT BE CONSTRUCTED AS SHOWN, CONTACT DCG/WATERSHED PRIOR TO CONSTRUCTION.

FACET
750 Sixth Street South
Kirkland, WA 98033
P: 425.822.5242
F: 425.827.8136
www.facetnw.com
FEDERAL WAY | KIRKLAND | MOUNT VERNON | SEATTLE | SPOKANE | WHIDBEY ISLAND

STATE OF WASHINGTON
ROBERT V. MIKLUCICH
No. 9176 EXP. 12/19/25
REGISTERED LANDSCAPE ARCHITECT

PRELIMINARY

CALL 811
2 BUSINESS DAYS BEFORE YOU DIG
(UNDERGROUND UTILITY LOCATIONS ARE APPROX.)

LAKE FOREST PARK LAKEFRONT IMPROVEMENTS

17337, 17345, & 17347 BEACH DR NE
LAKE FOREST PARK, WA 98155
2303.0384.02

50% DESIGN

IMPACT ANALYSIS

DATE: 10/3/2024
PLAN NUMBER:
L009
SHEET 11 OF 46

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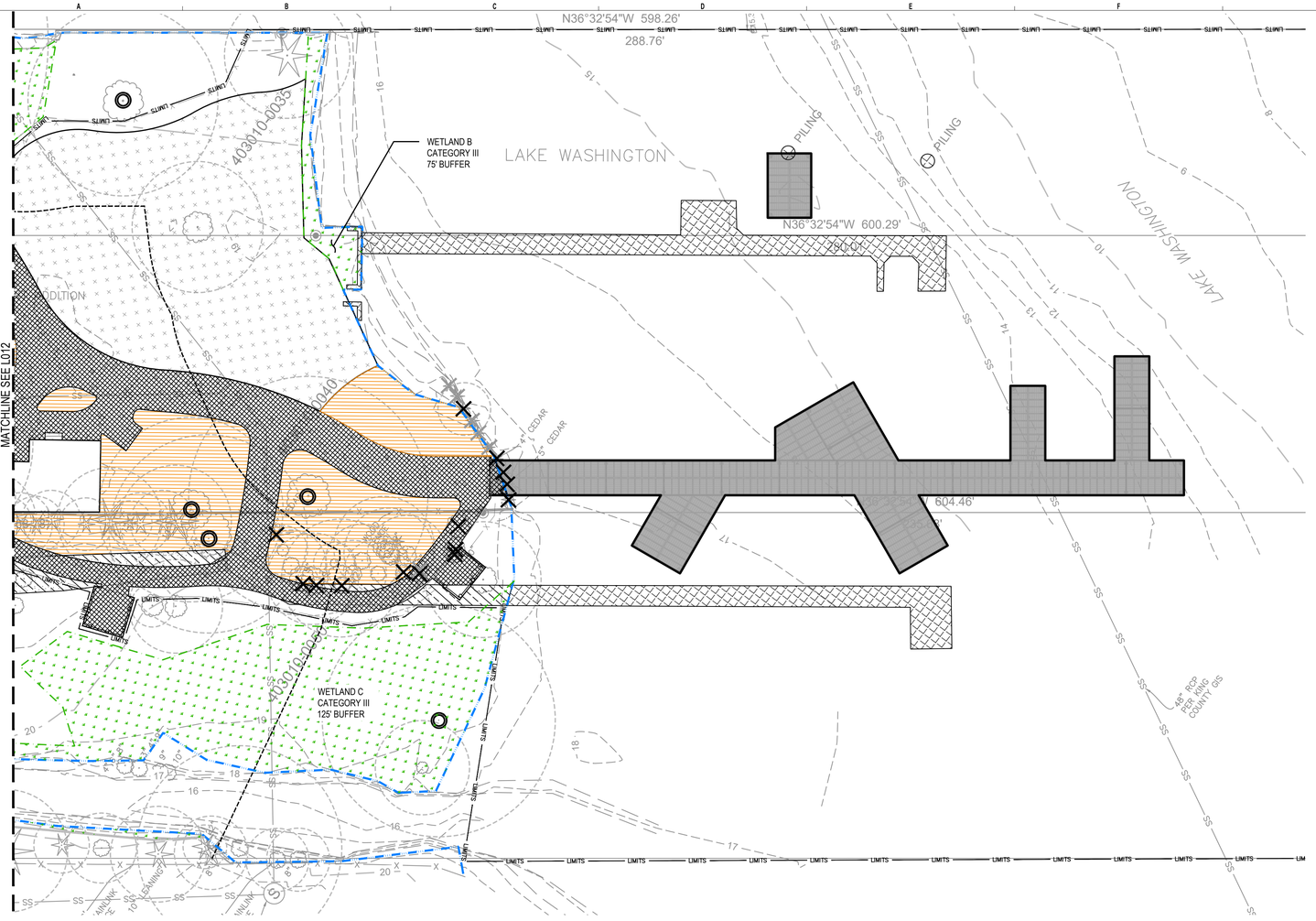
PRINCIPAL: ED PROJECT MANAGER: ED DESIGNED BY: JL DRAWN BY: MH CHECKED BY: ED

Attachment B
Impact Analysis Exhibit



LEGEND

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- WETLAND BOUNDARY (NOT-DELINEATED)
- ORDINARY HIGH WATER MARK (OHWM)
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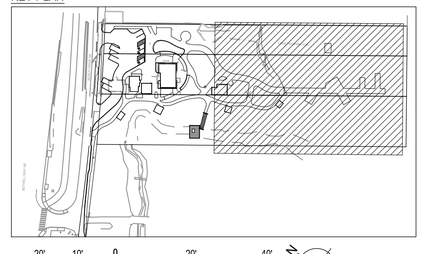

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50% DESIGN

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L010
SHEET 12 OF 46

FILE LOCATION: Z:\SHARED\PROJECTS\ACTIVE\2023\2303.0384.02 - LFP LAKEFRONT PARK PH 2\DRAWINGS\CAD-REVIT\ACTIVEFILE\L012-L013_IMPACTS ANALYSIS.DWG - ORIGINAL SHEET SIZE: ARCH FULL BLEED D (36.00 X 24.00 INCHES) - LAST MODIFIED BY: AMANDA SANELLI
PRINCIPAL: ED PROJECT MANAGER: ED DESIGNED BY: JL DRAWN BY: MH CHECKED BY: ED

December 4, 2023

Cory Roche
City of Lake Forest Park
206-957-2814
Via email: croche@cityoflfp.gov

Lakefront Property / Lyon Creek Waterfront Preserve Wetland and Stream Delineation Report

DCG/Watershed Reference Number: 230336

Summary

This report has been prepared to present the findings of a wetland and stream delineation study in the City of Lake Forest Park. Three City-owned properties located at 17245 and 17347 Beach Drive NE (parcels 403010-0035 & -0040, and -0050) are included in the study. In addition to the information and findings presented in this report, the following documents are enclosed:

- Wetland and Stream Delineation Sketch
- Wetland Determination Forms
- Wetland Rating Forms and Figures

Three wetlands (Wetlands A, B, and C), one stream (Lyon Creek, Stream A) and one lake shoreline (Lake Washington) were identified and delineated within the study area. A summary of critical area classifications, categories, and required buffer widths is provided in Table 1.

Table 1. Summary of critical areas and required buffers per Lake Forest Park Shoreline Master Plan.

Feature Name	Classification	Category	Habitat Score	Buffer (ft)	Setback (ft)
Wetland A	Lake-Fringe	III	5 (<19*)	75	15
Wetland B	Lake-Fringe	III	5 (<19*)	75	15
Wetland C	Riverine	III	6 (20-28*)	125	15
Lyon Creek	Type 1	n/a	n/a	115	15
Lake Washington	Type S	n/a	n/a	n/a	50
*Habitat score translated per the State of Washington Department of Ecology guidelines.					

Study Area

The study area is defined as parcels 403010-0035, -0040, and -0050, totaling approximately 3.3-acres in size (Figure 1). It is located in the City of Lake Forest Park in Section 10 of Township 26 North, Range 04 East. The subject parcels are located in the Lake Washington-Sammamish River drainage basin of the Cedar-Sammamish Water Resource Inventory Area (WRIA 8). Adjacent public or private property within 200 feet was screened from the edge of the parcel or nearest publicly accessible land; no private property was accessed without permission.

Figure 1. Study area, outlined in yellow (source: King County iMap).

Methods

Field investigations were conducted on October 19 and 31, 2023, by ecologists Sage Yuasa and Roen Hohlfeld. The study area was evaluated for streams based on the presence or absence of an ordinary high water mark (OHWM) as defined by Section 404 of the Clean Water Act, the Washington Administrative Code (WAC) 220-660-030, and the Revised Code of Washington (RCW) 90.58.030 and guidance documents including *Determining the Ordinary High Water Mark for Shoreline Management Act Compliance in Washington State* (Anderson 2016) and *A Guide to Ordinary High Water Mark (OHWM) Delineation for Non-Perennial Streams in the Western Mountains, Valleys, and Coast Region of the United States* (Mersel and Lichvar 2014).

The study area was evaluated for wetlands using methodology from the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region Version 2.0* (U.S. Army Corps of Engineers 2010). Presence or absence of wetlands was determined on the basis of an examination of vegetation, soils, and hydrology. These parameters were sampled at several locations along the wetland boundary to determine the approximate wetland edge. Wetlands were classified using the Washington State Department of Ecology's (Ecology) *Wetland Rating System for Western Washington:* (Hruby 2014).

Characterization of weather conditions for precipitation in the Wetland Determination Data Forms were determined using the WETS table methodology (USDA, NRCS 2015). The "Seattle Tacoma Intl AP" station from 1991-2020 was used as a source for precipitation data (http://agacis.rcc-acis.org/). The WETS table methodology uses climate data from the three months prior to the site visit month to determine if normal conditions are present in the study area region.

Public-domain information on the subject properties was reviewed for this delineation study. Resources and review findings are presented in Table 2 of the "Findings" section of this letter.

Findings

Desktop Review

Public-domain information reviewed for the site is summarized below (Table 2).

Table 2. Summary of online mapping and inventory resources.

Resource	Summary
USDA NRCS: Web Soil Survey	*Urban land – Alderwood complex, 0 to 5 percent slopes. No hydric soil rating, drainage class: moderately well drained.*
USFWS: NWI Wetland Mapper	*One lake habitat (L1UBHh), Lake Washington, and one stream (R4SBC), Lyon Creek, mapped within subject parcels.*
WDFW: PHS on the Web	*Coho and sockeye occurrence; resident coastal cutthroat and steelhead occurrence/migration; sockeye and coho breeding area mapped in Lyon Creek within subject parcels. Little brown bat mapped at township scale.*
WDFW & NWIFC: Statewide Washington Integrated Fish Distribution	*Gradient Accessible, Presence: mapped for Chinook in Lyon Creek. Documented Spawning: mapped for coho, sockeye in Lyon Creek. Documented presence: mapped for steelhead and coastal cutthroat trout in Lyon Creek.*
WA-DNR: Forest Practices Application Mapping Tool	*Lake Washington (Type S) and one stream (Lyon Creek, Type U) mapped within subject parcels.*
King County iMap	*One lake (Lake Washington) and one stream (Lyon Creek) mapped within subject parcels.*
City of Lake Forest Park Open Data Portal	*One riverine wetland and one lake wetland mapped within subject parcels.*
WETS Climatic Condition	*Normal conditions (October)*

Study Area Overview

The study area includes Lyon Creek Waterfront Preserve and two additional City-owned properties located adjacent to the east. Lyon Creek Waterfront Preserve is characterized by a natural area with mitigation plantings along Lyon Creek, located centrally on the parcel. The park includes a pedestrian trail with two creek crossings as well as a dock structure extending into Lake Washington. A small parking area is located at the park entry at the northwest end of the parcel.

The adjacent City-owned parcels currently have several cabins and a garage structure clustered around the northwest portion of the site. These parcels are characterized by a large, maintained lawn area and ornamental vegetation, including several large, mature trees. A bulkhead is located along Lake Washington in the southeastern part of the site; the parcels also include a dock structure.

Site topography is generally flat, with Lake Washington located at the relative low elevation point along the southeast boundary of the study area. The surrounding area is characterized by high-intensity residential land use.

Shorelines

Lake Washington, a shoreline of statewide significance, is located in the southern portion of the study area. The ordinary high water mark was flagged within the study area.

Photo 1. Lake Washington, near the mouth of Lyon Creek.

Streams

One stream (Lyon Creek) is located in the western portion of the study area. The ordinary high water mark along left and right banks was flagged within the study area.

The stream enters the northwest corner of subject parcels and flows south to Lake Washington along the western boundary of the study area. OHWM indicators such as flowing water, defined bed and bank characteristics, scour, sorted sediments, and hydrophytic vegetation were observed along the stream channel. Lyon Creek is a low gradient stream with a channel width

of approximately 10-feet. The streambed is composed of fine sediments, cobble, and small boulders. Riparian vegetation, including a forested canopy and understory vegetation overhangs the stream banks throughout the study area. Large woody debris is present, however stream channel complexity, such as pools and braiding, is limited.

Photo 2. Lyon Creek, in the northwest portion of the study area.

Wetlands

Three wetlands (Wetland A, B, and C) were identified and delineated within the study area as summarized in Tables 3, 4, and 5.

Table 3. Wetland A assessment summary.

DCG WATERSHED	**WETLAND A – Assessment Summary**		
Location:	Parcels #403010-0035 & -0040; Lake Forest Park		
WRIA / Sub-basin:	Cedar-Sammamish watershed (WRIA 8) / Lake Washington- Sammamish River sub-basin		
	2014 Western WA Ecology Rating:	Category III	
	Buffer Width and Buffer Setback:	75-foot standard buffer and 15-foot setback	
	Wetland Size:	Approx. 2,500 SF	
	Cowardin Classification(s):	Palustrine Emergent Palustrine Forested	
	HGM Classification(s):	Lake-Fringe	
	Wetland Data Sheet(s):	DP-2	
	Upland Data Sheet (s):	DP-6, DP-7, DP-9	
Vegetation	Tree stratum:	*Alnus rubra, Salix matsudana*	
	Shrub stratum:	*Rubus bifrons*	
	Herb stratum:	*Poa* sp., *Lysimachia vulgaris, Phalaris arundinacea, Hedera helix*	
Soils	Soil survey:	Urban land – Alderwood complex, 0 to 5 percent slopes	
	Field data:	Redox Dark Surface (F6)	
Hydrology	Source:	Lake-fringe, high water table	
	Field data:	Geomorphic Position (D2), FAC-Neutral Test (D5)	

Wetland Functions

	Improving Water Quality			Hydrologic			Habitat			
Site Potential	H	**M**	L	H	M	**L**	H	M	**L**	
Landscape Potential	**H**	M	L	**H**	M	L	H	M	**L**	
Value	H	**M**	L	**H**	M	L	**H**	M	L	**TOTAL**
Score Based on Ratings	7			7			5			19

Table 4. Wetland B assessment summary.

DCG WATERSHED	**WETLAND B – Assessment Summary**		
Location:	Parcels #403010-0035 & -0040; Lake Forest Park		
WRIA / Sub-basin:	Cedar-Sammamish watershed (WRIA 8) / Lake Washington- Sammamish River sub-basin		
	2014 Western WA Ecology Rating:	Category III	
	Buffer Width and Buffer Setback:	75-foot standard buffer and 15-foot setback	
	Wetland Size:	Approx. 1,125 SF	
	Cowardin Classification(s):	Palustrine Emergent	
	HGM Classification(s):	Lake-Fringe	
	Wetland Data Sheet(s):	DP-3	
	Upland Data Sheet (s):	DP-11, DP-12, DP-13	
Vegetation	Tree stratum:	*n/a*	
	Shrub stratum:	*n/a*	
	Herb stratum:	*Poa* sp., *Iris pseudacorus, Lotus coniculatus, Phalaris arundinacea, Persicaria maculosa*	
Soils	Soil survey:	Urban land – Alderwood complex, 0 to 5 percent slopes	
	Field data:	Sandy Redox (S5)	
Hydrology	Source:	Lake-fringe, high water table	
	Field data:	Geomorphic Position (D2), FAC-Neutral Test (D5)	

Wetland Functions

	Improving Water Quality			Hydrologic			Habitat			
Site Potential	H	**M**	L	H	M	**L**	H	M	**L**	
Landscape Potential	**H**	M	L	**H**	M	L	H	M	**L**	
Value	H	**M**	L	H	**M**	L	**H**	M	L	**TOTAL**
Score Based on Ratings	7			6			5			18

Table 5. Wetland C assessment summary.

DCG WATERSHED	**WETLAND C – Assessment Summary**	
Location:	Parcels #403010-0050; Lake Forest Park	
WRIA / Sub-basin:	Cedar-Sammamish watershed (WRIA 8) / Lake Washington- Sammamish River sub-basin	
	2014 Western WA Ecology Rating:	Category III
	Buffer Width and Buffer Setback:	125-foot standard buffer and 15-foot setback
	Wetland Size:	Approx. 0.25 acres
	Cowardin Classification(s):	Palustrine Emergent Palustrine Scrub-shrub Palustrine Forested
	HGM Classification(s):	Riverine, Lake-Fringe
	Wetland Data Sheet(s):	DP-4
	Upland Data Sheet (s):	DP-5
Vegetation	Tree stratum:	*Alnus rubra, Thuja plicata, Fraxinus latifolia*
	Shrub stratum:	*Acer circinatum, Cornus sericea, Physocarpus capitatus, Rubus bifrons*
	Herb stratum:	*Persicaria maculosa, Solanum dulcamara, Carex obnupta, Phalaris arundinacea, Impatience capensis*
Soils	Soil survey:	Urban land – Alderwood complex, 0 to 5 percent slopes
	Field data:	Redox Dark Surface (F6)
Hydrology	Source:	Lyon Creek, lake-fringe
	Field data:	Geomorphic Position (D2), FAC-Neutral Test (D5)

Wetland Functions

	Improving Water Quality			Hydrologic			Habitat			
Site Potential	H	**M**	L	H	**M**	L	H	**M**	L	
Landscape Potential	**H**	M	L	**H**	M	L	H	M	**L**	
Value	H	M	**L**	H	M	**L**	**H**	M	L	**TOTAL**
Score Based on Ratings	6			6			6			18

Non-Wetland Areas

The central and northeast portions of the study area do not meet wetland criteria. Vegetation in non-wetland areas includes native restoration plantings with species typical of non-wetland areas such as common snowberry (*Symphoricarpos albus*) tall Oregon grape (*Mahonia aquifolium*), and sword fern (*Polystichum munitum*). Maintained lawn and ornamental trees, shrubs and groundcovers are also common in non-wetland areas.

Photo 3. Typical non-wetland area conditions.

Local Regulations

Shorelines

Lake Washington is a shoreline of statewide significance and regulated under the Lake Forest Park Municipal Code (LFPMC) Chapter 16.18 Shoreline Master Program (SMP). The SMP currently classifies the subject parcels' shoreline environment designations as Shoreline Residential and Urban Conservatory. Per SMP Chapter 7.1, on Shoreline Residential lots with a depth of 100-feet of greater, a standard shoreline setback of 50-feet is required; Urban Conservancy lots also require a 50-foot standard setback.

SMP Chapter 7 provides specific details on shoreline use policies and regulations. Specifically, SMP section 7.10 outlines policies related to recreational uses in the shoreline jurisdiction. New recreational structures, other than those that are accessory or water-dependent, shall be set back 50-feet from the OHWM (SMP 7.10A).

Streams

The lower reach of Lyon Creek is located within Shoreline Jurisdiction and is therefore regulated under the City of Lake Forest Park's SMP. Per SMP Appendix A - *Environmentally Sensitive Areas Regulations in Shoreline Jurisdiction*, Section 40X, "streams that are fish passable from Lake Washington are presumed to be Type 1." Generally, Type 1 streams are fish-bearing streams, used by fish for spawning, rearing, or migration. Per WAC 22-16-031, stream segments with defined a channel of two feet in width or greater and with a gradient of 16% or less are presumed to have fish use. Lyon Creek meets these parameters and is therefore a Type 1 stream. The City of Lake Forest Park requires Type 1 streams located within the shoreline jurisdiction to have a standard 115-foot buffer (SMP Section 350A). Additionally, all buildings and structures must also have a 15-foot setback from the edge of the stream buffer (SMP Section 350M).

Wetlands

Wetland A and Wetland B are both located within Shoreline Jurisdiction and are therefore associated wetlands regulated under the City of Lake Forest Park's SMP. The SMP states that "Wetlands shall be rated according to the *Washington State Wetland Rating System for Western Washington* (Department of Ecology 2004, or as revised)" (SMP Section 40AA). As such, the wetland delineated in this study have been classified using the *2014 Update to the Western Washington Rating System* (Publication #14-06-029) (Rating System). However, Lake Forest Park's SMP was adopted in 2013, and utilizes the 2004 *Western Washington Rating System* scoring; as such, scoring has been translated per the State of Washington Department of Ecology guidelines to determine required buffer widths.

According to SMP Section 320A, wetlands are rated as one of four categories based upon the Rating System and wetland buffers are determined based upon a combination of the wetland category and habitat score. Wetlands A, B, and C are each Category III wetlands. Wetland A and Wetland B have habitat scores of 5 points each; Wetland C has a habitat score of 6 points. Per SMP Section 320A, Wetland A and Wetland B each require a standard buffer width of 75-feet; Wetland C requires a standards buffer width of 125-feet. Similar to streams, a minimum 15-foot setback from the wetland buffer is also required (SMP Section 320G).

Stream and Wetland Buffer Alterations

Generally, alterations of streams, wetlands and associated buffers are prohibited. However, buffer averaging and reduction may be allowable with conditions outlined in SMP Section 320D, 320E, 350F, and 350G. Lyon Creek's buffer may be reduced up to a minimum width of 70-feet with application of conditions outlined in SMP Section 350G. Similarly, Wetlands A, B, and C may be reduced to not less than 75% of the standard buffer width with conditions provided in SMP Section 320E.

Additionally, per SMP Section 330A, standard wetland requirements may allow for exceptions if "the development site proposal will enhance or protect the wildlife habitat, natural drainage or other functions and will be consistent with the purposes of these regulations and this Master Program." Crossings through a wetland may be allowed when no possible alternative exists. In such a case, impacts must be minimized and mitigation for unavoidable impacts shall be provided. Additionally, wetland hydrology should not be altered, habitat functions should not be disturbed, and construction shall be scheduled during periods of low water tables (SMP Section 230G).

State and Federal Regulations

Federal Agencies

Most wetlands and streams are regulated by the U.S. Army Corps of Engineers (Corps) under Section 404 of the Clean Water Act. Any proposed filling or other direct impacts to Waters of the U.S., including wetlands (except isolated wetlands), would require preconstruction notification and permit authorization from the Corps. A Jurisdictional Determination from the Corps would be required to confirm the wetland's jurisdictional status. Unavoidable impacts to jurisdictional wetlands are typically required to be compensated through implementation of an approved mitigation plan. If activities requiring a Corps permits are proposed, a Joint Aquatic Resource Permit Application (JARPA) could be submitted to obtain authorization.

Federally permitted actions that could affect endangered species may also require a biological assessment study and consultation with the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service. Compliance with the Endangered Species Act must be demonstrated for activities within jurisdictional wetlands and the 100-year floodplain. Application for Corps permits may also require an individual 401 Water Quality Certification and Coastal Zone Management Consistency determination from Ecology and a cultural resource study in accordance with Section 106 of the National Historic Preservation Act.

Washington Department of Ecology (Ecology)

Similar to the Corps, Ecology is charged with reviewing, conditioning, and approving or denying certain federally permitted actions that result in discharges to state waters under Section 401 of the Clean Water Act. However, Ecology review under the Clean Water Act would only become necessary if a Section 404 permit from the Corps was issued. Ecology also regulates wetlands, including isolated wetlands, under the Washington Water Pollution Control Act, but only if direct wetland impacts are proposed. Therefore, authorization from Ecology would not be needed if filling activities are avoided.

A JARPA may also be submitted to Ecology in order to obtain a Section 401 Water Quality Certification and Coastal Zone Management Consistency Determination if filling is proposed. Ecology approvals are either issued concurrently with the Corps approval or within 90 days following the Corps approval.

In general, neither the Corps nor Ecology regulates wetland and stream buffers, unless direct impacts are proposed. When direct impacts are proposed, buffers are applied based on Corps and Ecology joint regulatory guidance.

Washington Department of Fish and Wildlife (WDFW)

Chapter 77.55 of the RCW (the Hydraulic Code) gives WDFW the authority to review, condition, and approve or deny "any construction activity that will use, divert, obstruct, or change the bed or flow of state waters." This provision includes any in-water work, the crossing or bridging of any state waters and can sometimes include stormwater discharge to state waters. WDFW will issue a Hydraulic Project Approval (HPA) if a project meets regulatory requirements.

WDFW can also restrict activities to a particular timeframe through the conditions of approval on an HPA. Work is typically restricted to late summer and early fall, however, WDFW has in the past allowed crossings that don't involve in-stream work to occur at any time during the year.

Disclaimer

The information contained in this letter is based on the application of technical guidelines currently accepted as the best available science and in conjunction with the manuals and criteria referenced above. All discussions, conclusions and recommendations reflect the best professional judgment of the author(s) and are based upon information available at the time the study was conducted. All work was completed within the constraints of budget, scope, and

timing. The findings of this report are subject to verification and agreement by the appropriate local, state and federal regulatory authorities. No other warranty, expressed or implied, is made.

Please call if you have any questions or if we can provide you with any additional information.

Sincerely,

Roen Hohlfeld
Ecologist, ISA Certified Arborist

References

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DCG WATERSHED

Seattle
9706 4th Ave NE, Ste 300
Seattle, WA 98115
Tel 206.523.0024

Kirkland
750 6th Street
Kirkland, WA 98033
Tel 425.822.5242

Mount Vernon
2210 Riverside Dr, Ste 110
Mount Vernon, WA 98273
Tel 360.899.1110

Whidbey
1796 E Main St, Ste 105
Freeland, WA 98249
Tel 360.331.4131

Federal Way
31620 23rd Ave S, Ste 307
Federal Way, WA 98003
Tel 253.237.7770

Spokane
601 Main Ave, Ste 617
Spokane, WA 99201
Tel 509.606.3600

Wetland Delineation Sketch – Lakefront Property

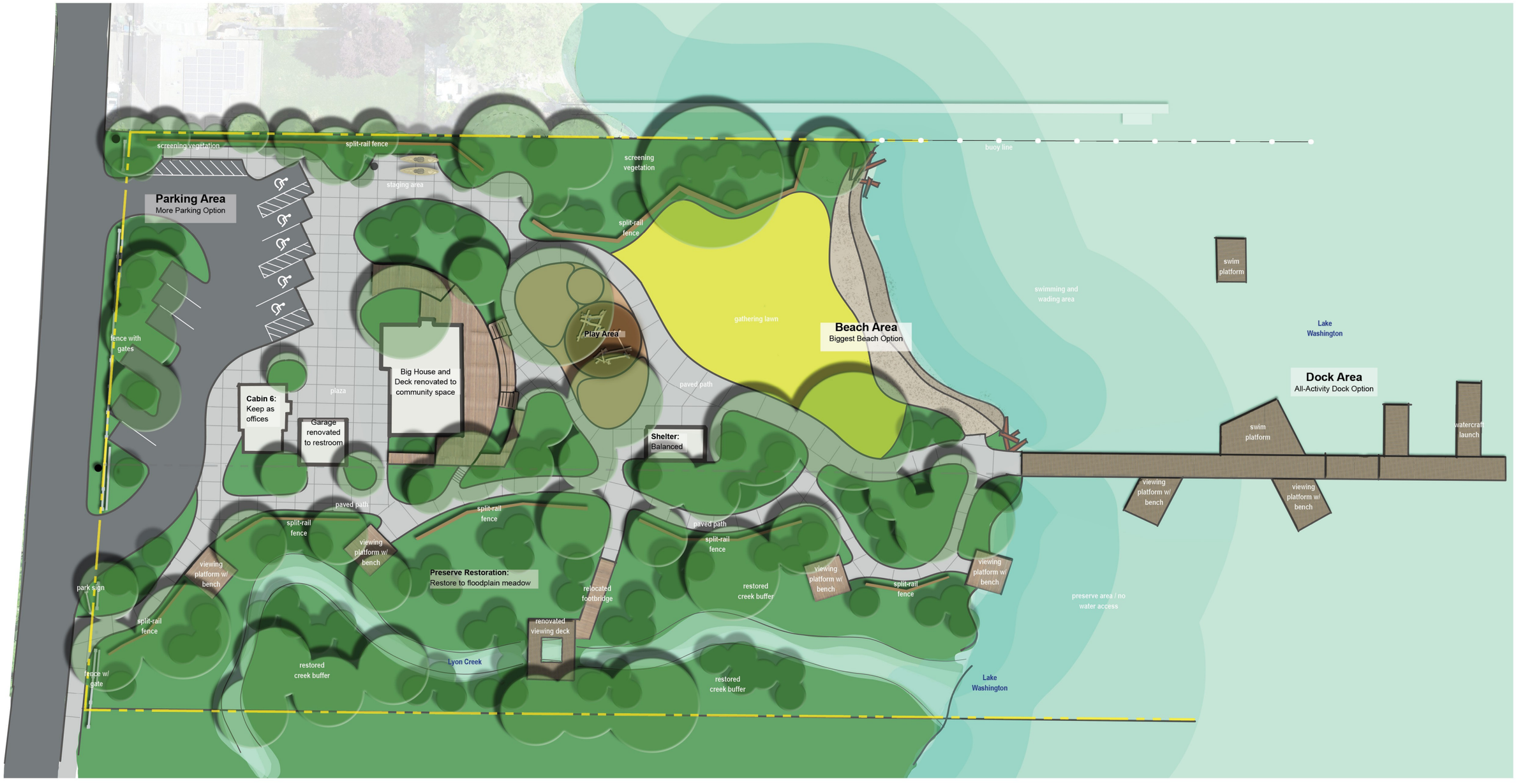
Site Address:	17345 & 17347 Beach Dr NE; Lake Forest Park, WA	Prepared for:	Cory Roche
Parcel Number:	403010-0035, -0040, and -0050	TWC Ref. No.:	230336
Site Visit Date:	11/19 and 11/31, 2023		

Note: Field sketch only. Features depicted are approximate and not to scale. Wetland boundaries are marked with pink- and black-striped flags. Stream boundaries are marked with blue- and black-striped flags. Data points are marked with yellow- and black-striped flags. All observations were made from within the study area; adjoining private properties were not entered.

LEGEND

- Study area
- Delineated OHWM
- Non-Delineated OHWM
- Delineated Wetland Boundary
- Non-Delineated Wetland Boundary
- Data Point (DP)

Attachment C
Wetland and Stream Delineation Report


screening vegetation
split-rail fence
staging area
screening vegetation
buoy line
Parking Area
More Parking Option
split-rail fence
swim platform
swimming and wading area
gathering lawn
Beach Area
Biggest Beach Option
Lake Washington
fence with gates
Play Area
Big House and Deck renovated to community space
Dock Area
All-Activity Dock Option
Cabin 6: Keep as offices
plaza
paved path
Garage renovated to restroom
Shelter: Balanced
swim platform
watercraft launch
paved path
split-rail fence
split-rail fence
viewing platform w/ bench
viewing platform w/ bench
viewing platform w/ bench
Preserve Restoration: Restore to floodplain meadow
paved path
split-rail fence
viewing platform w/ bench
viewing platform w/ bench
park sign
relocated footbridge
restored creek buffer
split-rail fence
split-rail fence
preserve area / no water access
renovated viewing deck
Lyon Creek
restored creek buffer
restored creek buffer
Lake Washington
fence w/ gate

Transportation Solutions
INNOVATIVE | PRACTICAL | EQUITABLE

LAKEFRONT IMPROVEMENTS PHASE 2
TRAFFIC IMPACT ANALYSIS

Lake Forest Park, WA

September 2024

Prepared for:
City of Lake Forest Park

16932 Woodinville Redmond Rd NE, Suite A206 | Woodinville, WA 98072 | 425-883-4134

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INTRODUCTION

This Traffic Impact Analysis documents the traffic impacts associated with development of the Lakefront Improvements park (Project) in the City of Lake Forest Park. The purpose of this report is to identify traffic impacts resulting from the Project and, where appropriate, outline programmatic and/or physical improvements to minimize or eliminate those impacts.

Project Location

The Project is at 17345 and 17347 Beach Drive, on the east side of Beach Dr. NE. The Project site is comprised of King County land parcel numbers 403010050 (1.39 acres), 4030100040 (1.10 acres) and 4030100035 (0.81 acres). A vicinity map is included as **Figure 1**.

The middle parcel and northern parcel for the existing site includes 9 cabin structures that have been vacant and not occupied within the last 5 to 10 years. The southern parcel is identified as the City's Lyon Creek Waterfront Preserve.

The site is zoned RS-7 single family residential. Single family homes are present to the north of the Project site along Beach Drive. A conditional use permit has been approved for the park.

Project Description

The Project proposes to demolish two docks, 5 of the 9 existing cabins, remodel cabin 6 to a community flex space, remodel the cabin 7 garage to a bathroom facility, remodel cabin 8 to use as a community flex space, and remodel cabin 9 into a picnic shelter. New features will include a community space, play area, beach area, dock, parking facilities, and pathways. A site plan is included as **Figure 2**.

Build-out is anticipated by 2027.

Study Area

City of Lake Forest Park staff requested the following study area intersections for this analysis:

1. Bothell Way NE (SR 522) & NE 170th Street
2. Bothell Way NE (SR 522) & Middle Driveway
3. Bothell Way NE (SR 522) & Ballinger Way NE (SR 104)
4. Ballinger Way NE (SR 104) & NE 175th Street
5. Beach Drive NE & Ballinger Way NE
6. Beach Drive NE & Site Access

Traffic operations were evaluated for the PM peak hour and Saturday peak hour conditions. The PM peak hour is defined as the highest 4 consecutive 15-minute traffic volume intervals between 4-6 PM. The Saturday peak hour was determined based on guidance from the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition (September 2021) for Public Parks which indicated that the highest trip generating hours for Saturday is from 11 AM to 1 PM.

N

APPROXIMATE SCALE FEET
100 0 100 200

Figure 1: Vicinity Map

Lake Forest Park-Park Improvements
Traffic Impact Analysis

Transportation Solutions
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Figure 2: Site Plan

EXISTING CONDITIONS

This section describes the existing transportation network in the study area.

Primary Roadways

The primary roadways in the study area are described below:

- Bothell Way NE (SR 522) is classified as a Principal Arterial. The road is 6-to-7-lanes wide and has a 35-mph posted speed. Curb, gutter, and sidewalk is present on the west side of Bothell Way NE in the project vicinity. The intersection at Beach Dr and Ballinger Way is signalized.
- Ballinger Way NE (SR 104) is classified as a Principal Arterial. Ballinger Way is 3 lanes wide and has a 30-mph posted speed. Curb and gutters are present on both sides of Ballinger Way NE, which includes traffic islands at the intersection with Bothell Way. Sidewalks are present on both sides of the street. The north sidewalk ends approximately 250 feet west of the intersection with Bothell Way.
- Beach Drive NE is classified as a Local Street. Beach Drive includes a 40-foot right of way. Curb is present on the east side of the street.

Road classifications are derived from the WSDOT Functional Classification Map.

Public Transportation Services

King County Metro provides service near the site.

- Route 331 Shoreline Community College to Kenmore, provides daily service with a westbound stop on Ballinger Way & NE 175th Street at Town Center and with an eastbound stop on Ballinger Way immediately north of Bothell Way.
- Route 322, Kenmore to First Hill, provides weekday AM peak hour service from Kenmore to First Hill in Seattle and PM peak hour service from First Hill to Kenmore with a stop on Bothell Way & Ballinger Way.
- Route 372, Bothell to University District, provides daily service between Bothell and the University District with a stop on Bothell Way & Ballinger Way.

Sound Transit provides service near the site.

- Route 522 Roosevelt to Woodinville provides daily service with a stop at Bothell Way & Ballinger Way.

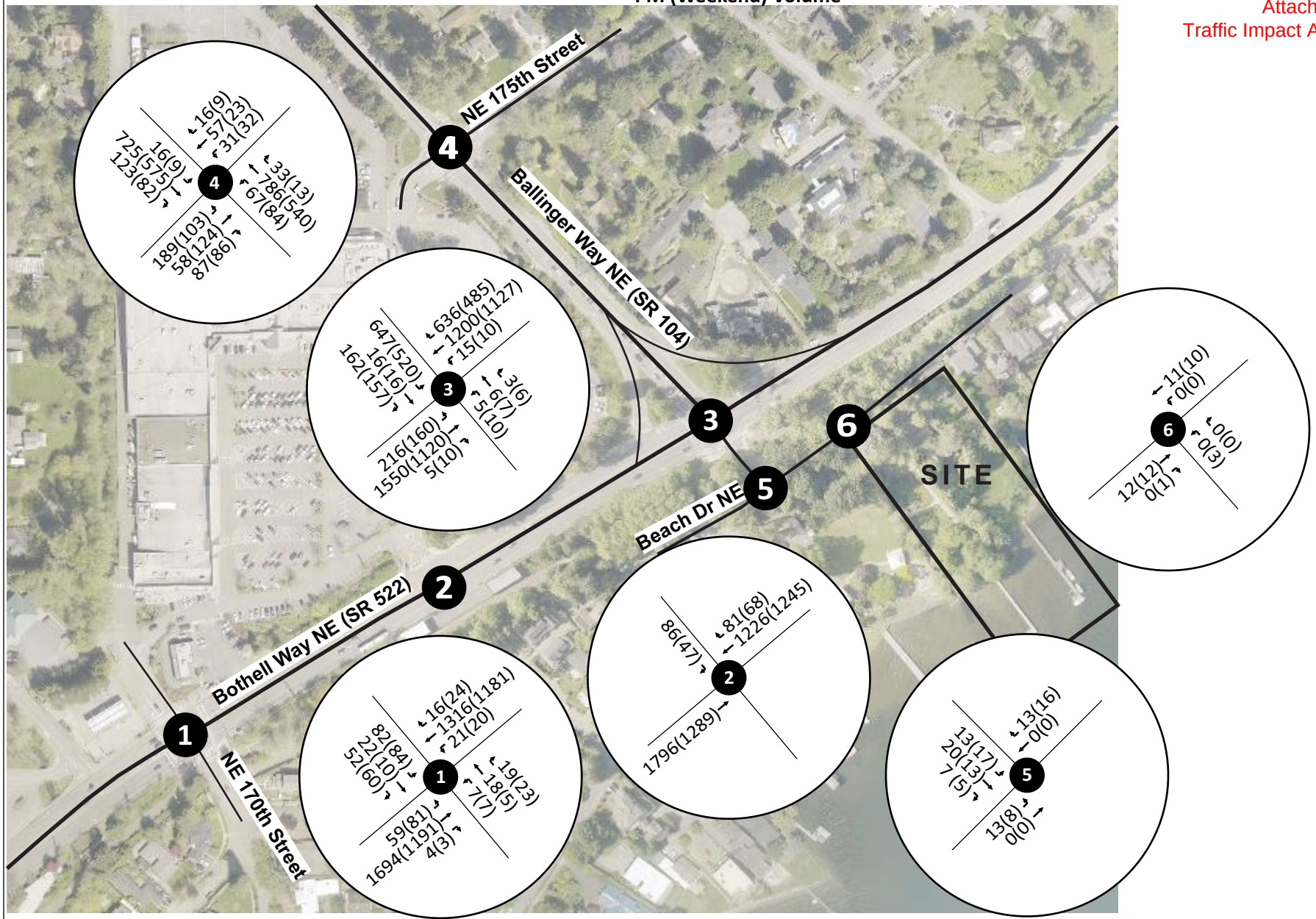
Traffic Volumes

PM peak hour and Saturday peak hour intersection turning movement volumes were collected by TC2 at the study area intersections on Tuesday, August 6, 2024, from 4 to 6 PM and on Saturday, August 10, 2024, from 11 AM to 1 PM. Copies of the volumes are included in the **Appendix**.

Figure 3 illustrates the PM and weekend peak hour study intersections turning movement volumes.

PM (Weekend) Volume

Attachment E
Traffic Impact Analysis



N

APPROXIMATE SCALE FEET

100 0 100 200

Figure 3: 2024 Existing Peak Hour Volumes

Lake Forest Park-Park Improvements
Traffic Impact Analysis

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Intersection Analysis

Study intersections were evaluated using Synchro, version 11, a computer program to analyze signalized and stop-sign controlled intersections, including two-way stop-sign controlled (TWSC) intersections, based on the Highway Capacity Manual (HCM) 6 methodology.

Table 1 summarizes the study intersections' PM peak hour and Saturday peak hour intersection level of service (LOS). Copies of the operations output reports are included in the **Appendix**.

Table 1: 2024 Existing Intersection Level of Service and Delay

Intersection	Control Type	PM Peak [1]	Saturday Peak [1]
1. Bothell Way / NE 170th St	Signal	B (19.6)	B (19.6)
2. Bothell Way / Middle Driveway	EB Stop	C (16.1)	B (14.8)
3. Bothell Way / Ballinger Way	Signal	D (35.4)	D (36.5)
4. Ballinger Way / NE 175th St	Signal	B (19.0)	A (9.4)
5. Beach Dr / Ballinger Way	NB/SB Stop[2]	A (9.6)	A (9.5)
6. Beach Dr / Site Access	WB Stop	A (0.0)	A (8.6)

[1] LOS (seconds of delay)
[2] Intersection analyzed as TWSC with NB/SB Stop. Intersection is uncontrolled.

The City of Lake Forest Park maintains LOS C/D for local roadways and WSDOT standard is LOS D for Bothell Way NE (SR 522) and LOS E Mitigated for Ballinger Way (SR 104). The study intersections satisfy the LOS standards.

Safety Analysis

Crash records were obtained from WSDOT for all study intersections for the most recent five-year period from 2019 through 2023. Intersection crash rates were calculated for each intersection based on crash history and traffic counts.

Intersection crash rates are typically expressed in terms of crashes per Million Entering Vehicles (MEV) and are calculated using the following equation:

$$R = \frac{C * 100{,}000{,}000}{365 * N * V}$$

where:

R = Crash rate, expressed as crashes per MEV, V = Average daily traffic (ADT) volume,
C = Total number of crashes in the study period, N = Number of years of crash data,

Generally, crash rates exceeding 1.00 per MEV indicate a potential high-crash location and may warrant a more detailed analysis to determine whether mitigation should be considered. Crash rates for the study intersections are summarized in **Table 2.** No crashes were reported at Beach Dr & Ballinger Way. No fatality or serious injury crashes were reported.

Table 2. 2019-2023 Intersection Crash History

Intersection	Predominant Crash Type	Crash Frequency (crashes/year)						Total Crashes	Crash Rate (/MEV)
		Fatal Injury (K)	Serious Injury (A)	Minor Injury (B)	Possible Injury (C)	PDO* (O)	All		
1. Bothell Way (SR 522) & NE 170th St	Rear-End (68%)	0.0	0.0	0.6	2.0	2.4	5.0	25	0.36
2. Bothell Way (SR 522) & Middle Driveway	Entering (100%)	0.0	0.0	0.2	0.2	1.2	1.6	8	0.04
3. Bothell Way (SR 522) & Ballinger Way (SR 104)	Rear-End (76%)	0.0	0.0	0.6	2.0	6.4	9.0	45	0.49
4. Ballinger Way (SR 104) & NE 175th St	Rear-End (50%)	0.0	0.0	0.2	0.4	1.4	2.0	10	0.25
6. Beach Dr & Site Entrance	None	0.0	0.0	0.0	0.0	0.2	0.2	1	2.26

* Property Damage Only (PDO)

One suspected minor injury pedestrian crash occurred at the intersection of Bothell Way & NE 170th Street on November 13, 2021, at 5:05 PM. The weather conditions were noted as raining and wet with streetlights on. The vehicle was turning left from southbound NE 170th Street to eastbound Bothell Way. The driver contributing circumstance was "did not grant right of way to non-motorist."

The intersection of Beach Drive and the site entrance included one non-injury crash with a parked vehicle on October 12th, 2019. The Crash Rate per MEV is greater than 1.00 due to the low volume of the roadway.

A sidewalk is proposed on the west side of Beach Drive to Ballinger Way including a new sidewalk and crosswalk on the south side of Ballinger Way to connect to the intersection of Bothell Way and Ballinger Way where non-motorized users can cross Bothell Way via the existing pedestrian route to City Hall (located at the southwest corner of Ballinger Way [SR 104] and Bothell Way [SR 522]). The sidewalk will also connect the park with the Burke Gillman Trail, a regional facility.

FUTURE CONDITIONS WITHOUT THE PROJECT

The project is anticipated to be built-out and operational by 2027. The horizon analysis year for this study is 2027, to represent a mature project. This section describes the future traffic without the project.

Local Improvements

WSDOT's Surface Transportation Improvement Plan (STIP) was evaluated, and no improvements were identified within the project vicinity.

Public Transportation Services

Sound Transit 3 authorized funding for a bus rapid transit route between the NE 145th Link light rail station and the SR 522 and I-405 interchange at S3. The route will pass through Lake Forest Park on Bothell Way NE. The project is expected to be in service by 2027.

Traffic Volumes

Non-project traffic growth includes growth generated by new development through the study area and general traffic growth through the study area.

For this analysis, a 0.5% annual growth rate was applied to the existing traffic volumes to forecast general traffic growth through the study area and account for growth generated by small new pipeline development, consistent with the Safe Highways Report from March 2018.

Figure 4 illustrates the 2027 AM and PM peak hour volumes without the project.

Intersection Analysis

Table 3 summarizes the study intersection PM and Saturday peak hour study intersection LOS. Copies of the operations output reports are included in the **Appendix**.

Table 3: 2027 Intersection Level of Service and Delay without the Project

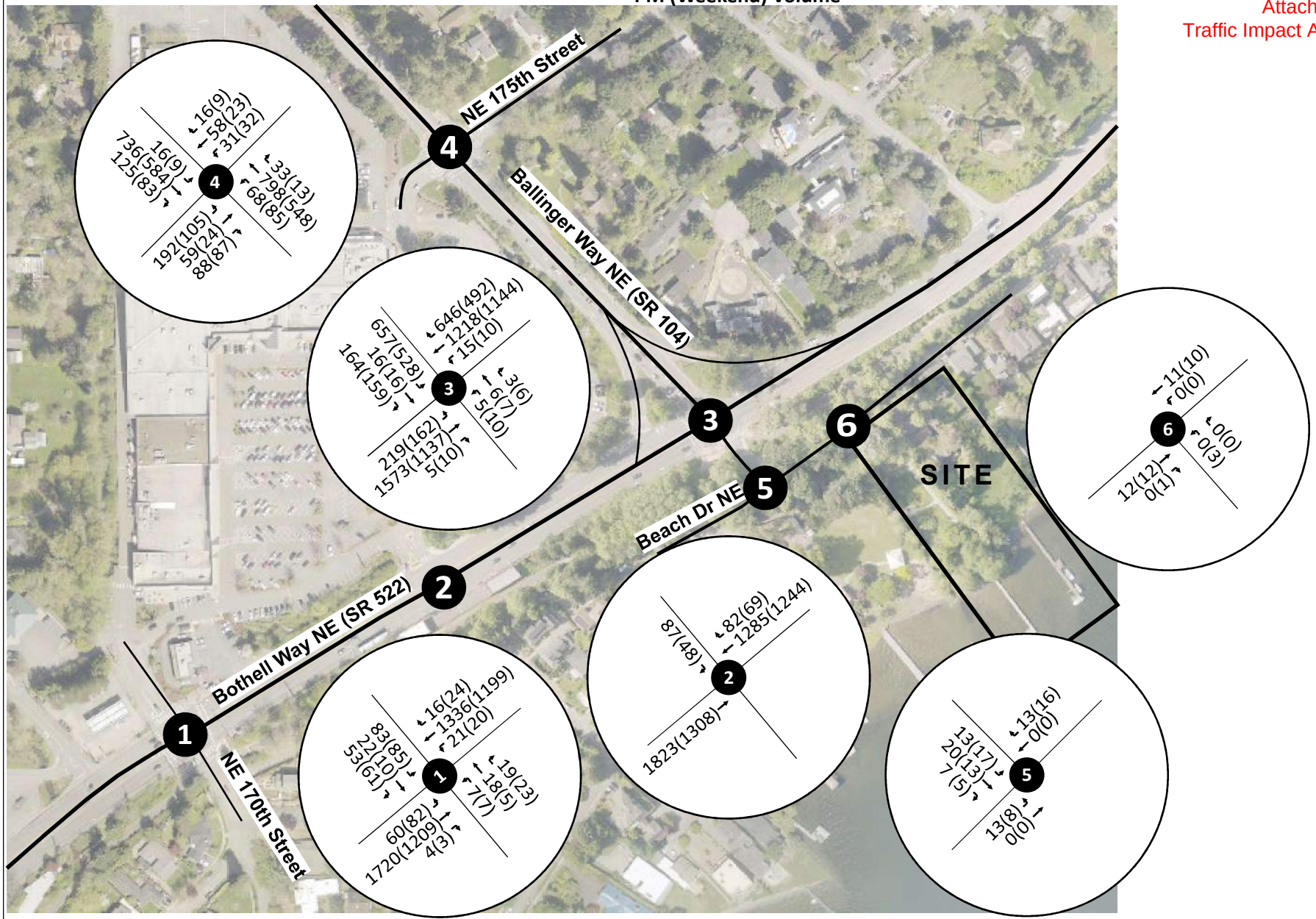
Intersection	Control	2024 Existing		2027 without the Project	
		PM Peak [1]	Sat Peak [1]	PM Peak [1]	Sat Peak [1]
1. Bothell Way / NE 170th St	Signal	B (19.6)	B (19.6)	B (19.9)	C (20.1)
2. Bothell Way / Middle Dwy	EB Stop	C (16.1)	B (14.8)	C (16.3)	C (15.0)
3. Bothell Way / Ballinger Way	Signal	D (35.4)	D (36.5)	D (36.0)	D (37.1)
4. Ballinger Way / NE 175th St	Signal	B (19.0)	A (9.4)	C (20.1)	A (9.6)
5. Beach Dr / Ballinger Way	NB/SB Stop[2]	A (9.6)	A (9.5)	A (9.6)	A (9.5)
6. Beach Dr / Park Access	WB Stop	A (0.0)	A (8.6)	A (0.0)	A (8.6)

[1] LOS (second of delay)
[2] Intersection analyzed as TWSC with EB/WB Stop. Intersection is uncontrolled.

All intersections operate at or above WSDOT and City of Lake Forest Park LOS standards.

PM (Weekend) Volume

Attachment E
Traffic Impact Analysis



N

APPROXIMATE SCALE FEET
100 0 100 200

Figure 4: 2027 Without Project Volumes

Lake Forest Park-Park Improvements
Traffic Impact Analysis

Transportation Solutions
INNOVATIVE | PRACTICAL | EQUITABLE

PROJECT IMPACTS

This section summarizes the project's trip generation, trip distribution and travel assignment forecasts.

Proposed Trip Generation

Data from the *Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition* (September 2021), Land Use 411, Public Park, was used to forecast trip generation for the proposed project. **Table 4** summarizes the trip generation for the Park.

Table 4: ITE Park Trip Generation

Time-Period	Size (acres)	Trip Rate	% In	% Out	In	Out	Total
Weekday Daily	3.3	0.78 trips/ acre	50	50	2	1	3
PM Peak Hour Trips	3.3	0.11 trips/acre	59	41	0	0	0
Weekend Peak	3.3	0.31 trips/acre	39	61	0	1	1

The ITE Trip Generation Manual data includes parks that are an average size of 612 acres. The proposed park is 3.3 acres. The average trip rate from the ITE Manual is expected to underestimate the forecasted number of trips for the proposed park due to the 200 to 1 difference in park size.

Since the ITE Manual did not offer a representative land use code for this Project, trip generation rates for the proposed park use were taken from a more suitable Trip and Parking Generation Study completed in March of 2023 by ITE Cal Poly for Santa Rose Park in San Luis Obispo for the Western District ITE Data Collection Project. The park size in that study is 9.98 acres and includes various amenities including "grass fields, picnic areas, playground facilities, basketball courts, softball fields, a skate park, and a roller sport field." That park is also located near a major state highway.

The Lakefront Improvements include a large, renovated house structure with bathrooms and a deck, a shelter, a play area, a swimming area, and a public launch dock for kayaks. The Lakefront Improvements is located near a major state highway. The trip generation forecast for the Lakefront Park using the trip generation rates for the Santa Rosa Park are summarized in **Table 5.**

Table 5: Santa Rosa Park Trip Generation

Time-Period	Size (acres)	Trip Rate	% In	% Out	In	Out	Total
PM Peak Hour Trips	3.3	6.71 trips/acre	37	63	8	14	22
Weekend Peak	3.3	5.01 trips/acre	44	56	7	9	16

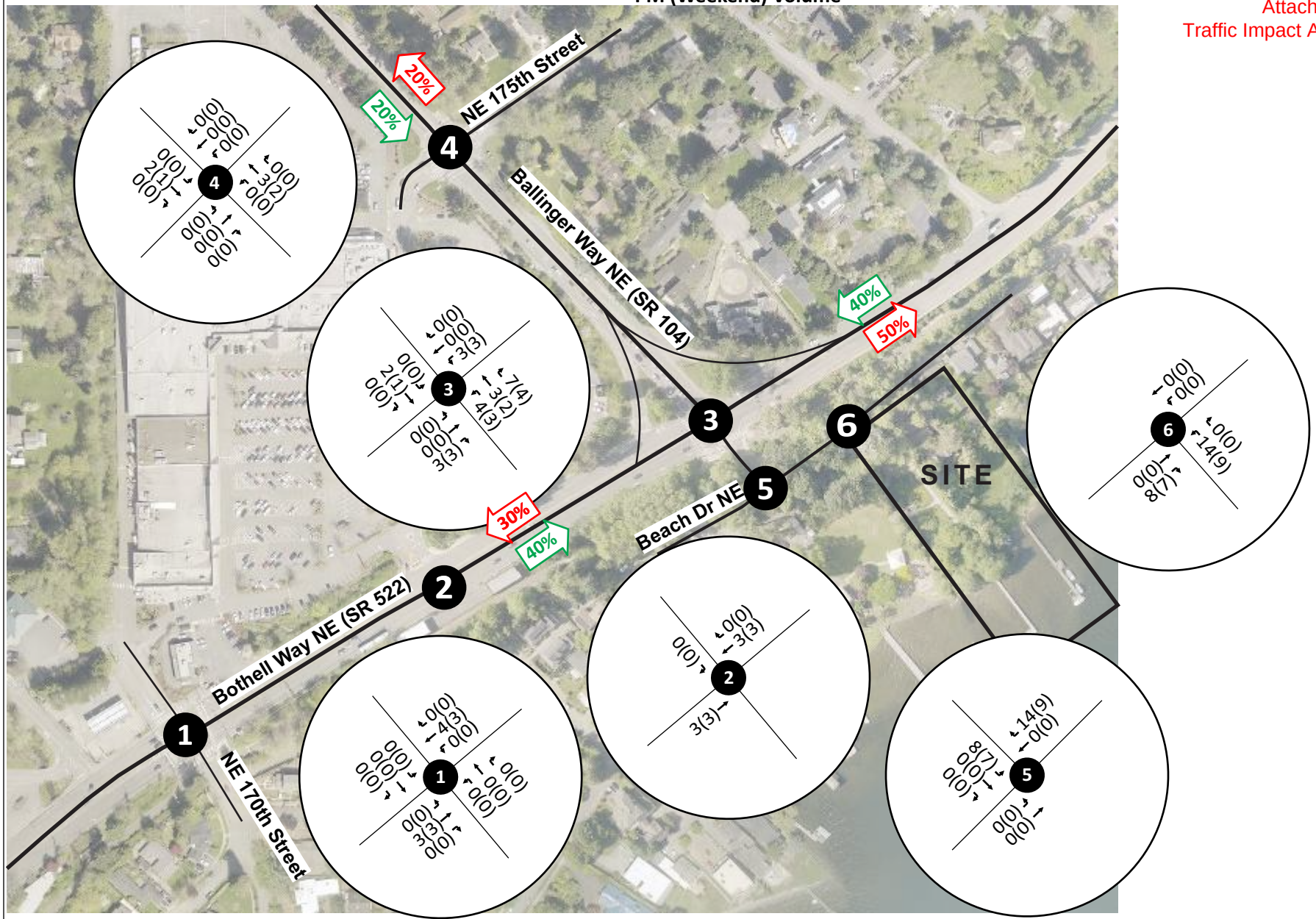
The trip generation study is included in the **Appendix.**

Trip Distribution and Travel Assignment

A trip distribution and peak hour travel assignment forecast are included as **Figure 5**.

PM (Weekend) Volume

Attachment E
Traffic Impact Analysis



APPROXIMATE SCALE FEET
100 0 100 200

Figure 5: Project Trips & Trip Distribution

Lake Forest Park-Park Improvements
Traffic Impact Analysis

Transportation Solutions
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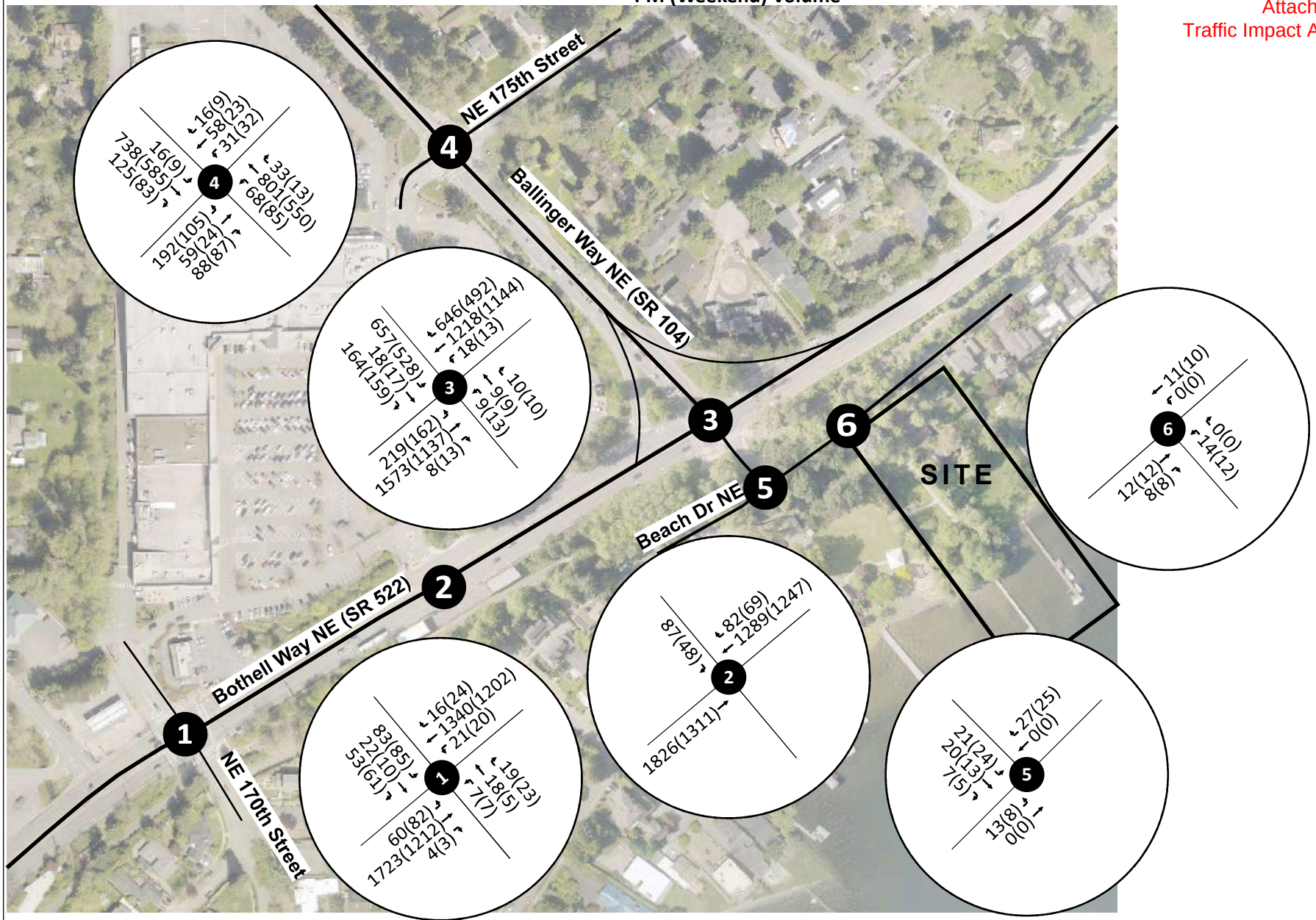
PM (Weekend) Volume

Attachment E
Traffic Impact Analysis



N

APPROXIMATE SCALE FEET

100 0 100 200

Figure 6: 2027 With Project Volumes

Lake Forest Park-Park Improvements
Traffic Impact Analysis

Transportation Solutions
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FUTURE CONDITIONS WITH THE PROJECT

This section describes the 2027 traffic with the project.

Public Transportation Services

The project is not anticipated to alter existing public transportation services.

Traffic Volumes

Future traffic volumes with the Project were computed by adding the Project trips to the future traffic volume conditions without the Project.

Figure 6 illustrates the 2027 PM peak hour and Saturday peak hour volumes with the Project.

Intersection Analysis

Table 6 summarizes the study intersection PM and Saturday peak hour study intersection LOS. Copies of the operations output reports are included in the **Appendix**.

Table 6: 2027 Intersection Level of Service and Delay with Project

Intersection	Control Type	2027 without the Project		2027 with the Project	
		PM Peak [1]	Sat Peak [1]	PM Peak [1]	Sat Peak[1]
1. Bothell Way / NE 170th St	Signal	B (19.9)	C (20.1)	B (20.0)	C (20.1)
2. Bothell Way/ Middle Dwy	EB Stop	C (16.3)	C (15.0)	C (16.4)	C (15.1)
3. Bothell Way / Ballinger Way	Signal	D (36.0)	D (37.1)	D (37.5)	D (41.9)
4. Ballinger Way / NE 175th St	Signal	C (20.1)	A (9.6)	C (20.2)	A (9.6)
5. Beach Dr / Ballinger Way	NB/SB Stop[2]	A (9.6)	A (9.5)	B (10.0)	A (9.8)
6. Beach Dr / Site Access	WB Stop	A (0.0)	A (8.6)	A (9.0)	A (8.7)

[1] LOS (second of delay)
[2] Intersection analyzed as TWSC with EB/WB Stop. Intersection is uncontrolled.

All intersections operate at or above WSDOT and City LOS standards. Traffic mitigation is not required.

PARKING ANALYSIS

The Project is comprised of three parcels totaling 3.3 acres. The southern parcel is a 1.39-acre passive use, existing City park known as Lyon Creek Waterfront Preserve. Information from the City's website:

> In 1998, the City of Lake Forest Park bought the residential property at the mouth of Lyon Creek, with the help of state and local grants, to develop as a park. In 2015, construction from the Lyon Creek Flood Mitigation Project has reestablished the floodplain by clearing and grading Lyon Creek Waterfront Preserve, constructing a floodplain with berm to contain flood water to the limits of the property. The property has been re-landscaped in the disturbed areas with ~4,000 native plants.

One (1) Americans with Disabilities Act (ADA)-compliant parking space is currently provided at the existing entrance to the Lyon Creek Waterfront Preserve park and two (2) signed/designated general use parking spaces are provided off-site for it at the City Hall parking lot. The existing park has a viewing dock and scenic and nature viewings from park benches.

As parking facilities have been established and provided for the Lyon Creek Waterfront Preserve park since 2015, the following assessment of parking needs for the Project is based upon the planned amenities and uses on the 1.9 acres of the two waterfront parcels adjacent to and north of the existing park area.

Lake Forest Park Municipal Code

The Lake Forest Park Municipal Code (LFPMC) Chapter 18.58, Table 18.58.030 Off-Street Parking Requirements by Land Use, outlines the parking requirements. The parking required for the project per Item 13, Recreational Facilities is "one parking space per employee and one parking stall for each 40 square feet of total floor area used for assembly purposes."

The renovated "Big House" that is a planned as community flex space is a total of 1,525 square feet of which 1,131 square feet will be for assembly purposes. The proposed picnic shelter area is 582 square feet. The combination of these two areas equal 1,713 square feet of total floor area to be used for assembly purposes. It is assumed there will be one employee for the park that needs parking. Based upon LFPMC and the proposed design, a total of 44 parking spaces would be required. The site plans identify 10 parking spaces will be provided on-site. The Project indicates that the balance of parking needed, that cannot be provided on-site, will be provided off-site at the City Hall parking lot by way of a shared use parking agreement. This shared use parking arrangement would be similar to how 2 parking spaces are currently provided for the existing Lyon Creek Waterfront Preserve.

The 44 parking spaces identified as being needed per the LFPMC translates into a total provided parking rate of 23.16 stalls/acre (44 stalls for 1.9 acres).

Parking Codes of Nearby Local Agencies

Parking requirements were evaluated for the cities of Sammamish and Kenmore as they have relevant similarities to Lake Forest Park. Kenmore Municipal Code 18.40.030 states that the City Manager sets the required minimum parking spaces for parks. For the City of Sammamish, the Community Development Director sets the minimum parking spaces required for parks.

ITE Parking Generation for Parks

The *ITE Parking Generation Manual, 6th Edition* (October 2023) includes Land Use Code 411 Public Park that has a variable input of acres. The average size of park used for the study that resulted in the parking rates was 126 acres for weekday peak parking demand and 20 acres for peak Sunday demand. The parks surveyed in the ITE study varied widely as to location, type, and number of facilities. The setting/location for this code is identified as "general urban/suburban." The 85th percentile parking rate was used in this document to evaluate the parking demand for the weekday and Sunday/weekend peak demand periods.

The Santa Rosa Park Trip Generation and Parking ITE Study (March 2023) included a peak parking rate for a weekday and Saturday/weekend. Santa Rosa Park in San Luis Obispo, California is an active 10-acre park site that contains several amenities including large grass fields, picnic areas, playground facilities, basketball courts, softball fields, a skate park, and a roller sport field.

Table 7 includes an evaluation and comparison of the parking demand for the Project using both above referenced ITE sources.

Table 7: Parking Demand Evaluation

Source	Time Period	Parking Rate	Quantity	Parking Demand
ITE Parking Generation Manual	Weekday	5.52/acre	1.9 acres	11
	Weekend	7.21/acre	1.9 acres	14
Santa Rosa Park ITE Study	Weekday	5.21/acre	1.9 acres	10
	Weekend	4.01/acre	1.9 acres	8

The ITE Parking Generation Manual indicates that the 85th percentile parking demand for the weekend is 14 spaces, which is lower than the number of parking spaces required by LFPMC. In accordance with this ITE source, the 10 spaces identified for on-site parking would not meet the demand and additional parking would be required off-site.

The Santa Rosa Park ITE Study indicates that using its parking rates of demand, 10 parking spaces would be required for the weekend, which is less than ITE's Parking Generation Manual and equal to the 10 spaces identified for on-site parking for the Project.

Accessible Parking

The Project is required to provide ADA-compliant parking spaces in accordance with the accessibility standards that apply to places of public accommodation, commercial facilities, and state and local government facilities in new construction, alterations, and additions. The ADA Standards are based on minimum guidelines set by the U.S. Access Board. The minimum number of parking stalls that are required to be accessible is a subset of the total number of parking stalls required for a site. **Table 8** includes information excerpted from Chapter 5: Parking Spaces from the U.S. Access Board website.

Table 8: Minimum Number of Accessible Parking Spaces

Parking Facility Total	Minimum Number of Accessible Spaces		
	Standard	Van*	Total (Standard + Van)
1 to 25	0	1	1
26 to 50	1	1	2
51 to 75	2	1	3
76 to 100	3	1	4

* at least 1 of every 6 accessible spaces or fraction of 6

If the LFPMC is the basis to determine the total number of stalls for the Project (44), then a minimum of 2 ADA stalls are required. If ITE sources are used as the basis determine the total number of stalls for the Project (14), then a minimum of 1 ADA stall is required.

It should be noted that 1 ADA-compliant stall is currently provided at the existing entrance to the Lyon Creek Waterfront Preserve park and 2 general use parking spaces for the existing park are designated and currently provided off-site at the City Hall parking lot. Since few changes are being made to the Lyon Creek Waterfront Preserve area, it is expected that the same number of existing ADA and general use parking spaces will be added to the number of parking spaces identified as needed for the new park area.

Nearby Local Agency Park Parking

A parking provision rate was calculated from waterfront parks in the City of Bellevue that have similar uses and access to Lake Washington as the Project. **Table 9** shows their park acreage, the number of general use parking spaces provided, the number of ADA designated stalls provided, total number of parking stalls, and a calculated rate of total parking spaces provided per acre.

Table 9: City of Bellevue Waterfront Parks Parking Provision Rates

Park	Park Size (Acres)	General Use Parking Stalls Provided	ADA Stalls Provided	Total Stalls Provided	Total Parking Provided Rate (Stalls/Acre)
Burrows Landing	0.15	2	0	2	13.42
Chesterfield Beach Park	0.60	5	0	5	8.38
Clyde Beach Park	2.06	18	3	21	10.19
Enatai Beach Park	4.12	32	2	34	8.25
Meydenbauer Bay Park	8.60	50	2	52	6.02
Chism Beach Park	17.03	68	5	73	4.29
Newcastle Beach Park	42.48	155	6	161	3.79
Average	**10.72**			**Average**	**7.77**
Median	**4.12**			**Median**	**8.25**

The average parking stalls provided rate for the City of Bellevue waterfront parks is 7.77 spaces per acre. This rate is slightly above the ITE Parking Generation Manual 85th percentile demand rate of 7.21 spaces per acre for weekends.

A parking stall comparison was also made to Log Boom Park, a nearby and similar waterfront park located in the City of Kenmore with access to Lake Washington. Log Boom Park is 3.9-acres with 50 general use parking stalls and 2 ADA stalls. The total parking provided rate for Log Boom Park is 13.33 stalls per acre.

Parking Recommendations

This document identifies different parking rates associated with parks and recreational facilities from different sources. The Project site and its anticipated park amenities have unique attributes which do not translate exactly to any referenced parking rate. This is expected considering that parks have many different settings, types, uses, and sizes, therefore an exercise in judgement is appropriate to determine the number of parking stalls to include with a new park facility.

Given that Project site park is identified as a passive use facility, one may assert that its amenities ought not be categorized as the type of recreational facility that is listed in the LFPMC. Similarly, each of the other nearby city waterfront parks may have enough subtle differences in their uses and users to allow one to challenge that their rates are not exactly the same as may be expected at Project site. Even with these minor differences, the example parking rates provided in this document offer reasonable references that ought to be considered when determining the parking needs for the Project. **Table 10** provides a comparison of the different parking rates identified from various sources included within this document.

Table 10: Comparison of Parking Rates

Source	Park Size (Acres)	Time Period	Parking Provided Rate (Stalls/Acre)	Project Site (Acres)	Parking Provided Calculation
Santa Rosa Park ITE Study	9.98	Weekday	5.21	1.9	10
ITE Parking Generation Manual	20 (avg)	Weekend	7.21	1.9	14
City of Bellevue Waterfront Parks	10.72 (avg) 4.12 (median)	---	7.77	1.9	15
City of Kenmore Log Boom Park	3.90	---	13.33	1.9	26
LFPMC Recreational Facilities (Item 13)	---	---	23.16	1.9	44

Another consideration when determining the amount of parking for a park site is its ability to be accessed by way of multiple modes of travel. The location of the Project site offers a relevant attribute to a determination about parking needs given that it is located close to the Burke Gillman trail and to transit stops along Bothell Way. Due to the park's location near a regional shared-use trail and to transit stops, park users may arrive at the Project site by walking, rolling, biking, or via transit, which could understandably reduce the total need for parking in comparison to a park that was not located along a regional trail.

The parking number calculated using the LFPMC category for Recreational Facilities is approximately 3 times the parking rate identified as needed by the ITE Parking Generation Manual and is approximately 3 times the parking rate provided for similar waterfront parks in the City of Bellevue. Therefore, it is reasoned that the LFPMC does not correlate as the relevant methodology to follow when determining the parking spaces needed for the Project.

Kenmore's Log Boom Park provides a useful and nearby comparison to the Project, however its parking provided is nearly 2 times the parking rate identified as needed by the ITE Parking Generation Manual and is nearly 2 times the parking rate provided for similar waterfront parks in the City of Bellevue. Therefore, it is logical that using this parking rate would result in more parking than is needed to fulfil the needs of the Project.

Bellevue's seven (7) waterfront parks provide a variety of relevant examples upon which to draw comparisons for the Project. ITE sources also provide relevant parking rates for the Project, which can be supported as they are considered national industry standards.

Based upon the resources and examples provided in this document, it is recommended that a parking rate of 10 stalls per acre be provided for the 1.9 acres of new park. This results in 19 parking spaces for the new park that are recommended to be combined with the 3 parking spaces provided for the existing park for a total of 22 parking spaces for the Project.

A 10 stalls per acre parking rate represents the approximate midpoint between the parking provided rate by City of Bellevue waterfront parks (7.77) and the City of Kenmore's Log Boom Park (13.33), all of which are along Lake Washington. It is also the approximate midpoint between ITE's Parking Generation Manual rate (7.21) and Log Boom Park's rate. The recommended 10 stalls per acre rate is greater than the parking provided rates for 5 of 7 waterfront parks in Bellevue. The 10 stalls per acre parking rate is also approximately the same parking provided rate (10.19) for Bellevue's Clyde Beach Park, a 2.06-acre park that is roughly the same size as the 1.91-acre park improvements for the Project.

The 22 total parking space recommendation for the Project also results in having approximately half (10) of the parking spaces provided on-site and the other approximate half (12) of the parking spaces provided off-site at City Hall by way of a shared used parking agreement. The existing off-site parking agreement at City Hall that provides two (2) parking spaces for Lyon Creek Waterfront Preserve would need to be amended to designate and allocate an additional ten (10) parking spaces to meet the needs of the Project.

The 22 total parking spaces for the Project includes parking spaces that are ADA-compliant. A minimum of 2 ADA parking spaces are recommended on-site, which is comprised of 1 standard ADA space and 1 van accessible space. The total number of ADA parking spaces may be increased as determined by the City.

It will be the City's determination as to whether a variance will be required of the Project from the LFPMC parking calculation for recreational facilities. This determination is anticipated to be based upon whether this definition of recreational facilities is applicable to the Project. The comparison to the number of spaces calculated for similar nearby local park facilities and parking rates provided by national industry standards is likely to be considered when determining the need for a variance. If a variance is required by the City, the comparative references included in this document are expected to be cited as reason for its approval request.

TRAFFIC MITIGATION

All intersections operate at or above City and WSDOT level of service standards, therefore no traffic mitigation is recommended.

APPENDIX

- Traffic Volumes
- ITE Trip Generation Manual-Public Park Sheets
- ITE Parking Generation Manual-Public Park Sheets
- ITE Western District Trip Generation and Parking Study
- 2024 Existing Peak Hour Intersection Level of Service
- 2027 Peak Hour Intersection Level of Service without the Project
- 2027 Peak Hour Intersection Level of Service with the Project

Traffic Volumes

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

Traffic Count Consultants, Inc.

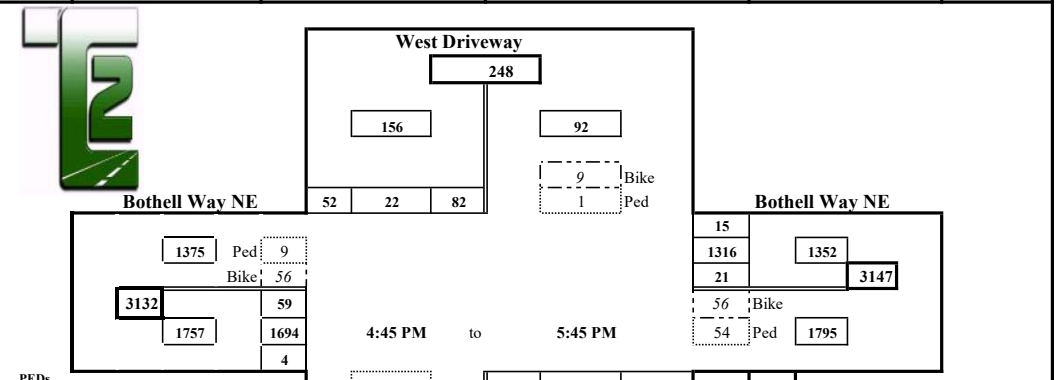
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: West Driveway/NE 170th St & Bothell Way NE **Date of Count:** Tue 08/06/2024

Location: Lake Forest Park, Washington **Checked By:** Jen

Time Interval	From North on (SB) West Driveway				From South on (NB) NE 170th St				From East on (WB) Bothell Way NE				From West on (EB) Bothell Way NE				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	16	7	19	0	0	6	2	5	5	269	3	4	28	414	0	769
4:30 P	0	22	3	8	0	3	2	3	2	7	322	6	3	8	442	0	826
4:45 P	0	23	7	17	0	2	2	2	4	10	278	1	2	15	401	0	758
5:00 P	0	15	8	14	0	2	5	7	2	5	350	7	5	17	426	0	856
5:15 P	0	24	4	20	0	3	2	2	12	5	317	4	5	17	438	2	838
5:30 P	0	19	6	9	1	1	5	7	5	7	322	2	3	13	442	1	834
5:45 P	0	24	4	9	0	1	6	3	2	4	327	2	5	12	388	1	781
6:00 P	0	13	4	17	0	0	1	3	3	12	335	2	3	19	437	1	844
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	156	43	113	1	12	29	29	35	55	2520	27	30	129	3388	5	6506
Peak Hour: 4:45 PM to 5:45 PM																	
Total	0	82	22	52	1	7	18	19	21	21	1316	15	18	59	1694	4	3309
Approach	156				44				1352				1757				3309
%HV	n/a				2.3%				1.6%				1.0%				1.2%
PHF	0.81				0.79				0.93				0.96				0.97



PEDs Across:	N	S	E	W	
INT 01	1	2	8	0	11
INT 02	1	5	4	1	11
INT 03	1	6	23	2	32
INT 04	0	9	12	0	21
INT 05	0	10	15	3	28
INT 06	0	6	14	4	24
INT 07	1	5	13	2	21
INT 08	2	6	15	3	26
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	6	49	104	15	**174**

Special Notes

Bicycles From:	N	S	E	W	
INT 01	1	0	9	14	24
INT 02	1	0	23	9	33
INT 03	2	0	19	6	27
INT 04	2	0	30	6	38
INT 05	2	0	14	16	32
INT 06	3	0	6	17	26
INT 07	2	0	6	17	25
INT 08	3	0	11	8	22
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	16	0	118	93	227

3424 *1.0 PHF Peak Hour Volume*

		PHF	%HV
	EB	0.96	1.0%
Check	WB	0.93	1.6%
In: 3309	NB	0.79	2.3%
Out: 3309	SB	0.81	n/a
	T Int.	0.97	1.2%

Conditions:

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

Traffic Count Consultants, Inc.

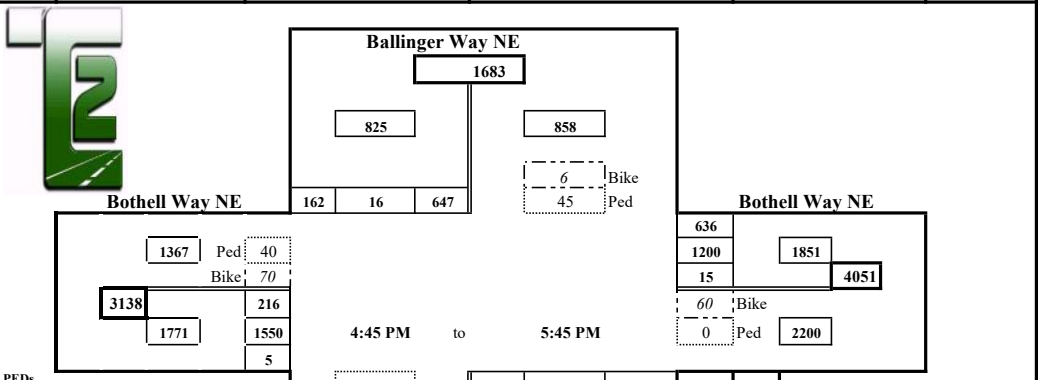
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Ballinger Way NE & Bothell Way NE **Date of Count:** Tue 08/06/2024

Location: Lake Forest Park, Washington **Checked By:** Jen

Time Interval	From North on (SB) Ballinger Way NE				From South on (NB) Ballinger Way NE				From East on (WB) Bothell Way NE				From West on (EB) Bothell Way NE				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	1	135	4	30	0	3	1	2	8	2	255	169	3	71	385	0	1057
4:30 P	3	136	5	41	0	3	6	2	4	2	299	164	3	52	389	3	1102
4:45 P	2	172	5	38	0	2	1	3	3	5	255	156	3	72	368	1	1078
5:00 P	1	158	4	40	0	1	2	1	4	3	318	156	5	39	395	3	1120
5:15 P	1	150	2	47	0	1	2	0	5	6	299	164	5	56	395	1	1123
5:30 P	1	161	8	28	0	1	2	0	5	1	298	161	6	58	413	0	1131
5:45 P	1	178	2	47	0	2	0	2	6	5	285	155	5	63	347	1	1087
6:00 P	1	163	2	37	0	1	2	2	4	1	301	139	3	47	416	0	1111
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	11	1253	32	308	0	14	16	12	39	25	2310	1264	33	458	3108	9	8809
Peak Hour: 4:45 PM to 5:45 PM																	
Total	4	647	16	162	0	5	6	3	20	15	1200	636	21	216	1550	5	4461
Approach	825				14				1851				1771				4461
%HV	0.5%				n/a				1.1%				1.2%				1.0%
PHF	0.91				0.88				0.97				0.94				0.99



PEDs Across:	N	S	E	W	
INT 01	3	20	0	14	37
INT 02	11	15	0	11	37
INT 03	3	14	0	3	20
INT 04	14	25	0	11	50
INT 05	8	8	0	7	23
INT 06	13	14	0	17	44
INT 07	10	13	0	5	28
INT 08	18	17	0	19	54
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	80	126	0	87	293

Bicycles From:	N	S	E	W	
INT 01	6	0	11	18	35
INT 02	1	1	21	14	37
INT 03	0	0	19	18	37
INT 04	2	0	28	11	41
INT 05	1	2	15	23	41
INT 06	2	0	7	17	26
INT 07	1	0	10	19	30
INT 08	3	0	17	10	30
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	16	3	128	130	277

4524 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	0.94	1.2%
WB	0.97	1.1%
NB	0.88	n/a
SB	0.91	0.5%
T Int.	0.99	1.0%

Check In: 4461 Out: 4461

Conditions:

Special Notes

TSI24066M_02P

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

Traffic Count Consultants, Inc.

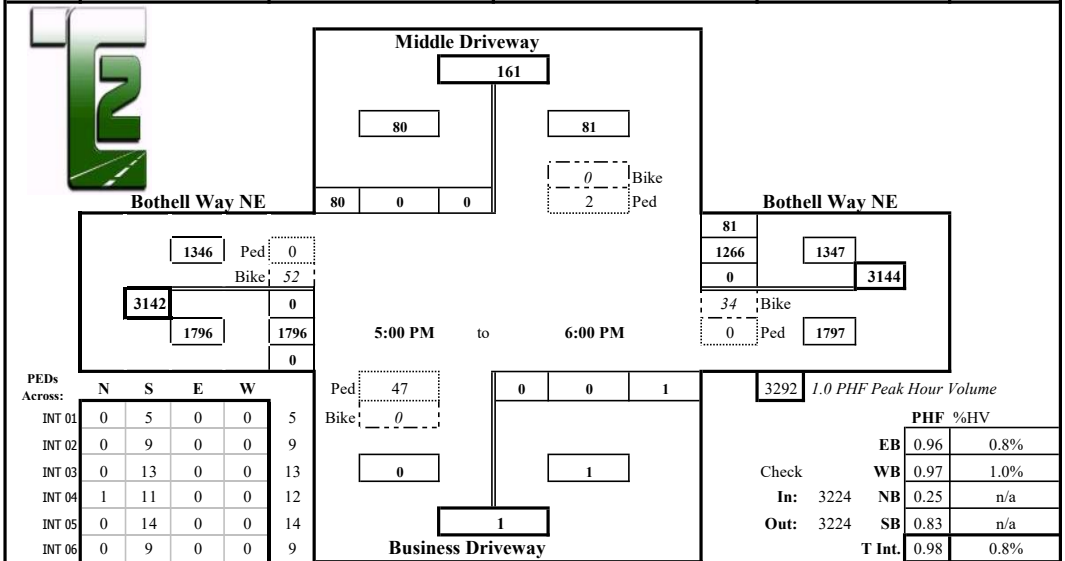
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Middle Driveway/Business Driveway & Bothell Way NE **Date of Count:** Tue 08/06/2024

Location: Lake Forest Park, Washington **Checked By:** Jen

Time Interval	From North on (SB) Middle Driveway				From South on (NB) Business Driveway				From East on (WB) Bothell Way NE				From West on (EB) Bothell Way NE				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	7	0	0	0	0	5	0	267	21	4	0	456	0	751
4:30 P	0	0	0	29	0	0	0	1	2	0	314	29	2	0	443	1	817
4:45 P	0	0	0	17	0	0	0	1	2	0	271	24	1	0	440	0	753
5:00 P	0	0	0	20	0	0	0	1	2	0	339	20	3	0	436	0	816
5:15 P	0	0	0	24	0	0	0	0	4	0	324	23	4	0	452	0	823
5:30 P	0	0	0	22	0	0	0	1	4	0	304	23	4	0	470	0	820
5:45 P	0	0	0	17	0	0	0	0	2	0	322	12	4	0	411	0	762
6:00 P	0	0	0	17	0	0	0	0	3	0	316	23	2	0	463	0	819
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	153	0	0	0	4	24	0	2457	175	24	0	3571	1	6361
Peak Hour: 5:00 PM to 6:00 PM																	
Total	0	0	0	80	0	0	0	1	13	0	1266	81	14	0	1796	0	3224
Approach	80				1				1347				1796				3224
%HV	n/a				n/a				1.0%				0.8%				0.8%
PHF	0.83				0.25				0.97				0.96				0.98



PEDs Across:	N	S	E	W	
INT 01	0	5	0	0	5
INT 02	0	9	0	0	9
INT 03	0	13	0	0	13
INT 04	1	11	0	0	12
INT 05	0	14	0	0	14
INT 06	0	9	0	0	9
INT 07	1	12	0	0	13
INT 08	1	12	0	0	13
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	3	85	0	0	88

Bicycles From:	N	S	E	W	
INT 01	0	0	9	14	23
INT 02	0	0	20	9	29
INT 03	0	0	20	13	33
INT 04	0	0	29	10	39
INT 05	0	0	15	16	31
INT 06	0	0	5	14	19
INT 07	0	0	6	14	20
INT 08	0	0	8	8	16
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	112	98	210

3292 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	0.96	0.8%
WB	0.97	1.0%
NB	0.25	n/a
SB	0.83	n/a
T Int.	0.98	0.8%

Check In: 3224 Out: 3224

Conditions:

Special Notes

TSI24066M_04P

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

Traffic Count Consultants, Inc.

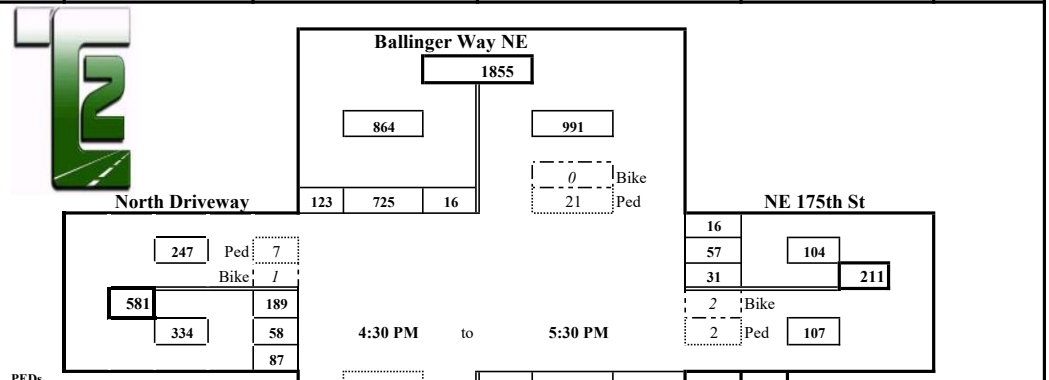
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Ballinger Way NE & NE 175th St/North Driveway **Date of Count:** Tue 08/06/2024

Location: Lake Forest Park, Washington **Checked By:** Jen

Time Interval	From North on (SB) Ballinger Way NE				From South on (NB) Ballinger Way NE				From East on (WB) NE 175th St				From West on (EB) North Driveway				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	6	116	20	3	19	208	9	1	9	12	4	0	45	12	14	474
4:30 P	4	6	146	35	0	16	208	6	0	10	13	1	0	35	15	25	516
4:45 P	2	7	186	32	1	22	208	6	0	8	17	5	0	39	10	21	561
5:00 P	1	4	187	26	2	14	190	9	0	10	14	4	0	47	20	28	553
5:15 P	1	2	179	33	1	20	186	11	0	6	14	2	0	58	18	16	545
5:30 P	1	3	173	32	1	11	202	7	0	7	12	5	0	45	10	22	529
5:45 P	3	11	189	24	3	17	163	8	0	13	11	8	0	39	10	19	512
6:00 P	0	2	181	33	1	31	154	14	0	10	13	5	0	46	7	22	518
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	12	41	1357	235	12	150	1519	70	1	73	106	34	0	354	102	167	4208
Peak Hour:	4:30 PM				to	5:30 PM											
Total	5	16	725	123	5	67	786	33	0	31	57	16	0	189	58	87	2188
Approach	864				886				104				334				2188
%HV	0.6%				0.6%				n/a				n/a				0.5%
PHF	0.96				0.94				0.87				0.88				0.98



PEDs Across:	N	S	E	W	
INT 01	1	1	1	1	4
INT 02	1	0	0	0	1
INT 03	4	0	0	2	6
INT 04	5	1	1	1	8
INT 05	3	0	1	0	4
INT 06	9	2	0	4	15
INT 07	5	0	0	1	6
INT 08	1	3	3	0	7
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	29	7	6	9	51

Special Notes

Bicycles From:	N	S	E	W	
INT 01	2	0	0	2	4
INT 02	0	0	0	0	0
INT 03	0	0	0	0	0
INT 04	0	2	2	0	4
INT 05	0	1	0	1	2
INT 06	0	2	0	0	2
INT 07	3	1	0	0	4
INT 08	1	0	0	0	1
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	6	6	2	3	17

		PHF	%HV
	EB	0.88	n/a
Check	WB	0.87	n/a
In: 2188	NB	0.94	0.6%
Out: 2188	SB	0.96	0.6%
	T Int.	0.98	0.5%

Conditions:

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

Traffic Count Consultants, Inc.

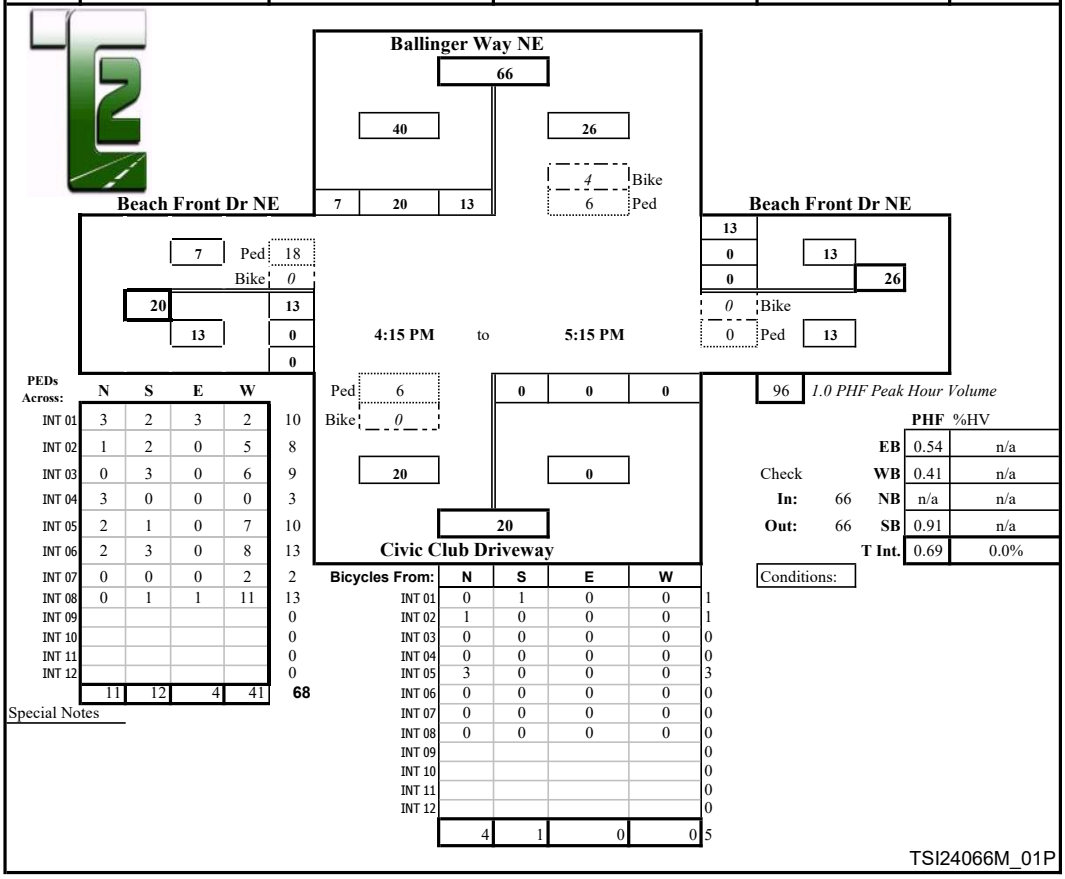
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Ballinger Way NE/Civic Club Driveway & Beach Front Dr NE **Date of Count:** Tue 08/06/2024

Location: Lake Forest Park, Washington **Checked By:** Jen

Time Interval Ending at	From North on (SB) Ballinger Way NE				From South on (NB) Civic Club Driveway				From East on (WB) Beach Front Dr NE				From West on (EB) Beach Front Dr NE				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	1	2	3	1	0	0	0	0	0	0	0	2	0	4	0	0	12
4:30 P	0	5	4	1	0	0	0	0	0	0	0	8	0	6	0	0	24
4:45 P	0	3	5	3	0	0	0	0	0	0	0	1	0	4	0	0	16
5:00 P	0	3	5	2	0	0	0	0	0	0	0	1	0	1	0	0	12
5:15 P	0	2	6	1	0	0	0	0	0	0	0	3	0	2	0	0	14
5:30 P	0	1	8	0	0	0	0	0	0	0	0	0	0	1	0	1	11
5:45 P	0	2	5	0	0	0	0	0	0	0	0	3	0	1	0	1	12
6:00 P	0	1	3	0	0	0	0	0	0	0	0	2	0	3	0	1	10
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	1	19	39	8	0	0	0	0	0	0	0	20	0	22	0	3	111
Peak Hour: 4:15 PM to 5:15 PM																	
Total	0	13	20	7	0	0	0	0	0	0	0	13	0	13	0	0	66
Approach	40				0				13				13				66
%HV	n/a				n/a				n/a				n/a				0.0%
PHF	0.91				n/a				0.41				0.54				0.69



PEDs Across:	N	S	E	W	
INT 01	3	2	3	2	10
INT 02	1	2	0	5	8
INT 03	0	3	0	6	9
INT 04	3	0	0	0	3
INT 05	2	1	0	7	10
INT 06	2	3	0	8	13
INT 07	0	0	0	2	2
INT 08	0	1	1	11	13
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	11	12	4	41	68

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

96 *1.0 PHF Peak Hour Volume*

		PHF	%HV
	EB	0.54	n/a
Check	WB	0.41	n/a
In: 66	NB	n/a	n/a
Out: 66	SB	0.91	n/a
	T Int.	0.69	0.0%

Conditions:

Special Notes

TSI24066M_01P

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

Traffic Count Consultants, Inc.

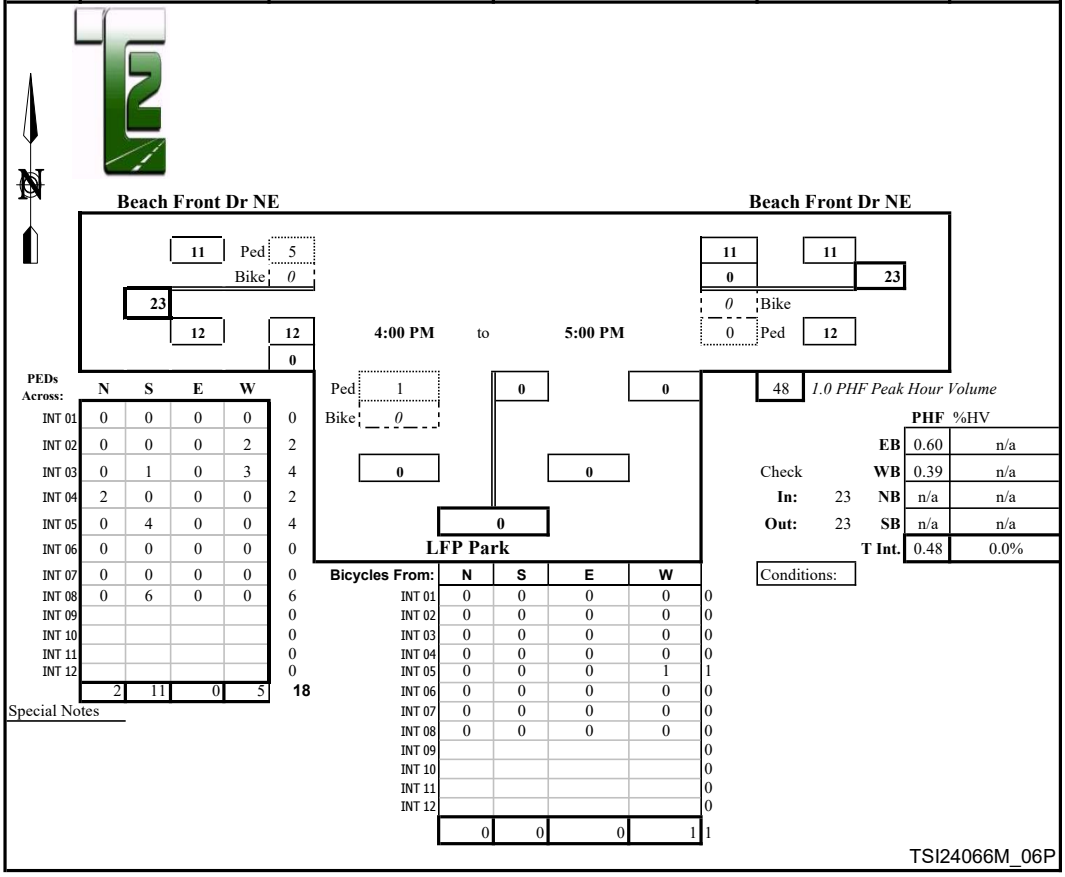
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: LFP Park & Beach Front Dr NE **Date of Count:** Tue 08/06/2024

Location: Lake Forest Park, Washington **Checked By:** Jen

Time Interval	From North on (SB) 0				From South on (NB) LFP Park				From East on (WB) Beach Front Dr NE				From West on (EB) Beach Front Dr NE				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	0	0	0	0	0	3	0	0	0	2	0	5
4:30 P	0	0	0	0	0	0	0	0	0	0	7	0	0	0	5	0	12
4:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
5:00 P	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4	0	5
5:15 P	0	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	5
5:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
5:45 P	0	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	5
6:00 P	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	3
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	0	0	0	0	0	19	0	0	0	18	0	37
Peak Hour: 4:00 PM to 5:00 PM																	
Total	0	0	0	0	0	0	0	0	0	0	11	0	0	0	12	0	23
Approach	0				0				11				12				23
%HV	n/a				n/a				n/a				n/a				0.0%
PHF	n/a				n/a				0.39				0.60				0.48



Special Notes

TSI24066M_06P

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

Traffic Count Consultants, Inc.

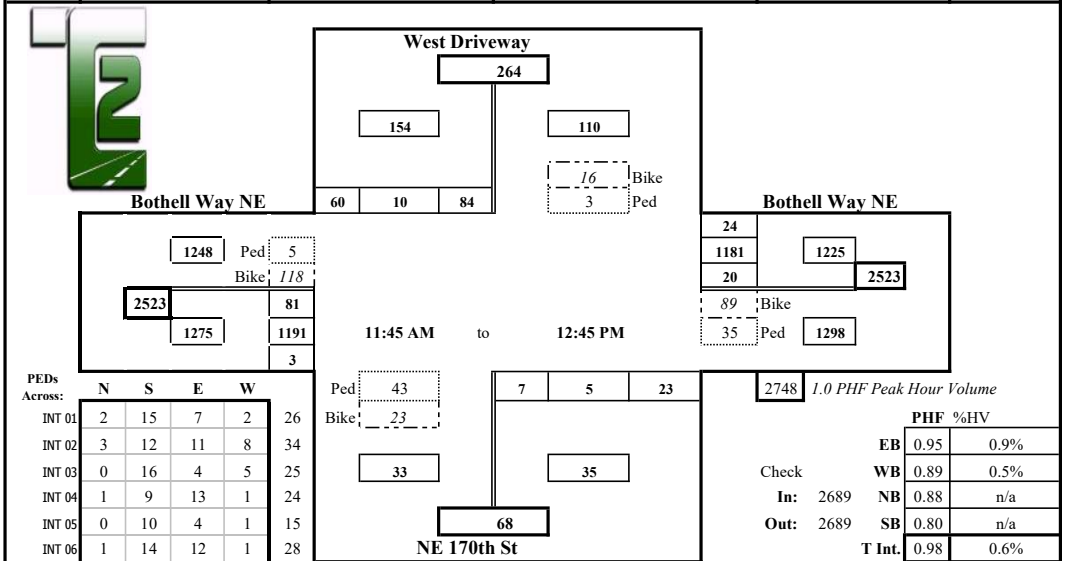
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: West Driveway/NE 170th St & Bothell Way NE **Date of Count:** Sat 08/10/2024

Location: Lake Forest Park, Washington **Checked By:** Jen

Time Interval Ending at	From North on (SB) West Driveway				From South on (NB) NE 170th St				From East on (WB) Bothell Way NE				From West on (EB) Bothell Way NE				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
11:15 A	0	19	0	7	0	2	5	5	2	11	249	6	4	10	249	1	564
11:30 A	0	22	2	11	0	3	0	4	2	4	258	3	1	11	255	0	573
11:45 A	0	16	1	16	0	1	3	8	4	6	285	4	2	19	279	1	639
12:00 P	0	22	1	14	0	3	1	4	2	4	295	6	4	15	322	0	687
12:15 P	0	28	8	12	0	1	2	6	2	5	266	5	1	19	302	1	655
12:30 P	0	14	1	15	0	3	1	6	1	2	336	7	2	22	265	2	674
12:45 P	0	20	0	19	0	0	1	7	1	9	284	6	4	25	302	0	673
1:00 P	0	35	3	15	0	1	1	3	7	4	323	1	1	17	278	2	683
1:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	0	176	16	109	0	14	14	43	21	45	2296	38	19	138	2252	7	5148
Peak Hour: 11:45 AM to 12:45 PM																	
Total	0	84	10	60	0	7	5	23	6	20	1181	24	11	81	1191	3	2689
Approach	154				35				1225				1275				2689
%HV	n/a				n/a				0.5%				0.9%				0.6%
PHF	0.80				0.88				0.89				0.95				0.98



PEDs Across:	N	S	E	W	
INT 01	2	15	7	2	26
INT 02	3	12	11	8	34
INT 03	0	16	4	5	25
INT 04	1	9	13	1	24
INT 05	0	10	4	1	15
INT 06	1	14	12	1	28
INT 07	1	10	6	2	19
INT 08	0	6	17	1	24
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	8	92	74	21	195

Bicycles From:	N	S	E	W	
INT 01	7	0	25	26	58
INT 02	11	3	22	25	61
INT 03	7	0	18	30	55
INT 04	1	0	29	23	53
INT 05	5	4	21	46	76
INT 06	8	13	13	24	58
INT 07	2	6	26	25	59
INT 08	5	1	29	22	57
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	46	27	183	221	477

2748 *1.0 PHF Peak Hour Volume*

	PHF	%HV
EB	0.95	0.9%
WB	0.89	0.5%
NB	0.88	n/a
SB	0.80	n/a
T Int.	0.98	0.6%

Check In: 2689 Out: 2689

Conditions:

Special Notes

TSI24066M_05M

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

Traffic Count Consultants, Inc.

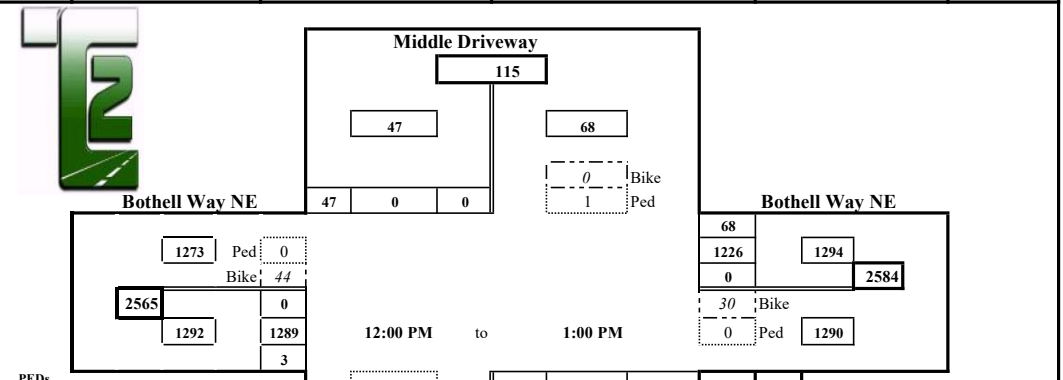
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Middle Driveway/Business Driveway & Bothell Way NE **Date of Count:** Sat 08/10/2024

Location: Lake Forest Park, Washington **Checked By:** Jen

Time Interval	From North on (SB) Middle Driveway				From South on (NB) Business Driveway				From East on (WB) Bothell Way NE				From West on (EB) Bothell Way NE				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
11:15 A	0	0	0	13	0	0	0	0	2	0	240	12	4	0	264	0	529
11:30 A	0	0	0	10	0	0	0	0	2	0	263	29	2	0	277	0	579
11:45 A	0	0	0	17	0	0	0	0	3	0	277	14	1	0	315	2	625
12:00 P	0	0	0	17	0	0	0	0	1	0	279	21	4	0	334	3	654
12:15 P	0	0	0	8	0	0	0	1	2	0	279	12	1	0	340	2	642
12:30 P	0	0	0	11	0	0	0	0	1	0	354	21	1	0	309	0	695
12:45 P	0	0	0	13	0	0	0	0	1	0	282	17	4	0	304	1	617
1:00 P	0	0	0	15	0	0	0	0	2	0	311	18	1	0	336	0	680
1:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	0	0	0	104	0	0	0	1	14	0	2285	144	18	0	2479	8	5021
Peak Hour: 12:00 PM to 1:00 PM																	
Total	0	0	0	47	0	0	0	1	6	0	1226	68	7	0	1289	3	2634
Approach	47				1				1294				1292				2634
%HV	n/a				n/a				0.5%				0.5%				0.5%
PHF	0.78				0.25				0.86				0.94				0.95



PEDs Across:	N	S	E	W	
INT 01	0	6	0	0	6
INT 02	10	5	0	0	15
INT 03	0	4	0	0	4
INT 04	0	4	0	0	4
INT 05	0	4	0	0	4
INT 06	0	6	0	0	6
INT 07	1	5	0	0	6
INT 08	0	5	0	0	5
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	11	39	0	0	50

Bicycles From:	N	S	E	W	
INT 01	0	0	4	9	13
INT 02	0	0	4	15	19
INT 03	0	0	5	10	15
INT 04	0	0	8	2	10
INT 05	0	0	6	13	19
INT 06	0	0	8	12	20
INT 07	0	0	6	5	11
INT 08	0	0	10	14	24
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	51	80	131

2780 *1.0 PHF Peak Hour Volume*

		PHF	%HV
	EB	0.94	0.5%
Check	WB	0.86	0.5%
In: 2634	NB	0.25	n/a
Out: 2634	SB	0.78	n/a
	T Int.	0.95	0.5%

Conditions:

Pedestrian & Bicycle numbers are low. The trail was in the shade during this count which made it very difficult to see them.

Special Notes

TSI24066M_04M

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

Traffic Count Consultants, Inc.

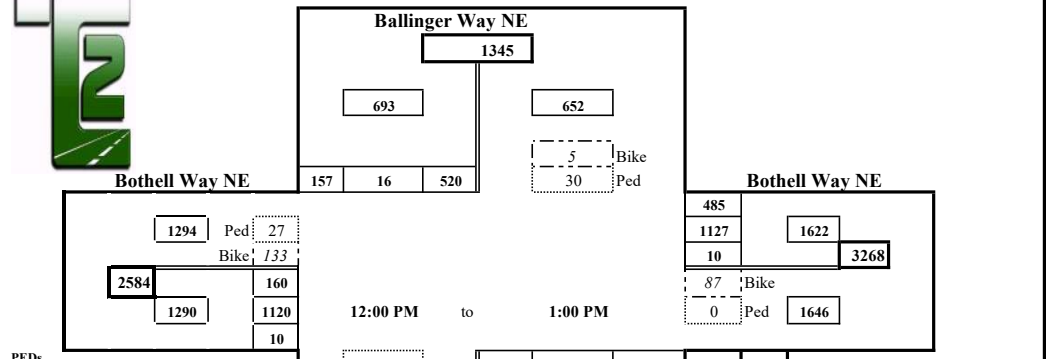
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Ballinger Way NE & Bothell Way NE **Date of Count:** Sat 08/10/2024

Location: Lake Forest Park, Washington **Checked By:** Jen

Time Interval Ending at	From North on (SB) Ballinger Way NE				From South on (NB) Ballinger Way NE				From East on (WB) Bothell Way NE				From West on (EB) Bothell Way NE				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
11:15 A	1	100	3	30	0	1	2	4	5	2	221	128	4	35	227	2	755
11:30 A	2	146	4	25	0	2	2	0	4	0	265	94	3	28	249	0	815
11:45 A	2	112	1	41	1	1	3	3	4	1	249	124	2	47	267	1	850
12:00 P	0	122	2	29	0	0	1	1	3	3	271	110	2	37	297	0	873
12:15 P	1	128	7	45	0	2	2	3	3	4	244	130	3	52	286	3	906
12:30 P	0	144	2	41	0	2	1	1	1	1	332	118	1	33	273	3	951
12:45 P	1	134	2	37	0	1	2	1	2	4	261	102	4	39	262	3	848
1:00 P	1	114	5	34	0	5	2	1	2	1	290	135	1	36	299	1	923
1:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	8	1000	26	282	1	14	15	14	24	16	2133	941	20	307	2160	13	6921
Peak Hour: 12:00 PM to 1:00 PM																	
Total	3	520	16	157	0	10	7	6	8	10	1127	485	9	160	1120	10	3628
Approach	693				23				1622				1290				3628
%HV	0.4%				n/a				0.5%				0.7%				0.6%
PHF	0.93				0.72				0.90				0.95				0.95



PEDs Across:	N	S	E	W	
INT 01	2	15	0	2	19
INT 02	7	18	0	7	32
INT 03	6	21	0	5	32
INT 04	12	22	0	11	45
INT 05	13	12	0	10	35
INT 06	5	20	0	5	30
INT 07	6	21	0	4	31
INT 08	6	11	0	8	25
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	57	140	0	52	**249**

Special Notes

Bicycles From:	N	S	E	W	
INT 01	0	0	38	38	76
INT 02	2	0	23	39	64
INT 03	1	0	17	34	52
INT 04	3	0	32	14	49
INT 05	1	0	23	50	74
INT 06	1	1	20	31	53
INT 07	1	0	25	24	50
INT 08	2	0	19	28	49
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	11	1	197	258	467

3804 *1.0 PHF Peak Hour Volume*

		PHF	%HV
	EB	0.95	0.7%
Check	WB	0.90	0.5%
In: 3628	NB	0.72	n/a
Out: 3628	SB	0.93	0.4%
	T Int.	0.95	0.6%

Conditions:

TSI24066M_02M

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

Traffic Count Consultants, Inc.

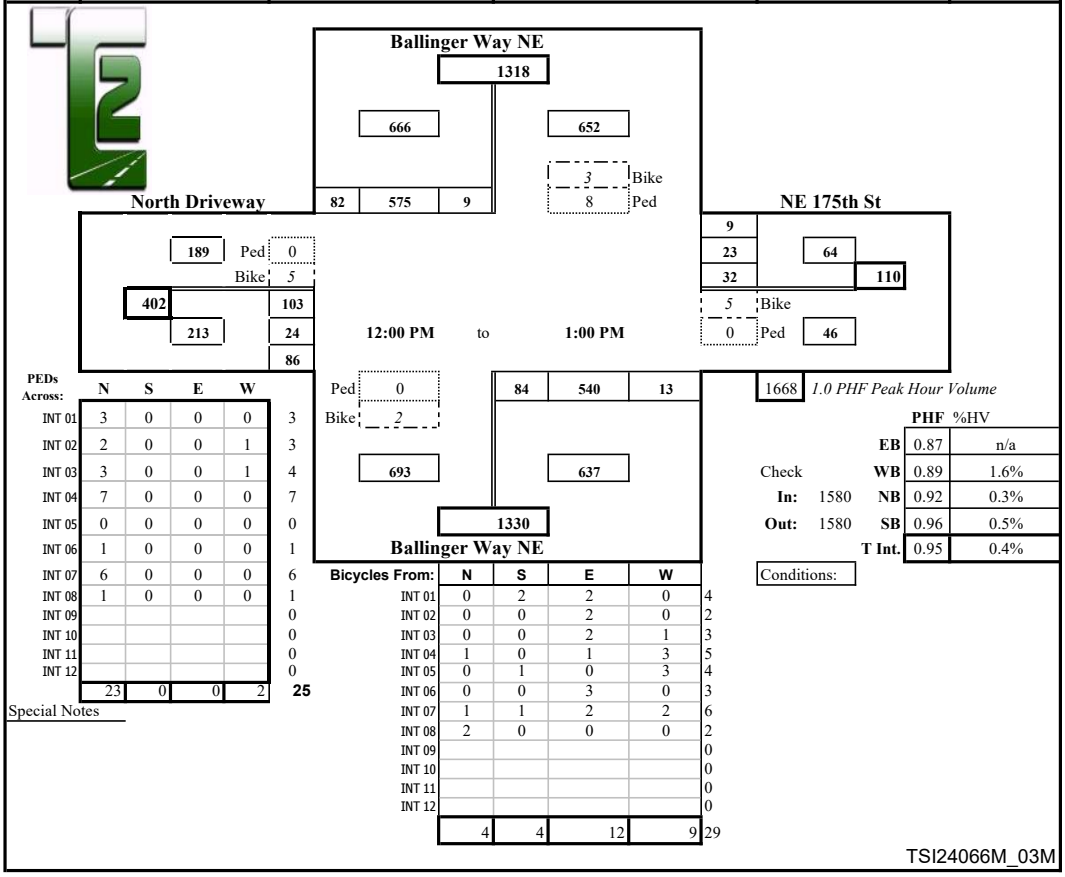
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Ballinger Way NE & NE 175th St/North Driveway **Date of Count:** Sat 08/10/2024

Location: Lake Forest Park, Washington **Checked By:** Jen

Time Interval	From North on (SB) Ballinger Way NE				From South on (NB) Ballinger Way NE				From East on (WB) NE 175th St				From West on (EB) North Driveway				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
11:15 A	2	2	114	36	2	21	134	2	0	7	6	4	0	27	7	13	373
11:30 A	1	1	137	29	2	16	117	6	0	8	1	7	1	32	7	26	387
11:45 A	2	1	137	22	1	13	141	8	0	5	6	1	0	17	7	13	371
12:00 P	0	3	131	13	2	21	137	6	0	9	8	5	0	18	4	12	367
12:15 P	1	0	135	23	0	17	135	3	0	7	7	3	0	29	6	24	389
12:30 P	0	4	153	17	0	13	148	3	0	10	7	1	0	18	8	27	409
12:45 P	1	1	145	22	1	25	117	3	0	8	2	2	0	24	4	12	365
1:00 P	1	4	142	20	1	29	140	4	1	7	7	3	0	32	6	23	417
1:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	8	16	1094	182	9	155	1069	35	1	61	44	26	1	197	49	150	3078
Peak Hour: 12:00 PM to 1:00 PM																	
Total	3	9	575	82	2	84	540	13	1	32	23	9	0	103	24	86	1580
Approach	666				637				64				213				1580
%HV	0.5%				0.3%				1.6%				n/a				0.4%
PHF	0.96				0.92				0.89				0.87				0.95



PEDs Across:	N	S	E	W	
INT 01	3	0	0	0	3
INT 02	2	0	0	1	3
INT 03	3	0	0	1	4
INT 04	7	0	0	0	7
INT 05	0	0	0	0	0
INT 06	1	0	0	0	1
INT 07	6	0	0	0	6
INT 08	1	0	0	0	1
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	23	0	0	2	25

Special Notes

Bicycles From:	N	S	E	W	
INT 01	0	2	2	0	4
INT 02	0	0	2	0	2
INT 03	0	0	2	1	3
INT 04	1	0	1	3	5
INT 05	0	1	0	3	4
INT 06	0	0	3	0	3
INT 07	1	1	2	2	6
INT 08	2	0	0	0	2
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	4	4	12	9	29

	PHF	%HV
EB	0.87	n/a
WB	0.89	1.6%
NB	0.92	0.3%
SB	0.96	0.5%
T Int.	0.95	0.4%

Check In: 1580 Out: 1580

Conditions:

TSI24066M_03M

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

Traffic Count Consultants, Inc.

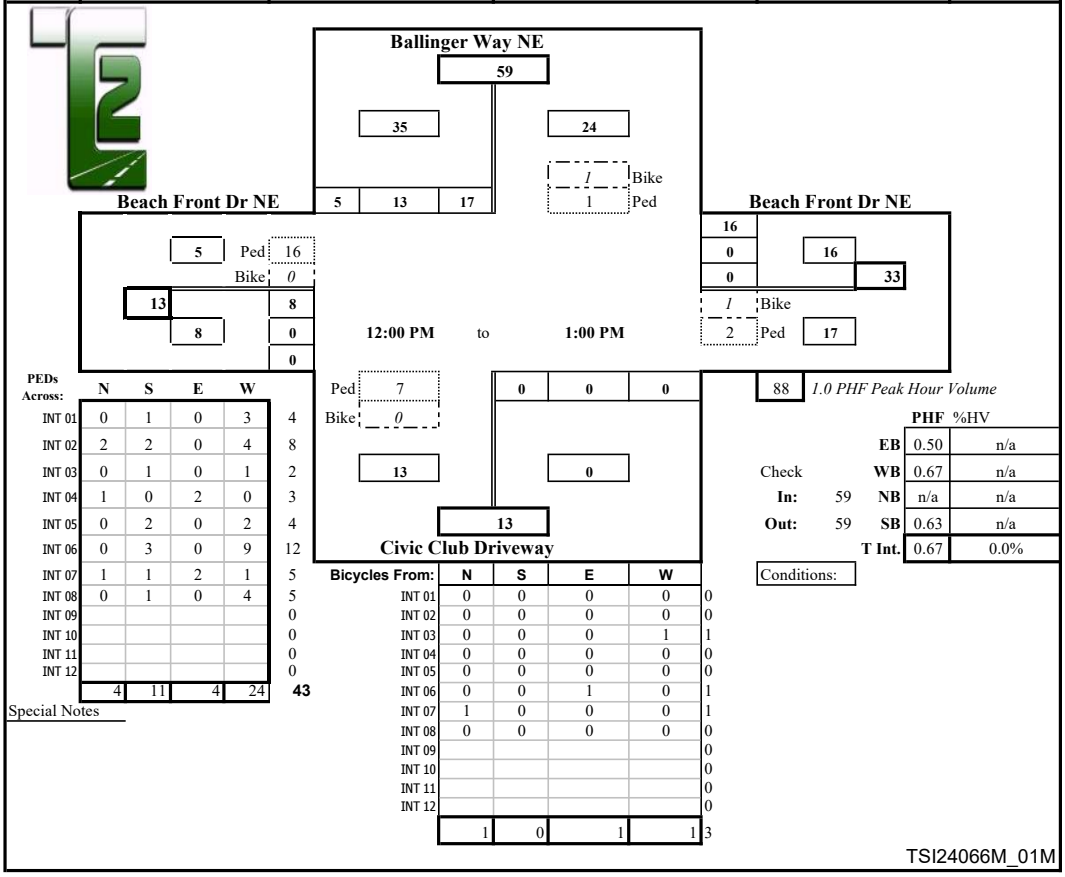
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Ballinger Way NE/Civic Club Driveway & Beach Front Dr NE **Date of Count:** Sat 08/10/2024

Location: Lake Forest Park, Washington **Checked By:** Jen

Time Interval Ending at	From North on (SB) Ballinger Way NE				From South on (NB) Civic Club Driveway				From East on (WB) Beach Front Dr NE				From West on (EB) Beach Front Dr NE				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
11:15 A	0	3	4	0	0	0	0	0	0	0	0	4	0	3	0	0	14
11:30 A	0	1	2	0	0	0	0	0	0	0	0	2	0	2	0	0	7
11:45 A	1	2	2	0	0	0	0	0	1	0	0	5	0	1	0	0	10
12:00 P	0	3	1	1	0	0	0	0	0	0	0	0	0	2	0	0	7
12:15 P	0	8	4	2	0	0	0	0	0	0	0	6	0	2	0	0	22
12:30 P	0	3	1	2	0	0	0	0	0	0	0	2	0	2	0	0	10
12:45 P	0	3	4	1	0	0	0	0	0	0	0	4	0	0	0	0	12
1:00 P	0	3	4	0	0	0	0	0	0	0	0	4	0	4	0	0	15
1:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	1	26	22	6	0	0	0	0	1	0	0	27	0	16	0	0	97
Peak Hour: 12:00 PM to 1:00 PM																	
Total	0	17	13	5	0	0	0	0	0	0	0	16	0	8	0	0	59
Approach	35				0				16				8				59
%HV	n/a				n/a				n/a				n/a				0.0%
PHF	0.63				n/a				0.67				0.50				0.67



PEDs Across:	N	S	E	W	
INT 01	0	1	0	3	4
INT 02	2	2	0	4	8
INT 03	0	1	0	1	2
INT 04	1	0	2	0	3
INT 05	0	2	0	2	4
INT 06	0	3	0	9	12
INT 07	1	1	2	1	5
INT 08	0	1	0	4	5
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	4	11	4	24	43

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

		PHF	%HV
	EB	0.50	n/a
Check	WB	0.67	n/a
In: 59	NB	n/a	n/a
Out: 59	SB	0.63	n/a
	T Int.	0.67	0.0%

Conditions:

Special Notes

TSI24066M_01M

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

Traffic Count Consultants, Inc.

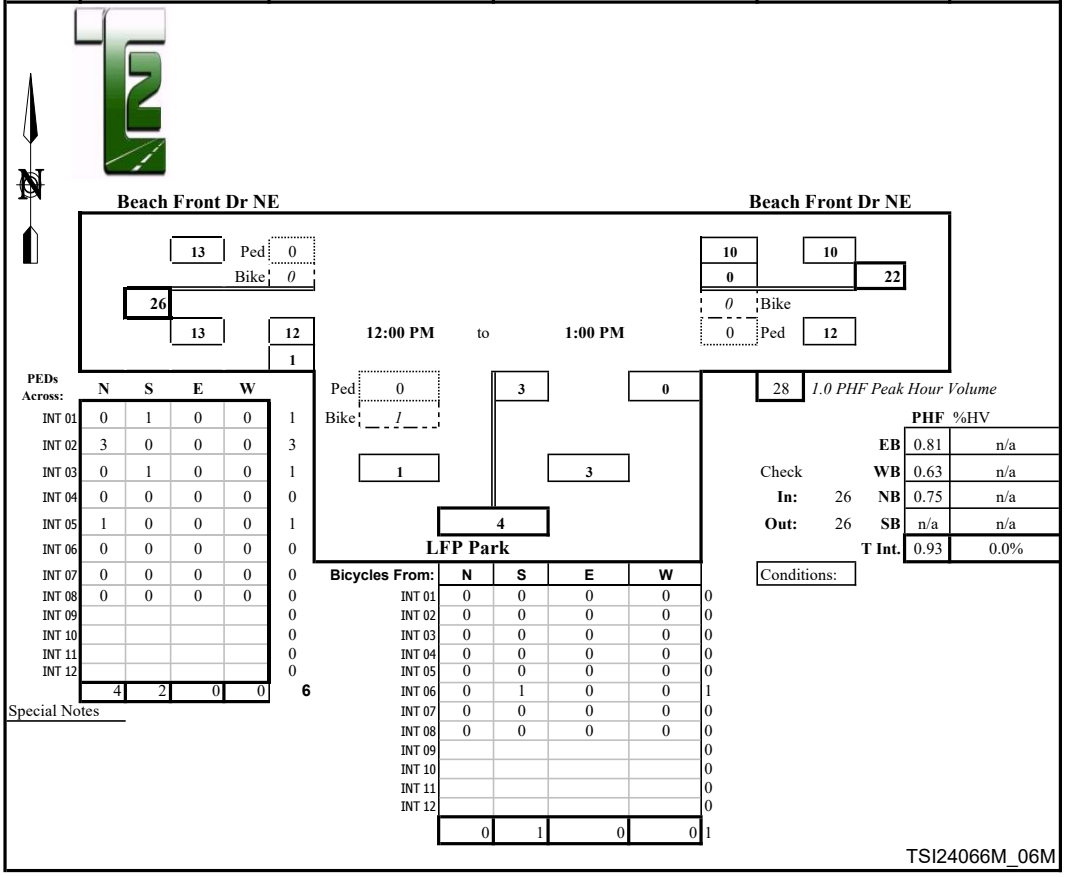
Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: LFP Park & Beach Front Dr NE **Date of Count:** Sat 08/10/2024

Location: Lake Forest Park, Washington **Checked By:** Jen

Time Interval	From North on (SB) 0				From South on (NB) LFP Park				From East on (WB) Beach Front Dr NE				From West on (EB) Beach Front Dr NE				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
11:15 A	0	0	0	0	0	3	0	0	0	0	2	0	0	0	1	1	7
11:30 A	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	4
11:45 A	0	0	0	0	0	1	0	0	1	0	3	0	1	0	1	1	6
12:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	3
12:15 P	0	0	0	0	0	1	0	0	0	0	2	0	0	0	4	0	7
12:30 P	0	0	0	0	0	1	0	0	0	0	1	0	0	0	3	0	5
12:45 P	0	0	0	0	0	1	0	0	0	0	3	0	0	0	2	1	7
1:00 P	0	0	0	0	0	0	0	0	0	0	4	0	0	0	3	0	7
1:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 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	7	0	0	1	0	18	0	1	0	17	4	46
Peak Hour: 12:00 PM to 1:00 PM																	
Total	0	0	0	0	0	3	0	0	0	0	10	0	0	0	12	1	26
Approach	0				3				10				13				26
%HV	n/a				n/a				n/a				n/a				0.0%
PHF	n/a				0.75				0.63				0.81				0.93



Special Notes

TSI24066M_06M

ITE Trip Generation Manual-Public Park Sheets

Land Use: 411
Public Park

Description

A public park is owned and operated by a municipal, county, state, or federal agency. The parks surveyed vary widely as to location, type, and number of facilities, including boating or swimming facilities, beaches, hiking trails, ball fields, soccer fields, campsites, and picnic facilities. Seasonal use of the individual sites differs widely as a result of the varying facilities and local conditions, such as weather. For example, some of the sites are used primarily for boating or swimming; others are used for softball games. Soccer complex (Land Use 488) is a related use.

Additional Data

The percentage of the park area that is used most intensively varies considerably within the studies contained in this land use. Therefore, caution should be used when using acres as an independent variable.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Arizona, California, New Jersey, New York, North Carolina, and Oregon.

Source Numbers

186, 392, 407, 709, 729, 852, 905

Public Park
(411)

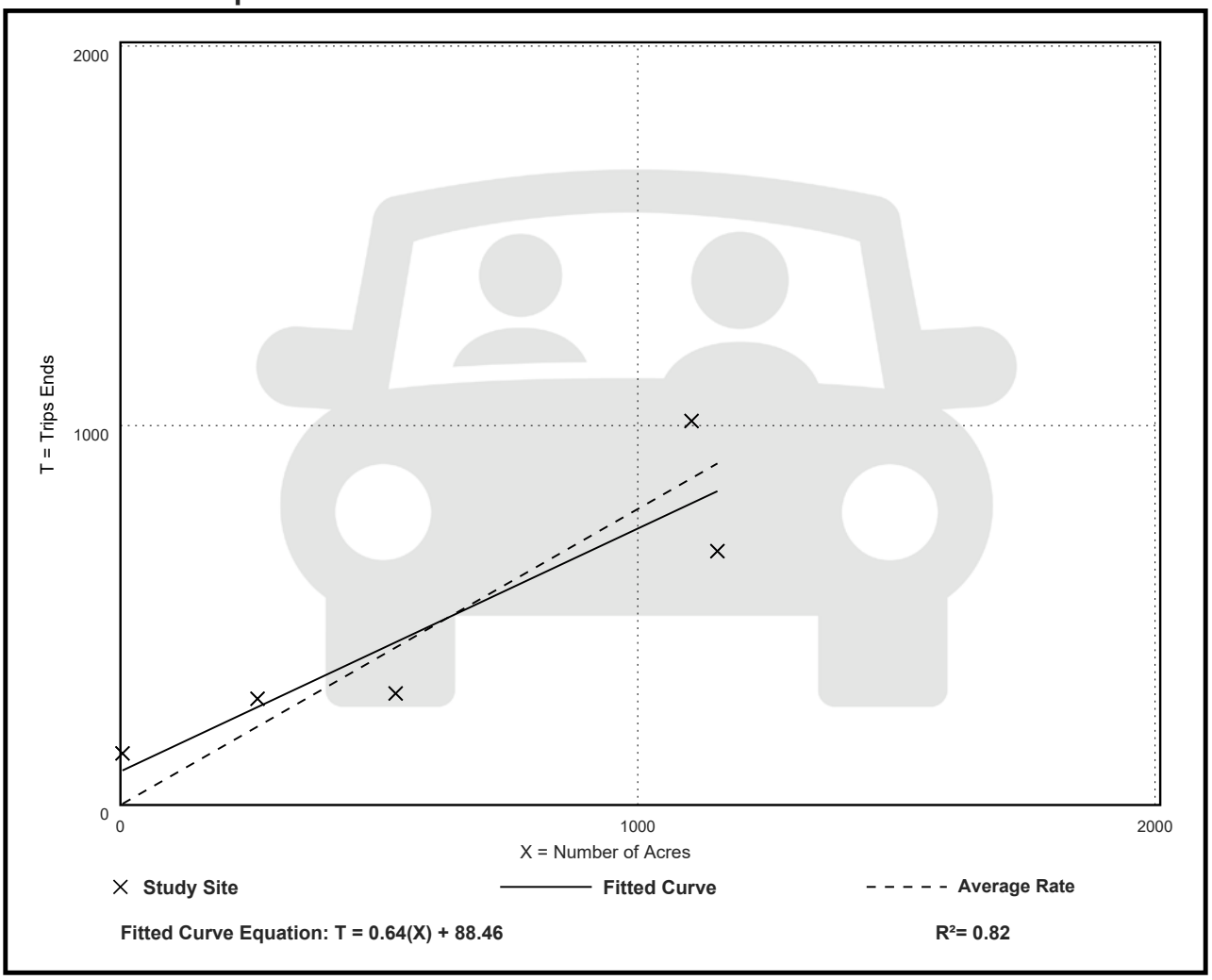
Vehicle Trip Ends vs: Acres
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 5
Avg. Num. of Acres: 612
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Acre

Average Rate	Range of Rates	Standard Deviation
0.78	0.55 - 34.00	1.36

Data Plot and Equation



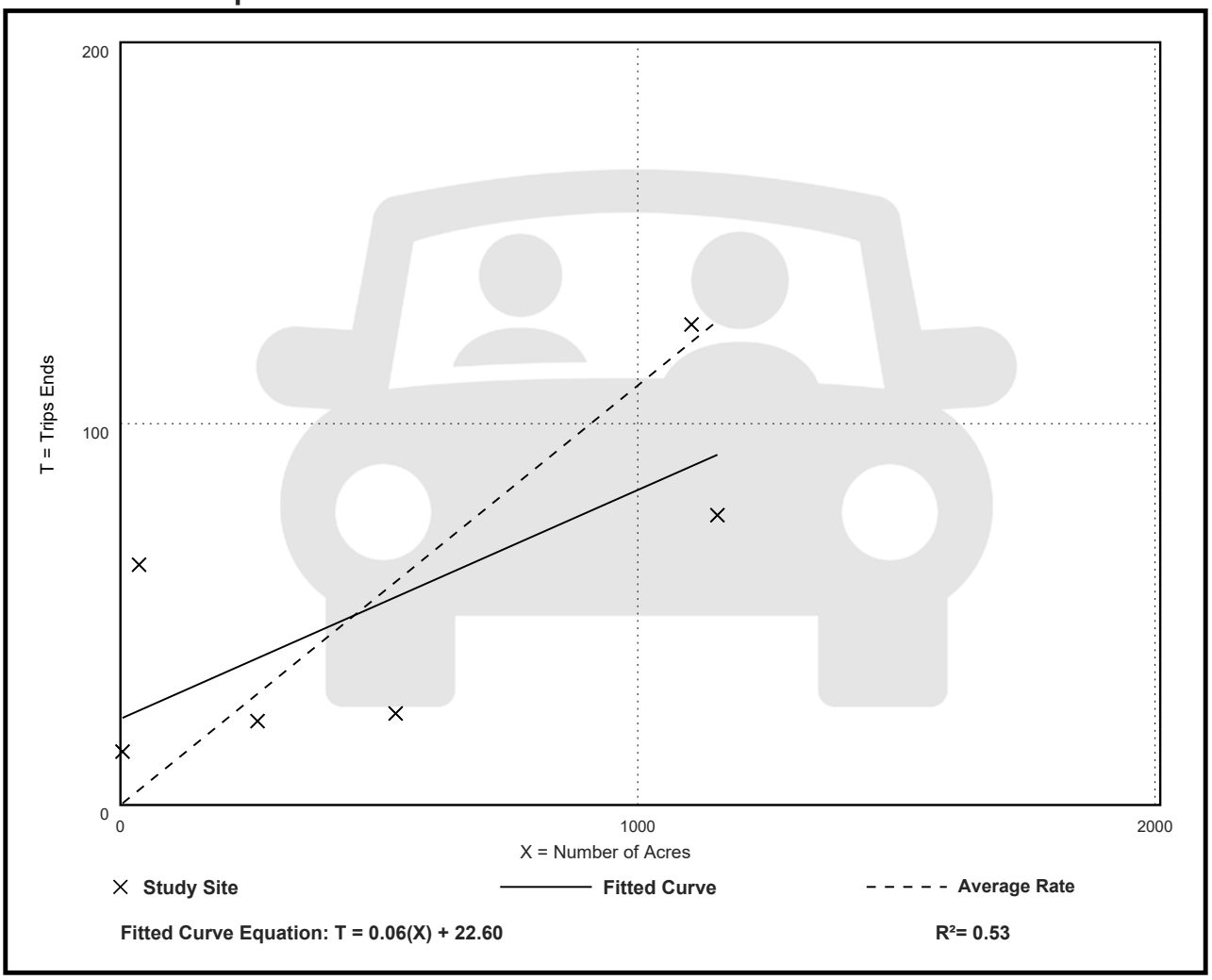
Public Park
(411)

Vehicle Trip Ends vs: Acres
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
Number of Studies: 6
Avg. Num. of Acres: 516
Directional Distribution: 55% entering, 45% exiting

Vehicle Trip Generation per Acre

Average Rate	Range of Rates	Standard Deviation
0.11	0.05 - 3.50	0.24

Data Plot and Equation



Public Park
(411)

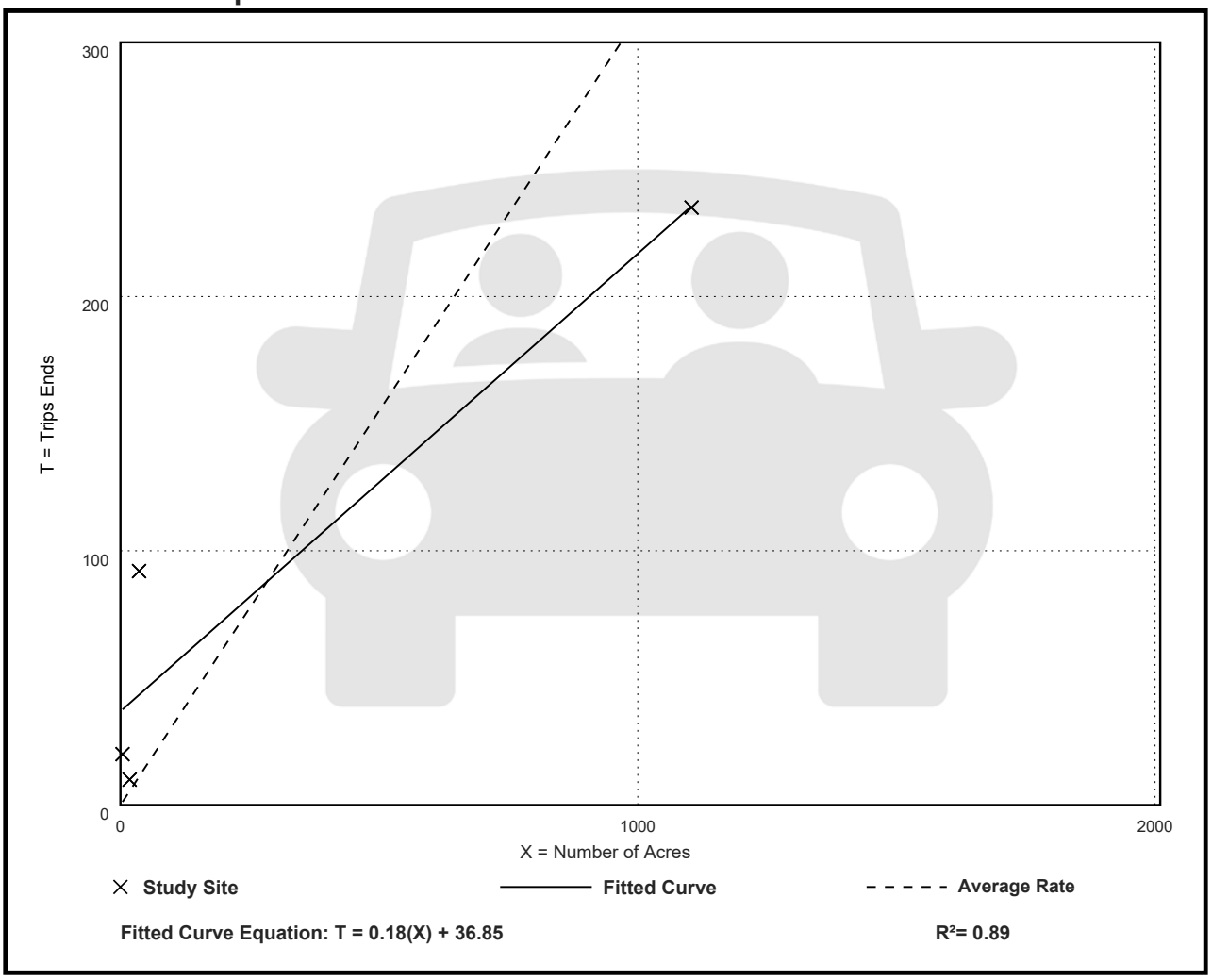
Vehicle Trip Ends vs: Acres
On a: Sunday, Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 4
Avg. Num. of Acres: 290
Directional Distribution: 39% entering, 61% exiting

Vehicle Trip Generation per Acre

Average Rate	Range of Rates	Standard Deviation
0.31	0.21 - 5.00	0.57

Data Plot and Equation



ITE Parking Generation Manual-Public Park Sheets

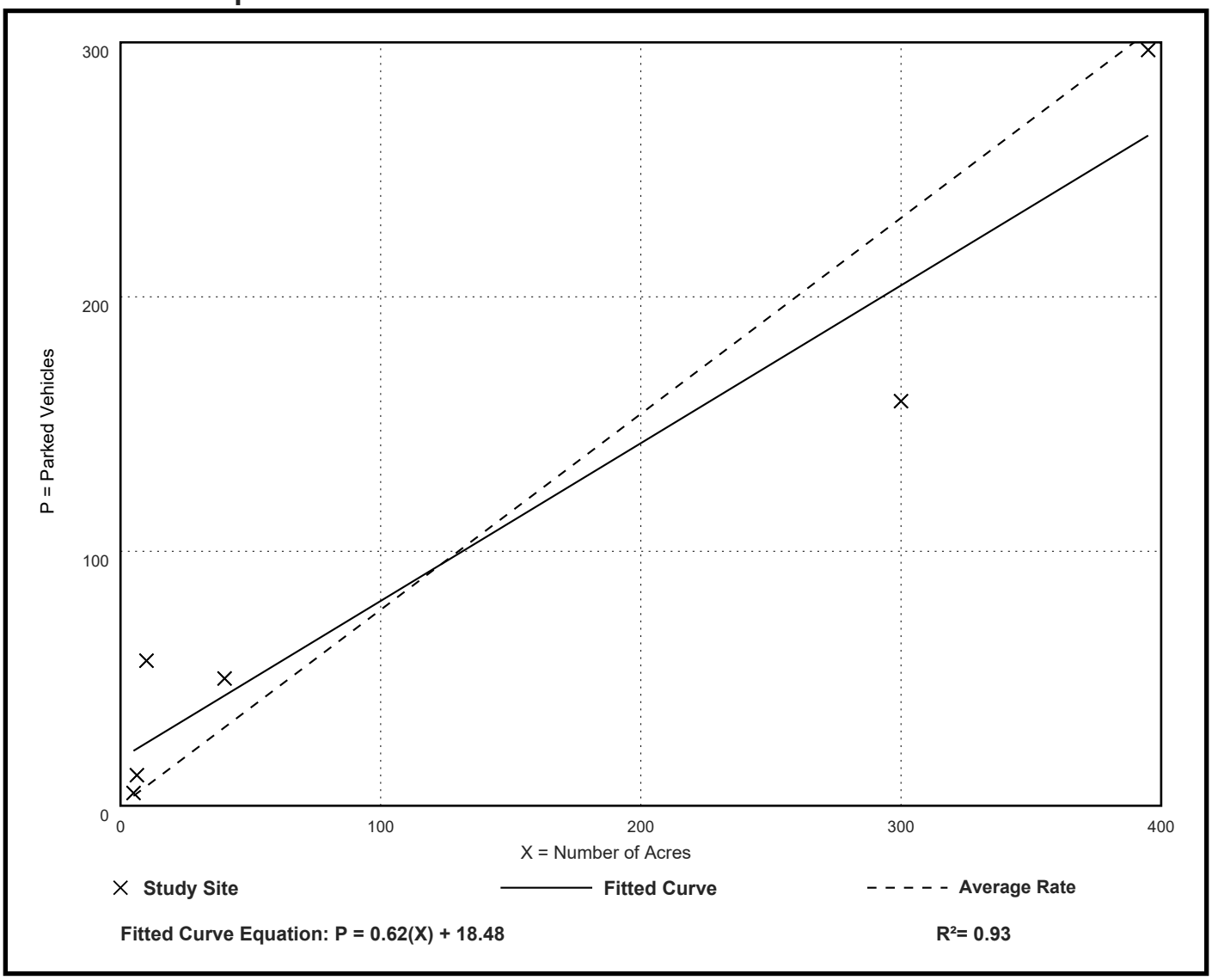
Public Park
(411)

Peak Period Parking Demand vs: Acres
On a: Weekday (Monday - Friday)
Setting/Location: General Urban/Suburban
Number of Studies: 6
Avg. Num. of Acres: 126

Peak Period Parking Demand per Acre

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
0.77	0.53 - 5.71	0.83 / 5.52	***	0.66 (86%)

Data Plot and Equation



Fitted Curve Equation: P = 0.62(X) + 18.48

R^2= 0.93

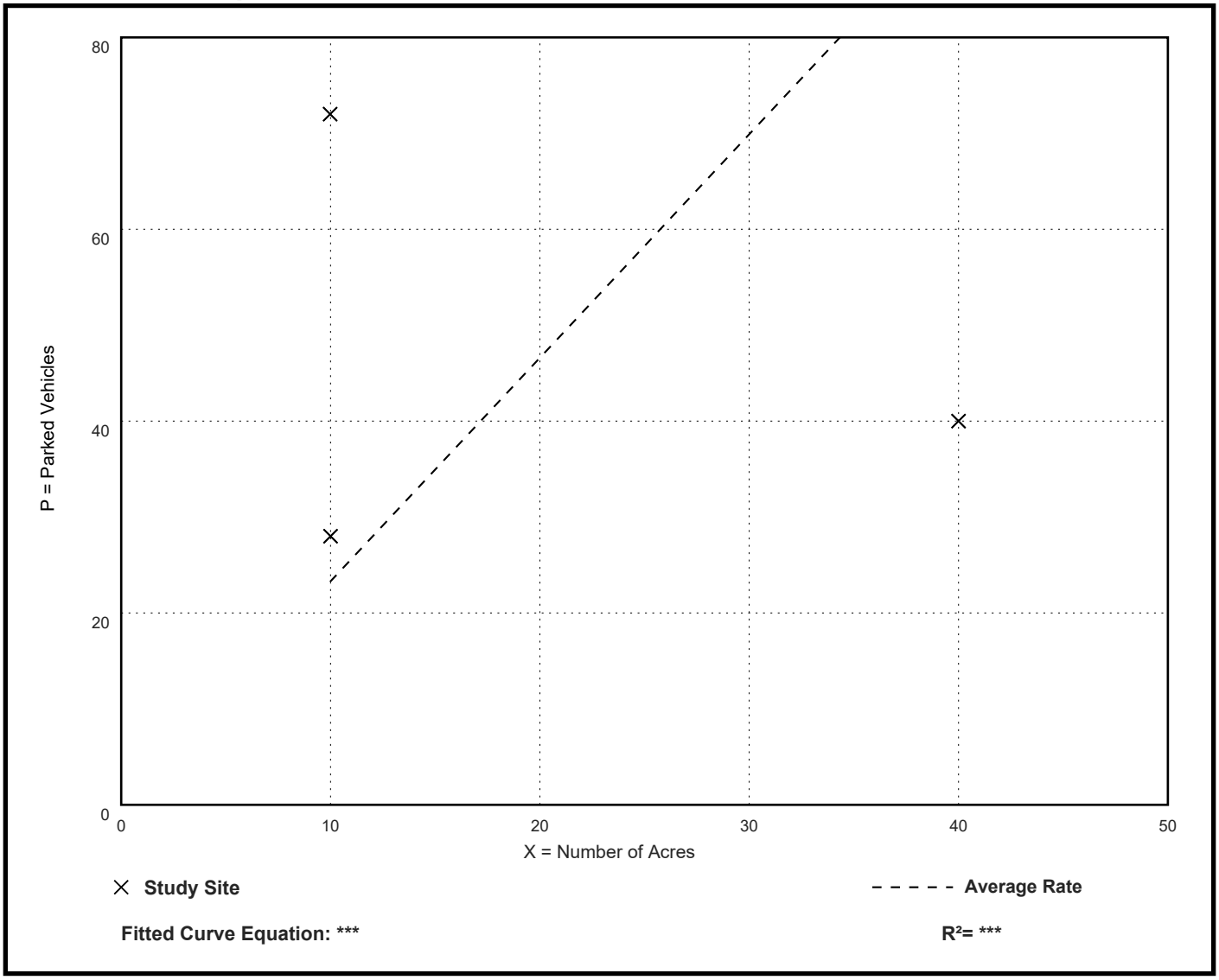
Public Park
(411)

Peak Period Parking Demand vs: Acres
On a: Sunday
Setting/Location: General Urban/Suburban
Number of Studies: 3
Avg. Num. of Acres: 20

Peak Period Parking Demand per Acre

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
2.33	1.00 - 7.21	1.58 / 7.21	***	2.79 (120%)

Data Plot and Equation



ITE Western District Trip Generation and Parking Generation Study

Spring 2023

TRIP AND PARKING GENERATION STUDY

Santa Rosa Park, San Luis Obispo

View of Playground at Santa Rosa Park, Credit: City of SLO

Institute of Transportation Engineers (ITE)
Cal Poly, San Luis Obispo Chapter

Table of Contents

Letter of Submittal

March 31, 2023

Jeanne Acutanza
Technical Committee Chair
ITE Western District

Subject: Report for 2023 Western District ITE Data Collection Project

On behalf of the Institute of Transportation Engineers Student Chapter at Cal Poly, San Luis Obispo, I am pleased to submit our Trip and Parking Generation Study.

We collected and analyzed trip and parking generation data at our chosen site: Santa Rosa Park, located in San Luis Obispo, CA. This location corresponds to the ITE Land Use 411, identified as a public park land use in the ITE Trip and Parking Generation Manual. Our chapter previously surveyed this site during the COVID-19 pandemic in 2021 as part of the ITE Western District's Data Collection Project for that year. We collected data in February on a Wednesday, Saturday, and Sunday, mirroring the methods from the previous study. This report includes a summary of our data and findings from our study as well as an appendix with all of the trip and parking demand data forms used.

Please do not hesitate to contact me by phone at (805) 206-5576 or by email at amiciano@calpoly.edu if you have any questions.

Sincerely,

Ana Miciano
Secretary
Cal Poly ITE Student Chapter

Background

The Cal Poly, San Luis Obispo (SLO) Institute of Transportation Engineers (ITE) student chapter collected trip generation and parking demand data for Santa Rosa Park (SRP), located within the City of SLO, CA. An aerial view of the location is provided in Figure 1. The park, recognized as land use (LU) 411 in the ITE Trip and Parking Generation Manual, 11th Edition, contains several amenities including large grass fields, picnic areas, playground facilities, basketball courts, softball fields, a skate park, and a roller sport field. Throughout the year, the park is also host to a variety of community events. Table 1 provides relevant site characteristics.

Figure 1: Aerial view of the project site (Source: Google Earth)

Table 1. Site Characteristics

Address	1050 Oak St, San Luis Obispo, CA 93405
Total Acreage	9.98 acres
Total Number of Parking Spaces	132
Amenities	Grass fields, picnic areas, playground facilities, basketball courts, softball fields, a skate park, and a roller sport field

The Cal Poly, SLO ITE student chapter originally collected trip generation and parking demand data at this site in February 2021 for the 2021 ITE Western District Collection Project during the COVID-19 pandemic with the effects of the pandemic in mind. We collected data at the site again to provide further insight into the effects the pandemic had on travel patterns and demand for this land use type, which is underrepresented in the ITE trip generation manual.

Methodology

We performed pedestrian, bicycle, and vehicle trip generation and parking demand data collection by means of manual, in-person counts, recording counts on forms attached in the Appendix. Data collection methods for trip generation and parking demand adhered to the methods specified in the ITE Trip Generation Manual, 11 Edition, and the ITE Parking Generation Manual, 5th Edition.

The 12-hour counts were conducted from the hours of 7AM to 7PM on each of our designated data collection dates by 18 volunteers, most of whom are active Cal Poly SLO ITE student chapter members. Those three data collection dates were Sunday, February 5th, 2023; Wednesday, February 8th, 2023; and Saturday, February 11th, 2023. In our proposal, we originally designated Sunday, February 12th, 2023 as our Sunday data collection, mirroring our chapter's previous study in 2021 and its dates. However, we moved the Sunday data collection date to the previous weekend to account for potentially irregular trip generation and parking demand trends due to the Super Bowl Sunday holiday on Sunday, February 12, 2023.

Data Collection Results

Table 2 summarizes weather observations we made during data collection efforts, which may have impacted trip and parking patterns at the park. Tables 3, 4, and 5 summarize the trip generation data collected on a Sunday, Wednesday, and Saturday respectively. The peak hours, trip totals for each transportation mode, directional distribution, and acreage trip rate for the 12-hr, AM peak, and PM peak periods are included for each day. Table 6 summarizes the parking generation data and includes peak hours and highest parking demands for each day of data collection.

Table 2. Weather Observations on Data Collection Dates

	Temperature	Wind	Precipitation
Sunday, February 5th, 2023	High: 59°F, Low: 48°F	Windy, max wind speed of 18 mph	-
Wednesday, February 8th, 2023	High: 74°F, Low: 41°F	Windy, max wind speed of 16 mph	-
Saturday, February 11th, 2023	High: 54°F, Low: 39°F	Slightly, max wind speed of 10 mph	15-20 minute periods of rainfall throughout day

Table 3. Trip Generation Data Summary for Sunday

Sunday, February 5th, 2023			
Time Period	**12-Hr Volume**	**AM Peak Hour**	**PM Peak Hour**
Peak Hour	-	11:00 - 12:00	1:00 - 2:00
Vehicles In	250	23	28
Vehicles Out	234	20	30
Total Vehicle Trips	484	43	58
Directional Distribution In	52%	53%	48%
Directional Distribution Out	48%	47%	52%
Trip Rate (Trips/Acre)	48.50	4.31	5.81
Truck Trips	2	0	0
Bicycle Trips	47	1	4
Pedestrian Trips	339	28	46
Total Trips	872	72	108

Table 4. Trip Generation Data Summary for Weekday

Wednesday, February 8th, 2023			
Time Period	**12-Hr Volume**	**AM Peak Hour**	**PM Peak Hour**
Peak Hour	-	11:00 - 12:00	1:00 - 2:00
Vehicles In	271	25	25
Vehicles Out	251	31	42
Total Vehicle Trips	522	56	67
Directional Distribution In	52%	45%	37%
Directional Distribution Out	48%	55%	63%
Trip Rate (Trips/Acre)	52.30	5.61	6.71
Truck Trips	11	0	0
Bicycle Trips	176	28	14
Pedestrian Trips	361	18	44
Total Trips	1070	102	125

Table 5. Trip Generation Data Summary for Saturday

Saturday, February 11th, 2023			
Time Period	**12-Hr Volume**	**AM Peak Hour**	**PM Peak Hour**
Peak Hour	-	11:00 - 12:00	5:00 - 6:00
Vehicles In	192	21	22
Vehicles Out	188	28	28
Total Vehicle Trips	380	49	50
Directional Distribution In	51%	43%	44%
Directional Distribution Out	49%	57%	56%
Trip Rate (Trips/Acre)	38.08	4.91	5.01
Truck Trips	10	2	0
Bicycle Trips	44	3	6
Pedestrian Trips	197	7	13
Total Trips	631	61	69

Table 6. Parking Generation Data Summary

Day	**Sunday**	**Wednesday**	**Saturday**
Date	February 5, 2023	February 8, 2023	February 11, 2023
Peak Hour	12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM	1:00 PM - 2:00 PM	11:00 AM - 12:00 PM
Peak Parking Demand	40	52	36
Parking Rate (Parking Demand/Acre)	4.01	5.21	3.61

ITE Trip Generation Comparison

Table 7 compares the daily average trip rates given in the 11th Edition ITE Trip Generation Manual for LU 441 to the calculated trip rates from the data collection at SRP for this study in 2023 (after the pandemic) and the previous study in 2021 (during the pandemic). Please note that the rates provided by the 11th Edition ITE Trip Generation Manual are 24-hour rates as opposed to the rates collected during the studies at SRP, which are 12-hour rates. As such, the daily rates for SRP are not included in the table and can be assumed to be slightly higher than the 12-hour rates. Further, the 11th Edition ITE Trip Generation Manual does not separate AM and PM peak periods.

Table 7: Trip Generation Comparison

Time Period	11th Edition Avg. Trip Rate (Trips/Acre)	2023 SRP Trip Rate (Trips/Acre)	2021 SRP Trip Rate (Trips/Acre)
Weekday	0.78	–	–
Weekday AM	0.07	5.61	7.52
Weekday PM	0.11	6.71	11.92
Saturday	1.96	–	–
Saturday Peak	0.28	5.01	10.22
Sunday	2.19	–	–
Sunday Peak	0.31	5.81	14.02

ITE Parking Generation Comparison

Table 8 directly compares the daily (24-hour) parking demand rates from the 5th Edition of the ITE Parking Generation Manual and the 12-hour parking demand rates for SRP for this study in 2023 (after the pandemic) and the previous study in 2021 (during the pandemic). Please note that the values given in the 5th Edition ITE Parking Generation Manual are 24-hour rates, while the values calculated for our study were 12-hour rates.

Table 8: Parking Generation Comparison

Time Period	5th Edition Daily Parking Rate (Parking Demand/Acre)	2023 SRP Daily Parking Rate (Parking Demand/Acre)	2021 SRP Daily Parking Rate (Parking Demand/Acre)
Saturday	0.47	3.61	6.71
Sunday	1.21	4.01	7.21

Analysis and Conclusion

SRP is situated near the center of the City of SLO along SR-1, a major state highway that is heavily traveled by tourists and commuters, and is easily accessible to pedestrians and bicyclists. The site is also served by local and regional transit, courtesy of a neighboring bus stop on the west side of the lot.

As demonstrated by Tables 7 and 8, there are large discrepancies between the trip and parking rates from the ITE Trip and Parking Generation Manuals and those from the studies at SRP in 2023 and 2021. The trip rates calculated for SRP are much greater than the trip rates in the manual. The given parking rates are also significantly different from the calculated rates using data from the conducted study. The

values calculated for Sunday seem to have the greatest discrepancy. There could be a few reasons for this.

First, SRP contains several amenities and is home to many organized community events, a few of which we observed during our data collection. A few of those events include roller derbies and organized baseball, soccer, and roller hockey practices. As those events were happening, there was still regular activity at the skatepark and playground facilities. As such, in proportion to its size, SRP generates a lot of trips for a public park. In fact, the trip and parking rates from the ITE Trip and Parking Generation Manuals were found from parks much larger than SRP with acreages ranging from 290 - 612 acres from the 11th Edition Trip Generation Manual and acreages running from 14 - 132 from the 5th Edition Parking Generation Manual–with SRP having a total acreage of 9.98 acres by comparison.

Further, we noticed that total pedestrian counts entering the park were much higher than pedestrian counts leaving the park; individuals coming to the park by scooter or skateboard were counted as pedestrians. We noticed that several kids came to the park by skateboard, scooter, or on foot, but were picked up in vehicles by their parents after a few hours or remained at the park after data collection hours had concluded. These may account for the uneven distribution we noticed. This pattern was noticed all three days, but particularly on Saturday where 125 pedestrians entered the park, but 72 exited, as seen in Appendix A.

Tables 7 and 8 also compare the trip and parking generation rates between the studies performed by our chapter in 2021 during the pandemic and in 2023 after the pandemic. The tables demonstrate that since the pandemic, there has been an overall decrease in trip and parking generation trends to SRP, with the values from 2021 being greater than those found in 2023. During the pandemic and subsequent quarantine, more people were at home and usual activities were lessened. As a result, outdoor activities were encouraged and more trips were made to local parks, including SRP.

During our data collection efforts we experienced bouts of inclement weather, which are mentioned in Table 2 in the Data Collection Results section. It rained periodically throughout Saturday and was rather windy on Sunday and Wednesday. Weather patterns can directly impact travel patterns to and from a particular site and it may have impacted our study as well with Saturday seeing the lowest total number of trips to SRP.

Acknowledgments

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Student Endowment Fund

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Appendices

Appendix A - ITE Trip Generation Data Forms

Sunday, February 5, 2023 Trip Generation Data Form
Wednesday, February 8, 2023 Trip Generation Data Form
Saturday, February 11, 2023 Trip Generation Data Form

Appendix B - ITE Parking Demand Survey Form

Appendix C - Trip Generation Tally Forms (include field notes)

Sunday, February 5, 2023 Trip Generation Tally Form
Wednesday, February 8, 2023 Trip Generation Tally Form
Saturday, February 11, 2023 Trip Generation Tally Form

Appendix D - Parking Generation Tally Forms (include field notes)

Sunday, February 5, 2023 Parking Generation Tally Form
Wednesday, February 8, 2023 Parking Generation Tally Form
Saturday, February 11, 2023 Parking Generation Tally Form

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Trip Generation Data Form (Part 1)

Land Use/Building Type:[1] Public Park	ITE Land Use Code: 411
Source: ITE Trip Generation Manual 11th Edition	Source No. (*ITE use only*):
Name of Development: Santa Rosa Park	Day of the Week: Sunday
City: San Luis Obispo State/Province: CA Zip/Postal Code: 90029	Day: 5 Month: February Year: 2023
Country: USA	Metropolitan Area: San Luis Obispo-Paso Robles

1. For fast-food land use, please specify if hamburger- or nonhamburger-based.

Location Within Area:

☐ (1) CBD ☐ (3) Suburban (Non-CBD) ☐ (5) Rural
☒ (2) Urban (Non-CBD) ☐ (4) Suburban CBD ☐ (6) Freeway Interchange Area (Rural)
☐ (7) Not Given

Independent Variable: (include data for as many as possible)[2]	Actual	Estimated
_____ (1) Employees (#)	☐	☐
_____ (2) Persons (#)	☐	☐
_____ (3) Total Units (#) (indicate unit:_____)	☐	☐
_____ (4) Occupied Units (#) (indicate unit:_____)	☐	☐
_____ (5) Gross Floor Area (gross sq. ft.)	☐	☐
(% of development occupied _____)		
_____ (6) Net Rentable Area (sq. ft.)	☐	☐
_____ (7) Gross Leasable Area (sq. ft.)	☐	☐
(% of development occupied _____)		
9.98 (8) Total Acres (% developed: _____)	☐	☒
132 (9) Parking Spaces (% occupied: _____)	☒	☐
_____ (10) Beds (% occupied: _____)	☐	☐
_____ (11) Seats (#)	☐	☐
_____ (12) Servicing Positions/Vehicle Fueling Positions	☐	☐
_____ (13) Shopping Center % Out-parcels/pads	☐	☐
_____ (14) A.M. Peak Hour Volume of Adjacent Street Traffic	☐	☐
_____ (15) P.M. Peak Hour Volume of Adjacent Street Traffic	☐	☐
_____ (16) Other _____	☐	☐
_____ (17) Other _____	☐	☐

Detailed Description of Development:[3]

Public Park, located within an urban area, with ample amounts of amenities. Amenities include large grass fields, picnic areas, playground facilities, basketball courts, softball fields, a large skate park, roller sport field, and various paved walking paths throughout Santa Rosa Park.

2. Definitions for several independent variables can be found in the *Trip Generation,* Second Edition, *User's Guide* Glossary.

3. Please provide all pertinent information to describe the subject project, including the presence of bicycle/pedestrian facilities. To report bicycle/pedestrian volumes, please refer to Part 4 of this data form.

Other Data:

Vehicle Occupancy (#):
_____ A.M. _____ P.M. _____ 24-hour %

Percent by Transit:
_____ A.M. % _____ P.M. % _____ 24-hour %

Percent by Carpool/Vanpool:
_____ A.M. % _____ P.M. % _____ 24-hour %

Employees by Shift:

	Start Time	End Time	Employees (#)
First Shift:	_____	_____	_____
Second Shift:	_____	_____	_____
Third Shift:	_____	_____	_____

Parking Cost on Site: Hourly _____ Daily _____

Transportation Demand Management (TDM) Information:

At the time of this study, was there a TDM program (that may have impacted the trip generation characteristics of this site) underway?

☒ No

☐ Yes (If yes, please check appropriate box/boxes, describe the nature of the TDM program(s) and provide a source for any studies that may help quantify this impact. Attach additional sheets if necessary)

☐ (1) Transit Service
☐ (2) Carpool Programs
☐ (3) Vanpool Programs
☐ (4) Bicycle/Pedestrian Facilities and Site Improvements
☐ (5) Employer Support Measures
☐ (6) Preferential HOV Treatments
☐ (7) Transit and Ridesharing Incentives
☐ (8) Parking Supply and Pricing Management
☐ (9) Tolls and Congestion Pricing
☐ (10) Variable Work Hours/Compressed Work Weeks
☐ (11) Telecommuting
☐ (12) Other _____

Please Complete Form on Other Side

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Trip Generation Data Form (Part 2)

Attachment E
Traffic Impact Analysis

Summary of Driveway Volumes ***(All = All Vehicles Counted, Including Trucks; Trucks = Heavy Duty Trucks and Buses)***

	Average Weekday (M-F)						Saturday						Sunday					
	Enter		Exit		Total		Enter		Exit		Total		Enter		Exit		Total	
	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks
12-Hour Volume													251	1	235	1	486	2
☒ Hour Volume 7 AM - 7 PM																		
A.M. Peak Hour of Adjacent Street Traffic (7 – 9) Time:																		
P.M. Peak Hour of Adjacent[1] Street Traffic (4 – 6) Time:																		
A.M. Peak Hour Generator[2] Time:																		
P.M. Peak Hour Generator[2] Time:																		
Peak Hour Generator[3] Time (Weekend): 1 PM - 2 PM													28	0	30	0	58	0

[1] **Highest hourly volume between 7 a.m. and 9 a.m. (4 p.m. and 6 p.m.). Please specify the peak hour.**
[2] **Highest hourly volume during the a.m. or p.m. period. Please specify the peak hour.**
[3] **Highest hourly volume during the entire day. Please specify the peak hour.**
Please refer to the *Trip Generation User's Guide* for full definition of terms.

Hourly Driveway Volumes- Average Weekday (M-F)

A.M. Period	Enter		Exit		Total		Mid-Day Period	Enter		Exit		Total		P.M. Period	Enter		Exit		Total	
	All	Trucks	All	Trucks	All	Trucks		All	Trucks	All	Trucks	All	Trucks		All	Trucks	All	Trucks	All	Trucks
6:00-7:00							11:00-12:00							3:00-4:00						
6:15-7:15							11:15-12:15							3:15-4:15						
6:30-7:30							11:30-12:30							3:30-4:30						
6:45-7:45							11:45-12:45							3:45-4:45						
7:00-8:00							12:00-1:00							4:00-5:00						
7:15-8:15							12:15-1:15							4:15-5:15						
7:30-8:30							12:30-1:30							4:30-5:30						
7:45-8:45							12:45-1:45							4:45-5:45						
8:00-9:00							1:00-2:00							5:00-6:00						

☒ **Check if Part 3, 4 and/or additional information is attached.**

Survey conducted by: Name: Ana Micano
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Attachment E
Traffic Impact Analysis

Institute of Transportation Engineers

Trip Generation Data Form (Part 3)

Name/Organization: Cal Poly SLO ITE **City/State:** San Luis Obispo, CA

Telephone Number: (805) 206-5576

Detailed Driveway Volumes: Attach this sheet to Parts 1 and 2 if you are providing additional information.

Day of the week: Sunday

(All = All Vehicles Counted, Including Trucks; Trucks = Heavy Duty Trucks and Buses)

A.M. Period	Enter		Exit		Total		P.M. Period	Enter		Exit		Total	
	All	Trucks	All	Trucks	All	Trucks		All	Trucks	All	Trucks	All	Trucks
12:00-12:15							12:00-12:15			3		3	
12:15-12:30							12:15-12:30	7		4		11	
12:30-12:45							12:30-12:45	8		9		17	
12:45-1:00							12:45-1:00	12		2		14	
1:00-1:15							1:00-1:15	10		8		18	
1:15-1:30							1:15-1:30	7		8		15	
1:30-1:45							1:30-1:45	5		4		9	
1:45-2:00							1:45-2:00	6		10		16	
2:00-2:15							2:00-2:15	2		6		8	
2:15-2:30							2:15-2:30	10		10		20	
2:30-2:45							2:30-2:45	3		11		14	
2:45-3:00							2:45-3:00	7		4		11	
3:00-3:15							3:00-3:15	10		5		15	
3:15-3:30							3:15-3:30	5		9		14	
3:30-3:45							3:30-3:45	4		3		7	
3:45-4:00							3:45-4:00	8		5		13	
4:00-4:15							4:00-4:15	6		3		9	
4:15-4:30							4:15-4:30	6		11		17	
4:30-4:45							4:30-4:45	10		10		20	
4:45-5:00							4:45-5:00	10		8		18	
5:00-5:15							5:00-5:15	3		5		8	
5:15-5:30							5:15-5:30	8		4		12	
5:30-5:45							5:30-5:45	8		8		16	
5:45-6:00							5:45-6:00	5		3		8	
6:00-6:15							6:00-6:15	7	1	5	1	12	2
6:15-6:30							6:15-6:30	2		10		12	
6:30-6:45							6:30-6:45	2		10		12	
6:45-7:00							6:45-7:00	3		7		10	
7:00-7:15	2				2		7:00-7:15						
7:15-7:30			1		1		7:15-7:30						
7:30-7:45			1		1		7:30-7:45						
7:45-8:00	1		1		2		7:45-8:00						
8:00-8:15	2		2		4		8:00-8:15						
8:15-8:30	3		1		4		8:15-8:30						
8:30-8:45	3		2		5		8:30-8:45						
8:45-9:00	2		4		6		8:45-9:00						
9:00-9:15	2		1		3		9:00-9:15						
9:15-9:30	2		2		4		9:15-9:30						
9:30-9:45	12		1		13		9:30-9:45						
9:45-10:00	7		4		11		9:45-10:00						
10:00-10:15	2		1		3		10:00-10:15						
10:15-10:30	4		1		5		10:15-10:30						
10:30-10:45	10		3		13		10:30-10:45						
10:45-11:00	2		5		7		10:45-11:00						
11:00-11:15	6		7		13		11:00-11:15						
11:15-11:30	7		5		12		11:15-11:30						
11:30-11:45	7		4		11		11:30-11:45						
11:45-12:00	3		4		7		11:45-12:00						

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Trip Generation Data Form (Part 4)

Attachment E
Traffic Impact Analysis

Summary of Bicycle Volumes

	Average Weekday (M-F)			Saturday			Sunday		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
12-Hour Volume ~~X~~-Hour Volume 7 AM - 7 PM							29	18	47
A.M. Peak Hour of Adjacent Street Traffic (7 – 9) Time:									
P.M. Peak Hour of Adjacent[1] Street Traffic (4 – 6) Time:									
A.M. Peak Hour Generator[2] Time:									
P.M. Peak Hour Generator[2] Time:									
Peak Hour Generator[3] Time (Weekend): 6 PM - 7 PM							5	2	7

[1] Highest hourly volume between 7 a.m. and 9 a.m. (4 p.m. and 6 p.m.) as defined in Trip Generation Data Form (Part 2). Please specify the peak hour.
[2] Highest hourly volume during the a.m. or p.m. period. Please specify the peak hour.
[3] Highest hourly volume during the entire day. Please specify the peak hour. Please attach supplemental hourly volumes.
Please refer to the *Trip Generation User's Guide* for full definition of terms.

Summary of Pedestrian Volumes

	Average Weekday (M-F)			Saturday			Sunday		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
12-Hour Volume ~~X~~-Hour Volume 7 AM - 7 PM							211	128	339
A.M. Peak Hour of Adjacent Street Traffic (7 – 9) Time:									
P.M. Peak Hour of Adjacent[1] Street Traffic (4 – 6) Time:									
A.M. Peak Hour Generator[2] Time:									
P.M. Peak Hour Generator[2] Time:									
Peak Hour Generator[3] Time (Weekend): 1 PM - 2 PM							29	17	46

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Institute of Transportation Engineers

Trip Generation Data Form (Part 1)

Land Use/Building Type:[1] Public Park	ITE Land Use Code: 411
Source: ITE Trip Generation Manual 11th Edition	Source No. (*ITE use only*):
Name of Development: Santa Rosa Park	Day of the Week: Wednesday
City: San Luis Obispo State/Province: CA Zip/Postal Code: 90029	Day: 8 Month: February Year: 2023
Country: USA	Metropolitan Area: San Luis Obispo-Paso Robles

1. For fast-food land use, please specify if hamburger- or nonhamburger-based.

Location Within Area:

- ☐ (1) CBD
- ☒ (2) Urban (Non-CBD)
- ☐ (3) Suburban (Non-CBD)
- ☐ (4) Suburban CBD
- ☐ (5) Rural
- ☐ (6) Freeway Interchange Area (Rural)
- ☐ (7) Not Given

Independent Variable: (include data for as many as possible)[2]	Actual	Estimated
_____ (1) Employees (#)	☐	☐
_____ (2) Persons (#)	☐	☐
_____ (3) Total Units (#) (indicate unit:_____)	☐	☐
_____ (4) Occupied Units (#) (indicate unit:_____)	☐	☐
_____ (5) Gross Floor Area (gross sq. ft.)	☐	☐
(% of development occupied _____)		
_____ (6) Net Rentable Area (sq. ft.)	☐	☐
_____ (7) Gross Leasable Area (sq. ft.)	☐	☐
(% of development occupied _____)		
9.98 (8) Total Acres (% developed: _____)	☐	☒
132 (9) Parking Spaces (% occupied: _____)	☒	☐
_____ (10) Beds (% occupied: _____)	☐	☐
_____ (11) Seats (#)	☐	☐
_____ (12) Servicing Positions/Vehicle Fueling Positions	☐	☐
_____ (13) Shopping Center % Out-parcels/pads	☐	☐
_____ (14) A.M. Peak Hour Volume of Adjacent Street Traffic	☐	☐
_____ (15) P.M. Peak Hour Volume of Adjacent Street Traffic	☐	☐
_____ (16) Other _____	☐	☐
_____ (17) Other _____	☐	☐

Detailed Description of Development:[3]

Public Park, located within an urban area, with ample amounts of amenities. Amenities include large grass fields, picnic areas, playground facilities, basketball courts, softball fields, a large skate park, roller sport field, and various paved walking paths throughout Santa Rosa Park.

2. Definitions for several independent variables can be found in the *Trip Generation,* Second Edition, *User's Guide* Glossary.

3. Please provide all pertinent information to describe the subject project, including the presence of bicycle/pedestrian facilities. To report bicycle/pedestrian volumes, please refer to Part 4 of this data form.

Other Data:

Vehicle Occupancy (#):
_____ A.M. _____ P.M. _____ 24-hour %

Percent by Transit:
_____ A.M. % _____ P.M. % _____ 24-hour %

Percent by Carpool/Vanpool:
_____ A.M. % _____ P.M. % _____ 24-hour %

Employees by Shift:

	Start Time	End Time	Employees (#)
First Shift:	_____	_____	_____
Second Shift:	_____	_____	_____
Third Shift:	_____	_____	_____

Parking Cost on Site: Hourly _____ Daily _____

Transportation Demand Management (TDM) Information:

At the time of this study, was there a TDM program (that may have impacted the trip generation characteristics of this site) underway?

☒ No

☐ Yes (If yes, please check appropriate box/boxes, describe the nature of the TDM program(s) and provide a source for any studies that may help quantify this impact. Attach additional sheets if necessary)

- ☐ (1) Transit Service
- ☐ (2) Carpool Programs
- ☐ (3) Vanpool Programs
- ☐ (4) Bicycle/Pedestrian Facilities and Site Improvements
- ☐ (5) Employer Support Measures
- ☐ (6) Preferential HOV Treatments
- ☐ (7) Transit and Ridesharing Incentives
- ☐ (8) Parking Supply and Pricing Management
- ☐ (9) Tolls and Congestion Pricing
- ☐ (10) Variable Work Hours/Compressed Work Weeks
- ☐ (11) Telecommuting
- ☐ (12) Other _____

Please Complete Form on Other Side

Institute of Transportation Engineers

Trip Generation Data Form (Part 2)

Attachment E
Traffic Impact Analysis

Summary of Driveway Volumes ***(All = All Vehicles Counted, Including Trucks; Trucks = Heavy Duty Trucks and Buses)***

	Average Weekday (M-F)						Saturday						Sunday					
	Enter		Exit		Total		Enter		Exit		Total		Enter		Exit		Total	
	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks
12-Hour Volume ~~X~~ Hour Volume 7 AM - 7 PM	278	7	255	4	544	11												
A.M. Peak Hour of Adjacent Street Traffic (7 – 9) Time:																		
P.M. Peak Hour of Adjacent[1] Street Traffic (4 – 6) Time:																		
A.M. Peak Hour Generator[2] Time: 11 AM - 12 PM	25	0	31	0	56	0												
P.M. Peak Hour Generator[2] Time: 1 PM - 2 PM	25	0	42	0	67	0												
Peak Hour Generator[3] Time (Weekend):																		

[1] **Highest hourly volume between 7 a.m. and 9 a.m. (4 p.m. and 6 p.m.). Please specify the peak hour.**
[2] **Highest hourly volume during the a.m. or p.m. period. Please specify the peak hour.**
[3] **Highest hourly volume during the entire day. Please specify the peak hour.**
Please refer to the *Trip Generation User's Guide* for full definition of terms.

Hourly Driveway Volumes- Average Weekday (M-F)

A.M. Period	Enter		Exit		Total		Mid-Day Period	Enter		Exit		Total		P.M. Period	Enter		Exit		Total	
	All	Trucks	All	Trucks	All	Trucks		All	Trucks	All	Trucks	All	Trucks		All	Trucks	All	Trucks	All	Trucks
6:00-7:00							11:00-12:00	16		11		27		3:00-4:00	26		26	1	52	1
6:15-7:15							11:15-12:15	22		14		36		3:15-4:15	25		33	1	58	1
6:30-7:30							11:30-12:30	23		19		42		3:30-4:30	25		31		56	
6:45-7:45							11:45-12:45	23	1	16		39	1	3:45-4:45	20		19		39	
7:00-8:00	8		5		13		12:00-1:00	25	1	15		40	1	4:00-5:00	21		19		40	
7:15-8:15	14		5		19		12:15-1:15	22	1	14		36	1	4:15-5:15	26		16		42	
7:30-8:30	13		6		19		12:30-1:30	22	1	7		29	1	4:30-5:30	25		17		42	
7:45-8:45	16		3		19		12:45-1:45	25		12	1	37	1	4:45-5:45	23		30		53	
8:00-9:00	18		9		27		1:00-2:00	30		25	1	55	1	5:00-6:00	26		35		61	

☒ **Check if Part 3, 4 and/or additional information is attached.**

Survey conducted by: Name: Ana Micano
Organization: Cal Poly SLO ITE
Address: 1 Grand Ave.
City/State/Zip: San Luis Obispo, CA 93405
Telephone #: (805) 206-5576 Fax #: N/A E-mail: amicano@calpoly.edu

Please return to: Institute of Transportation Engineers
Technical Projects Division
1099 14th Street, NW, Suite 300 West
Washington, DC 20005-3438 USA
Telephone: +1 202-289-0222
Fax: +1 202-289-7722
ITE on the Web: www.ite.org

Attachment E
Traffic Impact Analysis

Institute of Transportation Engineers

Trip Generation Data Form (Part 3)

Name/Organization: Cal Poly SLO ITE **City/State:** San Luis Obispo, CA

Telephone Number: (805) 206-5576

Detailed Driveway Volumes: Attach this sheet to Parts 1 and 2 if you are providing additional information.

Day of the week: Wednesday

(All = All Vehicles Counted, Including Trucks; Trucks = Heavy Duty Trucks and Buses)

A.M. Period	Enter		Exit		Total		P.M. Period	Enter		Exit		Total	
	All	Trucks	All	Trucks	All	Trucks		All	Trucks	All	Trucks	All	Trucks
12:00-12:15							12:00-12:15	6		2		8	
12:15-12:30							12:15-12:30	3		4		7	
12:30-12:45							12:30-12:45	11		4		15	
12:45-1:00							12:45-1:00	5		7		12	
1:00-1:15							1:00-1:15	4		15		19	
1:15-1:30							1:15-1:30	6		9		15	
1:30-1:45							1:30-1:45	11		10		21	
1:45-2:00							1:45-2:00	4		8		12	
2:00-2:15							2:00-2:15	6		10		16	
2:15-2:30							2:15-2:30	5		6		11	
2:30-2:45							2:30-2:45	4		6		10	
2:45-3:00							2:45-3:00	7		7		14	
3:00-3:15							3:00-3:15	6	1	4		10	1
3:15-3:30							3:15-3:30	15	2	7	2	22	4
3:30-3:45							3:30-3:45	8	1	7	1	15	2
3:45-4:00							3:45-4:00	5		8		13	
4:00-4:15							4:00-4:15	6		7		13	
4:15-4:30							4:15-4:30	11		8		19	
4:30-4:45							4:30-4:45	9		6		15	
4:45-5:00							4:45-5:00	5		6		11	
5:00-5:15							5:00-5:15	7	1	4		11	1
5:15-5:30							5:15-5:30	8		5		13	
5:30-5:45							5:30-5:45	7		8		15	
5:45-6:00							5:45-6:00	5	1	6		11	1
6:00-6:15							6:00-6:15	3		7		10	
6:15-6:30							6:15-6:30	4		2		6	
6:30-6:45							6:30-6:45	3		7		10	
6:45-7:00							6:45-7:00	5		2		7	
7:00-7:15					0		7:00-7:15						
7:15-7:30	4				4		7:15-7:30						
7:30-7:45	3		5		8		7:30-7:45						
7:45-8:00	1				1		7:45-8:00						
8:00-8:15	6				6		8:00-8:15						
8:15-8:30	3		1		4		8:15-8:30						
8:30-8:45	6		2		8		8:30-8:45						
8:45-9:00	3		6		9		8:45-9:00						
9:00-9:15	4		2		6		9:00-9:15						
9:15-9:30	9		4		13		9:15-9:30						
9:30-9:45	7		7		14		9:30-9:45						
9:45-10:00	3	1	3		6	1	9:45-10:00						
10:00-10:15	6		1		7		10:00-10:15						
10:15-10:30	6		3		9		10:15-10:30						
10:30-10:45	7				7		10:30-10:45						
10:45-11:00	6		8	1	14	1	10:45-11:00						
11:00-11:15	11		14		25		11:00-11:15						
11:15-11:30	2		4		6		11:15-11:30						
11:30-11:45	6		7		13		11:30-11:45						
11:45-12:00	6		6		12		11:45-12:00						

Attachment E
Traffic Impact Analysis

Institute of Transportation Engineers

Trip Generation Data Form (Part 1)

Land Use/Building Type:[1] Public Park	ITE Land Use Code: 411
Source: ITE Trip Generation Manual 11th Edition	Source No. (*ITE use only*):
Name of Development: Santa Rosa Park	Day of the Week: Saturday
City: San Luis Obispo State/Province: CA Zip/Postal Code: 90029	Day: 11 Month: February Year: 2023
Country: USA	Metropolitan Area: San Luis Obispo-Paso Robles

1. For fast-food land use, please specify if hamburger- or nonhamburger-based.

Location Within Area:

- ☐ (1) CBD
- ☒ (2) Urban (Non-CBD)
- ☐ (3) Suburban (Non-CBD)
- ☐ (4) Suburban CBD
- ☐ (5) Rural
- ☐ (6) Freeway Interchange Area (Rural)
- ☐ (7) Not Given

Independent Variable: (include data for as many as possible)[2]	Actual	Estimated
_____ (1) Employees (#)	☐	☐
_____ (2) Persons (#)	☐	☐
_____ (3) Total Units (#) (indicate unit:_____)	☐	☐
_____ (4) Occupied Units (#) (indicate unit:_____)	☐	☐
_____ (5) Gross Floor Area (gross sq. ft.)	☐	☐
(% of development occupied _____)		
_____ (6) Net Rentable Area (sq. ft.)	☐	☐
_____ (7) Gross Leasable Area (sq. ft.)	☐	☐
(% of development occupied _____)		
9.98 (8) Total Acres (% developed: _____)	☐	☒
132 (9) Parking Spaces (% occupied: _____)	☒	☐
_____ (10) Beds (% occupied: _____)	☐	☐
_____ (11) Seats (#)	☐	☐
_____ (12) Servicing Positions/Vehicle Fueling Positions	☐	☐
_____ (13) Shopping Center % Out-parcels/pads	☐	☐
_____ (14) A.M. Peak Hour Volume of Adjacent Street Traffic	☐	☐
_____ (15) P.M. Peak Hour Volume of Adjacent Street Traffic	☐	☐
_____ (16) Other _____	☐	☐
_____ (17) Other _____	☐	☐

Detailed Description of Development:[3]

Public Park, located within an urban area, with ample amounts of amenities. Amenities include large grass fields, picnic areas, playground facilities, basketball courts, softball fields, a large skate park, roller sport field, and various paved walking paths throughout Santa Rosa Park.

2. Definitions for several independent variables can be found in the *Trip Generation,* Second Edition, *User's Guide* Glossary.

3. Please provide all pertinent information to describe the subject project, including the presence of bicycle/pedestrian facilities. To report bicycle/pedestrian volumes, please refer to Part 4 of this data form.

Other Data:

Vehicle Occupancy (#):
_____ A.M. _____ P.M. _____ 24-hour %

Percent by Transit:
_____ A.M. % _____ P.M. % _____ 24-hour %

Percent by Carpool/Vanpool:
_____ A.M. % _____ P.M. % _____ 24-hour %

Employees by Shift:

	Start Time	End Time	Employees (#)
First Shift:	_____	_____	_____
Second Shift:	_____	_____	_____
Third Shift:	_____	_____	_____

Parking Cost on Site: Hourly _____ Daily _____

Transportation Demand Management (TDM) Information:

At the time of this study, was there a TDM program (that may have impacted the trip generation characteristics of this site) underway?

☒ No

☐ Yes (If yes, please check appropriate box/boxes, describe the nature of the TDM program(s) and provide a source for any studies that may help quantify this impact. Attach additional sheets if necessary)

- ☐ (1) Transit Service
- ☐ (2) Carpool Programs
- ☐ (3) Vanpool Programs
- ☐ (4) Bicycle/Pedestrian Facilities and Site Improvements
- ☐ (5) Employer Support Measures
- ☐ (6) Preferential HOV Treatments
- ☐ (7) Transit and Ridesharing Incentives
- ☐ (8) Parking Supply and Pricing Management
- ☐ (9) Tolls and Congestion Pricing
- ☐ (10) Variable Work Hours/Compressed Work Weeks
- ☐ (11) Telecommuting
- ☐ (12) Other _____

Please Complete Form on Other Side

Institute of Transportation Engineers

Trip Generation Data Form (Part 2)

Attachment E
Traffic Impact Analysis

Summary of Driveway Volumes ***(All = All Vehicles Counted, Including Trucks; Trucks = Heavy Duty Trucks and Buses)***

	Average Weekday (M-F)						Saturday						Sunday					
	Enter		Exit		Total		Enter		Exit		Total		Enter		Exit		Total	
	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks	All	Trucks
12-Hour Volume							199	7	191	3	390	10						
X Hour Volume 7 AM - 7 PM																		
A.M. Peak Hour of Adjacent Street Traffic (7 – 9) Time:																		
P.M. Peak Hour of Adjacent[1] Street Traffic (4 – 6) Time:																		
A.M. Peak Hour Generator[2] Time:																		
P.M. Peak Hour Generator[2] Time:																		
Peak Hour Generator[3] Time (Weekend): 5 PM - 6 PM							22	0	28	0	50	0						

[1.] **Highest hourly volume between 7 a.m. and 9 a.m. (4 p.m. and 6 p.m.). Please specify the peak hour.**
[2.] **Highest hourly volume during the a.m. or p.m. period. Please specify the peak hour.**
[3.] **Highest hourly volume during the entire day. Please specify the peak hour.**
Please refer to the *Trip Generation User's Guide* for full definition of terms.

Hourly Driveway Volumes- Average Weekday (M-F)

A.M. Period	Enter		Exit		Total		Mid-Day Period	Enter		Exit		Total		P.M. Period	Enter		Exit		Total	
	All	Trucks	All	Trucks	All	Trucks		All	Trucks	All	Trucks	All	Trucks		All	Trucks	All	Trucks	All	Trucks
6:00-7:00							11:00-12:00							3:00-4:00						
6:15-7:15							11:15-12:15							3:15-4:15						
6:30-7:30							11:30-12:30							3:30-4:30						
6:45-7:45							11:45-12:45							3:45-4:45						
7:00-8:00							12:00-1:00							4:00-5:00						
7:15-8:15							12:15-1:15							4:15-5:15						
7:30-8:30							12:30-1:30							4:30-5:30						
7:45-8:45							12:45-1:45							4:45-5:45						
8:00-9:00							1:00-2:00							5:00-6:00						

X **Check if Part 3, 4 and/or additional information is attached.**

Survey conducted by: Name: Ana Micano
Organization: Cal Poly SLO ITE
Address: 1 Grand Ave.
City/State/Zip: San Luis Obispo, CA 93405
Telephone #: (805) 206-5576 Fax #: N/A E-mail: amicano@calpoly.edu

Please return to: Institute of Transportation Engineers
Technical Projects Division
1099 14th Street, NW, Suite 300 West
Washington, DC 20005-3438 USA
Telephone: +1 202-289-0222
Fax: +1 202-289-7722
ITE on the Web: www.ite.org

Attachment E
Traffic Impact Analysis

Institute of Transportation Engineers

Trip Generation Data Form (Part 3)

Name/Organization: Cal Poly SLO ITE **City/State:** San Luis Obispo, CA

Telephone Number: (805) 206-5576

Detailed Driveway Volumes: Attach this sheet to Parts 1 and 2 if you are providing additional information.

Day of the week: _____ ***(All = All Vehicles Counted, Including Trucks; Trucks = Heavy Duty Trucks and Buses)***

A.M. Period	Enter		Exit		Total		P.M. Period	Enter		Exit		Total	
	All	Trucks	All	Trucks	All	Trucks		All	Trucks	All	Trucks	All	Trucks
12:00-12:15							12:00-12:15	4		3		7	
12:15-12:30							12:15-12:30	6		6		12	
12:30-12:45							12:30-12:45	3		7		10	
12:45-1:00							12:45-1:00	7		9		16	
1:00-1:15							1:00-1:15	1		2		3	
1:15-1:30							1:15-1:30	2		2		4	
1:30-1:45							1:30-1:45	3		4		7	
1:45-2:00							1:45-2:00	5		3		8	
2:00-2:15							2:00-2:15	6		1		7	
2:15-2:30							2:15-2:30	6		4		10	
2:30-2:45							2:30-2:45	4		1		5	
2:45-3:00							2:45-3:00	6		2		8	
3:00-3:15							3:00-3:15	1		4		5	
3:15-3:30							3:15-3:30	5		3		8	
3:30-3:45							3:30-3:45	3		8		11	
3:45-4:00							3:45-4:00	5		1		6	
4:00-4:15							4:00-4:15	10		2		12	
4:15-4:30							4:15-4:30	2		5		7	
4:30-4:45							4:30-4:45	3		4		7	
4:45-5:00							4:45-5:00	3		3		6	
5:00-5:15							5:00-5:15	1				1	
5:15-5:30							5:15-5:30	6		2		8	
5:30-5:45							5:30-5:45	9		13		22	
5:45-6:00							5:45-6:00	6		3		9	
6:00-6:15							6:00-6:15	2		6		8	
6:15-6:30							6:15-6:30			3		3	
6:30-6:45							6:30-6:45	2		1		3	
6:45-7:00							6:45-7:00	6		5		11	
7:00-7:15	2		1		3		7:00-7:15						
7:15-7:30			2		2		7:15-7:30						
7:30-7:45	4		2		6		7:30-7:45						
7:45-8:00			2		2		7:45-8:00						
8:00-8:15	3	2			3	2	8:00-8:15						
8:15-8:30	2		3	2	5	2	8:15-8:30						
8:30-8:45	7	1	1		8	1	8:30-8:45						
8:45-9:00	12	3	1		13	3	8:45-9:00						
9:00-9:15	5		1		6		9:00-9:15						
9:15-9:30	4		5		9		9:15-9:30						
9:30-9:45	2		4		6		9:30-9:45						
9:45-10:00	3		12		15		9:45-10:00						
10:00-10:15	3		3		6		10:00-10:15						
10:15-10:30	6		10		16		10:15-10:30						
10:30-10:45	4		5		9		10:30-10:45						
10:45-11:00	3		3		6		10:45-11:00						
11:00-11:15	4		3		7		11:00-11:15						
11:15-11:30	5	1	4		9	1	11:15-11:30						
11:30-11:45	8		13		21		11:30-11:45						
11:45-12:00	5		9	1	14	1	11:45-12:00						

Institute of Transportation Engineers

Trip Generation Data Form (Part 4)

Attachment E
Traffic Impact Analysis

Summary of Bicycle Volumes

	Average Weekday (M-F)			Saturday			Sunday		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
12-Hour Volume ~~X~~-Hour Volume 7 AM - 7 PM				26	28	54			
A.M. Peak Hour of Adjacent Street Traffic (7 – 9) Time:									
P.M. Peak Hour of Adjacent[1] Street Traffic (4 – 6) Time:									
A.M. Peak Hour Generator[2] Time:									
P.M. Peak Hour Generator[2] Time:									
Peak Hour Generator[3] Time (Weekend): 8 AM - 9 AM				7	3	10			

[1] Highest hourly volume between 7 a.m. and 9 a.m. (4 p.m. and 6 p.m.) as defined in Trip Generation Data Form (Part 2). Please specify the peak hour.
[2] Highest hourly volume during the a.m. or p.m. period. Please specify the peak hour.
[3] Highest hourly volume during the entire day. Please specify the peak hour. Please attach supplemental hourly volumes.
Please refer to the *Trip Generation User's Guide* for full definition of terms.

Summary of Pedestrian Volumes

	Average Weekday (M-F)			Saturday			Sunday		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
12-Hour Volume ~~X~~-Hour Volume 7 AM - 7 PM				125	72	197			
A.M. Peak Hour of Adjacent Street Traffic (7 – 9) Time:									
P.M. Peak Hour of Adjacent[1] Street Traffic (4 – 6) Time:									
A.M. Peak Hour Generator[2] Time:									
P.M. Peak Hour Generator[2] Time:									
Peak Hour Generator[3] Time (Weekend): 2 PM - 3 PM				20	10	30			

Survey conducted by: Name: Ana Micano
Organization: Cal Poly SLO ITE
Address: 1 Grand Ave.
City/State/Zip: San Luis Obispo, CA 93405
Telephone #: (805) 206-5576 Fax #: N/A E-mail: amicano@calpoly.edu

Please return to: Institute of Transportation Engineers
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1099 14th Street, NW, Suite 300 West
Washington, DC 20005-3438 USA
Telephone: +1 202-289-0222
Fax: +1 202-289-7722
ITE on the Web: www.ite.org

Parking Demand Survey Form

Institute of Transportation Engineers

*(fill in all highlighted cells - * are required data)*

			Land Use Code*	411		
			Name of Site	Santa Rosa Park		
			Brief Description of Site			
Transit*	Yes		Public Park			
Area*	SUB		**City**	San Luis Obispo		
TMP*	No		**State**	CA	**Country**	USA
Parking Price*	$ -		Daily Rate	$	Hourly Rate	

Site Size*	**9.98**	**Units**	Acres	**Occupancy***		**Land Use**
Site Size		**Units**		**Occupancy**		
Site Size		**Units**		**Occupancy**		
Site Size		**Units**		**Occupancy**		

Number of Parking Spaces Provided at Site 132

Highest Observed Parking Demand for the following hours of the day *(hour beginning)**

Date	2/5/2023	2/8/0203	2/11/2023				
Day	Sunday	Wednesday	Saturday				
12 Mid							
1:00 AM							
2:00 AM							
3:00 AM							
4:00 AM							
5:00 AM							
6:00 AM							
7:00 AM	6	26	11				
8:00 AM	9	31	23				
9:00 AM	27	34	34				
10:00 AM	30	43	35				
11:00 AM	35	50	36				
12 Noon	40	43	19				
1:00 PM	40	52	9				
2:00 PM	29	43	19				
3:00 PM	26	33	18				
4:00 PM	25	38	22				
5:00 PM	30	38	23				
6:00 PM	31	36	17				
7:00 PM							
8:00 PM							
9:00 PM							
10:00 PM							
11:00 PM							

Person	Ana Micano	**Organization**	Cal Poly SLO ITE
Phone	(805) 206-5576		
Fax			
Email	amiciano@calpoly.edu		
Notes			

Enter data on the web at www.ite.org

Comments to: ite_staff@ite.org

IF not entered on web site, please mail to:

Institute of Transportation Engineers, 1627 Eye Street, NW Suite 600; Washington, DC 20006

Form version 1.4

* DON'T COUNT PASS-THROUGHS *

DO COUNT PEDS WALKING THRU

2023 Cal Poly ITE Data Collection Project - Trip Generation Tally

Site: Santa Rosa Park
Date: 2/05/2023
People:

Please tally up number of vehicles, bikes and pedestrians entering and exiting here. Fill out the ITE Trip Generation Data Form using by counting up the total number of tallies here.

	Time	Vehicles		Bikes		Pedestrians		Trucks		Notes
		Entering	Exiting	Entering	Exiting	Entering	Exiting	Entering	Exiting	
AM	7:00 - 7:15	2				1				
	7:15 - 7:30		1			1	2			
	7:30 - 7:45		1			1	2			
	7:45 - 8:00	1	1			1	2			
	8:00 - 8:15	2	2	1						
	8:15 - 8:30	3	2		1	2				
	8:30 - 8:45	3	2			4	3			skateboards & rollerboard engaged
	8:45 - 9:00	2				3	3			
	9:00 - 9:15	2	1	1	1	3	3			
	9:15 - 9:30	2	1		1	3	3			
	9:30 - 9:45	6	1	1	1	1				
	9:45 - 10:00	5	4							
	10:00 - 10:15	2	1	3	1	2	2			
	10:15 - 10:30	4	1			2	2			
	10:30 - 10:45	5	2			3	3			
	10:45 - 11:00	2	3			3	3			roller derby
	11:00 - 11:15	3	4			3	2			
	11:15 - 11:30	3	4			3	2			
	11:30 - 11:45	3	4			3	3			
	11:45 - 12:00	3	4	1		3	4			
PM	12:00 - 12:15		3			4	4			
	12:15 - 12:30	4	3	1		4	4			
	12:30 - 12:45	4	4	1		4	4			
	12:45 - 1:00	4	3		1	4	4			
	1:00 - 1:15	4	4			4	4			
	1:15 - 1:30	4	4	2		4	5			
	1:30 - 1:45	4	4			4	5			
	1:45 - 2:00	4	5			4	5			
	2:00 - 2:15	2	4	1		4	5			
	2:15 - 2:30	5	5			5	5			
	2:30 - 2:45	5	6		1	5	5			
	2:45 - 3:00	5	6		1	5	5			
	3:00 - 3:15	5	5			5	5			
	3:15 - 3:30	4	4			5	5			
	3:30 - 3:45	4	4	1		5	5			
	3:45 - 4:00	4	4			5	5			
	4:00 - 4:15	4	4			5	5			
	4:15 - 4:30	4	4	1		5	5			
	4:30 - 4:45	4	4			5	5			
	4:45 - 5:00	4	4	1		5	5			
	5:00 - 5:15	4	4	1		5	5			
	5:15 - 5:30	4	4	1		5	5			
	5:30 - 5:45	4	4			5	5			
	5:45 - 6:00	4	4			5	5			
	6:00 - 6:15	4	4			5	5	1	1	
	6:15 - 6:30	4	4	1		5	5			
	6:30 - 6:45	3	4	1		5	5			
	6:45 - 7:00	3	4			5	5			

7am - 7pm
Covers BULK of Trip Generation

Truck parked waiting to deliver gas

DON'T COUNT PASSTHROUGHS
Vehicles

2023 Cal Poly ITE Data Collection Project - Trip Generation Tally

Site: Santa Rosa Park
Date: 2/8/2023
People:

Please tally up number of vehicles, bikes and pedestrians entering and exiting here. Fill out the ITE Trip Generation Data Form using by counting up the total number of tallies here.

	Time	Vehicles		Bikes		Pedestrians		Trucks		Notes
		Entering	Exiting	Entering	Exiting	Entering	Exiting	Entering	Exiting	
AM	7:00 - 7:15									People parked and left park on foot/ motor bikes
	7:15 - 7:30									
	7:30 - 7:45									
	7:45 - 8:00									
	8:00 - 8:15									
	8:15 - 8:30									
	8:30 - 8:45									
	8:45 - 9:00									backhoe
	9:00 - 9:15									
	9:15 - 9:30									- 1 entering & exiting bike is a scooter
	9:30 - 9:45									- 1 motorbike = scooter
	9:45 - 10:00									- 1 ped each = skateboard
	10:00 - 10:15									
	10:15 - 10:30									
	10:30 - 10:45									
	10:45 - 11:00									
	11:00 - 11:15									kids are picked up / dropped off by parents
	11:15 - 11:30									
	11:30 - 11:45									
	11:45 - 12:00									
PM	12:00 - 12:15									
	12:15 - 12:30									
	12:30 - 12:45									
	12:45 - 1:00									
	1:00 - 1:15									Moped
	1:15 - 1:30									
	1:30 - 1:45									one wheel (ped) 2
	1:45 - 2:00									
	2:00 - 2:15									Night van
	2:15 - 2:30									
	2:30 - 2:45									walked to park
	2:45 - 3:00									
	3:00 - 3:15									
	3:15 - 3:30									
	3:30 - 3:45									
	3:45 - 4:00									
	4:00 - 4:15									
	4:15 - 4:30									
	4:30 - 4:45									
	4:45 - 5:00									
	5:00 - 5:15									
	5:15 - 5:30									
	5:30 - 5:45									
	5:45 - 6:00									
	6:00 - 6:15									
	6:15 - 6:30									
	6:30 - 6:45									3.15 bus drop off - kids walked home
	6:45 - 7:00									

Truck pulls in to wait

DON'T COUNT PASSTHROUGHS

Attachment E
Traffic Impact Analysis

2023 Cal Poly ITE Data Collection Project - Trip Generation Tally

Site: Santa Rosa Park
Date: 2/11/2023
People:

Please tally up number of vehicles, bikes and pedestrians entering and exiting here. Fill out the ITE Trip Generation Data Form using by counting up the total number of tallies here.

	Time	Vehicles		Bikes		Pedestrians		Trucks		Notes
		Entering	Exiting	Entering	Exiting	Entering	Exiting	Entering	Exiting	
AM	7:00 - 7:15	2	1			3	1			
	7:15 - 7:30		2			3	3			
	7:30 - 7:45	4	2			1				
	7:45 - 8:00		2			2	2			
	8:00 - 8:15	1		1		1		2		
	8:15 - 8:30	2	1	2		3	1		2	
	8:30 - 8:45	3	1	2		3	1	1		
	8:45 - 9:00	5	1	2		3		3		
	9:00 - 9:15	4	1	1		2	3			Soccer practice, lots of people coming, hard to count
	9:15 - 9:30	3	3			1	1			Started raining @ 9:50
	9:30 - 9:45	2	2	3		1	2			
	9:45 - 10:00	1	5					1		* LOTS OF CARS JUST DROPPING FAMILY
	10:00 - 10:15	2	3			3				
	10:15 - 10:30	4	7			4	2			
	10:30 - 10:45	3	4							
	10:45 - 11:00	3	3							
	11:00 - 11:15	4	3	2	1	3				
	11:15 - 11:30	3	3			1		1		
	11:30 - 11:45	5	6			1			1	
	11:45 - 12:00	4	6			2			1	
PM	12:00 - 12:15	3	4			3	2			
	12:15 - 12:30	4	5			4	3			
	12:30 - 12:45	3	4	1	1	3	3			
	12:45 - 1:00	4	7			4	4			
	1:00 - 1:15	1	2		1	2	3			
	1:15 - 1:30	2	3	1	1	2	3			
	1:30 - 1:45	3	3			3	4			
	1:45 - 2:00	4	2			5	4			
	2:00 - 2:15	4	3			4	4			
	2:15 - 2:30	4	3	1	1	3	4			
	2:30 - 2:45	4	2	1		3	1			
	2:45 - 3:00	3	3		1	3	3			
	3:00 - 3:15	1	3			3	3			
	3:15 - 3:30	3	3	1	2	3	3			
	3:30 - 3:45	3	4			3	3			
	3:45 - 4:00	3	2		1	3	3			
	4:00 - 4:15	5	2			3	3			
	4:15 - 4:30	2	3			2	2			
	4:30 - 4:45	3	3	2		1	1			
	4:45 - 5:00	3	3			2	1			
	5:00 - 5:15	1	1	1	1	1	1			
	5:15 - 5:30	5	5	1		2	2			
	5:30 - 5:45	4	5			2	2			
	5:45 - 6:00	3	4	1	1	2	1			
	6:00 - 6:15	1	3	1			1			
	6:15 - 6:30	1	2	1						
	6:30 - 6:45	2	2							
	6:45 - 7:00	2	2							

Me Started showering, (5) 7:00

Pickup / Drop off shake @ 5

2023 Cal Poly ITE Data Collection Project - Parking Demand Tally

Site: Santa Rosa Park
Date: 2/05/2023
People:

Please tally up number of vehicles, bikes and pedestrians entering and exiting here. Fill out the ITE Trip Generation Data Form using by counting up the total number of tallies here.

* COUNT RV AS TWO SPOTS *
↳ use tally marks or #
↳ Oversize Vehicles / Trailers

	Time	Parking Demand	Notes
AM	7:00 - 7:15	6	
	7:15 - 7:30	6	
	7:30 - 7:45	5	
	7:45 - 8:00	4	
	8:00 - 8:15	4	
	8:15 - 8:30	7	
	8:30 - 8:45	8	
	8:45 - 9:00	9	
	9:00 - 9:15	12	
	9:15 - 9:30	10	
	9:30 - 9:45	25	
	9:45 - 10:00	27	
	10:00 - 10:15	30	
	10:15 - 10:30	30	
	10:30 - 10:45	30	
	10:45 - 11:00	23	
	11:00 - 11:15	25	
	11:15 - 11:30	30	
	11:30 - 11:45	33	
	11:45 - 12:00	35	
PM	12:00 - 12:15	30	
	12:15 - 12:30	31	
	12:30 - 12:45	32	
	12:45 - 1:00	40	
	1:00 - 1:15	38	
	1:15 - 1:30	40	
	1:30 - 1:45	35	
	1:45 - 2:00	34	
	2:00 - 2:15	28	
	2:15 - 2:30	29	
	2:30 - 2:45	21	
	2:45 - 3:00	28	
	3:00 - 3:15	25	
	3:15 - 3:30	23	
	3:30 - 3:45	23	
	3:45 - 4:00	23	
	4:00 - 4:15	24	
	4:15 - 4:30	19	
	4:30 - 4:45	24	
	4:45 - 5:00	25	
	5:00 - 5:15	25	
	5:15 - 5:30	26	
	5:30 - 5:45	26	
	5:45 - 6:00	30	
	6:00 - 6:15	31	
	6:15 - 6:30	27	
	6:30 - 6:45	24	
	6:45 - 7:00	20	

2023 Cal Poly ITE Data Collection Project - Parking Demand Tally

Site: Santa Rosa Park
Date: 2/8/2023
People:

Please tally up number of vehicles, bikes and pedestrians entering and exiting here. Fill out the ITE Trip Generation Data Form using by counting up the total number of tallies here.

COUNT RV / LARGE VEH / TRAILERS AS 2

	Time	Parking Demand	Notes
AM	7:00 - 7:15	20	
	7:15 - 7:30	21	
	7:30 - 7:45	26	
	7:45 - 8:00	24	
	8:00 - 8:15	25	
	8:15 - 8:30	28	
	8:30 - 8:45	31	
	8:45 - 9:00	27	
	9:00 - 9:15	31	
	9:15 - 9:30	30	
	9:30 - 9:45	33	
	9:45 - 10:00	33	
	10:00 - 10:15	34	
	10:15 - 10:30	35	
	10:30 - 10:45	43	
	10:45 - 11:00	42	
	11:00 - 11:15	50	
	11:15 - 11:30	43	
	11:30 - 11:45	41	
	11:45 - 12:00	32	
PM	12:00 - 12:15	41	
	12:15 - 12:30	42	
	12:30 - 12:45	45	
	12:45 - 1:00	52	
	1:00 - 1:15	50	
	1:15 - 1:30	43	
	1:30 - 1:45	43	
	1:45 - 2:00	34	
	2:00 - 2:15	31	
	2:15 - 2:30	33	
	2:30 - 2:45	29	
	2:45 - 3:00	25	
	3:00 - 3:15	31	
	3:15 - 3:30	28	
	3:30 - 3:45	28	
	3:45 - 4:00	28	
	4:00 - 4:15	37	
	4:15 - 4:30	36	
	4:30 - 4:45	39	
	4:45 - 5:00	34	16 acc. by la. pe truck
	5:00 - 5:15	37	16 " "
	5:15 - 5:30	36	16 " "
	5:30 - 5:45	34	
	5:45 - 6:00	32	
	6:00 - 6:15	26	
	6:15 - 6:30	29	
	6:30 - 6:45	24	
	6:45 - 7:00	20	

9 in side

* potential parking #s are college students / from neighboring businesses

2023 Cal Poly ITE Data Collection Project - Parking Demand Tally

Site: Santa Rosa Park
Date: 2/11/2023
People:

Please tally up number of vehicles, bikes and pedestrians entering and exiting here. Fill out the ITE Trip Generation Data Form using by counting up the total number of tallies here.

COUNT RVs / TRAILERS / LARGE VEH AS 2

	Time	Parking Demand	Notes
AM	7:00 - 7:15	10	
	7:15 - 7:30	9	
	7:30 - 7:45	11	
	7:45 - 8:00	9	
	8:00 - 8:15	9	
	8:15 - 8:30	8	
	8:30 - 8:45	11	
	8:45 - 9:00	23	
	9:00 - 9:15	25	
	9:15 - 9:30	30	
	9:30 - 9:45	34	
	9:45 - 10:00	32	
	10:00 - 10:15	26	← parked bus / [illegible]
	10:15 - 10:30	26	* lots of cars coming through parking lot
	10:30 - 10:45	27	
	10:45 - 11:00	35	
	11:00 - 11:15	31	
	11:15 - 11:30	36	
	11:30 - 11:45	28	← bus left
	11:45 - 12:00	16	started raining :(
PM	12:00 - 12:15	19	
	12:15 - 12:30	19	
	12:30 - 12:45	12	
	12:45 - 1:00	13	
	1:00 - 1:15	0	rain! :(
	1:15 - 1:30	4	
	1:30 - 1:45	9	
	1:45 - 2:00	9	
	2:00 - 2:15	16	
	2:15 - 2:30	13	
	2:30 - 2:45	17	
	2:45 - 3:00	19	
	3:00 - 3:15	16	
	3:15 - 3:30	17	
	3:30 - 3:45	13	
	3:45 - 4:00	18	
	4:00 - 4:15	22	
	4:15 - 4:30	19	
	4:30 - 4:45	16	
	4:45 - 5:00	17	
	5:00 - 5:15	19	
	5:15 - 5:30	23	
	5:30 - 5:45	20	
	5:45 - 6:00	22	
	6:00 - 6:15	16	
	6:15 - 6:30	15	
	6:30 - 6:45	16	
	6:45 - 7:00	17	

2024 Existing Peak Hour Intersection Level of Service

HCM 6th Signalized Intersection Summary
1: Bothell Way NE (SR 522) & NE 170th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	82	22	52	7	18	19	59	1694	4	21	1316	16
Future Volume (veh/h)	82	22	52	7	18	19	59	1694	4	21	1316	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	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1750	1750	1723	1723	1723	1736	1736	1736	1723	1723	1723
Adj Flow Rate, veh/h	85	23	54	7	19	20	61	1746	4	22	1357	16
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	2	2	2	1	1	1	2	2	2
Cap, veh/h	109	25	324	26	59	46	76	2160	942	32	2056	916
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.05	0.65	0.65	0.04	1.00	1.00
Sat Flow, veh/h	314	112	1483	0	272	209	1654	3299	1438	1641	3273	1459
Grp Volume(v), veh/h	108	0	54	46	0	0	61	1746	4	22	1357	16
Grp Sat Flow(s),veh/h/ln	426	0	1483	480	0	0	1654	1650	1438	1641	1637	1459
Q Serve(g_s), s	0.0	0.0	4.7	0.0	0.0	0.0	5.8	62.1	0.2	2.1	0.0	0.0
Cycle Q Clear(g_c), s	35.0	0.0	4.7	35.0	0.0	0.0	5.8	62.1	0.2	2.1	0.0	0.0
Prop In Lane	0.79		1.00	0.15		0.43	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	133	0	324	131	0	0	76	2160	942	32	2056	916
V/C Ratio(X)	0.81	0.00	0.17	0.35	0.00	0.00	0.80	0.81	0.00	0.69	0.66	0.02
Avail Cap(c_a), veh/h	133	0	324	131	0	0	202	2160	942	149	2056	916
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	64.2	0.0	50.7	52.1	0.0	0.0	75.6	20.2	9.6	76.4	0.0	0.0
Incr Delay (d2), s/veh	29.9	0.0	0.2	1.6	0.0	0.0	17.0	3.4	0.0	23.0	1.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.5	0.0	3.3	2.8	0.0	0.0	5.1	31.2	0.1	1.9	0.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	94.0	0.0	50.9	53.7	0.0	0.0	92.5	23.6	9.6	99.4	1.7	0.0
LnGrp LOS	F	A	D	D	A	A	F	C	A	F	A	A
Approach Vol, veh/h		162			46			1811			1395	
Approach Delay, s/veh		79.7			53.7			25.9			3.2	
Approach LOS		E			D			C			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.6	110.9		40.5	12.9	106.6		40.5				
Change Period (Y+Rc), s	5.5	6.1		* 5.5	5.5	6.1		5.5				
Max Green Setting (Gmax), s	14.5	93.9		* 35	19.5	88.9		34.5				
Max Q Clear Time (g_c+I1), s	4.1	64.1		37.0	7.8	2.0		37.0				
Green Ext Time (p_c), s	0.0	16.7		0.0	0.1	14.6		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		19.6
HCM 6th LOS		B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.4

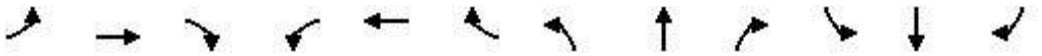
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	86	0	1796	1266	81
Future Vol, veh/h	0	86	0	1796	1266	81
Conflicting Peds, #/hr	0	2	0	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	100	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	0	88	0	1833	1292	83

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	650	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.92	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.31	-	-	-	-
Pot Cap-1 Maneuver	0	414	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	412	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.1	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	412	-	-
HCM Lane V/C Ratio	-	0.213	-	-
HCM Control Delay (s)	-	16.1	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.8	-	-

HCM 6th Signalized Intersection Summary
3: Bothell Way NE (SR 522) & Ballinger Way (SR 104)/Ballinger Way



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	647	16	162	5	6	3	216	1550	5	15	1200	636
Future Volume (veh/h)	647	16	162	5	6	3	216	1550	5	15	1200	636
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		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1736	1736	1736	1750	1750	1750	1736	1736	1736	1736	1736	1736
Adj Flow Rate, veh/h	665	0	0	5	6	3	218	1566	5	15	1212	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	1	1	1	0	0	0	1	1	1	1	1	1
Cap, veh/h	649	0		9	10	5	236	2084	900	25	1663	
Arrive On Green	0.20	0.00	0.00	0.01	0.01	0.01	0.29	1.00	1.00	0.02	0.50	0.00
Sat Flow, veh/h	3307	0	1471	592	710	355	1654	3299	1425	1654	3299	1471
Grp Volume(v), veh/h	665	0	0	14	0	0	218	1566	5	15	1212	0
Grp Sat Flow(s),veh/h/ln	1654	0	1471	1657	0	0	1654	1650	1425	1654	1650	1471
Q Serve(g_s), s	31.4	0.0	0.0	1.3	0.0	0.0	20.5	0.0	0.0	1.4	46.1	0.0
Cycle Q Clear(g_c), s	31.4	0.0	0.0	1.3	0.0	0.0	20.5	0.0	0.0	1.4	46.1	0.0
Prop In Lane	1.00		1.00	0.36		0.21	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	649	0		24	0	0	236	2084	900	25	1663	
V/C Ratio(X)	1.02	0.00		0.58	0.00	0.00	0.92	0.75	0.01	0.60	0.73	
Avail Cap(c_a), veh/h	649	0		150	0	0	305	2084	900	150	1663	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	0.54	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	64.3	0.0	0.0	78.4	0.0	0.0	56.4	0.0	0.0	78.3	31.1	0.0
Incr Delay (d2), s/veh	32.4	0.0	0.0	20.5	0.0	0.0	28.3	2.6	0.0	20.5	2.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	21.3	0.0	0.0	1.3	0.0	0.0	14.3	1.3	0.0	1.4	25.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	96.7	0.0	0.0	98.9	0.0	0.0	84.7	2.6	0.0	98.8	33.9	0.0
LnGrp LOS	F	A		F	A	A	F	A	A	F	C	
Approach Vol, veh/h		665			14			1789			1227	
Approach Delay, s/veh		96.7			98.9			12.6			34.7	
Approach LOS		F			F			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.9	107.3		37.0	28.3	86.9		7.8				
Change Period (Y+Rc), s	5.5	6.2		5.6	5.5	6.2		5.5				
Max Green Setting (Gmax), s	14.5	76.8		31.4	29.5	61.8		14.5				
Max Q Clear Time (g_c+I1), s	3.4	2.0		33.4	22.5	48.1		3.3				
Green Ext Time (p_c), s	0.0	19.1		0.0	0.3	6.9		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		35.4
HCM 6th LOS		D

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

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

HCM 6th Signalized Intersection Summary
4: NE 175th St & Ballinger Way (SR 104)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	725	123	67	786	33	189	58	87	31	57	16
Future Volume (veh/h)	16	725	123	67	786	33	189	58	87	31	57	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		0.98	0.99		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1750	1750	1750	1750	1750	1736	1736	1736	1736	1736	1736
Adj Flow Rate, veh/h	16	740	126	68	802	34	193	59	89	32	58	16
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0	1	1	1	1	1	1
Cap, veh/h	251	889	151	219	1019	43	316	74	381	154	341	94
Arrive On Green	0.61	0.61	0.61	0.61	0.61	0.61	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	668	1453	247	649	1665	71	931	285	1460	1249	1306	360
Grp Volume(v), veh/h	16	0	866	68	0	836	252	0	89	32	0	74
Grp Sat Flow(s),veh/h/ln	668	0	1700	649	0	1736	1215	0	1460	1249	0	1666
Q Serve(g_s), s	1.6	0.0	34.9	8.0	0.0	31.2	14.7	0.0	4.2	2.1	0.0	3.0
Cycle Q Clear(g_c), s	32.8	0.0	34.9	42.9	0.0	31.2	17.7	0.0	4.2	19.9	0.0	3.0
Prop In Lane	1.00		0.15	1.00		0.04	0.77		1.00	1.00		0.22
Lane Grp Cap(c), veh/h	251	0	1041	219	0	1063	390	0	381	154	0	435
V/C Ratio(X)	0.06	0.00	0.83	0.31	0.00	0.79	0.65	0.00	0.23	0.21	0.00	0.17
Avail Cap(c_a), veh/h	416	0	1461	380	0	1492	582	0	581	325	0	663
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.9	0.0	13.3	30.2	0.0	12.6	31.6	0.0	25.2	39.6	0.0	24.8
Incr Delay (d2), s/veh	0.1	0.0	3.0	0.8	0.0	1.9	1.8	0.0	0.3	0.7	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.5	0.0	18.0	2.3	0.0	16.4	8.8	0.0	2.6	1.2	0.0	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.0	0.0	16.3	31.0	0.0	14.5	33.4	0.0	25.5	40.2	0.0	25.0
LnGrp LOS	C	A	B	C	A	B	C	A	C	D	A	C
Approach Vol, veh/h		882			904			341			106	
Approach Delay, s/veh		16.4			15.7			31.4			29.6	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	28.1	58.6	28.1	58.6
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5
Max Green Setting (Gmax), s	34.5	74.5	34.5	74.5
Max Q Clear Time (g_c+I1), s	19.7	36.9	21.9	44.9
Green Ext Time (p_c), s	1.6	8.6	0.3	8.2

Intersection Summary	
HCM 6th Ctrl Delay	19.0
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	13	20	7	0	0	0	13	0	0	0	0	13
Future Vol, veh/h	13	20	7	0	0	0	13	0	0	0	0	13
Conflicting Peds, #/hr	6	0	18	18	0	0	24	0	6	6	0	6
Sign Control	Free	Free	Free	Yield	Yield	Yield	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	1080	147968	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	69	69	69	69	69	69	69	69	69	69	69
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	19	29	10	0	0	0	19	0	0	0	0	19

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	6	0	0	124	96	58	84	101	30
Stage 1	-	-	-	90	90	-	6	6	-
Stage 2	-	-	-	34	6	-	78	95	-
Critical Hdwy	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	6.1	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1628	-	-	855	798	1014	908	793	1050
Stage 1	-	-	-	922	824	-	-	-	-
Stage 2	-	-	-	-	-	-	936	820	-
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	1619	-	-	799	770	997	894	765	1020
Mov Cap-2 Maneuver	-	-	-	799	770	-	894	765	-
Stage 1	-	-	-	895	800	-	-	-	-
Stage 2	-	-	-	-	-	-	925	796	-

Approach	EB	NB	SB
HCM Control Delay, s	2.4	9.6	8.6
HCM LOS		A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	799	1619	-	-	1020
HCM Lane V/C Ratio	0.024	0.012	-	-	0.018
HCM Control Delay (s)	9.6	7.2	0	-	8.6
HCM Lane LOS	A	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	12	0	0	11
Future Vol, veh/h	0	0	12	0	0	11
Conflicting Peds, #/hr	6	0	0	1	1	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	48	48	48	48	48	48
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	25	0	0	23

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	55	26	0	0	26	0
Stage 1	26	-	-	-	-	-
Stage 2	29	-	-	-	-	-
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	958	1056	-	-	1601	-
Stage 1	1002	-	-	-	-	-
Stage 2	999	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	951	1055	-	-	1599	-
Mov Cap-2 Maneuver	951	-	-	-	-	-
Stage 1	1001	-	-	-	-	-
Stage 2	993	-	-	-	-	-

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)	-	-	-	1599	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

HCM 6th Signalized Intersection Summary
1: Bothell Way NE (SR 522) & NE 170th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	84	10	60	7	5	23	81	1191	3	20	1181	24
Future Volume (veh/h)	84	10	60	7	5	23	81	1191	3	20	1181	24
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		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1750	1750	1723	1723	1723	1736	1736	1736	1723	1723	1723
Adj Flow Rate, veh/h	87	10	62	7	5	24	84	1228	3	21	1218	25
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	2	2	2	1	1	1	2	2	2
Cap, veh/h	162	15	304	41	37	84	105	2097	904	34	1942	864
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.06	0.64	0.64	0.02	0.59	0.59
Sat Flow, veh/h	511	75	1483	26	179	411	1654	3299	1422	1641	3273	1456
Grp Volume(v), veh/h	97	0	62	36	0	0	84	1228	3	21	1218	25
Grp Sat Flow(s),veh/h/ln	586	0	1483	617	0	0	1654	1650	1422	1641	1637	1456
Q Serve(g_s), s	0.0	0.0	4.2	0.4	0.0	0.0	6.0	25.9	0.1	1.5	28.9	0.9
Cycle Q Clear(g_c), s	22.3	0.0	4.2	22.7	0.0	0.0	6.0	25.9	0.1	1.5	28.9	0.9
Prop In Lane	0.90		1.00	0.19		0.67	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	177	0	304	162	0	0	105	2097	904	34	1942	864
V/C Ratio(X)	0.55	0.00	0.20	0.22	0.00	0.00	0.80	0.59	0.00	0.61	0.63	0.03
Avail Cap(c_a), veh/h	301	0	433	289	0	0	200	2097	904	198	1942	864
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.5	0.0	39.6	39.8	0.0	0.0	55.5	12.7	8.0	58.3	15.8	10.1
Incr Delay (d2), s/veh	2.6	0.0	0.3	0.7	0.0	0.0	13.1	1.2	0.0	16.2	1.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.3	0.0	2.8	1.6	0.0	0.0	5.1	13.9	0.1	1.4	15.6	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.2	0.0	39.9	40.4	0.0	0.0	68.6	13.9	8.0	74.5	17.3	10.2
LnGrp LOS	D	A	D	D	A	A	E	B	A	E	B	B
Approach Vol, veh/h		159			36			1315			1264	
Approach Delay, s/veh		45.6			40.4			17.4			18.1	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.0	82.3		29.7	13.1	77.2		29.7				
Change Period (Y+Rc), s	5.5	6.1		5.0	5.5	6.1		5.0				
Max Green Setting (Gmax), s	14.5	53.9		35.0	14.5	53.9		35.0				
Max Q Clear Time (g_c+I1), s	3.5	27.9		24.3	8.0	30.9		24.7				
Green Ext Time (p_c), s	0.0	9.7		0.5	0.1	9.2		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			19.6									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	0.3

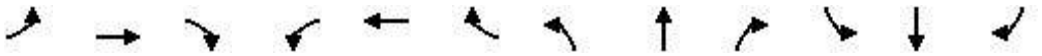
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	47	0	1289	1226	68
Future Vol, veh/h	0	47	0	1289	1226	68
Conflicting Peds, #/hr	0	2	0	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	100	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	1	1	1	1
Mvmt Flow	0	49	0	1357	1291	72

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	650	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	417	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	415	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	415	-	-
HCM Lane V/C Ratio	-	0.119	-	-
HCM Control Delay (s)	-	14.8	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.4	-	-

HCM 6th Signalized Intersection Summary
3: Bothell Way NE (SR 522) & Ballinger Way (SR 104)/Ballinger Way



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	520	16	157	10	7	6	160	1120	10	10	1127	485
Future Volume (veh/h)	520	16	157	10	7	6	160	1120	10	10	1127	485
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		0.94	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1750	1750	1750	1750	1750	1736	1736	1736	1736	1736	1736
Adj Flow Rate, veh/h	559	0	0	11	7	6	168	1179	11	11	1186	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	1	1	1	1	1	1
Cap, veh/h	720	0		17	11	9	195	1841	774	21	1494	
Arrive On Green	0.22	0.00	0.00	0.02	0.02	0.02	0.08	0.37	0.37	0.01	0.45	0.00
Sat Flow, veh/h	3333	0	1483	751	478	410	1654	3299	1387	1654	3299	1471
Grp Volume(v), veh/h	559	0	0	24	0	0	168	1179	11	11	1186	0
Grp Sat Flow(s),veh/h/ln	1667	0	1483	1639	0	0	1654	1650	1387	1654	1650	1471
Q Serve(g_s), s	19.0	0.0	0.0	1.7	0.0	0.0	12.0	35.3	0.6	0.8	36.9	0.0
Cycle Q Clear(g_c), s	19.0	0.0	0.0	1.7	0.0	0.0	12.0	35.3	0.6	0.8	36.9	0.0
Prop In Lane	1.00		1.00	0.46		0.25	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	720	0		38	0	0	195	1841	774	21	1494	
V/C Ratio(X)	0.78	0.00		0.64	0.00	0.00	0.86	0.64	0.01	0.52	0.79	
Avail Cap(c_a), veh/h	872	0		157	0	0	269	1841	774	131	1494	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00
Upstream Filter(I)	0.73	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	44.3	0.0	0.0	58.1	0.0	0.0	54.3	27.6	16.8	58.9	28.1	0.0
Incr Delay (d2), s/veh	2.7	0.0	0.0	16.6	0.0	0.0	18.1	1.7	0.0	18.4	4.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	12.1	0.0	0.0	1.6	0.0	0.0	10.1	21.2	0.3	0.8	21.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.0	0.0	0.0	74.7	0.0	0.0	72.3	29.4	16.8	77.2	32.5	0.0
LnGrp LOS	D	A		E	A	A	E	C	B	E	C	
Approach Vol, veh/h		559			24			1358			1197	
Approach Delay, s/veh		47.0			74.7			34.6			32.9	
Approach LOS		D			E			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.0	73.2		31.5	19.7	60.5		8.3				
Change Period (Y+Rc), s	5.5	6.2		5.6	5.5	6.2		5.5				
Max Green Setting (Gmax), s	9.5	44.8		31.4	19.5	34.8		11.5				
Max Q Clear Time (g_c+I1), s	2.8	37.3		21.0	14.0	38.9		3.7				
Green Ext Time (p_c), s	0.0	4.4		1.6	0.2	0.0		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		36.5
HCM 6th LOS		D

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

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

HCM 6th Signalized Intersection Summary
4: NE 175th St & Ballinger Way (SR 104)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	575	82	84	540	13	103	24	86	32	23	9
Future Volume (veh/h)	9	575	82	84	540	13	103	24	86	32	23	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	0.98		0.97	0.99		0.95
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	1736	1736	1736	1750	1750	1750	1750	1750	1750	1723	1723	1723
Adj Flow Rate, veh/h	9	605	86	88	568	14	108	25	91	34	24	9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	0	0	0	0	0	0	2	2	2
Cap, veh/h	456	837	119	367	961	24	342	63	264	285	216	81
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.18	0.18	0.18	0.18	0.18	0.18
Sat Flow, veh/h	839	1481	210	764	1699	42	1052	344	1437	1265	1175	441
Grp Volume(v), veh/h	9	0	691	88	0	582	133	0	91	34	0	33
Grp Sat Flow(s),veh/h/ln	839	0	1691	764	0	1741	1396	0	1437	1265	0	1615
Q Serve(g_s), s	0.3	0.0	13.1	4.2	0.0	9.6	3.1	0.0	2.4	1.1	0.0	0.7
Cycle Q Clear(g_c), s	9.9	0.0	13.1	17.3	0.0	9.6	3.9	0.0	2.4	5.0	0.0	0.7
Prop In Lane	1.00		0.12	1.00		0.02	0.81		1.00	1.00		0.27
Lane Grp Cap(c), veh/h	456	0	956	367	0	984	405	0	264	285	0	296
V/C Ratio(X)	0.02	0.00	0.72	0.24	0.00	0.59	0.33	0.00	0.35	0.12	0.00	0.11
Avail Cap(c_a), veh/h	1410	0	2879	1235	0	2964	1269	0	1133	1050	0	1273
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.4	0.0	7.0	13.4	0.0	6.2	16.2	0.0	15.6	18.4	0.0	14.9
Incr Delay (d2), s/veh	0.0	0.0	1.1	0.3	0.0	0.6	0.5	0.0	0.8	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.1	0.0	5.6	1.1	0.0	4.1	2.0	0.0	1.4	0.6	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.5	0.0	8.0	13.7	0.0	6.8	16.7	0.0	16.3	18.6	0.0	15.1
LnGrp LOS	A	A	A	B	A	A	B	A	B	B	A	B
Approach Vol, veh/h		700			670			224			67	
Approach Delay, s/veh		8.1			7.7			16.5			16.9	
Approach LOS		A			A			B			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	13.5	30.2	13.5	30.2
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5
Max Green Setting (Gmax), s	34.5	74.5	34.5	74.5
Max Q Clear Time (g_c+I1), s	5.9	15.1	7.0	19.3
Green Ext Time (p_c), s	1.1	6.1	0.2	5.4

Intersection Summary	
HCM 6th Ctrl Delay	9.4
HCM 6th LOS	A

Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	13	5	0	0	0	8	0	0	0	0	16
Future Vol, veh/h	17	13	5	0	0	0	8	0	0	0	0	16
Conflicting Peds, #/hr	3	0	17	23	0	9	17	0	7	9	0	3
Sign Control	Free	Free	Free	Yield	Yield	Yield	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	1080	147968	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	67	67	67	67	67	67	67	67	67	67	67	67
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	25	19	7	0	0	0	12	0	0	0	0	24

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	3	0	0	119	93	49	85	96	20
Stage 1	-	-	-	90	90	-	3	3	-
Stage 2	-	-	-	29	3	-	82	93	-
Critical Hdwy	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	6.1	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1632	-	-	861	801	1025	906	798	1064
Stage 1	-	-	-	922	824	-	-	-	-
Stage 2	-	-	-	-	-	-	931	822	-
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	1627	-	-	804	773	1008	892	770	1044
Mov Cap-2 Maneuver	-	-	-	804	773	-	892	770	-
Stage 1	-	-	-	892	798	-	-	-	-
Stage 2	-	-	-	-	-	-	916	796	-

Approach	EB	NB	SB
HCM Control Delay, s	3.5	9.5	8.5
HCM LOS		A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	804	1627	-	-	1044
HCM Lane V/C Ratio	0.015	0.016	-	-	0.023
HCM Control Delay (s)	9.5	7.2	0	-	8.5
HCM Lane LOS	A	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0.1

Intersection	
Int Delay, s/veh	1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	0	12	1	0	10
Future Vol, veh/h	3	0	12	1	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	3	0	13	1	0	11

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	25	14	0	0	14	0
Stage 1	14	-	-	-	-	-
Stage 2	11	-	-	-	-	-
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	996	1072	-	-	1617	-
Stage 1	1014	-	-	-	-	-
Stage 2	1017	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	996	1072	-	-	1617	-
Mov Cap-2 Maneuver	996	-	-	-	-	-
Stage 1	1014	-	-	-	-	-
Stage 2	1017	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.6	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	996	1617	-
HCM Lane V/C Ratio	-	-	0.003	-	-
HCM Control Delay (s)	-	-	8.6	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

2027 Peak Hour Intersection Level of Service without the Project

HCM 6th Signalized Intersection Summary
1: Bothell Way NE (SR 522) & NE 170th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	83	22	53	7	18	19	60	1720	4	21	1336	16
Future Volume (veh/h)	83	22	53	7	18	19	60	1720	4	21	1336	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	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1750	1750	1723	1723	1723	1736	1736	1736	1723	1723	1723
Adj Flow Rate, veh/h	86	23	55	7	19	20	62	1773	4	22	1377	16
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	2	2	2	1	1	1	2	2	2
Cap, veh/h	109	24	324	26	59	46	78	2160	942	32	2054	915
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.05	0.65	0.65	0.04	1.00	1.00
Sat Flow, veh/h	314	111	1483	0	272	209	1654	3299	1438	1641	3273	1459
Grp Volume(v), veh/h	109	0	55	46	0	0	62	1773	4	22	1377	16
Grp Sat Flow(s),veh/h/ln	425	0	1483	480	0	0	1654	1650	1438	1641	1637	1459
Q Serve(g_s), s	0.0	0.0	4.8	0.0	0.0	0.0	5.9	64.2	0.2	2.1	0.0	0.0
Cycle Q Clear(g_c), s	35.0	0.0	4.8	35.0	0.0	0.0	5.9	64.2	0.2	2.1	0.0	0.0
Prop In Lane	0.79		1.00	0.15		0.43	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	133	0	324	131	0	0	78	2160	942	32	2054	915
V/C Ratio(X)	0.82	0.00	0.17	0.35	0.00	0.00	0.80	0.82	0.00	0.69	0.67	0.02
Avail Cap(c_a), veh/h	133	0	324	131	0	0	202	2160	942	149	2054	915
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	64.4	0.0	50.7	52.1	0.0	0.0	75.5	20.6	9.6	76.4	0.0	0.0
Incr Delay (d2), s/veh	31.4	0.0	0.2	1.6	0.0	0.0	16.8	3.6	0.0	23.0	1.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.6	0.0	3.3	2.8	0.0	0.0	5.2	32.2	0.1	1.9	0.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	95.8	0.0	51.0	53.7	0.0	0.0	92.3	24.2	9.6	99.4	1.8	0.0
LnGrp LOS	F	A	D	D	A	A	F	C	A	F	A	A
Approach Vol, veh/h		164			46			1839			1415	
Approach Delay, s/veh		80.8			53.7			26.5			3.3	
Approach LOS		F			D			C			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.6	110.9		40.5	13.0	106.5		40.5				
Change Period (Y+Rc), s	5.5	6.1		* 5.5	5.5	6.1		5.5				
Max Green Setting (Gmax), s	14.5	93.9		* 35	19.5	88.9		34.5				
Max Q Clear Time (g_c+I1), s	4.1	66.2		37.0	7.9	2.0		37.0				
Green Ext Time (p_c), s	0.0	16.3		0.0	0.1	15.0		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	19.9
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.4

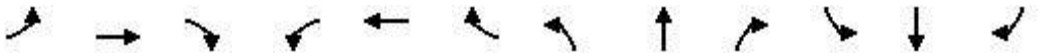
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	87	0	1823	1285	82
Future Vol, veh/h	0	87	0	1823	1285	82
Conflicting Peds, #/hr	0	2	0	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	100	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	0	89	0	1860	1311	84

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	660	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.92	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.31	-	-	-	-
Pot Cap-1 Maneuver	0	408	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	406	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.3	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	406	-	-
HCM Lane V/C Ratio	-	0.219	-	-
HCM Control Delay (s)	-	16.3	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.8	-	-

HCM 6th Signalized Intersection Summary
3: Bothell Way NE (SR 522) & Ballinger Way (SR 104)/Ballinger Way



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	657	16	164	5	6	3	219	1573	5	15	1218	646
Future Volume (veh/h)	657	16	164	5	6	3	219	1573	5	15	1218	646
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		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1736	1736	1736	1750	1750	1750	1736	1736	1736	1736	1736	1736
Adj Flow Rate, veh/h	675	0	0	5	6	3	221	1589	5	15	1230	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	1	1	1	0	0	0	1	1	1	1	1	1
Cap, veh/h	649	0		9	10	5	239	2084	900	25	1658	
Arrive On Green	0.20	0.00	0.00	0.01	0.01	0.01	0.29	1.00	1.00	0.02	0.50	0.00
Sat Flow, veh/h	3307	0	1471	592	710	355	1654	3299	1425	1654	3299	1471
Grp Volume(v), veh/h	675	0	0	14	0	0	221	1589	5	15	1230	0
Grp Sat Flow(s),veh/h/ln	1654	0	1471	1657	0	0	1654	1650	1425	1654	1650	1471
Q Serve(g_s), s	31.4	0.0	0.0	1.3	0.0	0.0	20.8	0.0	0.0	1.4	47.3	0.0
Cycle Q Clear(g_c), s	31.4	0.0	0.0	1.3	0.0	0.0	20.8	0.0	0.0	1.4	47.3	0.0
Prop In Lane	1.00		1.00	0.36		0.21	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	649	0		24	0	0	239	2084	900	25	1658	
V/C Ratio(X)	1.04	0.00		0.58	0.00	0.00	0.93	0.76	0.01	0.60	0.74	
Avail Cap(c_a), veh/h	649	0		150	0	0	305	2084	900	150	1658	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	0.53	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	64.3	0.0	0.0	78.4	0.0	0.0	56.1	0.0	0.0	78.3	31.6	0.0
Incr Delay (d2), s/veh	36.7	0.0	0.0	20.5	0.0	0.0	28.8	2.7	0.0	20.5	3.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	21.9	0.0	0.0	1.3	0.0	0.0	14.5	1.4	0.0	1.4	26.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	101.0	0.0	0.0	98.9	0.0	0.0	84.9	2.7	0.0	98.8	34.6	0.0
LnGrp LOS	F	A		F	A	A	F	A	A	F	C	
Approach Vol, veh/h		675			14			1815			1245	
Approach Delay, s/veh		101.0			98.9			12.7			35.4	
Approach LOS		F			F			B			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.9	107.3		37.0	28.6	86.6		7.8				
Change Period (Y+Rc), s	5.5	6.2		5.6	5.5	6.2		5.5				
Max Green Setting (Gmax), s	14.5	76.8		31.4	29.5	61.8		14.5				
Max Q Clear Time (g_c+I1), s	3.4	2.0		33.4	22.8	49.3		3.3				
Green Ext Time (p_c), s	0.0	19.6		0.0	0.3	6.6		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		36.5
HCM 6th LOS		D

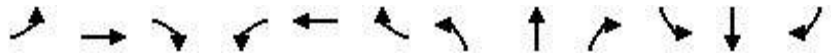
Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

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

HCM 6th Signalized Intersection Summary
4: NE 175th St & Ballinger Way (SR 104)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	736	125	68	798	33	192	59	88	31	58	16
Future Volume (veh/h)	16	736	125	68	798	33	192	59	88	31	58	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		0.98	0.99		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1750	1750	1750	1750	1750	1736	1736	1736	1736	1736	1736
Adj Flow Rate, veh/h	16	751	128	69	814	34	196	60	90	32	59	16
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0	1	1	1	1	1	1
Cap, veh/h	245	896	153	212	1028	43	313	74	382	146	343	93
Arrive On Green	0.62	0.62	0.62	0.62	0.62	0.62	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	660	1453	248	641	1666	70	928	284	1460	1247	1311	356
Grp Volume(v), veh/h	16	0	879	69	0	848	256	0	90	32	0	75
Grp Sat Flow(s),veh/h/ln	660	0	1700	641	0	1736	1212	0	1460	1247	0	1667
Q Serve(g_s), s	1.7	0.0	37.1	8.7	0.0	33.1	15.7	0.0	4.4	2.3	0.0	3.1
Cycle Q Clear(g_c), s	34.8	0.0	37.1	45.7	0.0	33.1	18.8	0.0	4.4	21.1	0.0	3.1
Prop In Lane	1.00		0.15	1.00		0.04	0.77		1.00	1.00		0.21
Lane Grp Cap(c), veh/h	245	0	1049	212	0	1071	387	0	382	146	0	436
V/C Ratio(X)	0.07	0.00	0.84	0.32	0.00	0.79	0.66	0.00	0.24	0.22	0.00	0.17
Avail Cap(c_a), veh/h	382	0	1400	345	0	1429	555	0	557	296	0	635
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.0	0.0	13.7	31.9	0.0	13.0	33.1	0.0	26.3	41.6	0.0	25.8
Incr Delay (d2), s/veh	0.1	0.0	3.5	0.9	0.0	2.3	1.9	0.0	0.3	0.7	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.5	0.0	19.3	2.5	0.0	17.5	9.3	0.0	2.8	1.3	0.0	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.1	0.0	17.3	32.7	0.0	15.2	35.1	0.0	26.6	42.4	0.0	26.0
LnGrp LOS	C	A	B	C	A	B	D	A	C	D	A	C
Approach Vol, veh/h		895			917			346			107	
Approach Delay, s/veh		17.4			16.6			32.9			30.9	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	29.2	61.3	29.2	61.3
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5
Max Green Setting (Gmax), s	34.5	74.5	34.5	74.5
Max Q Clear Time (g_c+I1), s	20.8	39.1	23.1	47.7
Green Ext Time (p_c), s	1.6	8.7	0.3	8.1

Intersection Summary	
HCM 6th Ctrl Delay	20.1
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	13	20	7	0	0	0	13	0	0	0	0	13
Future Vol, veh/h	13	20	7	0	0	0	13	0	0	0	0	13
Conflicting Peds, #/hr	6	0	18	18	0	0	24	0	6	6	0	6
Sign Control	Free	Free	Free	Yield	Yield	Yield	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	1080	147968	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	69	69	69	69	69	69	69	69	69	69	69
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	19	29	10	0	0	0	19	0	0	0	0	19

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	6	0	0	124	96	58	84	101	30
Stage 1	-	-	-	90	90	-	6	6	-
Stage 2	-	-	-	34	6	-	78	95	-
Critical Hdwy	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	6.1	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1628	-	-	855	798	1014	908	793	1050
Stage 1	-	-	-	922	824	-	-	-	-
Stage 2	-	-	-	-	-	-	936	820	-
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	1619	-	-	799	770	997	894	765	1020
Mov Cap-2 Maneuver	-	-	-	799	770	-	894	765	-
Stage 1	-	-	-	895	800	-	-	-	-
Stage 2	-	-	-	-	-	-	925	796	-

Approach	EB	NB	SB
HCM Control Delay, s	2.4	9.6	8.6
HCM LOS		A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	799	1619	-	-	1020
HCM Lane V/C Ratio	0.024	0.012	-	-	0.018
HCM Control Delay (s)	9.6	7.2	0	-	8.6
HCM Lane LOS	A	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	12	0	0	11
Future Vol, veh/h	0	0	12	0	0	11
Conflicting Peds, #/hr	6	0	0	1	1	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	48	48	48	48	48	48
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	25	0	0	23

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	55	26	0	0	26	0
Stage 1	26	-	-	-	-	-
Stage 2	29	-	-	-	-	-
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	958	1056	-	-	1601	-
Stage 1	1002	-	-	-	-	-
Stage 2	999	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	951	1055	-	-	1599	-
Mov Cap-2 Maneuver	951	-	-	-	-	-
Stage 1	1001	-	-	-	-	-
Stage 2	993	-	-	-	-	-

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)	-	-	-	1599	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

HCM 6th Signalized Intersection Summary
1: Bothell Way NE (SR 522) & NE 170th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	10	61	7	5	23	82	1209	3	20	1199	24
Future Volume (veh/h)	85	10	61	7	5	23	82	1209	3	20	1199	24
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		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1750	1750	1723	1723	1723	1736	1736	1736	1723	1723	1723
Adj Flow Rate, veh/h	88	10	63	7	5	24	85	1246	3	21	1236	25
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	2	2	2	1	1	1	2	2	2
Cap, veh/h	163	15	310	41	37	84	106	2084	898	34	1926	857
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.06	0.63	0.63	0.02	0.59	0.59
Sat Flow, veh/h	505	73	1483	26	176	404	1654	3299	1421	1641	3273	1456
Grp Volume(v), veh/h	98	0	63	36	0	0	85	1246	3	21	1236	25
Grp Sat Flow(s),veh/h/ln	578	0	1483	606	0	0	1654	1650	1421	1641	1637	1456
Q Serve(g_s), s	0.0	0.0	4.2	0.4	0.0	0.0	6.1	26.8	0.1	1.5	30.0	0.9
Cycle Q Clear(g_c), s	22.8	0.0	4.2	23.2	0.0	0.0	6.1	26.8	0.1	1.5	30.0	0.9
Prop In Lane	0.90		1.00	0.19		0.67	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	178	0	310	163	0	0	106	2084	898	34	1926	857
V/C Ratio(X)	0.55	0.00	0.20	0.22	0.00	0.00	0.80	0.60	0.00	0.61	0.64	0.03
Avail Cap(c_a), veh/h	296	0	433	283	0	0	200	2084	898	198	1926	857
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.3	0.0	39.2	39.4	0.0	0.0	55.4	13.1	8.2	58.3	16.3	10.3
Incr Delay (d2), s/veh	2.7	0.0	0.3	0.7	0.0	0.0	13.0	1.3	0.0	16.2	1.7	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.4	0.0	2.8	1.6	0.0	0.0	5.2	14.3	0.1	1.4	16.1	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.9	0.0	39.5	40.1	0.0	0.0	68.4	14.4	8.2	74.5	18.0	10.4
LnGrp LOS	D	A	D	D	A	A	E	B	A	E	B	B
Approach Vol, veh/h		161			36			1334			1282	
Approach Delay, s/veh		45.3			40.1			17.8			18.8	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.0	81.8		30.2	13.2	76.6		30.2				
Change Period (Y+Rc), s	5.5	6.1		5.0	5.5	6.1		5.0				
Max Green Setting (Gmax), s	14.5	53.9		35.0	14.5	53.9		35.0				
Max Q Clear Time (g_c+I1), s	3.5	28.8		24.8	8.1	32.0		25.2				
Green Ext Time (p_c), s	0.0	9.8		0.4	0.1	9.2		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			20.1									
HCM 6th LOS			C									

Intersection	
Int Delay, s/veh	0.3

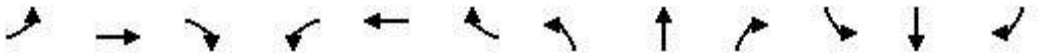
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	48	0	1308	1244	69
Future Vol, veh/h	0	48	0	1308	1244	69
Conflicting Peds, #/hr	0	2	0	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	100	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	1	1	1	1
Mvmt Flow	0	51	0	1377	1309	73

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	659	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	411	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	409	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	409	-	-
HCM Lane V/C Ratio	-	0.124	-	-
HCM Control Delay (s)	-	15	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.4	-	-

HCM 6th Signalized Intersection Summary
3: Bothell Way NE (SR 522) & Ballinger Way (SR 104)/Ballinger Way



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	528	16	159	10	7	6	162	1137	10	10	1144	492
Future Volume (veh/h)	528	16	159	10	7	6	162	1137	10	10	1144	492
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		0.94	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1750	1750	1750	1750	1750	1736	1736	1736	1736	1736	1736
Adj Flow Rate, veh/h	568	0	0	11	7	6	171	1197	11	11	1204	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	1	1	1	1	1	1
Cap, veh/h	726	0		17	11	9	198	1836	772	21	1482	
Arrive On Green	0.22	0.00	0.00	0.02	0.02	0.02	0.08	0.37	0.37	0.01	0.45	0.00
Sat Flow, veh/h	3333	0	1483	751	478	410	1654	3299	1387	1654	3299	1471
Grp Volume(v), veh/h	568	0	0	24	0	0	171	1197	11	11	1204	0
Grp Sat Flow(s),veh/h/ln	1667	0	1483	1639	0	0	1654	1650	1387	1654	1650	1471
Q Serve(g_s), s	19.3	0.0	0.0	1.7	0.0	0.0	12.3	36.1	0.6	0.8	38.0	0.0
Cycle Q Clear(g_c), s	19.3	0.0	0.0	1.7	0.0	0.0	12.3	36.1	0.6	0.8	38.0	0.0
Prop In Lane	1.00		1.00	0.46		0.25	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	726	0		38	0	0	198	1836	772	21	1482	
V/C Ratio(X)	0.78	0.00		0.64	0.00	0.00	0.86	0.65	0.01	0.52	0.81	
Avail Cap(c_a), veh/h	872	0		157	0	0	269	1836	772	131	1482	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00
Upstream Filter(I)	0.72	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	44.3	0.0	0.0	58.1	0.0	0.0	54.2	28.0	16.9	58.9	28.7	0.0
Incr Delay (d2), s/veh	2.8	0.0	0.0	16.6	0.0	0.0	18.7	1.8	0.0	18.4	5.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	12.2	0.0	0.0	1.6	0.0	0.0	10.3	21.6	0.3	0.8	21.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.1	0.0	0.0	74.7	0.0	0.0	72.9	29.8	16.9	77.2	33.6	0.0
LnGrp LOS	D	A		E	A	A	E	C	B	E	C	
Approach Vol, veh/h		568			24			1379			1215	
Approach Delay, s/veh		47.1			74.7			35.1			34.0	
Approach LOS		D			E			D			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.0	73.0		31.7	19.9	60.1		8.3				
Change Period (Y+Rc), s	5.5	6.2		5.6	5.5	6.2		5.5				
Max Green Setting (Gmax), s	9.5	44.8		31.4	19.5	34.8		11.5				
Max Q Clear Time (g_c+I1), s	2.8	38.1		21.3	14.3	40.0		3.7				
Green Ext Time (p_c), s	0.0	4.1		1.6	0.2	0.0		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		37.1	
HCM 6th LOS		D	

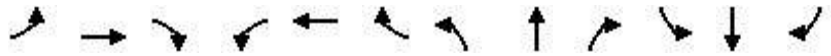
Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

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

HCM 6th Signalized Intersection Summary
4: NE 175th St & Ballinger Way (SR 104)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	584	83	85	548	13	105	24	87	32	23	9
Future Volume (veh/h)	9	584	83	85	548	13	105	24	87	32	23	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	0.98		0.97	0.99		0.95
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	1736	1736	1736	1750	1750	1750	1750	1750	1750	1723	1723	1723
Adj Flow Rate, veh/h	9	615	87	89	577	14	111	25	92	34	24	9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	0	0	0	0	0	0	2	2	2
Cap, veh/h	451	845	120	361	970	24	341	62	266	279	217	81
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.18	0.18	0.18	0.18	0.18	0.18
Sat Flow, veh/h	832	1482	210	756	1700	41	1058	333	1438	1264	1175	441
Grp Volume(v), veh/h	9	0	702	89	0	591	136	0	92	34	0	33
Grp Sat Flow(s),veh/h/ln	832	0	1691	756	0	1742	1391	0	1438	1264	0	1615
Q Serve(g_s), s	0.3	0.0	13.7	4.4	0.0	9.9	3.3	0.0	2.5	1.1	0.0	0.8
Cycle Q Clear(g_c), s	10.2	0.0	13.7	18.1	0.0	9.9	4.1	0.0	2.5	5.2	0.0	0.8
Prop In Lane	1.00		0.12	1.00		0.02	0.82		1.00	1.00		0.27
Lane Grp Cap(c), veh/h	451	0	965	361	0	993	403	0	266	279	0	299
V/C Ratio(X)	0.02	0.00	0.73	0.25	0.00	0.60	0.34	0.00	0.35	0.12	0.00	0.11
Avail Cap(c_a), veh/h	1356	0	2804	1183	0	2887	1234	0	1104	1016	0	1240
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.6	0.0	7.1	13.7	0.0	6.3	16.7	0.0	15.9	19.0	0.0	15.2
Incr Delay (d2), s/veh	0.0	0.0	1.1	0.4	0.0	0.6	0.5	0.0	0.8	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.1	0.0	5.9	1.2	0.0	4.3	2.1	0.0	1.4	0.6	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.6	0.0	8.2	14.1	0.0	6.9	17.1	0.0	16.7	19.2	0.0	15.4
LnGrp LOS	A	A	A	B	A	A	B	A	B	B	A	B
Approach Vol, veh/h		711			680			228			67	
Approach Delay, s/veh		8.2			7.8			17.0			17.3	
Approach LOS		A			A			B			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	13.8	31.1	13.8	31.1
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5
Max Green Setting (Gmax), s	34.5	74.5	34.5	74.5
Max Q Clear Time (g_c+I1), s	6.1	15.7	7.2	20.1
Green Ext Time (p_c), s	1.2	6.3	0.2	5.5

Intersection Summary	
HCM 6th Ctrl Delay	9.6
HCM 6th LOS	A

Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	13	5	0	0	0	8	0	0	0	0	16
Future Vol, veh/h	17	13	5	0	0	0	8	0	0	0	0	16
Conflicting Peds, #/hr	3	0	17	23	0	9	17	0	7	9	0	3
Sign Control	Free	Free	Free	Yield	Yield	Yield	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	1080	147968	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	67	67	67	67	67	67	67	67	67	67	67	67
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	25	19	7	0	0	0	12	0	0	0	0	24

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	3	0	0	119	93	49	85	96	20
Stage 1	-	-	-	90	90	-	3	3	-
Stage 2	-	-	-	29	3	-	82	93	-
Critical Hdwy	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	6.1	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1632	-	-	861	801	1025	906	798	1064
Stage 1	-	-	-	922	824	-	-	-	-
Stage 2	-	-	-	-	-	-	931	822	-
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	1627	-	-	804	773	1008	892	770	1044
Mov Cap-2 Maneuver	-	-	-	804	773	-	892	770	-
Stage 1	-	-	-	892	798	-	-	-	-
Stage 2	-	-	-	-	-	-	916	796	-

Approach	EB	NB	SB
HCM Control Delay, s	3.5	9.5	8.5
HCM LOS		A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	804	1627	-	-	1044
HCM Lane V/C Ratio	0.015	0.016	-	-	0.023
HCM Control Delay (s)	9.5	7.2	0	-	8.5
HCM Lane LOS	A	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0.1

Intersection	
Int Delay, s/veh	1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	0	12	1	0	10
Future Vol, veh/h	3	0	12	1	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	3	0	13	1	0	11

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	25	14	0	0	14	0
Stage 1	14	-	-	-	-	-
Stage 2	11	-	-	-	-	-
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	996	1072	-	-	1617	-
Stage 1	1014	-	-	-	-	-
Stage 2	1017	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	996	1072	-	-	1617	-
Mov Cap-2 Maneuver	996	-	-	-	-	-
Stage 1	1014	-	-	-	-	-
Stage 2	1017	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.6	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	996	1617	-
HCM Lane V/C Ratio	-	-	0.003	-	-
HCM Control Delay (s)	-	-	8.6	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

2027 Peak Hour Intersection Level of Service with the Project

HCM 6th Signalized Intersection Summary
1: Bothell Way NE (SR 522) & NE 170th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	83	22	53	7	18	19	60	1723	4	21	1340	16
Future Volume (veh/h)	83	22	53	7	18	19	60	1723	4	21	1340	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	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1750	1750	1723	1723	1723	1736	1736	1736	1723	1723	1723
Adj Flow Rate, veh/h	86	23	55	7	19	20	62	1776	4	22	1381	16
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	2	2	2	1	1	1	2	2	2
Cap, veh/h	109	24	324	26	59	46	78	2160	942	32	2054	915
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.05	0.65	0.65	0.04	1.00	1.00
Sat Flow, veh/h	314	111	1483	0	272	209	1654	3299	1438	1641	3273	1459
Grp Volume(v), veh/h	109	0	55	46	0	0	62	1776	4	22	1381	16
Grp Sat Flow(s),veh/h/ln	425	0	1483	480	0	0	1654	1650	1438	1641	1637	1459
Q Serve(g_s), s	0.0	0.0	4.8	0.0	0.0	0.0	5.9	64.4	0.2	2.1	0.0	0.0
Cycle Q Clear(g_c), s	35.0	0.0	4.8	35.0	0.0	0.0	5.9	64.4	0.2	2.1	0.0	0.0
Prop In Lane	0.79		1.00	0.15		0.43	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	133	0	324	131	0	0	78	2160	942	32	2054	915
V/C Ratio(X)	0.82	0.00	0.17	0.35	0.00	0.00	0.80	0.82	0.00	0.69	0.67	0.02
Avail Cap(c_a), veh/h	133	0	324	131	0	0	202	2160	942	149	2054	915
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	64.4	0.0	50.7	52.1	0.0	0.0	75.5	20.6	9.6	76.4	0.0	0.0
Incr Delay (d2), s/veh	31.4	0.0	0.2	1.6	0.0	0.0	16.8	3.7	0.0	23.0	1.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.6	0.0	3.3	2.8	0.0	0.0	5.2	32.3	0.1	1.9	0.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	95.8	0.0	51.0	53.7	0.0	0.0	92.3	24.3	9.6	99.4	1.8	0.0
LnGrp LOS	F	A	D	D	A	A	F	C	A	F	A	A
Approach Vol, veh/h		164			46			1842			1419	
Approach Delay, s/veh		80.8			53.7			26.6			3.3	
Approach LOS		F			D			C			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.6	110.9		40.5	13.0	106.5		40.5				
Change Period (Y+Rc), s	5.5	6.1		* 5.5	5.5	6.1		5.5				
Max Green Setting (Gmax), s	14.5	93.9		* 35	19.5	88.9		34.5				
Max Q Clear Time (g_c+I1), s	4.1	66.4		37.0	7.9	2.0		37.0				
Green Ext Time (p_c), s	0.0	16.3		0.0	0.1	15.1		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		20.0
HCM 6th LOS		B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.4

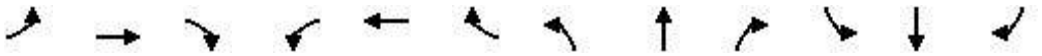
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	87	0	1826	1289	82
Future Vol, veh/h	0	87	0	1826	1289	82
Conflicting Peds, #/hr	0	2	0	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	100	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	0	89	0	1863	1315	84

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	662	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.92	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.31	-	-	-	-
Pot Cap-1 Maneuver	0	407	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	405	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	405	-	-
HCM Lane V/C Ratio	-	0.219	-	-
HCM Control Delay (s)	-	16.4	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.8	-	-

HCM 6th Signalized Intersection Summary
3: Bothell Way NE (SR 522) & Ballinger Way (SR 104)/Ballinger Way



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	657	18	164	9	9	10	219	1573	8	18	1218	646
Future Volume (veh/h)	657	18	164	9	9	10	219	1573	8	18	1218	646
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		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1736	1736	1736	1750	1750	1750	1736	1736	1736	1736	1736	1736
Adj Flow Rate, veh/h	677	0	0	9	9	10	221	1589	8	18	1230	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	1	1	1	0	0	0	1	1	1	1	1	1
Cap, veh/h	649	0		12	12	13	239	2051	886	28	1632	
Arrive On Green	0.20	0.00	0.00	0.02	0.02	0.02	0.29	1.00	1.00	0.02	0.49	0.00
Sat Flow, veh/h	3307	0	1471	521	521	579	1654	3299	1424	1654	3299	1471
Grp Volume(v), veh/h	677	0	0	28	0	0	221	1589	8	18	1230	0
Grp Sat Flow(s),veh/h/ln	1654	0	1471	1620	0	0	1654	1650	1424	1654	1650	1471
Q Serve(g_s), s	31.4	0.0	0.0	2.8	0.0	0.0	20.8	0.0	0.0	1.7	48.1	0.0
Cycle Q Clear(g_c), s	31.4	0.0	0.0	2.8	0.0	0.0	20.8	0.0	0.0	1.7	48.1	0.0
Prop In Lane	1.00		1.00	0.32		0.36	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	649	0		36	0	0	239	2051	886	28	1632	
V/C Ratio(X)	1.04	0.00		0.78	0.00	0.00	0.93	0.77	0.01	0.63	0.75	
Avail Cap(c_a), veh/h	649	0		147	0	0	305	2051	886	150	1632	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	0.53	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	64.3	0.0	0.0	77.8	0.0	0.0	56.1	0.0	0.0	78.1	32.6	0.0
Incr Delay (d2), s/veh	37.7	0.0	0.0	29.1	0.0	0.0	28.8	2.9	0.0	20.9	3.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	22.1	0.0	0.0	2.6	0.0	0.0	14.5	1.5	0.0	1.6	26.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	102.0	0.0	0.0	107.0	0.0	0.0	84.9	2.9	0.0	99.0	35.8	0.0
LnGrp LOS	F	A		F	A	A	F	A	A	F	D	
Approach Vol, veh/h		677			28			1818			1248	
Approach Delay, s/veh		102.0			107.0			12.9			36.8	
Approach LOS		F			F			B			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.3	105.7		37.0	28.6	85.4		9.1				
Change Period (Y+Rc), s	5.5	6.2		5.6	5.5	6.2		5.5				
Max Green Setting (Gmax), s	14.5	76.8		31.4	29.5	61.8		14.5				
Max Q Clear Time (g_c+I1), s	3.7	2.0		33.4	22.8	50.1		4.8				
Green Ext Time (p_c), s	0.0	19.7		0.0	0.3	6.3		0.0				

Intersection Summary		
HCM 6th Ctrl Delay	37.5	
HCM 6th LOS	D	

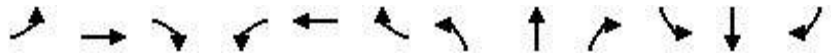
Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

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

HCM 6th Signalized Intersection Summary
4: NE 175th St & Ballinger Way (SR 104)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	738	125	68	801	33	192	59	88	31	58	16
Future Volume (veh/h)	16	738	125	68	801	33	192	59	88	31	58	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		0.98	0.99		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1750	1750	1750	1750	1750	1736	1736	1736	1736	1736	1736
Adj Flow Rate, veh/h	16	753	128	69	817	34	196	60	90	32	59	16
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0	1	1	1	1	1	1
Cap, veh/h	244	898	153	212	1030	43	312	74	381	145	342	93
Arrive On Green	0.62	0.62	0.62	0.62	0.62	0.62	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	658	1453	247	640	1667	69	928	284	1460	1247	1311	356
Grp Volume(v), veh/h	16	0	881	69	0	851	256	0	90	32	0	75
Grp Sat Flow(s),veh/h/ln	658	0	1700	640	0	1736	1212	0	1460	1247	0	1667
Q Serve(g_s), s	1.7	0.0	37.3	8.7	0.0	33.4	15.8	0.0	4.4	2.3	0.0	3.2
Cycle Q Clear(g_c), s	35.1	0.0	37.3	46.1	0.0	33.4	18.9	0.0	4.4	21.2	0.0	3.2
Prop In Lane	1.00		0.15	1.00		0.04	0.77		1.00	1.00		0.21
Lane Grp Cap(c), veh/h	244	0	1051	212	0	1073	387	0	381	145	0	435
V/C Ratio(X)	0.07	0.00	0.84	0.33	0.00	0.79	0.66	0.00	0.24	0.22	0.00	0.17
Avail Cap(c_a), veh/h	377	0	1394	341	0	1423	552	0	554	293	0	633
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.2	0.0	13.8	32.0	0.0	13.0	33.3	0.0	26.4	41.8	0.0	26.0
Incr Delay (d2), s/veh	0.1	0.0	3.6	0.9	0.0	2.3	1.9	0.0	0.3	0.8	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.5	0.0	19.4	2.5	0.0	17.7	9.3	0.0	2.8	1.3	0.0	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.3	0.0	17.4	32.9	0.0	15.3	35.2	0.0	26.8	42.6	0.0	26.2
LnGrp LOS	C	A	B	C	A	B	D	A	C	D	A	C
Approach Vol, veh/h		897			920			346			107	
Approach Delay, s/veh		17.5			16.7			33.0			31.1	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	29.2	61.7	29.2	61.7
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5
Max Green Setting (Gmax), s	34.5	74.5	34.5	74.5
Max Q Clear Time (g_c+I1), s	20.9	39.3	23.2	48.1
Green Ext Time (p_c), s	1.6	8.7	0.3	8.1

Intersection Summary	
HCM 6th Ctrl Delay	20.2
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	21	20	7	0	0	0	13	0	0	0	0	27
Future Vol, veh/h	21	20	7	0	0	0	13	0	0	0	0	27
Conflicting Peds, #/hr	6	0	18	18	0	0	24	0	6	6	0	6
Sign Control	Free	Free	Free	Yield	Yield	Yield	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	1080	147968	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	69	69	69	69	69	69	69	69	69	69	69
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	30	29	10	0	0	0	19	0	0	0	0	39

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	6	0	0	156	118	58	106	123	30
Stage 1	-	-	-	112	112	-	6	6	-
Stage 2	-	-	-	44	6	-	100	117	-
Critical Hdwy	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	6.1	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1628	-	-	815	776	1014	878	771	1050
Stage 1	-	-	-	898	807	-	-	-	-
Stage 2	-	-	-	-	-	-	911	803	-
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	1619	-	-	742	744	997	860	739	1020
Mov Cap-2 Maneuver	-	-	-	742	744	-	860	739	-
Stage 1	-	-	-	866	778	-	-	-	-
Stage 2	-	-	-	-	-	-	894	774	-

Approach	EB	NB	SB
HCM Control Delay, s	3.2	10	8.7
HCM LOS		B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	742	1619	-	-	1020
HCM Lane V/C Ratio	0.025	0.019	-	-	0.038
HCM Control Delay (s)	10	7.3	0	-	8.7
HCM Lane LOS	B	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	2.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	0	12	8	0	11
Future Vol, veh/h	14	0	12	8	0	11
Conflicting Peds, #/hr	6	0	0	1	1	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	48	48	48	48	48	48
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	29	0	25	17	0	23

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	64	35	0	0	43	0
Stage 1	35	-	-	-	-	-
Stage 2	29	-	-	-	-	-
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	947	1044	-	-	1579	-
Stage 1	993	-	-	-	-	-
Stage 2	999	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	940	1043	-	-	1577	-
Mov Cap-2 Maneuver	940	-	-	-	-	-
Stage 1	992	-	-	-	-	-
Stage 2	993	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	940	1577	-
HCM Lane V/C Ratio	-	-	0.031	-	-
HCM Control Delay (s)	-	-	9	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

HCM 6th Signalized Intersection Summary
1: Bothell Way NE (SR 522) & NE 170th St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	10	61	7	5	23	82	1212	3	20	1202	24
Future Volume (veh/h)	85	10	61	7	5	23	82	1212	3	20	1202	24
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		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1750	1750	1723	1723	1723	1736	1736	1736	1723	1723	1723
Adj Flow Rate, veh/h	88	10	63	7	5	24	85	1249	3	21	1239	25
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	2	2	2	1	1	1	2	2	2
Cap, veh/h	163	15	310	41	37	84	106	2084	898	34	1926	857
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.06	0.63	0.63	0.02	0.59	0.59
Sat Flow, veh/h	505	73	1483	26	176	404	1654	3299	1421	1641	3273	1456
Grp Volume(v), veh/h	98	0	63	36	0	0	85	1249	3	21	1239	25
Grp Sat Flow(s),veh/h/ln	578	0	1483	606	0	0	1654	1650	1421	1641	1637	1456
Q Serve(g_s), s	0.0	0.0	4.2	0.4	0.0	0.0	6.1	26.9	0.1	1.5	30.1	0.9
Cycle Q Clear(g_c), s	22.8	0.0	4.2	23.2	0.0	0.0	6.1	26.9	0.1	1.5	30.1	0.9
Prop In Lane	0.90		1.00	0.19		0.67	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	178	0	310	163	0	0	106	2084	898	34	1926	857
V/C Ratio(X)	0.55	0.00	0.20	0.22	0.00	0.00	0.80	0.60	0.00	0.61	0.64	0.03
Avail Cap(c_a), veh/h	296	0	433	283	0	0	200	2084	898	198	1926	857
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.3	0.0	39.2	39.4	0.0	0.0	55.4	13.1	8.2	58.3	16.3	10.3
Incr Delay (d2), s/veh	2.7	0.0	0.3	0.7	0.0	0.0	13.0	1.3	0.0	16.2	1.7	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.4	0.0	2.8	1.6	0.0	0.0	5.2	14.4	0.1	1.4	16.2	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.9	0.0	39.5	40.1	0.0	0.0	68.4	14.4	8.2	74.5	18.0	10.4
LnGrp LOS	D	A	D	D	A	A	E	B	A	E	B	B
Approach Vol, veh/h		161			36			1337			1285	
Approach Delay, s/veh		45.3			40.1			17.8			18.8	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.0	81.8		30.2	13.2	76.6		30.2				
Change Period (Y+Rc), s	5.5	6.1		5.0	5.5	6.1		5.0				
Max Green Setting (Gmax), s	14.5	53.9		35.0	14.5	53.9		35.0				
Max Q Clear Time (g_c+I1), s	3.5	28.9		24.8	8.1	32.1		25.2				
Green Ext Time (p_c), s	0.0	9.8		0.4	0.1	9.2		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			20.1									
HCM 6th LOS			C									

Intersection	
Int Delay, s/veh	0.3

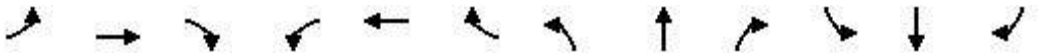
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	48	0	1311	1247	69
Future Vol, veh/h	0	48	0	1311	1247	69
Conflicting Peds, #/hr	0	2	0	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	100	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	1	1	1	1
Mvmt Flow	0	51	0	1380	1313	73

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	661	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	410	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	408	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	408	-	-
HCM Lane V/C Ratio	-	0.124	-	-
HCM Control Delay (s)	-	15.1	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.4	-	-

HCM 6th Signalized Intersection Summary
3: Bothell Way NE (SR 522) & Ballinger Way (SR 104)/Ballinger Way



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	528	17	159	13	9	10	162	1137	13	13	1144	492
Future Volume (veh/h)	528	17	159	13	9	10	162	1137	13	13	1144	492
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		0.94	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1750	1750	1750	1750	1750	1736	1736	1736	1736	1736	1736
Adj Flow Rate, veh/h	569	0	0	14	9	11	171	1197	14	14	1204	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	1	1	1	1	1	1
Cap, veh/h	727	0		19	12	15	199	1809	760	26	1462	
Arrive On Green	0.22	0.00	0.00	0.03	0.03	0.03	0.04	0.18	0.18	0.02	0.44	0.00
Sat Flow, veh/h	3333	0	1483	668	429	525	1654	3299	1386	1654	3299	1471
Grp Volume(v), veh/h	569	0	0	34	0	0	171	1197	14	14	1204	0
Grp Sat Flow(s),veh/h/ln	1667	0	1483	1622	0	0	1654	1650	1386	1654	1650	1471
Q Serve(g_s), s	19.3	0.0	0.0	2.5	0.0	0.0	12.3	40.5	1.0	1.0	38.4	0.0
Cycle Q Clear(g_c), s	19.3	0.0	0.0	2.5	0.0	0.0	12.3	40.5	1.0	1.0	38.4	0.0
Prop In Lane	1.00		1.00	0.41		0.32	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	727	0		46	0	0	199	1809	760	26	1462	
V/C Ratio(X)	0.78	0.00		0.74	0.00	0.00	0.86	0.66	0.02	0.54	0.82	
Avail Cap(c_a), veh/h	872	0		155	0	0	269	1809	760	131	1462	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	0.72	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	44.2	0.0	0.0	57.9	0.0	0.0	56.6	38.8	22.6	58.6	29.3	0.0
Incr Delay (d2), s/veh	2.8	0.0	0.0	20.7	0.0	0.0	18.2	1.9	0.0	16.7	5.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	12.2	0.0	0.0	2.3	0.0	0.0	10.7	25.3	0.6	1.0	22.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.1	0.0	0.0	78.6	0.0	0.0	74.8	40.7	22.7	75.4	34.7	0.0
LnGrp LOS	D	A		E	A	A	E	D	C	E	C	
Approach Vol, veh/h		569			34			1382			1218	
Approach Delay, s/veh		47.1			78.6			44.7			35.1	
Approach LOS		D			E			D			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.4	72.0		31.8	20.0	59.4		8.9				
Change Period (Y+Rc), s	5.5	6.2		5.6	5.5	6.2		5.5				
Max Green Setting (Gmax), s	9.5	44.8		31.4	19.5	34.8		11.5				
Max Q Clear Time (g_c+I1), s	3.0	42.5		21.3	14.3	40.4		4.5				
Green Ext Time (p_c), s	0.0	1.6		1.6	0.2	0.0		0.0				

Intersection Summary		
HCM 6th Ctrl Delay	41.9	
HCM 6th LOS	D	

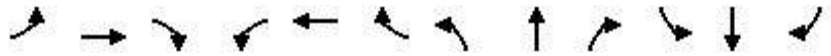
Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

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

HCM 6th Signalized Intersection Summary
4: NE 175th St & Ballinger Way (SR 104)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	585	83	85	550	13	105	24	87	32	23	9
Future Volume (veh/h)	9	585	83	85	550	13	105	24	87	32	23	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.98	0.98		0.97	0.99		0.95
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	1736	1736	1736	1750	1750	1750	1750	1750	1750	1723	1723	1723
Adj Flow Rate, veh/h	9	616	87	89	579	14	111	25	92	34	24	9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	0	0	0	0	0	0	2	2	2
Cap, veh/h	450	846	119	361	971	23	341	62	266	278	217	81
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.18	0.18	0.18	0.18	0.18	0.18
Sat Flow, veh/h	831	1482	209	755	1700	41	1058	333	1438	1264	1175	441
Grp Volume(v), veh/h	9	0	703	89	0	593	136	0	92	34	0	33
Grp Sat Flow(s),veh/h/ln	831	0	1691	755	0	1742	1390	0	1438	1264	0	1615
Q Serve(g_s), s	0.3	0.0	13.7	4.4	0.0	10.0	3.3	0.0	2.5	1.1	0.0	0.8
Cycle Q Clear(g_c), s	10.3	0.0	13.7	18.2	0.0	10.0	4.1	0.0	2.5	5.2	0.0	0.8
Prop In Lane	1.00		0.12	1.00		0.02	0.82		1.00	1.00		0.27
Lane Grp Cap(c), veh/h	450	0	966	361	0	994	402	0	266	278	0	299
V/C Ratio(X)	0.02	0.00	0.73	0.25	0.00	0.60	0.34	0.00	0.35	0.12	0.00	0.11
Avail Cap(c_a), veh/h	1350	0	2798	1179	0	2881	1232	0	1102	1014	0	1238
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.6	0.0	7.1	13.8	0.0	6.3	16.7	0.0	16.0	19.0	0.0	15.3
Incr Delay (d2), s/veh	0.0	0.0	1.1	0.4	0.0	0.6	0.5	0.0	0.8	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.1	0.0	5.9	1.2	0.0	4.3	2.2	0.0	1.4	0.6	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.7	0.0	8.2	14.1	0.0	6.9	17.2	0.0	16.8	19.2	0.0	15.4
LnGrp LOS	A	A	A	B	A	A	B	A	B	B	A	B
Approach Vol, veh/h		712			682			228			67	
Approach Delay, s/veh		8.2			7.8			17.0			17.3	
Approach LOS		A			A			B			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	13.8	31.2	13.8	31.2
Change Period (Y+Rc), s	5.5	5.5	5.5	5.5
Max Green Setting (Gmax), s	34.5	74.5	34.5	74.5
Max Q Clear Time (g_c+I1), s	6.1	15.7	7.2	20.2
Green Ext Time (p_c), s	1.2	6.3	0.2	5.5

Intersection Summary	
HCM 6th Ctrl Delay	9.6
HCM 6th LOS	A

Intersection	
Int Delay, s/veh	6.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	24	13	5	0	0	0	8	0	0	0	0	25
Future Vol, veh/h	24	13	5	0	0	0	8	0	0	0	0	25
Conflicting Peds, #/hr	3	0	17	23	0	9	17	0	7	9	0	3
Sign Control	Free	Free	Free	Yield	Yield	Yield	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	1080	147968	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	67	67	67	67	67	67	67	67	67	67	67	67
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	36	19	7	0	0	0	12	0	0	0	0	37

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	3	0	0	148	115	49	107	118	20
Stage 1	-	-	-	112	112	-	3	3	-
Stage 2	-	-	-	36	3	-	104	115	-
Critical Hdwy	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	6.1	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1632	-	-	825	779	1025	877	776	1064
Stage 1	-	-	-	898	807	-	-	-	-
Stage 2	-	-	-	-	-	-	907	804	-
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	1627	-	-	757	747	1008	859	744	1044
Mov Cap-2 Maneuver	-	-	-	757	747	-	859	744	-
Stage 1	-	-	-	864	776	-	-	-	-
Stage 2	-	-	-	-	-	-	887	773	-

Approach	EB	NB	SB
HCM Control Delay, s	4.1	9.8	8.6
HCM LOS		A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	757	1627	-	-	1044
HCM Lane V/C Ratio	0.016	0.022	-	-	0.036
HCM Control Delay (s)	9.8	7.3	0	-	8.6
HCM Lane LOS	A	A	A	-	A
HCM 95th %tile Q(veh)	0	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	2.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	0	12	8	0	10
Future Vol, veh/h	12	0	12	8	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	13	0	13	9	0	11

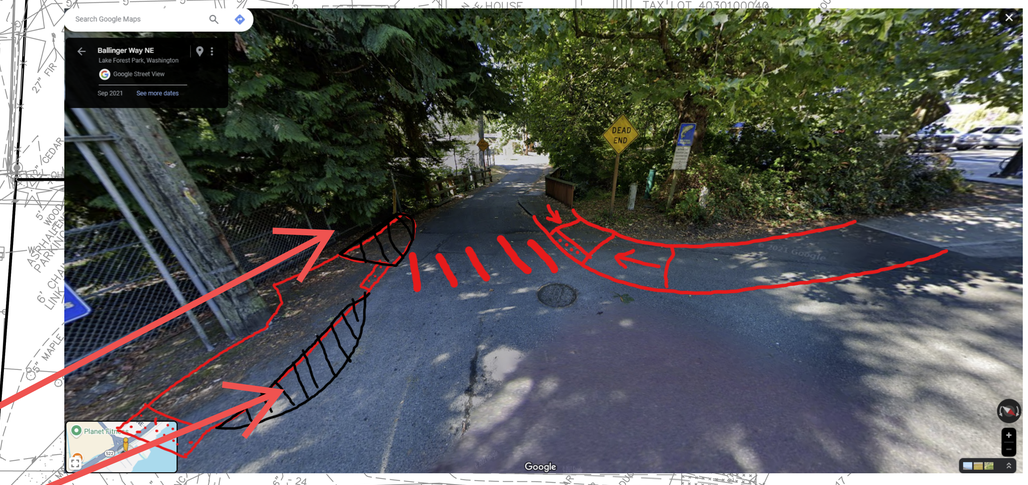
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	29	18	0	0	22	0
Stage 1	18	-	-	-	-	-
Stage 2	11	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	991	1066	-	-	1607	-
Stage 1	1010	-	-	-	-	-
Stage 2	1017	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	991	1066	-	-	1607	-
Mov Cap-2 Maneuver	991	-	-	-	-	-
Stage 1	1010	-	-	-	-	-
Stage 2	1017	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.7	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	991	1607	-
HCM Lane V/C Ratio	-	-	0.013	-	-
HCM Control Delay (s)	-	-	8.7	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

OPTION 1 CROSSWALK
(AT GRADE WALKWAY BEHIND ISLAND BUMPS)

BLACK = ISLANDS



Power pole

Stop-bar and stop sign (Typ)

Receiving ADA ramp to proposed sidewalk

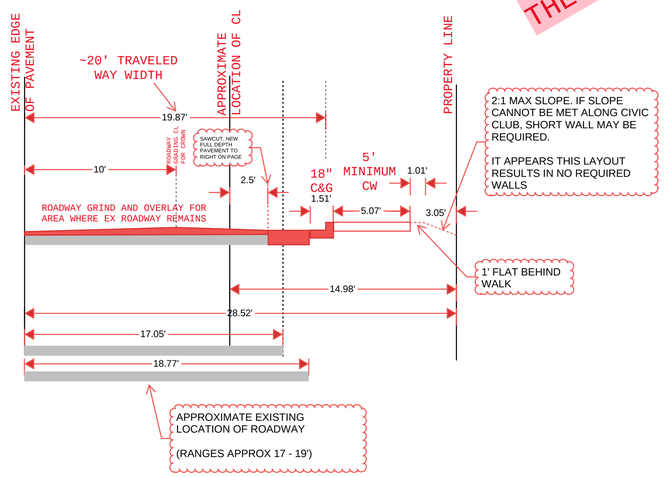
Stop-bar and stop sign may not be needed in this location if crosswalk is as shown

This driveway is already a oneway. Cars are not exiting this driveway

Power pole

New sidewalk and ADA ramp to crosswalk

TYPICAL NEW ROADWAY AND SIDEWALK SECTION



ROADWAY CROSS SECTION IS THE SAME BETWEEN OPTIONS

LEGEND

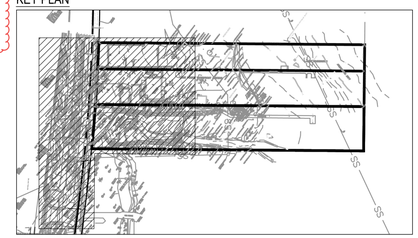
—— LIMITS —— LIMIT OF WORK

KEY NOTES

1
2
3

NOTES

KEY PLAN



20' 10' 0 20' 40'
SCALE: 1" = 20'

Know what's below. Call before you dig.

NO.	DATE	BY	REVISION
			BASE MAP/TOPOGRAPHY PROVIDED BY OTHERS. DCG/WATERSHED CANNOT BE HELD LIABLE FOR ACCURACY. CONTRACTOR SHALL FIELD VERIFY GRADES, UTILITIES, AND ALL OTHER EXISTING FEATURES AND CONDITIONS. IF CONDITIONS ARE NOT AS SHOWN AND/OR PLANS CANNOT BE CONSTRUCTED AS SHOWN, CONTACT DCG/WATERSHED PRIOR TO CONSTRUCTION.

FACET
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Kirkland, WA 98033
P: 425.822.5242
F: 425.827.8136
www.facetnw.com
FEDERAL WAY | KIRKLAND | MOUNT VERNON | SEATTLE | SPOKANE | WHIDBEY ISLAND

STATE OF WASHINGTON
AMBER V. MIKLUCIAK
No. 3178 EXP. 12/10/25
LICENSED LANDSCAPE ARCHITECT

CALL 811
2 BUSINESS DAYS
BEFORE YOU DIG
(UNDERGROUND UTILITY LOCATIONS ARE APPROX.)

LAKE FOREST PARK LAKEFRONT IMPROVEMENTS
17345 & 17347 BEACH DR NE
LAKE FOREST PARK, WA 98155
2303.0384.01

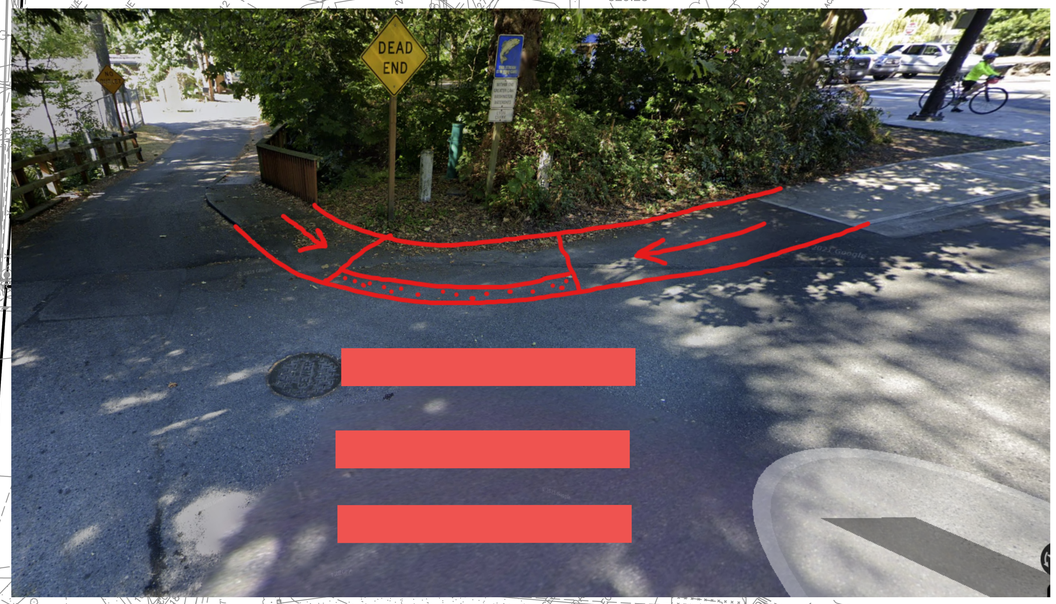
50% DESIGN

SITE DEMOLITION PLAN
(1 OF 2)

DATE: 8/2/2024
PLAN NUMBER:
XXXX
SHEET ___ OF X

PRINCIPAL: ED PROJECT MANAGER: AM DESIGNED BY: XX DRAWN BY: MH CHECKED BY: XX

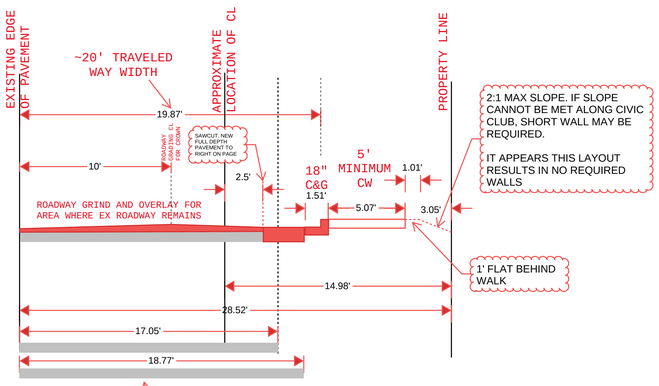
OPTION 2 CROSSWALK (DIAGONAL CROSSWALK)



Continue roadway improvements all throughout project frontage?

Power pole

TYPICAL NEW ROADWAY AND SIDEWALK SECTION



Stop-bar and stop sign (Typ)

New sidewalk and ADA ramp to diagonal crosswalk

Receiving ADA ramp to proposed sidewalk

Stop-bar and stop sign likely needed if diagonal crosswalk is proposed

This driveway is already a oneway. Cars are not exiting this driveway

Power pole

LEGEND

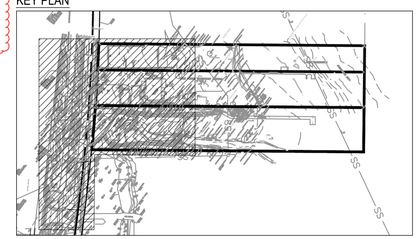
LIMITS — LIMIT OF WORK

KEY NOTES

1
2
3

NOTES

KEY PLAN



20' 10' 0 20' 40'
SCALE: 1" = 20'

Know what's below. Call before you dig.

NO.	DATE	BY	REVISION

BASE MAP/TOPOGRAPHY PROVIDED BY OTHERS. DCG/WATERSHED CANNOT BE HELD LIABLE FOR ACCURACY. CONTRACTOR SHALL FIELD VERIFY GRADES, UTILITIES, AND ALL OTHER EXISTING FEATURES AND CONDITIONS. IF CONDITIONS ARE NOT AS SHOWN AND/OR PLANS CANNOT BE CONSTRUCTED AS SHOWN, CONTACT DCG/WATERSHED PRIOR TO CONSTRUCTION.

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2 BUSINESS DAYS
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17345 & 17347 BEACH DR NE
LAKE FOREST PARK, WA 98155
2303.0384.01

50% DESIGN

SITE DEMOLITION PLAN
(1 OF 2)

DATE: 8/2/2024
PLAN NUMBER:
XXXX
SHEET ____ OF X

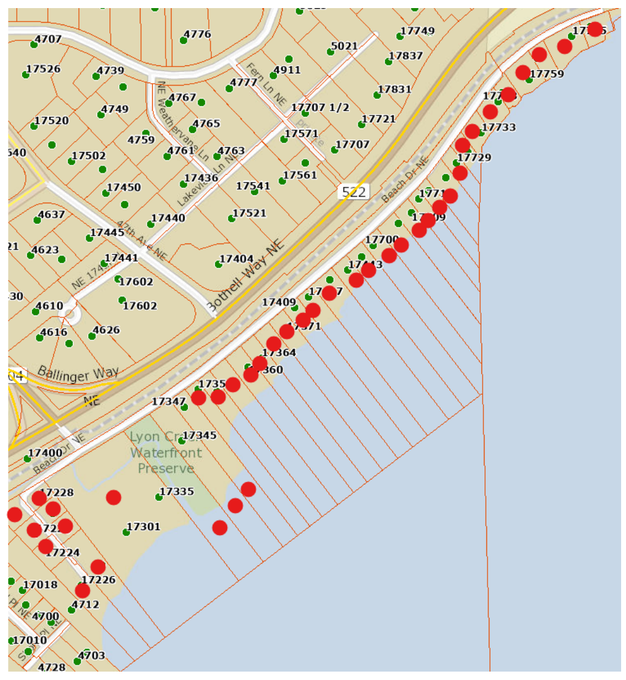
PRINCIPAL: ED PROJECT MANAGER: AM DESIGNED BY: XX DRAWN BY: MH CHECKED BY: XX

2.03(B) Urban Local Access Streets - (Curb Roadway Section)

Classification	Neighborhood Collectors	Subcollectors	Subaccess	Minor Access
Access	Restricted, Lots front on local access street where feasible.	As needed with some restrictions.[1]	Subaccess streets are not supportive of through traffic. Generally permanent cul-de-sacs or short loop[2] streets that connect to subcollectors.	Permanent cul-de-sacs or short loops with low traffic volumes that provide circulation and access to off-street parking within residential development limits.
Public or Private	Public	Public	Public or Private	Public or Private (See Section 2.06)
Serving Potential Number of Lots or Dwelling Units	Over 100[3]	100 Maximum[4]	50 Maximum	16 Maximum
Design Speed[5]	35 mph	30 mph	Low Speed Curve (See Section 2.10)	Low Speed Curve (See Section 2.10)
Max Superelevation	See Section 2.04B	See Section 2.04B	See Section 2.04B	See Section 2.04B
Horizontal Curvature	See Table 2.2	See Table 2.2	Low Speed Curve (See Section 2.10)	Low Speed Curve (See Section 2.10)
Maximum Grade[6]	11%	12%	12%	12%
Minimum Stopping Sight Distance	See Table 2.2	See Table 2.2	150 feet	150feet
Minimum Entering Sight Distance	See Table 2.2	-	-	-
Typical Traveled Way[8]	22 feet[1][7]	22 feet	22 feet	22 feet
Typical Roadway Width[8]	32 feet[7]	28 feet	24 feet	22 feet
Minimum Right-of-Way Width[8]	56 feet	48 feet	40 feet	40 feet
Minimum Half Street Width	20 feet	20 feet	20 feet	20 feet
Minimum One Way Paved Width	20 feet	20 feet	20 feet	20 feet
Minimum Sidewalk Width	See Section 3.02	See Section 3.02	See Section 3.02	See Section 3.02
Curb Type	Vertical	Vertical[1]/Rolled	Vertical/Rolled	Vertical/Rolled

[1] See Section 2.20 for urban exceptions. Also, when Section 2.20 applies the curbing shall be vertical.
[2] See Section 2.15 for one-way loops.
[3] See Section 2.20 for residential access connection requirements.
[4] See Section 2.20 for urban exception criteria.
[5] Design speed is a basis for determining geometric elements and does not imply posted or legally permissible speed.
[6] Maximum grade may be exceeded for short distances. See Section 2.11.
[7] Neighborhood collectors intersecting with arterials shall be 36 feet wide for the first 150 feet. See Section 4.05 for tapers.
[8] Greater traveled way, roadway, and road right-of-way widths may be required for the construction of bike lanes, equestrian trails, other nonmotorized use, or water quality facilities.

Count 39



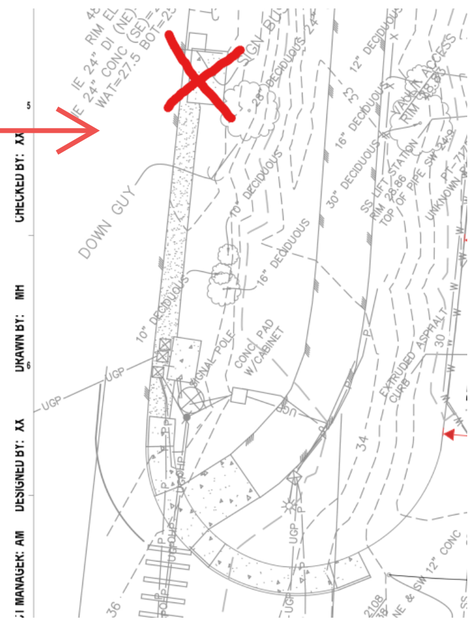
Typical is 22'. But project is recommending 20' width.

1. We are proposing widening the street from existing conditions.

2. For difficulty of construction/grading, adding 2' roadway to the west side of the road doesn't seem worth it. Additionally, sidewalk along this side would further encroach up the hill resulting in tree removal, culvert/infrastructure re-accommodation, and new stormwater infrastructure. City has said few pedestrians access/use roadway from the north curve and bus stop is to be removed (separate project) further limiting pedestrian use this side of the road. No sidewalk recommended on west side.

3. Also note that the existing CB and trench drain located in northern project area ROW aligns w 20' width. Project does not propose to extend this area

5' min width



CULTURAL RESOURCES REPORT COVER SHEET

DAHP Project Number: 2024-02-01232

Author: Whitney Osiensky and Austin Baker

Title of Report: Cultural Resources Assessment for the Lake Forest Park Lakefront Improvements Project 17345 and 17347 Beach Dr NE, Lake Forest Park, King County, Washington

Date of Report: February 2024

County: King Section: 10 Township: 26 Range: 4E

Quad: East Edmonds Acres: 1.91

PDF of report submitted (REQUIRED) ☒ Yes

Historic Property Inventory Forms to be Approved Online? ☐ Yes ☒ No

Archaeological Site(s)/Isolate(s) Found or Amended? ☐ Yes ☒ No

TCP(s) found? ☐ Yes ☒ No

Replace a draft? ☐ Yes ☒ No

Satisfy a DAHP Archaeological Excavation Permit requirement? ☐ Yes # ☒ No

Were Human Remains Found? ☐ Yes DAHP Case # ☒ No

DAHP Archaeological Site #:
_____

- Submission of PDFs is required.
- Please be sure that any PDF submitted to DAHP has its cover sheet, figures, graphics, appendices, attachments, correspondence, etc., compiled into one single PDF file.
- Please check that the PDF displays correctly when opened.

Cultural Resources Assessment for the Lake Forest Park Lakefront Improvements Project 17345 and 17347 Beach Dr NE, Lake Forest Park, King County, Washington

Prepared for:

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February 2024

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Management Summary

ASM Affiliates, Inc. (ASM) contracted with the DCG/Watershed to conduct a cultural resources assessment for the proposed Lake Forest Park Lakefront Improvements Project 17345 and 17347 Beach Dr NE in Lake Forest Park, King County, Washington. The proposed project consists of acquiring and developing a 1.91-acres adjacent to the Lyon Creek Waterfront Preserve. The project includes funding through the Washington State Recreation and Conservation Office using the Washington Wildlife and Recreation Program (PRISM Project #20-1862). The purpose of the assessment was to evaluate the project for the potential effects on archaeological or historic resources. ASM's efforts included a literature review of site forms and previous cultural resources reports on file at the Washington State Department of Archaeology and Historic Preservation as well as pertinent environmental, historic, and ethnographic maps and documentation; a field inventory of the Project area; and preparation of this technical report to fully document the results of the inventory in compliance with Governor's Executive Order 21-02.

During the assessment ASM identified historic structures at 17345 and 17347 Beach Drive. Although the structures are over 50 years old and thus represents a historic resource, they have previously been determined ineligible for the National Register of Historic Places (Borth 2021).

1. Introduction

This report presents the results of a cultural resources assessment conducted by ASM Affiliates, Inc. (ASM) for the Lake Forest Park Lakefront Improvements Project 17345 and 17347 Beach Dr NE in Lake Forest Park, King County, Washington. The project consists of acquiring and developing a 1.91-acres adjacent to the Lyon Creek Waterfront Preserve. The project includes funding through the Washington State Recreation and Conservation Office (RCO) using the Washington Wildlife and Recreation Program (WWRP) under PRISM Project #20-1862. The purpose of the assessment was to evaluate the project for the potential effects on archaeological or historic resources. ASM's efforts included a literature review of site forms and previous cultural resources reports on file at the Washington State Department of Archaeology and Historic Preservation (DAHP) as well as pertinent environmental, historic, and ethnographic maps and documentation; a field inventory of the Project area; and preparation of this technical report to fully document the results of the inventory in compliance with Governor's Executive Order 21-02 (EO 21-02). During the assessment ASM identified historic structures at 17345 and 17347 Beach Drive. Background research determined the structures spanning both properties has previously been determined ineligible for the NRHP.

After the introductory chapter, this report includes chapters on the archaeological context, briefly describing the environment, culture history and previous research; on research design and field methods; on field results; and on recommendations for further archaeological work associated with the proposed project.

Project Description and Background

The City of Lake Forest Park (the City) will use a grant from the RCO to acquire 1.91 acres on the northwest shores of Lake Washington. Goals for the project are to increase the park acres to population ratio, provide water access for the community while also providing pedestrian park access located approximately 350-feet off the highly used Burke-Gilman Trail. The purchase of this property will provide active and recreational access to grassy park land, approximately 150-feet of sandy beach, a dock, and the lake for local and regional park usage.

Currently, the property has one single family residence, built in 1930, as well as smaller cabin style structures, and garages on the property built from 1931-1937. The City plans to retain the main house as a potential community gathering place and one or two cabins to recognize the historic significance of the property combined with education. A bathroom and picnic shelter(s) would also be looked at to replace the existing cabin and garage that are in poor condition. The grassy area will be kept open for water access and recreation use. Currently the City is in the early stage of the project which is a rigorous planning process with community involvement. In 2024, using RCO funding, the City will conduct selective demolition and architectural deconstruction and salvage of several cabins and the carport. This initial phase of demolition with have little to no ground disturbance. Detail design and construction will also continue in upcoming years that the City applies for additional funding.

One single-family residence and six cottages on the subject properties were evaluated for the NRHP in 2021. These structures were determined in eligible under Criterion A, B, C, D.

DAHP and Tribal Consultation

At the time of reporting the RCO is the lead state agency for this project and will coordinate with DAHP and Tribal cultural resources staff for cultural resources compliance. The project is being funded through the RCO's Recreation and Conservation Funding Board under PRISM Project #20-1862. If federal funding for the project is acquired, then the RCO will work with the agency to conduct government to government consultation.

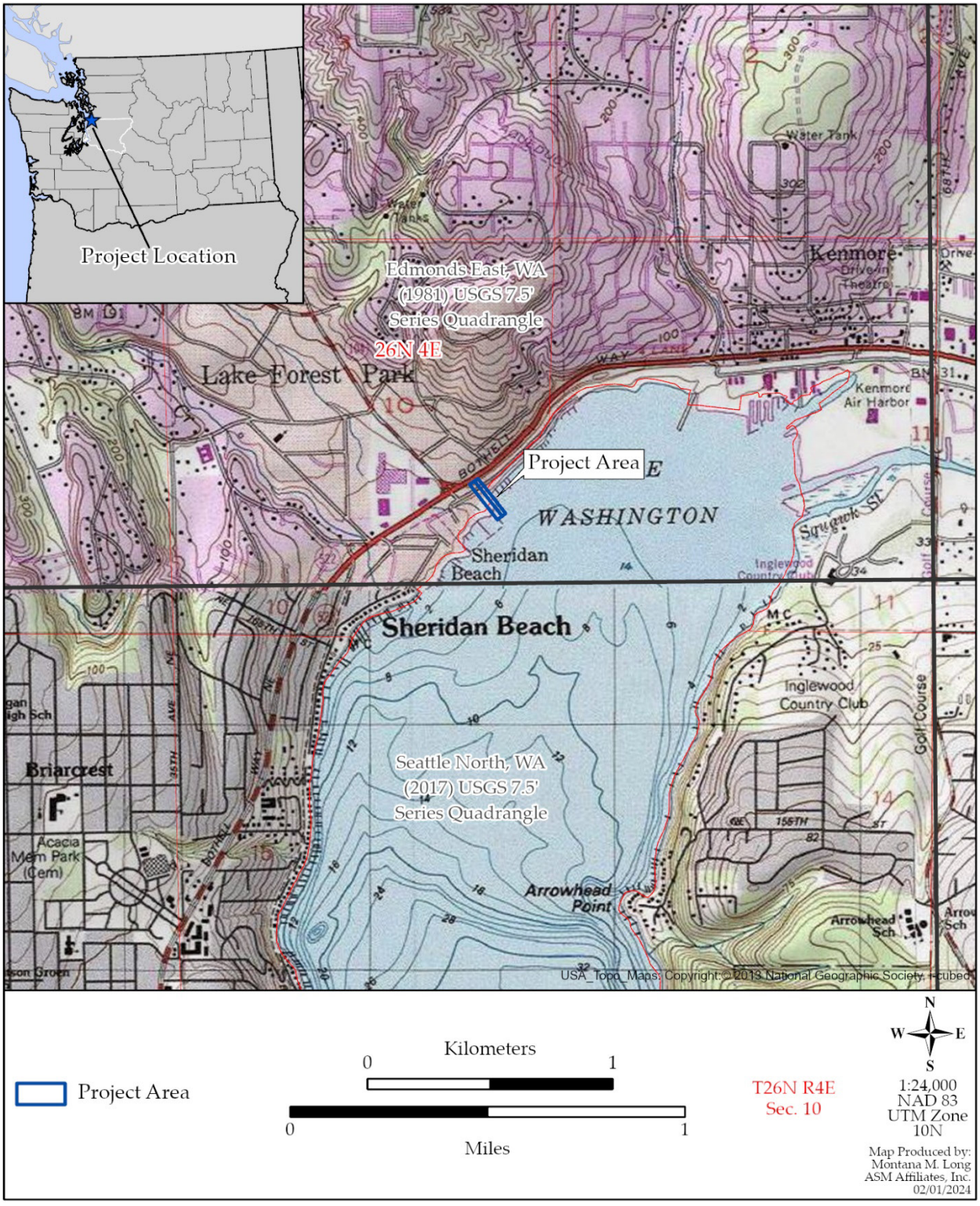

Figure 1. Lakefront Property Project APE Location

2. Archaeological Context

This chapter reviews the environmental setting and the precontact, ethnohistoric, and historic cultural sequences of the project vicinity and summarizes how pertinent investigations in the general region have contributed to the current constructions of cultural history.

Environmental Setting

Environmental factors affecting human land-use patterns in the current project vicinity include Pleistocene glaciation and Holocene climate change. The Cordilleran Ice Sheet began moving south from the coastal mountains of British Columbia approximately 20,000 years ago, representing the last advance of a continental glacier through the Puget Lowland. The Puget Lobe of the Cordilleran Ice Sheet progressed south through the Puget Sound Basin from Canada, reaching its southern limit approximately 17,000 years ago (Porter and Swanson 1998). The advancing glacier blocked drainage channels that previously flowed to the north into Puget Sound and the Strait of Juan de Fuca, forming lakes south of the Cordilleran Ice Sheet. Glacial outwash and ancestral channels of contemporary river systems in the Puget Lowland drained south through the Chehalis River Valley. Puget Sound embayments formed as the advancing glacier cut deep troughs through bedrock and previous glacial deposits. As the Puget Lobe of the Cordilleran Ice Sheet reached its maximum southern extent approximately 30 kilometers (km) south of Olympia by around 17,000 years ago, the southern edge of the ice sheet remained stationary and stagnated for a short period (Porter and Swanson 1998:210). At around 16,950 years ago, the Puget Lobe receded rapidly northward (Porter and Swanson 1998:210; Thorson 1981). After the retreat of the glacier, sea level of Puget Sound and much of the world was still lower than it is today. Sea level was rising relative to ground surfaces approximately 9,000 years ago, and the surface elevation of Puget Sound was probably within 5 to 9 meters (m) (16 to 30 ft.) of its present elevation by around 5,000 years ago (Beale 1991; Eronen et al. 1987).

Vegetation patterns in western Washington shifted at least three times in the past 14,000 years due to regional climate changes in the Pacific Northwest. The northern Puget Sound was characterized by a cool, dry climate between approximately 13,000 and 12,000 B.P. Vegetation at this time included grasslands within open forests of sparse lodgepole pine (*Pinus contorta*), sedges (Cyperaceae), sagebrush (*Artemisia* sp.), and an assortment of herbs (Barnosky et al. 1987; Brubaker 1991; Whitlock 1992). Regional climate warmed by approximately 12,000 B.P., and Douglas fir (*Pseudotsuga menziesii*) and western hemlock (*Tsuga heterophylla*) became integrated with the existing forest (Whitlock 1992). From approximately 12,000 to 7000 B.P., regional climate became much drier, characterized by higher summer temperatures and an increase in severity and frequency of summer droughts (Barnosky et al. 1987; Brubaker 1991; Whitlock 1992). The regional environment changed to a cooler, moist marine climate after 6000 B.P. An increase in summer precipitation and a decrease in summer temperatures accompanied an increase in the relative abundance of western red cedar (*Thuja plicata*) and western hemlock, culminating in a forest dominated by western hemlock and Douglas fir (Brubaker 1991; Whitlock 1992). Early General Land Office surveys documented stands of fir, hemlock, maple, alder, and cedar with a dense understory including salal and vine maple in the current project vicinity (United States Surveyor General 1867a, 1880).

The Project is located along the northern bank of Lake Washington. Soils mapped in the project location are Urban land Alderwood complex (Soil Survey Staff 2023). These soils form on hillslopes from glacial drift or outwash over dense glaciomarine deposits. The typical sediment profile of these soils is as follows:

- *A - 0 to 7 inches:* gravelly sandy loam
- *Bw1 - 7 to 21 inches:* very gravelly sandy loam
- *Bw2 - 21 to 30 inches:* very gravelly sandy loam
- *Bg - 30 to 35 inches:* very gravelly sandy loam
- *2Cd1 - 35 to 43 inches:* very gravelly sandy loam
- *2Cd2 - 43 to 59 inches:* very gravelly sandy loam

Cultural Setting

This section briefly reviews the precontact, ethnohistoric, and historic cultural sequence of the project vicinity. This is a summary of how pertinent investigations in the general region have contributed to the understanding of past utilization of the project area.

Precontact Context

The antiquity of human occupation in North America has been the subject of considerable debate, and several sites have been suggested to represent very early occupation of the Americas (Davis et al. 2019; Dillehay and Collins 1988; Dillehay and Meltzer 1991; Fariña 2015; Guidon and Delibrias 1986). The most widely accepted current model is that humans first entered the western hemisphere between approximately 16,000-15,000 B.P., with a second migration of proto-Clovis peoples occurring between 1,000-2,000 years later (e.g., Pitblado 2011; Waters and Stafford 2014). Humans probably migrated into the Puget Sound region as glaciers retreated during the Late Pleistocene. Limited archaeological evidence, characterized by lithic artifacts, including the distinctive Clovis type fluted projectile points and Western Stemmed Tradition stemmed and foliate bifaces, exists for these early populations in the Pacific Northwest region (Ames and Maschner 1999; Beck and Jones 2014; Carlson 1990; Kopperl 2016; Moss 2011). Cultural deposits dating between ca. Cal BP 12,000-10,000 from the Bear Creek Site (45KI839) north of Lake Sammamish represent an example of the Late Pleistocene-Holocene transition in Western Washington. Artifacts recovered from the site include projectile points, bifaces, scrapers, and retouched flakes comparable to those identified in Western Stemmed Tradition lithic assemblages. Evaluation of the Bear Creek Site lithic assemblage indicates a cultural continuity between the Late Pleistocene and Holocene populations in the region (Kopperl 2016).

The earliest archaeological evidence of Holocene exploitation in the Puget Sound region is commonly classified as the Olcott complex. The Olcott complex began around 10,000 B.P. and continued to as late as 4000 B.P., although the chronology of this complex is poorly understood, with various classifications, terminologies, and subdivisions utilized within the literature. These sites are generally recorded on river and streams terraces, with the Olcott type site (45IS14) recorded on the South Fork of the Stillaguamish River upstream from its confluence with Jim Creek. Large cobble tools and leaf-shaped projectile points, often heavily weathered, typically characterize Olcott sites. However, there is no consensus on the typology of Olcott tools, and similar artifacts are recorded in sites dated to the

Late Holocene as well. The Buse Timber Sales Site (45SN303) documented along the South Fork of the Stillaguamish River at the current City of Granite Falls represents one of the only stereotypical Olcott complex sites firmly dated to the Early Holocene. The Olcott artifacts indicate a subsistence strategy concentrating on large game hunting and plant food gathering, while the location of Olcott sites on river and stream terraces infers a fishing element (Carlson 1990; Chatters et al. 2011; Kidd 1964; Mattson 1985; Nelson 1990). The early and middle period for the Middle Green Basin is poorly represented archaeologically, however changing environmental conditions likely influenced subsistence practices. Prior to about five-thousand years ago, the Auburn vicinity was a tidal estuary of the Green River, and local inhabitants may have exploited marine resources. Environmental conditions changed abruptly 5,700 years ago when a massive lahar from Mt. Rainier (Osceola Mudflow) swept down the ancestral White River valley covering the Enumclaw Plateau with a massive deposit of rock and mud and extending the Auburn delta northward to Kent. The event transformed the Enumclaw Plateau into a massive level prairie, and likely affected resource procurement strategies on both the Muckleshoot and Covington plateaus.

As the regional climate shifted to a drier pattern and sea levels stabilized by 5000 B.P., people living in the Pacific Northwest Coast region increasingly relied on marine intertidal resources for subsistence (Ames and Maschner 1999:88-89), although sedentary seasonal winter settlements based on the storage of marine resources may have appeared on the Northwest Coast as early as 7000 B.P. (Cannon and Yang 2006). The specialized fishing industry characteristic of the Puget Sound region and the Pacific Northwest Coast in general solidified in the region after 2500 B.P. (Ames and Maschner 1999). Plank houses and specialized fishing implements, including toggled harpoons, appeared in the archaeological record of the Puget Sound region during that time, and were likely accompanied by an increased reliance on and surplus storage of salmon and harvested shellfish (Ames and Maschner 1999; Nelson 1990). Large shell midden sites also appeared in the archaeological record at this time and continued into the ethnohistoric period (Ames and Maschner 1999:89), as did small, notched projectile points potentially indicative of bow-and-arrow technology (Ames and Maschner 1999:200; Nelson 1990; Rorabaugh 2019, Rorabaugh and Fulkerson 2015).

Ethnohistoric Context

Native groups living in the Puget Sound region at the time of contact generally spoke one of two Lushootseed dialects, Northern and Southern. These groups all spoke languages assigned by linguists to the Coast Salish language family (Suttles and Lane 1990:485-486). Although there were distinct differences in the practices of speakers of various dialects, and even within groups speaking the same dialect, the people living in the Puget Sound region shared many cultural traits, including a dependence on marine resources, particularly salmon and shellfish, as their primary basis of subsistence, as well as extensive woodworking and basketry technologies. Gill and dip nets, basket traps, weirs, harpoons, and gaff hooks were utilized to catch fish, while shellfish were collected by hand or with digging sticks. Wooden implements, including boxes, water containers, and other domestic items were crafted using adzes, mauls, and wedges made of stone, antler, and wood. Cedar bark was utilized extensively for several purposes, including clothing, basketry, bedding, and cordage. People often occupied winter residences consisting of cedar plank longhouses, although some people lived in similar villages year-round. They also utilized seasonal resource procurement systems, using cedar dugout canoes, trail networks, and portable shelters when traveling to fishing, hunting, shellfish-collecting, and berry-gathering areas in the spring, summer, and early fall. Animals

hunted include deer, elk, bear, mountain goat, beaver, seal, and waterfowl, and were taken with bow and arrows, clubs, harpoons, pitfalls, deadfalls, and nets. In addition to food, animal resources also provided clothing, bedding, and tools Numerous types of roots, berries, nuts and other plants were gathered for subsistence as well as medicinal purposes (Gibbs 1877; Haeberlin and Gunther 1930; Smith 1941; Suttles and Lane 1990; Waterman 1973; Waterman and Greiner 1921). Puget Sound groups maintained expansive trading networks within the region, as well as south to the Columbia River, north into present-day Canada, west to the Pacific Coast, and eastward across the Cascade Mountain Range, and they established complex religious, economic, and social structures that were made possible by a surplus of stored marine resources (Holm 1990; Hymes 1990; Suttles and Lane 1990).

Numerous types of roots, berries, nuts and other plants were gathered for subsistence as well as medicinal purposes (Gibbs 1877; Haeberlin and Gunther 1930; Smith 1941; Suttles and Lane 1990; Waterman 1973; Waterman and Greiner 1921). Puget Sound groups maintained expansive trading networks within the region, as well as south to the Columbia River, north into present-day Canada, west to the Pacific Coast, and eastward across the Cascade Mountain Range, and they established complex religious, economic, and social structures that were made possible by a surplus of stored marine resources (Holm 1990; Hymes 1990; Suttles and Lane 1990).

The nearby Sammamish River, a river feeding Lake Washington, was home to the Southern Lushootseed speaking Sammamish (Gibbs 1877:179; Smith 1941:207; Suttles and Lane 1990:486). The Southern Lushootseed speaking Duwamish and Suquamish, as well as the Northern Lushootseed speaking Snohomish also utilized the project area. An ethnographic Duwamish village is documented at the mouth of McAleer Creek on Lake Washington just west of the project area. (Haeberlin and Gunther 1930:7-10; Spier 1936:42; Suttles and Lane 1990:486; Waterman 1973).

Contact with Euro-American populations resulted in extensive changes to the Native communities. Smallpox and other diseases greatly reduced Native populations in the Puget Sound region, and land claims by Euro-Americans, as well as the establishment of reservations, removed several Native groups from their traditional territories, limiting access to their customary hunting and fishing areas (Suttles and Lane 1990). The United States, under Washington Territorial Governor Isaac I. Stevens, established several reservations designed for the forced relocation of Native Americans living along Puget Sound in the middle of the nineteenth century (Marino 1990:169). In 1855, several representatives of numerous Northern and Southern Lushootseed-speaking tribes, including the Duwamish, Sammamish, Snohomish, and Suquamish, signed the Treaty of Point Elliott, resulting in the creation of the Tulalip and Port Madison reservations (Lane 1974, 1975a, 1975b, 1975c; Marino 1990; Ruby and Brown 1986).

Historic Context

Non-natives first arrived in the Puget Sound region in the late 1700s. The first non-natives to travel south of the Strait of Juan de Fuca were explorers, followed by fur traders and missionaries. British explorer George Vancouver explored and charted the shores of Puget Sound in the 1790s (Meany 1957). The Wilkes expedition, sponsored by the United States, conducted further exploration in 1841 (Meany 1926). The British-owned Hudson's Bay Company established Fort Nisqually in 1833 and maintained the British trading tradition with native Puget Sound groups (Carpenter 1986). The United

States took sole possession of the Oregon Country including what is now Washington State in 1846, and by the early l850s, Euro-Americans began streaming into Puget Sound, first seeking timber and then lands to establish homes and farms. The United States Congress established Washington Territory in 1853, and Washington gained statehood in 1889 (Whitfield 1926).

The project area at Lake Forest Park was first surveyed in 1859 on behalf of the Surveyor General's Office. The original survey depicts the north end of Lake Washington, similar to how it appears today, although it seems that the Eastern tip of the lake has been modified since the original survey. The original survey includes a network of streams that branch off McAleer Creek and Lyon Creek near the project area which do not seem to exist anymore. The survey does not include any structures, roads, trails or other cultural modifications (Bureau of Land Management 2021).

The project area was first allotted to Fred Drew on September 15, 1865, under the Scrip Warrant act of 1855 (Bureau of Land Management 2021). The Scrip Warrant Act of 1855 allowed the General Land Office to pay veterans or their heirs for their military service with land warrants (Department of Veteran Affairs 2023). The warrant was awarded to Clemente Villaronga of the United States Navy who assigned their warrant to Fred Drew, although neither the patent nor military warrant documenting the transaction describe Fred Drew's specific relationship to Clemente Villaronga (Bureau of Land Management 2021).

The earliest map of the project area available from the USGS is a map of the Snohomish Quadrangle from 1895. At that time, the project area and its surroundings had very few structures, and very little urban or industrial development, however, even as far back as 1895, the Pacific Railroad and Washington State Highway 522 passed very close by the project area (United States Geological Survey 1895). A USGS map of the Seattle Special Quadrangle from 1909 depicts the project area as marsh/grassland (United States Geological Survey 1909).

Atlases published by the Anderson Map Company in 1907, and by the Kroll Map Company in 1912, depict the project area without significant alteration, although by 1907, the Puget Mill Company owned the property directly North and South of the project area along the shore of Lake Washington (Anderson 1907, Kroll 1912). A map created by Metsker Maps in 1936 shows the area surrounding the project area heavily developed and divided into small tracts. Tracts containing the project area are unlabeled. The area may have been considered a part of Sheridan Beach which is just South of the project area along the shore of Lake Washington. A note points to the approximate location of the project area that reads "Lk. For. Waterfront Add." This may indicate the creation utilization or plans to utilize the project area as a waterfront (Metsker 1936).

A USGS map of the Edmonds East Quadrangle from 1954 depicts the project area, however, the project site is in a portion of the map marked red, which means that only landmark buildings are shown. The highlighting indicates that structures have already been built in the project area at this time. Unfortunately, we are not given any specific information on the map. By 1954, Beach Dr. had been constructed, including the portion that the project site is connected to. In 1954, the Pacific Railroad was still present and passed along the Northwest side of the project area, directly between Bothell Way

and Beach Dr. (United States Geological Survey 1953). The version of this map that was revised in 1968 shows docks added to the shore of Lake Washington, probably including the dock inside the project area. The docks are colored purple, meaning that they were added to the map sometime between 1953 and 1968 (United States Geological Survey 1968).

The main structure at 17345 Beach Dr. NE, was built in 1930 as a single-family residence. Two of the accompanying cabins were built in 1933, In 1937, three more cabins and the structure which now serves as a carport were constructed at 17347 Beach Dr. A sixth cabin was constructed at 17347 Beach Dr. in 1953. The property was purchased by Forterra NW in 2019, then by the City of Lake Forest Park in 2021 and then obtained by Washington State in 2022 (King County Department of Assessments 2022). The ownership history of the property at 17345 prior to 2019 is nearly identical to the ownership history of the property at 17347, indicating that both of these properties were typically owned together (King County Department of Assessments 2022).

Previous Research

A records search of documents on file at the DAHP revealed 10 cultural resources studies conducted within 1 mile of the Lake Forest Park (Appendix A). Most of the studies did not find any evidence of significant cultural resources or archaeological sites. The closest previous study to the project area was an archaeological pedestrian survey conducted in 2007 in preparation for the modification of the Burke Gilman Trail. The APE of this project passed within 20 meters of the project area. No cultural resources were discovered during this survey (Zuccotti 2007). An archaeological survey was conducted on the North shore of Lake Washington, 600 meters from the project area. During this survey, the ground soil was found to largely consist of artificial fill and natural stratigraphy was heavily disturbed (Breidenthal and Gerrish 2020). Other nearby subsurface surveys observed loamy fine sand subrounded cobbles and high levels of disturbance due to development (Boggs et al. 2009, Lahren 2013).

The subject properties were the focus of a Historic Property Inventory completed in 2021. The study looked at the seven structures, spanning both properties and determined them ineligible for the NRHP (Borth 2021).

Previously Recorded Cultural Resources

Previous studies have resulted in the recordation of two archaeological sites within 1 mile of the Lake Forest Park Project Area (Appendix B). The Railway Grade of the Seattle, Lake Shore and Eastern Railroad site (45KL541) contains numerous segments of historic railroad features including intact railroad grade and trestles as well as other associated features and artifacts (Hudson and Nelson, 1997). The Wurdemann House (45KL598), which is located directly Northeast of the project area and has historic significance as a landmark and architectural model (Saunders, 1990).

45KL451

The Railway Grade of the Seattle, Lake Shore, and Eastern Railroad (SLS&E) site is a series of historic railway grade segments and artifact deposits associated with the SLS&E, which has been abandoned since 1974. The site is located along portions of the Snohomish County Centennial Trail as well as

along the Eastern shore of Lake Sammamish and extending into North Bend. Another leg of the SLS&E Railroad passed along the North and West shore of Lake Washington into Seattle, directly adjacent to and less than 20 meters from the Lake Forest Park Project Area. Railroad grade, intact portions of track, railroad trestles, timber beam supports and communication poles with insulators as well as discarded railroad artifacts such as railroad ties, railroad spikes and coal deposits have been documented at various parts of the site. Related artifacts such as historic glass bottles have also been documented. Both Surface and subsurface artifacts between 30-80 cm below the surface have been documented. Documented features and artifacts can be dated as far back as 1896 and as recent as the mid-20th century. This site is significant to the Lake Forest Park Project Area due to its proximity to the area. Additionally, both areas are in close proximity to former railroads that operated at the same time, so it is likely that the Project Area could include similar artifacts and features to those found at 45KL451 (Hudson and Nelson, 1997).

45KL598

The Wurdemann House is a private residence located at 1706 Bothell Way NE, Lake Forest Park WA 98155. The house property is located 50 meters from the Lake Forest Park project area, directly across Bothell Way NE and Beach Dr NE. The Wurdemann House was built in 1914 and was one of the first residences built in Lake Forest Park. The house was intentionally designed to inspire future development by bringing attention to the area and giving it a sense of style and prestige. It is the largest and considered to be the most impressive residence in the area (Saunders 1990). The Wurdemann House is 2738 square feet, and its design is based on the Mediterranean Villa style, which was popular at the time of its construction. Its property also contains gardens and a cottage intended for a live-in gardener. From an architectural standpoint, the Wurdemann House is a technical feat as well as an example of architectural ideals of the period in which it was built. Due to the impressive nature of the home, and the social activity of its various owners, the home has served as a landmark and community center since its creation. The Wurdemann House's direct ties to the rise of urbanism and residence in the area make it not only a significant site on its own, but potentially impactful to the Lake Forest Park project area (Saunders, 1990).

3. Research Design and Field Methods

This chapter discusses the research design, including expectations for identifying cultural resources within the project area, as well as field methods employed for the Project.

Research Design

Several factors contribute to expectations concerning the likelihood of locating cultural resources within the project area. Recorded cultural resources, landform characteristics, documented land use, and previous archaeological work discussed in the preceding chapter all contributed to those expectations. The DAHP predictive modeling has determined the project APE is within an area of "very high" risk for cultural resources. The project area is along the shores of Lake Washington. An ethnographic Duwamish village is documented at the mouth of McAleer Creek on Lake Washington just west of the project area. People living at the creek mouth likely utilized the entire watershed during fishing, hunting, and plant gathering forays. Lushootseed place names documented for Lake Washington as well as the mouth of the creek support this assumption. Cultural resources associated with resource procurement activities in project area could include stone tools, ground stone implements, hearth features, fire-modified rock concentrations, culturally modified trees, terrestrial faunal remains, and fish bone.

Historic period cultural remains in the project area could represent those associated with the existing 1930's building as well as the railroad activities. These activities could have produced resources such as railroad debris and domestic refuse characterized by bottle glass, ceramics, brick, metal, and food remains; these resources would most likely date from the late nineteenth to the mid-twentieth century.

Field Methods

ASM Archaeologists Lane Larson and Austin Baker conducted the fieldwork for the cultural resources assessment of this project. Fieldwork consisted of both surface and subsurface examination of the project area (Figure 2). A total of 12 shovel test pits (STPs) were conducted within the project area. STPs were excavated throughout the property and were dug to a maximum depth of 100 centimeters below the surface (cmbs) and were between 45 and 50 centimeters in diameter. The depth of STP excavations was most commonly limited by water infiltration, tree roots, gravels, and glaciomarine sediments. In general, STP excavations were terminated between 80-100 cmbs. All sediments from STPs were screened through a 1/4-inch hardware mesh. All excavation results were documented on ASM forms, which include provenience, cultural material descriptions, information on sediment type, termination depth, and general observations. All excavations were backfilled after documentation. The location of all subsurface excavations was recorded on project maps. Digital photographs recorded the general condition of the survey area and the character of sediment deposits observed in subsurface investigations. Results from STP excavation are in Appendix C.

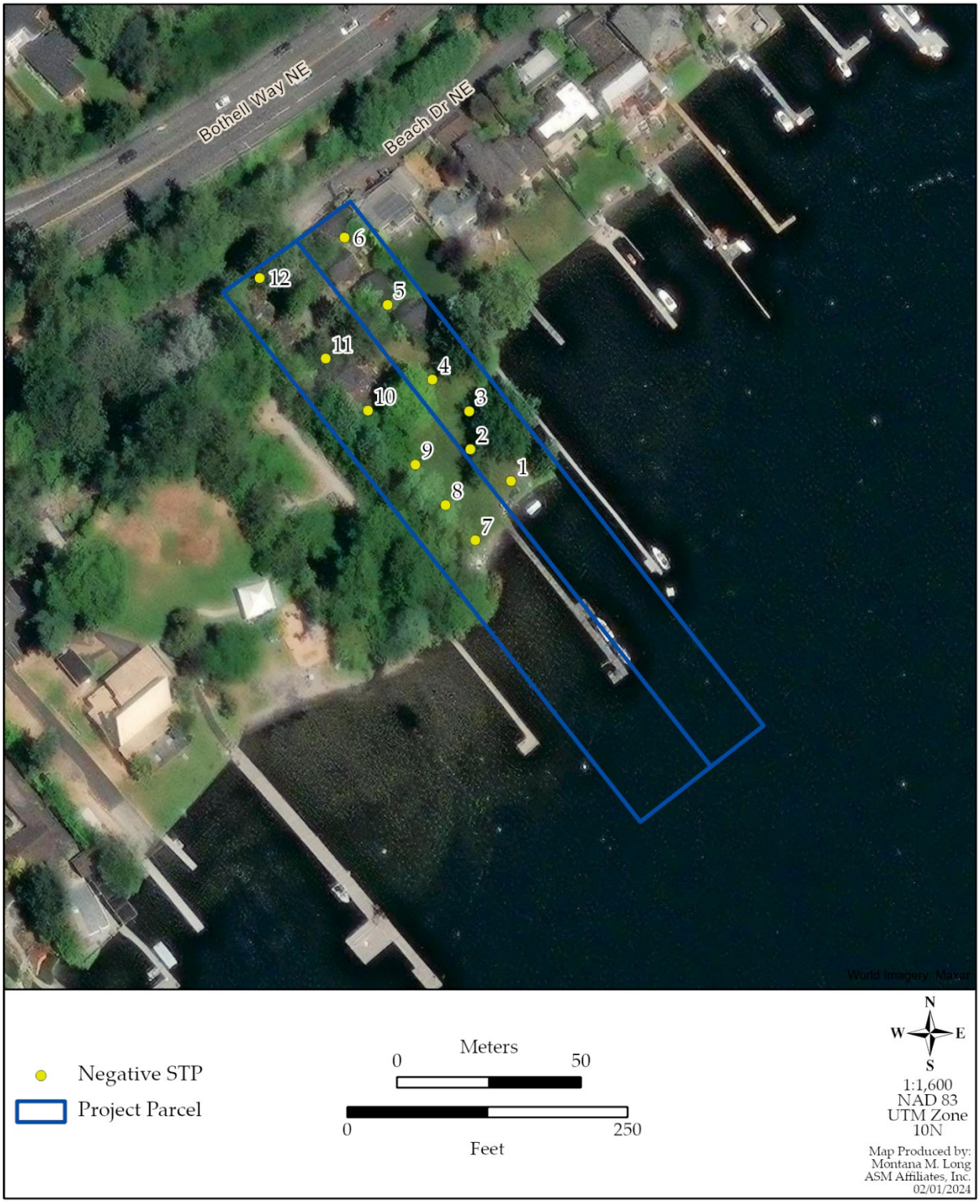

Figure 2. Field Results

4. Field Results

ASM completed both pedestrian and subsurface surveys of the project area. No significant cultural resources were encountered. The project is located on the northern tip of Lake Washington in Lake Forest Park, Washington (Figure 3). The project area consists of several residential lots with multiple houses and other structures. Some of the structures within the project area were previously evaluated for HPI, the remaining structures that appeared to be older than 50 years were photographed for further documentation. Vegetation on the property was consistent with a residential neighborhood and included Western Red Cedar and Fir trees, Rhododendrons, Camellias, several large Oak trees, and other various shrubs and small trees (Figure 4).

Figure 3. Southwest Overview of the Project Area.

Figure 4. Northwestern Overview of the Project Area.

Pedestrian Survey

ASM completed a pedestrian survey of the ground surface within the project area. The archaeologists scanned the ground surface looking for evidence of cultural resources. The archaeologists also inspected the surface for areas of past ground disturbances including buried utilities, old foundations, surface manipulation and past excavation within the project area. The ground surface was negative for any cultural resources. There were however some items that would have been associated with the structures such as old plastic pathway lighting and plastic gardening tools. These items are modern and do not represent a protected cultural resource.

Subsurface Survey

ASM completed the excavation of 12 STPs throughout the property. During STP excavations the archaeologists noted a consistent soil profile made up of 3 distinct layers (Figure 5). The first layer consisted of dark brown silty sand with very few rounded gravels; this layer is typical for a topsoil. Beneath this, a layer consisting of grayish brown sand with rounded to subrounded gravels overlaying a layer composed of grey sand with rounded to subrounded gravels. Modern plastic refuse, woody debris and nails were often found in this layer. The lower layer of each STP consisted of a bluish gray sand. Water filled up the bottom of most STPs, limiting the depth of the excavations. Several of the STP excavations were limited by roots and compaction. These STPs were located near some of the houses and were on or near extremely compact gravel driveways. STP 3 contained a large decaying piece of wood containing multiple rusted nails (Figure 6).

Figure 5. STP 7 Showing Typical Sediment Profile

Figure 7. Woody Debris and Nails in STP 3

5. Conclusions and Management Recommendations

ASM Affiliates, Inc. (ASM) contracted with the DCG/Watershed to conduct a cultural resources assessment for the proposed Lake Forest Park Lakefront Improvements Project 17345 and 17347 Beach Dr NE in Lake Forest Park, King County, Washington. The proposed project consists of acquiring and developing a 1.91-acres adjacent to the Lyon Creek Waterfront Preserve. The project includes funding through the Washington State Recreation and Conservation Office using the Washington Wildlife and Recreation Program (PRISM Project #20-1862). The purpose of the assessment was to evaluate the project for the potential effects on archaeological or historic resources. ASM's efforts included a literature review of site forms and previous cultural resources reports on file at the Washington State Department of Archaeology and Historic Preservation as well as pertinent environmental, historic, and ethnographic maps and documentation; a field inventory of the Project area; and preparation of this technical report to fully document the results of the inventory in compliance with Governor's Executive Order 21-02.

During the assessment ASM identified seven historic structures at 17345 and 17347 Beach Drive. Although the structures are over 50 years old and thus represents a historic resource, they have previously been determined ineligible for the National Register of Historic Places (Borth 2021).

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Appendices

Appendix A

Previous Cultural Resource Studies

Title	Author(s)	Date
Archaeological Survey for City of Kenmore Culvert Replacement	Bush and Baxley	2021
Technical Memo - Cultural Resources Survey of the Log Boom Park, City of Kenmore, Washington	Breidenthal and Gerrish	2020
A Cultural Resources Survey and Presence/Absence Testing for the Lake Forest Park Water District, Lake Forest Park	Lahren	2013
Survey Report: Historic Property Reconnaissance-Level Survey, Kenmore 2010-2011	O'Connor	2011
Lake Forest Park Water District Water Supply Project, Lake Forest Park	Boggs et al.	2009
Cultural Resource Investigations for the Burke Gilman Trail Redevelopment	Zuccotti	2007
FINAL - Cultural Resource Assessment City of Kenmore	Dugas and Robbins	2003
SR522 Corridor Improvements Project Cultural Resource Assessment, Kenmore	Dugas and Robbins	2002
Results of a Cultural Resources Assessment for the Tolt Pipeline No. 2, Phase IV Project	Goetz and Warner	1997
Bones Found During WSDOT's work on SR 522	Robinson	1996

Appendix B

Previously Recorded Cultural Resources

Trinomial	Description	Eligibility
45KI451	Railway Grade of the Seattle, Lake Shore, and Eastern Railroad	Determined Not Eligible
45KI598	Wurdemann House	Determined Eligible

Appendix C

Subsurface Excavation Results

STP	Depth (cm)	Soil Description
1	100	1-10: Dark brown fine grain sandy silt, no gravels, low compaction. Grass rootlets 10-60: Gray tan coarse grained sand, no gravels, loose compaction. 60-100: Blue gray medium grained sand, no gravels, loose compaction. Very wet
2	100	1-15: Dark brown fine grain sandy silt, no gravels, low compaction. Oak roots present. Grass rootlets 15-50: Gray tan coarse grained sand, no gravels, loose compaction. 50-100: Blue gray medium grained sand, no gravels, loose compaction. Very wet Location adjusted to avoid oak tree. STP began to fill with water while digging.
3	100	1-20: Dark brown fine grain sandy silt, no gravels, low compaction. Oak roots present. Grass rootlets 20-60: Gray tan coarse grained sand, 5-10% round gravels, loose compaction. Inclusion of wood fragments. **Deposit of rusted nails, rust stained soil and decayed wood found 30cm from the surface.** 60-100: Blue gray medium grained sand, no gravels, loose compaction. Very wet STP began to fill with water while digging.
4	100	1-20: Dark brown fine grain sandy silt, no gravels, low compaction. Oak roots present. Grass rootlets. Infrequent tree roots. 20-100: Blue gray coarse-grained sand, no gravels, loose compaction. Very wet. STP began to fill with water while digging.
5	100	0-100: Gray, brown medium grained loam silty loam with dark brown clay mottling 5-10% rounded gravels. Soil was sticky, heavy and waterlogged near the bottom. Bottom included rust colored mottling.
6	100	1-15: Dark brown fine grained silty clay, medium compaction, grass rootlets. 15-100: Tan gray medium grained sand, no gravels, medium-high compaction. Tan gray clay lens at 50cm. STP began to fill with water after completion, but much slower and less than other STPs.
7	84	0-17: Dark brown fine grain sandy silt, no gravels, low compaction. 17-41: Tan coarse grained sand, 5-10% round gravels, loose compaction. One pc. red plastic. 41-84: Gray medium grained sand, no gravels, medium-high compaction. Water infiltration at base.
8	91	0-13: Dark brown fine grain sandy silt, no gravels, low compaction. 13-91: Gray medium grained sand, no gravels, medium-high compaction. Water infiltration at base
9	81	0-11: Dark brown fine grain sandy silt, no gravels, low compaction. 11-60: Gray, brown medium grained sandy silt with dark brown clay mottling 60-81: Gray coarse-grained sand, 5-10% round gravels, loose compaction. Water at base.
10	94	0-21: Dark brown fine grain sandy silt, no gravels, low compaction. 21-63: Gray, brown medium grained sandy silt with dark brown clay mottling 63-94: Orangish-gray sand with 10% subrounded gravels. Water at base.
11	9	0-9: Dark brown fine grain sandy silt, gravels throughout, high compaction, terminated due to compaction.
12	34	0-34: Dark brown fine grain sandy silt and 10% gravels. Large root impasse

CULTURAL RESOURCES REPORT COVER SHEET

DAHP Project Number: 2024-02-01232

Author: Whitney Osiensky and Jessica Kearney

Title of Report: Cultural Resources Assessment Addendum for the Lake Forest Park Lakefront Improvements Project Phase 2, Lake Forest Park, King County, Washington

Date of Report: August 2024

County: King Section: 10 Township: 26 Range: 04E

Quad: East Edmonds Acres: 1.95

PDF of report submitted (REQUIRED) ☒ Yes

Historic Property Inventory Forms to be Approved Online? ☐ Yes ☒ No

Archaeological Site(s)/Isolate(s) Found or Amended? ☐ Yes ☒ No

TCP(s) found? ☐ Yes ☒ No

Replace a draft? ☐ Yes ☒ No

Satisfy a DAHP Archaeological Excavation Permit requirement? ☐ Yes # ☒ No

Were Human Remains Found? ☐ Yes DAHP Case # ☒ No

DAHP Archaeological Site #:

_____

- Submission of PDFs is required.
- Please be sure that any PDF submitted to DAHP has its cover sheet, figures, graphics, appendices, attachments, correspondence, etc., compiled into one single PDF file.
- Please check that the PDF displays correctly when opened.

ASM affiliates
archaeology
history
ethnography
architectural history

August 15, 2024

Amber Mikluscak
FacetNW Inc.
Seattle, WA

Re: Cultural Resources Assessment Addendum for the Lake Forest Park Lakefront Improvements Project Phase 2, Lake Forest Park, King County, Washington

Dear Ms. Mikluscak,

ASM Affiliates Inc. (ASM) was contacted by FacetNW Inc. to conduct a cultural resources assessment addendum for the Lake Forest Park Lakefront Improvements Project Phase 2 in Lake Forest Park, King County, Washington. ASM previously conducted a cultural resources assessment for the project on two adjacent lots 17345 and 17347 Beach Dr (Osiensky and Baker 2024). The project area is within Section 10 of Township 26 North, Range 4 East, Willamette Base and Meridian (Figure 1). Pertinent background and context sections as well as the original evaluation on the property are provided in the original survey report (Osiensky and Baker 2024). During the current assessment no cultural resources were encountered. As such, the recommendations in the original survey report should still apply.

PREVIOUS STUDIES ON THE LAKE FOREST PARK PROPERTY

The 2024 study completed by ASM was an extensive survey of the project area. A total of 12 shovel test probe (STPs) were completed throughout the property. STP excavations extended up to 100 cm in depth; the ground soil consisted largely of three distinct layers. The first layer was a dark brown silty sand with very few rounded gravels; this layer is typical for a topsoil. Beneath this, a layer consisting of grayish brown sand with rounded to subrounded gravels overlaying a layer composed of grey sand with rounded to subrounded gravels was identified. No significant cultural resources were discovered during this survey, although one STP yielded woody debris and nails (Osiensky and Baker 2024). The project area consists of several residential lots with multiple houses and other structures. Some of the structures within the project area were previously evaluated for the HPI, the remaining structures that appeared to be older than 50 years were photographed for further documentation. In a previous study, the properties had been determined ineligible for the NRHP (Borth 2021). Following this survey, FacetNW Inc. requested STPs be conducted in the Lyon Creek Waterfront Preserve, a parcel of land adjacent to this previous project area. This addendum report documents the results of that survey.

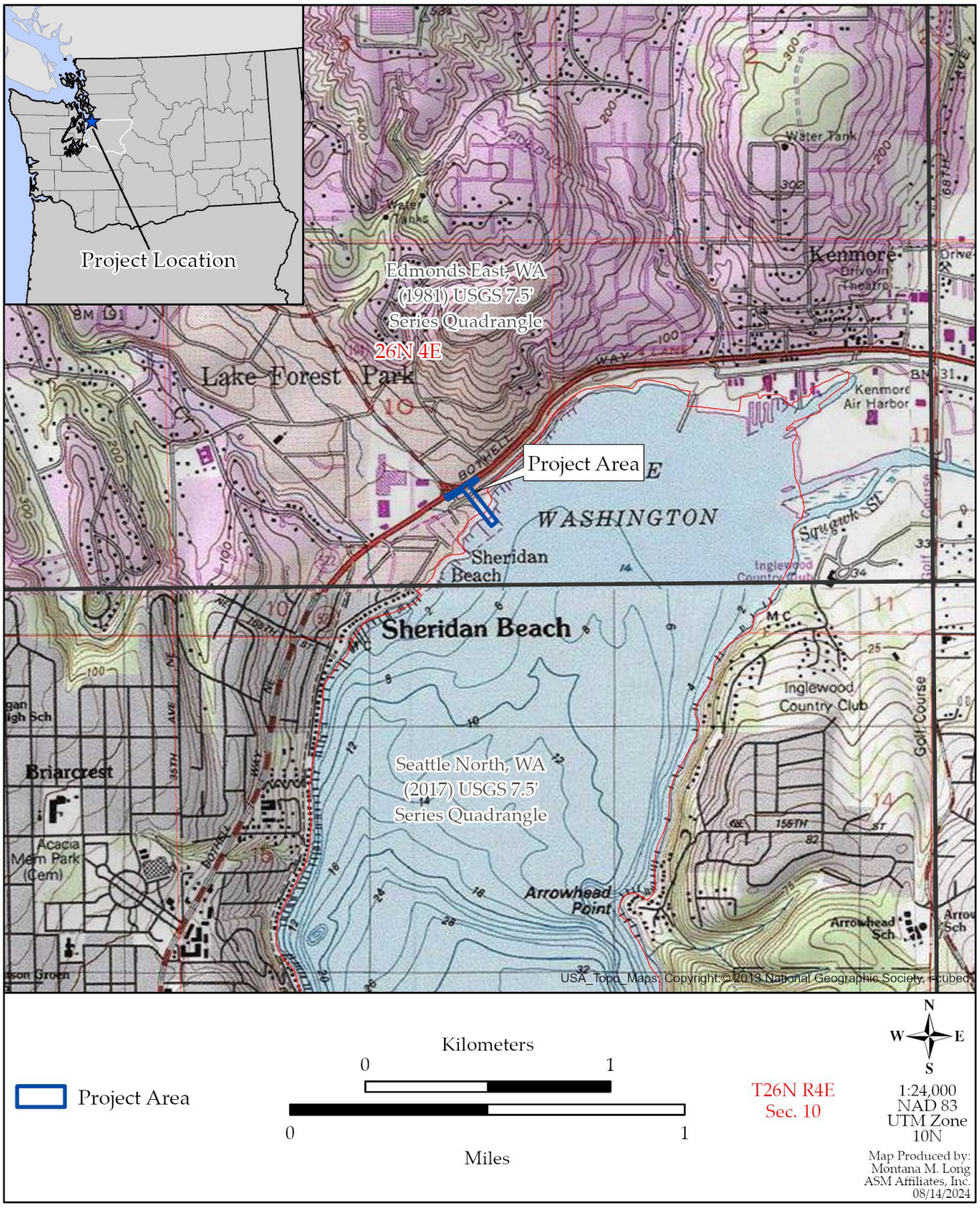


Figure 1. Lake Forest Park Project Area Location

SURVEY DESIGN AND METHODS

This chapter discusses the research design, including expectations for identifying cultural resources within the project area, as well as field methods employed in the cultural resource assessment conducted on the property.

Research Design

Several factors contribute to expectations concerning the likelihood of locating cultural resources within the Project area. Recorded cultural resources, landform characteristics, documented land use, and previous archaeological work discussed in the preceding chapter all contributed to those expectations. The DAHP predictive modeling has determined the Project APE is within an area of "very high" risk for cultural resources. The Project area is along the shores of Lake Washington. An ethnographic Duwamish village is documented at the mouth of McAleer Creek on Lake Washington just west of the Project area. People living at the creek mouth likely utilized the entire watershed during fishing, hunting, and plant gathering forays. Lushootseed place names documented for Lake Washington as well as the mouth of the creek support this assumption. Cultural resources associated with resource procurement activities in project area could include stone tools, ground stone implements, hearth features, fire-modified rock concentrations, culturally modified trees, terrestrial faunal remains, and fish bone.

Historic period cultural remains in the Project area could represent those associated with railroad activities and nearby historic buildings. These activities could have produced resources such as railroad debris and domestic refuse characterized by bottle glass, ceramics, brick, metal, and food remains; these resources would most likely date from the late nineteenth to the mid-twentieth century

Field Methods

ASM Associate Archaeologist Jessica Kearney conducted fieldwork for the cultural resources assessment for the Project. Fieldwork consisted of both a surface and subsurface examination of the project area (Figure 2). A total of 12 shovel test pits (STP) were conducted within the project area. STPs were excavated within the property directly adjacent to the previous survey area. The project area consists of the portion of the project area within the Lyon Creek Waterfront Preserve, as well as a stretch of Beach Dr NE. STPs were dug to a maximum depth of 100 centimeters below the surface (cmbs) and were between 45 and 50 cm in diameter. All sediments were screened through a ¼ -inch hardware mesh. All excavation results were documented on ASM forms, which include provenience, cultural material descriptions, information on sediment type, termination depth, and general observations. All excavations were backfilled after documentation. GPS coordinates were collected for all STP excavations using a hand-held GPS unit. Digital photographs recorded the general condition of the survey area and the character of sediment deposits observed in subsurface investigations.

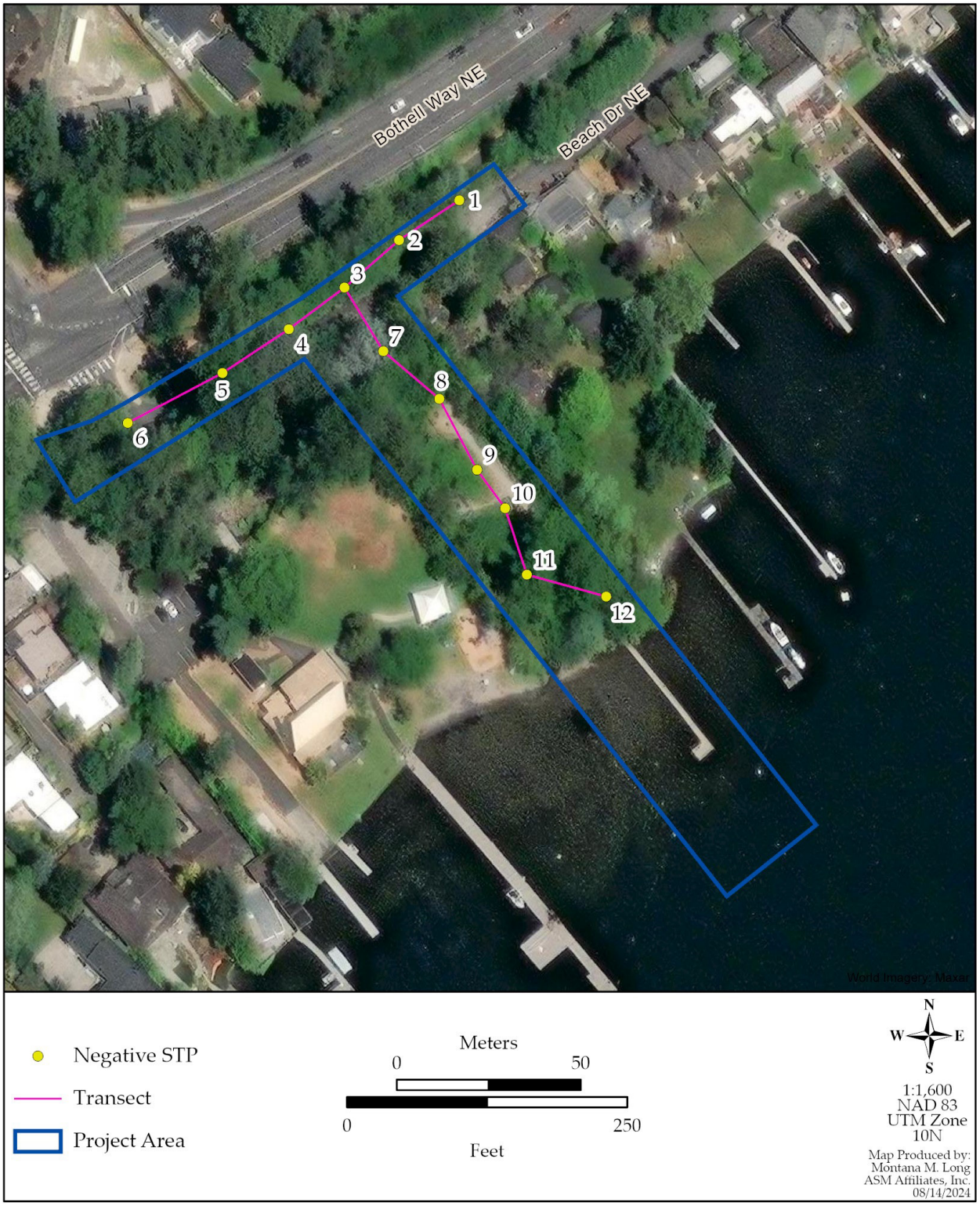


Figure. 2 Field Results.

FIELD RESULTS

ASM conducted the field assessment on the property through surface investigation in combination with subsurface excavation. No cultural resources were identified during the fieldwork. The project consists of a 140 meter (m) stretch of Beach Dr NE and a 108 m stretch of the Lyon Creek Waterfront Preserve, ending at the northern bank of Lake Washington (Figures 3-4). Most ground surface was asphalt within the Beach Dr NE area, while the Lyon Creek Waterfront Preserve contained soil within a riparian area alongside Lyon Creek and a dirt and wooden plank path. The project is within a nature preserve with a trail, benches, and viewpoints throughout, as well as a stretch of road along Beach Dr NE. Vegetation in the area included Western Red Cedar, vine maple, Fir trees including Douglas-fir, bracken fern, and various shrubs and small trees (Figures 3-4).

Pedestrian Survey

ASM completed a pedestrian survey of the ground surface throughout the project area. The archaeologists inspected the ground surface for evidence of cultural resources. The archaeologists also inspected the area looking for past ground disturbances (ditches, utility work, evidence of plowing) and looked for remains of foundations of former structures. The ground surface of a portion of the project area was covered in pavement from Beach Dr NE. No cultural resources were identified during the pedestrian survey.

Subsurface Survey

ASM's archaeologist excavated a total of twelve (12) STPs to complete the subsurface survey for the assessment. STP results are available in Table 1. STP excavations were consistent with the previous study and extended up to 100 cmbs. ASM encountered a typical sediment profile throughout the project area that consisted of 3 distinct layers (Figure 5). The first layer consisted of dark brown silty sand with very few rounded gravels; this layer is typical for a topsoil. Beneath this, a layer consisting of very compacted sandy silt loam with 30% angular gravel concentration was identified. Undiagnostic glass fragments and other refuse such as a glazed ceramic fragment and a brick were identified within this layer. The lower layer of each STP consisted of a darker gray sandy loam. Several of the STP excavations were limited by roots, cobbles, and soil compaction, especially those alongside Beach Dr NE. These STPs were located along the road prism, and as such a gravel fill layer was identified in this area. STP 8 contained a large brick within the wall at 40 cmbs, it was unable to be removed (Figure 6).

Table 1: STP Results

STP	Depth (cmbs)	Sediment Description	Termination Reason
1	0-4	Brown forest duff and pine needles	Cobble impasse
	4-51	Light brown sandy silt loam, 30% angular and subrounded gravel content, some large cobbles and some undiagnostic glass fragments found	
2	0-10	Light brown silty loam mixed with forest duff and roots	Cobble impasse, soil compaction
	10-35	Gravel fill	
3	0-9	Brown forest duff	Tree root impasse
	9-54	Light grayish brown sandy silt loam, 20% small subangular gravels	
4	0-15	Dark brown sandy loam with less than 5 percent rounded gravels	Cobble impasse
	15-60	Dark brown sandy loam with 10 percent rounded gravels.	
5	0-60	Light grayish brown sandy silt, 30% gravels, some undiagnostic glass fragments found	Cobble impasse
6	0-47	Gray sand, <10% gravels Utility wire encountered at 47 cmbs	Utility wire
7	0-84	Light brown sandy silt, 20% rounded gravels Corner of a utility pipe in the wall at 22 cmbs, interfered with digging at depth	Utility pipe
8	0-66	Light brown sandy loam, 10% rounded gravel Brick found at 40 cmbs, unable to remove	Brick
9	0-20	Brown silty sand	Plastic mesh
	20-53	Grayish brown sandy silt loam, very compact, 30% angular gravels, plastic mesh found at 31 cmbs in the wall, eventually interfered with digging at depth	
10	0-22	Light brown sandy silt	Maximum depth
	22-60	Light grayish brown silty loam, very compact, 30% gravels, one glazed white ceramic fragment found at 55 cmbs	
	60-100	Gray sandy loam mottled with dark brown, very compact	
11	0-50	Brown sandy clay loam, 10% rounded gravels	Groundwater
	50-70	Dark grayish brown sandy loam, one undiagnostic glass fragment found	
12	0-33	Dark brown sandy clay loam, <10% gravels	Root impasse

Figure 3. Overview of Project Area alongside Beach Dr NE

Figure 4. Overview of Project Area within Lyon Creek Waterfront Preserve

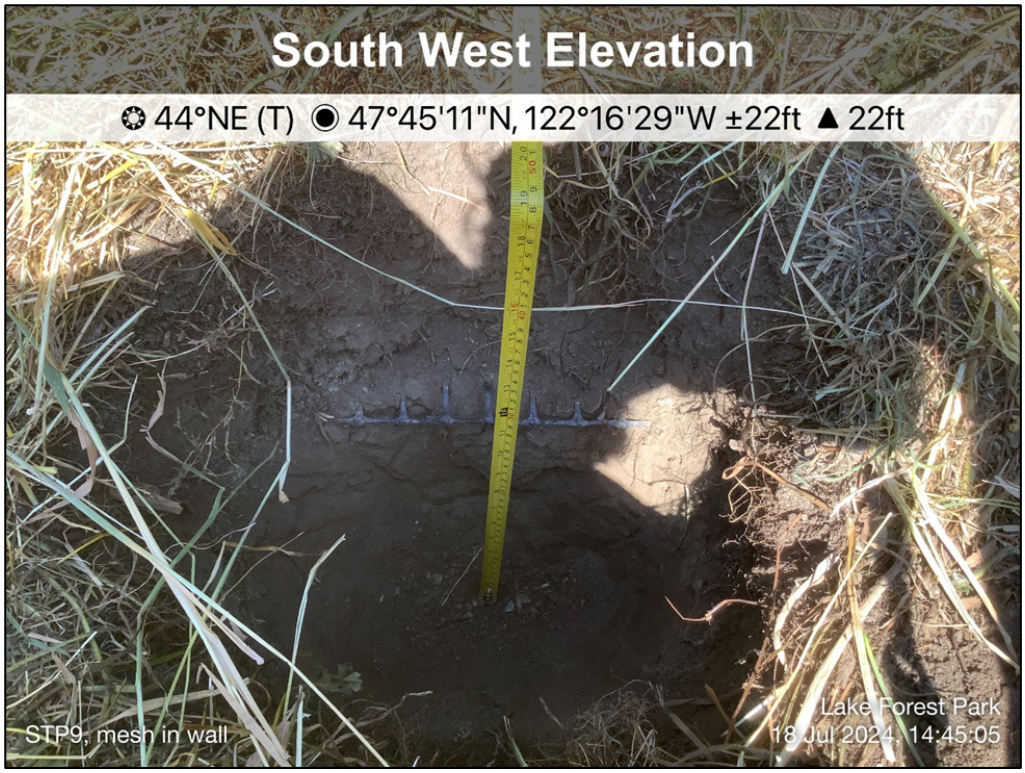


Figure 5. STP 9 Showing Typical Sediment Profile and Plastic Mesh

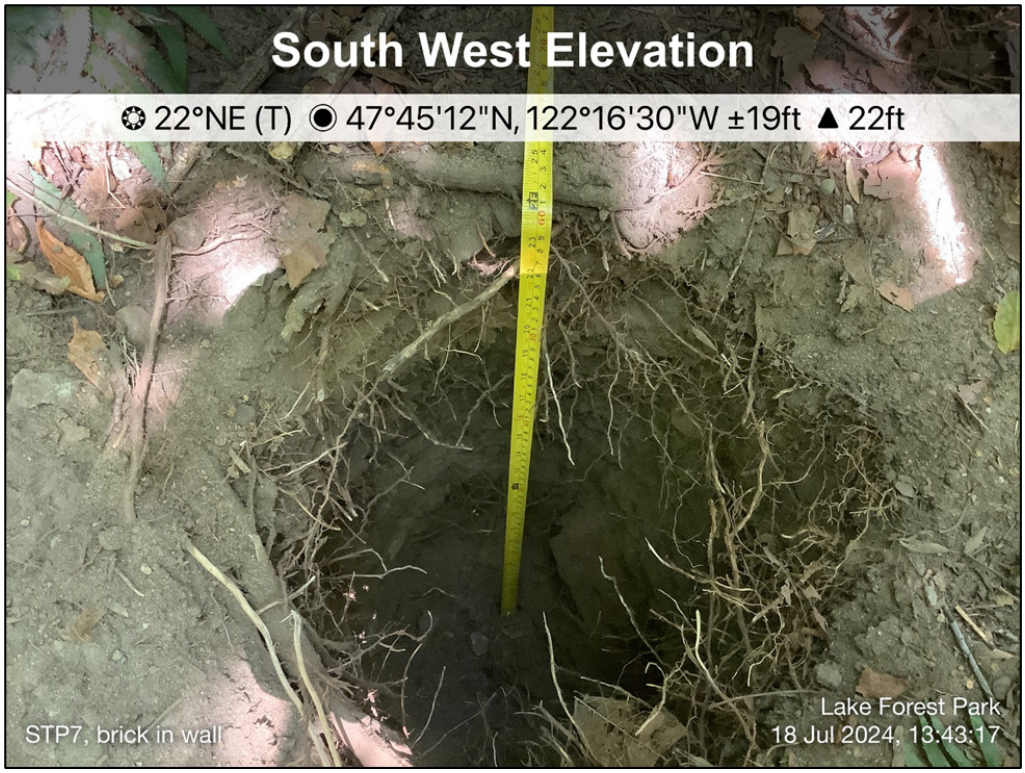
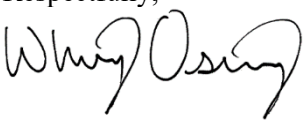


Figure 5. Overview of STP 8 and Brick

CONCLUSIONS AND MANAGEMENT RECOMMENDATIONS

ASM Affiliates Inc. (ASM) was contacted by FacetNW Inc. to conduct a cultural resources assessment addendum for the Lake Forest Park Lakefront Improvements Project Phase 2 in Lake Forest Park, King County, Washington. ASM previously conducted a cultural resources assessment for the project. FacetNW Inc. requested that an assessment be conducted in a parcel of land adjacent to this previous project area. As such, an addendum was necessary to document the excavation of this area. During the assessment ASM encountered a sediment profile consistent with the previous study. No cultural resources were identified. As a result of the study, ASM recommends the project continue to follow the recommendations presented in Osiensky and Baker 2024.

Respectfully,



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