

HEATH & ASSOCIATES

Transportation Planning & Engineering

# TRAFFIC IMPACT ANALYSIS

## The Pinnacle at Liberty Bay

Poulsbo, Washington

Version #5 / October 2026

1011 E Main Ave Suite 453 | Puyallup, WA | 98372
(253) 770-1401| heathtraffic.com

# THE PINNACLE AT LIBERTY BAY
# TRAFFIC IMPACT ANALYSIS

## Prepared for:

Montebanc Management, LLC
c/o Paul Devenzio, Chip McBroom

## Prepared by:

Heath & Associates
PO Box 397
Puyallup, WA  98371
(253) 770 1401
Heathtraffic.com

## License:




10/5/2026

**Date:** October 5, 2026

**To:** Michael Bateman, City of Poulsbo

**From:** Andrew L. Bratlien, P.E., PTOE
Heath & Associates

**Subject:** The Pinnacle at Liberty Bay – Version 5
TIA Comment Response

This memorandum provides responses to the unresolved comments provided by the City of Poulsbo and Parametrix in the September 2, 2026 memorandum "Traffic Impact Analysis and Transportation Review." The enclosed TIA has been updated based on the comments and responses provided below.

## COMMENT #1

### Comment #1A

Study Area Consistency: The report does not clearly and consistently identify all study intersections or reconcile which intersections are included in figures versus LOS tables.

**Heath Response (7/17/26)**: Descriptions of existing peak hour volumes (Section 4.4) have been expanded for clarity and consistency. Tables and figures have been updated to identify all seven study intersections.

**Parametrix Finding (9/2/26)**: Comment addressed. The revised TIA includes figures that consistently present the study intersections for existing conditions, project trip generation and distribution, pipeline project trips, and future conditions without and with the proposed project.

**Heath Response (10/5/26)**: Comment addressed.

### Comment #1B

Intersection Screening: The TIA does not demonstrate that all intersections with ≥10 new trips were evaluated per City requirements. Consider intersections to the south of Johnson Road and to the north of Hostmark Street, based on AM and PM trip distribution figures.

**Heath Response (7/17/26)**: The TIA study area was approved by City staff via email on June 10, 2025. Minor scoping revisions provided by City staff at that time were incorporated to the TIA and are reflected in the report.

**Parametrix Finding (9/2/26)**: Because the applicant has identified 8 additional study intersections that would be affected by more than 10 AM or PM peak hour project-generated trips, these locations should be addressed in the TIA.

**Heath Response (10/5/26)**: The TIA study area has been updated to include eight additional intersections which are expected to be impacted by at least 10 new project-generated peak hour trips, per City of Poulsbo TIA requirements. The eight additional study intersections and their corresponding TIA identification number are listed below.

- SR 305 & NE Lincoln Road (TIA #8)
- SR 305 & NE Liberty Road (TIA #9)
- SR 305 & Forest Rock Lane (TIA #10)
- SR 305 & Bond Road/SR 307 (TIA #11)
- NE Hostmark St & 6th Avenue NE (TIA #12)
- NE Hostmark St & Lincoln Road (TIA #13)
- NE Hostmark St & 4th Avenue NE (TIA #14)
- Front Street & NE Sunset Street (TIA #15)

### Comment #1C

Peak Hour Methodology: School-related peak demand and local peak hour variability are not fully documented.

**Heath Response (7/17/26)**: Traffic counts and the associated operational analysis applied Peak Hour Factor (PHF), which reflects the impacts of observed 15-minute volume peaking during each peak hour. The use of PHF allows the operational analysis to capture the impacts of short-duration school-related peaking, particularly during the AM peak hour. Existing PHFs are documented in the traffic count sheets. Peak hour variability at each study intersection is documented in Table 3.

**Parametrix Finding (9/2/26)**: Comment not addressed. The revised TIA (version 4) remains unchanged and does not include discussion of the afternoon school peak analysis. Per email communication with the City of Poulsbo on June 12, 2025, the City directs the applicant to address school traffic, recognizing that the school peak differs from the AM and PM peaks typically analyzed.

The PM peak hour analyzed in the TIA is based on traffic counts collected between 4:00 and 6:00 p.m. on a weekday. This window does not include the typical afternoon

peak of school-related traffic, which based on the North Kitsap School District schedule, indicates the middle and high school schedules conclude at 2:30 p.m. A discussion of school-related peak traffic demand should be included in the TIA.

**Heath Response (10/5/26)**: An expanded discussion of school peaking has been incorporated to the TIA report. The analysis periods used in the TIA were established in the May 2025 *Pinnacle at Liberty Bay Scoping Memo* as the 7:00–9:00 AM and 4:00–6:00 PM weekday peak periods. These are the standard commuter periods typically evaluated for traffic studies in Poulsbo and are consistent with other recent City traffic studies, including:

- Noll Pointe TIA – April 2026
- Cedarview at Glenwood – October 2025
- Sandstone Ridge – December 2024
- Northway Estates – October 2023

School-related traffic is captured during the AM analysis period, when school arrival overlaps the broader morning commute. School dismissal occurs before the broader afternoon commute and can create a concentrated, short-duration increase in traffic near the schools; however, it does not necessarily represent the controlling peak condition at the study intersections or for the proposed residential development.

The proposed development is expected to generate its highest afternoon demand during the commuter PM peak period. The project also provides a continuous pedestrian connection to nearby schools and access to SR 305 via Johnson Road NE, providing alternatives to vehicle travel along NE Hostmark Street during school dismissal.

Accordingly, Heath believes the 7:00–9:00 AM and 4:00–6:00 PM analysis periods remain appropriate and consistent with the City's adopted transportation planning methodology and the scope established for this TIA.

## COMMENT #2

### Comment #2A

The intersection of Hostmark/Caldart operates at LOS F (61.9–63.2 sec delay) under 2037 AM conditions, below the City LOS standard (E). Although the LOS F is consistent between 2037 No Build and Build conditions, the vehicle delay increases under the Build scenario.

**Heath Response (7/17/26)**: Long-range (2037) traffic forecasts have been updated. Previous versions included an error in compound growth calculations which resulted in an overestimation of anticipated growth. Based on the corrected traffic volume forecasts, the Hostmark/Caldart intersection is expected to operate at LOS E during the 2037 AM peak hour before and after the addition of project trips. The minimum LOS E standard is satisfied.

**Parametrix Finding (9/2/26)**: Comment not addressed. The revised TIA (version 4) does not provide justification for the corrected 2037 LOS/delay results at Hostmark/Caldart nor describes the growth rate calculation error. The intersection results presented in Table 9 do not reflect the Synchro output report in the Appendix.

The 2037 'without project' volumes presented in the revised TIA were calculated using a growth rate of approximately 3.5% for intersection entering volumes, which is the same growth rate used in the previous TIA (version 3), and results in the same LOS/delay (LOS F/61.9 sec).

Justification for the growth rate error should be described in the applicant's response, and the Hostmark/Caldart LOS/delay results shown in the Appendix should be reflected in Table 9 of the TIA.

**Heath Response (10/5/26)**: Background traffic volume forecasts applied a 0.5 percent straightline annual growth rate to through-trips on WSDOT routes, consistent with travel demand forecasts identified in the Transportation Element of the Poulsbo Comprehensive Plan, and a 2.0 percent straightline annual growth rate on City of Poulsbo streets, consistent with City guidance.

Prior TIA submittals (version 3 and earlier) included a growth forecasting error in the 2037 analysis horizon by which near-term (2025-2032) background growth was double-counted, thereby overestimating background growth. This error was identified and corrected in the July 2026 (Version 4) TIA submittal.

The updated TIA (Version 5 / October 2026) correctly applies the approved background traffic growth rates to all study intersections. Intersection capacity (Synchro) reports have been updated as necessary. The Hostmark/Caldart

intersection is expected to operate at LOS E or better through 2037 before and after the addition of project trips, satisfying the City of Poulsbo minimum LOS E standard.

Traffic volume forecasting calculations and all model files are provided with the TIA Version 5 submittal.

### Comment #2B

The school route to North Kitsap High School requires a mid-block crossing of Caldart Avenue without stop control. This crossing is aligned with and supported by Comprehensive Plan Policies TR-5.1, TR-5.2, and TR 5.3.

**Heath Response (7/17/26)**: Caldart Avenue currently provides marked pedestrian crossings at the Meredith Heights/Frank Raab Municipal Park driveway, at NE Odin Street, and at Hostmark Street. All of the existing marked crossings could serve pedestrian demand associated with North Kitsap High School. Please clarify the location of the midblock crossing referenced above.

**Parametrix Finding (9/2/26)**: Further discussion is needed. The applicant's response identifies marked pedestrian crossings on the walking route between the project site and the middle/high schools to be sufficient.

**Heath Response (10/5/26)**: Comment is noted.

### Comment #2C

The transportation analysis should evaluate improvements to the existing school crossing, including installation of a Rectangular Rapid Flashing Beacon (RRFB), to address pedestrian safety and support the City's transportation findings under PMC 14.04, PMC 17.60.040(A)(e), PMC 17.80.060, and Comprehensive Plan Policies TR-1.1 and TR-1.4.

**Heath Response (7/17/26)**: The Hostmark Street & Caldart Avenue intersection provides curb ramps and marked crosswalks on all legs. Hostmark Street also includes signalized pedestrian crossings at two locations to the east of Caldart Avenue. Please clarify the location of the school crossing referenced above.

**Parametrix Finding (9/2/26)**: Further discussion is needed. PMC 14.04.100(B)(3) states "intersections with adopted LOS F in the transportation element of the Poulsbo comprehensive plan may require mitigation measures which address impacts associated with adoption of the LOS F standard, but do not necessarily add capacity."

Hostmark/Caldart does not have an adopted LOS F standard documented in the Poulsbo Transportation Plan Update and is not expected to operate at LOS F per the

revised TIA (version 4). Therefore, the non-capacity mitigation suggested by the City – a Rectangular Rapid Flashing Beacon (RRFB) installed by the Pinnacle at Liberty Bay project at the marked crosswalk near the entrance to Raab Park – may not be applicable.

PMC 17.60.040(A)(e) states "A proposed preliminary subdivision may be approved only if the following findings are made by the review authority: The proposed preliminary subdivision makes adequate provisions for sidewalks and other planning features that provide safe walking conditions for students who walk to and from school." PMC 17.80.060(B)(5) states "Pedestrian and bicycle connection to adjacent subdivisions or property shall be provided as feasible and as consistent with the intent of the city's comprehensive plan's identified sidewalk and path connections."

The applicant's response identifies marked pedestrian crossings on the walking route between the project site and the middle/high schools to be sufficient.

**Heath Response (10/5/26)**: Comment is noted.

## COMMENT #3

The information provided in support of the applicant's feasibility determination does not adequately support the conclusion that the Baywatch connection is infeasible due to vertical geometry and stream crossing constraints because the feasibility evaluation does not fully address applicable City codes, policies, and reasonable design alternatives necessary for the City Engineer to determine infeasibility.

**Heath Response (7/17/26)**: Response to be provided by ESM.

**Parametrix Finding (9/2/26)**: Comment not addressed. The two access points identified by the applicant do not meet the intent and purpose of codes PMC 17.80.060 (to provide redundant and efficient routes and connections and to provide superior emergency vehicle response time by providing multiple access to streets) and PMC 17.60.040 (to ensure the street system provides for the safe, orderly and efficient circulation of traffic, makes adequate provisions for fire and emergency access and protection, and makes appropriate provisions for the public health, safety, and welfare).

**Heath Response (10/5/26)**: Responses to be provided by ESM. Heath & Associates also prepared a supplemental "Emergency Access Analysis" memorandum, dated October 5, 2026, which provides additional analysis comparing the emergency vehicle response routes with and without the Baywatch connection.

# COMMENT #4

## Comment #4A/4B

**Comment #4A**: Both Road C and Crystallia Court rely exclusively on Sunrise Ridge Ave NE, resulting in one functional access route and a single route condition, not two independent routes as required by City code and implied in the TIA. This is consistency with City code PMC 17.80.050(C).

**Comment #4B**: The TIA does not demonstrate that the proposed street network satisfies the redundancy objectives as required under City code PMC 17.80.060.

**Heath Response (7/17/26)**: The project proposes access to NE Crystallia Court and to Sunrise Ridge Avenue, providing two distinct public street connections to the site and satisfying access criteria defined in PMC 17.080.050(C). An internal street network will provide a contiguous connection between the two accesses, preserving full site access in the event of a blockage at either connection. The project also proposes completion of Sunrise Ridge Avenue to the south of the project, facilitating access to the site to/from the north via Caldart Avenue and to/from the south via Johnson Road.

Sunrise Ridge Avenue provides an approximately 390-foot centerline separation between NE Crystallia Court and the proposed Road C intersection. The magnitude of Sunrise Ridge Avenue blockage required for simultaneous closure of both NE Crystallia Court and Road C is significant and unlikely.

**Parametrix Finding (9/2/26)**: Comment not addressed. The two access points identified by the applicant do not meet the intent and purpose of codes PMC 17.80.060 (to provide redundant and efficient routes and connections and to provide superior emergency vehicle response time by providing multiple access to streets) and PMC 17.80.050(C) (to provide for at least two different standard routes for ingress and egress).

**Heath Response (10/5/26)**: See Comment Response #3.

## Comment #4C

The information provided does not demonstrate that the proposed subdivision provides the required street connections to adjacent properties and does not demonstrate feasibility or request exemption as required under PMC 17.80.060(B).

**Heath Response (7/17/26)**: Response to be provided by ESM.

**Parametrix Finding (9/2/26)**: Comment not addressed. The applicant has not provided sufficient information to show the project site and/or surrounding area's topography make connectivity technically and physically unfeasible.

**Heath Response (10/5/26)**: See Comment Response #3.

## Comment #4D

If, after further analysis, the Baywatch connection is determined by the City Engineer to be infeasible, the information provided does not demonstrate that the proposed Sunrise Ridge access configuration satisfies the applicable City and Fire Code requirements for access, connectivity and emergency response. Specific examples where the site plan of the TIA deviates from City or Fire Code include:

- Any blockage of Sunrise Ridge would significantly reduce site access, which is inconsistent with the intent of PMC 17.80.050(C) to provide access via two different streets and PMC 17.80.060 to provide redundant and efficient connections and emergency access provisions of IFC 503.1.2. This risk is amplified by steep grades (~12%) and significant elevation change.

**Heath Response (7/17/26)**: The project proposes access via two distinct public streets and a new connection on Sunrise Ridge Avenue to the south, satisfying access criteria defined in PMC 17.80.050(C). See Response #4A.

IFC D107.2 requires a minimum straight-line separation not less than one-half of the length of the maximum overall diagonal dimension of the property. The maximum overall diagonal dimension of the subject site is 1,918 feet, resulting in a minimum straightline separation of 909 feet.

The proposed accesses on NE Crystallia Court and the eastern edge of the subject site on Sunrise Ridge Avenue provide 940 feet of separation, satisfying IFC D107.2 access separation requirements for two separate access roads.

**Parametrix Finding (9/2/26)**: Comment not addressed. The two access points identified by the applicant do not meet the intent and purpose of IFC D107.2. The diagonal distance of the property should be measured from the Road C/Sunrise Ridge Avenue intersection, as that is the access point to the area beings served.

**Heath Response (10/5/26)**: See Comment Response #3. The diagonal dimension provided in the Heath 7/17 comment response (1,918 ft) was a typographical error and should have read 1,818 feet, consistent with ESM documentation.

### Comment #4E

No alternative mitigation (e.g. emergency access, sprinklering, roadway improvements) has been proposed in the TIA as required under PMC 17.80.050(C) and supporting provisions.

**Heath Response (7/17/26)**: The project proposes access via two distinct public streets and a new connection on Sunrise Ridge Avenue to the south, satisfying access criteria defined in PMC 17.80.050(C). See Response #4A.

**Parametrix Finding (9/2/26)**: Comment not addressed. The two access points identified by the applicant do not meet the intent and purpose of codes PMC 17.80.060 (to provide redundant and efficient routes and connections and to provide superior emergency vehicle response time by providing multiple access to streets) and PMC 17.80.050(C) (to provide for at least two different standard routes for ingress and egress). The applicant does not discuss sprinklering in their response to comments.

**Heath Response (10/5/26)**: See Comment Response #3.

### Comment #4F

Based on the site conditions, including terrain, steep grades (~12%), and access limitations, the transportation information provided does not adequately demonstrate that the proposed access configuration satisfies the applicable emergency access provisions of IFC 503.1.2 and IFC D107.2.

**Heath Response (7/17/26)**: The NE Crystallia Court and Road C accesses satisfy IFC separation requirements for emergency access separation. See Response #4D.

**Parametrix Finding (9/2/26)**: Comment not addressed. The two access points identified by the applicant do not meet the intent and purpose of IFC D107.2. The diagonal distance of the property should be measured from the Road C/Sunrise Ridge Avenue intersection, as that is the access point into the subdivision. The site access points do not meet IFC 503.1.2 because they both rely on a single road,

Sunrise Ridge Road, to reach the regional roadway network, which conflicts with the codes requirement to provide "more than one fire apparatus road based on the potential for impairment of a single road by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access."

**Heath Response (10/5/26)**: See Comment Response #3.

### Comment #4G/4H

**Comment #4G:** Road D exceeds allowable dead-end length and the initial project phase (>30 lots) is served by a single route, which is inconsistent with subdivision access and phasing requirements per City code PMC 17.80.050(C) and Fire code IFC D107.1.

**Comment #4H:** Each division must meet access and safety requirements independently per PMC 17.60.040(C), which is not demonstrated.

**Heath Response (7/17/26)**: Response to be provided by ESM.

**Parametrix Finding (9/2/26)**: Comment not addressed. The two access points identified by the applicant do not meet the intent and purpose of IFC D107.2. The diagonal distance of the property should be measured from the Road C/Sunrise Ridge Avenue intersection, as that is the access point into the subdivision. The site access points do not meet IFC 503.1.2 because they both rely on a single road, Sunrise Ridge Road, to reach the regional roadway network, which conflicts with the codes requirement to provide "more than one fire apparatus road based on the potential for impairment of a single road by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access."

**Heath Response (10/5/26)**: See Comment Response #3.

# THE PINNACLE AT LIBERTY BAY
# TRAFFIC IMPACT ANALYSIS

## CONTENTS


1. Introduction ..... 5
2. Project Description ..... 5
3. Study Area ..... 8
4. Existing Transportation Conditions ..... 9
5. Future Transportation Conditions ..... 30
6. Conclusions & Mitigation ..... 51


## TABLES


1. Existing Roadway Network ..... 9
2. Existing Transit Routes ..... 9
3. 2025 Peak Hour Intervals and Traffic Volumes ..... 11
4. Peak Hour Traffic Volume Comparison ..... 12
5. 2025 Traffic Volume Sources ..... 14
6. Existing Peak Hour Level of Service ..... 23
7. Crash History by Year ..... 25
8. Crash History by Type and Injury Severity ..... 26
9. Project Trip Generation ..... 30
10. Forecast 2032 Peak Hour Level of Service ..... 45
11. Forecast 2037 Peak Hour Level of Service ..... 46
12. PM Peak Hour Project Impacts at LOS-Deficient Intersections ..... 47
13. NE Hostmark Street & Caldart Avenue 95th Percentile Queue ..... 48

# FIGURES


1. Vicinity Map ..... 6
2. Conceptual Site Plan ..... 7
3. Existing AM Peak Hour Volumes ..... 15
4. Existing PM Peak Hour Volumes ..... 16
5. Existing AM Peak Hour Non-Motorist Volumes ..... 19
6. Existing PM Peak Hour Non-Motorist Volumes ..... 20
7. Safe Walking Routes to Schools ..... 21
8. Collision History Map ..... 29
9. AM Peak Hour Trip Distribution & Assignment ..... 32
10. PM Peak Hour Trip Distribution & Assignment ..... 33
11. AM Peak Hour Pipeline Volumes ..... 34
12. PM Peak Hour Pipeline Volumes ..... 35
13. Forecast 2032 AM Peak Hour Volumes Without Project ..... 36
14. Forecast 2032 PM Peak Hour Volumes Without Project ..... 37
15. Forecast 2032 AM Peak Hour Volumes With Project ..... 38
16. Forecast 2032 PM Peak Hour Volumes With Project ..... 39
17. Forecast 2037 AM Peak Hour Volumes Without Project ..... 40
18. Forecast 2037 PM Peak Hour Volumes Without Project ..... 41
19. Forecast 2037 AM Peak Hour Volumes With Project ..... 42
20. Forecast 2037 PM Peak Hour Volumes With Project ..... 43
21. Construction Route ..... 50

# THE PINNACLE AT LIBERTY BAY
# TRAFFIC IMPACT ANALYSIS

## 1. INTRODUCTION

This Traffic Impact Analysis (TIA) describes the transportation impacts associated with The Pinnacle at Liberty Bay, a proposed residential development within Poulsbo city limits. The report includes a description of existing transportation conditions, project-generated travel demand, and future transportation conditions before and after project buildout. The scope of this analysis has been coordinated with the City of Poulsbo. This TIA has been updated based on comments received from the City of Poulsbo and Parametrix in September 2026.

## 2. PROJECT DESCRIPTION

- **Proposal**
  - The Pinnacle at Liberty Bay is a proposed residential development consisting of 138 single-family homes located within Poulsbo.

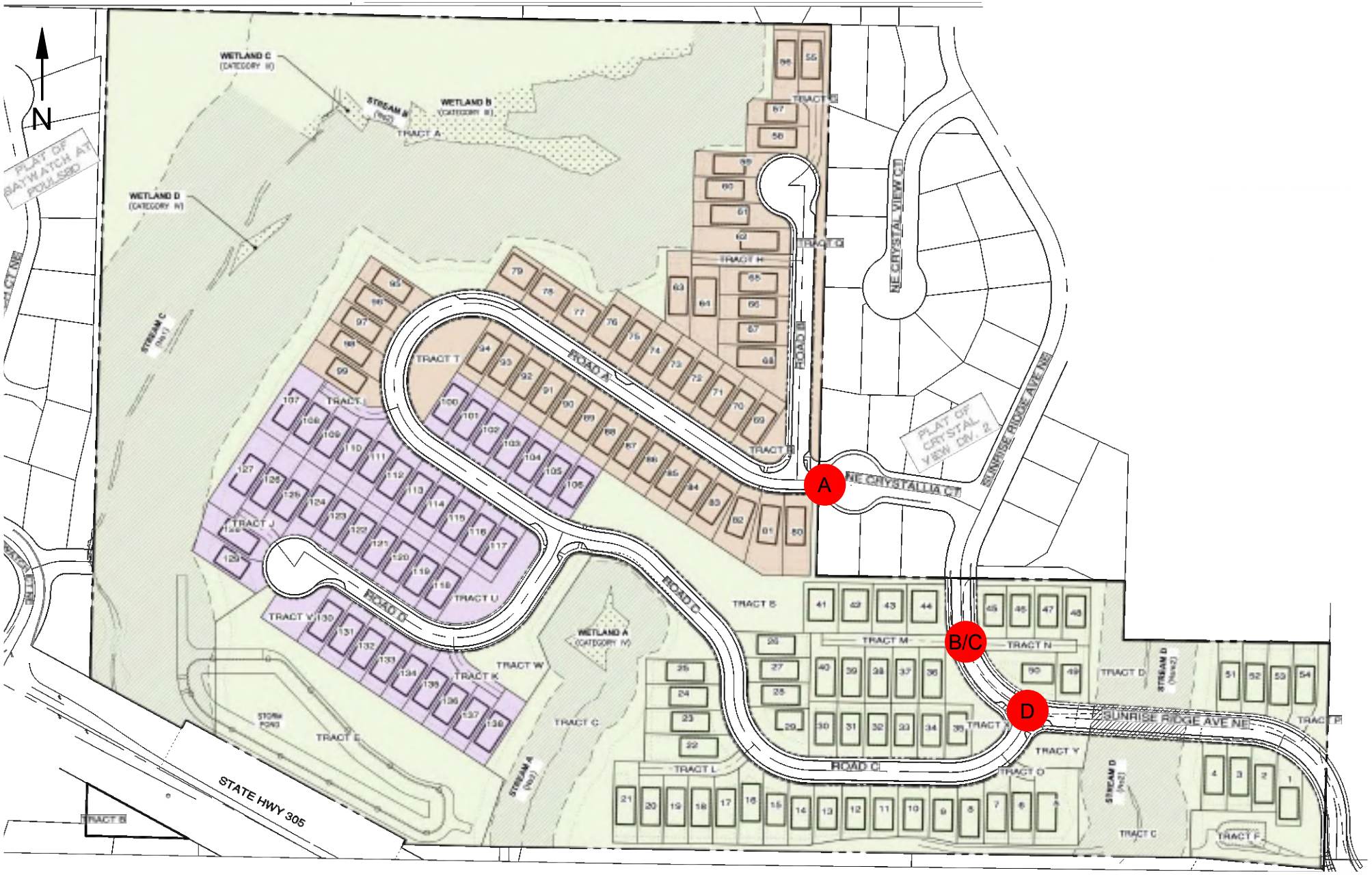
- **Location**
  - The subject site is bordered to the east by Sunset Ridge Avenue NE and single-family residential development, to the west by single-family residential development, and to the south by SR 305 and undeveloped property.
  - The site comprises 40.98 acres on four undeveloped tax parcels, 232601-4-001-2009, -3-003-2008, -3-018-2001, and -3-005-2006.

- **Site Access**
  - Access to the site will be provided at the following locations:
    1. Sunrise Ridge Avenue via extension of Crystallia Court
    2. Both sides of Sunrise Ridge Avenue 220 feet south of Crystallia Court
    3. Sunrise Ridge Avenue 385 feet south of Crystallia Court
  - Direct property access will be provided via a network of internal circulating roadways.

A vicinity map is provided in **Figure 1** with the subject site highlighted in blue. A conceptual site plan including access locations is presented in **Figure 2**.

**Figure 1: Vicinity Map**






HEATH&ASSOCIATES
Transportation Planning & Engineering

# PINNACLE AT LIBERTY BAY

SITE PLAN
FIGURE 2

# 3. STUDY AREA

Study intersections were identified based on City of Poulsbo TIA requirements and included intersections which are expected to be impacted by 10 or more peak hour project trips. The study area was scoped and refined through coordination with City of Poulsbo and City consultant staff. A total of 15 study intersections were identified:

1. SR 305 & NE Hostmark Street
2. SR 305 & Baywatch Court NE
3. SR 305 & Johnson Road NE
4. Johnson Road NE & Sunrise Ridge Avenue NE
5. Sunrise Ridge Avenue NE & Crystallia Court
6. NE Hostmark Street & Caldart Avenue NE
7. Caldart Avenue NE & Sunrise Ridge Avenue NE
8. SR 305 & NE Lincoln Rd
9. SR 305 & NE Liberty Rd
10. SR 305 & Forest Rock Lane
11. SR 305 & Bond Rd/SR 307
12. NE Hostmark St & 6th Ave NE
13. NE Hostmark St & Lincoln Rd
14. NE Hostmark St & 4th Ave NE
15. Front St & NE Sunset St

At the time of this analysis, Sunrise Ridge Avenue NE was gated to the northwest of Johnson Road NE. The Sunrise Ridge Avenue NE connection to Johnson Road NE will be completed as part of The Pinnacle at Liberty Bay Phase 1.

# 4. EXISTING TRANSPORTATION CONDITIONS

## 4.1 Existing Street System

Characteristics of key roadways serving the subject site are provided in **Table 1**.

**Table 1: Existing Roadway Network**

| Functional Classification | Roadway | Speed Limit (mph) | Lanes | Sidewalk | Bike Facilities |
|---|---|---|---|---|---|
| Principal Arterial | SR 305 | 50 | 2-5 | No* | No* |
| Minor Arterial | Johnson Rd NE | 25 | 2 | Yes | No |
| Neighborhood Collector | NE Hostmark St | 15-25 | 2-3 | Yes | Yes |
| | Caldart Ave NE | 20-25 | 2 | Yes | No |
| Local | Sunrise Ridge Ave NE | 25 | 2 | Yes | No |
| | Baywatch Ct NE | 25 | 2 | Yes | No |

*SR 305 includes sidewalk and bike facilities only at the roundabout at SR 305 & Johnson Rd NE

## 4.2 Existing Transit Service

A review of the Kitsap County Transit website indicates that transit is provided within one mile walking distance to/from the site. Route 344 – Poulsbo Central is provided at the intersection of Hostmark Street & Caldart Avenue approximately 3,500 feet north of the site. Route 333 – Silverdale/Bainbridge and Route 390 – Poulsbo/Bainbridge include stops at the intersection of SR 305 & Johnson Road, approximately 3,500 feet south of the project site. Each nearby route is identified in **Table 2** below. For more detailed information, refer to the Kitsap Transit website.

**Table 2: Existing Transit Routes**

| Route | Description | Weekday Service | Saturday | Sunday | Nearest Stop |
|---|---|---|---|---|---|
| **333** | Silverdale TC to Bainbridge Ferry | 4:22 AM – 8:55 PM[1] | -- | -- | SR 305 & Johnson |
| **344** | North Viking TC to 10th & Forest Rock | 8:30 AM – 7:20 PM | 10:30 AM – 6:20 PM | -- | Caldart & Hostmark |
| **390** | North Viking TC to Bainbridge Ferry | 4:00 AM – 9:24 PM | 8:08 AM – 7:37 PM | 8:10 AM – 5:00 PM | SR 305 & Johnson |

[1] Route does not run midday from 7:35 AM to 3:45 PM.

## 4.3 Roadway Improvements

The City of Poulsbo's (2026-2031) Transportation Improvement Program (TIP) and Washington State Department of Transportation (WSDOT) 2025-2028 Statewide Transportation Improvement Program (STIP) were reviewed to identify planned transportation improvement projects in the site vicinity. The Poulsbo TIP identifies one such improvement, described below.

**Noll Road Corridor Improvements (Priority #2):** The phased corridor improvement project will connect SR 305 to NE Lincoln Rd via Noll Rd, Langaunet Ln & Maranatha Ln, providing roadway, illumination, sidewalk, and shared use path improvements. The project's initial phase, including realignment of Noll Road, a new roundabout at the Noll Road/Johnson Road & Sunrise Ridge Avenue intersection, and a new roundabout with nonmotorized facilities at the Johnson Road NE/SR 305 intersection, has been completed. Future phases will provide a roundabout at Noll Road & Mesford Road, an extension of Langaunet Lane, and complete street improvements along the corridor from Noll Road/Storhoff Road to Lincoln Road.

At the time of this analysis, Sunrise Ridge Avenue NE was gated between Noll Road/Johnson Road NE and NE Crystallia Court. The future conditions analyses described in this report assumed that Sunrise Ridge Avenue NE will be opened to traffic by 2032, creating a new north-south local street connection between Noll Road/Johnson Road NE and Caldart Avenue to the north. The traffic volume impacts of the Sunrise Ridge Avenue connection are described later in this report.

## 4.4 Existing Traffic Volumes

Field data was collected from 7-9 AM and from 4-6 PM on non-holiday school weekdays in May 2025 at the following five intersections:

- SR 305 & NE Hostmark Street (ID #1)
- SR 305 & Baywatch Court NE (ID #2)
- SR 305 & Johnson Road NE (ID #3)
- Johnson Road NE & Sunrise Ridge Avenue NE (ID #4)
- NE Hostmark Street & Caldart Avenue NE (ID #6)

Traffic counts at each study intersection were reviewed to identify the one-hour peak period during each count, which was then applied to the intersection capacity analysis. The AM and PM peak hours of traffic volumes at each intersection are shown in **Table 3**.

**Table 3: 2025 Peak Hour Intervals and Traffic Volumes**

| ID | Study Intersection | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|---|
| | | Interval | Volume (vph) | Interval | Volume (vph) |
| 1 | SR 305 & NE Hostmark St | 7:00 – 8:00 AM | 2,010 | 4:00 – 5:00 PM | **2,450** |
| 2 | SR 305 & Baywatch Ct NE | 8:00 – 9:00 AM | 1,429 | 4:30 – 5:30 PM | **1,639** |
| 3 | SR 305 & Johnson Rd NE | 7:00 – 8:00 AM | 1,513 | 4:15 – 5:15 PM | **1,679** |
| 4 | Johnson Rd & Sunrise Ridge Ave | 7:15 – 8:15 AM | **114** | 4:00 – 5:00 PM | 67 |
| 6 | NE Hostmark St & Caldart Ave NE | 7:15 – 8:15 AM | **830** | 4:45 – 5:45 PM | 773 |

Peak hour traffic volumes at intersections along the SR 305 corridor were higher during the PM peak hour, with total entering volumes between 11 percent and 22 percent higher during the PM peak hour than the AM peak hour.

Peak hour traffic volumes at NE Hostmark Street & Caldart Avenue NE were higher during the AM peak hour, with total entering volume 7.4 percent higher during the AM peak hour than the PM peak hour. Morning volume peaking is likely influenced by the proximity of North Kitsap High School, Poulsbo Middle School, and Poulsbo Elementary School.

The intersection of Johnson Road & Sunrise Ridge Avenue currently serves relatively low traffic volume, with fewer than 150 total entering vehicles during the AM and PM peak hours.

Traffic volumes at the following two intersections were estimated based on nearby traffic counts, street connectivity, and existing development patterns, as described:

- **Caldart Avenue NE & Sunrise Ridge Avenue NE (ID #7)**: Estimated based on traffic counts collected at NE Hostmark Street & Caldart Avenue NE, existing development patterns, and street connectivity.
- **Sunrise Ridge Avenue NE & Crystallia Court (ID #5)**: Traffic volumes estimated based on seven existing single-family homes accessed by Crystallia Court. Sunrise Ridge Avenue NE is currently gated just south of Crystallia Court; therefore, the intersection serves no cut-through trips.

Afternoon (PM) peak hour traffic volumes at the following intersections were provided by City of Poulsbo staff and represent the technical basis for the existing conditions analysis described in the Transportation Element of the 2024 Poulsbo Comprehensive Plan:

- SR 305 & NE Lincoln Rd (ID #8)
- SR 305 & NE Liberty Rd (ID #9)
- SR 305 & Forest Rock Lane (ID #10)
- SR 305 & Bond Rd/SR 307 (ID #11)
- NE Hostmark St & 6th Ave NE (ID #12)
- NE Hostmark St & Lincoln Rd (ID #13)
- NE Hostmark St & 4th Ave NE (ID #14)
- Front St & NE Sunset St (ID #15)

Comprehensive Plan counts were collected in March 2023 and were adjusted to reflect the 2025 baseline of this analysis using a growth rate of 0.5 percent per year for through trips on WSDOT routes, consistent with Comprehensive Plan traffic volume forecasts, and a growth rate of 2.0 percent per year for traffic volumes on City of Poulsbo streets.

A comparison of AM peak hour and PM peak hour traffic volumes collected in May 2025, shown in Table 3, indicates traffic volumes in the study area are generally higher during the PM peak hour than the AM peak hour. A supplemental peak hour volume comparison was developed using AM and PM peak hour traffic counts collected from 6-8 AM and from 4-6 PM on Tuesday, October 8, 2019, as documented in the November 2020 *Oslo Bay Apartments Traffic Impact Analysis Final Report*, prepared by Transportation Solutions.

**Table 4: Peak Hour Traffic Volume Comparison**

| ID | Study Intersection | AM Peak Hour Volume (vph) | PM Peak Hour Volume (vph) | Highest Peak (% Difference) |
|---|---|---|---|---|
| 1 | SR 305 & NE Hostmark St | 2,004 | 2,714 | PM (35%) |
| 8 | SR 305 & NE Lincoln Rd | 2,245 | 3,095 | PM (38%) |
| 9 | SR 305 & NE Liberty Rd | 1,926 | 2,531 | PM (31%) |
| 10 | SR 305 & Forest Rock Ln | 2,344 | 3,324 | PM (42%) |
| 11 | SR 305 & Bond Rd/SR 307 | 3,553 | 4,706 | PM (32%) |
| 15 | Front St & NE Sunset St | 681 | 1,314 | PM (93%) |

Traffic volume at each observed intersection featured PM peak hour volumes at least 30 percent higher than AM peak hour volumes. This comparison included all five signalized SR 305 study intersections in addition to the intersection of Front Street & NE Sunset Street, both City of Poulsbo streets. Notably, PM peak hour volumes at Front Street & NE Sunset Street were approximately 93 percent higher during the PM peak hour than the AM peak hour.

Based on historical traffic counts, traffic volumes in the study area, including the SR 305 corridor, can be broadly characterized as peaking during the PM peak hour. The intersection of NE Hostmark Street & Caldart Avenue NE, likely due to its proximity to several schools, is the only observed study intersection with greater than 150 peak hour entering trips which serves higher traffic volume during the AM peak hour. As a result, the intersection operations evaluation documented in this analysis includes the following study periods:

- **AM and PM Peak Hour**
  1. SR 305 & NE Hostmark Street
  2. SR 305 & Baywatch Court NE
  3. SR 305 & Johnson Road NE
  4. Johnson Road NE & Sunrise Ridge Avenue NE
  5. Sunrise Ridge Avenue NE & Crystallia Court
  6. NE Hostmark Street & Caldart Avenue NE
  7. Caldart Avenue NE & Sunrise Ridge Avenue NE
- **PM Peak Hour**
  8. SR 305 & NE Lincoln Rd
  9. SR 305 & NE Liberty Rd
  10. SR 305 & Forest Rock Lane
  11. SR 305 & Bond Rd/SR 307
  12. NE Hostmark St & 6th Ave NE
  13. NE Hostmark St & Lincoln Rd
  14. NE Hostmark St & 4th Ave NE
  15. Front St & NE Sunset St

A summary of 2025 traffic count sources is provided in **Table 5**. Existing AM and PM peak hour turning movement volumes are shown in **Figures 3** and **4**. Traffic count sheets are provided in the appendix for reference.

**Table 5: 2025 Traffic Volume Sources**

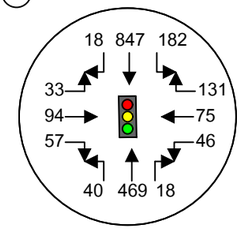
| ID | Study Intersection | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|---|
| | | Count Date | Source | Count Date | Source |
| 1 | SR 305 & NE Hostmark St | May 2025 | Heath | May 2025 | Heath |
| 2 | SR 305 & Baywatch Ct NE | May 2025 | Heath | May 2025 | Heath |
| 3 | SR 305 & Johnson Rd NE | May 2025 | Heath | May 2025 | Heath |
| 4 | Johnson Rd & Sunrise Ridge Ave | May 2025 | Heath | May 2025 | Heath |
| 5 | Sunrise Ridge Ave & Crystallia Ct | Estimated (low volume) | | Estimated (low volume) | |
| 6 | NE Hostmark St & Caldart Ave NE | May 2025 | Heath | May 2025 | Heath |
| 7 | Caldart Ave NE & Sunrise Ridge Ave | Estimated (low volume) | | Estimated (low volume) | |
| 8 | SR 305 & NE Lincoln Rd | --* | | Mar 2023 (adjusted) | City of Poulsbo |
| 9 | SR 305 & NE Liberty Rd | --* | | Mar 2023 (adjusted) | City of Poulsbo |
| 10 | SR 305 & Forest Rock Ln | --* | | Mar 2023 (adjusted) | City of Poulsbo |
| 11 | SR 305 & Bond Rd/SR 307 | --* | | Mar 2023 (adjusted) | City of Poulsbo |
| 12 | NE Hostmark St & 6th Ave NE | --* | | Mar 2023 (adjusted) | City of Poulsbo |
| 13 | NE Hostmark St & Lincoln Rd | --* | | Mar 2023 (adjusted) | City of Poulsbo |
| 14 | NE Hostmark St & 4th Ave NE | --* | | Mar 2023 (adjusted) | City of Poulsbo |
| 15 | Front St & Sunset St | --* | | Mar 2023 (adjusted) | City of Poulsbo |

*Historical traffic counts indicate traffic volumes peak during the PM peak hour. As a result, the PM peak hour can be characterized as the worst period of traffic congestion and is the focus of the intersection operations analysis.

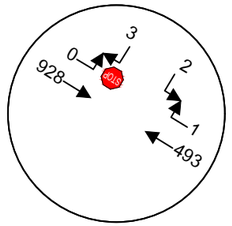



## OUTLYING STUDY INTERSECTIONS

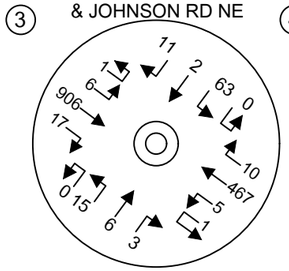
1 SR 305 & NE HOSTMARK ST



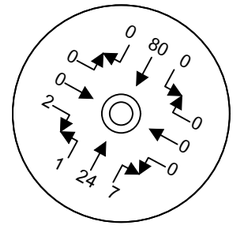

2 SR 305 & BAYWATCH CT NE



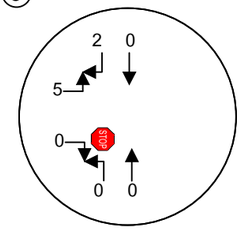

3 SR 305 & JOHNSON RD NE



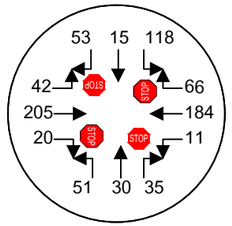

4 JOHNSON RD NE & SUNRISE RIDGE AVE NE



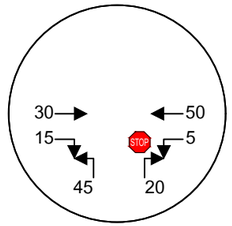

5 SUNRISE RIDGE AVE NE & NE CRYSTALLIA CT

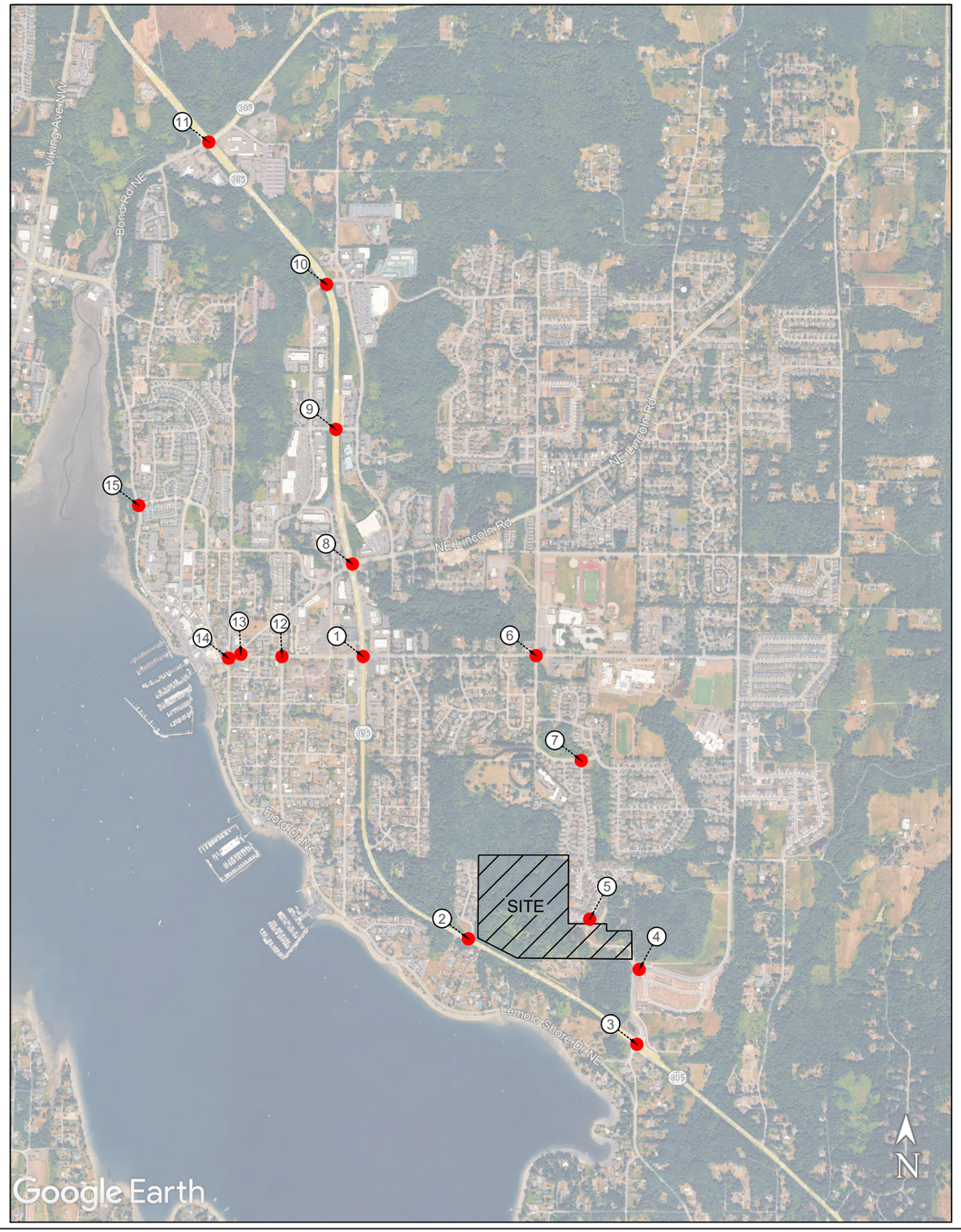



6 NE HOSTMARK ST & CALDART AVE NE

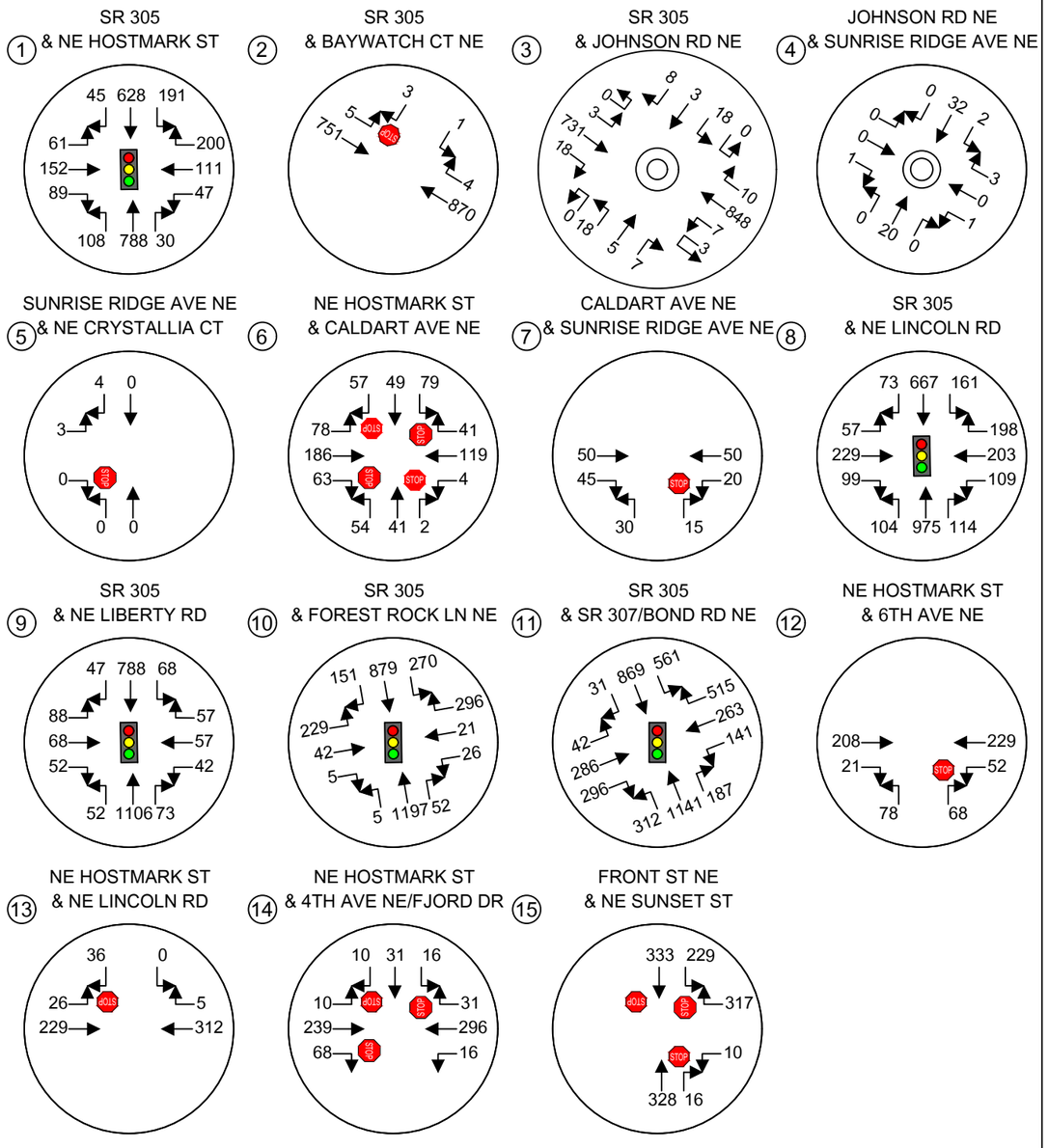



7 CALDART AVE NE & SUNRISE RIDGE AVE NE






## OUTLYING STUDY INTERSECTIONS




HEATH&ASSOCIATES
Transportation Planning & Engineering

PINNACLE AT LIBERTY BAY
EXISTING PM PEAK HOUR VOLUMES
FIGURE 4

## 4.5 School-Related Traffic Volume

The intersection of NE Hostmark Street & Caldart Avenue NE is located near three public schools, including North Kitsap High School (adjacent), Poulsbo Middle School (approximately 1,200 feet), and Poulsbo Elementary School (approximately 0.68 miles). Each school provides a full-day schedule on Monday, Tuesday, Thursday, and Friday, with an early release on Wednesday. Bell schedules at each nearby school are summarized below:

- **North Kitsap High School**: 7:55 AM – 2:30 PM (MTRF); 7:55 AM – 1:40 PM (W)
- **Poulsbo Middle School**: 7:55 AM – 2:30 PM (MTRF), 7:55 AM – 1:40 PM (W)
- **Poulsbo Elementary School**: 9:15 AM – 3:50 PM (MTRF), 9:15 AM – 3:00 PM (W)

May 2025 traffic data collection included the 7-9 AM and 4-6 PM period, designed to capture the peak of systemwide traffic volume which typically corresponds with the peak of morning and afternoon commute traffic as well as after-work shopping and recreational demand. The morning data collection period also captures the morning arrival peak at North Kitsap High School and Poulsbo Middle School (7:55 AM first bell). Morning school peaking, which is often characterized by short-duration periods of high traffic volumes, was therefore reflected in the AM peak hour intersection operation analysis. The effects of short-duration school-related traffic demand were modeled using observed 15-minute volume peaking, reflected in the intersection operations analysis as Peak Hour Factor (PHF). The intersection of NE Hostmark Street & Caldart Avenue NE was observed to operate with a PHF of 0.75 during the May 2025 AM peak hour.

The May 2025 4-6 PM data collection period did not explicitly capture the school dismissal period at North Kitsap High School, Poulsbo Middle School, and Poulsbo Elementary School which occur between 1:40 PM and 3:50 PM. However, the afternoon school peak period is generally brief and is offset from the peak period of overall traffic demand, which occurs later and is characterized by a longer sustained peak period of commuters returning home from work as well as shopping and recreational trips. The later systemwide peak hour reflects the basis for the technical analysis described in the Transportation Element of the Poulsbo Comprehensive Plan, and is consistent with traffic count data, models, and forecasts provided by City of Poulsbo staff.

Trip generation data published in the Institute of Transportation Engineers (ITE) *Trip Generation Manual 12th Edition* for Land Use Code (LUC) 210 – Single-Family Detached Housing indicates that the peak of trip generation for the proposed residential development will occur during the weekday 4-6 PM period.[2]

[2] "Hourly Distribution of Entering and Exiting Vehicle Trips by Land Use," ITE *Trip Generation Manual 12th Edition*.

While school-related afternoon dismissal traffic demand will influence streets and intersections in close proximity to North Kitsap High School, Poulsbo Middle School, and Poulsbo Elementary School, including the intersection of NE Hostmark Street & Caldart Avenue NE, the PM peak hour analysis described in this report focused on the overall systemwide peak which is the basis for City of Poulsbo planning efforts and coincides with the peak period of project trip generation impacts.

## 4.6 Existing Nonmotorized Conditions

Nonmotorized traffic was included in the AM and PM peak hour counts. Refer to **Figures 5 and 6** for AM and PM peak hour nonmotorized peak hour activity at each study intersection.

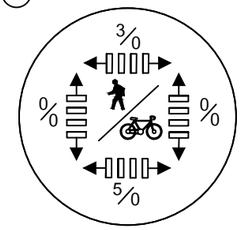
Nonmotorized infrastructure in the project vicinity includes sidewalks along both sides of Sunrise Ridge Avenue NE, Caldart Avenue NE, NE Hostmark Street, and Johnson Road NE. Sidewalks along Johnson Road NE to the south of the project provide a nonmotorized connection to transit stops on SR 305. The planned Noll Road corridor improvements will provide sidewalk and shared-use path facilities to the northeast of the project.

School-aged residents of the project would likely attend Poulsbo Elementary School, Poulsbo Middle School, or North Kitsap High School, each located less than 1.5 miles walking distance from the site. Continuous sidewalk segments, marked crosswalks, and reduced school speed zone signs are provided between the site and schools facilitating student transport. Refer to **Figure 7** for the pedestrian routes to and from each school.

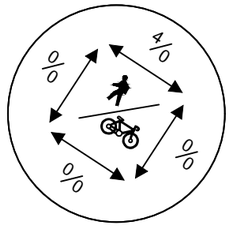



## OUTLYING STUDY INTERSECTIONS

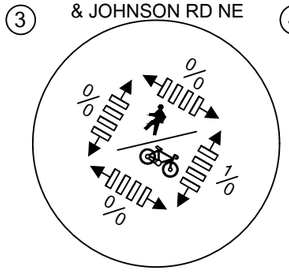
1 SR 305 & NE HOSTMARK ST



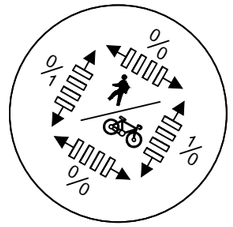

2 SR 305 & BAYWATCH CT NE



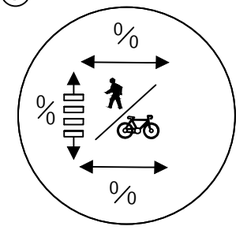

3 SR 305 & JOHNSON RD NE



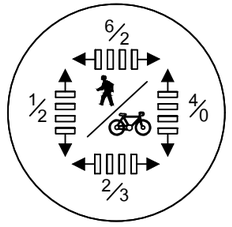

4 JOHNSON RD NE & SUNRISE RIDGE AVE NE



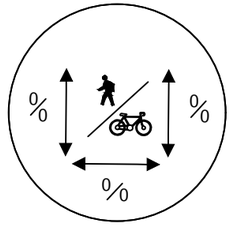

5 SUNRISE RIDGE AVE NE & NE CRYSTALLIA CT




6 NE HOSTMARK ST & CALDART AVE NE



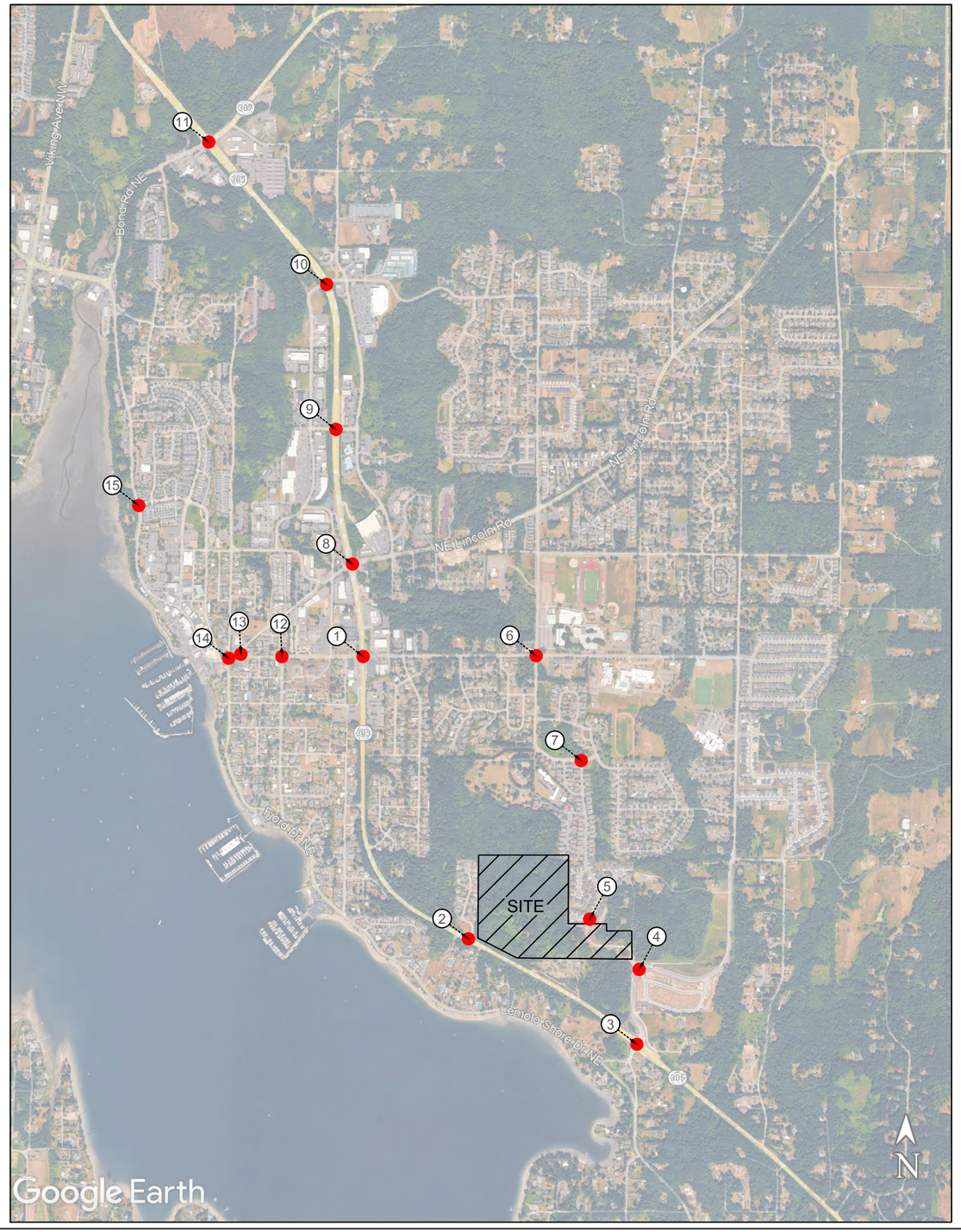

7 CALDART AVE NE & SUNRISE RIDGE AVE NE




HEATH&ASSOCIATES
Transportation Planning & Engineering

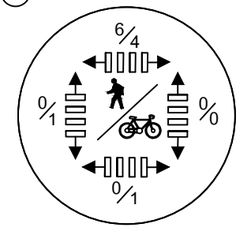
PINNACLE AT LIBERTY BAY

EXISTING AM PEAK HOUR NON-MOTORIST VOLUMES
FIGURE 5

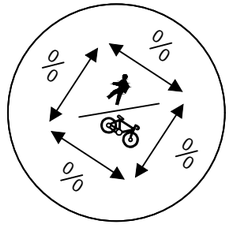



## OUTLYING STUDY INTERSECTIONS

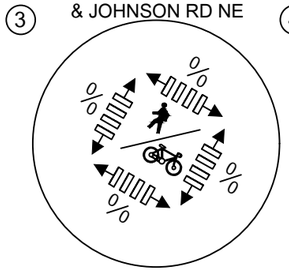
1 SR 305 & NE HOSTMARK ST



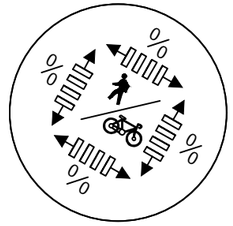

2 SR 305 & BAYWATCH CT NE



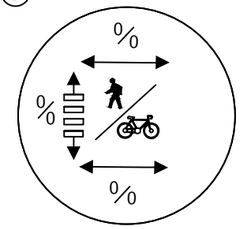

3 SR 305 & JOHNSON RD NE



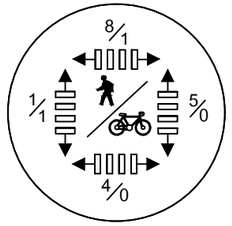

4 JOHNSON RD NE & SUNRISE RIDGE AVE NE



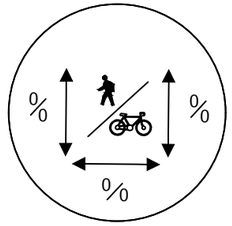

5 SUNRISE RIDGE AVE NE & NE CRYSTALLIA CT



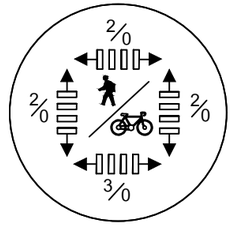

6 NE HOSTMARK ST & CALDART AVE NE



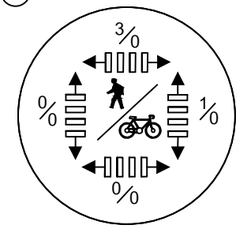

7 CALDART AVE NE & SUNRISE RIDGE AVE NE



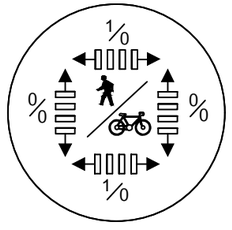

8 SR 305 & NE LINCOLN RD



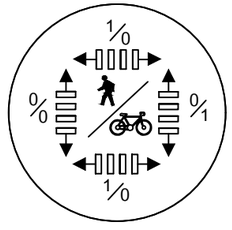

9 SR 305 & NE LIBERTY RD



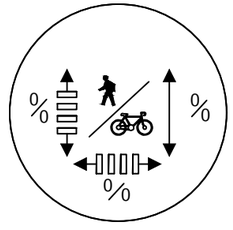

10 SR 305 & FOREST ROCK LN NE



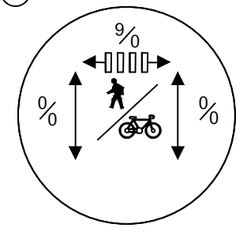

11 SR 305 & SR 307/BOND RD NE



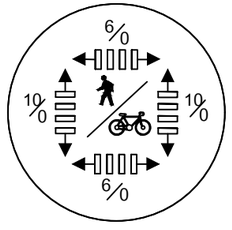

12 NE HOSTMARK ST & 6TH AVE NE



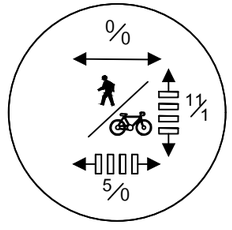

13 NE HOSTMARK ST & NE LINCOLN RD




14 NE HOSTMARK ST & 4TH AVE NE/FJORD DR




15 FRONT ST NE & NE SUNSET ST




HEATH&ASSOCIATES
Transportation Planning & Engineering

PINNACLE AT LIBERTY BAY

EXISTING PM PEAK HOUR NON-MOTORIST VOLUMES
FIGURE 6




HEATH&ASSOCIATES
Transportation Planning & Engineering

PINNACLE AT LIBERTY BAY

SAFE ROUTES TO SCHOOL MAP
FIGURE 7

## 4.7 Existing Level of Service

Level of Service (LOS) is a measure of congestion for transportation facilities which uses a range[3] from LOS A to LOS F, where LOS A indicates free-flow conditions with low delay and LOS F indicates congested conditions with high delay. For minor-approach stop-controlled intersections, LOS is determined by the highest-delay approach. For all other intersections, LOS is defined by the overall intersection delay.

Signalized and stop-controlled intersection operations were analyzed in Synchro 12 software using *Highway Capacity Manual 7th Edition* methodologies. Roundabout operations were analyzed in Sidra Intersection 11 software using WSDOT Sidra analysis guidance.

The City of Poulsbo has adopted a **minimum LOS E** standard for City intersections. Minimum LOS standards for State-owned facilities are established by the Washington State Department of Transportation (WSDOT), which has adopted a **minimum LOS D** standard for SR 305 and SR 307 (Bond Rd) in the study area.

Results of the existing LOS analysis are summarized in **Table 6**.

Three study intersections on SR 305 currently operate below the WSDOT minimum LOS D standard during the PM peak hour:

- SR 305 & NE Liberty Road (LOS F)
- SR 305 & Forest Rock Lane (LOS F)
- SR 305 & SR 307/Bond Road (LOS E)

Each of the three intersections with existing LOS deficiencies are documented in the Transportation Element of the 2024 Poulsbo Comprehensive Plan as LOS-deficient.

All other study intersections operate at LOS D or better, satisfying their respective minimum City and WSDOT minimum LOS standards.

---

[3] *Signalized Intersections - Level of Service*

| Level of Service | Control Delay (sec/veh) |
|---|---|
| A | <10 |
| B | ≥10 and <20 |
| C | ≥20 and <35 |
| D | ≥35 and <55 |
| E | ≥55 and <80 |
| F | ≥80 |

*Stop Controlled Intersections – Level of Service*

| Level of Service | Control Delay (sec/veh) |
|---|---|
| A | <10 |
| B | ≥10 and <15 |
| C | ≥15 and <25 |
| D | ≥25 and <35 |
| E | ≥35 and <50 |
| F | ≥50 |

Source: *Highway Capacity Manual, 7th Edition*

**Table 6: Existing Peak Hour Level of Service**

*Delays given in seconds per vehicle*

| ID | Intersection | Control | Peak Hour | Critical Approach | LOS* | Delay |
|---|---|---|---|---|---|---|
| 1 | SR 305 & Hostmark St | Signal | AM<br>PM | Overall | D<br>D | 35.9<br>43.9 |
| 2 | SR 305 & Baywatch Ct | One-Way Stop | AM<br>PM | SB | C<br>C | 20.5<br>23.8 |
| 3 | SR 305 & Johnson Rd | RAB | AM<br>PM | Overall | A<br>A | 7.1<br>6.4 |
| 4 | Johnson Rd & Sunrise Ridge Ave | RAB | AM<br>PM | Overall | A<br>A | 5.1<br>5.1 |
| 5 | Sunrise Ridge Ave & Crystallia Ct | One-Way Stop | AM<br>PM | EB | A<br>A | 8.5<br>8.5 |
| 6 | Hostmark St & Caldart Ave | AWSC | AM<br>PM | Overall | C<br>B | 15.3<br>12.0 |
| 7 | Caldart Ave & Sunrise Ridge Ave | TWSC | AM<br>PM | NB | A<br>A | 9.4<br>9.7 |
| 8 | SR 305 & NE Lincoln Rd | Signal | PM | Overall | D | 49.0 |
| 9 | SR 305 & NE Liberty Rd | Signal | PM | Overall | **F** | **88.4** |
| 10 | SR 305 & Forest Rock Ln | Signal | PM | Overall | **F** | **105.5** |
| 11 | SR 305 & SR 307/Bond Rd | Signal | PM | Overall | **E** | **61.2** |
| 12 | NE Hostmark St & 6th Ave NE | One-Way Stop | PM | NB | B | 12.6 |
| 13 | NE Hostmark St & Lincoln Rd | One-Way Stop | PM | SB | B | 10.5 |
| 14 | NE Hostmark St & 4th Ave NE | AWSC | PM | Overall | B | 10.6 |
| 15 | Front St & NE Sunset St | AWSC | PM | Overall | C | 20.8 |

*Signalized intersection LOS is based on overall intersection delay;
Roundabout and AWSC LOS is based on overall intersection delay and stop-controlled delay thresholds;
Minor-approach stop control LOS is based on worst-approach delay and stop-controlled delay thresholds

## 4.8 Crash History

Crash history data was obtained from WSDOT for the five-year period from 2021 through 2025 at all study intersections and key street segments in the site vicinity. Crash history by year is summarized in **Table 7**. A crash history map is provided in **Figure 8**.

Intersection crashes in the study area are concentrated along SR 305, with 92 percent of reported intersection crashes occurring at SR 305 intersections. Three study intersections, each along SR 305, operate with an average of five crashes per year or more. These include:

- SR 305 & Bond Road/SR 307 (ID #11): 14.6 crashes per year
- SR 305 & Forest Rock Lane (ID #10): 5.4 crashes per year
- SR 305 & NE Lincoln Road (ID #8): 5.0 crashes per year

All other intersections operate with fewer than five crashes per year, and all City of Poulsbo intersections operate with fewer than 1.5 crashes per year.

The Poulsbo Comprehensive Plan identifies the SR 305 corridor as a priority for safety, active transportation, and LOS improvements through coordination with WSDOT. Project trips are expected to represent less than one percent of total PM peak hour volume at each of the three SR 305 intersections with the highest crash frequency.

Crash history by collision type and worst reported injury severity are summarized in **Table 8**. Rear-end crashes represent the predominant collision type in the study area, constituting 46 percent of all reported crashes. Entering at angle collisions represent the second most frequent crash type, at 15 percent of all reported crashes. A total of four pedestrian-involved crashes were reported in the study area.

Approximately 26 percent of all reported crashes resulted in a possible or confirmed injury, including one fatal and five serious injury crashes.

Fatal and serious injury crashes as well as pedestrian-involved crashes are described in detail on the following pages.

**Table 7: Crash History by Year**

| ID | Location | 2021 | 2022 | 2023 | 2024 | 2025 | Total | Avg/Yr |
|---|---|---|---|---|---|---|---|---|
| *Study Intersections* | | | | | | | | |
| I1 | SR 305 & Hostmark St | 4 | 4 | 1 | 4 | 5 | 18 | **3.6** |
| I2 | SR 305 & Baywatch Ct | 0 | 1 | 0 | 1 | 0 | 2 | **0.4** |
| I3 | SR 305 & Johnson Rd | 1 | 3 | 4 | 4 | 5 | 17 | **3.4** |
| I4 | Johnson Rd & Sunrise Ridge | 0 | 0 | 0 | 0 | 0 | 0 | **0.0** |
| I5 | Sunrise Ridge & Crystallia Ct | 0 | 0 | 0 | 0 | 0 | 0 | **0.0** |
| I6 | Hostmark St & Caldart Ave | 1 | 2 | 2 | 0 | 2 | 7 | **1.4** |
| I7 | Caldart Ave & Sunrise Ridge | 0 | 0 | 0 | 0 | 0 | 0 | **0.0** |
| I8 | SR 305 & NE Lincoln Rd | 4 | 2 | 5 | 5 | 9 | 25 | **5.0** |
| I9 | SR 305 & NE Liberty Rd | 3 | 4 | 4 | 5 | 3 | 19 | **3.8** |
| I10 | SR 305 & Forest Rock Ln | 2 | 4 | 8 | 7 | 6 | 27 | **5.4** |
| I11 | SR 305 & SR 307/Bond Rd | 14 | 10 | 14 | 12 | 23 | 73 | **14.6** |
| I12 | Hostmark St & 6th Ave NE | 1 | 0 | 1 | 0 | 0 | 2 | **0.4** |
| I13 | Hostmark St & Lincoln Rd | 0 | 0 | 0 | 0 | 0 | 0 | **0.0** |
| I14 | Hostmark St & 4th Ave NE | 1 | 1 | 0 | 1 | 0 | 3 | **0.6** |
| I15 | Front St & NE Sunset St | 1 | 1 | 1 | 0 | 1 | 4 | **0.8** |
| *Study Street Segments* | | | | | | | | |
| S1 | SR 305 (Hostmark to Baywatch) | 10 | 8 | 4 | 7 | 9 | 38 | **7.6** |
| S2 | SR 305 (Baywatch to Johnson) | 6 | 1 | 2 | 0 | 0 | 9 | **1.8** |
| S3 | SR 305 (Johnson to Noll Rd) | 2 | 1 | 2 | 0 | 2 | 7 | **1.4** |
| S4 | Hostmark St (SR 305 to Caldart) | 0 | 0 | 3 | 1 | 1 | 5 | **1.0** |
| S5 | Hostmark St (Caldart to Noll Rd) | 0 | 0 | 0 | 0 | 1 | 1 | **0.2** |
| S6 | Caldart Ave (Hostmark to Sunrise Ridge) | 0 | 0 | 0 | 0 | 0 | 0 | **0.0** |
| S7 | Caldart Ave (Hostmark to Mesford) | 0 | 0 | 1 | 1 | 0 | 2 | **0.4** |

**Table 8: Crash History by Type and Injury Severity**

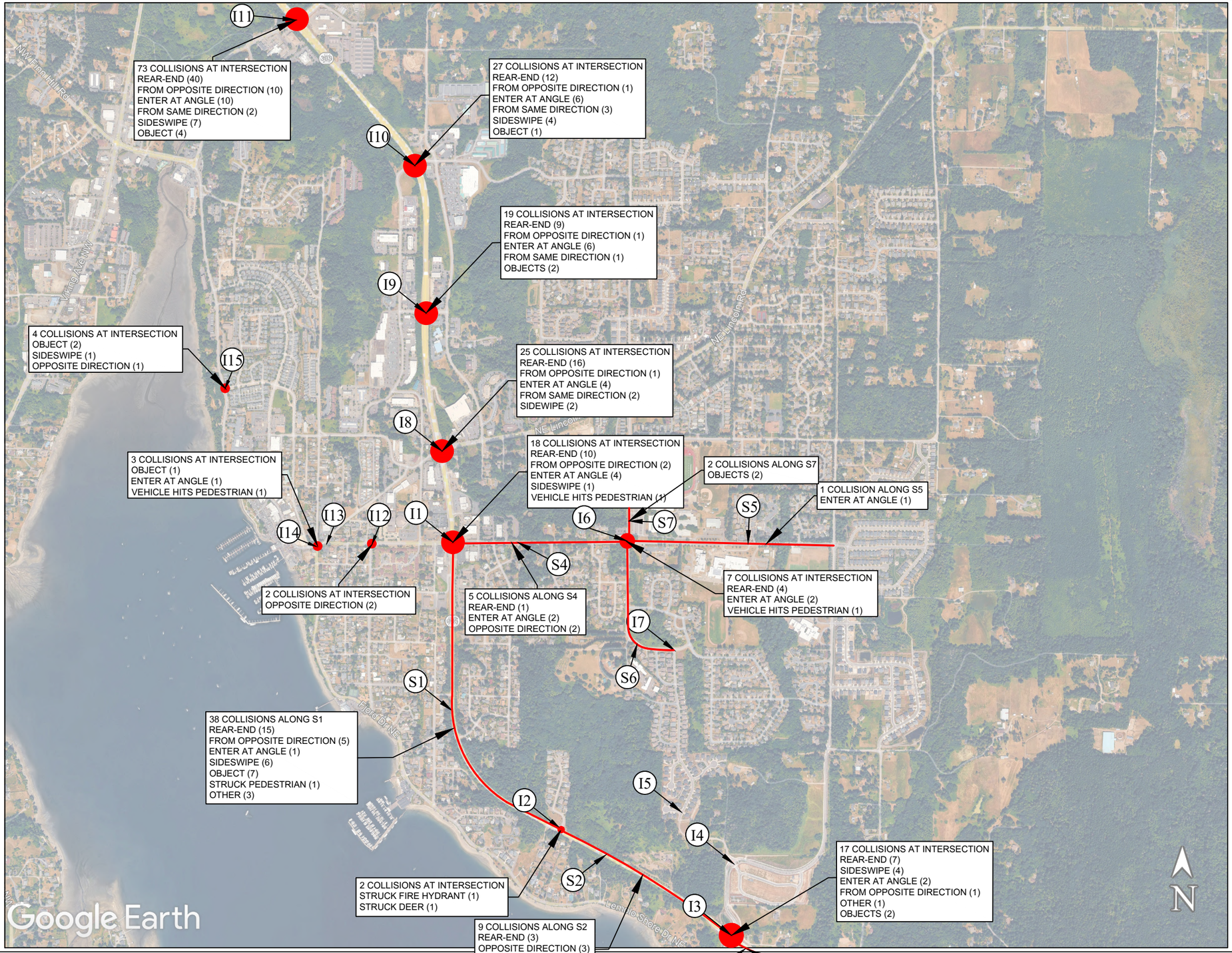
| ID | Location | Rear-End | Enter at Angle | Opposite Dir. | Sideswipe | Fixed Object | Same Dir. | Pedestrian | Other | Total | Fatal (K) | Serious Inj (A) | Minor Inj. (B) | Possible Inj (C) | PDO/Unknown |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I1 | SR 305 & Hostmark St | 10 | 4 | 2 | 1 | 0 | 0 | 1 | 0 | **18** | 0 | 0 | 2 | 4 | 12 |
| I2 | SR 305 & Baywatch Ct | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | **2** | 0 | 0 | 0 | 0 | 2 |
| I3 | SR 305 & Johnson Rd | 7 | 2 | 1 | 4 | 2 | 0 | 0 | 1 | **17** | 0 | 0 | 3 | 1 | 13 |
| I4 | Johnson Rd & Sunrise Ridge | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | 0 |
| I5 | Sunrise Rdg & Crystallia Ct | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | 0 |
| I6 | Hostmark St & Caldart Ave | 4 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | **7** | 0 | 0 | 1 | 1 | 5 |
| I7 | Caldart Ave & Sunrise Ridge | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | 0 |
| I8 | SR 305 & NE Lincoln Rd | 16 | 4 | 1 | 2 | 0 | 2 | 0 | 0 | **25** | 0 | 0 | 3 | 2 | 20 |
| I9 | SR 305 & NE Liberty Rd | 9 | 6 | 1 | 0 | 2 | 1 | 0 | 0 | **19** | 0 | 1 | 2 | 0 | 16 |
| I10 | SR 305 & Forest Rock Ln | 12 | 6 | 1 | 4 | 1 | 3 | 0 | 0 | **27** | 0 | 0 | 2 | 7 | 18 |
| I11 | SR 305 & SR 307/Bond Rd | 40 | 10 | 10 | 7 | 4 | 2 | 0 | 0 | **73** | 0 | 1 | 8 | 7 | 57 |
| I12 | Hostmark St & 6th Ave NE | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | 2 |
| I13 | Hostmark St & Lincoln Rd | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | 0 |
| I14 | Hostmark St & 4th Ave NE | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | **3** | 0 | 0 | 0 | 1 | 2 |
| I15 | Front St & NE Sunset St | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | **4** | 0 | 1 | 0 | 0 | 3 |
| S1 | SR 305 (Hostmark to Baywatch) | 15 | 1 | 5 | 6 | 7 | 0 | 1 | 3 | **38** | 0 | 1 | 6 | 4 | 27 |
| S2 | SR 305 (Baywatch to Johnson) | 3 | 0 | 3 | 1 | 1 | 0 | 0 | 1 | **9** | 1 | 1 | 0 | 3 | 4 |
| S3 | SR 305 (Johnson to Noll Rd) | 3 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | **7** | 0 | 0 | 2 | 1 | 4 |
| S4 | Hostmark St (SR 305 to Caldart) | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | **5** | 0 | 0 | 1 | 1 | 3 |
| S5 | Hostmark St (Caldart to Noll Rd) | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 1 |
| S6 | Caldart Ave (Hostmark to Sunrise Ridge) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | 0 |
| S7 | Caldart Ave (Hostmark to Mesford) | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | 2 |

Fatal injury, serious injury, and pedestrian- or bicycle-involved crashes are described below.

- **Fatal Injury**: At 6:36 PM on December 31, 2021, a vehicle traveling southbound on SR 305 between Baywatch Court and Johnson Road struck an oncoming vehicle head-on, resulting in a fatal injury. The crash occurred in darkness with wet road conditions, and drug use was cited as a contributing factor.
- **Serious Injury**:
    - At 8:17 AM on May 19, 2021, a vehicle traveling northbound on SR 305 between Baywatch Court and Hostmark Street struck a pedestrian walking along the east roadway shoulder, resulting in a serious injury. The crash occurred during daylight with wet road conditions and driver distraction was cited as a contributing factor.
    - At 11:22 PM on December 3, 2021, a vehicle traveling southbound on SR 305 between Baywatch Court and Johnson Road struck an oncoming vehicle head-on, resulting in a serious injury. The crash occurred under street illumination with dry road conditions. Alcohol was cited as a contributing factor.
    - At 10:45 PM on July 26, 2022, a vehicle traveling northbound on SR 305 struck a vehicle entering SR 305 from SR 307/Bond Road, resulting in a serious injury. The crash occurred under street illumination with dry road conditions. Excessive speed and failure to observe the traffic signal were identified as contributing factors.
    - At 11:31 AM on July 8, 2024, a vehicle traveling northbound on SR 305 struck a vehicle entering SR 305 from NE Liberty Road, resulting in at least one serious injury. The crash occurred during daylight with dry road conditions. Driver failure to observe traffic signal was cited as a contributing factor.
    - At 7:19 PM on September 13, 2025, two motorcycles making a southbound left-turn from Front Street to NE Sunset Street met in a sideswipe collision, resulting in at least one serious injury. The crash occurred during dusk with dry road conditions. Driver failure to observe traffic signage was cited as a contributing factor.
- **Pedestrian-Involved:**
    - At 8:17 AM on May 19, 2021, a vehicle-pedestrian collision on SR 305 between Baywatch Court and Hostmark Street resulted in a serious injury, as described above.
    - At 6:48 AM on December 19, 2022, a vehicle making a left-turn at Hostmark Street & 4th Avenue NE struck a pedestrian in the intersection, resulting in a possible injury. The crash occurred under street

illumination with wet road conditions. No contributing factors were identified in the crash report.

- At 2:38 PM on August 31, 2023, a vehicle traveling eastbound on NE Hostmark Street struck a pedestrian crossing the street approximately 75 feet east of the marked crosswalk at the Caldart Avenue intersection, resulting in a minor injury. The crash occurred in daylight with dry road conditions. The crash occurred midblock with no marked crosswalk, and the crash report cited pedestrian failure to grant right-of-way as a contributing factor.
- At 5:13 PM on October 11, 2024, a vehicle traveling southbound on SR 305 struck a pedestrian at a marked crosswalk in the NE Hostmark Street intersection, resulting in a minor injury. The crash occurred during daylight with dry road conditions. Driver failure to grant right-of-way to a pedestrian was cited as a contributing factor.




HEATH&ASSOCIATES
Transportation Planning & Engineering

PINNACLE AT LIBERTY BAY

COLLISION HISTORY EXHIBIT
FIGURE 8

# 5. FUTURE TRANSPORTATION CONDITIONS

## 5.1 Project Trip Generation

Trip generation is used to assess the impact a project will have on the surrounding street system by estimating the number of new trips that will enter and exit the site during specific time periods, such as peak hours (AM or PM) or over the course of a day. The expected vehicle trip generation for the proposed project was calculated using data from the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 12th Edition*. For this analysis, Land Use Code (LUC) 210 – Single-Family Detached Housing was selected, with dwelling units used as the input variable and ITE average rates applied to determine the number of trip ends.

A summary of the average weekday daily trips (AWDT), AM peak hour trips, and PM peak hour trips are shown below in **Table 9**.

**Table 9: Project Trip Generation**

| Land Use | Units | AWDT | AM Peak Hour Trips | | | PM Peak Hour Trips | | |
|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total |
| LUC 210 - Single-Family Housing | 138 | 1,254 | 26 | 71 | 97 | 80 | 48 | 128 |

The project is expected to generate 1,254 daily weekday trips, 97 AM peak hour trips (26 inbound / 71 outbound), and 128 PM peak hour trips (80 inbound / 48 outbound).

## 5.2 Project Distribution & Assignment

Trip distribution is the process by which project-generated trips are paired with origins and destinations in the vicinity of the project site. The project trip distribution forecast was calculated based on recent traffic counts, existing and anticipated development in the project vicinity, and with consideration for other recent residential projects in the vicinity.

Project trip distribution and assignment forecasts, shown in **Figures 9** and **10**, assumed completion of the Sunrise Ridge Avenue NE corridor which will provide a connection between Noll Road/Johnson Road and Caldart Avenue.

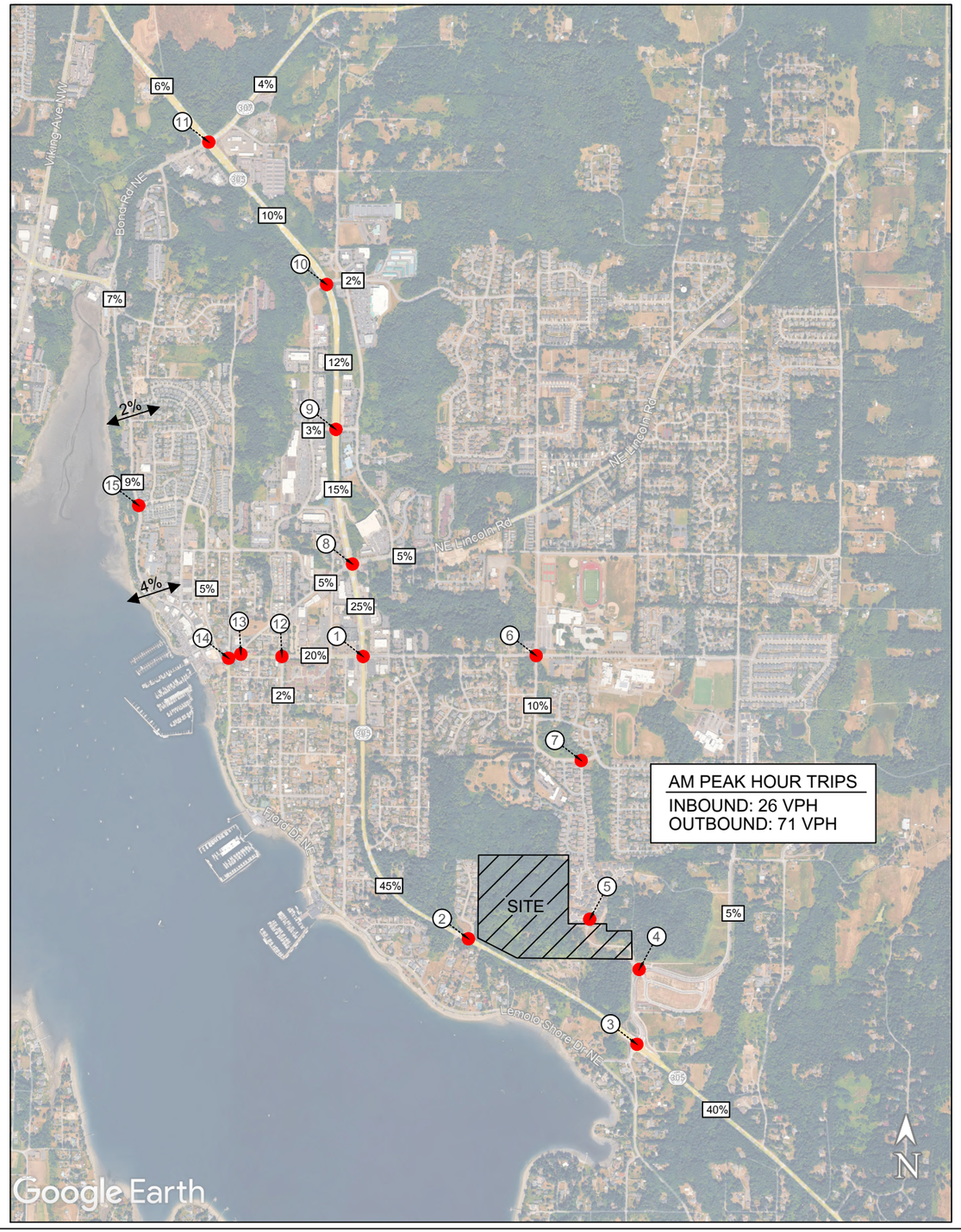
## 5.3 Future Peak Hour Volumes

Future traffic volumes were forecast for seven-year (2032) and 12-year (2037) analysis periods. Background (non-Project) traffic volumes were forecast as the sum of two components:

1. **Pipeline growth** reflects the impacts of specific projects which have been permitted in the project vicinity. Pipeline projects were identified by City of Poulsbo staff and included:
    a. Aktiv Mixed-Use, a 44-unit multifamily residential development located at the corner of NE Harrison Street and 9th Avenue NE.
    b. Audrey Estates, a 60-unit single-family residential development located to the east of the project site. Audrey Estates is bordered by Noll Road to the east and south, with access on Sunrise Ridge Avenue.
    c. Sandstone Ridge Plat, an 87-unit single-family residential development located at the corner of Noll Road NE & Langaunet Lane NE.
2. **Background growth** reflects the impacts of other local and regional growth which is anticipated to impact the study area. Background growth was calculated by applying growth rates:
    a. A 0.5 percent growth rate was applied to WSDOT routes. This is consistent with forecasts identified in the travel demand model, which constitutes the basis of the Transportation Element of the Poulsbo Comprehensive Plan.
    b. For City of Poulsbo streets, a growth rate of 2.0 percent per year was applied. This represents a more aggressive growth forecast than the 1.2 percent per year growth rate identified in the Poulsbo travel demand model. However, this growth rate was selected to allow the analysis to reflect a "worst case" forecast given recent growth in the project vicinity and was approved by City of Poulsbo staff through a scoping process.

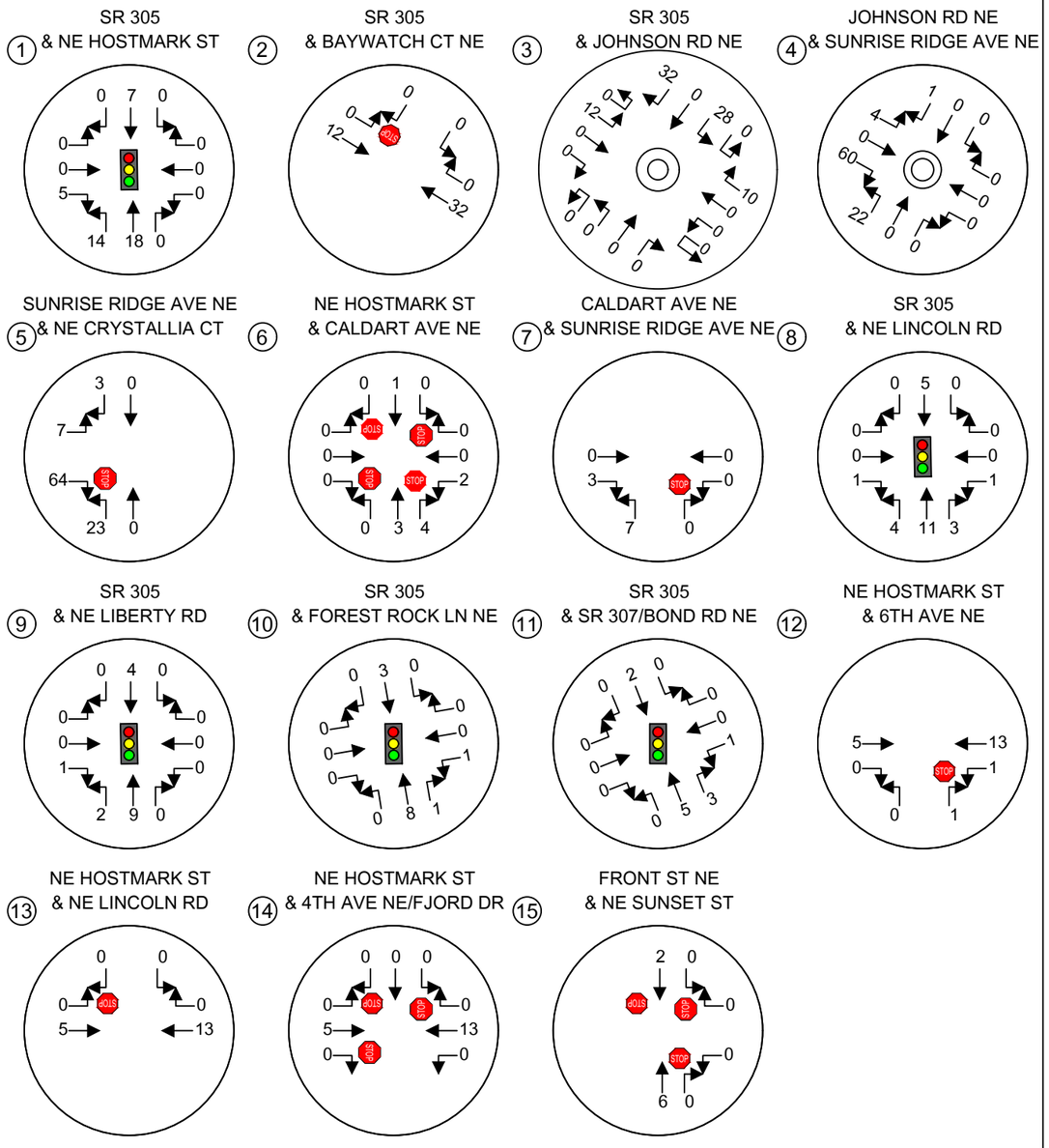
Future with-project analyses assumed Sunrise Ridge Avenue NE will be opened to traffic, creating a new north-south local street connection between Noll Road/Johnson Road NE and Caldart Avenue to the north. The new connection will provide a low-speed, circuitous alternative to the more direct Noll Road corridor, and will be designed to discourage cut-through demand. However, some redistribution and cut-through demand may occur. This analysis assumed that the new connection will capture 20 percent of existing AM and PM peak hour demand on the Noll Road corridor to the east. This results in a Sunrise Ridge Avenue traffic volume forecast which is generally consistent with the City of Poulsbo travel demand model forecast.

AM and PM peak hour pipeline volumes are shown in **Figures 11 and 12**. Future 2032 and 2037 AM and PM peak hour traffic volumes forecasts are shown graphically in **Figures 13 through 20**.




N

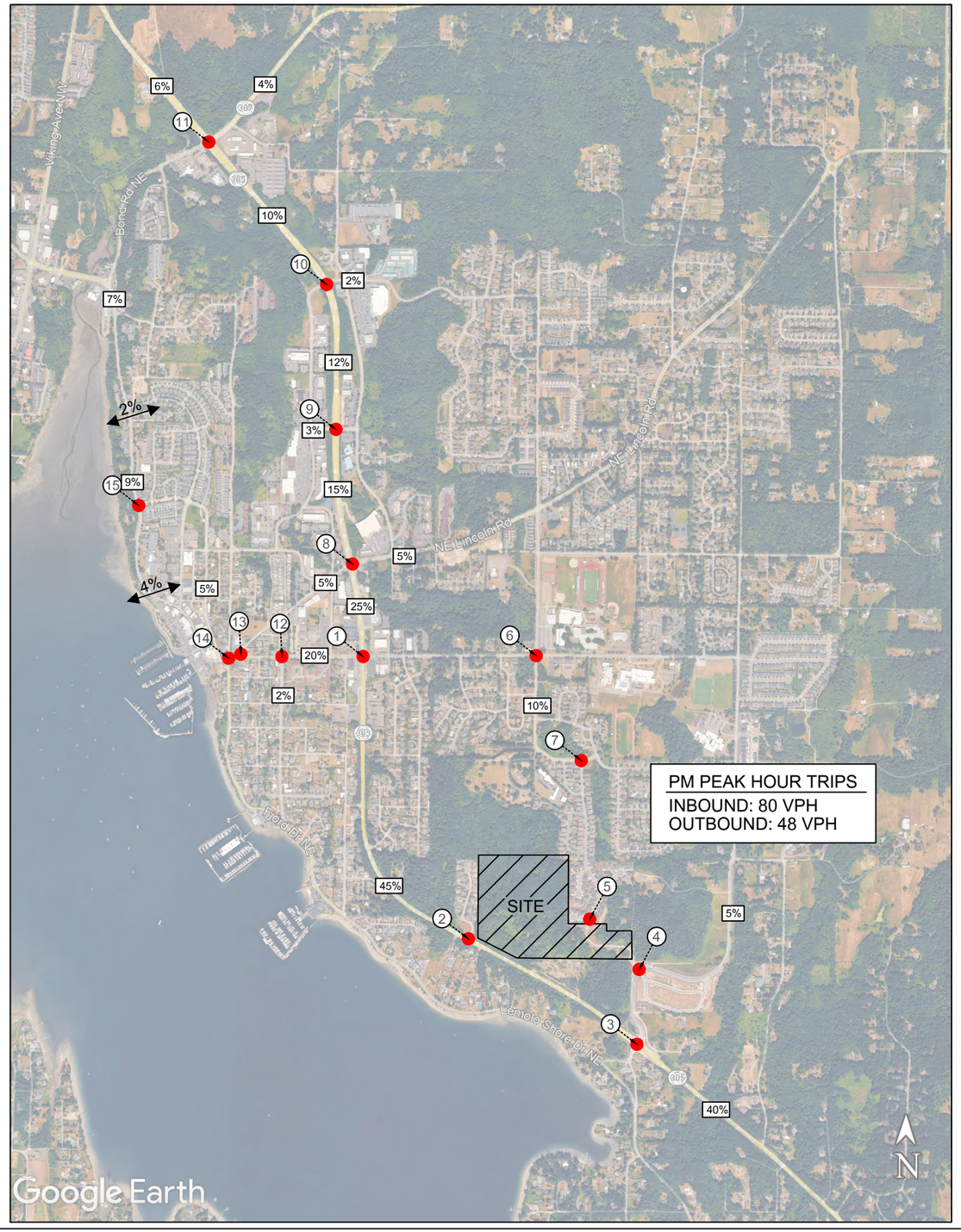
## OUTLYING STUDY INTERSECTIONS




HEATH&ASSOCIATES
Transportation Planning & Engineering

PINNACLE AT LIBERTY BAY

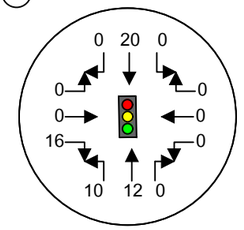
AM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT
FIGURE 9



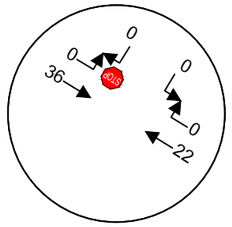

N

## OUTLYING STUDY INTERSECTIONS

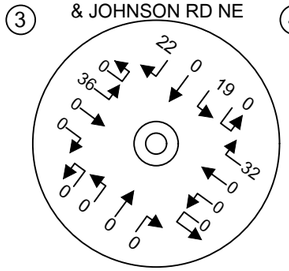
1 SR 305 & NE HOSTMARK ST



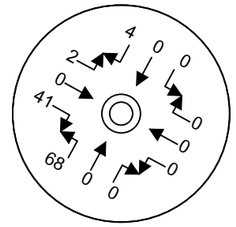

2 SR 305 & BAYWATCH CT NE



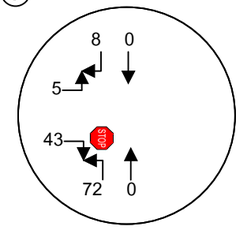

3 SR 305 & JOHNSON RD NE



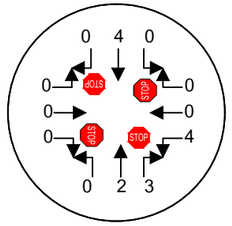

4 JOHNSON RD NE & SUNRISE RIDGE AVE NE



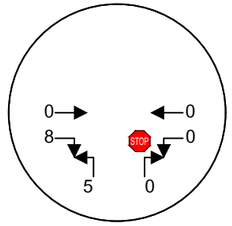

5 SUNRISE RIDGE AVE NE & NE CRYSTALLIA CT



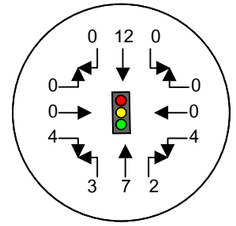

6 NE HOSTMARK ST & CALDART AVE NE



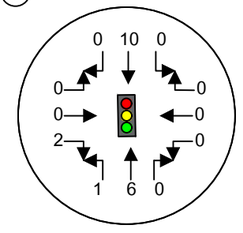

7 CALDART AVE NE & SUNRISE RIDGE AVE NE



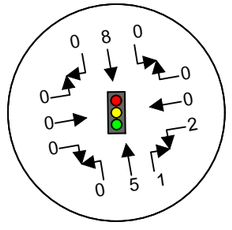

8 SR 305 & NE LINCOLN RD



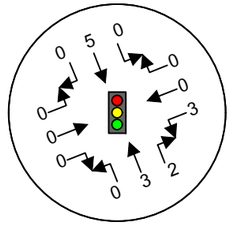

9 SR 305 & NE LIBERTY RD



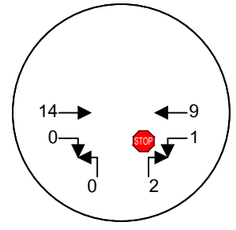

10 SR 305 & FOREST ROCK LN NE



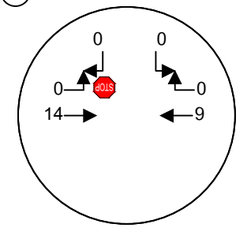

11 SR 305 & SR 307/BOND RD NE



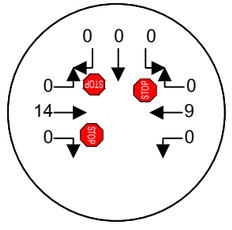

12 NE HOSTMARK ST & 6TH AVE NE



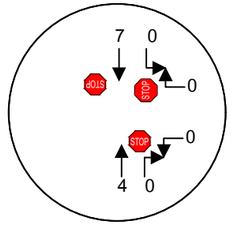

13 NE HOSTMARK ST & NE LINCOLN RD




14 NE HOSTMARK ST & 4TH AVE NE/FJORD DR




15 FRONT ST NE & NE SUNSET ST




HEATH&ASSOCIATES
Transportation Planning & Engineering

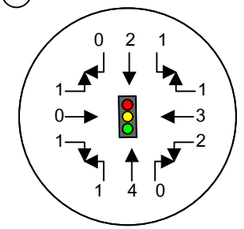
PINNACLE AT LIBERTY BAY
PM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT
FIGURE 10



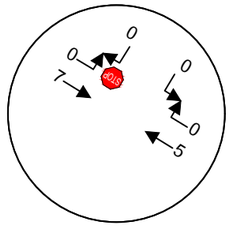

N

## OUTLYING STUDY INTERSECTIONS

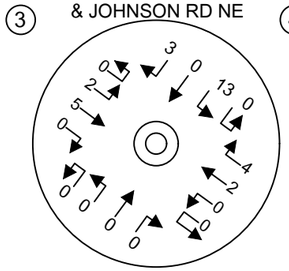
1 SR 305 & NE HOSTMARK ST



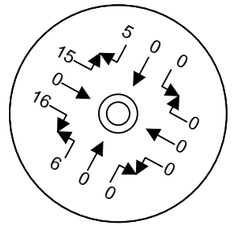

2 SR 305 & BAYWATCH CT NE



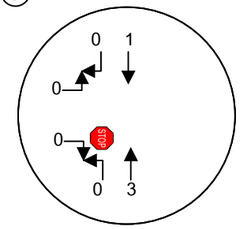

3 SR 305 & JOHNSON RD NE



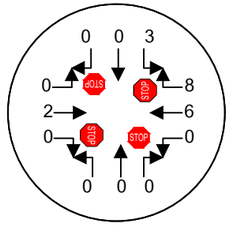

4 JOHNSON RD NE & SUNRISE RIDGE AVE NE



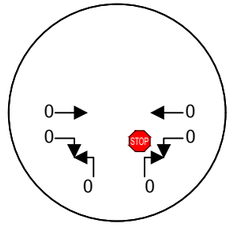

5 SUNRISE RIDGE AVE NE & NE CRYSTALLIA CT

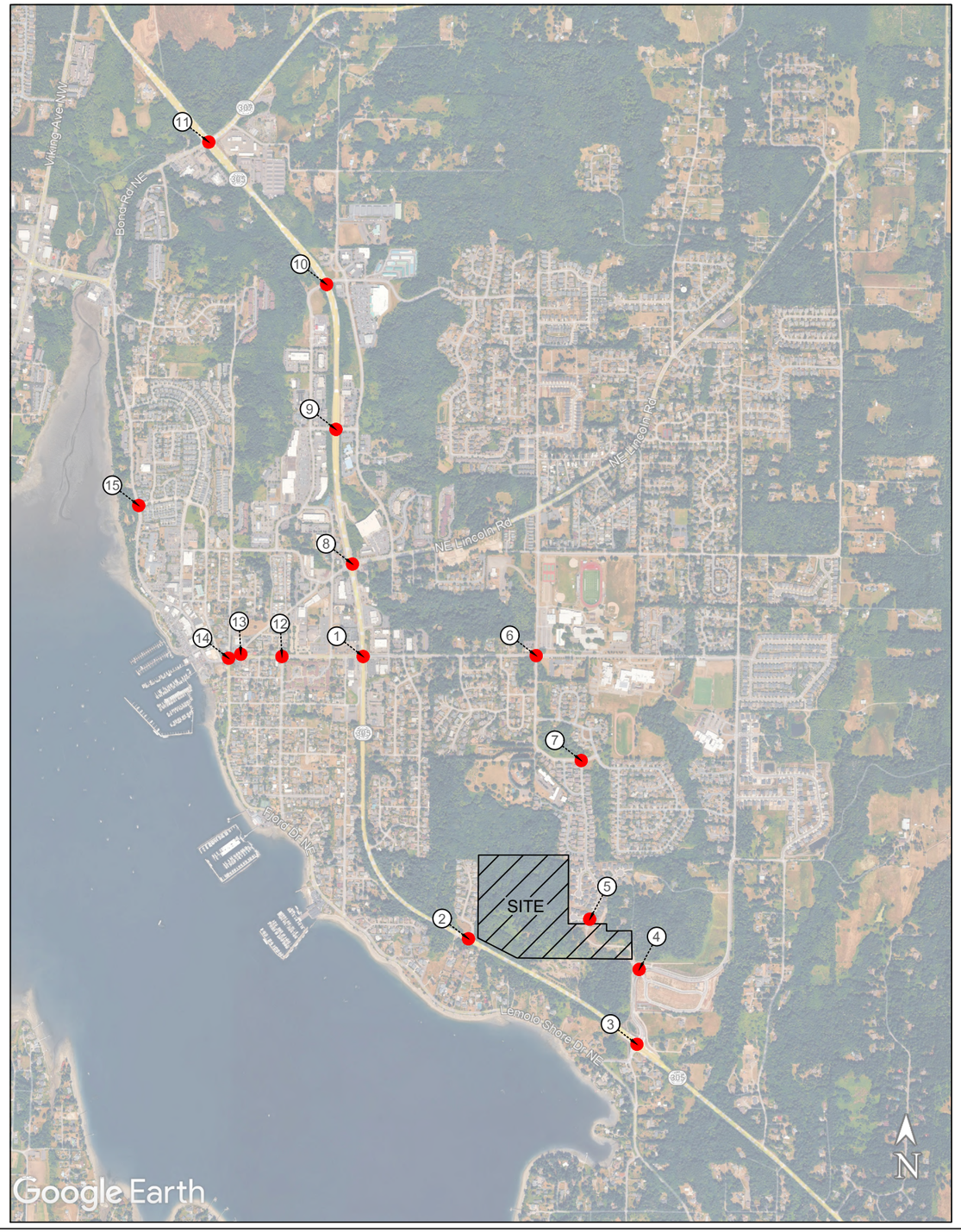



6 NE HOSTMARK ST & CALDART AVE NE



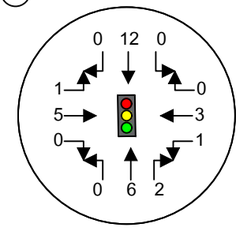

7 CALDART AVE NE & SUNRISE RIDGE AVE NE



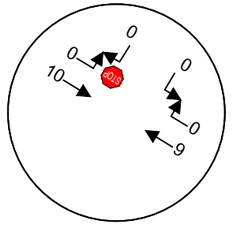



## OUTLYING STUDY INTERSECTIONS

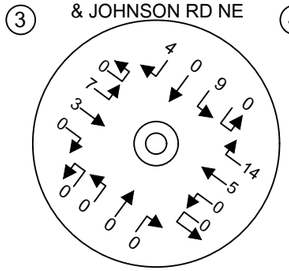
1 SR 305 & NE HOSTMARK ST



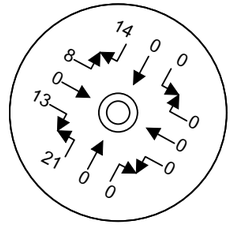

2 SR 305 & BAYWATCH CT NE



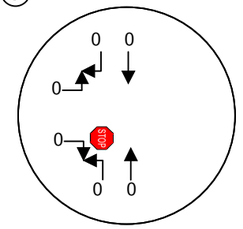

3 SR 305 & JOHNSON RD NE



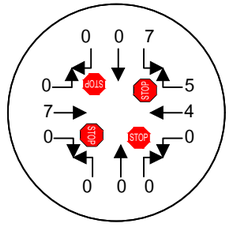
4 JOHNSON RD NE & SUNRISE RIDGE AVE NE



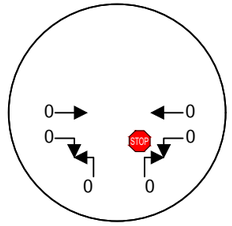
5 SUNRISE RIDGE AVE NE & NE CRYSTALLIA CT



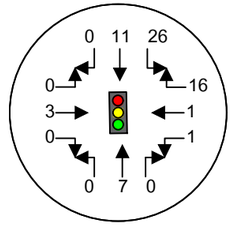

6 NE HOSTMARK ST & CALDART AVE NE



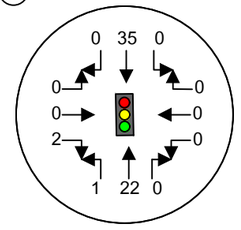

7 CALDART AVE NE & SUNRISE RIDGE AVE NE



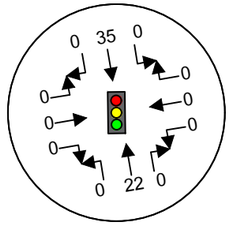

8 SR 305 & NE LINCOLN RD



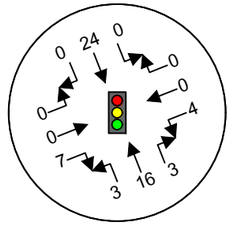

9 SR 305 & NE LIBERTY RD



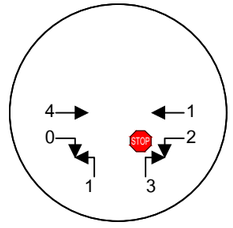

10 SR 305 & FOREST ROCK LN NE



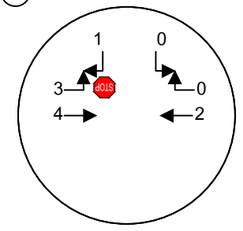

11 SR 305 & SR 307/BOND RD NE



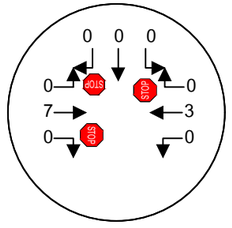

12 NE HOSTMARK ST & 6TH AVE NE



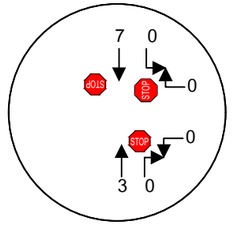

13 NE HOSTMARK ST & NE LINCOLN RD




14 NE HOSTMARK ST & 4TH AVE NE/FJORD DR




15 FRONT ST NE & NE SUNSET ST

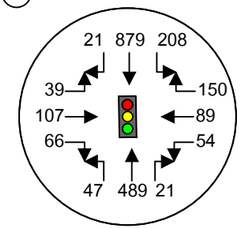




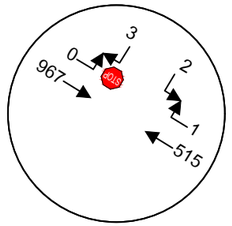

N

## OUTLYING STUDY INTERSECTIONS

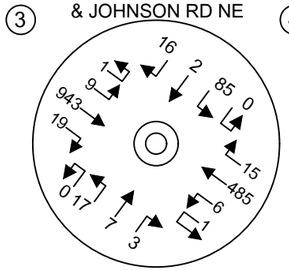
1 SR 305 & NE HOSTMARK ST



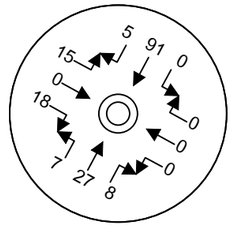

2 SR 305 & BAYWATCH CT NE



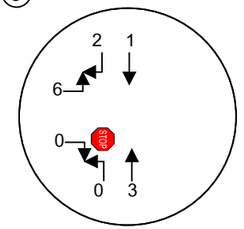

3 SR 305 & JOHNSON RD NE



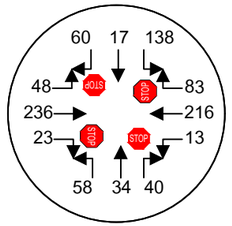

4 JOHNSON RD NE & SUNRISE RIDGE AVE NE



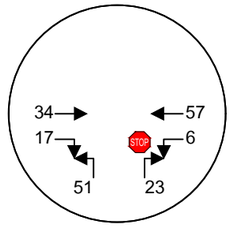

5 SUNRISE RIDGE AVE NE & NE CRYSTALLIA CT

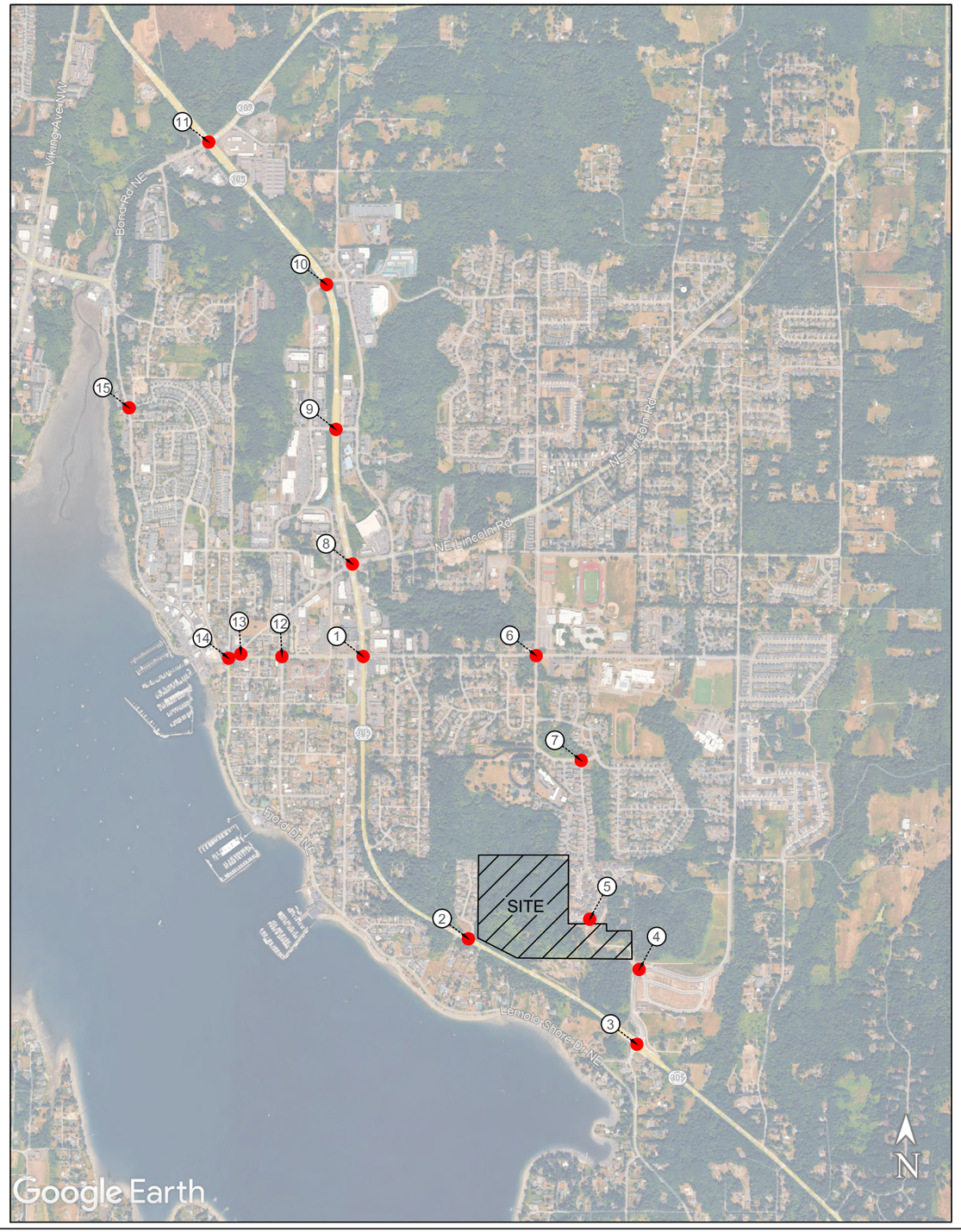



6 NE HOSTMARK ST & CALDART AVE NE



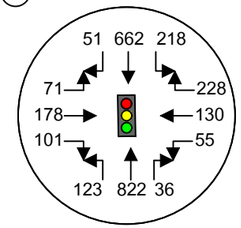

7 CALDART AVE NE & SUNRISE RIDGE AVE NE



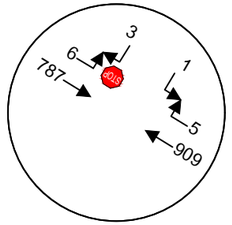



## OUTLYING STUDY INTERSECTIONS

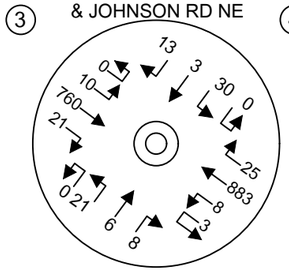
1 SR 305 & NE HOSTMARK ST



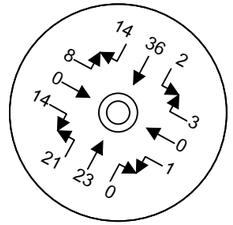

2 SR 305 & BAYWATCH CT NE



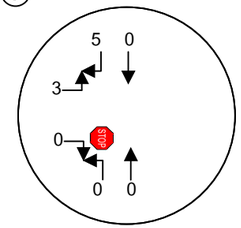

3 SR 305 & JOHNSON RD NE



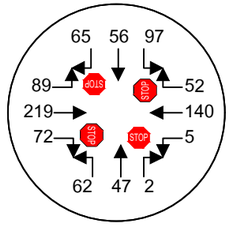

4 JOHNSON RD NE & SUNRISE RIDGE AVE NE



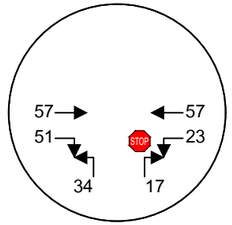

5 SUNRISE RIDGE AVE NE & NE CRYSTALLIA CT



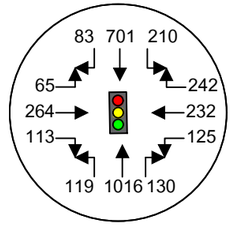

6 NE HOSTMARK ST & CALDART AVE NE



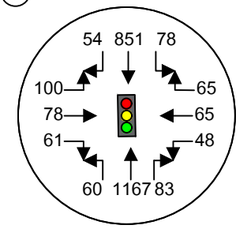

7 CALDART AVE NE & SUNRISE RIDGE AVE NE



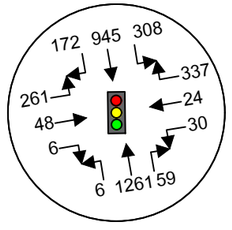

8 SR 305 & NE LINCOLN RD



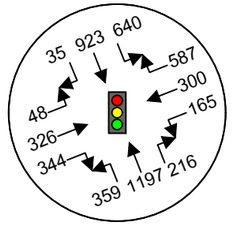

9 SR 305 & NE LIBERTY RD



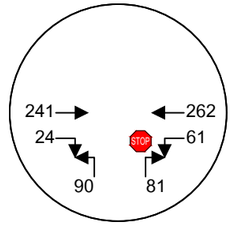

10 SR 305 & FOREST ROCK LN NE



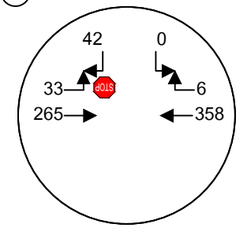

11 SR 305 & SR 307/BOND RD NE



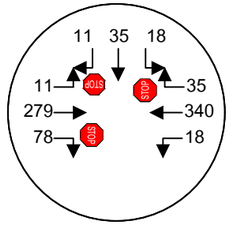

12 NE HOSTMARK ST & 6TH AVE NE



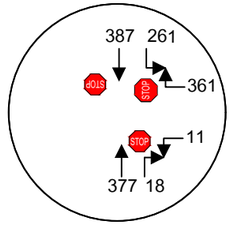

13 NE HOSTMARK ST & NE LINCOLN RD




14 NE HOSTMARK ST & 4TH AVE NE/FJORD DR




15 FRONT ST NE & NE SUNSET ST




HEATH&ASSOCIATES
Transportation Planning & Engineering

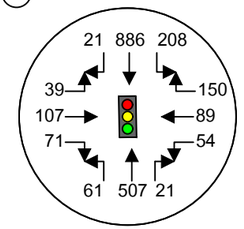
PINNACLE AT LIBERTY BAY
FORECAST 2032 PM PEAK HOUR VOLUMES WITHOUT PROJECT
FIGURE 14



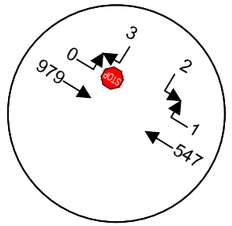

N

## OUTLYING STUDY INTERSECTIONS

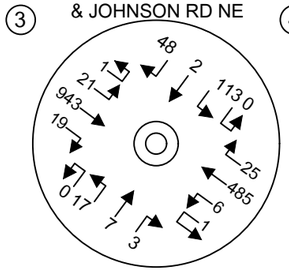
1 SR 305 & NE HOSTMARK ST



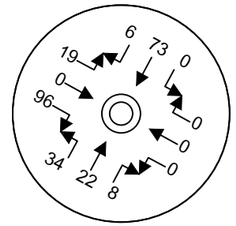

2 SR 305 & BAYWATCH CT NE



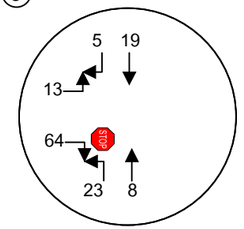

3 SR 305 & JOHNSON RD NE



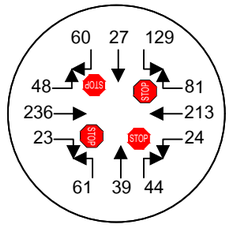

4 JOHNSON RD NE & SUNRISE RIDGE AVE NE



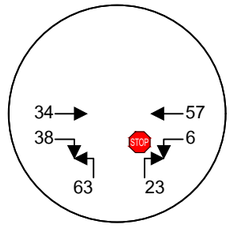

5 SUNRISE RIDGE AVE NE & NE CRYSTALLIA CT

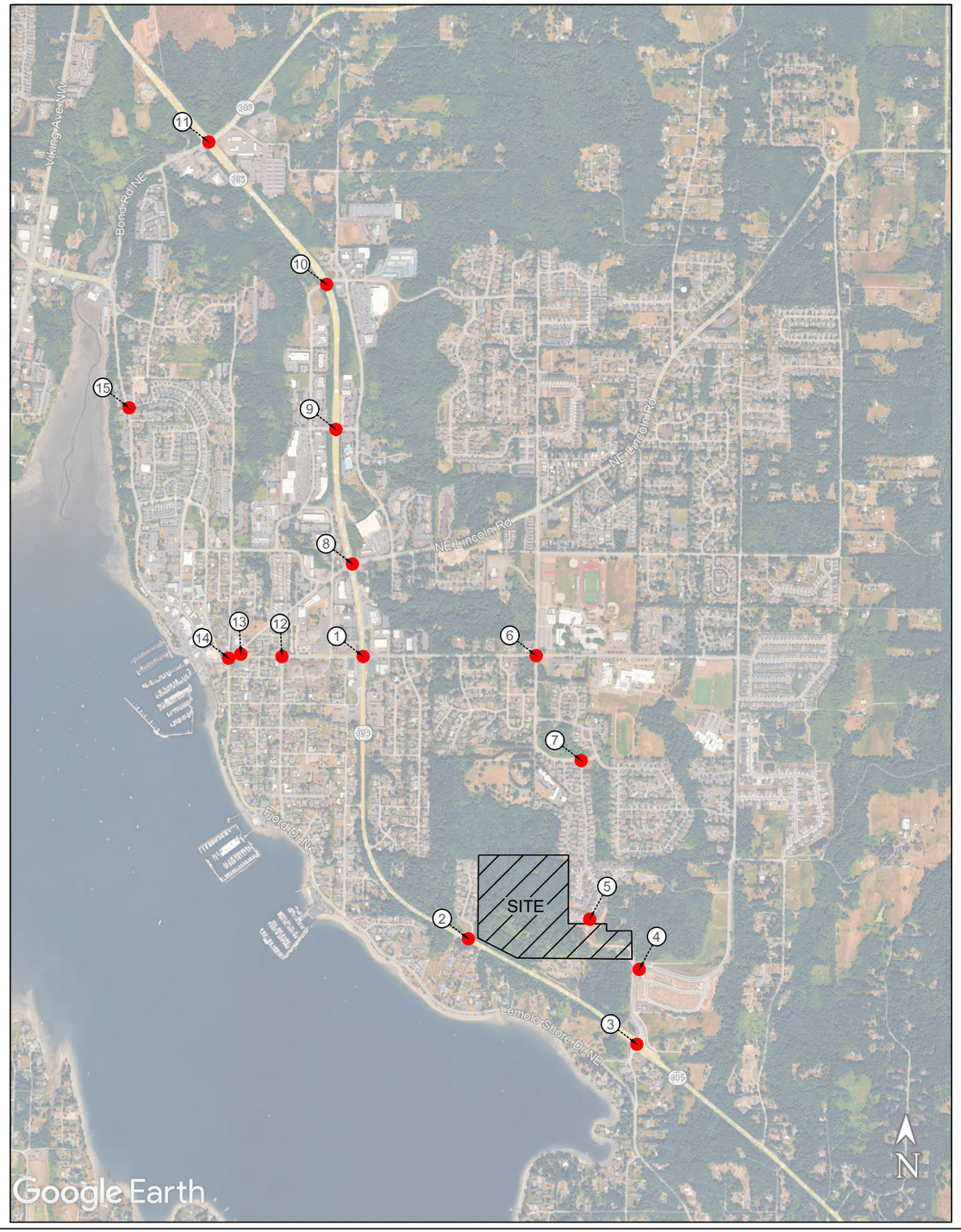



6 NE HOSTMARK ST & CALDART AVE NE



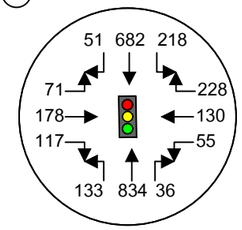

7 CALDART AVE NE & SUNRISE RIDGE AVE NE



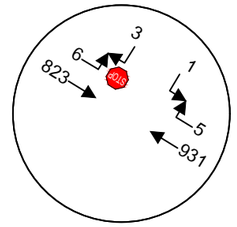



## OUTLYING STUDY INTERSECTIONS

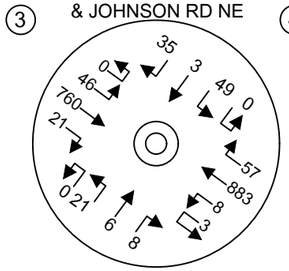
1 SR 305 & NE HOSTMARK ST



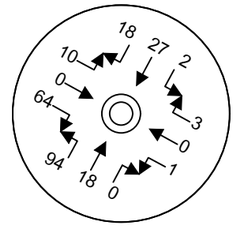

2 SR 305 & BAYWATCH CT NE



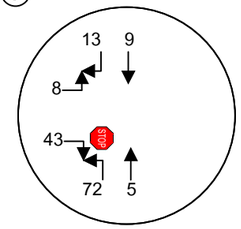

3 SR 305 & JOHNSON RD NE



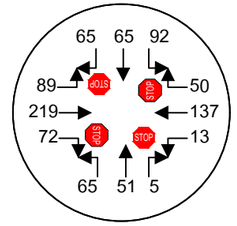

4 JOHNSON RD NE & SUNRISE RIDGE AVE NE



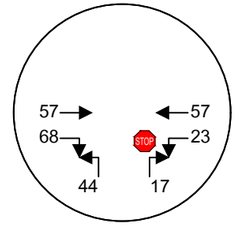

5 SUNRISE RIDGE AVE NE & NE CRYSTALLIA CT



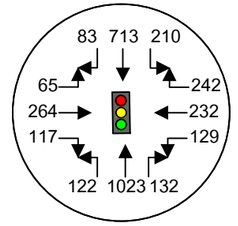

6 NE HOSTMARK ST & CALDART AVE NE



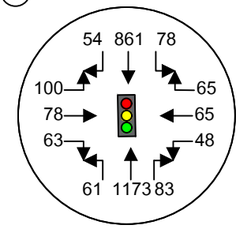

7 CALDART AVE NE & SUNRISE RIDGE AVE NE



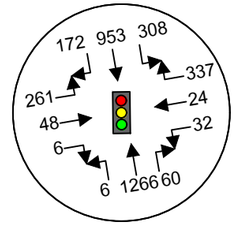

8 SR 305 & NE LINCOLN RD



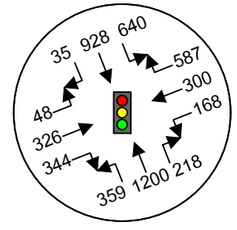

9 SR 305 & NE LIBERTY RD



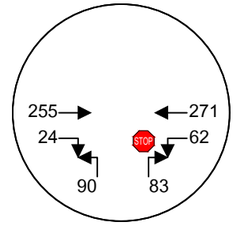

10 SR 305 & FOREST ROCK LN NE



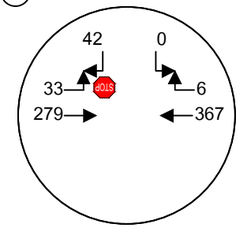

11 SR 305 & SR 307/BOND RD NE



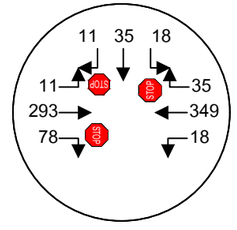

12 NE HOSTMARK ST & 6TH AVE NE



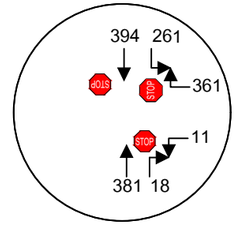

13 NE HOSTMARK ST & NE LINCOLN RD




14 NE HOSTMARK ST & 4TH AVE NE/FJORD DR




15 FRONT ST NE & NE SUNSET ST




HEATH&ASSOCIATES
Transportation Planning & Engineering

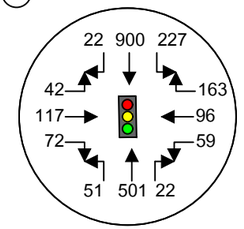
PINNACLE AT LIBERTY BAY
FORECAST 2032 PM PEAK HOUR VOLUMES WITH PROJECT
FIGURE 16



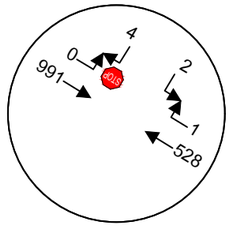

N

## OUTLYING STUDY INTERSECTIONS

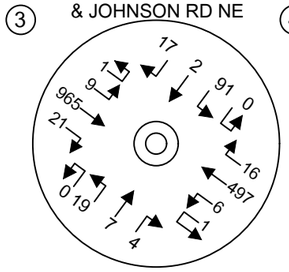
1 SR 305 & NE HOSTMARK ST



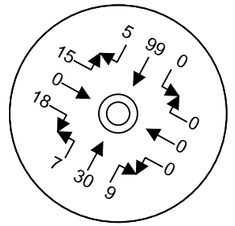

2 SR 305 & BAYWATCH CT NE



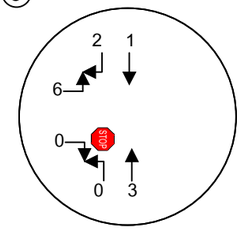

3 SR 305 & JOHNSON RD NE



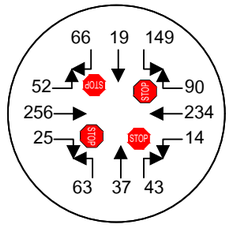

4 JOHNSON RD NE & SUNRISE RIDGE AVE NE



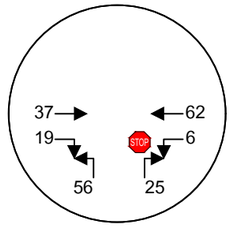

5 SUNRISE RIDGE AVE NE & NE CRYSTALLIA CT

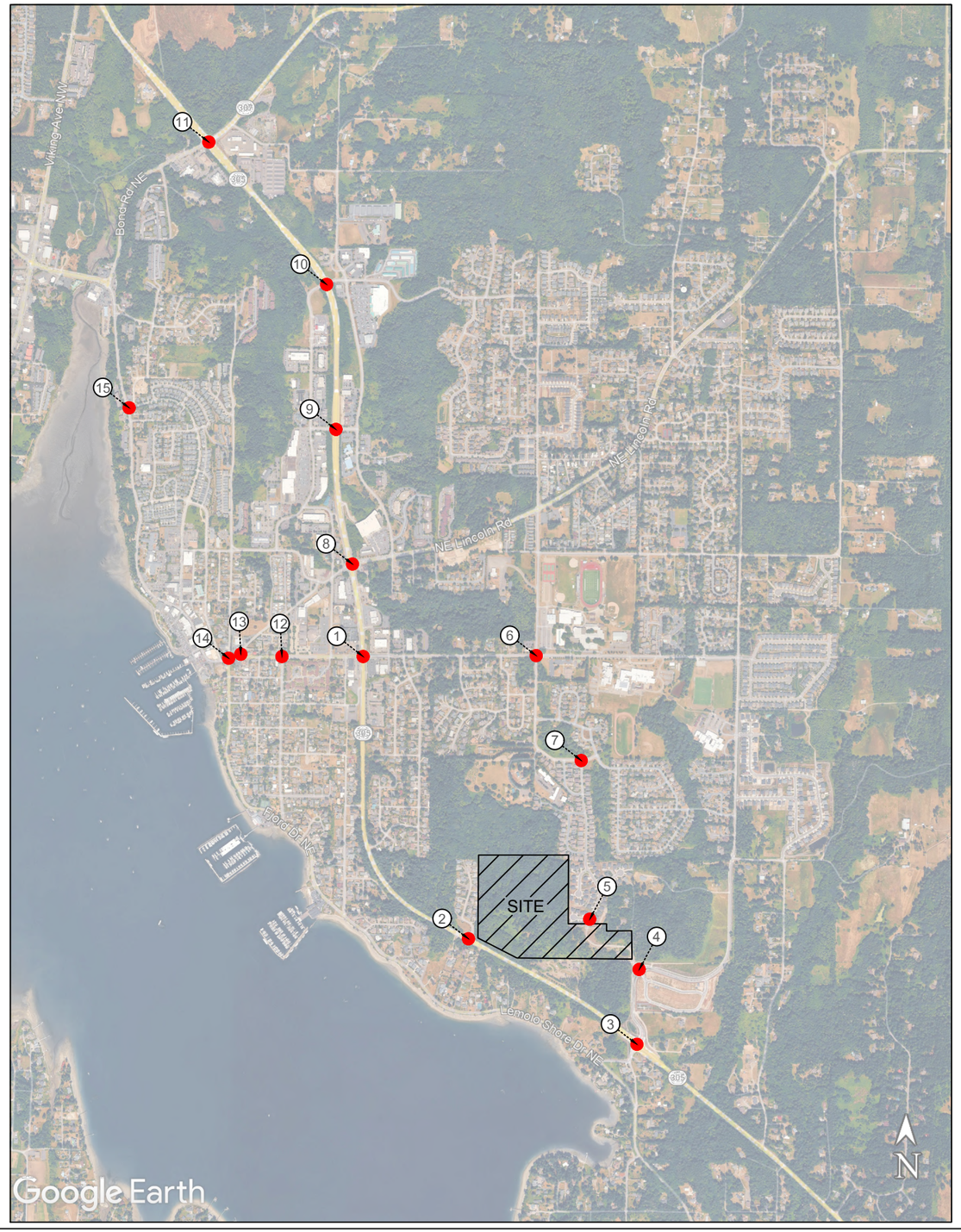



6 NE HOSTMARK ST & CALDART AVE NE



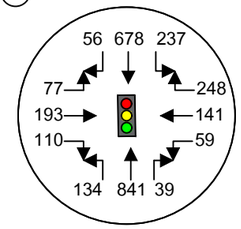

7 CALDART AVE NE & SUNRISE RIDGE AVE NE



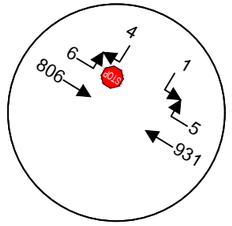



## OUTLYING STUDY INTERSECTIONS

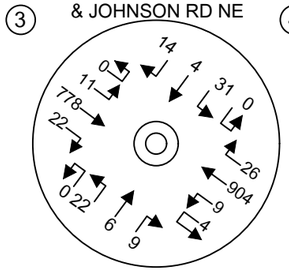
1 SR 305 & NE HOSTMARK ST



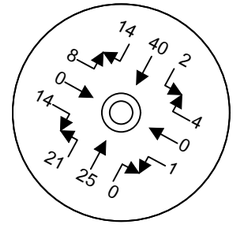

2 SR 305 & BAYWATCH CT NE



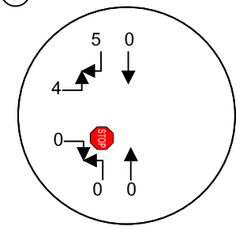

3 SR 305 & JOHNSON RD NE



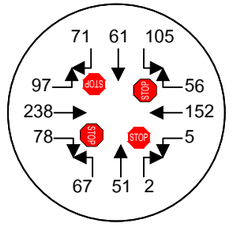

4 JOHNSON RD NE & SUNRISE RIDGE AVE NE



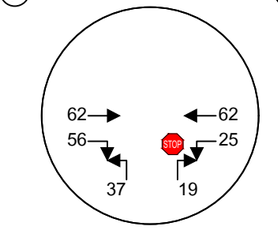

5 SUNRISE RIDGE AVE NE & NE CRYSTALLIA CT



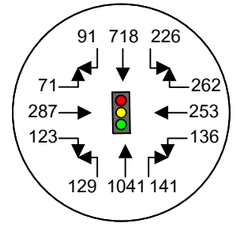

6 NE HOSTMARK ST & CALDART AVE NE



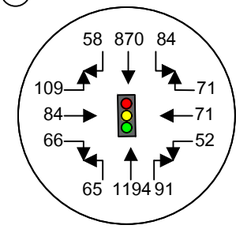

7 CALDART AVE NE & SUNRISE RIDGE AVE NE



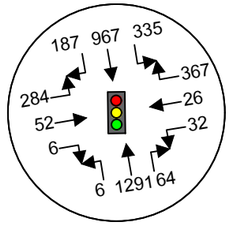

8 SR 305 & NE LINCOLN RD



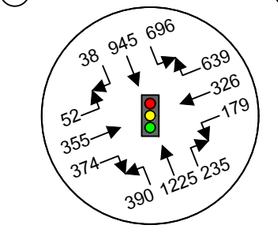

9 SR 305 & NE LIBERTY RD



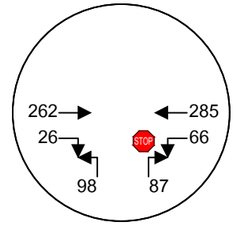

10 SR 305 & FOREST ROCK LN NE



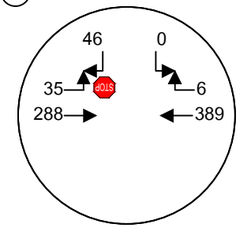

11 SR 305 & SR 307/BOND RD NE



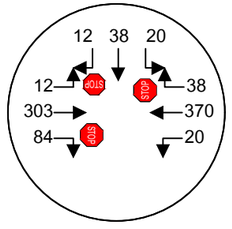

12 NE HOSTMARK ST & 6TH AVE NE



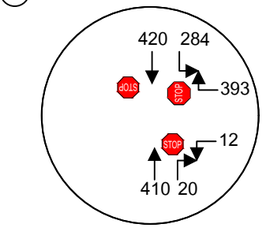

13 NE HOSTMARK ST & NE LINCOLN RD




14 NE HOSTMARK ST & 4TH AVE NE/FJORD DR




15 FRONT ST NE & NE SUNSET ST

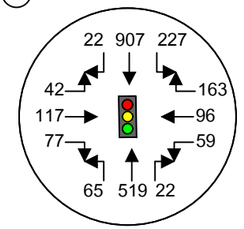




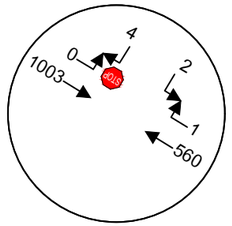

N

## OUTLYING STUDY INTERSECTIONS

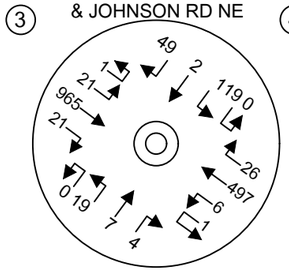
1 SR 305 & NE HOSTMARK ST



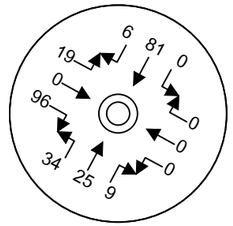

2 SR 305 & BAYWATCH CT NE



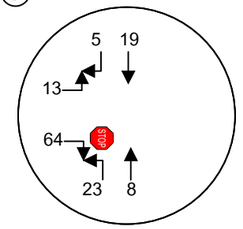

3 SR 305 & JOHNSON RD NE



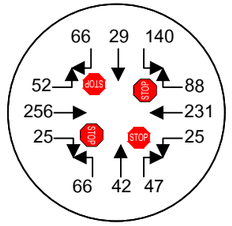

4 JOHNSON RD NE & SUNRISE RIDGE AVE NE



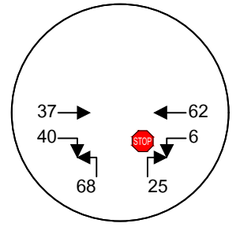

5 SUNRISE RIDGE AVE NE & NE CRYSTALLIA CT




6 NE HOSTMARK ST & CALDART AVE NE



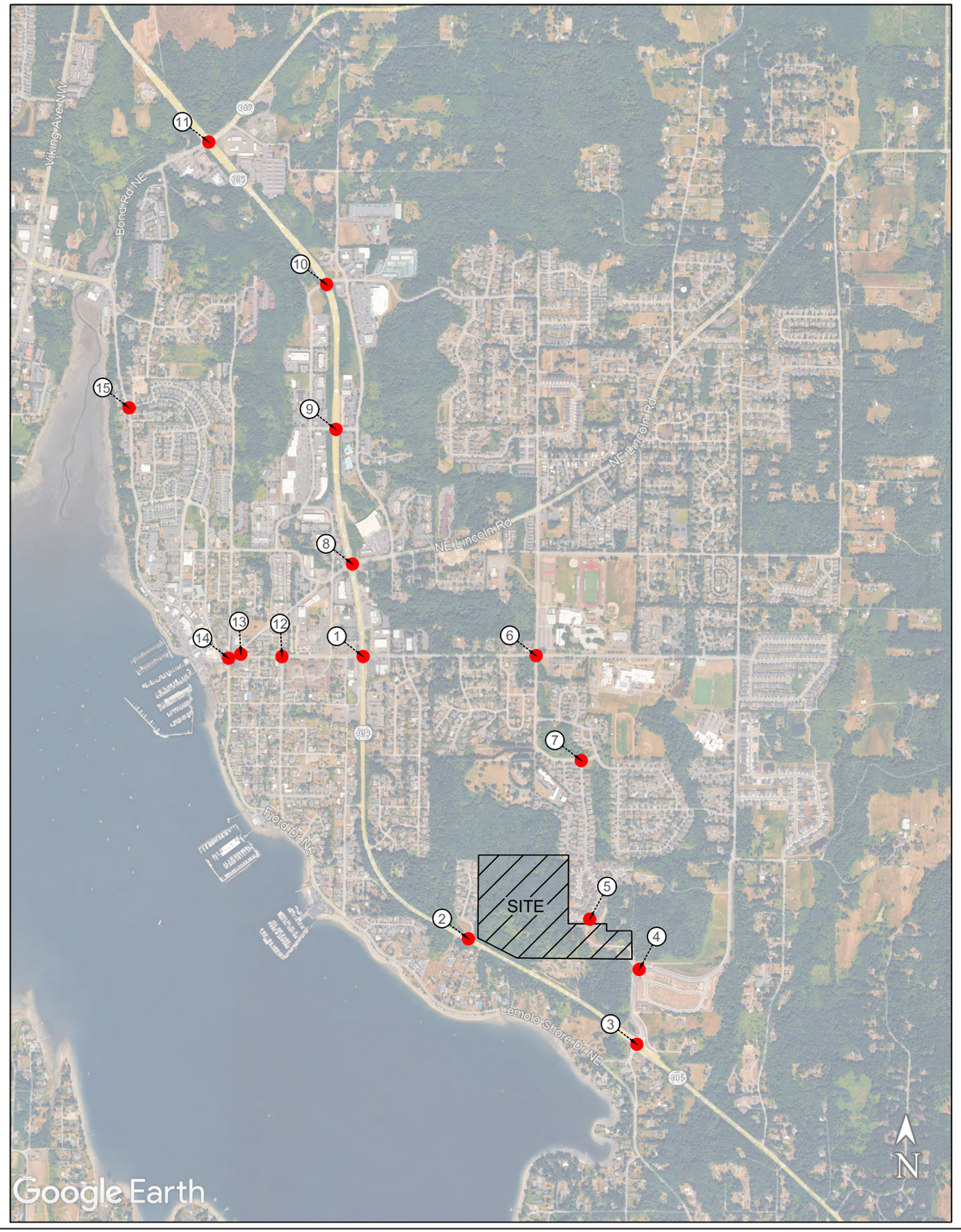

7 CALDART AVE NE & SUNRISE RIDGE AVE NE




HEATH&ASSOCIATES
Transportation Planning & Engineering

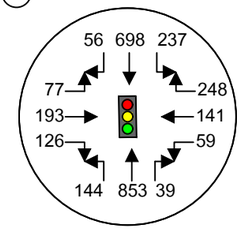
PINNACLE AT LIBERTY BAY

FORECAST 2037 AM PEAK HOUR VOLUMES WITH PROJECT
FIGURE 19

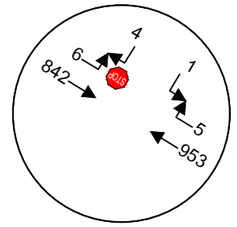



## OUTLYING STUDY INTERSECTIONS

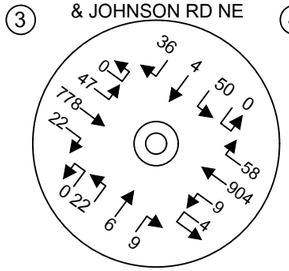
(1) SR 305 & NE HOSTMARK ST



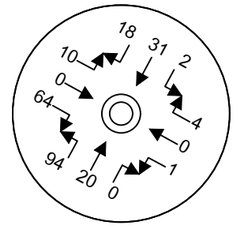

(2) SR 305 & BAYWATCH CT NE



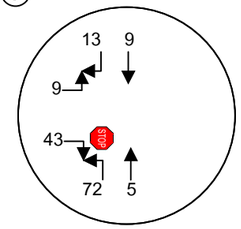

(3) SR 305 & JOHNSON RD NE



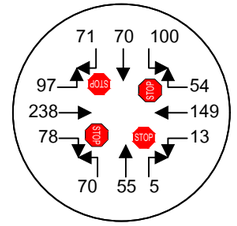

(4) JOHNSON RD NE & SUNRISE RIDGE AVE NE



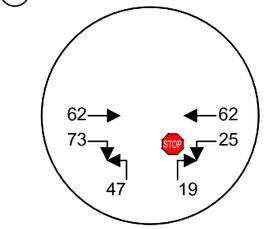

(5) SUNRISE RIDGE AVE NE & NE CRYSTALLIA CT



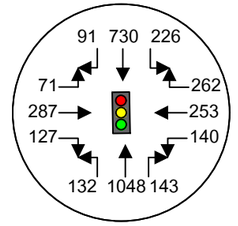

(6) NE HOSTMARK ST & CALDART AVE NE



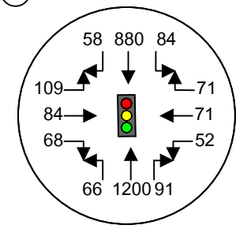

(7) CALDART AVE NE & SUNRISE RIDGE AVE NE



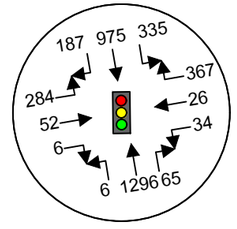

(8) SR 305 & NE LINCOLN RD



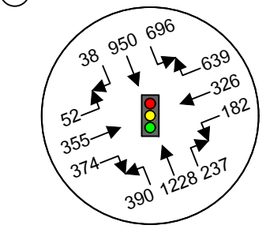

(9) SR 305 & NE LIBERTY RD



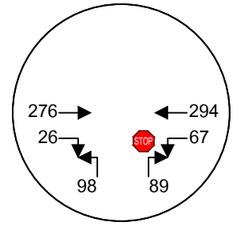

(10) SR 305 & FOREST ROCK LN NE



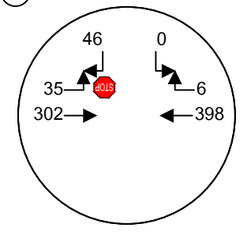

(11) SR 305 & SR 307/BOND RD NE



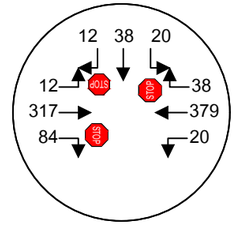

(12) NE HOSTMARK ST & 6TH AVE NE



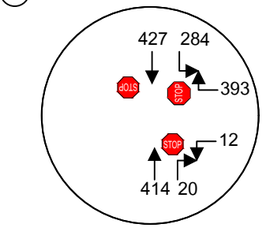

(13) NE HOSTMARK ST & NE LINCOLN RD




(14) NE HOSTMARK ST & 4TH AVE NE/FJORD DR




(15) FRONT ST NE & NE SUNSET ST



## 5.4 Site Access Locations and Assumptions

Site access will be provided at four locations, as shown in the conceptual site plan:

1. Sunrise Ridge Avenue via extension of Crystallia Court.
2. Both sides of Sunrise Ridge Avenue 220 feet south of Crystallia Ct.
3. Sunrise Ridge Avenue 385 feet south of Crystallia Court.

To provide a worst-case operations analysis, this study assumed project-generated trips will be consolidated at the Crystallia Court access. Sunrise Ridge Avenue NE & Crystallia Court, which was assumed to serve all project-generated trips, is expected to operate at LOS A through 2037, satisfying the City of Poulsbo minimum LOS E standard.

The location and design of site accesses as well as on-site circulating roadways and frontage improvements will be subject to City of Poulsbo review and approval.

## 5.5 Future Levels of Service

Intersection LOS was analyzed for the 2032 and 2037 forecasting horizons both without and with project-generated trips. Intersection delay and LOS results are summarized in **Table 10** for the 2032 analysis and in **Table 11** for the 2037 analysis.

The 2032 analysis assumed that existing Peak Hour Factor (PHF) would remain unchanged. The 2037 analysis applied a PHF of 1.0 on SR 305 intersections, consistent with WSDOT Synchro protocol for long-range analyses, while maintaining existing PHF at local intersections.

Three intersections along SR 305 which currently operate with LOS deficiencies are expected to continue to operate at LOS E/F through the 2032 and 2037 analysis years. LOS-deficient intersections on SR 305 are summarized below.

**SR 305 & NE Liberty Road**: The intersection will continue to operate at LOS F through 2037. Project-generated trips are expected to increase average PM peak hour delay by 2.2 seconds per vehicle in 2032 and by 1.7 seconds in 2037. It may be noted that 2037 intersection delay forecasts are slightly lower than 2032 forecasts due to PHF smoothing, per WSDOT Synchro policy for long-range analyses.

**SR 305 & Forest Rock Lane**: The intersection will continue to operate at LOS F through 2037. Project trips are expected to increase average PM peak hour delay by 1.0 seconds per vehicle in 2032 and by 0.8 seconds per vehicle in 2037.

**SR 305 & SR 307/Bond Road**: The intersection will continue to operate at LOS E in 2032 before and after the addition of project trips. By 2037, the intersection is expected to reach LOS F with or without project trips. Project trips are expected to

increase overall intersection delay by less than 0.5 seconds per vehicle and are not expected to degrade intersection LOS.

**Table 10: Forecast 2032 Peak Hour Level of Service**

*Delays Given in Seconds per Vehicle*

| ID | Intersection | Control | Peak Hour | Crt. Apprch | Without Project | | With Project | |
|---|---|---|---|---|---|---|---|---|
| | | | | | LOS | Delay | LOS | Delay |
| 1 | SR 305 & Hostmark St | Signal | AM | Overall | D | 36.5 | D | 37.1 |
| | | | PM | | D | 44.5 | D | 44.7 |
| 2 | SR 305 & Baywatch Ct | One-Way Stop | AM | SB | C | 21.8 | C | 22.8 |
| | | | PM | | D | 25.6 | D | 27.1 |
| 3 | SR 305 & Johnson Rd | RAB | AM | Overall | A | 7.4 | A | 7.7 |
| | | | PM | | A | 6.6 | A | 7.0 |
| 4 | Johnson Rd & Sunrise Ridge | RAB | AM | Overall | A | 5.5 | A | 5.9 |
| | | | PM | | A | 5.9 | A | 6.7 |
| 5 | Sunrise Ridge & Crystallia Ct | One-Way Stop | AM | EB | A | 8.6 | A | 8.8 |
| | | | PM | | A | 8.5 | A | 8.8 |
| 6 | Hostmark St & Caldart Ave | AWSC | AM | Overall | C | 22.2 | C | 24.6 |
| | | | PM | | B | 14.7 | C | 15.1 |
| 7 | Caldart Ave & Sunrise Ridge | TWSC | AM | NB | A | 9.5 | A | 9.7 |
| | | | PM | | A | 9.9 | B | 10.1 |
| 8 | SR 305 & NE Lincoln Rd | Signal | PM | Overall | D | 52.3 | D | 52.8 |
| 9 | SR 305 & NE Liberty Rd | Signal | PM | Overall | **F** | **104.7** | **F** | **106.9** |
| 10 | SR 305 & Forest Rock Ln | Signal | PM | Overall | **F** | **125.0** | **F** | **126.0** |
| 11 | SR 305 & SR 307/Bond Rd | Signal | PM | Overall | **E** | **77.9** | **E** | **78.2** |
| 12 | NE Hostmark St & 6th Ave NE | One-Way Stop | PM | NB | B | 14.0 | B | 14.4 |
| 13 | NE Hostmark St & Lincoln Rd | One-Way Stop | PM | SB | B | 11.0 | B | 11.1 |
| 14 | NE Hostmark St & 4th Ave NE | AWSC | PM | Overall | B | 11.9 | B | 12.2 |
| 15 | Front St & NE Sunset St | AWSC | PM | Overall | D | 33.9 | E | 35.2 |

*Signalized intersection LOS is based on overall intersection delay;
Roundabout (RAB) and AWSC LOS is based on overall intersection delay and stop-controlled delay thresholds;
Minor-approach stop control LOS is based on worst-approach delay and stop-controlled delay thresholds

**Table 11: Forecast 2037 Peak Hour Level of Service**

*Delays Given in Seconds per Vehicle*

| ID | Intersection | Control | Peak Hour | Crt. Apprch | Without Project | | With Project | |
|---|---|---|---|---|---|---|---|---|
| | | | | | LOS | Delay | LOS | Delay |
| 1 | SR 305 & Hostmark St | Signal | AM<br>PM | Overall | D<br>D | 36.5<br>44.9 | D<br>D | 37.1<br>45.1 |
| 2 | SR 305 & Baywatch Ct | One-Way Stop | AM<br>PM | SB | C<br>C | 18.9<br>22.2 | C<br>C | 19.7<br>23.2 |
| 3 | SR 305 & Johnson Rd | RAB | AM<br>PM | Overall | A<br>A | 7.3<br>6.6 | A<br>A | 7.5<br>6.9 |
| 4 | Johnson Rd & Sunrise Ridge | RAB | AM<br>PM | Overall | A<br>A | 5.5<br>5.9 | A<br>A | 5.9<br>6.7 |
| 5 | Sunrise Ridge & Crystallia Ct | One-Way Stop | AM<br>PM | EB | A<br>A | 8.6<br>8.5 | A<br>A | 8.8<br>8.8 |
| 6 | Hostmark St & Caldart Ave | AWSC | AM<br>PM | Overall | D<br>C | 33.0<br>18.0 | E<br>C | 38.4<br>18.5 |
| 7 | Caldart Ave & Sunrise Ridge | TWSC | AM<br>PM | EB | A<br>B | 9.6<br>10.0 | A<br>B | 9.8<br>10.2 |
| 8 | SR 305 & NE Lincoln Rd | Signal | PM | Overall | D | 52.7 | D | 53.1 |
| 9 | SR 305 & NE Liberty Rd | Signal | PM | Overall | **F** | **93.2** | **F** | **94.9** |
| 10 | SR 305 & Forest Rock Ln | Signal | PM | Overall | **F** | **123.6** | **F** | **124.4** |
| 11 | SR 305 & SR 307/Bond Rd | Signal | PM | Overall | **F** | **81.8** | **F** | **82.2** |
| 12 | NE Hostmark St & 6th Ave NE | One-Way Stop | PM | NB | C | 15.2 | C | 15.6 |
| 13 | NE Hostmark St & Lincoln Rd | One-Way Stop | PM | SB | B | 11.3 | B | 11.4 |
| 14 | NE Hostmark St & 4th Ave NE | AWSC | PM | Overall | B | 13.0 | B | 13.4 |
| 15 | Front St & NE Sunset St | AWSC | PM | Overall | **F** | **51.1** | **F** | **53.0** |

*Signalized intersection LOS is based on overall intersection delay;
Roundabout (RAB) and AWSC LOS is based on overall intersection delay and stop-controlled delay thresholds;
Minor-approach stop control LOS is based on worst-approach delay and stop-controlled delay thresholds

**Front Street & NE Sunset Street** will operate at LOS E during the 2032 PM peak hour. In the 2037 PM peak hour, the intersection will fall below the minimum LOS E standard, operating at LOS F (51.1 seconds of delay per vehicle) before project trips and LOS F (53.0 seconds of delay per vehicle) with project trips.

Project-related increases in PM peak hour intersection entering volume and average delay at intersections with existing or future LOS deficiencies are summarized in **Table 12**. Project trips are expected to increase total entering volume by less than one percent and overall delay by 2.2 seconds per vehicle or less. Each LOS-deficient intersection is expected to be impacted by fewer than 20 PM peak hour project trips.

The City of Poulsbo website[4] indicates that the Oslo Bay Apartments development will provide signal controller, detection, and interconnection upgrades at eight intersections along the SR 305 corridor, including all five signalized SR 305 study intersections. The identified hardware improvements are likely to improve operational efficiency at the study intersections while maintaining existing channelization and geometry.

**Table 12: PM Peak Hour Project Impacts at LOS-Deficient Intersections**

| ID | Intersection | PM Pk Hr Project Trips | 2032 Project Impacts | | 2037 Project Impacts | |
|---|---|---|---|---|---|---|
| | | | Volume Increase (%) | Delay Increase (sec/veh) | Volume Increase (%) | Delay Increase (sec/veh) |
| 9 | SR 305 & NE Liberty Rd | 19 | +0.70% | +2.2 | +0.67% | +1.7 |
| 10 | SR 305 & Forest Rock Ln | 16 | +0.46% | +1.0 | +0.44% | +0.8 |
| 11 | SR 305 & SR 307/Bond Rd | 13 | +0.25% | +0.3 | +0.24% | +0.4 |
| 15 | Front St & NE Sunset St | 11 | +0.78% | +1.3 | +0.71% | +1.9 |

**Hostmark Street & Caldart Avenue** will operate at LOS E or better through the 2037 AM and PM peak hours, satisfying the City of Poulsbo minimum LOS E standard. The 2037 analysis assumes existing school-related volume peaking will increase proportional to ongoing commercial and residential growth in the intersection vicinity.

[4] "Oslo Bay Apartments: Traffic and Mitigation," https://poulsbo.gov/oslobayapartments/. Retrieved October 3, 2026.

Anticipated 95th percentile AM and PM peak hour queuing at NE Hostmark Street & Caldart Avenue is summarized in **Table 13**.

**Table 13: NE Hostmark Street & Caldart Avenue 95th Percentile Queue**

| Approach | Study Period | 2025 Queue (ft) | 2032 Queue (ft) | | 2037 Queue (ft) | |
|---|---|---|---|---|---|---|
| | | | Without Project | With Project | Without Project | With Project |
| Eastbound | AM | 95 | 160 | 173 | 235 | 260 |
| | PM | 80 | 125 | 128 | 173 | 180 |
| Westbound | AM | 88 | 160 | 180 | 235 | 270 |
| | PM | 28 | 40 | 43 | 50 | 53 |
| Northbound | AM | 30 | 43 | 50 | 53 | 65 |
| | PM | 18 | 23 | 25 | 28 | 30 |
| Southbound | AM | 43 | 63 | 65 | 80 | 85 |
| | PM | 28 | 38 | 38 | 45 | 48 |

Peak hour 95th percentile queues are expected to extend up to 260 feet (approximately 10 car lengths) on the eastbound approach and 270 feet (11 car lengths) on the westbound approach in the 2037 AM peak hour with project trips. Project-generated trips are expected to increase 95th percentile queues on NE Hostmark Street by approximately 25-35 feet in the 2037 AM peak hour.

## 5.6 SR 305 Connectivity

A previous draft TIA report included a site access on Baywatch Court NE, a local access street to the southwest of the subject site which intersects SR 305 at a minor-approach stop-controlled intersection on a horizontal curve. The elimination of the Baywatch Court NE connection in the currently proposed site plan will result in project trips accessing SR 305 to the south via the roundabout intersection at Johnson Road or to the northwest via the signalized intersection at NE Hostmark Street, avoiding significant increases in entering and exiting traffic volumes at the stop-controlled Baywatch Court NE intersection.

A planning-level travel time analysis was developed to refine the project trip assignment forecast between the SR 305 & Hostmark Street intersection and the site. The analysis, which incorporated posted speed limits on each route, indicated that the SR 305/Johnson Road NE provides a shorter travel time route (168 seconds) than Hostmark Street/Caldart Avenue (181 seconds). Project trips to/from the north and west are therefore likely to utilize SR 305 and Johnson Road NE rather than the lower-speed Hostmark Street/Caldart Avenue corridors.

The operational analysis described in the previous section indicates that SR 305 intersections on Hostmark Street and Johnson Road provide adequate capacity to support project trips through the 2037 analysis horizon.

## 5.7 Future Nonmotorized Conditions

The internal circulating street network will include sidewalks and marked pedestrian crosswalks internal to the project site. On-site nonmotorized facilities will provide connections to the existing nonmotorized transportation network.

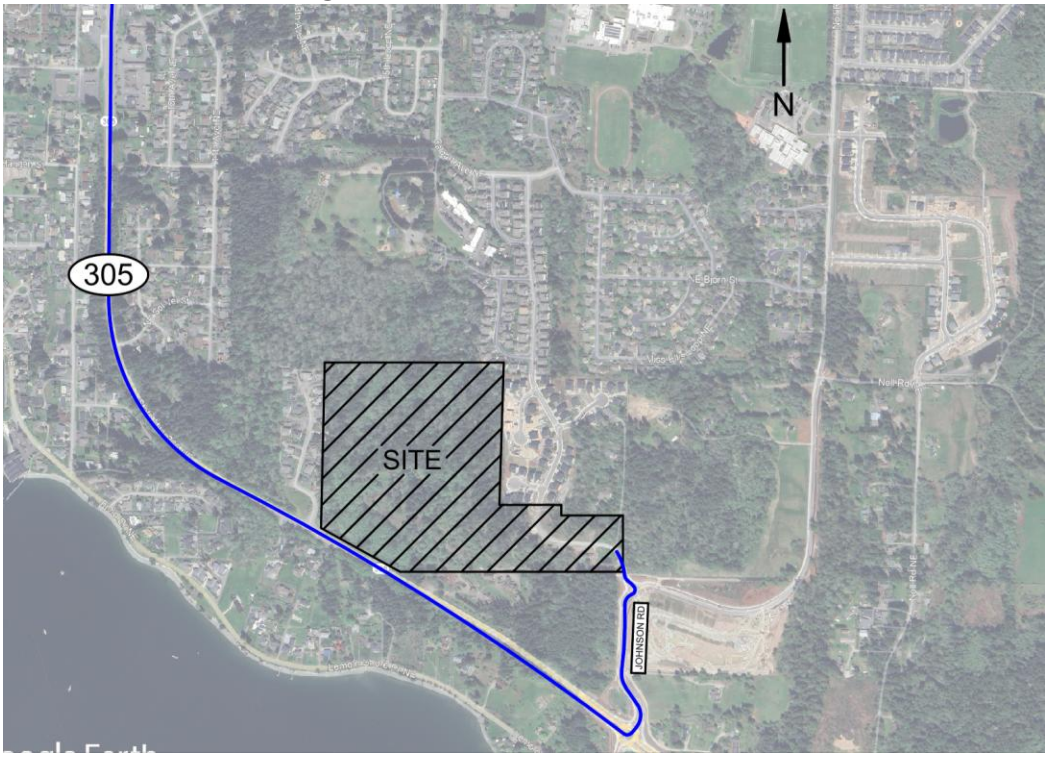
Sunrise Ridge Avenue NE, Caldart Avenue NE, and NE Hostmark Street provide a contiguous nonmotorized connection to nearby schools. Project improvements will also provide a nonmotorized connection to SR 305 via Sunrise Ridge Avenue and Johnson Parkway, facilitating alternatives to vehicle travel. Pedestrian routes to schools in the project vicinity are described in **Section 4.6**.

## 5.8 Construction Traffic

Truck activity will vary throughout project construction, with an estimated maximum of 60-80 trucks per day during a 3-4-week mass grading and import phase. Construction activity will involve a maximum of 20 on-site construction employees.

Construction traffic is anticipated to primarily utilize Johnson Road, a City arterial, to access SR 305, a state route. The anticipated construction route is illustrated in **Figure 21**. Route restrictions or preferences may be coordinated with the City.

**Figure 21: Construction Route**



# 6. CONCLUSIONS & MITIGATION

The Pinnacle at Liberty Bay is a proposed residential development consisting of 138 single-family homes located in Poulsbo. The subject site comprises 40.98 acres on four undeveloped tax parcels. Site ingress/egress is proposed via NE Crystallia Court and Sunrise Ridge Avenue NE.

Existing traffic operations were analyzed at 15 intersections in the site vicinity. Three intersections on SR 305 to the north of the subject site currently operate at LOS E or F during the PM peak hour, below the WSDOT LOS D standard. All City of Poulsbo intersections operate at LOS D or better during the AM and PM peak hours, satisfying the City of Poulsbo minimum LOS E standard.

An analysis of five-year crash history in the site vicinity indicated the majority of crashes, including 92 percent of reported intersection crashes, occurred along SR 305. All City of Poulsbo intersections reported fewer than 1.5 crashes per year. Six reported crashes involved at least one fatal or serious injury, including five crashes along the SR 305 corridor and one serious injury crash at Front Street & NE Sunset Street. The SR 305 corridor is identified in the Poulsbo Comprehensive Plan as a priority for safety, active transportation, and LOS improvements through coordination with WSDOT. Project trips are expected to represent less than one percent of total PM peak hour volume at each of the three SR 305 intersections with the highest crash frequency.

The project is expected to generate 1,254 daily weekday trips, 97 AM peak hour trips (26 inbound / 71 outbound), and 128 PM peak hour trips (80 inbound / 48 outbound). Future pipeline growth in the study area will include three nearby residential developments. Additional background traffic growth was forecast using travel demand forecasts and scoping direction provided by City of Poulsbo staff.

Future traffic conditions were analyzed for 2032 and 2037 horizon years. Traffic forecasts assumed completion of the Sunrise Ridge Avenue NE connection between Noll Road and Caldart Avenue, including redistribution of travel demand.

Three existing SR 305 intersection LOS deficiencies are expected to persist through the 2032 and 2037 horizon years. The intersection of Front Street & NE Sunset Street is expected to degrade to LOS F in the 2037 PM peak hour both without and with project trips. Project trips are expected to increase peak hour traffic volume by less than one percent at all LOS-deficient intersections.

Construction activity will vary over the anticipated 12-month construction period. Trucks are encouraged to utilize state routes and should coordinate preferred truck routes with the City of Poulsbo.

The following mitigation recommendations are provided for consideration:

1. Design of **on-site streets, intersections, and frontage improvements** will be subject to City of Poulsbo review and approval.

2. The project will be subject to **Traffic Impact Fees (TIF)** as imposed by the City of Poulsbo (PMC 3.86). Fees are based on project-generated trips, at a rate of $564.00 per net new daily trip as of October 2026. The estimated project traffic impact fee calculation is:

   1,254 daily trips x $564.00 per daily trip = **$707,256.00**

   Traffic impact fees will be calculated and determined by the City of Poulsbo at the time of building permit issuance.

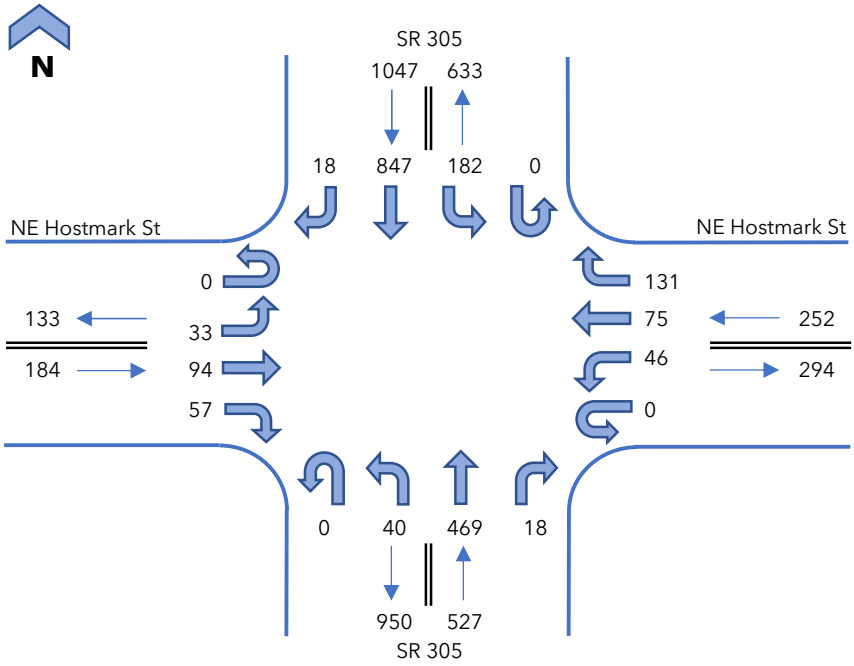
# THE PINNACLE AT LIBERTY BAY
# TRAFFIC IMPACT ANALYSIS

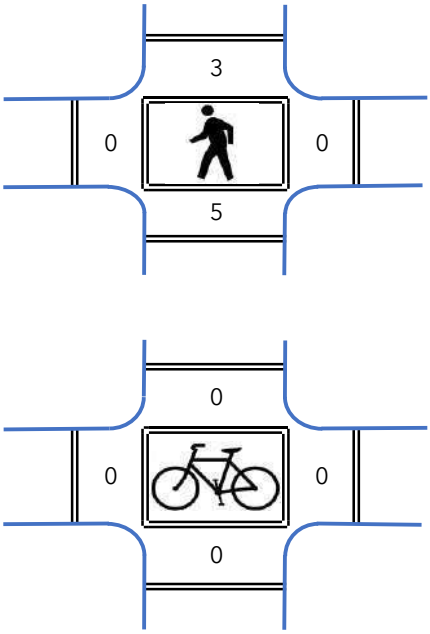
*APPENDIX*
*Traffic Counts*

HEATH & ASSOCIATES
Transportation Planning & Engineering

**Date Collected:** 5/21/2025
**Day of the Week:** Wednesday
**Time Period:** 7:00 AM to 9:00 AM
**Peak Hour:** 7:00 AM to 8:00 AM

**NE Hostmark Street & SR 305**




| Interval Start Time | NE Hostmark St Eastbound | | | | NE Hostmark St Westbound | | | | SR 305 Northbound | | | | SR 305 Southbound | | | | 15 Minute Totals | Hourly Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | | |
| 7:00 AM | 0 | 2 | 12 | 9 | 0 | 5 | 12 | 26 | 0 | 5 | 110 | 1 | 0 | 28 | 200 | 5 | 415 | |
| 7:15 AM | 0 | 11 | 29 | 18 | 0 | 19 | 16 | 29 | 0 | 6 | 111 | 4 | 0 | 50 | 226 | 4 | 523 | |
| 7:30 AM | 0 | 12 | 30 | 14 | 0 | 10 | 19 | 41 | 0 | 12 | 111 | 7 | 0 | 64 | 200 | 5 | 525 | |
| 7:45 AM | 0 | 8 | 23 | 16 | 0 | 12 | 28 | 35 | 0 | 17 | 137 | 6 | 0 | 40 | 221 | 4 | 547 | 2010 |
| 8:00 AM | 0 | 12 | 7 | 11 | 0 | 5 | 17 | 24 | 0 | 9 | 118 | 6 | 0 | 17 | 180 | 6 | 412 | 2007 |
| 8:15 AM | 0 | 11 | 11 | 9 | 0 | 7 | 14 | 24 | 0 | 9 | 128 | 5 | 0 | 12 | 180 | 3 | 413 | 1897 |
| 8:30 AM | 0 | 8 | 14 | 10 | 0 | 7 | 13 | 19 | 0 | 21 | 122 | 7 | 0 | 30 | 168 | 7 | 426 | 1798 |
| 8:45 AM | 0 | 9 | 15 | 14 | 0 | 12 | 13 | 33 | 0 | 8 | 150 | 7 | 0 | 23 | 163 | 6 | 453 | 1704 |
| Count Total | 0 | 73 | 141 | 101 | 0 | 77 | 132 | 231 | 0 | 87 | 987 | 43 | 0 | 264 | 1538 | 40 | 3714 | -- |
| Peak Hour Total | 0 | 33 | 94 | 57 | 0 | 46 | 75 | 131 | 0 | 40 | 469 | 18 | 0 | 182 | 847 | 18 | 2010 | -- |
| PHF | 0.79 | | | | 0.84 | | | | 0.82 | | | | 0.93 | | | | 0.92 | -- |
| Heavy Vehicles | 0 | 2 | 5 | 2 | 0 | 2 | 3 | 8 | 0 | 2 | 27 | 1 | 0 | 9 | 53 | 2 | 116 | -- |
| HV % | 0.0% | 6.1% | 5.3% | 3.5% | 0.0% | 4.3% | 4.0% | 6.1% | 0.0% | 5.0% | 5.8% | 5.6% | 0.0% | 4.9% | 6.3% | 11.1% | 5.8% | -- |

| Interval Start Time | Heavy Vehicles | | | | |
|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total |
| 7:00 AM | 2 | 1 | 7 | 10 | 20 |
| 7:15 AM | 4 | 3 | 10 | 15 | 32 |
| 7:30 AM | 2 | 7 | 2 | 22 | 33 |
| 7:45 AM | 1 | 2 | 11 | 17 | 31 |
| 8:00 AM | 4 | 3 | 5 | 20 | 32 |
| 8:15 AM | 3 | 3 | 9 | 16 | 31 |
| 8:30 AM | 1 | 2 | 11 | 22 | 36 |
| 8:45 AM | 3 | 3 | 10 | 13 | 29 |
| Count Total | 20 | 24 | 65 | 135 | 244 |
| Peak Hour Total | 9 | 13 | 30 | 64 | 116 |
| Peak Hour HV% | 4.9% | 5.2% | 5.7% | 6.1% | 5.8% |

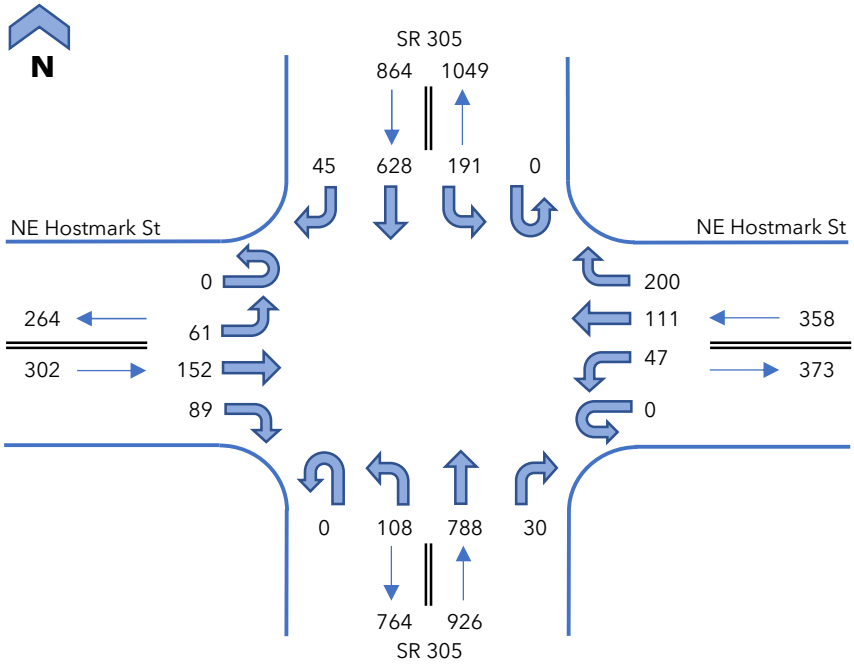
| Pedestrians (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 1 | 3 | 4 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 1 | 1 | 2 |
| 0 | 1 | 0 | 1 | 2 |
| 0 | 0 | 2 | 1 | 3 |
| 2 | 2 | 3 | 2 | 9 |
| 0 | 0 | 2 | 2 | 4 |
| 2 | 3 | 10 | 11 | 26 |
| 0 | 0 | 3 | 5 | 8 |

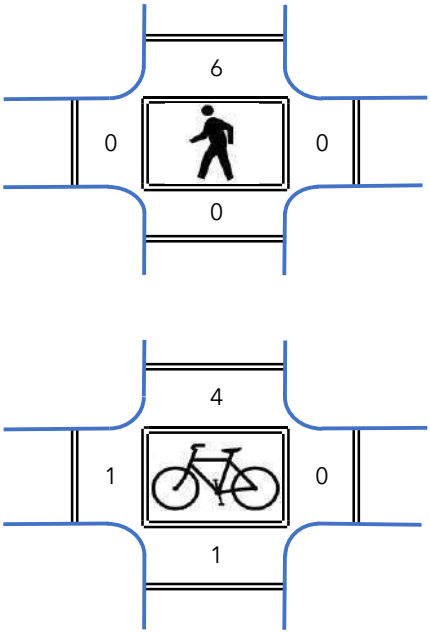
| Bicycles (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |

HEATH & ASSOCIATES
Transportation Planning & Engineering

**Date Collected:** 5/20/2025
**Day of the Week:** Tuesday
**Time Period:** 4:00 PM to 6:00 PM
**Peak Hour:** 4:00 PM to 5:00 PM

**NE Hostmark Street & SR 305**




| Interval Start Time | NE Hostmark St Eastbound | | | | NE Hostmark St Westbound | | | | SR 305 Northbound | | | | SR 305 Southbound | | | | 15 Minute Totals | Hourly Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | | |
| 4:00 PM | 0 | 19 | 39 | 16 | 0 | 12 | 25 | 48 | 0 | 21 | 205 | 5 | 0 | 49 | 164 | 12 | 615 | |
| 4:15 PM | 0 | 13 | 34 | 27 | 0 | 15 | 23 | 47 | 0 | 31 | 191 | 12 | 0 | 52 | 146 | 12 | 603 | |
| 4:30 PM | 0 | 13 | 43 | 24 | 0 | 9 | 41 | 62 | 0 | 28 | 182 | 5 | 0 | 43 | 150 | 15 | 615 | |
| 4:45 PM | 0 | 16 | 36 | 22 | 0 | 11 | 22 | 43 | 0 | 28 | 210 | 8 | 0 | 47 | 168 | 6 | 617 | 2450 |
| 5:00 PM | 0 | 12 | 40 | 30 | 0 | 4 | 26 | 31 | 0 | 20 | 169 | 4 | 0 | 54 | 173 | 9 | 572 | 2407 |
| 5:15 PM | 0 | 11 | 23 | 21 | 0 | 2 | 24 | 31 | 1 | 28 | 175 | 7 | 0 | 51 | 160 | 7 | 541 | 2345 |
| 5:30 PM | 0 | 20 | 38 | 14 | 0 | 7 | 13 | 27 | 0 | 17 | 216 | 6 | 0 | 38 | 149 | 14 | 559 | 2289 |
| 5:45 PM | 0 | 16 | 22 | 15 | 0 | 6 | 17 | 16 | 0 | 23 | 191 | 7 | 0 | 48 | 137 | 12 | 510 | 2182 |
| Count Total | 0 | 120 | 275 | 169 | 0 | 66 | 191 | 305 | 1 | 196 | 1539 | 54 | 0 | 382 | 1247 | 87 | 4632 | -- |
| Peak Hour Total | 0 | 61 | 152 | 89 | 0 | 47 | 111 | 200 | 0 | 108 | 788 | 30 | 0 | 191 | 628 | 45 | 2450 | -- |
| PHF | 0.94 | | | | 0.80 | | | | 0.94 | | | | 0.96 | | | | 0.99 | -- |
| Heavy Vehicles | 0 | 4 | 4 | 1 | 0 | 0 | 1 | 2 | 0 | 2 | 30 | 0 | 0 | 2 | 11 | 2 | 59 | -- |
| HV % | 0.0% | 6.6% | 2.6% | 1.1% | 0.0% | 0.0% | 0.9% | 1.0% | 0.0% | 1.9% | 3.8% | 0.0% | 0.0% | 1.0% | 1.8% | 4.4% | 2.4% | -- |

| Interval Start Time | Heavy Vehicles | | | | |
|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total |
| 4:00 PM | 1 | 1 | 4 | 2 | 8 |
| 4:15 PM | 0 | 1 | 9 | 1 | 11 |
| 4:30 PM | 3 | 0 | 15 | 6 | 24 |
| 4:45 PM | 5 | 1 | 4 | 6 | 16 |
| 5:00 PM | 0 | 4 | 3 | 5 | 12 |
| 5:15 PM | 0 | 0 | 8 | 4 | 12 |
| 5:30 PM | 0 | 0 | 9 | 2 | 11 |
| 5:45 PM | 2 | 0 | 9 | 1 | 12 |
| Count Total | 11 | 7 | 61 | 27 | 106 |
| Peak Hour Total | 9 | 3 | 32 | 15 | 59 |
| Peak Hour HV% | 3.0% | 0.8% | 3.5% | 1.7% | 2.4% |

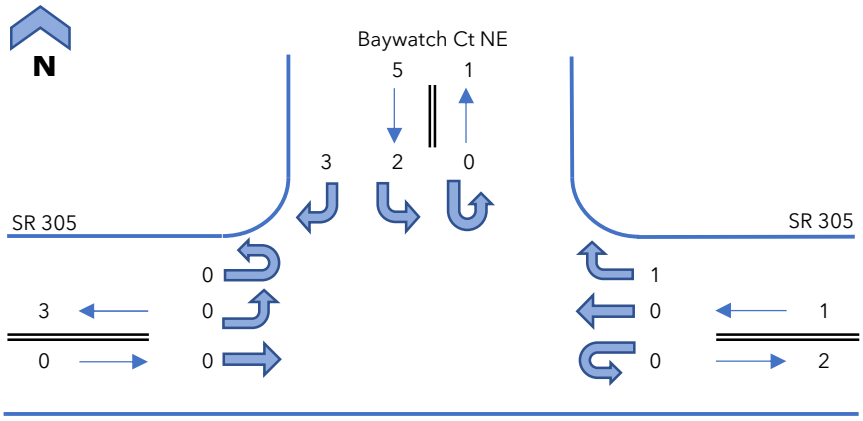
| Pedestrians (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 4 | 0 | 4 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 1 | 0 | 3 | 4 |
| 1 | 1 | 1 | 1 | 4 |
| 0 | 0 | 3 | 2 | 5 |
| 1 | 0 | 5 | 1 | 7 |
| 2 | 2 | 15 | 7 | 26 |
| 0 | 0 | 6 | 0 | 6 |

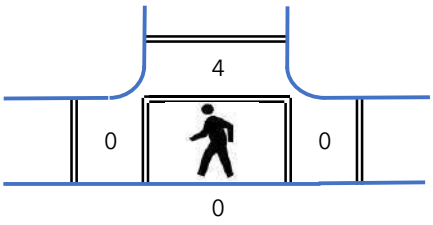
| Bicycles (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 3 | 0 | 3 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 1 | 3 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 4 | 1 | 6 |
| 0 | 1 | 4 | 1 | 6 |

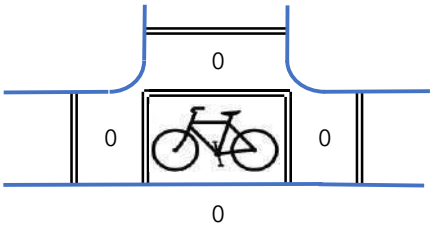
HEATH & ASSOCIATES
Transportation Planning & Engineering

**Date Collected:** 5/21/2025
**Day of the Week:** Wednesday
**Time Period:** 7:00 AM to 9:00 AM
**Peak Hour:** 8:00 AM to 9:00 AM

**SR 305 & Baywatch Court NE**




| Interval Start Time | SR 305 Eastbound | | | | SR 305 Westbound | | | | | | | | Baywatch Ct NE Southbound | | | | 15 Minute Totals | Hourly Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UT | LT | T | RT | UT | LT | T | RT | | | | | UT | LT | T | RT | | |
| 7:00 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 0 | -- | 1 | 1 | |
| 7:15 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 0 | -- | 0 | 0 | |
| 7:30 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 1 | -- | 1 | 2 | |
| 7:45 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 0 | -- | 0 | 0 | 3 |
| 8:00 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 0 | -- | 0 | 0 | 2 |
| 8:15 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 1 | -- | 1 | 2 | 4 |
| 8:30 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 1 | -- | 0 | 1 | 3 |
| 8:45 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 1 | -- | -- | -- | -- | 0 | 0 | -- | 2 | 3 | 6 |
| Count Total | 0 | 0 | 0 | -- | 0 | -- | 0 | 1 | -- | -- | -- | -- | 0 | 3 | -- | 5 | 9 | -- |
| Peak Hour Total | 0 | 0 | 0 | -- | 0 | -- | 0 | 1 | -- | -- | -- | -- | 0 | 2 | -- | 3 | 6 | -- |
| PHF | #DIV/0! | | | | 0.25 | | | | -- | | | | 0.63 | | | | 0.50 | -- |
| Heavy Vehicles | 0 | 0 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 0 | -- | 0 | 0 | -- |
| HV % | 0.0% | 0.0% | 0.0% | -- | 0.0% | -- | 0.0% | 0.0% | -- | -- | -- | -- | 0.0% | 0.0% | -- | 0.0% | 0.0% | -- |

| Interval Start Time | Heavy Vehicles | | | | |
|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total |
| 7:00 AM | 0 | 0 | -- | 0 | 0 |
| 7:15 AM | 0 | 0 | -- | 0 | 0 |
| 7:30 AM | 0 | 0 | -- | 0 | 0 |
| 7:45 AM | 0 | 0 | -- | 0 | 0 |
| 8:00 AM | 0 | 0 | -- | 0 | 0 |
| 8:15 AM | 0 | 0 | -- | 0 | 0 |
| 8:30 AM | 0 | 0 | -- | 0 | 0 |
| 8:45 AM | 0 | 0 | -- | 0 | 0 |
| Count Total | 0 | 0 | -- | 0 | 0 |
| Peak Hour Total | 0 | 0 | -- | 0 | 0 |
| Peak Hour HV% | 0.0% | 0.0% | -- | 0.0% | 0.0% |

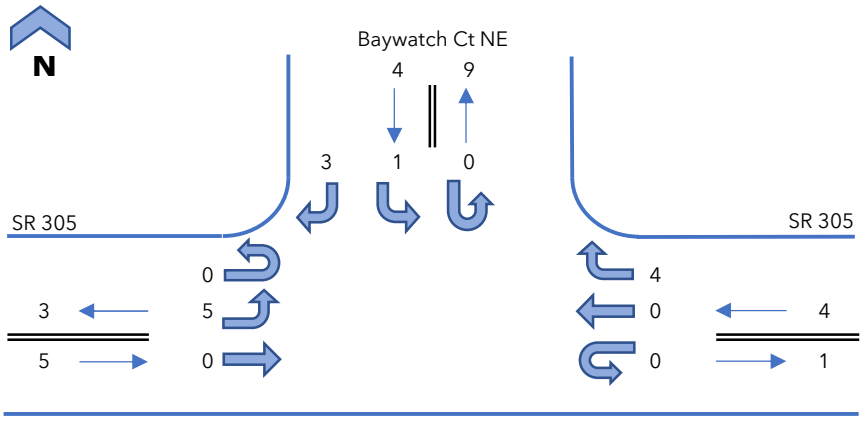
| Pedestrians (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 4 | 0 | 4 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 4 | 0 | 4 |
| 0 | 0 | 4 | 0 | 4 |

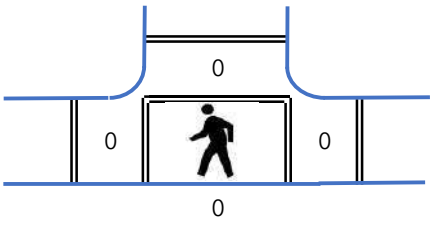
| Bicycles (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |

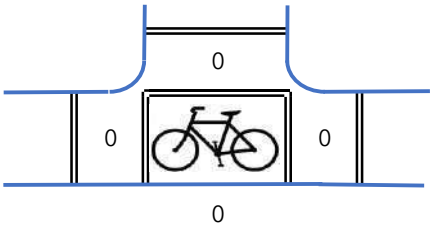
HEATH & ASSOCIATES
Transportation Planning & Engineering

**Date Collected:** 5/20/2025
**Day of the Week:** Tuesday
**Time Period:** 4:00 AM to 6:00 AM
**Peak Hour:** 4:30 AM to 5:30 AM

**SR 305 & Baywatch Court NE**




| Interval Start Time | SR 305 Eastbound | | | | SR 305 Westbound | | | | | | | | Baywatch Ct NE Southbound | | | | 15 Minute Totals | Hourly Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UT | LT | T | RT | UT | LT | T | RT | | | | | UT | LT | T | RT | | |
| 4:00 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 0 | -- | 0 | 0 | |
| 4:15 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 0 | -- | 0 | 0 | |
| 4:30 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 0 | -- | 1 | 1 | |
| 4:45 AM | 0 | 1 | 0 | -- | 0 | -- | 0 | 2 | -- | -- | -- | -- | 0 | 0 | -- | 0 | 3 | 4 |
| 5:00 AM | 0 | 3 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 0 | -- | 1 | 4 | 8 |
| 5:15 AM | 0 | 1 | 0 | -- | 0 | -- | 0 | 2 | -- | -- | -- | -- | 0 | 1 | -- | 1 | 5 | 13 |
| 5:30 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 1 | -- | -- | -- | -- | 0 | 0 | -- | 0 | 1 | 13 |
| 5:45 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 1 | -- | -- | -- | -- | 0 | 0 | -- | 0 | 1 | 11 |
| Count Total | 0 | 5 | 0 | -- | 0 | -- | 0 | 6 | -- | -- | -- | -- | 0 | 1 | -- | 3 | 15 | -- |
| Peak Hour Total | 0 | 5 | 0 | -- | 0 | -- | 0 | 4 | -- | -- | -- | -- | 0 | 1 | -- | 3 | 13 | -- |
| PHF | 0.42 | | | | 0.50 | | | | -- | | | | 0.50 | | | | 0.65 | -- |
| Heavy Vehicles | 0 | 1 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 1 | -- | 0 | 2 | -- |
| HV % | 0.0% | 20.0% | 0.0% | -- | 0.0% | -- | 0.0% | 0.0% | -- | -- | -- | -- | 0.0% | 100.0% | -- | 0.0% | 15.4% | -- |

| Interval Start Time | Heavy Vehicles | | | | |
|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total |
| 4:00 AM | 0 | 0 | -- | 0 | 0 |
| 4:15 AM | 0 | 0 | -- | 0 | 0 |
| 4:30 AM | 0 | 0 | -- | 0 | 0 |
| 4:45 AM | 0 | 0 | -- | 0 | 0 |
| 5:00 AM | 1 | 0 | -- | 0 | 1 |
| 5:15 AM | 0 | 0 | -- | 1 | 1 |
| 5:30 AM | 0 | 0 | -- | 0 | 0 |
| 5:45 AM | 0 | 0 | -- | 0 | 0 |
| Count Total | 1 | 0 | -- | 1 | 2 |
| Peak Hour Total | 1 | 0 | -- | 1 | 2 |
| Peak Hour HV% | 20.0% | 0.0% | -- | 25.0% | 15.4% |

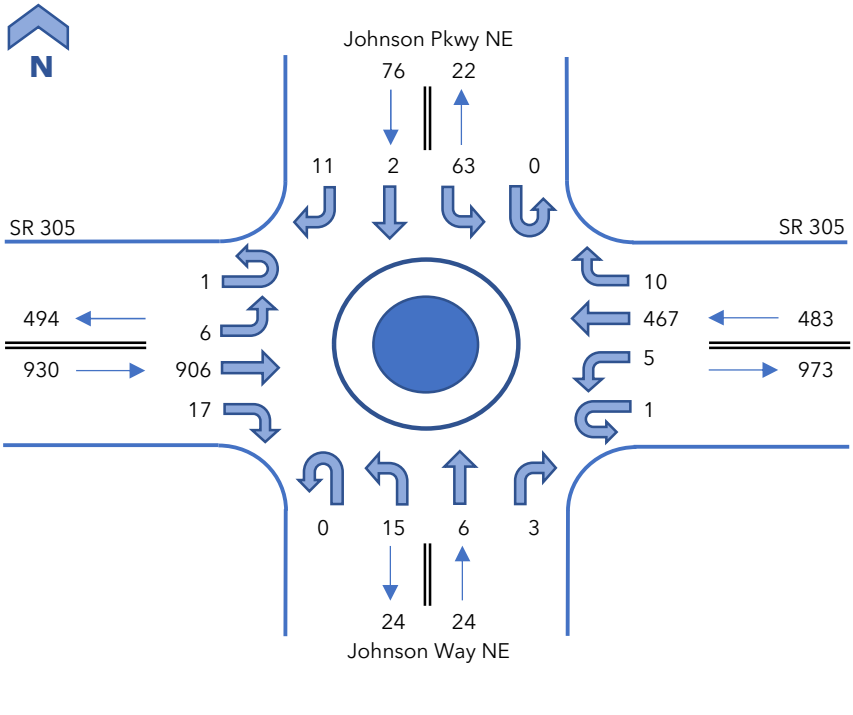
| Pedestrians (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |

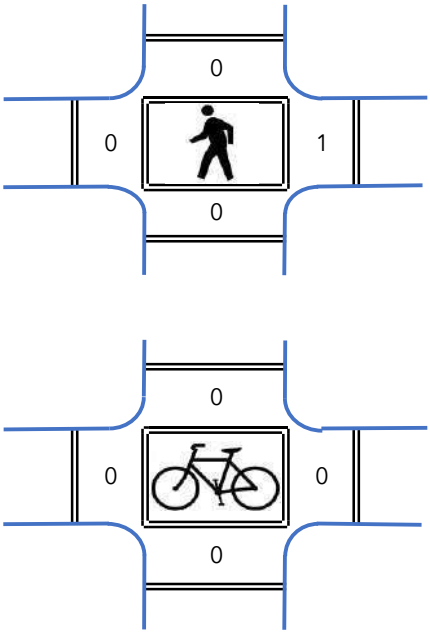
| Bicycles (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |

HEATH & ASSOCIATES
Transportation Planning & Engineering

**Date Collected:** 5/21/2025
**Day of the Week:** Wednesday
**Time Period:** 7:00 AM to 9:00 AM
**Peak Hour:** 7:00 AM to 8:00 AM

**SR 305 & Johnson Parkway NE**




| Interval Start Time | SR 305 Eastbound | | | | SR 305 Westbound | | | | Johnson Way NE Northbound | | | | Johnson Pkwy NE Southbound | | | | 15 Minute Totals | Hourly Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | | |
| 7:00 AM | 0 | 0 | 207 | 0 | 0 | 0 | 120 | 1 | 0 | 8 | 1 | 0 | 0 | 10 | 0 | 2 | 349 | |
| 7:15 AM | 0 | 5 | 271 | 4 | 0 | 1 | 100 | 4 | 0 | 2 | 0 | 2 | 0 | 16 | 0 | 1 | 406 | |
| 7:30 AM | 1 | 1 | 199 | 6 | 1 | 4 | 127 | 3 | 0 | 1 | 4 | 1 | 1 | 15 | 1 | 4 | 369 | |
| 7:45 AM | 0 | 0 | 229 | 7 | 0 | 0 | 120 | 2 | 0 | 4 | 1 | 0 | 0 | 22 | 1 | 4 | 390 | 1514 |
| 8:00 AM | 0 | 2 | 184 | 5 | 1 | 2 | 131 | 2 | 0 | 4 | 2 | 1 | 0 | 10 | 3 | 2 | 349 | 1514 |
| 8:15 AM | 1 | 1 | 187 | 6 | 1 | 1 | 136 | 1 | 0 | 4 | 2 | 1 | 0 | 2 | 1 | 2 | 346 | 1454 |
| 8:30 AM | 2 | 4 | 168 | 4 | 1 | 0 | 119 | 3 | 0 | 5 | 1 | 0 | 0 | 7 | 0 | 3 | 317 | 1402 |
| 8:45 AM | 0 | 2 | 158 | 5 | 0 | 3 | 165 | 4 | 0 | 4 | 2 | 0 | 0 | 2 | 0 | 5 | 350 | 1362 |
| Count Total | 4 | 15 | 1603 | 37 | 4 | 11 | 1018 | 20 | 0 | 32 | 13 | 5 | 1 | 84 | 6 | 23 | 2876 | -- |
| Peak Hour Total | 1 | 6 | 906 | 17 | 1 | 5 | 467 | 10 | 0 | 15 | 6 | 3 | 1 | 63 | 2 | 11 | 1514 | -- |
| PHF | 0.83 | | | | 0.89 | | | | 0.67 | | | | 0.71 | | | | 0.93 | -- |
| Heavy Vehicles | 0 | 1 | 70 | 2 | 0 | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 103 | -- |
| HV % | 0.0% | 16.7% | 7.7% | 11.8% | 0.0% | 0.0% | 5.8% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 100.0% | 3.2% | 0.0% | 0.0% | 6.8% | -- |

| Interval Start Time | Heavy Vehicles | | | | |
|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total |
| 7:00 AM | 7 | 6 | 0 | 0 | 13 |
| 7:15 AM | 11 | 8 | 0 | 0 | 19 |
| 7:30 AM | 18 | 6 | 0 | 2 | 26 |
| 7:45 AM | 25 | 7 | 0 | 1 | 33 |
| 8:00 AM | 19 | 5 | 0 | 0 | 24 |
| 8:15 AM | 15 | 6 | 2 | 1 | 24 |
| 8:30 AM | 20 | 8 | 0 | 2 | 30 |
| 8:45 AM | 15 | 11 | 0 | 0 | 26 |
| Count Total | 130 | 57 | 2 | 6 | 195 |
| Peak Hour Total | 73 | 27 | 0 | 3 | 103 |
| Peak Hour HV% | 7.8% | 5.6% | 0.0% | 3.9% | 6.8% |

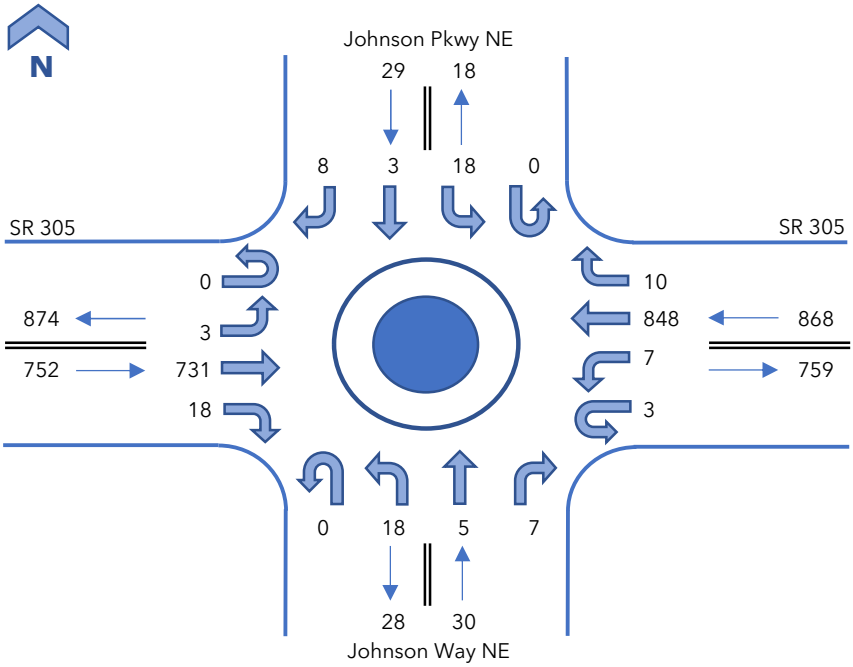
| Pedestrians (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 |
| 1 | 0 | 0 | 0 | 1 |

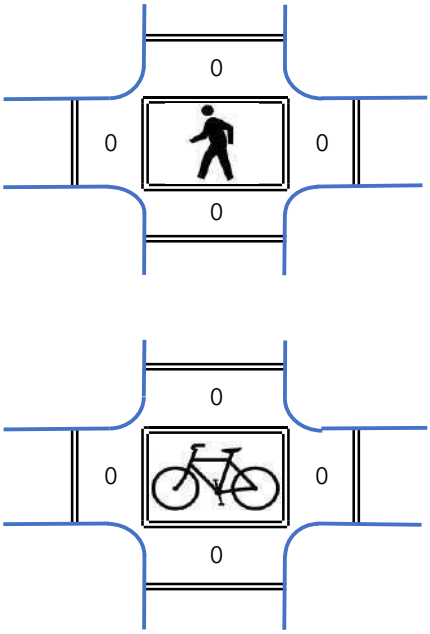
| Bicycles (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |

HEATH & ASSOCIATES
Transportation Planning & Engineering

**Date Collected:** 5/20/2025
**Day of the Week:** Tuesday
**Time Period:** 4:00 PM to 6:00 PM
**Peak Hour:** 4:15 PM to 5:15 PM

**SR 305 & Johnson Parkway NE**




| Interval Start Time | SR 305 Eastbound | | | | SR 305 Westbound | | | | Johnson Way NE Northbound | | | | Johnson Pkwy NE Southbound | | | | 15 Minute Totals | Hourly Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | | |
| 4:00 PM | 0 | 1 | 166 | 7 | 0 | 2 | 212 | 6 | 0 | 4 | 0 | 2 | 0 | 4 | 2 | 4 | 410 | |
| 4:15 PM | 0 | 2 | 186 | 3 | 0 | 1 | 244 | 0 | 0 | 5 | 1 | 1 | 0 | 3 | 2 | 2 | 450 | |
| 4:30 PM | 0 | 0 | 178 | 4 | 2 | 2 | 180 | 2 | 0 | 6 | 1 | 2 | 0 | 3 | 1 | 2 | 383 | |
| 4:45 PM | 0 | 0 | 179 | 7 | 0 | 0 | 219 | 5 | 0 | 2 | 1 | 3 | 0 | 8 | 0 | 3 | 427 | 1670 |
| 5:00 PM | 0 | 1 | 188 | 4 | 1 | 4 | 205 | 3 | 0 | 5 | 2 | 1 | 0 | 4 | 0 | 1 | 419 | 1679 |
| 5:15 PM | 1 | 3 | 171 | 3 | 0 | 0 | 211 | 1 | 0 | 7 | 1 | 0 | 0 | 6 | 1 | 3 | 408 | 1637 |
| 5:30 PM | 0 | 0 | 165 | 3 | 0 | 3 | 209 | 5 | 0 | 2 | 1 | 3 | 0 | 5 | 1 | 2 | 399 | 1653 |
| 5:45 PM | 0 | 1 | 136 | 4 | 0 | 1 | 224 | 2 | 0 | 11 | 2 | 3 | 0 | 1 | 0 | 3 | 388 | 1614 |
| Count Total | 1 | 8 | 1369 | 35 | 3 | 13 | 1704 | 24 | 0 | 42 | 9 | 15 | 0 | 34 | 7 | 20 | 3284 | -- |
| Peak Hour Total | 0 | 3 | 731 | 18 | 3 | 7 | 848 | 10 | 0 | 18 | 5 | 7 | 0 | 18 | 3 | 8 | 1679 | -- |
| PHF | 0.97 | | | | 0.89 | | | | 0.83 | | | | 0.66 | | | | 0.93 | -- |
| Heavy Vehicles | 0 | 0 | 11 | 0 | 0 | 0 | 26 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 41 | -- |
| HV % | 0.0% | 0.0% | 1.5% | 0.0% | 0.0% | 0.0% | 3.1% | 10.0% | 0.0% | 5.6% | 0.0% | 0.0% | 0.0% | 5.6% | 0.0% | 12.5% | 2.4% | -- |

| Interval Start Time | Heavy Vehicles | | | | |
|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total |
| 4:00 PM | 1 | 4 | 0 | 0 | 5 |
| 4:15 PM | 1 | 5 | 0 | 1 | 7 |
| 4:30 PM | 5 | 15 | 1 | 1 | 22 |
| 4:45 PM | 2 | 4 | 0 | 0 | 6 |
| 5:00 PM | 3 | 3 | 0 | 0 | 6 |
| 5:15 PM | 6 | 9 | 1 | 0 | 16 |
| 5:30 PM | 1 | 8 | 0 | 1 | 10 |
| 5:45 PM | 1 | 9 | 0 | 0 | 10 |
| Count Total | 20 | 57 | 2 | 3 | 82 |
| Peak Hour Total | 11 | 27 | 1 | 2 | 41 |
| Peak Hour HV% | 1.5% | 3.1% | 3.3% | 6.9% | 2.4% |

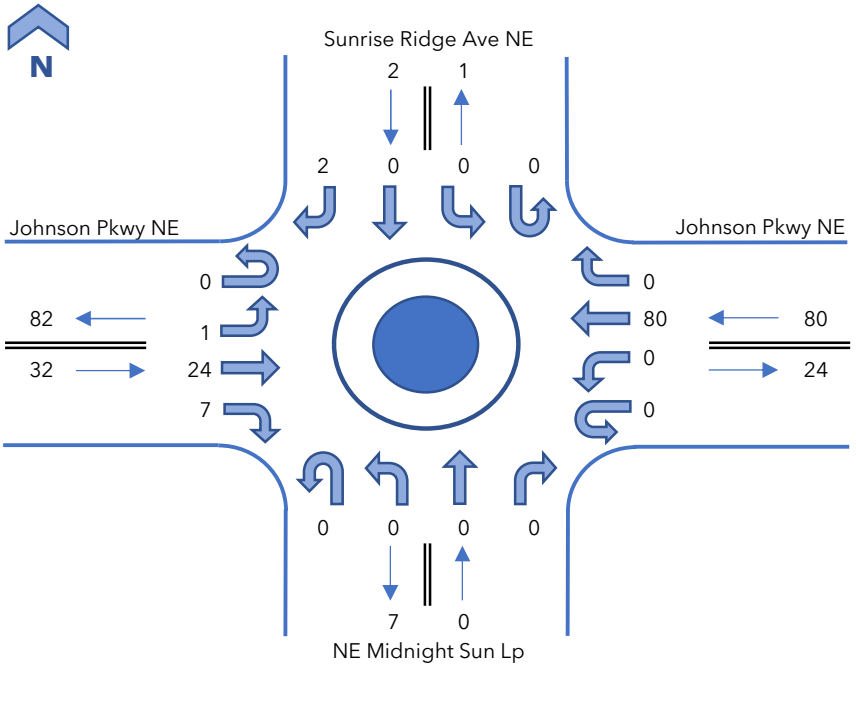
| Pedestrians (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |

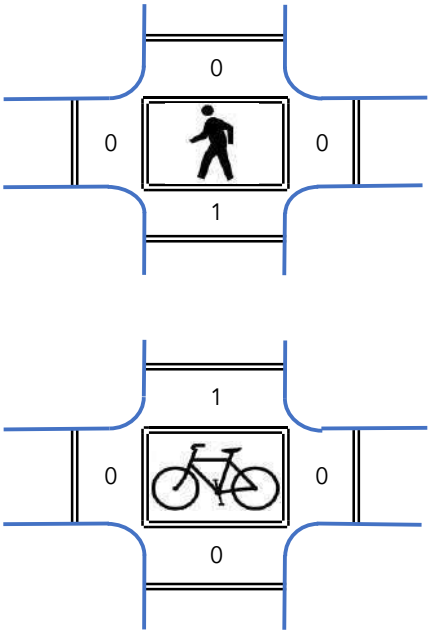
| Bicycles (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |

HEATH & ASSOCIATES
Transportation Planning & Engineering

**Date Collected:** 5/21/2025
**Day of the Week:** Wednesday
**Time Period:** 7:00 AM to 9:00 AM
**Peak Hour:** 7:15 AM to 8:15 AM

**Johnson Parkway NE & Sunrise Ridge NE**




| Interval Start Time | Johnson Pkwy NE Eastbound | | | | Johnson Pkwy NE Westbound | | | | NE Midnight Sun Lp Northbound | | | | Sunrise Ridge Ave NE Southbound | | | | 15 Minute Totals | Hourly Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | | |
| 7:00 AM | 0 | 0 | 2 | 0 | 0 | 0 | 12 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | |
| 7:15 AM | 0 | 0 | 7 | 4 | 0 | 0 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | |
| 7:30 AM | 0 | 1 | 9 | 1 | 0 | 0 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 34 | |
| 7:45 AM | 0 | 0 | 3 | 1 | 0 | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31 | 110 |
| 8:00 AM | 0 | 0 | 5 | 1 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 19 | 114 |
| 8:15 AM | 0 | 0 | 3 | 1 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 93 |
| 8:30 AM | 0 | 1 | 2 | 3 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 77 |
| 8:45 AM | 0 | 0 | 7 | 3 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 18 | 64 |
| Count Total | 0 | 2 | 38 | 14 | 0 | 0 | 113 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 3 | 174 | -- |
| Peak Hour Total | 0 | 1 | 24 | 7 | 0 | 0 | 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 114 | -- |
| PHF | 0.73 | | | | 0.74 | | | | #DIV/0! | | | | 0.50 | | | | 0.84 | -- |
| Heavy Vehicles | 0 | 0 | 1 | 1 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | -- |
| HV % | 0.0% | 0.0% | 4.2% | 14.3% | 0.0% | 0.0% | 5.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 5.3% | -- |

| Interval Start Time | Heavy Vehicles | | | | |
|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 1 | 2 | 0 | 0 | 3 |
| 7:45 AM | 0 | 2 | 0 | 0 | 2 |
| 8:00 AM | 1 | 0 | 0 | 0 | 1 |
| 8:15 AM | 0 | 0 | 1 | 0 | 1 |
| 8:30 AM | 1 | 2 | 0 | 0 | 3 |
| 8:45 AM | 2 | 0 | 0 | 0 | 2 |
| Count Total | 5 | 6 | 1 | 0 | 12 |
| Peak Hour Total | 2 | 4 | 0 | 0 | 6 |
| Peak Hour HV% | 6.3% | 5.0% | #DIV/0! | 0.0% | 5.3% |

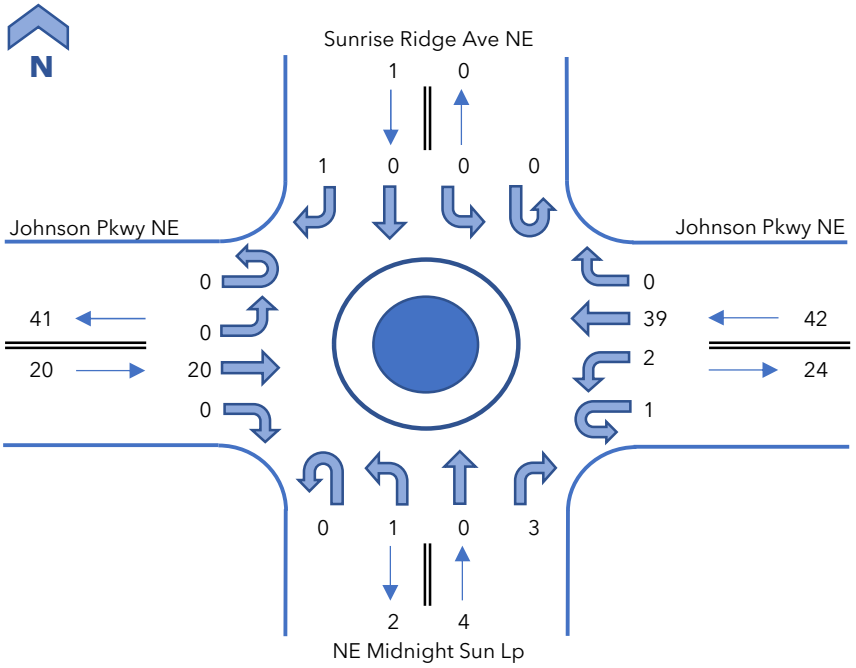
| Pedestrians (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 | 2 |
| 0 | 0 | 0 | 1 | 1 |

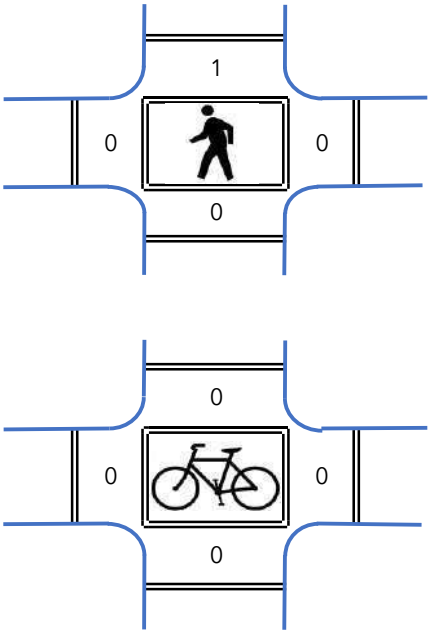
| Bicycles (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 1 | 0 | 1 |

HEATH&ASSOCIATES
Transportation Planning & Engineering

**Date Collected:** 5/20/2025
**Day of the Week:** Tuesday
**Time Period:** 4:00 PM to 6:00 PM
**Peak Hour:** 4:00 PM to 5:00 PM

**Johnson Parkway NE & Sunrise Ridge NE**




| Interval Start Time | Johnson Pkwy NE Eastbound | | | | Johnson Pkwy NE Westbound | | | | NE Midnight Sun Lp Northbound | | | | Sunrise Ridge Ave NE Southbound | | | | 15 Minute Totals | Hourly Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | | |
| 4:00 PM | 0 | 0 | 6 | 0 | 0 | 1 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | |
| 4:15 PM | 0 | 0 | 5 | 0 | 0 | 0 | 9 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 16 | |
| 4:30 PM | 0 | 0 | 3 | 0 | 1 | 1 | 9 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 16 | |
| 4:45 PM | 0 | 0 | 6 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 19 | 67 |
| 5:00 PM | 0 | 0 | 4 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 60 |
| 5:15 PM | 0 | 0 | 3 | 1 | 0 | 0 | 10 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 16 | 60 |
| 5:30 PM | 0 | 0 | 6 | 0 | 0 | 0 | 7 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 60 |
| 5:45 PM | 0 | 0 | 2 | 3 | 0 | 0 | 3 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 52 |
| Count Total | 0 | 0 | 35 | 4 | 1 | 2 | 64 | 1 | 0 | 7 | 0 | 3 | 0 | 0 | 0 | 2 | 119 | -- |
| Peak Hour Total | 0 | 0 | 20 | 0 | 1 | 2 | 39 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 1 | 67 | -- |
| PHF | 0.83 | | | | 0.88 | | | | 0.50 | | | | 0.25 | | | | 0.88 | -- |
| Heavy Vehicles | 0 | 0 | 2 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | -- |
| HV % | 0.0% | 0.0% | 10.0% | 0.0% | 0.0% | 0.0% | 10.3% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 9.0% | -- |

| Interval Start Time | Heavy Vehicles | | | | |
|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total |
| 4:00 PM | 0 | 1 | 0 | 0 | 1 |
| 4:15 PM | 1 | 2 | 0 | 0 | 3 |
| 4:30 PM | 1 | 1 | 0 | 0 | 2 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 2 | 0 | 1 | 0 | 3 |
| 5:30 PM | 0 | 0 | 1 | 0 | 1 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 |
| Count Total | 4 | 4 | 2 | 0 | 10 |
| Peak Hour Total | 2 | 4 | 0 | 0 | 6 |
| Peak Hour HV% | 10.0% | 9.5% | 0.0% | 0.0% | 9.0% |

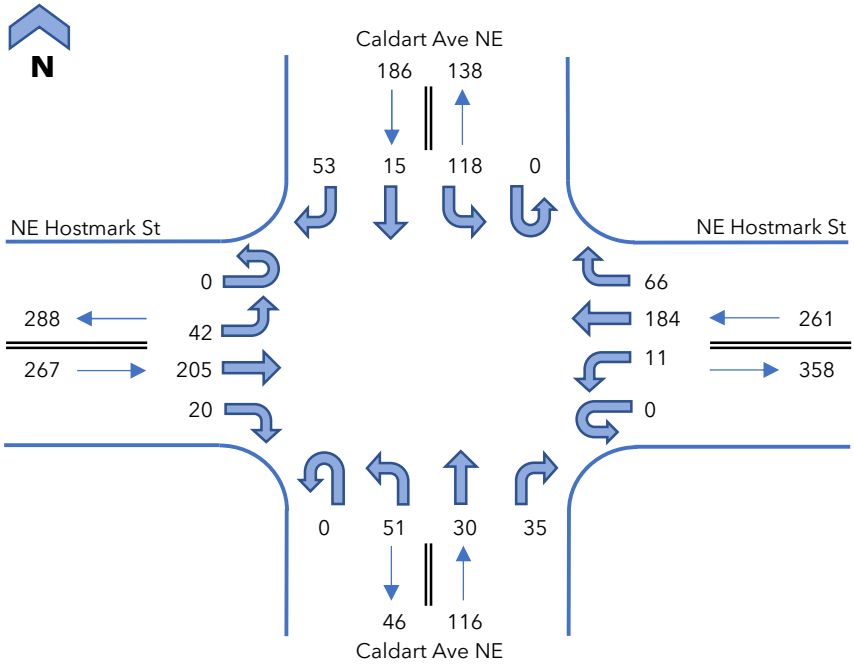
| Pedestrians (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 2 | 0 | 2 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 3 | 0 | 3 |
| 0 | 0 | 1 | 0 | 1 |

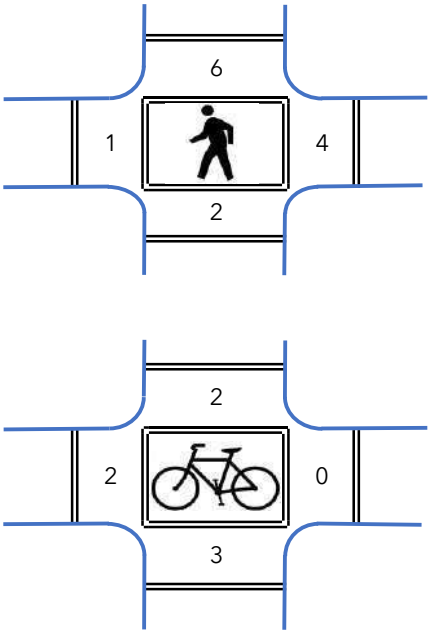
| Bicycles (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |

HEATH & ASSOCIATES
Transportation Planning & Engineering

**Date Collected:** 5/29/2025
**Day of the Week:** Thursday
**Time Period:** 7:00 AM to 9:00 AM
**Peak Hour:** 7:15 AM to 8:15 AM

**NE Hostmark Street & Caldart Avenue NE**




| Interval Start Time | NE Hostmark St Eastbound | | | | NE Hostmark St Westbound | | | | Caldart Ave NE Northbound | | | | Caldart Ave NE Southbound | | | | 15 Minute Totals | Hourly Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | | |
| 7:00 AM | 0 | 5 | 22 | 5 | 0 | 0 | 26 | 5 | 0 | 13 | 4 | 0 | 0 | 3 | 1 | 8 | 92 | |
| 7:15 AM | 0 | 8 | 57 | 10 | 0 | 1 | 37 | 5 | 0 | 16 | 3 | 1 | 0 | 26 | 1 | 18 | 183 | |
| 7:30 AM | 0 | 13 | 70 | 2 | 0 | 6 | 46 | 17 | 0 | 12 | 2 | 21 | 0 | 56 | 5 | 6 | 256 | |
| 7:45 AM | 0 | 14 | 53 | 4 | 0 | 3 | 67 | 37 | 0 | 15 | 20 | 13 | 0 | 32 | 2 | 18 | 278 | 809 |
| 8:00 AM | 0 | 7 | 25 | 4 | 0 | 1 | 34 | 7 | 0 | 8 | 5 | 0 | 0 | 4 | 7 | 11 | 113 | 830 |
| 8:15 AM | 0 | 5 | 15 | 4 | 0 | 0 | 23 | 1 | 0 | 23 | 5 | 2 | 0 | 8 | 2 | 11 | 99 | 746 |
| 8:30 AM | 0 | 4 | 29 | 6 | 0 | 0 | 11 | 4 | 0 | 8 | 4 | 0 | 0 | 9 | 7 | 9 | 91 | 581 |
| 8:45 AM | 0 | 6 | 14 | 6 | 0 | 1 | 23 | 6 | 0 | 13 | 5 | 3 | 0 | 14 | 9 | 13 | 113 | 416 |
| Count Total | 0 | 62 | 285 | 41 | 0 | 12 | 267 | 82 | 0 | 108 | 48 | 40 | 0 | 152 | 34 | 94 | 1225 | -- |
| Peak Hour Total | 0 | 42 | 205 | 20 | 0 | 11 | 184 | 66 | 0 | 51 | 30 | 35 | 0 | 118 | 15 | 53 | 830 | -- |
| PHF | 0.79 | | | | 0.61 | | | | 0.60 | | | | 0.69 | | | | 0.75 | -- |
| Heavy Vehicles | 0 | 0 | 12 | 1 | 0 | 0 | 13 | 0 | 0 | 0 | 1 | 2 | 0 | 9 | 0 | 2 | 40 | -- |
| HV % | 0.0% | 0.0% | 5.9% | 5.0% | 0.0% | 0.0% | 7.1% | 0.0% | 0.0% | 0.0% | 3.3% | 5.7% | 0.0% | 7.6% | 0.0% | 3.8% | 4.8% | -- |

| Interval Start Time | Heavy Vehicles | | | | |
|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total |
| 7:00 AM | 2 | 1 | 0 | 0 | 3 |
| 7:15 AM | 8 | 4 | 1 | 4 | 17 |
| 7:30 AM | 4 | 4 | 1 | 6 | 15 |
| 7:45 AM | 0 | 2 | 1 | 1 | 4 |
| 8:00 AM | 1 | 3 | 0 | 0 | 4 |
| 8:15 AM | 1 | 2 | 1 | 0 | 4 |
| 8:30 AM | 2 | 1 | 0 | 1 | 4 |
| 8:45 AM | 3 | 0 | 0 | 1 | 4 |
| Count Total | 21 | 17 | 4 | 13 | 55 |
| Peak Hour Total | 13 | 13 | 3 | 11 | 40 |
| Peak Hour HV% | 4.9% | 5.0% | 2.6% | 5.9% | 4.8% |

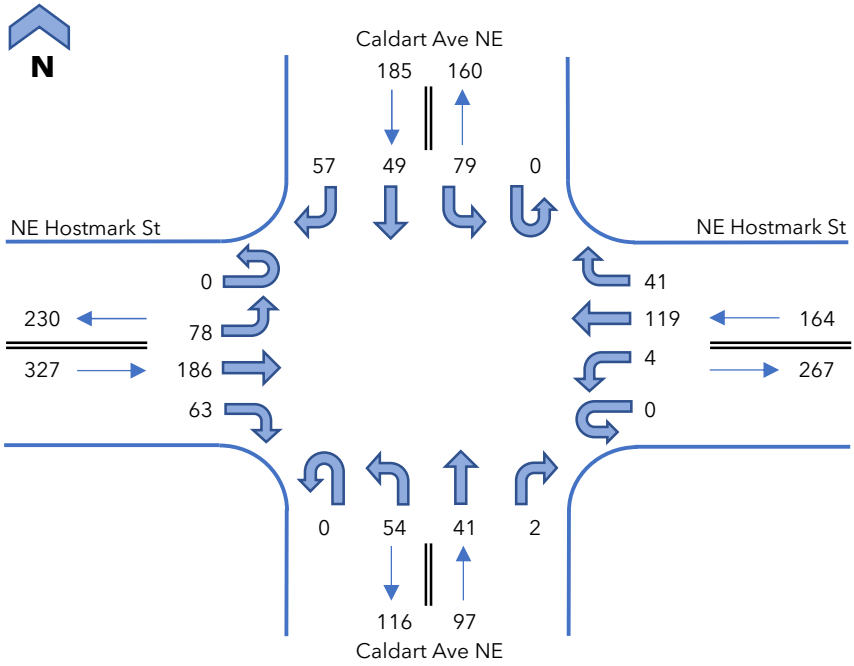
| Pedestrians (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 1 | 1 |
| 1 | 0 | 1 | 0 | 2 |
| 2 | 0 | 1 | 1 | 4 |
| 1 | 1 | 3 | 1 | 6 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 2 | 1 | 0 | 3 | 6 |
| 0 | 0 | 0 | 0 | 0 |
| 6 | 2 | 6 | 6 | 20 |
| 4 | 1 | 6 | 2 | 13 |

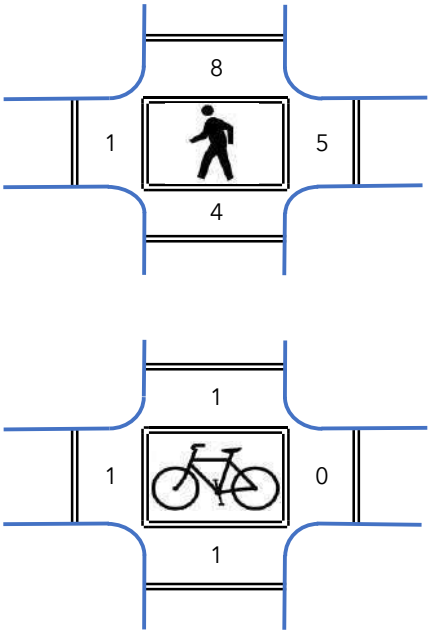
| Bicycles (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 2 | 1 | 2 | 5 |
| 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 2 | 2 | 3 | 7 |
| 0 | 2 | 2 | 3 | 7 |

HEATH & ASSOCIATES
Transportation Planning & Engineering

**Date Collected:** 5/29/2025
**Day of the Week:** Thursday
**Time Period:** 4:00 PM to 6:00 PM
**Peak Hour:** 4:45 PM to 5:45 PM

**NE Hostmark Street & Caldart Avenue NE**




| Interval Start Time | NE Hostmark St Eastbound | | | | NE Hostmark St Westbound | | | | Caldart Ave NE Northbound | | | | Caldart Ave NE Southbound | | | | 15 Minute Totals | Hourly Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | | |
| 4:00 PM | 0 | 8 | 37 | 21 | 0 | 2 | 48 | 12 | 0 | 21 | 12 | 2 | 0 | 19 | 9 | 14 | 205 | |
| 4:15 PM | 0 | 10 | 35 | 16 | 0 | 0 | 37 | 17 | 0 | 17 | 16 | 1 | 0 | 8 | 7 | 15 | 179 | |
| 4:30 PM | 0 | 8 | 54 | 12 | 0 | 0 | 22 | 13 | 0 | 11 | 7 | 0 | 0 | 15 | 8 | 10 | 160 | |
| 4:45 PM | 0 | 17 | 64 | 14 | 0 | 1 | 24 | 8 | 0 | 11 | 8 | 1 | 0 | 41 | 19 | 14 | 222 | 766 |
| 5:00 PM | 0 | 16 | 37 | 22 | 0 | 3 | 40 | 14 | 0 | 15 | 12 | 0 | 0 | 21 | 11 | 14 | 205 | 766 |
| 5:15 PM | 0 | 21 | 40 | 17 | 0 | 0 | 26 | 10 | 0 | 13 | 13 | 0 | 0 | 6 | 10 | 14 | 170 | 757 |
| 5:30 PM | 0 | 24 | 45 | 10 | 0 | 0 | 29 | 9 | 0 | 15 | 8 | 1 | 0 | 11 | 9 | 15 | 176 | 773 |
| 5:45 PM | 0 | 22 | 27 | 7 | 0 | 1 | 18 | 4 | 0 | 7 | 9 | 2 | 0 | 7 | 7 | 13 | 124 | 675 |
| Count Total | 0 | 126 | 339 | 119 | 0 | 7 | 244 | 87 | 0 | 110 | 85 | 7 | 0 | 128 | 80 | 109 | 1441 | -- |
| Peak Hour Total | 0 | 78 | 186 | 63 | 0 | 4 | 119 | 41 | 0 | 54 | 41 | 2 | 0 | 79 | 49 | 57 | 773 | -- |
| PHF | 0.86 | | | | 0.72 | | | | 0.90 | | | | 0.63 | | | | 0.87 | -- |
| Heavy Vehicles | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 6 | -- |
| HV % | 0.0% | 2.6% | 0.5% | 0.0% | 0.0% | 0.0% | 0.0% | 2.4% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 3.5% | 0.8% | -- |

| Interval Start Time | Heavy Vehicles | | | | |
|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total |
| 4:00 PM | 0 | 1 | 0 | 1 | 2 |
| 4:15 PM | 0 | 0 | 1 | 1 | 2 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 2 | 1 | 0 | 0 | 3 |
| 5:00 PM | 0 | 0 | 0 | 1 | 1 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 1 | 0 | 0 | 1 | 2 |
| 5:45 PM | 2 | 0 | 0 | 0 | 2 |
| Count Total | 5 | 2 | 1 | 4 | 12 |
| Peak Hour Total | 3 | 1 | 0 | 2 | 6 |
| Peak Hour HV% | 0.9% | 0.6% | 0.0% | 1.1% | 0.8% |

| Pedestrians (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 1 | 0 | 2 | 1 | 4 |
| 0 | 0 | 5 | 0 | 5 |
| 3 | 0 | 2 | 0 | 5 |
| 2 | 1 | 2 | 0 | 5 |
| 0 | 0 | 2 | 2 | 4 |
| 1 | 0 | 1 | 2 | 4 |
| 2 | 0 | 3 | 0 | 5 |
| 0 | 0 | 0 | 0 | 0 |
| 9 | 1 | 17 | 5 | 32 |
| 5 | 1 | 8 | 4 | 18 |

| Bicycles (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 2 | 2 |
| 0 | 1 | 0 | 0 | 1 |
| 1 | 2 | 1 | 1 | 5 |
| 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 0 | 0 | 1 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 4 | 2 | 4 | 11 |
| 0 | 1 | 1 | 1 | 3 |

# THE PINNACLE AT LIBERTY BAY
# TRAFFIC IMPACT ANALYSIS

*APPENDIX*
*ITE Sheets*

# Single-Family Detached Housing
(210)

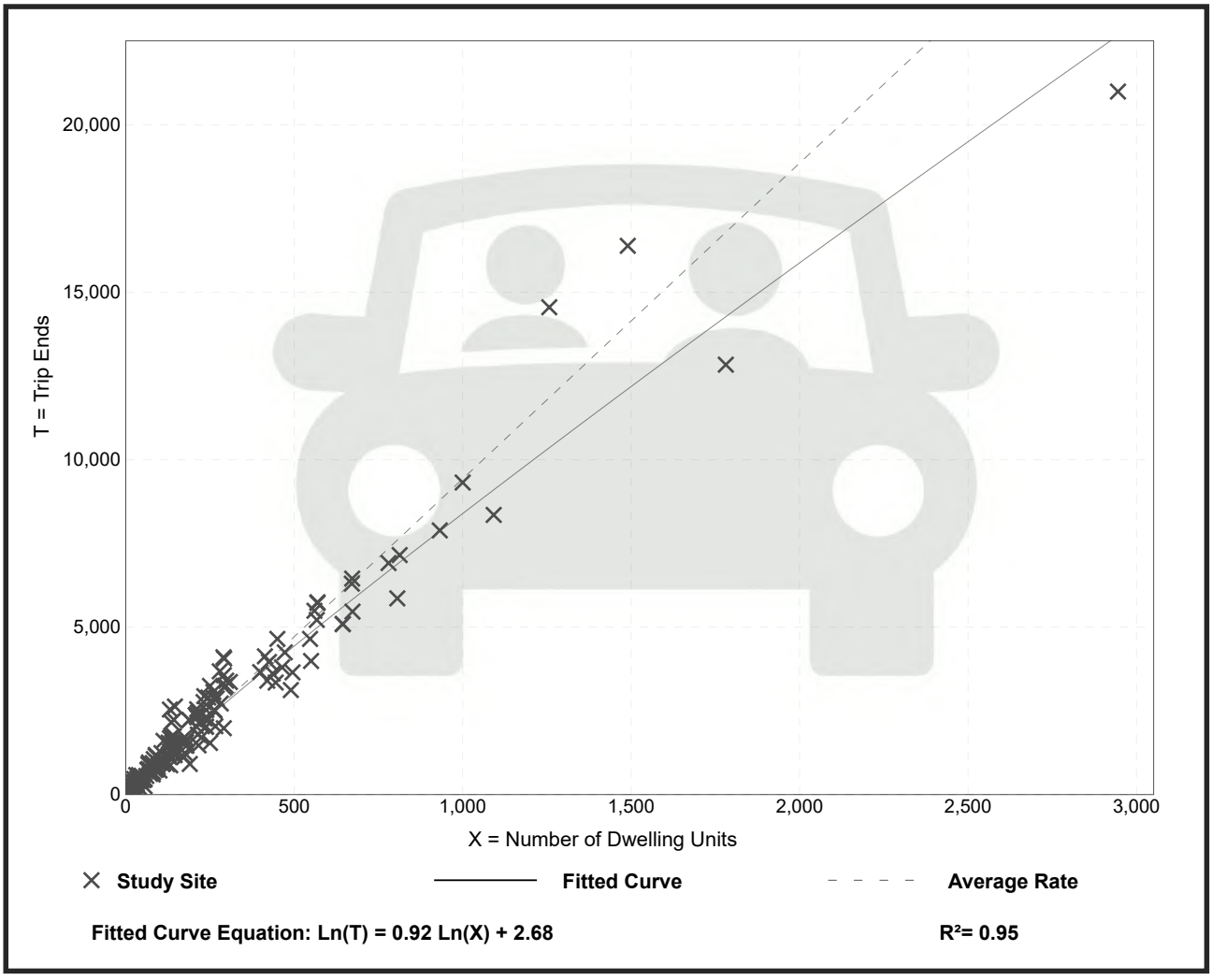
**Vehicle Trip Ends vs:** **Dwelling Units**
**On a:** **Weekday**

**Setting/Location:** **General Urban/Suburban**
Number of Studies: 174
Avg. Num. of Dwelling Units: 246
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 9.43 | 4.45 - 22.61 | 2.13 |

## Data Plot and Equation




*Trip Gen Manual,* 11th Edition ● Institute of Transportation Engineers

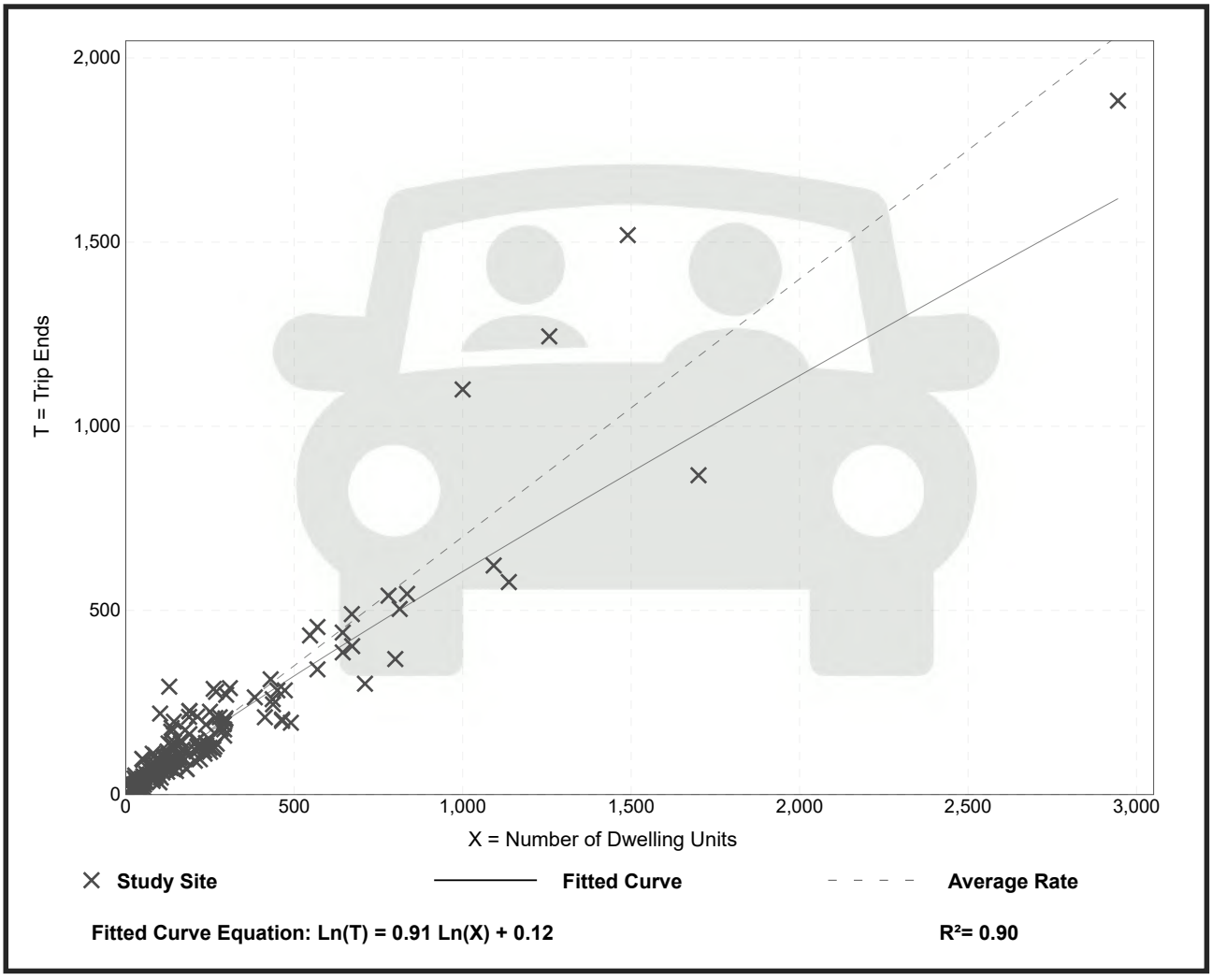
# Single-Family Detached Housing
(210)

**Vehicle Trip Ends vs:** **Dwelling Units**
**On a:** **Weekday,**
**Peak Hour of Adjacent Street Traffic,**
**One Hour Between 7 and 9 a.m.**
**Setting/Location:** **General Urban/Suburban**
Number of Studies: 192
Avg. Num. of Dwelling Units: 226
Directional Distribution: 25% entering, 75% exiting

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 0.70 | 0.27 - 2.27 | 0.24 |

## Data Plot and Equation




*Trip Gen Manual,* 11th Edition ● Institute of Transportation Engineers

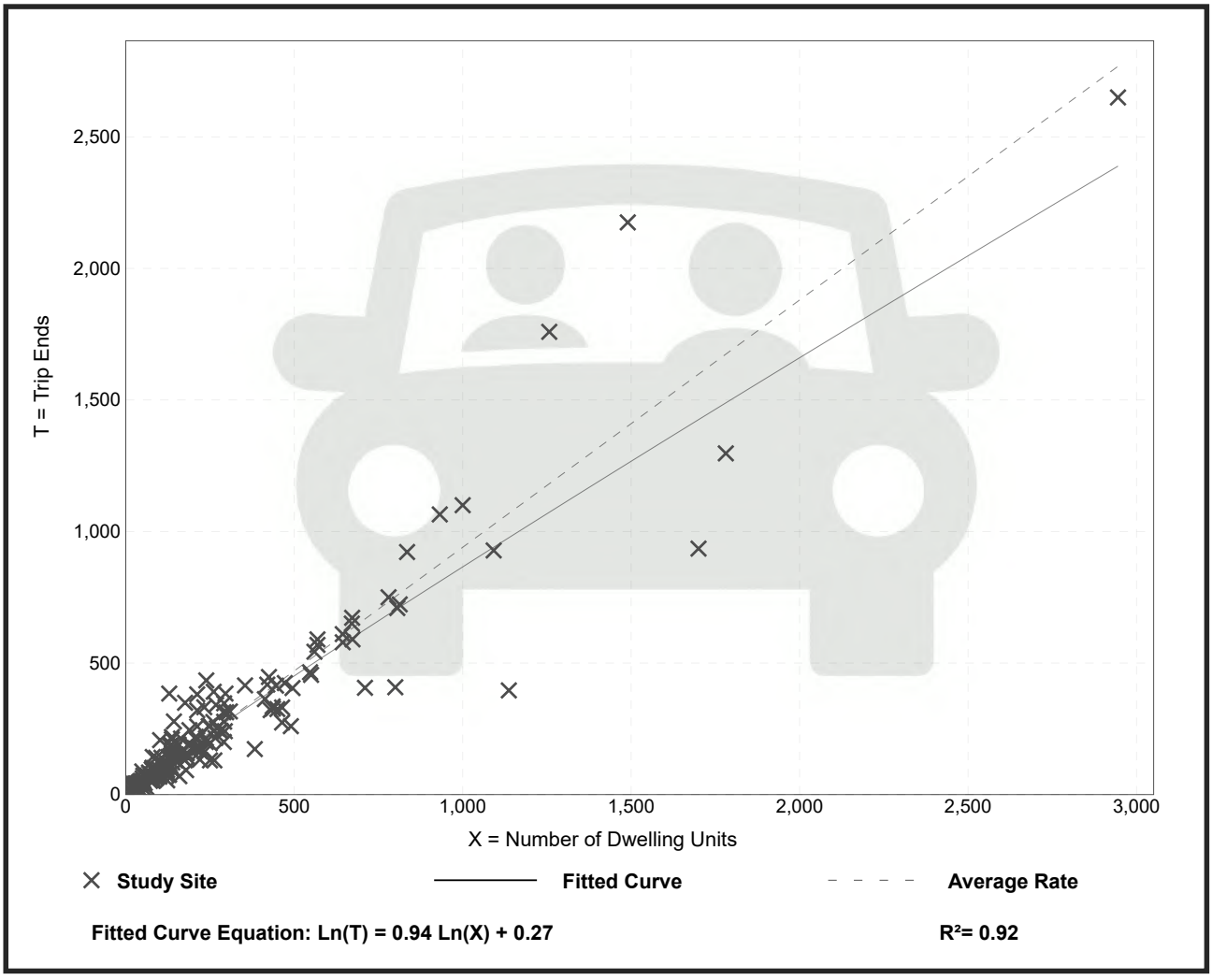
# Single-Family Detached Housing
(210)

**Vehicle Trip Ends vs:** **Dwelling Units**
**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: 208
Avg. Num. of Dwelling Units: 248
Directional Distribution: 63% entering, 37% exiting

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 0.94 | 0.35 - 2.98 | 0.31 |

## Data Plot and Equation




*Trip Gen Manual,* 11th Edition ● Institute of Transportation Engineers

# THE PINNACLE AT LIBERTY BAY TRAFFIC IMPACT ANALYSIS

*APPENDIX*
*PM Pipeline Volumes*

*Heath & Associates, Inc.*
*Pipeline Volumes - Pinnacle at Liberty Bay*

## 1. SR 305 & Hostmark

**PM Peak Hour**
**Pipeline Volume Summations**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Aktiv Mixed Use | | 5 | | | | | | 2 | | | | 1 |
| 2. Sandstone Ridge | | | | | 2 | 1 | 2 | | | | 3 | |
| 3. Audrey Estates | | 7 | | | 1 | | | 4 | | | 2 | |
| Totals | 0 | 12 | 0 | 0 | 3 | 1 | 2 | 6 | 0 | 0 | 5 | 1 |

## 2. 305 & Baywatch

**PM Peak Hour**
**Pipeline Volume Summations**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Aktiv Mixed Use | | | | | 3 | | | | | | 2 | |
| 2. Sandstone Ridge | | | | | 2 | | | | | | 1 | |
| 3. Audrey Estates | | | | | 4 | | | | | | 7 | |
| Totals | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 10 | 0 |

## 3. SR 305 & Johnson

**PM Peak Hour**
**Pipeline Volume Summations**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Aktiv Mixed Use | | | | | 3 | | | | | | 2 | |
| 2. Sandstone Ridge | | | | | 2 | | | | | | 1 | |
| 3. Audrey Estates | 4 | | 9 | 14 | | | | | | | | 7 |
| Totals | 4 | 0 | 9 | 14 | 5 | 0 | 0 | 0 | 0 | 0 | 3 | 7 |

## 4. Johnson & Sunrise

**PM Peak Hour**
**Pipeline Volume Summations**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Aktiv Mixed Use | | | | | | | | | | | | |
| 2. Sandstone Ridge | | | | | | | | | | | | |
| 3. Audrey Estates | 14 | | | | | | | | 21 | 13 | | 8 |
| Totals | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 13 | 0 | 8 |

## 5. Sunrise & Crystallia

**PM Peak Hour**
**Pipeline Volume Summations**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Aktiv Mixed Use | | | | | | | | | | | | |
| 2. Sandstone Ridge | | | | | | | | | | | | |
| 3. Audrey Estates | | | | | | | | | | | | |
| Totals | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

### 6. Hostmark & Caldart

**PM Peak Hour**
**Pipeline Volume Summations**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Aktiv Mixed Use | | | | | | | | | | | | |
| 2. Sandstone Ridge | | | | | 3 | | | | | | 5 | |
| 3. Audrey Estates | | | 7 | 5 | 1 | | | | | | 2 | |
| Totals | 0 | 0 | 7 | 5 | 4 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |

### 7. Caldart & Sunrise

**PM Peak Hour**
**Pipeline Volume Summations**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Aktiv Mixed Use | | | | | | | | | | | | |
| 2. Sandstone Ridge | | | | | | | | | | | | |
| 3. Audrey Estates | | | | | | | | | | | | |
| Totals | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

### 8. 305 & Lincoln

**PM Peak Hour**
**Pipeline Volume Summations**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Aktiv Mixed Use | | 4 | | | | 1 | | 3 | | | | |
| 2. Sandstone Ridge | | | 23 | 14 | 1 | | | | | | 3 | |
| 3. Audrey Estates | | 7 | 3 | 2 | | | | 4 | | | | |
| Totals | 0 | 11 | 26 | 16 | 1 | 1 | 0 | 7 | 0 | 0 | 3 | 0 |

### 9. 305 & Liberty

**PM Peak Hour**
**Pipeline Volume Summations**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Aktiv Mixed Use | | 4 | | | | | | 3 | | | | |
| 2. Sandstone Ridge | | 22 | | | | | | 13 | 1 | 1 | | |
| 3. Audrey Estates | | 9 | | | | | | 6 | | 1 | | |
| Totals | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 22 | 1 | 2 | 0 | 0 |

### 10. 305 & Forest

**PM Peak Hour**
**Pipeline Volume Summations**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Aktiv Mixed Use | | 4 | | | | | | 3 | | | | |
| 2. Sandstone Ridge | | 22 | | | | | | 13 | | | | |
| 3. Audrey Estates | | 9 | | | | | | 6 | | | | |
| Totals | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 0 | 0 |

### 11. 305 & Bond

**PM Peak Hour**
**Pipeline Volume Summations**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Aktiv Mixed Use | | 3 | | | | 1 | | 3 | | | | |
| 2. Sandstone Ridge | | 15 | | | | 2 | 2 | 9 | 2 | 5 | | |
| 3. Audrey Estates | | 6 | | | | 1 | 1 | 4 | 1 | 2 | | |
| Totals | 0 | 24 | 0 | 0 | 0 | 4 | 3 | 16 | 3 | 7 | 0 | 0 |

### 12. Hostmak & 6th

**PM Peak Hour**
**Pipeline Volume Summations**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Aktiv Mixed Use | | | | | | | | | 1 | | 2 | |
| 2. Sandstone Ridge | | | | | | 2 | 3 | | | | | |
| 3. Audrey Estates | | | | | 1 | | | | | | 2 | |
| Totals | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 0 | 1 | 0 | 4 | 0 |

### 13. Hostmark & Lincoln

**PM Peak Hour**
**Pipeline Volume Summations**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Aktiv Mixed Use | | | | | 1 | | | | | | 2 | |
| 2. Sandstone Ridge | 1 | | | | | | | | | | | 3 |
| 3. Audrey Estates | | | | | 1 | | | | | | 2 | |
| Totals | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 4 | 3 |

### 14. Hostmark & 4th

**PM Peak Hour**
**Pipeline Volume Summations**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Aktiv Mixed Use | | | | | 1 | | | | | | 2 | |
| 2. Sandstone Ridge | | | | | 1 | | | | | | 3 | |
| 3. Audrey Estates | | | | | 1 | | | | | | 2 | |
| Totals | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |

### 15. Front & Sunset

**PM Peak Hour**
**Pipeline Volume Summations**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Aktiv Mixed Use | | 2 | | | | | | 1 | | | | |
| 2. Sandstone Ridge | | 3 | | | | | | 1 | | | | |
| 3. Audrey Estates | | 2 | | | | | | 1 | | | | |
| Totals | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 |

# THE PINNACLE AT LIBERTY BAY TRAFFIC IMPACT ANALYSIS

*APPENDIX*
*2032 Forecast Excel*

*Heath & Associates, Inc*
*Pinnacle Bay TIA 10-2-26*

## AM Peak Hour Forecast Intersection Volumes

** 0.5% GR along SR 305 (NB-T/SB-T) / 2.0 all other roadways*

Annual Growth Rate: 2 % 0.5 % 2032
# of Years to Horizon: 7

**1. SR 305 & Hostmark**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 18 | 847 | 182 | 131 | 75 | 46 | 18 | 469 | 40 | 57 | 94 | 33 |
| Project Trips | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 18 | 14 | 5 | 0 | 0 |
| Pipeline | 0 | 2 | 1 | 1 | 3 | 2 | 0 | 4 | 1 | 1 | 0 | 1 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 21 | 879 | 208 | 150 | 89 | 54 | 21 | 489 | 47 | 66 | 107 | 39 |
| With | 21 | 886 | 208 | 150 | 89 | 54 | 21 | 507 | 61 | 71 | 107 | 39 |

**2. SR 305 & Baywatch**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 3 | 0 | 2 | 1 | 493 | 0 | 0 | 0 | 0 | 0 | 928 | 0 |
| Project Trips | 0 | 0 | 0 | 0 | 32 | 0 | 0 | 0 | 0 | 0 | 12 | 0 |
| Pipeline | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 3 | 0 | 2 | 1 | 515 | 0 | 0 | 0 | 0 | 0 | 967 | 0 |
| With | 3 | 0 | 2 | 1 | 547 | 0 | 0 | 0 | 0 | 0 | 979 | 0 |

**3. SR 305 & Johnson**

| | SBR | SBT | SBL | SBU | WBR | WBT | WBL | WBU | NBR | NBT | NBL | NBU | EBR | EBT | EBL | EBU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 11 | 2 | 63 | 0 | 10 | 467 | 5 | 1 | 3 | 6 | 15 | 0 | 17 | 906 | 6 | 1 |
| Project Trips | 32 | 0 | 28 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0 |
| Pipeline | 3 | 0 | 13 | 0 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 2 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 16 | 2 | 85 | 0 | 15 | 485 | 6 | 1 | 3 | 7 | 17 | 0 | 19 | 943 | 9 | 1 |
| With | 48 | 2 | 113 | 0 | 25 | 485 | 6 | 1 | 3 | 7 | 17 | 0 | 19 | 943 | 21 | 1 |

**4. Johnson & Sunrise Ridge**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 0 | 80 | 0 | 0 | 0 | 0 | 7 | 24 | 1 | 2 | 0 | 0 |
| Project Trips | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 60 | 0 | 4 |
| Pipeline | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 16 | 0 | 15 |
| Traffic Redist. | 0 | -18 | 0 | 0 | 0 | 0 | 0 | -5 | 5 | 18 | 0 | 0 |
| Without | 5 | 91 | 0 | 0 | 0 | 0 | 8 | 27 | 7 | 18 | 0 | 15 |
| With | 6 | 73 | 0 | 0 | 0 | 0 | 8 | 22 | 34 | 96 | 0 | 19 |

**5. Sunrise Ridge & Crystallia**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Project Trips | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 64 | 0 | 7 |
| Pipeline | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 |
| Traffic Redist. | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 |
| Without | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 6 |
| With | 5 | 19 | 0 | 0 | 0 | 0 | 0 | 8 | 23 | 64 | 0 | 13 |

**6. Hostmark & Caldart**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 53 | 15 | 118 | 66 | 184 | 11 | 35 | 30 | 51 | 20 | 205 | 42 |
| Project Trips | 0 | 1 | 0 | 0 | 0 | 2 | 4 | 3 | 0 | 0 | 0 | 0 |
| Pipeline | 0 | 0 | 3 | 8 | 6 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Traffic Redist. | 0 | 9 | -9 | -2 | -3 | 9 | 0 | 2 | 3 | 0 | 0 | 0 |
| Without | 60 | 17 | 138 | 83 | 216 | 13 | 40 | 34 | 58 | 23 | 236 | 48 |
| With | 60 | 27 | 129 | 81 | 213 | 24 | 44 | 39 | 61 | 23 | 236 | 48 |

**7. Caldart & Sunrise**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 0 | 0 | 0 | 0 | 50 | 5 | 20 | 0 | 45 | 15 | 30 | 0 |
| Project Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 3 | 0 | 0 |
| Pipeline | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 18 | 0 | 0 |
| Without | 0 | 0 | 0 | 0 | 57 | 6 | 23 | 0 | 51 | 17 | 34 | 0 |
| With | 0 | 0 | 0 | 0 | 57 | 6 | 23 | 0 | 63 | 38 | 34 | 0 |

*Heath & Associates, Inc*
*Pinnacle Bay TIA 10-2-26*

## PM Peak Hour Forecast Intersection Volumes

** 0.5% GR along SR 305 (NB-T/SB-T) / 2.0 all other roadways*

Annual Growth Rate: 2 % 0.5 % 2032
# of Years to Horizon: 7

**1. SR 305 & Hostmark**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 45 | 628 | 191 | 200 | 111 | 47 | 30 | 788 | 108 | 89 | 152 | 61 |
| Project Trips | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 12 | 10 | 16 | 0 | 0 |
| Pipeline | 0 | 12 | 0 | 0 | 3 | 1 | 2 | 6 | 0 | 0 | 5 | 1 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 51 | 662 | 218 | 228 | 130 | 55 | 36 | 822 | 123 | 101 | 178 | 71 |
| With | 51 | 682 | 218 | 228 | 130 | 55 | 36 | 834 | 133 | 117 | 178 | 71 |

**2. SR 305 & Baywatch**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 3 | 0 | 1 | 4 | 870 | 0 | 0 | 0 | 0 | 0 | 751 | 5 |
| Project Trips | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 0 | 0 | 0 | 36 | 0 |
| Pipeline | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 10 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 3 | 0 | 1 | 5 | 909 | 0 | 0 | 0 | 0 | 0 | 787 | 6 |
| With | 3 | 0 | 1 | 5 | 931 | 0 | 0 | 0 | 0 | 0 | 823 | 6 |

**3. SR 305 & Johnson**

| | SBR | SBT | SBL | SBU | WBR | WBT | WBL | WBU | NBR | NBT | NBL | NBU | EBR | EBT | EBL | EBU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 8 | 3 | 18 | 0 | 10 | 848 | 7 | 3 | 7 | 5 | 18 | 0 | 18 | 731 | 3 | 0 |
| Project Trips | 22 | 0 | 19 | 0 | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36 | 0 |
| Pipeline | 4 | 0 | 9 | 0 | 14 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 7 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 13 | 3 | 30 | 0 | 25 | 883 | 8 | 3 | 8 | 6 | 21 | 0 | 21 | 760 | 10 | 0 |
| With | 35 | 3 | 49 | 0 | 57 | 883 | 8 | 3 | 8 | 6 | 21 | 0 | 21 | 760 | 46 | 0 |

**4. Johnson & Sunrise Ridge**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 0 | 32 | 2 | 3 | 0 | 1 | 0 | 20 | 0 | 1 | 0 | 0 |
| Project Trips | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 68 | 41 | 0 | 2 |
| Pipeline | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 13 | 0 | 8 |
| Traffic Redist. | 0 | -9 | 0 | 0 | 0 | 0 | 0 | -5 | 5 | 9 | 0 | 0 |
| Without | 14 | 36 | 2 | 3 | 0 | 1 | 0 | 23 | 21 | 14 | 0 | 8 |
| With | 18 | 27 | 2 | 3 | 0 | 1 | 0 | 18 | 94 | 64 | 0 | 10 |

**5. Sunrise Ridge & Crystallia**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Project Trips | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 72 | 43 | 0 | 5 |
| Pipeline | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Traffic Redist. | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 |
| Without | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| With | 13 | 9 | 0 | 0 | 0 | 0 | 0 | 5 | 72 | 43 | 0 | 8 |

**6. Hostmark & Caldart**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 57 | 49 | 79 | 41 | 119 | 4 | 2 | 41 | 54 | 63 | 186 | 78 |
| Project Trips | 0 | 4 | 0 | 0 | 0 | 4 | 3 | 2 | 0 | 0 | 0 | 0 |
| Pipeline | 0 | 0 | 7 | 5 | 4 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Traffic Redist. | 0 | 5 | -5 | -2 | -3 | 4 | 0 | 2 | 3 | 0 | 0 | 0 |
| Without | 65 | 56 | 97 | 52 | 140 | 5 | 2 | 47 | 62 | 72 | 219 | 89 |
| With | 65 | 65 | 92 | 50 | 137 | 13 | 5 | 51 | 65 | 72 | 219 | 89 |

**7. Caldart & Sunrise**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 0 | 0 | 0 | 0 | 50 | 20 | 15 | 0 | 30 | 45 | 50 | 0 |
| Project Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 8 | 0 | 0 |
| Pipeline | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 9 | 0 | 0 |
| Without | 0 | 0 | 0 | 0 | 57 | 23 | 17 | 0 | 34 | 51 | 57 | 0 |
| With | 0 | 0 | 0 | 0 | 57 | 23 | 17 | 0 | 44 | 68 | 57 | 0 |

**8. SR 305 & Lincoln**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 73 | 667 | 161 | 198 | 203 | 109 | 114 | 975 | 104 | 99 | 229 | 57 |
| Project Trips | 0 | 12 | 0 | 0 | 0 | 4 | 2 | 7 | 3 | 4 | 0 | 0 |
| Pipeline | 0 | 11 | 26 | 16 | 1 | 1 | 0 | 7 | 0 | 0 | 3 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 83 | 701 | 210 | 242 | 232 | 125 | 130 | 1,016 | 119 | 113 | 264 | 65 |
| With | 83 | 713 | 210 | 242 | 232 | 129 | 132 | 1,023 | 122 | 117 | 264 | 65 |

**9. SR 305 & Liberty**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 47 | 788 | 68 | 57 | 57 | 42 | 73 | 1106 | 52 | 52 | 68 | 88 |
| Project Trips | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 2 | 0 | 0 |
| Pipeline | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 22 | 1 | 2 | 0 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 54 | 851 | 78 | 65 | 65 | 48 | 83 | 1,167 | 60 | 61 | 78 | 100 |
| With | 54 | 861 | 78 | 65 | 65 | 48 | 83 | 1,173 | 61 | 63 | 78 | 100 |

**10. SR 305 & Forest Rock**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 151 | 879 | 270 | 296 | 21 | 26 | 52 | 1197 | 5 | 5 | 42 | 229 |
| Project Trips | 0 | 8 | 0 | 0 | 0 | 2 | 1 | 5 | 0 | 0 | 0 | 0 |
| Pipeline | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 0 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 172 | 945 | 308 | 337 | 24 | 30 | 59 | 1,261 | 6 | 6 | 48 | 261 |
| With | 172 | 953 | 308 | 337 | 24 | 32 | 60 | 1,266 | 6 | 6 | 48 | 261 |

**11. SR 305 & Bond**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 31 | 869 | 561 | 515 | 263 | 141 | 187 | 1141 | 312 | 296 | 286 | 42 |
| Project Trips | 0 | 5 | 0 | 0 | 0 | 3 | 2 | 3 | 0 | 0 | 0 | 0 |
| Pipeline | 0 | 24 | 0 | 0 | 0 | 4 | 3 | 16 | 3 | 7 | 0 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 35 | 923 | 640 | 587 | 300 | 165 | 216 | 1,197 | 359 | 344 | 326 | 48 |
| With | 35 | 928 | 640 | 587 | 300 | 168 | 218 | 1,200 | 359 | 344 | 326 | 48 |

**12. Hostmark & 6th Ave**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 0 | 0 | 0 | 0 | 229 | 52 | 68 | 0 | 78 | 21 | 208 | 0 |
| Project Trips | 0 | 0 | 0 | 0 | 9 | 1 | 2 | 0 | 0 | 0 | 14 | 0 |
| Pipeline | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 0 | 1 | 0 | 4 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 0 | 0 | 0 | 0 | 262 | 61 | 81 | 0 | 90 | 24 | 241 | 0 |
| With | 0 | 0 | 0 | 0 | 271 | 62 | 83 | 0 | 90 | 24 | 255 | 0 |

**13. Hostmark & Lincoln**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 36 | 0 | 0 | 5 | 312 | 0 | 0 | 0 | 0 | 0 | 229 | 26 |
| Project Trips | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 14 | 0 |
| Pipeline | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 4 | 3 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 42 | 0 | 0 | 6 | 358 | 0 | 0 | 0 | 0 | 0 | 265 | 33 |
| With | 42 | 0 | 0 | 6 | 367 | 0 | 0 | 0 | 0 | 0 | 279 | 33 |

**14. Hostmark & 4th**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 10 | 31 | 16 | 31 | 296 | 16 | 0 | 0 | 0 | 0 | 68 | 239 | 10 |
| Project Trips | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 14 | 0 |
| Pipeline | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 11 | 35 | 18 | 35 | 340 | 18 | 0 | 0 | 0 | 78 | 279 | 11 |
| With | 11 | 35 | 18 | 35 | 349 | 18 | 0 | 0 | 0 | 78 | 293 | 11 |

**15. Front & Sunset**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 0 | 333 | 229 | 317 | 0 | 10 | 16 | 328 | 0 | 0 | 0 | 0 |
| Project Trips | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 |
| Pipeline | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 0 | 387 | 261 | 361 | 0 | 11 | 18 | 377 | 0 | 0 | 0 | 0 |
| With | 0 | 394 | 261 | 361 | 0 | 11 | 18 | 381 | 0 | 0 | 0 | 0 |

# THE PINNACLE AT LIBERTY BAY TRAFFIC IMPACT ANALYSIS

*APPENDIX*
*2037 Forecast Excel*

*Heath & Associates, Inc*
*Pinnacle Bay TIA 10-2-26*

## AM Peak Hour Forecast Intersection Volumes

** 0.5% GR along SR 305 (NB-T/SB-T) / 2.0 all other roadways*

Annual Growth Rate: 2 % 0.5 % 2032
# of Years to Horizon: 12

**1. SR 305 & Hostmark**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 18 | 847 | 182 | 131 | 75 | 46 | 18 | 469 | 40 | 57 | 94 | 33 |
| Project Trips | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 18 | 14 | 5 | 0 | 0 |
| Pipeline | 0 | 2 | 1 | 1 | 3 | 2 | 0 | 4 | 1 | 1 | 0 | 1 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 22 | 900 | 227 | 163 | 96 | 59 | 22 | 501 | 51 | 72 | 117 | 42 |
| With | 22 | 907 | 227 | 163 | 96 | 59 | 22 | 519 | 65 | 77 | 117 | 42 |

**2. SR 305 & Baywatch**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 3 | 0 | 2 | 1 | 493 | 0 | 0 | 0 | 0 | 0 | 928 | 0 |
| Project Trips | 0 | 0 | 0 | 0 | 32 | 0 | 0 | 0 | 0 | 0 | 12 | 0 |
| Pipeline | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 4 | 0 | 2 | 1 | 528 | 0 | 0 | 0 | 0 | 0 | 991 | 0 |
| With | 4 | 0 | 2 | 1 | 560 | 0 | 0 | 0 | 0 | 0 | 1,003 | 0 |

**3. SR 305 & Johnson**

| | SBR | SBT | SBL | SBU | WBR | WBT | WBL | WBU | NBR | NBT | NBL | NBU | EBR | EBT | EBL | EBU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 11 | 2 | 63 | 0 | 10 | 467 | 5 | 1 | 3 | 6 | 15 | 0 | 17 | 906 | 6 | 1 |
| Project Trips | 32 | 0 | 28 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0 |
| Pipeline | 3 | 0 | 13 | 0 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 2 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 17 | 2 | 91 | 0 | 16 | 497 | 6 | 1 | 4 | 7 | 19 | 0 | 21 | 965 | 9 | 1 |
| With | 49 | 2 | 119 | 0 | 26 | 497 | 6 | 1 | 4 | 7 | 19 | 0 | 21 | 965 | 21 | 1 |

**4. Johnson & Sunrise Ridge**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 0 | 80 | 0 | 0 | 0 | 0 | 7 | 24 | 1 | 2 | 0 | 0 |
| Project Trips | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 60 | 0 | 4 |
| Pipeline | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 16 | 0 | 15 |
| Traffic Redist. | 0 | -18 | 0 | 0 | 0 | 0 | 0 | -5 | 5 | 18 | 0 | 0 |
| Without | 5 | 99 | 0 | 0 | 0 | 0 | 9 | 30 | 7 | 18 | 0 | 15 |
| With | 6 | 81 | 0 | 0 | 0 | 0 | 9 | 25 | 34 | 96 | 0 | 19 |

**5. Sunrise Ridge & Crystallia**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Project Trips | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 64 | 0 | 7 |
| Pipeline | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 |
| Traffic Redist. | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 |
| Without | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 6 |
| With | 5 | 19 | 0 | 0 | 0 | 0 | 0 | 8 | 23 | 64 | 0 | 13 |

**6. Hostmark & Caldart**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 53 | 15 | 118 | 66 | 184 | 11 | 35 | 30 | 51 | 20 | 205 | 42 |
| Project Trips | 0 | 1 | 0 | 0 | 0 | 2 | 4 | 3 | 0 | 0 | 0 | 0 |
| Pipeline | 0 | 0 | 3 | 8 | 6 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Traffic Redist. | 0 | 9 | -9 | -2 | -3 | 9 | 0 | 2 | 3 | 0 | 0 | 0 |
| Without | 66 | 19 | 149 | 90 | 234 | 14 | 43 | 37 | 63 | 25 | 256 | 52 |
| With | 66 | 29 | 140 | 88 | 231 | 25 | 47 | 42 | 66 | 25 | 256 | 52 |

**7. Caldart & Sunrise**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 0 | 0 | 0 | 0 | 50 | 5 | 20 | 0 | 45 | 15 | 30 | 0 |
| Project Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 3 | 0 | 0 |
| Pipeline | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 18 | 0 | 0 |
| Without | 0 | 0 | 0 | 0 | 62 | 6 | 25 | 0 | 56 | 19 | 37 | 0 |
| With | 0 | 0 | 0 | 0 | 62 | 6 | 25 | 0 | 68 | 40 | 37 | 0 |

*Heath & Associates, Inc*
*Pinnacle Bay TIA 10-2-26*

## PM Peak Hour Forecast Intersection Volumes

** 0.5% GR along SR 305 (NB-T/SB-T) / 2.0 all other roadways*

Annual Growth Rate: 2 % 0.5 % 2032
# of Years to Horizon: 12

**1. SR 305 & Hostmark**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 45 | 628 | 191 | 200 | 111 | 47 | 30 | 788 | 108 | 89 | 152 | 61 |
| Project Trips | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 12 | 10 | 16 | 0 | 0 |
| Pipeline | 0 | 12 | 0 | 0 | 3 | 1 | 2 | 6 | 0 | 0 | 5 | 1 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 56 | 678 | 237 | 248 | 141 | 59 | 39 | 841 | 134 | 110 | 193 | 77 |
| With | 56 | 698 | 237 | 248 | 141 | 59 | 39 | 853 | 144 | 126 | 193 | 77 |

**2. SR 305 & Baywatch**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 3 | 0 | 1 | 4 | 870 | 0 | 0 | 0 | 0 | 0 | 751 | 5 |
| Project Trips | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 0 | 0 | 0 | 36 | 0 |
| Pipeline | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 10 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 4 | 0 | 1 | 5 | 931 | 0 | 0 | 0 | 0 | 0 | 806 | 6 |
| With | 4 | 0 | 1 | 5 | 953 | 0 | 0 | 0 | 0 | 0 | 842 | 6 |

**3. SR 305 & Johnson**

| | SBR | SBT | SBL | SBU | WBR | WBT | WBL | WBU | NBR | NBT | NBL | NBU | EBR | EBT | EBL | EBU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 8 | 3 | 18 | 0 | 10 | 848 | 7 | 3 | 7 | 5 | 18 | 0 | 18 | 731 | 3 | 0 |
| Project Trips | 22 | 0 | 19 | 0 | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36 | 0 |
| Pipeline | 4 | 0 | 9 | 0 | 14 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 7 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 14 | 4 | 31 | 0 | 26 | 904 | 9 | 4 | 9 | 6 | 22 | 0 | 22 | 778 | 11 | 0 |
| With | 36 | 4 | 50 | 0 | 58 | 904 | 9 | 4 | 9 | 6 | 22 | 0 | 22 | 778 | 47 | 0 |

**4. Johnson & Sunrise Ridge**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 0 | 32 | 2 | 3 | 0 | 1 | 0 | 20 | 0 | 1 | 0 | 0 |
| Project Trips | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 68 | 41 | 0 | 2 |
| Pipeline | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 13 | 0 | 8 |
| Traffic Redist. | 0 | -9 | 0 | 0 | 0 | 0 | 0 | -5 | 5 | 9 | 0 | 0 |
| Without | 14 | 40 | 2 | 4 | 0 | 1 | 0 | 25 | 21 | 14 | 0 | 8 |
| With | 18 | 31 | 2 | 4 | 0 | 1 | 0 | 20 | 94 | 64 | 0 | 10 |

**5. Sunrise Ridge & Crystallia**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Project Trips | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 72 | 43 | 0 | 5 |
| Pipeline | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Traffic Redist. | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 |
| Without | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| With | 13 | 9 | 0 | 0 | 0 | 0 | 0 | 5 | 72 | 43 | 0 | 9 |

**6. Hostmark & Caldart**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 57 | 49 | 79 | 41 | 119 | 4 | 2 | 41 | 54 | 63 | 186 | 78 |
| Project Trips | 0 | 4 | 0 | 0 | 0 | 4 | 3 | 2 | 0 | 0 | 0 | 0 |
| Pipeline | 0 | 0 | 7 | 5 | 4 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Traffic Redist. | 0 | 5 | -5 | -2 | -3 | 4 | 0 | 2 | 3 | 0 | 0 | 0 |
| Without | 71 | 61 | 105 | 56 | 152 | 5 | 2 | 51 | 67 | 78 | 238 | 97 |
| With | 71 | 70 | 100 | 54 | 149 | 13 | 5 | 55 | 70 | 78 | 238 | 97 |

**7. Caldart & Sunrise**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 0 | 0 | 0 | 0 | 50 | 20 | 15 | 0 | 30 | 45 | 50 | 0 |
| Project Trips | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 8 | 0 | 0 |
| Pipeline | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 9 | 0 | 0 |
| Without | 0 | 0 | 0 | 0 | 62 | 25 | 19 | 0 | 37 | 56 | 62 | 0 |
| With | 0 | 0 | 0 | 0 | 62 | 25 | 19 | 0 | 47 | 73 | 62 | 0 |

**8. SR 305 & Lincoln**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 73 | 667 | 161 | 198 | 203 | 109 | 114 | 975 | 104 | 99 | 229 | 57 |
| Project Trips | 0 | 12 | 0 | 0 | 0 | 4 | 2 | 7 | 3 | 4 | 0 | 0 |
| Pipeline | 0 | 11 | 26 | 16 | 1 | 1 | 0 | 7 | 0 | 0 | 3 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 91 | 718 | 226 | 262 | 253 | 136 | 141 | 1,041 | 129 | 123 | 287 | 71 |
| With | 91 | 730 | 226 | 262 | 253 | 140 | 143 | 1,048 | 132 | 127 | 287 | 71 |

**9. SR 305 & Liberty**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 47 | 788 | 68 | 57 | 57 | 42 | 73 | 1106 | 52 | 52 | 68 | 88 |
| Project Trips | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 2 | 0 | 0 |
| Pipeline | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 22 | 1 | 2 | 0 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 58 | 870 | 84 | 71 | 71 | 52 | 91 | 1,194 | 65 | 66 | 84 | 109 |
| With | 58 | 880 | 84 | 71 | 71 | 52 | 91 | 1,200 | 66 | 68 | 84 | 109 |

**10. SR 305 & Forest Rock**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 151 | 879 | 270 | 296 | 21 | 26 | 52 | 1197 | 5 | 5 | 42 | 229 |
| Project Trips | 0 | 8 | 0 | 0 | 0 | 2 | 1 | 5 | 0 | 0 | 0 | 0 |
| Pipeline | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 0 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 187 | 967 | 335 | 367 | 26 | 32 | 64 | 1,291 | 6 | 6 | 52 | 284 |
| With | 187 | 975 | 335 | 367 | 26 | 34 | 65 | 1,296 | 6 | 6 | 52 | 284 |

**11. SR 305 & Bond**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 31 | 869 | 561 | 515 | 263 | 141 | 187 | 1141 | 312 | 296 | 286 | 42 |
| Project Trips | 0 | 5 | 0 | 0 | 0 | 3 | 2 | 3 | 0 | 0 | 0 | 0 |
| Pipeline | 0 | 24 | 0 | 0 | 0 | 4 | 3 | 16 | 3 | 7 | 0 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 38 | 945 | 696 | 639 | 326 | 179 | 235 | 1,225 | 390 | 374 | 355 | 52 |
| With | 38 | 950 | 696 | 639 | 326 | 182 | 237 | 1,228 | 390 | 374 | 355 | 52 |

**12. Hostmark & 6th Ave**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 0 | 0 | 0 | 0 | 229 | 52 | 68 | 0 | 78 | 21 | 208 | 0 |
| Project Trips | 0 | 0 | 0 | 0 | 9 | 1 | 2 | 0 | 0 | 0 | 14 | 0 |
| Pipeline | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 0 | 1 | 0 | 4 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 0 | 0 | 0 | 0 | 285 | 66 | 87 | 0 | 98 | 26 | 262 | 0 |
| With | 0 | 0 | 0 | 0 | 294 | 67 | 89 | 0 | 98 | 26 | 276 | 0 |

**13. Hostmark & Lincoln**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 36 | 0 | 0 | 5 | 312 | 0 | 0 | 0 | 0 | 0 | 229 | 26 |
| Project Trips | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 14 | 0 |
| Pipeline | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 4 | 3 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 46 | 0 | 0 | 6 | 389 | 0 | 0 | 0 | 0 | 0 | 288 | 35 |
| With | 46 | 0 | 0 | 6 | 398 | 0 | 0 | 0 | 0 | 0 | 302 | 35 |

**14. Hostmark & 4th**

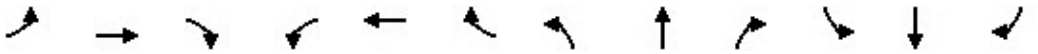
| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 10 | 31 | 16 | 31 | 296 | 16 | 0 | 0 | 0 | 68 | 239 | 10 |
| Project Trips | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 14 | 0 |
| Pipeline | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 12 | 38 | 20 | 38 | 370 | 20 | 0 | 0 | 0 | 84 | 303 | 12 |
| With | 12 | 38 | 20 | 38 | 379 | 20 | 0 | 0 | 0 | 84 | 317 | 12 |

**15. Front & Sunset**

| | SBR | SBT | SBL | WBR | WBT | WBL | NBR | NBT | NBL | EBR | EBT | EBL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Existing | 0 | 333 | 229 | 317 | 0 | 10 | 16 | 328 | 0 | 0 | 0 | 0 |
| Project Trips | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 |
| Pipeline | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 |
| Traffic Redist. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Without | 0 | 420 | 284 | 393 | 0 | 12 | 20 | 410 | 0 | 0 | 0 | 0 |
| With | 0 | 427 | 284 | 393 | 0 | 12 | 20 | 414 | 0 | 0 | 0 | 0 |

# THE PINNACLE AT LIBERTY BAY
# TRAFFIC IMPACT ANALYSIS

*APPENDIX*
*Existing Level of Service*



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 33 | 94 | 57 | 46 | 75 | 131 | 40 | 469 | 18 | 182 | 847 | 18 |
| Future Volume (veh/h) | 33 | 94 | 57 | 46 | 75 | 131 | 40 | 469 | 18 | 182 | 847 | 18 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 0.98 | | 0.97 | 0.99 | | 0.98 | 1.00 | | 0.98 | 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 | 1716 | 1730 | 1744 | 1744 | 1744 | 1716 | 1730 | 1716 | 1716 | 1730 | 1716 | 1646 |
| Adj Flow Rate, veh/h | 36 | 102 | 62 | 50 | 82 | 77 | 43 | 510 | 20 | 198 | 921 | 20 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 6 | 5 | 4 | 4 | 4 | 6 | 5 | 6 | 6 | 5 | 6 | 11 |
| Cap, veh/h | 166 | 164 | 136 | 158 | 183 | 149 | 48 | 576 | 23 | 826 | 1939 | 42 |
| Arrive On Green | 0.02 | 0.09 | 0.09 | 0.03 | 0.10 | 0.10 | 0.03 | 0.21 | 0.21 | 0.50 | 0.68 | 0.68 |
| Sat Flow, veh/h | 1634 | 1730 | 1440 | 1661 | 1744 | 1421 | 1647 | 2802 | 110 | 1647 | 2860 | 62 |
| Grp Volume(v), veh/h | 36 | 102 | 62 | 50 | 82 | 77 | 43 | 221 | 309 | 198 | 392 | 549 |
| Grp Sat Flow(s),veh/h/ln | 1634 | 1730 | 1440 | 1661 | 1744 | 1421 | 1647 | 1218 | 1693 | 1647 | 1218 | 1704 |
| Q Serve(g_s), s | 2.4 | 6.8 | 4.9 | 3.3 | 5.3 | 2.2 | 3.1 | 21.2 | 21.2 | 8.2 | 18.3 | 18.3 |
| Cycle Q Clear(g_c), s | 2.4 | 6.8 | 4.9 | 3.3 | 5.3 | 2.2 | 3.1 | 21.2 | 21.2 | 8.2 | 18.3 | 18.3 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.06 | 1.00 | | 0.04 |
| Lane Grp Cap(c), veh/h | 166 | 164 | 136 | 158 | 183 | 149 | 48 | 250 | 348 | 826 | 826 | 1156 |
| V/C Ratio(X) | 0.22 | 0.62 | 0.46 | 0.32 | 0.45 | 0.52 | 0.90 | 0.88 | 0.89 | 0.24 | 0.47 | 0.47 |
| Avail Cap(c_a), veh/h | 343 | 332 | 276 | 321 | 334 | 272 | 316 | 437 | 607 | 826 | 826 | 1156 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 48.0 | 52.3 | 51.4 | 47.4 | 50.5 | 6.5 | 58.1 | 46.3 | 46.3 | 17.0 | 9.2 | 9.2 |
| Incr Delay (d2), s/veh | 0.6 | 3.9 | 2.4 | 1.1 | 1.7 | 2.8 | 40.1 | 33.4 | 26.5 | 0.1 | 2.0 | 1.4 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 1.8 | 5.6 | 3.3 | 2.5 | 4.3 | 4.0 | 3.3 | 13.4 | 16.8 | 5.4 | 8.3 | 10.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 48.6 | 56.1 | 53.8 | 48.6 | 52.2 | 9.2 | 98.2 | 79.6 | 72.8 | 17.1 | 11.1 | 10.6 |
| LnGrp LOS | D | E | D | D | D | A | F | E | E | B | B | B |
| Approach Vol, veh/h | | 200 | | | 209 | | | 573 | | | 1139 | |
| Approach Delay, s/veh | | 54.0 | | | 35.5 | | | 77.4 | | | 11.9 | |
| Approach LOS | | D | | | D | | | E | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 65.2 | 29.7 | 8.8 | 16.3 | 8.5 | 86.4 | 7.6 | 17.6 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 18.9 | 43.5 | 16.1 | 23.5 | 23.5 | 38.9 | 16.1 | 23.5 |
| Max Q Clear Time (g_c+I1), s | 10.2 | 23.2 | 5.3 | 8.8 | 5.1 | 20.3 | 4.4 | 7.3 |
| Green Ext Time (p_c), s | 0.4 | 1.9 | 0.1 | 0.5 | 0.1 | 3.8 | 0.0 | 0.5 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 35.9 |
| HCM 7th LOS | D |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 928 | 493 | 1 | 2 | 3 |
| Future Vol, veh/h | 0 | 928 | 493 | 1 | 2 | 3 |
| Conflicting Peds, #/hr | 4 | 0 | 0 | 4 | 4 | 4 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 105 | - | - | 55 | 60 | 0 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 93 | 93 | 93 | 93 | 93 | 93 |
| Heavy Vehicles, % | 1 | 8 | 6 | 1 | 1 | 1 |
| Mvmt Flow | 0 | 998 | 530 | 1 | 2 | 3 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 535 | 0 | - | 0 | 1536 | 538 |
| Stage 1 | - | - | - | - | 534 | - |
| Stage 2 | - | - | - | - | 1002 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1038 | - | - | - | 128 | 545 |
| Stage 1 | - | - | - | - | 590 | - |
| Stage 2 | - | - | - | - | 357 | - |
| Platoon blocked, % | | | - | - | - | |
| Mov Cap-1 Maneuver | 1034 | - | - | - | 128 | 541 |
| Mov Cap-2 Maneuver | - | - | - | - | 128 | - |
| Stage 1 | - | - | - | - | 588 | - |
| Stage 2 | - | - | - | - | 355 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 0 | 20.49 |
| HCM LOS | | | C |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1034 | - | - | - | 128 | 541 |
| HCM Lane V/C Ratio | - | - | - | - | 0.017 | 0.006 |
| HCM Ctrl Dly (s/v) | 0 | - | - | - | 33.7 | 11.7 |
| HCM Lane LOS | A | - | - | - | D | B |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.1 | 0 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 6.1 |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 5 | 0 | 0 | 0 | 0 | 2 |
| Future Vol, veh/h | 5 | 0 | 0 | 0 | 0 | 2 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 5 | 0 | 0 | 0 | 0 | 2 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 1 | 1 | 2 | 0 | - | 0 |
| Stage 1 | 1 | - | - | - | - | - |
| Stage 2 | 0 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 1022 | 1083 | 1620 | - | - | - |
| Stage 1 | 1022 | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 1022 | 1083 | 1620 | - | - | - |
| Mov Cap-2 Maneuver | 1022 | - | - | - | - | - |
| Stage 1 | 1022 | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 8.54 | 0 | 0 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1620 | - | 1022 | - | - |
| HCM Lane V/C Ratio | - | - | 0.005 | - | - |
| HCM Ctrl Dly (s/v) | 0 | - | 8.5 | - | - |
| HCM Lane LOS | A | - | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0 | - | - |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 15.3 |
| Intersection LOS | C |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 42 | 205 | 20 | 11 | 184 | 66 | 51 | 30 | 35 | 118 | 15 | 53 |
| Future Vol, veh/h | 42 | 205 | 20 | 11 | 184 | 66 | 51 | 30 | 35 | 118 | 15 | 53 |
| Peak Hour Factor | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| Heavy Vehicles, % | 1 | 6 | 5 | 1 | 7 | 1 | 1 | 3 | 6 | 7 | 1 | 4 |
| Mvmt Flow | 56 | 273 | 27 | 15 | 245 | 88 | 68 | 40 | 47 | 157 | 20 | 71 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 1 | 1 |
| HCM Control Delay, s/veh | 17.1 | 16.2 | 12.4 | 13.2 |
| HCM LOS | C | C | B | B |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|
| Vol Left, % | 44% | 16% | 4% | 89% | 0% |
| Vol Thru, % | 26% | 77% | 70% | 11% | 0% |
| Vol Right, % | 30% | 7% | 25% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 116 | 267 | 261 | 133 | 53 |
| LT Vol | 51 | 42 | 11 | 118 | 0 |
| Through Vol | 30 | 205 | 184 | 15 | 0 |
| RT Vol | 35 | 20 | 66 | 0 | 53 |
| Lane Flow Rate | 155 | 356 | 348 | 177 | 71 |
| Geometry Grp | 4a | 2 | 2 | 5 | 5 |
| Degree of Util (X) | 0.286 | 0.588 | 0.565 | 0.368 | 0.122 |
| Departure Headway (Hd) | 6.648 | 5.948 | 5.845 | 7.478 | 6.204 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes |
| Cap | 540 | 609 | 619 | 481 | 577 |
| Service Time | 4.706 | 3.963 | 3.86 | 5.23 | 3.955 |
| HCM Lane V/C Ratio | 0.287 | 0.585 | 0.562 | 0.368 | 0.123 |
| HCM Control Delay, s/veh | 12.4 | 17.1 | 16.2 | 14.5 | 9.8 |
| HCM Lane LOS | B | C | C | B | A |
| HCM 95th-tile Q | 1.2 | 3.8 | 3.5 | 1.7 | 0.4 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 3.9 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 30 | 15 | 5 | 50 | 45 | 20 |
| Future Vol, veh/h | 30 | 15 | 5 | 50 | 45 | 20 |
| Conflicting Peds, #/hr | 0 | 10 | 10 | 0 | 10 | 10 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 33 | 16 | 5 | 54 | 49 | 22 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 59 | 0 | 126 | 61 |
| Stage 1 | - | - | - | - | 51 | - |
| Stage 2 | - | - | - | - | 75 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1545 | - | 869 | 1004 |
| Stage 1 | - | - | - | - | 972 | - |
| Stage 2 | - | - | - | - | 948 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1532 | - | 851 | 988 |
| Mov Cap-2 Maneuver | - | - | - | - | 851 | - |
| Stage 1 | - | - | - | - | 960 | - |
| Stage 2 | - | - | - | - | 940 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 0.67 | 9.4 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 889 | - | - | 164 | - |
| HCM Lane V/C Ratio | 0.079 | - | - | 0.004 | - |
| HCM Ctrl Dly (s/v) | 9.4 | - | - | 7.4 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0 | - |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 61 | 152 | 89 | 47 | 111 | 200 | 108 | 788 | 30 | 191 | 628 | 45 |
| Future Volume (veh/h) | 61 | 152 | 89 | 47 | 111 | 200 | 108 | 788 | 30 | 191 | 628 | 45 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 0.99 | | 0.96 | 0.99 | | 0.96 | 1.00 | | 0.96 | 1.00 | | 0.97 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1702 | 1758 | 1786 | 1786 | 1786 | 1786 | 1772 | 1744 | 1786 | 1786 | 1772 | 1744 |
| Adj Flow Rate, veh/h | 62 | 154 | 90 | 47 | 112 | 56 | 109 | 796 | 30 | 193 | 634 | 45 |
| 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, % | 7 | 3 | 1 | 1 | 1 | 1 | 2 | 4 | 1 | 1 | 2 | 4 |
| Cap, veh/h | 175 | 201 | 166 | 143 | 183 | 149 | 129 | 863 | 33 | 659 | 1712 | 121 |
| Arrive On Green | 0.04 | 0.11 | 0.11 | 0.03 | 0.10 | 0.10 | 0.08 | 0.30 | 0.30 | 0.39 | 0.61 | 0.61 |
| Sat Flow, veh/h | 1621 | 1758 | 1455 | 1701 | 1786 | 1450 | 1688 | 2850 | 107 | 1701 | 2790 | 198 |
| Grp Volume(v), veh/h | 62 | 154 | 90 | 47 | 112 | 56 | 109 | 346 | 480 | 193 | 286 | 393 |
| Grp Sat Flow(s),veh/h/ln | 1621 | 1758 | 1455 | 1701 | 1786 | 1450 | 1688 | 1238 | 1720 | 1701 | 1258 | 1729 |
| Q Serve(g_s), s | 4.1 | 10.2 | 7.0 | 3.0 | 7.2 | 2.1 | 7.7 | 32.4 | 32.4 | 9.4 | 13.6 | 13.6 |
| Cycle Q Clear(g_c), s | 4.1 | 10.2 | 7.0 | 3.0 | 7.2 | 2.1 | 7.7 | 32.4 | 32.4 | 9.4 | 13.6 | 13.6 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.06 | 1.00 | | 0.11 |
| Lane Grp Cap(c), veh/h | 175 | 201 | 166 | 143 | 183 | 149 | 129 | 375 | 521 | 659 | 772 | 1062 |
| V/C Ratio(X) | 0.35 | 0.77 | 0.54 | 0.33 | 0.61 | 0.38 | 0.85 | 0.92 | 0.92 | 0.29 | 0.37 | 0.37 |
| Avail Cap(c_a), veh/h | 320 | 337 | 279 | 314 | 342 | 278 | 323 | 444 | 616 | 659 | 772 | 1062 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.82 | 0.82 | 0.82 |
| Uniform Delay (d), s/veh | 46.0 | 51.6 | 50.2 | 46.9 | 51.6 | 11.8 | 54.7 | 40.5 | 40.5 | 25.4 | 11.6 | 11.6 |
| Incr Delay (d2), s/veh | 1.2 | 6.0 | 2.7 | 1.3 | 3.3 | 1.6 | 14.0 | 30.4 | 24.3 | 0.2 | 1.1 | 0.8 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 3.1 | 8.4 | 4.8 | 2.4 | 6.1 | 2.9 | 6.7 | 18.6 | 23.5 | 6.6 | 6.6 | 8.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 47.2 | 57.6 | 52.9 | 48.2 | 54.9 | 13.4 | 68.7 | 70.9 | 64.7 | 25.6 | 12.7 | 12.4 |
| LnGrp LOS | D | E | D | D | D | B | E | E | E | C | B | B |
| Approach Vol, veh/h | | 306 | | | 215 | | | 935 | | | 872 | |
| Approach Delay, s/veh | | 54.1 | | | 42.6 | | | 67.5 | | | 15.4 | |
| Approach LOS | | D | | | D | | | E | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 51.5 | 41.3 | 8.5 | 18.7 | 14.1 | 78.7 | 9.9 | 17.3 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 18.9 | 43.5 | 16.1 | 23.5 | 23.5 | 38.9 | 16.1 | 23.5 |
| Max Q Clear Time (g_c+I1), s | 11.4 | 34.4 | 5.0 | 12.2 | 9.7 | 15.6 | 6.1 | 9.2 |
| Green Ext Time (p_c), s | 0.4 | 2.4 | 0.1 | 0.7 | 0.3 | 2.7 | 0.1 | 0.5 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 43.9 |
| HCM 7th LOS | D |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 5 | 751 | 870 | 4 | 1 | 3 |
| Future Vol, veh/h | 5 | 751 | 870 | 4 | 1 | 3 |
| Conflicting Peds, #/hr | 1 | 0 | 0 | 1 | 1 | 1 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 105 | - | - | 55 | 60 | 0 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 93 | 93 | 93 | 93 | 93 | 93 |
| Heavy Vehicles, % | 10 | 2 | 3 | 1 | 10 | 1 |
| Mvmt Flow | 5 | 808 | 935 | 4 | 1 | 3 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 941 | 0 | - | 0 | 1756 | 937 |
| Stage 1 | - | - | - | - | 936 | - |
| Stage 2 | - | - | - | - | 819 | - |
| Critical Hdwy | 4.2 | - | - | - | 6.5 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.5 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.5 | - |
| Follow-up Hdwy | 2.29 | - | - | - | 3.59 | 3.309 |
| Pot Cap-1 Maneuver | 697 | - | - | - | 89 | 322 |
| Stage 1 | - | - | - | - | 369 | - |
| Stage 2 | - | - | - | - | 420 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 696 | - | - | - | 88 | 322 |
| Mov Cap-2 Maneuver | - | - | - | - | 88 | - |
| Stage 1 | - | - | - | - | 366 | - |
| Stage 2 | - | - | - | - | 419 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0.07 | 0 | 23.79 |
| HCM LOS | | | C |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 696 | - | - | - | 88 | 322 |
| HCM Lane V/C Ratio | 0.008 | - | - | - | 0.012 | 0.01 |
| HCM Ctrl Dly (s/v) | 10.2 | - | - | - | 46.2 | 16.3 |
| HCM Lane LOS | B | - | - | - | E | C |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0 | 0 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 3.7 |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 3 | 0 | 0 | 0 | 0 | 4 |
| Future Vol, veh/h | 3 | 0 | 0 | 0 | 0 | 4 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 3 | 0 | 0 | 0 | 0 | 4 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 2 | 2 | 4 | 0 | - | 0 |
| Stage 1 | 2 | - | - | - | - | - |
| Stage 2 | 0 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 1020 | 1082 | 1617 | - | - | - |
| Stage 1 | 1021 | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 1020 | 1082 | 1617 | - | - | - |
| Mov Cap-2 Maneuver | 1020 | - | - | - | - | - |
| Stage 1 | 1021 | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 8.54 | 0 | 0 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1617 | - | 1020 | - | - |
| HCM Lane V/C Ratio | - | - | 0.003 | - | - |
| HCM Ctrl Dly (s/v) | 0 | - | 8.5 | - | - |
| HCM Lane LOS | A | - | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0 | - | - |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 12 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 78 | 186 | 63 | 4 | 119 | 41 | 54 | 41 | 2 | 79 | 49 | 57 |
| Future Vol, veh/h | 78 | 186 | 63 | 4 | 119 | 41 | 54 | 41 | 2 | 79 | 49 | 57 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Heavy Vehicles, % | 3 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 4 |
| Mvmt Flow | 90 | 214 | 72 | 5 | 137 | 47 | 62 | 47 | 2 | 91 | 56 | 66 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 1 | 1 |
| HCM Control Delay, s/veh | 14 | 10.4 | 10.5 | 10.7 |
| HCM LOS | B | B | B | B |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|
| Vol Left, % | 56% | 24% | 2% | 62% | 0% |
| Vol Thru, % | 42% | 57% | 73% | 38% | 0% |
| Vol Right, % | 2% | 19% | 25% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 97 | 327 | 164 | 128 | 57 |
| LT Vol | 54 | 78 | 4 | 79 | 0 |
| Through Vol | 41 | 186 | 119 | 49 | 0 |
| RT Vol | 2 | 63 | 41 | 0 | 57 |
| Lane Flow Rate | 111 | 376 | 189 | 147 | 66 |
| Geometry Grp | 4a | 2 | 2 | 5 | 5 |
| Degree of Util (X) | 0.187 | 0.537 | 0.278 | 0.266 | 0.1 |
| Departure Headway (Hd) | 6.027 | 5.139 | 5.312 | 6.508 | 5.484 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes |
| Cap | 594 | 703 | 675 | 552 | 653 |
| Service Time | 4.076 | 3.176 | 3.356 | 4.251 | 3.226 |
| HCM Lane V/C Ratio | 0.187 | 0.535 | 0.28 | 0.266 | 0.101 |
| HCM Control Delay, s/veh | 10.5 | 14 | 10.4 | 11.6 | 8.8 |
| HCM Lane LOS | B | B | B | B | A |
| HCM 95th-tile Q | 0.7 | 3.2 | 1.1 | 1.1 | 0.3 |

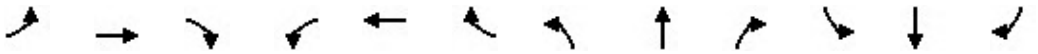
| Intersection | |
|---|---|
| Int Delay, s/veh | 2.8 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 50 | 45 | 20 | 50 | 30 | 15 |
| Future Vol, veh/h | 50 | 45 | 20 | 50 | 30 | 15 |
| Conflicting Peds, #/hr | 0 | 10 | 10 | 0 | 10 | 10 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 54 | 49 | 22 | 54 | 33 | 16 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 113 | 0 | 197 | 99 |
| Stage 1 | - | - | - | - | 89 | - |
| Stage 2 | - | - | - | - | 108 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1476 | - | 792 | 957 |
| Stage 1 | - | - | - | - | 935 | - |
| Stage 2 | - | - | - | - | 917 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1464 | - | 767 | 941 |
| Mov Cap-2 Maneuver | - | - | - | - | 767 | - |
| Stage 1 | - | - | - | - | 913 | - |
| Stage 2 | - | - | - | - | 909 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 2.14 | 9.68 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 817 | - | - | 514 | - |
| HCM Lane V/C Ratio | 0.06 | - | - | 0.015 | - |
| HCM Ctrl Dly (s/v) | 9.7 | - | - | 7.5 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.2 | - | - | 0 | - |



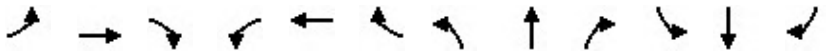
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 57 | 229 | 99 | 109 | 203 | 198 | 104 | 975 | 114 | 161 | 667 | 73 |
| Future Volume (veh/h) | 57 | 229 | 99 | 109 | 203 | 198 | 104 | 975 | 114 | 161 | 667 | 73 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 0.99 | 1.00 | | 0.97 | 1.00 | | 0.97 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1786 | 1786 | 1786 | 1772 | 1772 | 1772 | 1758 | 1758 | 1758 | 1772 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 59 | 239 | 103 | 114 | 211 | 206 | 108 | 1016 | 119 | 168 | 695 | 76 |
| Peak Hour Factor | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, % | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 |
| Cap, veh/h | 75 | 294 | 247 | 136 | 356 | 300 | 129 | 1094 | 128 | 403 | 1521 | 166 |
| Arrive On Green | 0.04 | 0.16 | 0.16 | 0.08 | 0.20 | 0.20 | 0.08 | 0.38 | 0.38 | 0.24 | 0.55 | 0.55 |
| Sat Flow, veh/h | 1701 | 1786 | 1500 | 1688 | 1772 | 1490 | 1674 | 2862 | 335 | 1688 | 2785 | 304 |
| Grp Volume(v), veh/h | 59 | 239 | 103 | 114 | 211 | 206 | 108 | 536 | 599 | 168 | 345 | 426 |
| Grp Sat Flow(s),veh/h/ln | 1701 | 1786 | 1500 | 1688 | 1772 | 1490 | 1674 | 1512 | 1686 | 1688 | 1382 | 1708 |
| Q Serve(g_s), s | 4.9 | 18.3 | 8.7 | 9.5 | 15.3 | 11.2 | 9.0 | 48.2 | 48.3 | 11.9 | 21.4 | 21.4 |
| Cycle Q Clear(g_c), s | 4.9 | 18.3 | 8.7 | 9.5 | 15.3 | 11.2 | 9.0 | 48.2 | 48.3 | 11.9 | 21.4 | 21.4 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.20 | 1.00 | | 0.18 |
| Lane Grp Cap(c), veh/h | 75 | 294 | 247 | 136 | 356 | 300 | 129 | 578 | 644 | 403 | 755 | 933 |
| V/C Ratio(X) | 0.79 | 0.81 | 0.42 | 0.84 | 0.59 | 0.69 | 0.84 | 0.93 | 0.93 | 0.42 | 0.46 | 0.46 |
| Avail Cap(c_a), veh/h | 137 | 395 | 332 | 183 | 442 | 372 | 208 | 597 | 666 | 403 | 755 | 933 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.75 | 0.75 | 0.75 | 0.81 | 0.81 | 0.81 |
| Uniform Delay (d), s/veh | 67.2 | 57.2 | 53.2 | 64.4 | 51.4 | 20.0 | 64.6 | 42.0 | 42.0 | 45.7 | 19.5 | 19.5 |
| Incr Delay (d2), s/veh | 12.8 | 9.2 | 1.1 | 21.9 | 1.6 | 3.9 | 9.2 | 19.0 | 17.7 | 0.6 | 1.6 | 1.3 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 4.3 | 14.1 | 6.2 | 8.6 | 11.4 | 7.7 | 7.0 | 27.0 | 29.5 | 8.4 | 10.9 | 13.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 80.1 | 66.4 | 54.3 | 86.2 | 53.0 | 23.9 | 73.8 | 61.0 | 59.7 | 46.2 | 21.1 | 20.8 |
| LnGrp LOS | F | E | D | F | D | C | E | E | E | D | C | C |
| Approach Vol, veh/h | | 401 | | | 531 | | | 1243 | | | 939 | |
| Approach Delay, s/veh | | 65.3 | | | 48.9 | | | 61.5 | | | 25.5 | |
| Approach LOS | | E | | | D | | | E | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 15.6 | 82.5 | 10.8 | 33.1 | 38.9 | 59.2 | 16.0 | 28.0 |
| Change Period (Y+Rc), s | 4.6 | 4.9 | 4.6 | 4.6 | 4.9 | * 4.9 | 4.6 | 4.6 |
| Max Green Setting (Gmax), s | 17.6 | 58.9 | 11.4 | 35.4 | 20.4 | * 56 | 15.4 | 31.4 |
| Max Q Clear Time (g_c+I1), s | 11.0 | 23.4 | 6.9 | 17.3 | 13.9 | 50.3 | 11.5 | 20.3 |
| Green Ext Time (p_c), s | 0.1 | 7.6 | 0.0 | 1.9 | 0.2 | 3.9 | 0.1 | 1.3 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 49.0 |
| HCM 7th LOS | D |

Notes

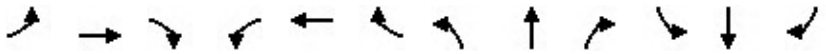
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 88 | 68 | 52 | 42 | 57 | 57 | 52 | 1106 | 73 | 68 | 788 | 47 |
| Future Volume (veh/h) | 88 | 68 | 52 | 42 | 57 | 57 | 52 | 1106 | 73 | 68 | 788 | 47 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 0.99 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1772 | 1772 | 1772 | 1786 | 1786 | 1786 | 1758 | 1758 | 1758 | 1772 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 94 | 72 | 55 | 45 | 61 | 61 | 55 | 1177 | 78 | 72 | 838 | 50 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 1 | 1 | 1 | 3 | 3 | 3 | 2 | 2 | 2 |
| Cap, veh/h | 161 | 140 | 113 | 111 | 142 | 155 | 676 | 1048 | 69 | 692 | 864 | 522 |
| Arrive On Green | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 | 0.40 | 0.34 | 0.34 | 0.41 | 0.35 | 0.35 |
| Sat Flow, veh/h | 739 | 889 | 720 | 462 | 906 | 990 | 1674 | 3065 | 203 | 1688 | 2481 | 1500 |
| Grp Volume(v), veh/h | 108 | 0 | 113 | 78 | 0 | 89 | 55 | 594 | 661 | 72 | 838 | 50 |
| Grp Sat Flow(s),veh/h/ln | 871 | 0 | 1478 | 918 | 0 | 1440 | 1674 | 1547 | 1721 | 1688 | 1240 | 1500 |
| Q Serve(g_s), s | 11.5 | 0.0 | 10.3 | 5.8 | 0.0 | 8.2 | 3.0 | 50.6 | 50.6 | 3.9 | 49.2 | 3.3 |
| Cycle Q Clear(g_c), s | 19.7 | 0.0 | 10.3 | 16.1 | 0.0 | 8.2 | 3.0 | 50.6 | 50.6 | 3.9 | 49.2 | 3.3 |
| Prop In Lane | 0.87 | | 0.49 | 0.58 | | 0.69 | 1.00 | | 0.12 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 182 | 0 | 232 | 182 | 0 | 226 | 676 | 529 | 588 | 692 | 864 | 522 |
| V/C Ratio(X) | 0.59 | 0.00 | 0.49 | 0.43 | 0.00 | 0.39 | 0.08 | 1.12 | 1.12 | 0.10 | 0.97 | 0.10 |
| Avail Cap(c_a), veh/h | 233 | 0 | 290 | 366 | 0 | 409 | 676 | 529 | 588 | 692 | 867 | 524 |
| 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 | 0.60 | 0.60 | 0.60 | 0.82 | 0.82 | 0.82 |
| Uniform Delay (d), s/veh | 64.5 | 0.0 | 57.0 | 61.5 | 0.0 | 56.1 | 27.2 | 48.7 | 48.7 | 26.9 | 47.5 | 32.5 |
| Incr Delay (d2), s/veh | 3.1 | 0.0 | 1.6 | 1.6 | 0.0 | 1.1 | 0.0 | 69.8 | 69.3 | 0.1 | 21.4 | 0.3 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 7.5 | 0.0 | 7.2 | 5.3 | 0.0 | 5.6 | 2.2 | 39.2 | 43.2 | 2.9 | 23.6 | 2.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 67.6 | 0.0 | 58.5 | 63.1 | 0.0 | 57.2 | 27.2 | 118.5 | 118.0 | 27.0 | 68.9 | 32.8 |
| LnGrp LOS | E | | E | E | | E | C | F | F | C | E | C |
| Approach Vol, veh/h | | 221 | | | 167 | | | 1310 | | | 960 | |
| Approach Delay, s/veh | | 63.0 | | | 59.9 | | | 114.4 | | | 63.8 | |
| Approach LOS | | E | | | E | | | F | | | E | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 64.2 | 56.0 | | 27.7 | 65.2 | 55.1 | | 27.7 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | | 4.5 |
| Max Green Setting (Gmax), s | 6.8 | 51.7 | | 29.0 | 7.9 | 50.6 | | 42.0 |
| Max Q Clear Time (g_c+I1), s | 5.0 | 51.2 | | 21.7 | 5.9 | 52.6 | | 18.1 |
| Green Ext Time (p_c), s | 0.0 | 0.3 | | 0.7 | 0.0 | 0.0 | | 1.0 |

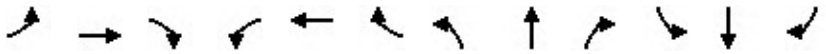
| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 88.4 |
| HCM 7th LOS | F |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 229 | 42 | 5 | 26 | 21 | 296 | 5 | 1197 | 52 | 270 | 879 | 151 |
| Future Volume (veh/h) | 229 | 42 | 5 | 26 | 21 | 296 | 5 | 1197 | 52 | 270 | 879 | 151 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1772 | 1772 | 1772 | 1772 | 1772 | 1772 | 1758 | 1758 | 1758 | 1772 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 241 | 44 | 5 | 27 | 22 | 312 | 5 | 1260 | 55 | 284 | 925 | 159 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 |
| Cap, veh/h | 271 | 251 | 29 | 194 | 158 | 306 | 13 | 980 | 43 | 336 | 1335 | 744 |
| Arrive On Green | 0.16 | 0.16 | 0.16 | 0.20 | 0.20 | 0.20 | 0.01 | 0.31 | 0.31 | 0.20 | 0.50 | 0.50 |
| Sat Flow, veh/h | 1688 | 1562 | 178 | 950 | 774 | 1499 | 1674 | 3176 | 139 | 1688 | 2693 | 1500 |
| Grp Volume(v), veh/h | 241 | 0 | 49 | 49 | 0 | 312 | 5 | 627 | 688 | 284 | 925 | 159 |
| Grp Sat Flow(s),veh/h/ln | 1688 | 0 | 1740 | 1724 | 0 | 1499 | 1674 | 1582 | 1733 | 1688 | 1347 | 1500 |
| Q Serve(g_s), s | 19.9 | 0.0 | 3.5 | 3.3 | 0.0 | 29.0 | 0.4 | 43.8 | 43.8 | 23.0 | 37.4 | 8.5 |
| Cycle Q Clear(g_c), s | 19.9 | 0.0 | 3.5 | 3.3 | 0.0 | 29.0 | 0.4 | 43.8 | 43.8 | 23.0 | 37.4 | 8.5 |
| Prop In Lane | 1.00 | | 0.10 | 0.55 | | 1.00 | 1.00 | | 0.08 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 271 | 0 | 280 | 352 | 0 | 306 | 13 | 488 | 534 | 336 | 1335 | 744 |
| V/C Ratio(X) | 0.89 | 0.00 | 0.18 | 0.14 | 0.00 | 1.02 | 0.39 | 1.28 | 1.29 | 0.84 | 0.69 | 0.21 |
| Avail Cap(c_a), veh/h | 392 | 0 | 404 | 352 | 0 | 306 | 71 | 488 | 534 | 336 | 1335 | 744 |
| 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 | 0.68 | 0.68 | 0.68 | 0.33 | 0.33 | 0.33 |
| Uniform Delay (d), s/veh | 58.3 | 0.0 | 51.5 | 46.3 | 0.0 | 56.5 | 70.1 | 49.1 | 49.1 | 54.7 | 27.5 | 20.2 |
| Incr Delay (d2), s/veh | 15.9 | 0.0 | 0.3 | 0.2 | 0.0 | 56.3 | 13.0 | 138.7 | 138.8 | 6.7 | 1.0 | 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 | 14.9 | 0.0 | 2.8 | 2.6 | 0.0 | 22.6 | 0.4 | 50.9 | 55.4 | 13.3 | 15.1 | 4.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 74.3 | 0.0 | 51.8 | 46.5 | 0.0 | 112.8 | 83.1 | 187.8 | 187.9 | 61.4 | 28.5 | 20.4 |
| LnGrp LOS | E | | D | D | | F | F | F | F | E | C | C |
| Approach Vol, veh/h | | 290 | | | 361 | | | 1320 | | | 1368 | |
| Approach Delay, s/veh | | 70.5 | | | 103.8 | | | 187.5 | | | 34.4 | |
| Approach LOS | | E | | | F | | | F | | | C | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 5.7 | 75.3 | | 27.4 | 33.2 | 47.8 | | 33.6 |
| Change Period (Y+Rc), s | 4.6 | 4.9 | | 4.6 | 4.9 | 4.0 | | 4.6 |
| Max Green Setting (Gmax), s | 6.3 | 55.3 | | 33.0 | 18.1 | 43.8 | | 29.0 |
| Max Q Clear Time (g_c+I1), s | 2.4 | 39.4 | | 21.9 | 25.0 | 45.8 | | 31.0 |
| Green Ext Time (p_c), s | 0.0 | 6.1 | | 0.8 | 0.0 | 0.0 | | 0.0 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 105.5 |
| HCM 7th LOS | F |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 42 | 286 | 296 | 141 | 263 | 515 | 312 | 1141 | 187 | 561 | 869 | 31 |
| Future Volume (veh/h) | 42 | 286 | 296 | 141 | 263 | 515 | 312 | 1141 | 187 | 561 | 869 | 31 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.99 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1786 | 1786 | 1786 | 1772 | 1772 | 1772 | 1758 | 1758 | 1758 | 1772 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 44 | 301 | 312 | 148 | 277 | 542 | 328 | 1201 | 197 | 591 | 915 | 33 |
| 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 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 |
| Cap, veh/h | 58 | 383 | 604 | 156 | 483 | 667 | 309 | 1300 | 579 | 573 | 1129 | 41 |
| Arrive On Green | 0.03 | 0.21 | 0.21 | 0.09 | 0.27 | 0.27 | 0.18 | 0.39 | 0.39 | 0.18 | 0.38 | 0.38 |
| Sat Flow, veh/h | 1701 | 1786 | 1514 | 1688 | 1772 | 1482 | 1674 | 3340 | 1489 | 3274 | 2974 | 107 |
| Grp Volume(v), veh/h | 44 | 301 | 312 | 148 | 277 | 542 | 328 | 1201 | 197 | 591 | 409 | 539 |
| Grp Sat Flow(s),veh/h/ln | 1701 | 1786 | 1514 | 1688 | 1772 | 1482 | 1674 | 1670 | 1489 | 1637 | 1329 | 1752 |
| Q Serve(g_s), s | 3.7 | 23.1 | 22.6 | 12.7 | 19.5 | 39.5 | 26.8 | 49.7 | 13.5 | 25.4 | 40.0 | 40.0 |
| Cycle Q Clear(g_c), s | 3.7 | 23.1 | 22.6 | 12.7 | 19.5 | 39.5 | 26.8 | 49.7 | 13.5 | 25.4 | 40.0 | 40.0 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.06 |
| Lane Grp Cap(c), veh/h | 58 | 383 | 604 | 156 | 483 | 667 | 309 | 1300 | 579 | 573 | 504 | 665 |
| V/C Ratio(X) | 0.75 | 0.79 | 0.52 | 0.95 | 0.57 | 0.81 | 1.06 | 0.92 | 0.34 | 1.03 | 0.81 | 0.81 |
| Avail Cap(c_a), veh/h | 116 | 443 | 656 | 156 | 483 | 667 | 309 | 1300 | 579 | 573 | 504 | 665 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.43 | 0.43 | 0.43 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 69.4 | 53.8 | 33.0 | 65.5 | 45.5 | 34.9 | 59.1 | 42.2 | 31.2 | 59.8 | 40.3 | 40.3 |
| Incr Delay (d2), s/veh | 17.5 | 7.9 | 0.7 | 56.8 | 1.7 | 7.6 | 50.6 | 6.1 | 0.7 | 45.6 | 13.2 | 10.3 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 3.4 | 16.7 | 13.2 | 12.5 | 13.7 | 24.7 | 20.5 | 26.0 | 7.4 | 20.5 | 20.9 | 25.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 86.9 | 61.8 | 33.7 | 122.3 | 47.1 | 42.5 | 109.7 | 48.4 | 31.9 | 105.4 | 53.6 | 50.7 |
| LnGrp LOS | F | E | C | F | D | D | F | D | C | F | D | D |
| Approach Vol, veh/h | | 657 | | | 967 | | | 1726 | | | 1539 | |
| Approach Delay, s/veh | | 50.1 | | | 56.0 | | | 58.2 | | | 72.5 | |
| Approach LOS | | D | | | E | | | E | | | E | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 31.4 | 59.9 | 9.6 | 44.1 | 30.0 | 61.3 | 18.0 | 35.7 |
| Change Period (Y+Rc), s | 4.6 | 4.9 | 4.6 | 4.6 | 4.6 | 4.9 | 4.6 | 4.6 |
| Max Green Setting (Gmax), s | 26.8 | 50.1 | 9.9 | 39.5 | 25.4 | 51.5 | 13.4 | 36.0 |
| Max Q Clear Time (g_c+I1), s | 28.8 | 42.0 | 5.7 | 41.5 | 27.4 | 51.7 | 14.7 | 25.1 |
| Green Ext Time (p_c), s | 0.0 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.2 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 61.2 |
| HCM 7th LOS | E |

| Intersection | |
|---|---|
| Int Delay, s/veh | 3.4 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 208 | 21 | 52 | 229 | 78 | 68 |
| Future Vol, veh/h | 208 | 21 | 52 | 229 | 78 | 68 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | 100 | - | 100 | 0 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 1 | 1 | 1 | 1 |
| Mvmt Flow | 226 | 23 | 57 | 249 | 85 | 74 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 249 | 0 | 599 | 238 |
| Stage 1 | - | - | - | - | 238 | - |
| Stage 2 | - | - | - | - | 362 | - |
| Critical Hdwy | - | - | 4.11 | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | - | - | 2.209 | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | - | - | 1323 | - | 466 | 804 |
| Stage 1 | - | - | - | - | 804 | - |
| Stage 2 | - | - | - | - | 707 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1323 | - | 446 | 804 |
| Mov Cap-2 Maneuver | - | - | - | - | 446 | - |
| Stage 1 | - | - | - | - | 770 | - |
| Stage 2 | - | - | - | - | 707 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 1.45 | 12.62 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 446 | 804 | - | - | 1323 | - |
| HCM Lane V/C Ratio | 0.19 | 0.092 | - | - | 0.043 | - |
| HCM Ctrl Dly (s/v) | 15 | 9.9 | - | - | 7.8 | - |
| HCM Lane LOS | B | A | - | - | A | - |
| HCM 95th %tile Q(veh) | 0.7 | 0.3 | - | - | 0.1 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 26 | 229 | 312 | 5 | 0 | 36 |
| Future Vol, veh/h | 26 | 229 | 312 | 5 | 0 | 36 |
| Conflicting Peds, #/hr | 9 | 0 | 0 | 9 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 0 | 0 |
| Mvmt Flow | 28 | 249 | 339 | 5 | 0 | 39 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 354 | 0 | - | 0 | 656 | 351 |
| Stage 1 | - | - | - | - | 351 | - |
| Stage 2 | - | - | - | - | 305 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.4 | 6.2 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.5 | 3.3 |
| Pot Cap-1 Maneuver | 1205 | - | - | - | 433 | 697 |
| Stage 1 | - | - | - | - | 717 | - |
| Stage 2 | - | - | - | - | 752 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1196 | - | - | - | 418 | 692 |
| Mov Cap-2 Maneuver | - | - | - | - | 418 | - |
| Stage 1 | - | - | - | - | 692 | - |
| Stage 2 | - | - | - | - | 752 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0.82 | 0 | 10.51 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 184 | - | - | - | 692 |
| HCM Lane V/C Ratio | 0.024 | - | - | - | 0.057 |
| HCM Ctrl Dly (s/v) | 8.1 | 0 | - | - | 10.5 |
| HCM Lane LOS | A | A | - | - | B |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.2 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 10.6 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 10 | 239 | 68 | 16 | 296 | 31 | 0 | 0 | 0 | 16 | 31 | 10 |
| Future Vol, veh/h | 10 | 239 | 68 | 16 | 296 | 31 | 0 | 0 | 0 | 16 | 31 | 10 |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Heavy Vehicles, % | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 |
| Mvmt Flow | 11 | 257 | 73 | 17 | 318 | 33 | 0 | 0 | 0 | 17 | 33 | 11 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | SB |
|---|---|---|---|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | SB | | WB |
| Conflicting Lanes Left | 1 | 0 | 1 |
| Conflicting Approach Right | | SB | EB |
| Conflicting Lanes Right | 0 | 1 | 1 |
| HCM Control Delay, s/veh | 10.4 | 11 | 8.9 |
| HCM LOS | B | B | A |

| Lane | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|
| Vol Left, % | 3% | 5% | 28% |
| Vol Thru, % | 75% | 86% | 54% |
| Vol Right, % | 21% | 9% | 18% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 317 | 343 | 57 |
| LT Vol | 10 | 16 | 16 |
| Through Vol | 239 | 296 | 31 |
| RT Vol | 68 | 31 | 10 |
| Lane Flow Rate | 341 | 369 | 61 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.411 | 0.451 | 0.091 |
| Departure Headway (Hd) | 4.34 | 4.401 | 5.357 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 828 | 819 | 667 |
| Service Time | 2.366 | 2.427 | 3.407 |
| HCM Lane V/C Ratio | 0.412 | 0.451 | 0.091 |
| HCM Control Delay, s/veh | 10.4 | 11 | 8.9 |
| HCM Lane LOS | B | B | A |
| HCM 95th-tile Q | 2 | 2.4 | 0.3 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 20.8 |
| Intersection LOS | C |

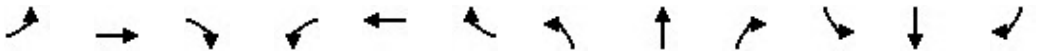
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 10 | 317 | 328 | 16 | 229 | 333 |
| Future Vol, veh/h | 10 | 317 | 328 | 16 | 229 | 333 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, % | 1 | 1 | 1 | 1 | 1 | 1 |
| Mvmt Flow | 11 | 360 | 373 | 18 | 260 | 378 |
| Number of Lanes | 1 | 1 | 1 | 0 | 1 | 1 |

| Approach | WB | NB | SB |
|---|---|---|---|
| Opposing Approach | | SB | NB |
| Opposing Lanes | 0 | 2 | 1 |
| Conflicting Approach Left | NB | | WB |
| Conflicting Lanes Left | 1 | 0 | 2 |
| Conflicting Approach Right | SB | WB | |
| Conflicting Lanes Right | 2 | 2 | 0 |
| HCM Control Delay, s/veh | 10.1 | 23.3 | 19.7 |
| HCM LOS | C | C | C |

| Lane | NBLn1 | WBLn1 | WBLn2 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|
| Vol Left, % | 0% | 100% | 0% | 100% | 0% |
| Vol Thru, % | 95% | 0% | 0% | 0% | 100% |
| Vol Right, % | 5% | 0% | 100% | 0% | 0% |
| Sign Control | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 344 | 10 | 317 | 229 | 333 |
| LT Vol | 0 | 10 | 0 | 229 | 0 |
| Through Vol | 328 | 0 | 0 | 0 | 333 |
| RT Vol | 16 | 0 | 317 | 0 | 0 |
| Lane Flow Rate | 391 | 11 | 360 | 260 | 378 |
| Geometry Grp | 3b | 5 | 5 | 5 | 5 |
| Degree of Util (X) | 0.7 | 0.024 | 0.647 | 0.503 | 0.677 |
| Departure Headway (Hd) | 6.448 | 7.687 | 6.461 | 6.955 | 6.445 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes |
| Cap | 559 | 464 | 555 | 515 | 556 |
| Service Time | 4.527 | 5.469 | 4.242 | 4.741 | 4.23 |
| HCM Lane V/C Ratio | 0.699 | 0.024 | 0.649 | 0.505 | 0.68 |
| HCM Control Delay, s/veh | 23.3 | 10.7 | 20.4 | 16.7 | 21.8 |
| HCM Lane LOS | C | B | C | C | C |
| HCM 95th-tile Q | 5.5 | 0.1 | 4.6 | 2.8 | 5.1 |

# THE PINNACLE AT LIBERTY BAY
# TRAFFIC IMPACT ANALYSIS

*APPENDIX*
*Forecast 2032 Level of Service*



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 39 | 107 | 66 | 54 | 89 | 150 | 47 | 489 | 21 | 208 | 879 | 21 |
| Future Volume (veh/h) | 39 | 107 | 66 | 54 | 89 | 150 | 47 | 489 | 21 | 208 | 879 | 21 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 0.99 | | 0.98 | 0.99 | | 0.98 | 1.00 | | 0.98 | 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 | 1716 | 1730 | 1744 | 1744 | 1744 | 1716 | 1730 | 1716 | 1716 | 1730 | 1716 | 1646 |
| Adj Flow Rate, veh/h | 42 | 116 | 72 | 59 | 97 | 98 | 51 | 532 | 23 | 226 | 955 | 23 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 6 | 5 | 4 | 4 | 4 | 6 | 5 | 6 | 6 | 5 | 6 | 11 |
| Cap, veh/h | 172 | 175 | 146 | 166 | 197 | 161 | 58 | 599 | 26 | 790 | 1879 | 45 |
| Arrive On Green | 0.03 | 0.10 | 0.10 | 0.04 | 0.11 | 0.11 | 0.04 | 0.21 | 0.21 | 0.48 | 0.66 | 0.66 |
| Sat Flow, veh/h | 1634 | 1730 | 1443 | 1661 | 1744 | 1423 | 1647 | 2789 | 120 | 1647 | 2852 | 69 |
| Grp Volume(v), veh/h | 42 | 116 | 72 | 59 | 97 | 98 | 51 | 232 | 323 | 226 | 408 | 570 |
| Grp Sat Flow(s),veh/h/ln | 1634 | 1730 | 1443 | 1661 | 1744 | 1423 | 1647 | 1218 | 1691 | 1647 | 1218 | 1703 |
| Q Serve(g_s), s | 2.8 | 7.8 | 5.7 | 3.8 | 6.3 | 3.0 | 3.7 | 22.2 | 22.2 | 9.9 | 20.6 | 20.6 |
| Cycle Q Clear(g_c), s | 2.8 | 7.8 | 5.7 | 3.8 | 6.3 | 3.0 | 3.7 | 22.2 | 22.2 | 9.9 | 20.6 | 20.6 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.07 | 1.00 | | 0.04 |
| Lane Grp Cap(c), veh/h | 172 | 175 | 146 | 166 | 197 | 161 | 58 | 262 | 363 | 790 | 803 | 1122 |
| V/C Ratio(X) | 0.24 | 0.66 | 0.49 | 0.36 | 0.49 | 0.61 | 0.88 | 0.89 | 0.89 | 0.29 | 0.51 | 0.51 |
| Avail Cap(c_a), veh/h | 341 | 332 | 277 | 318 | 334 | 273 | 316 | 437 | 606 | 790 | 803 | 1122 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 47.0 | 52.0 | 51.0 | 46.4 | 50.0 | 7.1 | 57.6 | 45.7 | 45.7 | 18.8 | 10.5 | 10.5 |
| Incr Delay (d2), s/veh | 0.7 | 4.3 | 2.6 | 1.3 | 1.9 | 3.7 | 30.5 | 32.9 | 26.2 | 0.2 | 2.3 | 1.6 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 2.1 | 6.4 | 3.9 | 2.9 | 5.1 | 5.1 | 3.6 | 13.8 | 17.4 | 6.7 | 9.3 | 11.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 47.8 | 56.2 | 53.6 | 47.7 | 51.9 | 10.8 | 88.1 | 78.6 | 71.9 | 19.0 | 12.8 | 12.1 |
| LnGrp LOS | D | E | D | D | D | B | F | E | E | B | B | B |
| Approach Vol, veh/h | | 230 | | | 254 | | | 606 | | | 1204 | |
| Approach Delay, s/veh | | 53.9 | | | 35.1 | | | 75.8 | | | 13.7 | |
| Approach LOS | | D | | | D | | | E | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 62.5 | 30.8 | 9.6 | 17.1 | 9.2 | 84.1 | 8.1 | 18.6 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 18.9 | 43.5 | 16.1 | 23.5 | 23.5 | 38.9 | 16.1 | 23.5 |
| Max Q Clear Time (g_c+I1), s | 11.9 | 24.2 | 5.8 | 9.8 | 5.7 | 22.6 | 4.8 | 8.3 |
| Green Ext Time (p_c), s | 0.4 | 2.0 | 0.1 | 0.6 | 0.1 | 3.8 | 0.1 | 0.6 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 36.5 |
| HCM 7th LOS | D |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 967 | 515 | 1 | 2 | 3 |
| Future Vol, veh/h | 0 | 967 | 515 | 1 | 2 | 3 |
| Conflicting Peds, #/hr | 4 | 0 | 0 | 4 | 4 | 4 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 105 | - | - | 55 | 60 | 0 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 93 | 93 | 93 | 93 | 93 | 93 |
| Heavy Vehicles, % | 1 | 8 | 6 | 1 | 1 | 1 |
| Mvmt Flow | 0 | 1040 | 554 | 1 | 2 | 3 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 559 | 0 | - | 0 | 1602 | 562 |
| Stage 1 | - | - | - | - | 558 | - |
| Stage 2 | - | - | - | - | 1044 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1017 | - | - | - | 117 | 529 |
| Stage 1 | - | - | - | - | 575 | - |
| Stage 2 | - | - | - | - | 341 | - |
| Platoon blocked, % | | | - | - | - | |
| Mov Cap-1 Maneuver | 1014 | - | - | - | 116 | 525 |
| Mov Cap-2 Maneuver | - | - | - | - | 116 | - |
| Stage 1 | - | - | - | - | 573 | - |
| Stage 2 | - | - | - | - | 339 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 0 | 21.76 |
| HCM LOS | | | C |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1014 | - | - | - | 116 | 525 |
| HCM Lane V/C Ratio | - | - | - | - | 0.018 | 0.006 |
| HCM Ctrl Dly (s/v) | 0 | - | - | - | 36.5 | 11.9 |
| HCM Lane LOS | A | - | - | - | E | B |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.1 | 0 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 4.3 |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 6 | 0 | 0 | 3 | 1 | 2 |
| Future Vol, veh/h | 6 | 0 | 0 | 3 | 1 | 2 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 7 | 0 | 0 | 3 | 1 | 2 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 5 | 2 | 3 | 0 | - | 0 |
| Stage 1 | 2 | - | - | - | - | - |
| Stage 2 | 3 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 1016 | 1082 | 1619 | - | - | - |
| Stage 1 | 1021 | - | - | - | - | - |
| Stage 2 | 1020 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 1016 | 1082 | 1619 | - | - | - |
| Mov Cap-2 Maneuver | 1016 | - | - | - | - | - |
| Stage 1 | 1021 | - | - | - | - | - |
| Stage 2 | 1020 | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 8.57 | 0 | 0 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1619 | - | 1016 | - | - |
| HCM Lane V/C Ratio | - | - | 0.006 | - | - |
| HCM Ctrl Dly (s/v) | 0 | - | 8.6 | - | - |
| HCM Lane LOS | A | - | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0 | - | - |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 22.2 |
| Intersection LOS | C |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 48 | 236 | 23 | 13 | 216 | 83 | 58 | 34 | 40 | 138 | 17 | 60 |
| Future Vol, veh/h | 48 | 236 | 23 | 13 | 216 | 83 | 58 | 34 | 40 | 138 | 17 | 60 |
| Peak Hour Factor | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| Heavy Vehicles, % | 1 | 6 | 5 | 1 | 7 | 1 | 1 | 3 | 6 | 7 | 1 | 4 |
| Mvmt Flow | 64 | 315 | 31 | 17 | 288 | 111 | 77 | 45 | 53 | 184 | 23 | 80 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 1 | 1 |
| HCM Control Delay, s/veh | 26.2 | 25.5 | 15 | 16.2 |
| HCM LOS | D | D | B | C |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|
| Vol Left, % | 44% | 16% | 4% | 89% | 0% |
| Vol Thru, % | 26% | 77% | 69% | 11% | 0% |
| Vol Right, % | 30% | 7% | 27% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 132 | 307 | 312 | 155 | 60 |
| LT Vol | 58 | 48 | 13 | 138 | 0 |
| Through Vol | 34 | 236 | 216 | 17 | 0 |
| RT Vol | 40 | 23 | 83 | 0 | 60 |
| Lane Flow Rate | 176 | 409 | 416 | 207 | 80 |
| Geometry Grp | 4a | 2 | 2 | 5 | 5 |
| Degree of Util (X) | 0.37 | 0.741 | 0.737 | 0.474 | 0.155 |
| Departure Headway (Hd) | 7.563 | 6.629 | 6.494 | 8.25 | 6.965 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes |
| Cap | 479 | 549 | 562 | 440 | 518 |
| Service Time | 5.575 | 4.629 | 4.494 | 5.95 | 4.665 |
| HCM Lane V/C Ratio | 0.367 | 0.745 | 0.74 | 0.47 | 0.154 |
| HCM Control Delay, s/veh | 15 | 26.2 | 25.5 | 18.2 | 10.9 |
| HCM Lane LOS | B | D | D | C | B |
| HCM 95th-tile Q | 1.7 | 6.3 | 6.3 | 2.5 | 0.5 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 4 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 34 | 17 | 6 | 57 | 51 | 23 |
| Future Vol, veh/h | 34 | 17 | 6 | 57 | 51 | 23 |
| Conflicting Peds, #/hr | 0 | 10 | 10 | 0 | 10 | 10 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 37 | 18 | 7 | 62 | 55 | 25 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 65 | 0 | 141 | 66 |
| Stage 1 | - | - | - | - | 56 | - |
| Stage 2 | - | - | - | - | 85 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1537 | - | 852 | 998 |
| Stage 1 | - | - | - | - | 966 | - |
| Stage 2 | - | - | - | - | 938 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1524 | - | 834 | 981 |
| Mov Cap-2 Maneuver | - | - | - | - | 834 | - |
| Stage 1 | - | - | - | - | 954 | - |
| Stage 2 | - | - | - | - | 930 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 0.7 | 9.53 |
| HCM LOS | | | A |

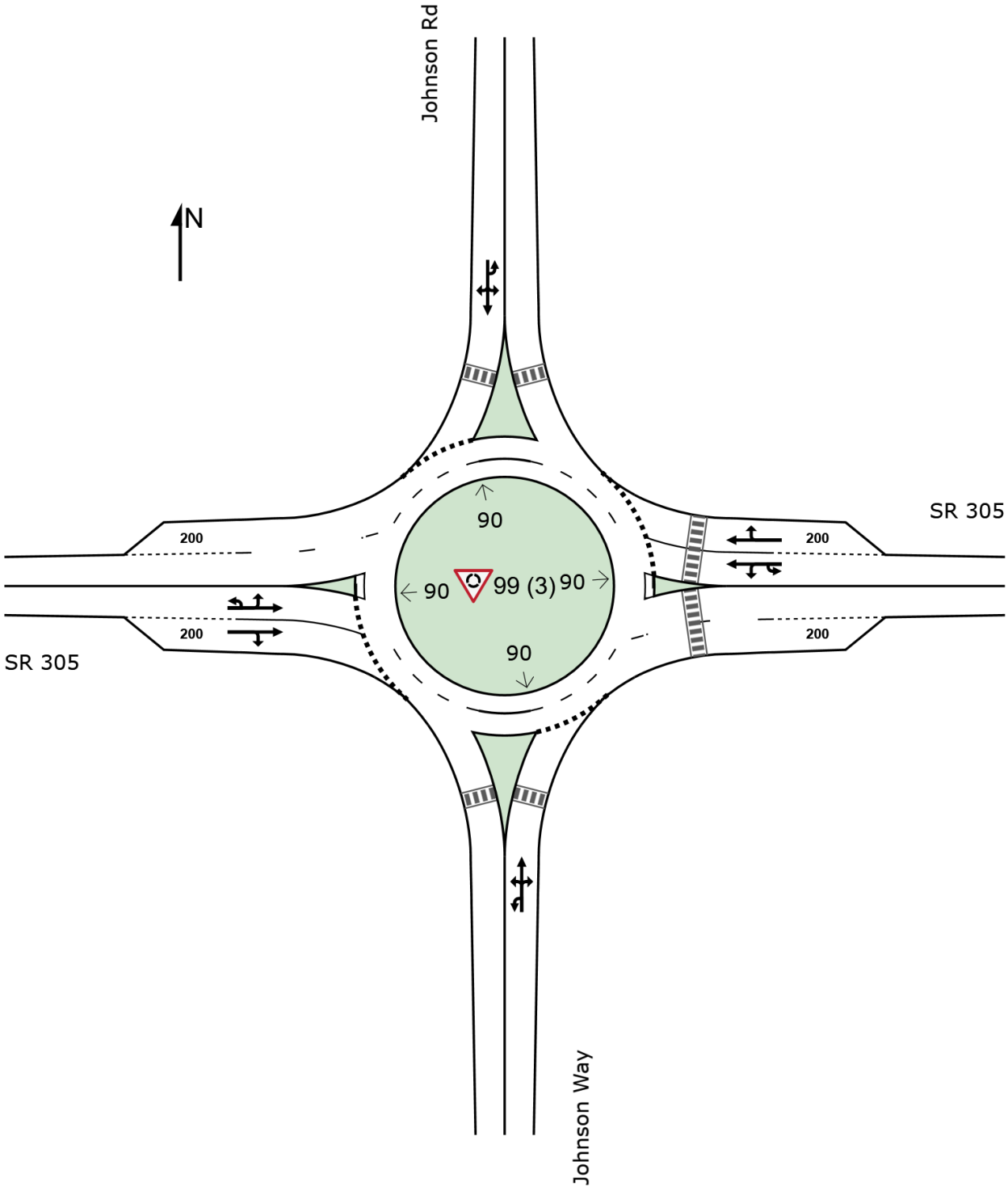
| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 875 | - | - | 171 | - |
| HCM Lane V/C Ratio | 0.092 | - | - | 0.004 | - |
| HCM Ctrl Dly (s/v) | 9.5 | - | - | 7.4 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0 | - |

# SITE LAYOUT

## Site: [99 (3)] SR 305 & Johnson Rd - Forecast 2032 AM
**Without** (AM Peak Hour)

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



# MOVEMENT SUMMARY

## Site: [99 (3)] SR 305 & Johnson Rd - Forecast 2032 AM

**Without** (AM Peak Hour)

Output produced by SIDRA INTERSECTION Version: 11.0.2

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Johnson Way | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.050 | 16.3 | LOS B | 0.2 | 5.5 | 0.67 | 0.79 | 0.67 | 30.6 |
| 3 | L2 | All MCs | 18 | 1.0 | 18 | 1.0 | 0.050 | 12.8 | LOS B | 0.2 | 5.5 | 0.67 | 0.79 | 0.67 | 32.3 |
| 8 | T1 | All MCs | 8 | 1.0 | 8 | 1.0 | 0.050 | 7.2 | LOS A | 0.2 | 5.5 | 0.67 | 0.79 | 0.67 | 29.8 |
| 18 | R2 | All MCs | 3 | 1.0 | 3 | 1.0 | 0.050 | 12.8 | LOS B | 0.2 | 5.5 | 0.67 | 0.79 | 0.67 | 32.7 |
| Approach | | | 30 | 1.0 | 30 | 1.0 | 0.050 | 11.5 | LOS B | 0.2 | 5.5 | 0.67 | 0.79 | 0.67 | 31.6 |
| East: SR 305 | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.266 | 12.0 | LOS B | 1.7 | 43.4 | 0.18 | 0.46 | 0.18 | 37.7 |
| 1 | L2 | All MCs | 6 | 1.0 | 6 | 1.0 | 0.266 | 11.4 | LOS B | 1.7 | 43.4 | 0.18 | 0.46 | 0.18 | 35.8 |
| 6 | T1 | All MCs | 522 | 6.0 | 522 | 6.0 | 0.266 | 6.1 | LOS A | 1.7 | 43.4 | 0.17 | 0.46 | 0.17 | 40.7 |
| 16 | R2 | All MCs | 16 | 1.0 | 16 | 1.0 | 0.121 | 5.8 | LOS A | 0.6 | 16.6 | 0.17 | 0.46 | 0.17 | 36.2 |
| Approach | | | 545 | 5.8 | 545 | 5.8 | 0.266 | 6.1 | LOS A | 1.7 | 43.4 | 0.17 | 0.46 | 0.17 | 40.5 |
| North: Johnson Rd | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.130 | 13.9 | LOS B | 0.5 | 12.5 | 0.48 | 0.70 | 0.48 | 31.0 |
| 7 | L2 | All MCs | 91 | 3.0 | 91 | 3.0 | 0.130 | 10.6 | LOS B | 0.5 | 12.5 | 0.48 | 0.70 | 0.48 | 32.6 |
| 4 | T1 | All MCs | 2 | 1.0 | 2 | 1.0 | 0.130 | 4.8 | LOS A | 0.5 | 12.5 | 0.48 | 0.70 | 0.48 | 30.3 |
| 14 | R2 | All MCs | 17 | 1.0 | 17 | 1.0 | 0.130 | 6.2 | LOS A | 0.5 | 12.5 | 0.48 | 0.70 | 0.48 | 33.3 |
| Approach | | | 112 | 2.6 | 112 | 2.6 | 0.130 | 9.9 | LOS A | 0.5 | 12.5 | 0.48 | 0.70 | 0.48 | 32.6 |
| West: SR 305 | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.551 | 12.5 | LOS B | 4.8 | 127.0 | 0.42 | 0.48 | 0.42 | 36.9 |
| 5 | L2 | All MCs | 10 | 17.0 | 10 | 17.0 | 0.551 | 12.5 | LOS B | 4.8 | 127.0 | 0.42 | 0.48 | 0.42 | 34.5 |
| 2 | T1 | All MCs | 1014 | 8.0 | 1014 | 8.0 | 0.551 | 7.7 | LOS A | 4.8 | 127.0 | 0.39 | 0.48 | 0.39 | 39.5 |
| 12 | R2 | All MCs | 20 | 12.0 | 20 | 12.0 | 0.251 | 6.5 | LOS A | 1.5 | 39.1 | 0.33 | 0.49 | 0.33 | 35.5 |
| Approach | | | 1045 | 8.2 | 1045 | 8.2 | 0.551 | 7.7 | LOS A | 4.8 | 127.0 | 0.39 | 0.48 | 0.39 | 39.4 |
| All Vehicles | | | 1732 | 6.9 | 1732 | 6.9 | 0.551 | 7.4 | LOS A | 4.8 | 127.0 | 0.33 | 0.50 | 0.33 | 39.0 |

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# MOVEMENT SUMMARY

## Site: [1 (3)] Johnson & Sunrise Ridge - 2032 AM Without

(Folder1)

Output produced by SIDRA INTERSECTION Version: 11.0.2

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NE Midnight Sun Loop | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 7.2 | LOS A | 0.0 | 0.4 | 0.16 | 0.45 | 0.16 | 23.5 |
| 3 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 5.8 | LOS A | 0.0 | 0.4 | 0.16 | 0.45 | 0.16 | 23.5 |
| 8 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 2.0 | LOS A | 0.0 | 0.4 | 0.16 | 0.45 | 0.16 | 23.7 |
| 18 | R2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 2.3 | LOS A | 0.0 | 0.4 | 0.16 | 0.45 | 0.16 | 23.6 |
| Approach | | | 5 | 3.0 | 5 | 3.0 | 0.004 | 4.3 | LOS A | 0.0 | 0.4 | 0.16 | 0.45 | 0.16 | 23.6 |
| East: Johnson Rd NE | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.087 | 10.8 | LOS B | 0.4 | 9.4 | 0.07 | 0.46 | 0.07 | 34.7 |
| 1 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.087 | 8.9 | LOS A | 0.4 | 9.4 | 0.07 | 0.46 | 0.07 | 34.7 |
| 6 | T1 | All MCs | 108 | 3.0 | 108 | 3.0 | 0.087 | 4.9 | LOS A | 0.4 | 9.4 | 0.07 | 0.46 | 0.07 | 35.4 |
| 16 | R2 | All MCs | 6 | 3.0 | 6 | 3.0 | 0.087 | 4.6 | LOS A | 0.4 | 9.4 | 0.07 | 0.46 | 0.07 | 35.1 |
| Approach | | | 117 | 3.0 | 117 | 3.0 | 0.087 | 5.0 | LOS A | 0.4 | 9.4 | 0.07 | 0.46 | 0.07 | 35.4 |
| North: Sunrise Ridge Ave NE | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.036 | 11.3 | LOS B | 0.1 | 3.8 | 0.24 | 0.58 | 0.24 | 33.6 |
| 7 | L2 | All MCs | 18 | 3.0 | 18 | 3.0 | 0.036 | 9.4 | LOS A | 0.1 | 3.8 | 0.24 | 0.58 | 0.24 | 33.6 |
| 4 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.036 | 5.3 | LOS A | 0.1 | 3.8 | 0.24 | 0.58 | 0.24 | 34.2 |
| 14 | R2 | All MCs | 21 | 3.0 | 21 | 3.0 | 0.036 | 5.1 | LOS A | 0.1 | 3.8 | 0.24 | 0.58 | 0.24 | 33.9 |
| Approach | | | 42 | 3.0 | 42 | 3.0 | 0.036 | 7.1 | LOS A | 0.1 | 3.8 | 0.24 | 0.58 | 0.24 | 33.8 |
| West: Johnson Rd NE | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.040 | 10.9 | LOS B | 0.2 | 4.4 | 0.10 | 0.51 | 0.10 | 34.4 |
| 5 | L2 | All MCs | 8 | 3.0 | 8 | 3.0 | 0.040 | 9.0 | LOS A | 0.2 | 4.4 | 0.10 | 0.51 | 0.10 | 34.4 |
| 2 | T1 | All MCs | 32 | 3.0 | 32 | 3.0 | 0.040 | 4.9 | LOS A | 0.2 | 4.4 | 0.10 | 0.51 | 0.10 | 35.0 |
| 12 | R2 | All MCs | 10 | 3.0 | 10 | 3.0 | 0.040 | 4.7 | LOS A | 0.2 | 4.4 | 0.10 | 0.51 | 0.10 | 34.7 |
| Approach | | | 51 | 3.0 | 51 | 3.0 | 0.040 | 5.7 | LOS A | 0.2 | 4.4 | 0.10 | 0.51 | 0.10 | 34.8 |
| All Vehicles | | | 214 | 3.0 | 214 | 3.0 | 0.087 | 5.5 | LOS A | 0.4 | 9.4 | 0.11 | 0.50 | 0.11 | 34.5 |

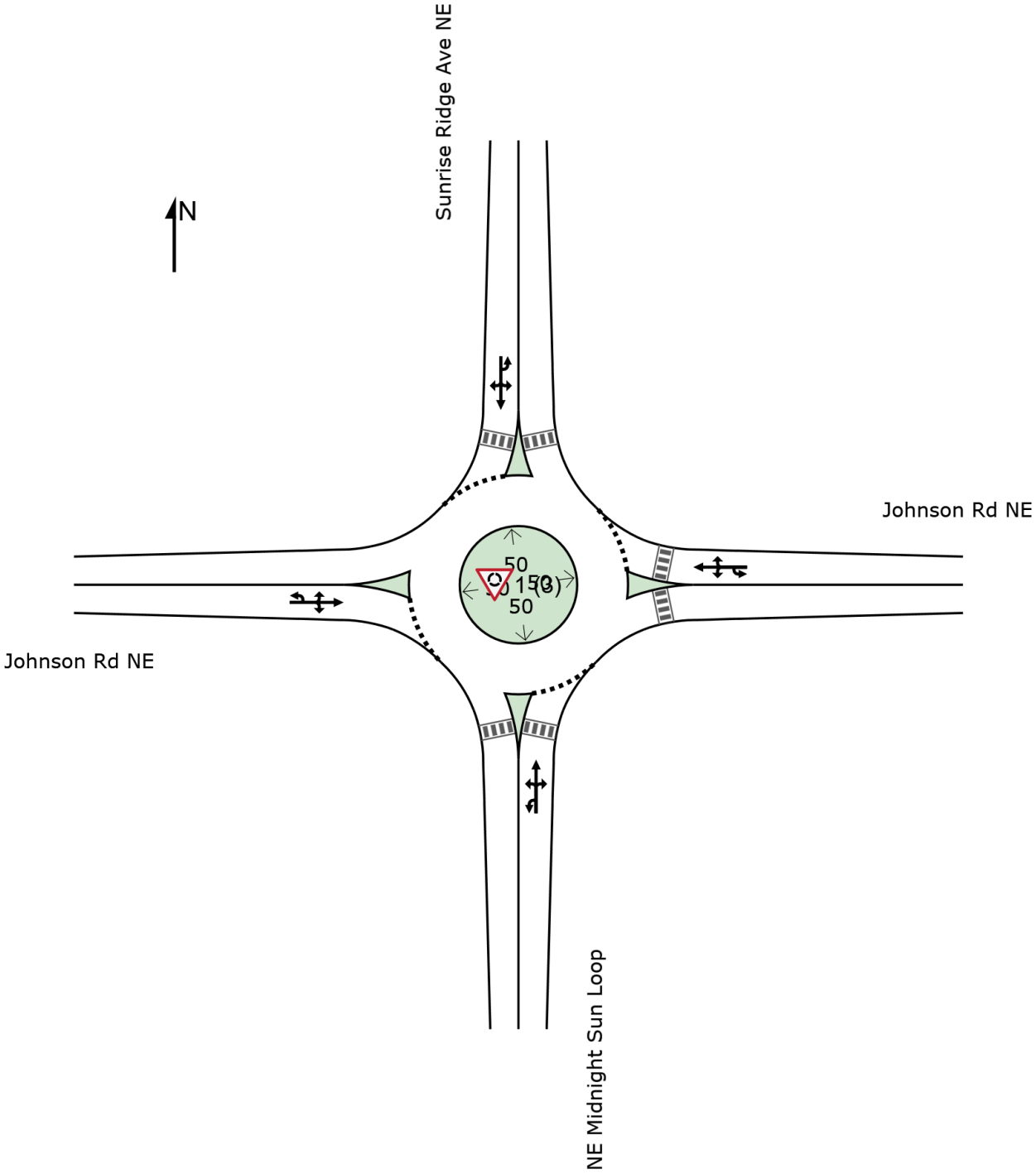
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

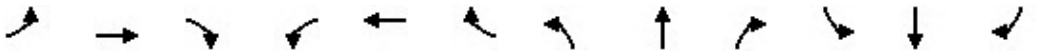
## Site: [1 (3)] Johnson & Sunrise Ridge - 2032 AM Without
(Folder1)

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.




**SIDRA INTERSECTION 11 | Copyright © 2000-2026 Akcelik and Associates Pty Ltd | sidrasolutions.com**
Organisation: HEATH & ASSOCIATES | Licence: PLUS / 1PC | Created: Saturday, October 3, 2026 3:27:28 PM
Project: C:\Users\LucasMaulin\Heath and Associates\Office Access - Documents\Project Files\Pinnacle at Liberty Bay - 5576\5-Analysis\Sidra\Johnson & Sunrise Ridge.sipx



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 71 | 178 | 101 | 55 | 130 | 228 | 123 | 822 | 36 | 218 | 662 | 51 |
| Future Volume (veh/h) | 71 | 178 | 101 | 55 | 130 | 228 | 123 | 822 | 36 | 218 | 662 | 51 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 0.99 | | 0.96 | 0.99 | | 0.96 | 1.00 | | 0.96 | 1.00 | | 0.97 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1702 | 1758 | 1786 | 1786 | 1786 | 1786 | 1772 | 1744 | 1786 | 1786 | 1772 | 1744 |
| Adj Flow Rate, veh/h | 72 | 180 | 102 | 56 | 131 | 84 | 124 | 830 | 36 | 220 | 669 | 52 |
| 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, % | 7 | 3 | 1 | 1 | 1 | 1 | 2 | 4 | 1 | 1 | 2 | 4 |
| Cap, veh/h | 186 | 223 | 185 | 149 | 204 | 166 | 145 | 893 | 39 | 606 | 1622 | 126 |
| Arrive On Green | 0.05 | 0.13 | 0.13 | 0.04 | 0.11 | 0.11 | 0.09 | 0.32 | 0.32 | 0.36 | 0.59 | 0.59 |
| Sat Flow, veh/h | 1621 | 1758 | 1459 | 1701 | 1786 | 1455 | 1688 | 2832 | 123 | 1701 | 2769 | 215 |
| Grp Volume(v), veh/h | 72 | 180 | 102 | 56 | 131 | 84 | 124 | 363 | 503 | 220 | 304 | 417 |
| Grp Sat Flow(s),veh/h/ln | 1621 | 1758 | 1459 | 1701 | 1786 | 1455 | 1688 | 1238 | 1716 | 1701 | 1258 | 1726 |
| Q Serve(g_s), s | 4.7 | 12.0 | 7.9 | 3.5 | 8.4 | 3.3 | 8.7 | 34.1 | 34.1 | 11.5 | 15.8 | 15.9 |
| Cycle Q Clear(g_c), s | 4.7 | 12.0 | 7.9 | 3.5 | 8.4 | 3.3 | 8.7 | 34.1 | 34.1 | 11.5 | 15.8 | 15.9 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.07 | 1.00 | | 0.12 |
| Lane Grp Cap(c), veh/h | 186 | 223 | 185 | 149 | 204 | 166 | 145 | 390 | 541 | 606 | 737 | 1011 |
| V/C Ratio(X) | 0.39 | 0.81 | 0.55 | 0.38 | 0.64 | 0.50 | 0.86 | 0.93 | 0.93 | 0.36 | 0.41 | 0.41 |
| Avail Cap(c_a), veh/h | 320 | 337 | 280 | 311 | 342 | 279 | 323 | 444 | 615 | 606 | 737 | 1011 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.76 | 0.76 | 0.76 |
| Uniform Delay (d), s/veh | 44.4 | 51.0 | 49.2 | 45.4 | 50.8 | 13.1 | 54.1 | 39.8 | 39.8 | 28.5 | 13.6 | 13.6 |
| Incr Delay (d2), s/veh | 1.3 | 8.4 | 2.6 | 1.6 | 3.3 | 2.4 | 13.2 | 30.8 | 24.7 | 0.3 | 1.3 | 0.9 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 3.5 | 9.7 | 5.4 | 2.8 | 7.1 | 4.3 | 7.5 | 19.3 | 24.5 | 7.7 | 7.5 | 9.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 45.8 | 59.4 | 51.8 | 46.9 | 54.1 | 15.5 | 67.3 | 70.6 | 64.5 | 28.8 | 14.9 | 14.5 |
| LnGrp LOS | D | E | D | D | D | B | E | E | E | C | B | B |
| Approach Vol, veh/h | | 354 | | | 271 | | | 990 | | | 941 | |
| Approach Delay, s/veh | | 54.4 | | | 40.7 | | | 67.1 | | | 18.0 | |
| Approach LOS | | D | | | D | | | E | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 47.8 | 42.8 | 9.2 | 20.2 | 15.3 | 75.3 | 10.7 | 18.7 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 18.9 | 43.5 | 16.1 | 23.5 | 23.5 | 38.9 | 16.1 | 23.5 |
| Max Q Clear Time (g_c+I1), s | 13.5 | 36.1 | 5.5 | 14.0 | 10.7 | 17.9 | 6.7 | 10.4 |
| Green Ext Time (p_c), s | 0.4 | 2.3 | 0.1 | 0.8 | 0.3 | 2.8 | 0.1 | 0.7 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 44.5 |
| HCM 7th LOS | D |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 6 | 787 | 909 | 5 | 1 | 3 |
| Future Vol, veh/h | 6 | 787 | 909 | 5 | 1 | 3 |
| Conflicting Peds, #/hr | 1 | 0 | 0 | 1 | 1 | 1 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 105 | - | - | 55 | 60 | 0 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 93 | 93 | 93 | 93 | 93 | 93 |
| Heavy Vehicles, % | 10 | 2 | 3 | 1 | 10 | 1 |
| Mvmt Flow | 6 | 846 | 977 | 5 | 1 | 3 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 984 | 0 | - | 0 | 1839 | 979 |
| Stage 1 | - | - | - | - | 978 | - |
| Stage 2 | - | - | - | - | 860 | - |
| Critical Hdwy | 4.2 | - | - | - | 6.5 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.5 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.5 | - |
| Follow-up Hdwy | 2.29 | - | - | - | 3.59 | 3.309 |
| Pot Cap-1 Maneuver | 671 | - | - | - | 79 | 305 |
| Stage 1 | - | - | - | - | 352 | - |
| Stage 2 | - | - | - | - | 401 | - |
| Platoon blocked, % | | | - | - | - | |
| Mov Cap-1 Maneuver | 671 | - | - | - | 78 | 304 |
| Mov Cap-2 Maneuver | - | - | - | - | 78 | - |
| Stage 1 | - | - | - | - | 349 | - |
| Stage 2 | - | - | - | - | 401 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0.08 | 0 | 25.63 |
| HCM LOS | | | D |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 671 | - | - | - | 78 | 304 |
| HCM Lane V/C Ratio | 0.01 | - | - | - | 0.014 | 0.011 |
| HCM Ctrl Dly (s/v) | 10.4 | - | - | - | 51.6 | 17 |
| HCM Lane LOS | B | - | - | - | F | C |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0 | 0 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 3.2 |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 3 | 0 | 0 | 0 | 0 | 5 |
| Future Vol, veh/h | 3 | 0 | 0 | 0 | 0 | 5 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 3 | 0 | 0 | 0 | 0 | 5 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 3 | 3 | 5 | 0 | - | 0 |
| Stage 1 | 3 | - | - | - | - | - |
| Stage 2 | 0 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 1020 | 1081 | 1616 | - | - | - |
| Stage 1 | 1020 | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 1020 | 1081 | 1616 | - | - | - |
| Mov Cap-2 Maneuver | 1020 | - | - | - | - | - |
| Stage 1 | 1020 | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 8.54 | 0 | 0 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1616 | - | 1020 | - | - |
| HCM Lane V/C Ratio | - | - | 0.003 | - | - |
| HCM Ctrl Dly (s/v) | 0 | - | 8.5 | - | - |
| HCM Lane LOS | A | - | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0 | - | - |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 14.7 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 89 | 219 | 72 | 5 | 140 | 52 | 62 | 47 | 2 | 97 | 56 | 65 |
| Future Vol, veh/h | 89 | 219 | 72 | 5 | 140 | 52 | 62 | 47 | 2 | 97 | 56 | 65 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Heavy Vehicles, % | 3 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 4 |
| Mvmt Flow | 102 | 252 | 83 | 6 | 161 | 60 | 71 | 54 | 2 | 111 | 64 | 75 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 1 | 1 |
| HCM Control Delay, s/veh | 18.6 | 11.9 | 11.6 | 12.1 |
| HCM LOS | C | B | B | B |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|
| Vol Left, % | 56% | 23% | 3% | 63% | 0% |
| Vol Thru, % | 42% | 58% | 71% | 37% | 0% |
| Vol Right, % | 2% | 19% | 26% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 111 | 380 | 197 | 153 | 65 |
| LT Vol | 62 | 89 | 5 | 97 | 0 |
| Through Vol | 47 | 219 | 140 | 56 | 0 |
| RT Vol | 2 | 72 | 52 | 0 | 65 |
| Lane Flow Rate | 128 | 437 | 226 | 176 | 75 |
| Geometry Grp | 4a | 2 | 2 | 5 | 5 |
| Degree of Util (X) | 0.231 | 0.661 | 0.358 | 0.338 | 0.122 |
| Departure Headway (Hd) | 6.508 | 5.451 | 5.685 | 6.914 | 5.877 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes |
| Cap | 547 | 660 | 627 | 517 | 606 |
| Service Time | 4.6 | 3.516 | 3.763 | 4.691 | 3.654 |
| HCM Lane V/C Ratio | 0.234 | 0.662 | 0.36 | 0.34 | 0.124 |
| HCM Control Delay, s/veh | 11.6 | 18.6 | 11.9 | 13.2 | 9.5 |
| HCM Lane LOS | B | C | B | B | A |
| HCM 95th-tile Q | 0.9 | 5 | 1.6 | 1.5 | 0.4 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 2.8 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 57 | 51 | 23 | 57 | 34 | 17 |
| Future Vol, veh/h | 57 | 51 | 23 | 57 | 34 | 17 |
| Conflicting Peds, #/hr | 0 | 10 | 10 | 0 | 10 | 10 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 62 | 55 | 25 | 62 | 37 | 18 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 127 | 0 | 222 | 110 |
| Stage 1 | - | - | - | - | 100 | - |
| Stage 2 | - | - | - | - | 122 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1459 | - | 767 | 944 |
| Stage 1 | - | - | - | - | 924 | - |
| Stage 2 | - | - | - | - | 903 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1447 | - | 740 | 928 |
| Mov Cap-2 Maneuver | - | - | - | - | 740 | - |
| Stage 1 | - | - | - | - | 900 | - |
| Stage 2 | - | - | - | - | 896 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 2.17 | 9.87 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 794 | - | - | 517 | - |
| HCM Lane V/C Ratio | 0.07 | - | - | 0.017 | - |
| HCM Ctrl Dly (s/v) | 9.9 | - | - | 7.5 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.2 | - | - | 0.1 | - |

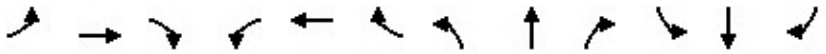
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 65 | 264 | 113 | 125 | 232 | 242 | 119 | 1016 | 130 | 210 | 701 | 83 |
| Future Volume (veh/h) | 65 | 264 | 113 | 125 | 232 | 242 | 119 | 1016 | 130 | 210 | 701 | 83 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 0.99 | 1.00 | | 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 | 1786 | 1786 | 1786 | 1772 | 1772 | 1772 | 1758 | 1758 | 1758 | 1772 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 68 | 275 | 118 | 130 | 242 | 252 | 124 | 1058 | 135 | 219 | 730 | 86 |
| Peak Hour Factor | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, % | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 |
| Cap, veh/h | 85 | 323 | 271 | 152 | 391 | 329 | 146 | 1109 | 141 | 345 | 1412 | 166 |
| Arrive On Green | 0.05 | 0.18 | 0.18 | 0.09 | 0.22 | 0.22 | 0.09 | 0.39 | 0.39 | 0.20 | 0.51 | 0.51 |
| Sat Flow, veh/h | 1701 | 1786 | 1501 | 1688 | 1772 | 1491 | 1674 | 2839 | 362 | 1688 | 2767 | 326 |
| Grp Volume(v), veh/h | 68 | 275 | 118 | 130 | 242 | 252 | 124 | 563 | 630 | 219 | 364 | 452 |
| Grp Sat Flow(s),veh/h/ln | 1701 | 1786 | 1501 | 1688 | 1772 | 1491 | 1674 | 1512 | 1689 | 1688 | 1382 | 1711 |
| Q Serve(g_s), s | 5.6 | 21.2 | 9.9 | 10.8 | 17.5 | 14.7 | 10.4 | 51.3 | 51.5 | 16.8 | 24.9 | 24.9 |
| Cycle Q Clear(g_c), s | 5.6 | 21.2 | 9.9 | 10.8 | 17.5 | 14.7 | 10.4 | 51.3 | 51.5 | 16.8 | 24.9 | 24.9 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.21 | 1.00 | | 0.19 |
| Lane Grp Cap(c), veh/h | 85 | 323 | 271 | 152 | 391 | 329 | 146 | 591 | 660 | 345 | 705 | 873 |
| V/C Ratio(X) | 0.80 | 0.85 | 0.43 | 0.86 | 0.62 | 0.77 | 0.85 | 0.95 | 0.95 | 0.63 | 0.52 | 0.52 |
| Avail Cap(c_a), veh/h | 137 | 395 | 332 | 183 | 442 | 372 | 208 | 597 | 667 | 345 | 705 | 873 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.70 | 0.70 | 0.70 | 0.75 | 0.75 | 0.75 |
| Uniform Delay (d), s/veh | 66.7 | 56.3 | 51.7 | 63.7 | 49.9 | 22.0 | 63.9 | 42.0 | 42.0 | 51.6 | 23.1 | 23.1 |
| Incr Delay (d2), s/veh | 11.8 | 13.9 | 1.1 | 27.1 | 2.1 | 8.2 | 13.3 | 21.5 | 20.2 | 2.8 | 2.0 | 1.6 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 4.9 | 16.3 | 7.0 | 9.8 | 12.8 | 10.0 | 8.0 | 28.5 | 31.3 | 11.2 | 12.4 | 14.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 78.5 | 70.2 | 52.8 | 90.8 | 52.1 | 30.2 | 77.2 | 63.5 | 62.3 | 54.4 | 25.1 | 24.8 |
| LnGrp LOS | E | E | D | F | D | C | E | E | E | D | C | C |
| Approach Vol, veh/h | | 461 | | | 624 | | | 1317 | | | 1035 | |
| Approach Delay, s/veh | | 67.0 | | | 51.3 | | | 64.2 | | | 31.2 | |
| Approach LOS | | E | | | D | | | E | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 17.0 | 77.4 | 11.7 | 35.9 | 34.0 | 60.4 | 17.4 | 30.3 |
| Change Period (Y+Rc), s | 4.6 | 4.9 | 4.6 | 4.6 | 4.9 | * 4.9 | 4.6 | 4.6 |
| Max Green Setting (Gmax), s | 17.6 | 58.9 | 11.4 | 35.4 | 20.4 | * 56 | 15.4 | 31.4 |
| Max Q Clear Time (g_c+I1), s | 12.4 | 26.9 | 7.6 | 19.5 | 18.8 | 53.5 | 12.8 | 23.2 |
| Green Ext Time (p_c), s | 0.1 | 8.0 | 0.0 | 2.2 | 0.1 | 2.0 | 0.1 | 1.3 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 52.3 |
| HCM 7th LOS | D |

Notes

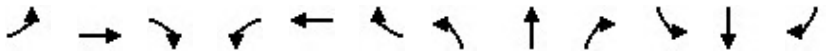
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 100 | 78 | 61 | 48 | 65 | 65 | 60 | 1167 | 83 | 78 | 851 | 54 |
| Future Volume (veh/h) | 100 | 78 | 61 | 48 | 65 | 65 | 60 | 1167 | 83 | 78 | 851 | 54 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 0.99 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1772 | 1772 | 1772 | 1786 | 1786 | 1786 | 1758 | 1758 | 1758 | 1772 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 106 | 83 | 65 | 51 | 69 | 69 | 64 | 1241 | 88 | 83 | 905 | 57 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 1 | 1 | 1 | 3 | 3 | 3 | 2 | 2 | 2 |
| Cap, veh/h | 171 | 151 | 128 | 117 | 154 | 171 | 644 | 1043 | 74 | 662 | 867 | 524 |
| Arrive On Green | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.38 | 0.34 | 0.34 | 0.39 | 0.35 | 0.35 |
| Sat Flow, veh/h | 721 | 863 | 732 | 447 | 881 | 982 | 1674 | 3050 | 216 | 1688 | 2481 | 1500 |
| Grp Volume(v), veh/h | 123 | 0 | 131 | 88 | 0 | 101 | 64 | 629 | 700 | 83 | 905 | 57 |
| Grp Sat Flow(s),veh/h/ln | 839 | 0 | 1476 | 868 | 0 | 1442 | 1674 | 1547 | 1719 | 1688 | 1240 | 1500 |
| Q Serve(g_s), s | 13.6 | 0.0 | 11.9 | 6.9 | 0.0 | 9.2 | 3.6 | 50.6 | 50.6 | 4.7 | 51.7 | 3.8 |
| Cycle Q Clear(g_c), s | 22.9 | 0.0 | 11.9 | 18.8 | 0.0 | 9.2 | 3.6 | 50.6 | 50.6 | 4.7 | 51.7 | 3.8 |
| Prop In Lane | 0.86 | | 0.50 | 0.58 | | 0.68 | 1.00 | | 0.13 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 192 | 0 | 258 | 190 | 0 | 252 | 644 | 529 | 588 | 662 | 867 | 524 |
| V/C Ratio(X) | 0.64 | 0.00 | 0.51 | 0.46 | 0.00 | 0.40 | 0.10 | 1.19 | 1.19 | 0.13 | 1.04 | 0.11 |
| Avail Cap(c_a), veh/h | 219 | 0 | 289 | 346 | 0 | 409 | 644 | 529 | 588 | 662 | 867 | 524 |
| 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 | 0.46 | 0.46 | 0.46 | 0.74 | 0.74 | 0.74 |
| Uniform Delay (d), s/veh | 64.3 | 0.0 | 55.3 | 60.9 | 0.0 | 54.2 | 29.1 | 48.7 | 48.7 | 28.7 | 48.2 | 32.6 |
| Incr Delay (d2), s/veh | 5.0 | 0.0 | 1.6 | 1.7 | 0.0 | 1.0 | 0.0 | 93.7 | 94.4 | 0.1 | 38.6 | 0.3 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 8.5 | 0.0 | 8.1 | 5.9 | 0.0 | 6.3 | 2.6 | 44.1 | 48.8 | 3.4 | 27.4 | 2.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 69.3 | 0.0 | 56.9 | 62.7 | 0.0 | 55.3 | 29.1 | 142.4 | 143.1 | 28.8 | 86.8 | 32.9 |
| LnGrp LOS | E | | E | E | | E | C | F | F | C | F | C |
| Approach Vol, veh/h | | 254 | | | 189 | | | 1393 | | | 1045 | |
| Approach Delay, s/veh | | 62.9 | | | 58.7 | | | 137.6 | | | 79.3 | |
| Approach LOS | | E | | | E | | | F | | | E | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 61.5 | 56.2 | | 30.3 | 62.6 | 55.1 | | 30.3 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | | 4.5 |
| Max Green Setting (Gmax), s | 6.8 | 51.7 | | 29.0 | 7.9 | 50.6 | | 42.0 |
| Max Q Clear Time (g_c+I1), s | 15.6 | 53.7 | | 24.9 | 6.7 | 52.6 | | 20.8 |
| Green Ext Time (p_c), s | 0.0 | 0.0 | | 0.5 | 0.0 | 0.0 | | 1.1 |

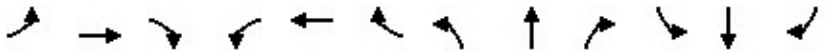
| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 104.7 |
| HCM 7th LOS | F |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 261 | 48 | 6 | 30 | 24 | 337 | 6 | 1261 | 59 | 308 | 945 | 172 |
| Future Volume (veh/h) | 261 | 48 | 6 | 30 | 24 | 337 | 6 | 1261 | 59 | 308 | 945 | 172 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1772 | 1772 | 1772 | 1772 | 1772 | 1772 | 1758 | 1758 | 1758 | 1772 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 275 | 51 | 6 | 32 | 25 | 355 | 6 | 1327 | 62 | 324 | 995 | 181 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 |
| Cap, veh/h | 304 | 280 | 33 | 198 | 154 | 306 | 15 | 976 | 46 | 303 | 1279 | 713 |
| Arrive On Green | 0.18 | 0.18 | 0.18 | 0.20 | 0.20 | 0.20 | 0.01 | 0.31 | 0.31 | 0.18 | 0.48 | 0.48 |
| Sat Flow, veh/h | 1688 | 1556 | 183 | 968 | 756 | 1499 | 1674 | 3165 | 148 | 1688 | 2693 | 1500 |
| Grp Volume(v), veh/h | 275 | 0 | 57 | 57 | 0 | 355 | 6 | 662 | 727 | 324 | 995 | 181 |
| Grp Sat Flow(s),veh/h/ln | 1688 | 0 | 1739 | 1724 | 0 | 1499 | 1674 | 1582 | 1731 | 1688 | 1347 | 1500 |
| Q Serve(g_s), s | 22.7 | 0.0 | 3.9 | 3.9 | 0.0 | 29.0 | 0.5 | 43.8 | 43.8 | 25.5 | 43.7 | 10.2 |
| Cycle Q Clear(g_c), s | 22.7 | 0.0 | 3.9 | 3.9 | 0.0 | 29.0 | 0.5 | 43.8 | 43.8 | 25.5 | 43.7 | 10.2 |
| Prop In Lane | 1.00 | | 0.11 | 0.56 | | 1.00 | 1.00 | | 0.09 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 304 | 0 | 313 | 352 | 0 | 306 | 15 | 488 | 534 | 303 | 1279 | 713 |
| V/C Ratio(X) | 0.90 | 0.00 | 0.18 | 0.16 | 0.00 | 1.16 | 0.40 | 1.36 | 1.36 | 1.07 | 0.78 | 0.25 |
| Avail Cap(c_a), veh/h | 392 | 0 | 404 | 352 | 0 | 306 | 71 | 488 | 534 | 303 | 1279 | 713 |
| 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 | 0.59 | 0.59 | 0.59 | 0.17 | 0.17 | 0.17 |
| Uniform Delay (d), s/veh | 57.0 | 0.0 | 49.3 | 46.5 | 0.0 | 56.5 | 70.0 | 49.1 | 49.1 | 58.2 | 31.0 | 22.3 |
| Incr Delay (d2), s/veh | 20.3 | 0.0 | 0.3 | 0.2 | 0.0 | 101.8 | 10.0 | 168.6 | 169.6 | 42.2 | 0.8 | 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 | 7.0 | 0.0 | 3.2 | 3.1 | 0.0 | 29.1 | 0.5 | 57.0 | 62.2 | 17.5 | 16.4 | 4.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 77.3 | 0.0 | 49.6 | 46.7 | 0.0 | 158.3 | 80.0 | 217.7 | 218.7 | 100.5 | 31.9 | 22.4 |
| LnGrp LOS | E | | D | D | | F | E | F | F | F | C | C |
| Approach Vol, veh/h | | 332 | | | 412 | | | 1395 | | | 1500 | |
| Approach Delay, s/veh | | 72.5 | | | 142.9 | | | 217.7 | | | 45.5 | |
| Approach LOS | | E | | | F | | | F | | | D | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 15.9 | 72.4 | | 30.2 | 30.4 | 47.8 | | 33.6 |
| Change Period (Y+Rc), s | 4.6 | 4.9 | | 4.6 | 4.9 | 4.0 | | 4.6 |
| Max Green Setting (Gmax), s | 6.3 | 55.3 | | 33.0 | 18.1 | 43.8 | | 29.0 |
| Max Q Clear Time (g_c+I1), s | 12.5 | 45.7 | | 24.7 | 27.5 | 45.8 | | 31.0 |
| Green Ext Time (p_c), s | 0.0 | 4.9 | | 0.8 | 0.0 | 0.0 | | 0.0 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 125.0 |
| HCM 7th LOS | F |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 48 | 326 | 344 | 165 | 300 | 587 | 359 | 1197 | 216 | 640 | 923 | 35 |
| Future Volume (veh/h) | 48 | 326 | 344 | 165 | 300 | 587 | 359 | 1197 | 216 | 640 | 923 | 35 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1786 | 1786 | 1786 | 1772 | 1772 | 1772 | 1758 | 1758 | 1758 | 1772 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 51 | 343 | 362 | 174 | 316 | 618 | 378 | 1260 | 227 | 674 | 972 | 37 |
| 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 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 |
| Cap, veh/h | 65 | 389 | 610 | 156 | 483 | 672 | 309 | 1287 | 574 | 573 | 1115 | 42 |
| Arrive On Green | 0.04 | 0.22 | 0.22 | 0.09 | 0.27 | 0.27 | 0.18 | 0.39 | 0.39 | 0.18 | 0.38 | 0.38 |
| Sat Flow, veh/h | 1701 | 1786 | 1514 | 1688 | 1772 | 1502 | 1674 | 3340 | 1489 | 3274 | 2967 | 113 |
| Grp Volume(v), veh/h | 51 | 343 | 362 | 174 | 316 | 618 | 378 | 1260 | 227 | 674 | 435 | 574 |
| Grp Sat Flow(s),veh/h/ln | 1701 | 1786 | 1514 | 1688 | 1772 | 1502 | 1674 | 1670 | 1489 | 1637 | 1329 | 1751 |
| Q Serve(g_s), s | 4.3 | 27.0 | 27.2 | 13.4 | 22.9 | 39.5 | 26.8 | 54.0 | 16.0 | 25.4 | 44.1 | 44.1 |
| Cycle Q Clear(g_c), s | 4.3 | 27.0 | 27.2 | 13.4 | 22.9 | 39.5 | 26.8 | 54.0 | 16.0 | 25.4 | 44.1 | 44.1 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.06 |
| Lane Grp Cap(c), veh/h | 65 | 389 | 610 | 156 | 483 | 672 | 309 | 1287 | 574 | 573 | 499 | 658 |
| V/C Ratio(X) | 0.79 | 0.88 | 0.59 | 1.12 | 0.65 | 0.92 | 1.22 | 0.98 | 0.40 | 1.18 | 0.87 | 0.87 |
| Avail Cap(c_a), veh/h | 116 | 443 | 656 | 156 | 483 | 672 | 309 | 1287 | 574 | 573 | 499 | 658 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.23 | 0.23 | 0.23 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 69.2 | 54.9 | 34.0 | 65.8 | 46.7 | 37.6 | 59.1 | 44.0 | 32.3 | 59.8 | 42.0 | 42.0 |
| Incr Delay (d2), s/veh | 18.6 | 16.8 | 1.3 | 106.5 | 3.2 | 17.9 | 106.6 | 8.1 | 0.5 | 96.1 | 18.6 | 14.8 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 4.0 | 20.0 | 15.4 | 16.3 | 15.8 | 31.4 | 26.7 | 26.9 | 7.8 | 27.0 | 23.4 | 28.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 87.8 | 71.6 | 35.2 | 172.3 | 49.9 | 55.5 | 165.7 | 52.0 | 32.8 | 155.9 | 60.6 | 56.8 |
| LnGrp LOS | F | E | D | F | D | E | F | D | C | F | E | E |
| Approach Vol, veh/h | | 756 | | | 1108 | | | 1865 | | | 1683 | |
| Approach Delay, s/veh | | 55.3 | | | 72.2 | | | 72.7 | | | 97.5 | |
| Approach LOS | | E | | | E | | | E | | | F | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 31.4 | 59.4 | 10.1 | 44.1 | 30.0 | 60.8 | 18.0 | 36.2 |
| Change Period (Y+Rc), s | 4.6 | 4.9 | 4.6 | 4.6 | 4.6 | 4.9 | 4.6 | 4.6 |
| Max Green Setting (Gmax), s | 26.8 | 50.1 | 9.9 | 39.5 | 25.4 | 51.5 | 13.4 | 36.0 |
| Max Q Clear Time (g_c+I1), s | 28.8 | 46.1 | 6.3 | 41.5 | 27.4 | 56.0 | 15.4 | 29.2 |
| Green Ext Time (p_c), s | 0.0 | 2.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.9 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 77.9 |
| HCM 7th LOS | E |

| Intersection | |
|---|---|
| Int Delay, s/veh | 3.8 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 241 | 24 | 61 | 262 | 90 | 81 |
| Future Vol, veh/h | 241 | 24 | 61 | 262 | 90 | 81 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | 100 | - | 100 | 0 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 1 | 1 | 1 | 1 |
| Mvmt Flow | 262 | 26 | 66 | 285 | 98 | 88 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 288 | 0 | 692 | 275 |
| Stage 1 | - | - | - | - | 275 | - |
| Stage 2 | - | - | - | - | 417 | - |
| Critical Hdwy | - | - | 4.11 | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | - | - | 2.209 | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | - | - | 1280 | - | 411 | 766 |
| Stage 1 | - | - | - | - | 774 | - |
| Stage 2 | - | - | - | - | 667 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1280 | - | 390 | 766 |
| Mov Cap-2 Maneuver | - | - | - | - | 390 | - |
| Stage 1 | - | - | - | - | 734 | - |
| Stage 2 | - | - | - | - | 667 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 1.5 | 13.99 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 390 | 766 | - | - | 1280 | - |
| HCM Lane V/C Ratio | 0.251 | 0.115 | - | - | 0.052 | - |
| HCM Ctrl Dly (s/v) | 17.3 | 10.3 | - | - | 8 | - |
| HCM Lane LOS | C | B | - | - | A | - |
| HCM 95th %tile Q(veh) | 1 | 0.4 | - | - | 0.2 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 33 | 265 | 358 | 6 | 0 | 42 |
| Future Vol, veh/h | 33 | 265 | 358 | 6 | 0 | 42 |
| Conflicting Peds, #/hr | 9 | 0 | 0 | 9 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 0 | 0 |
| Mvmt Flow | 36 | 288 | 389 | 7 | 0 | 46 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 405 | 0 | - | 0 | 761 | 401 |
| Stage 1 | - | - | - | - | 401 | - |
| Stage 2 | - | - | - | - | 360 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.4 | 6.2 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.5 | 3.3 |
| Pot Cap-1 Maneuver | 1154 | - | - | - | 376 | 653 |
| Stage 1 | - | - | - | - | 680 | - |
| Stage 2 | - | - | - | - | 711 | - |
| Platoon blocked, % | | | - | - | - | |
| Mov Cap-1 Maneuver | 1145 | - | - | - | 359 | 648 |
| Mov Cap-2 Maneuver | - | - | - | - | 359 | - |
| Stage 1 | - | - | - | - | 650 | - |
| Stage 2 | - | - | - | - | 711 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0.91 | 0 | 10.97 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 199 | - | - | - | 648 |
| HCM Lane V/C Ratio | 0.031 | - | - | - | 0.07 |
| HCM Ctrl Dly (s/v) | 8.2 | 0 | - | - | 11 |
| HCM Lane LOS | A | A | - | - | B |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.2 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 11.9 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 11 | 279 | 78 | 18 | 340 | 35 | 0 | 0 | 0 | 18 | 35 | 11 |
| Future Vol, veh/h | 11 | 279 | 78 | 18 | 340 | 35 | 0 | 0 | 0 | 18 | 35 | 11 |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Heavy Vehicles, % | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 |
| Mvmt Flow | 12 | 300 | 84 | 19 | 366 | 38 | 0 | 0 | 0 | 19 | 38 | 12 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | SB |
|---|---|---|---|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | SB | | WB |
| Conflicting Lanes Left | 1 | 0 | 1 |
| Conflicting Approach Right | | SB | EB |
| Conflicting Lanes Right | 0 | 1 | 1 |
| HCM Control Delay, s/veh | 11.6 | 12.5 | 9.3 |
| HCM LOS | B | B | A |

| Lane | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|
| Vol Left, % | 3% | 5% | 28% |
| Vol Thru, % | 76% | 87% | 55% |
| Vol Right, % | 21% | 9% | 17% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 368 | 393 | 64 |
| LT Vol | 11 | 18 | 18 |
| Through Vol | 279 | 340 | 35 |
| RT Vol | 78 | 35 | 11 |
| Lane Flow Rate | 396 | 423 | 69 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.487 | 0.527 | 0.107 |
| Departure Headway (Hd) | 4.433 | 4.492 | 5.59 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 811 | 803 | 637 |
| Service Time | 2.469 | 2.528 | 3.657 |
| HCM Lane V/C Ratio | 0.488 | 0.527 | 0.108 |
| HCM Control Delay, s/veh | 11.6 | 12.5 | 9.3 |
| HCM Lane LOS | B | B | A |
| HCM 95th-tile Q | 2.7 | 3.1 | 0.4 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 33.9 |
| Intersection LOS | D |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 11 | 361 | 377 | 18 | 261 | 387 |
| Future Vol, veh/h | 11 | 361 | 377 | 18 | 261 | 387 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, % | 1 | 1 | 1 | 1 | 1 | 1 |
| Mvmt Flow | 13 | 410 | 428 | 20 | 297 | 440 |
| Number of Lanes | 1 | 1 | 1 | 0 | 1 | 1 |

| Approach | WB | NB | SB |
|---|---|---|---|
| Opposing Approach | | SB | NB |
| Opposing Lanes | 0 | 2 | 1 |
| Conflicting Approach Left | NB | | WB |
| Conflicting Lanes Left | 1 | 0 | 2 |
| Conflicting Approach Right | SB | WB | |
| Conflicting Lanes Right | 2 | 2 | 0 |
| HCM Control Delay, s/veh | 30.4 | 40.1 | 32.2 |
| HCM LOS | D | E | D |

| Lane | NBLn1 | WBLn1 | WBLn2 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|
| Vol Left, % | 0% | 100% | 0% | 100% | 0% |
| Vol Thru, % | 95% | 0% | 0% | 0% | 100% |
| Vol Right, % | 5% | 0% | 100% | 0% | 0% |
| Sign Control | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 395 | 11 | 361 | 261 | 387 |
| LT Vol | 0 | 11 | 0 | 261 | 0 |
| Through Vol | 377 | 0 | 0 | 0 | 387 |
| RT Vol | 18 | 0 | 361 | 0 | 0 |
| Lane Flow Rate | 449 | 13 | 410 | 297 | 440 |
| Geometry Grp | 3b | 5 | 5 | 5 | 5 |
| Degree of Util (X) | 0.866 | 0.028 | 0.791 | 0.621 | 0.858 |
| Departure Headway (Hd) | 6.944 | 8.145 | 6.941 | 7.533 | 7.02 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes |
| Cap | 521 | 441 | 525 | 480 | 515 |
| Service Time | 4.989 | 5.875 | 4.641 | 5.286 | 4.773 |
| HCM Lane V/C Ratio | 0.862 | 0.029 | 0.781 | 0.619 | 0.854 |
| HCM Control Delay, s/veh | 40.1 | 11.1 | 31 | 21.9 | 39.1 |
| HCM Lane LOS | E | B | D | C | E |
| HCM 95th-tile Q | 9.3 | 0.1 | 7.4 | 4.1 | 9.1 |

# MOVEMENT SUMMARY

## Site: [99 (5)] SR 305 & Johnson Rd - Forecast 2032 PM

**Without** (PM Peak Hour)

Output produced by SIDRA INTERSECTION Version: 11.0.2

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Johnson Way | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.054 | 14.8 | LOS B | 0.2 | 5.2 | 0.55 | 0.74 | 0.55 | 31.1 |
| 3 | L2 | All MCs | 23 | 6.0 | 23 | 6.0 | 0.054 | 11.8 | LOS B | 0.2 | 5.2 | 0.55 | 0.74 | 0.55 | 32.3 |
| 8 | T1 | All MCs | 6 | 1.0 | 6 | 1.0 | 0.054 | 5.7 | LOS A | 0.2 | 5.2 | 0.55 | 0.74 | 0.55 | 30.3 |
| 18 | R2 | All MCs | 9 | 1.0 | 9 | 1.0 | 0.054 | 7.9 | LOS A | 0.2 | 5.2 | 0.55 | 0.74 | 0.55 | 33.4 |
| Approach | | | 39 | 3.9 | 39 | 3.9 | 0.054 | 10.0 | LOS A | 0.2 | 5.2 | 0.55 | 0.74 | 0.55 | 32.2 |
| East: SR 305 | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 3 | 1.0 | 3 | 1.0 | 0.471 | 12.1 | LOS B | 3.7 | 95.8 | 0.23 | 0.45 | 0.23 | 37.5 |
| 1 | L2 | All MCs | 9 | 1.0 | 9 | 1.0 | 0.471 | 11.5 | LOS B | 3.7 | 95.8 | 0.23 | 0.45 | 0.23 | 35.6 |
| 6 | T1 | All MCs | 949 | 3.0 | 949 | 3.0 | 0.471 | 6.5 | LOS A | 3.7 | 95.8 | 0.22 | 0.46 | 0.22 | 41.1 |
| 16 | R2 | All MCs | 27 | 10.0 | 27 | 10.0 | 0.214 | 6.0 | LOS A | 1.2 | 31.4 | 0.19 | 0.46 | 0.19 | 35.9 |
| Approach | | | 988 | 3.2 | 988 | 3.2 | 0.471 | 6.5 | LOS A | 3.7 | 95.8 | 0.22 | 0.46 | 0.22 | 40.8 |
| North: Johnson Rd | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.076 | 15.4 | LOS B | 0.3 | 7.6 | 0.60 | 0.77 | 0.60 | 30.7 |
| 7 | L2 | All MCs | 32 | 6.0 | 32 | 6.0 | 0.076 | 12.5 | LOS B | 0.3 | 7.6 | 0.60 | 0.77 | 0.60 | 31.9 |
| 4 | T1 | All MCs | 3 | 1.0 | 3 | 1.0 | 0.076 | 6.3 | LOS A | 0.3 | 7.6 | 0.60 | 0.77 | 0.60 | 30.0 |
| 14 | R2 | All MCs | 14 | 1.0 | 14 | 1.0 | 0.076 | 9.3 | LOS A | 0.3 | 7.6 | 0.60 | 0.77 | 0.60 | 32.9 |
| Approach | | | 51 | 4.2 | 51 | 4.2 | 0.076 | 11.3 | LOS B | 0.3 | 7.6 | 0.60 | 0.77 | 0.60 | 32.0 |
| West: SR 305 | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.403 | 12.1 | LOS B | 3.0 | 75.3 | 0.23 | 0.46 | 0.23 | 37.5 |
| 5 | L2 | All MCs | 11 | 1.0 | 11 | 1.0 | 0.403 | 11.5 | LOS B | 3.0 | 75.3 | 0.23 | 0.46 | 0.23 | 35.6 |
| 2 | T1 | All MCs | 817 | 2.0 | 817 | 2.0 | 0.403 | 6.3 | LOS A | 3.0 | 75.3 | 0.22 | 0.46 | 0.22 | 41.2 |
| 12 | R2 | All MCs | 23 | 1.0 | 23 | 1.0 | 0.183 | 5.9 | LOS A | 1.0 | 26.0 | 0.20 | 0.46 | 0.20 | 36.1 |
| Approach | | | 852 | 2.0 | 852 | 2.0 | 0.403 | 6.3 | LOS A | 3.0 | 75.3 | 0.22 | 0.46 | 0.22 | 41.0 |
| All Vehicles | | | 1929 | 2.7 | 1929 | 2.7 | 0.471 | 6.6 | LOS A | 3.7 | 95.8 | 0.24 | 0.47 | 0.24 | 40.4 |

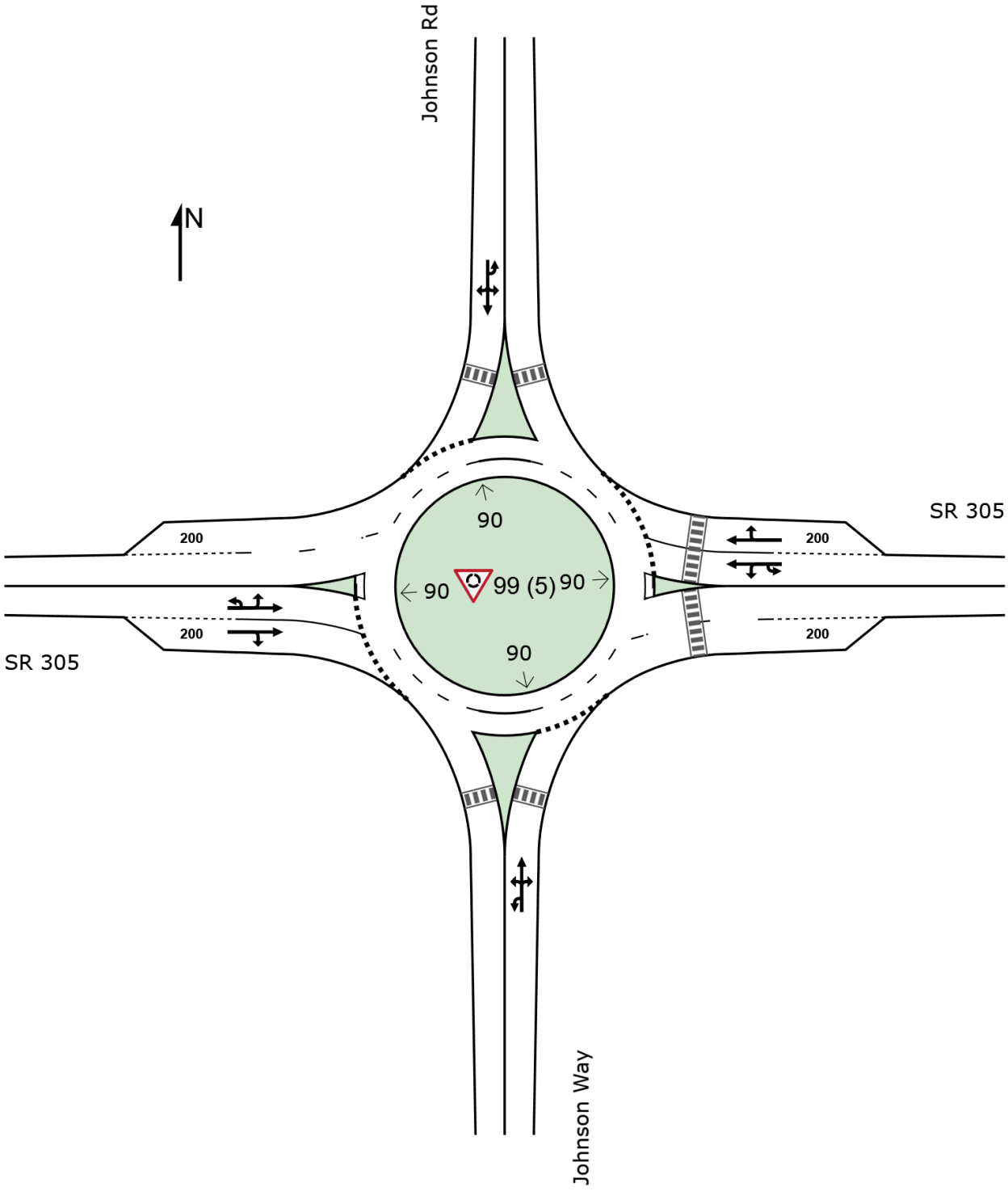
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [99 (5)] SR 305 & Johnson Rd - Forecast 2032 PM
**Without** (PM Peak Hour)

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



# MOVEMENT SUMMARY

## Site: [1 (5)] Johnson & Sunrise Ridge - 2032 PM Without

(Folder1)

Output produced by SIDRA INTERSECTION Version: 11.0.2

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NE Midnight Sun Loop | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.005 | 7.2 | LOS A | 0.0 | 0.5 | 0.16 | 0.42 | 0.16 | 23.6 |
| 3 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.005 | 5.8 | LOS A | 0.0 | 0.5 | 0.16 | 0.42 | 0.16 | 23.6 |
| 8 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.005 | 2.0 | LOS A | 0.0 | 0.5 | 0.16 | 0.42 | 0.16 | 23.8 |
| 18 | R2 | All MCs | 3 | 3.0 | 3 | 3.0 | 0.005 | 2.3 | LOS A | 0.0 | 0.5 | 0.16 | 0.42 | 0.16 | 23.8 |
| Approach | | | 7 | 3.0 | 7 | 3.0 | 0.005 | 3.7 | LOS A | 0.0 | 0.5 | 0.16 | 0.42 | 0.16 | 23.7 |
| East: Johnson Rd NE | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.046 | 10.9 | LOS B | 0.2 | 4.7 | 0.11 | 0.48 | 0.11 | 34.6 |
| 1 | L2 | All MCs | 2 | 3.0 | 2 | 3.0 | 0.046 | 9.0 | LOS A | 0.2 | 4.7 | 0.11 | 0.48 | 0.11 | 34.6 |
| 6 | T1 | All MCs | 41 | 3.0 | 41 | 3.0 | 0.046 | 4.9 | LOS A | 0.2 | 4.7 | 0.11 | 0.48 | 0.11 | 35.2 |
| 16 | R2 | All MCs | 16 | 3.0 | 16 | 3.0 | 0.046 | 4.7 | LOS A | 0.2 | 4.7 | 0.11 | 0.48 | 0.11 | 34.9 |
| Approach | | | 60 | 3.0 | 60 | 3.0 | 0.046 | 5.1 | LOS A | 0.2 | 4.7 | 0.11 | 0.48 | 0.11 | 35.1 |
| North: Sunrise Ridge Ave NE | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.022 | 11.0 | LOS B | 0.1 | 2.3 | 0.14 | 0.57 | 0.14 | 33.9 |
| 7 | L2 | All MCs | 9 | 3.0 | 9 | 3.0 | 0.022 | 9.1 | LOS A | 0.1 | 2.3 | 0.14 | 0.57 | 0.14 | 33.9 |
| 4 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.022 | 5.0 | LOS A | 0.1 | 2.3 | 0.14 | 0.57 | 0.14 | 34.6 |
| 14 | R2 | All MCs | 16 | 3.0 | 16 | 3.0 | 0.022 | 4.8 | LOS A | 0.1 | 2.3 | 0.14 | 0.57 | 0.14 | 34.2 |
| Approach | | | 27 | 3.0 | 27 | 3.0 | 0.022 | 6.5 | LOS A | 0.1 | 2.3 | 0.14 | 0.57 | 0.14 | 34.1 |
| West: Johnson Rd NE | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.041 | 10.9 | LOS B | 0.2 | 4.3 | 0.08 | 0.57 | 0.08 | 33.8 |
| 5 | L2 | All MCs | 24 | 3.0 | 24 | 3.0 | 0.041 | 8.9 | LOS A | 0.2 | 4.3 | 0.08 | 0.57 | 0.08 | 33.8 |
| 2 | T1 | All MCs | 26 | 3.0 | 26 | 3.0 | 0.041 | 4.9 | LOS A | 0.2 | 4.3 | 0.08 | 0.57 | 0.08 | 34.4 |
| 12 | R2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.041 | 4.6 | LOS A | 0.2 | 4.3 | 0.08 | 0.57 | 0.08 | 34.1 |
| Approach | | | 52 | 3.0 | 52 | 3.0 | 0.041 | 6.8 | LOS A | 0.2 | 4.3 | 0.08 | 0.57 | 0.08 | 34.1 |
| All Vehicles | | | 147 | 3.0 | 147 | 3.0 | 0.046 | 5.9 | LOS A | 0.2 | 4.7 | 0.11 | 0.53 | 0.11 | 33.8 |

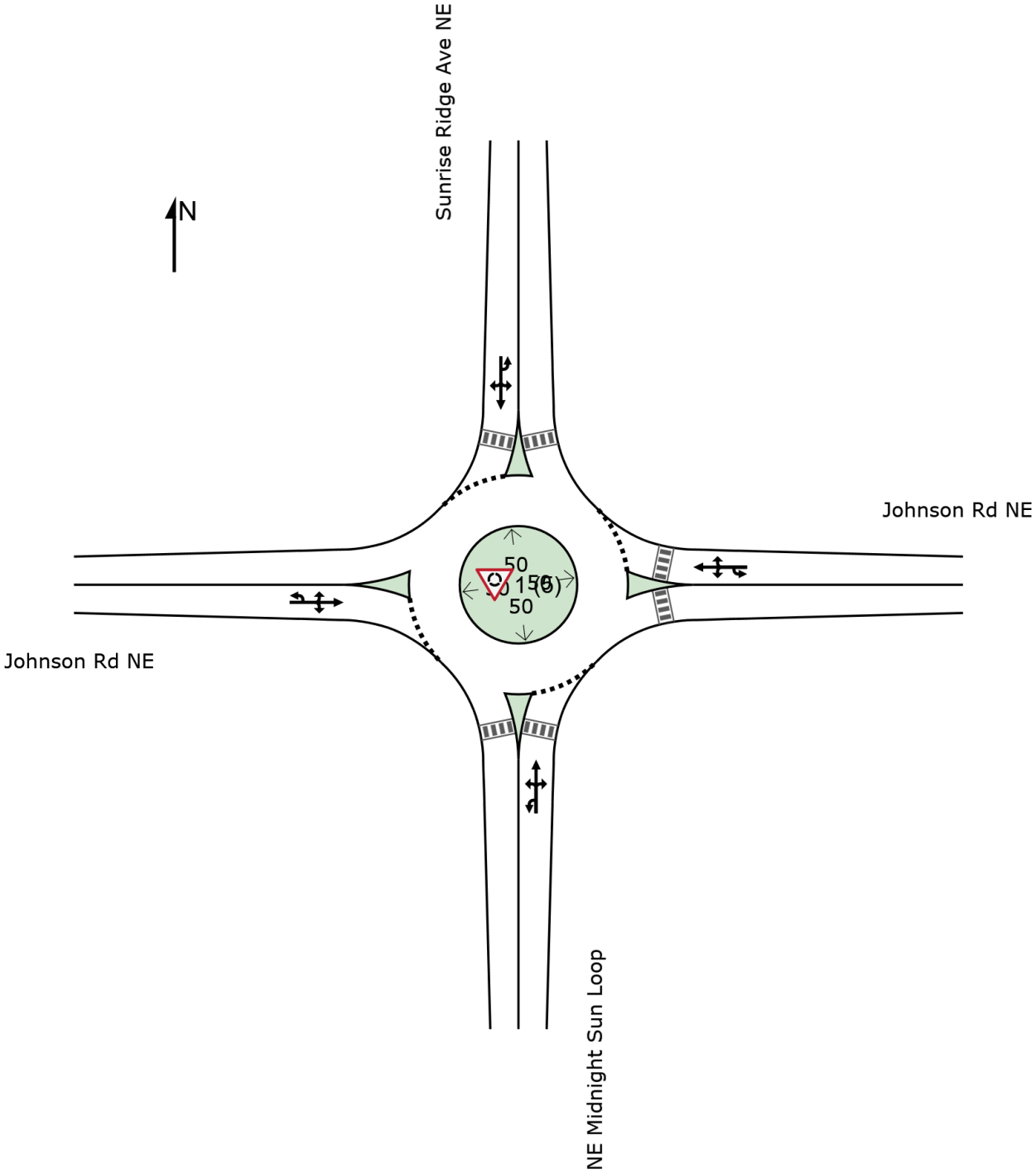
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

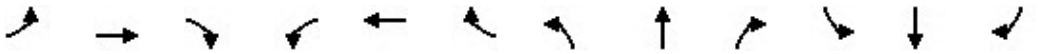
## Site: [1 (5)] Johnson & Sunrise Ridge - 2032 PM Without
(Folder1)

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.




**SIDRA INTERSECTION 11 | Copyright © 2000-2026 Akcelik and Associates Pty Ltd | sidrasolutions.com**
Organisation: HEATH & ASSOCIATES | Licence: PLUS / 1PC | Created: Saturday, October 3, 2026 3:30:27 PM
Project: C:\Users\LucasMaulin\Heath and Associates\Office Access - Documents\Project Files\Pinnacle at Liberty Bay - 5576\5-Analysis\Sidra\Johnson & Sunrise Ridge.sipx



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 39 | 107 | 71 | 54 | 89 | 150 | 61 | 507 | 21 | 208 | 886 | 21 |
| Future Volume (veh/h) | 39 | 107 | 71 | 54 | 89 | 150 | 61 | 507 | 21 | 208 | 886 | 21 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 0.99 | | 0.98 | 0.99 | | 0.98 | 1.00 | | 0.98 | 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 | 1716 | 1730 | 1744 | 1744 | 1744 | 1716 | 1730 | 1716 | 1716 | 1730 | 1716 | 1646 |
| Adj Flow Rate, veh/h | 42 | 116 | 77 | 59 | 97 | 98 | 66 | 551 | 23 | 226 | 963 | 23 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 6 | 5 | 4 | 4 | 4 | 6 | 5 | 6 | 6 | 5 | 6 | 11 |
| Cap, veh/h | 172 | 175 | 146 | 166 | 197 | 161 | 78 | 618 | 26 | 779 | 1846 | 44 |
| Arrive On Green | 0.03 | 0.10 | 0.10 | 0.04 | 0.11 | 0.11 | 0.05 | 0.22 | 0.22 | 0.47 | 0.65 | 0.65 |
| Sat Flow, veh/h | 1634 | 1730 | 1443 | 1661 | 1744 | 1423 | 1647 | 2794 | 117 | 1647 | 2853 | 68 |
| Grp Volume(v), veh/h | 42 | 116 | 77 | 59 | 97 | 98 | 66 | 240 | 334 | 226 | 411 | 575 |
| Grp Sat Flow(s),veh/h/ln | 1634 | 1730 | 1443 | 1661 | 1744 | 1423 | 1647 | 1218 | 1692 | 1647 | 1218 | 1703 |
| Q Serve(g_s), s | 2.8 | 7.8 | 6.1 | 3.8 | 6.3 | 3.0 | 4.8 | 22.9 | 23.0 | 10.1 | 21.6 | 21.6 |
| Cycle Q Clear(g_c), s | 2.8 | 7.8 | 6.1 | 3.8 | 6.3 | 3.0 | 4.8 | 22.9 | 23.0 | 10.1 | 21.6 | 21.6 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.07 | 1.00 | | 0.04 |
| Lane Grp Cap(c), veh/h | 172 | 175 | 146 | 166 | 197 | 161 | 78 | 270 | 375 | 779 | 788 | 1102 |
| V/C Ratio(X) | 0.24 | 0.66 | 0.53 | 0.36 | 0.49 | 0.61 | 0.85 | 0.89 | 0.89 | 0.29 | 0.52 | 0.52 |
| Avail Cap(c_a), veh/h | 341 | 332 | 277 | 318 | 334 | 273 | 316 | 437 | 606 | 779 | 788 | 1102 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 47.0 | 52.0 | 51.2 | 46.4 | 50.0 | 7.4 | 56.8 | 45.3 | 45.3 | 19.3 | 11.3 | 11.3 |
| Incr Delay (d2), s/veh | 0.7 | 4.3 | 2.9 | 1.3 | 1.9 | 3.7 | 21.7 | 32.5 | 25.9 | 0.2 | 2.5 | 1.8 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 2.1 | 6.4 | 4.2 | 2.9 | 5.1 | 5.1 | 4.4 | 14.2 | 17.8 | 6.8 | 9.7 | 12.4 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 47.7 | 56.2 | 54.1 | 47.7 | 51.9 | 11.1 | 78.4 | 77.8 | 71.2 | 19.5 | 13.7 | 13.1 |
| LnGrp LOS | D | E | D | D | D | B | E | E | E | B | B | B |
| Approach Vol, veh/h | | 235 | | | 254 | | | 640 | | | 1212 | |
| Approach Delay, s/veh | | 54.0 | | | 35.2 | | | 74.4 | | | 14.5 | |
| Approach LOS | | D | | | D | | | E | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 61.7 | 31.6 | 9.6 | 17.1 | 10.6 | 82.6 | 8.1 | 18.6 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 18.9 | 43.5 | 16.1 | 23.5 | 23.5 | 38.9 | 16.1 | 23.5 |
| Max Q Clear Time (g_c+I1), s | 12.1 | 25.0 | 5.8 | 9.8 | 6.8 | 23.6 | 4.8 | 8.3 |
| Green Ext Time (p_c), s | 0.4 | 2.1 | 0.1 | 0.6 | 0.1 | 3.8 | 0.1 | 0.6 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 37.1 |
| HCM 7th LOS | D |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 979 | 547 | 1 | 2 | 3 |
| Future Vol, veh/h | 0 | 979 | 547 | 1 | 2 | 3 |
| Conflicting Peds, #/hr | 4 | 0 | 0 | 4 | 4 | 4 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 105 | - | - | 55 | 60 | 0 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 93 | 93 | 93 | 93 | 93 | 93 |
| Heavy Vehicles, % | 1 | 8 | 6 | 1 | 1 | 1 |
| Mvmt Flow | 0 | 1053 | 588 | 1 | 2 | 3 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 593 | 0 | - | 0 | 1649 | 596 |
| Stage 1 | - | - | - | - | 592 | - |
| Stage 2 | - | - | - | - | 1057 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 988 | - | - | - | 109 | 505 |
| Stage 1 | - | - | - | - | 555 | - |
| Stage 2 | - | - | - | - | 336 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 984 | - | - | - | 109 | 502 |
| Mov Cap-2 Maneuver | - | - | - | - | 109 | - |
| Stage 1 | - | - | - | - | 553 | - |
| Stage 2 | - | - | - | - | 335 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 0 | 22.84 |
| HCM LOS | | | C |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 984 | - | - | - | 109 | 502 |
| HCM Lane V/C Ratio | - | - | - | - | 0.02 | 0.006 |
| HCM Ctrl Dly (s/v) | 0 | - | - | - | 38.8 | 12.2 |
| HCM Lane LOS | A | - | - | - | E | B |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.1 | 0 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 6.4 |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 13 | 64 | 23 | 8 | 19 | 5 |
| Future Vol, veh/h | 13 | 64 | 23 | 8 | 19 | 5 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 14 | 70 | 25 | 9 | 21 | 5 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 82 | 23 | 26 | 0 | - | 0 |
| Stage 1 | 23 | - | - | - | - | - |
| Stage 2 | 59 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 920 | 1053 | 1588 | - | - | - |
| Stage 1 | 999 | - | - | - | - | - |
| Stage 2 | 964 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 905 | 1053 | 1588 | - | - | - |
| Mov Cap-2 Maneuver | 905 | - | - | - | - | - |
| Stage 1 | 983 | - | - | - | - | - |
| Stage 2 | 964 | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 8.82 | 5.42 | 0 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1335 | - | 1025 | - | - |
| HCM Lane V/C Ratio | 0.016 | - | 0.082 | - | - |
| HCM Ctrl Dly (s/v) | 7.3 | 0 | 8.8 | - | - |
| HCM Lane LOS | A | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0.3 | - | - |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 24.6 |
| Intersection LOS | C |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 48 | 236 | 23 | 24 | 213 | 81 | 61 | 39 | 44 | 129 | 27 | 60 |
| Future Vol, veh/h | 48 | 236 | 23 | 24 | 213 | 81 | 61 | 39 | 44 | 129 | 27 | 60 |
| Peak Hour Factor | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| Heavy Vehicles, % | 1 | 6 | 5 | 1 | 7 | 1 | 1 | 3 | 6 | 7 | 1 | 4 |
| Mvmt Flow | 64 | 315 | 31 | 32 | 284 | 108 | 81 | 52 | 59 | 172 | 36 | 80 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 1 | 1 |
| HCM Control Delay, s/veh | 29.1 | 29.5 | 16 | 16.6 |
| HCM LOS | D | D | C | C |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|
| Vol Left, % | 42% | 16% | 8% | 83% | 0% |
| Vol Thru, % | 27% | 77% | 67% | 17% | 0% |
| Vol Right, % | 31% | 7% | 25% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 144 | 307 | 318 | 156 | 60 |
| LT Vol | 61 | 48 | 24 | 129 | 0 |
| Through Vol | 39 | 236 | 213 | 27 | 0 |
| RT Vol | 44 | 23 | 81 | 0 | 60 |
| Lane Flow Rate | 192 | 409 | 424 | 208 | 80 |
| Geometry Grp | 4a | 2 | 2 | 5 | 5 |
| Degree of Util (X) | 0.409 | 0.771 | 0.782 | 0.483 | 0.158 |
| Departure Headway (Hd) | 7.67 | 6.785 | 6.642 | 8.355 | 7.102 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes |
| Cap | 468 | 536 | 547 | 431 | 503 |
| Service Time | 5.747 | 4.807 | 4.663 | 6.12 | 4.866 |
| HCM Lane V/C Ratio | 0.41 | 0.763 | 0.775 | 0.483 | 0.159 |
| HCM Control Delay, s/veh | 16 | 29.1 | 29.5 | 18.7 | 11.2 |
| HCM Lane LOS | C | D | D | C | B |
| HCM 95th-tile Q | 2 | 6.9 | 7.2 | 2.6 | 0.6 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 4 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 34 | 38 | 6 | 57 | 63 | 23 |
| Future Vol, veh/h | 34 | 38 | 6 | 57 | 63 | 23 |
| Conflicting Peds, #/hr | 0 | 10 | 10 | 0 | 10 | 10 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 37 | 41 | 7 | 62 | 68 | 25 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 88 | 0 | 153 | 78 |
| Stage 1 | - | - | - | - | 68 | - |
| Stage 2 | - | - | - | - | 85 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1507 | - | 839 | 983 |
| Stage 1 | - | - | - | - | 955 | - |
| Stage 2 | - | - | - | - | 938 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1495 | - | 821 | 967 |
| Mov Cap-2 Maneuver | - | - | - | - | 821 | - |
| Stage 1 | - | - | - | - | 943 | - |
| Stage 2 | - | - | - | - | 930 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 0.71 | 9.72 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 856 | - | - | 171 | - |
| HCM Lane V/C Ratio | 0.109 | - | - | 0.004 | - |
| HCM Ctrl Dly (s/v) | 9.7 | - | - | 7.4 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.4 | - | - | 0 | - |

# MOVEMENT SUMMARY

## Site: [99 (4)] SR 305 & Johnson Rd - Forecast 2032 AM With (AM Peak Hour)

Output produced by SIDRA INTERSECTION Version: 11.0.2

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Johnson Way | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.053 | 16.6 | LOS B | 0.2 | 5.9 | 0.69 | 0.81 | 0.69 | 30.4 |
| 3 | L2 | All MCs | 18 | 1.0 | 18 | 1.0 | 0.053 | 13.1 | LOS B | 0.2 | 5.9 | 0.69 | 0.81 | 0.69 | 32.1 |
| 8 | T1 | All MCs | 8 | 1.0 | 8 | 1.0 | 0.053 | 7.5 | LOS A | 0.2 | 5.9 | 0.69 | 0.81 | 0.69 | 29.7 |
| 18 | R2 | All MCs | 3 | 1.0 | 3 | 1.0 | 0.053 | 13.6 | LOS B | 0.2 | 5.9 | 0.69 | 0.81 | 0.69 | 32.5 |
| Approach | | | 30 | 1.0 | 30 | 1.0 | 0.053 | 11.9 | LOS B | 0.2 | 5.9 | 0.69 | 0.81 | 0.69 | 31.5 |
| East: SR 305 | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.274 | 12.1 | LOS B | 1.7 | 43.3 | 0.20 | 0.46 | 0.20 | 37.6 |
| 1 | L2 | All MCs | 6 | 1.0 | 6 | 1.0 | 0.274 | 11.5 | LOS B | 1.7 | 43.3 | 0.20 | 0.46 | 0.20 | 35.7 |
| 6 | T1 | All MCs | 522 | 6.0 | 522 | 6.0 | 0.274 | 6.1 | LOS A | 1.7 | 43.3 | 0.20 | 0.46 | 0.20 | 40.6 |
| 16 | R2 | All MCs | 27 | 1.0 | 27 | 1.0 | 0.125 | 5.9 | LOS A | 0.6 | 16.6 | 0.20 | 0.47 | 0.20 | 36.1 |
| Approach | | | 556 | 5.7 | 556 | 5.7 | 0.274 | 6.2 | LOS A | 1.7 | 43.3 | 0.20 | 0.46 | 0.20 | 40.3 |
| North: Johnson Rd | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.206 | 14.1 | LOS B | 0.8 | 21.0 | 0.50 | 0.70 | 0.50 | 31.2 |
| 7 | L2 | All MCs | 122 | 3.0 | 122 | 3.0 | 0.206 | 10.8 | LOS B | 0.8 | 21.0 | 0.50 | 0.70 | 0.50 | 32.8 |
| 4 | T1 | All MCs | 2 | 1.0 | 2 | 1.0 | 0.206 | 5.0 | LOS A | 0.8 | 21.0 | 0.50 | 0.70 | 0.50 | 30.5 |
| 14 | R2 | All MCs | 52 | 1.0 | 52 | 1.0 | 0.206 | 6.4 | LOS A | 0.8 | 21.0 | 0.50 | 0.70 | 0.50 | 33.5 |
| Approach | | | 176 | 2.4 | 176 | 2.4 | 0.206 | 9.5 | LOS A | 0.8 | 21.0 | 0.50 | 0.70 | 0.50 | 33.0 |
| West: SR 305 | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.574 | 12.7 | LOS B | 5.1 | 134.9 | 0.49 | 0.51 | 0.49 | 36.6 |
| 5 | L2 | All MCs | 23 | 17.0 | 23 | 17.0 | 0.574 | 12.7 | LOS B | 5.1 | 134.9 | 0.49 | 0.51 | 0.49 | 34.2 |
| 2 | T1 | All MCs | 1014 | 8.0 | 1014 | 8.0 | 0.574 | 8.0 | LOS A | 5.1 | 134.9 | 0.46 | 0.50 | 0.46 | 39.2 |
| 12 | R2 | All MCs | 20 | 12.0 | 20 | 12.0 | 0.261 | 6.7 | LOS A | 1.5 | 41.0 | 0.38 | 0.50 | 0.38 | 35.3 |
| Approach | | | 1058 | 8.3 | 1058 | 8.3 | 0.574 | 8.1 | LOS A | 5.1 | 134.9 | 0.46 | 0.50 | 0.46 | 39.0 |
| All Vehicles | | | 1820 | 6.8 | 1820 | 6.8 | 0.574 | 7.7 | LOS A | 5.1 | 134.9 | 0.39 | 0.52 | 0.39 | 38.6 |

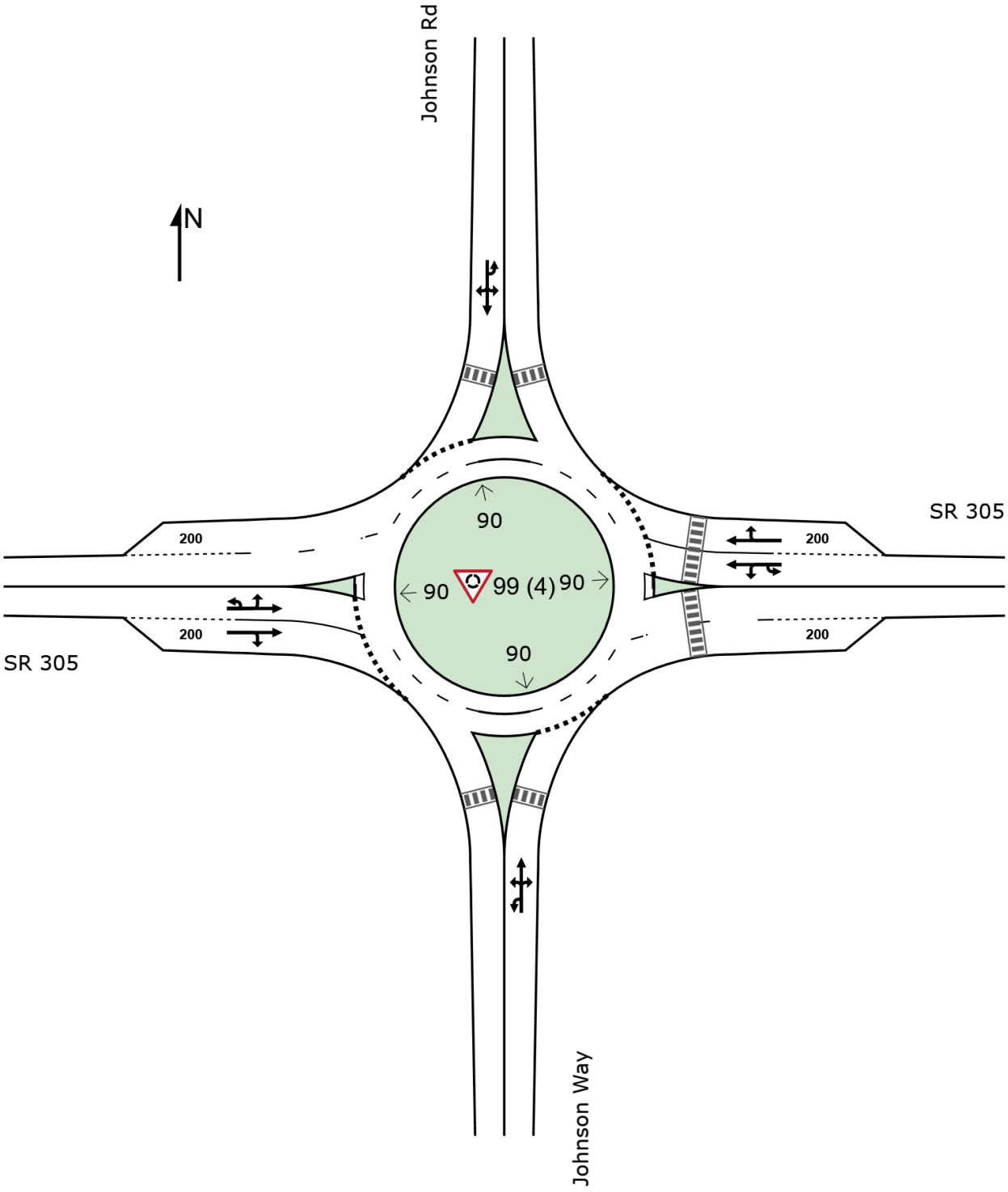
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [99 (4)] SR 305 & Johnson Rd - Forecast 2032 AM With
(AM Peak Hour)

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



# MOVEMENT SUMMARY

## Site: [1 (4)] Johnson & Sunrise Ridge - 2032 AM With (Folder1)

Output produced by SIDRA INTERSECTION Version: 11.0.2

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NE Midnight Sun Loop | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 7.3 | LOS A | 0.0 | 0.4 | 0.20 | 0.45 | 0.20 | 23.5 |
| 3 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 5.9 | LOS A | 0.0 | 0.4 | 0.20 | 0.45 | 0.20 | 23.5 |
| 8 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 2.1 | LOS A | 0.0 | 0.4 | 0.20 | 0.45 | 0.20 | 23.7 |
| 18 | R2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 2.5 | LOS A | 0.0 | 0.4 | 0.20 | 0.45 | 0.20 | 23.6 |
| Approach | | | 5 | 3.0 | 5 | 3.0 | 0.004 | 4.4 | LOS A | 0.0 | 0.4 | 0.20 | 0.45 | 0.20 | 23.5 |
| East: Johnson Rd NE | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.074 | 11.0 | LOS B | 0.3 | 8.0 | 0.14 | 0.46 | 0.14 | 34.5 |
| 1 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.074 | 9.1 | LOS A | 0.3 | 8.0 | 0.14 | 0.46 | 0.14 | 34.5 |
| 6 | T1 | All MCs | 87 | 3.0 | 87 | 3.0 | 0.074 | 5.0 | LOS A | 0.3 | 8.0 | 0.14 | 0.46 | 0.14 | 35.2 |
| 16 | R2 | All MCs | 7 | 3.0 | 7 | 3.0 | 0.074 | 4.8 | LOS A | 0.3 | 8.0 | 0.14 | 0.46 | 0.14 | 34.9 |
| Approach | | | 96 | 3.0 | 96 | 3.0 | 0.074 | 5.1 | LOS A | 0.3 | 8.0 | 0.14 | 0.46 | 0.14 | 35.1 |
| North: Sunrise Ridge Ave NE | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.119 | 11.2 | LOS B | 0.5 | 13.5 | 0.23 | 0.55 | 0.23 | 34.2 |
| 7 | L2 | All MCs | 23 | 3.0 | 23 | 3.0 | 0.119 | 9.3 | LOS A | 0.5 | 13.5 | 0.23 | 0.55 | 0.23 | 34.2 |
| 4 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.119 | 5.3 | LOS A | 0.5 | 13.5 | 0.23 | 0.55 | 0.23 | 34.9 |
| 14 | R2 | All MCs | 114 | 3.0 | 114 | 3.0 | 0.119 | 5.0 | LOS A | 0.5 | 13.5 | 0.23 | 0.55 | 0.23 | 34.5 |
| Approach | | | 139 | 3.0 | 139 | 3.0 | 0.119 | 5.8 | LOS A | 0.5 | 13.5 | 0.23 | 0.55 | 0.23 | 34.5 |
| West: Johnson Rd NE | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.061 | 10.9 | LOS B | 0.3 | 6.8 | 0.11 | 0.58 | 0.11 | 33.6 |
| 5 | L2 | All MCs | 40 | 3.0 | 40 | 3.0 | 0.061 | 9.0 | LOS A | 0.3 | 6.8 | 0.11 | 0.58 | 0.11 | 33.6 |
| 2 | T1 | All MCs | 26 | 3.0 | 26 | 3.0 | 0.061 | 4.9 | LOS A | 0.3 | 6.8 | 0.11 | 0.58 | 0.11 | 34.3 |
| 12 | R2 | All MCs | 10 | 3.0 | 10 | 3.0 | 0.061 | 4.7 | LOS A | 0.3 | 6.8 | 0.11 | 0.58 | 0.11 | 34.0 |
| Approach | | | 77 | 3.0 | 77 | 3.0 | 0.061 | 7.1 | LOS A | 0.3 | 6.8 | 0.11 | 0.58 | 0.11 | 33.9 |
| All Vehicles | | | 318 | 3.0 | 318 | 3.0 | 0.119 | 5.9 | LOS A | 0.5 | 13.5 | 0.18 | 0.53 | 0.18 | 34.3 |

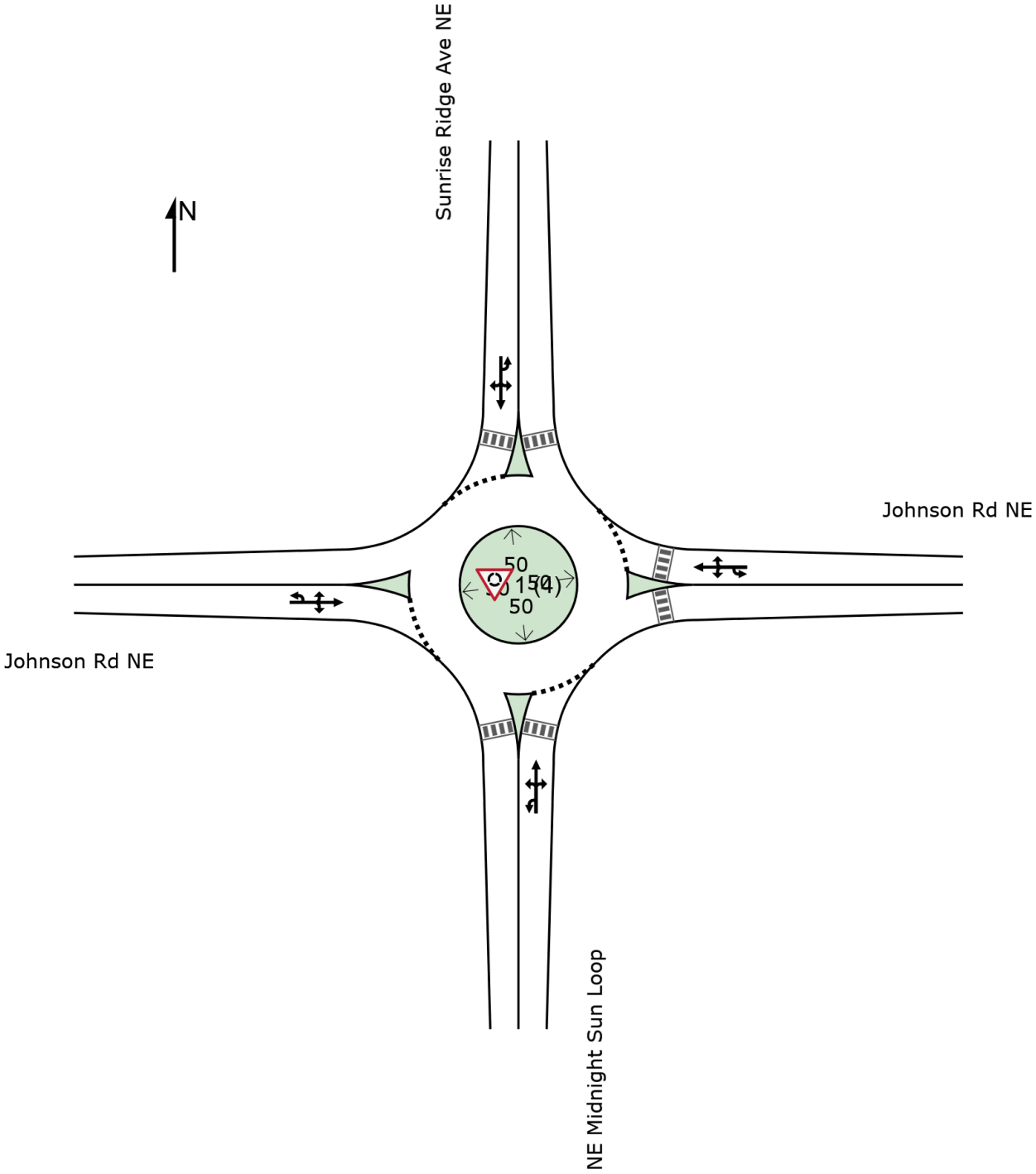
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

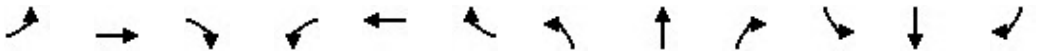
## Site: [1 (4)] Johnson & Sunrise Ridge - 2032 AM With
(Folder1)

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.




**SIDRA INTERSECTION 11 | Copyright © 2000-2026 Akcelik and Associates Pty Ltd | sidrasolutions.com**
Organisation: HEATH & ASSOCIATES | Licence: PLUS / 1PC | Created: Saturday, October 3, 2026 3:28:20 PM
Project: C:\Users\LucasMaulin\Heath and Associates\Office Access - Documents\Project Files\Pinnacle at Liberty Bay - 5576\5-Analysis\Sidra\Johnson & Sunrise Ridge.sipx



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 71 | 178 | 117 | 55 | 130 | 228 | 133 | 834 | 36 | 218 | 682 | 51 |
| Future Volume (veh/h) | 71 | 178 | 117 | 55 | 130 | 228 | 133 | 834 | 36 | 218 | 682 | 51 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 0.99 | | 0.96 | 0.99 | | 0.96 | 1.00 | | 0.96 | 1.00 | | 0.97 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1702 | 1758 | 1786 | 1786 | 1786 | 1786 | 1772 | 1744 | 1786 | 1786 | 1772 | 1744 |
| Adj Flow Rate, veh/h | 72 | 180 | 118 | 56 | 131 | 84 | 134 | 842 | 36 | 220 | 689 | 52 |
| 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, % | 7 | 3 | 1 | 1 | 1 | 1 | 2 | 4 | 1 | 1 | 2 | 4 |
| Cap, veh/h | 186 | 223 | 185 | 149 | 205 | 167 | 156 | 904 | 39 | 600 | 1607 | 121 |
| Arrive On Green | 0.05 | 0.13 | 0.13 | 0.03 | 0.11 | 0.11 | 0.09 | 0.32 | 0.32 | 0.35 | 0.58 | 0.58 |
| Sat Flow, veh/h | 1621 | 1758 | 1459 | 1701 | 1786 | 1455 | 1688 | 2834 | 121 | 1701 | 2776 | 209 |
| Grp Volume(v), veh/h | 72 | 180 | 118 | 56 | 131 | 84 | 134 | 368 | 510 | 220 | 312 | 429 |
| Grp Sat Flow(s),veh/h/ln | 1621 | 1758 | 1459 | 1701 | 1786 | 1455 | 1688 | 1238 | 1717 | 1701 | 1258 | 1727 |
| Q Serve(g_s), s | 4.7 | 12.0 | 9.2 | 3.5 | 8.4 | 3.4 | 9.4 | 34.6 | 34.6 | 11.5 | 16.7 | 16.7 |
| Cycle Q Clear(g_c), s | 4.7 | 12.0 | 9.2 | 3.5 | 8.4 | 3.4 | 9.4 | 34.6 | 34.6 | 11.5 | 16.7 | 16.7 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.07 | 1.00 | | 0.12 |
| Lane Grp Cap(c), veh/h | 186 | 223 | 185 | 149 | 205 | 167 | 156 | 395 | 547 | 600 | 729 | 1000 |
| V/C Ratio(X) | 0.39 | 0.81 | 0.64 | 0.38 | 0.64 | 0.50 | 0.86 | 0.93 | 0.93 | 0.37 | 0.43 | 0.43 |
| Avail Cap(c_a), veh/h | 320 | 337 | 280 | 311 | 342 | 279 | 323 | 444 | 615 | 600 | 729 | 1000 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.74 | 0.74 | 0.74 |
| Uniform Delay (d), s/veh | 44.4 | 50.9 | 49.8 | 45.3 | 50.7 | 13.3 | 53.7 | 39.6 | 39.6 | 28.9 | 14.1 | 14.1 |
| Incr Delay (d2), s/veh | 1.3 | 8.3 | 3.6 | 1.6 | 3.3 | 2.3 | 12.8 | 31.0 | 24.9 | 0.3 | 1.4 | 1.0 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 3.5 | 9.7 | 6.4 | 2.8 | 7.1 | 4.3 | 7.9 | 19.6 | 24.8 | 7.7 | 7.8 | 9.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 45.7 | 59.2 | 53.4 | 46.9 | 54.0 | 15.7 | 66.5 | 70.6 | 64.5 | 29.2 | 15.5 | 15.1 |
| LnGrp LOS | D | E | D | D | D | B | E | E | E | C | B | B |
| Approach Vol, veh/h | | 370 | | | 271 | | | 1012 | | | 961 | |
| Approach Delay, s/veh | | 54.7 | | | 40.7 | | | 67.0 | | | 18.5 | |
| Approach LOS | | D | | | D | | | E | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 47.3 | 43.3 | 9.2 | 20.2 | 16.1 | 74.5 | 10.7 | 18.8 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 18.9 | 43.5 | 16.1 | 23.5 | 23.5 | 38.9 | 16.1 | 23.5 |
| Max Q Clear Time (g_c+I1), s | 13.5 | 36.6 | 5.5 | 14.0 | 11.4 | 18.7 | 6.7 | 10.4 |
| Green Ext Time (p_c), s | 0.4 | 2.2 | 0.1 | 0.8 | 0.3 | 2.9 | 0.1 | 0.7 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 44.7 |
| HCM 7th LOS | D |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 6 | 823 | 931 | 5 | 1 | 3 |
| Future Vol, veh/h | 6 | 823 | 931 | 5 | 1 | 3 |
| Conflicting Peds, #/hr | 1 | 0 | 0 | 1 | 1 | 1 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 105 | - | - | 55 | 60 | 0 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 93 | 93 | 93 | 93 | 93 | 93 |
| Heavy Vehicles, % | 10 | 2 | 3 | 1 | 10 | 1 |
| Mvmt Flow | 6 | 885 | 1001 | 5 | 1 | 3 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 1007 | 0 | - | 0 | 1901 | 1003 |
| Stage 1 | - | - | - | - | 1002 | - |
| Stage 2 | - | - | - | - | 899 | - |
| Critical Hdwy | 4.2 | - | - | - | 6.5 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.5 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.5 | - |
| Follow-up Hdwy | 2.29 | - | - | - | 3.59 | 3.309 |
| Pot Cap-1 Maneuver | 657 | - | - | - | 72 | 295 |
| Stage 1 | - | - | - | - | 343 | - |
| Stage 2 | - | - | - | - | 385 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 657 | - | - | - | 71 | 295 |
| Mov Cap-2 Maneuver | - | - | - | - | 71 | - |
| Stage 1 | - | - | - | - | 339 | - |
| Stage 2 | - | - | - | - | 384 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0.08 | 0 | 27.05 |
| HCM LOS | | | D |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 657 | - | - | - | 71 | 295 |
| HCM Lane V/C Ratio | 0.01 | - | - | - | 0.015 | 0.011 |
| HCM Ctrl Dly (s/v) | 10.5 | - | - | - | 56.1 | 17.4 |
| HCM Lane LOS | B | - | - | - | F | C |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0 | 0 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 6.5 |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 8 | 43 | 72 | 5 | 9 | 13 |
| Future Vol, veh/h | 8 | 43 | 72 | 5 | 9 | 13 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 9 | 47 | 78 | 5 | 10 | 14 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 179 | 17 | 24 | 0 | - | 0 |
| Stage 1 | 17 | - | - | - | - | - |
| Stage 2 | 162 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 811 | 1062 | 1591 | - | - | - |
| Stage 1 | 1006 | - | - | - | - | - |
| Stage 2 | 867 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 771 | 1062 | 1591 | - | - | - |
| Mov Cap-2 Maneuver | 771 | - | - | - | - | - |
| Stage 1 | 956 | - | - | - | - | - |
| Stage 2 | 867 | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 8.8 | 6.9 | 0 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1586 | - | 1003 | - | - |
| HCM Lane V/C Ratio | 0.049 | - | 0.055 | - | - |
| HCM Ctrl Dly (s/v) | 7.4 | 0 | 8.8 | - | - |
| HCM Lane LOS | A | A | A | - | - |
| HCM 95th %tile Q(veh) | 0.2 | - | 0.2 | - | - |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 15.1 |
| Intersection LOS | C |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 89 | 219 | 72 | 13 | 137 | 50 | 65 | 51 | 5 | 92 | 65 | 65 |
| Future Vol, veh/h | 89 | 219 | 72 | 13 | 137 | 50 | 65 | 51 | 5 | 92 | 65 | 65 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Heavy Vehicles, % | 3 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 4 |
| Mvmt Flow | 102 | 252 | 83 | 15 | 157 | 57 | 75 | 59 | 6 | 106 | 75 | 75 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 1 | 1 |
| HCM Control Delay, s/veh | 19.2 | 12.3 | 11.9 | 12.3 |
| HCM LOS | C | B | B | B |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|
| Vol Left, % | 54% | 23% | 7% | 59% | 0% |
| Vol Thru, % | 42% | 58% | 69% | 41% | 0% |
| Vol Right, % | 4% | 19% | 25% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 121 | 380 | 200 | 157 | 65 |
| LT Vol | 65 | 89 | 13 | 92 | 0 |
| Through Vol | 51 | 219 | 137 | 65 | 0 |
| RT Vol | 5 | 72 | 50 | 0 | 65 |
| Lane Flow Rate | 139 | 437 | 230 | 180 | 75 |
| Geometry Grp | 4a | 2 | 2 | 5 | 5 |
| Degree of Util (X) | 0.256 | 0.67 | 0.369 | 0.348 | 0.123 |
| Departure Headway (Hd) | 6.636 | 5.52 | 5.773 | 6.947 | 5.933 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes |
| Cap | 545 | 651 | 616 | 514 | 599 |
| Service Time | 4.636 | 3.598 | 3.867 | 4.737 | 3.723 |
| HCM Lane V/C Ratio | 0.255 | 0.671 | 0.373 | 0.35 | 0.125 |
| HCM Control Delay, s/veh | 11.9 | 19.2 | 12.3 | 13.4 | 9.6 |
| HCM Lane LOS | B | C | B | B | A |
| HCM 95th-tile Q | 1 | 5.1 | 1.7 | 1.5 | 0.4 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 3 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 57 | 68 | 23 | 57 | 44 | 17 |
| Future Vol, veh/h | 57 | 68 | 23 | 57 | 44 | 17 |
| Conflicting Peds, #/hr | 0 | 10 | 10 | 0 | 10 | 10 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 62 | 74 | 25 | 62 | 48 | 18 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 146 | 0 | 231 | 119 |
| Stage 1 | - | - | - | - | 109 | - |
| Stage 2 | - | - | - | - | 122 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1436 | - | 757 | 933 |
| Stage 1 | - | - | - | - | 916 | - |
| Stage 2 | - | - | - | - | 903 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1424 | - | 731 | 917 |
| Mov Cap-2 Maneuver | - | - | - | - | 731 | - |
| Stage 1 | - | - | - | - | 891 | - |
| Stage 2 | - | - | - | - | 896 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 2.18 | 10.08 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 775 | - | - | 517 | - |
| HCM Lane V/C Ratio | 0.086 | - | - | 0.018 | - |
| HCM Ctrl Dly (s/v) | 10.1 | - | - | 7.6 | 0 |
| HCM Lane LOS | B | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0.1 | - |

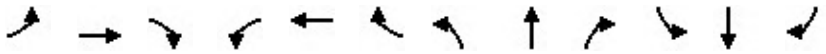
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 65 | 264 | 117 | 129 | 232 | 242 | 122 | 1023 | 132 | 210 | 713 | 83 |
| Future Volume (veh/h) | 65 | 264 | 117 | 129 | 232 | 242 | 122 | 1023 | 132 | 210 | 713 | 83 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 0.99 | 1.00 | | 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 | 1786 | 1786 | 1786 | 1772 | 1772 | 1772 | 1758 | 1758 | 1758 | 1772 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 68 | 275 | 122 | 134 | 242 | 252 | 127 | 1066 | 138 | 219 | 743 | 86 |
| Peak Hour Factor | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |
| Percent Heavy Veh, % | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 |
| Cap, veh/h | 85 | 323 | 272 | 156 | 395 | 333 | 149 | 1111 | 144 | 339 | 1404 | 162 |
| Arrive On Green | 0.05 | 0.18 | 0.18 | 0.09 | 0.22 | 0.22 | 0.09 | 0.39 | 0.39 | 0.20 | 0.51 | 0.51 |
| Sat Flow, veh/h | 1701 | 1786 | 1501 | 1688 | 1772 | 1492 | 1674 | 2834 | 366 | 1688 | 2773 | 321 |
| Grp Volume(v), veh/h | 68 | 275 | 122 | 134 | 242 | 252 | 127 | 568 | 636 | 219 | 370 | 459 |
| Grp Sat Flow(s),veh/h/ln | 1701 | 1786 | 1501 | 1688 | 1772 | 1492 | 1674 | 1512 | 1689 | 1688 | 1382 | 1712 |
| Q Serve(g_s), s | 5.6 | 21.2 | 10.3 | 11.1 | 17.4 | 14.7 | 10.6 | 52.0 | 52.2 | 16.9 | 25.7 | 25.7 |
| Cycle Q Clear(g_c), s | 5.6 | 21.2 | 10.3 | 11.1 | 17.4 | 14.7 | 10.6 | 52.0 | 52.2 | 16.9 | 25.7 | 25.7 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.22 | 1.00 | | 0.19 |
| Lane Grp Cap(c), veh/h | 85 | 323 | 272 | 156 | 395 | 333 | 149 | 593 | 662 | 339 | 700 | 866 |
| V/C Ratio(X) | 0.80 | 0.85 | 0.45 | 0.86 | 0.61 | 0.76 | 0.85 | 0.96 | 0.96 | 0.65 | 0.53 | 0.53 |
| Avail Cap(c_a), veh/h | 137 | 395 | 332 | 183 | 442 | 372 | 208 | 597 | 667 | 339 | 700 | 866 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.69 | 0.69 | 0.69 | 0.74 | 0.74 | 0.74 |
| Uniform Delay (d), s/veh | 66.7 | 56.3 | 51.9 | 63.5 | 49.6 | 22.1 | 63.8 | 42.0 | 42.1 | 52.1 | 23.7 | 23.7 |
| Incr Delay (d2), s/veh | 11.8 | 13.8 | 1.2 | 28.3 | 2.1 | 7.8 | 14.0 | 22.2 | 21.0 | 3.1 | 2.1 | 1.7 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 4.9 | 16.3 | 7.2 | 10.1 | 12.7 | 10.0 | 8.1 | 28.9 | 31.7 | 11.2 | 12.7 | 15.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 78.5 | 70.1 | 53.0 | 91.8 | 51.7 | 29.9 | 77.7 | 64.2 | 63.1 | 55.2 | 25.8 | 25.4 |
| LnGrp LOS | E | E | D | F | D | C | E | E | E | E | C | C |
| Approach Vol, veh/h | | 465 | | | 628 | | | 1331 | | | 1048 | |
| Approach Delay, s/veh | | 66.9 | | | 51.5 | | | 65.0 | | | 31.8 | |
| Approach LOS | | E | | | D | | | E | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 17.2 | 76.8 | 11.7 | 36.3 | 33.4 | 60.6 | 17.7 | 30.3 |
| Change Period (Y+Rc), s | 4.6 | 4.9 | 4.6 | 4.6 | 4.9 | * 4.9 | 4.6 | 4.6 |
| Max Green Setting (Gmax), s | 17.6 | 58.9 | 11.4 | 35.4 | 20.4 | * 56 | 15.4 | 31.4 |
| Max Q Clear Time (g_c+I1), s | 12.6 | 27.7 | 7.6 | 19.4 | 18.9 | 54.2 | 13.1 | 23.2 |
| Green Ext Time (p_c), s | 0.1 | 8.1 | 0.0 | 2.2 | 0.1 | 1.5 | 0.1 | 1.3 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 52.8 |
| HCM 7th LOS | D |

Notes

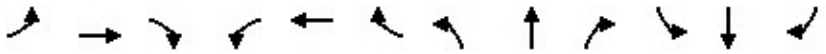
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 100 | 78 | 63 | 48 | 65 | 65 | 61 | 1173 | 83 | 78 | 861 | 54 |
| Future Volume (veh/h) | 100 | 78 | 63 | 48 | 65 | 65 | 61 | 1173 | 83 | 78 | 861 | 54 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 0.99 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1772 | 1772 | 1772 | 1786 | 1786 | 1786 | 1758 | 1758 | 1758 | 1772 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 106 | 83 | 67 | 51 | 69 | 69 | 65 | 1248 | 88 | 83 | 916 | 57 |
| Peak Hour Factor | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 1 | 1 | 1 | 3 | 3 | 3 | 2 | 2 | 2 |
| Cap, veh/h | 171 | 149 | 131 | 116 | 154 | 172 | 643 | 1043 | 73 | 661 | 867 | 524 |
| Arrive On Green | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 | 0.38 | 0.34 | 0.34 | 0.39 | 0.35 | 0.35 |
| Sat Flow, veh/h | 717 | 851 | 747 | 445 | 879 | 981 | 1674 | 3051 | 215 | 1688 | 2481 | 1500 |
| Grp Volume(v), veh/h | 124 | 0 | 132 | 87 | 0 | 102 | 65 | 632 | 704 | 83 | 916 | 57 |
| Grp Sat Flow(s),veh/h/ln | 842 | 0 | 1473 | 862 | 0 | 1443 | 1674 | 1547 | 1719 | 1688 | 1240 | 1500 |
| Q Serve(g_s), s | 13.7 | 0.0 | 12.0 | 6.9 | 0.0 | 9.2 | 3.7 | 50.6 | 50.6 | 4.7 | 51.7 | 3.8 |
| Cycle Q Clear(g_c), s | 23.0 | 0.0 | 12.0 | 18.9 | 0.0 | 9.2 | 3.7 | 50.6 | 50.6 | 4.7 | 51.7 | 3.8 |
| Prop In Lane | 0.86 | | 0.51 | 0.58 | | 0.68 | 1.00 | | 0.12 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 193 | 0 | 258 | 189 | 0 | 253 | 643 | 529 | 588 | 661 | 867 | 524 |
| V/C Ratio(X) | 0.64 | 0.00 | 0.51 | 0.46 | 0.00 | 0.40 | 0.10 | 1.19 | 1.20 | 0.13 | 1.06 | 0.11 |
| Avail Cap(c_a), veh/h | 220 | 0 | 289 | 344 | 0 | 409 | 643 | 529 | 588 | 661 | 867 | 524 |
| 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 | 0.44 | 0.44 | 0.44 | 0.73 | 0.73 | 0.73 |
| Uniform Delay (d), s/veh | 64.3 | 0.0 | 55.3 | 61.0 | 0.0 | 54.2 | 29.2 | 48.7 | 48.7 | 28.8 | 48.2 | 32.6 |
| Incr Delay (d2), s/veh | 5.2 | 0.0 | 1.6 | 1.7 | 0.0 | 1.0 | 0.0 | 95.9 | 96.7 | 0.1 | 42.6 | 0.3 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 8.5 | 0.0 | 8.2 | 5.9 | 0.0 | 6.3 | 2.7 | 44.5 | 49.3 | 3.4 | 28.1 | 2.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 69.4 | 0.0 | 56.9 | 62.7 | 0.0 | 55.2 | 29.2 | 144.6 | 145.4 | 28.9 | 90.8 | 32.9 |
| LnGrp LOS | E | | E | E | | E | C | F | F | C | F | C |
| Approach Vol, veh/h | | 256 | | | 189 | | | 1401 | | | 1056 | |
| Approach Delay, s/veh | | 63.0 | | | 58.7 | | | 139.7 | | | 82.8 | |
| Approach LOS | | E | | | E | | | F | | | F | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 61.4 | 56.2 | | 30.4 | 62.5 | 55.1 | | 30.4 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | | 4.5 |
| Max Green Setting (Gmax), s | 56.8 | 51.7 | | 29.0 | 7.9 | 50.6 | | 42.0 |
| Max Q Clear Time (g_c+I1), s | 15.7 | 53.7 | | 25.0 | 6.7 | 52.6 | | 20.9 |
| Green Ext Time (p_c), s | 0.0 | 0.0 | | 0.5 | 0.0 | 0.0 | | 1.1 |

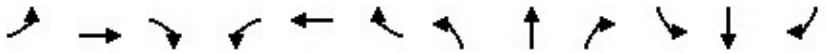
| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 106.9 |
| HCM 7th LOS | F |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 261 | 48 | 6 | 32 | 24 | 337 | 6 | 1266 | 60 | 308 | 953 | 172 |
| Future Volume (veh/h) | 261 | 48 | 6 | 32 | 24 | 337 | 6 | 1266 | 60 | 308 | 953 | 172 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1772 | 1772 | 1772 | 1772 | 1772 | 1772 | 1758 | 1758 | 1758 | 1772 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 275 | 51 | 6 | 34 | 25 | 355 | 6 | 1333 | 63 | 324 | 1003 | 181 |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 |
| Cap, veh/h | 304 | 280 | 33 | 203 | 149 | 306 | 15 | 976 | 46 | 303 | 1279 | 713 |
| Arrive On Green | 0.18 | 0.18 | 0.18 | 0.20 | 0.20 | 0.20 | 0.01 | 0.31 | 0.31 | 0.18 | 0.48 | 0.48 |
| Sat Flow, veh/h | 1688 | 1556 | 183 | 993 | 730 | 1499 | 1674 | 3164 | 149 | 1688 | 2693 | 1500 |
| Grp Volume(v), veh/h | 275 | 0 | 57 | 59 | 0 | 355 | 6 | 666 | 730 | 324 | 1003 | 181 |
| Grp Sat Flow(s),veh/h/ln | 1688 | 0 | 1739 | 1722 | 0 | 1499 | 1674 | 1582 | 1731 | 1688 | 1347 | 1500 |
| Q Serve(g_s), s | 22.7 | 0.0 | 3.9 | 4.0 | 0.0 | 29.0 | 0.5 | 43.8 | 43.8 | 25.5 | 44.2 | 10.2 |
| Cycle Q Clear(g_c), s | 22.7 | 0.0 | 3.9 | 4.0 | 0.0 | 29.0 | 0.5 | 43.8 | 43.8 | 25.5 | 44.2 | 10.2 |
| Prop In Lane | 1.00 | | 0.11 | 0.58 | | 1.00 | 1.00 | | 0.09 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 304 | 0 | 313 | 352 | 0 | 306 | 15 | 488 | 534 | 303 | 1279 | 713 |
| V/C Ratio(X) | 0.90 | 0.00 | 0.18 | 0.17 | 0.00 | 1.16 | 0.40 | 1.36 | 1.37 | 1.07 | 0.78 | 0.25 |
| Avail Cap(c_a), veh/h | 392 | 0 | 404 | 352 | 0 | 306 | 71 | 488 | 534 | 303 | 1279 | 713 |
| 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 | 0.58 | 0.58 | 0.58 | 0.15 | 0.15 | 0.15 |
| Uniform Delay (d), s/veh | 57.0 | 0.0 | 49.3 | 46.6 | 0.0 | 56.5 | 70.0 | 49.1 | 49.1 | 58.2 | 31.2 | 22.3 |
| Incr Delay (d2), s/veh | 20.3 | 0.0 | 0.3 | 0.2 | 0.0 | 101.8 | 9.8 | 171.5 | 172.6 | 41.1 | 0.8 | 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 | 7.0 | 0.0 | 3.2 | 3.2 | 0.0 | 29.1 | 0.5 | 57.6 | 62.9 | 17.3 | 16.4 | 4.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 77.3 | 0.0 | 49.6 | 46.8 | 0.0 | 158.3 | 79.8 | 220.6 | 221.7 | 99.4 | 31.9 | 22.4 |
| LnGrp LOS | E | | D | D | | F | E | F | F | F | C | C |
| Approach Vol, veh/h | | 332 | | | 414 | | | 1402 | | | 1508 | |
| Approach Delay, s/veh | | 72.5 | | | 142.4 | | | 220.6 | | | 45.3 | |
| Approach LOS | | E | | | F | | | F | | | D | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 15.9 | 72.4 | | 30.2 | 30.4 | 47.8 | | 33.6 |
| Change Period (Y+Rc), s | 4.6 | 4.9 | | 4.6 | 4.9 | 4.0 | | 4.6 |
| Max Green Setting (Gmax), s | 6.3 | 55.3 | | 33.0 | 18.1 | 43.8 | | 29.0 |
| Max Q Clear Time (g_c+I1), s | 12.5 | 46.2 | | 24.7 | 27.5 | 45.8 | | 31.0 |
| Green Ext Time (p_c), s | 0.0 | 4.7 | | 0.8 | 0.0 | 0.0 | | 0.0 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 126.0 |
| HCM 7th LOS | F |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 48 | 326 | 344 | 168 | 300 | 587 | 359 | 1200 | 218 | 640 | 928 | 35 |
| Future Volume (veh/h) | 48 | 326 | 344 | 168 | 300 | 587 | 359 | 1200 | 218 | 640 | 928 | 35 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1786 | 1786 | 1786 | 1772 | 1772 | 1772 | 1758 | 1758 | 1758 | 1772 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 51 | 343 | 362 | 177 | 316 | 618 | 378 | 1263 | 229 | 674 | 977 | 37 |
| 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 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 |
| Cap, veh/h | 65 | 389 | 610 | 156 | 483 | 672 | 309 | 1287 | 574 | 573 | 1115 | 42 |
| Arrive On Green | 0.04 | 0.22 | 0.22 | 0.09 | 0.27 | 0.27 | 0.18 | 0.39 | 0.39 | 0.18 | 0.38 | 0.38 |
| Sat Flow, veh/h | 1701 | 1786 | 1514 | 1688 | 1772 | 1502 | 1674 | 3340 | 1489 | 3274 | 2968 | 112 |
| Grp Volume(v), veh/h | 51 | 343 | 362 | 177 | 316 | 618 | 378 | 1263 | 229 | 674 | 437 | 577 |
| Grp Sat Flow(s),veh/h/ln | 1701 | 1786 | 1514 | 1688 | 1772 | 1502 | 1674 | 1670 | 1489 | 1637 | 1329 | 1752 |
| Q Serve(g_s), s | 4.3 | 27.0 | 27.2 | 13.4 | 22.9 | 39.5 | 26.8 | 54.2 | 16.2 | 25.4 | 44.4 | 44.4 |
| Cycle Q Clear(g_c), s | 4.3 | 27.0 | 27.2 | 13.4 | 22.9 | 39.5 | 26.8 | 54.2 | 16.2 | 25.4 | 44.4 | 44.4 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.06 |
| Lane Grp Cap(c), veh/h | 65 | 389 | 610 | 156 | 483 | 672 | 309 | 1287 | 574 | 573 | 499 | 658 |
| V/C Ratio(X) | 0.79 | 0.88 | 0.59 | 1.13 | 0.65 | 0.92 | 1.22 | 0.98 | 0.40 | 1.18 | 0.88 | 0.88 |
| Avail Cap(c_a), veh/h | 116 | 443 | 656 | 156 | 483 | 672 | 309 | 1287 | 574 | 573 | 499 | 658 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.22 | 0.22 | 0.22 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 69.2 | 54.9 | 34.0 | 65.8 | 46.7 | 37.6 | 59.1 | 44.0 | 32.4 | 59.8 | 42.1 | 42.1 |
| Incr Delay (d2), s/veh | 18.6 | 16.8 | 1.3 | 112.9 | 3.2 | 17.9 | 106.3 | 8.2 | 0.5 | 96.1 | 19.0 | 15.2 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 4.0 | 20.0 | 15.4 | 16.8 | 15.8 | 31.4 | 26.6 | 26.9 | 7.8 | 27.0 | 23.6 | 29.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 87.8 | 71.6 | 35.2 | 178.7 | 49.9 | 55.5 | 165.4 | 52.2 | 32.8 | 155.9 | 61.1 | 57.3 |
| LnGrp LOS | F | E | D | F | D | E | F | D | C | F | E | E |
| Approach Vol, veh/h | | 756 | | | 1111 | | | 1870 | | | 1688 | |
| Approach Delay, s/veh | | 55.3 | | | 73.5 | | | 72.7 | | | 97.7 | |
| Approach LOS | | E | | | E | | | E | | | F | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 31.4 | 59.4 | 10.1 | 44.1 | 30.0 | 60.8 | 18.0 | 36.2 |
| Change Period (Y+Rc), s | 4.6 | 4.9 | 4.6 | 4.6 | 4.6 | 4.9 | 4.6 | 4.6 |
| Max Green Setting (Gmax), s | 26.8 | 50.1 | 9.9 | 39.5 | 25.4 | 51.5 | 13.4 | 36.0 |
| Max Q Clear Time (g_c+I1), s | 28.8 | 46.4 | 6.3 | 41.5 | 27.4 | 56.2 | 15.4 | 29.2 |
| Green Ext Time (p_c), s | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.9 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 78.2 |
| HCM 7th LOS | E |

| Intersection | |
|---|---|
| Int Delay, s/veh | 3.8 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 255 | 24 | 62 | 271 | 90 | 83 |
| Future Vol, veh/h | 255 | 24 | 62 | 271 | 90 | 83 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | 100 | - | 100 | 0 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 1 | 1 | 1 | 1 |
| Mvmt Flow | 277 | 26 | 67 | 295 | 98 | 90 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 303 | 0 | 720 | 290 |
| Stage 1 | - | - | - | - | 290 | - |
| Stage 2 | - | - | - | - | 429 | - |
| Critical Hdwy | - | - | 4.11 | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | - | - | 2.209 | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | - | - | 1263 | - | 396 | 751 |
| Stage 1 | - | - | - | - | 762 | - |
| Stage 2 | - | - | - | - | 659 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1263 | - | 375 | 751 |
| Mov Cap-2 Maneuver | - | - | - | - | 375 | - |
| Stage 1 | - | - | - | - | 721 | - |
| Stage 2 | - | - | - | - | 659 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 1.49 | 14.35 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 375 | 751 | - | - | 1263 | - |
| HCM Lane V/C Ratio | 0.261 | 0.12 | - | - | 0.053 | - |
| HCM Ctrl Dly (s/v) | 17.9 | 10.4 | - | - | 8 | - |
| HCM Lane LOS | C | B | - | - | A | - |
| HCM 95th %tile Q(veh) | 1 | 0.4 | - | - | 0.2 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 33 | 279 | 367 | 6 | 0 | 42 |
| Future Vol, veh/h | 33 | 279 | 367 | 6 | 0 | 42 |
| Conflicting Peds, #/hr | 9 | 0 | 0 | 9 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 0 | 0 |
| Mvmt Flow | 36 | 303 | 399 | 7 | 0 | 46 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 414 | 0 | - | 0 | 786 | 411 |
| Stage 1 | - | - | - | - | 411 | - |
| Stage 2 | - | - | - | - | 375 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.4 | 6.2 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.5 | 3.3 |
| Pot Cap-1 Maneuver | 1145 | - | - | - | 364 | 645 |
| Stage 1 | - | - | - | - | 673 | - |
| Stage 2 | - | - | - | - | 699 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1136 | - | - | - | 347 | 640 |
| Mov Cap-2 Maneuver | - | - | - | - | 347 | - |
| Stage 1 | - | - | - | - | 643 | - |
| Stage 2 | - | - | - | - | 699 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0.87 | 0 | 11.06 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 190 | - | - | - | 640 |
| HCM Lane V/C Ratio | 0.032 | - | - | - | 0.071 |
| HCM Ctrl Dly (s/v) | 8.3 | 0 | - | - | 11.1 |
| HCM Lane LOS | A | A | - | - | B |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.2 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 12.2 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 11 | 293 | 78 | 18 | 349 | 35 | 0 | 0 | 0 | 18 | 35 | 11 |
| Future Vol, veh/h | 11 | 293 | 78 | 18 | 349 | 35 | 0 | 0 | 0 | 18 | 35 | 11 |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Heavy Vehicles, % | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 |
| Mvmt Flow | 12 | 315 | 84 | 19 | 375 | 38 | 0 | 0 | 0 | 19 | 38 | 12 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | SB |
|---|---|---|---|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | SB | | WB |
| Conflicting Lanes Left | 1 | 0 | 1 |
| Conflicting Approach Right | | SB | EB |
| Conflicting Lanes Right | 0 | 1 | 1 |
| HCM Control Delay, s/veh | 12 | 12.8 | 9.4 |
| HCM LOS | B | B | A |

| Lane | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|
| Vol Left, % | 3% | 4% | 28% |
| Vol Thru, % | 77% | 87% | 55% |
| Vol Right, % | 20% | 9% | 17% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 382 | 402 | 64 |
| LT Vol | 11 | 18 | 18 |
| Through Vol | 293 | 349 | 35 |
| RT Vol | 78 | 35 | 11 |
| Lane Flow Rate | 411 | 432 | 69 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.508 | 0.542 | 0.108 |
| Departure Headway (Hd) | 4.451 | 4.512 | 5.641 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 809 | 800 | 631 |
| Service Time | 2.489 | 2.55 | 3.715 |
| HCM Lane V/C Ratio | 0.508 | 0.54 | 0.109 |
| HCM Control Delay, s/veh | 12 | 12.8 | 9.4 |
| HCM Lane LOS | B | B | A |
| HCM 95th-tile Q | 2.9 | 3.3 | 0.4 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 35.2 |
| Intersection LOS | E |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 11 | 361 | 381 | 18 | 261 | 394 |
| Future Vol, veh/h | 11 | 361 | 381 | 18 | 261 | 394 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, % | 1 | 1 | 1 | 1 | 1 | 1 |
| Mvmt Flow | 13 | 410 | 433 | 20 | 297 | 448 |
| Number of Lanes | 1 | 1 | 1 | 0 | 1 | 1 |

| Approach | WB | NB | SB |
|---|---|---|---|
| Opposing Approach | | SB | NB |
| Opposing Lanes | 0 | 2 | 1 |
| Conflicting Approach Left | NB | | WB |
| Conflicting Lanes Left | 1 | 0 | 2 |
| Conflicting Approach Right | SB | WB | |
| Conflicting Lanes Right | 2 | 2 | 0 |
| HCM Control Delay, s/veh | 30.8 | 41.7 | 33.7 |
| HCM LOS | D | E | D |

| Lane | NBLn1 | WBLn1 | WBLn2 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|
| Vol Left, % | 0% | 100% | 0% | 100% | 0% |
| Vol Thru, % | 95% | 0% | 0% | 0% | 100% |
| Vol Right, % | 5% | 0% | 100% | 0% | 0% |
| Sign Control | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 399 | 11 | 361 | 261 | 394 |
| LT Vol | 0 | 11 | 0 | 261 | 0 |
| Through Vol | 381 | 0 | 0 | 0 | 394 |
| RT Vol | 18 | 0 | 361 | 0 | 0 |
| Lane Flow Rate | 453 | 13 | 410 | 297 | 448 |
| Geometry Grp | 3b | 5 | 5 | 5 | 5 |
| Degree of Util (X) | 0.877 | 0.028 | 0.794 | 0.622 | 0.875 |
| Departure Headway (Hd) | 6.96 | 8.198 | 6.964 | 7.552 | 7.039 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes |
| Cap | 521 | 439 | 525 | 478 | 515 |
| Service Time | 5.004 | 5.898 | 4.664 | 5.306 | 4.793 |
| HCM Lane V/C Ratio | 0.869 | 0.03 | 0.781 | 0.621 | 0.87 |
| HCM Control Delay, s/veh | 41.7 | 11.1 | 31.4 | 22 | 41.5 |
| HCM Lane LOS | E | B | D | C | E |
| HCM 95th-tile Q | 9.6 | 0.1 | 7.4 | 4.2 | 9.5 |

# MOVEMENT SUMMARY

## Site: [99 (6)] SR 305 & Johnson Rd - Forecast 2032 PM With (PM Peak Hour)

Output produced by SIDRA INTERSECTION Version: 11.0.2

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Johnson Way | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.057 | 15.0 | LOS B | 0.2 | 5.7 | 0.58 | 0.75 | 0.58 | 31.0 |
| 3 | L2 | All MCs | 23 | 6.0 | 23 | 6.0 | 0.057 | 12.0 | LOS B | 0.2 | 5.7 | 0.58 | 0.75 | 0.58 | 32.2 |
| 8 | T1 | All MCs | 6 | 1.0 | 6 | 1.0 | 0.057 | 6.0 | LOS A | 0.2 | 5.7 | 0.58 | 0.75 | 0.58 | 30.2 |
| 18 | R2 | All MCs | 9 | 1.0 | 9 | 1.0 | 0.057 | 8.2 | LOS A | 0.2 | 5.7 | 0.58 | 0.75 | 0.58 | 33.2 |
| Approach | | | 39 | 3.9 | 39 | 3.9 | 0.057 | 10.3 | LOS B | 0.2 | 5.7 | 0.58 | 0.75 | 0.58 | 32.0 |
| East: SR 305 | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 3 | 1.0 | 3 | 1.0 | 0.502 | 12.3 | LOS B | 3.9 | 98.8 | 0.32 | 0.47 | 0.32 | 37.2 |
| 1 | L2 | All MCs | 9 | 1.0 | 9 | 1.0 | 0.502 | 11.7 | LOS B | 3.9 | 98.8 | 0.32 | 0.47 | 0.32 | 35.3 |
| 6 | T1 | All MCs | 949 | 3.0 | 949 | 3.0 | 0.502 | 6.6 | LOS A | 3.9 | 98.8 | 0.30 | 0.47 | 0.30 | 40.7 |
| 16 | R2 | All MCs | 61 | 10.0 | 61 | 10.0 | 0.228 | 6.3 | LOS A | 1.2 | 32.4 | 0.26 | 0.49 | 0.26 | 35.6 |
| Approach | | | 1023 | 3.4 | 1023 | 3.4 | 0.502 | 6.7 | LOS A | 3.9 | 98.8 | 0.30 | 0.47 | 0.30 | 40.3 |
| North: Johnson Rd | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.146 | 15.7 | LOS B | 0.6 | 15.7 | 0.63 | 0.77 | 0.63 | 30.7 |
| 7 | L2 | All MCs | 53 | 6.0 | 53 | 6.0 | 0.146 | 12.8 | LOS B | 0.6 | 15.7 | 0.63 | 0.77 | 0.63 | 32.0 |
| 4 | T1 | All MCs | 3 | 1.0 | 3 | 1.0 | 0.146 | 6.6 | LOS A | 0.6 | 15.7 | 0.63 | 0.77 | 0.63 | 30.0 |
| 14 | R2 | All MCs | 38 | 1.0 | 38 | 1.0 | 0.146 | 9.8 | LOS A | 0.6 | 15.7 | 0.63 | 0.77 | 0.63 | 33.0 |
| Approach | | | 95 | 3.8 | 95 | 3.8 | 0.146 | 11.4 | LOS B | 0.6 | 15.7 | 0.63 | 0.77 | 0.63 | 32.3 |
| West: SR 305 | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.430 | 12.2 | LOS B | 3.3 | 84.0 | 0.29 | 0.48 | 0.29 | 37.1 |
| 5 | L2 | All MCs | 49 | 1.0 | 49 | 1.0 | 0.430 | 11.6 | LOS B | 3.3 | 84.0 | 0.29 | 0.48 | 0.29 | 35.2 |
| 2 | T1 | All MCs | 817 | 2.0 | 817 | 2.0 | 0.430 | 6.4 | LOS A | 3.3 | 84.0 | 0.28 | 0.47 | 0.28 | 40.8 |
| 12 | R2 | All MCs | 23 | 1.0 | 23 | 1.0 | 0.195 | 6.0 | LOS A | 1.1 | 28.3 | 0.25 | 0.47 | 0.25 | 35.9 |
| Approach | | | 890 | 1.9 | 890 | 1.9 | 0.430 | 6.7 | LOS A | 3.3 | 84.0 | 0.28 | 0.47 | 0.28 | 40.3 |
| All Vehicles | | | 2046 | 2.8 | 2046 | 2.8 | 0.502 | 7.0 | LOS A | 3.9 | 98.8 | 0.31 | 0.49 | 0.31 | 39.7 |

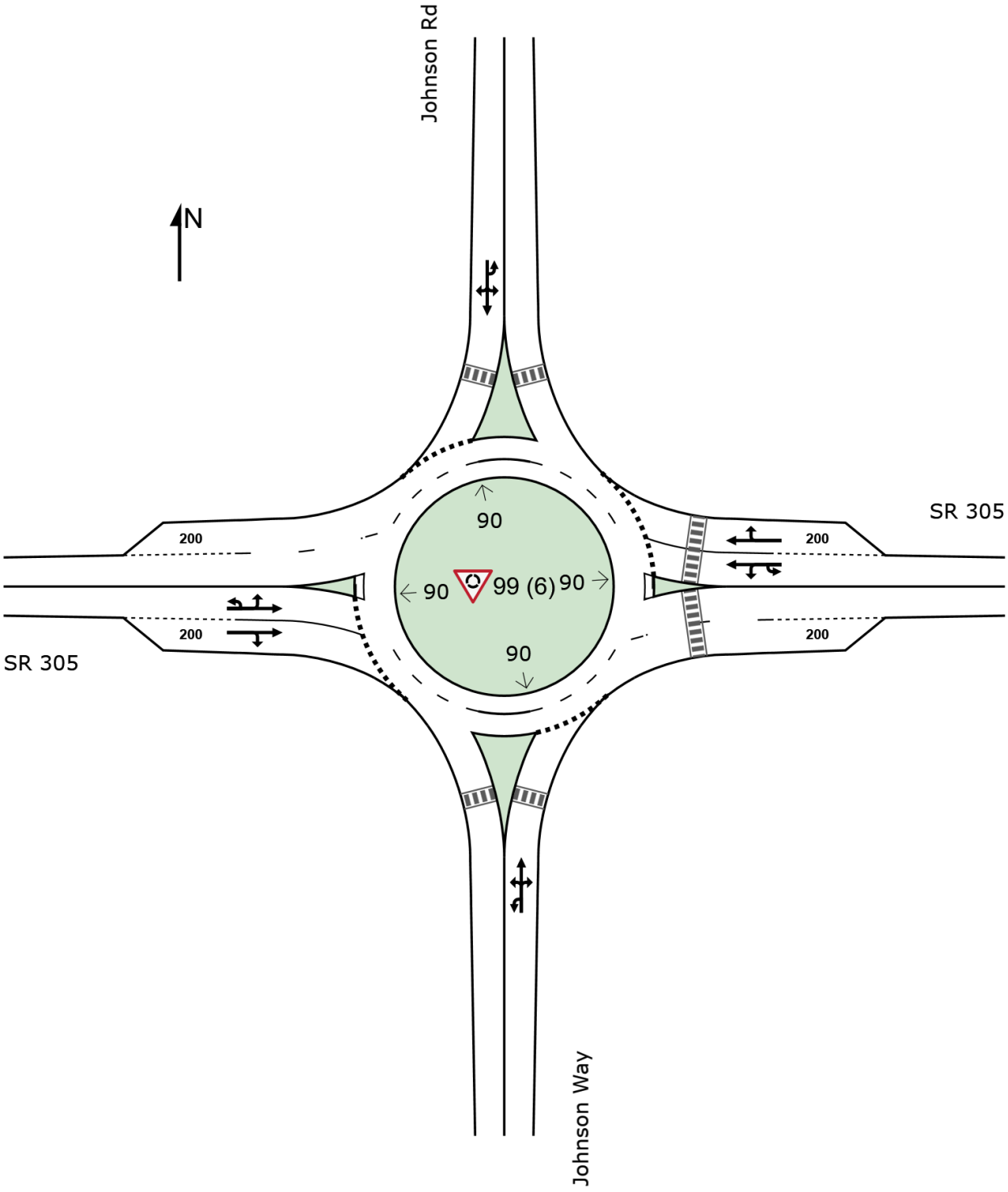
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [99 (6)] SR 305 & Johnson Rd - Forecast 2032 PM With
(PM Peak Hour)

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



# MOVEMENT SUMMARY

## Site: [1 (6)] Johnson & Sunrise Ridge - 2032 PM With (Folder1)

Output produced by SIDRA INTERSECTION Version: 11.0.2

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NE Midnight Sun Loop | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.006 | 7.5 | LOS A | 0.0 | 0.6 | 0.25 | 0.43 | 0.25 | 23.6 |
| 3 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.006 | 6.1 | LOS A | 0.0 | 0.6 | 0.25 | 0.43 | 0.25 | 23.6 |
| 8 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.006 | 2.3 | LOS A | 0.0 | 0.6 | 0.25 | 0.43 | 0.25 | 23.8 |
| 18 | R2 | All MCs | 3 | 3.0 | 3 | 3.0 | 0.006 | 2.7 | LOS A | 0.0 | 0.6 | 0.25 | 0.43 | 0.25 | 23.7 |
| Approach | | | 7 | 3.0 | 7 | 3.0 | 0.006 | 4.0 | LOS A | 0.0 | 0.6 | 0.25 | 0.43 | 0.25 | 23.6 |
| East: Johnson Rd NE | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.044 | 11.2 | LOS B | 0.2 | 4.7 | 0.23 | 0.50 | 0.23 | 34.3 |
| 1 | L2 | All MCs | 2 | 3.0 | 2 | 3.0 | 0.044 | 9.3 | LOS A | 0.2 | 4.7 | 0.23 | 0.50 | 0.23 | 34.3 |
| 6 | T1 | All MCs | 31 | 3.0 | 31 | 3.0 | 0.044 | 5.3 | LOS A | 0.2 | 4.7 | 0.23 | 0.50 | 0.23 | 34.9 |
| 16 | R2 | All MCs | 20 | 3.0 | 20 | 3.0 | 0.044 | 5.0 | LOS A | 0.2 | 4.7 | 0.23 | 0.50 | 0.23 | 34.6 |
| Approach | | | 55 | 3.0 | 55 | 3.0 | 0.044 | 5.5 | LOS A | 0.2 | 4.7 | 0.23 | 0.50 | 0.23 | 34.8 |
| North: Sunrise Ridge Ave NE | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.070 | 11.0 | LOS B | 0.3 | 7.8 | 0.14 | 0.54 | 0.14 | 34.5 |
| 7 | L2 | All MCs | 11 | 3.0 | 11 | 3.0 | 0.070 | 9.0 | LOS A | 0.3 | 7.8 | 0.14 | 0.54 | 0.14 | 34.5 |
| 4 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.070 | 5.0 | LOS A | 0.3 | 7.8 | 0.14 | 0.54 | 0.14 | 35.1 |
| 14 | R2 | All MCs | 73 | 3.0 | 73 | 3.0 | 0.070 | 4.7 | LOS A | 0.3 | 7.8 | 0.14 | 0.54 | 0.14 | 34.8 |
| Approach | | | 86 | 3.0 | 86 | 3.0 | 0.070 | 5.4 | LOS A | 0.3 | 7.8 | 0.14 | 0.54 | 0.14 | 34.7 |
| West: Johnson Rd NE | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.101 | 10.9 | LOS B | 0.4 | 11.3 | 0.09 | 0.63 | 0.09 | 33.1 |
| 5 | L2 | All MCs | 107 | 3.0 | 107 | 3.0 | 0.101 | 8.9 | LOS A | 0.4 | 11.3 | 0.09 | 0.63 | 0.09 | 33.1 |
| 2 | T1 | All MCs | 20 | 3.0 | 20 | 3.0 | 0.101 | 4.9 | LOS A | 0.4 | 11.3 | 0.09 | 0.63 | 0.09 | 33.7 |
| 12 | R2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.101 | 4.7 | LOS A | 0.4 | 11.3 | 0.09 | 0.63 | 0.09 | 33.4 |
| Approach | | | 130 | 3.0 | 130 | 3.0 | 0.101 | 8.3 | LOS A | 0.4 | 11.3 | 0.09 | 0.63 | 0.09 | 33.2 |
| All Vehicles | | | 277 | 3.0 | 277 | 3.0 | 0.101 | 6.7 | LOS A | 0.4 | 11.3 | 0.13 | 0.57 | 0.13 | 33.6 |

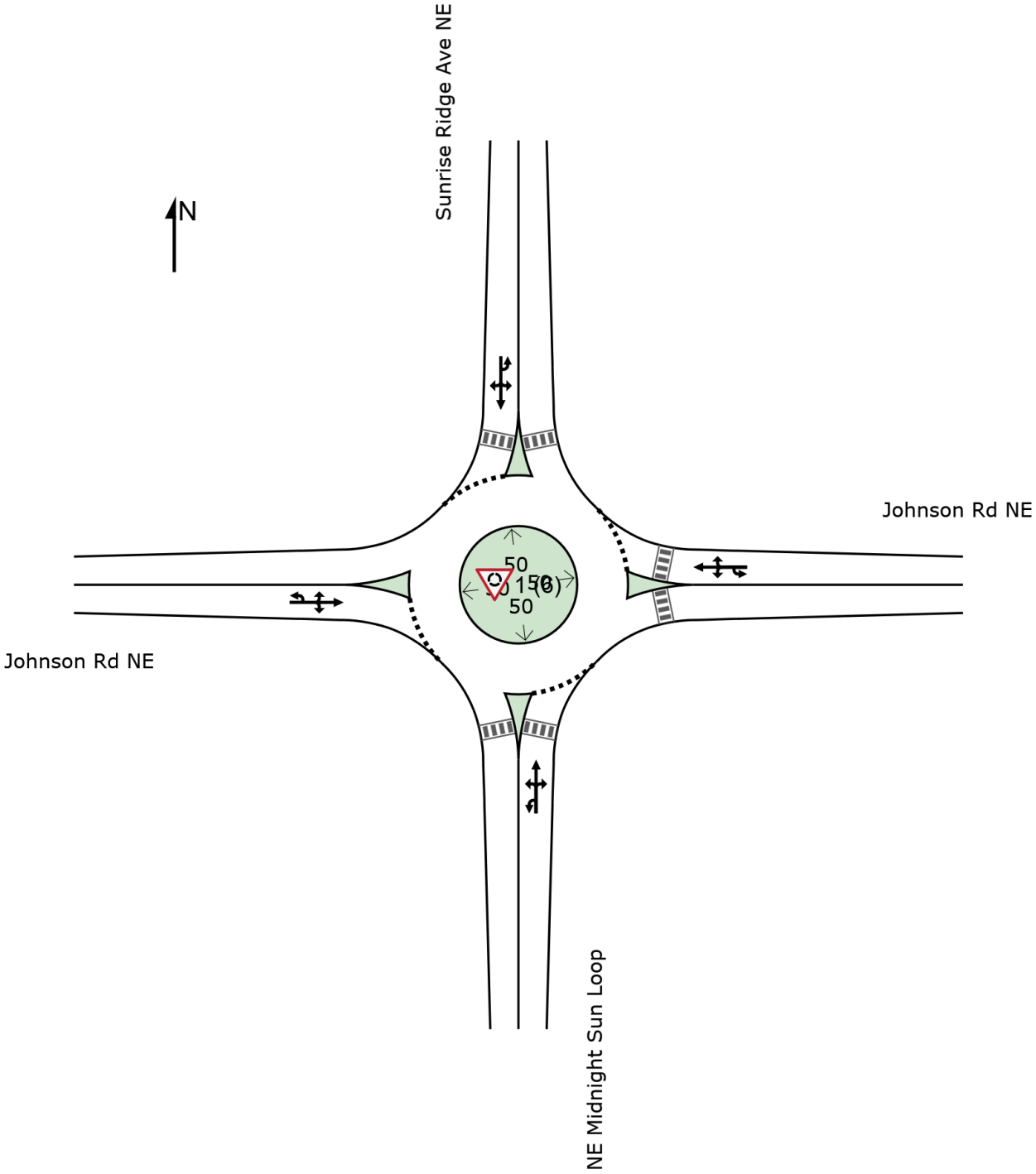
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [1 (6)] Johnson & Sunrise Ridge - 2032 PM With
(Folder1)

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

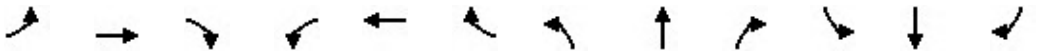
Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.




**SIDRA INTERSECTION 11 | Copyright © 2000-2026 Akcelik and Associates Pty Ltd | sidrasolutions.com**
Organisation: HEATH & ASSOCIATES | Licence: PLUS / 1PC | Created: Saturday, October 3, 2026 3:31:10 PM
Project: C:\Users\LucasMaulin\Heath and Associates\Office Access - Documents\Project Files\Pinnacle at Liberty Bay - 5576\5-Analysis\Sidra\Johnson & Sunrise Ridge.sipx

# THE PINNACLE AT LIBERTY BAY
# TRAFFIC IMPACT ANALYSIS

*APPENDIX*
*Forecast 2037 Level of Service*



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 42 | 117 | 72 | 59 | 96 | 163 | 51 | 501 | 22 | 227 | 900 | 22 |
| Future Volume (veh/h) | 42 | 117 | 72 | 59 | 96 | 163 | 51 | 501 | 22 | 227 | 900 | 22 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 0.99 | | 0.98 | 0.99 | | 0.98 | 1.00 | | 0.98 | 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 | 1716 | 1730 | 1744 | 1744 | 1744 | 1716 | 1730 | 1716 | 1716 | 1730 | 1716 | 1646 |
| Adj Flow Rate, veh/h | 42 | 117 | 72 | 59 | 96 | 103 | 51 | 501 | 22 | 227 | 900 | 22 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 6 | 5 | 4 | 4 | 4 | 6 | 5 | 6 | 6 | 5 | 6 | 11 |
| Cap, veh/h | 172 | 176 | 146 | 165 | 198 | 161 | 58 | 567 | 25 | 808 | 1877 | 46 |
| Arrive On Green | 0.03 | 0.10 | 0.10 | 0.04 | 0.11 | 0.11 | 0.04 | 0.20 | 0.20 | 0.49 | 0.66 | 0.66 |
| Sat Flow, veh/h | 1634 | 1730 | 1443 | 1661 | 1744 | 1423 | 1647 | 2787 | 122 | 1647 | 2851 | 70 |
| Grp Volume(v), veh/h | 42 | 117 | 72 | 59 | 96 | 103 | 51 | 219 | 304 | 227 | 385 | 537 |
| Grp Sat Flow(s),veh/h/ln | 1634 | 1730 | 1443 | 1661 | 1744 | 1423 | 1647 | 1218 | 1691 | 1647 | 1218 | 1703 |
| Q Serve(g_s), s | 2.8 | 7.8 | 5.7 | 3.8 | 6.2 | 3.0 | 3.7 | 20.9 | 21.0 | 9.8 | 18.9 | 18.9 |
| Cycle Q Clear(g_c), s | 2.8 | 7.8 | 5.7 | 3.8 | 6.2 | 3.0 | 3.7 | 20.9 | 21.0 | 9.8 | 18.9 | 18.9 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.07 | 1.00 | | 0.04 |
| Lane Grp Cap(c), veh/h | 172 | 176 | 146 | 165 | 198 | 161 | 58 | 248 | 344 | 808 | 802 | 1121 |
| V/C Ratio(X) | 0.24 | 0.67 | 0.49 | 0.36 | 0.49 | 0.64 | 0.88 | 0.88 | 0.89 | 0.28 | 0.48 | 0.48 |
| Avail Cap(c_a), veh/h | 342 | 332 | 277 | 318 | 334 | 273 | 316 | 437 | 606 | 808 | 802 | 1121 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 47.0 | 52.0 | 51.0 | 46.3 | 49.9 | 6.7 | 57.6 | 46.4 | 46.4 | 18.1 | 10.2 | 10.2 |
| Incr Delay (d2), s/veh | 0.7 | 4.3 | 2.5 | 1.3 | 1.8 | 4.1 | 30.5 | 33.5 | 26.7 | 0.2 | 2.0 | 1.5 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 2.1 | 6.5 | 3.9 | 2.9 | 5.1 | 5.4 | 3.6 | 13.3 | 16.7 | 6.5 | 8.6 | 11.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 47.7 | 56.3 | 53.5 | 47.6 | 51.7 | 10.8 | 88.1 | 79.9 | 73.1 | 18.3 | 12.3 | 11.7 |
| LnGrp LOS | D | E | D | D | D | B | F | E | E | B | B | B |
| Approach Vol, veh/h | | 231 | | | 258 | | | 574 | | | 1149 | |
| Approach Delay, s/veh | | 53.9 | | | 34.5 | | | 77.0 | | | 13.2 | |
| Approach LOS | | D | | | C | | | E | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 63.9 | 29.4 | 9.6 | 17.2 | 9.2 | 84.0 | 8.1 | 18.6 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 18.9 | 43.5 | 16.1 | 23.5 | 23.5 | 38.9 | 16.1 | 23.5 |
| Max Q Clear Time (g_c+I1), s | 11.8 | 23.0 | 5.8 | 9.8 | 5.7 | 20.9 | 4.8 | 8.2 |
| Green Ext Time (p_c), s | 0.5 | 1.9 | 0.1 | 0.6 | 0.1 | 3.7 | 0.1 | 0.7 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 36.5 |
| HCM 7th LOS | D |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 991 | 528 | 1 | 2 | 4 |
| Future Vol, veh/h | 0 | 991 | 528 | 1 | 2 | 4 |
| Conflicting Peds, #/hr | 4 | 0 | 0 | 4 | 4 | 4 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 105 | - | - | 55 | 60 | 0 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 1 | 8 | 6 | 1 | 1 | 1 |
| Mvmt Flow | 0 | 991 | 528 | 1 | 2 | 4 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 533 | 0 | - | 0 | 1527 | 536 |
| Stage 1 | - | - | - | - | 532 | - |
| Stage 2 | - | - | - | - | 995 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1040 | - | - | - | 130 | 547 |
| Stage 1 | - | - | - | - | 591 | - |
| Stage 2 | - | - | - | - | 359 | - |
| Platoon blocked, % | | | - | - | - | |
| Mov Cap-1 Maneuver | 1036 | - | - | - | 129 | 543 |
| Mov Cap-2 Maneuver | - | - | - | - | 129 | - |
| Stage 1 | - | - | - | - | 589 | - |
| Stage 2 | - | - | - | - | 358 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 0 | 18.89 |
| HCM LOS | | | C |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1036 | - | - | - | 129 | 543 |
| HCM Lane V/C Ratio | - | - | - | - | 0.015 | 0.007 |
| HCM Ctrl Dly (s/v) | 0 | - | - | - | 33.3 | 11.7 |
| HCM Lane LOS | A | - | - | - | D | B |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0 | 0 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 4.3 |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 6 | 0 | 0 | 3 | 1 | 2 |
| Future Vol, veh/h | 6 | 0 | 0 | 3 | 1 | 2 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 7 | 0 | 0 | 3 | 1 | 2 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 5 | 2 | 3 | 0 | - | 0 |
| Stage 1 | 2 | - | - | - | - | - |
| Stage 2 | 3 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 1016 | 1082 | 1619 | - | - | - |
| Stage 1 | 1021 | - | - | - | - | - |
| Stage 2 | 1020 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 1016 | 1082 | 1619 | - | - | - |
| Mov Cap-2 Maneuver | 1016 | - | - | - | - | - |
| Stage 1 | 1021 | - | - | - | - | - |
| Stage 2 | 1020 | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 8.57 | 0 | 0 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1619 | - | 1016 | - | - |
| HCM Lane V/C Ratio | - | - | 0.006 | - | - |
| HCM Ctrl Dly (s/v) | 0 | - | 8.6 | - | - |
| HCM Lane LOS | A | - | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0 | - | - |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 33 |
| Intersection LOS | D |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 52 | 256 | 25 | 14 | 234 | 90 | 63 | 37 | 43 | 149 | 19 | 66 |
| Future Vol, veh/h | 52 | 256 | 25 | 14 | 234 | 90 | 63 | 37 | 43 | 149 | 19 | 66 |
| Peak Hour Factor | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| Heavy Vehicles, % | 1 | 6 | 5 | 1 | 7 | 1 | 1 | 3 | 6 | 7 | 1 | 4 |
| Mvmt Flow | 69 | 341 | 33 | 19 | 312 | 120 | 84 | 49 | 57 | 199 | 25 | 88 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 1 | 1 |
| HCM Control Delay, s/veh | 41.8 | 40.6 | 17.5 | 18.9 |
| HCM LOS | E | E | C | C |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|
| Vol Left, % | 44% | 16% | 4% | 89% | 0% |
| Vol Thru, % | 26% | 77% | 69% | 11% | 0% |
| Vol Right, % | 30% | 8% | 27% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 143 | 333 | 338 | 168 | 66 |
| LT Vol | 63 | 52 | 14 | 149 | 0 |
| Through Vol | 37 | 256 | 234 | 19 | 0 |
| RT Vol | 43 | 25 | 90 | 0 | 66 |
| Lane Flow Rate | 191 | 444 | 451 | 224 | 88 |
| Geometry Grp | 4a | 2 | 2 | 5 | 5 |
| Degree of Util (X) | 0.434 | 0.873 | 0.869 | 0.545 | 0.183 |
| Departure Headway (Hd) | 8.203 | 7.08 | 6.944 | 8.756 | 7.467 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes |
| Cap | 437 | 511 | 518 | 410 | 479 |
| Service Time | 6.298 | 5.15 | 5.015 | 6.533 | 5.243 |
| HCM Lane V/C Ratio | 0.437 | 0.869 | 0.871 | 0.546 | 0.184 |
| HCM Control Delay, s/veh | 17.5 | 41.8 | 40.6 | 21.6 | 11.9 |
| HCM Lane LOS | C | E | E | C | B |
| HCM 95th-tile Q | 2.1 | 9.4 | 9.4 | 3.2 | 0.7 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 4 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 37 | 19 | 6 | 62 | 56 | 25 |
| Future Vol, veh/h | 37 | 19 | 6 | 62 | 56 | 25 |
| Conflicting Peds, #/hr | 0 | 10 | 10 | 0 | 10 | 10 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 40 | 21 | 7 | 67 | 61 | 27 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 71 | 0 | 151 | 71 |
| Stage 1 | - | - | - | - | 61 | - |
| Stage 2 | - | - | - | - | 90 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1530 | - | 841 | 992 |
| Stage 1 | - | - | - | - | 962 | - |
| Stage 2 | - | - | - | - | 933 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1517 | - | 823 | 976 |
| Mov Cap-2 Maneuver | - | - | - | - | 823 | - |
| Stage 1 | - | - | - | - | 950 | - |
| Stage 2 | - | - | - | - | 925 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 0.65 | 9.63 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 865 | - | - | 159 | - |
| HCM Lane V/C Ratio | 0.102 | - | - | 0.004 | - |
| HCM Ctrl Dly (s/v) | 9.6 | - | - | 7.4 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0 | - |

# MOVEMENT SUMMARY

## Site: [99 (7)] SR 305 & Johnson Rd - Forecast 2037 AM

**Without** (AM Peak Hour)

Output produced by SIDRA INTERSECTION Version: 11.0.2

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Johnson Way | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.049 | 16.0 | LOS B | 0.2 | 5.3 | 0.65 | 0.78 | 0.65 | 30.7 |
| 3 | L2 | All MCs | 19 | 1.0 | 19 | 1.0 | 0.049 | 12.5 | LOS B | 0.2 | 5.3 | 0.65 | 0.78 | 0.65 | 32.4 |
| 8 | T1 | All MCs | 7 | 1.0 | 7 | 1.0 | 0.049 | 6.9 | LOS A | 0.2 | 5.3 | 0.65 | 0.78 | 0.65 | 29.9 |
| 18 | R2 | All MCs | 4 | 1.0 | 4 | 1.0 | 0.049 | 11.8 | LOS B | 0.2 | 5.3 | 0.65 | 0.78 | 0.65 | 32.8 |
| Approach | | | 31 | 1.0 | 31 | 1.0 | 0.049 | 11.3 | LOS B | 0.2 | 5.3 | 0.65 | 0.78 | 0.65 | 31.8 |
| East: SR 305 | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.253 | 12.0 | LOS B | 1.6 | 40.7 | 0.17 | 0.46 | 0.17 | 37.7 |
| 1 | L2 | All MCs | 6 | 1.0 | 6 | 1.0 | 0.253 | 11.4 | LOS B | 1.6 | 40.7 | 0.17 | 0.46 | 0.17 | 35.8 |
| 6 | T1 | All MCs | 497 | 6.0 | 497 | 6.0 | 0.253 | 6.0 | LOS A | 1.6 | 40.7 | 0.17 | 0.46 | 0.17 | 40.8 |
| 16 | R2 | All MCs | 16 | 1.0 | 16 | 1.0 | 0.115 | 5.8 | LOS A | 0.6 | 15.7 | 0.17 | 0.47 | 0.17 | 36.2 |
| Approach | | | 520 | 5.8 | 520 | 5.8 | 0.253 | 6.1 | LOS A | 1.6 | 40.7 | 0.17 | 0.46 | 0.17 | 40.5 |
| North: Johnson Rd | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.128 | 13.8 | LOS B | 0.5 | 12.2 | 0.47 | 0.70 | 0.47 | 31.0 |
| 7 | L2 | All MCs | 91 | 3.0 | 91 | 3.0 | 0.128 | 10.5 | LOS B | 0.5 | 12.2 | 0.47 | 0.70 | 0.47 | 32.6 |
| 4 | T1 | All MCs | 2 | 1.0 | 2 | 1.0 | 0.128 | 4.7 | LOS A | 0.5 | 12.2 | 0.47 | 0.70 | 0.47 | 30.3 |
| 14 | R2 | All MCs | 17 | 1.0 | 17 | 1.0 | 0.128 | 6.1 | LOS A | 0.5 | 12.2 | 0.47 | 0.70 | 0.47 | 33.3 |
| Approach | | | 111 | 2.6 | 111 | 2.6 | 0.128 | 9.8 | LOS A | 0.5 | 12.2 | 0.47 | 0.70 | 0.47 | 32.7 |
| West: SR 305 | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.524 | 12.5 | LOS B | 4.3 | 115.8 | 0.40 | 0.48 | 0.40 | 36.9 |
| 5 | L2 | All MCs | 9 | 17.0 | 9 | 17.0 | 0.524 | 12.4 | LOS B | 4.3 | 115.8 | 0.40 | 0.48 | 0.40 | 34.5 |
| 2 | T1 | All MCs | 965 | 8.0 | 965 | 8.0 | 0.524 | 7.4 | LOS A | 4.3 | 115.8 | 0.38 | 0.48 | 0.38 | 39.6 |
| 12 | R2 | All MCs | 21 | 12.0 | 21 | 12.0 | 0.239 | 6.5 | LOS A | 1.4 | 36.8 | 0.32 | 0.49 | 0.32 | 35.5 |
| Approach | | | 996 | 8.2 | 996 | 8.2 | 0.524 | 7.5 | LOS A | 4.3 | 115.8 | 0.38 | 0.48 | 0.38 | 39.4 |
| All Vehicles | | | 1658 | 6.9 | 1658 | 6.9 | 0.524 | 7.3 | LOS A | 4.3 | 115.8 | 0.32 | 0.49 | 0.32 | 39.0 |

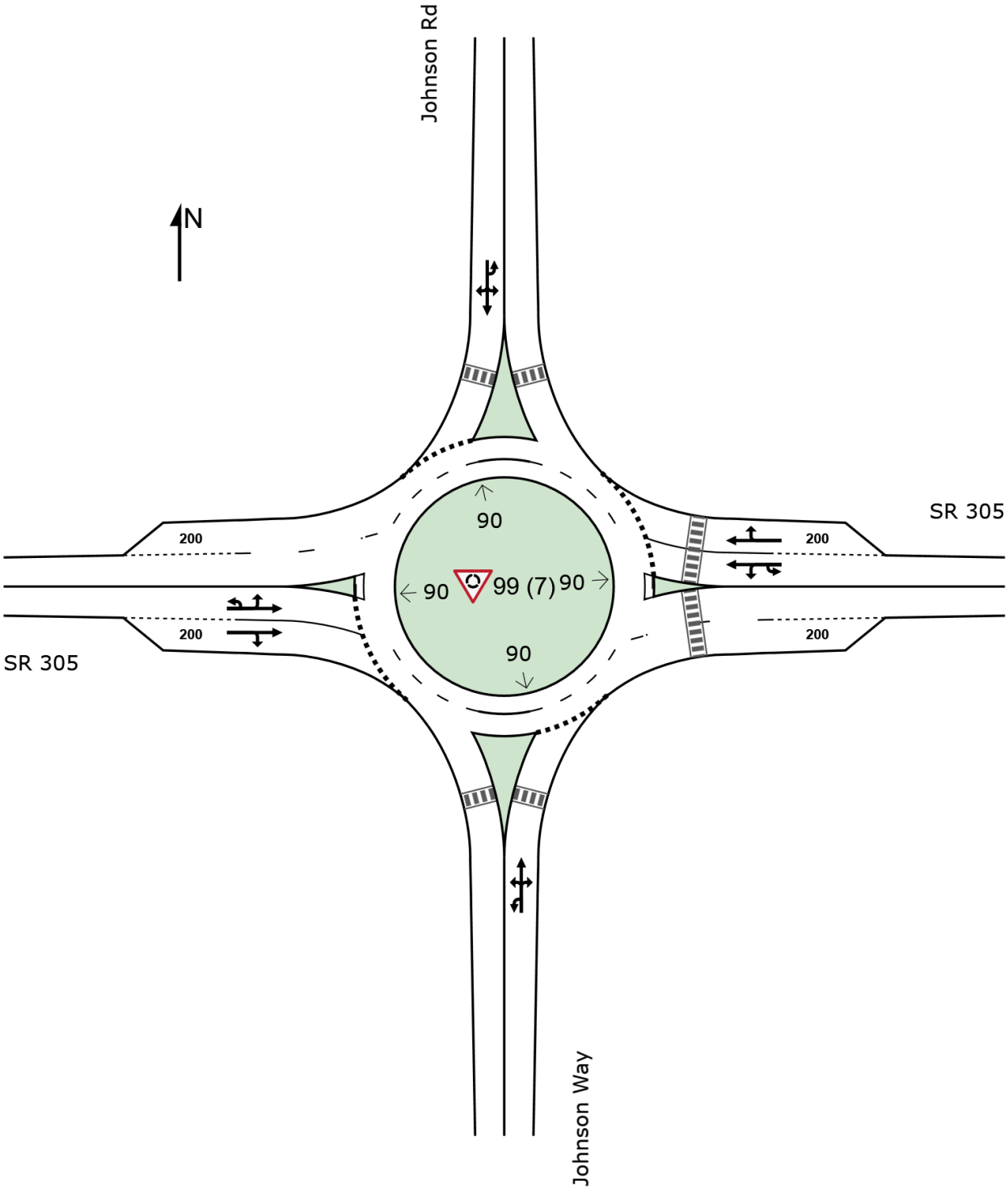
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [99 (7)] SR 305 & Johnson Rd - Forecast 2037 AM
**Without** (AM Peak Hour)

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



# MOVEMENT SUMMARY

## Site: [1 (7)] Johnson & Sunrise Ridge - 2037 AM Without

(Folder1)

Output produced by SIDRA INTERSECTION Version: 11.0.2

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NE Midnight Sun Loop | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 7.2 | LOS A | 0.0 | 0.4 | 0.17 | 0.45 | 0.17 | 23.5 |
| 3 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 5.8 | LOS A | 0.0 | 0.4 | 0.17 | 0.45 | 0.17 | 23.5 |
| 8 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 2.0 | LOS A | 0.0 | 0.4 | 0.17 | 0.45 | 0.17 | 23.7 |
| 18 | R2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 2.4 | LOS A | 0.0 | 0.4 | 0.17 | 0.45 | 0.17 | 23.6 |
| Approach | | | 5 | 3.0 | 5 | 3.0 | 0.004 | 4.3 | LOS A | 0.0 | 0.4 | 0.17 | 0.45 | 0.17 | 23.6 |
| East: Johnson Rd NE | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.094 | 10.8 | LOS B | 0.4 | 10.3 | 0.07 | 0.46 | 0.07 | 34.7 |
| 1 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.094 | 8.9 | LOS A | 0.4 | 10.3 | 0.07 | 0.46 | 0.07 | 34.7 |
| 6 | T1 | All MCs | 118 | 3.0 | 118 | 3.0 | 0.094 | 4.9 | LOS A | 0.4 | 10.3 | 0.07 | 0.46 | 0.07 | 35.4 |
| 16 | R2 | All MCs | 6 | 3.0 | 6 | 3.0 | 0.094 | 4.6 | LOS A | 0.4 | 10.3 | 0.07 | 0.46 | 0.07 | 35.1 |
| Approach | | | 126 | 3.0 | 126 | 3.0 | 0.094 | 4.9 | LOS A | 0.4 | 10.3 | 0.07 | 0.46 | 0.07 | 35.4 |
| North: Sunrise Ridge Ave NE | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.036 | 11.3 | LOS B | 0.1 | 3.8 | 0.25 | 0.58 | 0.25 | 33.6 |
| 7 | L2 | All MCs | 18 | 3.0 | 18 | 3.0 | 0.036 | 9.4 | LOS A | 0.1 | 3.8 | 0.25 | 0.58 | 0.25 | 33.6 |
| 4 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.036 | 5.4 | LOS A | 0.1 | 3.8 | 0.25 | 0.58 | 0.25 | 34.2 |
| 14 | R2 | All MCs | 21 | 3.0 | 21 | 3.0 | 0.036 | 5.1 | LOS A | 0.1 | 3.8 | 0.25 | 0.58 | 0.25 | 33.9 |
| Approach | | | 42 | 3.0 | 42 | 3.0 | 0.036 | 7.1 | LOS A | 0.1 | 3.8 | 0.25 | 0.58 | 0.25 | 33.8 |
| West: Johnson Rd NE | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.044 | 10.9 | LOS B | 0.2 | 4.8 | 0.10 | 0.51 | 0.10 | 34.4 |
| 5 | L2 | All MCs | 8 | 3.0 | 8 | 3.0 | 0.044 | 9.0 | LOS A | 0.2 | 4.8 | 0.10 | 0.51 | 0.10 | 34.4 |
| 2 | T1 | All MCs | 36 | 3.0 | 36 | 3.0 | 0.044 | 4.9 | LOS A | 0.2 | 4.8 | 0.10 | 0.51 | 0.10 | 35.0 |
| 12 | R2 | All MCs | 11 | 3.0 | 11 | 3.0 | 0.044 | 4.7 | LOS A | 0.2 | 4.8 | 0.10 | 0.51 | 0.10 | 34.7 |
| Approach | | | 56 | 3.0 | 56 | 3.0 | 0.044 | 5.6 | LOS A | 0.2 | 4.8 | 0.10 | 0.51 | 0.10 | 34.8 |
| All Vehicles | | | 229 | 3.0 | 229 | 3.0 | 0.094 | 5.5 | LOS A | 0.4 | 10.3 | 0.11 | 0.49 | 0.11 | 34.6 |

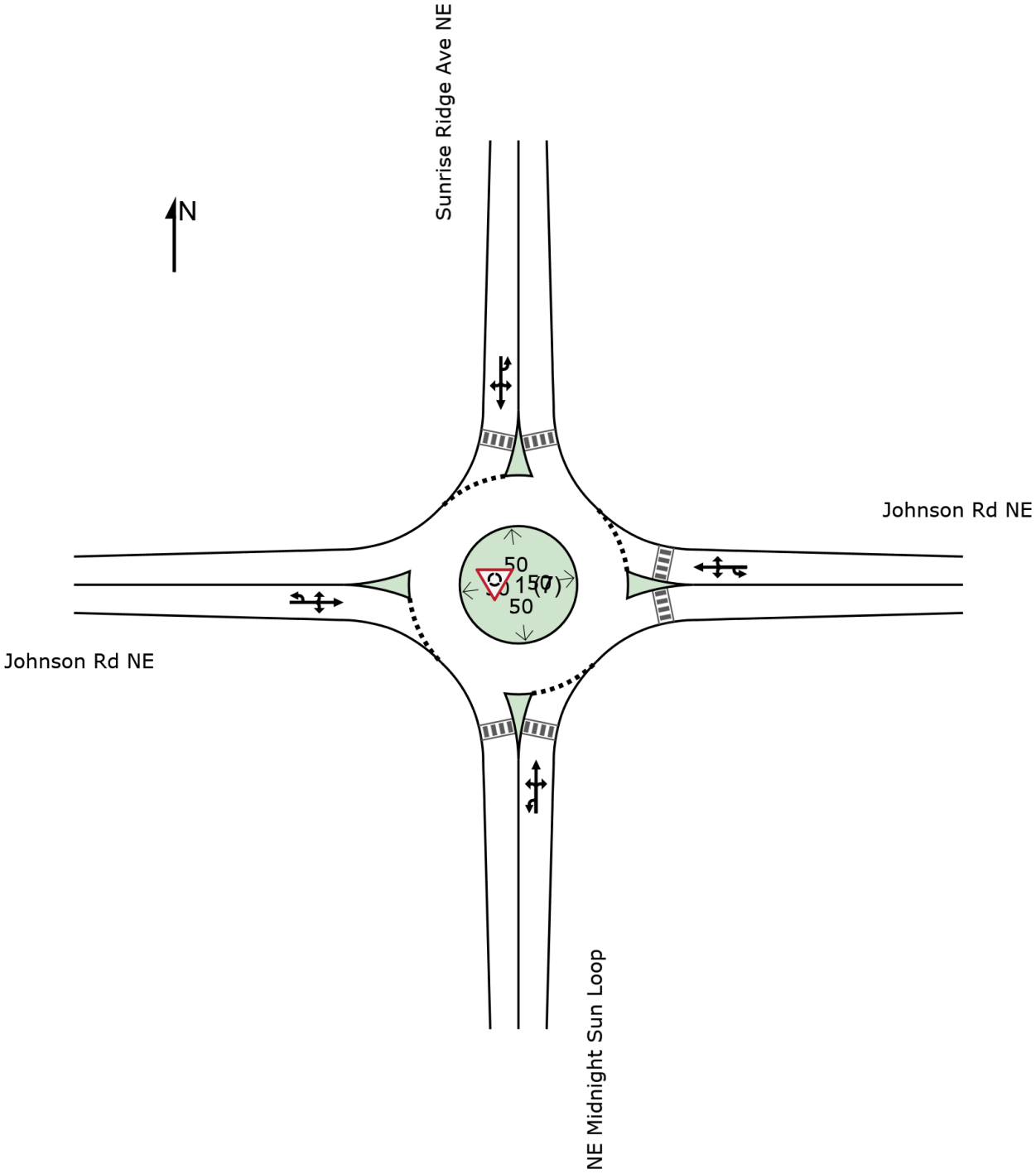
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [1 (7)] Johnson & Sunrise Ridge - 2037 AM Without
(Folder1)

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.




**SIDRA INTERSECTION 11 | Copyright © 2000-2026 Akcelik and Associates Pty Ltd | sidrasolutions.com**
Organisation: HEATH & ASSOCIATES | Licence: PLUS / 1PC | Created: Saturday, October 3, 2026 3:29:00 PM
Project: C:\Users\LucasMaulin\Heath and Associates\Office Access - Documents\Project Files\Pinnacle at Liberty Bay - 5576\5-Analysis\Sidra\Johnson & Sunrise Ridge.sipx

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 77 | 193 | 110 | 59 | 141 | 248 | 134 | 841 | 39 | 237 | 678 | 56 |
| Future Volume (veh/h) | 77 | 193 | 110 | 59 | 141 | 248 | 134 | 841 | 39 | 237 | 678 | 56 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 0.99 | | 0.96 | 0.99 | | 0.96 | 1.00 | | 0.96 | 1.00 | | 0.97 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1702 | 1758 | 1786 | 1786 | 1786 | 1786 | 1772 | 1744 | 1786 | 1786 | 1772 | 1744 |
| Adj Flow Rate, veh/h | 77 | 193 | 110 | 59 | 141 | 103 | 134 | 841 | 39 | 237 | 678 | 56 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 7 | 3 | 1 | 1 | 1 | 1 | 2 | 4 | 1 | 1 | 2 | 4 |
| Cap, veh/h | 189 | 233 | 194 | 151 | 213 | 174 | 156 | 902 | 42 | 585 | 1573 | 130 |
| Arrive On Green | 0.05 | 0.13 | 0.13 | 0.04 | 0.12 | 0.12 | 0.09 | 0.32 | 0.32 | 0.34 | 0.57 | 0.57 |
| Sat Flow, veh/h | 1621 | 1758 | 1460 | 1701 | 1786 | 1456 | 1688 | 2822 | 131 | 1701 | 2754 | 227 |
| Grp Volume(v), veh/h | 77 | 193 | 110 | 59 | 141 | 103 | 134 | 369 | 511 | 237 | 309 | 425 |
| Grp Sat Flow(s),veh/h/ln | 1621 | 1758 | 1460 | 1701 | 1786 | 1456 | 1688 | 1238 | 1715 | 1701 | 1258 | 1723 |
| Q Serve(g_s), s | 5.0 | 12.8 | 8.5 | 3.6 | 9.1 | 4.2 | 9.4 | 34.7 | 34.7 | 12.7 | 16.8 | 16.8 |
| Cycle Q Clear(g_c), s | 5.0 | 12.8 | 8.5 | 3.6 | 9.1 | 4.2 | 9.4 | 34.7 | 34.7 | 12.7 | 16.8 | 16.8 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.08 | 1.00 | | 0.13 |
| Lane Grp Cap(c), veh/h | 189 | 233 | 194 | 151 | 213 | 174 | 156 | 396 | 548 | 585 | 719 | 984 |
| V/C Ratio(X) | 0.41 | 0.83 | 0.57 | 0.39 | 0.66 | 0.59 | 0.86 | 0.93 | 0.93 | 0.41 | 0.43 | 0.43 |
| Avail Cap(c_a), veh/h | 318 | 337 | 280 | 309 | 342 | 279 | 323 | 444 | 614 | 585 | 719 | 984 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.75 | 0.75 | 0.75 |
| Uniform Delay (d), s/veh | 43.8 | 50.7 | 48.8 | 44.8 | 50.5 | 13.8 | 53.7 | 39.6 | 39.6 | 30.0 | 14.6 | 14.6 |
| Incr Delay (d2), s/veh | 1.4 | 10.7 | 2.6 | 1.7 | 3.5 | 3.2 | 12.8 | 31.0 | 24.9 | 0.3 | 1.4 | 1.0 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 3.7 | 10.5 | 5.8 | 2.9 | 7.6 | 5.4 | 7.9 | 19.6 | 24.8 | 8.4 | 7.9 | 10.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 45.2 | 61.4 | 51.4 | 46.5 | 54.0 | 17.0 | 66.5 | 70.6 | 64.5 | 30.3 | 16.0 | 15.7 |
| LnGrp LOS | D | E | D | D | D | B | E | E | E | C | B | B |
| Approach Vol, veh/h | | 380 | | | 303 | | | 1014 | | | 971 | |
| Approach Delay, s/veh | | 55.2 | | | 40.0 | | | 67.0 | | | 19.4 | |
| Approach LOS | | E | | | D | | | E | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 46.3 | 43.4 | 9.4 | 20.9 | 16.1 | 73.6 | 11.0 | 19.3 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 18.9 | 43.5 | 16.1 | 23.5 | 23.5 | 38.9 | 16.1 | 23.5 |
| Max Q Clear Time (g_c+I1), s | 14.7 | 36.7 | 5.6 | 14.8 | 11.4 | 18.8 | 7.0 | 11.1 |
| Green Ext Time (p_c), s | 0.3 | 2.2 | 0.1 | 0.8 | 0.3 | 2.8 | 0.1 | 0.7 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 44.9 |
| HCM 7th LOS | D |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 6 | 806 | 931 | 5 | 1 | 4 |
| Future Vol, veh/h | 6 | 806 | 931 | 5 | 1 | 4 |
| Conflicting Peds, #/hr | 1 | 0 | 0 | 1 | 1 | 1 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 105 | - | - | 55 | 60 | 0 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 10 | 2 | 3 | 1 | 10 | 1 |
| Mvmt Flow | 6 | 806 | 931 | 5 | 1 | 4 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 937 | 0 | - | 0 | 1751 | 933 |
| Stage 1 | - | - | - | - | 932 | - |
| Stage 2 | - | - | - | - | 819 | - |
| Critical Hdwy | 4.2 | - | - | - | 6.5 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.5 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.5 | - |
| Follow-up Hdwy | 2.29 | - | - | - | 3.59 | 3.309 |
| Pot Cap-1 Maneuver | 699 | - | - | - | 90 | 324 |
| Stage 1 | - | - | - | - | 371 | - |
| Stage 2 | - | - | - | - | 420 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 699 | - | - | - | 89 | 324 |
| Mov Cap-2 Maneuver | - | - | - | - | 89 | - |
| Stage 1 | - | - | - | - | 367 | - |
| Stage 2 | - | - | - | - | 420 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0.08 | 0 | 22.2 |
| HCM LOS | | | C |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 699 | - | - | - | 89 | 324 |
| HCM Lane V/C Ratio | 0.009 | - | - | - | 0.011 | 0.012 |
| HCM Ctrl Dly (s/v) | 10.2 | - | - | - | 45.9 | 16.3 |
| HCM Lane LOS | B | - | - | - | E | C |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0 | 0 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 3.8 |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 4 | 0 | 0 | 0 | 0 | 5 |
| Future Vol, veh/h | 4 | 0 | 0 | 0 | 0 | 5 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 4 | 0 | 0 | 0 | 0 | 5 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 3 | 3 | 5 | 0 | - | 0 |
| Stage 1 | 3 | - | - | - | - | - |
| Stage 2 | 0 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 1020 | 1081 | 1616 | - | - | - |
| Stage 1 | 1020 | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 1020 | 1081 | 1616 | - | - | - |
| Mov Cap-2 Maneuver | 1020 | - | - | - | - | - |
| Stage 1 | 1020 | - | - | - | - | - |
| Stage 2 | - | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 8.55 | 0 | 0 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1616 | - | 1020 | - | - |
| HCM Lane V/C Ratio | - | - | 0.004 | - | - |
| HCM Ctrl Dly (s/v) | 0 | - | 8.5 | - | - |
| HCM Lane LOS | A | - | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0 | - | - |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 18 |
| Intersection LOS | C |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 97 | 238 | 78 | 5 | 152 | 56 | 67 | 51 | 2 | 105 | 61 | 71 |
| Future Vol, veh/h | 97 | 238 | 78 | 5 | 152 | 56 | 67 | 51 | 2 | 105 | 61 | 71 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Heavy Vehicles, % | 3 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 4 |
| Mvmt Flow | 111 | 274 | 90 | 6 | 175 | 64 | 77 | 59 | 2 | 121 | 70 | 82 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 1 | 1 |
| HCM Control Delay, s/veh | 24.7 | 13.3 | 12.5 | 13.2 |
| HCM LOS | C | B | B | B |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|
| Vol Left, % | 56% | 23% | 2% | 63% | 0% |
| Vol Thru, % | 42% | 58% | 71% | 37% | 0% |
| Vol Right, % | 2% | 19% | 26% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 120 | 413 | 213 | 166 | 71 |
| LT Vol | 67 | 97 | 5 | 105 | 0 |
| Through Vol | 51 | 238 | 152 | 61 | 0 |
| RT Vol | 2 | 78 | 56 | 0 | 71 |
| Lane Flow Rate | 138 | 475 | 245 | 191 | 82 |
| Geometry Grp | 4a | 2 | 2 | 5 | 5 |
| Degree of Util (X) | 0.266 | 0.76 | 0.411 | 0.385 | 0.141 |
| Departure Headway (Hd) | 6.936 | 5.76 | 6.042 | 7.267 | 6.228 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes |
| Cap | 517 | 631 | 595 | 494 | 575 |
| Service Time | 4.995 | 3.76 | 4.086 | 5.018 | 3.978 |
| HCM Lane V/C Ratio | 0.267 | 0.753 | 0.412 | 0.387 | 0.143 |
| HCM Control Delay, s/veh | 12.5 | 24.7 | 13.3 | 14.5 | 10 |
| HCM Lane LOS | B | C | B | B | A |
| HCM 95th-tile Q | 1.1 | 6.9 | 2 | 1.8 | 0.5 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 2.9 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 62 | 56 | 25 | 62 | 37 | 19 |
| Future Vol, veh/h | 62 | 56 | 25 | 62 | 37 | 19 |
| Conflicting Peds, #/hr | 0 | 10 | 10 | 0 | 10 | 10 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 67 | 61 | 27 | 67 | 40 | 21 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 138 | 0 | 240 | 118 |
| Stage 1 | - | - | - | - | 108 | - |
| Stage 2 | - | - | - | - | 132 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1445 | - | 749 | 934 |
| Stage 1 | - | - | - | - | 917 | - |
| Stage 2 | - | - | - | - | 894 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1433 | - | 722 | 919 |
| Mov Cap-2 Maneuver | - | - | - | - | 722 | - |
| Stage 1 | - | - | - | - | 891 | - |
| Stage 2 | - | - | - | - | 887 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 2.17 | 10.02 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 778 | - | - | 517 | - |
| HCM Lane V/C Ratio | 0.078 | - | - | 0.019 | - |
| HCM Ctrl Dly (s/v) | 10 | - | - | 7.6 | 0 |
| HCM Lane LOS | B | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0.1 | - |

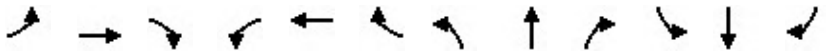
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 71 | 287 | 123 | 136 | 253 | 262 | 129 | 1041 | 141 | 226 | 718 | 91 |
| Future Volume (veh/h) | 71 | 287 | 123 | 136 | 253 | 262 | 129 | 1041 | 141 | 226 | 718 | 91 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 0.99 | 1.00 | | 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 | 1786 | 1786 | 1786 | 1772 | 1772 | 1772 | 1758 | 1758 | 1758 | 1772 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 71 | 287 | 123 | 136 | 253 | 262 | 129 | 1041 | 141 | 226 | 718 | 91 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 |
| Cap, veh/h | 89 | 332 | 279 | 158 | 403 | 339 | 151 | 1097 | 148 | 333 | 1367 | 173 |
| Arrive On Green | 0.05 | 0.19 | 0.19 | 0.09 | 0.23 | 0.23 | 0.09 | 0.39 | 0.39 | 0.20 | 0.50 | 0.50 |
| Sat Flow, veh/h | 1701 | 1786 | 1501 | 1688 | 1772 | 1492 | 1674 | 2816 | 381 | 1688 | 2742 | 347 |
| Grp Volume(v), veh/h | 71 | 287 | 123 | 136 | 253 | 262 | 129 | 558 | 624 | 226 | 362 | 447 |
| Grp Sat Flow(s),veh/h/ln | 1701 | 1786 | 1501 | 1688 | 1772 | 1492 | 1674 | 1512 | 1686 | 1688 | 1382 | 1707 |
| Q Serve(g_s), s | 5.9 | 22.1 | 10.3 | 11.3 | 18.3 | 15.4 | 10.8 | 50.8 | 50.9 | 17.6 | 25.2 | 25.3 |
| Cycle Q Clear(g_c), s | 5.9 | 22.1 | 10.3 | 11.3 | 18.3 | 15.4 | 10.8 | 50.8 | 50.9 | 17.6 | 25.2 | 25.3 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.23 | 1.00 | | 0.20 |
| Lane Grp Cap(c), veh/h | 89 | 332 | 279 | 158 | 403 | 339 | 151 | 589 | 656 | 333 | 689 | 851 |
| V/C Ratio(X) | 0.80 | 0.86 | 0.44 | 0.86 | 0.63 | 0.77 | 0.86 | 0.95 | 0.95 | 0.68 | 0.53 | 0.53 |
| Avail Cap(c_a), veh/h | 137 | 395 | 332 | 183 | 442 | 372 | 208 | 597 | 666 | 333 | 689 | 851 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.67 | 0.67 | 0.67 | 0.76 | 0.76 | 0.76 |
| Uniform Delay (d), s/veh | 66.6 | 56.0 | 51.2 | 63.4 | 49.4 | 22.3 | 63.7 | 42.0 | 42.0 | 52.8 | 24.2 | 24.2 |
| Incr Delay (d2), s/veh | 13.6 | 15.6 | 1.1 | 28.9 | 2.4 | 8.9 | 14.1 | 20.1 | 19.0 | 4.2 | 2.2 | 1.8 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 5.2 | 17.1 | 7.2 | 10.2 | 13.3 | 10.5 | 8.2 | 27.9 | 30.6 | 11.8 | 12.6 | 15.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 80.2 | 71.6 | 52.3 | 92.4 | 51.9 | 31.1 | 77.8 | 62.1 | 61.0 | 57.1 | 26.4 | 26.0 |
| LnGrp LOS | F | E | D | F | D | C | E | E | E | E | C | C |
| Approach Vol, veh/h | | 481 | | | 651 | | | 1311 | | | 1035 | |
| Approach Delay, s/veh | | 68.0 | | | 52.0 | | | 63.1 | | | 32.9 | |
| Approach LOS | | E | | | D | | | E | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 17.4 | 75.7 | 12.0 | 36.9 | 32.9 | 60.2 | 17.9 | 31.0 |
| Change Period (Y+Rc), s | 4.6 | 4.9 | 4.6 | 4.6 | 4.9 | * 4.9 | 4.6 | 4.6 |
| Max Green Setting (Gmax), s | 17.6 | 58.9 | 11.4 | 35.4 | 20.4 | * 56 | 15.4 | 31.4 |
| Max Q Clear Time (g_c+I1), s | 12.8 | 27.3 | 7.9 | 20.3 | 19.6 | 52.9 | 13.3 | 24.1 |
| Green Ext Time (p_c), s | 0.1 | 7.9 | 0.0 | 2.2 | 0.1 | 2.4 | 0.1 | 1.3 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 52.7 |
| HCM 7th LOS | D |

Notes

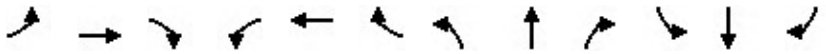
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 109 | 84 | 66 | 52 | 71 | 71 | 65 | 1194 | 91 | 84 | 870 | 58 |
| Future Volume (veh/h) | 109 | 84 | 66 | 52 | 71 | 71 | 65 | 1194 | 91 | 84 | 870 | 58 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 0.99 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1772 | 1772 | 1772 | 1786 | 1786 | 1786 | 1758 | 1758 | 1758 | 1772 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 109 | 84 | 66 | 52 | 71 | 71 | 65 | 1194 | 91 | 84 | 870 | 58 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 1 | 1 | 1 | 3 | 3 | 3 | 2 | 2 | 2 |
| Cap, veh/h | 174 | 152 | 130 | 118 | 157 | 175 | 639 | 1037 | 79 | 656 | 867 | 524 |
| Arrive On Green | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 | 0.38 | 0.34 | 0.34 | 0.39 | 0.35 | 0.35 |
| Sat Flow, veh/h | 722 | 856 | 728 | 444 | 881 | 985 | 1674 | 3032 | 231 | 1688 | 2481 | 1500 |
| Grp Volume(v), veh/h | 125 | 0 | 134 | 90 | 0 | 104 | 65 | 608 | 677 | 84 | 870 | 58 |
| Grp Sat Flow(s),veh/h/ln | 828 | 0 | 1477 | 868 | 0 | 1442 | 1674 | 1547 | 1716 | 1688 | 1240 | 1500 |
| Q Serve(g_s), s | 14.0 | 0.0 | 12.1 | 7.1 | 0.0 | 9.5 | 3.7 | 50.6 | 50.6 | 4.7 | 51.7 | 3.9 |
| Cycle Q Clear(g_c), s | 23.5 | 0.0 | 12.1 | 19.2 | 0.0 | 9.5 | 3.7 | 50.6 | 50.6 | 4.7 | 51.7 | 3.9 |
| Prop In Lane | 0.87 | | 0.49 | 0.58 | | 0.68 | 1.00 | | 0.13 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 193 | 0 | 263 | 193 | 0 | 257 | 639 | 529 | 587 | 656 | 867 | 524 |
| V/C Ratio(X) | 0.65 | 0.00 | 0.51 | 0.47 | 0.00 | 0.41 | 0.10 | 1.15 | 1.15 | 0.13 | 1.00 | 0.11 |
| Avail Cap(c_a), veh/h | 216 | 0 | 289 | 344 | 0 | 409 | 639 | 529 | 587 | 656 | 867 | 524 |
| 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 | 0.45 | 0.45 | 0.45 | 0.74 | 0.74 | 0.74 |
| Uniform Delay (d), s/veh | 64.3 | 0.0 | 55.0 | 60.7 | 0.0 | 53.9 | 29.5 | 48.7 | 48.7 | 29.1 | 48.2 | 32.6 |
| Incr Delay (d2), s/veh | 5.6 | 0.0 | 1.5 | 1.7 | 0.0 | 1.0 | 0.0 | 77.8 | 78.1 | 0.1 | 27.3 | 0.3 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 3.6 | 0.0 | 8.3 | 6.0 | 0.0 | 6.4 | 2.7 | 40.3 | 44.5 | 3.5 | 25.1 | 2.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 69.9 | 0.0 | 56.5 | 62.5 | 0.0 | 54.9 | 29.5 | 126.5 | 126.8 | 29.1 | 75.4 | 32.9 |
| LnGrp LOS | E | | E | E | | D | C | F | F | C | E | C |
| Approach Vol, veh/h | | 259 | | | 194 | | | 1350 | | | 1012 | |
| Approach Delay, s/veh | | 63.0 | | | 58.4 | | | 122.0 | | | 69.1 | |
| Approach LOS | | E | | | E | | | F | | | E | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 61.0 | 56.2 | | 30.8 | 62.1 | 55.1 | | 30.8 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | | 4.5 |
| Max Green Setting (Gmax), s | 56.5 | 51.7 | | 29.0 | 7.9 | 50.6 | | 42.0 |
| Max Q Clear Time (g_c+I1), s | 15.7 | 53.7 | | 25.5 | 6.7 | 52.6 | | 21.2 |
| Green Ext Time (p_c), s | 0.0 | 0.0 | | 0.5 | 0.0 | 0.0 | | 1.1 |

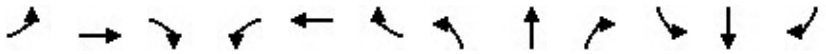
| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 93.2 |
| HCM 7th LOS | F |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 284 | 52 | 6 | 32 | 26 | 367 | 6 | 1291 | 64 | 335 | 967 | 187 |
| Future Volume (veh/h) | 284 | 52 | 6 | 32 | 26 | 367 | 6 | 1291 | 64 | 335 | 967 | 187 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1772 | 1772 | 1772 | 1772 | 1772 | 1772 | 1758 | 1758 | 1758 | 1772 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 284 | 52 | 6 | 32 | 26 | 367 | 6 | 1291 | 64 | 335 | 967 | 187 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 |
| Cap, veh/h | 313 | 289 | 33 | 194 | 158 | 306 | 15 | 973 | 48 | 295 | 1266 | 705 |
| Arrive On Green | 0.19 | 0.19 | 0.19 | 0.20 | 0.20 | 0.20 | 0.01 | 0.31 | 0.31 | 0.17 | 0.47 | 0.47 |
| Sat Flow, veh/h | 1688 | 1559 | 180 | 951 | 773 | 1499 | 1674 | 3155 | 156 | 1688 | 2693 | 1500 |
| Grp Volume(v), veh/h | 284 | 0 | 58 | 58 | 0 | 367 | 6 | 647 | 708 | 335 | 967 | 187 |
| Grp Sat Flow(s),veh/h/ln | 1688 | 0 | 1739 | 1724 | 0 | 1499 | 1674 | 1582 | 1729 | 1688 | 1347 | 1500 |
| Q Serve(g_s), s | 23.4 | 0.0 | 4.0 | 3.9 | 0.0 | 29.0 | 0.5 | 43.8 | 43.8 | 24.8 | 42.2 | 10.7 |
| Cycle Q Clear(g_c), s | 23.4 | 0.0 | 4.0 | 3.9 | 0.0 | 29.0 | 0.5 | 43.8 | 43.8 | 24.8 | 42.2 | 10.7 |
| Prop In Lane | 1.00 | | 0.10 | 0.55 | | 1.00 | 1.00 | | 0.09 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 313 | 0 | 322 | 352 | 0 | 306 | 15 | 488 | 533 | 295 | 1266 | 705 |
| V/C Ratio(X) | 0.91 | 0.00 | 0.18 | 0.16 | 0.00 | 1.20 | 0.40 | 1.32 | 1.33 | 1.14 | 0.76 | 0.27 |
| Avail Cap(c_a), veh/h | 392 | 0 | 404 | 352 | 0 | 306 | 71 | 488 | 533 | 295 | 1266 | 705 |
| 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 | 0.62 | 0.62 | 0.62 | 0.20 | 0.20 | 0.20 |
| Uniform Delay (d), s/veh | 56.7 | 0.0 | 48.8 | 46.5 | 0.0 | 56.5 | 70.0 | 49.1 | 49.1 | 58.6 | 31.1 | 22.8 |
| Incr Delay (d2), s/veh | 21.4 | 0.0 | 0.3 | 0.2 | 0.0 | 116.5 | 10.5 | 155.0 | 155.7 | 70.3 | 0.9 | 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 | 17.6 | 0.0 | 3.2 | 3.1 | 0.0 | 31.2 | 0.5 | 54.1 | 59.0 | 20.6 | 16.1 | 5.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 78.1 | 0.0 | 49.0 | 46.7 | 0.0 | 173.0 | 80.5 | 204.1 | 204.8 | 128.9 | 32.0 | 23.0 |
| LnGrp LOS | E | | D | D | | F | F | F | F | F | C | C |
| Approach Vol, veh/h | | 342 | | | 425 | | | 1361 | | | 1489 | |
| Approach Delay, s/veh | | 73.2 | | | 155.8 | | | 203.9 | | | 52.7 | |
| Approach LOS | | E | | | F | | | F | | | D | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 15.9 | 71.6 | | 30.9 | 29.7 | 47.8 | | 33.6 |
| Change Period (Y+Rc), s | 4.6 | 4.9 | | 4.6 | 4.9 | 4.0 | | 4.6 |
| Max Green Setting (Gmax), s | 6.3 | 55.3 | | 33.0 | 18.1 | 43.8 | | 29.0 |
| Max Q Clear Time (g_c+I1), s | 12.5 | 44.2 | | 25.4 | 26.8 | 45.8 | | 31.0 |
| Green Ext Time (p_c), s | 0.0 | 5.3 | | 0.7 | 0.0 | 0.0 | | 0.0 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 123.6 |
| HCM 7th LOS | F |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 52 | 355 | 374 | 179 | 326 | 639 | 390 | 1225 | 235 | 696 | 945 | 38 |
| Future Volume (veh/h) | 52 | 355 | 374 | 179 | 326 | 639 | 390 | 1225 | 235 | 696 | 945 | 38 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1786 | 1786 | 1786 | 1772 | 1772 | 1772 | 1758 | 1758 | 1758 | 1772 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 52 | 355 | 374 | 179 | 326 | 639 | 390 | 1225 | 235 | 696 | 945 | 38 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 |
| Cap, veh/h | 66 | 395 | 614 | 156 | 487 | 676 | 309 | 1277 | 569 | 573 | 1103 | 44 |
| Arrive On Green | 0.04 | 0.22 | 0.22 | 0.09 | 0.27 | 0.27 | 0.18 | 0.38 | 0.38 | 0.18 | 0.37 | 0.37 |
| Sat Flow, veh/h | 1701 | 1786 | 1514 | 1688 | 1772 | 1502 | 1674 | 3340 | 1489 | 3274 | 2960 | 119 |
| Grp Volume(v), veh/h | 52 | 355 | 374 | 179 | 326 | 639 | 390 | 1225 | 235 | 696 | 424 | 559 |
| Grp Sat Flow(s),veh/h/ln | 1701 | 1786 | 1514 | 1688 | 1772 | 1502 | 1674 | 1670 | 1489 | 1637 | 1329 | 1750 |
| Q Serve(g_s), s | 4.4 | 28.0 | 28.3 | 13.4 | 23.7 | 39.8 | 26.8 | 51.9 | 16.8 | 25.4 | 42.7 | 42.7 |
| Cycle Q Clear(g_c), s | 4.4 | 28.0 | 28.3 | 13.4 | 23.7 | 39.8 | 26.8 | 51.9 | 16.8 | 25.4 | 42.7 | 42.7 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.07 |
| Lane Grp Cap(c), veh/h | 66 | 395 | 614 | 156 | 487 | 676 | 309 | 1277 | 569 | 573 | 495 | 652 |
| V/C Ratio(X) | 0.79 | 0.90 | 0.61 | 1.15 | 0.67 | 0.95 | 1.26 | 0.96 | 0.41 | 1.21 | 0.86 | 0.86 |
| Avail Cap(c_a), veh/h | 116 | 443 | 656 | 156 | 487 | 676 | 309 | 1277 | 569 | 573 | 495 | 652 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.21 | 0.21 | 0.21 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 69.1 | 54.9 | 34.0 | 65.8 | 46.7 | 38.2 | 59.1 | 43.7 | 32.9 | 59.8 | 41.9 | 41.9 |
| Incr Delay (d2), s/veh | 18.4 | 19.5 | 1.5 | 117.3 | 3.5 | 22.2 | 122.8 | 5.4 | 0.5 | 111.5 | 17.2 | 13.6 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 4.0 | 20.9 | 15.9 | 17.1 | 16.3 | 33.6 | 28.7 | 25.3 | 8.0 | 29.0 | 22.6 | 27.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 87.4 | 74.4 | 35.5 | 183.1 | 50.3 | 60.4 | 181.9 | 49.1 | 33.3 | 171.3 | 59.1 | 55.5 |
| LnGrp LOS | F | E | D | F | D | E | F | D | C | F | E | E |
| Approach Vol, veh/h | | 781 | | | 1144 | | | 1850 | | | 1679 | |
| Approach Delay, s/veh | | 56.6 | | | 76.7 | | | 75.1 | | | 104.4 | |
| Approach LOS | | E | | | E | | | E | | | F | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 31.4 | 58.9 | 10.2 | 44.4 | 30.0 | 60.3 | 18.0 | 36.7 |
| Change Period (Y+Rc), s | 4.6 | 4.9 | 4.6 | 4.6 | 4.6 | 4.9 | 4.6 | 4.6 |
| Max Green Setting (Gmax), s | 26.8 | 50.1 | 9.9 | 39.5 | 25.4 | 51.5 | 13.4 | 36.0 |
| Max Q Clear Time (g_c+I1), s | 28.3 | 44.7 | 6.4 | 41.8 | 27.4 | 53.9 | 15.4 | 30.3 |
| Green Ext Time (p_c), s | 0.0 | 2.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.8 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 81.8 |
| HCM 7th LOS | F |

| Intersection | |
|---|---|
| Int Delay, s/veh | 4.1 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 262 | 26 | 66 | 285 | 98 | 87 |
| Future Vol, veh/h | 262 | 26 | 66 | 285 | 98 | 87 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | 100 | - | 100 | 0 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 1 | 1 | 1 | 1 |
| Mvmt Flow | 285 | 28 | 72 | 310 | 107 | 95 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 313 | 0 | 752 | 299 |
| Stage 1 | - | - | - | - | 299 | - |
| Stage 2 | - | - | - | - | 453 | - |
| Critical Hdwy | - | - | 4.11 | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | - | - | 2.209 | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | - | - | 1253 | - | 379 | 743 |
| Stage 1 | - | - | - | - | 755 | - |
| Stage 2 | - | - | - | - | 642 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1253 | - | 358 | 743 |
| Mov Cap-2 Maneuver | - | - | - | - | 358 | - |
| Stage 1 | - | - | - | - | 711 | - |
| Stage 2 | - | - | - | - | 642 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 1.51 | 15.18 |
| HCM LOS | | | C |

| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 358 | 743 | - | - | 1253 | - |
| HCM Lane V/C Ratio | 0.298 | 0.127 | - | - | 0.057 | - |
| HCM Ctrl Dly (s/v) | 19.3 | 10.6 | - | - | 8 | - |
| HCM Lane LOS | C | B | - | - | A | - |
| HCM 95th %tile Q(veh) | 1.2 | 0.4 | - | - | 0.2 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1.1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 35 | 288 | 389 | 6 | 0 | 46 |
| Future Vol, veh/h | 35 | 288 | 389 | 6 | 0 | 46 |
| Conflicting Peds, #/hr | 9 | 0 | 0 | 9 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 0 | 0 |
| Mvmt Flow | 38 | 313 | 423 | 7 | 0 | 50 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 438 | 0 | - | 0 | 824 | 435 |
| Stage 1 | - | - | - | - | 435 | - |
| Stage 2 | - | - | - | - | 389 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.4 | 6.2 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.5 | 3.3 |
| Pot Cap-1 Maneuver | 1121 | - | - | - | 345 | 625 |
| Stage 1 | - | - | - | - | 657 | - |
| Stage 2 | - | - | - | - | 689 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1113 | - | - | - | 329 | 621 |
| Mov Cap-2 Maneuver | - | - | - | - | 329 | - |
| Stage 1 | - | - | - | - | 625 | - |
| Stage 2 | - | - | - | - | 689 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0.9 | 0 | 11.31 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 195 | - | - | - | 621 |
| HCM Lane V/C Ratio | 0.034 | - | - | - | 0.081 |
| HCM Ctrl Dly (s/v) | 8.3 | 0 | - | - | 11.3 |
| HCM Lane LOS | A | A | - | - | B |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.3 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 13 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 12 | 303 | 84 | 20 | 370 | 38 | 0 | 0 | 0 | 20 | 38 | 12 |
| Future Vol, veh/h | 12 | 303 | 84 | 20 | 370 | 38 | 0 | 0 | 0 | 20 | 38 | 12 |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Heavy Vehicles, % | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 |
| Mvmt Flow | 13 | 326 | 90 | 22 | 398 | 41 | 0 | 0 | 0 | 22 | 41 | 13 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | SB |
|---|---|---|---|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | SB | | WB |
| Conflicting Lanes Left | 1 | 0 | 1 |
| Conflicting Approach Right | | SB | EB |
| Conflicting Lanes Right | 0 | 1 | 1 |
| HCM Control Delay, s/veh | 12.7 | 13.8 | 9.6 |
| HCM LOS | B | B | A |

| Lane | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|
| Vol Left, % | 3% | 5% | 29% |
| Vol Thru, % | 76% | 86% | 54% |
| Vol Right, % | 21% | 9% | 17% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 399 | 428 | 70 |
| LT Vol | 12 | 20 | 20 |
| Through Vol | 303 | 370 | 38 |
| RT Vol | 84 | 38 | 12 |
| Lane Flow Rate | 429 | 460 | 75 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.537 | 0.583 | 0.12 |
| Departure Headway (Hd) | 4.504 | 4.558 | 5.742 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 798 | 792 | 619 |
| Service Time | 2.548 | 2.601 | 3.827 |
| HCM Lane V/C Ratio | 0.538 | 0.581 | 0.121 |
| HCM Control Delay, s/veh | 12.7 | 13.8 | 9.6 |
| HCM Lane LOS | B | B | A |
| HCM 95th-tile Q | 3.2 | 3.8 | 0.4 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 51.1 |
| Intersection LOS | F |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 12 | 393 | 410 | 20 | 284 | 420 |
| Future Vol, veh/h | 12 | 393 | 410 | 20 | 284 | 420 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, % | 1 | 1 | 1 | 1 | 1 | 1 |
| Mvmt Flow | 14 | 447 | 466 | 23 | 323 | 477 |
| Number of Lanes | 1 | 1 | 1 | 0 | 1 | 1 |

| Approach | WB | NB | SB |
|---|---|---|---|
| Opposing Approach | | SB | NB |
| Opposing Lanes | 0 | 2 | 1 |
| Conflicting Approach Left | NB | | WB |
| Conflicting Lanes Left | 1 | 0 | 2 |
| Conflicting Approach Right | SB | WB | |
| Conflicting Lanes Right | 2 | 2 | 0 |
| HCM Control Delay, s/veh | 12.2 | 62.8 | 49 |
| HCM LOS | E | F | E |

| Lane | NBLn1 | WBLn1 | WBLn2 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|
| Vol Left, % | 0% | 100% | 0% | 100% | 0% |
| Vol Thru, % | 95% | 0% | 0% | 0% | 100% |
| Vol Right, % | 5% | 0% | 100% | 0% | 0% |
| Sign Control | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 430 | 12 | 393 | 284 | 420 |
| LT Vol | 0 | 12 | 0 | 284 | 0 |
| Through Vol | 410 | 0 | 0 | 0 | 420 |
| RT Vol | 20 | 0 | 393 | 0 | 0 |
| Lane Flow Rate | 489 | 14 | 447 | 323 | 477 |
| Geometry Grp | 3b | 5 | 5 | 5 | 5 |
| Degree of Util (X) | 0.981 | 0.032 | 0.884 | 0.709 | 0.981 |
| Departure Headway (Hd) | 7.227 | 8.362 | 7.125 | 7.911 | 7.396 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes |
| Cap | 503 | 429 | 509 | 458 | 492 |
| Service Time | 5.267 | 6.092 | 4.855 | 5.665 | 5.15 |
| HCM Lane V/C Ratio | 0.972 | 0.033 | 0.878 | 0.705 | 0.97 |
| HCM Control Delay, s/veh | 62.8 | 11.4 | 43.1 | 27.8 | 63.4 |
| HCM Lane LOS | F | B | E | D | F |
| HCM 95th-tile Q | 12.9 | 0.1 | 9.8 | 5.5 | 12.8 |

# MOVEMENT SUMMARY

## Site: [99 (9)] SR 305 & Johnson Rd - Forecast 2037 Without (PM Peak Hour)

Output produced by SIDRA INTERSECTION Version: 11.0.2

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Johnson Way | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.052 | 14.6 | LOS B | 0.2 | 5.0 | 0.54 | 0.73 | 0.54 | 31.2 |
| 3 | L2 | All MCs | 22 | 6.0 | 22 | 6.0 | 0.052 | 11.6 | LOS B | 0.2 | 5.0 | 0.54 | 0.73 | 0.54 | 32.4 |
| 8 | T1 | All MCs | 6 | 1.0 | 6 | 1.0 | 0.052 | 5.5 | LOS A | 0.2 | 5.0 | 0.54 | 0.73 | 0.54 | 30.4 |
| 18 | R2 | All MCs | 9 | 1.0 | 9 | 1.0 | 0.052 | 7.6 | LOS A | 0.2 | 5.0 | 0.54 | 0.73 | 0.54 | 33.4 |
| Approach | | | 38 | 3.9 | 38 | 3.9 | 0.052 | 9.8 | LOS A | 0.2 | 5.0 | 0.54 | 0.73 | 0.54 | 32.3 |
| East: SR 305 | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 3 | 1.0 | 3 | 1.0 | 0.448 | 12.1 | LOS B | 3.4 | 88.0 | 0.22 | 0.45 | 0.22 | 37.5 |
| 1 | L2 | All MCs | 9 | 1.0 | 9 | 1.0 | 0.448 | 11.5 | LOS B | 3.4 | 88.0 | 0.22 | 0.45 | 0.22 | 35.6 |
| 6 | T1 | All MCs | 904 | 3.0 | 904 | 3.0 | 0.448 | 6.4 | LOS A | 3.4 | 88.0 | 0.21 | 0.46 | 0.21 | 41.1 |
| 16 | R2 | All MCs | 26 | 10.0 | 26 | 10.0 | 0.204 | 6.0 | LOS A | 1.1 | 29.5 | 0.19 | 0.46 | 0.19 | 35.9 |
| Approach | | | 942 | 3.2 | 942 | 3.2 | 0.448 | 6.4 | LOS A | 3.4 | 88.0 | 0.21 | 0.46 | 0.21 | 40.9 |
| North: Johnson Rd | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.073 | 15.2 | LOS B | 0.3 | 7.2 | 0.58 | 0.76 | 0.58 | 30.8 |
| 7 | L2 | All MCs | 31 | 6.0 | 31 | 6.0 | 0.073 | 12.2 | LOS B | 0.3 | 7.2 | 0.58 | 0.76 | 0.58 | 32.0 |
| 4 | T1 | All MCs | 4 | 1.0 | 4 | 1.0 | 0.073 | 6.1 | LOS A | 0.3 | 7.2 | 0.58 | 0.76 | 0.58 | 30.1 |
| 14 | R2 | All MCs | 14 | 1.0 | 14 | 1.0 | 0.073 | 8.8 | LOS A | 0.3 | 7.2 | 0.58 | 0.76 | 0.58 | 33.1 |
| Approach | | | 50 | 4.1 | 50 | 4.1 | 0.073 | 10.8 | LOS B | 0.3 | 7.2 | 0.58 | 0.76 | 0.58 | 32.1 |
| West: SR 305 | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.384 | 12.1 | LOS B | 2.7 | 69.8 | 0.22 | 0.46 | 0.22 | 37.5 |
| 5 | L2 | All MCs | 11 | 1.0 | 11 | 1.0 | 0.384 | 11.5 | LOS B | 2.7 | 69.8 | 0.22 | 0.46 | 0.22 | 35.6 |
| 2 | T1 | All MCs | 778 | 2.0 | 778 | 2.0 | 0.384 | 6.2 | LOS A | 2.7 | 69.8 | 0.22 | 0.46 | 0.22 | 41.2 |
| 12 | R2 | All MCs | 22 | 1.0 | 22 | 1.0 | 0.175 | 5.9 | LOS A | 1.0 | 24.4 | 0.20 | 0.47 | 0.20 | 36.1 |
| Approach | | | 812 | 2.0 | 812 | 2.0 | 0.384 | 6.3 | LOS A | 2.7 | 69.8 | 0.22 | 0.46 | 0.22 | 41.0 |
| All Vehicles | | | 1842 | 2.7 | 1842 | 2.7 | 0.448 | 6.6 | LOS A | 3.4 | 88.0 | 0.23 | 0.47 | 0.23 | 40.4 |

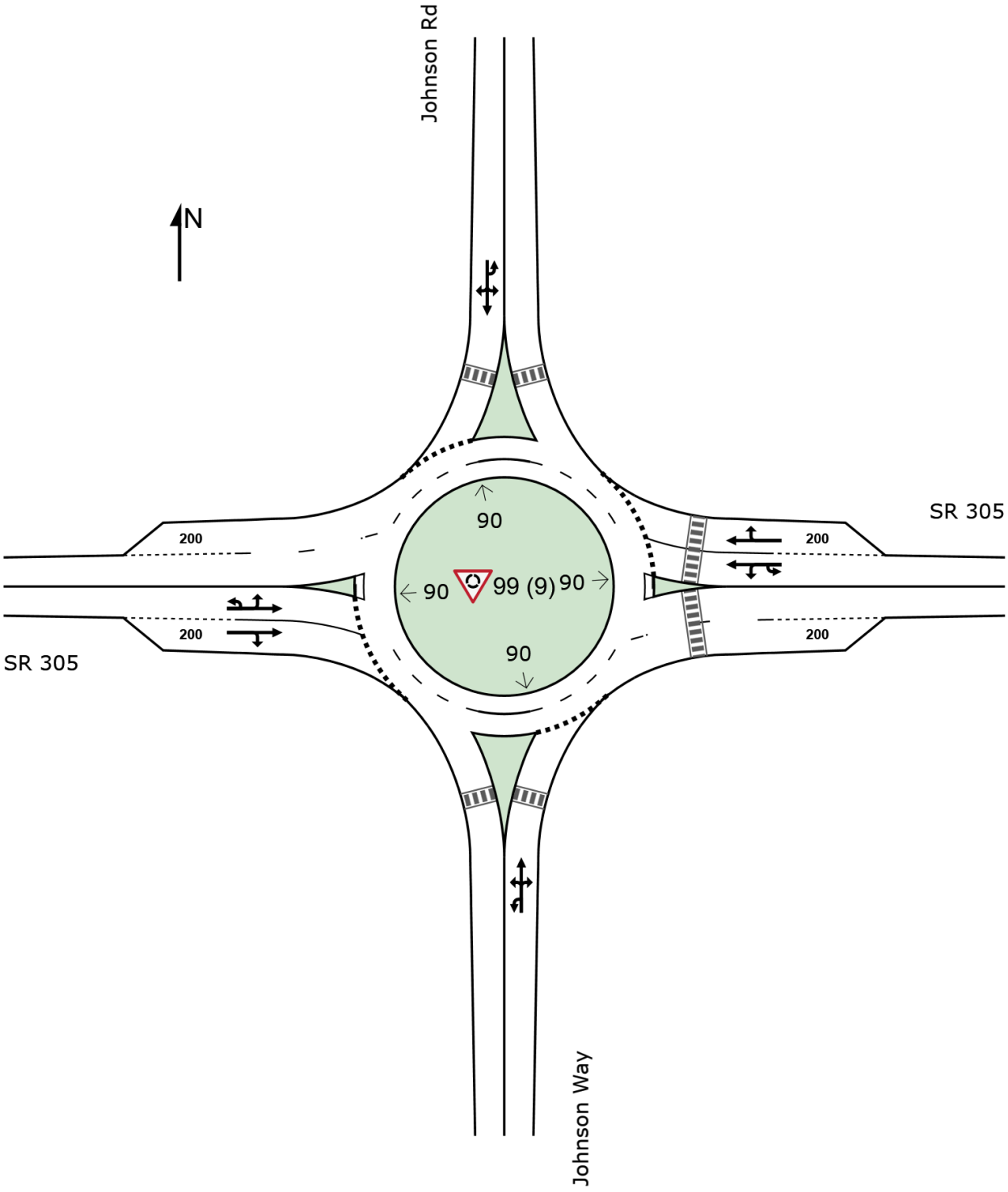
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [99 (9)] SR 305 & Johnson Rd - Forecast 2037 Without
(PM Peak Hour)

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



# MOVEMENT SUMMARY

## Site: [1 (9)] Johnson & Sunrise Ridge - 2037 PM Without

(Folder1)

Output produced by SIDRA INTERSECTION Version: 11.0.2

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NE Midnight Sun Loop | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.006 | 7.2 | LOS A | 0.0 | 0.6 | 0.16 | 0.41 | 0.16 | 23.7 |
| 3 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.006 | 5.8 | LOS A | 0.0 | 0.6 | 0.16 | 0.41 | 0.16 | 23.7 |
| 8 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.006 | 2.0 | LOS A | 0.0 | 0.6 | 0.16 | 0.41 | 0.16 | 23.9 |
| 18 | R2 | All MCs | 5 | 3.0 | 5 | 3.0 | 0.006 | 2.4 | LOS A | 0.0 | 0.6 | 0.16 | 0.41 | 0.16 | 23.8 |
| Approach | | | 8 | 3.0 | 8 | 3.0 | 0.006 | 3.5 | LOS A | 0.0 | 0.6 | 0.16 | 0.41 | 0.16 | 23.8 |
| East: Johnson Rd NE | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.049 | 10.9 | LOS B | 0.2 | 5.1 | 0.11 | 0.48 | 0.11 | 34.6 |
| 1 | L2 | All MCs | 2 | 3.0 | 2 | 3.0 | 0.049 | 9.0 | LOS A | 0.2 | 5.1 | 0.11 | 0.48 | 0.11 | 34.6 |
| 6 | T1 | All MCs | 45 | 3.0 | 45 | 3.0 | 0.049 | 4.9 | LOS A | 0.2 | 5.1 | 0.11 | 0.48 | 0.11 | 35.3 |
| 16 | R2 | All MCs | 16 | 3.0 | 16 | 3.0 | 0.049 | 4.7 | LOS A | 0.2 | 5.1 | 0.11 | 0.48 | 0.11 | 34.9 |
| Approach | | | 65 | 3.0 | 65 | 3.0 | 0.049 | 5.1 | LOS A | 0.2 | 5.1 | 0.11 | 0.48 | 0.11 | 35.1 |
| North: Sunrise Ridge Ave NE | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.022 | 11.0 | LOS B | 0.1 | 2.3 | 0.15 | 0.57 | 0.15 | 33.9 |
| 7 | L2 | All MCs | 9 | 3.0 | 9 | 3.0 | 0.022 | 9.1 | LOS A | 0.1 | 2.3 | 0.15 | 0.57 | 0.15 | 33.9 |
| 4 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.022 | 5.0 | LOS A | 0.1 | 2.3 | 0.15 | 0.57 | 0.15 | 34.5 |
| 14 | R2 | All MCs | 16 | 3.0 | 16 | 3.0 | 0.022 | 4.8 | LOS A | 0.1 | 2.3 | 0.15 | 0.57 | 0.15 | 34.2 |
| Approach | | | 27 | 3.0 | 27 | 3.0 | 0.022 | 6.5 | LOS A | 0.1 | 2.3 | 0.15 | 0.57 | 0.15 | 34.1 |
| West: Johnson Rd NE | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.043 | 10.9 | LOS B | 0.2 | 4.5 | 0.08 | 0.57 | 0.08 | 33.9 |
| 5 | L2 | All MCs | 24 | 3.0 | 24 | 3.0 | 0.043 | 8.9 | LOS A | 0.2 | 4.5 | 0.08 | 0.57 | 0.08 | 33.9 |
| 2 | T1 | All MCs | 28 | 3.0 | 28 | 3.0 | 0.043 | 4.9 | LOS A | 0.2 | 4.5 | 0.08 | 0.57 | 0.08 | 34.5 |
| 12 | R2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.043 | 4.6 | LOS A | 0.2 | 4.5 | 0.08 | 0.57 | 0.08 | 34.2 |
| Approach | | | 55 | 3.0 | 55 | 3.0 | 0.043 | 6.8 | LOS A | 0.2 | 4.5 | 0.08 | 0.57 | 0.08 | 34.2 |
| All Vehicles | | | 155 | 3.0 | 155 | 3.0 | 0.049 | 5.9 | LOS A | 0.2 | 5.1 | 0.11 | 0.52 | 0.11 | 33.8 |

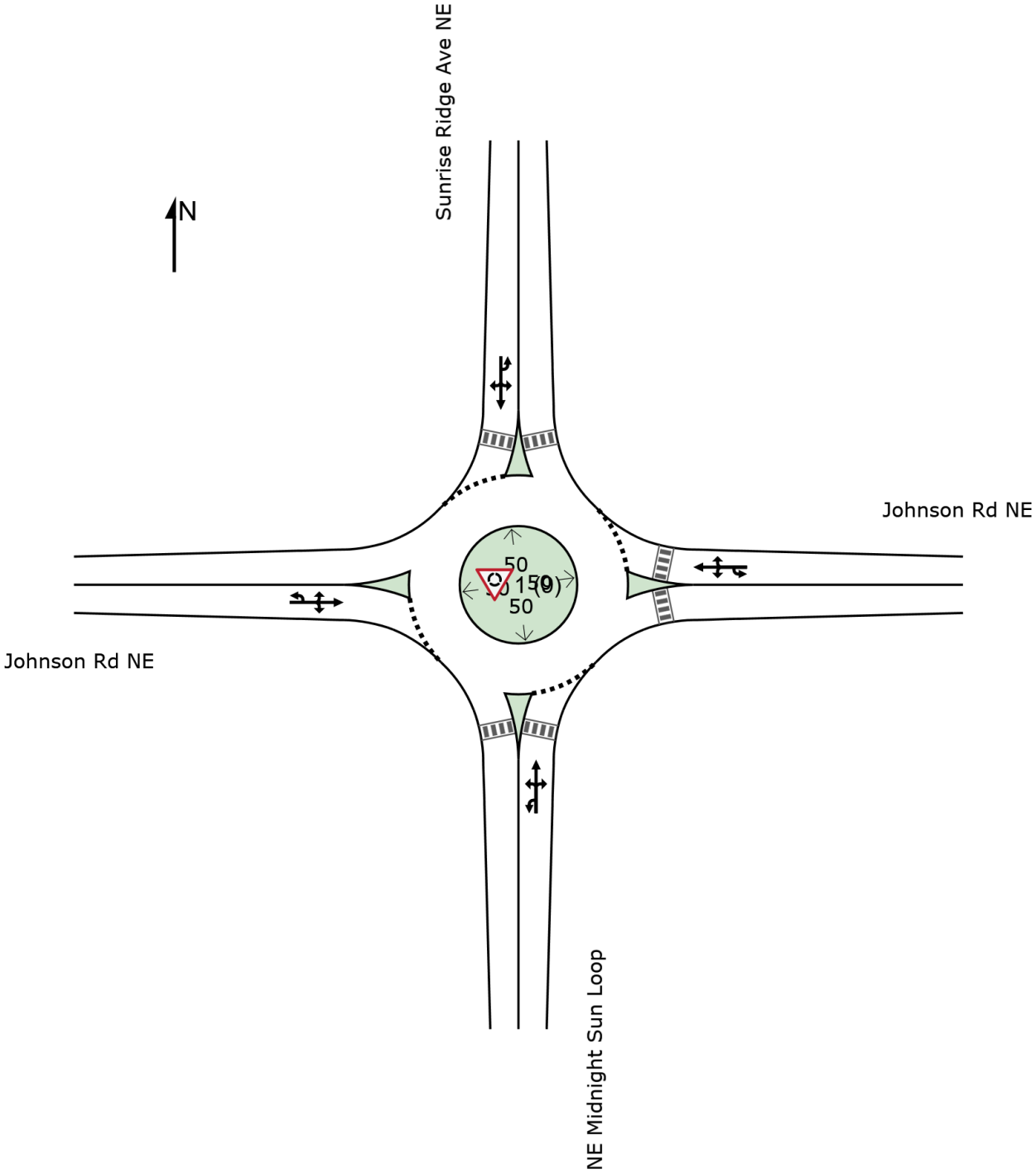
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [1 (9)] Johnson & Sunrise Ridge - 2037 PM Without
(Folder1)

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.




**SIDRA INTERSECTION 11 | Copyright © 2000-2026 Akcelik and Associates Pty Ltd | sidrasolutions.com**
Organisation: HEATH & ASSOCIATES | Licence: PLUS / 1PC | Created: Saturday, October 3, 2026 3:31:55 PM
Project: C:\Users\LucasMaulin\Heath and Associates\Office Access - Documents\Project Files\Pinnacle at Liberty Bay - 5576\5-Analysis\Sidra\Johnson & Sunrise Ridge.sipx

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 42 | 117 | 77 | 59 | 96 | 163 | 65 | 519 | 22 | 227 | 907 | 22 |
| Future Volume (veh/h) | 42 | 117 | 77 | 59 | 96 | 163 | 65 | 519 | 22 | 227 | 907 | 22 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 0.99 | | 0.98 | 0.99 | | 0.98 | 1.00 | | 0.98 | 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 | 1716 | 1730 | 1744 | 1744 | 1744 | 1716 | 1730 | 1716 | 1716 | 1730 | 1716 | 1646 |
| Adj Flow Rate, veh/h | 42 | 117 | 77 | 59 | 96 | 103 | 65 | 519 | 22 | 227 | 907 | 22 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 6 | 5 | 4 | 4 | 4 | 6 | 5 | 6 | 6 | 5 | 6 | 11 |
| Cap, veh/h | 173 | 176 | 147 | 165 | 198 | 162 | 76 | 585 | 25 | 797 | 1846 | 45 |
| Arrive On Green | 0.03 | 0.10 | 0.10 | 0.04 | 0.11 | 0.11 | 0.05 | 0.21 | 0.21 | 0.48 | 0.65 | 0.65 |
| Sat Flow, veh/h | 1634 | 1730 | 1443 | 1661 | 1744 | 1423 | 1647 | 2792 | 118 | 1647 | 2852 | 69 |
| Grp Volume(v), veh/h | 42 | 117 | 77 | 59 | 96 | 103 | 65 | 226 | 315 | 227 | 387 | 542 |
| Grp Sat Flow(s),veh/h/ln | 1634 | 1730 | 1443 | 1661 | 1744 | 1423 | 1647 | 1218 | 1692 | 1647 | 1218 | 1703 |
| Q Serve(g_s), s | 2.8 | 7.8 | 6.1 | 3.8 | 6.2 | 3.1 | 4.7 | 21.6 | 21.7 | 9.9 | 19.7 | 19.7 |
| Cycle Q Clear(g_c), s | 2.8 | 7.8 | 6.1 | 3.8 | 6.2 | 3.1 | 4.7 | 21.6 | 21.7 | 9.9 | 19.7 | 19.7 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.07 | 1.00 | | 0.04 |
| Lane Grp Cap(c), veh/h | 173 | 176 | 147 | 165 | 198 | 162 | 76 | 255 | 355 | 797 | 789 | 1102 |
| V/C Ratio(X) | 0.24 | 0.67 | 0.53 | 0.36 | 0.48 | 0.64 | 0.85 | 0.89 | 0.89 | 0.28 | 0.49 | 0.49 |
| Avail Cap(c_a), veh/h | 342 | 332 | 277 | 318 | 334 | 273 | 316 | 437 | 606 | 797 | 789 | 1102 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 47.0 | 51.9 | 51.2 | 46.3 | 49.9 | 6.9 | 56.8 | 46.0 | 46.0 | 18.5 | 10.9 | 10.9 |
| Incr Delay (d2), s/veh | 0.7 | 4.3 | 2.9 | 1.3 | 1.8 | 4.1 | 22.1 | 33.1 | 26.4 | 0.2 | 2.2 | 1.6 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 2.1 | 6.5 | 4.2 | 2.9 | 5.1 | 5.4 | 4.3 | 13.6 | 17.1 | 6.6 | 9.0 | 11.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 47.7 | 56.2 | 54.1 | 47.6 | 51.7 | 11.1 | 78.9 | 79.1 | 72.4 | 18.7 | 13.1 | 12.5 |
| LnGrp LOS | D | E | D | D | D | B | E | E | E | B | B | B |
| Approach Vol, veh/h | | 236 | | | 258 | | | 606 | | | 1156 | |
| Approach Delay, s/veh | | 54.0 | | | 34.5 | | | 75.6 | | | 13.9 | |
| Approach LOS | | D | | | C | | | E | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 63.1 | 30.2 | 9.6 | 17.2 | 10.6 | 82.7 | 8.1 | 18.6 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 18.9 | 43.5 | 16.1 | 23.5 | 23.5 | 38.9 | 16.1 | 23.5 |
| Max Q Clear Time (g_c+I1), s | 11.9 | 23.7 | 5.8 | 9.8 | 6.7 | 21.7 | 4.8 | 8.2 |
| Green Ext Time (p_c), s | 0.4 | 2.0 | 0.1 | 0.6 | 0.1 | 3.6 | 0.1 | 0.7 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 37.1 |
| HCM 7th LOS | D |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 1003 | 560 | 1 | 2 | 4 |
| Future Vol, veh/h | 0 | 1003 | 560 | 1 | 2 | 4 |
| Conflicting Peds, #/hr | 4 | 0 | 0 | 4 | 4 | 4 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 105 | - | - | 55 | 60 | 0 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 1 | 8 | 6 | 1 | 1 | 1 |
| Mvmt Flow | 0 | 1003 | 560 | 1 | 2 | 4 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 565 | 0 | - | 0 | 1571 | 568 |
| Stage 1 | - | - | - | - | 564 | - |
| Stage 2 | - | - | - | - | 1007 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1012 | - | - | - | 122 | 524 |
| Stage 1 | - | - | - | - | 571 | - |
| Stage 2 | - | - | - | - | 355 | - |
| Platoon blocked, % | | | - | - | - | |
| Mov Cap-1 Maneuver | 1008 | - | - | - | 121 | 521 |
| Mov Cap-2 Maneuver | - | - | - | - | 121 | - |
| Stage 1 | - | - | - | - | 570 | - |
| Stage 2 | - | - | - | - | 353 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 0 | 19.69 |
| HCM LOS | | | C |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1008 | - | - | - | 121 | 521 |
| HCM Lane V/C Ratio | - | - | - | - | 0.016 | 0.008 |
| HCM Ctrl Dly (s/v) | 0 | - | - | - | 35.1 | 12 |
| HCM Lane LOS | A | - | - | - | E | B |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.1 | 0 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 6.4 |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 13 | 64 | 23 | 8 | 19 | 5 |
| Future Vol, veh/h | 13 | 64 | 23 | 8 | 19 | 5 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 14 | 70 | 25 | 9 | 21 | 5 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 82 | 23 | 26 | 0 | - | 0 |
| Stage 1 | 23 | - | - | - | - | - |
| Stage 2 | 59 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 920 | 1053 | 1588 | - | - | - |
| Stage 1 | 999 | - | - | - | - | - |
| Stage 2 | 964 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 905 | 1053 | 1588 | - | - | - |
| Mov Cap-2 Maneuver | 905 | - | - | - | - | - |
| Stage 1 | 983 | - | - | - | - | - |
| Stage 2 | 964 | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 8.82 | 5.42 | 0 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1335 | - | 1025 | - | - |
| HCM Lane V/C Ratio | 0.016 | - | 0.082 | - | - |
| HCM Ctrl Dly (s/v) | 7.3 | 0 | 8.8 | - | - |
| HCM Lane LOS | A | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0.3 | - | - |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 38.4 |
| Intersection LOS | E |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 52 | 256 | 25 | 25 | 231 | 88 | 66 | 42 | 47 | 140 | 29 | 66 |
| Future Vol, veh/h | 52 | 256 | 25 | 25 | 231 | 88 | 66 | 42 | 47 | 140 | 29 | 66 |
| Peak Hour Factor | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| Heavy Vehicles, % | 1 | 6 | 5 | 1 | 7 | 1 | 1 | 3 | 6 | 7 | 1 | 4 |
| Mvmt Flow | 69 | 341 | 33 | 33 | 308 | 117 | 88 | 56 | 63 | 187 | 39 | 88 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 1 | 1 |
| HCM Control Delay, s/veh | 48.5 | 49.9 | 19.3 | 19.9 |
| HCM LOS | E | E | C | C |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|
| Vol Left, % | 43% | 16% | 7% | 83% | 0% |
| Vol Thru, % | 27% | 77% | 67% | 17% | 0% |
| Vol Right, % | 30% | 8% | 26% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 155 | 333 | 344 | 169 | 66 |
| LT Vol | 66 | 52 | 25 | 140 | 0 |
| Through Vol | 42 | 256 | 231 | 29 | 0 |
| RT Vol | 47 | 25 | 88 | 0 | 66 |
| Lane Flow Rate | 207 | 444 | 459 | 225 | 88 |
| Geometry Grp | 4a | 2 | 2 | 5 | 5 |
| Degree of Util (X) | 0.485 | 0.908 | 0.92 | 0.564 | 0.189 |
| Departure Headway (Hd) | 8.454 | 7.365 | 7.218 | 9.011 | 7.75 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes |
| Cap | 426 | 493 | 505 | 401 | 463 |
| Service Time | 6.524 | 5.402 | 5.253 | 6.755 | 5.494 |
| HCM Lane V/C Ratio | 0.486 | 0.901 | 0.909 | 0.561 | 0.19 |
| HCM Control Delay, s/veh | 19.3 | 48.5 | 49.9 | 22.8 | 12.3 |
| HCM Lane LOS | C | E | E | C | B |
| HCM 95th-tile Q | 2.6 | 10.4 | 10.8 | 3.4 | 0.7 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 4 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 37 | 40 | 6 | 62 | 68 | 25 |
| Future Vol, veh/h | 37 | 40 | 6 | 62 | 68 | 25 |
| Conflicting Peds, #/hr | 0 | 10 | 10 | 0 | 10 | 10 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 40 | 43 | 7 | 67 | 74 | 27 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 94 | 0 | 162 | 82 |
| Stage 1 | - | - | - | - | 72 | - |
| Stage 2 | - | - | - | - | 90 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1501 | - | 828 | 978 |
| Stage 1 | - | - | - | - | 951 | - |
| Stage 2 | - | - | - | - | 933 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1488 | - | 811 | 962 |
| Mov Cap-2 Maneuver | - | - | - | - | 811 | - |
| Stage 1 | - | - | - | - | 939 | - |
| Stage 2 | - | - | - | - | 925 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 0.66 | 9.83 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 847 | - | - | 159 | - |
| HCM Lane V/C Ratio | 0.119 | - | - | 0.004 | - |
| HCM Ctrl Dly (s/v) | 9.8 | - | - | 7.4 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.4 | - | - | 0 | - |

# MOVEMENT SUMMARY

## Site: [99 (8)] SR 305 & Johnson Rd - Forecast 2037 AM With

(AM Peak Hour)

Output produced by SIDRA INTERSECTION Version: 11.0.2

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Johnson Way | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.052 | 16.3 | LOS B | 0.2 | 5.7 | 0.67 | 0.80 | 0.67 | 30.5 |
| 3 | L2 | All MCs | 19 | 1.0 | 19 | 1.0 | 0.052 | 12.8 | LOS B | 0.2 | 5.7 | 0.67 | 0.80 | 0.67 | 32.3 |
| 8 | T1 | All MCs | 7 | 1.0 | 7 | 1.0 | 0.052 | 7.2 | LOS A | 0.2 | 5.7 | 0.67 | 0.80 | 0.67 | 29.8 |
| 18 | R2 | All MCs | 4 | 1.0 | 4 | 1.0 | 0.052 | 12.5 | LOS B | 0.2 | 5.7 | 0.67 | 0.80 | 0.67 | 32.7 |
| Approach | | | 31 | 1.0 | 31 | 1.0 | 0.052 | 11.6 | LOS B | 0.2 | 5.7 | 0.67 | 0.80 | 0.67 | 31.7 |
| East: SR 305 | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.261 | 12.1 | LOS B | 1.6 | 40.7 | 0.20 | 0.46 | 0.20 | 37.6 |
| 1 | L2 | All MCs | 6 | 1.0 | 6 | 1.0 | 0.261 | 11.5 | LOS B | 1.6 | 40.7 | 0.20 | 0.46 | 0.20 | 35.7 |
| 6 | T1 | All MCs | 497 | 6.0 | 497 | 6.0 | 0.261 | 6.1 | LOS A | 1.6 | 40.7 | 0.20 | 0.46 | 0.20 | 40.7 |
| 16 | R2 | All MCs | 26 | 1.0 | 26 | 1.0 | 0.119 | 5.9 | LOS A | 0.6 | 15.7 | 0.19 | 0.47 | 0.19 | 36.1 |
| Approach | | | 530 | 5.7 | 530 | 5.7 | 0.261 | 6.1 | LOS A | 1.6 | 40.7 | 0.20 | 0.46 | 0.20 | 40.3 |
| North: Johnson Rd | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.197 | 13.9 | LOS B | 0.8 | 19.9 | 0.49 | 0.69 | 0.49 | 31.2 |
| 7 | L2 | All MCs | 119 | 3.0 | 119 | 3.0 | 0.197 | 10.7 | LOS B | 0.8 | 19.9 | 0.49 | 0.69 | 0.49 | 32.9 |
| 4 | T1 | All MCs | 2 | 1.0 | 2 | 1.0 | 0.197 | 4.9 | LOS A | 0.8 | 19.9 | 0.49 | 0.69 | 0.49 | 30.5 |
| 14 | R2 | All MCs | 49 | 1.0 | 49 | 1.0 | 0.197 | 6.2 | LOS A | 0.8 | 19.9 | 0.49 | 0.69 | 0.49 | 33.5 |
| Approach | | | 171 | 2.4 | 171 | 2.4 | 0.197 | 9.3 | LOS A | 0.8 | 19.9 | 0.49 | 0.69 | 0.49 | 33.0 |
| West: SR 305 | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.545 | 12.6 | LOS B | 4.6 | 122.8 | 0.46 | 0.50 | 0.46 | 36.7 |
| 5 | L2 | All MCs | 21 | 17.0 | 21 | 17.0 | 0.545 | 12.7 | LOS B | 4.6 | 122.8 | 0.46 | 0.50 | 0.46 | 34.3 |
| 2 | T1 | All MCs | 965 | 8.0 | 965 | 8.0 | 0.545 | 7.8 | LOS A | 4.6 | 122.8 | 0.44 | 0.50 | 0.44 | 39.3 |
| 12 | R2 | All MCs | 21 | 12.0 | 21 | 12.0 | 0.248 | 6.7 | LOS A | 1.4 | 38.4 | 0.37 | 0.50 | 0.37 | 35.4 |
| Approach | | | 1008 | 8.3 | 1008 | 8.3 | 0.545 | 7.8 | LOS A | 4.6 | 122.8 | 0.44 | 0.50 | 0.44 | 39.1 |
| All Vehicles | | | 1740 | 6.8 | 1740 | 6.8 | 0.545 | 7.5 | LOS A | 4.6 | 122.8 | 0.37 | 0.51 | 0.37 | 38.6 |

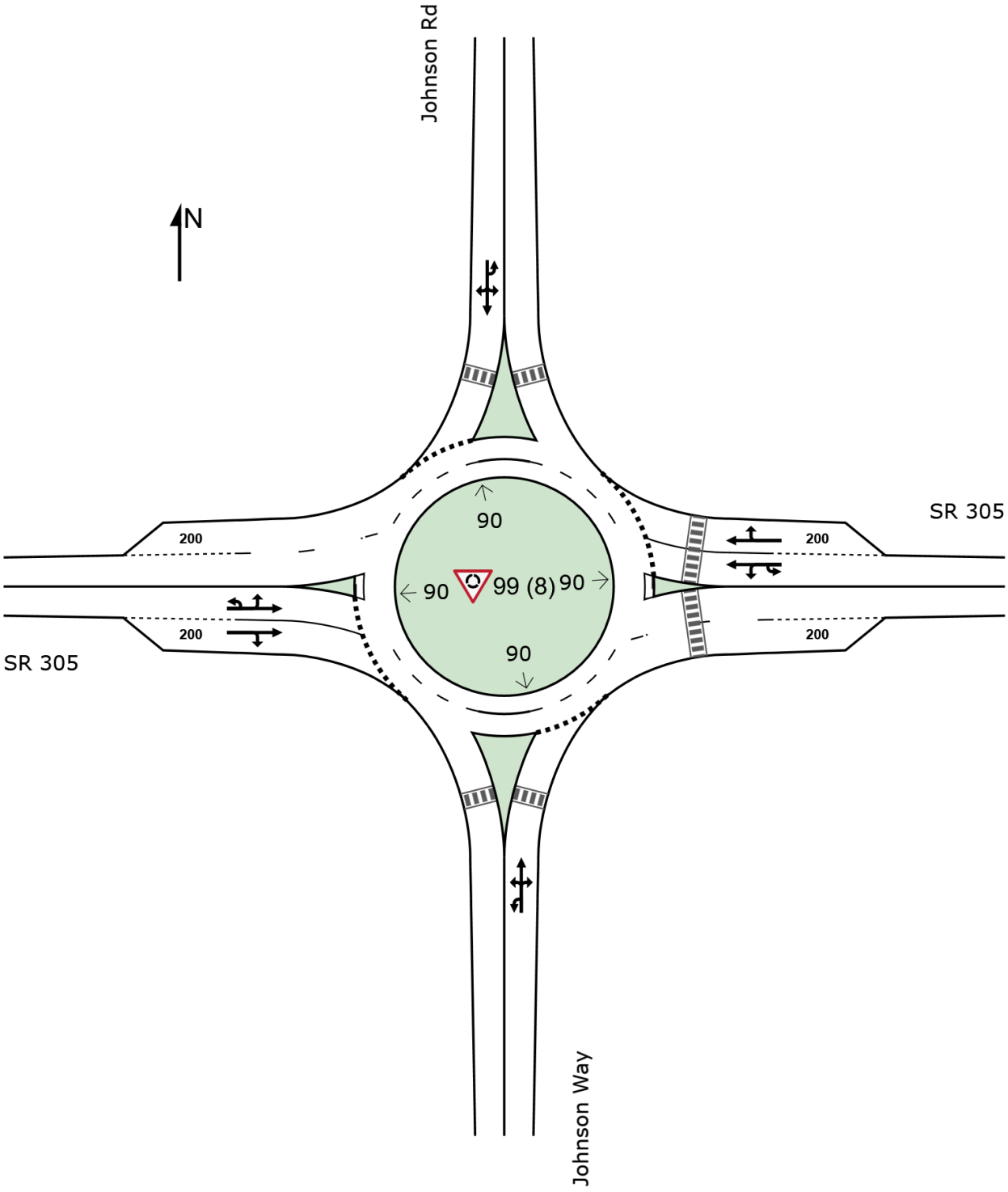
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [99 (8)] SR 305 & Johnson Rd - Forecast 2037 AM With
(AM Peak Hour)

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



# MOVEMENT SUMMARY

## Site: [1 (8)] Johnson & Sunrise Ridge - 2037 AM With (Folder1)

Output produced by SIDRA INTERSECTION Version: 11.0.2

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NE Midnight Sun Loop | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 7.3 | LOS A | 0.0 | 0.4 | 0.21 | 0.45 | 0.21 | 23.4 |
| 3 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 5.9 | LOS A | 0.0 | 0.4 | 0.21 | 0.45 | 0.21 | 23.4 |
| 8 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 2.1 | LOS A | 0.0 | 0.4 | 0.21 | 0.45 | 0.21 | 23.6 |
| 18 | R2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 2.5 | LOS A | 0.0 | 0.4 | 0.21 | 0.45 | 0.21 | 23.6 |
| Approach | | | 5 | 3.0 | 5 | 3.0 | 0.004 | 4.4 | LOS A | 0.0 | 0.4 | 0.21 | 0.45 | 0.21 | 23.5 |
| East: Johnson Rd NE | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.081 | 11.0 | LOS B | 0.3 | 8.9 | 0.14 | 0.46 | 0.14 | 34.5 |
| 1 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.081 | 9.1 | LOS A | 0.3 | 8.9 | 0.14 | 0.46 | 0.14 | 34.5 |
| 6 | T1 | All MCs | 96 | 3.0 | 96 | 3.0 | 0.081 | 5.0 | LOS A | 0.3 | 8.9 | 0.14 | 0.46 | 0.14 | 35.2 |
| 16 | R2 | All MCs | 7 | 3.0 | 7 | 3.0 | 0.081 | 4.8 | LOS A | 0.3 | 8.9 | 0.14 | 0.46 | 0.14 | 34.9 |
| Approach | | | 106 | 3.0 | 106 | 3.0 | 0.081 | 5.1 | LOS A | 0.3 | 8.9 | 0.14 | 0.46 | 0.14 | 35.1 |
| North: Sunrise Ridge Ave NE | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.120 | 11.3 | LOS B | 0.5 | 13.7 | 0.24 | 0.55 | 0.24 | 34.2 |
| 7 | L2 | All MCs | 23 | 3.0 | 23 | 3.0 | 0.120 | 9.4 | LOS A | 0.5 | 13.7 | 0.24 | 0.55 | 0.24 | 34.2 |
| 4 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.120 | 5.3 | LOS A | 0.5 | 13.7 | 0.24 | 0.55 | 0.24 | 34.8 |
| 14 | R2 | All MCs | 114 | 3.0 | 114 | 3.0 | 0.120 | 5.1 | LOS A | 0.5 | 13.7 | 0.24 | 0.55 | 0.24 | 34.5 |
| Approach | | | 139 | 3.0 | 139 | 3.0 | 0.120 | 5.8 | LOS A | 0.5 | 13.7 | 0.24 | 0.55 | 0.24 | 34.5 |
| West: Johnson Rd NE | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.065 | 10.9 | LOS B | 0.3 | 7.2 | 0.11 | 0.57 | 0.11 | 33.7 |
| 5 | L2 | All MCs | 40 | 3.0 | 40 | 3.0 | 0.065 | 9.0 | LOS A | 0.3 | 7.2 | 0.11 | 0.57 | 0.11 | 33.7 |
| 2 | T1 | All MCs | 30 | 3.0 | 30 | 3.0 | 0.065 | 4.9 | LOS A | 0.3 | 7.2 | 0.11 | 0.57 | 0.11 | 34.3 |
| 12 | R2 | All MCs | 11 | 3.0 | 11 | 3.0 | 0.065 | 4.7 | LOS A | 0.3 | 7.2 | 0.11 | 0.57 | 0.11 | 34.0 |
| Approach | | | 82 | 3.0 | 82 | 3.0 | 0.065 | 7.0 | LOS A | 0.3 | 7.2 | 0.11 | 0.57 | 0.11 | 34.0 |
| All Vehicles | | | 332 | 3.0 | 332 | 3.0 | 0.120 | 5.9 | LOS A | 0.5 | 13.7 | 0.18 | 0.53 | 0.18 | 34.3 |

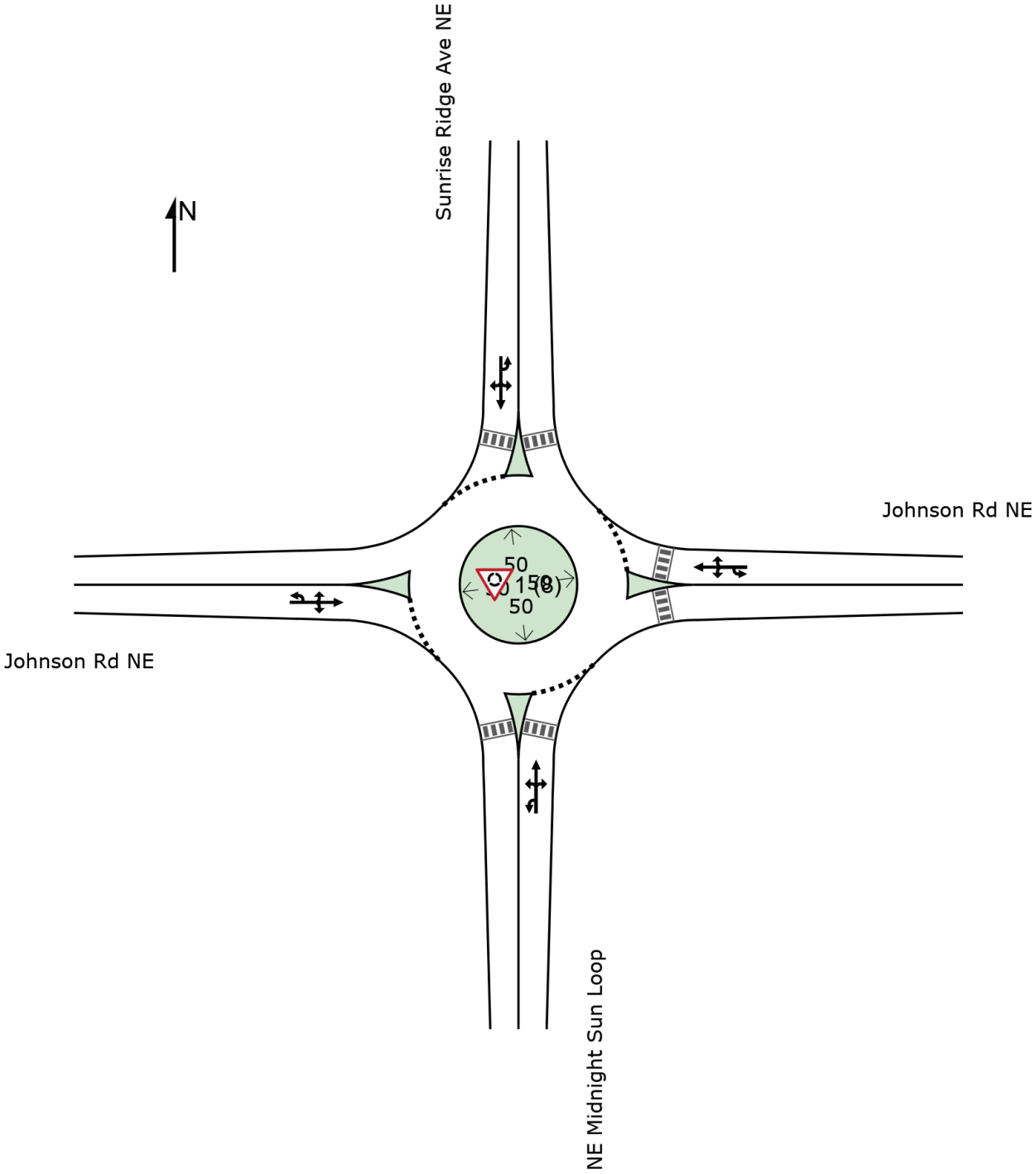
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [1 (8)] Johnson & Sunrise Ridge - 2037 AM With
(Folder1)

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.




**SIDRA INTERSECTION 11 | Copyright © 2000-2026 Akcelik and Associates Pty Ltd | sidrasolutions.com**
Organisation: HEATH & ASSOCIATES | Licence: PLUS / 1PC | Created: Saturday, October 3, 2026 3:29:40 PM
Project: C:\Users\LucasMaulin\Heath and Associates\Office Access - Documents\Project Files\Pinnacle at Liberty Bay - 5576\5-Analysis\Sidra\Johnson & Sunrise Ridge.sipx

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 77 | 193 | 126 | 59 | 141 | 248 | 144 | 853 | 39 | 237 | 698 | 56 |
| Future Volume (veh/h) | 77 | 193 | 126 | 59 | 141 | 248 | 144 | 853 | 39 | 237 | 698 | 56 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 0.99 | | 0.96 | 0.99 | | 0.96 | 1.00 | | 0.96 | 1.00 | | 0.97 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1702 | 1758 | 1786 | 1786 | 1786 | 1786 | 1772 | 1744 | 1786 | 1786 | 1772 | 1744 |
| Adj Flow Rate, veh/h | 77 | 193 | 126 | 59 | 141 | 103 | 144 | 853 | 39 | 237 | 698 | 56 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 7 | 3 | 1 | 1 | 1 | 1 | 2 | 4 | 1 | 1 | 2 | 4 |
| Cap, veh/h | 190 | 234 | 194 | 151 | 214 | 174 | 166 | 912 | 42 | 579 | 1559 | 125 |
| Arrive On Green | 0.05 | 0.13 | 0.13 | 0.04 | 0.12 | 0.12 | 0.10 | 0.32 | 0.32 | 0.34 | 0.56 | 0.56 |
| Sat Flow, veh/h | 1621 | 1758 | 1460 | 1701 | 1786 | 1457 | 1688 | 2824 | 129 | 1701 | 2761 | 221 |
| Grp Volume(v), veh/h | 77 | 193 | 126 | 59 | 141 | 103 | 144 | 374 | 518 | 237 | 318 | 436 |
| Grp Sat Flow(s),veh/h/ln | 1621 | 1758 | 1460 | 1701 | 1786 | 1457 | 1688 | 1238 | 1715 | 1701 | 1258 | 1724 |
| Q Serve(g_s), s | 5.0 | 12.8 | 9.8 | 3.6 | 9.1 | 4.2 | 10.1 | 35.2 | 35.2 | 12.8 | 17.7 | 17.7 |
| Cycle Q Clear(g_c), s | 5.0 | 12.8 | 9.8 | 3.6 | 9.1 | 4.2 | 10.1 | 35.2 | 35.2 | 12.8 | 17.7 | 17.7 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.08 | 1.00 | | 0.13 |
| Lane Grp Cap(c), veh/h | 190 | 234 | 194 | 151 | 214 | 174 | 166 | 400 | 554 | 579 | 711 | 974 |
| V/C Ratio(X) | 0.41 | 0.82 | 0.65 | 0.39 | 0.66 | 0.59 | 0.87 | 0.93 | 0.93 | 0.41 | 0.45 | 0.45 |
| Avail Cap(c_a), veh/h | 319 | 337 | 280 | 309 | 342 | 279 | 323 | 444 | 615 | 579 | 711 | 974 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.74 | 0.74 | 0.74 |
| Uniform Delay (d), s/veh | 43.8 | 50.6 | 49.3 | 44.8 | 50.5 | 14.0 | 53.3 | 39.4 | 39.4 | 30.4 | 15.2 | 15.2 |
| Incr Delay (d2), s/veh | 1.4 | 10.5 | 3.6 | 1.7 | 3.5 | 3.2 | 12.5 | 31.2 | 25.1 | 0.3 | 1.5 | 1.1 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 3.7 | 10.4 | 6.8 | 2.9 | 7.6 | 5.4 | 8.4 | 19.9 | 25.1 | 8.4 | 8.2 | 10.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 45.2 | 61.2 | 52.9 | 46.4 | 53.9 | 17.1 | 65.9 | 70.6 | 64.5 | 30.7 | 16.7 | 16.3 |
| LnGrp LOS | D | E | D | D | D | B | E | E | E | C | B | B |
| Approach Vol, veh/h | | 396 | | | 303 | | | 1036 | | | 991 | |
| Approach Delay, s/veh | | 55.4 | | | 40.0 | | | 66.9 | | | 19.9 | |
| Approach LOS | | E | | | D | | | E | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 45.8 | 43.8 | 9.4 | 21.0 | 16.8 | 72.8 | 11.0 | 19.4 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 18.9 | 43.5 | 16.1 | 23.5 | 23.5 | 38.9 | 16.1 | 23.5 |
| Max Q Clear Time (g_c+I1), s | 14.8 | 37.2 | 5.6 | 14.8 | 12.1 | 19.7 | 7.0 | 11.1 |
| Green Ext Time (p_c), s | 0.3 | 2.1 | 0.1 | 0.9 | 0.3 | 2.9 | 0.1 | 0.7 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 45.1 |
| HCM 7th LOS | D |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 6 | 842 | 953 | 5 | 1 | 4 |
| Future Vol, veh/h | 6 | 842 | 953 | 5 | 1 | 4 |
| Conflicting Peds, #/hr | 1 | 0 | 0 | 1 | 1 | 1 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 105 | - | - | 55 | 60 | 0 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 10 | 2 | 3 | 1 | 10 | 1 |
| Mvmt Flow | 6 | 842 | 953 | 5 | 1 | 4 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 959 | 0 | - | 0 | 1809 | 955 |
| Stage 1 | - | - | - | - | 954 | - |
| Stage 2 | - | - | - | - | 855 | - |
| Critical Hdwy | 4.2 | - | - | - | 6.5 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.5 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.5 | - |
| Follow-up Hdwy | 2.29 | - | - | - | 3.59 | 3.309 |
| Pot Cap-1 Maneuver | 686 | - | - | - | 83 | 315 |
| Stage 1 | - | - | - | - | 362 | - |
| Stage 2 | - | - | - | - | 404 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 685 | - | - | - | 82 | 314 |
| Mov Cap-2 Maneuver | - | - | - | - | 82 | - |
| Stage 1 | - | - | - | - | 358 | - |
| Stage 2 | - | - | - | - | 403 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0.07 | 0 | 23.2 |
| HCM LOS | | | C |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 685 | - | - | - | 82 | 314 |
| HCM Lane V/C Ratio | 0.009 | - | - | - | 0.012 | 0.013 |
| HCM Ctrl Dly (s/v) | 10.3 | - | - | - | 49.6 | 16.6 |
| HCM Lane LOS | B | - | - | - | E | C |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0 | 0 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 6.6 |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 9 | 43 | 72 | 5 | 9 | 13 |
| Future Vol, veh/h | 9 | 43 | 72 | 5 | 9 | 13 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 10 | 47 | 78 | 5 | 10 | 14 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 179 | 17 | 24 | 0 | - | 0 |
| Stage 1 | 17 | - | - | - | - | - |
| Stage 2 | 162 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 811 | 1062 | 1591 | - | - | - |
| Stage 1 | 1006 | - | - | - | - | - |
| Stage 2 | 867 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 771 | 1062 | 1591 | - | - | - |
| Mov Cap-2 Maneuver | 771 | - | - | - | - | - |
| Stage 1 | 956 | - | - | - | - | - |
| Stage 2 | 867 | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 8.83 | 6.9 | 0 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1586 | - | 997 | - | - |
| HCM Lane V/C Ratio | 0.049 | - | 0.057 | - | - |
| HCM Ctrl Dly (s/v) | 7.4 | 0 | 8.8 | - | - |
| HCM Lane LOS | A | A | A | - | - |
| HCM 95th %tile Q(veh) | 0.2 | - | 0.2 | - | - |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 18.5 |
| Intersection LOS | C |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 97 | 238 | 78 | 13 | 149 | 54 | 70 | 55 | 5 | 100 | 70 | 71 |
| Future Vol, veh/h | 97 | 238 | 78 | 13 | 149 | 54 | 70 | 55 | 5 | 100 | 70 | 71 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Heavy Vehicles, % | 3 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 4 |
| Mvmt Flow | 111 | 274 | 90 | 15 | 171 | 62 | 80 | 63 | 6 | 115 | 80 | 82 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 1 | 1 |
| HCM Control Delay, s/veh | 25.8 | 13.7 | 12.9 | 13.4 |
| HCM LOS | D | B | B | B |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|
| Vol Left, % | 54% | 23% | 6% | 59% | 0% |
| Vol Thru, % | 42% | 58% | 69% | 41% | 0% |
| Vol Right, % | 4% | 19% | 25% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 130 | 413 | 216 | 170 | 71 |
| LT Vol | 70 | 97 | 13 | 100 | 0 |
| Through Vol | 55 | 238 | 149 | 70 | 0 |
| RT Vol | 5 | 78 | 54 | 0 | 71 |
| Lane Flow Rate | 149 | 475 | 248 | 195 | 82 |
| Geometry Grp | 4a | 2 | 2 | 5 | 5 |
| Degree of Util (X) | 0.29 | 0.771 | 0.424 | 0.397 | 0.143 |
| Departure Headway (Hd) | 6.98 | 5.849 | 6.145 | 7.317 | 6.299 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes |
| Cap | 513 | 622 | 583 | 490 | 568 |
| Service Time | 5.045 | 3.849 | 4.198 | 5.074 | 4.056 |
| HCM Lane V/C Ratio | 0.29 | 0.764 | 0.425 | 0.398 | 0.144 |
| HCM Control Delay, s/veh | 12.9 | 25.8 | 13.7 | 14.8 | 10.1 |
| HCM Lane LOS | B | D | B | B | B |
| HCM 95th-tile Q | 1.2 | 7.2 | 2.1 | 1.9 | 0.5 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 3 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 62 | 73 | 25 | 62 | 47 | 19 |
| Future Vol, veh/h | 62 | 73 | 25 | 62 | 47 | 19 |
| Conflicting Peds, #/hr | 0 | 10 | 10 | 0 | 10 | 10 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 67 | 79 | 27 | 67 | 51 | 21 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 157 | 0 | 249 | 127 |
| Stage 1 | - | - | - | - | 117 | - |
| Stage 2 | - | - | - | - | 132 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1423 | - | 740 | 923 |
| Stage 1 | - | - | - | - | 908 | - |
| Stage 2 | - | - | - | - | 894 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1411 | - | 713 | 908 |
| Mov Cap-2 Maneuver | - | - | - | - | 713 | - |
| Stage 1 | - | - | - | - | 882 | - |
| Stage 2 | - | - | - | - | 887 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 2.18 | 10.23 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 760 | - | - | 517 | - |
| HCM Lane V/C Ratio | 0.094 | - | - | 0.019 | - |
| HCM Ctrl Dly (s/v) | 10.2 | - | - | 7.6 | 0 |
| HCM Lane LOS | B | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0.1 | - |

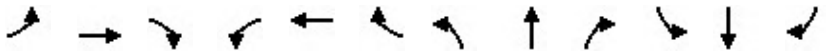
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 71 | 287 | 127 | 140 | 253 | 262 | 132 | 1048 | 143 | 226 | 730 | 91 |
| Future Volume (veh/h) | 71 | 287 | 127 | 140 | 253 | 262 | 132 | 1048 | 143 | 226 | 730 | 91 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 0.99 | 1.00 | | 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 | 1786 | 1786 | 1786 | 1772 | 1772 | 1772 | 1758 | 1758 | 1758 | 1772 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 71 | 287 | 127 | 140 | 253 | 262 | 132 | 1048 | 143 | 226 | 730 | 91 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 |
| Cap, veh/h | 89 | 333 | 280 | 162 | 407 | 343 | 154 | 1099 | 150 | 327 | 1358 | 169 |
| Arrive On Green | 0.05 | 0.19 | 0.19 | 0.10 | 0.23 | 0.23 | 0.09 | 0.39 | 0.39 | 0.19 | 0.49 | 0.49 |
| Sat Flow, veh/h | 1701 | 1786 | 1501 | 1688 | 1772 | 1492 | 1674 | 2814 | 383 | 1688 | 2748 | 342 |
| Grp Volume(v), veh/h | 71 | 287 | 127 | 140 | 253 | 262 | 132 | 563 | 628 | 226 | 367 | 454 |
| Grp Sat Flow(s),veh/h/ln | 1701 | 1786 | 1501 | 1688 | 1772 | 1492 | 1674 | 1512 | 1685 | 1688 | 1382 | 1708 |
| Q Serve(g_s), s | 5.9 | 22.1 | 10.7 | 11.6 | 18.2 | 15.4 | 11.0 | 51.3 | 51.5 | 17.7 | 26.0 | 26.0 |
| Cycle Q Clear(g_c), s | 5.9 | 22.1 | 10.7 | 11.6 | 18.2 | 15.4 | 11.0 | 51.3 | 51.5 | 17.7 | 26.0 | 26.0 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.23 | 1.00 | | 0.20 |
| Lane Grp Cap(c), veh/h | 89 | 333 | 280 | 162 | 407 | 343 | 154 | 590 | 658 | 327 | 683 | 844 |
| V/C Ratio(X) | 0.80 | 0.86 | 0.45 | 0.87 | 0.62 | 0.76 | 0.86 | 0.95 | 0.95 | 0.69 | 0.54 | 0.54 |
| Avail Cap(c_a), veh/h | 137 | 395 | 332 | 183 | 442 | 372 | 208 | 597 | 666 | 327 | 683 | 844 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.66 | 0.66 | 0.66 | 0.76 | 0.76 | 0.76 |
| Uniform Delay (d), s/veh | 66.6 | 56.0 | 51.4 | 63.3 | 49.1 | 22.4 | 63.6 | 42.0 | 42.0 | 53.3 | 24.7 | 24.7 |
| Incr Delay (d2), s/veh | 13.6 | 15.6 | 1.2 | 30.1 | 2.4 | 8.4 | 14.7 | 20.6 | 19.5 | 4.7 | 2.3 | 1.9 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 5.2 | 17.1 | 7.5 | 10.5 | 13.2 | 10.5 | 8.3 | 28.2 | 30.9 | 11.9 | 13.0 | 15.4 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 80.2 | 71.6 | 52.5 | 93.4 | 51.5 | 30.8 | 78.3 | 62.6 | 61.5 | 58.0 | 27.0 | 26.6 |
| LnGrp LOS | F | E | D | F | D | C | E | E | E | E | C | C |
| Approach Vol, veh/h | | 485 | | | 655 | | | 1323 | | | 1047 | |
| Approach Delay, s/veh | | 67.9 | | | 52.2 | | | 63.6 | | | 33.5 | |
| Approach LOS | | E | | | D | | | E | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 17.7 | 75.1 | 12.0 | 37.2 | 32.4 | 60.4 | 18.2 | 31.0 |
| Change Period (Y+Rc), s | 4.6 | 4.9 | 4.6 | 4.6 | 4.9 | * 4.9 | 4.6 | 4.6 |
| Max Green Setting (Gmax), s | 17.6 | 58.9 | 11.4 | 35.4 | 20.4 | * 56 | 15.4 | 31.4 |
| Max Q Clear Time (g_c+I1), s | 13.0 | 28.0 | 7.9 | 20.2 | 19.7 | 53.5 | 13.6 | 24.1 |
| Green Ext Time (p_c), s | 0.1 | 8.0 | 0.0 | 2.2 | 0.0 | 2.0 | 0.1 | 1.3 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 53.1 |
| HCM 7th LOS | D |

Notes

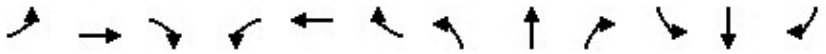
* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 109 | 84 | 68 | 52 | 71 | 71 | 66 | 1200 | 91 | 84 | 880 | 58 |
| Future Volume (veh/h) | 109 | 84 | 68 | 52 | 71 | 71 | 66 | 1200 | 91 | 84 | 880 | 58 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 0.99 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1772 | 1772 | 1772 | 1786 | 1786 | 1786 | 1758 | 1758 | 1758 | 1772 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 109 | 84 | 68 | 52 | 71 | 71 | 66 | 1200 | 91 | 84 | 880 | 58 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 1 | 1 | 1 | 3 | 3 | 3 | 2 | 2 | 2 |
| Cap, veh/h | 174 | 151 | 133 | 117 | 157 | 176 | 638 | 1037 | 79 | 655 | 867 | 524 |
| Arrive On Green | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 | 0.38 | 0.34 | 0.34 | 0.39 | 0.35 | 0.35 |
| Sat Flow, veh/h | 719 | 844 | 743 | 442 | 879 | 983 | 1674 | 3033 | 230 | 1688 | 2481 | 1500 |
| Grp Volume(v), veh/h | 126 | 0 | 135 | 90 | 0 | 104 | 66 | 611 | 680 | 84 | 880 | 58 |
| Grp Sat Flow(s),veh/h/ln | 831 | 0 | 1474 | 862 | 0 | 1442 | 1674 | 1547 | 1716 | 1688 | 1240 | 1500 |
| Q Serve(g_s), s | 14.1 | 0.0 | 12.3 | 7.1 | 0.0 | 9.5 | 3.8 | 50.6 | 50.6 | 4.7 | 51.7 | 3.9 |
| Cycle Q Clear(g_c), s | 23.6 | 0.0 | 12.3 | 19.3 | 0.0 | 9.5 | 3.8 | 50.6 | 50.6 | 4.7 | 51.7 | 3.9 |
| Prop In Lane | 0.87 | | 0.50 | 0.58 | | 0.68 | 1.00 | | 0.13 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 194 | 0 | 263 | 192 | 0 | 258 | 638 | 529 | 587 | 655 | 867 | 524 |
| V/C Ratio(X) | 0.65 | 0.00 | 0.51 | 0.47 | 0.00 | 0.40 | 0.10 | 1.16 | 1.16 | 0.13 | 1.02 | 0.11 |
| Avail Cap(c_a), veh/h | 216 | 0 | 289 | 342 | 0 | 409 | 638 | 529 | 587 | 655 | 867 | 524 |
| 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 | 0.43 | 0.43 | 0.43 | 0.74 | 0.74 | 0.74 |
| Uniform Delay (d), s/veh | 64.3 | 0.0 | 55.0 | 60.8 | 0.0 | 53.8 | 29.5 | 48.7 | 48.7 | 29.1 | 48.2 | 32.6 |
| Incr Delay (d2), s/veh | 5.8 | 0.0 | 1.5 | 1.8 | 0.0 | 1.0 | 0.0 | 79.6 | 79.9 | 0.1 | 30.2 | 0.3 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 8.7 | 0.0 | 8.3 | 6.0 | 0.0 | 6.4 | 2.7 | 40.6 | 44.9 | 3.5 | 25.7 | 2.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 70.0 | 0.0 | 56.5 | 62.5 | 0.0 | 54.8 | 29.6 | 128.3 | 128.6 | 29.2 | 78.4 | 32.9 |
| LnGrp LOS | E | | E | E | | D | C | F | F | C | F | C |
| Approach Vol, veh/h | | 261 | | | 194 | | | 1357 | | | 1022 | |
| Approach Delay, s/veh | | 63.0 | | | 58.4 | | | 123.7 | | | 71.7 | |
| Approach LOS | | E | | | E | | | F | | | E | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 60.9 | 56.2 | | 30.9 | 62.0 | 55.1 | | 30.9 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | | 4.5 | 4.5 | 4.5 | | 4.5 |
| Max Green Setting (Gmax), s | 6.8 | 51.7 | | 29.0 | 7.9 | 50.6 | | 42.0 |
| Max Q Clear Time (g_c+I1), s | 5.8 | 53.7 | | 25.6 | 6.7 | 52.6 | | 21.3 |
| Green Ext Time (p_c), s | 0.0 | 0.0 | | 0.5 | 0.0 | 0.0 | | 1.1 |

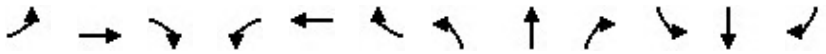
| Intersection Summary | | |
|---|---|---|
| HCM 7th Control Delay, s/veh | | 94.9 |
| HCM 7th LOS | | F |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 284 | 52 | 6 | 34 | 26 | 367 | 6 | 1296 | 65 | 335 | 975 | 187 |
| Future Volume (veh/h) | 284 | 52 | 6 | 34 | 26 | 367 | 6 | 1296 | 65 | 335 | 975 | 187 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1772 | 1772 | 1772 | 1772 | 1772 | 1772 | 1758 | 1758 | 1758 | 1772 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 284 | 52 | 6 | 34 | 26 | 367 | 6 | 1296 | 65 | 335 | 975 | 187 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 |
| Cap, veh/h | 313 | 289 | 33 | 199 | 152 | 306 | 15 | 973 | 49 | 295 | 1266 | 705 |
| Arrive On Green | 0.19 | 0.19 | 0.19 | 0.20 | 0.20 | 0.20 | 0.01 | 0.31 | 0.31 | 0.17 | 0.47 | 0.47 |
| Sat Flow, veh/h | 1688 | 1559 | 180 | 976 | 747 | 1499 | 1674 | 3153 | 158 | 1688 | 2693 | 1500 |
| Grp Volume(v), veh/h | 284 | 0 | 58 | 60 | 0 | 367 | 6 | 649 | 712 | 335 | 975 | 187 |
| Grp Sat Flow(s),veh/h/ln | 1688 | 0 | 1739 | 1723 | 0 | 1499 | 1674 | 1582 | 1729 | 1688 | 1347 | 1500 |
| Q Serve(g_s), s | 23.4 | 0.0 | 4.0 | 4.1 | 0.0 | 29.0 | 0.5 | 43.8 | 43.8 | 24.8 | 42.7 | 10.7 |
| Cycle Q Clear(g_c), s | 23.4 | 0.0 | 4.0 | 4.1 | 0.0 | 29.0 | 0.5 | 43.8 | 43.8 | 24.8 | 42.7 | 10.7 |
| Prop In Lane | 1.00 | | 0.10 | 0.57 | | 1.00 | 1.00 | | 0.09 | 1.00 | | 1.00 |
| Lane Grp Cap(c), veh/h | 313 | 0 | 322 | 352 | 0 | 306 | 15 | 488 | 533 | 295 | 1266 | 705 |
| V/C Ratio(X) | 0.91 | 0.00 | 0.18 | 0.17 | 0.00 | 1.20 | 0.40 | 1.33 | 1.33 | 1.14 | 0.77 | 0.27 |
| Avail Cap(c_a), veh/h | 392 | 0 | 404 | 352 | 0 | 306 | 71 | 488 | 533 | 295 | 1266 | 705 |
| 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 | 0.61 | 0.61 | 0.61 | 0.19 | 0.19 | 0.19 |
| Uniform Delay (d), s/veh | 56.7 | 0.0 | 48.8 | 46.6 | 0.0 | 56.5 | 70.0 | 49.1 | 49.1 | 58.6 | 31.3 | 22.8 |
| Incr Delay (d2), s/veh | 21.4 | 0.0 | 0.3 | 0.2 | 0.0 | 116.5 | 10.3 | 157.4 | 158.2 | 69.9 | 0.9 | 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 | 7.6 | 0.0 | 3.2 | 3.3 | 0.0 | 31.2 | 0.5 | 54.6 | 59.5 | 20.5 | 16.2 | 5.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 78.1 | 0.0 | 49.0 | 46.8 | 0.0 | 173.0 | 80.3 | 206.5 | 207.3 | 128.5 | 32.2 | 23.0 |
| LnGrp LOS | E | | D | D | | F | F | F | F | F | C | C |
| Approach Vol, veh/h | | 342 | | | 427 | | | 1367 | | | 1497 | |
| Approach Delay, s/veh | | 73.2 | | | 155.3 | | | 206.4 | | | 52.6 | |
| Approach LOS | | E | | | F | | | F | | | D | |

| Timer - Assigned Phs | 1 | 2 | | 4 | 5 | 6 | | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 5.9 | 71.6 | | 30.9 | 29.7 | 47.8 | | 33.6 |
| Change Period (Y+Rc), s | 4.6 | 4.9 | | 4.6 | 4.9 | 4.0 | | 4.6 |
| Max Green Setting (Gmax), s | 6.3 | 55.3 | | 33.0 | 18.1 | 43.8 | | 29.0 |
| Max Q Clear Time (g_c+I1), s | 2.5 | 44.7 | | 25.4 | 26.8 | 45.8 | | 31.0 |
| Green Ext Time (p_c), s | 0.0 | 5.1 | | 0.7 | 0.0 | 0.0 | | 0.0 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 124.4 |
| HCM 7th LOS | F |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 52 | 355 | 374 | 182 | 326 | 639 | 390 | 1228 | 237 | 696 | 950 | 38 |
| Future Volume (veh/h) | 52 | 355 | 374 | 182 | 326 | 639 | 390 | 1228 | 237 | 696 | 950 | 38 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1786 | 1786 | 1786 | 1772 | 1772 | 1772 | 1758 | 1758 | 1758 | 1772 | 1772 | 1772 |
| Adj Flow Rate, veh/h | 52 | 355 | 374 | 182 | 326 | 639 | 390 | 1228 | 237 | 696 | 950 | 38 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 |
| Cap, veh/h | 66 | 395 | 614 | 156 | 487 | 676 | 309 | 1277 | 569 | 573 | 1103 | 44 |
| Arrive On Green | 0.04 | 0.22 | 0.22 | 0.09 | 0.27 | 0.27 | 0.18 | 0.38 | 0.38 | 0.18 | 0.37 | 0.37 |
| Sat Flow, veh/h | 1701 | 1786 | 1514 | 1688 | 1772 | 1502 | 1674 | 3340 | 1489 | 3274 | 2961 | 118 |
| Grp Volume(v), veh/h | 52 | 355 | 374 | 182 | 326 | 639 | 390 | 1228 | 237 | 696 | 426 | 562 |
| Grp Sat Flow(s),veh/h/ln | 1701 | 1786 | 1514 | 1688 | 1772 | 1502 | 1674 | 1670 | 1489 | 1637 | 1329 | 1750 |
| Q Serve(g_s), s | 4.4 | 28.0 | 28.3 | 13.4 | 23.7 | 39.8 | 26.8 | 52.1 | 17.0 | 25.4 | 43.0 | 43.0 |
| Cycle Q Clear(g_c), s | 4.4 | 28.0 | 28.3 | 13.4 | 23.7 | 39.8 | 26.8 | 52.1 | 17.0 | 25.4 | 43.0 | 43.0 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.07 |
| Lane Grp Cap(c), veh/h | 66 | 395 | 614 | 156 | 487 | 676 | 309 | 1277 | 569 | 573 | 495 | 652 |
| V/C Ratio(X) | 0.79 | 0.90 | 0.61 | 1.17 | 0.67 | 0.95 | 1.26 | 0.96 | 0.42 | 1.21 | 0.86 | 0.86 |
| Avail Cap(c_a), veh/h | 116 | 443 | 656 | 156 | 487 | 676 | 309 | 1277 | 569 | 573 | 495 | 652 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.21 | 0.21 | 0.21 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 69.1 | 54.9 | 34.0 | 65.8 | 46.7 | 38.2 | 59.1 | 43.7 | 32.9 | 59.8 | 42.0 | 42.0 |
| Incr Delay (d2), s/veh | 18.4 | 19.5 | 1.5 | 124.0 | 3.5 | 22.2 | 122.8 | 5.6 | 0.5 | 111.5 | 17.6 | 14.0 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 4.0 | 20.9 | 15.9 | 17.6 | 16.3 | 33.6 | 28.7 | 25.4 | 8.1 | 29.0 | 22.8 | 28.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 87.4 | 74.4 | 35.5 | 189.8 | 50.3 | 60.4 | 181.9 | 49.4 | 33.4 | 171.3 | 59.6 | 56.0 |
| LnGrp LOS | F | E | D | F | D | E | F | D | C | F | E | E |
| Approach Vol, veh/h | | 781 | | | 1147 | | | 1855 | | | 1684 | |
| Approach Delay, s/veh | | 56.6 | | | 78.1 | | | 75.2 | | | 104.6 | |
| Approach LOS | | E | | | E | | | E | | | F | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 31.4 | 58.9 | 10.2 | 44.4 | 30.0 | 60.3 | 18.0 | 36.7 |
| Change Period (Y+Rc), s | 4.6 | 4.9 | 4.6 | 4.6 | 4.6 | 4.9 | 4.6 | 4.6 |
| Max Green Setting (Gmax), s | 26.8 | 50.1 | 9.9 | 39.5 | 25.4 | 51.5 | 13.4 | 36.0 |
| Max Q Clear Time (g_c+I1), s | 28.3 | 45.0 | 6.4 | 41.8 | 27.4 | 54.1 | 15.4 | 30.3 |
| Green Ext Time (p_c), s | 0.0 | 2.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.8 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 82.2 |
| HCM 7th LOS | F |

| Intersection | |
|---|---|
| Int Delay, s/veh | 4.1 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 276 | 26 | 67 | 294 | 98 | 89 |
| Future Vol, veh/h | 276 | 26 | 67 | 294 | 98 | 89 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | 100 | - | 100 | 0 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 1 | 1 | 1 | 1 |
| Mvmt Flow | 300 | 28 | 73 | 320 | 107 | 97 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 328 | 0 | 779 | 314 |
| Stage 1 | - | - | - | - | 314 | - |
| Stage 2 | - | - | - | - | 465 | - |
| Critical Hdwy | - | - | 4.11 | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | - | - | 2.209 | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | - | - | 1237 | - | 366 | 729 |
| Stage 1 | - | - | - | - | 743 | - |
| Stage 2 | - | - | - | - | 634 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1237 | - | 344 | 729 |
| Mov Cap-2 Maneuver | - | - | - | - | 344 | - |
| Stage 1 | - | - | - | - | 699 | - |
| Stage 2 | - | - | - | - | 634 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 1.5 | 15.62 |
| HCM LOS | | | C |

| Minor Lane/Major Mvmt | NBLn1 | NBLn2 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 344 | 729 | - | - | 1237 | - |
| HCM Lane V/C Ratio | 0.31 | 0.133 | - | - | 0.059 | - |
| HCM Ctrl Dly (s/v) | 20.1 | 10.7 | - | - | 8.1 | - |
| HCM Lane LOS | C | B | - | - | A | - |
| HCM 95th %tile Q(veh) | 1.3 | 0.5 | - | - | 0.2 | - |

| Intersection | |
|---|---|
| Int Delay, s/veh | 1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 35 | 302 | 398 | 6 | 0 | 46 |
| Future Vol, veh/h | 35 | 302 | 398 | 6 | 0 | 46 |
| Conflicting Peds, #/hr | 9 | 0 | 0 | 9 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 0 | 0 |
| Mvmt Flow | 38 | 328 | 433 | 7 | 0 | 50 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 448 | 0 | - | 0 | 849 | 445 |
| Stage 1 | - | - | - | - | 445 | - |
| Stage 2 | - | - | - | - | 404 | - |
| Critical Hdwy | 4.12 | - | - | - | 6.4 | 6.2 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 | - |
| Follow-up Hdwy | 2.218 | - | - | - | 3.5 | 3.3 |
| Pot Cap-1 Maneuver | 1112 | - | - | - | 334 | 617 |
| Stage 1 | - | - | - | - | 650 | - |
| Stage 2 | - | - | - | - | 678 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1104 | - | - | - | 317 | 613 |
| Mov Cap-2 Maneuver | - | - | - | - | 317 | - |
| Stage 1 | - | - | - | - | 618 | - |
| Stage 2 | - | - | - | - | 678 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0.87 | 0 | 11.4 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 |
|---|---|---|---|---|---|
| Capacity (veh/h) | 187 | - | - | - | 613 |
| HCM Lane V/C Ratio | 0.034 | - | - | - | 0.082 |
| HCM Ctrl Dly (s/v) | 8.4 | 0 | - | - | 11.4 |
| HCM Lane LOS | A | A | - | - | B |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.3 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 13.4 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 12 | 317 | 84 | 20 | 379 | 38 | 0 | 0 | 0 | 20 | 38 | 12 |
| Future Vol, veh/h | 12 | 317 | 84 | 20 | 379 | 38 | 0 | 0 | 0 | 20 | 38 | 12 |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Heavy Vehicles, % | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 |
| Mvmt Flow | 13 | 341 | 90 | 22 | 408 | 41 | 0 | 0 | 0 | 22 | 41 | 13 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | SB |
|---|---|---|---|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | SB | | WB |
| Conflicting Lanes Left | 1 | 0 | 1 |
| Conflicting Approach Right | | SB | EB |
| Conflicting Lanes Right | 0 | 1 | 1 |
| HCM Control Delay, s/veh | 13.2 | 14.2 | 9.7 |
| HCM LOS | B | B | A |

| Lane | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|
| Vol Left, % | 3% | 5% | 29% |
| Vol Thru, % | 77% | 87% | 54% |
| Vol Right, % | 20% | 9% | 17% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 413 | 437 | 70 |
| LT Vol | 12 | 20 | 20 |
| Through Vol | 317 | 379 | 38 |
| RT Vol | 84 | 38 | 12 |
| Lane Flow Rate | 444 | 470 | 75 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.558 | 0.597 | 0.121 |
| Departure Headway (Hd) | 4.52 | 4.575 | 5.792 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 795 | 785 | 613 |
| Service Time | 2.566 | 2.623 | 3.882 |
| HCM Lane V/C Ratio | 0.558 | 0.599 | 0.122 |
| HCM Control Delay, s/veh | 13.2 | 14.2 | 9.7 |
| HCM Lane LOS | B | B | A |
| HCM 95th-tile Q | 3.5 | 4 | 0.4 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 53 |
| Intersection LOS | F |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 12 | 393 | 414 | 20 | 284 | 427 |
| Future Vol, veh/h | 12 | 393 | 414 | 20 | 284 | 427 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, % | 1 | 1 | 1 | 1 | 1 | 1 |
| Mvmt Flow | 14 | 447 | 470 | 23 | 323 | 485 |
| Number of Lanes | 1 | 1 | 1 | 0 | 1 | 1 |

| Approach | WB | NB | SB |
|---|---|---|---|
| Opposing Approach | | SB | NB |
| Opposing Lanes | 0 | 2 | 1 |
| Conflicting Approach Left | NB | | WB |
| Conflicting Lanes Left | 1 | 0 | 2 |
| Conflicting Approach Right | SB | WB | |
| Conflicting Lanes Right | 2 | 2 | 0 |
| HCM Control Delay, s/veh | 12.1 | 64.8 | 52.1 |
| HCM LOS | E | F | F |

| Lane | NBLn1 | WBLn1 | WBLn2 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|
| Vol Left, % | 0% | 100% | 0% | 100% | 0% |
| Vol Thru, % | 95% | 0% | 0% | 0% | 100% |
| Vol Right, % | 5% | 0% | 100% | 0% | 0% |
| Sign Control | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 434 | 12 | 393 | 284 | 427 |
| LT Vol | 0 | 12 | 0 | 284 | 0 |
| Through Vol | 414 | 0 | 0 | 0 | 427 |
| RT Vol | 20 | 0 | 393 | 0 | 0 |
| Lane Flow Rate | 493 | 14 | 447 | 323 | 485 |
| Geometry Grp | 3b | 5 | 5 | 5 | 5 |
| Degree of Util (X) | 0.992 | 0.031 | 0.886 | 0.711 | 1 |
| Departure Headway (Hd) | 7.242 | 8.256 | 7.146 | 7.932 | 7.417 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes |
| Cap | 513 | 436 | 518 | 455 | 490 |
| Service Time | 5.143 | 5.956 | 4.756 | 5.683 | 5.168 |
| HCM Lane V/C Ratio | 0.961 | 0.032 | 0.863 | 0.71 | 0.99 |
| HCM Control Delay, s/veh | 64.8 | 11.2 | 43 | 28 | 68.1 |
| HCM Lane LOS | F | B | E | D | F |
| HCM 95th-tile Q | 13.4 | 0.1 | 9.9 | 5.5 | 13.4 |

# MOVEMENT SUMMARY

## Site: [99 (10)] SR 305 & Johnson Rd - Forecast 2037 With (PM Peak Hour)

Output produced by SIDRA INTERSECTION Version: 11.0.2

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Johnson Way | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.054 | 14.8 | LOS B | 0.2 | 5.3 | 0.56 | 0.74 | 0.56 | 31.1 |
| 3 | L2 | All MCs | 22 | 6.0 | 22 | 6.0 | 0.054 | 11.8 | LOS B | 0.2 | 5.3 | 0.56 | 0.74 | 0.56 | 32.3 |
| 8 | T1 | All MCs | 6 | 1.0 | 6 | 1.0 | 0.054 | 5.8 | LOS A | 0.2 | 5.3 | 0.56 | 0.74 | 0.56 | 30.3 |
| 18 | R2 | All MCs | 9 | 1.0 | 9 | 1.0 | 0.054 | 7.9 | LOS A | 0.2 | 5.3 | 0.56 | 0.74 | 0.56 | 33.3 |
| Approach | | | 38 | 3.9 | 38 | 3.9 | 0.054 | 10.0 | LOS B | 0.2 | 5.3 | 0.56 | 0.74 | 0.56 | 32.2 |
| East: SR 305 | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 3 | 1.0 | 3 | 1.0 | 0.477 | 12.3 | LOS B | 3.5 | 90.5 | 0.30 | 0.47 | 0.30 | 37.3 |
| 1 | L2 | All MCs | 9 | 1.0 | 9 | 1.0 | 0.477 | 11.7 | LOS B | 3.5 | 90.5 | 0.30 | 0.47 | 0.30 | 35.4 |
| 6 | T1 | All MCs | 904 | 3.0 | 904 | 3.0 | 0.477 | 6.5 | LOS A | 3.5 | 90.5 | 0.29 | 0.47 | 0.29 | 40.8 |
| 16 | R2 | All MCs | 58 | 10.0 | 58 | 10.0 | 0.217 | 6.2 | LOS A | 1.2 | 30.4 | 0.26 | 0.48 | 0.26 | 35.7 |
| Approach | | | 974 | 3.4 | 974 | 3.4 | 0.477 | 6.6 | LOS A | 3.5 | 90.5 | 0.29 | 0.47 | 0.29 | 40.4 |
| North: Johnson Rd | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.136 | 15.4 | LOS B | 0.6 | 14.3 | 0.61 | 0.76 | 0.61 | 30.8 |
| 7 | L2 | All MCs | 50 | 6.0 | 50 | 6.0 | 0.136 | 12.6 | LOS B | 0.6 | 14.3 | 0.61 | 0.76 | 0.61 | 32.1 |
| 4 | T1 | All MCs | 4 | 1.0 | 4 | 1.0 | 0.136 | 6.4 | LOS A | 0.6 | 14.3 | 0.61 | 0.76 | 0.61 | 30.1 |
| 14 | R2 | All MCs | 36 | 1.0 | 36 | 1.0 | 0.136 | 9.2 | LOS A | 0.6 | 14.3 | 0.61 | 0.76 | 0.61 | 33.1 |
| Approach | | | 91 | 3.7 | 91 | 3.7 | 0.136 | 11.0 | LOS B | 0.6 | 14.3 | 0.61 | 0.76 | 0.61 | 32.4 |
| West: SR 305 | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.408 | 12.2 | LOS B | 3.0 | 77.3 | 0.28 | 0.48 | 0.28 | 37.2 |
| 5 | L2 | All MCs | 47 | 1.0 | 47 | 1.0 | 0.408 | 11.6 | LOS B | 3.0 | 77.3 | 0.28 | 0.48 | 0.28 | 35.3 |
| 2 | T1 | All MCs | 778 | 2.0 | 778 | 2.0 | 0.408 | 6.4 | LOS A | 3.0 | 77.3 | 0.27 | 0.47 | 0.27 | 40.9 |
| 12 | R2 | All MCs | 22 | 1.0 | 22 | 1.0 | 0.186 | 6.0 | LOS A | 1.0 | 26.6 | 0.25 | 0.47 | 0.25 | 35.9 |
| Approach | | | 848 | 1.9 | 848 | 1.9 | 0.408 | 6.7 | LOS A | 3.0 | 77.3 | 0.27 | 0.47 | 0.27 | 40.4 |
| All Vehicles | | | 1951 | 2.8 | 1951 | 2.8 | 0.477 | 6.9 | LOS A | 3.5 | 90.5 | 0.30 | 0.49 | 0.30 | 39.7 |

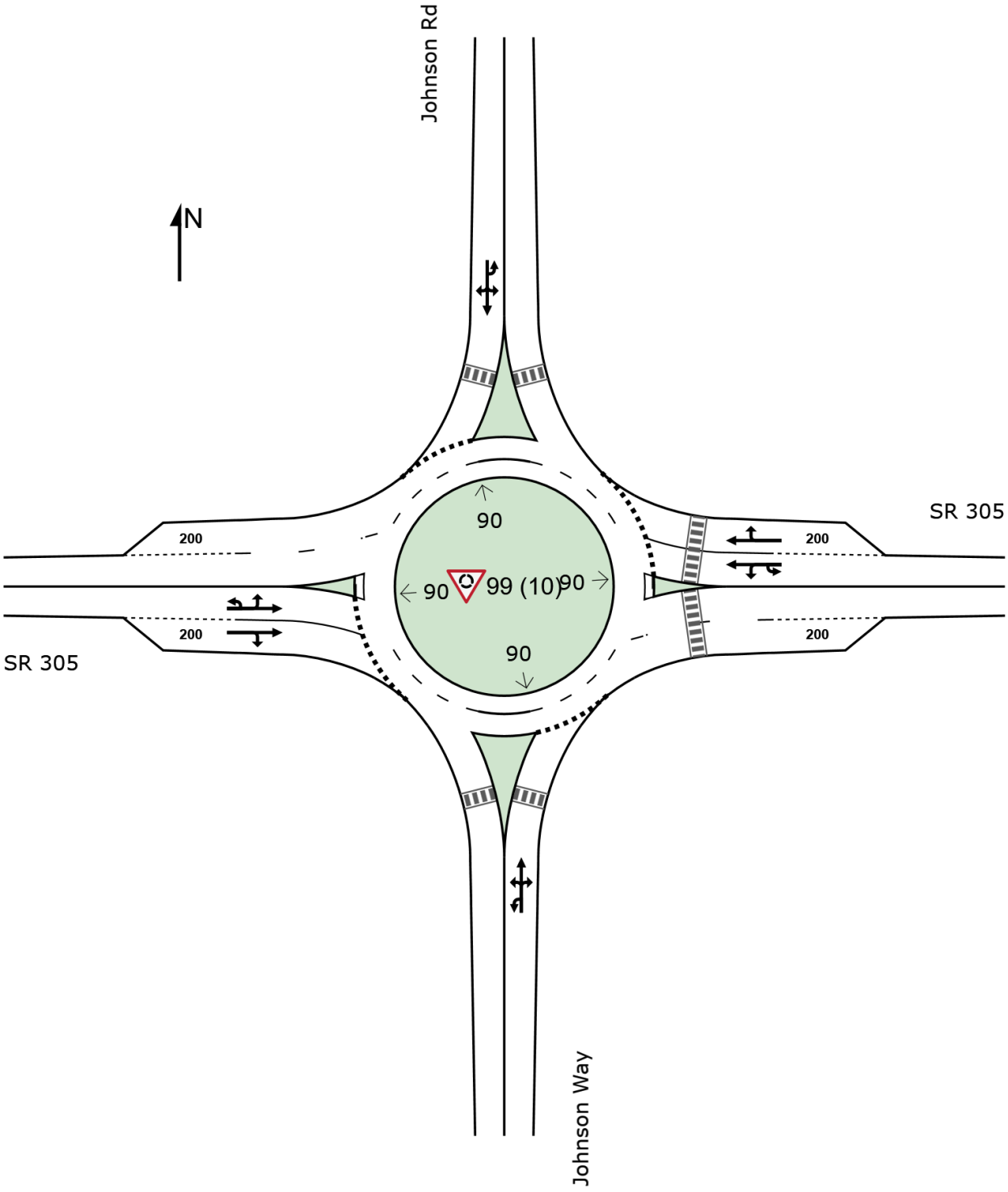
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [99 (10)] SR 305 & Johnson Rd - Forecast 2037 With
(PM Peak Hour)

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



# MOVEMENT SUMMARY

## Site: [1 (10)] Johnson & Sunrise Ridge - 2037 PM With (Folder1)

Output produced by SIDRA INTERSECTION Version: 11.0.2

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NE Midnight Sun Loop | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.007 | 7.5 | LOS A | 0.0 | 0.7 | 0.26 | 0.42 | 0.26 | 23.6 |
| 3 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.007 | 6.1 | LOS A | 0.0 | 0.7 | 0.26 | 0.42 | 0.26 | 23.6 |
| 8 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.007 | 2.3 | LOS A | 0.0 | 0.7 | 0.26 | 0.42 | 0.26 | 23.8 |
| 18 | R2 | All MCs | 5 | 3.0 | 5 | 3.0 | 0.007 | 2.7 | LOS A | 0.0 | 0.7 | 0.26 | 0.42 | 0.26 | 23.7 |
| Approach | | | 8 | 3.0 | 8 | 3.0 | 0.007 | 3.8 | LOS A | 0.0 | 0.7 | 0.26 | 0.42 | 0.26 | 23.7 |
| East: Johnson Rd NE | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.048 | 11.2 | LOS B | 0.2 | 5.1 | 0.23 | 0.50 | 0.23 | 34.3 |
| 1 | L2 | All MCs | 2 | 3.0 | 2 | 3.0 | 0.048 | 9.3 | LOS A | 0.2 | 5.1 | 0.23 | 0.50 | 0.23 | 34.3 |
| 6 | T1 | All MCs | 35 | 3.0 | 35 | 3.0 | 0.048 | 5.3 | LOS A | 0.2 | 5.1 | 0.23 | 0.50 | 0.23 | 34.9 |
| 16 | R2 | All MCs | 20 | 3.0 | 20 | 3.0 | 0.048 | 5.0 | LOS A | 0.2 | 5.1 | 0.23 | 0.50 | 0.23 | 34.6 |
| Approach | | | 59 | 3.0 | 59 | 3.0 | 0.048 | 5.5 | LOS A | 0.2 | 5.1 | 0.23 | 0.50 | 0.23 | 34.8 |
| North: Sunrise Ridge Ave NE | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.070 | 11.0 | LOS B | 0.3 | 7.9 | 0.14 | 0.54 | 0.14 | 34.4 |
| 7 | L2 | All MCs | 11 | 3.0 | 11 | 3.0 | 0.070 | 9.1 | LOS A | 0.3 | 7.9 | 0.14 | 0.54 | 0.14 | 34.4 |
| 4 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.070 | 5.0 | LOS A | 0.3 | 7.9 | 0.14 | 0.54 | 0.14 | 35.1 |
| 14 | R2 | All MCs | 73 | 3.0 | 73 | 3.0 | 0.070 | 4.8 | LOS A | 0.3 | 7.9 | 0.14 | 0.54 | 0.14 | 34.8 |
| Approach | | | 86 | 3.0 | 86 | 3.0 | 0.070 | 5.4 | LOS A | 0.3 | 7.9 | 0.14 | 0.54 | 0.14 | 34.7 |
| West: Johnson Rd NE | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.103 | 10.9 | LOS B | 0.4 | 11.5 | 0.09 | 0.62 | 0.09 | 33.2 |
| 5 | L2 | All MCs | 107 | 3.0 | 107 | 3.0 | 0.103 | 8.9 | LOS A | 0.4 | 11.5 | 0.09 | 0.62 | 0.09 | 33.2 |
| 2 | T1 | All MCs | 23 | 3.0 | 23 | 3.0 | 0.103 | 4.9 | LOS A | 0.4 | 11.5 | 0.09 | 0.62 | 0.09 | 33.7 |
| 12 | R2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.103 | 4.7 | LOS A | 0.4 | 11.5 | 0.09 | 0.62 | 0.09 | 33.5 |
| Approach | | | 132 | 3.0 | 132 | 3.0 | 0.103 | 8.2 | LOS A | 0.4 | 11.5 | 0.09 | 0.62 | 0.09 | 33.3 |
| All Vehicles | | | 285 | 3.0 | 285 | 3.0 | 0.103 | 6.7 | LOS A | 0.4 | 11.5 | 0.14 | 0.57 | 0.14 | 33.6 |

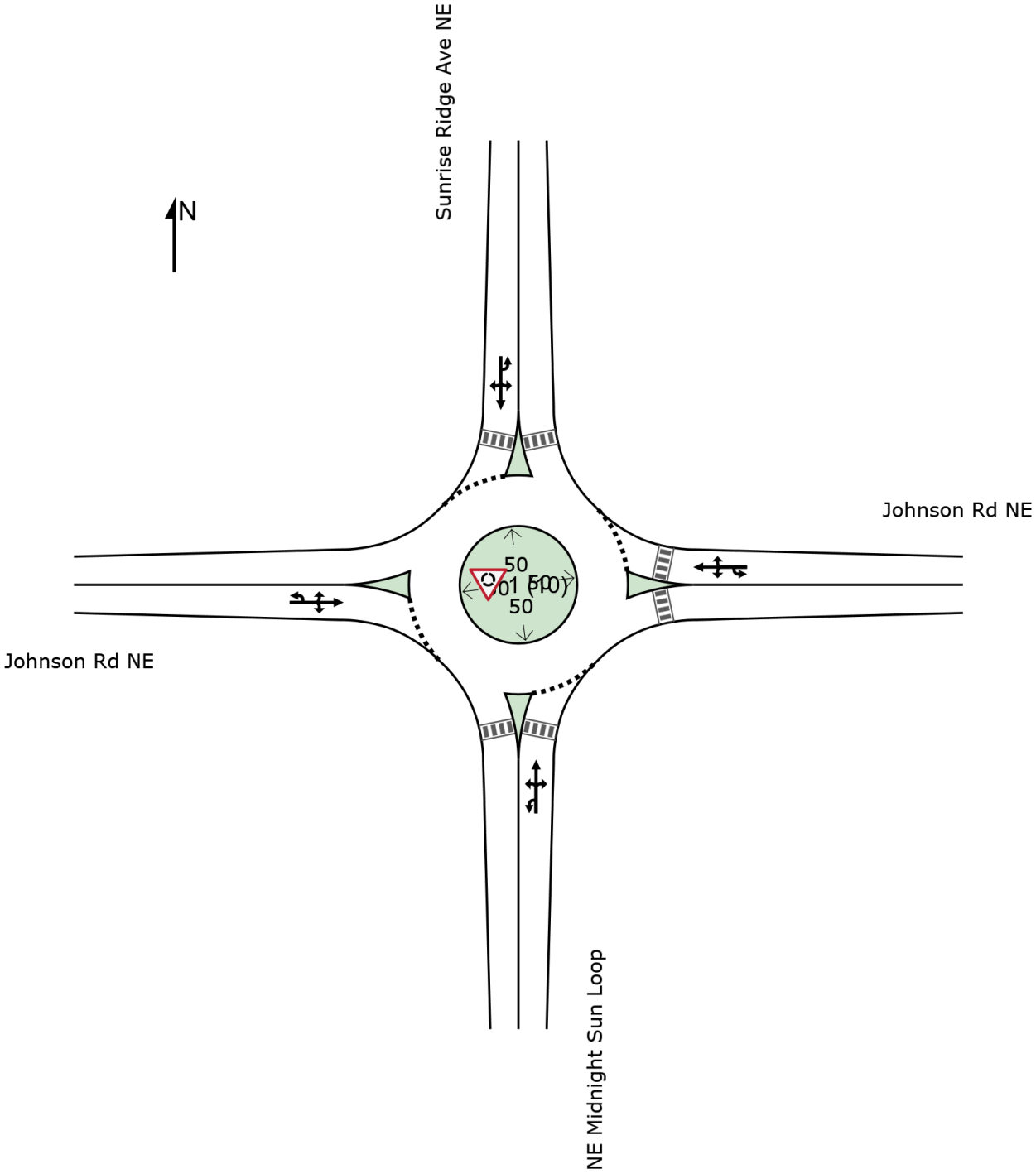
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [1 (10)] Johnson & Sunrise Ridge - 2037 PM With (Folder1)

New Site
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.




**SIDRA INTERSECTION 11 | Copyright © 2000-2026 Akcelik and Associates Pty Ltd | sidrasolutions.com**
Organisation: HEATH & ASSOCIATES | Licence: PLUS / 1PC | Created: Saturday, October 3, 2026 3:32:29 PM
Project: C:\Users\LucasMaulin\Heath and Associates\Office Access - Documents\Project Files\Pinnacle at Liberty Bay - 5576\5-Analysis\Sidra\Johnson & Sunrise Ridge.sipx

# THE PINNACLE AT LIBERTY BAY
# TRAFFIC IMPACT ANALYSIS

*APPENDIX*
*Site Plan*

# A PORTION OF THE SE 1/4 OF SECTION 23, TWP. 26 N., RGE. 1 E.,WM

| TRACT AREA TABLE | | | |
|---|---|---|---|
| TRACT | USE | OWNERSHIP | AREA (SF) |
| A | CRITICAL AREA | HOA | 589,600 |
| B | CRITICAL AREA | HOA | 6,842 |
| C | CRITICAL AREA | HOA | 135,518 |
| D | CRITICAL AREA | HOA | 28,901 |
| E | STORMWATER | CITY | 89,997 |
| F | STORMWATER/OPEN SPACE | HOA | 17,635 |
| G | ACCESS/UTILITY | HOA | 2,761 |
| H | ACCESS/UTILITY | HOA | 3,453 |
| I | ACCESS/UTILITY | HOA | 2,278 |
| J | ACCESS/UTILITY | HOA | 1,535 |
| K | ACCESS/UTILITY | HOA | 2,055 |
| L | ACCESS/UTILITY | HOA | 3,681 |
| M | ACCESS/UTILITY | HOA | 4,062 |

| TRACT AREA TABLE | | | |
|---|---|---|---|
| TRACT | USE | OWNERSHIP | AREA (SF) |
| N | ACCESS/UTILITY | HOA | 3,026 |
| O | ACCESS/UTILITY | HOA | 820 |
| P | ACCESS/UTILITY | HOA | 3,528 |
| Q | OPEN SPACE | HOA | 10,287 |
| R | OPEN SPACE | HOA | 2,535 |
| S | OPEN SPACE | HOA | 35,393 |
| T | RECREATION | HOA | 10,568 |
| U | RECREATION | HOA | 9,258 |
| V | RECREATION | HOA | 4,592 |
| W | RECREATION | HOA | 13,055 |
| X | RECREATION | HOA | 5,871 |
| Y | RECREATION | HOA | 5,288 |

| LOT AREA TABLE | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LOT # | AREA (SF) | LOT # | AREA (SF) | LOT # | AREA (SF) | LOT # | AREA (SF) | LOT # | AREA (SF) | LOT # | AREA (SF) | LOT # | AREA (SF) | LOT # | AREA (SF) | LOT # | AREA (SF) | LOT # | AREA (SF) | LOT # | AREA (SF) |
| 1 | 4,108 | 13 | 4,085 | 26 | 4,476 | 38 | 3,870 | 50 | 6,316 | 62 | 6,277 | 74 | 4,100 | 86 | 4,100 | 98 | 4,530 | 110 | 4,567 | 122 | 4,100 | 134 | 4,326 |
| 2 | 4,023 | 14 | 3,917 | 27 | 4,015 | 39 | 3,870 | 51 | 4,521 | 63 | 5,079 | 75 | 4,100 | 87 | 4,100 | 99 | 6,141 | 111 | 4,584 | 123 | 4,100 | 135 | 4,504 |
| 3 | 4,237 | 15 | 4,330 | 28 | 3,916 | 40 | 4,420 | 52 | 4,614 | 64 | 5,926 | 76 | 4,613 | 88 | 4,100 | 100 | 4,058 | 112 | 4,158 | 124 | 4,426 | 136 | 4,110 |
| 4 | 4,313 | 16 | 5,088 | 29 | 5,408 | 41 | 4,429 | 53 | 4,871 | 65 | 5,037 | 77 | 4,200 | 89 | 4,100 | 101 | 4,100 | 113 | 4,100 | 125 | 4,949 | 137 | 4,100 |
| 5 | 8,715 | 17 | 4,518 | 30 | 3,937 | 42 | 4,427 | 54 | 5,209 | 66 | 4,477 | 78 | 4,200 | 90 | 4,100 | 102 | 4,100 | 114 | 4,100 | 126 | 4,900 | 138 | 4,900 |
| 6 | 4,265 | 19 | 4,345 | 31 | 3,762 | 43 | 4,425 | 55 | 3,832 | 67 | 4,477 | 79 | 4,374 | 91 | 4,100 | 103 | 4,100 | 115 | 4,100 | 127 | 6,996 | | |
| 7 | 4,408 | 20 | 4,345 | 32 | 3,763 | 44 | 5,015 | 56 | 4,433 | 68 | 6,270 | 80 | 5,825 | 92 | 4,100 | 104 | 4,100 | 116 | 4,100 | 128 | 4,605 | | |
| 8 | 4,049 | 21 | 5,185 | 33 | 3,763 | 45 | 3,903 | 57 | 3,898 | 69 | 4,098 | 81 | 6,303 | 93 | 4,100 | 105 | 4,100 | 117 | 4,100 | 129 | 5,206 | | |
| 9 | 3,850 | 22 | 6,353 | 34 | 3,762 | 46 | 3,757 | 58 | 4,581 | 70 | 4,100 | 82 | 5,274 | 94 | 4,058 | 106 | 4,020 | 118 | 4,072 | 130 | 4,099 | | |
| 10 | 4,050 | 23 | 5,122 | 35 | 3,788 | 47 | 3,756 | 59 | 4,551 | 71 | 4,100 | 83 | 4,439 | 95 | 4,440 | 107 | 6,014 | 119 | 4,100 | 131 | 4,100 | | |
| 11 | 3,709 | 24 | 4,786 | 36 | 3,870 | 48 | 3,996 | 60 | 4,086 | 72 | 4,100 | 84 | 4,100 | 96 | 4,010 | 108 | 4,100 | 120 | 4,100 | 132 | 4,100 | | |
| 12 | 3,838 | 25 | 4,680 | 37 | 3,870 | 49 | 4,461 | 61 | 5,404 | 73 | 4,100 | 85 | 4,100 | 97 | 4,037 | 109 | 4,109 | 121 | 4,100 | 133 | 4,107 | | |




## BUILDING SETBACKS

| | |
|---|---|
| REAR: | 10' |
| FRONT: | 20' |
| SIDE: | 5' |
| STREET SIDE: | 10' |
| STREAM: | 25' |
| WETLAND: | 15' |

SCALE: 1" = 80'

80 40 0 80 160




KEY MAP

## LEGEND

- BUILDING SETBACK LINE
- LOT LINE/TRACT LINE
- RIGHT OF WAY LINE
- PROPOSED EASEMENT
- MONUMENT
- CRITICAL AREA BUFFER
- WETLAND
- PHASE 1
- PHASE 2
- PHASE 3
- PRELIMINARY HOUSE FOOTPRINTS

| REVISIONS | | |
|---|---|---|
| NO. | DESCRIPTION/DATE | BY |
| | | |

BRANDON MICHAEL LOUCKS
STATE OF WASHINGTON
50085
REGISTERED
PROFESSIONAL ENGINEER


CONSULTING ENGINEERS LLC
33400 8th Ave S, Suite 205
Federal Way, WA 98003
FEDERAL WAY (253) 838-6113
LYNNWOOD (425) 297-1900
www.esmcivil.com
ESM
Civil Engineering
Public Works
Land Planning
Landscape Architecture
Land Surveying
Project Management


MONTEBANC MANAGEMENT, LLC

PINNACLE AT LIBERTY BAY SUBDIVISION

CITY OF POULSBO OVERALL SITE PLAN & LOT/TRACT PHASING PLAN WASHINGTON

| | |
|---|---|
| JOB NO.: | 2090-004-022 |
| DWG. NAME: | PP-07 |
| DESIGNED BY: | |
| DRAWN BY: | |
| CHECKED BY: | |
| DATE: | 11/26/2025 |
| DATE OF PRINT: | |

PP-07

7 OF 33 SHEETS

File: \\Esm8\engr\ESM-JOBS\2090\004\022\base\0040222ST.dwg
Plotted: 11/25/2025 3:56 PM Plotted By: Dan Lapp

# THE PINNACLE AT LIBERTY BAY
# TRAFFIC IMPACT ANALYSIS

*APPENDIX*

*Previous Review Comment Letters*

**Date:** March 26, 2026

**To:** Michael Bateman, City of Poulsbo

**From:** Andrew L. Bratlien, P.E., PTOE
Heath & Associates

**Subject:** The Pinnacle at Liberty Bay TIA Comment Response

This memorandum provides responses to the comments provided by the City of Pouslbo and Parametrix as identified in the September 8, 2025 memorandum "Review for The Pinnacle at Liberty Bay Traffic Impact Analysis (TIA)." The enclosed TIA has been updated based on the March 2026 site plan, including a revised layout consisting of 138 dwelling units

## 1. COMMENT RESPONSES

Parametrix numbered comments and associated responses are provided below.

**Comment #1**: Page 8: SR 305 speed is 40 mph north of ~Baywatch Court and 50 mph south of that location.

**Response #1**: TIA Table 1 has been updated.

**Comment #2**: Page 10: AM and PM peaks are noted as generally occurring between 7-8 AM and 5-6 PM. Do any of the study intersections have local peaks that are substantially (>30 minutes) outside of the system peaks?

**Response #2**: TIA language has been refined and a table has been added to identify AM and PM peak hour for each intersection.

**Comment #3**: Page 10: Verify how the AM school traffic was accounted for. Was there a decrease in PHF to account for the 15-minute spike or some other method?

**Response #3**: AM peak hour traffic counts captured school peaking effects via PHF which was applied to the existing and future conditions intersection operations analysis. Existing PHFs are documented in the traffic count sheets.

**Comment #4**: ~Pages 10-16: Clarify which study intersections are reporting performance metrics. There appears to be variability in what is reported for study intersections, for example:

- Section 3.4 lists out 5 intersections where counts were collected and mentions 2 other intersections where counts were estimated.
- Figures 3-4 show 6 of the 7 intersections mentioned, Figures 5-6 show 5 of the 7 intersections and Table 3 (Existing LOS) reports 6 of the 7 study intersections.

Consider adding a section near the front of the report (e.g. Section 2 or 3) that lists all study intersections that will have metrics reported throughout the entire report. Adding them to Figure 1 for example may help with clarifying where all of the key study intersections are located.

**Response #4**: A new section, "Study Area," has been added to the TIA report to clarify study intersections and performance measures.

**Comment #5**: Page 17: For Table 4 (Collisions), Separate out and identifying each location as an intersection or a corridor. Consider using the same numbering for the intersections as what was used for the operational analysis and creating new numbering for the corridor locations. Consider adding totals for each column and row to add more clarity to the data.

**Response #5**: Crash summary tables have been reconfigured.

**Comment #6**: Page 18: Consider updating Tables 5 and 6 also with Ref # and intersection/corridor names for clarity and adding total columns/rows.

**Response #6**: Crash summary tables have been reconfigured.

**Comment #7**: Page 18: Consider expanding further on the text "Out of the 45 total collisions, one resulted in six non-incapacitating injuries, and six possible injuries". Should it say something like 6 of the 45 collisions resulted in non-incapacitating and 6 of the 45 resulted in possible injury?

**Response #7**: Text has been revised for clarity.

**Comment #8**: Page 20: For figure 8, consider adding numbering to intersections/corridors to tie back to tables easier.

**Response #8**: Intersection and street corridor numbering has been added to Figure 8.

**Comment #9**: Pages 16 & 35: Provide more details in the notes of Tables 3 and 9 related to delay and LOS for clarification – Signals, use signalized thresholds for overall intersection, AWSC/Roundabout – use stop control thresholds for overall intersection, TWSC use stop control thresholds for worst approach.

**Response #9**: Notes have been added to LOS tables.

**Comment #10**: [General comment]: Provide additional discussion on the Sunrise Ridge extension and what project or development will trigger the opening. Will the extension be completed as part of the Pinnacle at Liberty Bay development?

**Response #10**: The Sunrisde Ridge Avenue NE extension will be completed as part of the project's first phase. An explanatory statement has been added to the "Study Area" section of the report.

**Comment #11**: [General comment:] Adding the access points to the study area map or site plan would be helpful in understanding the traffic to and from the site. Consider adding labels for access points A, B, C/D, and E to the maps/figures.

**Response #11**: Site plan (Figure 2) has been updated to identify access locations.

**Comment #12**: [General comment:] The city guidelines state that intersections should be analyzed for intersections with over approximately 10 new trips added. Were additional intersections to the north or west of Hostmark Street/SR 305 considered for analysis (where >10 trips along those roadways are being generated per Figures 9 and 10).

**Response #12**: The TIA study area was approved by City staff via email on June 10, 2025. Minor scoping revisions provided by City staff at that time were incorporated to the TIA and are reflected in the report.

**Olympic Region**

# PLANS, SPECIFICATIONS AND ESTIMATE
# Review Comment Disposition Form

| | | | |
|---|---|---|---|
| Project Title: | Pinnacle at Liberty Bay | Job Charge #: | |
| Reviewer (name & office) Casey Chilton– Traffic Design<br><br>Date of Review Comments: 7/29/25 | | Responses By: Andrew L. Bratlien, PE, PTOE<br><br>Date of Disposition: 3/26/2026 | |

| Comment No. | Sht or Pg. | Review Comment | Status Code | Designer's Response |
|---|---|---|---|---|
| 1. | PDF p8 | SR 305 speed limit at this location is 50 MPH.<br>The roundabout at Johnson Rd NE and SR 305 includes pedestrian and bike facilities, but they do not continue along SR 305. Can you please mark "no" for these categories? An asterisk with a note about the RAB having facilities would be a great way to document this. | | Table 1 has been updated to incorporate these comments. |
| 2. | PDF p9 | Future analysis assumes Sunrise Ridge Ave NE will be opened to through traffic, can you please add details on why this assumption was made? Did the city confirm if/when this will happen? | | The Sunrise Ridge Ave NE extension will be completed as part of the project's first phase. An explanatory statement has been added to the "Study Area" section of the report. |
| 3. | GEN | Can you please speak to why the addition of the project traffic volumes will result in a decrease in delay at the following locations? If optimize was used, please reproduce without.<br>**Table 8: Forecast 2032 & 2037 Weekday Peak Hour Level of Service**<br>Delays Given in Seconds per Vehicle<br>*Without Project* / *With Project*<br>Intersection \| Control \| Peak-Hour \| Crt. Apprch \| LOS \| Delay \| LOS \| Delay<br>**Forecast 2032 Peak Hour Analysis**<br>SR 305 & Hostmark \| Signal \| AM \| Overall \| D \| 36.5 \| D \| 37.2<br>PM \| D \| 44.5 \| D \| 44.7<br>SR 305 & Baywatch \| One-Way Stop \| AM \| SB \| C \| 21.8 \| C \| 16.4<br>PM \| D \| 25.8 \| C \| 24.7<br>SR 305 & Johnson \| RAB \| AM \| Overall \| A \| 7.4 \| A \| 7.7<br>PM \| A \| 6.6 \| A \| 6.8<br>Sunrise Ridge & Johnson \| RAB \| AM \| Overall \| A \| 5.6 \| A \| 5.7<br>PM \| A \| 6.0 \| A \| 6.5<br>Sunrise Ridge & Crystallia \| One-Way Stop \| AM \| EB \| -- \| -- \| A \| 8.8<br>PM \| -- \| -- \| A \| 8.8<br>Hostmark & Caldart \| AWSC \| AM \| Overall \| C \| 22.6 \| C \| 24.2<br>PM \| B \| 14.9 \| C \| 15.2<br>Sunrise Ridge & Caldart \| TWSC \| AM \| NB \| A \| 9.7 \| A \| 9.8<br>PM \| B \| 10.0 \| B \| 10.1<br>**Forecast 2037 Peak Hour Analysis**<br>SR 305 & Hostmark \| Signal \| AM \| Overall \| D \| 37.0 \| D \| 37.6<br>PM \| D \| 45.9 \| D \| 46.3<br>SR 305 & Baywatch \| One-Way Stop \| AM \| SB \| C \| 19.7 \| C \| 16.0<br>PM \| C \| 23.5 \| C \| 23.7<br>SR 305 & Johnson \| RAB \| AM \| Overall \| A \| 7.5 \| A \| 7.7<br>PM \| A \| 6.7 \| A \| 6.8<br>Sunrise Ridge & Johnson \| RAB \| AM \| Overall \| A \| 5.5 \| A \| 6.1<br>PM \| A \| 5.9 \| A \| 6.4<br>Sunrise Ridge & Crystallia \| One-Way Stop \| AM \| EB \| -- \| -- \| A \| 8.9<br>PM \| -- \| -- \| A \| 8.8<br>Hostmark & Caldart \| AWSC \| AM \| Overall \| F \| 61.9 \| F \| 63.3<br>PM \| D \| 26.1 \| D \| 27.0<br>Sunrise Ridge & Caldart \| TWSC \| AM \| NB \| A \| 9.9 \| B \| 10.0<br>PM \| B \| 10.4 \| B \| 10.5<br>RAB: Roundabout<br>**SR 305 & Baywatch Court NE** will operate acceptably at LOS D or better through 2037, with average delay of 26 seconds or less on the stop-controlled southbound | | Intersection operations forecasts have been updated to reflect revised trip generation, distribution and assignment forecasts. The intersections in question no longer indicate delay reductions with the addition of project trips. |
| 4. | | | | |

Status Code Legend: A = Incorporated B = Open/Under Review C = Evaluated/Not Incorporated D = Beyond Scope/Not Evaluated
All "B" and "C" responses require explanatory comments.

**Date:** November 12, 2025

**To:** Michael Bateman, City of Poulsbo

**From:** Andrew L. Bratlien, P.E., PTOE
Heath & Associates

**Subject:** The Pinnacle at Liberty Bay TIA Comment Response

This memorandum provides responses to the comments provided by the City of Pouslbo and Parametrix as identified in the September 8, 2025 memorandum "Review for The Pinnacle at Liberty Bay Traffic Impact Analysis (TIA)."

## 1. COMMENT RESPONSES

Parametrix numbered comments and associated responses are provided below.

**Comment #1**: Page 8: SR 305 speed is 40 mph north of ~Baywatch Court and 50 mph south of that location.

**Response #1**: TIA Table 1 has been updated.

**Comment #2**: Page 10: AM and PM peaks are noted as generally occurring between 7-8 AM and 5-6 PM. Do any of the study intersections have local peaks that are substantially (>30 minutes) outside of the system peaks?

**Response #2**: TIA language has been refined and a table has been added to identify AM and PM peak hour for each intersection.

**Comment #3**: Page 10: Verify how the AM school traffic was accounted for. Was there a decrease in PHF to account for the 15-minute spike or some other method?

**Response #3**: AM peak hour traffic counts captured school peaking effects via PHF which was applied to the existing and future conditions intersection operations analysis. Existing PHFs are documented in the traffic count sheets.

**Comment #4**: ~Pages 10-16: Clarify which study intersections are reporting performance metrics. There appears to be variability in what is reported for study intersections, for example:

- Section 3.4 lists out 5 intersections where counts were collected and mentions 2 other intersections where counts were estimated.
- Figures 3-4 show 6 of the 7 intersections mentioned, Figures 5-6 show 5 of the 7 intersections and Table 3 (Existing LOS) reports 6 of the 7 study intersections.

Consider adding a section near the front of the report (e.g. Section 2 or 3) that lists all study intersections that will have metrics reported throughout the entire report. Adding them to Figure 1 for example may help with clarifying where all of the key study intersections are located.

**Response #4**: A new section, "Study Area," has been added to the TIA report to clarify study intersections and performance measures.

**Comment #5**: Page 17: For Table 4 (Collisions), Separate out and identifying each location as an intersection or a corridor. Consider using the same numbering for the intersections as what was used for the operational analysis and creating new numbering for the corridor locations. Consider adding totals for each column and row to add more clarity to the data.

**Response #5**: Crash summary tables have been reconfigured.

**Comment #6**: Page 18: Consider updating Tables 5 and 6 also with Ref # and intersection/corridor names for clarity and adding total columns/rows.

**Response #6**: Crash summary tables have been reconfigured.

**Comment #7**: Page 18: Consider expanding further on the text "Out of the 45 total collisions, one resulted in six non-incapacitating injuries, and six possible injuries". Should it say something like 6 of the 45 collisions resulted in non-incapacitating and 6 of the 45 resulted in possible injury?

**Response #7**: Text has been revised for clarity.

**Comment #8**: Page 20: For figure 8, consider adding numbering to intersections/corridors to tie back to tables easier.

**Response #8**: Intersection and street corridor numbering has been added to Figure 8.

**Comment #9**: Pages 16 & 35: Provide more details in the notes of Tables 3 and 9 related to delay and LOS for clarification – Signals, use signalized thresholds for overall intersection, AWSC/Roundabout – use stop control thresholds for overall intersection, TWSC use stop control thresholds for worst approach.

**Response #9**: Notes have been added to LOS tables.

**Comment #10**: [General comment]: Provide additional discussion on the Sunrise Ridge extension and what project or development will trigger the opening. Will the extension be completed as part of the Pinnacle at Liberty Bay development?

**Response #10**: The Sunrisde Ridge Avenue NE extension will be completed as part of the project's first phase. An explanatory statement has been added to the "Study Area" section of the report.

**Comment #11**: [General comment:] Adding the access points to the study area map or site plan would be helpful in understanding the traffic to and from the site. Consider adding labels for access points A, B, C/D, and E to the maps/figures.

> **Response #11**: Site plan (Figure 2) has been updated to identify access locations.

**Comment #12**: [General comment:] The city guidelines state that intersections should be analyzed for intersections with over approximately 10 new trips added. Were additional intersections to the north or west of Hostmark Street/SR 305 considered for analysis (where >10 trips along those roadways are being generated per Figures 9 and 10).

> **Response #12**: The TIA study area was approved by City staff via email on June 10, 2025. Minor scoping revisions provided by City staff at that time were incorporated to the TIA and are reflected in the report.

**Date:** July 20, 2026

**To:** Michael Bateman, City of Poulsbo

**From:** Andrew L. Bratlien, P.E., PTOE
Heath & Associates

**Subject:** The Pinnacle at Liberty Bay – TIA Comment Response

This memorandum provides responses to the comments provided by the City of Pouslbo and Parametrix in the July 1, 2026 memorandum "Traffic Impact Analysis and Transportation Review." The enclosed TIA has been updated based on the comments and responses provided below.

## 1. COMMENT RESPONSES

**Comment #1A**: Study Area Consistency: The report does not clearly and consistently identify all study intersections or reconcile which intersections are included in figures versus LOS tables.

**Response #1A**: Descriptions of existing peak hour volumes (Section 4.4) have been expanded for clarity and consistency. Tables and figures have been updated to identify all seven study intersections.

**Comment #1B**: Intersection Screening: The TIA does not demonstrate that all intersections with ≥10 new trips were evaluated per City requirements. Consider intersections to the south of Johnson Road and to the north of Hostmark Street, based on AM and PM trip distribution figures.

**Response #1B**: The TIA study area was approved by City staff via email on June 10, 2025. Minor scoping revisions provided by City staff at that time were incorporated to the TIA and are reflected in the report.

Expanded trip distribution forecasts have been developed and attached to this memorandum, documenting eight functionally classified (collector/arterial) intersections within Poulsbo city limits which are expected to be impacted by 10 or more peak hour project trips. The additional intersections, their corresponding 2023 and 2044 Levels of Service, per the January 2025 *City of Poulsbo Transportation Plan Update*, and project-generated PM peak hour trips as a share of 2023 PM peak hour volume, are summarized in the table on the following page.

| Intersection | Control[1] | Transportation Plan PM LOS[2] | | PM Peak Hour Project Trips | |
|---|---|---|---|---|---|
| | | 2023 | 2044 | Trips | As % of 2023[4] |
| SR 305 & NE Lincoln Rd | Signal | D | D | 31 | +1.1% |
| SR 305 & NE Liberty Rd | Signal | **F** | **E** | 19 | +0.8% |
| SR 305 & 7th Ave/Forest Rock | Signal | **F** | **F** | 15 | +0.5% |
| SR 305 & Bond Rd/SR 307 | Signal | **E** | **F** | 13 | +0.3% |
| NE Hostmark St & 6th Ave NE | MASC | B | C | 26 | +4.1% |
| NE Hostmark St & Lincoln Rd | MASC | B | A | 23 | +3.9% |
| NE Hostmark St & 4th Ave NE | AWSC | B[3] | B[3] | 23 | +3.3% |
| Front St & NE Sunset St | AWSC | F[3] | F[3] | 11 | +0.9% |

[1]Signal = signalized; AWSC = all-way stop control; MASC = minor-approach stop control
[2]PM Peak hour intersection Level of Service per January 2025 Poulsbo Transportation Plan Update
[3]Denotes intersection with adopted LOS F standard
[4]Peak hour project trips as share of total 2044 PM peak hour intersection entering volume
**RED** denotes intersection operating below adopted LOS standard

The intersections of SR 305 & NE Liberty Road, SR 305 & 7th Avenue/Forest Rock Lane, and SR 305 & Bond Road/SR 307 currently operate below the WSDOT LOS D standard for SR 305 and are anticipated to continue to operate with LOS deficiencies through the 2044 Comprehensive Plan horizon. Project trips are expected to constitute less than one percent of peak hour demand at each LOS-deficient intersection. Further, all LOS-deficient SR 305 intersections have been identified as locations of developer-driven improvements including traffic signal controller, detection, and interconnection upgrades.

The other five collector and arterial intersections expected to serve 10 or more PM peak hour project trips are anticipated to operate at or above their respective minimum LOS standards through 2044. Project trips, which are implicitly included in the Poulsbo Comprehensive Plan long-range travel demand forecasts, are anticipated to constitute less than five percent of total PM peak hour demand at each intersection

Given the limited number of project trips, the planned SR 305 traffic signal control improvements, and the documented long-term adequacy of vehicle capacity at several surrounding intersections according to the Poulsbo Comprehensive Plan, an expanded TIA study area is not recommended.

**Comment #1C**: Peak Hour Methodology: School-related peak demand and local peak hour variability are not fully documented.

**Response #1C**: Traffic counts and the associated operational analysis applied Peak Hour Factor (PHF), which reflects the impacts of observed 15-minute volume peaking during each peak hour. The use of PHF allows the operational analysis to capture the impacts of short-duration school-related peaking, particularly during the AM peak hour. Existing PHFs are documented in the traffic count sheets. Peak hour variability at each study intersection is documented in Table 3.

**Comment #2A**: The intersection of Hostmark/Caldart operates at LOS F (61.9–63.2 sec delay) under 2037 AM conditions, below the City LOS standard (E). Although the LOS F is consistent between 2037 No Build and Build conditions, the vehicle delay increases under the Build scenario.

**Response #2A**: Long-range (2037) traffic forecasts have been updated. Previous versions included an error in compound growth calculations which resulted in an overestimation of anticipated growth. Based on the corrected traffic volume forecasts, the Hostmark/Caldart intersection is expected to operate at LOS E during the 2037 AM peak hour before and after the addition of project trips. The minimum LOS E standard is satisfied.

**Comment #2B**: The school route to North Kitsap High School requires a mid-block crossing of Caldart Avenue without stop control. This crossing is aligned with and supported by Comprehensive Plan Policies TR-5.1, TR-5.2, and TR 5.3.

**Response #2B**: Caldart Avenue currently provides marked pedestrian crossings at the Meredith Heights/Frank Raab Municipal Park driveway, at NE Odin Street, and at Hostmark Street. All of the existing marked crossings could serve pedestrian demand associated with North Kitsap High School. Please clarify the location of the midblock crossing referenced above.

**Comment #2C**: The transportation analysis should evaluate improvements to the existing school crossing, including installation of a Rectangular Rapid Flashing Beacon (RRFB), to address pedestrian safety and support the City's transportation findings under PMC 14.04, PMC 17.60.040(A)(e), PMC 17.80.060, and Comprehensive Plan Policies TR-1.1 and TR-1.4.

**Response #2C**: The Hostmark Street & Caldart Avenue intersection provides curb ramps and marked crosswalks on all legs. Hostmark Street also includes signalized pedestrian crossings at two locations to the east of Caldart Avenue. Please clarify the location of the school crossing referenced above.

**Comment #3**: The information provided in support of the applicant's feasibility determination does not adequately support the conclusion that the Baywatch connection is infeasible due to vertical geometry and stream crossing constraints because the feasibility evaluation does not fully address applicable City codes, policies, and reasonable design alternatives necessary for the City Engineer to determine infeasibility.

**Response #3**: Response to be provided by ESM.

**Comment #4A**: Both Road C and Crystallia Court rely exclusively on Sunrise Ridge Ave NE, resulting in one functional access route and a single route condition, not two independent routes as required by City code and implied in the TIA. This is consistency with City code PMC 17.80.050(C).

**Response #4A**: The project proposes access to NE Crystallia Court and to Sunrise Ridge Avenue, providing two distinct public street connections to the site and satisfying access criteria defined in PMC 17.080.050(C). An internal street network will provide a contiguous connection between the two accesses, preserving full site access in the event of a blockage at either connection. The project also proposes completion of Sunrise Ridge Avenue to the south of the project, facilitating access to the site to/from the north via Caldart Avenue and to/from the south via Johnson Road.

Sunrise Ridge Avenue provides an approximately 390-foot centerline separation between NE Crystallia Court and the proposed Road C intersection. The magnitude of Sunrise Ridge Avenue blockage required for simultaneous closure of both NE Crystallia Court and Road C is significant and unlikely.

**Comment #4B**: The TIA does not demonstrate that the proposed street network satisfies the redundancy objectives as required under City code PMC 17.80.060.

**Response #4B**: The project proposes two distinct access routes to the site, satisfying access criteria defined in PMC 17.080.050(C). See Response #4A.

**Comment #4D**: If, after further analysis, the Baywatch connection is determined by the City Engineer to be infeasible, the information provided does not demonstrate that the proposed Sunrise Ridge access configuration satisfies the applicable City and Fire Code requirements for access, connectivity and emergency response. Specific examples where the site plan of the TIA deviates from City or Fire Code include:

- Any blockage of Sunrise Ridge would significantly reduce site access, which is inconsistent with the intent of PMC 17.80.050(C) to provide access via two different streets and PMC 17.80.060 to provide redundant and efficient connections and emergency access provisions

of IFC 503.1.2. This risk is amplified by steep grades (~12%) and significant elevation change.

**Response #4D**: The project proposes access via two distinct public streets and a new connection on Sunrise Ridge Avenue to the south, satisfying access criteria defined in PMC 17.80.050(C). See Response #4A.

IFC D107.2 requires a minimum straight-line separation not less than one-half of the length of the maximum overall diagonal dimension of the property. The maximum overall diagonal dimension of the subject site is 1,918 feet, resulting in a minimum straightline separation of 909 feet.

The proposed accesses on NE Crystallia Court and the eastern edge of the subject site on Sunrise Ridge Avenue provide 940 feet of separation, satisfying IFC D107.2 access separation requirements for two separate access roads.

**Comment #4E**: No alternative mitigation (e.g. emergency access, sprinklering, roadway improvements) has been proposed in the TIA as required under PMC 17.80.050(C) and supporting provisions.

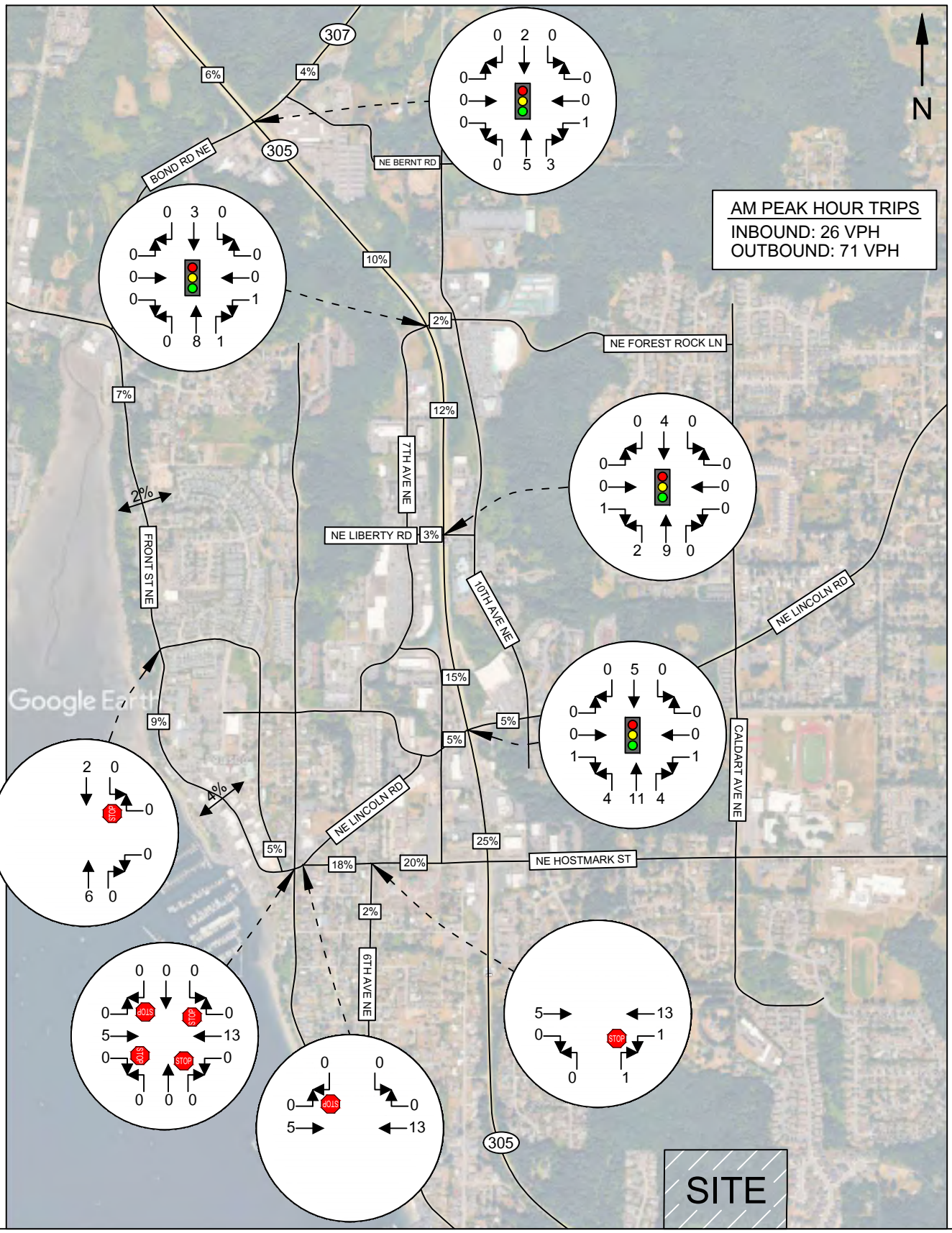
**Response #4E:** The project proposes access via two distinct public streets and a new connection on Sunrise Ridge Avenue to the south, satisfying access criteria defined in PMC 17.80.050(C). See Response #4A.

**Comment #4F**: Based on the site conditions, including terrain, steep grades (~12%), and access limitations, the transportation information provided does not adequately demonstrate that the proposed access configuration satisfies the applicable emergency access provisions of IFC 503.1.2 and IFC D107.2.

**Response #4F:** The NE Crystallia Court and Road C accesses satisfy IFC separation requirements for emergency access separation. See Response #4D.

**Responses to Comments 3, 4C, 4G, and 4H will be provided by ESM.**

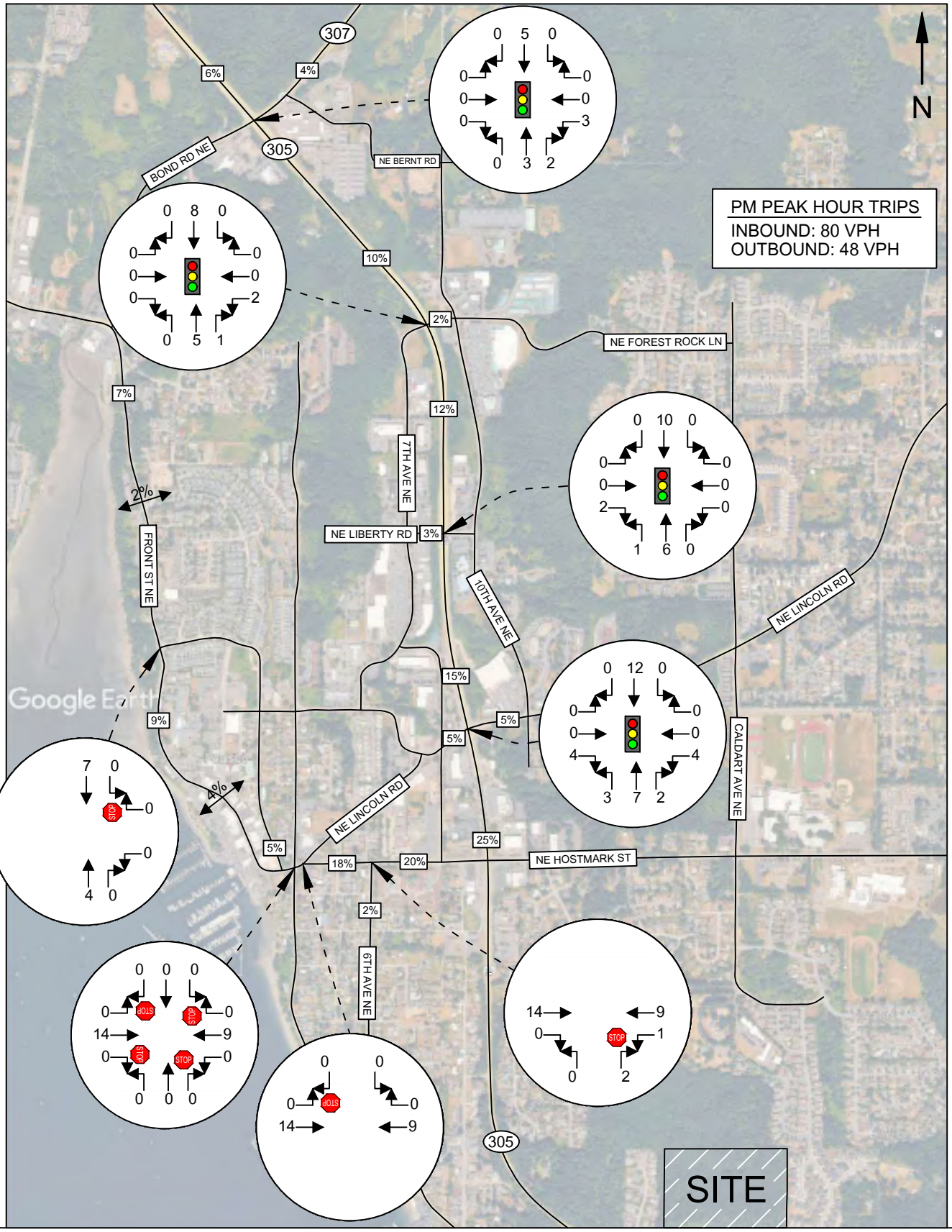
Attachment A. Expanded AM Peak Hour Project Trip Distribution
Attachment B. Expanded PM Peak Hour Project Trip Distribution




HEATH&ASSOCIATES
Transportation Planning & Engineering

PINNACLE AT LIBERTY BAY

EXPANDED AM PEAK HOUR TRIP DISTRIBUTION AND ASSIGNMENT
FIGURE A




HEATH&ASSOCIATES
Transportation Planning & Engineering

PINNACLE AT LIBERTY BAY

EXPANDED PM PEAK HOUR TRIP DISTRIBUTION AND ASSIGNMENT
FIGURE B

# THE PINNACLE AT LIBERTY BAY
# TRAFFIC IMPACT ANALYSIS

*APPENDIX*

*Emergency Access Memo*

**Date:** October 5, 2026

**To:** City of Poulsbo

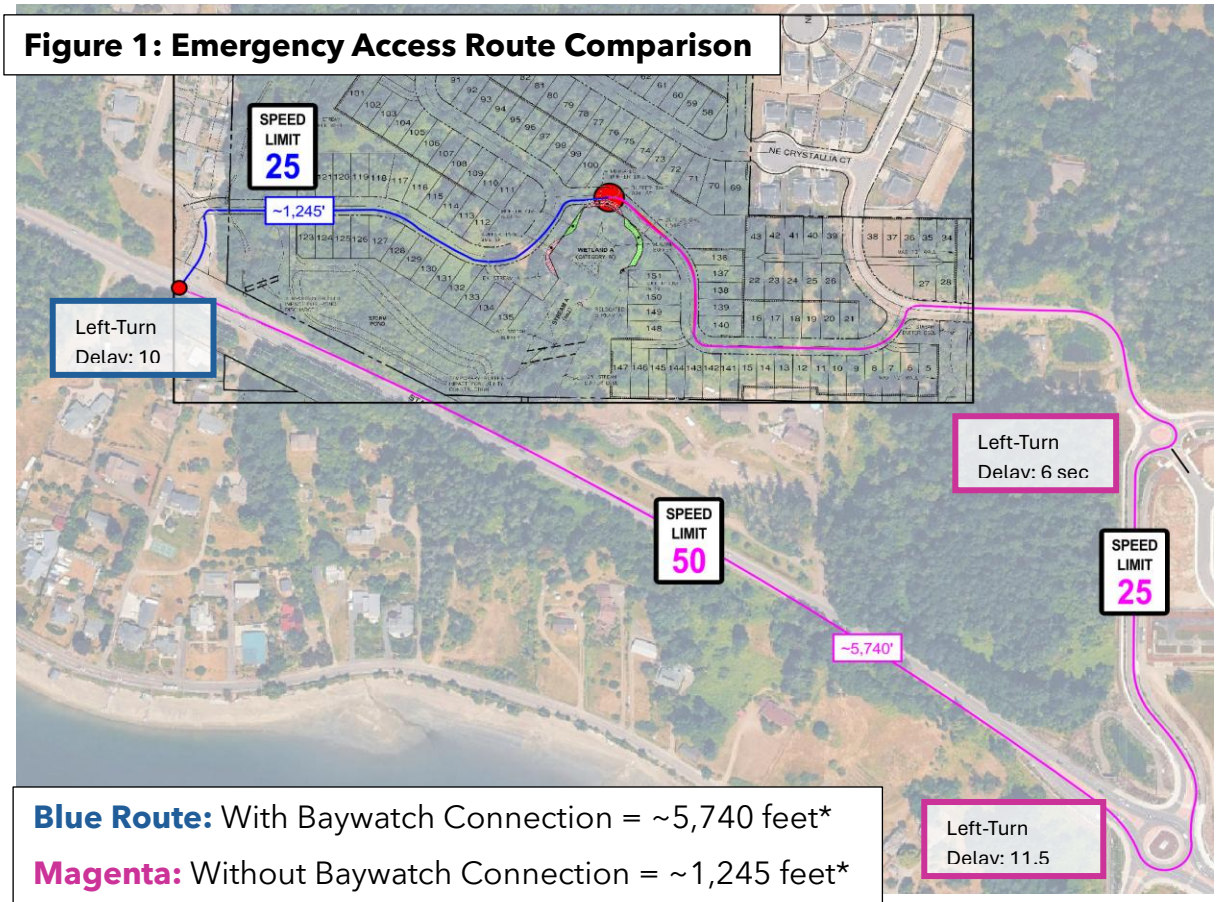
**From:** Aaron Van Aken, P.E., PTOE
Heath & Associates

**Subject:** The Pinnacle at Liberty Bay – Supplemental Emergency Access Analysis

This memorandum provides supplemental transportation analysis regarding emergency access for the proposed Pinnacle at Liberty Bay development. Route lengths and characteristics are compared for scenarios with and without the Baywatch connection.

**Figure 1** illustrates the relative emergency access route lengths from the SR 305 & Baywatch Ct NE intersection to midpoint of the project site. An alternative access route to the north via Hostmark Street is acknowledged but excluded from the comparison to isolate the difference between the Baywatch and Johnson Parkway routes.

**Figure 1: Emergency Access Route Comparison**




**Blue Route:** With Baywatch Connection = ~5,740 feet*

**Magenta:** Without Baywatch Connection = ~1,245 feet*

*Measured approximately to the midpoint of the proposed plat.

## Emergency Access Route Comparison

**Table 1: Route Characteristics**

| Variable | Route 1 – Baywatch | Route 2 – Johnson |
|---|---|---|
| Route Length | 1,245 ft | 5,740 ft |
| Approx. Distance | 0.24 mi | 1.09 mi |
| Speed Assumption | 25 mph | 2,500 ft @ 50 mph; 3,240 ft @ 25 mph |
| Max Grade | ≥12% via Baywatch | 12% via Johnson Parkway |
| Estimated Running Time | ~34 sec | ~122 sec |
| Intersection Delay | 10 sec | 17.5 sec |
| Estimated Total Travel Time* | ~44 sec | ~140 sec |
| **Difference** | | **~96 sec longer** |

* Travel times were estimated based on roadway lengths and posted speed limits and are intended solely for relative route comparison. They do not represent actual emergency vehicle response times.

**Table 1** compares the Baywatch and Johnson Parkway access routes. Measured to the approximate midpoint of the project, the Baywatch route is shorter, with an estimated travel time difference of approximately 96 seconds.

Although the Johnson Parkway route is longer, roadway grades are generally comparable. ESM estimates the Baywatch connection would require a minimum grade of 12 percent, and likely steeper, while Johnson Parkway includes existing grades of approximately 12 percent. Therefore, while Baywatch would provide a shorter route, it would not eliminate the steep-grade conditions identified as an emergency access concern.

## Access Redundancy and Potential Blockage

Although both project access points are located on Sunrise Ridge Avenue NE, they are approximately 385 feet apart and function as two physically distinct intersections. Sunrise Ridge can be accessed from the north via Hostmark Street and from the south via Johnson Parkway. Accordingly, a localized collision or obstruction at one project access would not inherently block the second access, and emergency vehicles could approach the site from the opposite direction.

Traffic volumes on Sunrise Ridge are also relatively low with a forecast 2037 northbound PM peak hour volume of approximately 37 vehicles per hour, equating to around one vehicle arriving every 97 seconds. Assuming a complete blockage at the northern access intersection of NE Crystallia Ct (illustrated to the right) and 25 feet per vehicle, approximately 15 vehicles would need to be stopped to extend the 385 feet to the southern "Road C" access. At an arrival rate of one vehicle every 97 seconds, this would take approximately 24 minutes of continuous blockage, assuming no vehicles could pass and no traffic control or incident response occurred.




Based on the travel times (estimated from the posted speeds, not actual response times), the Johnson connection route is approximately 96 seconds longer to reach the midpoint of the project relative to the Baywatch connection route. During the 96 seconds of additional travel time, only about one additional northbound vehicle would be expected to arrive on Sunrise Ridge, occupying only a small portion of the 385 feet separating the two access points.

Therefore, if an incident blocked the northern project access, the additional travel time associated with approaching the site from the south via Johnson Parkway would not be expected to result in a queue extending to and blocking the southern project access.



HEATH & ASSOCIATES

Transportation Planning & Engineering

# TRAFFIC IMPACT ANALYSIS

## The Pinnacle at Liberty Bay

Poulsbo, Washington

November 2025

1011 E Main Ave Suite 453 | Puyallup, WA | 98372
(253) 770-1401| heathtraffic.com

# THE PINNACLE AT LIBERTY BAY
# TRAFFIC IMPACT ANALYSIS

Prepared for:

Montebanc Management, LLC
c/o Paul Devenzio, Chip McBroom

Prepared by:

Heath & Associates
PO Box 397
Puyallup, WA  98371
(253) 770 1401
Heathtraffic.com

License:




11/12/2025

**Date:** November 12, 2025

**To:** Michael Bateman, City of Poulsbo

**From:** Andrew L. Bratlien, P.E., PTOE
Heath & Associates

**Subject:** The Pinnacle at Liberty Bay TIA Comment Response

This memorandum provides responses to the comments provided by the City of Pouslbo and Parametrix as identified in the September 8, 2025 memorandum "Review for The Pinnacle at Liberty Bay Traffic Impact Analysis (TIA)."

## 1. COMMENT RESPONSES

Parametrix numbered comments and associated responses are provided below.

**Comment #1**: Page 8: SR 305 speed is 40 mph north of ~Baywatch Court and 50 mph south of that location.

**Response #1**: TIA Table 1 has been updated.

**Comment #2**: Page 10: AM and PM peaks are noted as generally occurring between 7-8 AM and 5-6 PM. Do any of the study intersections have local peaks that are substantially (>30 minutes) outside of the system peaks?

**Response #2**: TIA language has been refined and a table has been added to identify AM and PM peak hour for each intersection.

**Comment #3**: Page 10: Verify how the AM school traffic was accounted for. Was there a decrease in PHF to account for the 15-minute spike or some other method?

**Response #3**: AM peak hour traffic counts captured school peaking effects via PHF which was applied to the existing and future conditions intersection operations analysis. Existing PHFs are documented in the traffic count sheets.

**Comment #4**: ~Pages 10-16: Clarify which study intersections are reporting performance metrics. There appears to be variability in what is reported for study intersections, for example:

- Section 3.4 lists out 5 intersections where counts were collected and mentions 2 other intersections where counts were estimated.
- Figures 3-4 show 6 of the 7 intersections mentioned, Figures 5-6 show 5 of the 7 intersections and Table 3 (Existing LOS) reports 6 of the 7 study intersections.

Consider adding a section near the front of the report (e.g. Section 2 or 3) that lists all study intersections that will have metrics reported throughout the entire report. Adding them to Figure 1 for example may help with clarifying where all of the key study intersections are located.

**Response #4**: A new section, "Study Area," has been added to the TIA report to clarify study intersections and performance measures.

**Comment #5**: Page 17: For Table 4 (Collisions), Separate out and identifying each location as an intersection or a corridor. Consider using the same numbering for the intersections as what was used for the operational analysis and creating new numbering for the corridor locations. Consider adding totals for each column and row to add more clarity to the data.

**Response #5**: Crash summary tables have been reconfigured.

**Comment #6**: Page 18: Consider updating Tables 5 and 6 also with Ref # and intersection/corridor names for clarity and adding total columns/rows.

**Response #6**: Crash summary tables have been reconfigured.

**Comment #7**: Page 18: Consider expanding further on the text "Out of the 45 total collisions, one resulted in six non-incapacitating injuries, and six possible injuries". Should it say something like 6 of the 45 collisions resulted in non-incapacitating and 6 of the 45 resulted in possible injury?

**Response #7**: Text has been revised for clarity.

**Comment #8**: Page 20: For figure 8, consider adding numbering to intersections/corridors to tie back to tables easier.

**Response #8**: Intersection and street corridor numbering has been added to Figure 8.

**Comment #9**: Pages 16 & 35: Provide more details in the notes of Tables 3 and 9 related to delay and LOS for clarification – Signals, use signalized thresholds for overall intersection, AWSC/Roundabout – use stop control thresholds for overall intersection, TWSC use stop control thresholds for worst approach.

**Response #9**: Notes have been added to LOS tables.

**Comment #10**: [General comment]: Provide additional discussion on the Sunrise Ridge extension and what project or development will trigger the opening. Will the extension be completed as part of the Pinnacle at Liberty Bay development?

**Response #10**: The Sunrisde Ridge Avenue NE extension will be completed as part of the project's first phase. An explanatory statement has been added to the "Study Area" section of the report.

**Comment #11**: [General comment:] Adding the access points to the study area map or site plan would be helpful in understanding the traffic to and from the site. Consider adding labels for access points A, B, C/D, and E to the maps/figures.

**Response #11**: Site plan (Figure 2) has been updated to identify access locations.

**Comment #12**: [General comment:] The city guidelines state that intersections should be analyzed for intersections with over approximately 10 new trips added. Were additional intersections to the north or west of Hostmark Street/SR 305 considered for analysis (where >10 trips along those roadways are being generated per Figures 9 and 10).

**Response #12**: The TIA study area was approved by City staff via email on June 10, 2025. Minor scoping revisions provided by City staff at that time were incorporated to the TIA and are reflected in the report.

**Olympic Region**

# PLANS, SPECIFICATIONS AND ESTIMATE
# Review Comment Disposition Form

| | | | |
|---|---|---|---|
| Project Title: | Pinnacle at Liberty Bay | Job Charge #: | |
| Reviewer (name & office) Casey Chilton– Traffic Design<br><br>Date of Review Comments: 7/29/25 | | Responses By: Andrew L. Bratlien, PE, PTOE<br><br>Date of Disposition: 11/12/2025 | |

| Comment No. | Sht or Pg. | Review Comment | Status Code | Designer's Response |
|---|---|---|---|---|
| 1. | PDF p8 | SR 305 speed limit at this location is 50 MPH.<br>The roundabout at Johnson Rd NE and SR 305 includes pedestrian and bike facilities, but they do not continue along SR 305. Can you please mark "no" for these categories? An asterisk with a note about the RAB having facilities would be a great way to document this. | | Table 1 has been updated to incorporate these comments. |
| 2. | PDF p9 | Future analysis assumes Sunrise Ridge Ave NE will be opened to through traffic, can you please add details on why this assumption was made? Did the city confirm if/when this will happen? | | The Sunrise Ridge Ave NE extension will be completed as part of the project's first phase. An explanatory statement has been added to the "Study Area" section of the report. |
| 3. | GEN | Can you please speak to why the addition of the project traffic volumes will result in a decrease in delay at the following locations? If optimize was used, please reproduce without.<br>**Table 8: Forecast 2032 & 2037 Weekday Peak Hour Level of Service**<br>(Delays Given in Seconds per Vehicle) | | Project-generated trips at the SR 305 & Baywatch Ct NE intersection are distributed predominantly to/from the north, resulting in an increase in right-turn volume on the stop-controlled Baywatch Ct NE approach. The utilization of available capacity on the relatively low-delay right-turn movement results in a decreased in weighted average approach delay. |
| 4. | | | | |

| Intersection | Control | Peak-Hour | Crt. Apprch | Without Project LOS | Without Project Delay | With Project LOS | With Project Delay |
|---|---|---|---|---|---|---|---|
| **Forecast 2032 Peak Hour Analysis** | | | | | | | |
| SR 305 & Hostmark | Signal | AM | Overall | D | 36.5 | D | 37.2 |
| | | PM | | D | 44.5 | D | 44.7 |
| SR 305 & Baywatch | One-Way Stop | AM | SB | C | 21.8 | C | 16.4 |
| | | PM | | D | 25.8 | C | 24.7 |
| SR 305 & Johnson | RAB | AM | Overall | A | 7.4 | A | 7.7 |
| | | PM | | A | 6.6 | A | 6.8 |
| Sunrise Ridge & Johnson | RAB | AM | Overall | A | 5.6 | A | 5.7 |
| | | PM | | A | 6.0 | A | 6.5 |
| Sunrise Ridge & Crystallia | One-Way Stop | AM | EB | – | – | A | 8.8 |
| | | PM | | | | A | 8.8 |
| Hostmark & Caldart | AWSC | AM | Overall | C | 22.6 | C | 24.2 |
| | | PM | | B | 14.9 | C | 15.2 |
| Sunrise Ridge & Caldart | TWSC | AM | NB | A | 9.7 | A | 9.8 |
| | | PM | | B | 10.0 | B | 10.1 |
| **Forecast 2037 Peak Hour Analysis** | | | | | | | |
| SR 305 & Hostmark | Signal | AM | Overall | D | 37.0 | D | 37.6 |
| | | PM | | D | 45.9 | D | 46.3 |
| SR 305 & Baywatch | One-Way Stop | AM | SB | C | 19.7 | C | 16.0 |
| | | PM | | C | 23.5 | C | 23.7 |
| SR 305 & Johnson | RAB | AM | Overall | A | 7.5 | A | 7.7 |
| | | PM | | A | 6.7 | A | 6.8 |
| Sunrise Ridge & Johnson | RAB | AM | Overall | A | 5.5 | A | 6.1 |
| | | PM | | A | 5.9 | A | 6.4 |
| Sunrise Ridge & Crystallia | One-Way Stop | AM | EB | – | – | A | 8.9 |
| | | PM | | | | A | 8.8 |
| Hostmark & Caldart | AWSC | AM | Overall | F | 61.9 | F | 63.3 |
| | | PM | | D | 26.1 | D | 27.0 |
| Sunrise Ridge & Caldart | TWSC | AM | NB | A | 9.9 | B | 10.0 |
| | | PM | | B | 10.4 | B | 10.5 |

RAB: Roundabout

**SR 305 & Baywatch Court NE** will operate acceptably at LOS D or better through 2037, with average delay of 26 seconds or less on the stop-controlled southbound

Status Code Legend: A = Incorporated B = Open/Under Review C = Evaluated/Not Incorporated D = Beyond Scope/Not Evaluated
All "B" and "C" responses require explanatory comments.

# THE PINNACLE AT LIBERTY BAY
# TRAFFIC IMPACT ANALYSIS

## CONTENTS


1. Introduction ..... 5
2. Project Description ..... 5
3. Existing Conditions ..... 8
4. Forecast Traffic Demand and Analysis ..... 22
5. Conclusions & Mitigation ..... 41


## TABLES


1. Roadway Network ..... 8
2. Bus Routes ..... 9
3. 2025 Peak Hours ..... 10
4. Existing Peak Hour Level of Service ..... 17
5. Crash History by Year ..... 18
6. Crash History by Type ..... 19
7. Crash History by Severity ..... 20
8. Project Trip Generation ..... 22
9. Forecast 2032 & 2037 Weekday Peak Hour Level of Service ..... 37

# FIGURES


1. Vicinity Map ..... 6
2. Site Plan ..... 7
3. Existing AM Peak Hour Volumes ..... 12
4. Existing PM Peak Hour Volumes ..... 13
5. Existing AM Peak Hour Non-Motorist Volumes ..... 14
6. Existing PM Peak Hour Non-Motorist Volumes ..... 15
7. Safe Walking Route to Schools ..... 16
8. Collision History Map ..... 21
9. AM Peak Hour Trip Distribution & Assignment ..... 24
10. PM Peak Hour Trip Distribution & Assignment ..... 25
11. AM Peak Hour Pipeline Volumes ..... 26
12. PM Peak Hour Pipeline Volumes ..... 27
13. Forecast 2032 AM Peak Hour Volumes Without Project ..... 28
14. Forecast 2032 PM Peak Hour Volumes Without Project ..... 29
15. Forecast 2032 AM Peak Hour Volumes With Project ..... 30
16. Forecast 2032 PM Peak Hour Volumes With Project ..... 31
17. Forecast 2037 AM Peak Hour Volumes Without Project ..... 32
18. Forecast 2037 PM Peak Hour Volumes Without Project ..... 33
19. Forecast 2037 AM Peak Hour Volumes With Project ..... 34
20. Forecast 2037 PM Peak Hour Volumes With Project ..... 35
21. Baywatch Court NE Sight Distance Analysis ..... 39
22. Construction Route ..... 40

# THE PINNACLE AT LIBERTY BAY
# TRAFFIC IMPACT ANALYSIS

## 1. INTRODUCTION

Heath & Associates has been engaged to prepare a Traffic Impact Analysis (TIA) to assess the impacts of a proposed residential development within Poulsbo city limits. The tasks include reviewing existing traffic conditions in the site vicinity and comparing them to future buildout conditions, both with and without the proposed development. As a final step, conclusions, and if necessary, mitigation measures, will be identified. The TIA requirements were established during the scoping process with City staff.

## 2. PROJECT DESCRIPTION

- **Proposal**
  - The Pinnacle at Liberty Bay is a proposed residential development consisting of 151 single-family homes located within Poulsbo.

- **Location**
  - The subject site is bordered to the east by Sunset Ridge Avenue NE and single-family residential development, to the west by single-family residential development, and to the south by SR 305 and undeveloped property.
  - The site comprises 40.98 acres on four undeveloped tax parcels, 232601-4-001-2009, -3-003-2008, -3-018-2001, and -3-005-2006.

- **Site Access**
  - Access to the site will be provided at five locations:
    1. Access A: Baywatch Ct NE approximately 190 feet north of SR 305
    2. Access B: Sunrise Ridge Avenue via extension of Crystallia Court
    3. Access C/D: Both sides of Sunrise Ridge Avenue 220 feet south of Crystallia Court
    4. Access E: Sunrise Ridge Avenue 380 feet south of Crystallia Court
  - Direct property access will be provided via a network of internal circulating roadways.

A vicinity map is provided in **Figure 1** with the subject site highlighted in blue. A conceptual site plan including access locations is presented in **Figure 2**.

**Figure 1: Vicinity Map**






HEATH&ASSOCIATES
Transportation Planning & Engineering

# PINNACLE AT LIBERTY BAY

SITE PLAN
FIGURE 2

# 3. STUDY AREA

Study intersections were identified through scoping process and approved by City of Poulsbo staff. A total of seven study intersections were included in this analysis:

1. SR 305 & NE Hostmark Street
2. SR 305 & Baywatch Court NE
3. SR 305 & Johnson Road NE
4. NE Hostmark Street & Caldart Avenue NE
5. Johnson Road NE & Sunrise Ridge Avenue NE
6. Caldart Avenue NE & Sunrise Ridge Avenue NE
7. Sunrise Ridge Avenue NE & Crystallia Court

At the time of this analysis, Sunrise Ridge Avenue NE was gated to the northwest of Johnson Road NE. Therefore, the intersection of Sunrise Ridge Avenue NE & Crystallia Court (#7) currently operates with very low traffic volumes and was not included in this study's existing conditions analysis.

The Sunrisde Ridge Avenue NE connection to Johnson Road NE will be completed as part of The Pinnacle at Liberty Bay Phase 1; therefore the future conditions analysis considered all seven study intersections.

# 4. EXISTING CONDITIONS

## 3.1 Existing Street System

Characteristics of key roadways serving the subject site are provided in **Table 1**.

**Table 1: Roadway Network**

| Functional Classification | Roadway | Speed Limit (mph) | Lanes | Sidewalk | Bike Facilities |
|---|---|---|---|---|---|
| Principal Arterial | SR 305 | 50 | 2-5 | No* | No* |
| Minor Arterial | Johnson Rd NE | 25 | 2 | Yes | No |
| Neighborhood Collector | NE Hostmark St | 15-25 | 2-3 | Yes | Yes |
| | Caldart Ave NE | 20-25 | 2 | Yes | No |
| Local | Sunrise Ridge Ave NE | 25 | 2 | Yes | No |
| | Baywatch Ct NE | 25 | 2 | Yes | No |
| *SR 305 includes sidewalk and bike facilities only at the roundabout at SR 305 & Johnson Rd NE | | | | | |

## 3.2 Transit Service

A review of the Kitsap County Transit website indicates that transit is provided within one mile walking distance to/from the site. Route 344 – Poulsbo Central is provided at the intersection of Hostmark Street & Caldart Avenue approximately 3,500 feet north of the site. Route 333 – Silverdale/Bainbridge and Route 390 – Poulsbo/Bainbridge include stops at the intersection of SR 305 & Johnson Road, approximately 3,500 feet south of the project site. Each nearby route is identified in **Table 2** below. For more detailed information, refer to the Kitsap Transit website.

**Table 2: Bus Routes**

| Route | Description | Weekday Service | Saturday | Sunday | Nearest Stop |
|---|---|---|---|---|---|
| **333** | Silverdale TC to Bainbridge Ferry | 4:22 AM – 8:55 PM[1] | -- | -- | SR 305 & Johnson |
| **344** | North Viking TC to 10th & Forest Rock | 8:30 AM – 7:20 PM | 10:30 AM – 6:20 PM | -- | Caldart & Hostmark |
| **390** | North Viking TC to Bainbridge Ferry | 4:00 AM – 9:24 PM | 8:08 AM – 7:37 PM | 8:10 AM – 5:00 PM | SR 305 & Johnson |

## 3.3 Roadway Improvements

The City of Poulsbo's (2026-2031) Transportation Improvement Program (TIP) and Washington State Department of Transportation (WSDOT) 2025-2028 Statewide Transportation Improvement Program (STIP) were reviewed to identify planned transportation improvement projects in the site vicinity. The Poulsbo TIP identifies one such improvement, described below.

**Noll Road Corridor Improvements (Priority #2):** The phased corridor improvement project will connect SR 305 to NE Lincoln Rd via Noll Rd, Langaunet Ln & Maranatha Ln, providing roadway, illumination, sidewalk, and shared use path improvements. The project's initial phase, including realignment of Noll Road, a new roundabout at the Noll Road/Johnson Road & Sunrise Ridge Avenue intersection, and a new roundabout with nonmotorized facilities at the Johnson Road NE/SR 305 intersection, has been completed. Future phases will provide a roundabout at Noll Road & Mesford Road, an extension of Langaunet Lane, and complete street improvements along the corridor from Noll Road/Storhoff Road to Lincoln Road.

[1] Route does not run midday from 7:35 AM to 3:45 PM.

At the time of this analysis, Sunrise Ridge Avenue NE is closed between Noll Road/Johnson Road NE and NE Crystallia Court. The future conditions analyses described in this report assumed that Sunrise Ridge Avenue NE will be opened to traffic by 2032, creating a new north-south local street connection between Noll Road/Johnson Road NE and Caldart Avenue to the north. The traffic volume impacts of the Sunrise Ridge Avenue connection are described later in this report.

### 3.4 Existing Peak Hour Volumes and Travel Patterns

Field data for this study was collected from 7-9 AM and from 4-6 PM on non-holiday school weekdays in May 2025 at the following intersections:

1. SR 305 & NE Hostmark Street
2. SR 305 & Baywatch Court NE
3. SR 305 & Johnson Road NE
4. NE Hostmark Street & Caldart Avenue NE
5. Johnson Road NE & Sunrise Ridge Avenue NE

Traffic volumes at the intersections of Sunrise Ridge Avenue NE & Caldart Avenue and Sunrise Ridge Avenue NE & Crystallia Court were estimated based on traffic counts at nearby intersections and existing development patterns. Trips generated by existing development in the vicinity of the intersections were estimated using methodology and data published in the Institute of Transportation Engineers *Trip Generation Manual 11th Edition*.

Traffic counts at each intersection were reviewed to identify the one-hour peak period during each count, which was then applied to the intersection capacity analysis. The AM and PM peak hours of traffic volumes at each intersection are shown in **Table 3**. **Figures 3 and 4** illustrate existing AM and PM peak hour volumes at counted intersections. Full turning movement count sheets are available in the appendix.

**Table 3: 2025 Peak Hours**

| Study Intersection | AM Peak Hour | PM Peak Hour |
|---|---|---|
| SR 305 & Hostmark | 7:00 – 8:00 AM | 4:00 – 5:00 PM |
| SR 305 & Baywatch | 8:00 – 9:00 AM | 4:30 – 5:30 PM |
| SR 305 & Johnson | 7:00 – 8:00 AM | 4:15 – 5:15 PM |
| Hostmark & Caldart | 7:15 – 8:15 AM | 4:45 – 5:45 PM |
| Johnson Rd & Sunrise Ridge | 7:15 – 8:15 AM | 4:00 – 5:00 PM |

Traffic volume data indicated that the morning peak hour generally coincides with the school drop-off period and the morning commuter "rush hour." These concurrent phenomena are reflected in the AM peak hour analyses described in this report. The afternoon school peak period is generally brief and is offset from the overall afternoon peak hour of travel demand, which occurs later and is characterized by commuters returning home from work as well as recreational and shopping trips. The PM peak hour analysis described in this report focused on the overall systemwide peak to provide a worst-case analysis.

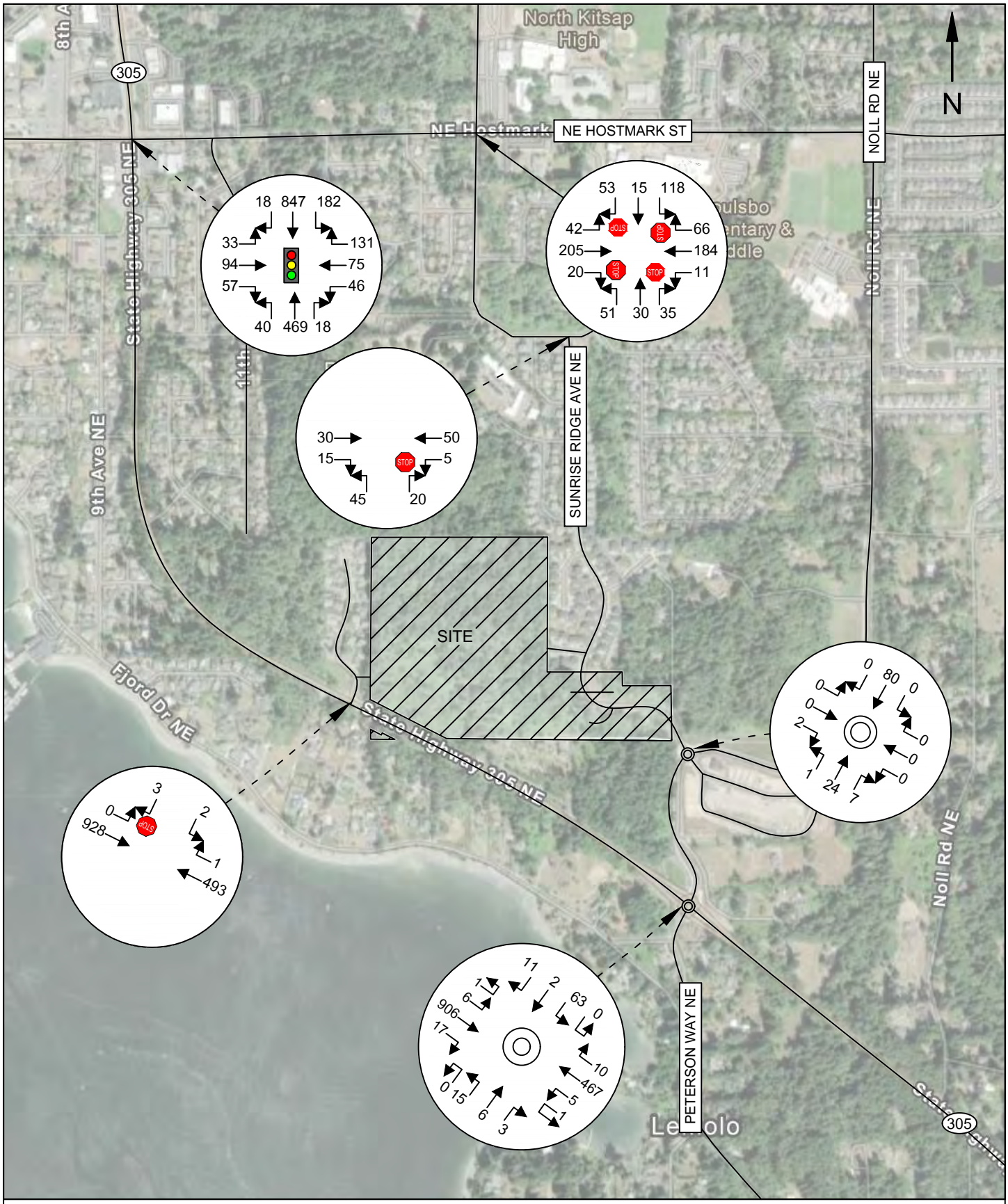
### 3.5 Nonmotorized Conditions

Nonmotorized traffic was included in the AM and PM peak hour counts. Refer to **Figures 5 and 6** for AM and PM peak hour nonmotorized peak hour activity at each study intersection.

Nonmotorized infrastructure in the project vicinity includes sidewalks along both sides of Sunrise Ridge Avenue NE, Caldart Avenue NE, NE Hostmark Street, and Johnson Road NE. Sidewalks along Johnson Road NE to the south of the project provide a nonmotorized connection to transit stops on SR 305. The planned Noll Road corridor improvements will provide sidewalk and shared-use path facilities to the northeast of the project.

The internal circulating street network will include sidewalks and marked pedestrian crosswalks in the project site.

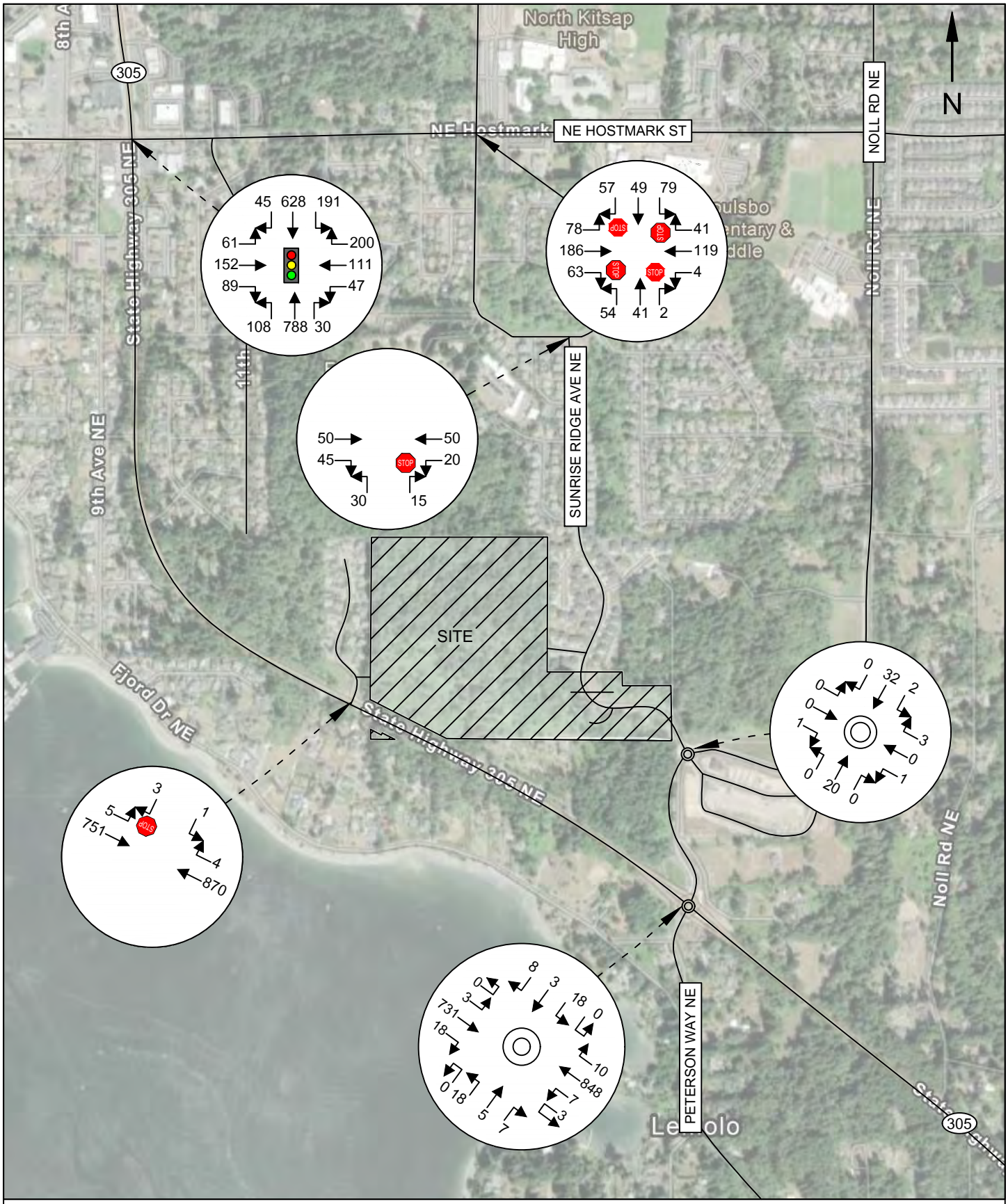
School-aged residents of the project would likely attend Poulsbo Elementary School and Poulsbo Middle School, both located approximately 1.0-miles walking distance to the north of the site. Continuous sidewalk segments, marked crosswalks, and reduced school speed zone signs are provided between the site and schools facilitating student transport. Refer to **Figure 7** for the pedestrian routes to and from each school.




HEATH&ASSOCIATES
Transportation Planning & Engineering

PINNACLE AT LIBERTY BAY

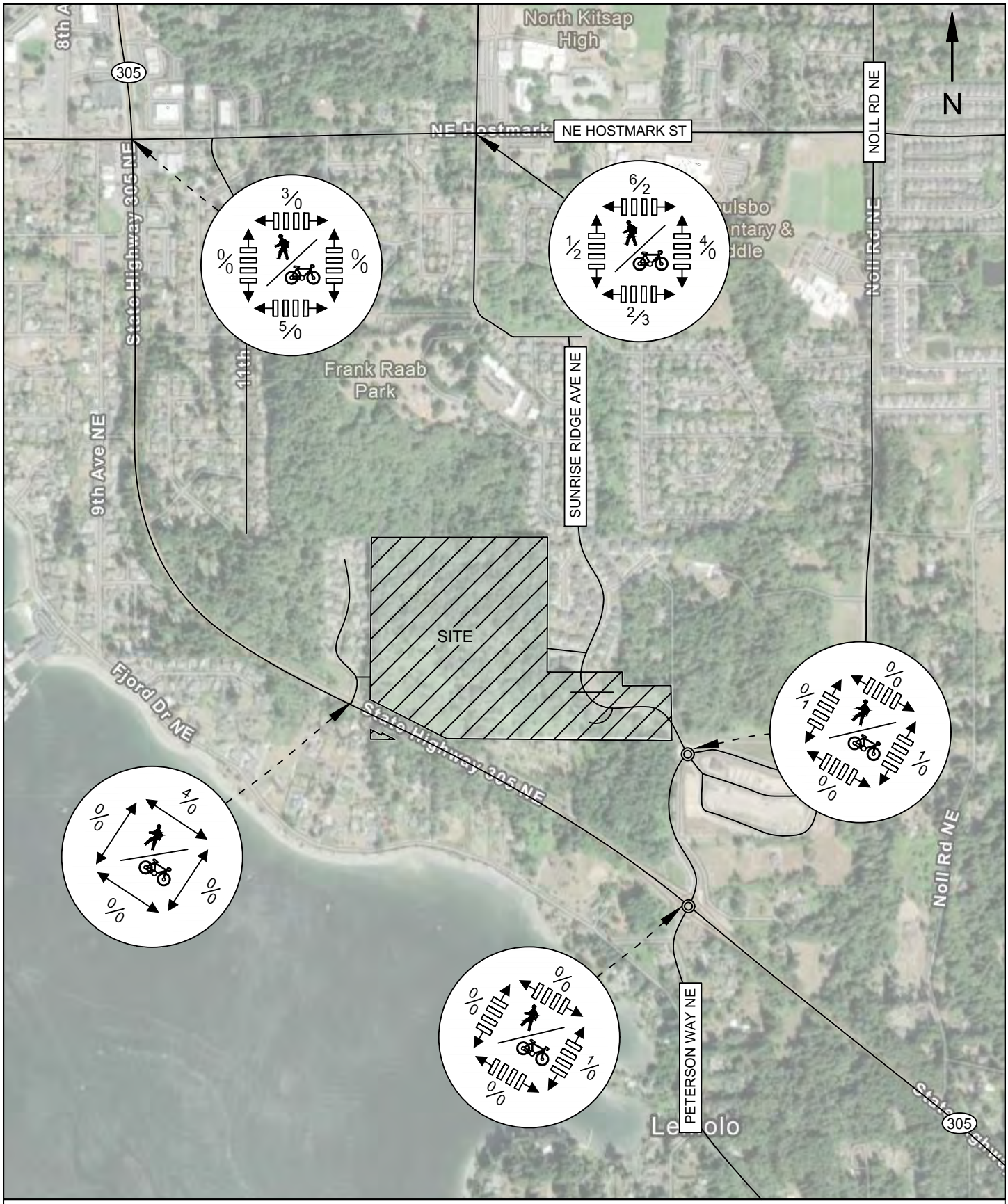
EXISTING AM PEAK HOUR VOLUMES
FIGURE 3




HEATH&ASSOCIATES
Transportation Planning & Engineering

## PINNACLE AT LIBERTY BAY

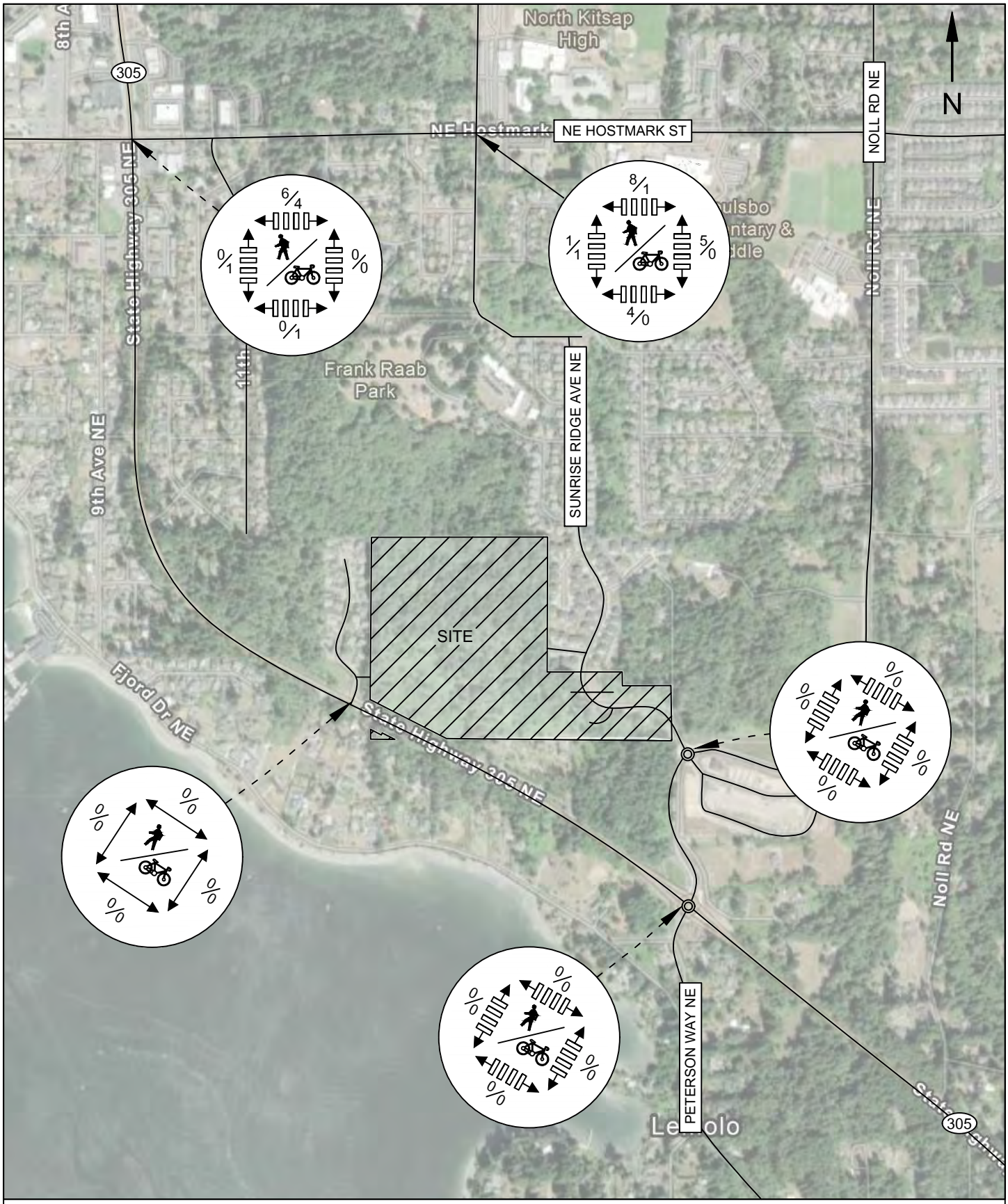
EXISTING PM PEAK HOUR VOLUMES
FIGURE 4




HEATH&ASSOCIATES
Transportation Planning & Engineering

PINNACLE AT LIBERTY BAY

EXISTING AM PEAK HOUR NON-MOTORIST VOLUMES
FIGURE 5




HEATH&ASSOCIATES
Transportation Planning & Engineering

PINNACLE AT LIBERTY BAY

EXISTING PM PEAK HOUR NON-MOTORIST VOLUMES
FIGURE 6




HEATH&ASSOCIATES
Transportation Planning & Engineering

PINNACLE AT LIBERTY BAY

SAFE ROUTES TO SCHOOL MAP
FIGURE 7

## 3.6 Existing Level of Service

Level of Service (LOS) is a measure of congestion for transportation facilities which uses a range[2] from LOS A to LOS F, where LOS A indicates free-flow conditions with low delay and LOS F indicates congested conditions with high delay. For minor-approach stop-controlled intersections, LOS is determined by the highest-delay approach. For all other intersections, LOS is defined by the overall intersection delay.

Signalized and stop-controlled intersection operations were analyzed in Synchro 12 software using *Highway Capacity Manual 7th Edition* methodologies. Roundabout operations were analyzed in Sidra Intersection 10 software using WSDOT Sidra analysis guidance. Results of the existing LOS analysis are summarized in **Table 4**.

The City of Poulsbo has adopted a minimum LOS E standard for City intersections. Minimum LOS standards for State-owned facilities are set by WSDOT. The WSDOT minimum LOS standard for SR 305 is LOS D.

**Table 4: Existing Peak Hour Level of Service**

*Delays given in seconds per vehicle*

| Intersection | Control | Peak Hour | Critical Approach | LOS* | Delay |
|---|---|---|---|---|---|
| SR 305 & Hostmark St | Signal | AM | Overall | D | 35.9 |
| | | PM | | D | 44.0 |
| SR 305 & Baywatch Ct | One-Way Stop | AM | SB | C | 20.5 |
| | | PM | | C | 23.8 |
| SR 305 & Johnson Rd | RAB | AM | Overall | A | 7.1 |
| | | PM | | A | 6.4 |
| Hostmark & Caldart | AWSC | AM | Overall | C | 15.1 |
| | | PM | | B | 12.0 |
| Johnson Rd & Sunrise Ridge | RAB | AM | Overall | A | 5.1 |
| | | PM | | A | 5.1 |
| Caldart Ave & Sunrise Ridge | TWSC | AM | NB | A | 9.4 |
| | | PM | | A | 9.7 |

*Signalized intersection LOS is based on overall intersection delay;
Roundabout and AWSC LOS is based on overall intersection delay and stop-controlled delay thresholds;
Minor-approach stop control LOS is based on worst-approach delay and stop-controlled delay thresholds

[2] *Signalized Intersections - Level of Service*

| Level of Service | Control Delay (sec/veh) |
|---|---|
| A | <10 |
| B | ≥10 and <20 |
| C | ≥20 and <35 |
| D | ≥35 and <55 |
| E | ≥55 and <80 |
| F | ≥80 |

*Stop Controlled Intersections – Level of Service*

| Level of Service | Control Delay (sec/veh) |
|---|---|
| A | <10 |
| B | ≥10 and <15 |
| C | ≥15 and <25 |
| D | ≥25 and <35 |
| E | ≥35 and <50 |
| F | ≥50 |

Source: *Highway Capacity Manual, 7th Edition*

All intersections currently operate at LOS D or better, satisfying their respective minimum LOS standards during the AM and PM peak hours.

### 3.7 Collision History

Crash history data in the project vicinity for the five-year period from 2020 through 2024 was obtained from WSDOT and is summarized below. **Table 5** describes crash history by year.

**Table 5: Crash History by Year**

| **(Ref #) Intersection/Segment** | **2020** | **2021** | **2022** | **2023** | **2024** | **Total** | **Avg/Yr** |
|---|---|---|---|---|---|---|---|
| *Study Intersections* | | | | | | | |
| (I1) SR 305 & Hostmark St | 2 | 3 | 2 | 1 | 4 | 12 | 2.4 |
| (I2) SR 305 & Baywatch Ct | 0 | 0 | 1 | 0 | 1 | 2 | 0.4 |
| (I3) SR 305 & Johnson Rd | 3 | 0 | 3 | 3 | 4 | 13 | 2.6 |
| (I4) Hostmark St & Caldart Ave | 2 | 1 | 0 | 2 | 0 | 5 | 1.0 |
| (I5) Johnson Rd & Sunrise Ridge | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| (I6) Caldart Ave & Sunrise Ridge | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| (I7) Sunrise Ridge & Crystallia Ct | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| *Study Street Segments* | | | | | | | |
| (S1) SR 305 s/o Hostmark St | 0 | 2 | 3 | 0 | 2 | 7 | 1.4 |
| (S2) SR 305 s/o Baywatch Ct | 0 | 2 | 0 | 0 | 0 | 2 | 0.4 |
| (S3) SR 305 s/o Johnson Rd | 1 | 0 | 0 | 1 | 0 | 2 | 0.4 |
| (S4) Caldart Ave n/o Hostmark | 0 | 0 | 0 | 1 | 1 | 2 | 0.4 |
| **Total (All Intersections & Segments)** | **8** | **8** | **9** | **8** | **12** | **45** | **9.0** |

A total of 45 crashes were recorded in the study area during the five-year study period, including 12 resulting in injury. No serious injury or fatal crashes were reported. Crashes are summarized by type in **Table 6** and by severity in **Table 7**.

**Table 6: Crash History by Type**

| Crash Type | Number of Crashes (2020-2024) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Intersections | | | | | | | Street Segments | | | |
| | I1 | I2 | I3 | I4 | I5 | I6 | I7 | S1 | S2 | S3 | S4 |
| Rear-end | 5 | 0 | 8 | 3 | 0 | 0 | 0 | 3 | 0 | 1 | 0 |
| Enter at angle | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Opposite direction | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| Same direction | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrian-Involved | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sideswipe | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| Struck fixed object | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 |
| Vehicle overturned | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Table7: Crash History by Severity**

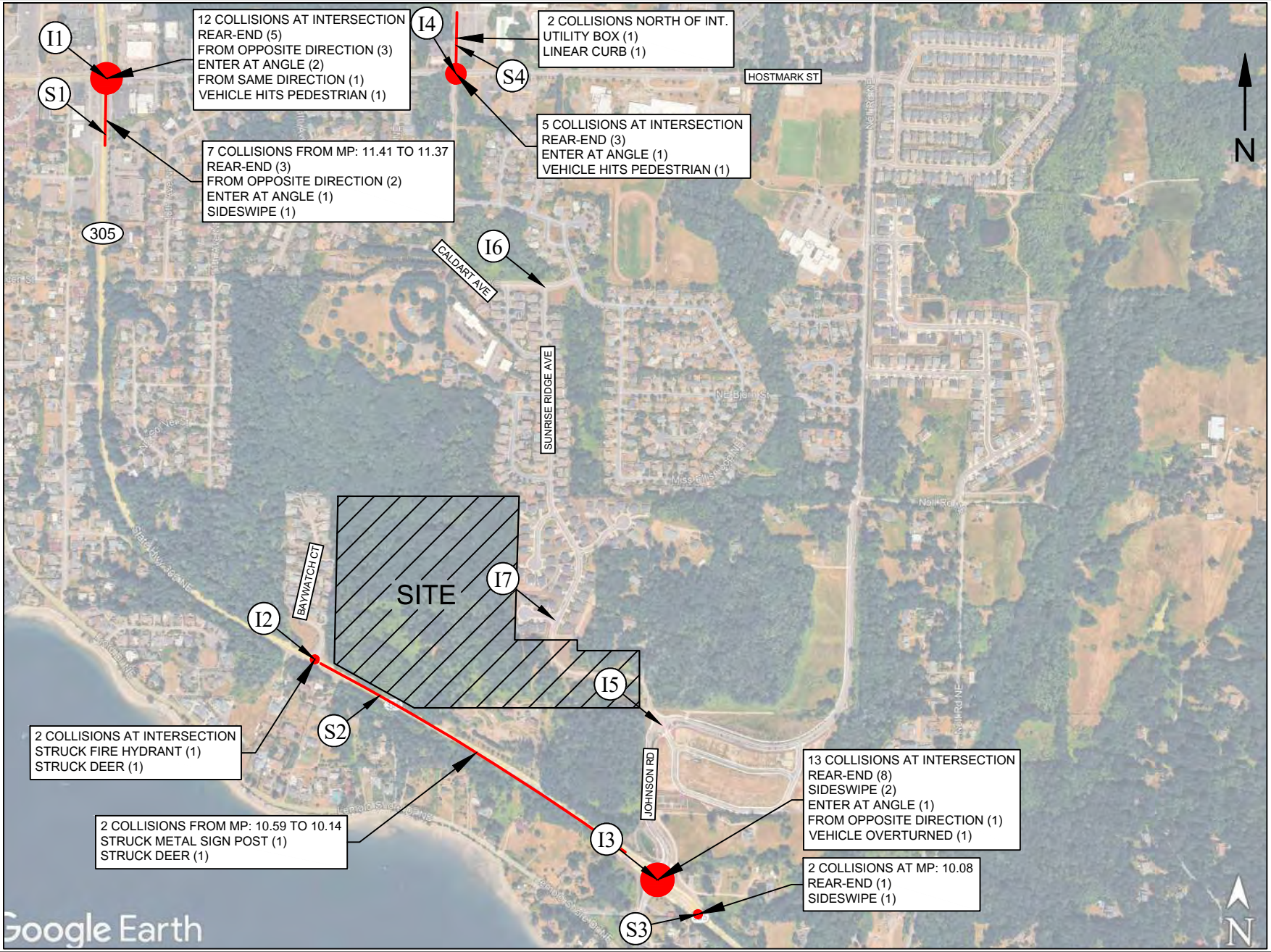
| (Ref #) Intersection/Segment | Fatal (K) | Serious Injury (A) | Minor Inj. (B) | Possible Inj. (C) | PDO |
|---|---|---|---|---|---|
| (I1) SR 305 & Hostmark St | 0 | 0 | 1 | 1 | 10 |
| (I2) SR 305 & Baywatch Ct | 0 | 0 | 0 | 0 | 2 |
| (I3) SR 305 & Johnson Rd | 0 | 0 | 2 | 2 | 9 |
| (I4) Hostmark St & Caldart Ave | 0 | 0 | 1 | 2 | 2 |
| (I5) Johnson Rd & Sunrise Ridge | 0 | 0 | 0 | 0 | 0 |
| (I6) Caldart Ave & Sunrise Ridge | 0 | 0 | 0 | 0 | 0 |
| (I7) Sunrise Ridge & Crystallia Ct | 0 | 0 | 0 | 0 | 0 |
| (S1) SR 305 s/o Hostmark St | 0 | 0 | 1 | 1 | 5 |
| (S2) SR 305 s/o Baywatch Ct | 0 | 0 | 0 | 0 | 2 |
| (S3) SR 305 s/o Johnson Rd | 0 | 0 | 1 | 0 | 1 |
| (S4) Caldart Ave n/o Hostmark | 0 | 0 | 0 | 0 | 2 |

Six of the 45 total crashes resulted in minor injuries, and six crashes resulted in possible injuries. Two pedestrian-involved crashes were reported and are summarized below. A crash history map is provided in **Figure 8**.

Vehicle Going Straight Hits Pedestrian (August 2023):
This crash occurred in August 2023 at 2:30 PM when a vehicle traveling eastbound on Hostmark Street struck a pedestrian between Caldart Avenue and Noll Road. The crash occurred in daylight with dry roadway conditions. Pedestrian failure to grant

right-of-way to vehicle was cited as a contributing factor. The collision resulted in a suspected minor injury.

Vehicle Going Straight Hits Pedestrian (October 2024):
This crash occurred at the intersection of SR 305 & Hostmark Street in October 2024 at 5:10 PM vehicle traveling southbound on SR 305 struck a pedestrian. The crash occurred during daylight with a dry roadway surface. Pedestrian failure to grant right-of-way to vehicle was cited as a contributing factor. The crash resulted in a suspected minor injury.




HEATH&ASSOCIATES
Transportation Planning & Engineering

## PINNACLE AT LIBERTY BAY

COLLISION HISTORY MAP
FIGURE 8

# 5. FORECAST TRAFFIC DEMAND & ANALYSIS

## 4.1 Project Trip Generation

Trip generation is used to assess the impact a project will have on the surrounding street system by estimating the number of new trips that will enter and exit the site during specific time periods, such as peak hours (AM or PM) or over the course of a day. The expected vehicle trip generation for the proposed project was calculated using data from the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 11th Edition*. For this analysis, Land Use Code (LUC) 210 – Single-Family Detached Housing was selected, with dwelling units used as the input variable and ITE average rates applied to determine the number of trip ends.

A summary of the average weekday daily trips (AWDT), AM peak hour trips, and PM peak hour trips are shown below in **Table 8**.

**Table 8: Project Trip Generation**

| Land Use | Units | AWDT | AM Peak-Hour Trips | | | PM Peak-Hour Trips | | |
|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total |
| LUC 210 - Single-Family Housing | 151 | 1,424 | 26 | 80 | 106 | 89 | 53 | 142 |

Based on ITE data, the project is estimated to generate 1,424 daily weekday trips, 106 AM peak hour trips (26 inbound / 80 outbound), and 142 PM peak hour trips (89 inbound / 53 outbound).

## 4.2 Project Distribution & Assignment

Trip distribution is the process by which project-generated trips are paired with origins and destinations in the vicinity of the project site. The project trip distribution forecast was calculated based on recent traffic counts, existing and anticipated development in the project vicinity, and with consideration for other recent residential projects in the vicinity.

Project trip distribution and assignment forecasts, shown in **Figures 9** and **10**, assumed completion of the Sunrise Ridge Avenue NE corridor which will provide a connection between Noll Road/Johnson Road and Caldart Avenue.

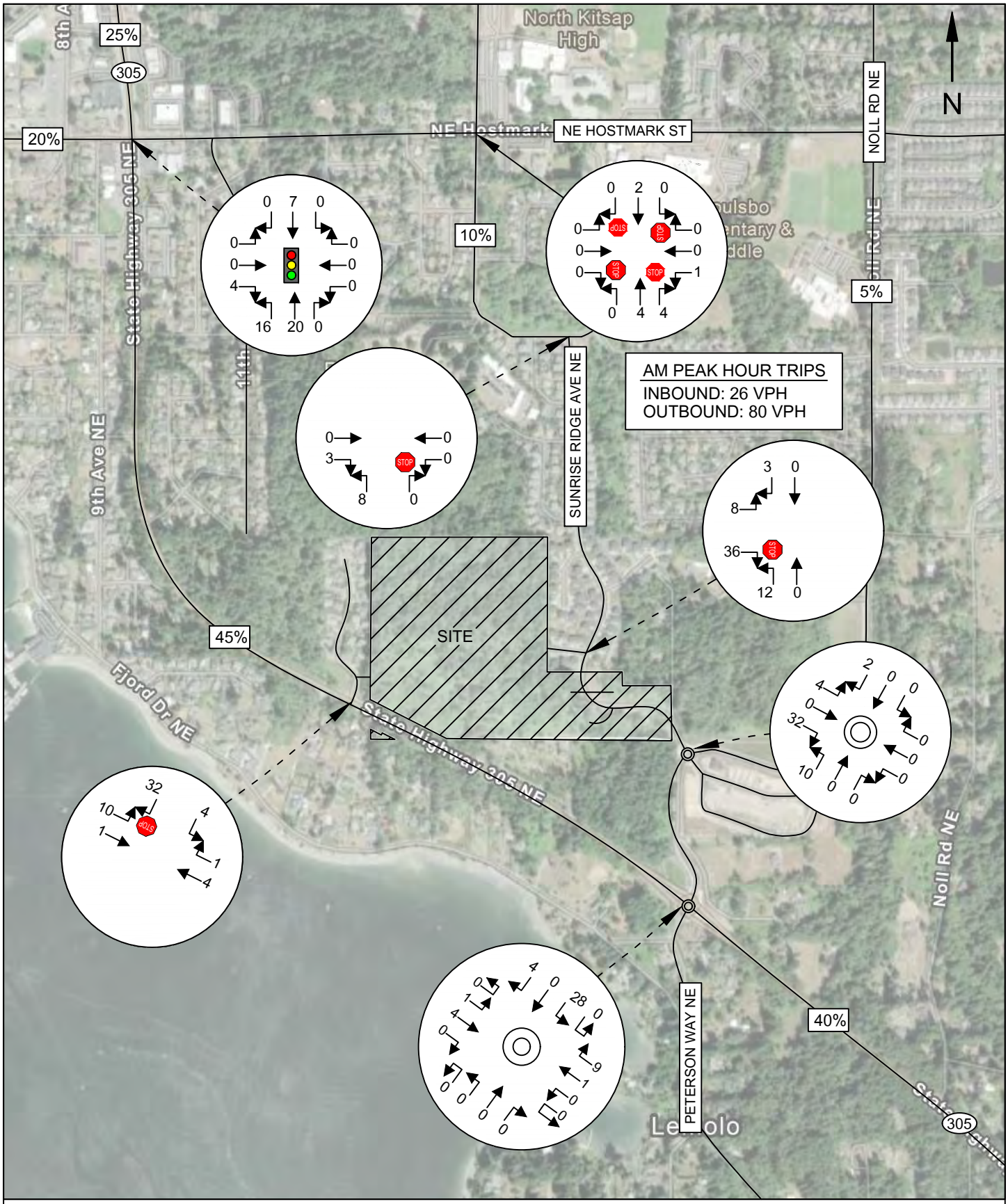
## 4.3 Future Peak Hour Volumes

Future traffic volumes were forecast for seven-year (2032) and 12-year (2037) analysis periods. Background (non-Project) traffic volumes were forecast as the sum of two components:

1. **Pipeline growth** reflects the impacts of specific projects which have been permitted in the project vicinity. Pipeline projects were identified by City of Poulsbo staff and included:
    a. Aktiv Mixed-Use, a 44-unit multifamily residential development located at the corner of NE Harrison Street and 9th Avenue NE.
    b. Audrey Estates, a 60-unit single-family residential development located to the east of the project site. Audrey Estates is bordered by Noll Road to the east and south, with access on Sunrise Ridge Avenue.
    c. Sandstone Ridge Plat, an 87-unit single-family residential development located at the corner of Noll Road NE & Langaunet Lane NE.
2. **Background growth** reflects the impacts of other local and regional growth which is anticipated to impact the study area. Background growth was calculated by applying growth rates:
    a. For SR 305, a growth rate of 0.5 percent per year was applied. This is consistent with SR 305 forecasts identified in the travel demand model, which constitutes the basis of the Transportation Element of the Poulsbo Comprehensive Plan
    b. For all other streets, a growth rate of 2.0 percent per year was applied. This represents a more aggressive growth forecast than the 1.2 percent per year growth rate identified in the Poulsbo travel demand model. However, this growth rate was selected to allow the analysis to reflect a "worst case" forecast given recent growth in the project vicinity.

All future year analyses assumed Sunrise Ridge Avenue NE will be opened to traffic by 2032, creating a new north-south local street connection between Noll Road/Johnson Road NE and Caldart Avenue to the north. The new connection will provide a low-speed, circuitous alternative to the more direct Noll Road corridor, and will be designed to discourage cut-through demand. However, some redistribution and cut-through demand may occur. This analysis assumed that the new connection will capture 20 percent of existing AM and PM peak hour demand on the Noll Road corridor to the east. This results in a Sunrise Ridge Avenue traffic volume forecast which is generally consistent with the City of Poulsbo travel demand model forecast.

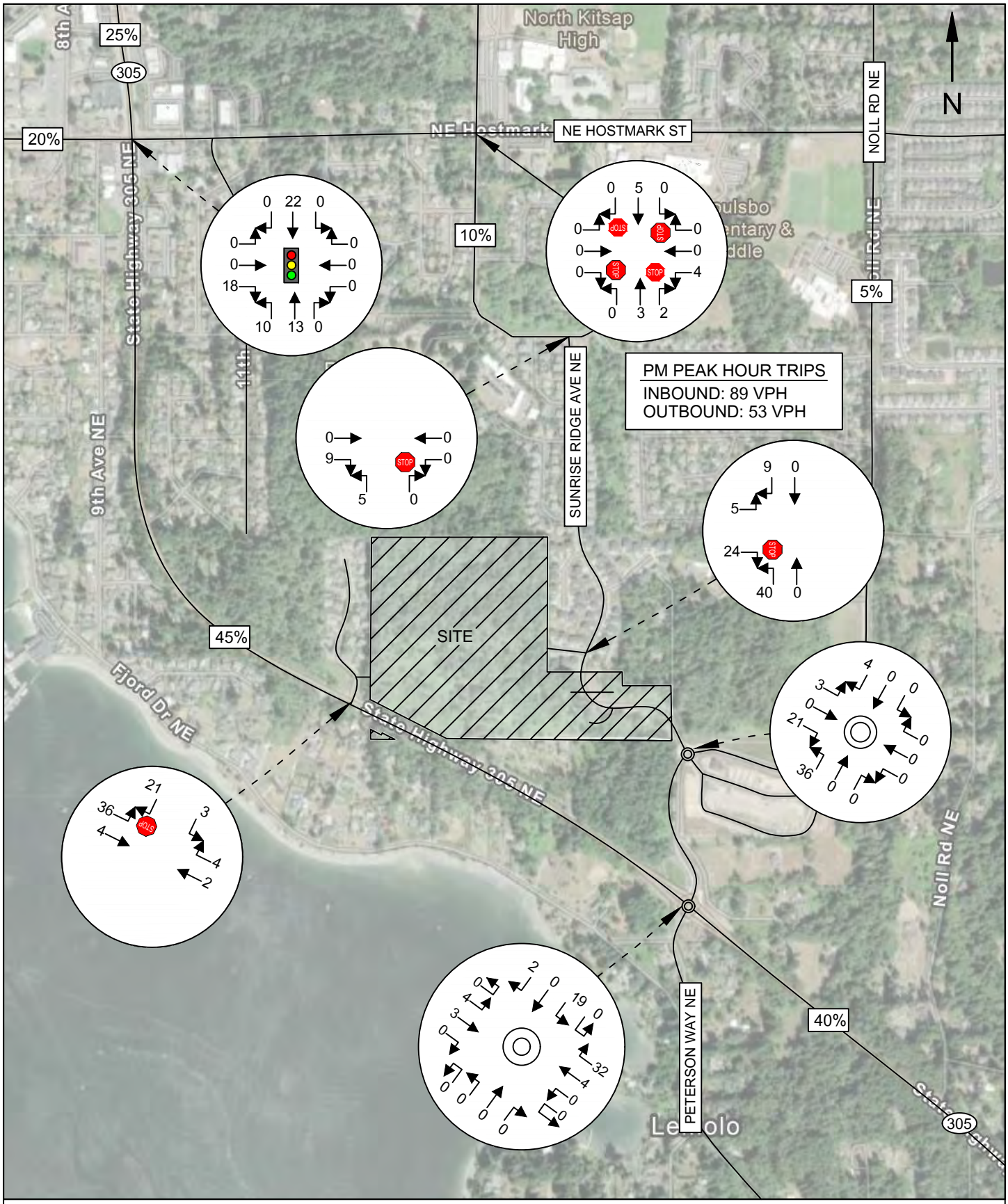
AM and PM peak hour pipeline volumes are shown in **Figures 11 and 12**. Future 2032 and 2037 AM and PM peak hour traffic volumes forecasts are shown graphically in **Figures 13 through 20**.




HEATH&ASSOCIATES
Transportation Planning & Engineering

## PINNACLE AT LIBERTY BAY

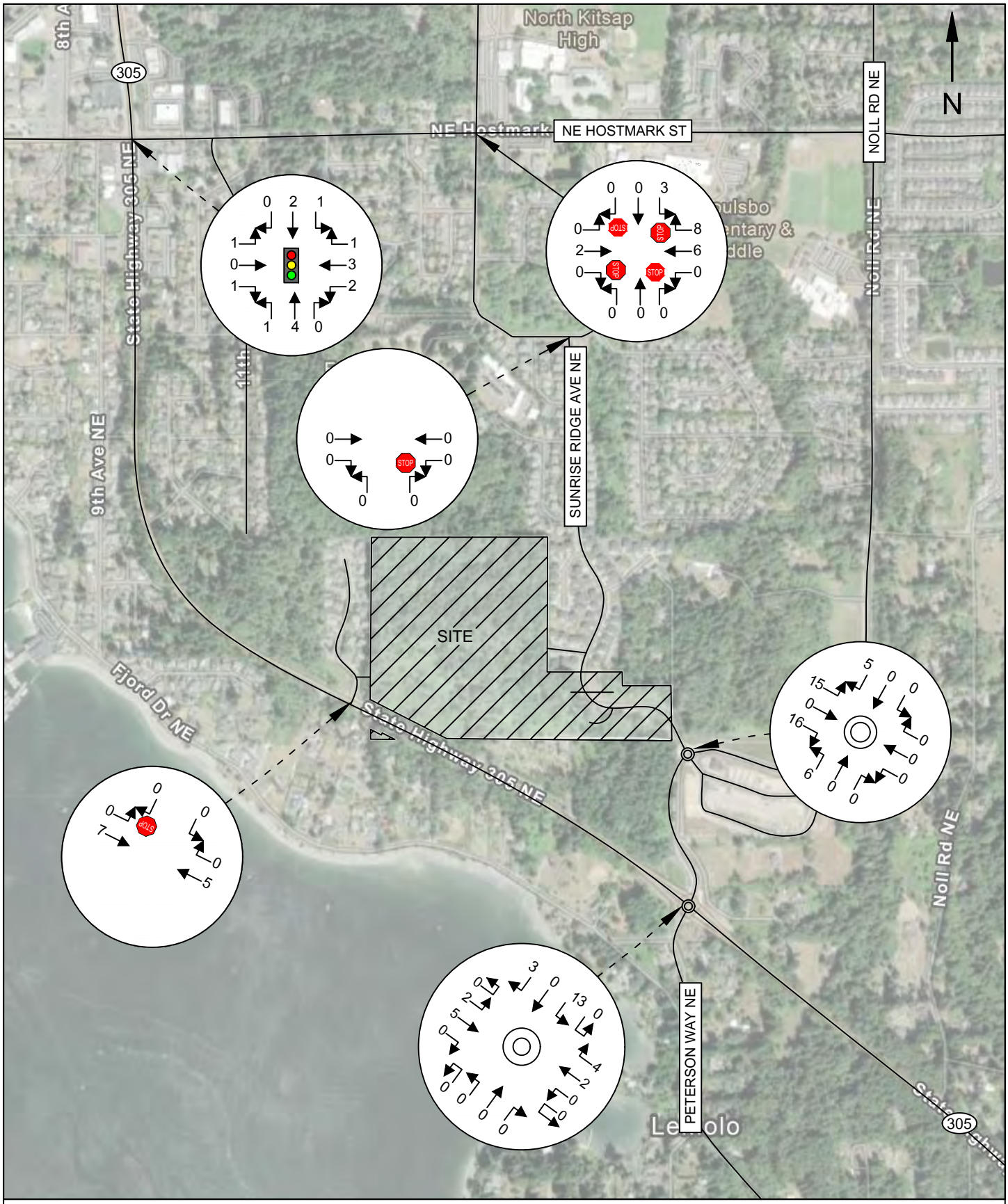
AM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT
FIGURE 9




HEATH&ASSOCIATES
Transportation Planning & Engineering

## PINNACLE AT LIBERTY BAY

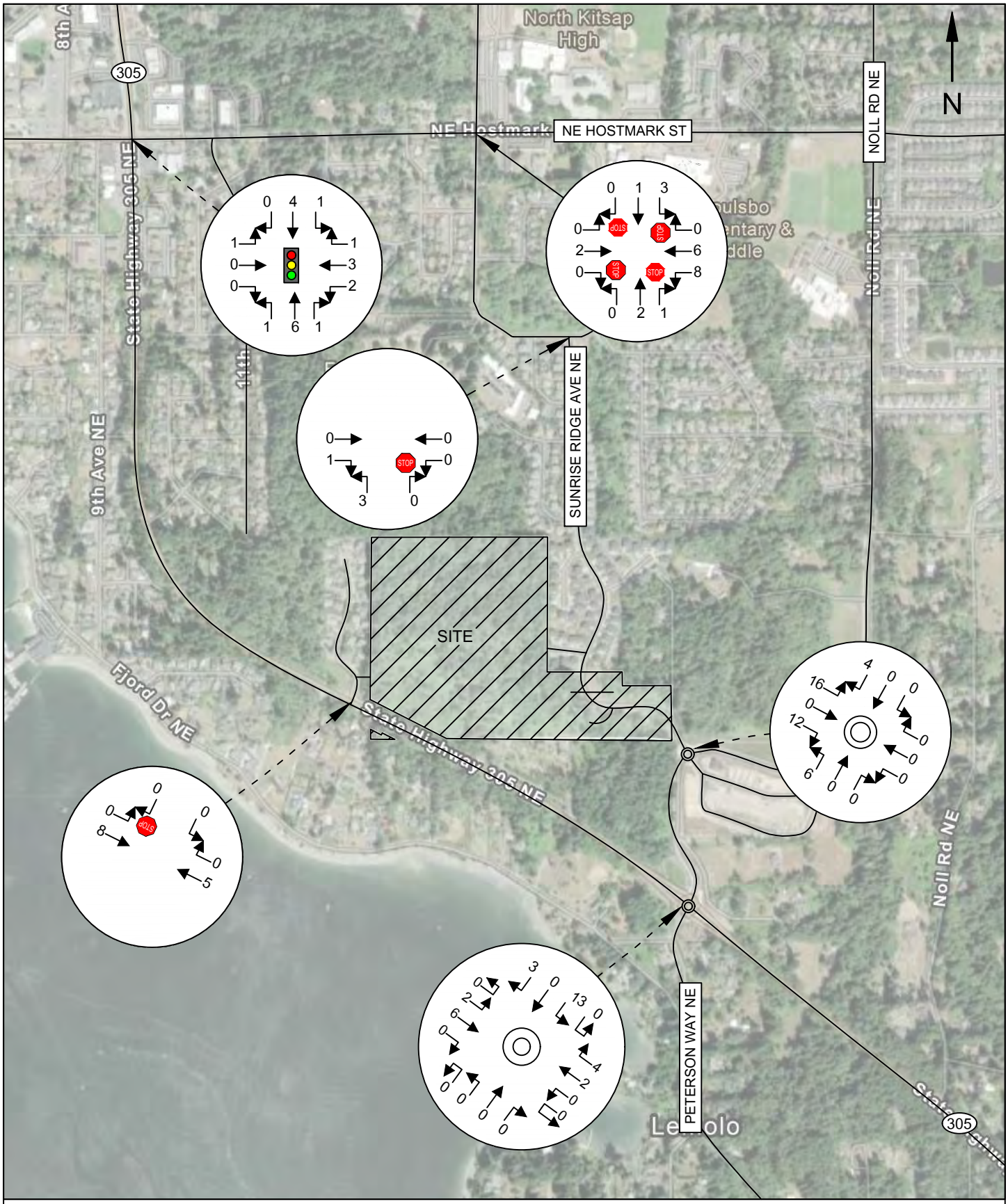
PM PEAK HOUR TRIP DISTRIBUTION & ASSIGNMENT
FIGURE 10




HEATH&ASSOCIATES
Transportation Planning & Engineering

PINNACLE AT LIBERTY BAY

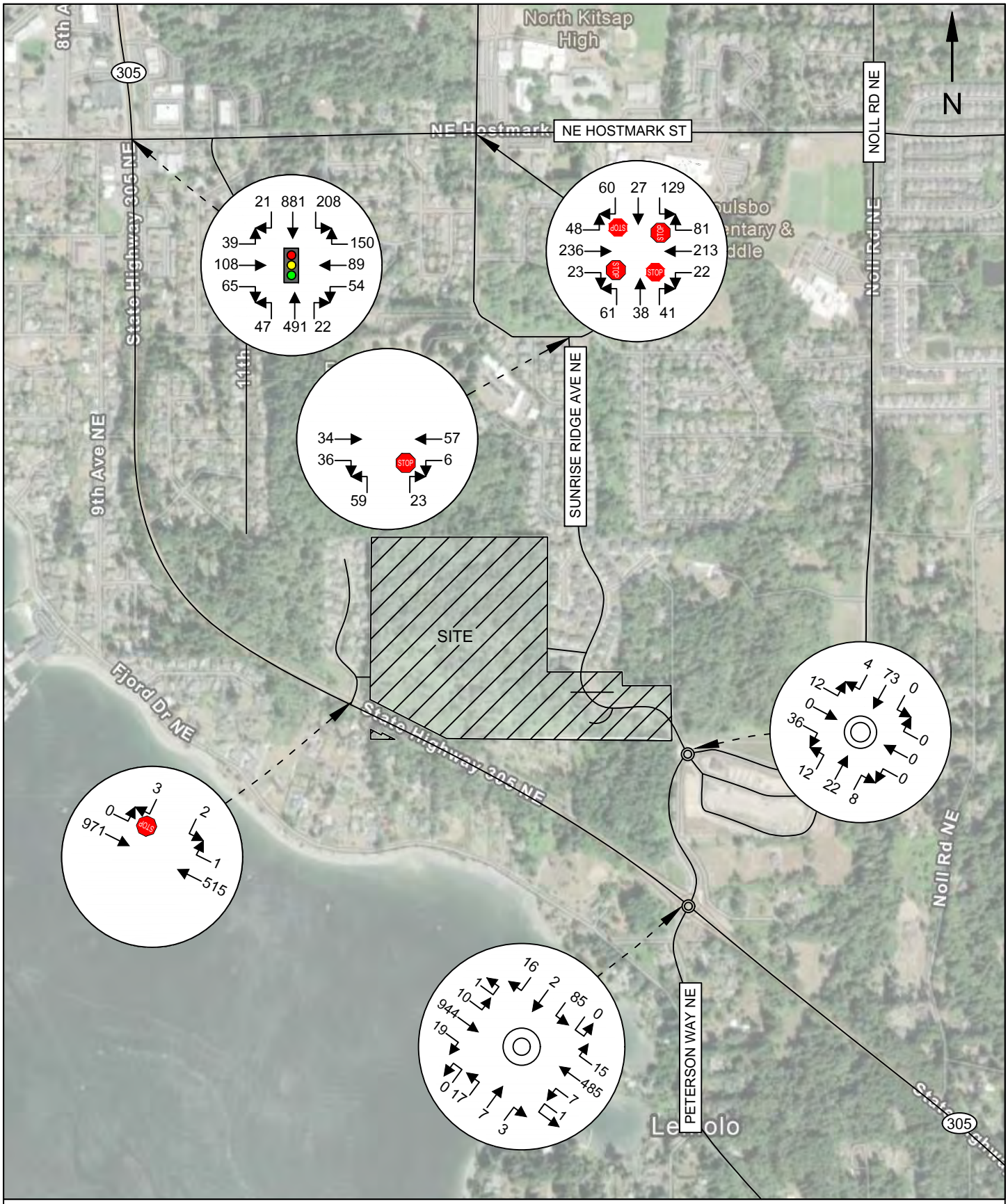
AM PEAK HOUR PIPELINE VOLUMES
FIGURE 11




HEATH&ASSOCIATES
Transportation Planning & Engineering

## PINNACLE AT LIBERTY BAY

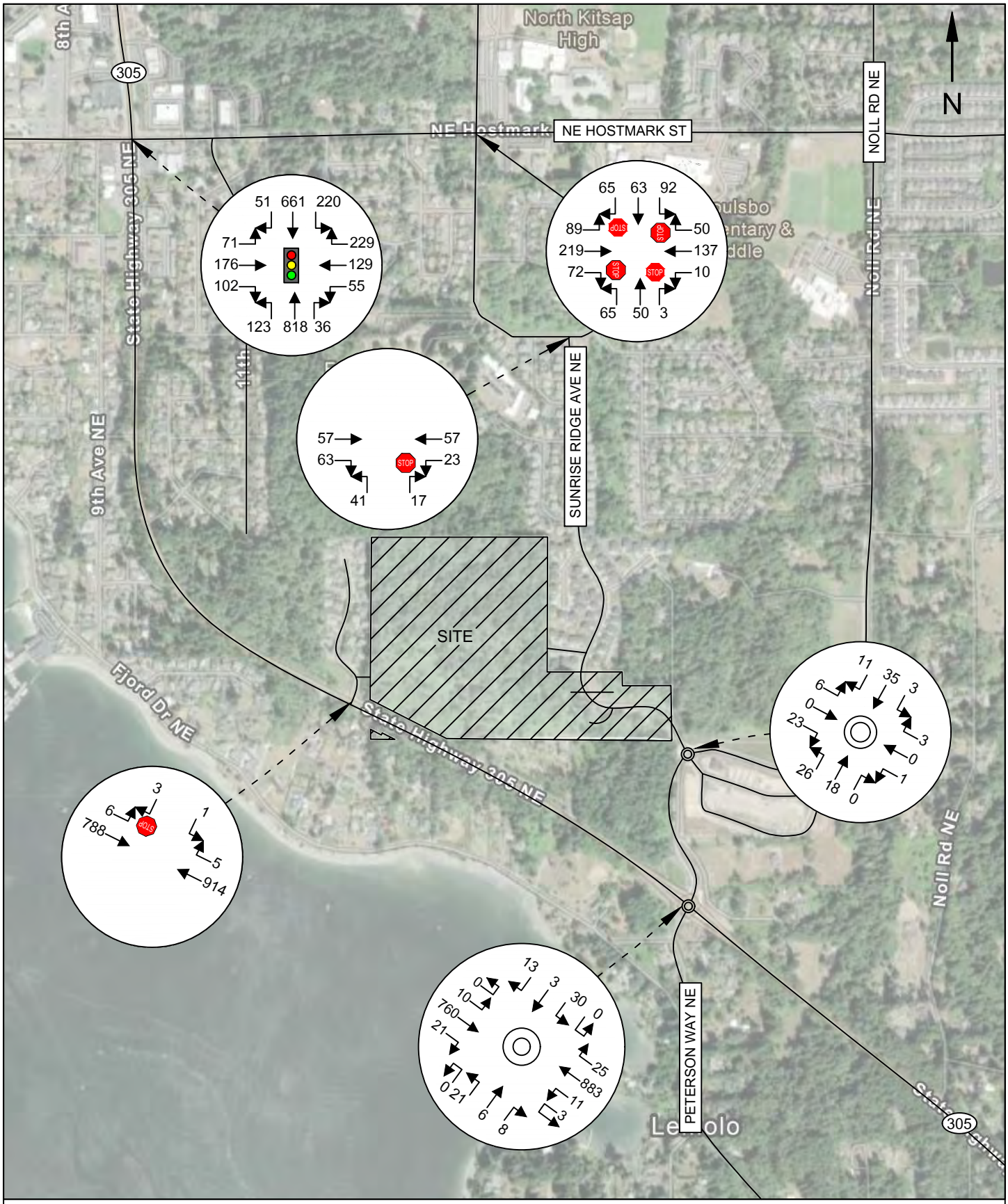
PM PEAK HOUR PIPELINE VOLUMES
FIGURE 12




HEATH&ASSOCIATES
Transportation Planning & Engineering

## PINNACLE AT LIBERTY BAY

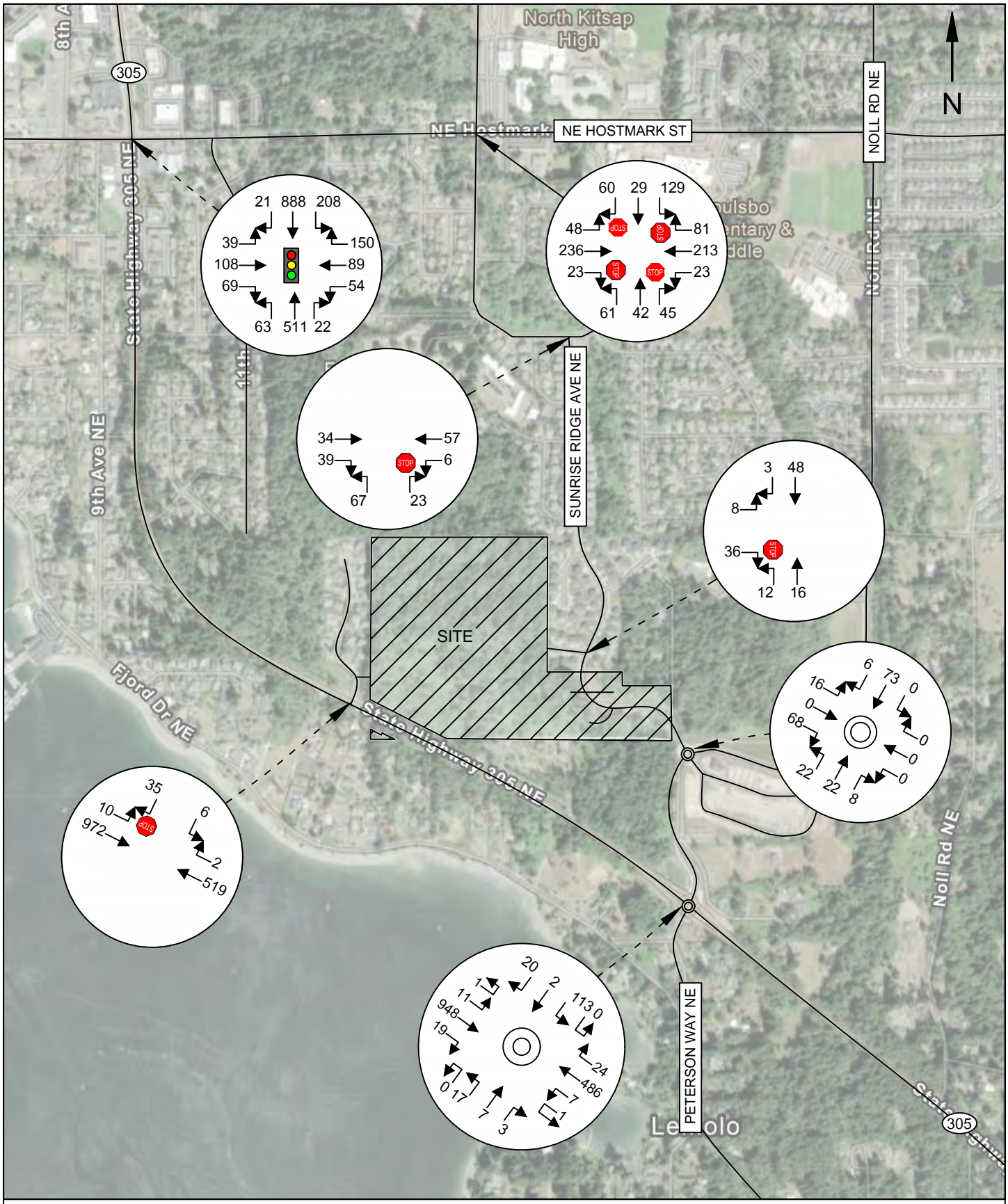
FORECAST 2032 AM PEAK HOUR VOLUMES WITHOUT PROJECT
FIGURE 13




HEATH&ASSOCIATES
Transportation Planning & Engineering

PINNACLE AT LIBERTY BAY

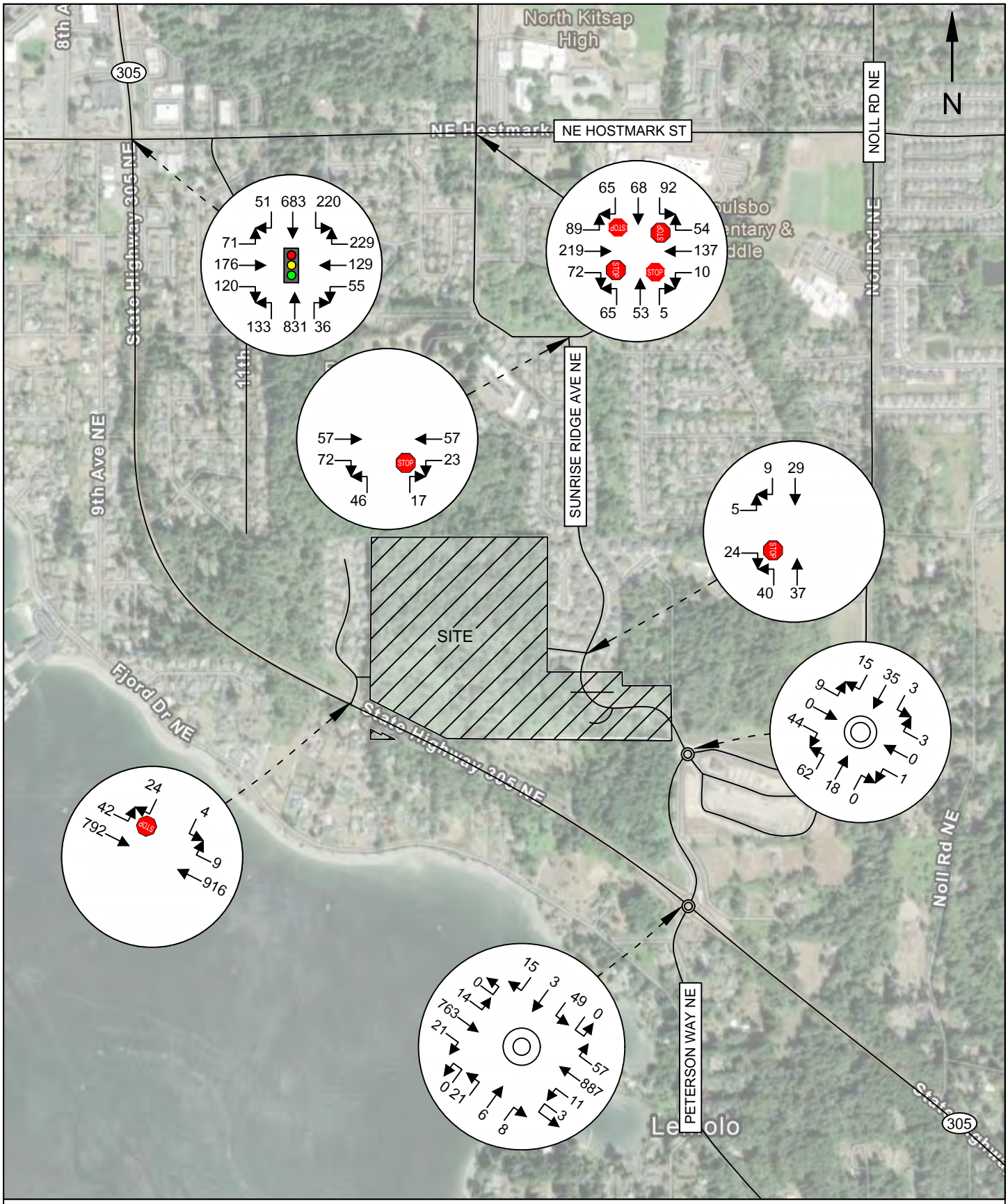
FORECAST 2032 PM PEAK HOUR VOLUMES WITHOUT PROJECT
FIGURE 14




HEATH&ASSOCIATES
Transportation Planning & Engineering

PINNACLE AT LIBERTY BAY

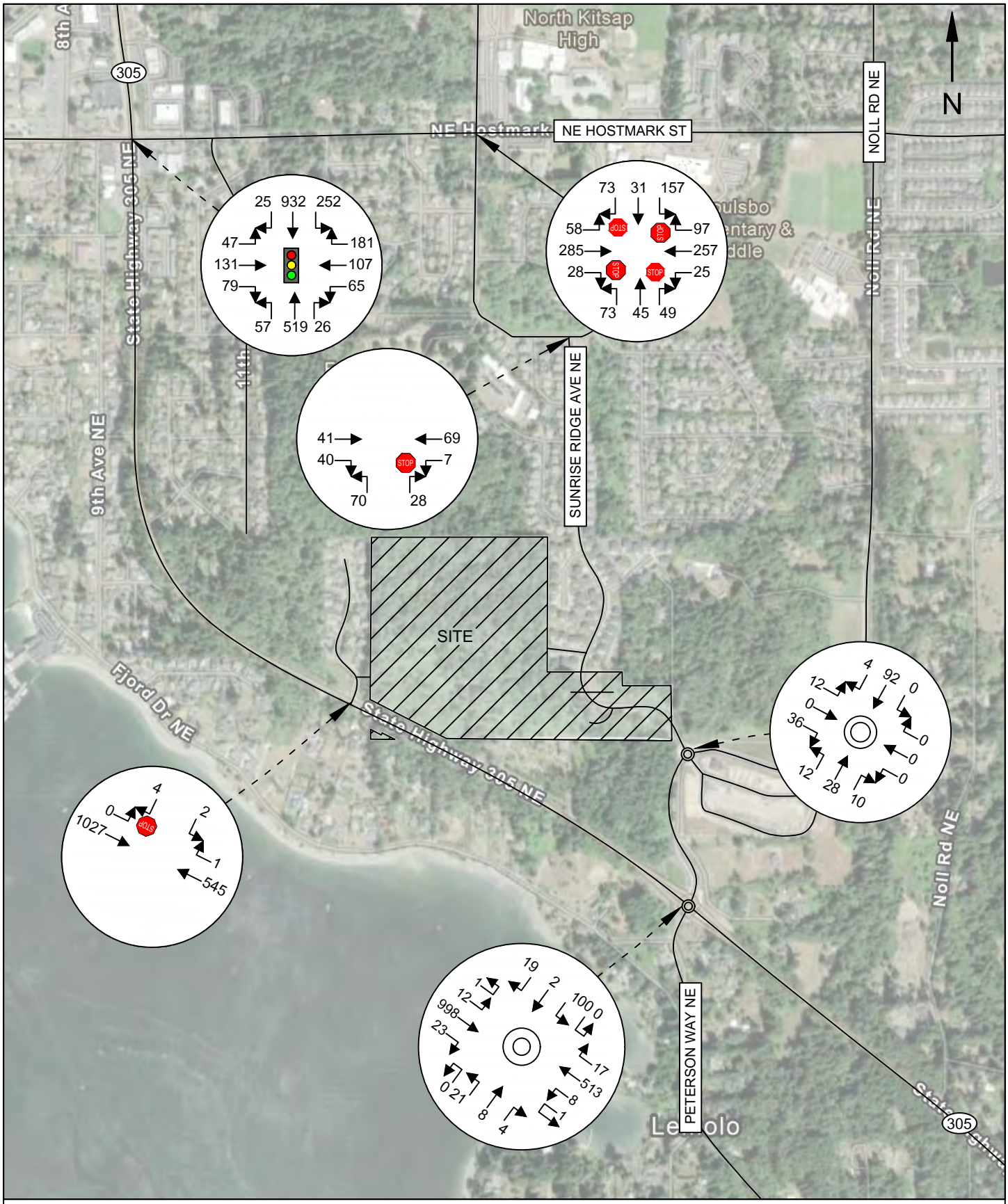
FORECAST 2032 AM PEAK HOUR VOLUMES WITH PROJECT
FIGURE 15




HEATH&ASSOCIATES
Transportation Planning & Engineering

PINNACLE AT LIBERTY BAY

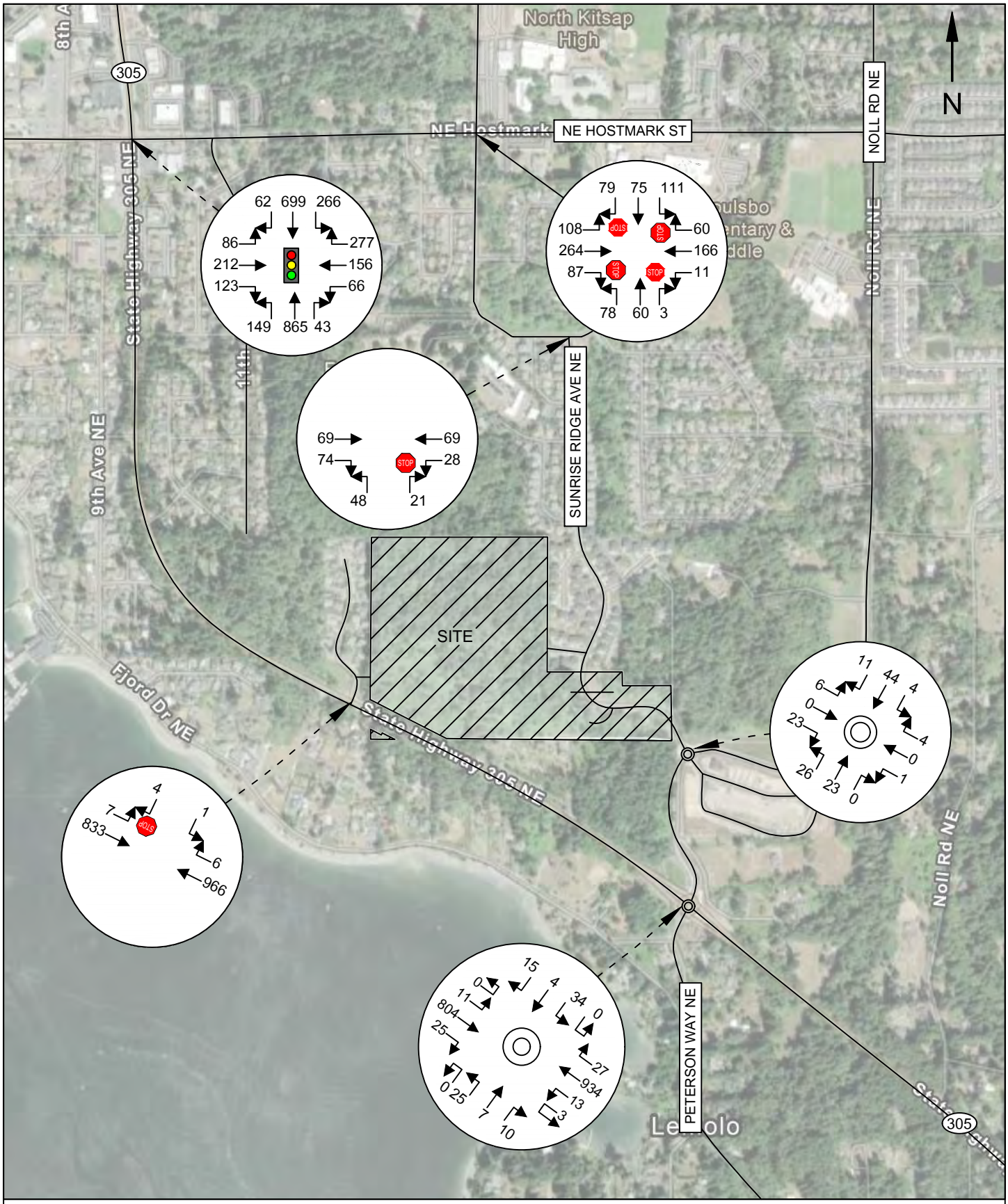
FORECAST 2032 PM PEAK HOUR VOLUMES WITH PROJECT
FIGURE 16




HEATH&ASSOCIATES
Transportation Planning & Engineering

PINNACLE AT LIBERTY BAY

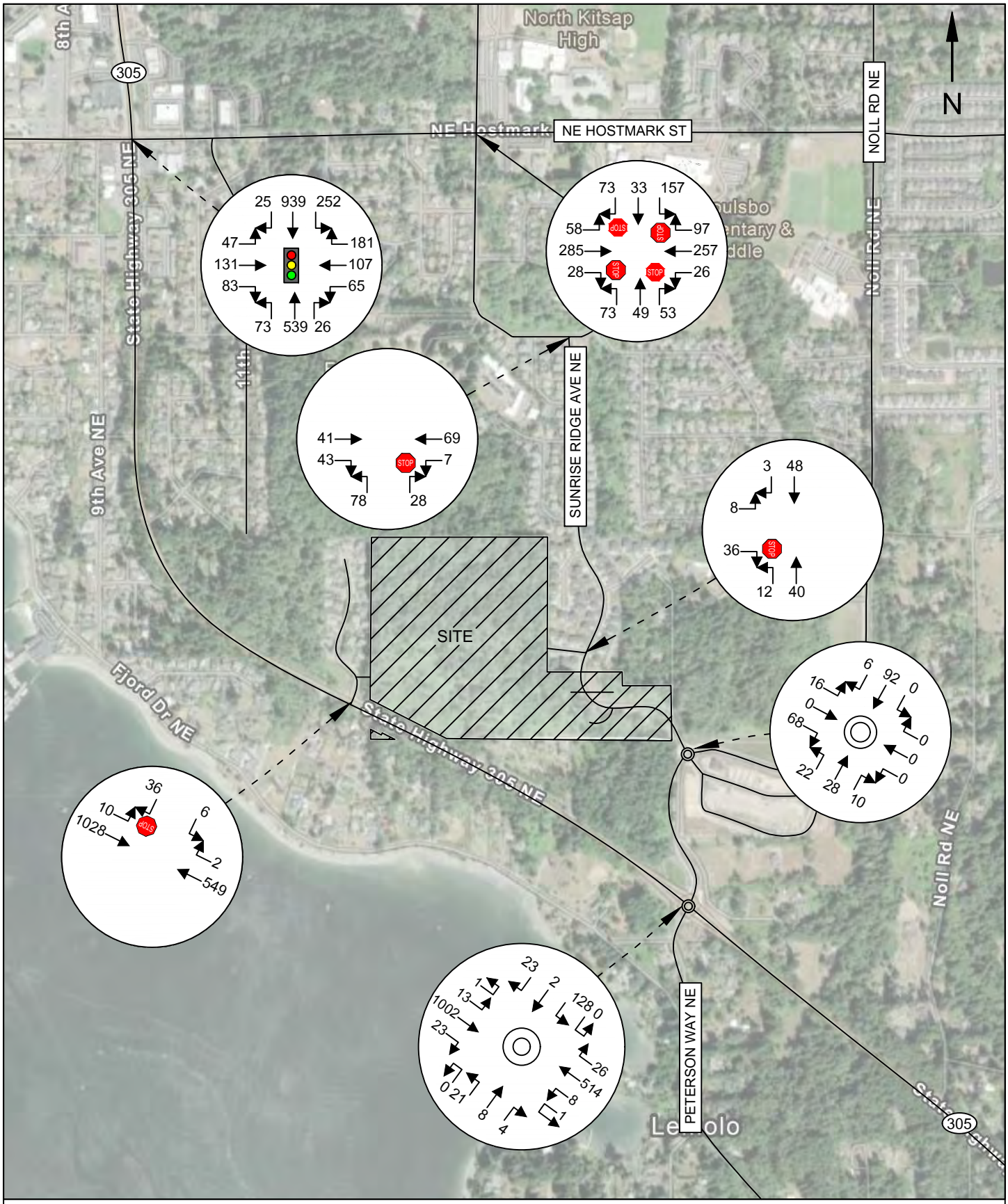
FORECAST 2037 AM PEAK HOUR VOLUMES WITHOUT PROJECT
FIGURE 17




HEATH&ASSOCIATES
Transportation Planning & Engineering

PINNACLE AT LIBERTY BAY

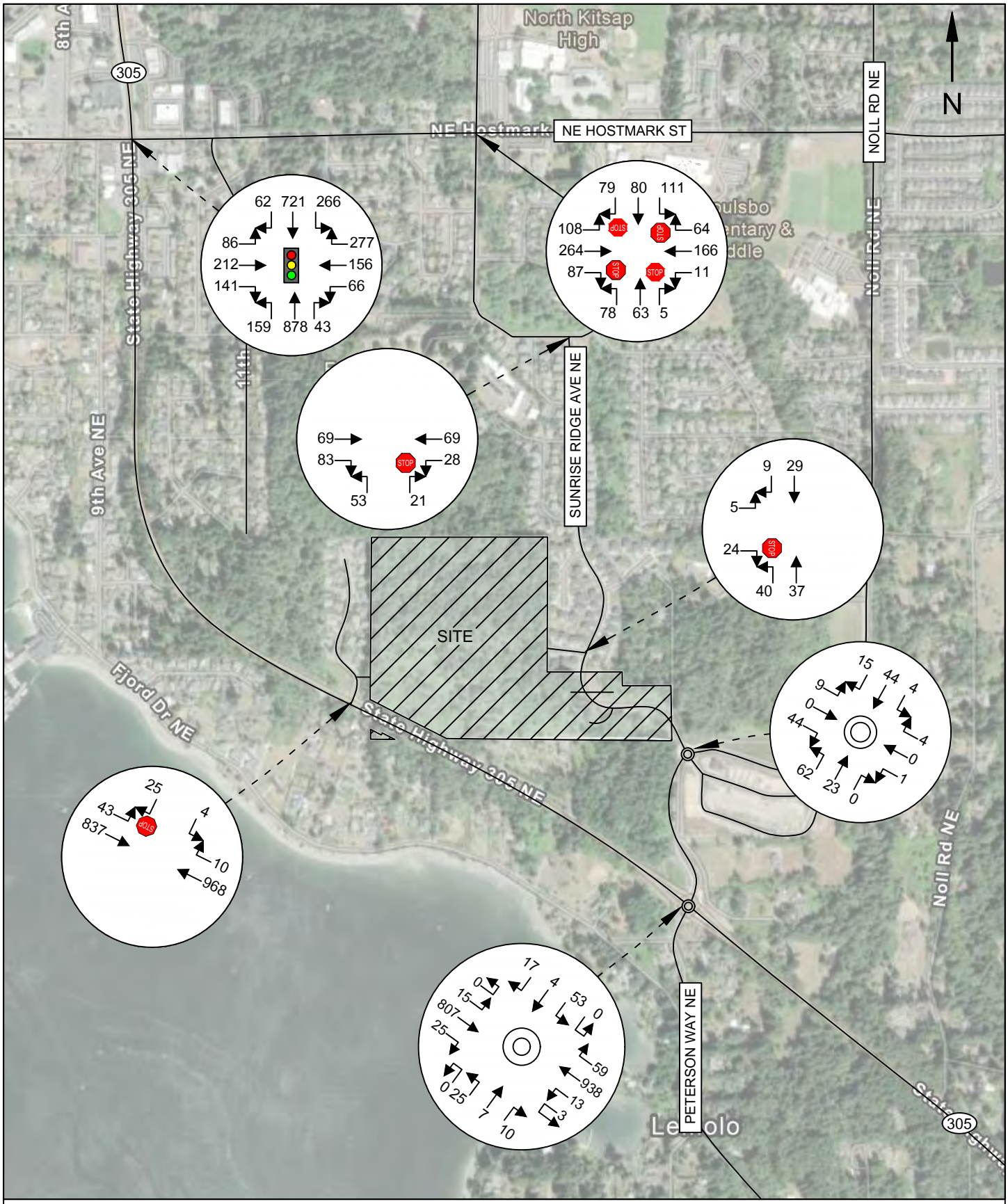
FORECAST 2037 PM PEAK HOUR VOLUMES WITHOUT PROJECT
FIGURE 18




HEATH&ASSOCIATES
Transportation Planning & Engineering

## PINNACLE AT LIBERTY BAY

FORECAST 2037 AM PEAK HOUR VOLUMES WITH PROJECT
FIGURE 19




HEATH&ASSOCIATES
Transportation Planning & Engineering

## PINNACLE AT LIBERTY BAY

FORECAST 2037 PM PEAK HOUR VOLUMES WITH PROJECT
FIGURE 20

## 4.5 Project Access

Site access will be provided at five locations, as identified in Figure 2:

1. Access A: Baywatch Court NE approximately 190 feet north of SR 305
2. Access B: Sunrise Ridge Avenue via extension of Crystallia Court
3. Access C/D: Both sides of Sunrise Ridge Avenue 220 feet south of Crystallia Court
4. Access E: Sunrise Ridge Avenue 380 feet south of Crystallia Court

To provide a worst-case operations analysis, this study assumed project-generated trips will be consolidated at the two primary accesses, Access A and Access B. The analysis indicates that the associated study intersections of SR 305 & Baywatch Court NE and Sunrise Ridge Avenue NE & Crystallia Court will operate at LOS D or better through 2037, maintaining applicable WSDOT and City of Poulsbo minimum LOS standards.

Design of on-site streets, intersections, and frontage improvements should be coordinated with the City of Poulsbo.

## 4.6 Future Level of Service

Intersection LOS was analyzed for the 2032 and 2037 forecasting horizons both without and with project-generated trips. Intersection delay and LOS results are summarized in **Table 9**. The 2032 analysis assumed that existing Peak Hour Factor (PHF) would remain unchanged. The 2037 analysis applied a PHF of 1.0 on SR 305 intersections, consistent with WSDOT Synchro protocol for long-range analyses, while maintaining the counted 2025 PHFs on local intersections.

**Hostmark Street & Caldart Avenue** will degrade to LOS F in the 2037 AM Without Project scenario, below the City of Poulsbo minimum LOS E standard. The LOS deficiency is the result of school-related demand surge which was observed to occur for approximately 30 minutes during the weekday AM peak hour. The addition of project-generated trips will not significantly increase delay. The additional 1.4 seconds of delay per vehicle during the AM peak hour represents an increase of 2 percent relative to the without-project condition. 95$^{th}$ percentile queues are anticipated to extend 14-15 vehicles on the eastbound and westbound approaches in the 2037 AM peak hour and will not increase with the addition of project-generated trips. The project is not anticipated to generate a significant adverse impact, and no mitigation is recommended.

**Table 9: Forecast 2032 & 2037 Weekday Peak Hour Level of Service**

*Delays Given in Seconds per Vehicle*

| | | | | *Without Project* | | *With Project* | |
|---|---|---|---|---|---|---|---|
| **Intersection** | **Control** | **Peak-Hour** | **Crt. Apprch** | **LOS** | **Delay** | **LOS** | **Delay** |
| **Forecast 2032 Peak Hour Analysis** | | | | | | | |
| SR 305 & Hostmark | Signal | AM<br>PM | Overall | D<br>D | 36.5<br>44.5 | D<br>D | 37.2<br>44.7 |
| SR 305 & Baywatch | One-Way Stop | AM<br>PM | SB | C<br>D | 21.8<br>25.8 | C<br>C | 16.4<br>24.7 |
| SR 305 & Johnson | RAB | AM<br>PM | Overall | A<br>A | 7.4<br>6.6 | A<br>A | 7.7<br>6.8 |
| Hostmark & Caldart | AWSC | AM<br>PM | Overall | C<br>B | 22.6<br>14.9 | C<br>C | 24.2<br>15.2 |
| Johnson Rd & Sunrise Ridge | RAB | AM<br>PM | Overall | A<br>A | 5.6<br>6.0 | A<br>A | 5.7<br>6.5 |
| Caldart Ave & Sunrise Ridge | TWSC | AM<br>PM | NB | A<br>B | 9.7<br>10.0 | A<br>B | 9.8<br>10.1 |
| Sunrise Ridge & Crystallia | One-Way Stop | AM<br>PM | EB | -- | -- | A<br>A | 8.8<br>8.8 |
| **Forecast 2037 Peak Hour Analysis** | | | | | | | |
| SR 305 & Hostmark | Signal | AM<br>PM | Overall | D<br>D | 37.0<br>45.9 | D<br>D | 37.6<br>46.3 |
| SR 305 & Baywatch | One-Way Stop | AM<br>PM | SB | C<br>C | 19.7<br>23.5 | C<br>C | 16.0<br>23.7 |
| SR 305 & Johnson | RAB | AM<br>PM | Overall | A<br>A | 7.5<br>6.7 | A<br>A | 7.7<br>6.8 |
| Hostmark & Caldart | AWSC | AM<br>PM | Overall | **F**<br>D | **61.9**<br>26.1 | **F**<br>D | **63.3**<br>27.0 |
| Johnson Rd & Sunrise Ridge | RAB | AM<br>PM | Overall | A<br>A | 5.5<br>5.9 | A<br>A | 6.1<br>6.4 |
| Caldart & Sunrise Ridge | TWSC | AM<br>PM | NB | A<br>B | 9.9<br>10.4 | B<br>B | 10.0<br>10.5 |
| Sunrise Ridge & Crystallia | One-Way Stop | AM<br>PM | EB | -- | -- | A<br>A | 8.9<br>8.8 |

*Signalized intersection LOS is based on overall intersection delay;
Roundabout (RAB) and AWSC LOS is based on overall intersection delay and stop-controlled delay thresholds;
Minor-approach stop control LOS is based on worst-approach delay and stop-controlled delay thresholds

**SR 305 & Baywatch Court NE** will operate acceptably at LOS D or better through 2037, with average delay of 26 seconds or less on the stop-controlled southbound approach. The addition of project-generated trips will result in a slight reduction in average approach delay during the 2032 PM peak hour due to utilization of available southbound right-turn capacity by project-generated trips. The southbound left-turn movement will operate at LOS F in all future PM peak hour scenarios; however, project-generated trips will not significantly increase delay due to the availability of left-turn egress onto SR 305 from the Johnson Road NE roundabout to the east. 95$^{th}$ percentile queues are anticipated to extend no more than one car-length through 2037 under without- and with-project scenarios. Note that SR 305 & Baywatch Court NE intersection delay forecasts are slightly lower in 2037 than 2032 due to the application of a 1.0 PHF on SR 305 intersections in the long-range forecasting horizon, consistent with WSDOT Synchro protocol.

All other intersections will operate at LOS D or better, satisfying their respective minimum City and WSDOT LOS standards through 2037.

## 4.7 Sight Distance Analysis

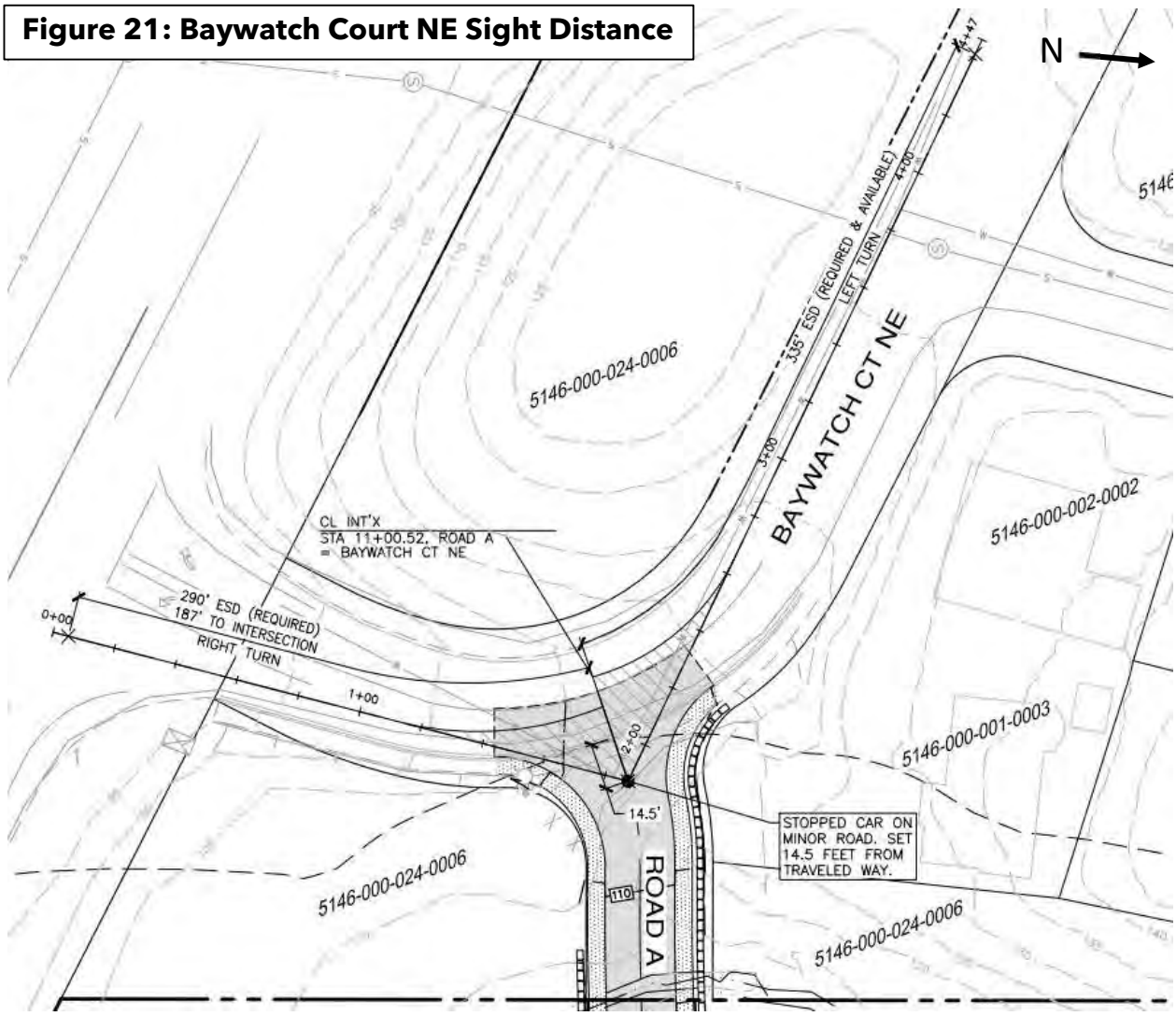
Entering sight distance (ESD) was evaluated at the proposed site access on Baywatch Court NE. The access centerline will be located approximately 187 feet from the edge of SR 305. Minimum required ESD for left-turn and right-turn movements exiting the site were calculated using the AASHTO *Green Book* methodology, assuming a 30-mph design speed and a passenger car design vehicle. The minimum required ESD are 335 feet for left-turn movements and 290 feet for right-turn movements.

An analysis of the proposed Baywatch Court NE access "Road A" indicated that the existing ESD for right-turn movements extends to the SR 305 intersection 187 feet away. While lower than the 290-foot minimum, vehicles entering Baywatch Court NE from SR 305 are likely to be travelling at lower speeds than the 30-mph design assumption. For example, the available ESD satisfies a 145-foot requirement for a 15-mph speed which is closer to the estimated vehicles speeds turning from SR 305.

For drivers looking right and intending to turn left from "Road A", the existing ESD extends 335 feet and beyond the Baywatch Court T-intersection to the northwest of the site access. The minimum 335-foot ESD for left-turn movements is satisfied. An illustration of existing ESD at Baywatch Court is provided in **Figure 21**.

All other site access points and internal roadways will be designed in compliance with City of Poulsbo standards and will be subject to review and approval during the civil engineering plan review process.

**Figure 21: Baywatch Court NE Sight Distance**

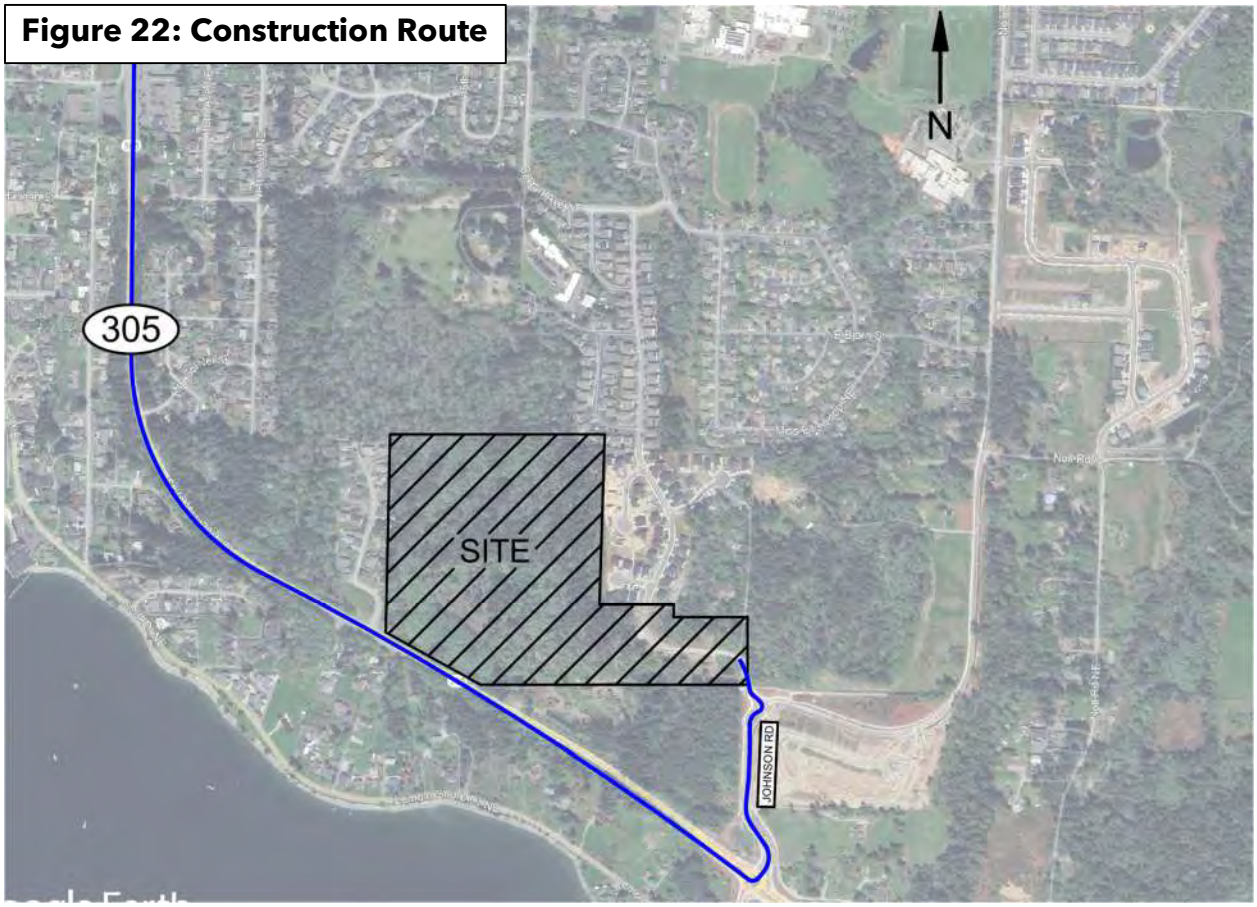


## 4.7 Construction Traffic

Truck activity will vary throughout project construction, with an estimated maximum of 60-80 trucks per day during a 3-4-week mass grading and import phase. Construction activity will involve a maximum of 20 on-site construction employees.

Construction traffic is anticipated to primarily utilize Johnson Road, a City arterial, to access SR 305, a state route. The anticipated construction route is illustrated in **Figure 22**. Any route restrictions or preferences can be coordinated with the City.

**Figure 22: Construction Route**



# 5. CONCLUSIONS & MITIGATION

The Pinnacle at Liberty Bay is a proposed residential development consisting of 151 single-family homes located within the City of Poulsbo. The subject site comprises 40.98 acres on four undeveloped tax parcels. Site ingress/egress is proposed via Baywatch Court NE, NE Crystallia Court, and Sunrise Ridge Avenue NE.

Existing traffic operations were analyzed at six intersections in the project vicinity. All study intersections currently operate at LOS D or better, satisfying WSDOT and City of Poulsbo minimum LOS standards. A crash history analysis indicated no serious injury or fatal crashes in the study area and no safety deficiencies were identified.

The project is anticipated to generate 1,424 average weekday daily trips, 106 AM peak hour trips, and 142 PM peak hour trips. Future pipeline growth in the study area will include three nearby residential developments. Additional background traffic growth was forecast using travel demand forecasts provided by the City of Poulsbo.

Future traffic conditions were analyzed for 2032 and 2037 horizon years. Traffic forecasts assumed completion of the Sunrise Ridge Avenue NE connection between Noll Road and Caldart Avenue, including redistribution of travel demand.

The traffic operations forecasts indicated that the intersection of Hostmark Street & Caldart Avenue will operate at LOS F in the 2037 AM Without Project scenario, below the City of Poulsbo minimum LOS E standard. The LOS deficiency is the result of a school-related demand surge which was observed to occur for approximately 30 minutes during the AM peak hour. The addition of project-generated trips will not significantly increase delay, and no mitigation is recommended.

All other intersections will operate at LOS D or better, satisfying their respective minimum City and WSDOT LOS standards through 2037.

Construction activity will vary over the anticipated 12-month construction period. Trucks are encouraged to utilize state routes and should coordinate preferred truck routes with the City of Poulsbo.

The following mitigation recommendations are provided for consideration:

1. Design of on-site streets, intersections, and frontage improvements should be coordinated with the City of Poulsbo.

2. The project will be subject to Traffic Impact Fees (TIF) as imposed by the City of Poulsbo (PMC 3.86). Fees are based on project-generated trips, assessed at $564.00 per net new daily trip. The estimated fee calculation is:

   1,424 daily trips x $564.00 per daily trip = **$803,136.00**

   Traffic impact fees will be calculated and determined by the City at the time of building permit issuance.

No other mitigation is recommended.

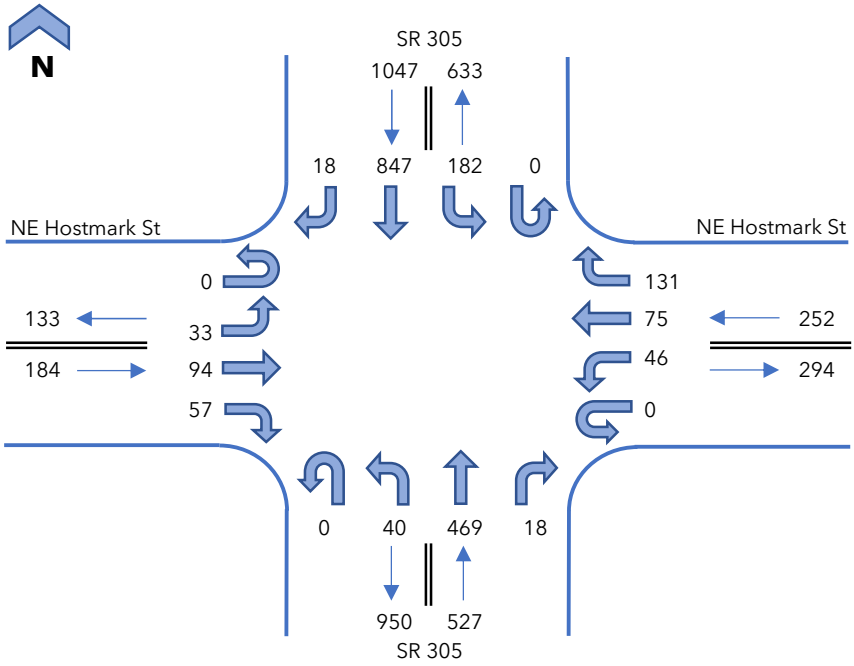
# THE PINNACLE AT LIBERTY BAY
# TRAFFIC IMPACT ANALYSIS

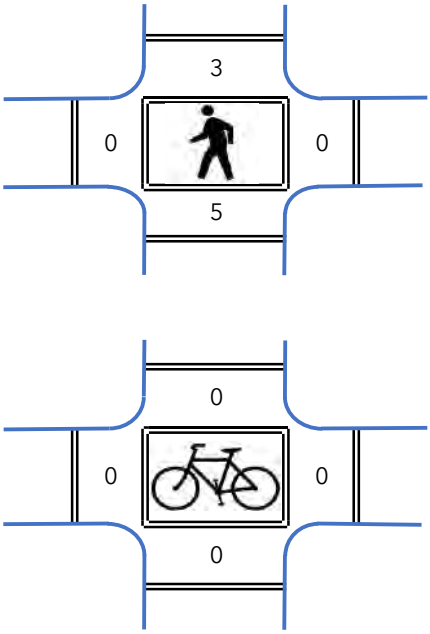
*APPENDIX*
*Traffic Counts*

HEATH & ASSOCIATES
Transportation Planning & Engineering

**Date Collected:** 5/21/2025
**Day of the Week:** Wednesday
**Time Period:** 7:00 AM to 9:00 AM
**Peak Hour:** 7:00 AM to 8:00 AM

**NE Hostmark Street & SR 305**




| Interval Start Time | NE Hostmark St Eastbound | | | | NE Hostmark St Westbound | | | | SR 305 Northbound | | | | SR 305 Southbound | | | | 15 Minute Totals | Hourly Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | | |
| 7:00 AM | 0 | 2 | 12 | 9 | 0 | 5 | 12 | 26 | 0 | 5 | 110 | 1 | 0 | 28 | 200 | 5 | 415 | |
| 7:15 AM | 0 | 11 | 29 | 18 | 0 | 19 | 16 | 29 | 0 | 6 | 111 | 4 | 0 | 50 | 226 | 4 | 523 | |
| 7:30 AM | 0 | 12 | 30 | 14 | 0 | 10 | 19 | 41 | 0 | 12 | 111 | 7 | 0 | 64 | 200 | 5 | 525 | |
| 7:45 AM | 0 | 8 | 23 | 16 | 0 | 12 | 28 | 35 | 0 | 17 | 137 | 6 | 0 | 40 | 221 | 4 | 547 | 2010 |
| 8:00 AM | 0 | 12 | 7 | 11 | 0 | 5 | 17 | 24 | 0 | 9 | 118 | 6 | 0 | 17 | 180 | 6 | 412 | 2007 |
| 8:15 AM | 0 | 11 | 11 | 9 | 0 | 7 | 14 | 24 | 0 | 9 | 128 | 5 | 0 | 12 | 180 | 3 | 413 | 1897 |
| 8:30 AM | 0 | 8 | 14 | 10 | 0 | 7 | 13 | 19 | 0 | 21 | 122 | 7 | 0 | 30 | 168 | 7 | 426 | 1798 |
| 8:45 AM | 0 | 9 | 15 | 14 | 0 | 12 | 13 | 33 | 0 | 8 | 150 | 7 | 0 | 23 | 163 | 6 | 453 | 1704 |
| Count Total | 0 | 73 | 141 | 101 | 0 | 77 | 132 | 231 | 0 | 87 | 987 | 43 | 0 | 264 | 1538 | 40 | 3714 | -- |
| Peak Hour Total | 0 | 33 | 94 | 57 | 0 | 46 | 75 | 131 | 0 | 40 | 469 | 18 | 0 | 182 | 847 | 18 | 2010 | -- |
| PHF | 0.79 | | | | 0.84 | | | | 0.82 | | | | 0.93 | | | | 0.92 | -- |
| Heavy Vehicles | 0 | 2 | 5 | 2 | 0 | 2 | 3 | 8 | 0 | 2 | 27 | 1 | 0 | 9 | 53 | 2 | 116 | -- |
| HV % | 0.0% | 6.1% | 5.3% | 3.5% | 0.0% | 4.3% | 4.0% | 6.1% | 0.0% | 5.0% | 5.8% | 5.6% | 0.0% | 4.9% | 6.3% | 11.1% | 5.8% | -- |

| Interval Start Time | Heavy Vehicles | | | | |
|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total |
| 7:00 AM | 2 | 1 | 7 | 10 | 20 |
| 7:15 AM | 4 | 3 | 10 | 15 | 32 |
| 7:30 AM | 2 | 7 | 2 | 22 | 33 |
| 7:45 AM | 1 | 2 | 11 | 17 | 31 |
| 8:00 AM | 4 | 3 | 5 | 20 | 32 |
| 8:15 AM | 3 | 3 | 9 | 16 | 31 |
| 8:30 AM | 1 | 2 | 11 | 22 | 36 |
| 8:45 AM | 3 | 3 | 10 | 13 | 29 |
| Count Total | 20 | 24 | 65 | 135 | 244 |
| Peak Hour Total | 9 | 13 | 30 | 64 | 116 |
| Peak Hour HV% | 4.9% | 5.2% | 5.7% | 6.1% | 5.8% |

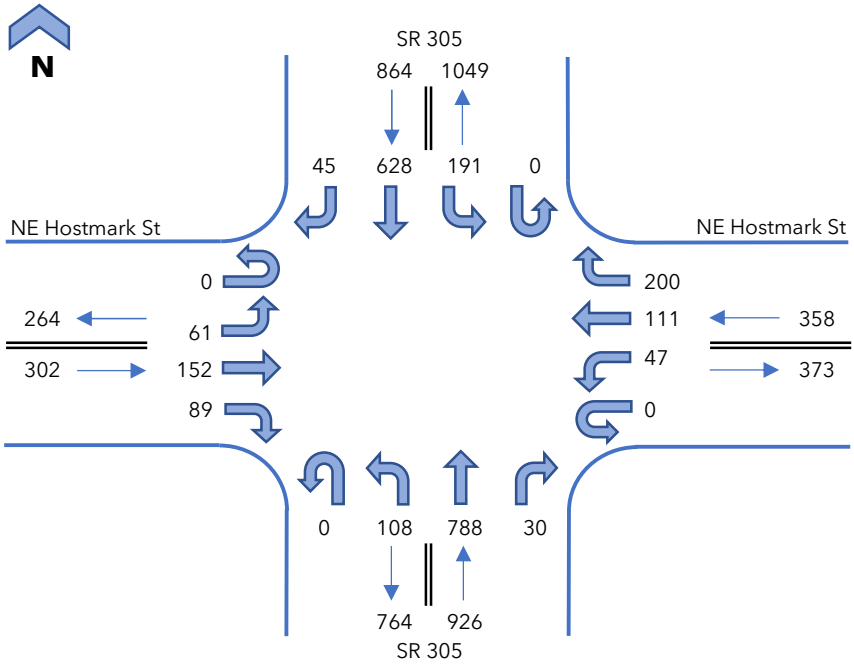
| Pedestrians (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 1 | 3 | 4 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 1 | 1 | 2 |
| 0 | 1 | 0 | 1 | 2 |
| 0 | 0 | 2 | 1 | 3 |
| 2 | 2 | 3 | 2 | 9 |
| 0 | 0 | 2 | 2 | 4 |
| 2 | 3 | 10 | 11 | 26 |
| 0 | 0 | 3 | 5 | 8 |

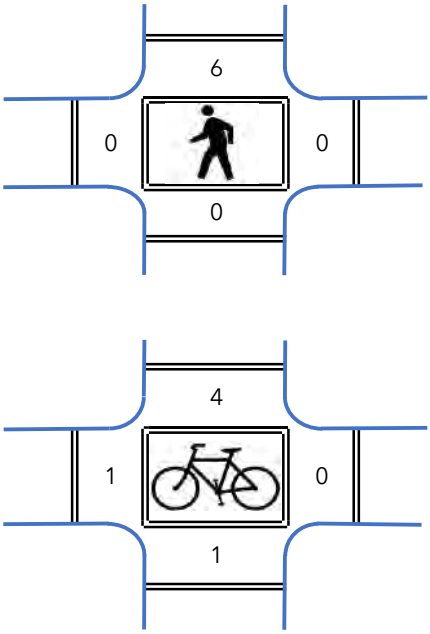
| Bicycles (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |

HEATH & ASSOCIATES
Transportation Planning & Engineering

**Date Collected:** 5/20/2025
**Day of the Week:** Tuesday
**Time Period:** 4:00 PM to 6:00 PM
**Peak Hour:** 4:00 PM to 5:00 PM

**NE Hostmark Street & SR 305**




| Interval Start Time | NE Hostmark St Eastbound | | | | NE Hostmark St Westbound | | | | SR 305 Northbound | | | | SR 305 Southbound | | | | 15 Minute Totals | Hourly Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | | |
| 4:00 PM | 0 | 19 | 39 | 16 | 0 | 12 | 25 | 48 | 0 | 21 | 205 | 5 | 0 | 49 | 164 | 12 | 615 | |
| 4:15 PM | 0 | 13 | 34 | 27 | 0 | 15 | 23 | 47 | 0 | 31 | 191 | 12 | 0 | 52 | 146 | 12 | 603 | |
| 4:30 PM | 0 | 13 | 43 | 24 | 0 | 9 | 41 | 62 | 0 | 28 | 182 | 5 | 0 | 43 | 150 | 15 | 615 | |
| 4:45 PM | 0 | 16 | 36 | 22 | 0 | 11 | 22 | 43 | 0 | 28 | 210 | 8 | 0 | 47 | 168 | 6 | 617 | 2450 |
| 5:00 PM | 0 | 12 | 40 | 30 | 0 | 4 | 26 | 31 | 0 | 20 | 169 | 4 | 0 | 54 | 173 | 9 | 572 | 2407 |
| 5:15 PM | 0 | 11 | 23 | 21 | 0 | 2 | 24 | 31 | 1 | 28 | 175 | 7 | 0 | 51 | 160 | 7 | 541 | 2345 |
| 5:30 PM | 0 | 20 | 38 | 14 | 0 | 7 | 13 | 27 | 0 | 17 | 216 | 6 | 0 | 38 | 149 | 14 | 559 | 2289 |
| 5:45 PM | 0 | 16 | 22 | 15 | 0 | 6 | 17 | 16 | 0 | 23 | 191 | 7 | 0 | 48 | 137 | 12 | 510 | 2182 |
| Count Total | 0 | 120 | 275 | 169 | 0 | 66 | 191 | 305 | 1 | 196 | 1539 | 54 | 0 | 382 | 1247 | 87 | 4632 | -- |
| Peak Hour Total | 0 | 61 | 152 | 89 | 0 | 47 | 111 | 200 | 0 | 108 | 788 | 30 | 0 | 191 | 628 | 45 | 2450 | -- |
| PHF | 0.94 | | | | 0.80 | | | | 0.94 | | | | 0.96 | | | | 0.99 | -- |
| Heavy Vehicles | 0 | 4 | 4 | 1 | 0 | 0 | 1 | 2 | 0 | 2 | 30 | 0 | 0 | 2 | 11 | 2 | 59 | -- |
| HV % | 0.0% | 6.6% | 2.6% | 1.1% | 0.0% | 0.0% | 0.9% | 1.0% | 0.0% | 1.9% | 3.8% | 0.0% | 0.0% | 1.0% | 1.8% | 4.4% | 2.4% | -- |

| Interval Start Time | Heavy Vehicles | | | | |
|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total |
| 4:00 PM | 1 | 1 | 4 | 2 | 8 |
| 4:15 PM | 0 | 1 | 9 | 1 | 11 |
| 4:30 PM | 3 | 0 | 15 | 6 | 24 |
| 4:45 PM | 5 | 1 | 4 | 6 | 16 |
| 5:00 PM | 0 | 4 | 3 | 5 | 12 |
| 5:15 PM | 0 | 0 | 8 | 4 | 12 |
| 5:30 PM | 0 | 0 | 9 | 2 | 11 |
| 5:45 PM | 2 | 0 | 9 | 1 | 12 |
| Count Total | 11 | 7 | 61 | 27 | 106 |
| Peak Hour Total | 9 | 3 | 32 | 15 | 59 |
| Peak Hour HV% | 3.0% | 0.8% | 3.5% | 1.7% | 2.4% |

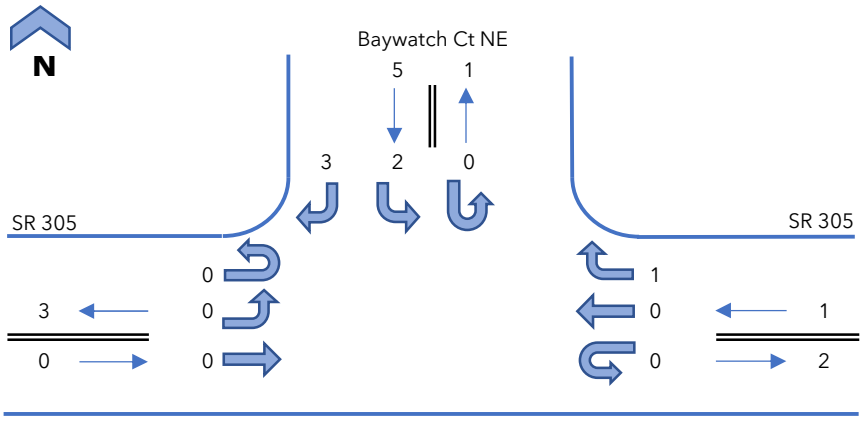
| Pedestrians (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 4 | 0 | 4 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 1 | 0 | 3 | 4 |
| 1 | 1 | 1 | 1 | 4 |
| 0 | 0 | 3 | 2 | 5 |
| 1 | 0 | 5 | 1 | 7 |
| 2 | 2 | 15 | 7 | 26 |
| 0 | 0 | 6 | 0 | 6 |

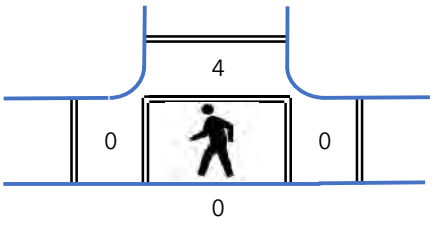
| Bicycles (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 3 | 0 | 3 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 1 | 3 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 4 | 1 | 6 |
| 0 | 1 | 4 | 1 | 6 |

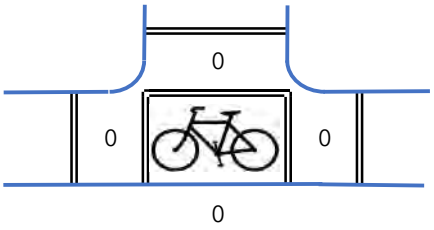
HEATH & ASSOCIATES
Transportation Planning & Engineering

**Date Collected:** 5/21/2025
**Day of the Week:** Wednesday
**Time Period:** 7:00 AM to 9:00 AM
**Peak Hour:** 8:00 AM to 9:00 AM

**SR 305 & Baywatch Court NE**




| Interval Start Time | SR 305 Eastbound | | | | SR 305 Westbound | | | | | | | | Baywatch Ct NE Southbound | | | | 15 Minute Totals | Hourly Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UT | LT | T | RT | UT | LT | T | RT | | | | | UT | LT | T | RT | | |
| 7:00 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 0 | -- | 1 | 1 | |
| 7:15 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 0 | -- | 0 | 0 | |
| 7:30 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 1 | -- | 1 | 2 | |
| 7:45 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 0 | -- | 0 | 0 | 3 |
| 8:00 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 0 | -- | 0 | 0 | 2 |
| 8:15 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 1 | -- | 1 | 2 | 4 |
| 8:30 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 1 | -- | 0 | 1 | 3 |
| 8:45 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 1 | -- | -- | -- | -- | 0 | 0 | -- | 2 | 3 | 6 |
| Count Total | 0 | 0 | 0 | -- | 0 | -- | 0 | 1 | -- | -- | -- | -- | 0 | 3 | -- | 5 | 9 | -- |
| Peak Hour Total | 0 | 0 | 0 | -- | 0 | -- | 0 | 1 | -- | -- | -- | -- | 0 | 2 | -- | 3 | 6 | -- |
| PHF | #DIV/0! | | | | 0.25 | | | | -- | | | | 0.63 | | | | 0.50 | -- |
| Heavy Vehicles | 0 | 0 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 0 | -- | 0 | 0 | -- |
| HV % | 0.0% | 0.0% | 0.0% | -- | 0.0% | -- | 0.0% | 0.0% | -- | -- | -- | -- | 0.0% | 0.0% | -- | 0.0% | 0.0% | -- |

| Interval Start Time | Heavy Vehicles | | | | |
|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total |
| 7:00 AM | 0 | 0 | -- | 0 | 0 |
| 7:15 AM | 0 | 0 | -- | 0 | 0 |
| 7:30 AM | 0 | 0 | -- | 0 | 0 |
| 7:45 AM | 0 | 0 | -- | 0 | 0 |
| 8:00 AM | 0 | 0 | -- | 0 | 0 |
| 8:15 AM | 0 | 0 | -- | 0 | 0 |
| 8:30 AM | 0 | 0 | -- | 0 | 0 |
| 8:45 AM | 0 | 0 | -- | 0 | 0 |
| Count Total | 0 | 0 | -- | 0 | 0 |
| Peak Hour Total | 0 | 0 | -- | 0 | 0 |
| Peak Hour HV% | 0.0% | 0.0% | -- | 0.0% | 0.0% |

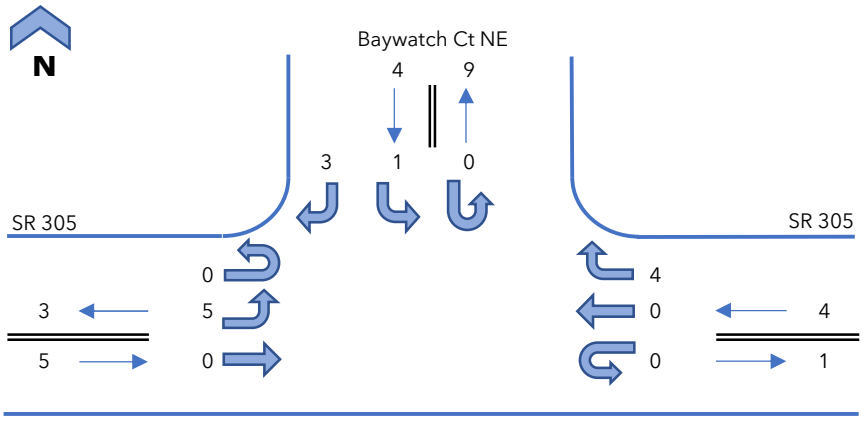
| Pedestrians (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 4 | 0 | 4 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 4 | 0 | 4 |
| 0 | 0 | 4 | 0 | 4 |

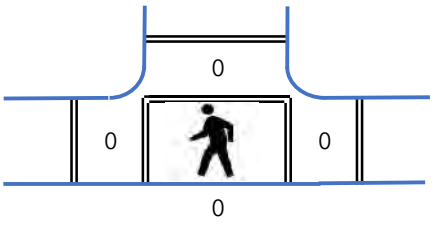
| Bicycles (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |

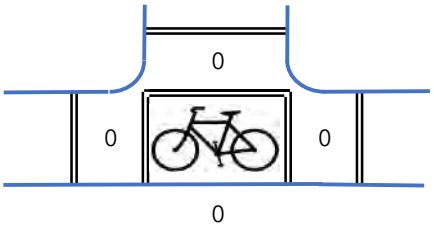
HEATH & ASSOCIATES
Transportation Planning & Engineering

**Date Collected:** 5/20/2025
**Day of the Week:** Tuesday
**Time Period:** 4:00 AM to 6:00 AM
**Peak Hour:** 4:30 AM to 5:30 AM

**SR 305 & Baywatch Court NE**




| Interval Start Time | SR 305 Eastbound | | | | SR 305 Westbound | | | | | | | | Baywatch Ct NE Southbound | | | | 15 Minute Totals | Hourly Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UT | LT | T | RT | UT | LT | T | RT | | | | | UT | LT | T | RT | | |
| 4:00 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 0 | -- | 0 | 0 | |
| 4:15 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 0 | -- | 0 | 0 | |
| 4:30 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 0 | -- | 1 | 1 | |
| 4:45 AM | 0 | 1 | 0 | -- | 0 | -- | 0 | 2 | -- | -- | -- | -- | 0 | 0 | -- | 0 | 3 | 4 |
| 5:00 AM | 0 | 3 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 0 | -- | 1 | 4 | 8 |
| 5:15 AM | 0 | 1 | 0 | -- | 0 | -- | 0 | 2 | -- | -- | -- | -- | 0 | 1 | -- | 1 | 5 | 13 |
| 5:30 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 1 | -- | -- | -- | -- | 0 | 0 | -- | 0 | 1 | 13 |
| 5:45 AM | 0 | 0 | 0 | -- | 0 | -- | 0 | 1 | -- | -- | -- | -- | 0 | 0 | -- | 0 | 1 | 11 |
| Count Total | 0 | 5 | 0 | -- | 0 | -- | 0 | 6 | -- | -- | -- | -- | 0 | 1 | -- | 3 | 15 | -- |
| Peak Hour Total | 0 | 5 | 0 | -- | 0 | -- | 0 | 4 | -- | -- | -- | -- | 0 | 1 | -- | 3 | 13 | -- |
| PHF | 0.42 | | | | 0.50 | | | | -- | | | | 0.50 | | | | 0.65 | -- |
| Heavy Vehicles | 0 | 1 | 0 | -- | 0 | -- | 0 | 0 | -- | -- | -- | -- | 0 | 1 | -- | 0 | 2 | -- |
| HV % | 0.0% | 20.0% | 0.0% | -- | 0.0% | -- | 0.0% | 0.0% | -- | -- | -- | -- | 0.0% | 100.0% | -- | 0.0% | 15.4% | -- |

| Interval Start Time | Heavy Vehicles | | | | |
|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total |
| 4:00 AM | 0 | 0 | -- | 0 | 0 |
| 4:15 AM | 0 | 0 | -- | 0 | 0 |
| 4:30 AM | 0 | 0 | -- | 0 | 0 |
| 4:45 AM | 0 | 0 | -- | 0 | 0 |
| 5:00 AM | 1 | 0 | -- | 0 | 1 |
| 5:15 AM | 0 | 0 | -- | 1 | 1 |
| 5:30 AM | 0 | 0 | -- | 0 | 0 |
| 5:45 AM | 0 | 0 | -- | 0 | 0 |
| Count Total | 1 | 0 | -- | 1 | 2 |
| Peak Hour Total | 1 | 0 | -- | 1 | 2 |
| Peak Hour HV% | 20.0% | 0.0% | -- | 25.0% | 15.4% |

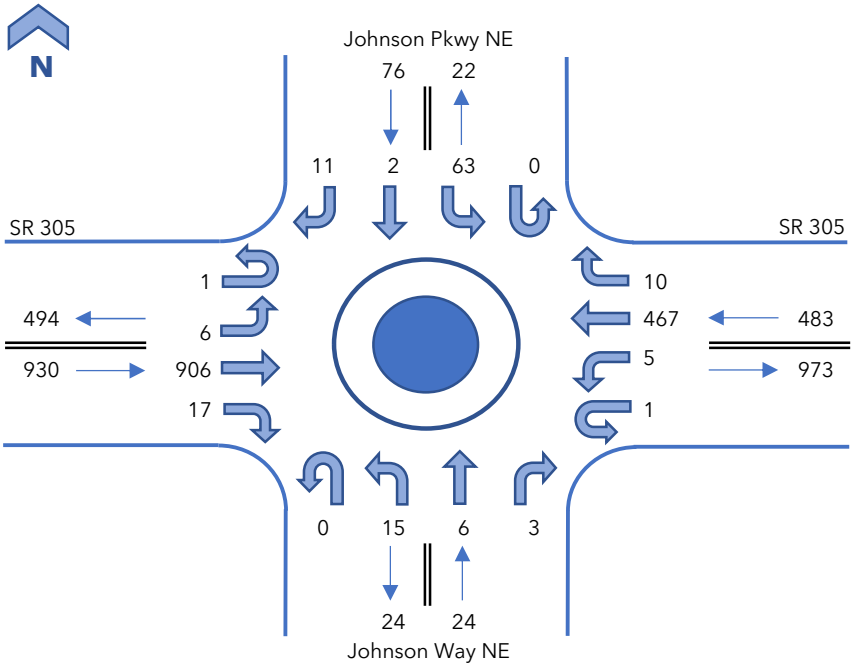
| Pedestrians (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |

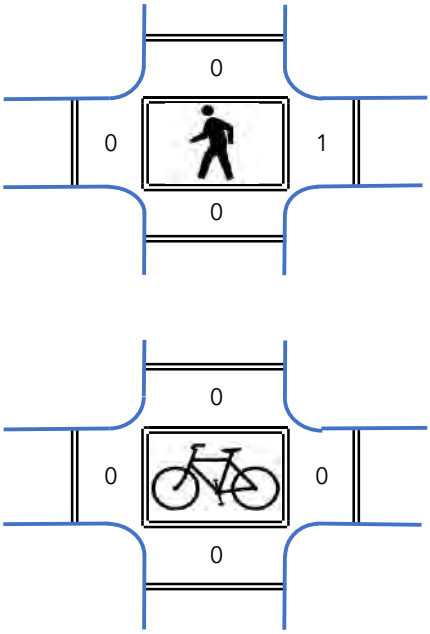
| Bicycles (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |

HEATH & ASSOCIATES
Transportation Planning & Engineering

**Date Collected:** 5/21/2025
**Day of the Week:** Wednesday
**Time Period:** 7:00 AM to 9:00 AM
**Peak Hour:** 7:00 AM to 8:00 AM

**SR 305 & Johnson Parkway NE**




| Interval Start Time | SR 305 Eastbound | | | | SR 305 Westbound | | | | Johnson Way NE Northbound | | | | Johnson Pkwy NE Southbound | | | | 15 Minute Totals | Hourly Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | | |
| 7:00 AM | 0 | 0 | 207 | 0 | 0 | 0 | 120 | 1 | 0 | 8 | 1 | 0 | 0 | 10 | 0 | 2 | 349 | |
| 7:15 AM | 0 | 5 | 271 | 4 | 0 | 1 | 100 | 4 | 0 | 2 | 0 | 2 | 0 | 16 | 0 | 1 | 406 | |
| 7:30 AM | 1 | 1 | 199 | 6 | 1 | 4 | 127 | 3 | 0 | 1 | 4 | 1 | 1 | 15 | 1 | 4 | 369 | |
| 7:45 AM | 0 | 0 | 229 | 7 | 0 | 0 | 120 | 2 | 0 | 4 | 1 | 0 | 0 | 22 | 1 | 4 | 390 | 1514 |
| 8:00 AM | 0 | 2 | 184 | 5 | 1 | 2 | 131 | 2 | 0 | 4 | 2 | 1 | 0 | 10 | 3 | 2 | 349 | 1514 |
| 8:15 AM | 1 | 1 | 187 | 6 | 1 | 1 | 136 | 1 | 0 | 4 | 2 | 1 | 0 | 2 | 1 | 2 | 346 | 1454 |
| 8:30 AM | 2 | 4 | 168 | 4 | 1 | 0 | 119 | 3 | 0 | 5 | 1 | 0 | 0 | 7 | 0 | 3 | 317 | 1402 |
| 8:45 AM | 0 | 2 | 158 | 5 | 0 | 3 | 165 | 4 | 0 | 4 | 2 | 0 | 0 | 2 | 0 | 5 | 350 | 1362 |
| Count Total | 4 | 15 | 1603 | 37 | 4 | 11 | 1018 | 20 | 0 | 32 | 13 | 5 | 1 | 84 | 6 | 23 | 2876 | -- |
| Peak Hour Total | 1 | 6 | 906 | 17 | 1 | 5 | 467 | 10 | 0 | 15 | 6 | 3 | 1 | 63 | 2 | 11 | 1514 | -- |
| PHF | 0.83 | | | | 0.89 | | | | 0.67 | | | | 0.71 | | | | 0.93 | -- |
| Heavy Vehicles | 0 | 1 | 70 | 2 | 0 | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 103 | -- |
| HV % | 0.0% | 16.7% | 7.7% | 11.8% | 0.0% | 0.0% | 5.8% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 100.0% | 3.2% | 0.0% | 0.0% | 6.8% | -- |

| Interval Start Time | Heavy Vehicles | | | | |
|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total |
| 7:00 AM | 7 | 6 | 0 | 0 | 13 |
| 7:15 AM | 11 | 8 | 0 | 0 | 19 |
| 7:30 AM | 18 | 6 | 0 | 2 | 26 |
| 7:45 AM | 25 | 7 | 0 | 1 | 33 |
| 8:00 AM | 19 | 5 | 0 | 0 | 24 |
| 8:15 AM | 15 | 6 | 2 | 1 | 24 |
| 8:30 AM | 20 | 8 | 0 | 2 | 30 |
| 8:45 AM | 15 | 11 | 0 | 0 | 26 |
| Count Total | 130 | 57 | 2 | 6 | 195 |
| Peak Hour Total | 73 | 27 | 0 | 3 | 103 |
| Peak Hour HV% | 7.8% | 5.6% | 0.0% | 3.9% | 6.8% |

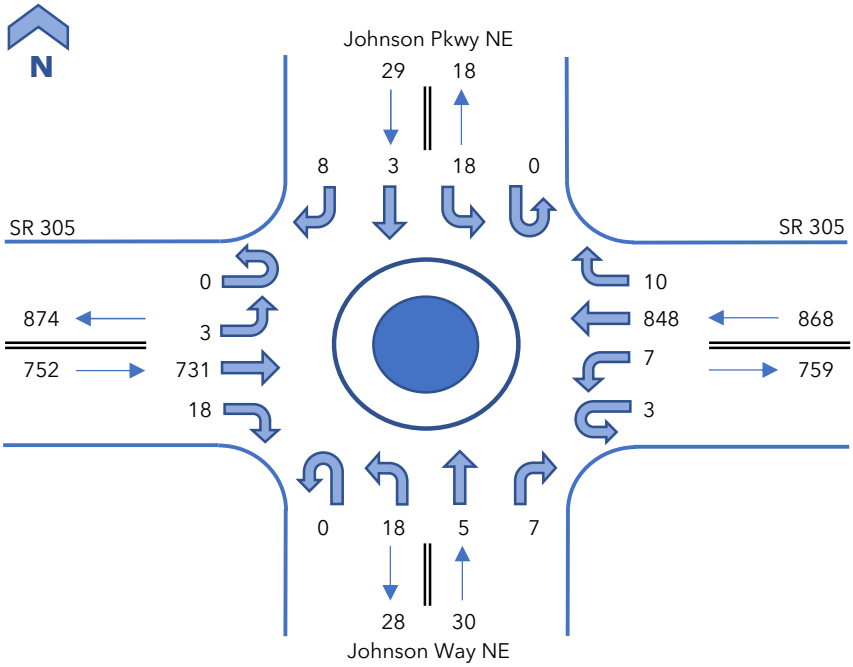
| Pedestrians (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 |
| 1 | 0 | 0 | 0 | 1 |

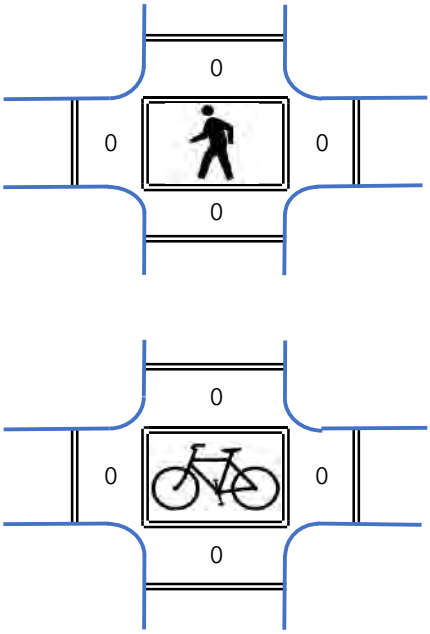
| Bicycles (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |

HEATH & ASSOCIATES
Transportation Planning & Engineering

**Date Collected:** 5/20/2025
**Day of the Week:** Tuesday
**Time Period:** 4:00 PM to 6:00 PM
**Peak Hour:** 4:15 PM to 5:15 PM

**SR 305 & Johnson Parkway NE**




| Interval Start Time | SR 305 Eastbound | | | | SR 305 Westbound | | | | Johnson Way NE Northbound | | | | Johnson Pkwy NE Southbound | | | | 15 Minute Totals | Hourly Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | | |
| 4:00 PM | 0 | 1 | 166 | 7 | 0 | 2 | 212 | 6 | 0 | 4 | 0 | 2 | 0 | 4 | 2 | 4 | 410 | |
| 4:15 PM | 0 | 2 | 186 | 3 | 0 | 1 | 244 | 0 | 0 | 5 | 1 | 1 | 0 | 3 | 2 | 2 | 450 | |
| 4:30 PM | 0 | 0 | 178 | 4 | 2 | 2 | 180 | 2 | 0 | 6 | 1 | 2 | 0 | 3 | 1 | 2 | 383 | |
| 4:45 PM | 0 | 0 | 179 | 7 | 0 | 0 | 219 | 5 | 0 | 2 | 1 | 3 | 0 | 8 | 0 | 3 | 427 | 1670 |
| 5:00 PM | 0 | 1 | 188 | 4 | 1 | 4 | 205 | 3 | 0 | 5 | 2 | 1 | 0 | 4 | 0 | 1 | 419 | 1679 |
| 5:15 PM | 1 | 3 | 171 | 3 | 0 | 0 | 211 | 1 | 0 | 7 | 1 | 0 | 0 | 6 | 1 | 3 | 408 | 1637 |
| 5:30 PM | 0 | 0 | 165 | 3 | 0 | 3 | 209 | 5 | 0 | 2 | 1 | 3 | 0 | 5 | 1 | 2 | 399 | 1653 |
| 5:45 PM | 0 | 1 | 136 | 4 | 0 | 1 | 224 | 2 | 0 | 11 | 2 | 3 | 0 | 1 | 0 | 3 | 388 | 1614 |
| Count Total | 1 | 8 | 1369 | 35 | 3 | 13 | 1704 | 24 | 0 | 42 | 9 | 15 | 0 | 34 | 7 | 20 | 3284 | -- |
| Peak Hour Total | 0 | 3 | 731 | 18 | 3 | 7 | 848 | 10 | 0 | 18 | 5 | 7 | 0 | 18 | 3 | 8 | 1679 | -- |
| PHF | 0.97 | | | | 0.89 | | | | 0.83 | | | | 0.66 | | | | 0.93 | -- |
| Heavy Vehicles | 0 | 0 | 11 | 0 | 0 | 0 | 26 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 41 | -- |
| HV % | 0.0% | 0.0% | 1.5% | 0.0% | 0.0% | 0.0% | 3.1% | 10.0% | 0.0% | 5.6% | 0.0% | 0.0% | 0.0% | 5.6% | 0.0% | 12.5% | 2.4% | -- |

| Interval Start Time | Heavy Vehicles | | | | |
|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total |
| 4:00 PM | 1 | 4 | 0 | 0 | 5 |
| 4:15 PM | 1 | 5 | 0 | 1 | 7 |
| 4:30 PM | 5 | 15 | 1 | 1 | 22 |
| 4:45 PM | 2 | 4 | 0 | 0 | 6 |
| 5:00 PM | 3 | 3 | 0 | 0 | 6 |
| 5:15 PM | 6 | 9 | 1 | 0 | 16 |
| 5:30 PM | 1 | 8 | 0 | 1 | 10 |
| 5:45 PM | 1 | 9 | 0 | 0 | 10 |
| Count Total | 20 | 57 | 2 | 3 | 82 |
| Peak Hour Total | 11 | 27 | 1 | 2 | 41 |
| Peak Hour HV% | 1.5% | 3.1% | 3.3% | 6.9% | 2.4% |

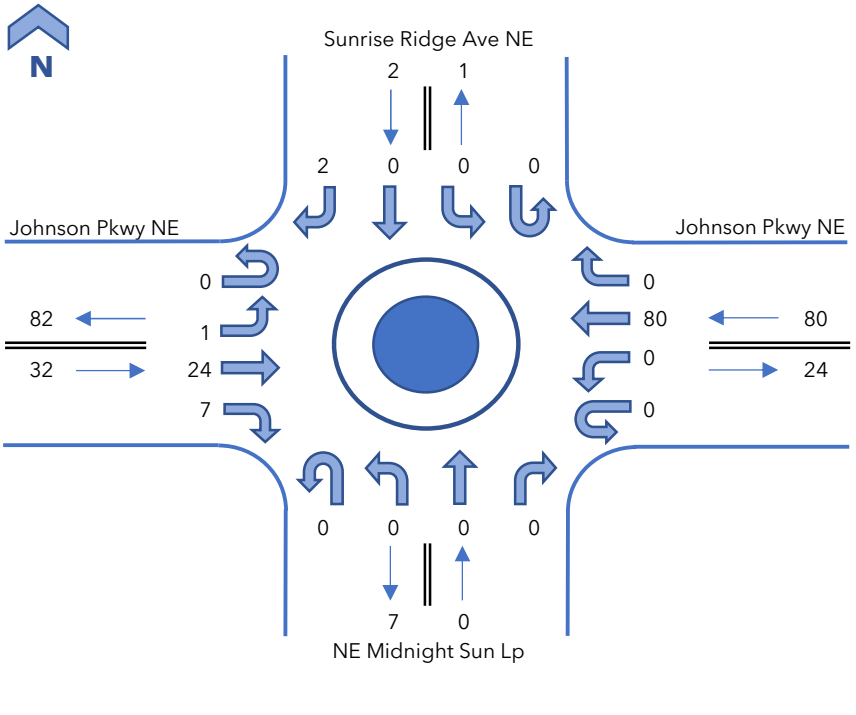
| Pedestrians (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |

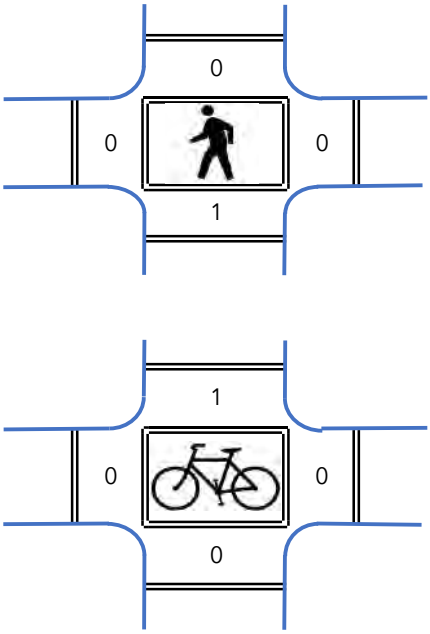
| Bicycles (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |

HEATH & ASSOCIATES
Transportation Planning & Engineering

**Date Collected:** 5/21/2025
**Day of the Week:** Wednesday
**Time Period:** 7:00 AM to 9:00 AM
**Peak Hour:** 7:15 AM to 8:15 AM

**Johnson Parkway NE & Sunrise Ridge NE**




| Interval Start Time | Johnson Pkwy NE Eastbound | | | | Johnson Pkwy NE Westbound | | | | NE Midnight Sun Lp Northbound | | | | Sunrise Ridge Ave NE Southbound | | | | 15 Minute Totals | Hourly Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | | |
| 7:00 AM | 0 | 0 | 2 | 0 | 0 | 0 | 12 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | |
| 7:15 AM | 0 | 0 | 7 | 4 | 0 | 0 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | |
| 7:30 AM | 0 | 1 | 9 | 1 | 0 | 0 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 34 | |
| 7:45 AM | 0 | 0 | 3 | 1 | 0 | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31 | 110 |
| 8:00 AM | 0 | 0 | 5 | 1 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 19 | 114 |
| 8:15 AM | 0 | 0 | 3 | 1 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 93 |
| 8:30 AM | 0 | 1 | 2 | 3 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 77 |
| 8:45 AM | 0 | 0 | 7 | 3 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 18 | 64 |
| Count Total | 0 | 2 | 38 | 14 | 0 | 0 | 113 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 3 | 174 | -- |
| Peak Hour Total | 0 | 1 | 24 | 7 | 0 | 0 | 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 114 | -- |
| PHF | 0.73 | | | | 0.74 | | | | #DIV/0! | | | | 0.50 | | | | 0.84 | -- |
| Heavy Vehicles | 0 | 0 | 1 | 1 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | -- |
| HV % | 0.0% | 0.0% | 4.2% | 14.3% | 0.0% | 0.0% | 5.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 5.3% | -- |

| Interval Start Time | Heavy Vehicles | | | | |
|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 1 | 2 | 0 | 0 | 3 |
| 7:45 AM | 0 | 2 | 0 | 0 | 2 |
| 8:00 AM | 1 | 0 | 0 | 0 | 1 |
| 8:15 AM | 0 | 0 | 1 | 0 | 1 |
| 8:30 AM | 1 | 2 | 0 | 0 | 3 |
| 8:45 AM | 2 | 0 | 0 | 0 | 2 |
| Count Total | 5 | 6 | 1 | 0 | 12 |
| Peak Hour Total | 2 | 4 | 0 | 0 | 6 |
| Peak Hour HV% | 6.3% | 5.0% | #DIV/0! | 0.0% | 5.3% |

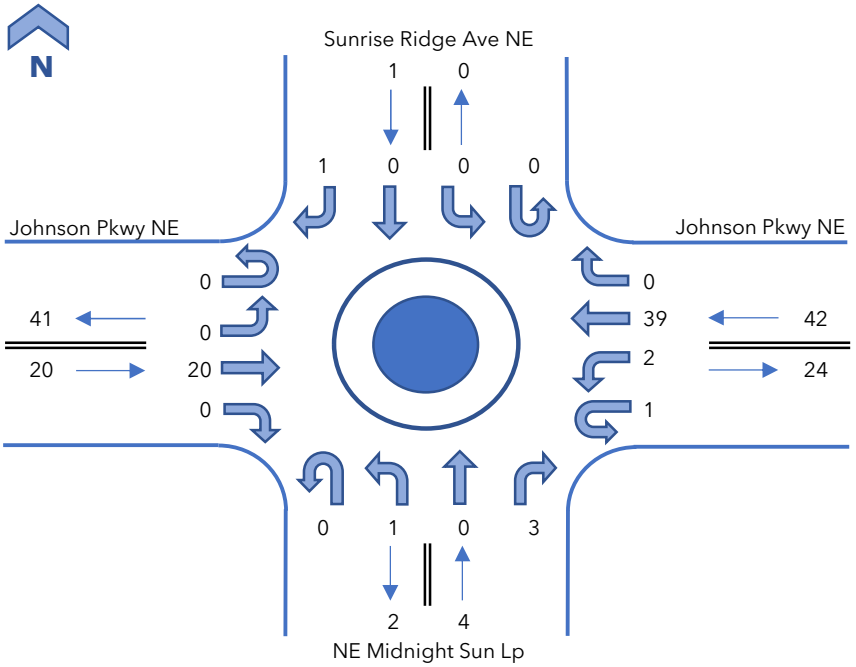
| Pedestrians (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 | 2 |
| 0 | 0 | 0 | 1 | 1 |

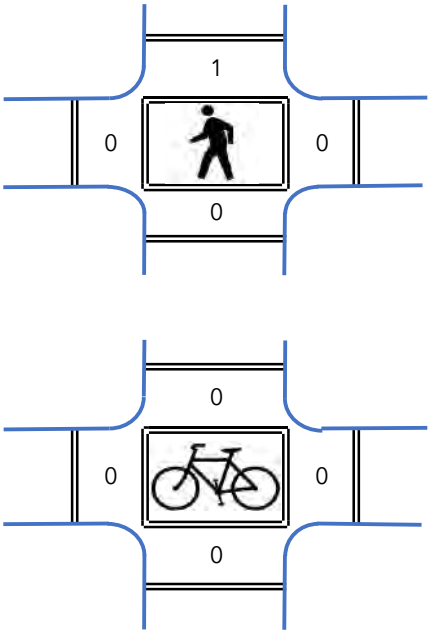
| Bicycles (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 1 | 0 | 1 |

HEATH & ASSOCIATES
Transportation Planning & Engineering

**Date Collected:** 5/20/2025
**Day of the Week:** Tuesday
**Time Period:** 4:00 PM to 6:00 PM
**Peak Hour:** 4:00 PM to 5:00 PM

**Johnson Parkway NE & Sunrise Ridge NE**




| Interval Start Time | Johnson Pkwy NE Eastbound | | | | Johnson Pkwy NE Westbound | | | | NE Midnight Sun Lp Northbound | | | | Sunrise Ridge Ave NE Southbound | | | | 15 Minute Totals | Hourly Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | | |
| 4:00 PM | 0 | 0 | 6 | 0 | 0 | 1 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | |
| 4:15 PM | 0 | 0 | 5 | 0 | 0 | 0 | 9 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 16 | |
| 4:30 PM | 0 | 0 | 3 | 0 | 1 | 1 | 9 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 16 | |
| 4:45 PM | 0 | 0 | 6 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 19 | 67 |
| 5:00 PM | 0 | 0 | 4 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 60 |
| 5:15 PM | 0 | 0 | 3 | 1 | 0 | 0 | 10 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 16 | 60 |
| 5:30 PM | 0 | 0 | 6 | 0 | 0 | 0 | 7 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 60 |
| 5:45 PM | 0 | 0 | 2 | 3 | 0 | 0 | 3 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 52 |
| Count Total | 0 | 0 | 35 | 4 | 1 | 2 | 64 | 1 | 0 | 7 | 0 | 3 | 0 | 0 | 0 | 2 | 119 | -- |
| Peak Hour Total | 0 | 0 | 20 | 0 | 1 | 2 | 39 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 1 | 67 | -- |
| PHF | 0.83 | | | | 0.88 | | | | 0.50 | | | | 0.25 | | | | 0.88 | -- |
| Heavy Vehicles | 0 | 0 | 2 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | -- |
| HV % | 0.0% | 0.0% | 10.0% | 0.0% | 0.0% | 0.0% | 10.3% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 9.0% | -- |

| Interval Start Time | Heavy Vehicles | | | | |
|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total |
| 4:00 PM | 0 | 1 | 0 | 0 | 1 |
| 4:15 PM | 1 | 2 | 0 | 0 | 3 |
| 4:30 PM | 1 | 1 | 0 | 0 | 2 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 2 | 0 | 1 | 0 | 3 |
| 5:30 PM | 0 | 0 | 1 | 0 | 1 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 |
| Count Total | 4 | 4 | 2 | 0 | 10 |
| Peak Hour Total | 2 | 4 | 0 | 0 | 6 |
| Peak Hour HV% | 10.0% | 9.5% | 0.0% | 0.0% | 9.0% |

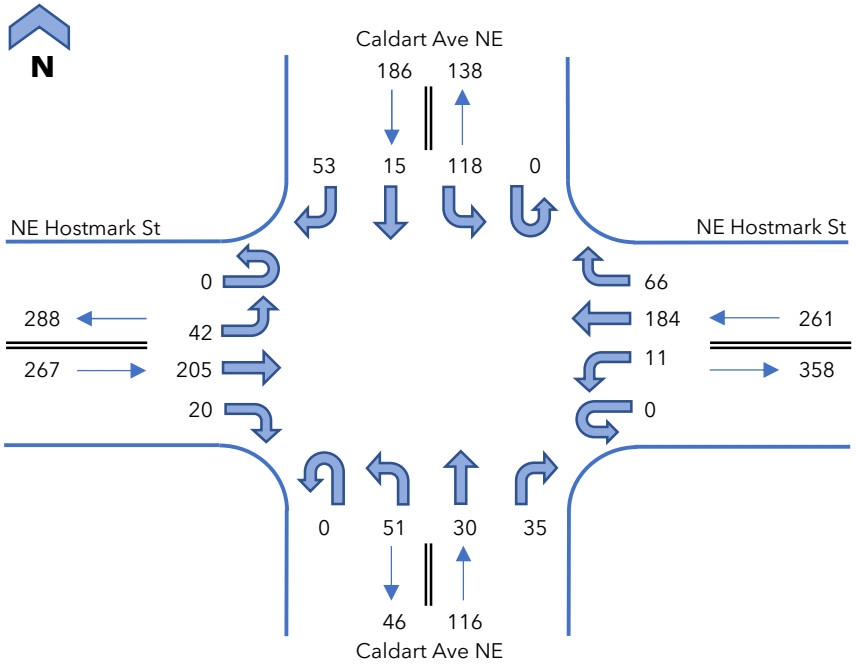
| Pedestrians (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 2 | 0 | 2 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 3 | 0 | 3 |
| 0 | 0 | 1 | 0 | 1 |

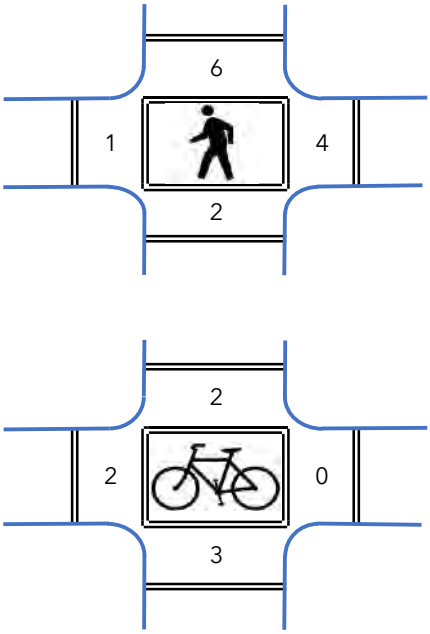
| Bicycles (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |

HEATH & ASSOCIATES
Transportation Planning & Engineering

**Date Collected:** 5/29/2025
**Day of the Week:** Thursday
**Time Period:** 7:00 AM to 9:00 AM
**Peak Hour:** 7:15 AM to 8:15 AM

**NE Hostmark Street & Caldart Avenue NE**




| Interval Start Time | NE Hostmark St Eastbound | | | | NE Hostmark St Westbound | | | | Caldart Ave NE Northbound | | | | Caldart Ave NE Southbound | | | | 15 Minute Totals | Hourly Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | | |
| 7:00 AM | 0 | 5 | 22 | 5 | 0 | 0 | 26 | 5 | 0 | 13 | 4 | 0 | 0 | 3 | 1 | 8 | 92 | |
| 7:15 AM | 0 | 8 | 57 | 10 | 0 | 1 | 37 | 5 | 0 | 16 | 3 | 1 | 0 | 26 | 1 | 18 | 183 | |
| 7:30 AM | 0 | 13 | 70 | 2 | 0 | 6 | 46 | 17 | 0 | 12 | 2 | 21 | 0 | 56 | 5 | 6 | 256 | |
| 7:45 AM | 0 | 14 | 53 | 4 | 0 | 3 | 67 | 37 | 0 | 15 | 20 | 13 | 0 | 32 | 2 | 18 | 278 | 809 |
| 8:00 AM | 0 | 7 | 25 | 4 | 0 | 1 | 34 | 7 | 0 | 8 | 5 | 0 | 0 | 4 | 7 | 11 | 113 | 830 |
| 8:15 AM | 0 | 5 | 15 | 4 | 0 | 0 | 23 | 1 | 0 | 23 | 5 | 2 | 0 | 8 | 2 | 11 | 99 | 746 |
| 8:30 AM | 0 | 4 | 29 | 6 | 0 | 0 | 11 | 4 | 0 | 8 | 4 | 0 | 0 | 9 | 7 | 9 | 91 | 581 |
| 8:45 AM | 0 | 6 | 14 | 6 | 0 | 1 | 23 | 6 | 0 | 13 | 5 | 3 | 0 | 14 | 9 | 13 | 113 | 416 |
| Count Total | 0 | 62 | 285 | 41 | 0 | 12 | 267 | 82 | 0 | 108 | 48 | 40 | 0 | 152 | 34 | 94 | 1225 | -- |
| Peak Hour Total | 0 | 42 | 205 | 20 | 0 | 11 | 184 | 66 | 0 | 51 | 30 | 35 | 0 | 118 | 15 | 53 | 830 | -- |
| PHF | 0.79 | | | | 0.61 | | | | 0.60 | | | | 0.69 | | | | 0.75 | -- |
| Heavy Vehicles | 0 | 0 | 12 | 1 | 0 | 0 | 13 | 0 | 0 | 0 | 1 | 2 | 0 | 9 | 0 | 2 | 40 | -- |
| HV % | 0.0% | 0.0% | 5.9% | 5.0% | 0.0% | 0.0% | 7.1% | 0.0% | 0.0% | 0.0% | 3.3% | 5.7% | 0.0% | 7.6% | 0.0% | 3.8% | 4.8% | -- |

| Interval Start Time | Heavy Vehicles | | | | |
|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total |
| 7:00 AM | 2 | 1 | 0 | 0 | 3 |
| 7:15 AM | 8 | 4 | 1 | 4 | 17 |
| 7:30 AM | 4 | 4 | 1 | 6 | 15 |
| 7:45 AM | 0 | 2 | 1 | 1 | 4 |
| 8:00 AM | 1 | 3 | 0 | 0 | 4 |
| 8:15 AM | 1 | 2 | 1 | 0 | 4 |
| 8:30 AM | 2 | 1 | 0 | 1 | 4 |
| 8:45 AM | 3 | 0 | 0 | 1 | 4 |
| Count Total | 21 | 17 | 4 | 13 | 55 |
| Peak Hour Total | 13 | 13 | 3 | 11 | 40 |
| Peak Hour HV% | 4.9% | 5.0% | 2.6% | 5.9% | 4.8% |

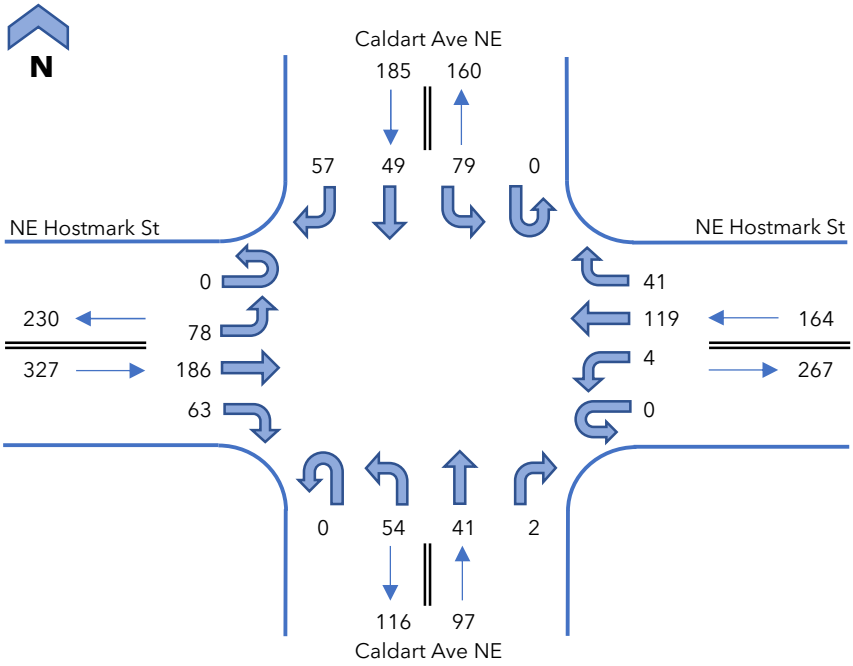
| Pedestrians (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 1 | 1 |
| 1 | 0 | 1 | 0 | 2 |
| 2 | 0 | 1 | 1 | 4 |
| 1 | 1 | 3 | 1 | 6 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 2 | 1 | 0 | 3 | 6 |
| 0 | 0 | 0 | 0 | 0 |
| 6 | 2 | 6 | 6 | 20 |
| 4 | 1 | 6 | 2 | 13 |

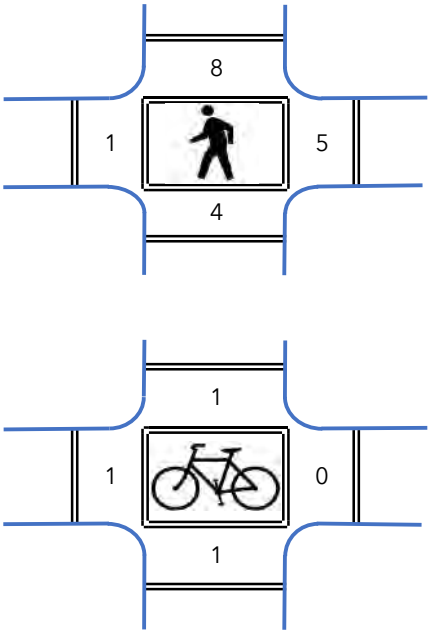
| Bicycles (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 2 | 1 | 2 | 5 |
| 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 2 | 2 | 3 | 7 |
| 0 | 2 | 2 | 3 | 7 |

HEATH & ASSOCIATES
Transportation Planning & Engineering

**Date Collected:** 5/29/2025
**Day of the Week:** Thursday
**Time Period:** 4:00 PM to 6:00 PM
**Peak Hour:** 4:45 PM to 5:45 PM

**NE Hostmark Street & Caldart Avenue NE**




| Interval Start Time | NE Hostmark St Eastbound | | | | NE Hostmark St Westbound | | | | Caldart Ave NE Northbound | | | | Caldart Ave NE Southbound | | | | 15 Minute Totals | Hourly Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | UT | LT | T | RT | | |
| 4:00 PM | 0 | 8 | 37 | 21 | 0 | 2 | 48 | 12 | 0 | 21 | 12 | 2 | 0 | 19 | 9 | 14 | 205 | |
| 4:15 PM | 0 | 10 | 35 | 16 | 0 | 0 | 37 | 17 | 0 | 17 | 16 | 1 | 0 | 8 | 7 | 15 | 179 | |
| 4:30 PM | 0 | 8 | 54 | 12 | 0 | 0 | 22 | 13 | 0 | 11 | 7 | 0 | 0 | 15 | 8 | 10 | 160 | |
| 4:45 PM | 0 | 17 | 64 | 14 | 0 | 1 | 24 | 8 | 0 | 11 | 8 | 1 | 0 | 41 | 19 | 14 | 222 | 766 |
| 5:00 PM | 0 | 16 | 37 | 22 | 0 | 3 | 40 | 14 | 0 | 15 | 12 | 0 | 0 | 21 | 11 | 14 | 205 | 766 |
| 5:15 PM | 0 | 21 | 40 | 17 | 0 | 0 | 26 | 10 | 0 | 13 | 13 | 0 | 0 | 6 | 10 | 14 | 170 | 757 |
| 5:30 PM | 0 | 24 | 45 | 10 | 0 | 0 | 29 | 9 | 0 | 15 | 8 | 1 | 0 | 11 | 9 | 15 | 176 | 773 |
| 5:45 PM | 0 | 22 | 27 | 7 | 0 | 1 | 18 | 4 | 0 | 7 | 9 | 2 | 0 | 7 | 7 | 13 | 124 | 675 |
| Count Total | 0 | 126 | 339 | 119 | 0 | 7 | 244 | 87 | 0 | 110 | 85 | 7 | 0 | 128 | 80 | 109 | 1441 | -- |
| Peak Hour Total | 0 | 78 | 186 | 63 | 0 | 4 | 119 | 41 | 0 | 54 | 41 | 2 | 0 | 79 | 49 | 57 | 773 | -- |
| PHF | 0.86 | | | | 0.72 | | | | 0.90 | | | | 0.63 | | | | 0.87 | -- |
| Heavy Vehicles | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 6 | -- |
| HV % | 0.0% | 2.6% | 0.5% | 0.0% | 0.0% | 0.0% | 0.0% | 2.4% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 3.5% | 0.8% | -- |

| Interval Start Time | Heavy Vehicles | | | | |
|---|---|---|---|---|---|
| | EB | WB | NB | SB | Total |
| 4:00 PM | 0 | 1 | 0 | 1 | 2 |
| 4:15 PM | 0 | 0 | 1 | 1 | 2 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 2 | 1 | 0 | 0 | 3 |
| 5:00 PM | 0 | 0 | 0 | 1 | 1 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 1 | 0 | 0 | 1 | 2 |
| 5:45 PM | 2 | 0 | 0 | 0 | 2 |
| Count Total | 5 | 2 | 1 | 4 | 12 |
| Peak Hour Total | 3 | 1 | 0 | 2 | 6 |
| Peak Hour HV% | 0.9% | 0.6% | 0.0% | 1.1% | 0.8% |

| Pedestrians (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 1 | 0 | 2 | 1 | 4 |
| 0 | 0 | 5 | 0 | 5 |
| 3 | 0 | 2 | 0 | 5 |
| 2 | 1 | 2 | 0 | 5 |
| 0 | 0 | 2 | 2 | 4 |
| 1 | 0 | 1 | 2 | 4 |
| 2 | 0 | 3 | 0 | 5 |
| 0 | 0 | 0 | 0 | 0 |
| 9 | 1 | 17 | 5 | 32 |
| 5 | 1 | 8 | 4 | 18 |

| Bicycles (Leg) | | | | |
|---|---|---|---|---|
| E | W | N | S | Total |
| 0 | 0 | 0 | 2 | 2 |
| 0 | 1 | 0 | 0 | 1 |
| 1 | 2 | 1 | 1 | 5 |
| 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 0 | 0 | 1 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 4 | 2 | 4 | 11 |
| 0 | 1 | 1 | 1 | 3 |

# THE PINNACLE AT LIBERTY BAY
# TRAFFIC IMPACT ANALYSIS

*APPENDIX*
*ITE Sheets*

# Single-Family Detached Housing
(210)

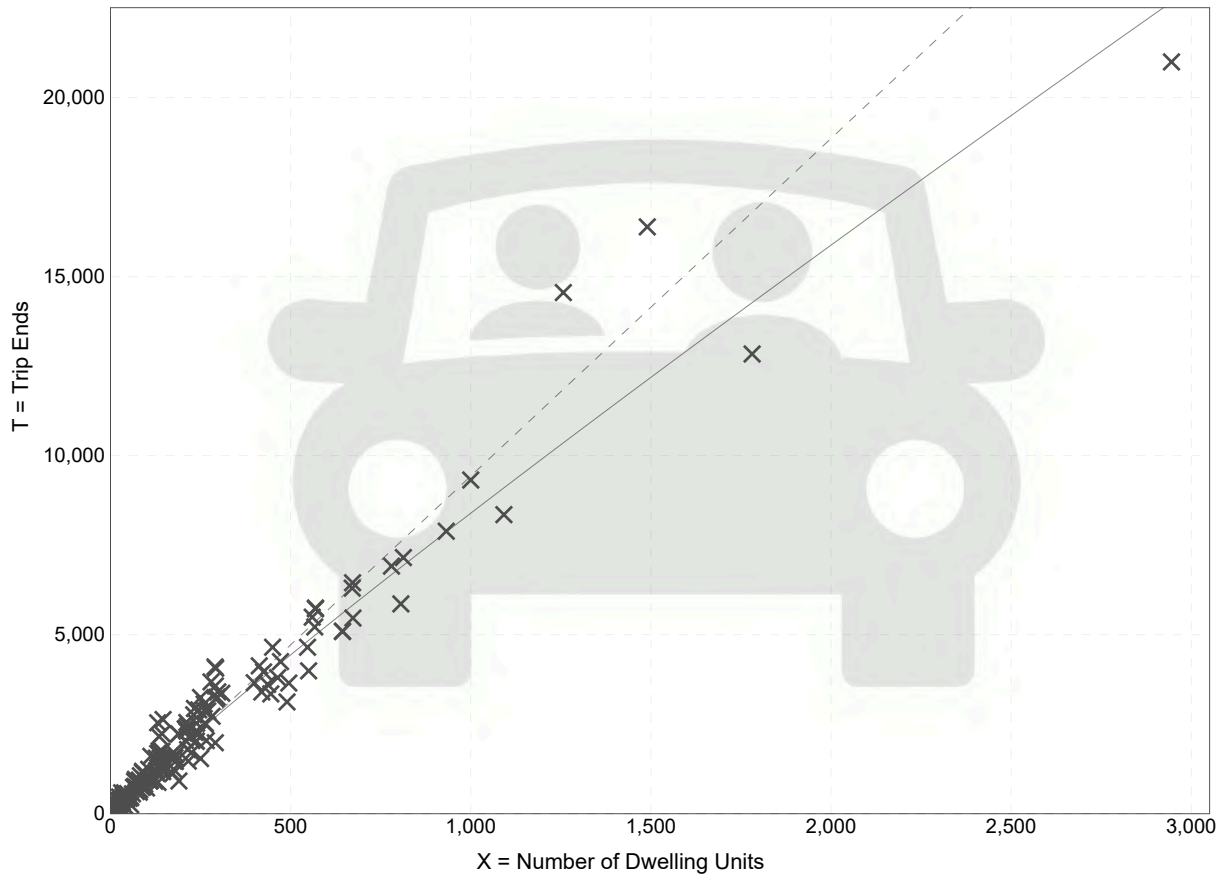
**Vehicle Trip Ends vs:** **Dwelling Units**
**On a:** **Weekday**

**Setting/Location:** **General Urban/Suburban**
Number of Studies: 174
Avg. Num. of Dwelling Units: 246
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 9.43 | 4.45 - 22.61 | 2.13 |

## Data Plot and Equation




**Fitted Curve Equation: Ln(T) = 0.92 Ln(X) + 2.68** **$R^2$= 0.95**

*Trip Gen Manual,* 11th Edition ● Institute of Transportation Engineers

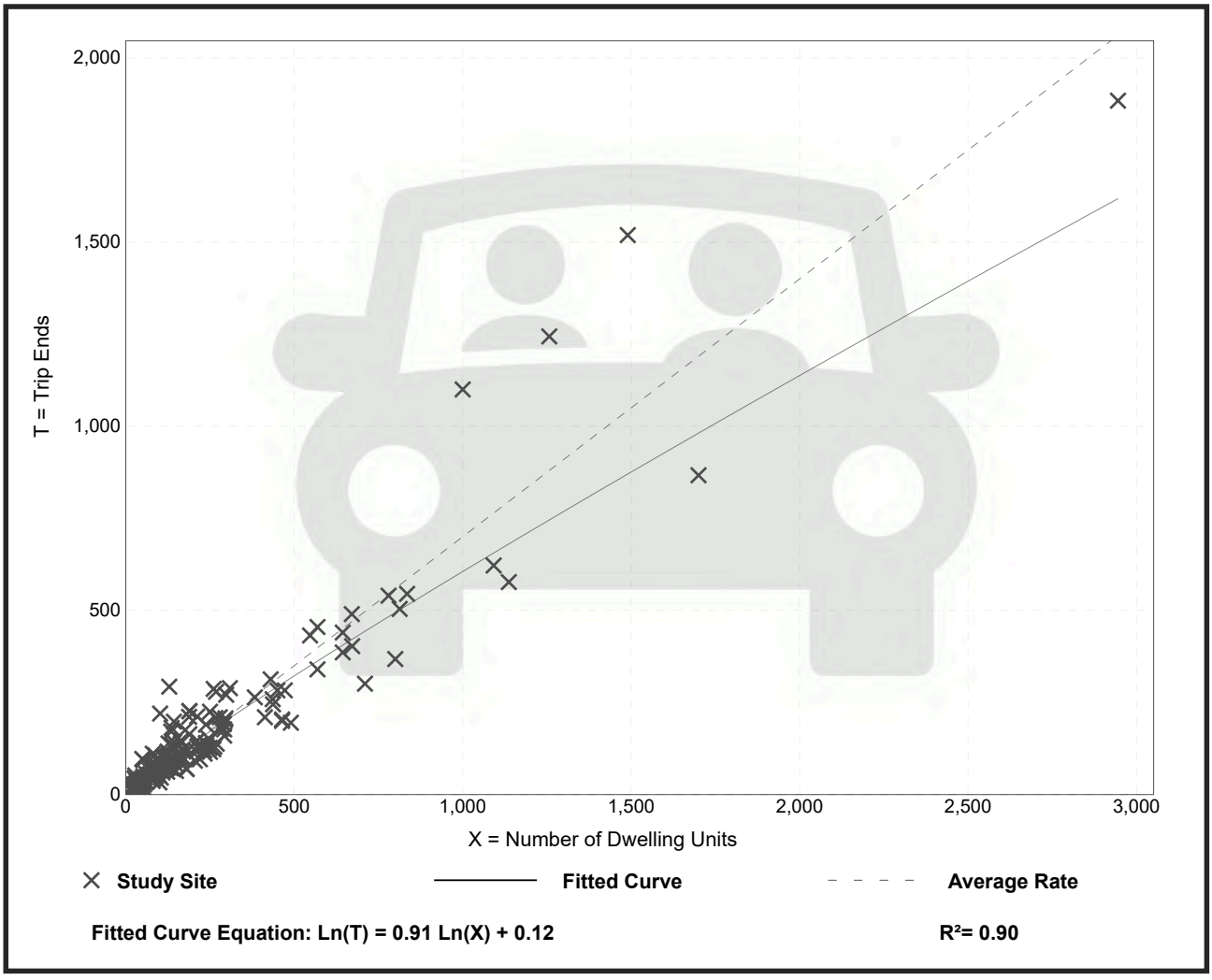
# Single-Family Detached Housing
(210)

**Vehicle Trip Ends vs:** **Dwelling Units**
**On a:** **Weekday,**
**Peak Hour of Adjacent Street Traffic,**
**One Hour Between 7 and 9 a.m.**
**Setting/Location:** **General Urban/Suburban**
Number of Studies: 192
Avg. Num. of Dwelling Units: 226
Directional Distribution: 25% entering, 75% exiting

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 0.70 | 0.27 - 2.27 | 0.24 |

## Data Plot and Equation




*Trip Gen Manual,* 11th Edition ● Institute of Transportation Engineers

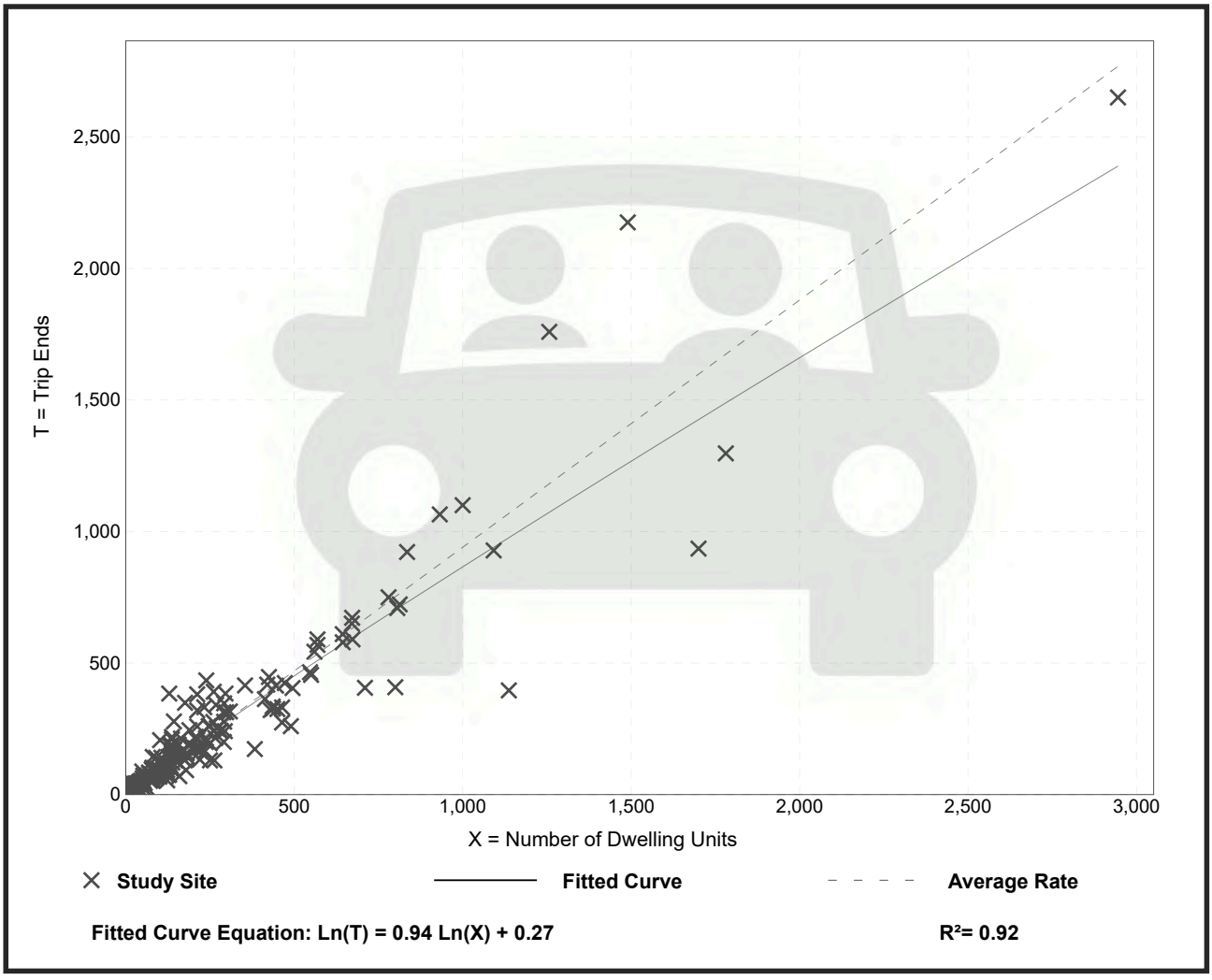
# Single-Family Detached Housing
(210)

**Vehicle Trip Ends vs:** **Dwelling Units**
**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: 208
Avg. Num. of Dwelling Units: 248
Directional Distribution: 63% entering, 37% exiting

## Vehicle Trip Generation per Dwelling Unit

| Average Rate | Range of Rates | Standard Deviation |
|---|---|---|
| 0.94 | 0.35 - 2.98 | 0.31 |

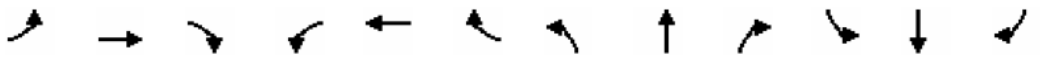
## Data Plot and Equation




*Trip Gen Manual,* 11th Edition ● Institute of Transportation Engineers

# THE PINNACLE AT LIBERTY BAY
# TRAFFIC IMPACT ANALYSIS

*APPENDIX*
*Existing Level of Service*



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 33 | 94 | 57 | 46 | 75 | 131 | 40 | 469 | 18 | 182 | 847 | 18 |
| Future Volume (veh/h) | 33 | 94 | 57 | 46 | 75 | 131 | 40 | 469 | 18 | 182 | 847 | 18 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 0.98 | | 0.97 | 0.99 | | 0.98 | 1.00 | | 0.98 | 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 | 1716 | 1730 | 1744 | 1744 | 1744 | 1716 | 1730 | 1716 | 1716 | 1730 | 1716 | 1646 |
| Adj Flow Rate, veh/h | 36 | 102 | 62 | 50 | 82 | 77 | 43 | 510 | 20 | 198 | 921 | 20 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 6 | 5 | 4 | 4 | 4 | 6 | 5 | 6 | 6 | 5 | 6 | 11 |
| Cap, veh/h | 166 | 164 | 136 | 158 | 183 | 149 | 48 | 576 | 23 | 826 | 1939 | 42 |
| Arrive On Green | 0.02 | 0.09 | 0.09 | 0.03 | 0.10 | 0.10 | 0.03 | 0.21 | 0.21 | 0.50 | 0.68 | 0.68 |
| Sat Flow, veh/h | 1634 | 1730 | 1440 | 1661 | 1744 | 1421 | 1647 | 2802 | 110 | 1647 | 2860 | 62 |
| Grp Volume(v), veh/h | 36 | 102 | 62 | 50 | 82 | 77 | 43 | 221 | 309 | 198 | 392 | 549 |
| Grp Sat Flow(s),veh/h/ln | 1634 | 1730 | 1440 | 1661 | 1744 | 1421 | 1647 | 1218 | 1693 | 1647 | 1218 | 1704 |
| Q Serve(g_s), s | 2.4 | 6.8 | 4.9 | 3.3 | 5.3 | 2.2 | 3.1 | 21.2 | 21.2 | 8.2 | 18.3 | 18.3 |
| Cycle Q Clear(g_c), s | 2.4 | 6.8 | 4.9 | 3.3 | 5.3 | 2.2 | 3.1 | 21.2 | 21.2 | 8.2 | 18.3 | 18.3 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.06 | 1.00 | | 0.04 |
| Lane Grp Cap(c), veh/h | 166 | 164 | 136 | 158 | 183 | 149 | 48 | 250 | 348 | 826 | 826 | 1156 |
| V/C Ratio(X) | 0.22 | 0.62 | 0.46 | 0.32 | 0.45 | 0.52 | 0.90 | 0.88 | 0.89 | 0.24 | 0.47 | 0.47 |
| Avail Cap(c_a), veh/h | 343 | 332 | 276 | 321 | 334 | 272 | 316 | 437 | 607 | 826 | 826 | 1156 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 48.0 | 52.3 | 51.4 | 47.4 | 50.5 | 6.5 | 58.1 | 46.3 | 46.3 | 17.0 | 9.2 | 9.2 |
| Incr Delay (d2), s/veh | 0.6 | 3.9 | 2.4 | 1.1 | 1.7 | 2.8 | 40.1 | 33.4 | 26.5 | 0.1 | 2.0 | 1.4 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 1.8 | 5.6 | 3.3 | 2.5 | 4.3 | 4.0 | 3.3 | 13.4 | 16.8 | 5.4 | 8.3 | 10.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 48.6 | 56.1 | 53.8 | 48.6 | 52.2 | 9.2 | 98.2 | 79.6 | 72.8 | 17.1 | 11.1 | 10.6 |
| LnGrp LOS | D | E | D | D | D | A | F | E | E | B | B | B |
| Approach Vol, veh/h | | 200 | | | 209 | | | 573 | | | 1139 | |
| Approach Delay, s/veh | | 54.0 | | | 35.5 | | | 77.4 | | | 11.9 | |
| Approach LOS | | D | | | D | | | E | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 65.2 | 29.7 | 8.8 | 16.3 | 8.5 | 86.4 | 7.6 | 17.6 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 18.9 | 43.5 | 16.1 | 23.5 | 23.5 | 38.9 | 16.1 | 23.5 |
| Max Q Clear Time (g_c+I1), s | 10.2 | 23.2 | 5.3 | 8.8 | 5.1 | 20.3 | 4.4 | 7.3 |
| Green Ext Time (p_c), s | 0.4 | 1.9 | 0.1 | 0.5 | 0.1 | 3.8 | 0.0 | 0.5 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 35.9 |
| HCM 7th LOS | D |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 928 | 493 | 1 | 2 | 3 |
| Future Vol, veh/h | 0 | 928 | 493 | 1 | 2 | 3 |
| Conflicting Peds, #/hr | 4 | 0 | 0 | 4 | 4 | 4 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 105 | - | - | 55 | 60 | 0 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 93 | 93 | 93 | 93 | 93 | 93 |
| Heavy Vehicles, % | 1 | 8 | 6 | 1 | 1 | 1 |
| Mvmt Flow | 0 | 998 | 530 | 1 | 2 | 3 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 535 | 0 | - | 0 | 1536 | 538 |
| Stage 1 | - | - | - | - | 534 | - |
| Stage 2 | - | - | - | - | 1002 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1038 | - | - | - | 128 | 545 |
| Stage 1 | - | - | - | - | 590 | - |
| Stage 2 | - | - | - | - | 357 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1034 | - | - | - | 128 | 541 |
| Mov Cap-2 Maneuver | - | - | - | - | 128 | - |
| Stage 1 | - | - | - | - | 588 | - |
| Stage 2 | - | - | - | - | 355 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 0 | 20.49 |
| HCM LOS | | | C |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1034 | - | - | - | 128 | 541 |
| HCM Lane V/C Ratio | - | - | - | - | 0.017 | 0.006 |
| HCM Ctrl Dly (s/v) | 0 | - | - | - | 33.7 | 11.7 |
| HCM Lane LOS | A | - | - | - | D | B |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.1 | 0 |

# MOVEMENT SUMMARY

**Site: [99] SR 305 & Johnson Rd** (Existing AM Peak Hour)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Johnson Way | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.042 | 15.8 | LOS B | 0.2 | 4.4 | 0.63 | 0.77 | 0.63 | 30.8 |
| 3 | L2 | All MCs | 16 | 1.0 | 16 | 1.0 | 0.042 | 12.4 | LOS B | 0.2 | 4.4 | 0.63 | 0.77 | 0.63 | 32.5 |
| 8 | T1 | All MCs | 6 | 1.0 | 6 | 1.0 | 0.042 | 6.7 | LOS A | 0.2 | 4.4 | 0.63 | 0.77 | 0.63 | 30.0 |
| 18 | R2 | All MCs | 3 | 1.0 | 3 | 1.0 | 0.042 | 11.4 | LOS B | 0.2 | 4.4 | 0.63 | 0.77 | 0.63 | 32.9 |
| Approach | | | 27 | 1.0 | 27 | 1.0 | 0.042 | 11.0 | LOS B | 0.2 | 4.4 | 0.63 | 0.77 | 0.63 | 31.8 |
| East: SR 305 | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.251 | 12.0 | LOS B | 1.5 | 40.6 | 0.16 | 0.46 | 0.16 | 37.8 |
| 1 | L2 | All MCs | 5 | 1.0 | 5 | 1.0 | 0.251 | 11.4 | LOS B | 1.5 | 40.6 | 0.16 | 0.46 | 0.16 | 35.8 |
| 6 | T1 | All MCs | 502 | 6.0 | 502 | 6.0 | 0.251 | 6.0 | LOS A | 1.5 | 40.6 | 0.16 | 0.46 | 0.16 | 40.8 |
| 16 | R2 | All MCs | 11 | 1.0 | 11 | 1.0 | 0.114 | 5.8 | LOS A | 0.6 | 15.7 | 0.15 | 0.46 | 0.15 | 36.2 |
| Approach | | | 519 | 5.8 | 519 | 5.8 | 0.251 | 6.1 | LOS A | 1.5 | 40.6 | 0.16 | 0.46 | 0.16 | 40.7 |
| North: Johnson Rd | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.095 | 13.7 | LOS B | 0.3 | 8.8 | 0.45 | 0.70 | 0.45 | 31.0 |
| 7 | L2 | All MCs | 68 | 3.0 | 68 | 3.0 | 0.095 | 10.4 | LOS B | 0.3 | 8.8 | 0.45 | 0.70 | 0.45 | 32.7 |
| 4 | T1 | All MCs | 2 | 1.0 | 2 | 1.0 | 0.095 | 4.7 | LOS A | 0.3 | 8.8 | 0.45 | 0.70 | 0.45 | 30.3 |
| 14 | R2 | All MCs | 12 | 1.0 | 12 | 1.0 | 0.095 | 6.0 | LOS A | 0.3 | 8.8 | 0.45 | 0.70 | 0.45 | 33.3 |
| Approach | | | 83 | 2.6 | 83 | 2.6 | 0.095 | 9.7 | LOS A | 0.3 | 8.8 | 0.45 | 0.70 | 0.45 | 32.7 |
| West: SR 305 | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.515 | 12.3 | LOS B | 4.3 | 113.5 | 0.34 | 0.47 | 0.34 | 37.1 |
| 5 | L2 | All MCs | 6 | 17.0 | 6 | 17.0 | 0.515 | 12.2 | LOS B | 4.3 | 113.5 | 0.34 | 0.47 | 0.34 | 34.7 |
| 2 | T1 | All MCs | 974 | 8.0 | 974 | 8.0 | 0.515 | 7.2 | LOS A | 4.3 | 113.5 | 0.33 | 0.47 | 0.33 | 39.8 |
| 12 | R2 | All MCs | 18 | 12.0 | 18 | 12.0 | 0.234 | 6.3 | LOS A | 1.4 | 36.2 | 0.28 | 0.47 | 0.28 | 35.7 |
| Approach | | | 1000 | 8.1 | 1000 | 8.1 | 0.515 | 7.3 | LOS A | 4.3 | 113.5 | 0.33 | 0.47 | 0.33 | 39.7 |
| All Vehicles | | | 1629 | 7.0 | 1629 | 7.0 | 0.515 | 7.1 | LOS A | 4.3 | 113.5 | 0.28 | 0.48 | 0.28 | 39.4 |

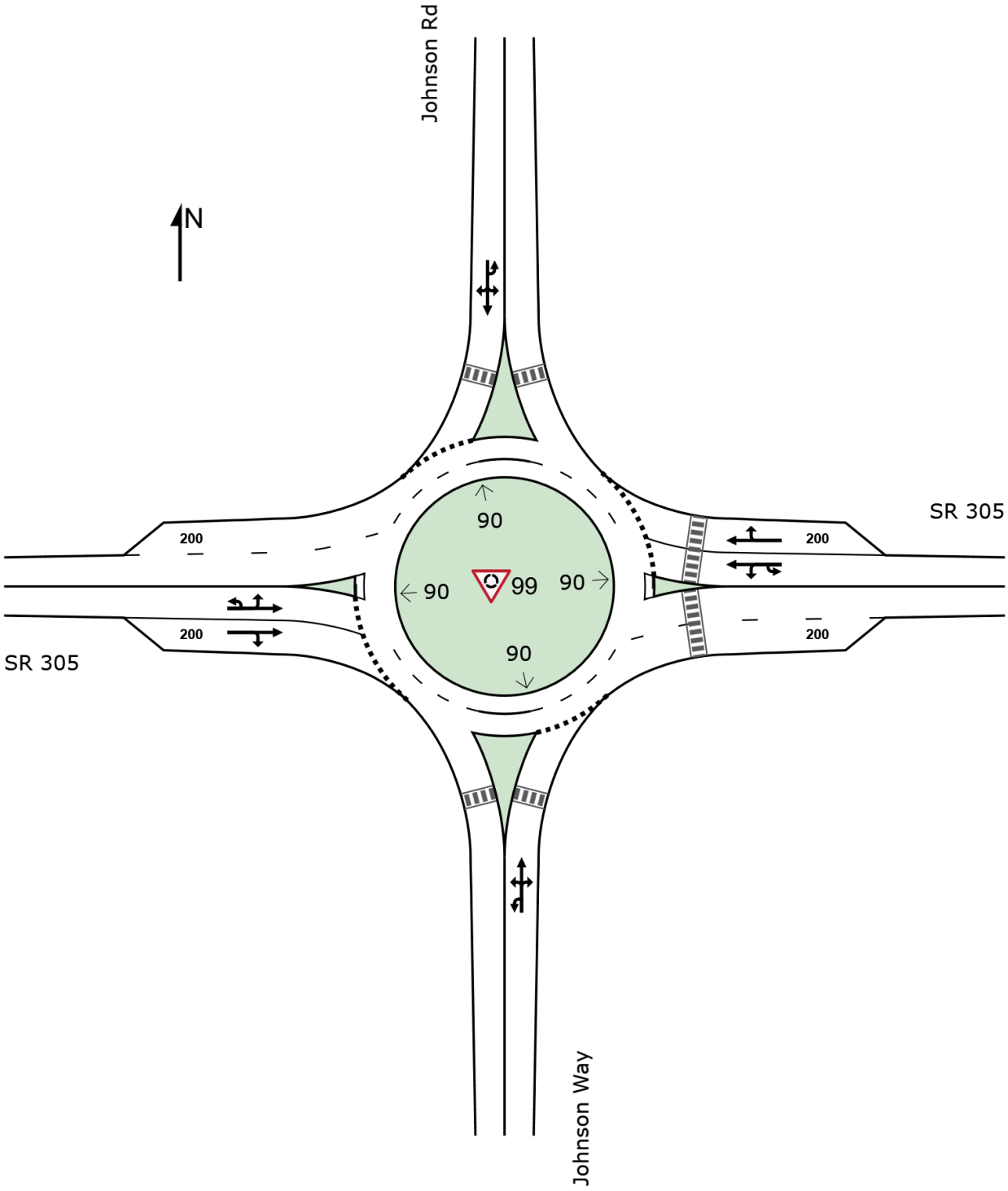
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [99] SR 305 & Johnson Rd (Existing AM Peak Hour)

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



# MOVEMENT SUMMARY

**Site: [1] Johnson & Sunrise Ridge - Existing AM** (Folder1)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NE Midnight Sun Loop | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 7.1 | LOS A | 0.0 | 0.4 | 0.11 | 0.45 | 0.11 | 23.5 |
| 3 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 5.7 | LOS A | 0.0 | 0.4 | 0.11 | 0.45 | 0.11 | 23.5 |
| 8 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 1.9 | LOS A | 0.0 | 0.4 | 0.11 | 0.45 | 0.11 | 23.7 |
| 18 | R2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 2.2 | LOS A | 0.0 | 0.4 | 0.11 | 0.45 | 0.11 | 23.6 |
| Approach | | | 5 | 3.0 | 5 | 3.0 | 0.004 | 4.2 | LOS A | 0.0 | 0.4 | 0.11 | 0.45 | 0.11 | 23.6 |
| East: Johnson Rd NE | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.073 | 10.8 | LOS B | 0.3 | 7.8 | 0.05 | 0.46 | 0.05 | 34.8 |
| 1 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.073 | 8.9 | LOS A | 0.3 | 7.8 | 0.05 | 0.46 | 0.05 | 34.8 |
| 6 | T1 | All MCs | 95 | 3.0 | 95 | 3.0 | 0.073 | 4.8 | LOS A | 0.3 | 7.8 | 0.05 | 0.46 | 0.05 | 35.5 |
| 16 | R2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.073 | 4.6 | LOS A | 0.3 | 7.8 | 0.05 | 0.46 | 0.05 | 35.1 |
| Approach | | | 99 | 3.0 | 99 | 3.0 | 0.073 | 5.0 | LOS A | 0.3 | 7.8 | 0.05 | 0.46 | 0.05 | 35.4 |
| North: Sunrise Ridge Ave NE | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.005 | 11.2 | LOS B | 0.0 | 0.5 | 0.21 | 0.56 | 0.21 | 33.6 |
| 7 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.005 | 9.3 | LOS A | 0.0 | 0.5 | 0.21 | 0.56 | 0.21 | 33.6 |
| 4 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.005 | 5.2 | LOS A | 0.0 | 0.5 | 0.21 | 0.56 | 0.21 | 34.2 |
| 14 | R2 | All MCs | 2 | 3.0 | 2 | 3.0 | 0.005 | 5.0 | LOS A | 0.0 | 0.5 | 0.21 | 0.56 | 0.21 | 33.9 |
| Approach | | | 6 | 3.0 | 6 | 3.0 | 0.005 | 7.1 | LOS A | 0.0 | 0.5 | 0.21 | 0.56 | 0.21 | 33.8 |
| West: Johnson Rd NE | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.030 | 10.8 | LOS B | 0.1 | 3.2 | 0.05 | 0.49 | 0.05 | 34.7 |
| 5 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.030 | 8.9 | LOS A | 0.1 | 3.2 | 0.05 | 0.49 | 0.05 | 34.7 |
| 2 | T1 | All MCs | 29 | 3.0 | 29 | 3.0 | 0.030 | 4.8 | LOS A | 0.1 | 3.2 | 0.05 | 0.49 | 0.05 | 35.4 |
| 12 | R2 | All MCs | 8 | 3.0 | 8 | 3.0 | 0.030 | 4.6 | LOS A | 0.1 | 3.2 | 0.05 | 0.49 | 0.05 | 35.1 |
| Approach | | | 39 | 3.0 | 39 | 3.0 | 0.030 | 5.1 | LOS A | 0.1 | 3.2 | 0.05 | 0.49 | 0.05 | 35.3 |
| All Vehicles | | | 149 | 3.0 | 149 | 3.0 | 0.073 | 5.1 | LOS A | 0.3 | 7.8 | 0.06 | 0.47 | 0.06 | 34.8 |

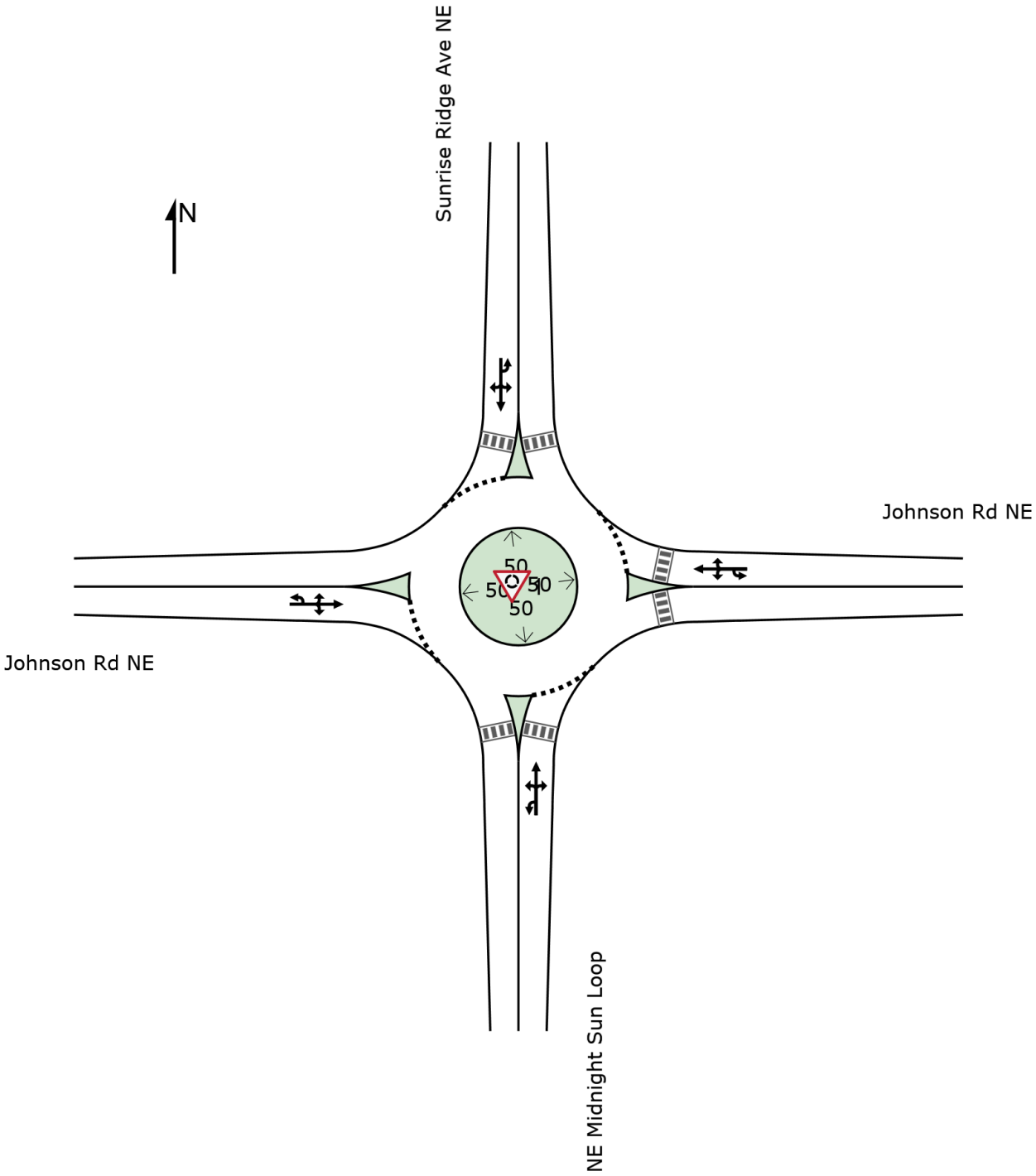
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [1] Johnson & Sunrise Ridge - Existing AM (Folder1)

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.




**SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com**
Organisation: HEATH & ASSOCIATES | Licence: PLUS / 1PC | Created: Monday, July 7, 2025 2:13:18 PM
Project: C:\Users\LucasMaulin\Heath and Associates\Office Access - Documents\Project Files\Pinnacle at Liberty Bay - 5576\5-Analysis\Sidra\Johnson & Sunrise Ridge.sipx

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 15.1 |
| Intersection LOS | C |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 42 | 205 | 20 | 11 | 184 | 66 | 51 | 30 | 35 | 118 | 15 | 53 |
| Future Vol, veh/h | 42 | 205 | 20 | 11 | 184 | 66 | 51 | 30 | 35 | 118 | 15 | 53 |
| Peak Hour Factor | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.87 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| Heavy Vehicles, % | 1 | 6 | 5 | 1 | 7 | 1 | 1 | 3 | 6 | 7 | 1 | 4 |
| Mvmt Flow | 56 | 273 | 27 | 15 | 245 | 88 | 59 | 40 | 47 | 157 | 20 | 71 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 1 | 1 |
| HCM Control Delay, s/veh | 16.8 | 15.9 | 12.1 | 13.1 |
| HCM LOS | C | C | B | B |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|
| Vol Left, % | 44% | 16% | 4% | 89% | 0% |
| Vol Thru, % | 26% | 77% | 70% | 11% | 0% |
| Vol Right, % | 30% | 7% | 25% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 116 | 267 | 261 | 133 | 53 |
| LT Vol | 51 | 42 | 11 | 118 | 0 |
| Through Vol | 30 | 205 | 184 | 15 | 0 |
| RT Vol | 35 | 20 | 66 | 0 | 53 |
| Lane Flow Rate | 145 | 356 | 348 | 177 | 71 |
| Geometry Grp | 4a | 2 | 2 | 5 | 5 |
| Degree of Util (X) | 0.267 | 0.583 | 0.56 | 0.366 | 0.121 |
| Departure Headway (Hd) | 6.628 | 5.897 | 5.794 | 7.439 | 6.165 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes |
| Cap | 540 | 616 | 626 | 484 | 581 |
| Service Time | 4.681 | 3.911 | 3.808 | 5.184 | 3.91 |
| HCM Lane V/C Ratio | 0.269 | 0.578 | 0.556 | 0.366 | 0.122 |
| HCM Control Delay, s/veh | 12.1 | 16.8 | 15.9 | 14.4 | 9.8 |
| HCM Lane LOS | B | C | C | B | A |
| HCM 95th-tile Q | 1.1 | 3.8 | 3.5 | 1.7 | 0.4 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 3.9 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 30 | 15 | 5 | 50 | 45 | 20 |
| Future Vol, veh/h | 30 | 15 | 5 | 50 | 45 | 20 |
| Conflicting Peds, #/hr | 0 | 10 | 10 | 0 | 10 | 10 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 33 | 16 | 5 | 54 | 49 | 22 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 59 | 0 | 126 | 61 |
| Stage 1 | - | - | - | - | 51 | - |
| Stage 2 | - | - | - | - | 75 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1545 | - | 869 | 1004 |
| Stage 1 | - | - | - | - | 972 | - |
| Stage 2 | - | - | - | - | 948 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1532 | - | 851 | 988 |
| Mov Cap-2 Maneuver | - | - | - | - | 851 | - |
| Stage 1 | - | - | - | - | 964 | - |
| Stage 2 | - | - | - | - | 936 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 0.67 | 9.4 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 889 | - | - | 164 | - |
| HCM Lane V/C Ratio | 0.079 | - | - | 0.004 | - |
| HCM Ctrl Dly (s/v) | 9.4 | - | - | 7.4 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0 | - |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 61 | 152 | 89 | 47 | 111 | 200 | 108 | 788 | 30 | 191 | 628 | 45 |
| Future Volume (veh/h) | 61 | 152 | 89 | 47 | 111 | 200 | 108 | 788 | 30 | 191 | 628 | 45 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 0.99 | | 0.96 | 0.99 | | 0.96 | 1.00 | | 0.96 | 1.00 | | 0.97 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1702 | 1758 | 1786 | 1786 | 1786 | 1786 | 1772 | 1744 | 1786 | 1786 | 1772 | 1744 |
| Adj Flow Rate, veh/h | 62 | 154 | 90 | 47 | 112 | 56 | 109 | 796 | 30 | 193 | 634 | 45 |
| 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, % | 7 | 3 | 1 | 1 | 1 | 1 | 2 | 4 | 1 | 1 | 2 | 4 |
| Cap, veh/h | 175 | 201 | 166 | 143 | 183 | 149 | 129 | 863 | 33 | 659 | 1712 | 121 |
| Arrive On Green | 0.04 | 0.11 | 0.11 | 0.03 | 0.10 | 0.10 | 0.08 | 0.30 | 0.30 | 0.39 | 0.61 | 0.61 |
| Sat Flow, veh/h | 1621 | 1758 | 1455 | 1701 | 1786 | 1450 | 1688 | 2850 | 107 | 1701 | 2790 | 198 |
| Grp Volume(v), veh/h | 62 | 154 | 90 | 47 | 112 | 56 | 109 | 346 | 480 | 193 | 286 | 393 |
| Grp Sat Flow(s),veh/h/ln | 1621 | 1758 | 1455 | 1701 | 1786 | 1450 | 1688 | 1238 | 1720 | 1701 | 1258 | 1729 |
| Q Serve(g_s), s | 4.1 | 10.2 | 7.0 | 3.0 | 7.2 | 2.1 | 7.7 | 32.4 | 32.4 | 9.4 | 13.6 | 13.6 |
| Cycle Q Clear(g_c), s | 4.1 | 10.2 | 7.0 | 3.0 | 7.2 | 2.1 | 7.7 | 32.4 | 32.4 | 9.4 | 13.6 | 13.6 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.06 | 1.00 | | 0.11 |
| Lane Grp Cap(c), veh/h | 175 | 201 | 166 | 143 | 183 | 149 | 129 | 375 | 521 | 659 | 772 | 1062 |
| V/C Ratio(X) | 0.35 | 0.77 | 0.54 | 0.33 | 0.61 | 0.38 | 0.85 | 0.92 | 0.92 | 0.29 | 0.37 | 0.37 |
| Avail Cap(c_a), veh/h | 320 | 337 | 279 | 314 | 342 | 278 | 323 | 444 | 616 | 659 | 772 | 1062 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 46.0 | 51.6 | 50.2 | 46.9 | 51.6 | 11.8 | 54.7 | 40.5 | 40.5 | 25.4 | 11.6 | 11.6 |
| Incr Delay (d2), s/veh | 1.2 | 6.0 | 2.7 | 1.3 | 3.3 | 1.6 | 14.0 | 30.4 | 24.3 | 0.2 | 1.4 | 1.0 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 3.1 | 8.4 | 4.8 | 2.4 | 6.1 | 2.9 | 6.7 | 18.6 | 23.5 | 6.8 | 6.9 | 8.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 47.2 | 57.6 | 52.9 | 48.2 | 54.9 | 13.4 | 68.7 | 70.9 | 64.7 | 25.7 | 12.9 | 12.6 |
| LnGrp LOS | D | E | D | D | D | B | E | E | E | C | B | B |
| Approach Vol, veh/h | | 306 | | | 215 | | | 935 | | | 872 | |
| Approach Delay, s/veh | | 54.1 | | | 42.6 | | | 67.5 | | | 15.6 | |
| Approach LOS | | D | | | D | | | E | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 51.5 | 41.3 | 8.5 | 18.7 | 14.1 | 78.7 | 9.9 | 17.3 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 18.9 | 43.5 | 16.1 | 23.5 | 23.5 | 38.9 | 16.1 | 23.5 |
| Max Q Clear Time (g_c+I1), s | 11.4 | 34.4 | 5.0 | 12.2 | 9.7 | 15.6 | 6.1 | 9.2 |
| Green Ext Time (p_c), s | 0.4 | 2.4 | 0.1 | 0.7 | 0.3 | 2.7 | 0.1 | 0.5 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 44.0 |
| HCM 7th LOS | D |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 5 | 751 | 870 | 4 | 1 | 3 |
| Future Vol, veh/h | 5 | 751 | 870 | 4 | 1 | 3 |
| Conflicting Peds, #/hr | 1 | 0 | 0 | 1 | 1 | 1 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 105 | - | - | 55 | 60 | 0 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 93 | 93 | 93 | 93 | 93 | 93 |
| Heavy Vehicles, % | 10 | 2 | 3 | 1 | 10 | 1 |
| Mvmt Flow | 5 | 808 | 935 | 4 | 1 | 3 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 941 | 0 | - | 0 | 1756 | 937 |
| Stage 1 | - | - | - | - | 936 | - |
| Stage 2 | - | - | - | - | 819 | - |
| Critical Hdwy | 4.2 | - | - | - | 6.5 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.5 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.5 | - |
| Follow-up Hdwy | 2.29 | - | - | - | 3.59 | 3.309 |
| Pot Cap-1 Maneuver | 697 | - | - | - | 89 | 322 |
| Stage 1 | - | - | - | - | 369 | - |
| Stage 2 | - | - | - | - | 420 | - |
| Platoon blocked, % | | | - | - | - | |
| Mov Cap-1 Maneuver | 696 | - | - | - | 88 | 322 |
| Mov Cap-2 Maneuver | - | - | - | - | 88 | - |
| Stage 1 | - | - | - | - | 366 | - |
| Stage 2 | - | - | - | - | 419 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0.07 | 0 | 23.79 |
| HCM LOS | | | C |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 696 | - | - | - | 88 | 322 |
| HCM Lane V/C Ratio | 0.008 | - | - | - | 0.012 | 0.01 |
| HCM Ctrl Dly (s/v) | 10.2 | - | - | - | 46.2 | 16.3 |
| HCM Lane LOS | B | - | - | - | E | C |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0 | 0 |

# MOVEMENT SUMMARY

**Site: [99 (2)] SR 305 & Johnson Rd** (Existing PM Peak Hour)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Johnson Way | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.045 | 14.5 | LOS B | 0.2 | 4.2 | 0.53 | 0.72 | 0.53 | 31.2 |
| 3 | L2 | All MCs | 19 | 6.0 | 19 | 6.0 | 0.045 | 11.5 | LOS B | 0.2 | 4.2 | 0.53 | 0.72 | 0.53 | 32.4 |
| 8 | T1 | All MCs | 5 | 1.0 | 5 | 1.0 | 0.045 | 5.4 | LOS A | 0.2 | 4.2 | 0.53 | 0.72 | 0.53 | 30.4 |
| 18 | R2 | All MCs | 8 | 1.0 | 8 | 1.0 | 0.045 | 7.5 | LOS A | 0.2 | 4.2 | 0.53 | 0.72 | 0.53 | 33.5 |
| Approach | | | 33 | 3.9 | 33 | 3.9 | 0.045 | 9.7 | LOS A | 0.2 | 4.2 | 0.53 | 0.72 | 0.53 | 32.3 |
| East: SR 305 | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 3 | 1.0 | 3 | 1.0 | 0.438 | 12.0 | LOS B | 3.4 | 87.2 | 0.19 | 0.45 | 0.19 | 37.7 |
| 1 | L2 | All MCs | 8 | 1.0 | 8 | 1.0 | 0.438 | 11.4 | LOS B | 3.4 | 87.2 | 0.19 | 0.45 | 0.19 | 35.7 |
| 6 | T1 | All MCs | 912 | 3.0 | 912 | 3.0 | 0.438 | 6.3 | LOS A | 3.4 | 87.2 | 0.18 | 0.45 | 0.18 | 41.2 |
| 16 | R2 | All MCs | 11 | 10.0 | 11 | 10.0 | 0.199 | 5.9 | LOS A | 1.1 | 29.4 | 0.16 | 0.46 | 0.16 | 36.0 |
| Approach | | | 933 | 3.1 | 933 | 3.1 | 0.438 | 6.4 | LOS A | 3.4 | 87.2 | 0.18 | 0.45 | 0.18 | 41.1 |
| North: Johnson Rd | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.047 | 15.0 | LOS B | 0.2 | 4.5 | 0.57 | 0.75 | 0.57 | 30.9 |
| 7 | L2 | All MCs | 19 | 6.0 | 19 | 6.0 | 0.047 | 12.1 | LOS B | 0.2 | 4.5 | 0.57 | 0.75 | 0.57 | 32.1 |
| 4 | T1 | All MCs | 3 | 1.0 | 3 | 1.0 | 0.047 | 6.0 | LOS A | 0.2 | 4.5 | 0.57 | 0.75 | 0.57 | 30.2 |
| 14 | R2 | All MCs | 9 | 1.0 | 9 | 1.0 | 0.047 | 8.6 | LOS A | 0.2 | 4.5 | 0.57 | 0.75 | 0.57 | 33.2 |
| Approach | | | 32 | 4.0 | 32 | 4.0 | 0.047 | 10.7 | LOS B | 0.2 | 4.5 | 0.57 | 0.75 | 0.57 | 32.2 |
| West: SR 305 | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.377 | 12.0 | LOS B | 2.6 | 67.1 | 0.18 | 0.45 | 0.18 | 37.7 |
| 5 | L2 | All MCs | 3 | 1.0 | 3 | 1.0 | 0.377 | 11.4 | LOS B | 2.6 | 67.1 | 0.18 | 0.45 | 0.18 | 35.8 |
| 2 | T1 | All MCs | 786 | 2.0 | 786 | 2.0 | 0.377 | 6.1 | LOS A | 2.6 | 67.1 | 0.18 | 0.45 | 0.18 | 41.5 |
| 12 | R2 | All MCs | 19 | 1.0 | 19 | 1.0 | 0.171 | 5.8 | LOS A | 0.9 | 23.9 | 0.16 | 0.46 | 0.16 | 36.2 |
| Approach | | | 810 | 2.0 | 810 | 2.0 | 0.377 | 6.2 | LOS A | 2.6 | 67.1 | 0.18 | 0.46 | 0.18 | 41.3 |
| All Vehicles | | | 1809 | 2.6 | 1809 | 2.6 | 0.438 | 6.4 | LOS A | 3.4 | 87.2 | 0.19 | 0.46 | 0.19 | 40.8 |

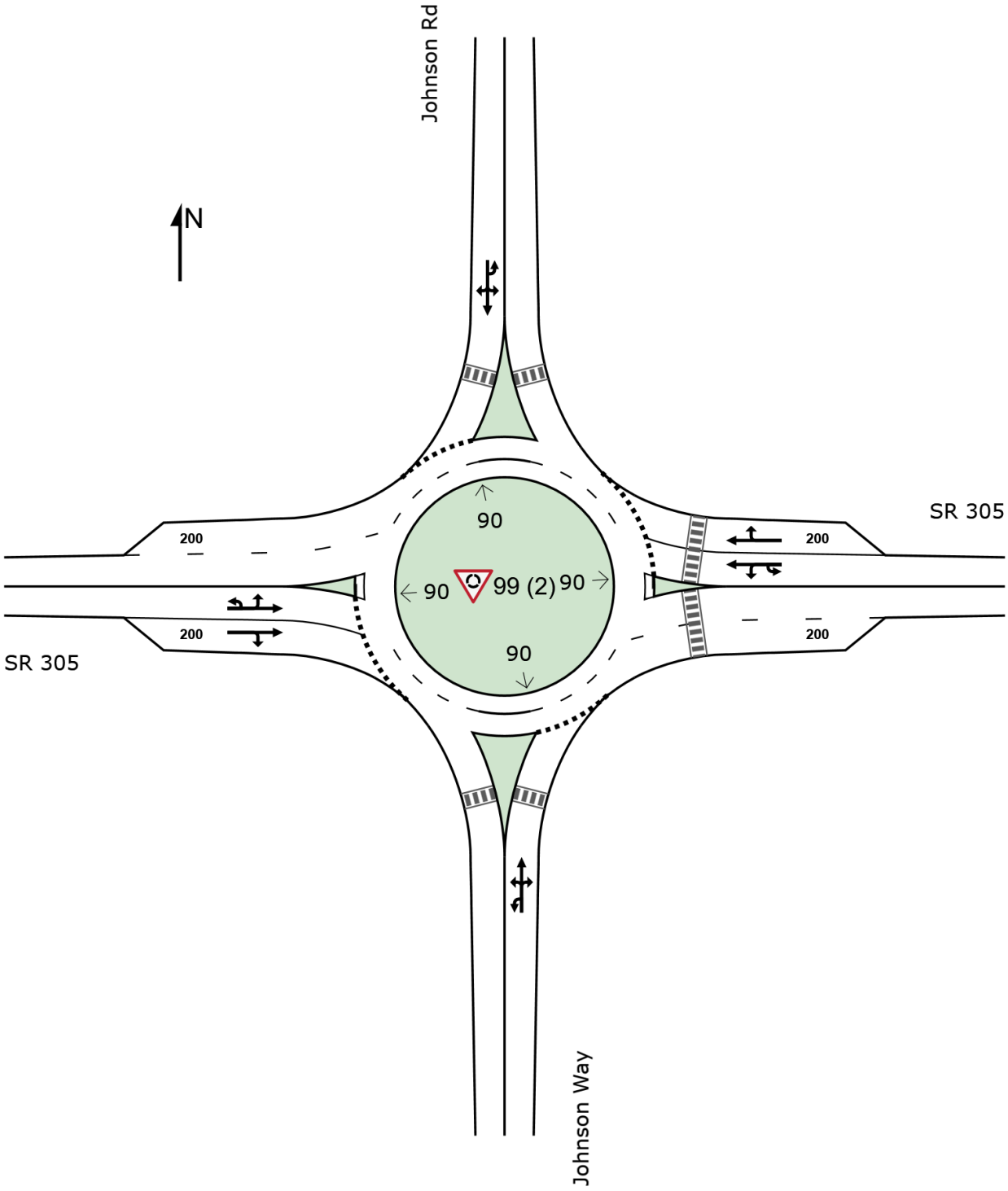
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [99 (2)] SR 305 & Johnson Rd (Existing PM Peak Hour)

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



# MOVEMENT SUMMARY

**Site: [1 (2)] Johnson & Sunrise Ridge - Existing AP** (Folder1)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NE Midnight Sun Loop | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.005 | 7.1 | LOS A | 0.0 | 0.5 | 0.10 | 0.42 | 0.10 | 23.7 |
| 3 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.005 | 5.7 | LOS A | 0.0 | 0.5 | 0.10 | 0.42 | 0.10 | 23.7 |
| 8 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.005 | 1.8 | LOS A | 0.0 | 0.5 | 0.10 | 0.42 | 0.10 | 23.9 |
| 18 | R2 | All MCs | 3 | 3.0 | 3 | 3.0 | 0.005 | 2.2 | LOS A | 0.0 | 0.5 | 0.10 | 0.42 | 0.10 | 23.8 |
| Approach | | | 7 | 3.0 | 7 | 3.0 | 0.005 | 3.5 | LOS A | 0.0 | 0.5 | 0.10 | 0.42 | 0.10 | 23.8 |
| East: Johnson Rd NE | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.035 | 10.8 | LOS B | 0.1 | 3.6 | 0.04 | 0.47 | 0.04 | 34.8 |
| 1 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.035 | 8.9 | LOS A | 0.1 | 3.6 | 0.04 | 0.47 | 0.04 | 34.8 |
| 6 | T1 | All MCs | 44 | 3.0 | 44 | 3.0 | 0.035 | 4.8 | LOS A | 0.1 | 3.6 | 0.04 | 0.47 | 0.04 | 35.4 |
| 16 | R2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.035 | 4.6 | LOS A | 0.1 | 3.6 | 0.04 | 0.47 | 0.04 | 35.1 |
| Approach | | | 48 | 3.0 | 48 | 3.0 | 0.035 | 5.1 | LOS A | 0.1 | 3.6 | 0.04 | 0.47 | 0.04 | 35.4 |
| North: Sunrise Ridge Ave NE | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 11.0 | LOS B | 0.0 | 0.4 | 0.14 | 0.58 | 0.14 | 33.5 |
| 7 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 9.1 | LOS A | 0.0 | 0.4 | 0.14 | 0.58 | 0.14 | 33.5 |
| 4 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 5.0 | LOS A | 0.0 | 0.4 | 0.14 | 0.58 | 0.14 | 34.1 |
| 14 | R2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 4.8 | LOS A | 0.0 | 0.4 | 0.14 | 0.58 | 0.14 | 33.8 |
| Approach | | | 5 | 3.0 | 5 | 3.0 | 0.004 | 7.5 | LOS A | 0.0 | 0.4 | 0.14 | 0.58 | 0.14 | 33.7 |
| West: Johnson Rd NE | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.020 | 10.8 | LOS B | 0.1 | 2.1 | 0.04 | 0.49 | 0.04 | 34.7 |
| 5 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.020 | 8.9 | LOS A | 0.1 | 2.1 | 0.04 | 0.49 | 0.04 | 34.7 |
| 2 | T1 | All MCs | 23 | 3.0 | 23 | 3.0 | 0.020 | 4.8 | LOS A | 0.1 | 2.1 | 0.04 | 0.49 | 0.04 | 35.3 |
| 12 | R2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.020 | 4.6 | LOS A | 0.1 | 2.1 | 0.04 | 0.49 | 0.04 | 35.0 |
| Approach | | | 26 | 3.0 | 26 | 3.0 | 0.020 | 5.3 | LOS A | 0.1 | 2.1 | 0.04 | 0.49 | 0.04 | 35.2 |
| All Vehicles | | | 85 | 3.0 | 85 | 3.0 | 0.035 | 5.1 | LOS A | 0.1 | 3.6 | 0.05 | 0.48 | 0.05 | 33.9 |

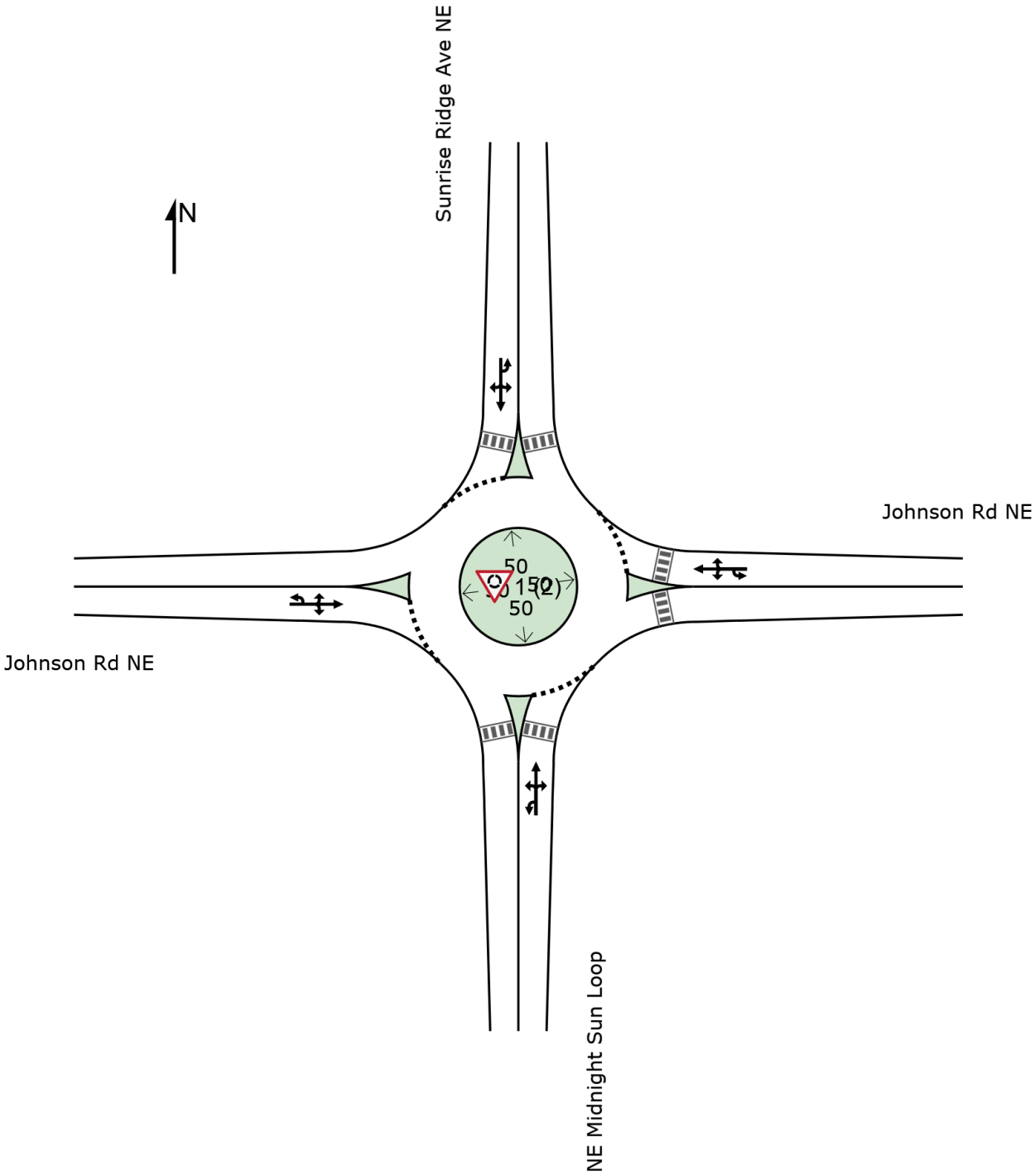
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [1 (2)] Johnson & Sunrise Ridge - Existing AP (Folder1)

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.




**SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com**
Organisation: HEATH & ASSOCIATES | Licence: PLUS / 1PC | Created: Monday, July 7, 2025 2:12:24 PM
Project: C:\Users\LucasMaulin\Heath and Associates\Office Access - Documents\Project Files\Pinnacle at Liberty Bay - 5576\5-Analysis\Sidra\Johnson & Sunrise Ridge.sipx

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 12 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 78 | 186 | 63 | 4 | 119 | 41 | 54 | 41 | 2 | 79 | 49 | 57 |
| Future Vol, veh/h | 78 | 186 | 63 | 4 | 119 | 41 | 54 | 41 | 2 | 79 | 49 | 57 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Heavy Vehicles, % | 3 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 4 |
| Mvmt Flow | 90 | 214 | 72 | 5 | 137 | 47 | 62 | 47 | 2 | 91 | 56 | 66 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 1 | 1 |
| HCM Control Delay, s/veh | 14 | 10.4 | 10.5 | 10.7 |
| HCM LOS | B | B | B | B |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|
| Vol Left, % | 56% | 24% | 2% | 62% | 0% |
| Vol Thru, % | 42% | 57% | 73% | 38% | 0% |
| Vol Right, % | 2% | 19% | 25% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 97 | 327 | 164 | 128 | 57 |
| LT Vol | 54 | 78 | 4 | 79 | 0 |
| Through Vol | 41 | 186 | 119 | 49 | 0 |
| RT Vol | 2 | 63 | 41 | 0 | 57 |
| Lane Flow Rate | 111 | 376 | 189 | 147 | 66 |
| Geometry Grp | 4a | 2 | 2 | 5 | 5 |
| Degree of Util (X) | 0.187 | 0.537 | 0.278 | 0.266 | 0.1 |
| Departure Headway (Hd) | 6.027 | 5.139 | 5.312 | 6.508 | 5.484 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes |
| Cap | 594 | 703 | 675 | 552 | 653 |
| Service Time | 4.076 | 3.176 | 3.356 | 4.251 | 3.226 |
| HCM Lane V/C Ratio | 0.187 | 0.535 | 0.28 | 0.266 | 0.101 |
| HCM Control Delay, s/veh | 10.5 | 14 | 10.4 | 11.6 | 8.8 |
| HCM Lane LOS | B | B | B | B | A |
| HCM 95th-tile Q | 0.7 | 3.2 | 1.1 | 1.1 | 0.3 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 2.8 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 50 | 45 | 20 | 50 | 30 | 15 |
| Future Vol, veh/h | 50 | 45 | 20 | 50 | 30 | 15 |
| Conflicting Peds, #/hr | 0 | 10 | 10 | 0 | 10 | 10 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 54 | 49 | 22 | 54 | 33 | 16 |

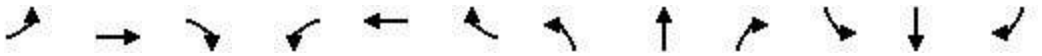
| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 113 | 0 | 197 | 99 |
| Stage 1 | - | - | - | - | 89 | - |
| Stage 2 | - | - | - | - | 108 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1476 | - | 792 | 957 |
| Stage 1 | - | - | - | - | 935 | - |
| Stage 2 | - | - | - | - | 917 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1464 | - | 767 | 941 |
| Mov Cap-2 Maneuver | - | - | - | - | 767 | - |
| Stage 1 | - | - | - | - | 927 | - |
| Stage 2 | - | - | - | - | 895 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 2.14 | 9.68 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 817 | - | - | 514 | - |
| HCM Lane V/C Ratio | 0.06 | - | - | 0.015 | - |
| HCM Ctrl Dly (s/v) | 9.7 | - | - | 7.5 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.2 | - | - | 0 | - |

# THE PINNACLE AT LIBERTY BAY
# TRAFFIC IMPACT ANALYSIS

*APPENDIX*
*Forecast 2032 Level of Service*



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 39 | 108 | 65 | 54 | 89 | 150 | 47 | 491 | 22 | 208 | 881 | 21 |
| Future Volume (veh/h) | 39 | 108 | 65 | 54 | 89 | 150 | 47 | 491 | 22 | 208 | 881 | 21 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 0.99 | | 0.98 | 0.99 | | 0.98 | 1.00 | | 0.98 | 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 | 1716 | 1730 | 1744 | 1744 | 1744 | 1716 | 1730 | 1716 | 1716 | 1730 | 1716 | 1646 |
| Adj Flow Rate, veh/h | 42 | 117 | 71 | 59 | 97 | 98 | 51 | 534 | 24 | 226 | 958 | 23 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 6 | 5 | 4 | 4 | 4 | 6 | 5 | 6 | 6 | 5 | 6 | 11 |
| Cap, veh/h | 172 | 175 | 146 | 165 | 198 | 161 | 58 | 601 | 27 | 787 | 1878 | 45 |
| Arrive On Green | 0.03 | 0.10 | 0.10 | 0.04 | 0.11 | 0.11 | 0.04 | 0.22 | 0.22 | 0.48 | 0.66 | 0.66 |
| Sat Flow, veh/h | 1634 | 1730 | 1443 | 1661 | 1744 | 1423 | 1647 | 2784 | 125 | 1647 | 2853 | 68 |
| Grp Volume(v), veh/h | 42 | 117 | 71 | 59 | 97 | 98 | 51 | 233 | 325 | 226 | 409 | 572 |
| Grp Sat Flow(s),veh/h/ln | 1634 | 1730 | 1443 | 1661 | 1744 | 1423 | 1647 | 1218 | 1690 | 1647 | 1218 | 1703 |
| Q Serve(g_s), s | 2.8 | 7.8 | 5.6 | 3.8 | 6.3 | 3.0 | 3.7 | 22.3 | 22.4 | 10.0 | 20.7 | 20.7 |
| Cycle Q Clear(g_c), s | 2.8 | 7.8 | 5.6 | 3.8 | 6.3 | 3.0 | 3.7 | 22.3 | 22.4 | 10.0 | 20.7 | 20.7 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.07 | 1.00 | | 0.04 |
| Lane Grp Cap(c), veh/h | 172 | 175 | 146 | 165 | 198 | 161 | 58 | 263 | 365 | 787 | 802 | 1121 |
| V/C Ratio(X) | 0.24 | 0.67 | 0.49 | 0.36 | 0.49 | 0.61 | 0.88 | 0.89 | 0.89 | 0.29 | 0.51 | 0.51 |
| Avail Cap(c_a), veh/h | 342 | 332 | 277 | 318 | 334 | 273 | 316 | 437 | 606 | 787 | 802 | 1121 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 47.0 | 52.0 | 51.0 | 46.3 | 49.9 | 7.2 | 57.6 | 45.6 | 45.7 | 18.9 | 10.5 | 10.5 |
| Incr Delay (d2), s/veh | 0.7 | 4.3 | 2.5 | 1.3 | 1.9 | 3.6 | 30.5 | 32.8 | 26.1 | 0.2 | 2.3 | 1.7 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 2.1 | 6.5 | 3.8 | 2.9 | 5.1 | 5.1 | 3.6 | 13.9 | 17.5 | 6.7 | 9.3 | 11.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 47.7 | 56.3 | 53.4 | 47.6 | 51.8 | 10.8 | 88.1 | 78.4 | 71.8 | 19.1 | 12.8 | 12.2 |
| LnGrp LOS | D | E | D | D | D | B | F | E | E | B | B | B |
| Approach Vol, veh/h | | 230 | | | 254 | | | 609 | | | 1207 | |
| Approach Delay, s/veh | | 53.8 | | | 35.0 | | | 75.7 | | | 13.7 | |
| Approach LOS | | D | | | D | | | E | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 62.4 | 30.9 | 9.6 | 17.2 | 9.2 | 84.0 | 8.1 | 18.6 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 18.9 | 43.5 | 16.1 | 23.5 | 23.5 | 38.9 | 16.1 | 23.5 |
| Max Q Clear Time (g_c+I1), s | 12.0 | 24.4 | 5.8 | 9.8 | 5.7 | 22.7 | 4.8 | 8.3 |
| Green Ext Time (p_c), s | 0.4 | 2.0 | 0.1 | 0.6 | 0.1 | 3.8 | 0.1 | 0.6 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 36.5 |
| HCM 7th LOS | D |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 971 | 515 | 1 | 2 | 3 |
| Future Vol, veh/h | 0 | 971 | 515 | 1 | 2 | 3 |
| Conflicting Peds, #/hr | 4 | 0 | 0 | 4 | 4 | 4 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 105 | - | - | 55 | 60 | 0 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 93 | 93 | 93 | 93 | 93 | 93 |
| Heavy Vehicles, % | 1 | 8 | 6 | 1 | 1 | 1 |
| Mvmt Flow | 0 | 1044 | 554 | 1 | 2 | 3 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 559 | 0 | - | 0 | 1606 | 562 |
| Stage 1 | - | - | - | - | 558 | - |
| Stage 2 | - | - | - | - | 1048 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1017 | - | - | - | 116 | 529 |
| Stage 1 | - | - | - | - | 575 | - |
| Stage 2 | - | - | - | - | 339 | - |
| Platoon blocked, % | | | - | - | - | |
| Mov Cap-1 Maneuver | 1014 | - | - | - | 116 | 525 |
| Mov Cap-2 Maneuver | - | - | - | - | 116 | - |
| Stage 1 | - | - | - | - | 573 | - |
| Stage 2 | - | - | - | - | 338 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 0 | 21.83 |
| HCM LOS | | | C |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1014 | - | - | - | 116 | 525 |
| HCM Lane V/C Ratio | - | - | - | - | 0.019 | 0.006 |
| HCM Ctrl Dly (s/v) | 0 | - | - | - | 36.7 | 11.9 |
| HCM Lane LOS | A | - | - | - | E | B |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.1 | 0 |

# MOVEMENT SUMMARY

## Site: [99 (3)] SR 305 & Johnson Rd - Forecast 2032 AM

**Without** (Existing AM Peak Hour)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Johnson Way | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.050 | 16.3 | LOS B | 0.2 | 5.5 | 0.67 | 0.79 | 0.67 | 30.6 |
| 3 | L2 | All MCs | 18 | 1.0 | 18 | 1.0 | 0.050 | 12.8 | LOS B | 0.2 | 5.5 | 0.67 | 0.79 | 0.67 | 32.3 |
| 8 | T1 | All MCs | 8 | 1.0 | 8 | 1.0 | 0.050 | 7.2 | LOS A | 0.2 | 5.5 | 0.67 | 0.79 | 0.67 | 29.8 |
| 18 | R2 | All MCs | 3 | 1.0 | 3 | 1.0 | 0.050 | 12.8 | LOS B | 0.2 | 5.5 | 0.67 | 0.79 | 0.67 | 32.7 |
| Approach | | | 30 | 1.0 | 30 | 1.0 | 0.050 | 11.5 | LOS B | 0.2 | 5.5 | 0.67 | 0.79 | 0.67 | 31.6 |
| East: SR 305 | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.266 | 12.0 | LOS B | 1.7 | 43.3 | 0.18 | 0.46 | 0.18 | 37.7 |
| 1 | L2 | All MCs | 8 | 1.0 | 8 | 1.0 | 0.266 | 11.4 | LOS B | 1.7 | 43.3 | 0.18 | 0.46 | 0.18 | 35.7 |
| 6 | T1 | All MCs | 522 | 6.0 | 522 | 6.0 | 0.266 | 6.1 | LOS A | 1.7 | 43.3 | 0.18 | 0.46 | 0.18 | 40.7 |
| 16 | R2 | All MCs | 16 | 1.0 | 16 | 1.0 | 0.121 | 5.8 | LOS A | 0.6 | 16.6 | 0.17 | 0.47 | 0.17 | 36.2 |
| Approach | | | 546 | 5.8 | 546 | 5.8 | 0.266 | 6.1 | LOS A | 1.7 | 43.3 | 0.18 | 0.46 | 0.18 | 40.5 |
| North: Johnson Rd | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.131 | 13.9 | LOS B | 0.5 | 12.5 | 0.48 | 0.70 | 0.48 | 31.0 |
| 7 | L2 | All MCs | 91 | 3.0 | 91 | 3.0 | 0.131 | 10.6 | LOS B | 0.5 | 12.5 | 0.48 | 0.70 | 0.48 | 32.6 |
| 4 | T1 | All MCs | 2 | 1.0 | 2 | 1.0 | 0.131 | 4.8 | LOS A | 0.5 | 12.5 | 0.48 | 0.70 | 0.48 | 30.3 |
| 14 | R2 | All MCs | 17 | 1.0 | 17 | 1.0 | 0.131 | 6.2 | LOS A | 0.5 | 12.5 | 0.48 | 0.70 | 0.48 | 33.3 |
| Approach | | | 112 | 2.6 | 112 | 2.6 | 0.131 | 9.9 | LOS A | 0.5 | 12.5 | 0.48 | 0.70 | 0.48 | 32.6 |
| West: SR 305 | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.553 | 12.5 | LOS B | 4.8 | 127.3 | 0.42 | 0.48 | 0.42 | 36.8 |
| 5 | L2 | All MCs | 11 | 17.0 | 11 | 17.0 | 0.553 | 12.5 | LOS B | 4.8 | 127.3 | 0.42 | 0.48 | 0.42 | 34.5 |
| 2 | T1 | All MCs | 1015 | 8.0 | 1015 | 8.0 | 0.553 | 7.7 | LOS A | 4.8 | 127.3 | 0.40 | 0.48 | 0.40 | 39.5 |
| 12 | R2 | All MCs | 20 | 12.0 | 20 | 12.0 | 0.251 | 6.5 | LOS A | 1.5 | 39.3 | 0.33 | 0.49 | 0.33 | 35.5 |
| Approach | | | 1047 | 8.2 | 1047 | 8.2 | 0.553 | 7.7 | LOS A | 4.8 | 127.3 | 0.39 | 0.48 | 0.39 | 39.4 |
| All Vehicles | | | 1735 | 6.9 | 1735 | 6.9 | 0.553 | 7.4 | LOS A | 4.8 | 127.3 | 0.34 | 0.50 | 0.34 | 39.0 |

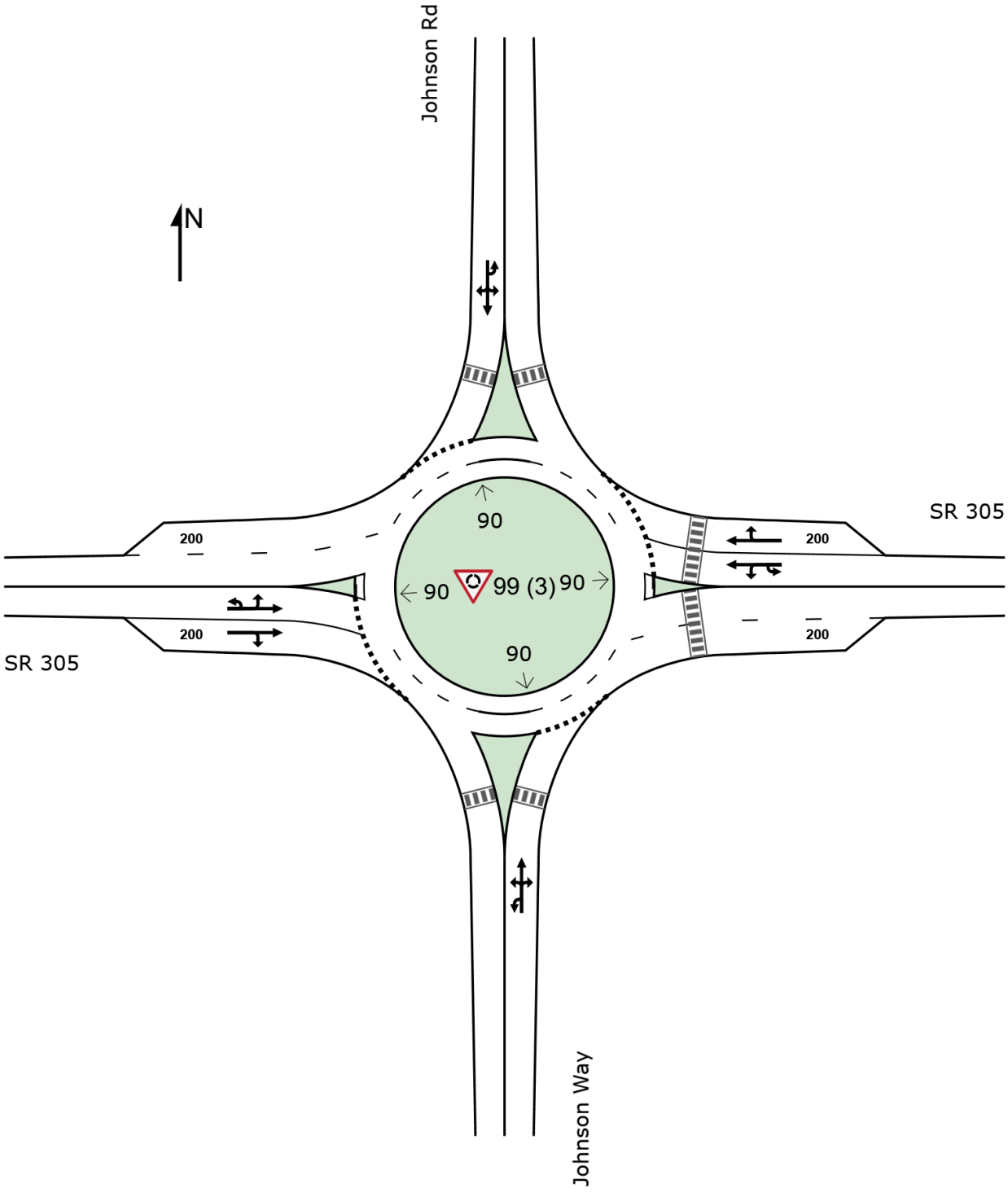
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [99 (3)] SR 305 & Johnson Rd - Forecast 2032 AM
**Without** (Existing AM Peak Hour)

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



# MOVEMENT SUMMARY

## Site: [1 (3)] Johnson & Sunrise Ridge - 2032 AM Without

(Folder1)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NE Midnight Sun Loop | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 7.2 | LOS A | 0.0 | 0.4 | 0.15 | 0.45 | 0.15 | 23.5 |
| 3 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 5.8 | LOS A | 0.0 | 0.4 | 0.15 | 0.45 | 0.15 | 23.5 |
| 8 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 2.0 | LOS A | 0.0 | 0.4 | 0.15 | 0.45 | 0.15 | 23.7 |
| 18 | R2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 2.3 | LOS A | 0.0 | 0.4 | 0.15 | 0.45 | 0.15 | 23.6 |
| Approach | | | 5 | 3.0 | 5 | 3.0 | 0.004 | 4.3 | LOS A | 0.0 | 0.4 | 0.15 | 0.45 | 0.15 | 23.6 |
| East: Johnson Rd NE | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.071 | 10.9 | LOS B | 0.3 | 7.5 | 0.09 | 0.46 | 0.09 | 34.7 |
| 1 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.071 | 8.9 | LOS A | 0.3 | 7.5 | 0.09 | 0.46 | 0.09 | 34.7 |
| 6 | T1 | All MCs | 87 | 3.0 | 87 | 3.0 | 0.071 | 4.9 | LOS A | 0.3 | 7.5 | 0.09 | 0.46 | 0.09 | 35.3 |
| 16 | R2 | All MCs | 5 | 3.0 | 5 | 3.0 | 0.071 | 4.7 | LOS A | 0.3 | 7.5 | 0.09 | 0.46 | 0.09 | 35.0 |
| Approach | | | 94 | 3.0 | 94 | 3.0 | 0.071 | 5.0 | LOS A | 0.3 | 7.5 | 0.09 | 0.46 | 0.09 | 35.3 |
| North: Sunrise Ridge Ave NE | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.051 | 11.2 | LOS B | 0.2 | 5.4 | 0.21 | 0.56 | 0.21 | 34.1 |
| 7 | L2 | All MCs | 14 | 3.0 | 14 | 3.0 | 0.051 | 9.3 | LOS A | 0.2 | 5.4 | 0.21 | 0.56 | 0.21 | 34.1 |
| 4 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.051 | 5.2 | LOS A | 0.2 | 5.4 | 0.21 | 0.56 | 0.21 | 34.7 |
| 14 | R2 | All MCs | 43 | 3.0 | 43 | 3.0 | 0.051 | 5.0 | LOS A | 0.2 | 5.4 | 0.21 | 0.56 | 0.21 | 34.4 |
| Approach | | | 60 | 3.0 | 60 | 3.0 | 0.051 | 6.1 | LOS A | 0.2 | 5.4 | 0.21 | 0.56 | 0.21 | 34.3 |
| West: Johnson Rd NE | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.040 | 10.9 | LOS B | 0.2 | 4.3 | 0.09 | 0.54 | 0.09 | 34.1 |
| 5 | L2 | All MCs | 14 | 3.0 | 14 | 3.0 | 0.040 | 9.0 | LOS A | 0.2 | 4.3 | 0.09 | 0.54 | 0.09 | 34.1 |
| 2 | T1 | All MCs | 26 | 3.0 | 26 | 3.0 | 0.040 | 4.9 | LOS A | 0.2 | 4.3 | 0.09 | 0.54 | 0.09 | 34.8 |
| 12 | R2 | All MCs | 10 | 3.0 | 10 | 3.0 | 0.040 | 4.7 | LOS A | 0.2 | 4.3 | 0.09 | 0.54 | 0.09 | 34.5 |
| Approach | | | 51 | 3.0 | 51 | 3.0 | 0.040 | 6.1 | LOS A | 0.2 | 4.3 | 0.09 | 0.54 | 0.09 | 34.5 |
| All Vehicles | | | 210 | 3.0 | 210 | 3.0 | 0.071 | 5.6 | LOS A | 0.3 | 7.5 | 0.13 | 0.51 | 0.13 | 34.4 |

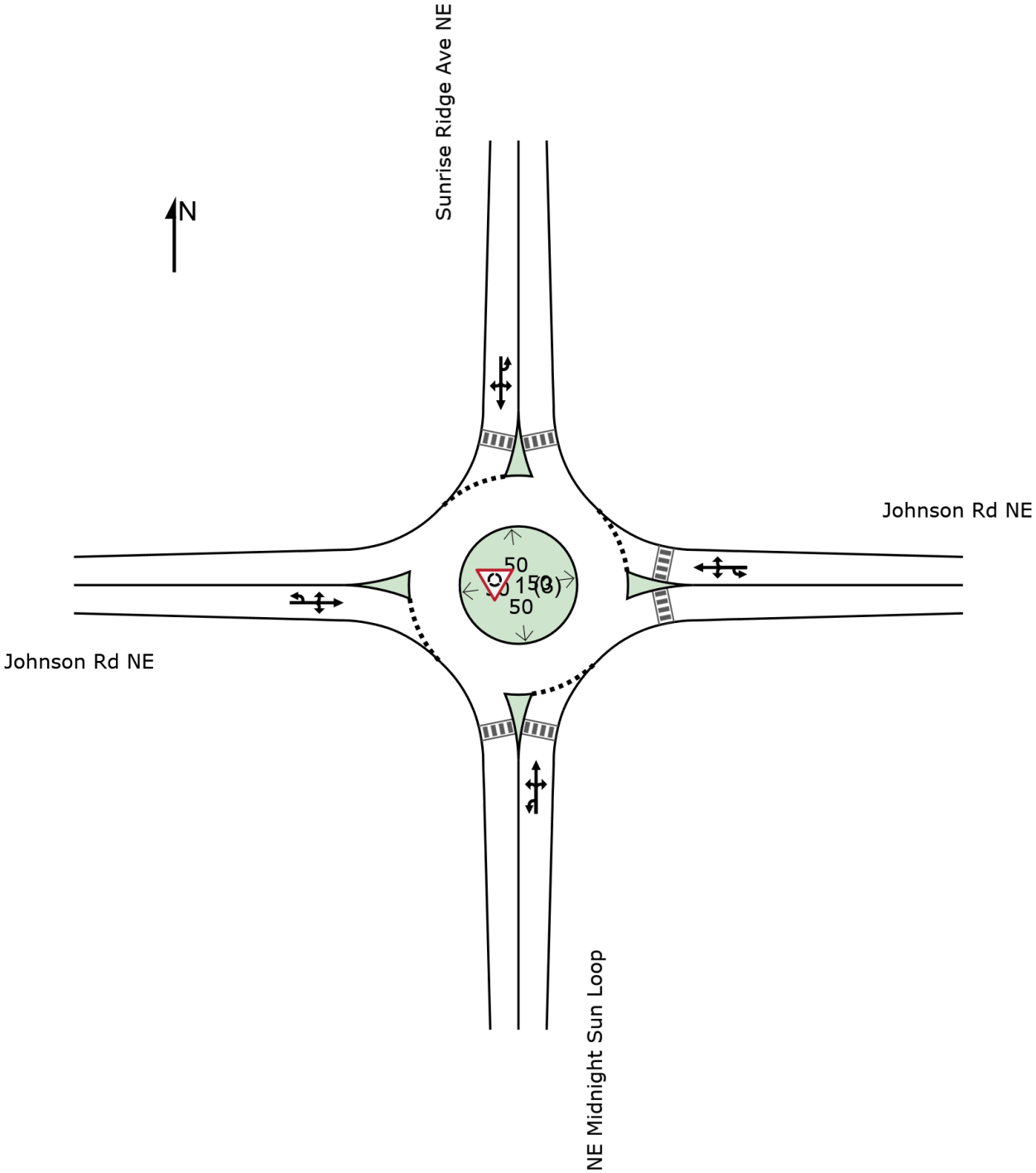
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [1 (3)] Johnson & Sunrise Ridge - 2032 AM Without
(Folder1)

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



| Intersection | |
|---|---|
| Intersection Delay, s/veh | 22.6 |
| Intersection LOS | C |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 48 | 236 | 23 | 22 | 213 | 81 | 61 | 38 | 41 | 129 | 27 | 60 |
| Future Vol, veh/h | 48 | 236 | 23 | 22 | 213 | 81 | 61 | 38 | 41 | 129 | 27 | 60 |
| Peak Hour Factor | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.87 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| Heavy Vehicles, % | 1 | 6 | 5 | 1 | 7 | 1 | 1 | 3 | 6 | 7 | 1 | 4 |
| Mvmt Flow | 64 | 315 | 31 | 29 | 284 | 108 | 70 | 51 | 55 | 172 | 36 | 80 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 1 | 1 |
| HCM Control Delay, s/veh | 26.5 | 26.4 | 15 | 16.2 |
| HCM LOS | D | D | B | C |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|
| Vol Left, % | 44% | 16% | 7% | 83% | 0% |
| Vol Thru, % | 27% | 77% | 67% | 17% | 0% |
| Vol Right, % | 29% | 7% | 26% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 140 | 307 | 316 | 156 | 60 |
| LT Vol | 61 | 48 | 22 | 129 | 0 |
| Through Vol | 38 | 236 | 213 | 27 | 0 |
| RT Vol | 41 | 23 | 81 | 0 | 60 |
| Lane Flow Rate | 175 | 409 | 421 | 208 | 80 |
| Geometry Grp | 4a | 2 | 2 | 5 | 5 |
| Degree of til (D) | 0.371 | 0.744 | 0.749 | 0.476 | 0.155 |
| Departure Headway (Hd) | 7.603 | 6.653 | 6.516 | 8.246 | 6.993 |
| Convergence, D/N | es | es | es | es | es |
| Cap | 475 | 549 | 560 | 439 | 516 |
| Service Time | 5.616 | 4.653 | 4.516 | 5.946 | 4.693 |
| HCM Lane V/C Ratio | 0.368 | 0.745 | 0.752 | 0.474 | 0.155 |
| HCM Control Delay, s/veh | 15 | 26.5 | 26.4 | 18.2 | 11 |
| HCM Lane LOS | B | D | D | C | B |
| HCM 95th-tile Q | 1.7 | 6.4 | 6.5 | 2.5 | 0.5 |

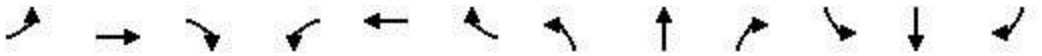
| Intersection | |
|---|---|
| Int Delay, s/veh | 3.9 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 34 | 36 | 6 | 57 | 59 | 23 |
| Future Vol, veh/h | 34 | 36 | 6 | 57 | 59 | 23 |
| Conflicting Peds, #/hr | 0 | 10 | 10 | 0 | 10 | 10 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 37 | 39 | 7 | 62 | 64 | 25 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 86 | 0 | 152 | 77 |
| Stage 1 | - | - | - | - | 67 | - |
| Stage 2 | - | - | - | - | 85 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1510 | - | 840 | 985 |
| Stage 1 | - | - | - | - | 956 | - |
| Stage 2 | - | - | - | - | 938 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1498 | - | 823 | 968 |
| Mov Cap-2 Maneuver | - | - | - | - | 823 | - |
| Stage 1 | - | - | - | - | 948 | - |
| Stage 2 | - | - | - | - | 926 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 0.71 | 9.68 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 859 | - | - | 171 | - |
| HCM Lane V/C Ratio | 0.104 | - | - | 0.004 | - |
| HCM Ctrl Dly (s/v) | 9.7 | - | - | 7.4 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0 | - |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 71 | 176 | 102 | 55 | 129 | 229 | 123 | 818 | 36 | 220 | 661 | 51 |
| Future Volume (veh/h) | 71 | 176 | 102 | 55 | 129 | 229 | 123 | 818 | 36 | 220 | 661 | 51 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 0.99 | | 0.96 | 0.99 | | 0.96 | 1.00 | | 0.96 | 1.00 | | 0.97 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1702 | 1758 | 1786 | 1786 | 1786 | 1786 | 1772 | 1744 | 1786 | 1786 | 1772 | 1744 |
| Adj Flow Rate, veh/h | 72 | 178 | 103 | 56 | 130 | 85 | 124 | 826 | 36 | 222 | 668 | 52 |
| 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, % | 7 | 3 | 1 | 1 | 1 | 1 | 2 | 4 | 1 | 1 | 2 | 4 |
| Cap, veh/h | 185 | 221 | 183 | 150 | 203 | 165 | 145 | 889 | 39 | 610 | 1624 | 126 |
| Arrive On Green | 0.05 | 0.13 | 0.13 | 0.04 | 0.11 | 0.11 | 0.09 | 0.31 | 0.31 | 0.36 | 0.59 | 0.59 |
| Sat Flow, veh/h | 1621 | 1758 | 1458 | 1701 | 1786 | 1455 | 1688 | 2831 | 123 | 1701 | 2768 | 215 |
| Grp Volume(v), veh/h | 72 | 178 | 103 | 56 | 130 | 85 | 124 | 361 | 501 | 222 | 303 | 417 |
| Grp Sat Flow(s),veh/h/ln | 1621 | 1758 | 1458 | 1701 | 1786 | 1455 | 1688 | 1238 | 1716 | 1701 | 1258 | 1726 |
| Q Serve(g_s), s | 4.7 | 11.8 | 8.0 | 3.5 | 8.4 | 3.4 | 8.7 | 33.9 | 33.9 | 11.6 | 15.8 | 15.8 |
| Cycle Q Clear(g_c), s | 4.7 | 11.8 | 8.0 | 3.5 | 8.4 | 3.4 | 8.7 | 33.9 | 33.9 | 11.6 | 15.8 | 15.8 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.07 | 1.00 | | 0.12 |
| Lane Grp Cap(c), veh/h | 185 | 221 | 183 | 150 | 203 | 165 | 145 | 389 | 539 | 610 | 738 | 1012 |
| V/C Ratio(X) | 0.39 | 0.81 | 0.56 | 0.37 | 0.64 | 0.52 | 0.86 | 0.93 | 0.93 | 0.36 | 0.41 | 0.41 |
| Avail Cap(c_a), veh/h | 319 | 337 | 280 | 311 | 342 | 279 | 323 | 444 | 615 | 610 | 738 | 1012 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 44.5 | 51.0 | 49.3 | 45.5 | 50.9 | 13.1 | 54.1 | 39.9 | 39.9 | 28.4 | 13.5 | 13.5 |
| Incr Delay (d2), s/veh | 1.3 | 8.0 | 2.7 | 1.5 | 3.4 | 2.5 | 13.2 | 30.8 | 24.6 | 0.4 | 1.7 | 1.2 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 3.5 | 9.6 | 5.5 | 2.8 | 7.1 | 4.4 | 7.5 | 19.3 | 24.4 | 8.2 | 8.0 | 10.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 45.9 | 59.1 | 52.0 | 47.0 | 54.2 | 15.6 | 67.3 | 70.6 | 64.5 | 28.8 | 15.2 | 14.8 |
| LnGrp LOS | D | E | D | D | D | B | E | E | E | C | B | B |
| Approach Vol, veh/h | | 353 | | | 271 | | | 986 | | | 942 | |
| Approach Delay, s/veh | | 54.3 | | | 40.6 | | | 67.1 | | | 18.2 | |
| Approach LOS | | D | | | D | | | E | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 48.0 | 42.7 | 9.2 | 20.1 | 15.3 | 75.4 | 10.7 | 18.6 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 18.9 | 43.5 | 16.1 | 23.5 | 23.5 | 38.9 | 16.1 | 23.5 |
| Max Q Clear Time (g_c+I1), s | 13.6 | 35.9 | 5.5 | 13.8 | 10.7 | 17.8 | 6.7 | 10.4 |
| Green Ext Time (p_c), s | 0.4 | 2.3 | 0.1 | 0.8 | 0.3 | 2.8 | 0.1 | 0.7 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 44.5 |
| HCM 7th LOS | D |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 6 | 788 | 914 | 5 | 1 | 3 |
| Future Vol, veh/h | 6 | 788 | 914 | 5 | 1 | 3 |
| Conflicting Peds, #/hr | 1 | 0 | 0 | 1 | 1 | 1 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 105 | - | - | 55 | 60 | 0 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 93 | 93 | 93 | 93 | 93 | 93 |
| Heavy Vehicles, % | 10 | 2 | 3 | 1 | 10 | 1 |
| Mvmt Flow | 6 | 847 | 983 | 5 | 1 | 3 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 989 | 0 | - | 0 | 1845 | 985 |
| Stage 1 | - | - | - | - | 984 | - |
| Stage 2 | - | - | - | - | 861 | - |
| Critical Hdwy | 4.2 | - | - | - | 6.5 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.5 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.5 | - |
| Follow-up Hdwy | 2.29 | - | - | - | 3.59 | 3.309 |
| Pot Cap-1 Maneuver | 668 | - | - | - | 78 | 302 |
| Stage 1 | - | - | - | - | 350 | - |
| Stage 2 | - | - | - | - | 401 | - |
| Platoon blocked, % | | | - | - | - | |
| Mov Cap-1 Maneuver | 667 | - | - | - | 78 | 302 |
| Mov Cap-2 Maneuver | - | - | - | - | 78 | - |
| Stage 1 | - | - | - | - | 346 | - |
| Stage 2 | - | - | - | - | 401 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0.08 | 0 | 25.81 |
| HCM LOS | | | D |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 667 | - | - | - | 78 | 302 |
| HCM Lane V/C Ratio | 0.01 | - | - | - | 0.014 | 0.011 |
| HCM Ctrl Dly (s/v) | 10.4 | - | - | - | 52.1 | 17.1 |
| HCM Lane LOS | B | - | - | - | F | C |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0 | 0 |

# MOVEMENT SUMMARY

## Site: [99 (5)] SR 305 & Johnson Rd - Forecast 2032 PM

**Without** (PM Peak Hour)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Johnson Way | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.054 | 14.8 | LOS B | 0.2 | 5.2 | 0.55 | 0.74 | 0.55 | 31.1 |
| 3 | L2 | All MCs | 23 | 6.0 | 23 | 6.0 | 0.054 | 11.7 | LOS B | 0.2 | 5.2 | 0.55 | 0.74 | 0.55 | 32.3 |
| 8 | T1 | All MCs | 6 | 1.0 | 6 | 1.0 | 0.054 | 5.7 | LOS A | 0.2 | 5.2 | 0.55 | 0.74 | 0.55 | 30.3 |
| 18 | R2 | All MCs | 9 | 1.0 | 9 | 1.0 | 0.054 | 7.9 | LOS A | 0.2 | 5.2 | 0.55 | 0.74 | 0.55 | 33.4 |
| Approach | | | 39 | 3.9 | 39 | 3.9 | 0.054 | 10.0 | LOS A | 0.2 | 5.2 | 0.55 | 0.74 | 0.55 | 32.2 |
| East: SR 305 | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 3 | 1.0 | 3 | 1.0 | 0.471 | 12.1 | LOS B | 3.7 | 95.6 | 0.23 | 0.45 | 0.23 | 37.5 |
| 1 | L2 | All MCs | 12 | 1.0 | 12 | 1.0 | 0.471 | 11.5 | LOS B | 3.7 | 95.6 | 0.23 | 0.45 | 0.23 | 35.6 |
| 6 | T1 | All MCs | 949 | 3.0 | 949 | 3.0 | 0.471 | 6.5 | LOS A | 3.7 | 95.6 | 0.22 | 0.46 | 0.22 | 41.1 |
| 16 | R2 | All MCs | 27 | 10.0 | 27 | 10.0 | 0.214 | 6.0 | LOS A | 1.2 | 31.6 | 0.19 | 0.46 | 0.19 | 35.9 |
| Approach | | | 991 | 3.2 | 991 | 3.2 | 0.471 | 6.5 | LOS A | 3.7 | 95.6 | 0.22 | 0.46 | 0.22 | 40.8 |
| North: Johnson Rd | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.076 | 15.4 | LOS B | 0.3 | 7.6 | 0.59 | 0.77 | 0.59 | 30.7 |
| 7 | L2 | All MCs | 32 | 6.0 | 32 | 6.0 | 0.076 | 12.5 | LOS B | 0.3 | 7.6 | 0.59 | 0.77 | 0.59 | 31.9 |
| 4 | T1 | All MCs | 3 | 1.0 | 3 | 1.0 | 0.076 | 6.3 | LOS A | 0.3 | 7.6 | 0.59 | 0.77 | 0.59 | 30.0 |
| 14 | R2 | All MCs | 14 | 1.0 | 14 | 1.0 | 0.076 | 9.3 | LOS A | 0.3 | 7.6 | 0.59 | 0.77 | 0.59 | 32.9 |
| Approach | | | 51 | 4.2 | 51 | 4.2 | 0.076 | 11.3 | LOS B | 0.3 | 7.6 | 0.59 | 0.77 | 0.59 | 32.0 |
| West: SR 305 | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.403 | 12.1 | LOS B | 2.9 | 74.3 | 0.23 | 0.46 | 0.23 | 37.5 |
| 5 | L2 | All MCs | 11 | 1.0 | 11 | 1.0 | 0.403 | 11.5 | LOS B | 2.9 | 74.3 | 0.23 | 0.46 | 0.23 | 35.6 |
| 2 | T1 | All MCs | 817 | 2.0 | 817 | 2.0 | 0.403 | 6.3 | LOS A | 2.9 | 74.3 | 0.23 | 0.46 | 0.23 | 41.2 |
| 12 | R2 | All MCs | 23 | 1.0 | 23 | 1.0 | 0.183 | 5.9 | LOS A | 1.0 | 25.9 | 0.21 | 0.47 | 0.21 | 36.1 |
| Approach | | | 852 | 2.0 | 852 | 2.0 | 0.403 | 6.3 | LOS A | 2.9 | 74.3 | 0.23 | 0.46 | 0.23 | 41.0 |
| All Vehicles | | | 1932 | 2.7 | 1932 | 2.7 | 0.471 | 6.6 | LOS A | 3.7 | 95.6 | 0.24 | 0.47 | 0.24 | 40.4 |

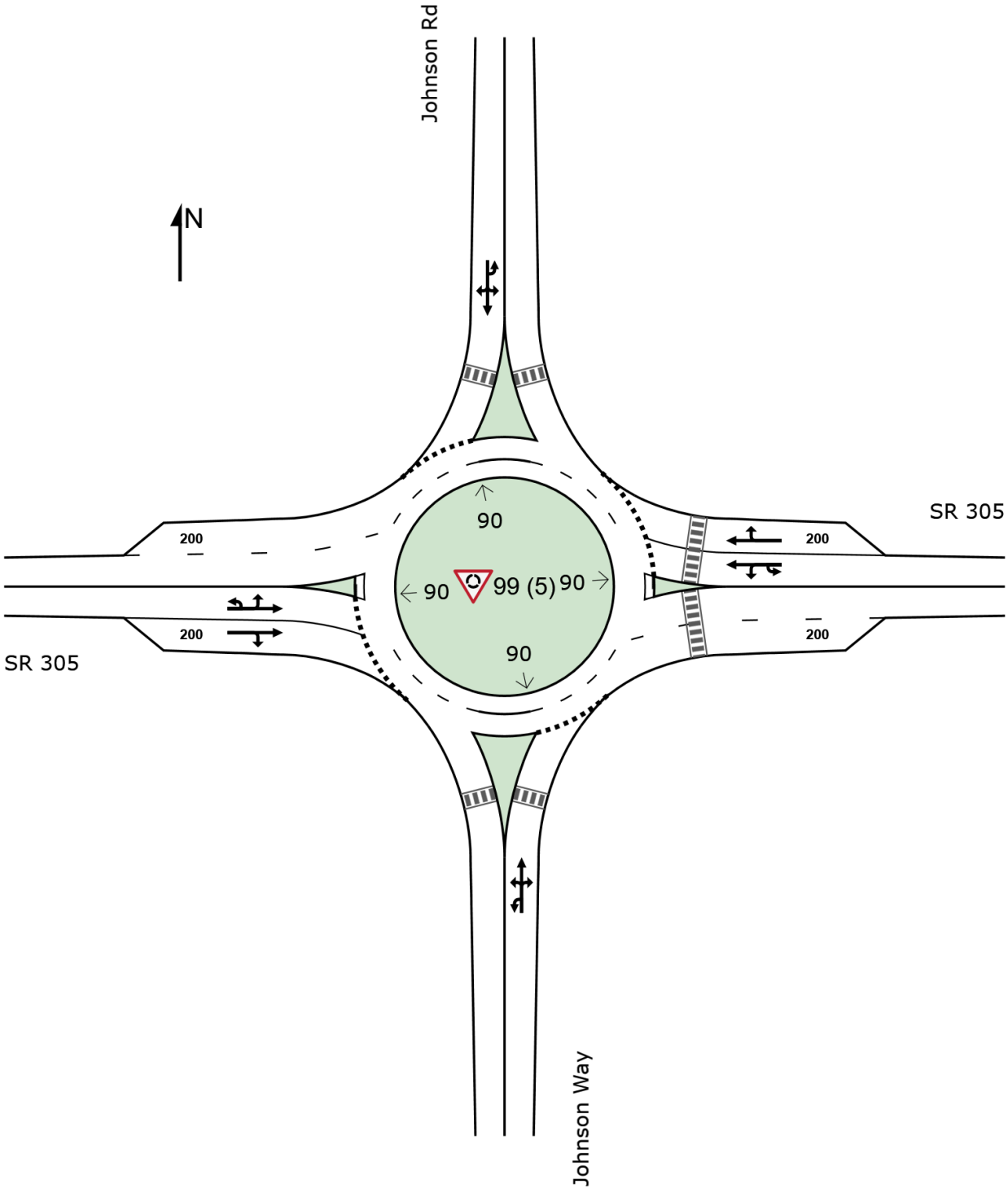
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [99 (5)] SR 305 & Johnson Rd - Forecast 2032 PM
**Without** (PM Peak Hour)

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



# MOVEMENT SUMMARY

## Site: [1 (5)] Johnson & Sunrise Ridge - 2032 PM Without

(Folder1)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NE Midnight Sun Loop | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.005 | 7.2 | LOS A | 0.0 | 0.5 | 0.16 | 0.42 | 0.16 | 23.6 |
| 3 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.005 | 5.8 | LOS A | 0.0 | 0.5 | 0.16 | 0.42 | 0.16 | 23.6 |
| 8 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.005 | 2.0 | LOS A | 0.0 | 0.5 | 0.16 | 0.42 | 0.16 | 23.9 |
| 18 | R2 | All MCs | 3 | 3.0 | 3 | 3.0 | 0.005 | 2.3 | LOS A | 0.0 | 0.5 | 0.16 | 0.42 | 0.16 | 23.8 |
| Approach | | | 7 | 3.0 | 7 | 3.0 | 0.005 | 3.7 | LOS A | 0.0 | 0.5 | 0.16 | 0.42 | 0.16 | 23.7 |
| East: Johnson Rd NE | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.043 | 10.9 | LOS B | 0.2 | 4.5 | 0.12 | 0.49 | 0.12 | 34.5 |
| 1 | L2 | All MCs | 3 | 3.0 | 3 | 3.0 | 0.043 | 9.0 | LOS A | 0.2 | 4.5 | 0.12 | 0.49 | 0.12 | 34.5 |
| 6 | T1 | All MCs | 40 | 3.0 | 40 | 3.0 | 0.043 | 5.0 | LOS A | 0.2 | 4.5 | 0.12 | 0.49 | 0.12 | 35.2 |
| 16 | R2 | All MCs | 12 | 3.0 | 12 | 3.0 | 0.043 | 4.7 | LOS A | 0.2 | 4.5 | 0.12 | 0.49 | 0.12 | 34.8 |
| Approach | | | 57 | 3.0 | 57 | 3.0 | 0.043 | 5.3 | LOS A | 0.2 | 4.5 | 0.12 | 0.49 | 0.12 | 35.0 |
| North: Sunrise Ridge Ave NE | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.029 | 11.0 | LOS B | 0.1 | 3.0 | 0.15 | 0.55 | 0.15 | 34.3 |
| 7 | L2 | All MCs | 7 | 3.0 | 7 | 3.0 | 0.029 | 9.1 | LOS A | 0.1 | 3.0 | 0.15 | 0.55 | 0.15 | 34.3 |
| 4 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.029 | 5.0 | LOS A | 0.1 | 3.0 | 0.15 | 0.55 | 0.15 | 34.9 |
| 14 | R2 | All MCs | 26 | 3.0 | 26 | 3.0 | 0.029 | 4.8 | LOS A | 0.1 | 3.0 | 0.15 | 0.55 | 0.15 | 34.6 |
| Approach | | | 35 | 3.0 | 35 | 3.0 | 0.029 | 5.8 | LOS A | 0.1 | 3.0 | 0.15 | 0.55 | 0.15 | 34.5 |
| West: Johnson Rd NE | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.041 | 10.8 | LOS B | 0.2 | 4.3 | 0.07 | 0.59 | 0.07 | 33.6 |
| 5 | L2 | All MCs | 30 | 3.0 | 30 | 3.0 | 0.041 | 8.9 | LOS A | 0.2 | 4.3 | 0.07 | 0.59 | 0.07 | 33.6 |
| 2 | T1 | All MCs | 20 | 3.0 | 20 | 3.0 | 0.041 | 4.9 | LOS A | 0.2 | 4.3 | 0.07 | 0.59 | 0.07 | 34.2 |
| 12 | R2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.041 | 4.6 | LOS A | 0.2 | 4.3 | 0.07 | 0.59 | 0.07 | 33.9 |
| Approach | | | 52 | 3.0 | 52 | 3.0 | 0.041 | 7.3 | LOS A | 0.2 | 4.3 | 0.07 | 0.59 | 0.07 | 33.9 |
| All Vehicles | | | 151 | 3.0 | 151 | 3.0 | 0.043 | 6.0 | LOS A | 0.2 | 4.5 | 0.11 | 0.53 | 0.11 | 33.8 |

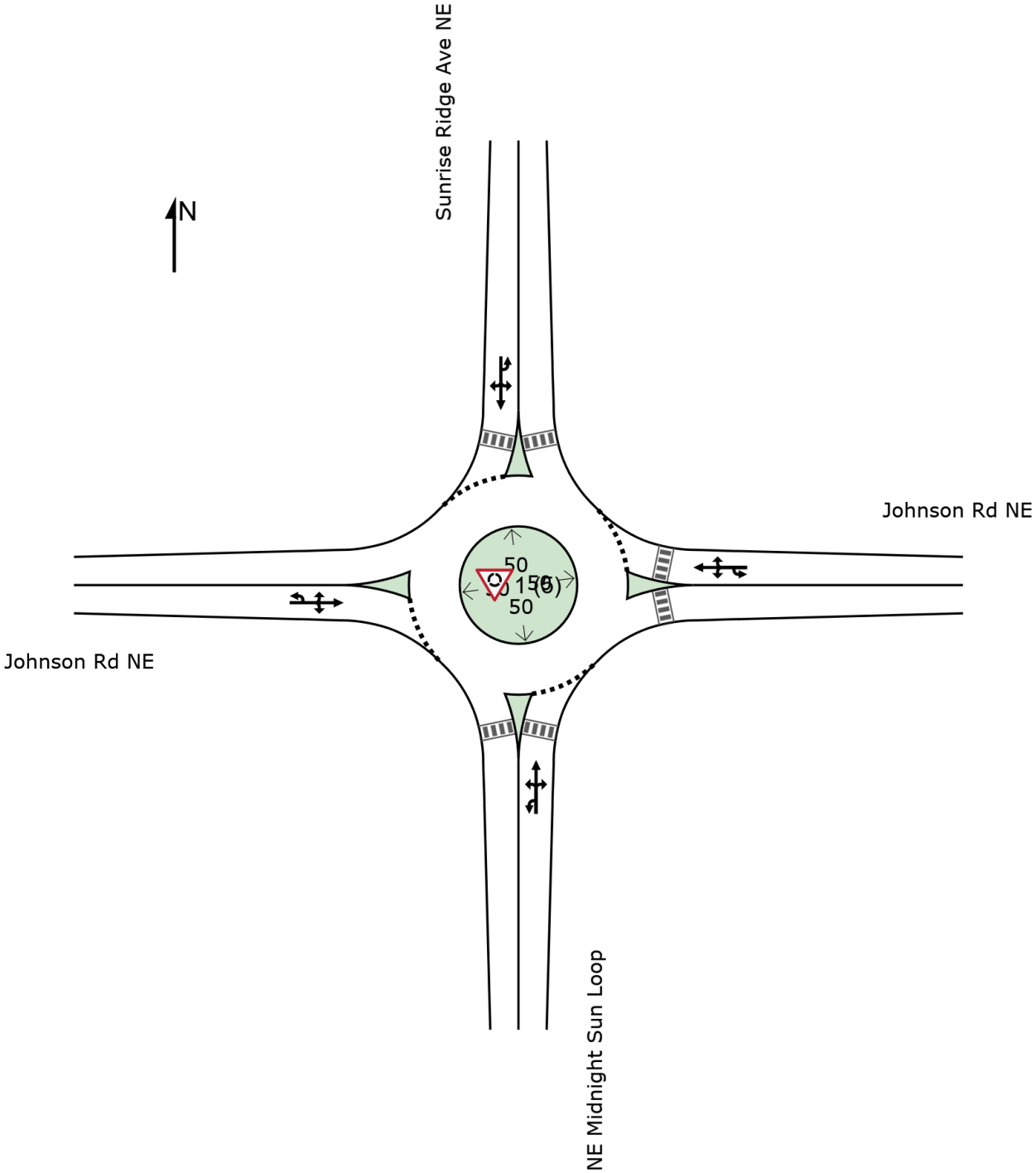
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [1 (5)] Johnson & Sunrise Ridge - 2032 PM Without
(Folder1)

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



| Intersection | |
|---|---|
| Intersection Delay, s/veh | 14.9 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 89 | 219 | 72 | 10 | 137 | 50 | 65 | 50 | 3 | 92 | 63 | 65 |
| Future Vol, veh/h | 89 | 219 | 72 | 10 | 137 | 50 | 65 | 50 | 3 | 92 | 63 | 65 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Heavy Vehicles, % | 3 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 4 |
| Mvmt Flow | 102 | 252 | 83 | 11 | 157 | 57 | 75 | 57 | 3 | 106 | 72 | 75 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 1 | 1 |
| HCM Control Delay, s/veh | 18.9 | 12.1 | 11.8 | 12.2 |
| HCM LOS | C | B | B | B |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|
| Vol Left, % | 55% | 23% | 5% | 59% | 0% |
| Vol Thru, % | 42% | 58% | 70% | 41% | 0% |
| Vol Right, % | 3% | 19% | 25% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 118 | 380 | 197 | 155 | 65 |
| LT Vol | 65 | 89 | 10 | 92 | 0 |
| Through Vol | 50 | 219 | 137 | 63 | 0 |
| RT Vol | 3 | 72 | 50 | 0 | 65 |
| Lane Flow Rate | 136 | 437 | 226 | 178 | 75 |
| Geometry Grp | 4a | 2 | 2 | 5 | 5 |
| Degree of Util (X) | 0.246 | 0.666 | 0.361 | 0.343 | 0.123 |
| Departure Headway (Hd) | 6.521 | 5.489 | 5.74 | 6.925 | 5.908 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes |
| Cap | 547 | 655 | 620 | 517 | 602 |
| Service Time | 4.617 | 3.559 | 3.825 | 4.706 | 3.688 |
| HCM Lane V/C Ratio | 0.249 | 0.667 | 0.365 | 0.344 | 0.125 |
| HCM Control Delay, s/veh | 11.8 | 18.9 | 12.1 | 13.3 | 9.5 |
| HCM Lane LOS | B | C | B | B | A |
| HCM 95th-tile Q | 1 | 5 | 1.6 | 1.5 | 0.4 |

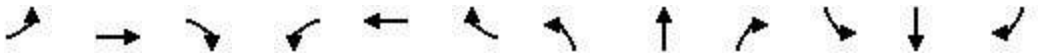
| Intersection | |
|---|---|
| Int Delay, s/veh | 2.9 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 57 | 63 | 23 | 57 | 41 | 17 |
| Future Vol, veh/h | 57 | 63 | 23 | 57 | 41 | 17 |
| Conflicting Peds, #/hr | 0 | 10 | 10 | 0 | 10 | 10 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 62 | 68 | 25 | 62 | 45 | 18 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 140 | 0 | 228 | 116 |
| Stage 1 | - | - | - | - | 106 | - |
| Stage 2 | - | - | - | - | 122 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1443 | - | 760 | 936 |
| Stage 1 | - | - | - | - | 918 | - |
| Stage 2 | - | - | - | - | 903 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1431 | - | 734 | 920 |
| Mov Cap-2 Maneuver | - | - | - | - | 734 | - |
| Stage 1 | - | - | - | - | 910 | - |
| Stage 2 | - | - | - | - | 880 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 2.17 | 10.02 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 780 | - | - | 517 | - |
| HCM Lane V/C Ratio | 0.081 | - | - | 0.017 | - |
| HCM Ctrl Dly (s/v) | 10 | - | - | 7.6 | 0 |
| HCM Lane LOS | B | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0.1 | - |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 39 | 108 | 69 | 54 | 89 | 150 | 63 | 511 | 22 | 208 | 888 | 21 |
| Future Volume (veh/h) | 39 | 108 | 69 | 54 | 89 | 150 | 63 | 511 | 22 | 208 | 888 | 21 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 0.99 | | 0.98 | 0.99 | | 0.98 | 1.00 | | 0.98 | 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 | 1716 | 1730 | 1744 | 1744 | 1744 | 1716 | 1730 | 1716 | 1716 | 1730 | 1716 | 1646 |
| Adj Flow Rate, veh/h | 42 | 117 | 75 | 59 | 97 | 98 | 68 | 555 | 24 | 226 | 965 | 23 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 6 | 5 | 4 | 4 | 4 | 6 | 5 | 6 | 6 | 5 | 6 | 11 |
| Cap, veh/h | 172 | 176 | 147 | 165 | 198 | 162 | 80 | 622 | 27 | 775 | 1841 | 44 |
| Arrive On Green | 0.03 | 0.10 | 0.10 | 0.04 | 0.11 | 0.11 | 0.05 | 0.22 | 0.22 | 0.47 | 0.65 | 0.65 |
| Sat Flow, veh/h | 1634 | 1730 | 1443 | 1661 | 1744 | 1423 | 1647 | 2789 | 120 | 1647 | 2853 | 68 |
| Grp Volume(v), veh/h | 42 | 117 | 75 | 59 | 97 | 98 | 68 | 242 | 337 | 226 | 412 | 576 |
| Grp Sat Flow(s),veh/h/ln | 1634 | 1730 | 1443 | 1661 | 1744 | 1423 | 1647 | 1218 | 1691 | 1647 | 1218 | 1703 |
| Q Serve(g_s), s | 2.8 | 7.8 | 5.9 | 3.8 | 6.3 | 3.0 | 4.9 | 23.1 | 23.2 | 10.1 | 21.8 | 21.8 |
| Cycle Q Clear(g_c), s | 2.8 | 7.8 | 5.9 | 3.8 | 6.3 | 3.0 | 4.9 | 23.1 | 23.2 | 10.1 | 21.8 | 21.8 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.07 | 1.00 | | 0.04 |
| Lane Grp Cap(c), veh/h | 172 | 176 | 147 | 165 | 198 | 162 | 80 | 272 | 378 | 775 | 786 | 1099 |
| V/C Ratio(X) | 0.24 | 0.67 | 0.51 | 0.36 | 0.49 | 0.61 | 0.85 | 0.89 | 0.89 | 0.29 | 0.52 | 0.52 |
| Avail Cap(c_a), veh/h | 342 | 332 | 277 | 318 | 334 | 273 | 316 | 437 | 606 | 775 | 786 | 1099 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 47.0 | 51.9 | 51.1 | 46.3 | 49.9 | 7.5 | 56.6 | 45.2 | 45.2 | 19.5 | 11.4 | 11.4 |
| Incr Delay (d2), s/veh | 0.7 | 4.3 | 2.7 | 1.3 | 1.9 | 3.6 | 21.0 | 32.4 | 25.8 | 0.2 | 2.5 | 1.8 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 2.1 | 6.5 | 4.1 | 2.9 | 5.1 | 5.1 | 4.5 | 14.3 | 17.9 | 6.8 | 9.8 | 12.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 47.7 | 56.2 | 53.8 | 47.6 | 51.8 | 11.1 | 77.6 | 77.6 | 71.0 | 19.7 | 13.9 | 13.2 |
| LnGrp LOS | D | E | D | D | D | B | E | E | E | B | B | B |
| Approach Vol, veh/h | | 234 | | | 254 | | | 647 | | | 1214 | |
| Approach Delay, s/veh | | 53.9 | | | 35.1 | | | 74.2 | | | 14.7 | |
| Approach LOS | | D | | | D | | | E | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 61.5 | 31.8 | 9.6 | 17.2 | 10.8 | 82.4 | 8.1 | 18.6 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 18.9 | 43.5 | 16.1 | 23.5 | 23.5 | 38.9 | 16.1 | 23.5 |
| Max Q Clear Time (g_c+I1), s | 12.1 | 25.2 | 5.8 | 9.8 | 6.9 | 23.8 | 4.8 | 8.3 |
| Green Ext Time (p_c), s | 0.4 | 2.1 | 0.1 | 0.6 | 0.1 | 3.8 | 0.1 | 0.6 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 37.2 |
| HCM 7th LOS | D |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.5 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 10 | 972 | 519 | 2 | 6 | 35 |
| Future Vol, veh/h | 10 | 972 | 519 | 2 | 6 | 35 |
| Conflicting Peds, #/hr | 4 | 0 | 0 | 4 | 4 | 4 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 105 | - | - | 55 | 60 | 0 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 93 | 93 | 93 | 93 | 93 | 93 |
| Heavy Vehicles, % | 1 | 8 | 6 | 1 | 1 | 1 |
| Mvmt Flow | 11 | 1045 | 558 | 2 | 6 | 38 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 564 | 0 | - | 0 | 1633 | 566 |
| Stage 1 | - | - | - | - | 562 | - |
| Stage 2 | - | - | - | - | 1071 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1012 | - | - | - | 112 | 526 |
| Stage 1 | - | - | - | - | 573 | - |
| Stage 2 | - | - | - | - | 331 | - |
| Platoon blocked, % | | | - | - | - | |
| Mov Cap-1 Maneuver | 1009 | - | - | - | 110 | 522 |
| Mov Cap-2 Maneuver | - | - | - | - | 110 | - |
| Stage 1 | - | - | - | - | 565 | - |
| Stage 2 | - | - | - | - | 330 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0.09 | 0 | 16.43 |
| HCM LOS | | | C |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1009 | - | - | - | 110 | 522 |
| HCM Lane V/C Ratio | 0.011 | - | - | - | 0.059 | 0.072 |
| HCM Ctrl Dly (s/v) | 8.6 | - | - | - | 39.7 | 12.4 |
| HCM Lane LOS | A | - | - | - | E | B |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.2 | 0.2 |

# MOVEMENT SUMMARY

## Site: [99 (4)] SR 305 & Johnson Rd - Forecast 2032 AM With

(AM Peak Hour)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Johnson Way | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.053 | 16.5 | LOS B | 0.2 | 5.9 | 0.69 | 0.80 | 0.69 | 30.4 |
| 3 | L2 | All MCs | 18 | 1.0 | 18 | 1.0 | 0.053 | 13.1 | LOS B | 0.2 | 5.9 | 0.69 | 0.80 | 0.69 | 32.2 |
| 8 | T1 | All MCs | 8 | 1.0 | 8 | 1.0 | 0.053 | 7.5 | LOS A | 0.2 | 5.9 | 0.69 | 0.80 | 0.69 | 29.7 |
| 18 | R2 | All MCs | 3 | 1.0 | 3 | 1.0 | 0.053 | 13.7 | LOS B | 0.2 | 5.9 | 0.69 | 0.80 | 0.69 | 32.5 |
| Approach | | | 30 | 1.0 | 30 | 1.0 | 0.053 | 11.9 | LOS B | 0.2 | 5.9 | 0.69 | 0.80 | 0.69 | 31.5 |
| East: SR 305 | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.272 | 12.0 | LOS B | 1.7 | 44.4 | 0.18 | 0.46 | 0.18 | 37.7 |
| 1 | L2 | All MCs | 8 | 1.0 | 8 | 1.0 | 0.272 | 11.4 | LOS B | 1.7 | 44.4 | 0.18 | 0.46 | 0.18 | 35.7 |
| 6 | T1 | All MCs | 523 | 6.0 | 523 | 6.0 | 0.272 | 6.1 | LOS A | 1.7 | 44.4 | 0.18 | 0.46 | 0.18 | 40.7 |
| 16 | R2 | All MCs | 26 | 1.0 | 26 | 1.0 | 0.124 | 5.8 | LOS A | 0.7 | 16.9 | 0.18 | 0.47 | 0.18 | 36.1 |
| Approach | | | 557 | 5.7 | 557 | 5.7 | 0.272 | 6.1 | LOS A | 1.7 | 44.4 | 0.18 | 0.46 | 0.18 | 40.4 |
| North: Johnson Rd | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.171 | 14.0 | LOS B | 0.7 | 17.0 | 0.49 | 0.71 | 0.49 | 30.9 |
| 7 | L2 | All MCs | 122 | 3.0 | 122 | 3.0 | 0.171 | 10.7 | LOS B | 0.7 | 17.0 | 0.49 | 0.71 | 0.49 | 32.5 |
| 4 | T1 | All MCs | 2 | 1.0 | 2 | 1.0 | 0.171 | 4.9 | LOS A | 0.7 | 17.0 | 0.49 | 0.71 | 0.49 | 30.2 |
| 14 | R2 | All MCs | 22 | 1.0 | 22 | 1.0 | 0.171 | 6.4 | LOS A | 0.7 | 17.0 | 0.49 | 0.71 | 0.49 | 33.2 |
| Approach | | | 146 | 2.7 | 146 | 2.7 | 0.171 | 10.0 | LOS B | 0.7 | 17.0 | 0.49 | 0.71 | 0.49 | 32.6 |
| West: SR 305 | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.571 | 12.7 | LOS B | 5.0 | 132.6 | 0.48 | 0.50 | 0.48 | 36.6 |
| 5 | L2 | All MCs | 12 | 17.0 | 12 | 17.0 | 0.571 | 12.7 | LOS B | 5.0 | 132.6 | 0.48 | 0.50 | 0.48 | 34.3 |
| 2 | T1 | All MCs | 1019 | 8.0 | 1019 | 8.0 | 0.571 | 8.1 | LOS A | 5.0 | 132.6 | 0.46 | 0.50 | 0.46 | 39.3 |
| 12 | R2 | All MCs | 20 | 12.0 | 20 | 12.0 | 0.260 | 6.7 | LOS A | 1.5 | 40.6 | 0.37 | 0.50 | 0.37 | 35.3 |
| Approach | | | 1053 | 8.2 | 1053 | 8.2 | 0.571 | 8.1 | LOS A | 5.0 | 132.6 | 0.45 | 0.50 | 0.45 | 39.1 |
| All Vehicles | | | 1786 | 6.8 | 1786 | 6.8 | 0.571 | 7.7 | LOS A | 5.0 | 132.6 | 0.38 | 0.51 | 0.38 | 38.7 |

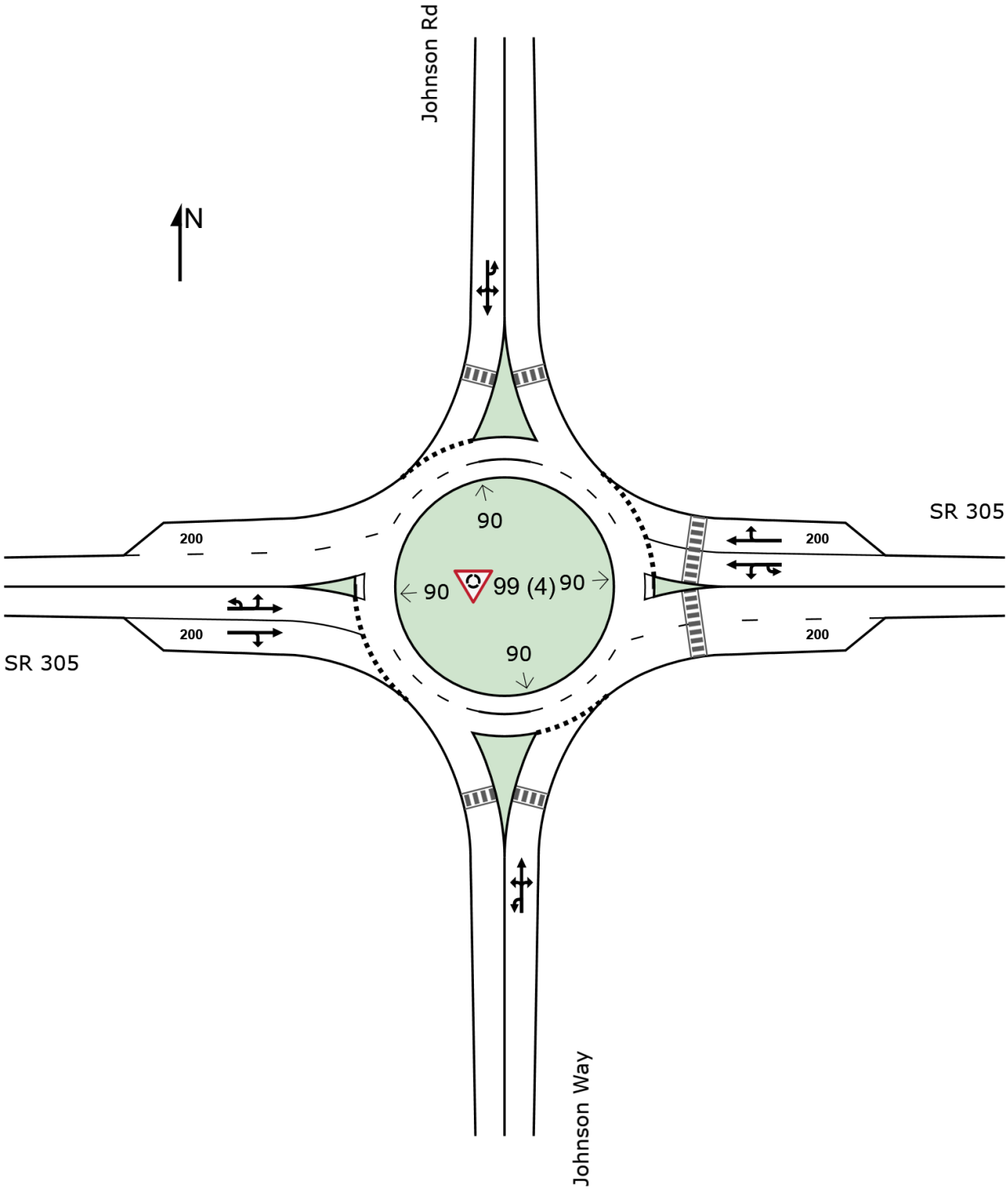
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [99 (4)] SR 305 & Johnson Rd - Forecast 2032 AM With
(AM Peak Hour)

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



# MOVEMENT SUMMARY

## Site: [1 (4)] Johnson & Sunrise Ridge - 2032 AM With (Folder1)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NE Midnight Sun Loop | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 7.2 | LOS A | 0.0 | 0.4 | 0.18 | 0.45 | 0.18 | 23.5 |
| 3 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 5.8 | LOS A | 0.0 | 0.4 | 0.18 | 0.45 | 0.18 | 23.5 |
| 8 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 2.0 | LOS A | 0.0 | 0.4 | 0.18 | 0.45 | 0.18 | 23.7 |
| 18 | R2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 2.4 | LOS A | 0.0 | 0.4 | 0.18 | 0.45 | 0.18 | 23.6 |
| Approach | | | 5 | 3.0 | 5 | 3.0 | 0.004 | 4.4 | LOS A | 0.0 | 0.4 | 0.18 | 0.45 | 0.18 | 23.6 |
| East: Johnson Rd NE | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.073 | 10.9 | LOS B | 0.3 | 7.9 | 0.12 | 0.46 | 0.12 | 34.6 |
| 1 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.073 | 9.0 | LOS A | 0.3 | 7.9 | 0.12 | 0.46 | 0.12 | 34.6 |
| 6 | T1 | All MCs | 87 | 3.0 | 87 | 3.0 | 0.073 | 5.0 | LOS A | 0.3 | 7.9 | 0.12 | 0.46 | 0.12 | 35.3 |
| 16 | R2 | All MCs | 7 | 3.0 | 7 | 3.0 | 0.073 | 4.7 | LOS A | 0.3 | 7.9 | 0.12 | 0.46 | 0.12 | 34.9 |
| Approach | | | 96 | 3.0 | 96 | 3.0 | 0.073 | 5.1 | LOS A | 0.3 | 7.9 | 0.12 | 0.46 | 0.12 | 35.2 |
| North: Sunrise Ridge Ave NE | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.087 | 11.2 | LOS B | 0.4 | 9.6 | 0.22 | 0.55 | 0.22 | 34.2 |
| 7 | L2 | All MCs | 19 | 3.0 | 19 | 3.0 | 0.087 | 9.3 | LOS A | 0.4 | 9.6 | 0.22 | 0.55 | 0.22 | 34.2 |
| 4 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.087 | 5.3 | LOS A | 0.4 | 9.6 | 0.22 | 0.55 | 0.22 | 34.8 |
| 14 | R2 | All MCs | 81 | 3.0 | 81 | 3.0 | 0.087 | 5.0 | LOS A | 0.4 | 9.6 | 0.22 | 0.55 | 0.22 | 34.5 |
| Approach | | | 102 | 3.0 | 102 | 3.0 | 0.087 | 5.9 | LOS A | 0.4 | 9.6 | 0.22 | 0.55 | 0.22 | 34.4 |
| West: Johnson Rd NE | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.050 | 10.9 | LOS B | 0.2 | 5.4 | 0.10 | 0.56 | 0.10 | 33.9 |
| 5 | L2 | All MCs | 26 | 3.0 | 26 | 3.0 | 0.050 | 9.0 | LOS A | 0.2 | 5.4 | 0.10 | 0.56 | 0.10 | 33.9 |
| 2 | T1 | All MCs | 26 | 3.0 | 26 | 3.0 | 0.050 | 4.9 | LOS A | 0.2 | 5.4 | 0.10 | 0.56 | 0.10 | 34.5 |
| 12 | R2 | All MCs | 10 | 3.0 | 10 | 3.0 | 0.050 | 4.7 | LOS A | 0.2 | 5.4 | 0.10 | 0.56 | 0.10 | 34.2 |
| Approach | | | 63 | 3.0 | 63 | 3.0 | 0.050 | 6.7 | LOS A | 0.2 | 5.4 | 0.10 | 0.56 | 0.10 | 34.2 |
| All Vehicles | | | 267 | 3.0 | 267 | 3.0 | 0.087 | 5.7 | LOS A | 0.4 | 9.6 | 0.15 | 0.52 | 0.15 | 34.4 |

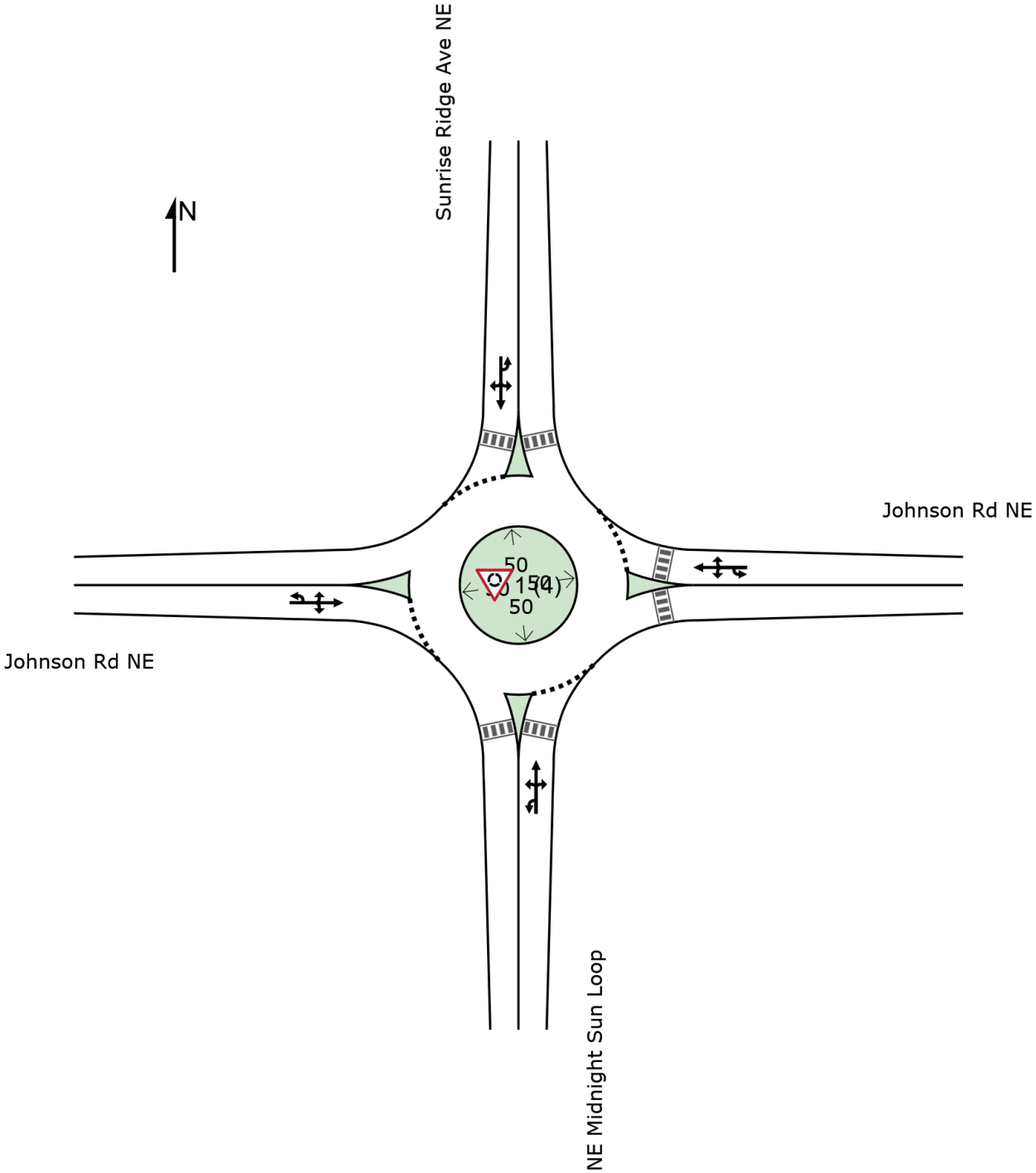
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [1 (4)] Johnson & Sunrise Ridge - 2032 AM With (Folder1)

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



| Intersection | |
|---|---|
| Int Delay, s/veh | 3.9 |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 8 | 36 | 12 | 16 | 48 | 3 |
| Future Vol, veh/h | 8 | 36 | 12 | 16 | 48 | 3 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 9 | 39 | 13 | 17 | 52 | 3 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 97 | 54 | 55 | 0 | - | 0 |
| Stage 1 | 54 | - | - | - | - | - |
| Stage 2 | 43 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 902 | 1013 | 1549 | - | - | - |
| Stage 1 | 969 | - | - | - | - | - |
| Stage 2 | 979 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 894 | 1013 | 1549 | - | - | - |
| Mov Cap-2 Maneuver | 894 | - | - | - | - | - |
| Stage 1 | 960 | - | - | - | - | - |
| Stage 2 | 979 | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 8.82 | 3.15 | 0 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 771 | - | 989 | - | - |
| HCM Lane V/C Ratio | 0.008 | - | 0.048 | - | - |
| HCM Ctrl Dly (s/v) | 7.3 | 0 | 8.8 | - | - |
| HCM Lane LOS | A | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0.2 | - | - |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 24.2 |
| Intersection LOS | C |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 48 | 236 | 23 | 23 | 213 | 81 | 61 | 42 | 45 | 129 | 29 | 60 |
| Future Vol, veh/h | 48 | 236 | 23 | 23 | 213 | 81 | 61 | 42 | 45 | 129 | 29 | 60 |
| Peak Hour Factor | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.87 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| Heavy Vehicles, % | 1 | 6 | 5 | 1 | 7 | 1 | 1 | 3 | 6 | 7 | 1 | 4 |
| Mvmt Flow | 64 | 315 | 31 | 31 | 284 | 108 | 70 | 56 | 60 | 172 | 39 | 80 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 1 | 1 |
| HCM Control Delay, s/veh | 28.7 | 28.9 | 15.7 | 16.6 |
| HCM LOS | D | D | C | C |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|
| Vol Left, % | 41% | 16% | 7% | 82% | 0% |
| Vol Thru, % | 28% | 77% | 67% | 18% | 0% |
| Vol Right, % | 30% | 7% | 26% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 148 | 307 | 317 | 158 | 60 |
| LT Vol | 61 | 48 | 23 | 129 | 0 |
| Through Vol | 42 | 236 | 213 | 29 | 0 |
| RT Vol | 45 | 23 | 81 | 0 | 60 |
| Lane Flow Rate | 186 | 409 | 423 | 211 | 80 |
| Geometry Grp | 4a | 2 | 2 | 5 | 5 |
| Degree of til (D) | 0.396 | 0.768 | 0.776 | 0.486 | 0.157 |
| Departure Headway (Hd) | 7.659 | 6.752 | 6.611 | 8.313 | 7.065 |
| Convergence, /N | es | es | es | es | es |
| Cap | 469 | 536 | 549 | 434 | 506 |
| Service Time | 5.731 | 4.772 | 4.632 | 6.075 | 4.827 |
| HCM Lane V/C Ratio | 0.397 | 0.763 | 0.77 | 0.486 | 0.158 |
| HCM Control Delay, s/veh | 15.7 | 28.7 | 28.9 | 18.7 | 11.1 |
| HCM Lane LOS | C | D | D | C | B |
| HCM 95th-tile Q | 1.9 | 6.9 | 7.1 | 2.6 | 0.6 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 4.1 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 34 | 39 | 6 | 57 | 67 | 23 |
| Future Vol, veh/h | 34 | 39 | 6 | 57 | 67 | 23 |
| Conflicting Peds, #/hr | 0 | 10 | 10 | 0 | 10 | 10 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 37 | 42 | 7 | 62 | 73 | 25 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 89 | 0 | 153 | 78 |
| Stage 1 | - | - | - | - | 68 | - |
| Stage 2 | - | - | - | - | 85 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1506 | - | 838 | 982 |
| Stage 1 | - | - | - | - | 955 | - |
| Stage 2 | - | - | - | - | 938 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1493 | - | 821 | 966 |
| Mov Cap-2 Maneuver | - | - | - | - | 821 | - |
| Stage 1 | - | - | - | - | 947 | - |
| Stage 2 | - | - | - | - | 926 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 0.71 | 9.76 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 854 | - | - | 171 | - |
| HCM Lane V/C Ratio | 0.115 | - | - | 0.004 | - |
| HCM Ctrl Dly (s/v) | 9.8 | - | - | 7.4 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.4 | - | - | 0 | - |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 71 | 176 | 120 | 55 | 129 | 229 | 133 | 831 | 36 | 220 | 683 | 51 |
| Future Volume (veh/h) | 71 | 176 | 120 | 55 | 129 | 229 | 133 | 831 | 36 | 220 | 683 | 51 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 0.99 | | 0.96 | 0.99 | | 0.96 | 1.00 | | 0.96 | 1.00 | | 0.97 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1702 | 1758 | 1786 | 1786 | 1786 | 1786 | 1772 | 1744 | 1786 | 1786 | 1772 | 1744 |
| Adj Flow Rate, veh/h | 72 | 178 | 121 | 56 | 130 | 85 | 134 | 839 | 36 | 222 | 690 | 52 |
| 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, % | 7 | 3 | 1 | 1 | 1 | 1 | 2 | 4 | 1 | 1 | 2 | 4 |
| Cap, veh/h | 186 | 222 | 184 | 150 | 203 | 166 | 156 | 901 | 39 | 602 | 1610 | 121 |
| Arrive On Green | 0.05 | 0.13 | 0.13 | 0.04 | 0.11 | 0.11 | 0.09 | 0.32 | 0.32 | 0.35 | 0.58 | 0.58 |
| Sat Flow, veh/h | 1621 | 1758 | 1459 | 1701 | 1786 | 1455 | 1688 | 2833 | 122 | 1701 | 2776 | 209 |
| Grp Volume(v), veh/h | 72 | 178 | 121 | 56 | 130 | 85 | 134 | 367 | 508 | 222 | 312 | 430 |
| Grp Sat Flow(s),veh/h/ln | 1621 | 1758 | 1459 | 1701 | 1786 | 1455 | 1688 | 1238 | 1717 | 1701 | 1258 | 1727 |
| Q Serve(g_s), s | 4.7 | 11.8 | 9.5 | 3.5 | 8.3 | 3.4 | 9.4 | 34.4 | 34.4 | 11.6 | 16.7 | 16.7 |
| Cycle Q Clear(g_c), s | 4.7 | 11.8 | 9.5 | 3.5 | 8.3 | 3.4 | 9.4 | 34.4 | 34.4 | 11.6 | 16.7 | 16.7 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.07 | 1.00 | | 0.12 |
| Lane Grp Cap(c), veh/h | 186 | 222 | 184 | 150 | 203 | 166 | 156 | 394 | 546 | 602 | 730 | 1001 |
| V/C Ratio(X) | 0.39 | 0.80 | 0.66 | 0.37 | 0.64 | 0.51 | 0.86 | 0.93 | 0.93 | 0.37 | 0.43 | 0.43 |
| Avail Cap(c_a), veh/h | 320 | 337 | 280 | 311 | 342 | 279 | 323 | 444 | 615 | 602 | 730 | 1001 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 44.5 | 51.0 | 50.0 | 45.4 | 50.8 | 13.3 | 53.7 | 39.6 | 39.7 | 28.8 | 14.1 | 14.1 |
| Incr Delay (d2), s/veh | 1.3 | 7.9 | 4.0 | 1.5 | 3.3 | 2.4 | 12.8 | 30.9 | 24.8 | 0.4 | 1.8 | 1.3 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 3.5 | 9.6 | 6.6 | 2.8 | 7.1 | 4.4 | 7.9 | 19.5 | 24.7 | 8.3 | 8.4 | 10.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 45.8 | 58.9 | 53.9 | 47.0 | 54.1 | 15.8 | 66.5 | 70.6 | 64.5 | 29.2 | 15.9 | 15.4 |
| LnGrp LOS | D | E | D | D | D | B | E | E | E | C | B | B |
| Approach Vol, veh/h | | 371 | | | 271 | | | 1009 | | | 964 | |
| Approach Delay, s/veh | | 54.7 | | | 40.6 | | | 67.0 | | | 18.8 | |
| Approach LOS | | D | | | D | | | E | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 47.5 | 43.2 | 9.2 | 20.1 | 16.1 | 74.6 | 10.7 | 18.7 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 18.9 | 43.5 | 16.1 | 23.5 | 23.5 | 38.9 | 16.1 | 23.5 |
| Max Q Clear Time (g_c+I1), s | 13.6 | 36.4 | 5.5 | 13.8 | 11.4 | 18.7 | 6.7 | 10.3 |
| Green Ext Time (p_c), s | 0.4 | 2.2 | 0.1 | 0.8 | 0.3 | 2.9 | 0.1 | 0.7 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 44.7 |
| HCM 7th LOS | D |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.6 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 42 | 792 | 916 | 9 | 4 | 24 |
| Future Vol, veh/h | 42 | 792 | 916 | 9 | 4 | 24 |
| Conflicting Peds, #/hr | 1 | 0 | 0 | 1 | 1 | 1 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 105 | - | - | 55 | 60 | 0 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 93 | 93 | 93 | 93 | 93 | 93 |
| Heavy Vehicles, % | 10 | 2 | 3 | 1 | 10 | 1 |
| Mvmt Flow | 45 | 852 | 985 | 10 | 4 | 26 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 996 | 0 | - | 0 | 1929 | 987 |
| Stage 1 | - | - | - | - | 986 | - |
| Stage 2 | - | - | - | - | 943 | - |
| Critical Hdwy | 4.2 | - | - | - | 6.5 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.5 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.5 | - |
| Follow-up Hdwy | 2.29 | - | - | - | 3.59 | 3.309 |
| Pot Cap-1 Maneuver | 664 | - | - | - | 69 | 302 |
| Stage 1 | - | - | - | - | 349 | - |
| Stage 2 | - | - | - | - | 366 | - |
| Platoon blocked, % | | | - | - | - | |
| Mov Cap-1 Maneuver | 664 | - | - | - | 65 | 301 |
| Mov Cap-2 Maneuver | - | - | - | - | 65 | - |
| Stage 1 | - | - | - | - | 325 | - |
| Stage 2 | - | - | - | - | 366 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0.54 | 0 | 24.73 |
| HCM LOS | | | C |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 664 | - | - | - | 65 | 301 |
| HCM Lane V/C Ratio | 0.068 | - | - | - | 0.067 | 0.086 |
| HCM Ctrl Dly (s/v) | 10.8 | - | - | - | 64.7 | 18.1 |
| HCM Lane LOS | B | - | - | - | F | C |
| HCM 95th %tile Q(veh) | 0.2 | - | - | - | 0.2 | 0.3 |

# MOVEMENT SUMMARY

## Site: [99 (6)] SR 305 & Johnson Rd - Forecast 2032 PM With

(PM Peak Hour)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Johnson Way | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.056 | 14.9 | LOS B | 0.2 | 5.5 | 0.57 | 0.74 | 0.57 | 31.1 |
| 3 | L2 | All MCs | 23 | 6.0 | 23 | 6.0 | 0.056 | 11.9 | LOS B | 0.2 | 5.5 | 0.57 | 0.74 | 0.57 | 32.3 |
| 8 | T1 | All MCs | 6 | 1.0 | 6 | 1.0 | 0.056 | 5.8 | LOS A | 0.2 | 5.5 | 0.57 | 0.74 | 0.57 | 30.3 |
| 18 | R2 | All MCs | 9 | 1.0 | 9 | 1.0 | 0.056 | 8.1 | LOS A | 0.2 | 5.5 | 0.57 | 0.74 | 0.57 | 33.3 |
| Approach | | | 39 | 3.9 | 39 | 3.9 | 0.056 | 10.1 | LOS B | 0.2 | 5.5 | 0.57 | 0.74 | 0.57 | 32.1 |
| East: SR 305 | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 3 | 1.0 | 3 | 1.0 | 0.492 | 12.1 | LOS B | 4.0 | 101.9 | 0.25 | 0.46 | 0.25 | 37.4 |
| 1 | L2 | All MCs | 12 | 1.0 | 12 | 1.0 | 0.492 | 11.5 | LOS B | 4.0 | 101.9 | 0.25 | 0.46 | 0.25 | 35.5 |
| 6 | T1 | All MCs | 954 | 3.0 | 954 | 3.0 | 0.492 | 6.4 | LOS A | 4.0 | 101.9 | 0.24 | 0.46 | 0.24 | 41.0 |
| 16 | R2 | All MCs | 61 | 10.0 | 61 | 10.0 | 0.224 | 6.0 | LOS A | 1.3 | 33.4 | 0.20 | 0.47 | 0.20 | 35.8 |
| Approach | | | 1030 | 3.4 | 1030 | 3.4 | 0.492 | 6.5 | LOS A | 4.0 | 101.9 | 0.24 | 0.46 | 0.24 | 40.6 |
| North: Johnson Rd | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.112 | 15.6 | LOS B | 0.5 | 11.7 | 0.61 | 0.78 | 0.61 | 30.4 |
| 7 | L2 | All MCs | 53 | 6.0 | 53 | 6.0 | 0.112 | 12.7 | LOS B | 0.5 | 11.7 | 0.61 | 0.78 | 0.61 | 31.6 |
| 4 | T1 | All MCs | 3 | 1.0 | 3 | 1.0 | 0.112 | 6.5 | LOS A | 0.5 | 11.7 | 0.61 | 0.78 | 0.61 | 29.7 |
| 14 | R2 | All MCs | 16 | 1.0 | 16 | 1.0 | 0.112 | 9.6 | LOS A | 0.5 | 11.7 | 0.61 | 0.78 | 0.61 | 32.6 |
| Approach | | | 73 | 4.6 | 73 | 4.6 | 0.112 | 11.8 | LOS B | 0.5 | 11.7 | 0.61 | 0.78 | 0.61 | 31.7 |
| West: SR 305 | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.414 | 12.2 | LOS B | 3.1 | 78.2 | 0.29 | 0.47 | 0.29 | 37.3 |
| 5 | L2 | All MCs | 15 | 1.0 | 15 | 1.0 | 0.414 | 11.6 | LOS B | 3.1 | 78.2 | 0.29 | 0.47 | 0.29 | 35.4 |
| 2 | T1 | All MCs | 820 | 2.0 | 820 | 2.0 | 0.414 | 6.4 | LOS A | 3.1 | 78.2 | 0.28 | 0.47 | 0.28 | 41.0 |
| 12 | R2 | All MCs | 23 | 1.0 | 23 | 1.0 | 0.188 | 6.0 | LOS A | 1.1 | 27.0 | 0.26 | 0.47 | 0.26 | 35.9 |
| Approach | | | 859 | 2.0 | 859 | 2.0 | 0.414 | 6.5 | LOS A | 3.1 | 78.2 | 0.28 | 0.47 | 0.28 | 40.7 |
| All Vehicles | | | 2001 | 2.8 | 2001 | 2.8 | 0.492 | 6.8 | LOS A | 4.0 | 101.9 | 0.28 | 0.48 | 0.28 | 40.0 |

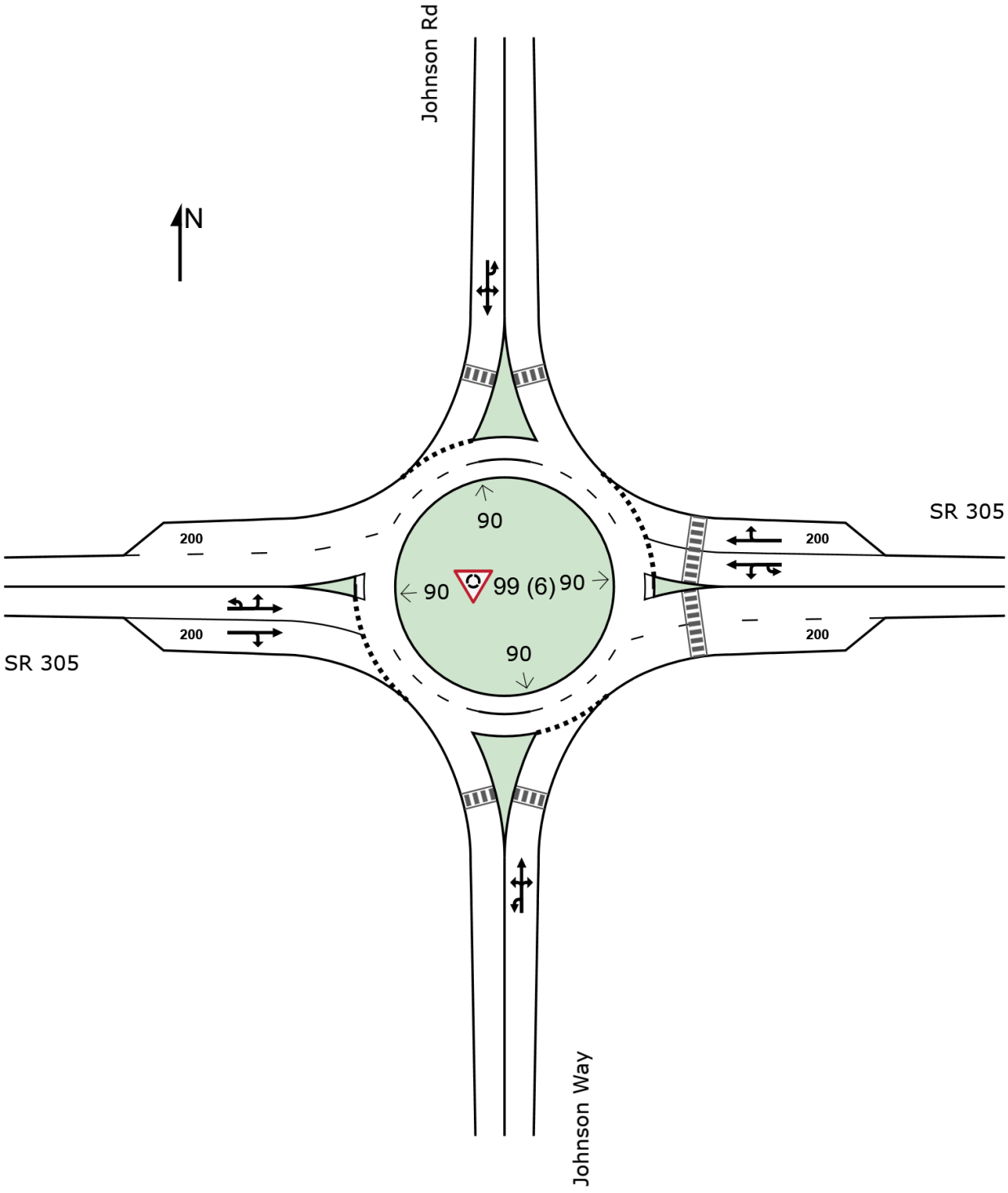
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [99 (6)] SR 305 & Johnson Rd - Forecast 2032 PM With
(PM Peak Hour)

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



# MOVEMENT SUMMARY

## Site: [1 (6)] Johnson & Sunrise Ridge - 2032 PM With (Folder1)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NE Midnight Sun Loop | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.006 | 7.3 | LOS A | 0.0 | 0.6 | 0.22 | 0.42 | 0.22 | 23.6 |
| 3 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.006 | 5.9 | LOS A | 0.0 | 0.6 | 0.22 | 0.42 | 0.22 | 23.6 |
| 8 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.006 | 2.1 | LOS A | 0.0 | 0.6 | 0.22 | 0.42 | 0.22 | 23.8 |
| 18 | R2 | All MCs | 3 | 3.0 | 3 | 3.0 | 0.006 | 2.5 | LOS A | 0.0 | 0.6 | 0.22 | 0.42 | 0.22 | 23.7 |
| Approach | | | 7 | 3.0 | 7 | 3.0 | 0.006 | 3.8 | LOS A | 0.0 | 0.6 | 0.22 | 0.42 | 0.22 | 23.7 |
| East: Johnson Rd NE | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.048 | 11.1 | LOS B | 0.2 | 5.1 | 0.18 | 0.49 | 0.18 | 34.4 |
| 1 | L2 | All MCs | 3 | 3.0 | 3 | 3.0 | 0.048 | 9.2 | LOS A | 0.2 | 5.1 | 0.18 | 0.49 | 0.18 | 34.4 |
| 6 | T1 | All MCs | 40 | 3.0 | 40 | 3.0 | 0.048 | 5.1 | LOS A | 0.2 | 5.1 | 0.18 | 0.49 | 0.18 | 35.0 |
| 16 | R2 | All MCs | 17 | 3.0 | 17 | 3.0 | 0.048 | 4.9 | LOS A | 0.2 | 5.1 | 0.18 | 0.49 | 0.18 | 34.7 |
| Approach | | | 61 | 3.0 | 61 | 3.0 | 0.048 | 5.4 | LOS A | 0.2 | 5.1 | 0.18 | 0.49 | 0.18 | 34.9 |
| North: Sunrise Ridge Ave NE | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.051 | 11.0 | LOS B | 0.2 | 5.5 | 0.15 | 0.54 | 0.15 | 34.3 |
| 7 | L2 | All MCs | 10 | 3.0 | 10 | 3.0 | 0.051 | 9.1 | LOS A | 0.2 | 5.5 | 0.15 | 0.54 | 0.15 | 34.3 |
| 4 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.051 | 5.0 | LOS A | 0.2 | 5.5 | 0.15 | 0.54 | 0.15 | 35.0 |
| 14 | R2 | All MCs | 50 | 3.0 | 50 | 3.0 | 0.051 | 4.8 | LOS A | 0.2 | 5.5 | 0.15 | 0.54 | 0.15 | 34.7 |
| Approach | | | 62 | 3.0 | 62 | 3.0 | 0.051 | 5.6 | LOS A | 0.2 | 5.5 | 0.15 | 0.54 | 0.15 | 34.6 |
| West: Johnson Rd NE | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.073 | 10.9 | LOS B | 0.3 | 7.9 | 0.09 | 0.62 | 0.09 | 33.3 |
| 5 | L2 | All MCs | 70 | 3.0 | 70 | 3.0 | 0.073 | 8.9 | LOS A | 0.3 | 7.9 | 0.09 | 0.62 | 0.09 | 33.3 |
| 2 | T1 | All MCs | 20 | 3.0 | 20 | 3.0 | 0.073 | 4.9 | LOS A | 0.3 | 7.9 | 0.09 | 0.62 | 0.09 | 33.8 |
| 12 | R2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.073 | 4.7 | LOS A | 0.3 | 7.9 | 0.09 | 0.62 | 0.09 | 33.6 |
| Approach | | | 93 | 3.0 | 93 | 3.0 | 0.073 | 8.0 | LOS A | 0.3 | 7.9 | 0.09 | 0.62 | 0.09 | 33.4 |
| All Vehicles | | | 224 | 3.0 | 224 | 3.0 | 0.073 | 6.5 | LOS A | 0.3 | 7.9 | 0.13 | 0.56 | 0.13 | 33.7 |

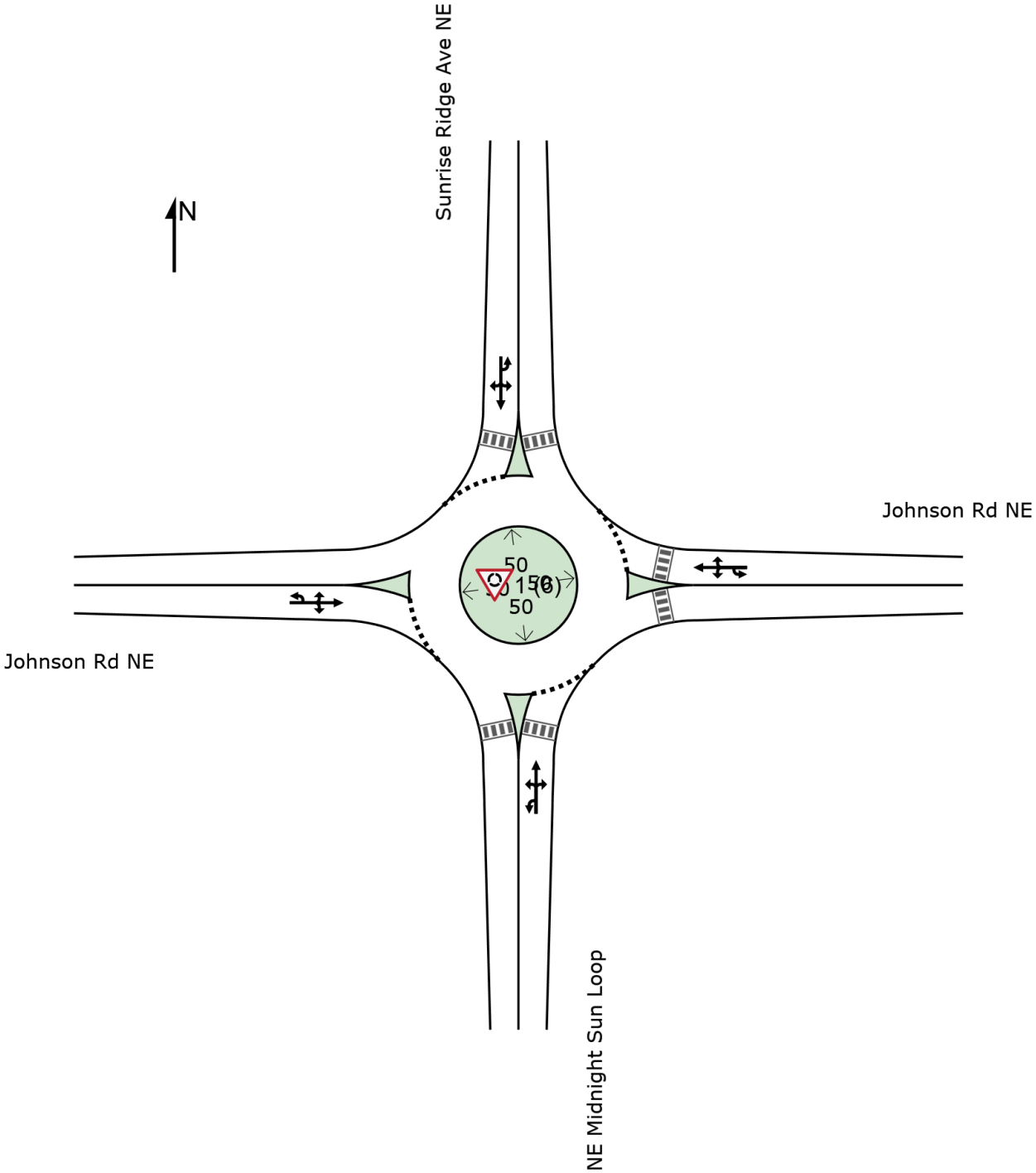
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [1 (6)] Johnson & Sunrise Ridge - 2032 PM With (Folder1)

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



| Intersection | |
|---|---|
| Int Delay, s/veh | 3.8 |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 5 | 24 | 40 | 37 | 29 | 9 |
| Future Vol, veh/h | 5 | 24 | 40 | 37 | 29 | 9 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 5 | 26 | 43 | 40 | 32 | 10 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 164 | 36 | 41 | 0 | - | 0 |
| Stage 1 | 36 | - | - | - | - | - |
| Stage 2 | 127 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 827 | 1036 | 1568 | - | - | - |
| Stage 1 | 986 | - | - | - | - | - |
| Stage 2 | 899 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 804 | 1036 | 1568 | - | - | - |
| Mov Cap-2 Maneuver | 804 | - | - | - | - | - |
| Stage 1 | 958 | - | - | - | - | - |
| Stage 2 | 899 | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 8.77 | 3.82 | 0 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 935 | - | 987 | - | - |
| HCM Lane V/C Ratio | 0.028 | - | 0.032 | - | - |
| HCM Ctrl Dly (s/v) | 7.4 | 0 | 8.8 | - | - |
| HCM Lane LOS | A | A | A | - | - |
| HCM 95th %tile Q(veh) | 0.1 | - | 0.1 | - | - |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 15.2 |
| Intersection LOS | C |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 89 | 219 | 72 | 10 | 137 | 54 | 65 | 53 | 5 | 92 | 68 | 65 |
| Future Vol, veh/h | 89 | 219 | 72 | 10 | 137 | 54 | 65 | 53 | 5 | 92 | 68 | 65 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Heavy Vehicles, % | 3 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 4 |
| Mvmt Flow | 102 | 252 | 83 | 11 | 157 | 62 | 75 | 61 | 6 | 106 | 78 | 75 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 1 | 1 |
| HCM Control Delay, s/veh | 19.4 | 12.3 | 12 | 12.4 |
| HCM LOS | C | B | B | B |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|
| Vol Left, % | 53% | 23% | 5% | 57% | 0% |
| Vol Thru, % | 43% | 58% | 68% | 43% | 0% |
| Vol Right, % | 4% | 19% | 27% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 123 | 380 | 201 | 160 | 65 |
| LT Vol | 65 | 89 | 10 | 92 | 0 |
| Through Vol | 53 | 219 | 137 | 68 | 0 |
| RT Vol | 5 | 72 | 54 | 0 | 65 |
| Lane Flow Rate | 141 | 437 | 231 | 184 | 75 |
| Geometry Grp | 4a | 2 | 2 | 5 | 5 |
| Degree of Util (X) | 0.261 | 0.673 | 0.371 | 0.355 | 0.123 |
| Departure Headway (Hd) | 6.654 | 5.543 | 5.783 | 6.954 | 5.946 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes |
| Cap | 543 | 646 | 615 | 513 | 597 |
| Service Time | 4.654 | 3.623 | 3.882 | 4.747 | 3.739 |
| HCM Lane V/C Ratio | 0.26 | 0.676 | 0.376 | 0.359 | 0.126 |
| HCM Control Delay, s/veh | 12 | 19.4 | 12.3 | 13.6 | 9.6 |
| HCM Lane LOS | B | C | B | B | A |
| HCM 95th-tile Q | 1 | 5.2 | 1.7 | 1.6 | 0.4 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 3 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 57 | 72 | 23 | 57 | 46 | 17 |
| Future Vol, veh/h | 57 | 72 | 23 | 57 | 46 | 17 |
| Conflicting Peds, #/hr | 0 | 10 | 10 | 0 | 10 | 10 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 62 | 78 | 25 | 62 | 50 | 18 |

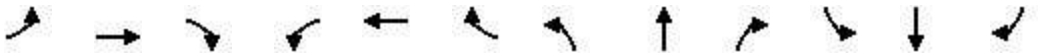
| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 150 | 0 | 233 | 121 |
| Stage 1 | - | - | - | - | 111 | - |
| Stage 2 | - | - | - | - | 122 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1431 | - | 755 | 930 |
| Stage 1 | - | - | - | - | 914 | - |
| Stage 2 | - | - | - | - | 903 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1419 | - | 729 | 915 |
| Mov Cap-2 Maneuver | - | - | - | - | 729 | - |
| Stage 1 | - | - | - | - | 906 | - |
| Stage 2 | - | - | - | - | 880 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 2.18 | 10.12 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 771 | - | - | 517 | - |
| HCM Lane V/C Ratio | 0.089 | - | - | 0.018 | - |
| HCM Ctrl Dly (s/v) | 10.1 | - | - | 7.6 | 0 |
| HCM Lane LOS | B | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0.1 | - |

# THE PINNACLE AT LIBERTY BAY
# TRAFFIC IMPACT ANALYSIS

*APPENDIX*
*Forecast 2037 Level of Service*



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 47 | 131 | 79 | 65 | 107 | 181 | 57 | 519 | 26 | 252 | 932 | 25 |
| Future Volume (veh/h) | 47 | 131 | 79 | 65 | 107 | 181 | 57 | 519 | 26 | 252 | 932 | 25 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 0.99 | | 0.98 | 0.99 | | 0.98 | 1.00 | | 0.98 | 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 | 1716 | 1730 | 1744 | 1744 | 1744 | 1716 | 1730 | 1716 | 1716 | 1730 | 1716 | 1646 |
| Adj Flow Rate, veh/h | 47 | 131 | 79 | 65 | 107 | 121 | 57 | 519 | 26 | 252 | 932 | 25 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 6 | 5 | 4 | 4 | 4 | 6 | 5 | 6 | 6 | 5 | 6 | 11 |
| Cap, veh/h | 178 | 187 | 156 | 169 | 210 | 171 | 66 | 585 | 29 | 778 | 1829 | 49 |
| Arrive On Green | 0.03 | 0.11 | 0.11 | 0.04 | 0.12 | 0.12 | 0.04 | 0.21 | 0.21 | 0.47 | 0.64 | 0.64 |
| Sat Flow, veh/h | 1634 | 1730 | 1445 | 1661 | 1744 | 1425 | 1647 | 2767 | 138 | 1647 | 2843 | 76 |
| Grp Volume(v), veh/h | 47 | 131 | 79 | 65 | 107 | 121 | 57 | 228 | 317 | 252 | 399 | 558 |
| Grp Sat Flow(s),veh/h/ln | 1634 | 1730 | 1445 | 1661 | 1744 | 1425 | 1647 | 1218 | 1688 | 1647 | 1218 | 1701 |
| Q Serve(g_s), s | 3.1 | 8.8 | 6.2 | 4.2 | 6.9 | 3.7 | 4.1 | 21.8 | 21.9 | 11.4 | 20.9 | 20.9 |
| Cycle Q Clear(g_c), s | 3.1 | 8.8 | 6.2 | 4.2 | 6.9 | 3.7 | 4.1 | 21.8 | 21.9 | 11.4 | 20.9 | 20.9 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.08 | 1.00 | | 0.04 |
| Lane Grp Cap(c), veh/h | 178 | 187 | 156 | 169 | 210 | 171 | 66 | 258 | 357 | 778 | 784 | 1095 |
| V/C Ratio(X) | 0.26 | 0.70 | 0.51 | 0.38 | 0.51 | 0.71 | 0.86 | 0.89 | 0.89 | 0.32 | 0.51 | 0.51 |
| Avail Cap(c_a), veh/h | 341 | 332 | 277 | 316 | 334 | 273 | 316 | 437 | 605 | 778 | 784 | 1095 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 46.1 | 51.7 | 50.5 | 45.5 | 49.5 | 7.3 | 57.3 | 45.9 | 45.9 | 19.7 | 11.4 | 11.4 |
| Incr Delay (d2), s/veh | 0.8 | 4.7 | 2.5 | 1.4 | 1.9 | 5.3 | 26.1 | 33.0 | 26.3 | 0.2 | 2.4 | 1.7 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 2.3 | 7.3 | 4.2 | 3.2 | 5.6 | 6.4 | 3.9 | 13.7 | 17.2 | 7.7 | 9.5 | 12.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 46.9 | 56.4 | 53.1 | 46.9 | 51.4 | 12.5 | 83.3 | 78.9 | 72.3 | 20.0 | 13.7 | 13.0 |
| LnGrp LOS | D | E | D | D | D | B | F | E | E | B | B | B |
| Approach Vol, veh/h | | 257 | | | 293 | | | 602 | | | 1209 | |
| Approach Delay, s/veh | | 53.6 | | | 34.3 | | | 75.8 | | | 14.7 | |
| Approach LOS | | D | | | C | | | E | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 61.6 | 30.4 | 10.0 | 17.9 | 9.8 | 82.2 | 8.6 | 19.4 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 18.9 | 43.5 | 16.1 | 23.5 | 23.5 | 38.9 | 16.1 | 23.5 |
| Max Q Clear Time (g_c+I1), s | 13.4 | 23.9 | 6.2 | 10.8 | 6.1 | 22.9 | 5.1 | 8.9 |
| Green Ext Time (p_c), s | 0.4 | 2.0 | 0.1 | 0.6 | 0.1 | 3.7 | 0.1 | 0.8 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 37.0 |
| HCM 7th LOS | D |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 0 | 1027 | 545 | 1 | 2 | 4 |
| Future Vol, veh/h | 0 | 1027 | 545 | 1 | 2 | 4 |
| Conflicting Peds, #/hr | 4 | 0 | 0 | 4 | 4 | 4 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 105 | - | - | 55 | 60 | 0 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 1 | 8 | 6 | 1 | 1 | 1 |
| Mvmt Flow | 0 | 1027 | 545 | 1 | 2 | 4 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 550 | 0 | - | 0 | 1580 | 553 |
| Stage 1 | - | - | - | - | 549 | - |
| Stage 2 | - | - | - | - | 1031 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1025 | - | - | - | 121 | 535 |
| Stage 1 | - | - | - | - | 581 | - |
| Stage 2 | - | - | - | - | 345 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1021 | - | - | - | 120 | 531 |
| Mov Cap-2 Maneuver | - | - | - | - | 120 | - |
| Stage 1 | - | - | - | - | 579 | - |
| Stage 2 | - | - | - | - | 344 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 0 | 19.73 |
| HCM LOS | | | C |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1021 | - | - | - | 120 | 531 |
| HCM Lane V/C Ratio | - | - | - | - | 0.017 | 0.008 |
| HCM Ctrl Dly (s/v) | 0 | - | - | - | 35.5 | 11.8 |
| HCM Lane LOS | A | - | - | - | E | B |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.1 | 0 |

# MOVEMENT SUMMARY

## Site: [99 (7)] SR 305 & Johnson Rd - Forecast 2037 AM

**Without** (AM Peak Hour)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Johnson Way | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.057 | 16.3 | LOS B | 0.2 | 6.2 | 0.67 | 0.80 | 0.67 | 30.5 |
| 3 | L2 | All MCs | 21 | 1.0 | 21 | 1.0 | 0.057 | 12.8 | LOS B | 0.2 | 6.2 | 0.67 | 0.80 | 0.67 | 32.3 |
| 8 | T1 | All MCs | 8 | 1.0 | 8 | 1.0 | 0.057 | 7.2 | LOS A | 0.2 | 6.2 | 0.67 | 0.80 | 0.67 | 29.8 |
| 18 | R2 | All MCs | 4 | 1.0 | 4 | 1.0 | 0.057 | 12.7 | LOS B | 0.2 | 6.2 | 0.67 | 0.80 | 0.67 | 32.7 |
| Approach | | | 34 | 1.0 | 34 | 1.0 | 0.057 | 11.6 | LOS B | 0.2 | 6.2 | 0.67 | 0.80 | 0.67 | 31.6 |
| East: SR 305 | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.264 | 12.0 | LOS B | 1.6 | 42.8 | 0.19 | 0.46 | 0.19 | 37.6 |
| 1 | L2 | All MCs | 8 | 1.0 | 8 | 1.0 | 0.264 | 11.5 | LOS B | 1.6 | 42.8 | 0.19 | 0.46 | 0.19 | 35.7 |
| 6 | T1 | All MCs | 513 | 6.0 | 513 | 6.0 | 0.264 | 6.1 | LOS A | 1.6 | 42.8 | 0.19 | 0.46 | 0.19 | 40.7 |
| 16 | R2 | All MCs | 17 | 1.0 | 17 | 1.0 | 0.120 | 5.8 | LOS A | 0.6 | 16.4 | 0.18 | 0.47 | 0.18 | 36.1 |
| Approach | | | 539 | 5.8 | 539 | 5.8 | 0.264 | 6.2 | LOS A | 1.6 | 42.8 | 0.19 | 0.46 | 0.19 | 40.4 |
| North: Johnson Rd | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.142 | 13.9 | LOS B | 0.5 | 13.8 | 0.48 | 0.70 | 0.48 | 31.0 |
| 7 | L2 | All MCs | 100 | 3.0 | 100 | 3.0 | 0.142 | 10.6 | LOS B | 0.5 | 13.8 | 0.48 | 0.70 | 0.48 | 32.6 |
| 4 | T1 | All MCs | 2 | 1.0 | 2 | 1.0 | 0.142 | 4.8 | LOS A | 0.5 | 13.8 | 0.48 | 0.70 | 0.48 | 30.3 |
| 14 | R2 | All MCs | 19 | 1.0 | 19 | 1.0 | 0.142 | 6.2 | LOS A | 0.5 | 13.8 | 0.48 | 0.70 | 0.48 | 33.2 |
| Approach | | | 122 | 2.6 | 122 | 2.6 | 0.142 | 9.9 | LOS A | 0.5 | 13.8 | 0.48 | 0.70 | 0.48 | 32.6 |
| West: SR 305 | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.550 | 12.5 | LOS B | 4.7 | 125.4 | 0.43 | 0.49 | 0.43 | 36.8 |
| 5 | L2 | All MCs | 12 | 17.0 | 12 | 17.0 | 0.550 | 12.5 | LOS B | 4.7 | 125.4 | 0.43 | 0.49 | 0.43 | 34.4 |
| 2 | T1 | All MCs | 998 | 8.0 | 998 | 8.0 | 0.550 | 7.7 | LOS A | 4.7 | 125.4 | 0.41 | 0.49 | 0.41 | 39.5 |
| 12 | R2 | All MCs | 23 | 12.0 | 23 | 12.0 | 0.250 | 6.6 | LOS A | 1.5 | 39.0 | 0.34 | 0.49 | 0.34 | 35.5 |
| Approach | | | 1034 | 8.2 | 1034 | 8.2 | 0.550 | 7.7 | LOS A | 4.7 | 125.4 | 0.41 | 0.49 | 0.41 | 39.3 |
| All Vehicles | | | 1729 | 6.9 | 1729 | 6.9 | 0.550 | 7.5 | LOS A | 4.7 | 125.4 | 0.35 | 0.50 | 0.35 | 38.9 |

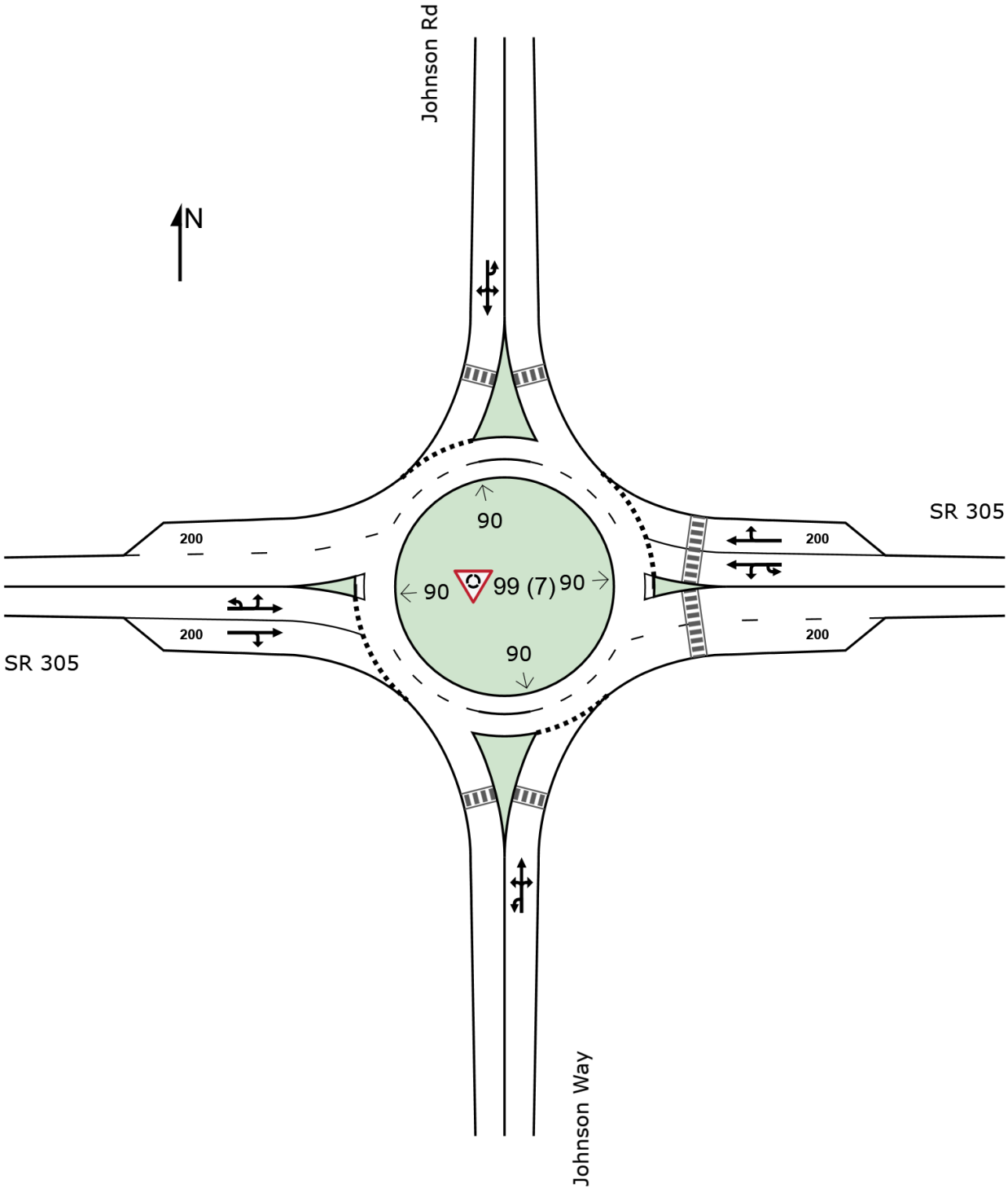
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [99 (7)] SR 305 & Johnson Rd - Forecast 2037 AM
**Without** (AM Peak Hour)

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



# MOVEMENT SUMMARY

## Site: [1 (7)] Johnson & Sunrise Ridge - 2037 AM Without

(Folder1)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NE Midnight Sun Loop | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 7.2 | LOS A | 0.0 | 0.4 | 0.17 | 0.45 | 0.17 | 23.5 |
| 3 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 5.8 | LOS A | 0.0 | 0.4 | 0.17 | 0.45 | 0.17 | 23.5 |
| 8 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 2.0 | LOS A | 0.0 | 0.4 | 0.17 | 0.45 | 0.17 | 23.7 |
| 18 | R2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 2.4 | LOS A | 0.0 | 0.4 | 0.17 | 0.45 | 0.17 | 23.6 |
| Approach | | | 5 | 3.0 | 5 | 3.0 | 0.004 | 4.3 | LOS A | 0.0 | 0.4 | 0.17 | 0.45 | 0.17 | 23.6 |
| East: Johnson Rd NE | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.088 | 10.9 | LOS B | 0.4 | 9.5 | 0.09 | 0.46 | 0.09 | 34.7 |
| 1 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.088 | 8.9 | LOS A | 0.4 | 9.5 | 0.09 | 0.46 | 0.09 | 34.7 |
| 6 | T1 | All MCs | 110 | 3.0 | 110 | 3.0 | 0.088 | 4.9 | LOS A | 0.4 | 9.5 | 0.09 | 0.46 | 0.09 | 35.3 |
| 16 | R2 | All MCs | 5 | 3.0 | 5 | 3.0 | 0.088 | 4.7 | LOS A | 0.4 | 9.5 | 0.09 | 0.46 | 0.09 | 35.0 |
| Approach | | | 117 | 3.0 | 117 | 3.0 | 0.088 | 5.0 | LOS A | 0.4 | 9.5 | 0.09 | 0.46 | 0.09 | 35.3 |
| North: Sunrise Ridge Ave NE | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.052 | 11.3 | LOS B | 0.2 | 5.5 | 0.24 | 0.56 | 0.24 | 34.0 |
| 7 | L2 | All MCs | 14 | 3.0 | 14 | 3.0 | 0.052 | 9.4 | LOS A | 0.2 | 5.5 | 0.24 | 0.56 | 0.24 | 34.0 |
| 4 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.052 | 5.3 | LOS A | 0.2 | 5.5 | 0.24 | 0.56 | 0.24 | 34.6 |
| 14 | R2 | All MCs | 43 | 3.0 | 43 | 3.0 | 0.052 | 5.1 | LOS A | 0.2 | 5.5 | 0.24 | 0.56 | 0.24 | 34.3 |
| Approach | | | 60 | 3.0 | 60 | 3.0 | 0.052 | 6.2 | LOS A | 0.2 | 5.5 | 0.24 | 0.56 | 0.24 | 34.2 |
| West: Johnson Rd NE | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.048 | 10.9 | LOS B | 0.2 | 5.2 | 0.09 | 0.53 | 0.09 | 34.2 |
| 5 | L2 | All MCs | 14 | 3.0 | 14 | 3.0 | 0.048 | 9.0 | LOS A | 0.2 | 5.2 | 0.09 | 0.53 | 0.09 | 34.2 |
| 2 | T1 | All MCs | 33 | 3.0 | 33 | 3.0 | 0.048 | 4.9 | LOS A | 0.2 | 5.2 | 0.09 | 0.53 | 0.09 | 34.9 |
| 12 | R2 | All MCs | 12 | 3.0 | 12 | 3.0 | 0.048 | 4.7 | LOS A | 0.2 | 5.2 | 0.09 | 0.53 | 0.09 | 34.6 |
| Approach | | | 61 | 3.0 | 61 | 3.0 | 0.048 | 5.9 | LOS A | 0.2 | 5.2 | 0.09 | 0.53 | 0.09 | 34.6 |
| All Vehicles | | | 242 | 3.0 | 242 | 3.0 | 0.088 | 5.5 | LOS A | 0.4 | 9.5 | 0.13 | 0.50 | 0.13 | 34.5 |

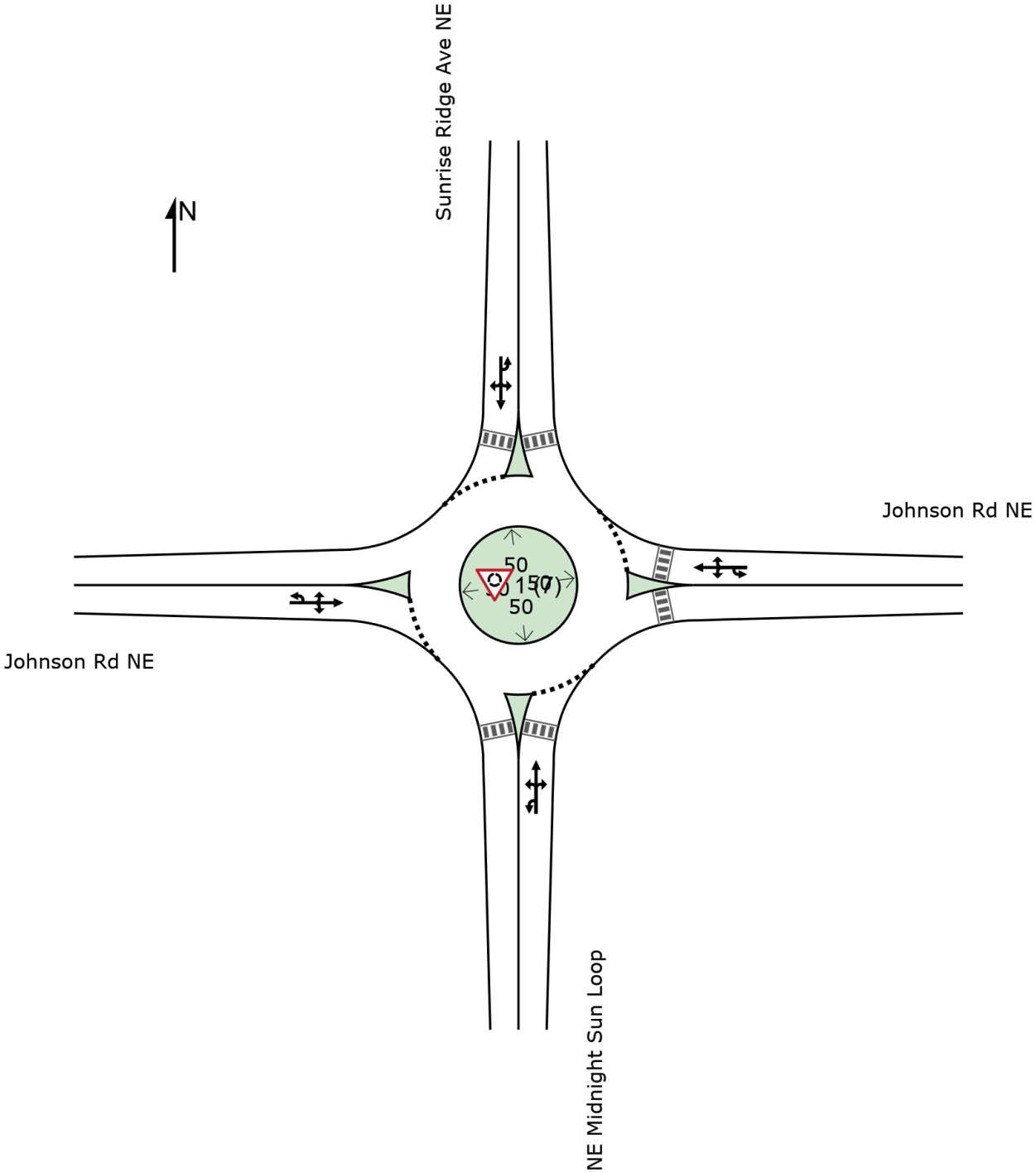
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [1 (7)] Johnson & Sunrise Ridge - 2037 AM Without
(Folder1)

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



| Intersection | |
|---|---|
| Intersection Delay, s/veh | 61.9 |
| Intersection LOS | F |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 58 | 285 | 28 | 25 | 257 | 97 | 73 | 45 | 49 | 157 | 31 | 73 |
| Future Vol, veh/h | 58 | 285 | 28 | 25 | 257 | 97 | 73 | 45 | 49 | 157 | 31 | 73 |
| Peak Hour Factor | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.87 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| Heavy Vehicles, % | 1 | 6 | 5 | 1 | 7 | 1 | 1 | 3 | 6 | 7 | 1 | 4 |
| Mvmt Flow | 77 | 380 | 37 | 33 | 343 | 129 | 84 | 60 | 65 | 209 | 41 | 97 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 1 | 1 |
| HCM Control Delay, s/veh | 80.8 | 86.4 | 21.8 | 23.7 |
| HCM LOS | F | F | C | C |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|
| Vol Left, % | 44% | 16% | 7% | 84% | 0% |
| Vol Thru, % | 27% | 77% | 68% | 16% | 0% |
| Vol Right, % | 29% | 8% | 26% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 167 | 371 | 379 | 188 | 73 |
| LT Vol | 73 | 58 | 25 | 157 | 0 |
| Through Vol | 45 | 285 | 257 | 31 | 0 |
| RT Vol | 49 | 28 | 97 | 0 | 73 |
| Lane Flow Rate | 209 | 495 | 505 | 251 | 97 |
| Geometry Grp | 4a | 2 | 2 | 5 | 5 |
| Degree of Util (X) | 0.514 | 1.038 | 1.06 | 0.639 | 0.215 |
| Departure Headway (Hd) | 9.321 | 7.891 | 7.722 | 9.592 | 8.321 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes |
| Cap | 389 | 465 | 475 | 379 | 434 |
| Service Time | 7.321 | 5.891 | 5.722 | 7.292 | 6.021 |
| HCM Lane V/C Ratio | 0.537 | 1.065 | 1.063 | 0.662 | 0.224 |
| HCM Control Delay, s/veh | 21.8 | 80.8 | 86.4 | 27.8 | 13.3 |
| HCM Lane LOS | C | F | F | D | B |
| HCM 95th-tile Q | 2.8 | 14.5 | 15.5 | 4.2 | 0.8 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 4 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 41 | 40 | 7 | 69 | 70 | 28 |
| Future Vol, veh/h | 41 | 40 | 7 | 69 | 70 | 28 |
| Conflicting Peds, /hr | 0 | 10 | 10 | 0 | 10 | 10 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channeli ed | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 45 | 43 | 8 | 75 | 76 | 30 |

| Ma or/Minor | Ma or1 | | Ma or2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 98 | 0 | 177 | 86 |
| Stage 1 | - | - | - | - | 76 | - |
| Stage 2 | - | - | - | - | 100 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1495 | - | 813 | 972 |
| Stage 1 | - | - | - | - | 947 | - |
| Stage 2 | - | - | - | - | 924 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1483 | - | 795 | 956 |
| Mov Cap-2 Maneuver | - | - | - | - | 795 | - |
| Stage 1 | - | - | - | - | 939 | - |
| Stage 2 | - | - | - | - | 911 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 0.69 | 9.94 |
| HCM LOS | | | A |

| Minor Lane/Ma or Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 836 | - | - | 166 | - |
| HCM Lane V/C Ratio | 0.127 | - | - | 0.005 | - |
| HCM Ctrl Dly (s/v) | 9.9 | - | - | 7.4 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.4 | - | - | 0 | - |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 86 | 212 | 123 | 66 | 156 | 277 | 149 | 865 | 43 | 266 | 699 | 62 |
| Future Volume (veh/h) | 86 | 212 | 123 | 66 | 156 | 277 | 149 | 865 | 43 | 266 | 699 | 62 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 0.99 | | 0.97 | 0.99 | | 0.96 | 1.00 | | 0.96 | 1.00 | | 0.97 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1702 | 1758 | 1786 | 1786 | 1786 | 1786 | 1772 | 1744 | 1786 | 1786 | 1772 | 1744 |
| Adj Flow Rate, veh/h | 86 | 212 | 123 | 66 | 156 | 132 | 149 | 865 | 43 | 266 | 699 | 62 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 7 | 3 | 1 | 1 | 1 | 1 | 2 | 4 | 1 | 1 | 2 | 4 |
| Cap, veh/h | 196 | 249 | 207 | 155 | 227 | 185 | 171 | 922 | 46 | 548 | 1501 | 133 |
| Arrive On Green | 0.06 | 0.14 | 0.14 | 0.04 | 0.13 | 0.13 | 0.10 | 0.33 | 0.33 | 0.32 | 0.55 | 0.55 |
| Sat Flow, veh/h | 1621 | 1758 | 1463 | 1701 | 1786 | 1459 | 1688 | 2811 | 140 | 1701 | 2735 | 242 |
| Grp Volume(v), veh/h | 86 | 212 | 123 | 66 | 156 | 132 | 149 | 381 | 527 | 266 | 321 | 440 |
| Grp Sat Flow(s),veh/h/ln | 1621 | 1758 | 1463 | 1701 | 1786 | 1459 | 1688 | 1238 | 1713 | 1701 | 1258 | 1720 |
| Q Serve(g_s), s | 5.5 | 14.1 | 9.5 | 4.0 | 10.0 | 5.7 | 10.4 | 35.8 | 35.9 | 15.1 | 18.6 | 18.6 |
| Cycle Q Clear(g_c), s | 5.5 | 14.1 | 9.5 | 4.0 | 10.0 | 5.7 | 10.4 | 35.8 | 35.9 | 15.1 | 18.6 | 18.6 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.08 | 1.00 | | 0.14 |
| Lane Grp Cap(c), veh/h | 196 | 249 | 207 | 155 | 227 | 185 | 171 | 406 | 562 | 548 | 690 | 944 |
| V/C Ratio(X) | 0.44 | 0.85 | 0.59 | 0.42 | 0.69 | 0.71 | 0.87 | 0.94 | 0.94 | 0.48 | 0.47 | 0.47 |
| Avail Cap(c_a), veh/h | 316 | 337 | 280 | 306 | 342 | 280 | 323 | 444 | 614 | 548 | 690 | 944 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 42.8 | 50.3 | 48.3 | 43.8 | 50.1 | 14.9 | 53.1 | 39.1 | 39.2 | 32.7 | 16.4 | 16.4 |
| Incr Delay (d2), s/veh | 1.5 | 14.3 | 2.7 | 1.8 | 3.7 | 5.0 | 12.4 | 31.6 | 25.5 | 0.7 | 2.2 | 1.7 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 4.1 | 11.6 | 6.5 | 3.2 | 8.3 | 7.0 | 8.6 | 20.2 | 25.5 | 10.3 | 9.3 | 11.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 44.3 | 64.5 | 51.0 | 45.7 | 53.8 | 19.9 | 65.6 | 70.7 | 64.6 | 33.3 | 18.7 | 18.1 |
| LnGrp LOS | D | E | D | D | D | B | E | E | E | C | B | B |
| Approach Vol, veh/h | | 421 | | | 354 | | | 1057 | | | 1027 | |
| Approach Delay, s/veh | | 56.4 | | | 39.6 | | | 67.0 | | | 22.2 | |
| Approach LOS | | E | | | D | | | E | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 43.7 | 44.3 | 10.0 | 22.0 | 17.2 | 70.9 | 11.7 | 20.3 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 18.9 | 43.5 | 16.1 | 23.5 | 23.5 | 38.9 | 16.1 | 23.5 |
| Max Q Clear Time (g_c+I1), s | 17.1 | 37.9 | 6.0 | 16.1 | 12.4 | 20.6 | 7.5 | 12.0 |
| Green Ext Time (p_c), s | 0.2 | 2.0 | 0.1 | 0.8 | 0.3 | 2.9 | 0.1 | 0.9 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 45.9 |
| HCM 7th LOS | D |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.1 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 7 | 833 | 966 | 6 | 1 | 4 |
| Future Vol, veh/h | 7 | 833 | 966 | 6 | 1 | 4 |
| Conflicting Peds, #/hr | 1 | 0 | 0 | 1 | 1 | 1 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 105 | - | - | 55 | 60 | 0 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 10 | 2 | 3 | 1 | 10 | 1 |
| Mvmt Flow | 7 | 833 | 966 | 6 | 1 | 4 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 973 | 0 | - | 0 | 1815 | 968 |
| Stage 1 | - | - | - | - | 967 | - |
| Stage 2 | - | - | - | - | 848 | - |
| Critical Hdwy | 4.2 | - | - | - | 6.5 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.5 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.5 | - |
| Follow-up Hdwy | 2.29 | - | - | - | 3.59 | 3.309 |
| Pot Cap-1 Maneuver | 678 | - | - | - | 82 | 309 |
| Stage 1 | - | - | - | - | 357 | - |
| Stage 2 | - | - | - | - | 407 | - |
| Platoon blocked, % | | | - | - | - | |
| Mov Cap-1 Maneuver | 677 | - | - | - | 81 | 309 |
| Mov Cap-2 Maneuver | - | - | - | - | 81 | - |
| Stage 1 | - | - | - | - | 353 | - |
| Stage 2 | - | - | - | - | 406 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0.09 | 0 | 23.46 |
| HCM LOS | | | C |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 677 | - | - | - | 81 | 309 |
| HCM Lane V/C Ratio | 0.01 | - | - | - | 0.012 | 0.013 |
| HCM Ctrl Dly (s/v) | 10.4 | - | - | - | 50 | 16.8 |
| HCM Lane LOS | B | - | - | - | F | C |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0 | 0 |

# MOVEMENT SUMMARY

## Site: [99 (9)] SR 305 & Johnson Rd - Forecast 2037 Without

(PM Peak Hour)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Johnson Way | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.060 | 14.7 | LOS B | 0.2 | 5.8 | 0.55 | 0.73 | 0.55 | 31.2 |
| 3 | L2 | All MCs | 25 | 6.0 | 25 | 6.0 | 0.060 | 11.7 | LOS B | 0.2 | 5.8 | 0.55 | 0.73 | 0.55 | 32.3 |
| 8 | T1 | All MCs | 7 | 1.0 | 7 | 1.0 | 0.060 | 5.7 | LOS A | 0.2 | 5.8 | 0.55 | 0.73 | 0.55 | 30.4 |
| 18 | R2 | All MCs | 10 | 1.0 | 10 | 1.0 | 0.060 | 7.8 | LOS A | 0.2 | 5.8 | 0.55 | 0.73 | 0.55 | 33.4 |
| Approach | | | 43 | 3.9 | 43 | 3.9 | 0.060 | 9.9 | LOS A | 0.2 | 5.8 | 0.55 | 0.73 | 0.55 | 32.2 |
| East: SR 305 | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 3 | 1.0 | 3 | 1.0 | 0.465 | 12.1 | LOS B | 3.7 | 93.8 | 0.24 | 0.46 | 0.24 | 37.5 |
| 1 | L2 | All MCs | 13 | 1.0 | 13 | 1.0 | 0.465 | 11.5 | LOS B | 3.7 | 93.8 | 0.24 | 0.46 | 0.24 | 35.6 |
| 6 | T1 | All MCs | 934 | 3.0 | 934 | 3.0 | 0.465 | 6.5 | LOS A | 3.7 | 93.8 | 0.23 | 0.46 | 0.23 | 41.0 |
| 16 | R2 | All MCs | 27 | 10.0 | 27 | 10.0 | 0.211 | 6.0 | LOS A | 1.2 | 31.2 | 0.20 | 0.46 | 0.20 | 35.9 |
| Approach | | | 977 | 3.2 | 977 | 3.2 | 0.465 | 6.5 | LOS A | 3.7 | 93.8 | 0.23 | 0.46 | 0.23 | 40.8 |
| North: Johnson Rd | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.081 | 15.3 | LOS B | 0.3 | 8.1 | 0.59 | 0.77 | 0.59 | 30.7 |
| 7 | L2 | All MCs | 34 | 6.0 | 34 | 6.0 | 0.081 | 12.4 | LOS B | 0.3 | 8.1 | 0.59 | 0.77 | 0.59 | 31.9 |
| 4 | T1 | All MCs | 4 | 1.0 | 4 | 1.0 | 0.081 | 6.3 | LOS A | 0.3 | 8.1 | 0.59 | 0.77 | 0.59 | 30.0 |
| 14 | R2 | All MCs | 15 | 1.0 | 15 | 1.0 | 0.081 | 9.1 | LOS A | 0.3 | 8.1 | 0.59 | 0.77 | 0.59 | 33.0 |
| Approach | | | 54 | 4.1 | 54 | 4.1 | 0.081 | 11.1 | LOS B | 0.3 | 8.1 | 0.59 | 0.77 | 0.59 | 32.0 |
| West: SR 305 | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.399 | 12.1 | LOS B | 2.9 | 73.1 | 0.24 | 0.46 | 0.24 | 37.5 |
| 5 | L2 | All MCs | 11 | 1.0 | 11 | 1.0 | 0.399 | 11.5 | LOS B | 2.9 | 73.1 | 0.24 | 0.46 | 0.24 | 35.5 |
| 2 | T1 | All MCs | 804 | 2.0 | 804 | 2.0 | 0.399 | 6.3 | LOS A | 2.9 | 73.1 | 0.24 | 0.46 | 0.24 | 41.2 |
| 12 | R2 | All MCs | 25 | 1.0 | 25 | 1.0 | 0.181 | 5.9 | LOS A | 1.0 | 25.6 | 0.22 | 0.47 | 0.22 | 36.0 |
| Approach | | | 841 | 2.0 | 841 | 2.0 | 0.399 | 6.4 | LOS A | 2.9 | 73.1 | 0.23 | 0.46 | 0.23 | 40.9 |
| All Vehicles | | | 1915 | 2.7 | 1915 | 2.7 | 0.465 | 6.7 | LOS A | 3.7 | 93.8 | 0.25 | 0.47 | 0.25 | 40.3 |

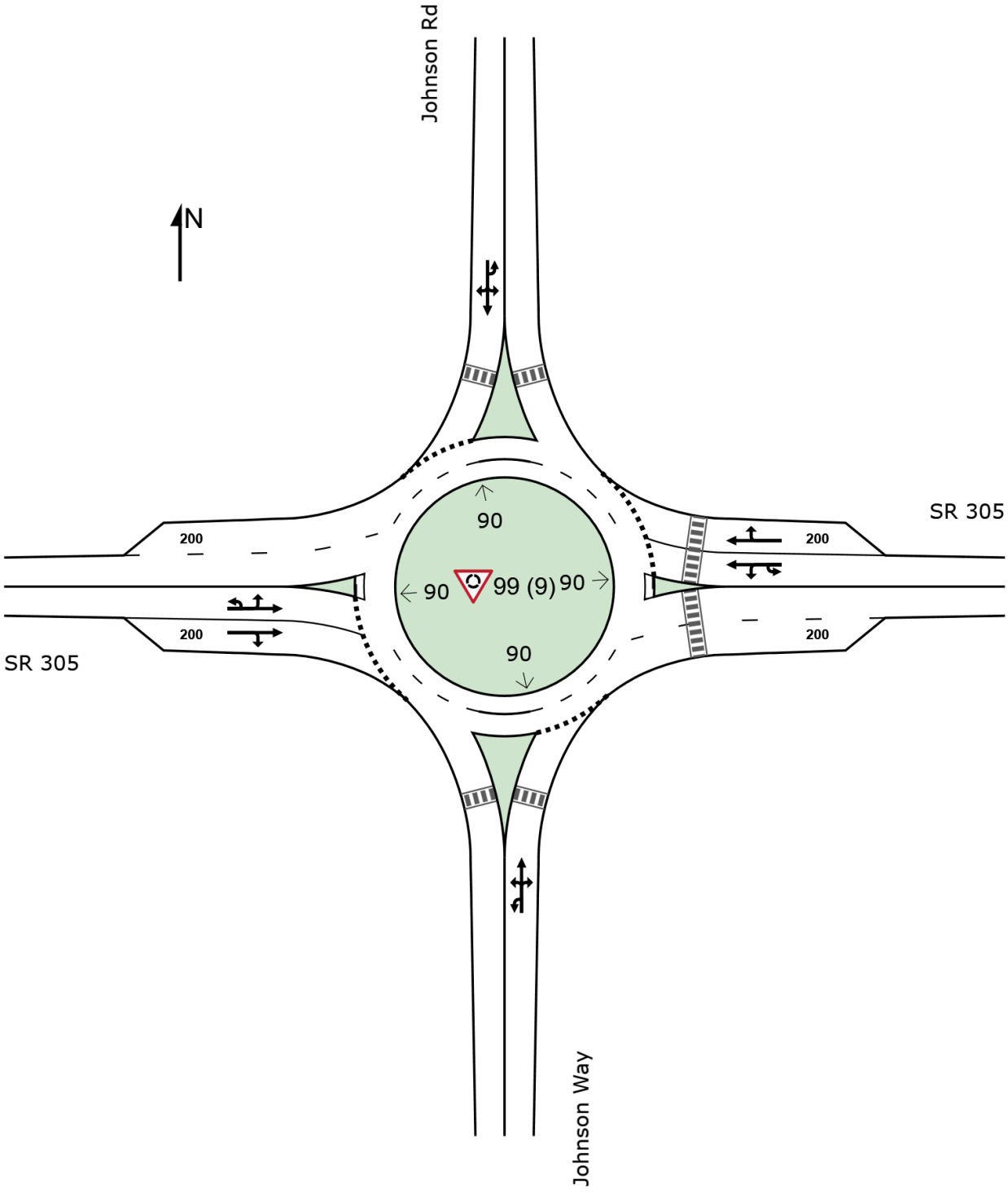
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [99 (9)] SR 305 & Johnson Rd - Forecast 2037 Without
(PM Peak Hour)

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



# MOVEMENT SUMMARY

## Site: [1 (9)] Johnson & Sunrise Ridge - 2037 PM Without

(Folder1)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NE Midnight Sun Loop | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.006 | 7.2 | LOS A | 0.0 | 0.6 | 0.17 | 0.41 | 0.17 | 23.7 |
| 3 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.006 | 5.8 | LOS A | 0.0 | 0.6 | 0.17 | 0.41 | 0.17 | 23.7 |
| 8 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.006 | 2.0 | LOS A | 0.0 | 0.6 | 0.17 | 0.41 | 0.17 | 23.9 |
| 18 | R2 | All MCs | 5 | 3.0 | 5 | 3.0 | 0.006 | 2.4 | LOS A | 0.0 | 0.6 | 0.17 | 0.41 | 0.17 | 23.8 |
| Approach | | | 8 | 3.0 | 8 | 3.0 | 0.006 | 3.5 | LOS A | 0.0 | 0.6 | 0.17 | 0.41 | 0.17 | 23.8 |
| East: Johnson Rd NE | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.052 | 10.9 | LOS B | 0.2 | 5.4 | 0.12 | 0.48 | 0.12 | 34.5 |
| 1 | L2 | All MCs | 5 | 3.0 | 5 | 3.0 | 0.052 | 9.0 | LOS A | 0.2 | 5.4 | 0.12 | 0.48 | 0.12 | 34.5 |
| 6 | T1 | All MCs | 50 | 3.0 | 50 | 3.0 | 0.052 | 5.0 | LOS A | 0.2 | 5.4 | 0.12 | 0.48 | 0.12 | 35.1 |
| 16 | R2 | All MCs | 12 | 3.0 | 12 | 3.0 | 0.052 | 4.7 | LOS A | 0.2 | 5.4 | 0.12 | 0.48 | 0.12 | 34.8 |
| Approach | | | 68 | 3.0 | 68 | 3.0 | 0.052 | 5.3 | LOS A | 0.2 | 5.4 | 0.12 | 0.48 | 0.12 | 35.0 |
| North: Sunrise Ridge Ave NE | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.029 | 11.0 | LOS B | 0.1 | 3.0 | 0.16 | 0.55 | 0.16 | 34.2 |
| 7 | L2 | All MCs | 7 | 3.0 | 7 | 3.0 | 0.029 | 9.1 | LOS A | 0.1 | 3.0 | 0.16 | 0.55 | 0.16 | 34.2 |
| 4 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.029 | 5.1 | LOS A | 0.1 | 3.0 | 0.16 | 0.55 | 0.16 | 34.8 |
| 14 | R2 | All MCs | 26 | 3.0 | 26 | 3.0 | 0.029 | 4.8 | LOS A | 0.1 | 3.0 | 0.16 | 0.55 | 0.16 | 34.5 |
| Approach | | | 35 | 3.0 | 35 | 3.0 | 0.029 | 5.9 | LOS A | 0.1 | 3.0 | 0.16 | 0.55 | 0.16 | 34.5 |
| West: Johnson Rd NE | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.045 | 10.9 | LOS B | 0.2 | 4.8 | 0.08 | 0.58 | 0.08 | 33.7 |
| 5 | L2 | All MCs | 30 | 3.0 | 30 | 3.0 | 0.045 | 8.9 | LOS A | 0.2 | 4.8 | 0.08 | 0.58 | 0.08 | 33.7 |
| 2 | T1 | All MCs | 26 | 3.0 | 26 | 3.0 | 0.045 | 4.9 | LOS A | 0.2 | 4.8 | 0.08 | 0.58 | 0.08 | 34.3 |
| 12 | R2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.045 | 4.6 | LOS A | 0.2 | 4.8 | 0.08 | 0.58 | 0.08 | 34.0 |
| Approach | | | 58 | 3.0 | 58 | 3.0 | 0.045 | 7.1 | LOS A | 0.2 | 4.8 | 0.08 | 0.58 | 0.08 | 34.0 |
| All Vehicles | | | 169 | 3.0 | 169 | 3.0 | 0.052 | 5.9 | LOS A | 0.2 | 5.4 | 0.12 | 0.53 | 0.12 | 33.8 |

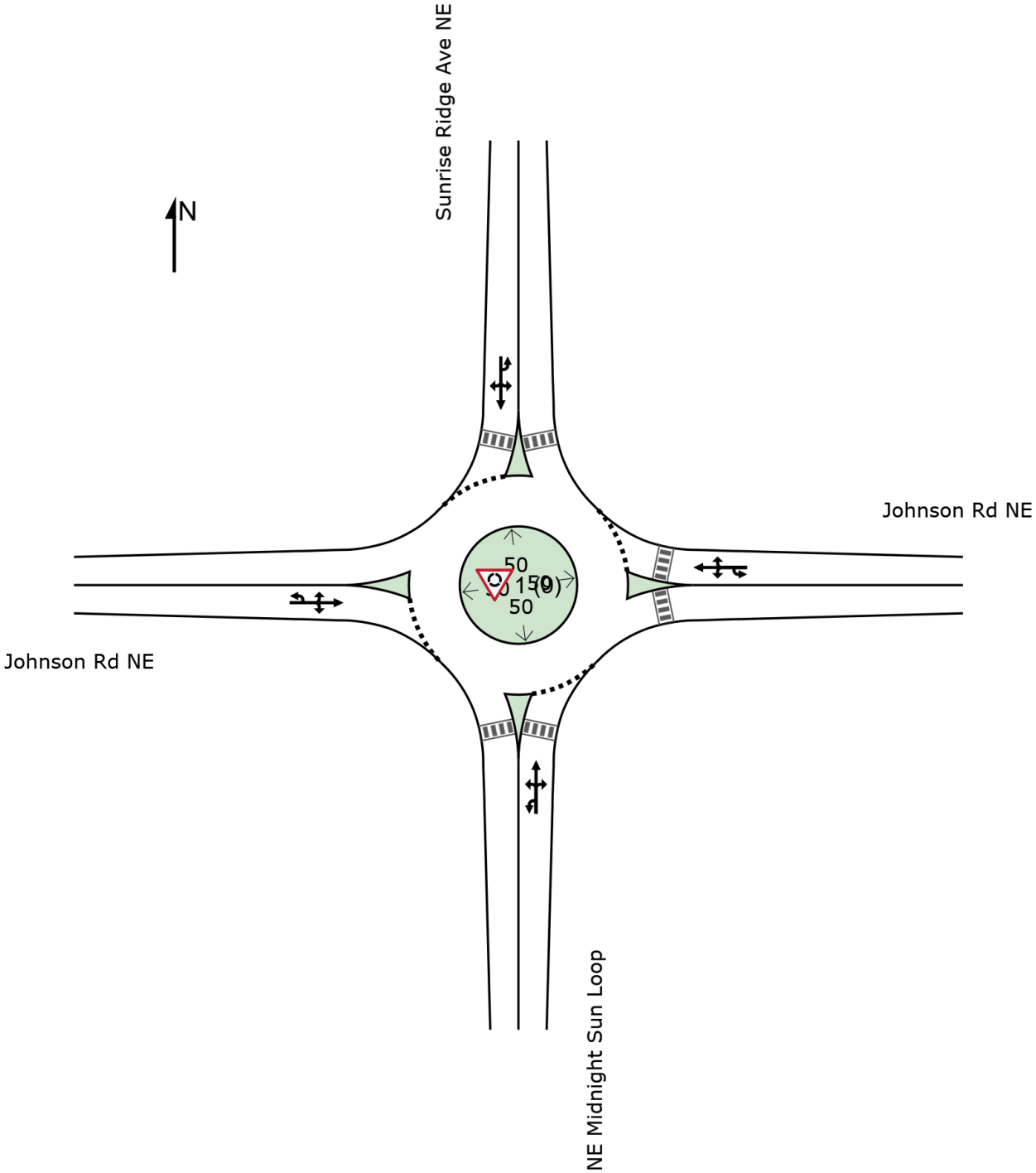
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [1 (9)] Johnson & Sunrise Ridge - 2037 PM Without
(Folder1)

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



| Intersection | |
|---|---|
| Intersection Delay, s/veh | 26.1 |
| Intersection LOS | D |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 108 | 264 | 87 | 11 | 166 | 60 | 78 | 60 | 3 | 111 | 75 | 79 |
| Future Vol, veh/h | 108 | 264 | 87 | 11 | 166 | 60 | 78 | 60 | 3 | 111 | 75 | 79 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Heavy Vehicles, % | 3 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 4 |
| Mvmt Flow | 124 | 303 | 100 | 13 | 191 | 69 | 90 | 69 | 3 | 128 | 86 | 91 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 1 | 1 |
| HCM Control Delay, s/veh | 41.3 | 16 | 14.4 | 15.2 |
| HCM LOS | E | C | B | C |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|
| Vol Left, % | 55% | 24% | 5% | 60% | 0% |
| Vol Thru, % | 43% | 58% | 70% | 40% | 0% |
| Vol Right, % | 2% | 19% | 25% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 141 | 459 | 237 | 186 | 79 |
| LT Vol | 78 | 108 | 11 | 111 | 0 |
| Through Vol | 60 | 264 | 166 | 75 | 0 |
| RT Vol | 3 | 87 | 60 | 0 | 79 |
| Lane Flow Rate | 162 | 528 | 272 | 214 | 91 |
| Geometry Grp | 4a | 2 | 2 | 5 | 5 |
| Degree of til (v) | 0.338 | 0.898 | 0.497 | 0.46 | 0.169 |
| Departure Headway (Hd) | 7.505 | 6.127 | 6.565 | 7.74 | 6.714 |
| Convergence, /N | es | es | es | es | es |
| Cap | 476 | 591 | 545 | 464 | 531 |
| Service Time | 5.598 | 4.187 | 4.641 | 5.518 | 4.491 |
| HCM Lane V/C Ratio | 0.34 | 0.893 | 0.499 | 0.461 | 0.171 |
| HCM Control Delay, s/veh | 14.4 | 41.3 | 16 | 17 | 10.9 |
| HCM Lane LOS | B | E | C | C | B |
| HCM 95th-tile Q | 1.5 | 10.8 | 2.7 | 2.4 | 0.6 |

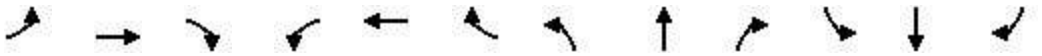
| Intersection | |
|---|---|
| Int Delay, s/veh | 3 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 69 | 74 | 28 | 69 | 48 | 21 |
| Future Vol, veh/h | 69 | 74 | 28 | 69 | 48 | 21 |
| Conflicting Peds, #/hr | 0 | 10 | 10 | 0 | 10 | 10 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 75 | 80 | 30 | 75 | 52 | 23 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 165 | 0 | 271 | 135 |
| Stage 1 | - | - | - | - | 125 | - |
| Stage 2 | - | - | - | - | 146 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1413 | - | 718 | 914 |
| Stage 1 | - | - | - | - | 900 | - |
| Stage 2 | - | - | - | - | 881 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1401 | - | 690 | 898 |
| Mov Cap-2 Maneuver | - | - | - | - | 690 | - |
| Stage 1 | - | - | - | - | 893 | - |
| Stage 2 | - | - | - | - | 854 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 2.2 | 10.39 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 743 | - | - | 520 | - |
| HCM Lane V/C Ratio | 0.101 | - | - | 0.022 | - |
| HCM Ctrl Dly (s/v) | 10.4 | - | - | 7.6 | 0 |
| HCM Lane LOS | B | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0.1 | - |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 47 | 131 | 83 | 65 | 107 | 181 | 73 | 539 | 26 | 252 | 939 | 25 |
| Future Volume (veh/h) | 47 | 131 | 83 | 65 | 107 | 181 | 73 | 539 | 26 | 252 | 939 | 25 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 0.99 | | 0.98 | 0.99 | | 0.98 | 1.00 | | 0.98 | 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 | 1716 | 1730 | 1744 | 1744 | 1744 | 1716 | 1730 | 1716 | 1716 | 1730 | 1716 | 1646 |
| Adj Flow Rate, veh/h | 47 | 131 | 83 | 65 | 107 | 121 | 73 | 539 | 26 | 252 | 939 | 25 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 6 | 5 | 4 | 4 | 4 | 6 | 5 | 6 | 6 | 5 | 6 | 11 |
| Cap, veh/h | 178 | 187 | 156 | 169 | 210 | 171 | 86 | 606 | 29 | 766 | 1795 | 48 |
| Arrive On Green | 0.03 | 0.11 | 0.11 | 0.04 | 0.12 | 0.12 | 0.05 | 0.22 | 0.22 | 0.46 | 0.63 | 0.63 |
| Sat Flow, veh/h | 1634 | 1730 | 1445 | 1661 | 1744 | 1425 | 1647 | 2773 | 134 | 1647 | 2844 | 76 |
| Grp Volume(v), veh/h | 47 | 131 | 83 | 65 | 107 | 121 | 73 | 236 | 329 | 252 | 402 | 562 |
| Grp Sat Flow(s),veh/h/ln | 1634 | 1730 | 1445 | 1661 | 1744 | 1425 | 1647 | 1218 | 1689 | 1647 | 1218 | 1702 |
| Q Serve(g_s), s | 3.1 | 8.8 | 6.5 | 4.2 | 6.9 | 3.8 | 5.3 | 22.6 | 22.7 | 11.6 | 21.8 | 21.8 |
| Cycle Q Clear(g_c), s | 3.1 | 8.8 | 6.5 | 4.2 | 6.9 | 3.8 | 5.3 | 22.6 | 22.7 | 11.6 | 21.8 | 21.8 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.08 | 1.00 | | 0.04 |
| Lane Grp Cap(c), veh/h | 178 | 187 | 156 | 169 | 210 | 171 | 86 | 266 | 369 | 766 | 769 | 1074 |
| V/C Ratio(X) | 0.26 | 0.70 | 0.53 | 0.38 | 0.51 | 0.71 | 0.85 | 0.89 | 0.89 | 0.33 | 0.52 | 0.52 |
| Avail Cap(c_a), veh/h | 342 | 332 | 277 | 316 | 334 | 273 | 316 | 437 | 605 | 766 | 769 | 1074 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 46.1 | 51.7 | 50.7 | 45.5 | 49.5 | 7.6 | 56.4 | 45.5 | 45.5 | 20.3 | 12.2 | 12.2 |
| Incr Delay (d2), s/veh | 0.8 | 4.7 | 2.8 | 1.4 | 1.9 | 5.2 | 19.4 | 32.6 | 26.0 | 0.2 | 2.5 | 1.8 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 2.3 | 7.3 | 4.5 | 3.2 | 5.6 | 6.4 | 4.7 | 14.0 | 17.6 | 7.8 | 9.9 | 12.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 46.9 | 56.4 | 53.5 | 46.9 | 51.4 | 12.8 | 75.8 | 78.1 | 71.5 | 20.5 | 14.7 | 14.0 |
| LnGrp LOS | D | E | D | D | D | B | E | E | E | C | B | B |
| Approach Vol, veh/h | | 261 | | | 293 | | | 638 | | | 1216 | |
| Approach Delay, s/veh | | 53.7 | | | 34.5 | | | 74.5 | | | 15.6 | |
| Approach LOS | | D | | | C | | | E | | | B | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 60.8 | 31.2 | 10.0 | 18.0 | 11.3 | 80.7 | 8.6 | 19.4 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 18.9 | 43.5 | 16.1 | 23.5 | 23.5 | 38.9 | 16.1 | 23.5 |
| Max Q Clear Time (g_c+I1), s | 13.6 | 24.7 | 6.2 | 10.8 | 7.3 | 23.8 | 5.1 | 8.9 |
| Green Ext Time (p_c), s | 0.4 | 2.1 | 0.1 | 0.6 | 0.2 | 3.7 | 0.1 | 0.8 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 37.6 |
| HCM 7th LOS | D |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.5 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 10 | 1028 | 549 | 2 | 6 | 36 |
| Future Vol, veh/h | 10 | 1028 | 549 | 2 | 6 | 36 |
| Conflicting Peds, #/hr | 4 | 0 | 0 | 4 | 4 | 4 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 105 | - | - | 55 | 60 | 0 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 1 | 8 | 6 | 1 | 1 | 1 |
| Mvmt Flow | 10 | 1028 | 549 | 2 | 6 | 36 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 555 | 0 | - | 0 | 1605 | 557 |
| Stage 1 | - | - | - | - | 553 | - |
| Stage 2 | - | - | - | - | 1052 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1020 | - | - | - | 116 | 532 |
| Stage 1 | - | - | - | - | 578 | - |
| Stage 2 | - | - | - | - | 338 | - |
| Platoon blocked, % | | | - | - | - | |
| Mov Cap-1 Maneuver | 1017 | - | - | - | 115 | 528 |
| Mov Cap-2 Maneuver | - | - | - | - | 115 | - |
| Stage 1 | - | - | - | - | 571 | - |
| Stage 2 | - | - | - | - | 336 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0.08 | 0 | 16 |
| HCM LOS | | | C |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 1017 | - | - | - | 115 | 528 |
| HCM Lane V/C Ratio | 0.01 | - | - | - | 0.052 | 0.068 |
| HCM Ctrl Dly (s/v) | 8.6 | - | - | - | 38.1 | 12.3 |
| HCM Lane LOS | A | - | - | - | E | B |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.2 | 0.2 |

# MOVEMENT SUMMARY

## Site: [99 (8)] SR 305 & Johnson Rd - Forecast 2037 AM With (AM Peak Hour)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Johnson Way | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.059 | 16.5 | LOS B | 0.3 | 6.7 | 0.69 | 0.81 | 0.69 | 30.4 |
| 3 | L2 | All MCs | 21 | 1.0 | 21 | 1.0 | 0.059 | 13.1 | LOS B | 0.3 | 6.7 | 0.69 | 0.81 | 0.69 | 32.2 |
| 8 | T1 | All MCs | 8 | 1.0 | 8 | 1.0 | 0.059 | 7.5 | LOS A | 0.3 | 6.7 | 0.69 | 0.81 | 0.69 | 29.7 |
| 18 | R2 | All MCs | 4 | 1.0 | 4 | 1.0 | 0.059 | 13.5 | LOS B | 0.3 | 6.7 | 0.69 | 0.81 | 0.69 | 32.5 |
| Approach | | | 34 | 1.0 | 34 | 1.0 | 0.059 | 11.9 | LOS B | 0.3 | 6.7 | 0.69 | 0.81 | 0.69 | 31.5 |
| East: SR 305 | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.271 | 12.0 | LOS B | 1.7 | 44.3 | 0.19 | 0.46 | 0.19 | 37.6 |
| 1 | L2 | All MCs | 8 | 1.0 | 8 | 1.0 | 0.271 | 11.5 | LOS B | 1.7 | 44.3 | 0.19 | 0.46 | 0.19 | 35.7 |
| 6 | T1 | All MCs | 518 | 6.0 | 518 | 6.0 | 0.271 | 6.1 | LOS A | 1.7 | 44.3 | 0.19 | 0.46 | 0.19 | 40.7 |
| 16 | R2 | All MCs | 26 | 1.0 | 26 | 1.0 | 0.123 | 5.8 | LOS A | 0.6 | 16.9 | 0.19 | 0.47 | 0.19 | 36.1 |
| Approach | | | 553 | 5.7 | 553 | 5.7 | 0.271 | 6.2 | LOS A | 1.7 | 44.3 | 0.19 | 0.46 | 0.19 | 40.3 |
| North: Johnson Rd | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.180 | 14.0 | LOS B | 0.7 | 18.0 | 0.49 | 0.71 | 0.49 | 30.9 |
| 7 | L2 | All MCs | 128 | 3.0 | 128 | 3.0 | 0.180 | 10.7 | LOS B | 0.7 | 18.0 | 0.49 | 0.71 | 0.49 | 32.5 |
| 4 | T1 | All MCs | 2 | 1.0 | 2 | 1.0 | 0.180 | 4.9 | LOS A | 0.7 | 18.0 | 0.49 | 0.71 | 0.49 | 30.2 |
| 14 | R2 | All MCs | 23 | 1.0 | 23 | 1.0 | 0.180 | 6.4 | LOS A | 0.7 | 18.0 | 0.49 | 0.71 | 0.49 | 33.2 |
| Approach | | | 154 | 2.7 | 154 | 2.7 | 0.180 | 10.0 | LOS B | 0.7 | 18.0 | 0.49 | 0.71 | 0.49 | 32.6 |
| West: SR 305 | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.567 | 12.7 | LOS B | 4.9 | 130.4 | 0.49 | 0.51 | 0.49 | 36.6 |
| 5 | L2 | All MCs | 13 | 17.0 | 13 | 17.0 | 0.567 | 12.8 | LOS B | 4.9 | 130.4 | 0.49 | 0.51 | 0.49 | 34.2 |
| 2 | T1 | All MCs | 1002 | 8.0 | 1002 | 8.0 | 0.567 | 8.0 | LOS A | 4.9 | 130.4 | 0.46 | 0.51 | 0.46 | 39.2 |
| 12 | R2 | All MCs | 23 | 12.0 | 23 | 12.0 | 0.258 | 6.8 | LOS A | 1.5 | 40.2 | 0.38 | 0.51 | 0.38 | 35.3 |
| Approach | | | 1039 | 8.2 | 1039 | 8.2 | 0.567 | 8.1 | LOS A | 4.9 | 130.4 | 0.46 | 0.51 | 0.46 | 39.1 |
| All Vehicles | | | 1780 | 6.8 | 1780 | 6.8 | 0.567 | 7.7 | LOS A | 4.9 | 130.4 | 0.39 | 0.52 | 0.39 | 38.6 |

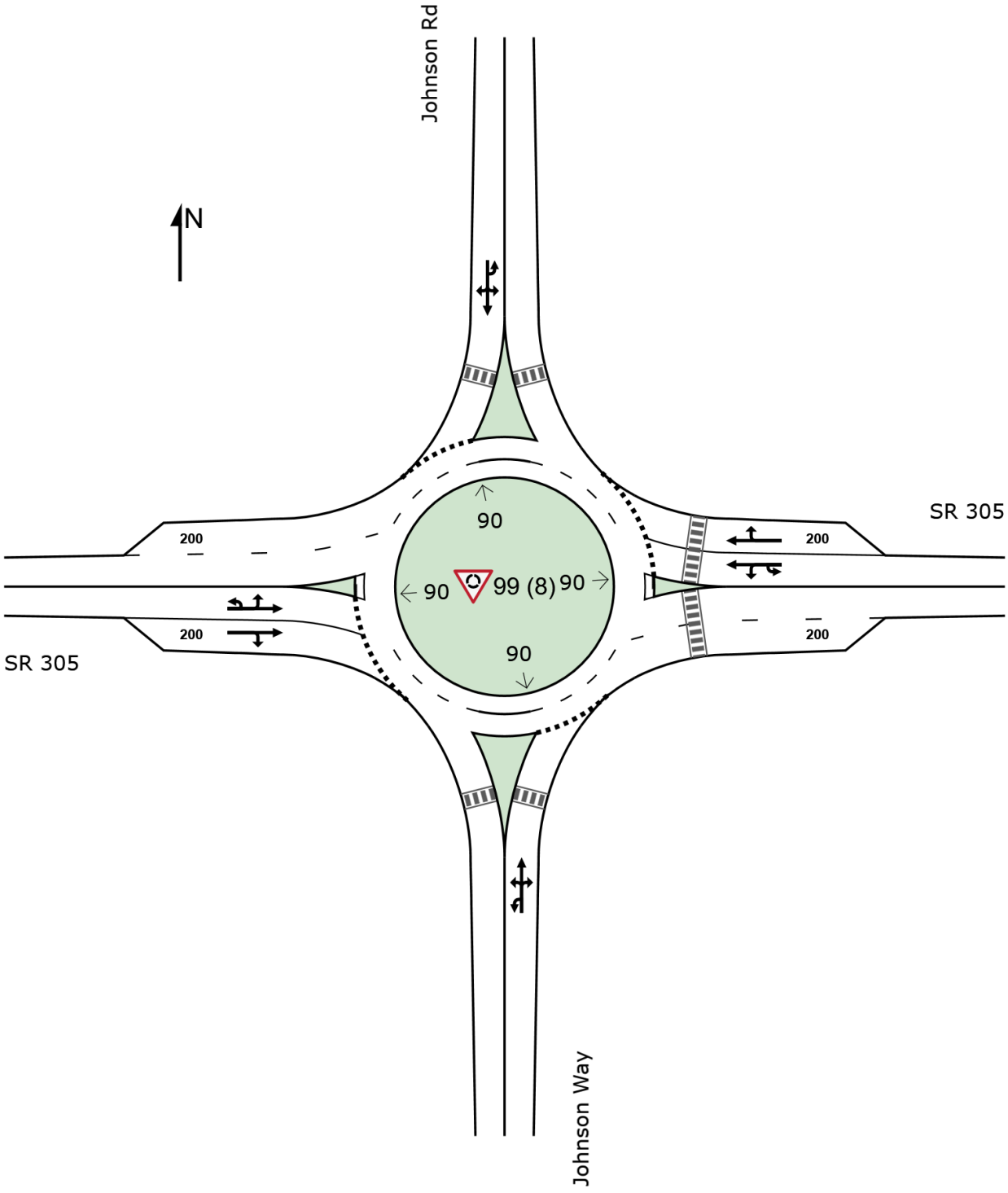
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [99 (8)] SR 305 & Johnson Rd - Forecast 2037 AM With
(AM Peak Hour)

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



# MOVEMENT SUMMARY

## Site: [1 (8)] Johnson & Sunrise Ridge - 2037 AM With (Folder1)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NE Midnight Sun Loop | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 7.3 | LOS A | 0.0 | 0.4 | 0.20 | 0.45 | 0.20 | 23.4 |
| 3 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 5.9 | LOS A | 0.0 | 0.4 | 0.20 | 0.45 | 0.20 | 23.4 |
| 8 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 2.1 | LOS A | 0.0 | 0.4 | 0.20 | 0.45 | 0.20 | 23.6 |
| 18 | R2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.004 | 2.5 | LOS A | 0.0 | 0.4 | 0.20 | 0.45 | 0.20 | 23.6 |
| Approach | | | 5 | 3.0 | 5 | 3.0 | 0.004 | 4.4 | LOS A | 0.0 | 0.4 | 0.20 | 0.45 | 0.20 | 23.5 |
| East: Johnson Rd NE | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.091 | 11.0 | LOS B | 0.4 | 10.0 | 0.14 | 0.46 | 0.14 | 34.5 |
| 1 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.091 | 9.1 | LOS A | 0.4 | 10.0 | 0.14 | 0.46 | 0.14 | 34.5 |
| 6 | T1 | All MCs | 110 | 3.0 | 110 | 3.0 | 0.091 | 5.0 | LOS A | 0.4 | 10.0 | 0.14 | 0.46 | 0.14 | 35.2 |
| 16 | R2 | All MCs | 7 | 3.0 | 7 | 3.0 | 0.091 | 4.8 | LOS A | 0.4 | 10.0 | 0.14 | 0.46 | 0.14 | 34.9 |
| Approach | | | 119 | 3.0 | 119 | 3.0 | 0.091 | 5.1 | LOS A | 0.4 | 10.0 | 0.14 | 0.46 | 0.14 | 35.2 |
| North: Sunrise Ridge Ave NE | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.091 | 11.5 | LOS B | 0.4 | 10.1 | 0.28 | 0.56 | 0.28 | 34.1 |
| 7 | L2 | All MCs | 19 | 3.0 | 19 | 3.0 | 0.091 | 9.5 | LOS A | 0.4 | 10.1 | 0.28 | 0.56 | 0.28 | 34.1 |
| 4 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.091 | 5.5 | LOS A | 0.4 | 10.1 | 0.28 | 0.56 | 0.28 | 34.7 |
| 14 | R2 | All MCs | 81 | 3.0 | 81 | 3.0 | 0.091 | 5.2 | LOS A | 0.4 | 10.1 | 0.28 | 0.56 | 0.28 | 34.4 |
| Approach | | | 102 | 3.0 | 102 | 3.0 | 0.091 | 6.1 | LOS A | 0.4 | 10.1 | 0.28 | 0.56 | 0.28 | 34.3 |
| West: Johnson Rd NE | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 26 | 3.0 | 26 | 3.0 | 0.068 | 10.9 | LOS B | 0.3 | 7.6 | 0.11 | 0.59 | 0.11 | 33.5 |
| 5 | L2 | All MCs | 14 | 3.0 | 14 | 3.0 | 0.068 | 9.0 | LOS A | 0.3 | 7.6 | 0.11 | 0.59 | 0.11 | 33.5 |
| 2 | T1 | All MCs | 33 | 3.0 | 33 | 3.0 | 0.068 | 4.9 | LOS A | 0.3 | 7.6 | 0.11 | 0.59 | 0.11 | 34.1 |
| 12 | R2 | All MCs | 12 | 3.0 | 12 | 3.0 | 0.068 | 4.7 | LOS A | 0.3 | 7.6 | 0.11 | 0.59 | 0.11 | 33.8 |
| Approach | | | 86 | 3.0 | 86 | 3.0 | 0.068 | 7.4 | LOS A | 0.3 | 7.6 | 0.11 | 0.59 | 0.11 | 33.8 |
| All Vehicles | | | 312 | 3.0 | 312 | 3.0 | 0.091 | 6.1 | LOS A | 0.4 | 10.1 | 0.18 | 0.53 | 0.18 | 34.2 |

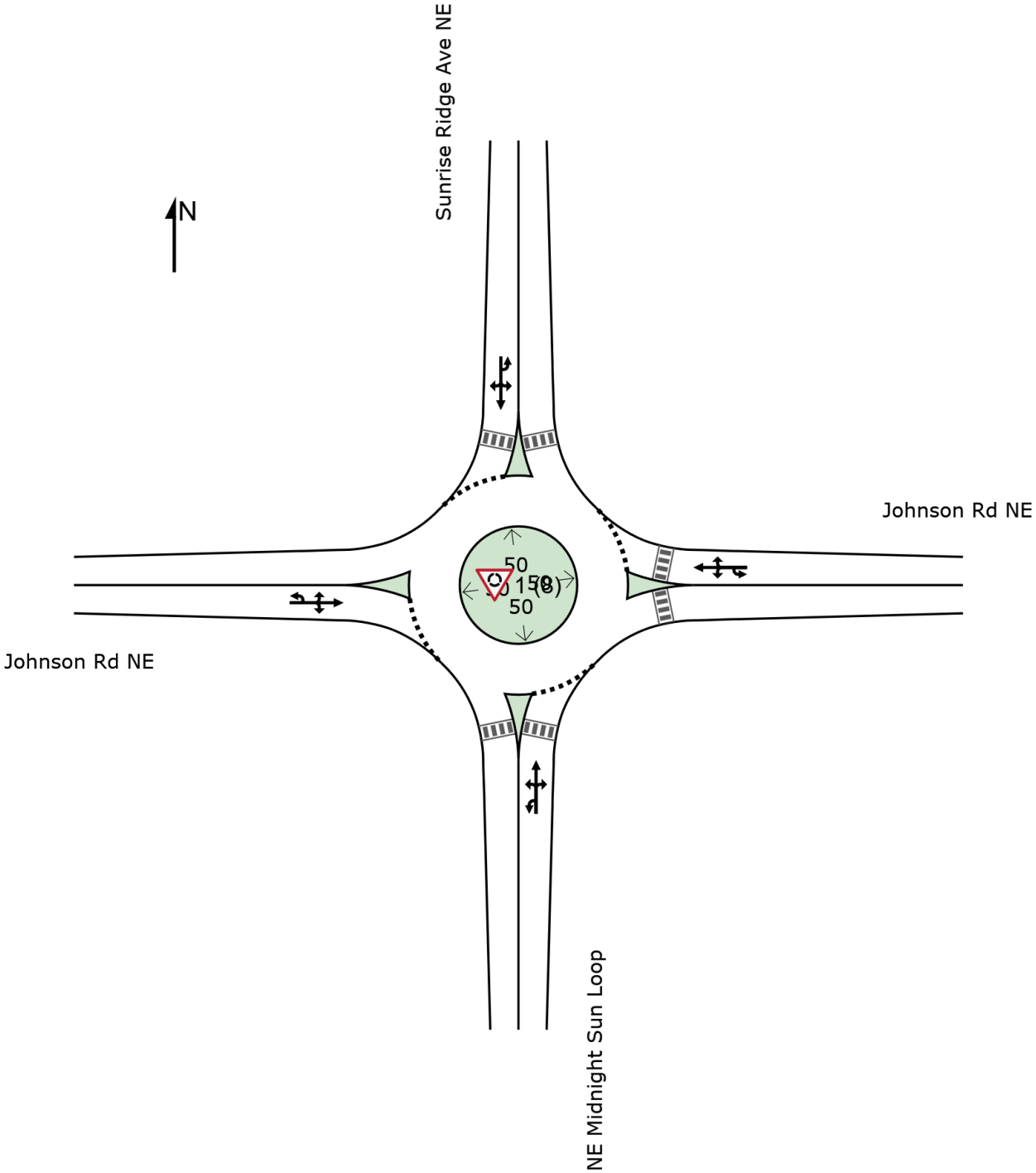
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [1 (8)] Johnson & Sunrise Ridge - 2037 AM With
(Folder1)

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



| Intersection | |
|---|---|
| Int Delay, s/veh | 3.2 |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 8 | 36 | 12 | 40 | 48 | 3 |
| Future Vol, veh/h | 8 | 36 | 12 | 40 | 48 | 3 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 9 | 39 | 13 | 43 | 52 | 3 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 123 | 54 | 55 | 0 | - | 0 |
| Stage 1 | 54 | - | - | - | - | - |
| Stage 2 | 70 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 872 | 1013 | 1549 | - | - | - |
| Stage 1 | 969 | - | - | - | - | - |
| Stage 2 | 953 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 864 | 1013 | 1549 | - | - | - |
| Mov Cap-2 Maneuver | 864 | - | - | - | - | - |
| Stage 1 | 960 | - | - | - | - | - |
| Stage 2 | 953 | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 8.85 | 1.69 | 0 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 415 | - | 983 | - | - |
| HCM Lane V/C Ratio | 0.008 | - | 0.049 | - | - |
| HCM Ctrl Dly (s/v) | 7.3 | 0 | 8.9 | - | - |
| HCM Lane LOS | A | A | A | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0.2 | - | - |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 63.3 |
| Intersection LOS | F |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 58 | 285 | 28 | 26 | 257 | 97 | 73 | 49 | 53 | 157 | 33 | 73 |
| Future Vol, veh/h | 58 | 285 | 28 | 26 | 257 | 97 | 73 | 49 | 53 | 157 | 33 | 73 |
| Peak Hour Factor | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.87 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| Heavy Vehicles, % | 1 | 6 | 5 | 1 | 7 | 1 | 1 | 3 | 6 | 7 | 1 | 4 |
| Mvmt Flow | 77 | 380 | 37 | 35 | 343 | 129 | 84 | 65 | 71 | 209 | 44 | 97 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 1 | 1 |
| HCM Control Delay, s/veh | 85 | 86.7 | 22.9 | 24.4 |
| HCM LOS | F | F | C | C |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|
| Vol Left, % | 42% | 16% | 7% | 83% | 0% |
| Vol Thru, % | 28% | 77% | 68% | 17% | 0% |
| Vol Right, % | 30% | 8% | 26% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 175 | 371 | 380 | 190 | 73 |
| LT Vol | 73 | 58 | 26 | 157 | 0 |
| Through Vol | 49 | 285 | 257 | 33 | 0 |
| RT Vol | 53 | 28 | 97 | 0 | 73 |
| Lane Flow Rate | 220 | 495 | 507 | 253 | 97 |
| Geometry Grp | 4a | 2 | 2 | 5 | 5 |
| Degree of Util (X) | 0.541 | 1.051 | 1.059 | 0.649 | 0.217 |
| Departure Headway (Hd) | 9.363 | 7.983 | 7.839 | 9.669 | 8.403 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes |
| Cap | 387 | 460 | 466 | 375 | 430 |
| Service Time | 7.363 | 5.983 | 5.839 | 7.369 | 6.103 |
| HCM Lane V/C Ratio | 0.568 | 1.076 | 1.088 | 0.675 | 0.226 |
| HCM Control Delay, s/veh | 22.9 | 85 | 86.7 | 28.6 | 13.4 |
| HCM Lane LOS | C | F | F | D | B |
| HCM 95th-tile Q | 3.1 | 14.8 | 15.3 | 4.4 | 0.8 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 4.2 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 41 | 43 | 7 | 69 | 78 | 28 |
| Future Vol, veh/h | 41 | 43 | 7 | 69 | 78 | 28 |
| Conflicting Peds, #/hr | 0 | 10 | 10 | 0 | 10 | 10 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 45 | 47 | 8 | 75 | 85 | 30 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 101 | 0 | 178 | 88 |
| Stage 1 | - | - | - | - | 78 | - |
| Stage 2 | - | - | - | - | 100 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1491 | - | 811 | 970 |
| Stage 1 | - | - | - | - | 945 | - |
| Stage 2 | - | - | - | - | 924 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1479 | - | 794 | 954 |
| Mov Cap-2 Maneuver | - | - | - | - | 794 | - |
| Stage 1 | - | - | - | - | 937 | - |
| Stage 2 | - | - | - | - | 911 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 0.69 | 10.03 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 831 | - | - | 166 | - |
| HCM Lane V/C Ratio | 0.139 | - | - | 0.005 | - |
| HCM Ctrl Dly (s/v) | 10 | - | - | 7.4 | 0 |
| HCM Lane LOS | B | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.5 | - | - | 0 | - |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 86 | 212 | 141 | 66 | 156 | 277 | 159 | 878 | 43 | 266 | 721 | 62 |
| Future Volume (veh/h) | 86 | 212 | 141 | 66 | 156 | 277 | 159 | 878 | 43 | 266 | 721 | 62 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Width 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 |
| Ped-Bike Adj(A_pbT) | 0.99 | | 0.97 | 0.99 | | 0.96 | 1.00 | | 0.96 | 1.00 | | 0.97 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1702 | 1758 | 1786 | 1786 | 1786 | 1786 | 1772 | 1744 | 1786 | 1786 | 1772 | 1744 |
| Adj Flow Rate, veh/h | 86 | 212 | 141 | 66 | 156 | 132 | 159 | 878 | 43 | 266 | 721 | 62 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Percent Heavy Veh, % | 7 | 3 | 1 | 1 | 1 | 1 | 2 | 4 | 1 | 1 | 2 | 4 |
| Cap, veh/h | 196 | 250 | 208 | 155 | 228 | 186 | 182 | 933 | 46 | 542 | 1488 | 128 |
| Arrive On Green | 0.06 | 0.14 | 0.14 | 0.04 | 0.13 | 0.13 | 0.11 | 0.33 | 0.33 | 0.32 | 0.54 | 0.54 |
| Sat Flow, veh/h | 1621 | 1758 | 1463 | 1701 | 1786 | 1459 | 1688 | 2813 | 138 | 1701 | 2743 | 236 |
| Grp Volume(v), veh/h | 86 | 212 | 141 | 66 | 156 | 132 | 159 | 386 | 535 | 266 | 330 | 453 |
| Grp Sat Flow(s),veh/h/ln | 1621 | 1758 | 1463 | 1701 | 1786 | 1459 | 1688 | 1238 | 1713 | 1701 | 1258 | 1721 |
| Q Serve(g_s), s | 5.5 | 14.1 | 11.0 | 4.0 | 10.0 | 5.7 | 11.1 | 36.4 | 36.4 | 15.2 | 19.6 | 19.6 |
| Cycle Q Clear(g_c), s | 5.5 | 14.1 | 11.0 | 4.0 | 10.0 | 5.7 | 11.1 | 36.4 | 36.4 | 15.2 | 19.6 | 19.6 |
| Prop In Lane | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.08 | 1.00 | | 0.14 |
| Lane Grp Cap(c), veh/h | 196 | 250 | 208 | 155 | 228 | 186 | 182 | 410 | 568 | 542 | 682 | 933 |
| V/C Ratio(X) | 0.44 | 0.85 | 0.68 | 0.42 | 0.68 | 0.71 | 0.87 | 0.94 | 0.94 | 0.49 | 0.48 | 0.48 |
| Avail Cap(c_a), veh/h | 317 | 337 | 280 | 306 | 342 | 280 | 323 | 444 | 614 | 542 | 682 | 933 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 42.7 | 50.2 | 48.9 | 43.8 | 50.0 | 15.1 | 52.7 | 39.0 | 39.0 | 33.0 | 17.0 | 17.1 |
| Incr Delay (d2), s/veh | 1.5 | 14.1 | 3.9 | 1.8 | 3.6 | 4.9 | 12.3 | 31.9 | 25.8 | 0.7 | 2.5 | 1.8 |
| Initial Q Delay(d3), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(95%),veh/ln | 4.1 | 11.6 | 7.6 | 3.2 | 8.3 | 7.0 | 9.0 | 20.5 | 25.9 | 10.3 | 9.8 | 12.4 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d), s/veh | 44.3 | 64.3 | 52.8 | 45.6 | 53.7 | 20.1 | 65.0 | 70.9 | 64.7 | 33.7 | 19.5 | 18.9 |
| LnGrp LOS | D | E | D | D | D | C | E | E | E | C | B | B |
| Approach Vol, veh/h | | 439 | | | 354 | | | 1080 | | | 1049 | |
| Approach Delay, s/veh | | 56.7 | | | 39.6 | | | 67.0 | | | 22.8 | |
| Approach LOS | | E | | | D | | | E | | | C | |

| Timer - Assigned Phs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Phs Duration (G+Y+Rc), s | 43.2 | 44.8 | 10.0 | 22.0 | 17.9 | 70.1 | 11.7 | 20.3 |
| Change Period (Y+Rc), s | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Max Green Setting (Gmax), s | 18.9 | 43.5 | 16.1 | 23.5 | 23.5 | 38.9 | 16.1 | 23.5 |
| Max Q Clear Time (g_c+I1), s | 17.2 | 38.4 | 6.0 | 16.1 | 13.1 | 21.6 | 7.5 | 12.0 |
| Green Ext Time (p_c), s | 0.2 | 1.9 | 0.1 | 0.9 | 0.4 | 3.0 | 0.1 | 0.9 |

| Intersection Summary | |
|---|---|
| HCM 7th Control Delay, s/veh | 46.3 |
| HCM 7th LOS | D |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.6 |

| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 43 | 837 | 968 | 10 | 4 | 25 |
| Future Vol, veh/h | 43 | 837 | 968 | 10 | 4 | 25 |
| Conflicting Peds, #/hr | 1 | 0 | 0 | 1 | 1 | 1 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 105 | - | - | 55 | 60 | 0 |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles, % | 10 | 2 | 3 | 1 | 10 | 1 |
| Mvmt Flow | 43 | 837 | 968 | 10 | 4 | 25 |

| Major/Minor | Major1 | | Major2 | | Minor2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 979 | 0 | - | 0 | 1893 | 970 |
| Stage 1 | - | - | - | - | 969 | - |
| Stage 2 | - | - | - | - | 924 | - |
| Critical Hdwy | 4.2 | - | - | - | 6.5 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.5 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.5 | - |
| Follow-up Hdwy | 2.29 | - | - | - | 3.59 | 3.309 |
| Pot Cap-1 Maneuver | 674 | - | - | - | 73 | 308 |
| Stage 1 | - | - | - | - | 356 | - |
| Stage 2 | - | - | - | - | 374 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 673 | - | - | - | 68 | 308 |
| Mov Cap-2 Maneuver | - | - | - | - | 68 | - |
| Stage 1 | - | - | - | - | 333 | - |
| Stage 2 | - | - | - | - | 374 | - |

| Approach | EB | WB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0.52 | 0 | 23.68 |
| HCM LOS | | | C |

| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|
| Capacity (veh/h) | 673 | - | - | - | 68 | 308 |
| HCM Lane V/C Ratio | 0.064 | - | - | - | 0.059 | 0.081 |
| HCM Ctrl Dly (s/v) | 10.7 | - | - | - | 60.9 | 17.7 |
| HCM Lane LOS | B | - | - | - | F | C |
| HCM 95th %tile Q(veh) | 0.2 | - | - | - | 0.2 | 0.3 |

# MOVEMENT SUMMARY

## Site: [99 (10)] SR 305 & Johnson Rd - Forecast 2037 With
(PM Peak Hour)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Johnson Way | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.061 | 14.9 | LOS B | 0.2 | 6.1 | 0.57 | 0.74 | 0.57 | 31.1 |
| 3 | L2 | All MCs | 25 | 6.0 | 25 | 6.0 | 0.061 | 11.9 | LOS B | 0.2 | 6.1 | 0.57 | 0.74 | 0.57 | 32.3 |
| 8 | T1 | All MCs | 7 | 1.0 | 7 | 1.0 | 0.061 | 5.8 | LOS A | 0.2 | 6.1 | 0.57 | 0.74 | 0.57 | 30.3 |
| 18 | R2 | All MCs | 10 | 1.0 | 10 | 1.0 | 0.061 | 8.1 | LOS A | 0.2 | 6.1 | 0.57 | 0.74 | 0.57 | 33.3 |
| Approach | | | 43 | 3.9 | 43 | 3.9 | 0.061 | 10.1 | LOS B | 0.2 | 6.1 | 0.57 | 0.74 | 0.57 | 32.2 |
| East: SR 305 | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 3 | 1.0 | 3 | 1.0 | 0.485 | 12.1 | LOS B | 3.9 | 99.7 | 0.25 | 0.46 | 0.25 | 37.4 |
| 1 | L2 | All MCs | 13 | 1.0 | 13 | 1.0 | 0.485 | 11.6 | LOS B | 3.9 | 99.7 | 0.25 | 0.46 | 0.25 | 35.5 |
| 6 | T1 | All MCs | 938 | 3.0 | 938 | 3.0 | 0.485 | 6.4 | LOS A | 3.9 | 99.7 | 0.24 | 0.46 | 0.24 | 41.0 |
| 16 | R2 | All MCs | 59 | 10.0 | 59 | 10.0 | 0.220 | 6.1 | LOS A | 1.3 | 32.9 | 0.21 | 0.47 | 0.21 | 35.8 |
| Approach | | | 1013 | 3.4 | 1013 | 3.4 | 0.485 | 6.5 | LOS A | 3.9 | 99.7 | 0.24 | 0.46 | 0.24 | 40.5 |
| North: Johnson Rd | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.114 | 15.6 | LOS B | 0.5 | 11.9 | 0.61 | 0.78 | 0.61 | 30.4 |
| 7 | L2 | All MCs | 53 | 6.0 | 53 | 6.0 | 0.114 | 12.7 | LOS B | 0.5 | 11.9 | 0.61 | 0.78 | 0.61 | 31.7 |
| 4 | T1 | All MCs | 4 | 1.0 | 4 | 1.0 | 0.114 | 6.5 | LOS A | 0.5 | 11.9 | 0.61 | 0.78 | 0.61 | 29.8 |
| 14 | R2 | All MCs | 17 | 1.0 | 17 | 1.0 | 0.114 | 9.5 | LOS A | 0.5 | 11.9 | 0.61 | 0.78 | 0.61 | 32.7 |
| Approach | | | 75 | 4.5 | 75 | 4.5 | 0.114 | 11.7 | LOS B | 0.5 | 11.9 | 0.61 | 0.78 | 0.61 | 31.8 |
| West: SR 305 | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 1.0 | 1 | 1.0 | 0.409 | 12.2 | LOS B | 3.0 | 76.6 | 0.29 | 0.47 | 0.29 | 37.3 |
| 5 | L2 | All MCs | 15 | 1.0 | 15 | 1.0 | 0.409 | 11.6 | LOS B | 3.0 | 76.6 | 0.29 | 0.47 | 0.29 | 35.4 |
| 2 | T1 | All MCs | 807 | 2.0 | 807 | 2.0 | 0.409 | 6.4 | LOS A | 3.0 | 76.6 | 0.28 | 0.47 | 0.28 | 40.9 |
| 12 | R2 | All MCs | 25 | 1.0 | 25 | 1.0 | 0.186 | 6.0 | LOS A | 1.0 | 26.6 | 0.26 | 0.47 | 0.26 | 35.9 |
| Approach | | | 848 | 2.0 | 848 | 2.0 | 0.409 | 6.5 | LOS A | 3.0 | 76.6 | 0.28 | 0.47 | 0.28 | 40.7 |
| All Vehicles | | | 1979 | 2.8 | 1979 | 2.8 | 0.485 | 6.8 | LOS A | 3.9 | 99.7 | 0.28 | 0.48 | 0.28 | 39.9 |

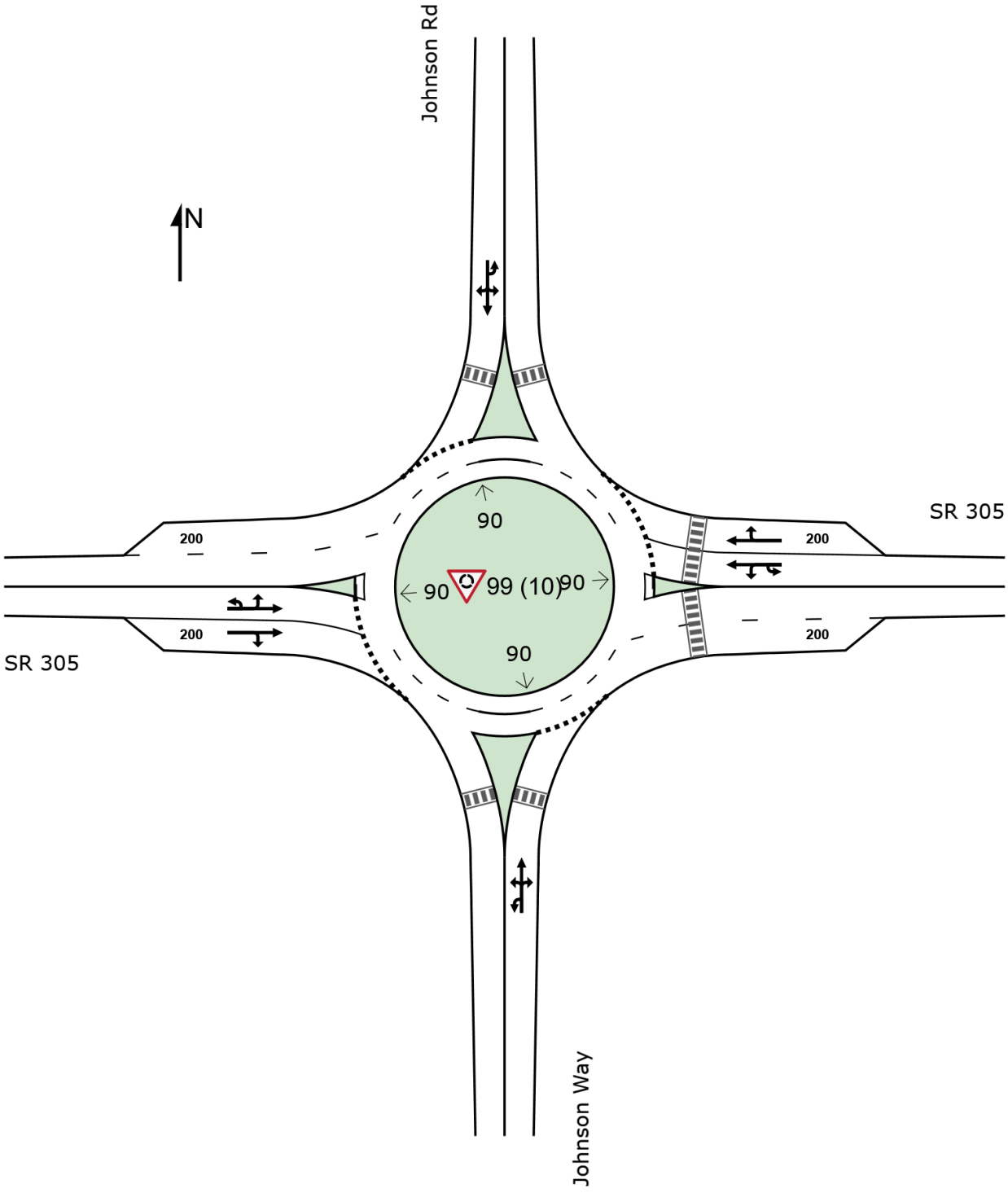
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [99 (10)] SR 305 & Johnson Rd - Forecast 2037 With
(PM Peak Hour)

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



# MOVEMENT SUMMARY

## Site: [1 (10)] Johnson & Sunrise Ridge - 2037 PM With (Folder1)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

**Vehicle Movement Performance**

| Mov ID | Turn | Mov Class | Demand Flows [ Total veh/h | HV ] % | Arrival Flows [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% Back Of Queue [ Veh. veh | Dist ] ft | Prop. Qued | Eff. Stop Rate | Number of Cycles to Depart | Aver. Speed mph |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: NE Midnight Sun Loop | | | | | | | | | | | | | | | |
| 3u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.007 | 7.4 | LOS A | 0.0 | 0.7 | 0.22 | 0.42 | 0.22 | 23.6 |
| 3 | L2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.007 | 6.0 | LOS A | 0.0 | 0.7 | 0.22 | 0.42 | 0.22 | 23.6 |
| 8 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.007 | 2.2 | LOS A | 0.0 | 0.7 | 0.22 | 0.42 | 0.22 | 23.8 |
| 18 | R2 | All MCs | 5 | 3.0 | 5 | 3.0 | 0.007 | 2.5 | LOS A | 0.0 | 0.7 | 0.22 | 0.42 | 0.22 | 23.7 |
| Approach | | | 8 | 3.0 | 8 | 3.0 | 0.007 | 3.7 | LOS A | 0.0 | 0.7 | 0.22 | 0.42 | 0.22 | 23.7 |
| East: Johnson Rd NE | | | | | | | | | | | | | | | |
| 1u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.057 | 11.1 | LOS B | 0.2 | 6.1 | 0.19 | 0.49 | 0.19 | 34.4 |
| 1 | L2 | All MCs | 5 | 3.0 | 5 | 3.0 | 0.057 | 9.2 | LOS A | 0.2 | 6.1 | 0.19 | 0.49 | 0.19 | 34.4 |
| 6 | T1 | All MCs | 50 | 3.0 | 50 | 3.0 | 0.057 | 5.1 | LOS A | 0.2 | 6.1 | 0.19 | 0.49 | 0.19 | 35.0 |
| 16 | R2 | All MCs | 17 | 3.0 | 17 | 3.0 | 0.057 | 4.9 | LOS A | 0.2 | 6.1 | 0.19 | 0.49 | 0.19 | 34.7 |
| Approach | | | 73 | 3.0 | 73 | 3.0 | 0.057 | 5.4 | LOS A | 0.2 | 6.1 | 0.19 | 0.49 | 0.19 | 34.9 |
| North: Sunrise Ridge Ave NE | | | | | | | | | | | | | | | |
| 7u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.052 | 11.1 | LOS B | 0.2 | 5.6 | 0.17 | 0.54 | 0.17 | 34.3 |
| 7 | L2 | All MCs | 10 | 3.0 | 10 | 3.0 | 0.052 | 9.1 | LOS A | 0.2 | 5.6 | 0.17 | 0.54 | 0.17 | 34.3 |
| 4 | T1 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.052 | 5.1 | LOS A | 0.2 | 5.6 | 0.17 | 0.54 | 0.17 | 34.9 |
| 14 | R2 | All MCs | 50 | 3.0 | 50 | 3.0 | 0.052 | 4.8 | LOS A | 0.2 | 5.6 | 0.17 | 0.54 | 0.17 | 34.6 |
| Approach | | | 62 | 3.0 | 62 | 3.0 | 0.052 | 5.7 | LOS A | 0.2 | 5.6 | 0.17 | 0.54 | 0.17 | 34.6 |
| West: Johnson Rd NE | | | | | | | | | | | | | | | |
| 5u | U | All MCs | 1 | 3.0 | 1 | 3.0 | 0.077 | 10.9 | LOS B | 0.3 | 8.4 | 0.09 | 0.61 | 0.09 | 33.3 |
| 5 | L2 | All MCs | 70 | 3.0 | 70 | 3.0 | 0.077 | 9.0 | LOS A | 0.3 | 8.4 | 0.09 | 0.61 | 0.09 | 33.3 |
| 2 | T1 | All MCs | 26 | 3.0 | 26 | 3.0 | 0.077 | 4.9 | LOS A | 0.3 | 8.4 | 0.09 | 0.61 | 0.09 | 33.9 |
| 12 | R2 | All MCs | 1 | 3.0 | 1 | 3.0 | 0.077 | 4.7 | LOS A | 0.3 | 8.4 | 0.09 | 0.61 | 0.09 | 33.6 |
| Approach | | | 99 | 3.0 | 99 | 3.0 | 0.077 | 7.9 | LOS A | 0.3 | 8.4 | 0.09 | 0.61 | 0.09 | 33.5 |
| All Vehicles | | | 242 | 3.0 | 242 | 3.0 | 0.077 | 6.4 | LOS A | 0.3 | 8.4 | 0.14 | 0.55 | 0.14 | 33.7 |

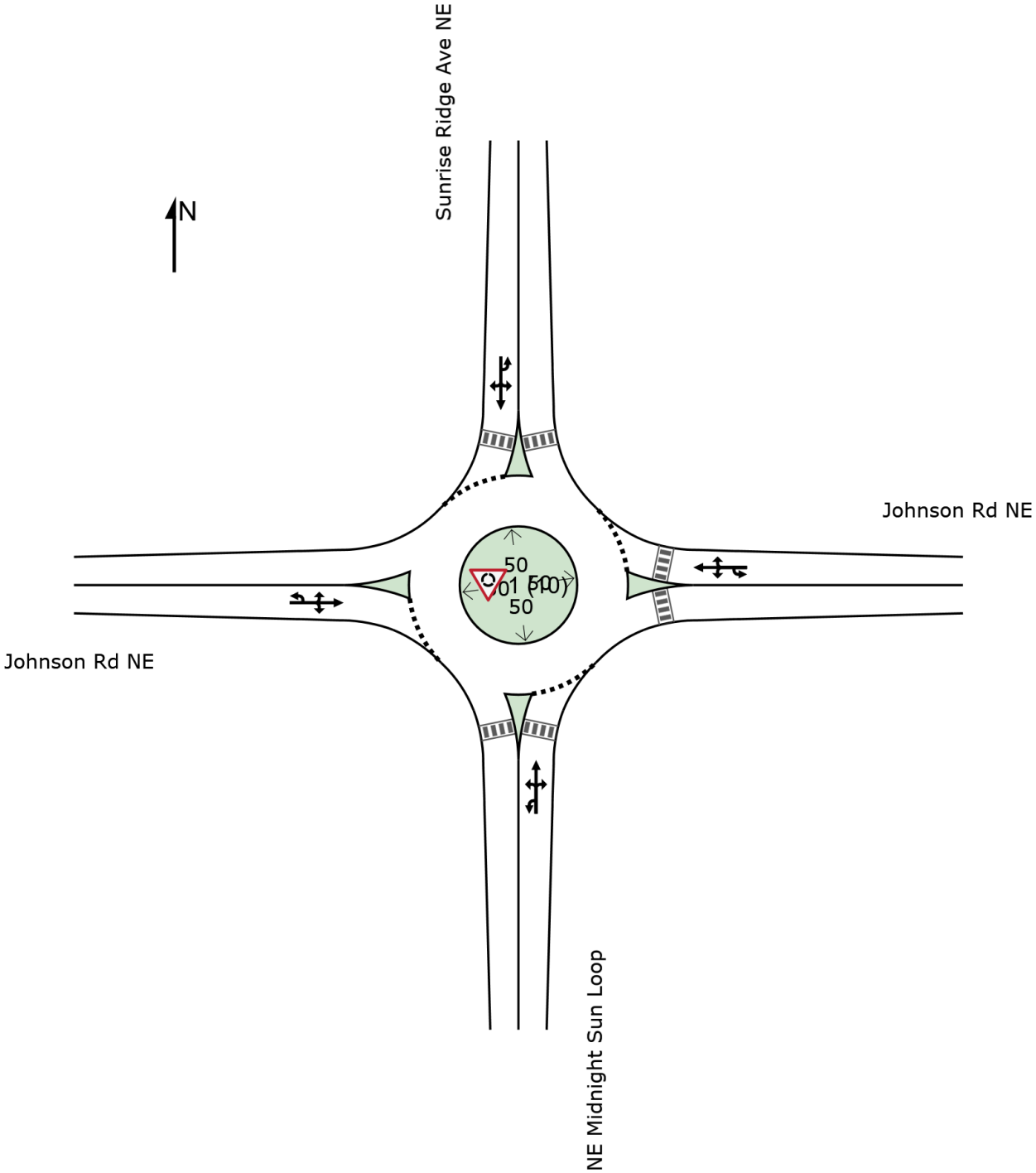
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

# SITE LAYOUT

## Site: [1 (10)] Johnson & Sunrise Ridge - 2037 PM With
(Folder1)

New Site
Site Category: (None)
Roundabout
**Site Scenario: 1 | Local Volumes**

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



| Intersection | |
|---|---|
| Int Delay, s/veh | 3.8 |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 5 | 24 | 40 | 37 | 29 | 9 |
| Future Vol, veh/h | 5 | 24 | 40 | 37 | 29 | 9 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 5 | 26 | 43 | 40 | 32 | 10 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 164 | 36 | 41 | 0 | - | 0 |
| Stage 1 | 36 | - | - | - | - | - |
| Stage 2 | 127 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 827 | 1036 | 1568 | - | - | - |
| Stage 1 | 986 | - | - | - | - | - |
| Stage 2 | 899 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 804 | 1036 | 1568 | - | - | - |
| Mov Cap-2 Maneuver | 804 | - | - | - | - | - |
| Stage 1 | 958 | - | - | - | - | - |
| Stage 2 | 899 | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 8.77 | 3.82 | 0 |
| HCM LOS | A | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 935 | - | 987 | - | - |
| HCM Lane V/C Ratio | 0.028 | - | 0.032 | - | - |
| HCM Ctrl Dly (s/v) | 7.4 | 0 | 8.8 | - | - |
| HCM Lane LOS | A | A | A | - | - |
| HCM 95th %tile Q(veh) | 0.1 | - | 0.1 | - | - |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 27 |
| Intersection LOS | D |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 108 | 264 | 87 | 11 | 166 | 64 | 78 | 63 | 5 | 111 | 80 | 79 |
| Future Vol, veh/h | 108 | 264 | 87 | 11 | 166 | 64 | 78 | 63 | 5 | 111 | 80 | 79 |
| Peak Hour Factor | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| Heavy Vehicles, % | 3 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 4 |
| Mvmt Flow | 124 | 303 | 100 | 13 | 191 | 74 | 90 | 72 | 6 | 128 | 92 | 91 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 2 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 2 | 1 | 1 |
| HCM Control Delay, s/veh | 43.2 | 16.5 | 14.8 | 15.6 |
| HCM LOS | E | C | B | C |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|
| Vol Left, % | 53% | 24% | 5% | 58% | 0% |
| Vol Thru, % | 43% | 58% | 69% | 42% | 0% |
| Vol Right, % | 3% | 19% | 27% | 0% | 100% |
| Sign Control | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 146 | 459 | 241 | 191 | 79 |
| LT Vol | 78 | 108 | 11 | 111 | 0 |
| Through Vol | 63 | 264 | 166 | 80 | 0 |
| RT Vol | 5 | 87 | 64 | 0 | 79 |
| Lane Flow Rate | 168 | 528 | 277 | 220 | 91 |
| Geometry Grp | 4a | 2 | 2 | 5 | 5 |
| Degree of til (v) | 0.352 | 0.908 | 0.51 | 0.475 | 0.171 |
| Departure Headway (Hd) | 7.561 | 6.198 | 6.63 | 7.792 | 6.773 |
| Convergence, /N | es | es | es | es | es |
| Cap | 473 | 580 | 540 | 461 | 527 |
| Service Time | 5.66 | 4.263 | 4.715 | 5.574 | 4.554 |
| HCM Lane V/C Ratio | 0.355 | 0.91 | 0.513 | 0.477 | 0.173 |
| HCM Control Delay, s/veh | 14.8 | 43.2 | 16.5 | 17.5 | 11 |
| HCM Lane LOS | B | E | C | C | B |
| HCM 95th-tile Q | 1.6 | 11.1 | 2.9 | 2.5 | 0.6 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 3.1 |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 69 | 83 | 28 | 69 | 53 | 21 |
| Future Vol, veh/h | 69 | 83 | 28 | 69 | 53 | 21 |
| Conflicting Peds, #/hr | 0 | 10 | 10 | 0 | 10 | 10 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 75 | 90 | 30 | 75 | 58 | 23 |

| Major/Minor | Major1 | | Major2 | | Minor1 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 0 | 0 | 175 | 0 | 276 | 140 |
| Stage 1 | - | - | - | - | 130 | - |
| Stage 2 | - | - | - | - | 146 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1401 | - | 714 | 908 |
| Stage 1 | - | - | - | - | 896 | - |
| Stage 2 | - | - | - | - | 881 | - |
| Platoon blocked, % | - | - | | - | | |
| Mov Cap-1 Maneuver | - | - | 1389 | - | 686 | 893 |
| Mov Cap-2 Maneuver | - | - | - | - | 686 | - |
| Stage 1 | - | - | - | - | 888 | - |
| Stage 2 | - | - | - | - | 854 | - |

| Approach | EB | WB | NB |
|---|---|---|---|
| HCM Ctrl Dly, s/v | 0 | 2.21 | 10.51 |
| HCM LOS | | | B |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|---|---|---|---|---|---|
| Capacity (veh/h) | 734 | - | - | 520 | - |
| HCM Lane V/C Ratio | 0.11 | - | - | 0.022 | - |
| HCM Ctrl Dly (s/v) | 10.5 | - | - | 7.6 | 0 |
| HCM Lane LOS | B | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.4 | - | - | 0.1 | - |

# THE PINNACLE AT LIBERTY BAY
# TRAFFIC IMPACT ANALYSIS

*APPENDIX*
*Site Plan*

A PORTION OF THE SE 1/4 OF SECTION 23, TWP. 26 N., RGE. 1 E.,WM




n

SCALE: 1" = 80'

80 40 0 80 160

## BUFFER GIVE/TAKE ANALYSIS

| | |
|---|---|
| WETLAND A | |
| TOTAL GIVE | 2,207 SF |
| TOTAL TAKE | 2,033 SF |
| NTET GIVE | 174 SF |
| WETLNAD B | |
| TOTAL GIVE | 11,912 SF |
| TOTAL TAKE | 11,637 SF |
| NET GIVE | 275 SF |

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

REVISIONS

| NO. | DESCRIPTION/DATE | BY |
|---|---|---|
| | | |

TREVOR L. STIFF — STATE OF WASHINGTON — 42334 — REGISTERED PROFESSIONAL ENGINEER


CONSULTING ENGINEERS, LLC
33400 8th Ave S, Suite 205
Federal Way, WA 98003
FEDERAL WAY (253) 838-6113
LYNNWOOD (425) 297-9900
www.esmcivil.com
ESM
Civil Engineering | Land Planning
Public Works | Landscape Architecture
Land Surveying
Project Management


MONTEBANC MANAGEMENT, LLC

# PINNACLE AT LIBERTY BAY

ROW & BUFFER PLAN

CITY OF POULSBO — WASHINGTON

| | |
|---|---|
| JOB NO.: | 2090-004-022 |
| DWG. NAME: | PP-05 |
| DESIGNED BY: | TLS |
| DRAWN BY: | HAF |
| CHECKED BY: | |
| DATE: | 6/13/2025 |
| DATE OF PRINT: | |

PP-05

5 OF 26 SHEETS

File: \\esm6\ENGR\ESM-JOBS\2090\004\022\P-plot\Plots\PP-05.dwg
Plotted: 6/10/2025 11:53 AM
Plotted By: Don Lapp

Parametrix
let's create tomorrow, together

# Technical Memorandum

| | |
|---|---|
| DATE: | September 8, 2025 |
| TO: | Donald Washburn, City of Poulsbo |
| FROM: | Tony Woody, PE, PTOE, Parametrix |
| SUBJECT: | Review for The Pinnacle at Liberty Bay Traffic Impact Analysis (TIA) |
| CC: | Rebecca Parker, Kristen Zimmerman, Parametrix |
| PROJECT NUMBER: | 234-2237-150 Task 01 |
| PROJECT NAME: | The Pinnacle at Liberty Bay TIA Review |

This memorandum provides comments on the Traffic Impact Analysis report for The Pinnacle at Liberty Bay development, prepared by Heath and Associates, dated July 14, 2025.

## Traffic Impact Analysis Review

### Parametrix Primary Comments

**Comment #1 –** Page 8: SR 305 speed is 40mph north of ~Baywatch Court and 50mph south of that location.

**Comment #2** - Page 10: AM and PM peaks are noted as generally occurring between 7-8 AM and 5-6 PM. Do any of the study intersections have local peaks that are substantially (>30 minutes) outside of the system peaks?

**Comment #3** - Page 10: Verify how the AM school traffic was accounted for. Was there a decrease in PHF to account for the 15-minute spike or some other method?

**Comment #4** – ~Pages 10-16: Clarify which study intersections are reporting performance metrics. There appears to be variability in what is reported for study intersections, for example:

- Section 3.4 lists out 5 intersections where counts were collected and mentions 2 other intersections where counts were estimated.
- Figures 3-4 show 6 of the 7 intersections mentioned, Figures 5-6 show 5 of the 7 intersections and Table 3 (Existing LOS) reports 6 of the 7 study intersections.

Consider adding a section near the front of the report (e.g. Section 2 or 3) that lists all study intersections that will have metrics reported throughout the entire report. Adding them to Figure 1 for example may help with clarifying where all of the key study intersections are located.

**Comment #5** – Page 17: For Table 4 (Collisions), Separate out and identifying each location as an intersection or a corridor. Consider using the same numbering for the intersections as what was used for the operational analysis and creating new numbering for the corridor locations. Consider adding totals for each column and row to add more clarity to the data.

**Comment #6** – Page 18: Consider updating Tables 5 and 6 also with Ref # and intersection/corridor names for clarity and adding total columns/rows.

**Comment #7** - Page 18: Consider expanding further on the text *"Out of the 45 total collisions, one resulted in six non-incapacitating injuries, and six possible injuries"*. Should it say something like 6 of the 45 collisions resulted in non-incapacitating and 6 of the 45 resulted in possible injury?

**Comment #8** – Page 20: For figure 8, consider adding numbering to intersections/corridors to tie back to tables easier.

**Comment #9** – Pages 16 & 35: Provide more details in the notes of Tables 3 and 9 related to delay and LOS for clarification – Signals, use signalized thresholds for overall intersection, AWSC/Roundabout – use stop control thresholds for overall intersection, TWSC use stop control thresholds for worst approach.

**Comment #10** – [General comment]: Provide additional discussion on the Sunrise Ridge extension and what project or development will trigger the opening. Will the extension be completed as part of the Pinnacle at Liberty Bay development?

**Comment #11** – [General comment:] Adding the access points to the study area map or site plan would be helpful in understanding the traffic to and from the site. Consider adding labels for access points A, B, C/D, and E to the maps/figures.

**Comment #12** – [General comment:] The city guidelines state that intersections should be analyzed for intersections with over approximately 10 new trips added. Were additional intersections to the north or west of Hostmark Street/SR 305 considered for analysis (where >10 trips along those roadways are being generated per Figures 9 and 10)?

Parametrix
let's create tomorrow, together

Technical Memorandum

| | |
|---|---|
| DATE: | July 1, 2026 |
| TO: | Donald Washburn, City of Poulsbo |
| FROM: | Tony Woody, PE, PTOE, Alex Atchison, PE, PTOE, Terry Shin, PE, PTOE, Parametrix |
| SUBJECT: | Traffic Impact Analysis and Transportation Review |
| PROJECT NUMBER: | 234-2237-150 TA-05 |
| PROJECT NAME: | The Pinnacle at Liberty Bay |

This memorandum documents Parametrix's review of the applicant's Traffic Impact Analysis (TIA) for The Pinnacle at Liberty Bay development, prepared by Heath and Associates, dated April 2026, as well as other transportation information submitted in support of the proposed development. The review evaluates (1) the TIA's consistency with the City's Traffic Impact Analysis Requirements, and (2) whether the transportation information provided is sufficient to support the City's transportation review and required findings under the Poulsbo Municipal Code, Comprehensive Plan, and other applicable transportation requirements. Where additional information or analysis is identified, the comments are intended to assist the City in determining whether the proposed development adequately addresses transportation impacts and supports the required transportation findings.

# Parametrix Primary Comments

### 1. Comment #1 – General TIA Completeness and Consistency

The revised TIA includes updates; however, deficiencies remain for completeness and consistency with the City's applicable TIA guidelines and policies. Key Issues include:

- Study Area Consistency: The report does not clearly and consistently identify all study intersections or reconcile which intersections are included in figures versus LOS tables.
- Intersection Screening: The TIA does not demonstrate that all intersections with ≥10 new trips were evaluated per City requirements. Consider intersections to the south of Johnson Road and to the north of Hostmark Street, based on AM and PM trip distribution figures.
- Peak Hour Methodology: School-related peak demand and local peak hour variability are not fully documented.

*Comment Summary: Additional documentation is required to demonstrate compliance with City TIA standards and HCM-based methods.*

### 2. Comment #2 – Safe Routes to School, LOS, and Concurrency

The TIA does not adequately address school-related impacts or pedestrian safety, specifically regarding the following transportation issues:

- The intersection of Hostmark/Caldart operates at LOS F (61.9–63.2 sec delay) under 2037 AM conditions, below the City LOS standard (E). Although the LOS F is consistent between 2037 No Build and Build conditions, the vehicle delay increases under the Build scenario.

- The school route to North Kitsap High School requires a mid-block crossing of Caldart Avenue without stop control. This crossing is aligned with and supported by Comprehensive Plan Policies TR-5.1, TR-5.2, and TR 5.3.
- The transportation analysis should evaluate improvements to the existing school crossing, including installation of a Rectangular Rapid Flashing Beacon (RRFB), to address pedestrian safety and support the City's transportation findings under PMC 14.04, PMC 17.60.040(A)(e), PMC 17.80.060, and Comprehensive Plan Policies TR-1.1 and TR-1.4.

*Comment Summary: The TIA does not adequately evaluate pedestrian safety or identify mitigation measures necessary to address project-related transportation impacts. Based on the information currently provided, the TIA does not adequately support the City's required findings related to concurrency (PMC 14.04) and student safety.*

### 3. Comment #3 – Baywatch Connection Feasibility Analysis

The information provided in support of the applicant's feasibility determination does not adequately support the conclusion that the Baywatch connection is infeasible due to vertical geometry and stream crossing constraints because the feasibility evaluation does not fully address applicable City codes, policies, and reasonable design alternatives necessary for the City Engineer to determine infeasibility. The feasibility evaluation should include the following:

- Additional alternatives addressing alternative crossing locations or configurations. Only one alignment was evaluated as part of the feasibility study
- Additional analysis with design deviations considered for alternatives. The current analysis assumes a K value of 6.0 and concludes the proposed connection is infeasible. While a K = 6 vertical curve is an allowable design deviation at a stop-controlled intersection under City standards, the analysis does not evaluate other reasonable design alternatives using the City's typical vertical curve criteria (AASHTO/WSDOT standard K = 12 for crest curves and K = 26 for sag curves), nor does it clearly explain why the selected design approach represents the only feasible option.
- Expanded evaluation of the basis for concluding the connection is infeasible. The memo does currently demonstrate a standard design failure, but it does not demonstrate that all reasonable modified or mitigated designs are infeasible.
- A discussion on the Baywatch connection (NR-12) is identified as a required roadway connection under the City's Comprehensive Plan (Appendix B.4a) and is necessary to meet connectivity and redundancy requirements via codes PMC 17.80.060 and PMC 17.60.040.

*Comment Summary: The information provided is insufficient for the City Engineer to make a determination of infeasibility under PMC 17.80.060. Additional analysis and evaluation of alternatives and allowable deviations for the Baywatch connection is requested to determine all possible scenarios under the applicable city codes and policies. The Baywatch connection (NR-12) is identified as a required roadway in the City's Comprehensive Plan and is necessary to support connectivity and redundancy objectives.*

### 4. Comment #4 – Access and Connectivity Without Baywatch Connection

If, after further analysis, the Baywatch connection is determined by the City Engineer to be infeasible, the information provided does not demonstrate that the proposed Sunrise Ridge access configuration satisfies the applicable City and Fire Code requirements for access, connectivity and

emergency response. Specific examples where the site plan of the TIA deviates from City or Fire Code include:

- Both Road C and Crystallia Court rely exclusively on Sunrise Ridge Ave NE, resulting in one functional access route and a single route condition, not two independent routes as required by City code and implied in the TIA. This is inconsistent with City code PMC 17.80.050(C).
- The TIA does not demonstrate that the proposed street network satisfies the redundancy objectives as required under City code PMC 17.80.060.
- The information provided does not demonstrate that the proposed subdivision provides the required street connections to adjacent properties and does not demonstrate feasibility or request exemption as required under PMC 17.80.060(B).
- Any blockage of Sunrise Ridge would significantly reduce site access, which is inconsistent with the intent of PMC 17.80.050(C) to provide access via two different streets and PMC 17.80.060 to provide redundant and efficient connections and emergency access provisions of IFC 503.1.2. This risk is amplified by steep grades (~12%) and significant elevation change.
- No alternative mitigation (e.g., emergency access, sprinklering, roadway improvements) has been proposed in the TIA as required under PMC 17.80.050(C) and supporting provisions.
- Based on the site conditions, including terrain, steep grades (~12%), and access limitations, the transportation information provided does not adequately demonstrate that the proposed access configuration satisfies the applicable emergency access provisions of IFC 503.1.2 and IFC D107.2.
- Road D exceeds allowable dead-end length and the initial project phase (>30 lots) is served by a single route, which is inconsistent with subdivision access and phasing requirements per City code PMC 17.80.050(C) and Fire code IFC D107.1.
- Each division must meet access and safety requirements independently per PMC 17.60.040(C), which is not demonstrated.

*Comment Summary: Based on the information provided, the proposed access configuration does not demonstrate compliance with the City's requirements for independent access routes, roadway redundancy, and emergency access, resulting in potential life safety concerns that should be addressed through additional analysis or documentation. Accordingly, the information provided does not demonstrate consistency with the applicable City and Fire Code access provisions.*

Parametrix
let's create tomorrow, together

# Technical Memorandum

| | |
|---|---|
| DATE: | September 2, 2026 |
| TO: | Donald Washburn, City of Poulsbo |
| FROM: | Tony Woody, PE, PTOE, Alex Atchinson, PE, PTOE, Terry Shin, PE, PTOE, Parametrix |
| SUBJECT: | Traffic Impact Analysis and Transportation Review |
| PROJECT NUMBER: | 234-2237-150 TA-05 |
| PROJECT NAME: | The Pinnacle at Liberty Bay |

This memorandum documents Parametrix's review of Traffic Impact Analysis (TIA) Resubmittal #5 for The Pinnacle at Liberty Bay development, prepared by Heath and Associates, submitted by the applicant to the City of Poulsbo on July 20, 2026. TIA Resubmittal #5 includes

This review (1) evaluates the resubmitted TIA's revisions and responses to comments provided to the applicant by the City of Poulsbo and Parametrix on July 1, 2026, and (2) summarizes the applicants responses to other transportation requirements related to Poulsbo Municipal Code compliance and access feasibility. Parametrix responses to the applicant's response and recommendations are provided in blue text within the memo.

## Parametrix Primary Comments

### Comment #1 – General TIA Completeness and Consistency

**Comment #1A**. Study Area Consistency: The report does not clearly and consistently identify all study intersections or reconcile which intersections are included in figures versus LOS tables.

**Applicant Response**. Descriptions of existing peak hour volumes (Section 4.4) have been expanded for clarity and consistency. Tables and figures have been updated to identify all seven study intersections.

**Parametrix Finding.** Comment addressed. The revised TIA includes figures that consistently present the study intersections for existing conditions, project trip generation and distribution, pipeline project trips, and future conditions without and with the proposed project.

**Comment #1B**. Intersection Screening: The TIA does not demonstrate that all intersections with ≥10 new trips were evaluated per City requirements. Consider intersections to the south of Johnson Road and to the north of Hostmark Street, based on AM and PM trip distribution figures.

**Applicant Response.** The TIA study area was approved by City staff via email on June 10, 2025. Minor scoping revisions provided by City staff at that time were incorporated to the TIA and are reflected in the report.

**Parametrix Finding.** Comment not addressed. The revised TIA (version 4) remains unchanged and does not include all study intersections that would be affected by more than 10 AM or PM peak hour project-generated trips. Per email communication with the City of Poulsbo on June 12, 2025, the City directs the applicant to consider any intersections that could

generate public input that are near the 10 trip threshold as they will need to be addressed during permit approval.

The applicant's response to this comment includes figures depicting an expanded network of 8 intersections on SR 305 and on NE Hostmark St to the northwest of the proposed project site that would be affected by more than 10 PM peak hour project-generated trips. These figures do not include intersections on SR 305 to the south of the project.

The applicant's response presents the project-generated trips as a percentage share of the 2023 PM peak hour intersection entering volumes (referenced from the Poulsbo Transportation Plan Update (January 2025) at the 8 intersections. The applicant suggests that project-generated trips would increase the vehicle demand by one percent or less, resulting in virtually no change to the results reported in the Poulsbo Transportation Plan Update, and therefore does not recommend revising the TIA study area.

Because the applicant has identified 8 additional study intersections that would be affected by more than 10 AM or PM peak hour project-generated trips, these locations should be addressed in the TIA.

**Comment #1C**. Peak Hour Methodology: School-related peak demand and local peak hour variability are not fully documented.

**Applicant Response.** Traffic counts and the associated operational analysis applied Peak Hour Factor (PHF), which reflects the impacts of observed 15-minute volume peaking during each peak hour. The use of PHF allows the operational analysis to capture the impacts of short-duration school-related peaking, particularly during the AM peak hour. Existing PHFs are documented in the traffic count sheets. Peak hour variability at each study intersection is documented in Table 3.

**Parametrix Finding.** Comment not addressed. The revised TIA (version 4) remains unchanged and does not include discussion of the afternoon school peak analysis. Per email communication with the City of Poulsbo on June 12, 2025, the City directs the applicant to address school traffic, recognizing that the school peak differs from the AM and PM peaks typically analyzed.

The PM peak hour analyzed in the TIA is based on traffic counts collected between 4:00 and 6:00 p.m. on a weekday. This window does not include the typical afternoon peak of school-related traffic, which based on the North Kitsap School District schedule, indicates the middle and high school schedules conclude at 2:30 p.m.

A discussion of school-related peak traffic demand should be included in the TIA.

### Comment #2 – Safe Routes to School, LOS, and Concurrency

**Comment #2A**. The intersection of Hostmark/Caldart operates at LOS F (61.9–63.2 sec delay) under 2037 AM conditions, below the City LOS standard (E). Although the LOS F is consistent between 2037 No Build and Build conditions, the vehicle delay increases under the Build scenario.

**Applicant Response**. Long-range (2037) traffic forecasts have been updated. Previous versions included an error in compound growth calculations which resulted in an

overestimation of anticipated growth. Based on the corrected traffic volume forecasts, the Hostmark/Caldart intersection is expected to operate at LOS E during the 2037 AM peak hour before and after the addition of project trips. The minimum LOS E standard is satisfied.

**Parametrix Finding.** Comment not addressed. The revised TIA (version 4) does not provide justification for the corrected 2037 LOS/delay results at Hostmark/Caldart nor describes the growth rate calculation error. The intersection results presented in Table 9 do not reflect the Synchro output report in the Appendix.

The 2037 'without project' volumes presented in the revised TIA were calculated using a growth rate of approximately 3.5% for intersection entering volumes, which is the same growth rate used in the previous TIA (version 3), and results in the same LOS/delay (LOS F/61.9 sec).

Justification for the growth rate error should be described in the applicant's response, and the Hostmark/Caldart LOS/delay results shown in the Appendix should be reflected in Table 9 of the TIA.

**Comment #2B.** The school route to North Kitsap High School requires a mid-block crossing of Caldart Avenue without stop control. This crossing is aligned with and supported by Comprehensive Plan Policies TR-5.1, TR-5.2, and TR 5.3.

**Applicant Response**. Caldart Avenue currently provides marked pedestrian crossings at the Meredith Heights/Frank Raab Municipal Park driveway, at NE Odin Street, and at Hostmark Street. All of the existing marked crossings could serve pedestrian demand associated with North Kitsap High School. Please clarify the location of the midblock crossing referenced above.

**Parametrix Finding.** Further discussion is needed. The applicant's response identifies marked pedestrian crossings on the walking route between the project site and the middle/high schools to be sufficient.

**Comment #2C.** The transportation analysis should evaluate improvements to the existing school crossing, including installation of a Rectangular Rapid Flashing Beacon (RRFB), to address pedestrian safety and support the City's transportation findings under PMC 14.04, PMC 17.60.040(A)(e), PMC 17.80.060, and Comprehensive Plan Policies TR-1.1 and TR-1.4.

**Applicant Response**. The Hostmark Street & Caldart Avenue intersection provides curb ramps and marked crosswalks on all legs. Hostmark Street also includes signalized pedestrian crossings at two locations to the east of Caldart Avenue. Please clarify the location of the school crossing referenced above.

**Parametrix Finding.** Further discussion is needed. PMC 14.04.100(B)(3) states "intersections with adopted LOS F in the transportation element of the Poulsbo comprehensive plan may require mitigation measures which address impacts associated with adoption of the LOS F standard, but do not necessarily add capacity."

Hostmark/Caldart does not have an adopted LOS F standard documented in the Poulsbo Transportation Plan Update and is not expected to operate at LOS F per the revised TIA (version 4). Therefore, the non-capacity mitigation suggested by the City – a Rectangular

Rapid Flashing Beacon (RRFB) installed by the Pinnacle at Liberty Bay project at the marked crosswalk near the entrance to Raab Park – may not be applicable.

PMC 17.60.040(A)(e) states "A proposed preliminary subdivision may be approved only if the following findings are made by the review authority: The proposed preliminary subdivision makes adequate provisions for sidewalks and other planning features that provide safe walking conditions for students who walk to and from school." PMC 17.80.060(B)(5) states "Pedestrian and bicycle connection to adjacent subdivisions or property shall be provided as feasible and as consistent with the intent of the city's comprehensive plan's identified sidewalk and path connections."

The applicant's response identifies marked pedestrian crossings on the walking route between the project site and the middle/high schools to be sufficient.

### Comment #3 – Baywatch Connection Feasibility Analysis

**Comment #3.** The information provided in support of the applicant's feasibility determination does not adequately support the conclusion that the Baywatch connection is infeasible due to vertical geometry and stream crossing constraints because the feasibility evaluation does not fully address applicable City codes, policies, and reasonable design alternatives necessary for the City Engineer to determine infeasibility. The feasibility evaluation should include the following:

- Additional alternatives addressing alternative crossing locations or configurations. Only one alignment was evaluated as part of the feasibility study
- Additional analysis with design deviations considered for alternatives. The current analysis assumes strict compliance with a 12% max grade and K=6.0, but the city allows design deviations consistent with Construction Standards Section 1(C), which were not evaluated
- Expanded evaluation of the basis for concluding the connection is infeasible. The memo does currently demonstrate a standard design failure, but it does not demonstrate that all reasonable modified or mitigated designs are infeasible.
- A discussion on the Baywatch connection (NR-12) is identified as a required roadway connection under the City's Comprehensive Plan (Appendix B.4a) and is necessary to meet connectivity and redundancy requirements via codes PMC 17.80.060 and PMC 17.60.040.

**Applicant Response**. The stream crossing feasibility study was updated to evaluate alternative alignments but concluded that there is only one available crossing (the existing stub off of Baywatch Court NE).

Micro alignment adjustments were made to the available crossing. The updated study provides a vertical curve based on Fire's maximum allowed approach angle, and the city's intersection landing requirements. Non-standard design parameters were not considered due to safety and liability concerns.

The applicant maintains that the project provides two distinct access points along Sunrise Ridge Avenue approximately 330' apart.

**Parametrix Finding.** Comment not addressed. The two access points identified by the applicant do not meet the intent and purpose of codes PMC 17.80.060 (to provide

redundant and efficient routes and connections and to provide superior emergency vehicle response time by providing multiple access to streets) and PMC 17.60.040 (to ensure the street system provides for the safe, orderly and efficient circulation of traffic, makes adequate provisions for fire and emergency access and protection, and makes appropriate provisions for the public health, safety, and welfare).

### Comment #4 – Access and Connectivity Without Baywatch Connection

**Comment #4.** If, after further analysis, the Baywatch connection is determined by the City Engineer to be infeasible, the information provided does not demonstrate that the proposed Sunrise Ridge access configuration satisfies the applicable City and Fire Code requirements for access, connectivity and emergency response. Specific examples where the site plan of the TIA deviates from City or Fire Code include:

**4A.** Both Road C and Crystallia Court rely exclusively on Sunrise Ridge Ave NE, resulting in one functional access route and a single route condition, not two independent routes as required by City code and implied in the TIA. This is inconsistent with City code PMC 17.80.050(C).

**4B.** The TIA does not demonstrate that the proposed street network satisfies the redundancy objectives as required under City code PMC 17.80.060.

**Applicant Response to 4A, 4B.** The project proposes access to NE Crystallia Court and to Sunrise Ridge Avenue, providing two distinct public street connections to the site and satisfying access criteria defined in PMC 17.080.050(C). An internal street network will provide a contiguous connection between the two accesses, preserving full site access in the event of a blockage at either connection. The project also proposes completion of Sunrise Ridge Avenue to the south of the project, facilitating access to the site to/from the north via Caldart Avenue and to/from the south via Johnson Road.

**Parametrix Finding to 4A, 4B.** Comment not addressed. The two access points identified by the applicant do not meet the intent and purpose of codes PMC 17.80.060 (to provide redundant and efficient routes and connections and to provide superior emergency vehicle response time by providing multiple access to streets) and PMC 17.80.050(C) (to provide for at least two different standard routes for ingress and egress).

**4C.** The information provided does not demonstrate that the proposed subdivision provides the required street connections to adjacent properties and does not demonstrate feasibility or request exemption as required under PMC 17.80.060(B).

**Applicant Response to 4C.** Feasibility studies for connections to the adjacent parcels to the south, Parcels 252601-2-034-2002 and 252601-2-044-2000, have been completed and are enclosed with this resubmittal. Connections to either parcel have been found to be infeasible.

**Parametrix Finding to 4C.** Comment not addressed. The applicant has not provided sufficient information to show the project site and/or surrounding area's topography make connectivity technically and physically unfeasible.

**4D.** Any blockage of Sunrise Ridge would significantly reduce site access, which is inconsistent with the intent of PMC 17.80.050(C) to provide access via two different streets and PMC

17.80.060 to provide redundant and efficient connections and emergency access provisions of IFC 503.1.2. This risk is amplified by steep grades (~12%) and significant elevation change.

**Applicant Response to 4D.** IFC D107.2 requires a minimum straight-line separation not less than one-half of the length of the maximum overall diagonal dimension of the property. The maximum overall diagonal dimension of the subject site is 1,918 feet, resulting in a minimum straightline separation of 909 feet. The proposed accesses on NE Crystallia Court and the eastern edge of the subject site on Sunrise Ridge Avenue provide 940 feet of separation, satisfying IFC D107.2 access separation requirements for two separate access roads.

**Parametrix Finding to 4D.** Comment not addressed. The two access points identified by the applicant do not meet the intent and purpose of IFC D107.2. The diagonal distance of the property should be measured from the Road C/Sunrise Ridge Avenue intersection, as that is the access point to the area beings served.

**4E.** No alternative mitigation (e.g., emergency access, sprinklering, roadway improvements) has been proposed in the TIA as required under PMC 17.80.050(C) and supporting provisions.

**Applicant Response to 4E.** The project proposes access via two distinct public streets and a new connection on Sunrise Ridge Avenue to the south, satisfying access criteria defined in PMC 17.80.050(C). See Response #4A.

**Parametrix Finding to 4E.** Comment not addressed. The two access points identified by the applicant do not meet the intent and purpose of codes PMC 17.80.060 (to provide redundant and efficient routes and connections and to provide superior emergency vehicle response time by providing multiple access to streets) and PMC 17.80.050(C) (to provide for at least two different standard routes for ingress and egress). The applicant does not discuss sprinklering in their response to comments.

**4F.** Based on the site conditions, including terrain, steep grades (~12%), and access limitations, the transportation information provided does not adequately demonstrate that the proposed access configuration satisfies the applicable emergency access provisions of IFC 503.1.2 and IFC D107.2.

**Applicant Response to 4F.** The NE Crystallia Court and Road C accesses satisfy IFC separation requirements for emergency access separation. See Response #4D.

**Parametrix Finding to 4F.** Comment not addressed. The two access points identified by the applicant do not meet the intent and purpose of IFC D107.2. The diagonal distance of the property should be measured from the Road C/Sunrise Ridge Avenue intersection, as that is the access point into the subdivision. The site access points do not meet IFC 503.1.2 because they both rely on a single road, Sunrise Ridge Road, to reach the regional roadway network, which conflicts with the codes requirement to provide “more than one fire apparatus road based on the potential for impairment of a single road by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.”

**4G.** Road D exceeds allowable dead-end length and the initial project phase (>30 lots) is served by a single route, which is inconsistent with subdivision access and phasing requirements per City code PMC 17.80.050(C) and Fire code IFC D107.1.

**4H.** Each division must meet access and safety requirements independently per PMC 17.60.040(C), which is not demonstrated.

**Applicant Response to 4G, 4H.** Road D has been shortened to 500 feet. This has prompted the removal of Lot 130. Additionally, Road D is planned to be constructed with Phase 3 of the project. Phase 1 will construct the entire looped roadway that Road D will then later tee off of to serve 20 units. The entire looped road is proposed to be constructed with Phase 1. Dead end road B will be built with Phase 2, and dead-end road D will be constructed with Phase 3. All phases will meet access and safety requirements independently when constructed in the noted order.

**Parametrix Finding to 4G, 4H.** Comment not addressed. Phase 1 will access the site via two streets that both rely on a single road, Sunrise Ridge Road, to reach the regional roadway network. This does not meet the intent and purpose of the city and fire codes to provide for at least two different standard routes for ingress and egress and to ensure the street system provides for the safe, orderly and efficient circulation of traffic, makes adequate provisions for fire and emergency access and protection, and makes appropriate provisions for the public health, safety, and welfare.

Parametrix
let's create tomorrow, together

Technical Memorandum

| | |
|---|---|
| DATE: | October 19, 2026 |
| TO: | Donald Washburn, City of Poulsbo |
| FROM: | Tony Woody, PE, PTOE, Alex Atchinson, PE, PTOE, Terry Shin, PE, PTOE, Parametrix |
| SUBJECT: | Traffic Impact Analysis and Transportation Review |
| PROJECT NUMBER: | 234-2237-150 TA-05 |
| PROJECT NAME: | The Pinnacle at Liberty Bay |

This memorandum documents Parametrix's review of Traffic Impact Analysis (TIA) Version #5, included in Resubmittal #6 for The Pinnacle at Liberty Bay development, prepared by Heath and Associates, submitted by the applicant to the City of Poulsbo on October 5, 2026.

This review (1) evaluates the resubmitted TIA's revisions and responses to comments provided to the applicant by the City of Poulsbo and Parametrix on September 2, 2026, and (2) summarizes the applicants responses to other transportation requirements related to Poulsbo Municipal Code compliance and access feasibility. Parametrix responses to the applicant's response and recommendations are provided in green text within the memo.

# Traffic Impact Analysis Comments

### Comment #1 – General TIA Completeness and Consistency

**Comment #1A**. Study Area Consistency: The report does not clearly and consistently identify all study intersections or reconcile which intersections are included in figures versus LOS tables.

**Applicant Response**. Descriptions of existing peak hour volumes (Section 4.4) have been expanded for clarity and consistency. Tables and figures have been updated to identify all seven study intersections.

**Parametrix Finding (9/3/26).** Comment addressed. The revised TIA includes figures that consistently present the study intersections for existing conditions, project trip generation and distribution, pipeline project trips, and future conditions without and with the proposed project.

**Comment #1B**. Intersection Screening: The TIA does not demonstrate that all intersections with ≥10 new trips were evaluated per City requirements. Consider intersections to the south of Johnson Road and to the north of Hostmark Street, based on AM and PM trip distribution figures.

**Applicant Response.** The TIA study area was approved by City staff via email on June 10, 2025. Minor scoping revisions provided by City staff at that time were incorporated to the TIA and are reflected in the report.

**Parametrix Finding (9/3/26).** Comment not addressed. The revised TIA (version 4) remains unchanged and does not include all study intersections that would be affected by more than 10 AM or PM peak hour project-generated trips. Per email communication with the City of Poulsbo on June 12, 2025, the City directs the applicant to consider any intersections that

could generate public input that are near the 10 trip threshold as they will need to be addressed during permit approval.

The applicant's response to this comment includes figures depicting an expanded network of 8 intersections on SR 305 and on NE Hostmark St to the northwest of the proposed project site that would be affected by more than 10 PM peak hour project-generated trips. These figures do not include intersections on SR 305 to the south of the project.

The applicant's response presents the project-generated trips as a percentage share of the 2023 PM peak hour intersection entering volumes (referenced from the Poulsbo Transportation Plan Update (January 2025) at the 8 intersections. The applicant suggests that project-generated trips would increase the vehicle demand by one percent or less, resulting in virtually no change to the results reported in the Poulsbo Transportation Plan Update, and therefore does not recommend revising the TIA study area.

Because the applicant has identified 8 additional study intersections that would be affected by more than 10 AM or PM peak hour project-generated trips, these locations should be addressed in the TIA.

**Applicant Response (10/5/26).** The TIA study area has been updated to include eight additional intersections which are expected to be impacted by at least 10 new project-generated peak hour trips, per City of Poulsbo TIA requirements. The eight additional study intersections and their corresponding TIA identification number are listed below.

- SR 305 & NE Lincoln Road (TIA #8)
- SR 305 & NE Liberty Road (TIA #9)
- SR 305 & Forest Rock Lane (TIA #10)
- SR 305 & Bond Road/SR 307 (TIA #11)
- NE Hostmark St & 6th Avenue NE (TIA #12)
- NE Hostmark St & Lincoln Road (TIA #13)
- NE Hostmark St & 4th Avenue NE (TIA #14)
- Front Street & NE Sunset Street (TIA #15)

**Parametrix Finding (10/19/26).** TIA comment addressed. The revised TIA includes an analysis of the 8 additional intersections that would be affected by more than 10 PM peak hour project-generated trips.

Although the revised TIA does not include an AM peak hour analysis of these 8 additional intersections, it does include a comparison of 2025 AM and PM peak hour volumes at select intersections (#1, #8, #9, #10, #11 are located on SR 305, #15 is located on Front Street). This comparison indicates that the existing PM peak hour volumes are at least 30 percent higher than AM peak hour volumes. Site-generated trips are also higher during the PM peak hour. Therefore, the TIA adequately captures potential project impacts by evaluating traffic operations during the higher-volume peak.

**Comment #1C.** Peak Hour Methodology: School-related peak demand and local peak hour variability are not fully documented.

**Applicant Response.** Traffic counts and the associated operational analysis applied Peak Hour Factor (PHF), which reflects the impacts of observed 15-minute volume peaking during each peak hour. The use of PHF allows the operational analysis to capture the impacts of short-duration school-related peaking, particularly during the AM peak hour. Existing PHFs are documented in the traffic count sheets. Peak hour variability at each study intersection is documented in Table 3.

**Parametrix Finding (9/3/26).** Comment not addressed. The revised TIA (version 4) remains unchanged and does not include discussion of the afternoon school peak analysis. Per email communication with the City of Poulsbo on June 12, 2025, the City directs the applicant to address school traffic, recognizing that the school peak differs from the AM and PM peaks typically analyzed.

The PM peak hour analyzed in the TIA is based on traffic counts collected between 4:00 and 6:00 p.m. on a weekday. This window does not include the typical afternoon peak of school-related traffic, which based on the North Kitsap School District schedule, indicates the middle and high school schedules conclude at 2:30 p.m.

A discussion of school-related peak traffic demand should be included in the TIA.

**Applicant Response (10/5/26).** An expanded discussion of school peaking has been incorporated to the TIA report. The analysis periods used in the TIA were established in the May 2025 Pinnacle at Liberty Bay Scoping Memo as the 7:00–9:00 AM and 4:00–6:00 PM weekday peak periods. These are the standard commuter periods typically evaluated for traffic studies in Poulsbo and are consistent with other recent City traffic studies, including:

- Noll Pointe TIA – April 2026
- Cedarview at Glenwood – October 2025
- Sandstone Ridge – December 2024
- Northway Estates – October 2023

School-related traffic is captured during the AM analysis period, when school arrival overlaps the broader morning commute. School dismissal occurs before the broader afternoon commute and can create a concentrated, short-duration increase in traffic near the schools; however, it does not necessarily represent the controlling peak condition at the study intersections or for the proposed residential development.

The proposed development is expected to generate its highest afternoon demand during the commuter PM peak period. The project also provides a continuous pedestrian connection to nearby schools and access to SR 305 via Johnson Road NE, providing alternatives to vehicle travel along NE Hostmark Street during school dismissal.

Accordingly, Heath believes the 7:00–9:00 AM and 4:00–6:00 PM analysis periods remain appropriate and consistent with the City's adopted transportation planning methodology and the scope established for this TIA.

**Parametrix Finding (10/19/26).** TIA comment addressed. The revised TIA includes a new section, 4.5 School-Related Traffic Volume, that describes how school-related traffic coincides with and is incorporated into the AM peak hour analysis. The revised TIA includes the afternoon school release schedules at 3 schools near the Pinnacle at Liberty Bay development and recognizes that while the school release times do not coincide with the PM peak hour analyzed (which focuses on systemwide peak traffic conditions), localized peaks in school traffic after dismissal will briefly influence intersection operations.

### Comment #2 – Safe Routes to School, LOS, and Concurrency

**Comment #2A.** The intersection of Hostmark/Caldart operates at LOS F (61.9–63.2 sec delay) under 2037 AM conditions, below the City LOS standard (E). Although the LOS F is consistent between 2037 No Build and Build conditions, the vehicle delay increases under the Build scenario.

**Applicant Response**. Long-range (2037) traffic forecasts have been updated. Previous versions included an error in compound growth calculations which resulted in an overestimation of anticipated growth. Based on the corrected traffic volume forecasts, the Hostmark/Caldart intersection is expected to operate at LOS E during the 2037 AM peak hour before and after the addition of project trips. The minimum LOS E standard is satisfied.

**Parametrix Finding (9/3/26).** Comment not addressed. The revised TIA (version 4) does not provide justification for the corrected 2037 LOS/delay results at Hostmark/Caldart nor describes the growth rate calculation error. The intersection results presented in Table 9 do not reflect the Synchro output report in the Appendix.

The 2037 'without project' volumes presented in the revised TIA were calculated using a growth rate of approximately 3.5% for intersection entering volumes, which is the same growth rate used in the previous TIA (version 3), and results in the same LOS/delay (LOS F/61.9 sec).

Justification for the growth rate error should be described in the applicant's response, and the Hostmark/Caldart LOS/delay results shown in the Appendix should be reflected in Table 9 of the TIA.

**Applicant Response (10/5/26).** Background traffic volume forecasts applied a 0.5 percent straightline annual growth rate to through-trips on WSDOT routes, consistent with travel demand forecasts identified in the Transportation Element of the Poulsbo Comprehensive Plan, and a 2.0 percent straightline annual growth rate on City of Poulsbo streets, consistent with City guidance.

Prior TIA submittals (version 3 and earlier) included a growth forecasting error in the 2037 analysis horizon by which near-term (2025-2032) background growth was double-counted, thereby overestimating background growth. This error was identified and corrected in the July 2026 (Version 4) TIA submittal.

The updated TIA (Version 5 / October 2026) correctly applies the approved background traffic growth rates to all study intersections. Intersection capacity (Synchro) reports have

been updated as necessary. The Hostmark/Caldart intersection is expected to operate at LOS E or better through 2037 before and after the addition of project trips, satisfying the City of Poulsbo minimum LOS E standard. Traffic volume forecasting calculations and all model files are provided with the TIA Version 5 submittal.

**Parametrix Finding (10/19/26).** TIA comment addressed. The revised TIA includes updated turning movement volume figures for both forecast years. The volumes at Hostmark/Caldart reflect an annual growth rate of approximately 2 percent.

The intersection results presented in Table 10 and Table 11 reflect the Synchro output report in the Appendix.

**Comment #2B.** The school route to North Kitsap High School requires a mid-block crossing of Caldart Avenue without stop control. This crossing is aligned with and supported by Comprehensive Plan Policies TR-5.1, TR-5.2, and TR 5.3.

**Applicant Response**. Caldart Avenue currently provides marked pedestrian crossings at the Meredith Heights/Frank Raab Municipal Park driveway, at NE Odin Street, and at Hostmark Street. All of the existing marked crossings could serve pedestrian demand associated with North Kitsap High School. Please clarify the location of the midblock crossing referenced above.

**Parametrix Finding (9/3/26).** Further discussion is needed. The applicant's response identifies marked pedestrian crossings on the walking route between the project site and the middle/high schools to be sufficient.

**Applicant Response (10/5/26).** Comment is noted.

**Parametrix Finding (10/19/26).** TIA comment addressed. Marked crosswalks on Caldart Avenue are provided between the proposed development and North Kitsap High School.

**Comment #2C.** The transportation analysis should evaluate improvements to the existing school crossing, including installation of a Rectangular Rapid Flashing Beacon (RRFB), to address pedestrian safety and support the City's transportation findings under PMC 14.04, PMC 17.60.040(A)(e), PMC 17.80.060, and Comprehensive Plan Policies TR-1.1 and TR-1.4.

**Applicant Response**. The Hostmark Street & Caldart Avenue intersection provides curb ramps and marked crosswalks on all legs. Hostmark Street also includes signalized pedestrian crossings at two locations to the east of Caldart Avenue. Please clarify the location of the school crossing referenced above.

**Parametrix Finding (9/3/26).** Further discussion is needed. PMC 14.04.100(B)(3) states "intersections with adopted LOS F in the transportation element of the Poulsbo comprehensive plan may require mitigation measures which address impacts associated with adoption of the LOS F standard, but do not necessarily add capacity."

Hostmark/Caldart does not have an adopted LOS F standard documented in the Poulsbo Transportation Plan Update and is not expected to operate at LOS F per the revised TIA (version 4). Therefore, the non-capacity mitigation suggested by the City – a Rectangular Rapid Flashing Beacon (RRFB) installed by the Pinnacle at Liberty Bay project at the marked crosswalk near the entrance to Raab Park – may not be applicable.

PMC 17.60.040(A)(e) states "A proposed preliminary subdivision may be approved only if the following findings are made by the review authority: The proposed preliminary subdivision makes adequate provisions for sidewalks and other planning features that provide safe walking conditions for students who walk to and from school." PMC 17.80.060(B)(5) states "Pedestrian and bicycle connection to adjacent subdivisions or property shall be provided as feasible and as consistent with the intent of the city's comprehensive plan's identified sidewalk and path connections."

The applicant's response identifies marked pedestrian crossings on the walking route between the project site and the middle/high schools to be sufficient.

**Applicant Response (10/5/26).** Comment is noted.

**Parametrix Finding (10/19/26).** TIA comment addressed. The intersection of Hostmark/Caldart is expected to operate at LOS E or better through 2037 before and after the addition of project trips, satisfying the City of Poulsbo minimum LOS E standard.

# Proposed Development Site Access/Feasibility Comments

### Comment #3 – Baywatch Connection Feasibility Analysis

**Comment #3.** The information provided in support of the applicant's feasibility determination does not adequately support the conclusion that the Baywatch connection is infeasible due to vertical geometry and stream crossing constraints because the feasibility evaluation does not fully address applicable City codes, policies, and reasonable design alternatives necessary for the City Engineer to determine infeasibility. The feasibility evaluation should include the following:

- Additional alternatives addressing alternative crossing locations or configurations. Only one alignment was evaluated as part of the feasibility study
- Additional analysis with design deviations considered for alternatives. The current analysis assumes strict compliance with a 12% max grade and K=6.0, but the city allows design deviations consistent with Construction Standards Section 1(C), which were not evaluated
- Expanded evaluation of the basis for concluding the connection is infeasible. The memo does currently demonstrate a standard design failure, but it does not demonstrate that all reasonable modified or mitigated designs are infeasible.
- A discussion on the Baywatch connection (NR-12) is identified as a required roadway connection under the City's Comprehensive Plan (Appendix B.4a) and is necessary to meet connectivity and redundancy requirements via codes PMC 17.80.060 and PMC 17.60.040.

**Applicant Response.** The stream crossing feasibility study was updated to evaluate alternative alignments but concluded that there is only one available crossing (the existing stub off of Baywatch Court NE).

Micro alignment adjustments were made to the available crossing. The updated study provides a vertical curve based on Fire's maximum allowed approach angle, and the city's intersection landing requirements. Non-standard design parameters were not considered due to safety and liability concerns.

The applicant maintains that the project provides two distinct access points along Sunrise Ridge Avenue approximately 330' apart.

**Parametrix Finding (9/3/26).** Comment not addressed. The two access points identified by the applicant do not meet the intent and purpose of codes PMC 17.80.060 (to provide redundant and efficient routes and connections and to provide superior emergency vehicle response time by providing multiple access to streets) and PMC 17.60.040 (to ensure the street system provides for the safe, orderly and efficient circulation of traffic, makes adequate provisions for fire and emergency access and protection, and makes appropriate provisions for the public health, safety, and welfare).

**Applicant Response (10/5/26).** Responses to be provided by ESM. Heath & Associates also prepared a supplemental "Emergency Access Analysis" memorandum, dated October 5, 2026, which provides additional analysis comparing the emergency vehicle response routes with and without the Baywatch connection.

**Parametrix Finding (10/19/26).** Site access comments not addressed. Submittal #6 does not include an updated response from ESM related to the intent and purpose of codes PMC 17.80.060 and PMC 17.60.040. Both proposed accesses (Road C and Crystallia Court) rely exclusively on Sunrise Ridge Avenue NE.

### Comment #4 – Access and Connectivity Without Baywatch Connection

**Comment #4.** If, after further analysis, the Baywatch connection is determined by the City Engineer to be infeasible, the information provided does not demonstrate that the proposed Sunrise Ridge access configuration satisfies the applicable City and Fire Code requirements for access, connectivity and emergency response. Specific examples where the site plan of the TIA deviates from City or Fire Code include:

**4A.** Both Road C and Crystallia Court rely exclusively on Sunrise Ridge Ave NE, resulting in one functional access route and a single route condition, not two independent routes as required by City code and implied in the TIA. This is inconsistent with City code PMC 17.80.050(C).

**4B.** The TIA does not demonstrate that the proposed street network satisfies the redundancy objectives as required under City code PMC 17.80.060.

**Applicant Response to 4A, 4B.** The project proposes access to NE Crystallia Court and to Sunrise Ridge Avenue, providing two distinct public street connections to the site and satisfying access criteria defined in PMC 17.080.050(C). An internal street network will provide a contiguous connection between the two accesses, preserving full site access in the event of a blockage at either connection. The project also proposes completion of Sunrise Ridge Avenue to the south of the project, facilitating access to the site to/from the north via Caldart Avenue and to/from the south via Johnson Road.

**Parametrix Finding to 4A, 4B (9/3/26).** Comment not addressed. The two access points identified by the applicant do not meet the intent and purpose of codes PMC 17.80.060 (to provide redundant and efficient routes and connections and to provide superior emergency vehicle response time by providing multiple access to streets) and PMC 17.80.050(C) (to provide for at least two different standard routes for ingress and egress).

**Applicant Response (10/5/26).** See Comment Response #3.

**Parametrix Finding (10/19/26).** Site access comments not addressed. Submittal #6 does not include an updated response from ESM related to the intent and purpose of codes PMC 17.80.060 and PMC 17.80.050(C). Both proposed accesses (Road C and Crystallia Court) rely exclusively on Sunrise Ridge Avenue NE.

**4C.** The information provided does not demonstrate that the proposed subdivision provides the required street connections to adjacent properties and does not demonstrate feasibility or request exemption as required under PMC 17.80.060(B).

**Applicant Response to 4C.** Feasibility studies for connections to the adjacent parcels to the south, Parcels 252601-2-034-2002 and 252601-2-044-2000, have been completed and are enclosed with this resubmittal. Connections to either parcel have been found to be infeasible.

**Parametrix Finding to 4C (9/3/26).** Comment not addressed. The applicant has not provided sufficient information to show the project site and/or surrounding area's topography make connectivity technically and physically unfeasible.

**Applicant Response (10/5/26).** See Comment Response #3.

**Parametrix Finding (10/19/26).** Site access comments not addressed. Submittal #6 does not include an updated response from ESM related to feasibility under PMC 17.80.060(B).

Applicant response in Pinnacle@LB-Technical-Review-5-Response-Letter-v5.pdf, included with Submittal #6, states:

Applicant respectfully disagrees that the previously submitted information is inadequate to make this determination; however, additional analysis documenting that the Baywatch connection is not feasible to construct is included with this submittal. See Stream Crossing Letter and supporting exhibit. The Applicant does not believe that the Baywatch connection can or should be legally required to comply with City codes and standards and therefore the plans have not been revised to show this connection. The Applicant expects this issue to be resolved at the hearing.

**4D.** Any blockage of Sunrise Ridge would significantly reduce site access, which is inconsistent with the intent of PMC 17.80.050(C) to provide access via two different streets and PMC 17.80.060 to provide redundant and efficient connections and emergency access provisions of IFC 503.1.2. This risk is amplified by steep grades (~12%) and significant elevation change.

**Applicant Response to 4D.** IFC D107.2 requires a minimum straight-line separation not less than one-half of the length of the maximum overall diagonal dimension of the property. The maximum overall diagonal dimension of the subject site is 1,918 feet, resulting in a minimum straightline separation of 909 feet. The proposed accesses on NE Crystallia Court and the eastern edge of the subject site on Sunrise Ridge Avenue provide 940 feet of separation, satisfying IFC D107.2 access separation requirements for two separate access roads.

**Parametrix Finding to 4D (9/3/26).** Comment not addressed. The two access points identified by the applicant do not meet the intent and purpose of IFC D107.2. The diagonal

distance of the property should be measured from the Road C/Sunrise Ridge Avenue intersection, as that is the access point to the area beings served.

**Applicant Response (10/5/26).** See Comment Response #3. The diagonal dimension provided in the Heath 7/17 comment response (1,918 ft) was a typographical error and should have read 1,818 feet, consistent with ESM documentation.

**Parametrix Finding (10/19/26).** Site access comments not addressed. Submittal #6 does not include an updated response from ESM related to the intent and purpose of codes PMC 17.80.060 and PMC 17.80.050(C) nor IFC 503.1.2. Both proposed accesses (Road C and Crystallia Court) rely exclusively on Sunrise Ridge Avenue NE.

Applicant response in Pinnacle@LB-Hinton-Engineering-Access-Road-Opinion-v1.pdf, included with Submittal #6, states:

Hinton Engineering's response: The distance measured and shown on Access Separation Exhibit Sheet EN-37 dated 06/24/2026 is acceptable as there is access from the north on Sunrise Ridge Ave NE. This is a separate and distinct access and does not require travel on Sunrise Ridge Ave NE from the project/site access point.

Per IFC D107.2, the diagonal distance of the property, if measured from the Road C/Sunrise Ridge Avenue intersection to the west boundary, would be approximately 1300 to 1400 feet. The two required fire-apparatus access roads would need be separated by no less than 650 to 700 feet. The distance between the Road C/Sunrise Ridge Avenue intersection and the proposed access on NE Crystallia Court is not more than 400 feet.

**4E.** No alternative mitigation (e.g., emergency access, sprinklering, roadway improvements) has been proposed in the TIA as required under PMC 17.80.050(C) and supporting provisions.

**Applicant Response to 4E.** The project proposes access via two distinct public streets and a new connection on Sunrise Ridge Avenue to the south, satisfying access criteria defined in PMC 17.80.050(C). See Response #4A.

**Parametrix Finding to 4E (9/3/26).** Comment not addressed. The two access points identified by the applicant do not meet the intent and purpose of codes PMC 17.80.060 (to provide redundant and efficient routes and connections and to provide superior emergency vehicle response time by providing multiple access to streets) and PMC 17.80.050(C) (to provide for at least two different standard routes for ingress and egress). The applicant does not discuss sprinklering in their response to comments.

**Applicant Response (10/5/26).** See Comment Response #3.

**Parametrix Finding (10/19/26).** Site access comments not addressed. Submittal #6 does not include an updated response from ESM confirming sprinkler systems will be installed.

**4F.** Based on the site conditions, including terrain, steep grades (~12%), and access limitations, the transportation information provided does not adequately demonstrate that the proposed access configuration satisfies the applicable emergency access provisions of IFC 503.1.2 and IFC D107.2.

**Applicant Response to 4F.** The NE Crystallia Court and Road C accesses satisfy IFC separation requirements for emergency access separation. See Response #4D.

**Parametrix Finding to 4F (9/3/26).** Comment not addressed. The two access points identified by the applicant do not meet the intent and purpose of IFC D107.2. The diagonal distance of the property should be measured from the Road C/Sunrise Ridge Avenue intersection, as that is the access point into the subdivision. The site access points do not meet IFC 503.1.2 because they both rely on a single road, Sunrise Ridge Road, to reach the regional roadway network, which conflicts with the codes requirement to provide "more than one fire apparatus road based on the potential for impairment of a single road by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access."

**Applicant Response (10/5/26).** See Comment Response #3.

**Parametrix Finding (10/19/26).** Site access comments not addressed. Submittal #6 does not include an updated response from ESM related to the intent and purpose of codes PMC 17.80.060 and PMC 17.80.050(C) nor IFC 503.1.2. Both proposed accesses (Road C and Crystallia Court) rely exclusively on Sunrise Ridge Avenue NE.

Per IFC D107.2, the diagonal distance of the property, if measured from the Road C/Sunrise Ridge Avenue intersection to the west boundary, would be approximately 1300 to 1400 feet. The two required fire-apparatus access roads would need be separated by no less than 650 feet. The distance between the Road C/Sunrise Ridge Avenue intersection and the proposed access on NE Crystallia Court is not more than 400 feet.

**4G.** Road D exceeds allowable dead-end length and the initial project phase (>30 lots) is served by a single route, which is inconsistent with subdivision access and phasing requirements per City code PMC 17.80.050(C) and Fire code IFC D107.1.

**4H.** Each division must meet access and safety requirements independently per PMC 17.60.040(C), which is not demonstrated.

**Applicant Response to 4G, 4H.** Road D has been shortened to 500 feet. This has prompted the removal of Lot 130. Additionally, Road D is planned to be constructed with Phase 3 of the project. Phase 1 will construct the entire looped roadway that Road D will then later tee off of to serve 20 units. The entire looped road is proposed to be constructed with Phase 1. Dead end road B will be built with Phase 2, and dead-end road D will be constructed with Phase 3. All phases will meet access and safety requirements independently when constructed in the noted order.

**Parametrix Finding to 4G, 4H (9/3/26).** Comment not addressed. Phase 1 will access the site via two streets that both rely on a single road, Sunrise Ridge Road, to reach the regional roadway network. This does not meet the intent and purpose of the city and fire codes to provide for at least two different standard routes for ingress and egress and to ensure the street system provides for the safe, orderly and efficient circulation of traffic, makes adequate provisions for fire and emergency access and protection, and makes appropriate provisions for the public health, safety, and welfare.

**Applicant Response (10/5/26).** See Comment Response #3.

**Parametrix Finding (10/19/26).** Site access comments not addressed. Submittal #6 does not include an updated response from ESM confirming sprinkler systems will be installed.

Applicant response in Pinnacle@LB-Hinton-Engineering-Access-Road-Opinion-v1.pdf, included with Submittal #6, states:

For a one- or two-family residential development, Appendix D Section D107.1 also provides an exception to the two-access-road requirement where more than 30 dwelling units are served by a single public or private fire-apparatus access road and all dwellings are equipped throughout with an approved automatic sprinkler system installed in accordance with IFC Section 903.3.1.3 (NFPA 13D). Based on this exception, access from two directions is not required by Appendix D.

Parametrix
let's create tomorrow, together

# Technical Memorandum

| | |
|---|---|
| DATE: | September 16, 2026 |
| TO: | Josh Ranes, P.E., City Engineer, City of Poulsbo |
| FROM: | Craig Buitrago, P.E., Parametrix |
| SUBJECT: | Pinnacle at Liberty Bay Connection Road Feasibility Independent Review |
| PROJECT NUMBER: | 553-2237-158 |
| PROJECT NAME: | Pinnacle Connection Road Peer Review |

---

This memorandum documents Parametrix's independent engineering review of available site data to determine feasibility of a public roadway connection from Baywatch Court NE to The Pinnacle at Liberty Bay development that crossing over Stream C (also referred to as Barrantes Creek) that meets engineering standards and requirements for emergency vehicle access.

The independent engineering review was done in two parts: first a review of the Applicant's engineering feasibility documentation, and second an independent engineering evaluation.

## Summary of Applicant's Feasibility Assessment

The documents reviewed were the Applicant's technical justification letters and critical areas report (CAR) and habitat management plan (HMP). The Applicant's engineering feasibility evaluations were prepared by ESM Consulting Engineers. The letter dated April 6, 2026, presents an explanation of design factors, and the letter dated July 21, 2026, responds to the City's letter of noncompliance to the Applicant and presents an explanation of design factors for an alternative road location. The Pinnacle at Liberty Bay Critical Area Report & Habitat Management Plan and Addenda, prepared by Sewall Wetland Consulting, Inc., and peer review letters by Grette Associates, describes the critical areas within the proposed development area, which includes Stream C.

The CAR & HMP and addenda describe Stream C as a Type F, fish bearing stream, and as having bankfull width (BFW) between 2-feet and 6-feet and notes that upstream of an existing culvert near the proposed crossing the channel consists of a BFW of approximately 4 feet, an upstream gradient of six percent, and moderate spawning gravels for fish species.

The technical design evaluations include a geometric analysis of possible roadway crossing alternatives over Stream C. The feasibility evaluations considered the following design factors:

- *Crossing Standard*: Per the City's finding that Stream C is fish-bearing, the crossing must comply with WAC 200-110-070 and WDFW 2013 Guidelines. This requires a bottomless structure with a minimum 3.0-foot vertical freeboard above the ordinary highwater mark/top of bank to allow for debris and sediment transport.
    - The crossing structure dimensions included in the evaluations have width of 14-ft and 3.0-foot vertical freeboard.
- *Max Grade*: Per City of Poulsbo Constructions Standards, the maximum allowable road grade is 12% .
- *Intersection Landing* per King County Road Standard Figure 2-013. This City adopted figure establishes the geometric profile and cross-slope tolerances for intersection landing requiring a flat approach zone extending 20 feet for residential streets from the major road's right-of-way line. Within this defined landing zone, the vertical profile is controlled to a 1-foot

maximum variation from the finished grade to eliminate abrupt transitions before vehicles enter the primary travel way.

- *Fire Truck considerations and Fire Access Standards*:
    - Truck: Poulsbo E-One Pumper; Length: 30 feet; Width: 8.33 feet, Ground Clearance: 1.1 feet
- *Bridge Deck Structural Thickness*: A preliminary structural thickness of the lid/slab at the crossing is estimate at 12-inches (1.0-foot) to support standard AASHTO HL-93 structural loading.
- *Roadway Section Cover*: A preliminary assumption of 12-inches of structural cover and pavement section is estimated to be necessary overtop of the bridge deck.
- *Total Structural Depth Assembly*: Incorporating a standard 1.0-foot precast structural lid with the 1.0-foot of structural cover establishes a 2-foot depth required between the final finished centerline road grade and the bottom of the crossing structure.

Both technical justification letters concluded that there is no mathematical solution that satisfies the mandatory WDFW 3.0-foot freeboard while also meeting City standards for road grade and emergency vehicle access, and therefore a roadway crossing at this location is technically infeasible.

## Independent Engineering Review and Findings

For the stream crossing, Parametrix reviewed the information provided by City of Poulsbo and performed a desktop review of available information on Stream C. The CAR & HMP and addenda and technical justification letters do not include a stream assessment, stream hydrology, or hydraulic calculations. The review conclusion is that there is no basis for the assumed dimensions of the stream crossing structure included in the technical justification letters for feasibility. It is true that stream crossings must comply with WAC 220-660-190 and the 2013 WDFW Water Crossing Design Guidelines. However, when considering design feasibility, the crossing structure type, size, and location varies depending on stream characteristics and geomorphology. Consequently, the stream crossing structure and roadway presented in the technical justification letter appear to be overly conservative for Stream C.

Parametrix also reviewed available online information for Stream C. The USGS StreamStats web application (https://streamstats.usgs.gov/ss/) and was used to delineate a drainage basin area, estimate channel width, and estimate hydrology based on Washington Region 3 Regression Equations. The WDFW's Fish Passage and Diversion Screening Inventory database webmap application (https://geodataservices.wdfw.wa.gov/hp/fishpassage/index.html) was used to determine if any WDFW habitat biologists had evaluated Stream C for crossings or barriers. Four site identification reports were found: three downstream (Site ID #936731, 936734, and 994328) and one upstream (Site ID #933725) of the possible Baywatch Court NE connector road.

From the Applicant's CAR & HMP, StreamStats web application, and WDFW Site ID reports, it is reasonable to assume the following:

1. Crossing Structure Span of 10-feet.
    a. Using BFW of 6-feet, and Equation 3.2 from the 2013 WDFW Water Crossing Design Guidelines (1.2 x BFW plus 2 feet and rounding up to nearest whole foot).
2. Vertical Clearance of 1-feet or 2-feet
    a. Based on 2013 WDFW Water Crossing Design Guidelines in Chapter 1 discussion for suggested clearances based on potential debris loading and stream sizes. While 3-

feet is a common bridge clearance, a smaller stream suitable for a culvert crossing should require less clearance such as, 1-foot clearance for small streams with BFW less than 8-feet, or 2-feet clearance for streams with BFW from 8-15 feet.

3. Stream Hydrology (based on StreamStats report using USGS Region 3 Regression Equation)
    a. Estimated Drainage Area = 0.06 square miles
    b. Mean Annual Precipitation = 36.84 inches
    c. 100-year design flood = 5.01 cubic feet per second (cfs).
        i. 100-year design flood is also referred to as 1% Annual Exceedance Percentage (AEP) flood.
    d. 500-year design flood = 0.2% Annual Exceedance Percentage (AEP) flood = 6.51 cfs.
        i. 500-year design flood is also referred to as 0.2% AEP.

## Independent Analysis Results

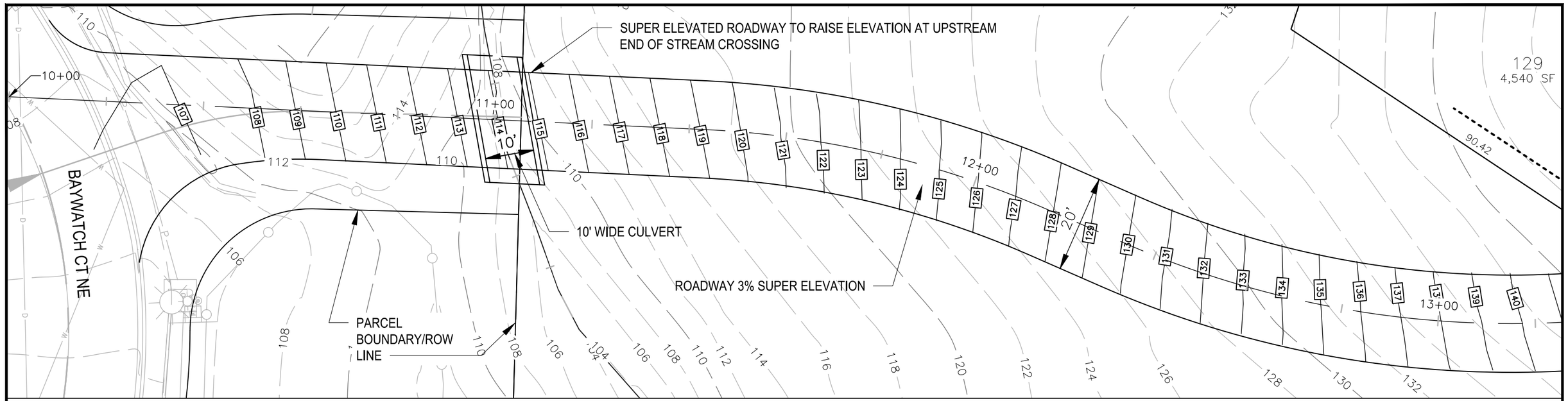
Parametrix used the stream crossing design parameters identified above as well as the roadway design factors and geometric design considerations listed above in the Applicant's feasibility assessment to analyze if a connection roadway is feasible.

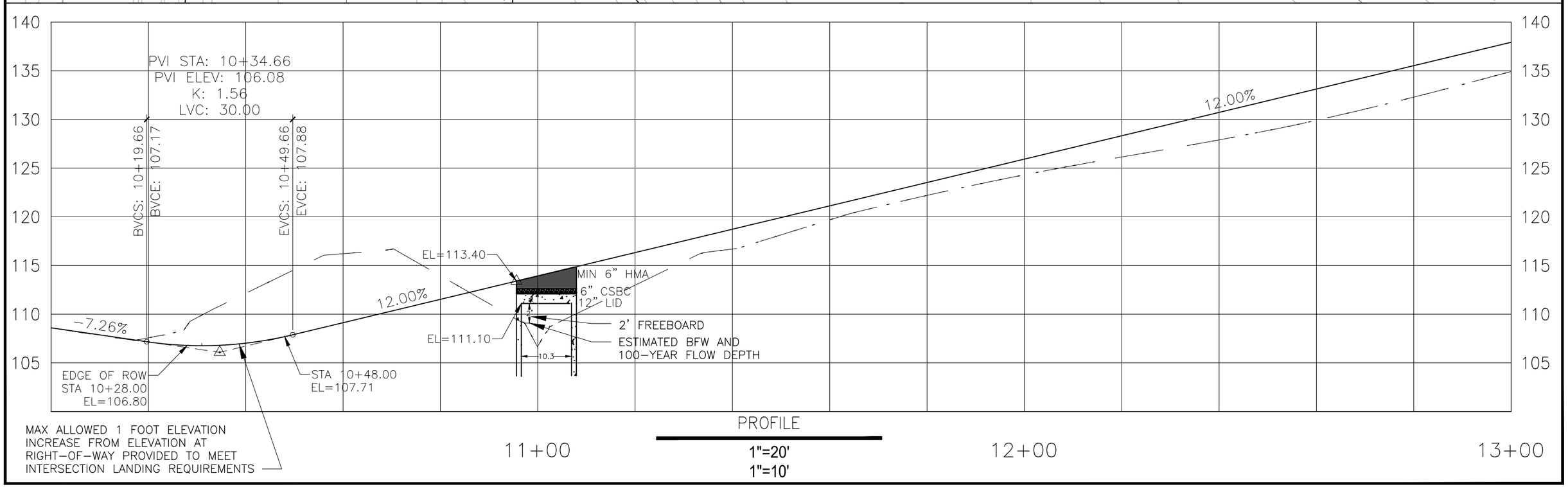
The result of the design analysis is that it is possible to design a connector roadway from Baywatch Court NE to the proposed land development that meets the road requirements described in this memo, and using the stream crossing structure dimensions of 10-feet minimum span and vertical clearance assumption of 2-feet. Figure 1 provides a depiction of a feasible design.

It should be noted that this preliminary design analysis presents one feasible alternative for a connector road over Stream C, and the analysis does not include all design (stormwater, geotechnical, structural engineering, etc.) and construction elements required for final design and permitting. For example, in addition to obtaining City permits for the connection roadway, the Applicant would also need to obtain a HPA permit from WDFW for the stream crossing, and a stream assessment and design report would be necessary to confirm the crossing design.

## Conclusion

Parametrix performed independent engineering analysis and concludes that it is feasible to design a connector road based on the reasonable design assumptions noted in the independent review, findings, and analysis results sections above (see Figure 1).




Parametrix

DATE: September 16, 2026

FILE: 0004022SCN – JMR_CAB

0 N 20

1 INCH = 20 FT.

# FIGURE 1

CONNECTION ROAD ALTERNATIVE
PLAN AND PROFILE

# City of Poulsbo

200 NE Moe Street
Poulsbo, WA 98370
(360) 779-4078

# TRANSPORTATION CONCURRENCY APPLICATION

**DATE:** _____

**PROJECT:** Pinnacle at Liberty Bay

**ASSESSOR #:** mutliple - see below (Tax Lot #)

**LOCATION** *(address/street)*: 17505 Sunrise Ridge Ave NE + 4 vacant parcels

**APPLICANT:** Montebanc Management, LLC (Company name if applicable) Phone: (425) 894-4043

Address: 400 NW Gilman Blvd, STE 2781, Issaquah, WA 98027

Print Name of Individual: Paul DeVenzio, Manager

Signature: Paul J. DeVenzio III Date: 6/17/25

**OWNER:** Johnson Forest Land, LLC Phone: 206-422-1568

Address: 1913 34th Ave W, Seattle, WA 98199

**Legal status of Applicant** with respect to the land: Contract Purchaser

Tax IDs : 23260140012009, 24260130032008, 24260130182001, 24260130052006, 24260130192000

| **PROJECT INFORMATION** | **New Average Daily Trips (ADT)** |
|---|---|
| ☐ **Short Plat** Number of Lots _____ | _____ |
| ☒ **Long Plat** Number of Lots 151 | 1474 |
| ☐ **Commercial / Multi-family / Other** | |
| Proposed Land Use _____ | |
| Square Feet of Gross Floor Area _____ | |
| Number of Dwelling Units _____ | |
| **Total** | _____ |
| Existing Land Use (credit) vacant | 0 |
| **Total New Average Daily Trips** | 1474 |

**Traffic Impact Analysis Required** (>300 new ADT) ☑ Yes ☐ No

July 21, 2026 Job No. 2090-004-022

Mr. Joshua M. Ranes, P.E.
Mr. Michael Bateman, P.E.
City of Poulsbo
200 NE Moe St
Poulsbo, WA 98370

**RE: Pinnacle at Liberty Bay PRD, P-06-20-25-03**
**Noncompliance with PMC 17.80.050 and 17.80.060 – Response Letter**

Dear Mr. Ranes and Mr. Bateman:

ESM Consulting Engineers, LLC, is submitting the following responses to the Memo that was received from you dated June 15, 2026. In an effort to provide concise and direct responses, we have copied the review comments below in *italics* and our responses are in **bold**.

The purpose of this memo is to document staff's findings regarding the proposed Pinnacle at Liberty Bay Planned Residential Development (PRD) and Preliminary Subdivision. Staff has determined that, as proposed, the project does not satisfy the City's adopted requirements for neighborhood street connectivity and multiple points of vehicular ingress and egress as required by the Poulsbo Municipal Code (PMC), Construction Standards, Transportation Plan, and adopted Comprehensive Plan goals and policies.

*PMC 17.80.060 – Street Connectivity*

- *The proposal does not construct the planned public street connection identified as Future Street NR-12 in the City's adopted Comprehensive Plan (Figure TR-3: 2044 New Roadway Segments Map) by connecting to Baywatch Court NE.*
- *The proposal does not provide the level of public street connectivity contemplated by the City's adopted transportation network to support multiple emergency response routes as well as future neighborhood connectivity. As proposed, large portions of the subdivision rely on a single primary access corridor, reducing roadway redundancy and limiting emergency vehicle access if that route becomes blocked or impassable.*

*PMC 17.80.050 – Street Standards*

- *The subdivision does not provide 2 independent public street routes for vehicular ingress and egress.*
- *Large portions of the development rely on a single internal circulation route, reducing transportation network redundancy and limiting emergency access should the primary roadway become obstructed.*

**RESPONSE: The Applicant respectfully disagrees with the above conclusions. See analysis in Heath & Associations TIA Comment Response at 4 (Responses to Comments 4A and 4B) dated July 20th, 2026.**

*To achieve compliance with the City's adopted street connectivity standards, staff recommends the following conditions (or similar at time of Hearing):*

- *Condition 1 - Baywatch Court Connection. Prior to final plat approval, the applicant shall construct a public street connection between the proposed subdivision roadway system and Baywatch Court NE, consistent with the City's adopted Future Street Plan (NR-12), unless an alternative alignment is approved by the City Engineer that provides an equivalent level of public connectivity, consistent with PMC 17.80.060 and 17.80.050.*
- *Condition 2 - Future Street Connection. Prior to final plat approval, the applicant shall dedicate and construct, or dedicate sufficient right-of-way for, a future public street connection to the adjacent southerly property (Parcel No. 252601-2-034-2002 and 252601-2-044-2000), in a location approved by the City Engineer, consistent with PMC 17.80.060.*

**RESPONSE: As detailed below and in the attached submittals, these conditions are not required to meet applicable City standards.**

*The proposed Pinnacle at Liberty Bay PRD and Preliminary Subdivision consists of 138 detached single-family lots on 5 parcels totaling approximately 41 acres. The site presents topographic and environmental constraints, including approximately 223 feet of elevation change across the property, steep hillside terrain northeast of State Route 305, three regulated streams with associated wetlands and buffers, and areas of geologically hazardous slopes. These physical constraints have influenced the proposed street layout and are central to evaluating the project's compliance and findings with the City's requirements for street connectivity, multiple points of access, and emergency vehicle circulation.*

*As proposed, the primary access to the project is provided by Sunrise Ridge Ave NE, a residential collector. The project includes 23 lots that will have direct access to Sunrise Ridge Ave NE. The remaining 115 lots are serviced by an internal looped road system that connects to Sunrise Ridge Ave NE at two locations approximately 330 feet apart.*

**RESPONSE: This statement is factually incorrect. The project proposes access to NE Crystallia Court and to Sunrise Ridge Avenue NE, providing two distinct public street connections to the site. Sunrise Ridge Avenue NE provides an approximately 390-foot centerline separation between NE Crystallia Court and the proposed Road C intersection. See analysis in Heath & Associations TIA Comment Response at 4 (Responses to Comments 4A and 4B) dated July 20th, 2026.**

*Public safety and emergency response are fundamental considerations in the design of the City's transportation network and development projects. As currently designed, and absent the recommended conditions of approval, it is the determination of the City Engineer and staff that the project's proposed location, size and design do not provide the level of roadway redundancy and emergency access intended by the City's adopted codes, standards, and Comprehensive Plan to protect the public interest, health, safety, and welfare of the City. The site's topography, significant elevation changes, surrounding critical areas, and reliance on a single primary access corridor create a roadway network with limited redundancy and increase the potential for portions of the subdivision to become isolated should Sunrise Ridge Avenue NE become blocked or otherwise inaccessible.*

**RESPONSE: The road section crossing Barrantes Creek was eliminated as infeasible following classification of Barrantes Creek as a fish-bearing stream by the City's peer review consultant, Grette Associates, as described in response to the City's Technical Revision No. 2 (April 10, 2026). Additional comments regarding feasibility are addressed with this submittal. Regarding risk of blockage, see analysis in Heath & Associations TIA Comment Response at 4 (Responses to Comments 4A and 4B) dated July 20th, 2026.**

*In addition to the safety concerns, the project does not fully implement the City's adopted codes, standards, and policies for neighborhood connectivity and redundant roadway networks. The absence of connectivity to existing future road connections and neighboring parcels further limits the redundancy and connectivity envisioned by the City's adopted transportation network. The City's adopted codes, standards and policies support and require interconnected public streets that provide neighborhood circulation, future connectivity, roadway redundancy, and emergency access.*

**RESPONSE: The project meets all City codes, standards and policies for neighborhood connectivity and redundant roadway networks as detailed in the responses and reports provided with this resubmittal while entirely avoiding impacts of constructing a stream crossing to Barrantes Creek, a fish-bearing stream, consistent with the City's adopted Critical Area Ordinance and the Suquamish Tribe's December 19, 2025 comments.**

*The City's adopted Comprehensive Plan (Figure TR-3) and Transportation Comprehensive Plan (Figure 6-2) provides the City's long-term project and roadway connectivity map. There are two required roadways from the City's New Roadway map within the Pinnacle at Liberty Bay project area. Required roadway NR-13 is the completion of Sunrise Ridge Ave NE extension connecting between the existing Crystal View subdivision and Johnson Parkway NE. Johnson Parkway NE was recently completed by the City. The Sunrise Ridge extension currently exists as an emergency access roadway connecting to and constructed by the Crystal View subdivision as a condition of approval for that subdivision (P-06-22-09-01). Required roadway NR-12 connects NR-13 with the existing planned roadway stub in the Baywatch subdivision to the West.*

*Per PMC 17.80.060(A), PMC 17.80.050(C)(2), and the City's adopted 2044 New Roadway Segments Map (TR-3), the Pinnacle at Liberty Bay PRD project is required to complete both new roadway segments NR-12 and NR-13. Completion of these roadway segments is necessary to implement the City's adopted transportation network, mitigate transportation impacts created by the proposed subdivision, and provide improvements that are roughly proportional to those impacts.*

**RESPONSE: The project is completing new roadway segment NR-13. For the reasons detailed elsewhere in this submittal, the Applicant cannot feasibly construct the crossing of Barrantes Creek required to complete new roadway segment NR-12 to connect to Baywatch. While this segment is included in the 2025 Comprehensive Plan, the City's 2024 Best Available Science analysis upon which the Comprehensive Plan was based identified Barrantes Creek as non-fish bearing. The City's peer review consultant, Grette Associates, has since determined it is fish-bearing based on site-specific analysis, which requires greater clearance. Both the Comprehensive Plan and City code allow for deviations in alignment of Comprehensive Plan roadways based upon various considerations, including topography, natural features, or other conditions which make achievement of a planned alignment impractical. PMC 17.80.060(A)(1) and Comp Plan Policy TR-6.2. Such is the case here. Further, the Applicant has submitted a TIA confirming that there are no unmitigated transportation impacts resulting from the project even with elimination of the Baywatch connection.**




*The Pinnacle at Liberty Bay provides two primary access points from Sunrise Ridge Ave NE serving the majority of homes in the subdivision. One access point (Road C) connects directly to the new NR-13 segment of Sunrise Ridge Avenue NE to be constructed as part of the project. The second access point connects to Sunrise Ridge Avenue NE via the planned extension of NE Crystallia Court within the existing Crystal View subdivision. Together, this internal looped roadway system provides primary access to 115 of the proposed 138 residential lots. The remaining 23 lots are served by two private access roads (Tracts M and N) and ten individual driveways with direct access to Sunrise Ridge Avenue NE. Although the subdivision includes two access points to Sunrise Ridge Avenue NE, both ultimately rely on the same public roadway corridor for ingress and egress from the development.*

*The two primary access points have an effective access distance along Sunrise Ridge Ave NE being approximately 330' apart. Tracts M and N access Sunrise Ridge Ave NE approximately halfway between the two primary access points. All of these connections access a single road - Sunrise Ridge Ave NE.*




*Providing the required new roadway segment NR-12 connecting to the existing Baywatch subdivision satisfies the City's adopted Future Roadway Segments Map, neighborhood connectivity requirements, and the requirement for multiple redundant connections accessing different streets as required by PMC 17.80.050 and 17.80.060. This connection also satisfies International Fire Code (IFC) section 503.1.2 Additional Access where there is the potential for impairment of a single road by vehicle congestion, conditions of terrain, climactic conditions and other factors that could limit access, as well as IFC Appendix D D107.2 Remoteness requirements for distance between access points. Constructing this required roadway connection further mitigates the project's transportation impacts by avoiding the concentration of project traffic on a single roadway (Sunrise Ridge Avenue NE) and distributing trips across the surrounding street network, providing more direct westbound access to SR 305 for residents in the western portion of the development.*

**RESPONSE: As noted above, the above analysis is incorrect in several material respects, including but not limited to that Fire Code provisions are not satisfied. In fact, they are. See analysis in Heath & Associations TIA Comment Response at 4 (Responses to Comments 4A, 4B, 4D, 4E, and 4F) dated July 20th, 2026 and the previously submitted Access Separation Exhibit dated June 24, 2026.**

*Additionally, the Baywatch connection provides a more direct route with greatly reduced grade limitation for most of the route to the subdivision for emergency response and shortens the emergency response route distance to homes in the Road D cul-de-sac from approximately 2.1 miles via Sunrise Ridge Ave NE from the North and 2.7 miles via SR305/Johnson Parkway from the South to approximately 1.6 miles via SR305/Baywatch Ct NE.*

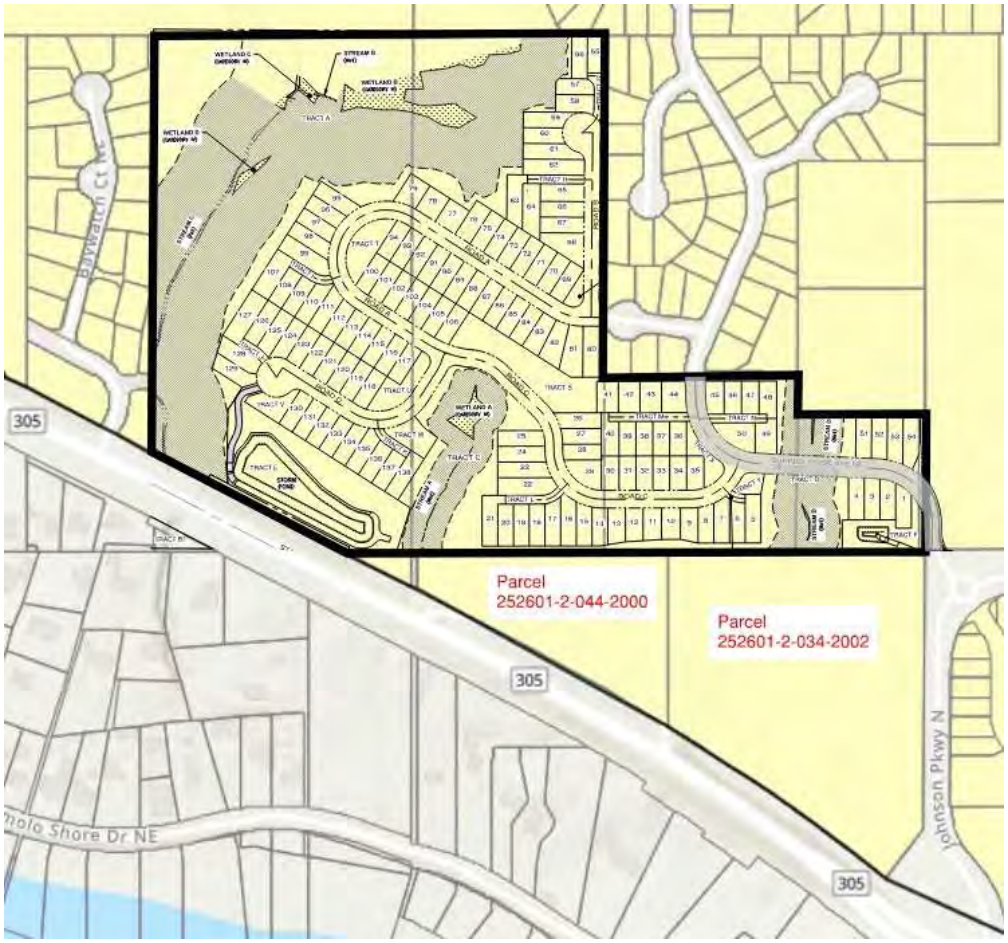
**RESPONSE: While it may be more direct, the Baywatch connection to the west cannot feasibly be built to City standards, as documented elsewhere with this resubmittal. Regarding emergency response times, the Applicant previously submitted an analysis of Emergency Response Times prepared by Heath & Associates showing in enclosed Figure 2, is adequate emergency access to the project from north and south which experience de minimis changes without the Baywatch connection.**

*The project is proposed to be constructed in three divisions. Per PMC 17.60.040(C), all divisions must meet all requirements independently from any other division. Under the current proposal, without construction of the Baywatch connection, the first division will have over 30 homes accessed from a single roadway, violating the requirements of PMC 17.80.050(C) and IFC D107.1. Sprinklering of those homes would be required in addition to any other mitigation deemed appropriate by the Fire Code Official and City Engineer. Construction of the NR-12 Baywatch connection during the first division would eliminate the need for residential fire sprinklers required solely due to the single-access limitation under IFC Appendix D.*

**RESPONSE: This comment is incorrect. The entire looped road (Roads A and C) will be constructed with Phase 1; dead end Road B will be constructed with Phase 2, and dead-end Road D will be constructed with Phase 3. The Applicant notes that even if the analysis were correct, it could be addressed with a condition requiring residential fire sprinklers in Phase 1.**

*There are two adjacent properties to the South of the project that do not currently have a feasible connection showing from the Pinnacle at Liberty Bay properties - property tax id 252601-2-034-2002 and 252601-2-044-2000. The applicant is required to demonstrate the feasibility of providing these future street connections, unless exempted by the City Engineer pursuant to PMC 17.80.060(B)(6). When required, demonstration of the feasibility of providing the connection must be included in the development permit application per PMC 17.80.060(B)(4). During the public comment period, the owner of property tax id 252601-2-034-2002 requested connection to that property from the Pinnacle at Liberty Bay project be provided. As of the date of this memo, the applicant has not requested an exemption from these requirements, the City Engineer has not granted an exemption, and no documentation demonstrating the feasibility of the future street connections has been submitted.*

**RESPONSE: The Applicant notes that the City did not request any analysis of connectivity to the southern parcels as part of the two rounds of earlier City review which preceded elimination of the proposed Baywatch connection. Notwithstanding this earlier omission, the Applicant has completed the requested analysis and determined connections are not feasible to provide to the two identified parcels See attached letters requesting exemptions to providing connection of both parcels under PMC 17.80.060(B)(6).**




*Findings of Fact*

*The requirement to provide new roads NR-12 and NR-13 is directly related and proportionate to the transportation impacts generated by the proposed subdivision. These roadway improvements implement the City's adopted Comprehensive Plan, Transportation Comprehensive Plan, and development regulations; support the City's obligations under the Growth Management Act to provide an adequate transportation system to serve planned growth; improve neighborhood connectivity, roadway redundancy, and emergency access; and are feasible to construct as part of the proposed development.*

*Conclusion*

*The requirement for construction of planned roadways NR-12 (Baywatch connection) and NR-13 (Sunrise Ridge Ave NE extension) per City codes and standards is a proportional requirement to mitigate new impacts to street connectivity, access, egress and public safety caused by the construction of the Pinnacle at Liberty Bay project. This requirement is also consistent with how other development projects throughout the City have been required to provide connections to existing and planned future roadway networks. The required improvements are also consistent with prior City actions requiring transportation connectivity despite environmental constraints, including the adjacent Crystal View subdivision, which constructed an emergency access roadway across a stream, and the Johnson Parkway project, which required crossings of two streams and approximately 2.3 acres of wetland mitigation to implement the City's adopted transportation network. . Both of these projects directly benefited the Pinnacle at Liberty Bay project and are consistent with the requirements of the Pinnacle development.*

*Minor deviations to the City's Engineering Construction Standards, as authorized by Section 1(C) may be approved by the City Engineer to facilitate construction of the NR-12 Baywatch connection and should be evaluated before concluding that the required roadway connection is infeasible. If detailed analysis demonstrates to the City Engineer's satisfaction that providing the required public roadway connection is infeasible, construction of an emergency access point with pedestrian accommodations to the Baywatch subdivision shall be completed to mitigate project impacts to the extent feasible.*

*Construction of roadway segments NR-12 (Baywatch connection) and NR-13 (Sunrise Ridge Avenue NE extension) shall be required as conditions of approval for the project.*

*Demonstration of the feasibility of providing future public street connections to Parcel Nos. 252601-2-034-2002 and 252601-2-044-2000, as required by PMC 17.80.060, shall be required as a condition of approval and reflected in the project plans and supporting application materials.*

*Basis for connectivity and access requirements*

*The City Engineer is required by Poulsbo Municipal Code to make findings in the plat approval process specific to street connectivity, access to adjacent parcels and multiple points of access and egress. The City's adopted codes, engineering standards, and policies establish the applicable findings and decision criteria contained in PMC 17.60.040(A) & (B) and PMC 18.260.140(A), (B), (I), (J) & (L). These findings evaluate whether the proposed development adequately addresses its impacts on street connectivity, access, egress, roadway redundancy, and public safety while complying with the City's adopted regulations. As currently proposed, staff cannot make these required findings without the recommended conditions of approval.*

*Multiple points of access and egress are necessary to mitigate the transportation and public safety impacts generated by the proposed subdivision. These impacts include connectivity issues, need for sufficient and redundant emergency access, and roadway*

*system redundancy. Specifically, PMC 17.80.050(C) requires that preliminary plats shall provide at least two different routes for ingress and egress. Additionally, per PMC 17.80.050(C)(2), when only one public street provides primary access to the entrance points of a residential subdivision, an additional emergency access road must be established that connects to a different road than the primary access points.*

*PMC 17.80.060(B) requires new subdivisions to connect to, or provide future connections for, adjacent properties. Additionally, PMC 17.80.050(C)(2)(a) establishes emergency access requirements, while PMC 17.80.060 requires an interconnected street network that provides future connectivity and roadway redundancy.*

*PMC 17.80.050(C) and PMC 17.80.060(B)(6) authorize the City Engineer to approve limited exemptions from certain street connectivity requirements under specific circumstances, provided appropriate mitigation measures are implemented. These measures may include, but are not limited to, residential fire sprinklers, roadway widening with turnouts, or phased development, as provided in PMC 17.80.050(C)(2)(b)(ii). It is important to note that while sprinklering of homes does provide significant life safety benefits in the event of structure fire, emergency access decisions must also include consideration of redundant access to homes to minimize response times and provide access alternatives to medical emergencies in all weather conditions.*

RESPONSE: The Applicant disputes the above findings and conclusions for the reasons noted above and in the technical analyses submitted concurrently with this response, and therefore respectfully objects to the imposition of corresponding proposed conditions of approval requiring the project to construct roadway segment NR-12 as well as the future public street connections to the properties to the south.

*References*

*Note that Poulsbo Municipal Code is the implementation of the City's Comprehensive Plan policies. As such, relevant comprehensive plan policies are included here to inform interpretation of municipal code being referenced and analyzed in this document.*

RESPONSE: The Applicant notes that the references to the Comprehensive Plan and municipal codes provided in this analysis relate exclusively to connectivity and transportation and fail to consider consistency or compliance with other equally applicable City goals, policies, and codes relevant to construction of a stream crossing over Barrantes Creek now that it has been identified as a fish bearing stream. These include, but are not limited to, the following:

COMPREHENSIVE PLAN

Policy NE-1.1: The City shall protect critical areas, habitat and the natural environment through land use plans, surface water management plans and programs, comprehensive park plans, development regulations and site-specific project review.

Policy NE-1.2 The City shall maintain regulations such as the Critical Areas Ordinance (CAO), which provide protection for all regulated critical areas – a) wetlands; b) areas with a critical recharging effect on aquifers (aquifer recharge areas); c) frequently flooded areas; d) fish and wildlife habitat conservation areas; and e) geologically hazardous areas. The City's CAO development standards shall incorporate and utilize appropriate and applicable best available science for purposes of designating and protecting all regulated critical areas and give "special consideration" to conservation and protection measures for anadromous fisheries.

Policy NE-1.4 The City shall promote innovative and environmentally sensitive practices techniques in site planning, design, materials selection, construction, and maintenance.

Policy NE-1.5 The City shall support environmental stewardship on private and public lands through partnerships and voluntary efforts to protect, restore and enhance the quality and functions of the City's critical areas and associated buffers.

GOAL NE-6 Protect biological diversity by appropriately regulating fish and wildlife habitat conservation areas.

Policy NE-6.1 The City's Critical Areas Ordinance shall require vegetative buffers along surface waters to protect anadromous fish and wildlife habitat. New development shall be subject to buffers or resource management areas, as identified in the Critical Areas Ordinance and other applicable development standards.

Policy NE-6.2 The City shall protect the natural habitat functions of listed or candidate Endangered Species. The City's Critical Areas Ordinance shall establish appropriate protection measures and procedures for habitat conservation.

Policy TR-6.6 Ensure environmental protection, water quality, and other applicable environmental standards, through best management practices during the design, construction, and operation of the City's transportation system, including:

- Design transportation improvements consistent with City's stormwater regulations, striving for enhanced water quality standards, and minimizing impacts to fish and wildlife habitat areas.

<u>Poulsbo Municipal Code</u>

PMC 16.20.320(I) Road/Street Repair and Construction. Public road or street repair, maintenance, expansion or construction may be allowed in fish and wildlife habitat conservation areas or their RMZs subject to the following development standards:

1. No other reasonable or practicable alternative exists;

PMC 16.20.155, "Mitigation" means an action or set of actions undertaken to avoid, minimize or compensate for adverse critical area impacts. Mitigation includes the following steps, in sequential order (WAC 197-11-768):

A. Avoiding the impact altogether by not taking a specific action or part of an action.

B. Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps to avoid or reduce impacts.
C. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
D. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
E. Compensating for the impact by replacing, enhancing or providing substitute resources or environments.
F. Monitoring the impact and taking the appropriate corrective measures.

[remainder omitted]

Should you have any questions or require additional information, please do not hesitate to contact us at (253) 838-6113.

Sincerely,

ESM CONSULTING ENGINEERS, LLC



ROBBY OVERFIELD
Project Manager

Encl. Figure, 1, Figure 2

\\esm8\engr\esm-jobs\2090\004\022\document\letter-017.docx

September 16, 2026 Job No. 2090-004-022

Mr. Joshua Ranes
City of Poulsbo Engineering Department
200 NE Moe St
Poulsbo, WA 98370

**RE: City Engineer Exemption Connection to Parcel 252601-2-034-2002**
**(Divoky Property)**
**Pinnacle at Liberty Bay Preliminary Plat and Planned Residential Development**
**P-06-20-25-03**

Dear Mr. Ranes:

M onsulting ngineers, is requesting an exemption from the ity's connectivity requirement for the Divoky property south of the proposed Pinnacle at Liberty Bay development.

The request is being made in relation to PMC 17.80.060(B)(6)(a-d) and is based on the criteria that the revised design provides the same result, or a better one, without creating safety or operational issues, without causing maintenance or cost problems, and in a way that is allowed by City, state, and federal requirements. The overall site design is also intended to meet code requirements for vehicle, traffic, and pedestrian safety, sight distance, emergency access, and utility service.

PMC 17.80.060(B)(6)The City Engineer may exempt the requirement for street connectivity under the following circumstances:

*A. There are existing and available connections to collector or arterial streets*

**The Divoky property has fronting access along 500 feet of Johnson Parkway NE, a collector roadway.**

*B. The existing development and ownership pattern, site and/or surrounding area's topography make connectivity technically and physically unfeasible*

**There are two physical (not necessarily feasible) areas for a connection to the Divoky property from the proposed Pinnacle at Liberty Bay plat. The feasibility of each is discussed below. Refer to enclosed figure for a depiction.**

**<u>Connection #1, from Pinnacle at Liberty Bay Road C</u>**
**The proposed Pinnacle at Liberty Bay Road C is situated approximately 140 LF north of the Divoky property. Pinnacle Plat Road C is designed at elevation 230 at**

its lowest point where it is adjacent to the Divoky property. This low point is approximately 130 feet north of the Divoky property line and 48 feet higher in elevation. Extending a road across this distance holding the maximum allowed slope of 12% would result in the road being elevated approximately 32 feet above existing grade at the Divoky property.

Result: Road stub would be elevated too high at the Divoky property line.

Connection #2, from Sunrise Ridge at Southeast Corner of Pinnacle at Liberty Bay
This connection location was originally identified by City staff. However, analysis of the site geometry reveals that establishing a public street connection to Sunrise Ridge Avenue NE to the Divoky property is infeasible under City and State design criteria. Two different options off of Sunrise Ridge were evaluated. The findings of each are detailed below:

Connection #2 - Option A

This option considered a future public right-of-way connection to the Divoky property near the southeast corner of the Pinnacle Plat. However, a connection in this location would not meet the ity's minimum intersection spacing requirements.

Section 2, Item 11 of the City of Poulsbo Construction Standards requires at least 125 feet of spacing between intersections. For this location, the spacing from Johnson Parkway is measured using the 'access spacing and corner clearance' methods in WSDOT Design Manual Chapter 520. Under those methods, the distance is measured along the main road from the outside edge of the roundabout's traveled way to the centerline of the proposed connection.

The enclosed figure shows that after applying the required 125-foot clearance from the Johnson Parkway roundabout, only 80 feet remains between the proposed connection and the City-approved Audrey Estates intersection. Since the City also requires 125 feet of spacing from that adjacent intersection, there is not enough distance available to place a compliant public street connection between Audrey Estates and the Johnson Parkway NE roundabout.

Connection #2 - Option B

The infeasibility of Option A led to the consideration of an intersection directly at the Audrey Estates connection creating a 4-way intersection. The location of a future connection at this intersection presents a new issue, entering sight distance challenges. This is a challenge for particularly a right-turn maneuver onto Sunrise Ridge Ave NE where a driver would be required to look left up Sunrise Ridge Ave NE.

Under AASHTO Case B2 (Right Turn from a Stop) for a 25-mph design speed, the baseline required Intersection Sight Distance on flat ground is 240 feet. This metric relies on a 6.5-second time gap ($t_g$) for a driver stopped on the minor leg to

evaluate a gap, execute a right turn, and accelerate up to speed without forcing oncoming major-road traffic to decelerate.

The resulting sight distance triangle from Connection Option 2B has been mapped on the enclosed Figure 1. It is revealed that the oncoming major road approach (Sunrise Rive Ave) introduces a driver orientation hazard. Because the intersection would be placed on the inside of a horizontal curve, a driver stopped at the stop bar preparing to turn right is forced to rotate their line of sight well beyond 90 degrees (approximately 120 degrees) from the forward vehicle axis to scan for oncoming traffic approaching down Sunrise Ridge Ave NE.

Standard human factors guidelines (*FHWA Highway Design Standards* and *NCHRP Report 600*) establish that comfortable driver neck rotation is limited to 60 to 75 degrees. Requiring a driver to look back past 90 degrees is a movement that is particularly restrictive or impossible for older drivers or those with neck mobility limitations.

Additionally, at sight angles exceeding 90 degrees, a driver's line of sight no longer passes through the vehicle's side window. Instead, oncoming traffic is completely obstructed by the vehicle's driver-side B-pillar, headrest, and door frame.

These sight distance failures created by an access at the Audrey Estates renders this 4-way intersection layout geometrically undesignable and structurally unsafe.

A separate evaluation was done to see if the Option 2B connection could be further skewed to reduce the 120-degree viewing angle. However, the potential ROW connection is already sitting at the maximum 30-degree skew (60-degree intersection) as allowed by the city. This skew angle is depicted on Figure 1.

C. *Temporary emergency vehicle access is provided, and street connectivity will occur in the future*

- The Divoky property is currently undeveloped. Emergency vehicle access is provided along the existing 500+ feet of Johnson Parkway NE. Future street connectivity can additionally be provided from Johnson Parkway NE.

D. *The street connection is not identified on the comprehensive plan transportation map series*

- h e ity's transportation maps do not show a future public street to the Divoky property.

## Conclusion

A physical connection to the Divoky property would violate intersection-spacing requirements within the functional area of the Johnson Parkway roundabout and create critical entering sight-distance hazards.

The Divoky property retains 500 feet of direct access along Johnson Parkway NE, which preserves emergency access, and no street connection is identified on the City's Comprehensive Plan Map. Granting this exemption therefore upholds the intent of City code without compromising public safety or operational efficiency.

Therefore, the applicant requests that the City Engineer approve this exemption from the street connectivity requirement for the Pinnacle at Liberty Bay project.

Should you have any questions or require additional information, please do not hesitate to contact us at (253) 838-6113.

Respectfully,

ESM CONSULTING ENGINEERS, LLC

BRANDON LOUCKS, P.E.
Project Manager

Encl. Figure 1

\\esm8\engr\esm-jobs\2090\004\022\document\letter-015.docx

A PORTION OF THE SE 1/4 OF SECTION 23, TWP. 26 N., RGE. 1 E.,WM

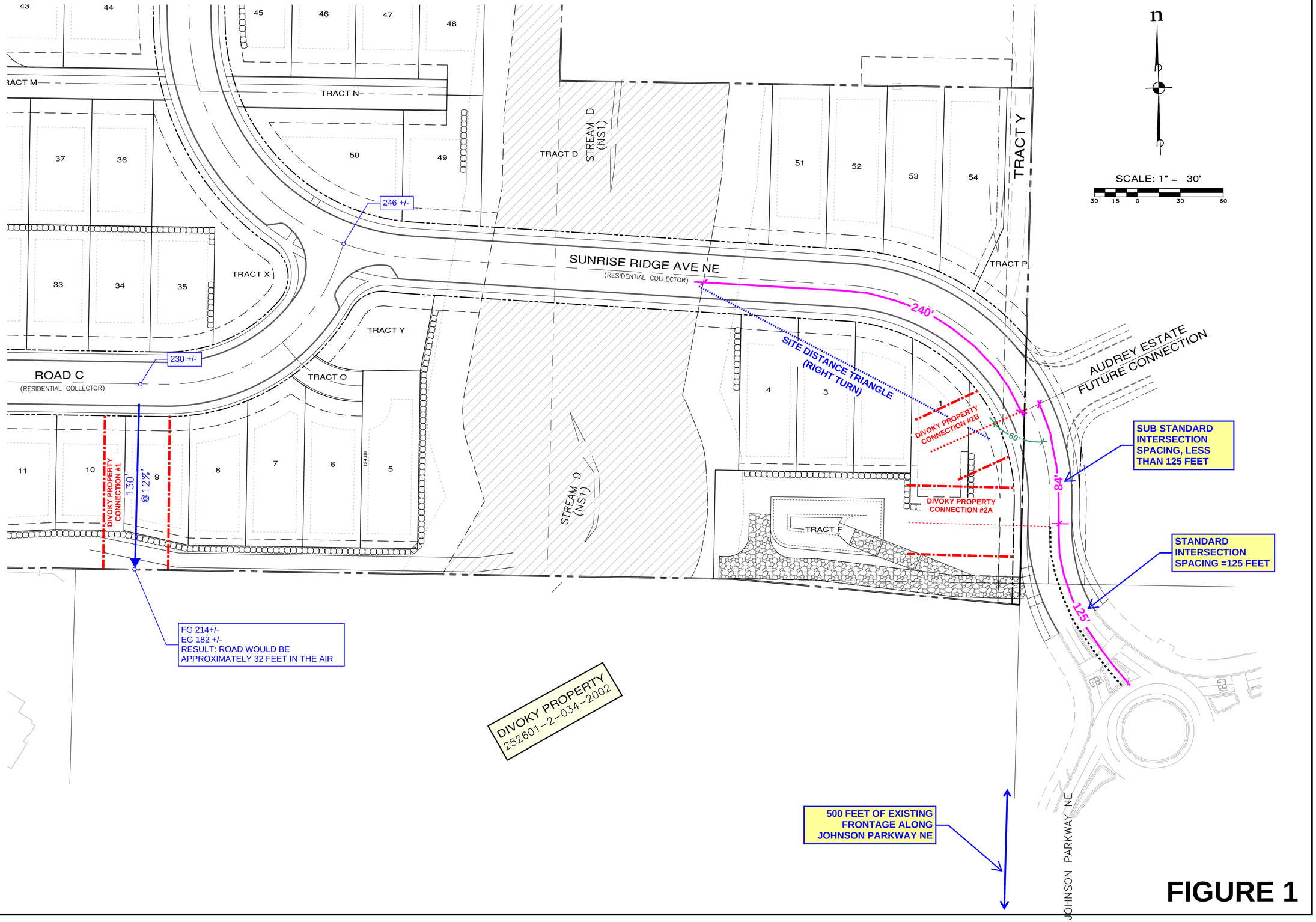



**FIGURE 1**

REVISIONS

| NO. | DESCRIPTION/DATE | BY |
|---|---|---|
| | | |


ESM CONSULTING ENGINEERS, LLC
32001 32nd Ave S, Suite 200
Federal Way, WA 98001
FEDERAL WAY (253) 838-6113
LYNNWOOD (425) 337-3300
www.esmcivil.com
Civil Engineering | Land Surveying | Land Planning
Public Works | Project Management | Landscape Architecture


MONTEBANC MANAGEMENT, LLC

PINNACLE AT LIBERTY BAY SUBDIVISION

CITY OF POULSBO | DIVOKY PROPERTY ACCESS FEASIBILITY | WASHINGTON

| | |
|---|---|
| JOB NO.: | 2090-004-022 |
| DWG. NAME: | PP-08 |
| DESIGNED BY: | |
| DRAWN BY: | |
| CHECKED BY: | |
| DATE: | 07/21/2026 |
| DATE OF PRINT: | |

EN-39

1 OF 1 SHEETS


File: \\esm01\ENGR\ESM - JOBS\2090\004\022\exhibit\EN-39.dwg
Plotted: 7/20/2026 4:06 PM
Plotted By: Brandon Loucks

September 16, 2026 Job No. 2090-004-022

Mr. Joshua Ranes
City of Poulsbo Engineering Department
200 NE Moe St
Poulsbo, WA 98370

**RE: City Engineer Exemption Connection to Parcel 252601-2-044-2000 (Skelley Property)**
**Pinnacle at Liberty Bay Preliminary Plat and Planned Residential Development**
**P-06-20-25-03**

Dear Mr. Ranes:

ESM Consulting Engineers, LLC is requesting an exemption from the City's connectivity requirement for the Skelley property south of the proposed Pinnacle at Liberty Bay development. The site plan has been revised based on existing site conditions and project feasibility, and the request is meant to keep the project as currently designed while matching the intent of the City's standards.

The request is being made in relation to PMC 17.80.060(B)(6)(a-d) and is based on the criteria that the revised design provides the same result, or a better one, without creating safety or operational issues, without causing maintenance or cost problems, and in a way that is allowed by City, State, and Federal requirements. The overall site design is also intended to meet code requirements for vehicle, traffic, and pedestrian safety, sight distance, emergency access, and utility service.

PMC 17.80.060(B)(6)The City Engineer may exempt the requirement for street connectivity under the following circumstances:

*A. There are existing and available connections to collector or arterial streets.*

**The Skelley access easement is an existing substandard easement that does not meet current street connection standards. Its existing configuration is not suited for adjustment to meet those standards without affecting the properties that rely on it.**

**Instead of modifying the existing easement, this development provides a new easement and street connection to Johnson Parkway NE, which meets the intent of the connectivity standard and results in a more efficient connection than the existing substandard access easement.**

*B. The existing development and ownership pattern, site and/or surrounding area's topography make connectivity technically and physically unfeasible*.

Road C Alignment & Grade Constraints
Road C circulates internally within the project site and cannot be extended south to connect with the Skelley property due to topographic differences and required City roadway geometry standards (specifically minimum vertical curve K-values).

Primary Connection Evaluation: The lowest point along Road C is established at approximately elevation 205. The City's minimum vertical curve criteria (minimum K=26 for sag curves) physically preclude the road profile from being designed much lower. This low point is approximately 295 feet north of the Skelley property line and 65 feet higher in elevation. Extending a road across this distance holding the maximum allowed slope of 12% would result in the road being elevated approximately 36 feet above existing grade at the Skelley property.

Result: Road stub would be too far in the air at the property line.

Secondary Connection Evaluation (Eastern Option): An alternative connection location was evaluated further east along Road C at a higher elevation. However, due to steeper terrain, extending a road south at this location results in an even more severe 43% grade, nearly four times the City's allowable maximum.

Because any potential physical alignment between Road C and the south parcel exceeds municipal maximum grade limits, adding a new street connection to the south is geometrically infeasible.

*(Refer to the enclosed Figure 1 for a detailed profile depiction of both evaluated alignments.)*

*C. Temporary emergency vehicle access is provided, and street connectivity will occur in the future*

Temporary emergency vehicle access to the Skelley property is provided primarily via the existing access easement directly from State Highway 305. The newly dedicated easement and street connection at the Johnson Parkway NE/Sunrise Ridge Ave NE roundabout, as shown on the civil plans, will provide secondary emergency vehicle access to the Skelley property. Together, these routes maintain emergency access while preserving the option for a future public street connection to the Skelley parcel to support potential future development.

*D. The street connection is not identified on the comprehensive plan transportation map series*

The City's transportation maps do not show a future public street or required north-south connection into the parcel to the south, also known as the Skelley property.

The street connectivity exemption request meets PMC 17.80.060(B)(6)(a-d) and is supported by what's shown in the proposed project plans and fits the intent of the code.

The project preserves the existing grandfathered easement serving the Skelley property and dedicates a new easement to the Sunrise Ridge Ave NE/Johnson Parkway NE roundabout, as shown on the plan set. A direct public street connection is not feasible because the Skelley property is at a significantly lower elevation and the grades to Road C are too steep to meet applicable street design standards (see enclosed Figure 1).

The proposal provides temporary emergency vehicle access using the existing grandfathered access from State Highway 305, together with secondary emergency vehicle access via the newly dedicated easement to the Johnson Parkway NE/Sunrise Ridge Ave NE roundabout. The connection is also not shown on the City of Poulsbo's Comprehensive Plan transportation maps.

Should you have any questions or require additional information, please do not hesitate to contact us at (253) 838-6113.

Respectfully,

ESM CONSULTING ENGINEERS, LLC

ROBBY OVERFIELD
Project Manager

Encl. Figure 1

\\esm8\engr\esm-jobs\2090\004\022\document\letter-014.docx

A PORTION OF THE SE 1/4 OF SECTION 23, TWP. 26 N., RGE. 1 E.,WM

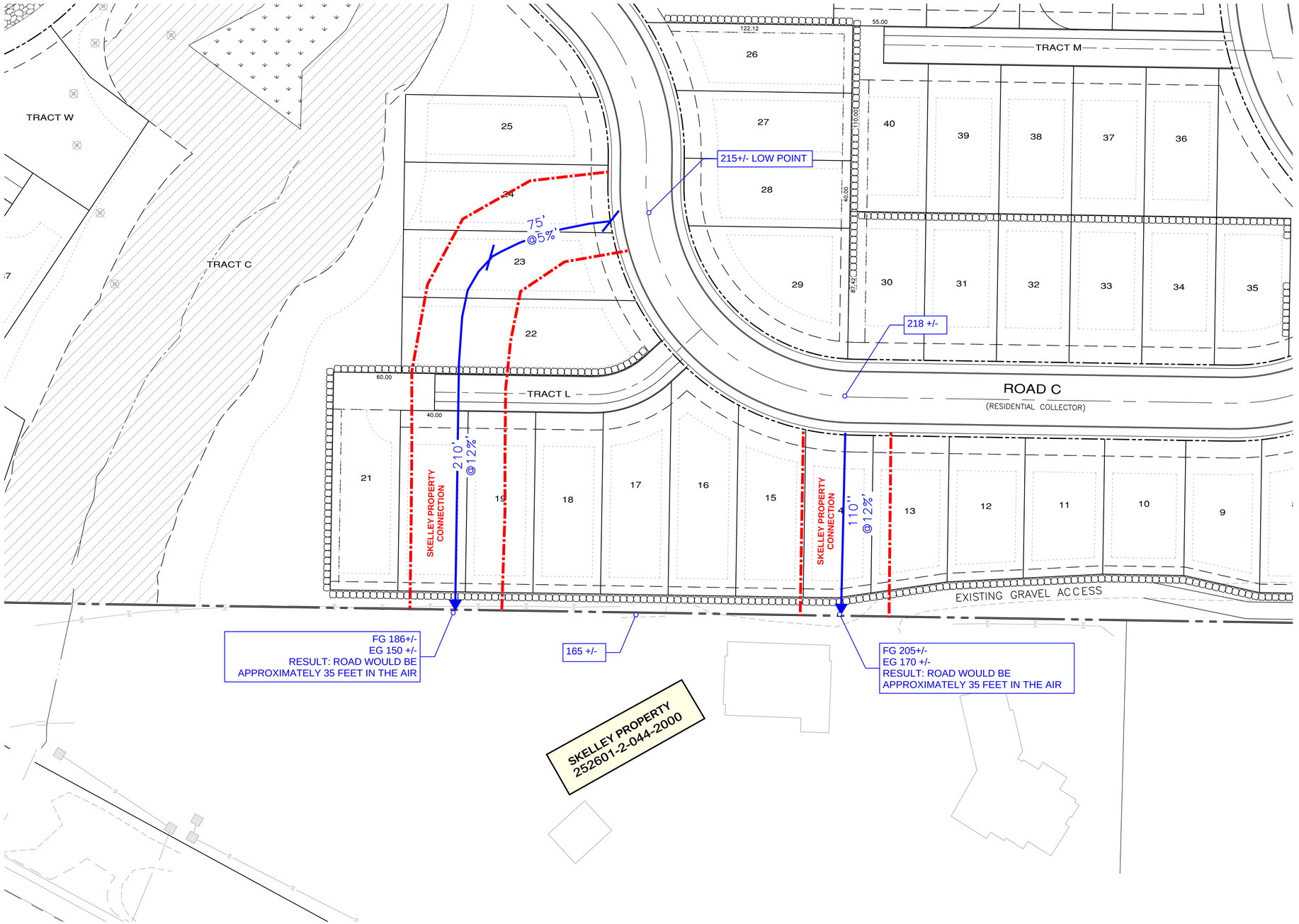



**FIGURE 1**

File: \\esmfil\ENGR\ESM - JOBS\2090\004\022\exhibit\EN-40.dwg
Plotted: 7/20/2026 5:34 PM
Plotted By: Brandon Loucks

REVISIONS

| NO. | DESCRIPTION/DATE | BY |
|---|---|---|
| | | |


CONSULTING ENGINEERS LLC
32001 32nd Ave S, Suite 200
Federal Way, WA 98001
FEDERAL WAY (253) 838-6113
LYNNWOOD (425) 337-3300
www.esmcivil.com
Civil Engineering | Land Surveying | Land Planning
Public Works | Project Management | Landscape Architecture


MONTEBANC MANAGEMENT, LLC

PINNACLE AT LIBERTY BAY SUBDIVISION

CITY OF POULSBO SKELLEY PROPERTY ACCESS FEASIBILITY WASHINGTON

| | |
|---|---|
| JOB NO.: | 2090-004-022 |
| DWG. NAME: | EN-40 |
| DESIGNED BY: | |
| DRAWN BY: | |
| CHECKED BY: | |
| DATE: | 07/21/2026 |
| DATE OF PRINT: | |

EN-40

1 OF 1 SHEETS

September 16, 2026 Job No. 2090-004-022

Mr. Joshua M. Ranes
City of Poulsbo Engineering Department
200 NE Moe St
Poulsbo, WA 98370

**RE: Technical Justification for Vertical Roadway Geometry Failures at Stream C Crossing (Pinnacle at Liberty Bay Preliminary Plat and Planned Residential Development) P-06-20-25-03**

## PURPOSE

The purpose of this letter is to provide City staff with a technical evaluation of the geometric and regulatory constraints associated with a proposed roadway crossing of Stream C (Barrantes Creek) extending from Baywatch Court NE. This narrative serves as a technical companion to the enclosed Engineering Exhibit (Figure 2), which maps the dimensional conflicts of this crossing.

## ALTERNATE ROAD ALIGNMENT ANALYSIS

An analysis was conducted to determine whether an alternative roadway alignment could be provided along the west side of the project. Based on the existing parcel layout, built infrastructure, and adjacent critical areas, there are no available alternative access corridors to the property. The proposed location is the only viable access point to the project site.

### Alternative Road Locations

As shown in Figure 1 – Alternative Access Locations Analysis, the west side of the project site is constrained by existing physical conditions.

**Southern Boundary (SR 305 Frontage):** Direct vehicular access to the south is not permitted due to state highway access control regulations along State Route 305.
**Southwestern Boundary (Existing Infrastructure):** The presence of an established detention pond creates an unbuildable constraint along the southwestern corner of the property.
**Western Boundary (Built Environment):** The western property line is bordered by an existing residential plat, leaving no practical opportunity to establish a new public right-of-way.
**Sole road location:** The existing Right-of-Way (ROW) stub at Baywatch Ct NE is the single point of connection. Because the stream channel runs parallel to this western boundary, any road extending from the ROW stub must cross the stream even before entering the project parcel.

### Alignment Optimization at Existing ROW Stub

Because a stream crossing is necessary at the existing ROW stub, the alignment review focused on minimizing the vertical conflict at the crossing.

**Intersection Angle Limit:** City of Poulsbo Street Standards Section 2, Item 12 prohibits public streets from intersecting at angles of less than 60 degrees. To start the new road at the highest practical elevation, the proposed alignment uses this minimum 60-degree angle. Rather than connecting perpendicular to Baywatch Ct NE, the angled intersection moves the connection farther uphill. This provides more vertical room as the road extends into the ravine and helps maximize clearance over the stream.

**Superelevated Road:** The road cross-slope is intentionally superelevated (instead of a typical crown layout) to lift the north side of the roadway profile as high as possible, representing in effort to clear the crossing structure.

## GEOMETRIC ANALYSIS OF CITY AND FIRE STANDARDS

### Design Factors

The following criteria were used to evaluate the feasibility of a potential stream crossing road profile given the optimized road alignment.

**Crossing Clearance Standard:** Per the ity's finding that tream is fish-bearing, the crossing must comply with WAC 220-660-190 and WDFW 2013 Guidelines. Because the stream channel is located within a confined ravine, the standard recommended clearance of 3.0 feet above the ordinary high-water mark (OHWM)/top of bank was assumed as the minimum required vertical clearance to the bottom of the crossing structure to safely accommodate debris and sediment transport.

Additionally, it is assumed that the crossing structure will be placed parallel to the longitudinal slope of the stream to maintain approximately 3 feet of freeboard across the full width of the channel. In other words, the top of the culvert is assumed to be sloped to minimize the overall crossing culvert height above the channel.

**Maximum Grade:** Per City of Poulsbo Construction Standards and Fire Standards, the maximum allowable grade for a road within the City is 12%.

**Intersection Landing** per King County Road Standard Figure 2-013. This City adopted King County figure establishes the geometric profile tolerances for intersection landings, requiring a flat approach zone extending 20 feet for residential streets from the major road's right-of-way line. Within this defined landing zone, the vertical profile is controlled to a 1-foot maximum variation from the finished grade to eliminate abrupt transitions before vehicles enter the primary travel way.

**Fire Truck Considerations:** Poulsbo E-One Pumper (Length: 30 feet, Width: 8.33 feet, Ground Clearance: 1.1 feet)

**Fire Access Standards:** Maximum Grade: 12%, Maximum Approach: 6%

**Crossing Structure and Structural Cover:** For this evaluation, we assumed a 12-foot-wide, low-profile bottomless arch culvert. The span allows the concrete footings to remain entirely outside the active channel and ordinary high water mark (OHWM), while clearing the stream banks and accommodating the channel's natural skew. A structural plate arch was selected because its low-profile shape reduces the depth needed between the stream and the roadway.

To support standard AASHTO HL-93 highway loading, the arch requires a minimum of 1.5 to 2.0 feet of structural cover and pavement above its crown. Keeping this cover to the minimum required depth helps maintain the lowest practical driving-surface elevation, which is necessary to stay within the 6.0% maximum approach grade for emergency fire apparatus.

**Roadside Geometry**. The road section used for the analysis is based on a Collector classification. This includes two 11-foot lanes, curb & gutter, parking, and sidewalk on both sides all within a 50-foot ROW. City staff have supported the idea of a reduced ROW to make the stream crossing more feasible. At a minimum, the section requires one sidewalk, curb and gutter, and two 11-foot travel lanes.

**Guardrail and Wall Clearances:** The vertical drop to the stream requires both a retaining wall and a guardrail. Approximately 6 feet of horizontal clearance is needed between the back of the sidewalk and the face of the retaining wall to accommodate the wall, guardrail, and the required 2- to 3-foot deflection zone for a W-beam guardrail system.

## RESULTING ANALYSIS

This analysis demonstrates that a code-compliant roadway crossing over Stream C is likely a physical impossibility as depicted in the enclosed Figure 2.

To satisfy the fire engine's physical front bumper overhang constraints and limit the approach grade change to the max allowed of 6.0%, a minimum sag vertical curve length of 25.7 feet is necessary (K=1.31). The vertical curve has been placed such that it stays within the ity's intersection landing criteria per the City's vertical curve criteria memo dated April 29, 2014.

While this profile prevents the emergency vehicle from bottoming out on paper, it triggers other physical and legal conflicts:

**Inadequate Stream Clearance:** As shown on the North Side of Road Profile on Figure 2, the incoming roadway profile along the north is forced down so low by the intersection landing constraints that the pavement surface sits almost on the top of the arch culvert.

**Property Line & Retaining Wall Conflicts:** The constrained topography necessitates an 8-to 10-foot retaining wall on the north side of the road. There is inadequate space (only 3 feet) to construct this retaining wall between the road and the neighbor's property line along parcel 5146-000-001-003. Constructing this wall would require grading encroachments and a temporary construction easement from the adjacent neighbor, which cannot be obtained. Furthermore, the required wall alignment conflicts with an existing gas main and other utilities in the adjacent utility easement.

**Critical Area Disturbance:** A roadway crossing in this location would still require a significant disturbance within the stream buffer. Even if vertical retaining walls were used to narrow the road footprint, the bridge or culvert, wall foundations, guardrail, and utility easements would all need room. In practical terms, a crossing that meets City and fire access standards would extend all the way through the protected 150-foot stream buffer and would impact the stream corridor.

## CONCLUSION

As demonstrated by the attached exhibits, there is no apparent solution that satisfies the crossing clearances while also meeting City standards for road grade and emergency vehicle access. Incorporating the required retaining walls, guard rails, and dry utility easements further expands the disturbance footprint, causing direct conflicts with existing utilities and neighboring property lines that cannot be mitigated.

It has been determined that a roadway crossing at this location is technically and legally infeasible and will not be proposed as part of the Pinnacle at Liberty Bay development.

Respectfully,

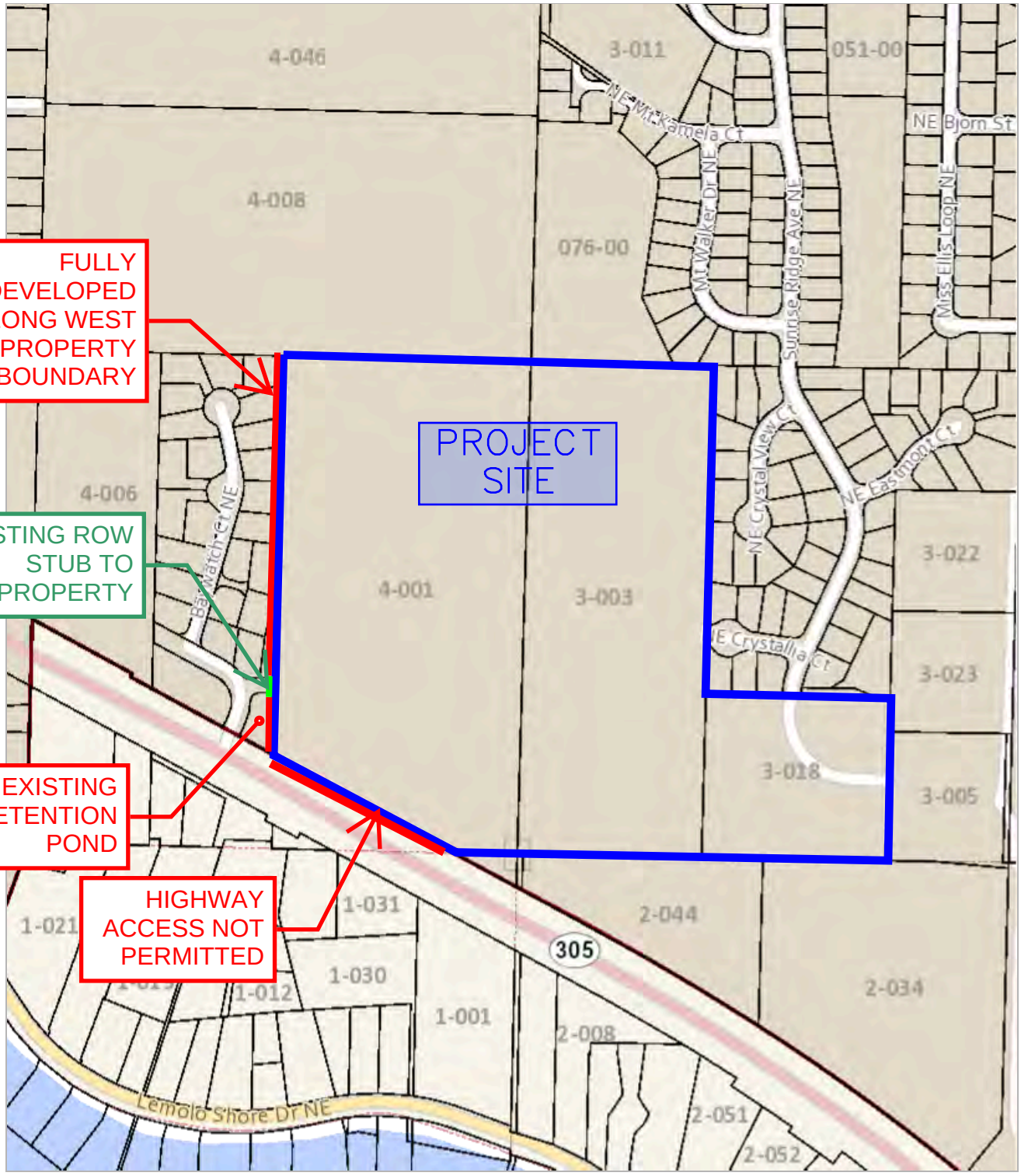
ESM CONSULTING ENGINEERS, LLC

BRANDON LOUCKS, P.E.
Project Manager

Encl. Figure 1, Figure 2
\\esm8\engr\esm-jobs\2090\004\022\document\letter-011-2.docx

Map Scale: 1 : 4,800

Printed: Sunday. Jul 19, 2026




** This map is not a substitute for field survey **

500 ft

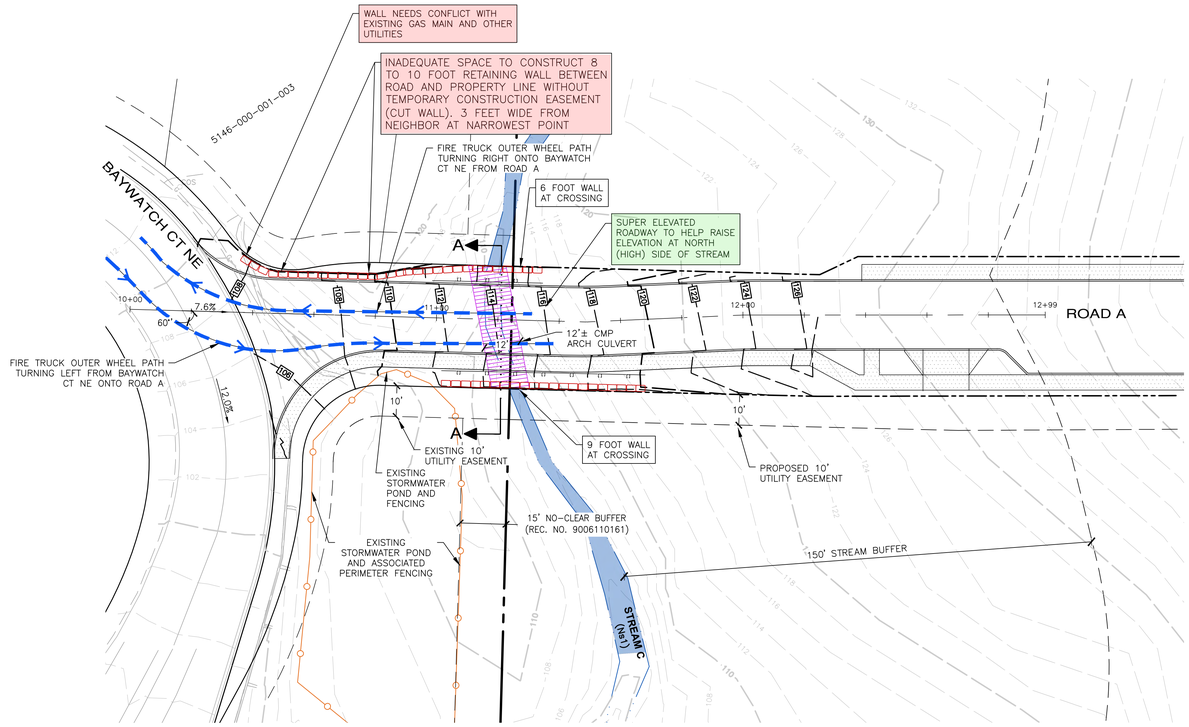
FIGURE 1 - Alternative Access Locations Analysis

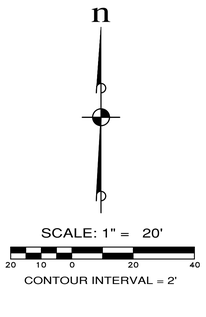
N

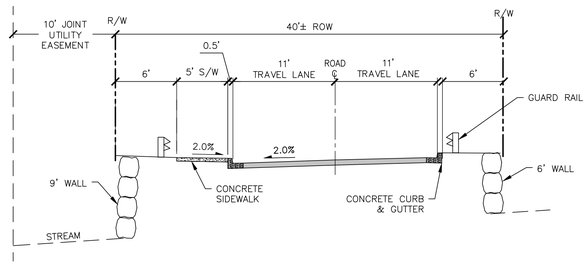
W E

S

A PORTION OF THE SE 1/4 OF SEC 23, TWP 26 N, RGE 1 E, W.M.



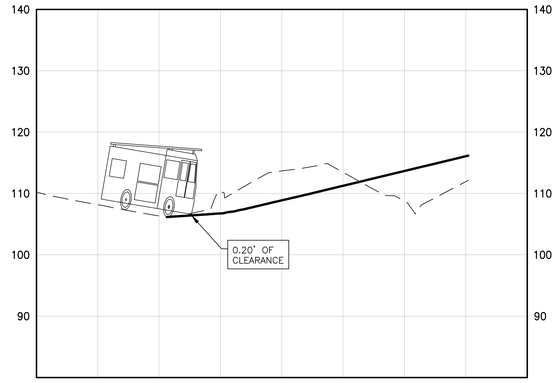



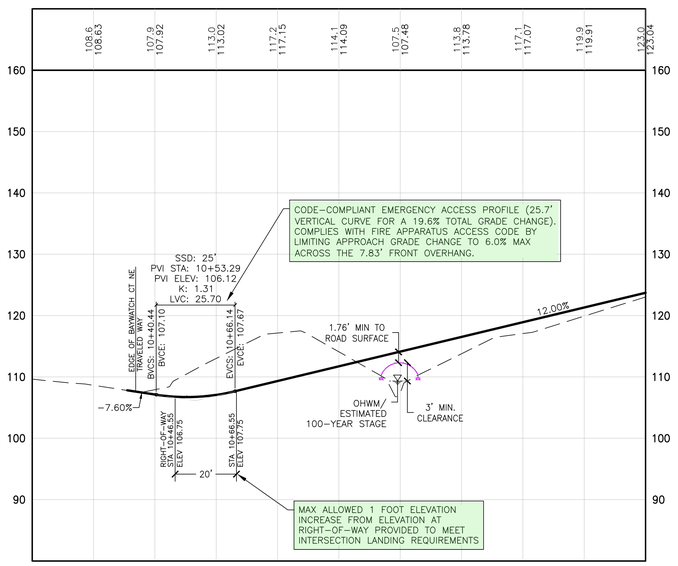

A-A ROAD SECTION AT STREAM
MODIFIED COLLECTOR
SCALE: 1"=6'

POULSBO EONE PUMPER

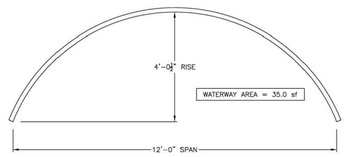
| | |
|---|---|
| OVERALL LENGTH: | 30 FEET |
| OVERALL WIDTH: | 8.33 FEET |
| OVERALL BODY HEIGHT: | 7.5 FEET |
| MIN GROUND CLEARANCE: | 1.1 FEET |



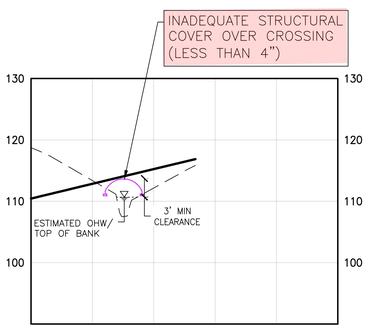

FIRE TRUCK OUTER WHEEL PATH TURNING LEFT FROM BAYWATCH CT NE ONTO ROAD A
SCALE: 1"=20' HORIZ. 1"=10' VERT.



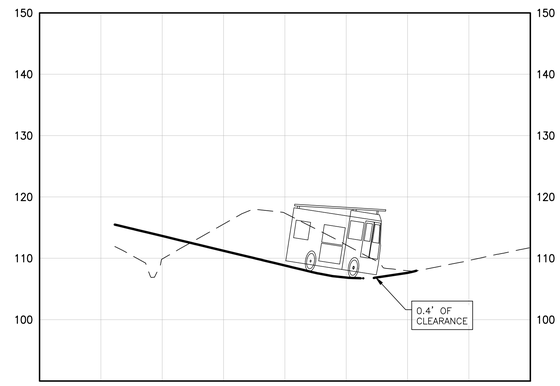

ROAD A
SCALE: 1"=20' HORIZ. 1"=10' VERT.




ESTIMATED CULVERT DIMENSIONS
SCALE: NTS




NORTH SIDE OF ROAD
SCALE: 1"=20' HORIZ. 1"=10' VERT.




FIRE TRUCK OUTER WHEEL PATH TURNING RIGHT ONTO BAYWATCH CT NE FROM ROAD A
SCALE: 1"=20' HORIZ. 1"=10' VERT.

| REVISIONS | | |
|---|---|---|
| NO. | DESCRIPTION/DATE | BY |


CONSULTING ENGINEERS, LLC
32001 32nd Ave S, Suite 200
Federal Way, WA 98001
(253) 838-6113
(425) 207-9900
TF/EMAIL, WAY
LYNNWOOD
www.esmcivil.com
ESM
Civil Engineering
Public Works
Land Planning
Landscape Architecture
Land Surveying
Project Management


MONTEBANC MANAGEMENT, LLC

PINNACLE AT LIBERTY BAY SUBDIVISION

STREAM C & ROAD A CROSSING FEASIBILITY EXHIBIT

CITY OF POULSBO WASHINGTON

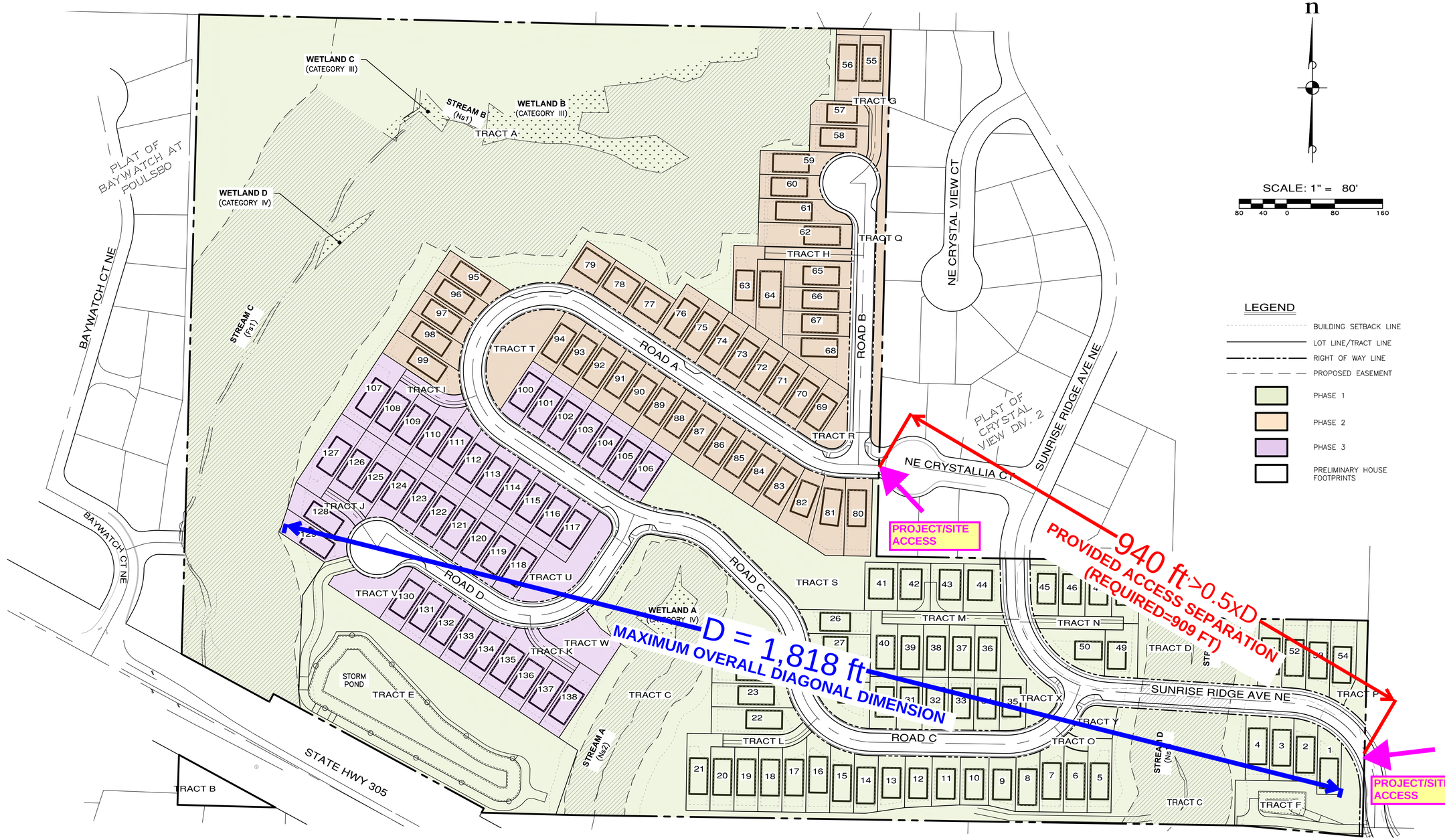
| | |
|---|---|
| JOB NO. | 2090-004-022 |
| DWG. NAME | EN-35 |
| DESIGNED BY: | |
| DRAWN BY: | DCL |
| CHECKED BY: | |
| DATE: | 09/03/2026 |

EN-35

1 OF 1 SHEETS


File: \\esm8\ENGR\ESM - JOBS\2090\004\022\exhibit\EN-35-Working-7_recover.dwg
Plotted: 9/16/2026 1:39 PM
Plotted By: Brendon Locke

A PORTION OF THE SE 1/4 OF SECTION 23, TWP. 26 N., RGE. 1 E.,WM




n

SCALE: 1" = 80'

80 40 0 80 160

LEGEND

- BUILDING SETBACK LINE
- LOT LINE/TRACT LINE
- RIGHT OF WAY LINE
- PROPOSED EASEMENT
- PHASE 1
- PHASE 2
- PHASE 3
- PRELIMINARY HOUSE FOOTPRINTS

| REVISIONS | | |
|---|---|---|
| NO. | DESCRIPTION/DATE | BY |

BRANDON MICHAEL LOUCKS
STATE OF WASHINGTON
50085
REGISTERED
PROFESSIONAL ENGINEER


CONSULTING ENGINEERS LLC
32001 32nd Ave S, Suite 200
Federal Way, WA 98003
FEDERAL WAY (253) 838-6113
LYNNWOOD (425) 297-1900
www.esmcivil.com
ESM
Civil Engineering
Public Works
Land Planning
Landscape Architecture
Land Surveying
Project Management


MONTEBANC MANAGEMENT, LLC

PINNACLE AT LIBERTY BAY SUBDIVISION
ACCESS SEPARATION EXHIBIT
CITY OF POULSBO WASHINGTON

| | |
|---|---|
| JOB NO.: | 2090-004-022 |
| DWG. NAME: | EN-37 |
| DESIGNED BY: | |
| DRAWN BY: | |
| CHECKED BY: | |
| DATE: | 06/24/2026 |
| DATE OF PRINT: | |

EN-37

1 OF 1 SHEETS

File: \\esm8\ENGR\ESM-0085\2090\004\022\exhibits\EN-37.dwg
Plotted: 6/25/2026 1:19 PM Plotted By: Brandon Loucks

TECHNICAL OPINION REPORT
Fire Protection Engineering Assessment
Pinnacle at Liberty Bay Subdivision
Date: September 9, 2026
Prepared by: Robert Hinton, PE - Hinton Engineering

**Purpose**

This report provides a conceptual fire protection engineering assessment of the proposed housing development, Pinnacle at Liberty Bay Subdivision. It evaluates road access in accordance with the International Fire Code (2021 Edition).

**Background**

The proposed development has 130 one or two family residential units. The maximum overall dimension of the development is 1,818 feet and the proposed separation between the two access roads is 940 ft as shown on Access Separation Exhibit Sheet EN-37 dated 06/24/2026.

**Fire Apparatus Access-Road Remoteness Opinion**

Basis of assessment: 2021 International Fire Code (IFC), Appendix D, Section D107.2. The maximum overall diagonal dimension of the property or area served is 1,818 feet. Appendix D requires two required fire-apparatus access roads to be separated by not less than one-half of that dimension, measured in a straight line between accesses.

1,818 ft / 2 = 909 ft minimum separation

The proposed straight-line separation between access roads is 940 feet. The proposed separation exceeds the required 909 feet by 31 feet.

Opinion: The proposed access-road arrangement complies with the remoteness requirement of 2021 IFC Appendix D.

For a one- or two-family residential development, Appendix D Section D107.1 also provides an exception to the two-access-road requirement where more than 30 dwelling units are served by a single public or private fire-apparatus access road and all dwellings are equipped throughout with an approved automatic sprinkler system installed in accordance with IFC Section 903.3.1.3 (NFPA 13D). Based on this exception, access from two directions is not required by Appendix D.

**Review and Response to Comments Regarding Fire Code Compliance**

**Peer Review Comments**

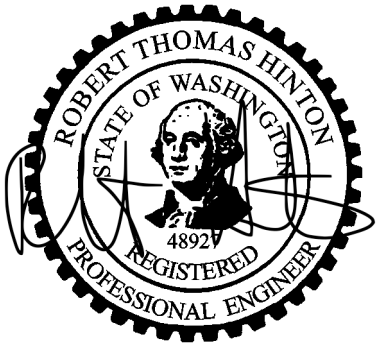
The City's peer reviewer, Parametrix, commented that "The two access points identified by the applicant do not meet the intent and purpose of IFC D107.2. The diagonal distance of the property should be measured from the Road C/Sunrise Ridge Avenue intersection, as that is the access point to the area beings served."

Hinton Engineering's response: The distance measured and shown on Access Separation Exhibit Sheet EN-37 dated 06/24/2026 is acceptable as there is access from the north on Sunrise Ridge Ave NE. This is a separate and distinct access and does not require travel on Sunrise Ridge Ave NE from the project/site access point.

**Comments from Washington State Deputy Fire Marshal**

The comments provided by the State Fire Marshal's Office state that "an NFPA 13D system is not recognized by NFPA as a substitute for community vehicular egress capacity or an evacuation route."

Hinton Engineering's response: The International Fire Code (2021 edition) specifically states in Appendix D107.1 Exception 1, that access from two directions shall not be required where all dwelling units are equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3 which requires one- and two-family homes to be sprinklered in accordance with NFPA 13D specifically.
The comments also refer to NFPA 1141 *Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas*, which is not referenced by the International Fire Code (2021 edition) and is not applicable.




Robert T. Hinton, PE
Hinton Engineering
(206) 778-7987
rob@hintonengineering.com

# Poulsbo Fire Department

*Kitsap County Fire District #18*
*911 N.E. Liberty Rd. Poulsbo WA 98370*
*James S. Gillard, Fire Chief*
*360-779-3997 Fax 360-779-4699 www.poulsbofire.org*


To: City of Poulsbo Engineering Department

From: Brian Ramey, Captain / Deputy Fire Marshal

Date: July 28, 2026

Subject: Operational Emergency Response Considerations – Pinnacle at Liberty Bay PRD

## Purpose

As Deputy Fire Marshal for the Poulsbo Fire Department, I reviewed the proposed roadway network for the Pinnacle at Liberty Bay Planned Residential Development to evaluate its operational characteristics from an emergency response perspective. The purpose of this memorandum is to describe the operational benefits associated with providing a roadway connection between the proposed development and the existing Baywatch subdivision. These comments are limited to fire and emergency response considerations.

## Operational Context

Emergency response systems rely on roadway networks that remain functional under both routine and adverse conditions. While roadway design standards establish geometric criteria, emergency operations evaluate how the network performs when normal travel is disrupted. Vehicle collisions, disabled vehicles, winter weather, utility interruptions, construction activity, and other routine incidents can temporarily impair a roadway and affect responder access.

Redundant, independent access routes improve operational reliability, especially in areas with complex terrain.

## Topographic Influence on Emergency Access

The Pinnacle site features pronounced topography, including substantial elevation changes and areas of sustained grade throughout the project. These conditions affect emergency access in several ways:

- Steep or sustained grades can limit maneuvering options for fire apparatus and slow emergency vehicle movement when returning toward Sunrise Ridge.

- Elevation transitions and hillside development concentrate all access through engineered roadway segments that are more sensitive to obstruction.
- Retaining walls and constrained roadway edges reduce available shoulder space and limit informal bypass options.
- When terrain restricts vehicle movement to a limited number of steep corridors, even minor disruptions—such as a stalled vehicle, ice, or utility work—can create disproportionate delays.

Individually, these conditions may be manageable; collectively, they increase the operational consequences of any incident occurring anywhere within the Pinnacle development in its current configuration, particularly those that affect movement toward or along the primary access corridor.

## Primary Access Configuration

The proposed development includes two primary access points; however, both depend on Sunrise Ridge Avenue as the single transportation corridor serving the neighborhood. From an emergency operations perspective, two access points that rely on the same constrained roadway do not provide independent resiliency, particularly in a development where sustained grades and topographic limitations affect vehicle movement back toward the primary corridor.

## Operational Benefits of the Baywatch Connection

The proposed connection to the Baywatch subdivision provides a meaningful operational benefit by creating an access route not dependent on Sunrise Ridge Avenue and by offering egress for the most remote portion of the Pinnacle development. While elevation changes exist along both routes, the Baywatch connection nevertheless improves emergency access reliability in several key ways:

- Provides responders an alternate approach to the development if Sunrise Ridge is partially or fully obstructed.
- Reduces reliance on a single corridor where sustained grades and topographic constraints amplify operational vulnerabilities.
- Improves access and egress for the most remote portion of the development.
- Increases flexibility for apparatus placement, staging, and movement during extended operations.
- Improves response reliability for emergency medical incidents, which constitute most Fire Department responses. EMS operations are highly time-dependent, and even brief delays caused by roadway obstructions or steep terrain can significantly affect patient outcomes.
- Supports evacuation, law enforcement, and utility response operations during roadway disruptions.

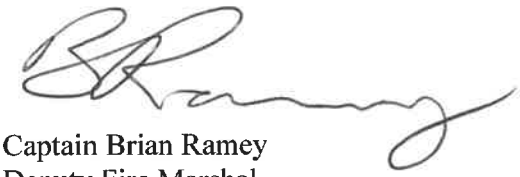
## Operational Judgment

This assessment is based not only on minimum requirements, but on the cumulative effect of site conditions—particularly topography and roadway constraints—as they relate to reliable emergency response and public safety. Emergency access must be evaluated as a complete system, including how it performs under adverse conditions.

## Professional Opinion

In my professional opinion, a roadway connection to the Baywatch subdivision provides measurable operational benefits by increasing emergency response reliability, reducing dependence on a single topographically constrained access corridor, and improving operational flexibility for fire, medical, and other emergency incidents. These benefits materially enhance the resiliency of emergency access to the Pinnacle at Liberty Bay development.

Respectfully,



Captain Brian Ramey
Deputy Fire Marshal
Poulsbo Fire Department
(360)697-8284
bramey@poulsbofire.org

# City of Poulsbo

## Building Department

(360) 394-9882 Fax: (360) 697-8269

**Fire Access and Emergency Egress Review**

**08/19/2026**

**To Nikole Coleman**

**Project:** Pinnacle at Liberty Bay
**Permit:** P-06-20-25-03

**RE: Fire Access and Emergency Egress**

Dear Applicant:

In response to the submittal dated July 21, 2026, I have reviewed the proposed fire apparatus access and emergency egress for the Pinnacle at Liberty Bay development and provide the following comments:

**Fire Access and Emergency Egress**

In accordance with Section D107.1 of the 2021 International Fire Code (IFC), as adopted and amended by the State of Washington under Chapter 51-54A WAC and locally adopted under PMC 15.04, developments of one- or two-family dwellings exceeding 30 dwelling units are required to provide two separate and approved fire apparatus access roads, subject to the exceptions provided in Section D107.1.

The purpose of providing two separate fire apparatus access roads is to ensure that fire apparatus can reach all dwelling units within the development during emergency conditions and to reduce the potential for a single blocked or inaccessible roadway to impede emergency response. Providing two separate access roads also provides redundancy and improves the reliability of fire suppression, rescue, and emergency operations. Given the steep hillside terrain of the proposed development, two separate and reliable fire apparatus access roads are particularly important to ensure adequate emergency access to and from the development.

It is the interpretation of the Fire Code Official that a second access point to the development is required at the southwest corner of the project, providing a connection to the Baywatch development. This additional access is necessary to satisfy the requirements of Section D107.1 of the 2021 International Fire Code (IFC), as adopted and amended by the State of Washington under Chapter 51-54A WAC, and to provide a reliable means of emergency access, ingress, and egress.

The proposed Pinnacle development is located on steep terrain, and it may be physically impracticable for fire apparatus or other emergency vehicles to safely exit the development during inclement weather conditions. A secondary connection to the Baywatch development is therefore necessary to provide an alternate emergency access route and improve emergency response reliability.

**In accordance with Section D107.2 Remoteness**

Where two fire apparatus access roads are required, they shall be placed a distance apart equal to not less than one-half the length of the maximum overall diagonal dimension of the property or area to be served, measured in a straight line between accesses. The two proposed access points do not satisfy the remoteness requirements of Section D107.2. See engineering memorandum for additional comments.

Please provide revised plans and supporting documentation demonstrating compliance with Sections D107.1 and D107.2, of the 2021 International Fire Code (IFC), as adopted and amended by the State of Washington under Chapter 51-54A WAC,. Alternatively, provide a proposed alternative design for review and approval by the Fire Code Official.

Sincerely,

**Matt Logue**
Building Official, Fire Code Official
City of Poulsbo

mlogue@poulsbo.gov

360-394-9729

ENGINEERING DEPARTMENT
200 NE Moe Street | Poulsbo, Washington 98370
(360) 394-9882 | D (360) 394-9744
www.cityofpoulsbo.com | mbateman@poulsbo.gov

# MEMO

**To:** Montebanc Management LLC, John Everett

**From:** Josh Ranes, PE, City Engineer
Michael Bateman, PE, Transportation Engineer

**Subject:** Noncompliance with PMC 17.80.050 and 17.80.060 - Connectivity and Multiple Points of Access/Egress - Pinnacle at Liberty Bay PRD, P-06-20-25-03

**Date:** 10/28/2026

## Purpose

The purpose of this memo is to document City staff's analysis and findings regarding the proposed Pinnacle at Liberty Bay Planned Residential Development (PRD) and Preliminary Subdivision. The analysis addresses the City's adopted codes, standards, Comprehensive Plan, and related requirements for neighborhood connectivity, multiple points of vehicular ingress and egress, emergency access, and the findings required of the City Engineer under the Poulsbo Municipal Code (PMC).

## Overview

The proposed Pinnacle at Liberty Bay PRD and Preliminary Subdivision consists of 130 detached single-family lots on five parcels totaling approximately 41 acres. The site presents substantial topographic and environmental constraints, including approximately 223 feet of elevation change across the property, steep hillside terrain northeast of State Route 305, three regulated streams with associated wetlands and buffers, and areas of geologically hazardous slopes.

These physical constraints have influenced the proposed street layout and are central to evaluating the project's compliance and findings with the City's requirements for street connectivity, multiple points of access, and emergency vehicle circulation.

Primary access to the project is provided by Sunrise Ridge Ave NE, a residential collector. Sunrise Ridge Avenue NE connects through Johnson Parkway NE to State Route 305 to the South and through adjacent Crystal View and Meredith Heights neighborhoods to Caldart Avenue NE to the North.

The project includes 22 lots that will have direct access to Sunrise Ridge Ave NE. The remaining 108 lot project area is served by an internal looped road system that includes looped roads A and C connecting to Sunrise Ridge Ave NE at two locations approximately 330 feet apart and cul-de-sac roads B and D connecting to the road A-C loop. Reference Figure 1 below.

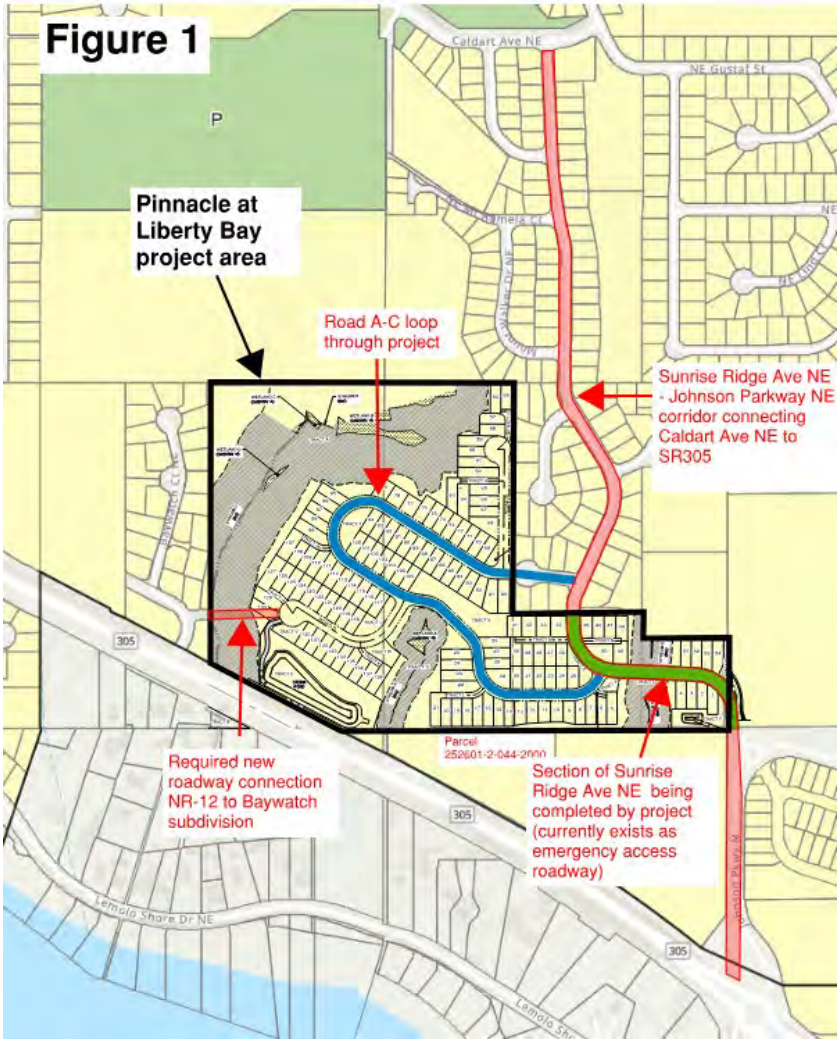
Public safety and emergency response are fundamental considerations in the design of the City's transportation network and development projects. As currently designed and submitted, and absent the recommended conditions of approval, City staff, the City Engineer, and City Fire Code Official have determined that the project's proposed location, size and design do not provide the level of roadway redundancy, connectivity, and emergency access required by the City's adopted codes, standards and Comprehensive Plan to protect the public interest, health, safety, and welfare and to mitigate the project's direct impacts.

The site's topography, significant elevation changes, surrounding critical areas, and reliance on a single primary access corridor result in a roadway network with limited redundancy. As a result, portions of the subdivision could become isolated if Sunrise Ridge Avenue NE were blocked or otherwise inaccessible.

The Fire Code Official's determination is documented in the attached Fire Access and Emergency Egress Review memorandum dated 8/19/2026 in SEPA Exhibit G - Transportation. Additional operational considerations are addressed in the attached Operational Emergency Considerations memorandum from Poulsbo Fire District 18 dated 7/28/2026 prepared in support of the Fire Code Official's determination under International Fire Code (IFC) 503.1.2. Engineering memo ICC Code Interpretation Request dated 10/27/2026 in SEPA Exhibit G – Transportation clarifies that the City's interpretation and application of Internation Fire Code is correct.

In addition to the emergency access safety concerns, the project as proposed does not fully implement the City's adopted requirements and policies for neighborhood connectivity and redundant roadway networks necessary to mitigate the project's direct impacts. The absence of connectivity to existing planned roadway connections and neighboring parcels as required by City codes and standards further limits the redundancy and connectivity envisioned by the City's adopted transportation network. The City's adopted codes, standards and policies support and require interconnected public streets that provide neighborhood circulation, current and future roadway connectivity, roadway redundancy, and emergency access/egress for neighborhood residents.

***Accordingly, the project will be conditioned to provide the additional new road NR-12 connection to the Baywatch subdivision. This condition is necessary to satisfy applicable City requirements, mitigate the project's direct transportation and emergency access impacts and allow the City Engineer to make the findings required by City codes.***



## Code requirements and recommended Conditions of Approval

The City's policies and requirements for street connectivity and multiple points of access and egress and emergency access are implemented through the Poulsbo Municipal Code, the City's adopted Comprehensive Plan, City Construction Standards, and International Fire Code. The complete code and policy sections quoted and discussed here are included in Appendix A for reference.

PMC 17.80.060 establishes the purposes of the City's street connectivity requirements including:

> *(1) Implementing the city's comprehensive plan's future street plan;*
> *(2) Providing redundant and efficient routes and connections within the city; and*
> *(3) Providing superior emergency vehicle response times through multiple street access points.*

PMC 17.80.060 – Street Connectivity and Comprehensive Plan

- PMC 17.80.060 requires plats to provide for an interconnected and redundant street network consistent with the City's comprehensive plan new roadways map TR-3, including connecting to adjacent properties.
- The project does not, as currently proposed, construct the planned public street connection identified as Future Street NR-12 in the City's adopted Comprehensive Plan (Figure TR-3: 2044 New Roadway Segments Map) by connecting to Baywatch Court NE.
- Without the NR-12 connection, the project does not provide the level of safe, redundant, and efficient public street connectivity contemplated by the City's adopted transportation network to support multiple emergency response routes as well as current and future neighborhood connectivity. As proposed, large portions of the subdivision rely on a single primary access corridor, reducing roadway redundancy and limiting emergency vehicle access and subdivision resident egress if that route becomes blocked or otherwise impassable.

PMC 17.80.050 – Street Standards

- PMC 17.80.050 requires preliminary plats to provide at least two different standard routes for ingress and egress connecting to different streets.
- Although the project provides two access points to Sunrise Ridge Avenue NE, those access points ultimately connect to the same public roadway corridor and in close proximity to one another. Accordingly, the project does not provide two independent public street routes for vehicular ingress and egress consistent with the requirements of PMC 17.80.050.
- Large portions of the development rely on a single internal circulation route to a single roadway corridor, limiting transportation network redundancy and emergency access should the primary roadway become obstructed.

International Fire Code – Section 503 and Appendix D

- IFC Appendix D, Section D107.1 requires two separate and approved fire apparatus access roads. Section D107.2 requires the separate access roads to be located at a distance apart of not less than one-half the maximum overall diagonal dimension of the area served.
- In addition, IFC Section 503.1.2 authorizes the Fire Code Official to require additional fire apparatus access where there is a potential for impairment of a single road because of vehicle congestion, terrain, climatic conditions, or other factors that could limit access.
- The subdivision does not provide two separate and approved fire apparatus access roads for the area served by roads A-D that satisfy the applicable remoteness requirement of IFC D107.2. The Fire Code Official's determination is documented in the attached Fire Access and Emergency Egress Review memorandum and is further supported the Poulsbo Fire District 18 Operational Emergency Response Considerations memorandum.

## Recommended Conditions of Approval

To achieve compliance with the City's adopted codes and standards, mitigate the project's direct impacts, and allow the City Engineer to make the required findings, staff recommends the following conditions, or substantially similar conditions as may be modified at the time of Hearing:

- *Condition 1 – Baywatch Court Connection.* Prior to final plat approval, the applicant shall construct a public street connection between the proposed subdivision roadway system and Baywatch Court NE, consistent with the City's adopted Future Street Plan designation NR-12, unless an alternative alignment is approved by the City Engineer that provides an equivalent level of public connectivity consistent with PMC 17.80.060 and 17.80.050.
- *Condition 2 – Future Street Connection.* Prior to final plat approval, the applicant shall dedicate and construct, or dedicate sufficient right-of-way for, a future public street connection to the adjacent southerly property (Parcel No. 252601-2-034-2002), in a location approved by the City Engineer, consistent with PMC 17.80.060.

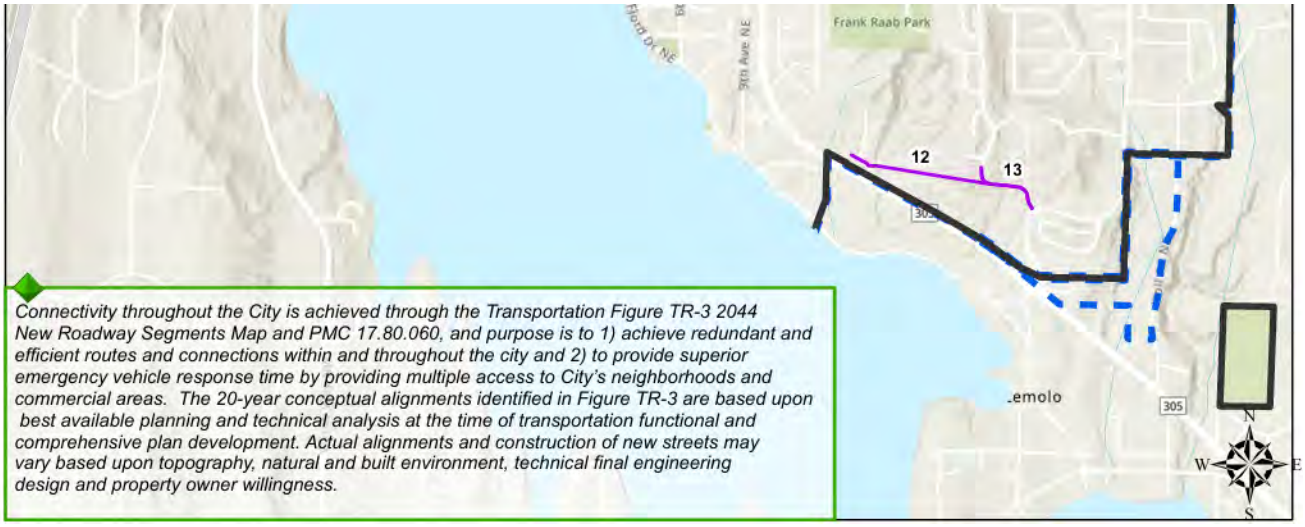
## Appendix A

## Project Analysis

### Comprehensive Plan New Roadway Connection Requirements

The City's adopted Comprehensive Plan (Figure TR-3) and Transportation Comprehensive Plan (Figure 6-2) provides the City's long-term project and roadway connectivity map. There are two required roadways from the City's New Roadway map within the Pinnacle at Liberty Bay project area. Required roadway NR-13 is the completion of Sunrise Ridge Ave NE extension connecting between the existing Crystal View subdivision and Johnson Parkway NE, recently completed by the City. The Sunrise Ridge extension currently exists as an emergency access roadway connecting to and constructed by the Crystal View subdivision as a condition of approval for that subdivision (P-06-22-09-01). Required roadway NR-12 connects NR-13 with the existing planned roadway stub in the Baywatch subdivision to the West.

**Figure 1 – Excerpt from City Transportation Figure TR-3**




Per the requirements contained in PMC 17.80.060(A), PMC 17.80.050(C), City Construction Standards Section 2(C)1 and the City's adopted 2044 New Roadway Segments Map (TR-3), the Pinnacle at Liberty Bay PRD project is required to complete both new roadway segments NR-12 and NR-13 through the project area. Completion of these roadway segments is necessary to implement the City's adopted planned transportation network providing safe, redundant and efficient access and egress, mitigate transportation impacts created by the proposed subdivision, and provide improvements that are roughly proportional to those impacts.

The project proposes to complete the construction of new roadway segment NR-13 through the project connecting to the City's existing roadway network. However, the project does not propose to complete the new roadway NR-12 connection to the adjacent Baywatch subdivision as required.

***The project will therefore be conditioned to provide the New Road NR-12 Baywatch connection.***

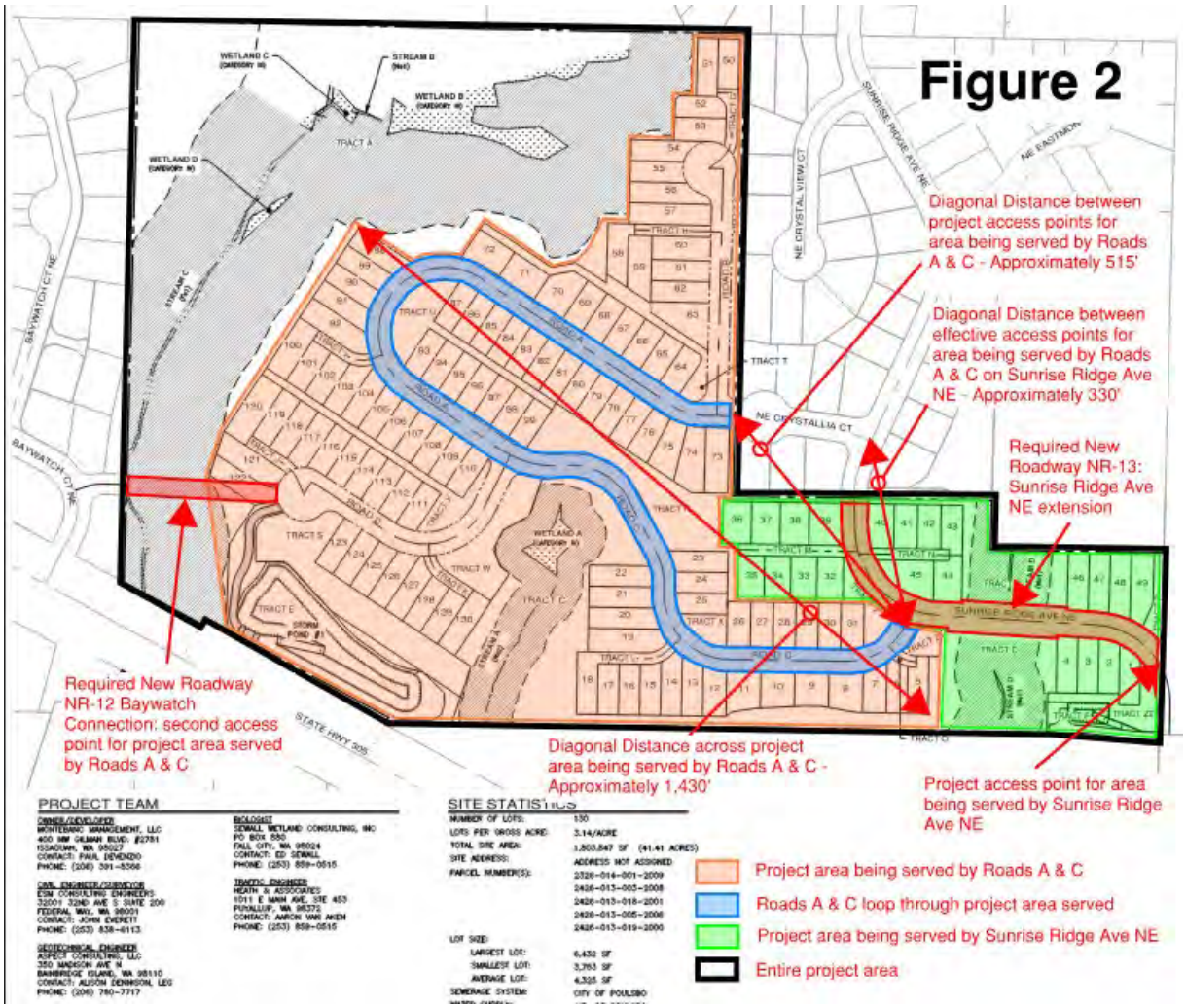
### Multiple Points of Access and Egress

Multiple points of access and egress are necessary to mitigate the transportation and public safety impacts generated by the proposed subdivision. These impacts include the need for street connectivity, redundant emergency access and egress, and a transportation network capable of maintaining circulation if an

individual roadway becomes blocked. Specifically, PMC 17.80.050(C) requires preliminary plats to provide at least two different routes for ingress and egress. PMC 17.80.050(C)(2) further provides that, when only one public street provides primary access to the *entrance points* of a residential subdivision, an additional emergency access road must be established that connects to a different road than the primary access points.

PMC 17.80.060(B) requires new subdivisions to connect to, or provide future connections for, adjacent properties. Additionally, PMC 17.80.050(C)(2)(a) establishes additional emergency access requirements, while PMC 17.80.060 requires an interconnected street network that provides future connectivity and roadway redundancy. City Construction Standards Section 2(C)1 further address these requirements.

PMC 17.10.010 Purpose indicates that the purpose of the title is to implement the provisions of the various applicable statutes, codes and comprehensive plans, promoting public health, safety and general welfare, facilitating adequate provision for streets and providing for proper and safe ingress and egress. PMC 17.10.040 Interpretation further indicates that the title shall be liberally interpreted and construed to secure the public health, safety, morals and welfare. PMC 17.60.010 contains similar purpose provisions.




The project provides two primary access points from Sunrise Ridge Ave NE serving the majority of homes in the subdivision in close proximity. One access point (Road C) connects directly to the new NR-13 segment of Sunrise Ridge Avenue NE to be constructed as part of the project. The second access point (Road A)

connects to Sunrise Ridge Avenue NE via the planned extension of NE Crystallia Court within the existing Crystal View subdivision. Together, these roads create an internal looped roadway system serving 108 of the proposed 130 residential lots. The remaining 22 lots are served by two private access roads (Tracts M and N) and ten individual driveways with direct access to Sunrise Ridge Avenue NE. Although the subdivision includes two access points to Sunrise Ridge Avenue NE, both ultimately rely on the same public roadway corridor (Sunrise Ridge Ave NE) for ingress and egress from the development. Reference Figures 1 and 2 above. The two primary access points for the main project area have an effective access distance along Sunrise Ridge Ave NE approximately 330' apart.

As proposed, the project does not provide the level of independent street connectivity, roadway redundancy, and multiple points of access and egress required by the City's adopted codes and standards.

> ***The NR-12 Baywatch connection provides the required connection to a different roadway and creates an independent route for vehicular and emergency access and egress. Therefore, the project will be conditioned to provide the New Road NR-12 Baywatch connection.***

### International Fire Code Requirements

IFC Appendix D 107.1 requires two separate and *approved* fire apparatus access roads, and the access roads are required to be a distance apart at least one-half the diagonal dimension of the property or area to be served per IFC Appendix D 107.2.

Additionally, IFC section 503.1.2 Additional Access allows the Fire Code Official to require more than one fire apparatus access road where there is the potential for impairment of a single road by vehicle congestion, conditions of terrain, climactic conditions and other factors that could limit access.

The area being served by roads A-D has a diagonal dimension across of approximately 1,430 feet, requiring the access roads to be at least 715 feet apart. These distances quoted here have been determined to be the required distances for the Pinnacle at Liberty Bay project by the City Engineer and the City's Fire Code Official. The proposed roadway layout for the project without completing the NR-12 connection to the Baywatch subdivision does not meet these International Fire Code requirements. Reference the following documents in Planning SEPA Exhibit G - Transportation:

- City of Poulsbo Fire Code Official Fire Access and Emergency Egress Review memo dated 8/19/2026
- Poulsbo Fire District 18 Operational Emergency Response Considerations memo dated 7/28/2026
- Engineering Department International Code Council (ICC) code interpretation request memo dated 10/27/2026

Also reference Figure 2 above.

> ***The project will be conditioned to provide the New Road NR-12 Baywatch connection to meet these code requirements.***

### Additional Considerations

Construction of NR-12 connecting to the existing Baywatch subdivision would satisfy the City's adopted Future Roadway Segments Map, neighborhood connectivity requirements, and the requirement for multiple redundant connections to different streets under PMC 17.80.050 and 17.80.060. This connection would also address the applicable requirements identified by the Fire Code Official under IFC section 503.1.2 and IFC Appendix D, Section D107.2.

Constructing NR-12 would further mitigate the project's direct transportation impacts by distributing project traffic across the surrounding street network rather than concentrating project traffic on Sunrise Ridge Avenue NE and the Crystal View neighborhood. It would also provide a more direct westbound access to SR 305. Earlier versions of the project's TIA did include the NR-12 connection to Baywatch. In the November

25, 2025 version of the TIA, the estimated trip distribution routed approximately 35.8% of the project's trips to this connection. Removal of this required connection will result in adding those trips to the project's impacts to Sunrise Ridge NE, increasing the project's impacts to that route.

The NR-12 connection would provide an additional emergency response route to the subdivision using State Route 305 with greatly reduced grade limitation for almost the entire route to the subdivision, as well as reducing elevation gain and loss in the route to the Western project area. The routing analysis shows this connection would reduce the emergency response distance to homes in the Road D cul-de-sac from approximately 2.1 miles via Sunrise Ridge Ave NE from the North or 2.7 miles via SR305/Johnson Parkway from the South to approximately 1.6 miles via SR305/Baywatch Ct NE.

The NR-12 connection would also provide an additional route for subdivision residents to enter/exit the development in the event of roadway blockages or other emergency factors affecting the primary access route(s).

### NR-12 Baywatch Connection Construction Feasibility

The applicant submitted a Technical Justification Letter (Planning staff report Exhibit B.5.i, attached) dated April 6, 2025 addressing the feasibility of constructing the required roadway NR-12 connection to the Baywatch subdivision. The applicant's letter identifies geometric constraints that, in the applicant's view, demonstrate that construction of the connection is infeasible.

City staff and the City Engineer reviewed the applicant's technical justification. The City also retained the City's stormwater and transportation consultant, Parametrix, to independently evaluate the feasibility of designing and constructing the NR-12 roadway connection. See attached Parametrix Connection Road Feasibility Independent Evaluation memorandum dated September 16, 2026 in Planning SEPA determination Exhibit G - Transportation.

Based on the City Engineer's review and Parametrix's independent evaluation, the NR-12 roadway connection has been determined to be feasible to design and construct.

> ***Accordingly, staff concludes that the required NR-12 Baywatch connection is feasible to construct and should be required as a condition of project approval.***

### NR-12 Baywatch Connection Construction Timing

The project is proposed to be constructed in three divisions. Per PMC 17.60.040(C), all divisions must meet all requirements independently from any other division. Under the current proposal, without construction of the Baywatch connection, the first division will have over 30 homes with only one public street (Sunrise Ridge Ave NE) providing primary access to the entrance points of the subdivision, violating the requirements of PMC 17.80.050(C), IFC D107.1 and IFC D107.2. Sprinklering of those homes would be required in addition to any other mitigation deemed appropriate by the Fire Code Official and City Engineer. Construction of the NR-12 Baywatch connection during the first division would eliminate the need for residential fire sprinklers required by PMC17.80.050(C) and IFC Appendix D due to the access limitation.

> ***The project will be conditioned accordingly to indicate that if the New Roadway NR-12 connection to Baywatch is not constructed in the first phase, additional mitigation such as sprinklering of homes will be required.***

### Adjacent Properties

There are two adjacent properties to the South of the project that do not currently have a feasible connection showing from the Pinnacle at Liberty Bay properties – property tax id 252601-2-034-2002 and 252601-2-044-2000. The applicant is required to demonstrate the feasibility of providing these future street connections, unless exempted by the City Engineer pursuant to PMC 17.80.060(B)(6). When required,

demonstration of the feasibility of providing the connection must be included in the development permit application per PMC 17.80.060(B)(4).

During the public comment period, the owner of property tax id 252601-2-034-2002 requested connection to that property from the Pinnacle at Liberty Bay project be provided. The applicant has submitted connection feasibility analysis documents for parcel 252601-2-034-2002 (Divoky) and 252601-2-044-2000 (Skelley) – these documents are in Planning SEPA Exhibit G. The City Engineer has determined that the applicant has adequately documented infeasibility of providing a connection to the Skelley parcel. The City Engineer has determined that provision for future connection to the Divoky property is feasible and will be required.

## Decision Criteria

PMC 17.60.040 requires the City Engineer to make the following findings. The criteria related to the items analyzed in this memo are in highlighted in bold italic:

A. A proposed preliminary subdivision may be approved only if the following findings are made by the review authority:
   1. The proposed preliminary subdivision conforms to the requirements of this title.
   2. The proposed preliminary subdivision conforms to the site requirements for the zoning district in which the property is located and/or other applicable zoning provisions.
   3. The proposed preliminary subdivision:
      a. ***Makes adequate provision for streets, roads, alleys, other public ways, and transit stops as required; and the proposed street system provides for the safe, orderly and efficient circulation of traffic.***
      b. Will be adequately served with water, sewer, storm drainage, and other utilities appropriate to the nature of the subdivision, and meets all current and applicable standards.
      c. Makes adequate provision for parks, recreation and playgrounds, as required.
      d. Makes adequate provision for schools and school grounds, as required.
      e. Makes adequate provisions for sidewalks and other planning features that provide safe walking conditions for students who walk to and from school.
      f. Makes adequate provisions for critical area protection pursuant to Chapter 16.20.
      g. ***Makes adequate provisions for fire and emergency access and protection.***
      h. ***Serves the public interest and makes appropriate provisions for the public health, safety, and welfare.***

PMC 18.260.140 further requires the following findings be made. The criteria related to the items analyzed in this memo are in highlighted in bold italic:

In approving a planned residential development, the review authority must make the following findings:

A. The proposal, through its design and submitted supporting documents, has clearly demonstrated it meets the stated purposes of this chapter.
B. The proposal complies with all of the applicable provisions of this title, except those provisions from which deviation has been allowed under this chapter.
C. The proposal provides overall site design features through its conceptual architectural renderings for the entire project, and has included open space areas, pedestrian walkways and connections, recreational amenities, and outdoor features.

D. The proposal would not impair the integrity and character of the zoning district in which it is to be located.

E. The site is physically suited for the type and intensity of land use being proposed.

F. The proposal would be compatible with existing and future land uses within the general area in which the proposal is to be located by providing screening or buffering between parcels and providing consistency between any existing single-family subdivisions and the proposal.

G. The proposal would preserve natural features and critical areas and would preserve and incorporate existing significant stands of trees within the project design as much as possible.

*H. There are adequate provisions for water, sanitary sewer, and public utilities (electric, gas, phone) and services to ensure that the proposal would not be detrimental to public health and safety.*

*I. There will be adequate provisions for public access to serve the subject proposal, as well as providing for neighborhood connectivity as appropriate and as required by the city.*

*J. The proposal is consistent with the comprehensive plan and the city's adopted development standards.*

K. There will not be significant unmitigated harmful effects upon environmental quality and natural resources.

*L. The proposed location, size and design of the proposal would not be detrimental to the public interests, health, safety or welfare of the city.*

*With the recommended condition of approval to provide the required New Roadway NR-12 connection to the Baywatch subdivision, the decision criteria listed above are satisfied and the City Engineer can recommend approval of the project.*

## Conclusion

The required construction of planned roadway segments NR-12 (Baywatch connection) and NR-13 (Sunrise Ridge Ave NE extension) is directly related to and proportionate to the transportation, connectivity, access, egress, and emergency response impacts generated by the proposed Pinnacle at Liberty Bay development.

The requirements are consistent with how other development projects throughout the City have been required to provide connections to existing and planned future roadway networks. The required improvements are also consistent with prior City actions requiring transportation connectivity despite environmental constraints, including the adjacent Crystal View subdivision, which constructed an emergency access roadway across a stream, and the Johnson Parkway project, which required crossings of two streams and approximately 2.3 acres of wetland mitigation to implement the City's adopted transportation network. Both of these projects directly benefit the Pinnacle at Liberty Bay project and are consistent with the requirements of the Pinnacle development.

The City Engineer has determined that construction of new roadway segment NR-12 (Baywatch Connection) is feasible and required to provide adequate roadway connectivity and safe, redundant and efficient access and egress to the subdivision as required by City codes and adopted standards.

Construction of roadway segments NR-12 (Baywatch connection) and NR-13 (Sunrise Ridge Avenue NE extension) shall be required as conditions of approval for the project.

Providing for future public street connection Parcel No. 252601-2-034-2002, as required by PMC 17.80.060, shall be required as a condition of approval and reflected in the project plans and supporting application materials.

## Findings of Fact

The requirement to construct new roadways NR-12 and NR-13 is directly related and proportionate to the direct transportation and emergency services impacts generated by the proposed subdivision. These roadway improvements implement the City's adopted Comprehensive Plan, Transportation Comprehensive Plan, development regulations and adopted international fire code; support the City's obligations under the Growth Management Act to provide an adequate transportation system to serve planned growth; improve neighborhood connectivity, roadway redundancy, and emergency access/egress; distribute project trips among the roadway network to avoid concentrating project trip impacts to a single roadway and are feasible to construct as part of the proposed development. With the project conditions of approval as recommended, staff, the City Engineer and the City Fire Code Official have determined that the project adequately mitigates the project's direct transportation and emergency services impacts. With the recommended conditions of approval, the project complies with City adopted codes and standards, meets the decision criteria required, and staff and the City Engineer recommend approval.

## Appendix B

### Codes, Standards and Comprehensive Plan References

Note that Poulsbo Municipal Code is the implementation of the City's Comprehensive Plan policies. As such, relevant comprehensive plan policies are included here to inform interpretation of Poulsbo Municipal Code referenced and analyzed in this document. The following section provides a comprehensive list of codes and comprehensive plan policies and requirements related to street connectivity, multiple points of access and egress and the City's new road map requirements. The complete code and policy sections referenced are included for reference.

**Street connectivity purposes as required by PMC 17.80.060 Street Connectivity and the associated relevant goals, policies, PMC and Fire code:**

*The purpose of street connectivity is threefold: (1) to implement the city's comprehensive plan's future street plan; (2) to provide redundant and efficient routes and connections within the city; and (3) provide superior emergency vehicle response time by providing multiple access to streets.*

**1 - Implementing the City's future street map:**

Comp Plan goals & policies:
Goal TR-1, Policy TR1.1

Implementing PMC:
PMC 17.80.060(A) and (B)

**2 - Redundant and efficient routes and connections:**

Comp Plan goals & policies:
Goal TR-1, Policies TR-1.1 & TR1.4,
Goal TR-4, Policy TR-4.5,
Goal TR-5, Policies TR-5.1, TR-5.2, TR-5.3 & TR-5.10,
Goal TR-6, Policies TR-6.1 and 6.2

Implementing PMC:
PMC 17.80.050(C)
PMC 17.80.060(B)

Relevant International Fire Code:
IFC 503.1 and 503.1.2
IFC Appendix D, Section 107.1 and D107.2

**3 - Providing superior emergency vehicle response time by providing multiple access to streets**

Comp Plan goals & policies:
Goal TR-1, Policies TR-1.1 & TR-1.4
Goal TR-4, Policy TR-4.5
Goal TR-5, Policies TR-5.1, TR-5.3 and TR-5.10
Goal TR-6, Policy TR-6.2

Implementing PMC:
PMC 17.80.050(C)
PMC 17.80.060(A) & (C)

Relevant International Fire Code:
IFC 503.1 and 503.1.2
IFC Appendix D, Section 107.1 and D107.2

## Referenced City Municipal Code Sections:

### Title 17.10 General Provisions:

### PMC 17.10.010 Purpose.

The purpose of this title is to implement the provisions of the various applicable state statutes, including but not limited to Chapters 58.17, 35.63 and 65.08 RCW, and the city of Poulsbo comprehensive plan and Poulsbo Municipal Code. The regulations contained herein are intended to:

A. Regulate the subdivision of land and to promote the public health, safety and general welfare in accordance with standards established by the state and city.

B. Promote the effective utilization of land and infrastructure.

C. Make adequate provision for the housing, commercial and industrial needs of the city.

D. Prescribe procedures for the expeditious review of proposed subdivision of land in accordance with officially adopted plans, policies and standards, including the provisions of the zoning code (Title 18).

E. Provide for the efficient processing of subdivision applications.

F. Implement the Growth Management Act and the policies of the city of Poulsbo comprehensive plan.

G. Facilitate adequate provision for streets, water, sanitary sewer, utilities, stormwater drainage, schools and park and recreation areas, and other public requirements.

H. Provide for proper and safe ingress and egress.

I. Provide for uniform monumenting of land subdivisions and conveyance by accurate legal descriptions.

J. Provide for access to utilities for ease of installation, inspection and maintenance.

### PMC 17.10.040 Interpretation.

This title shall be liberally interpreted and construed to secure the public health, safety, morals, and welfare, to implement the city of Poulsbo comprehensive plan, and to comply with all applicable requirements of Washington State law, and the rule of strict construction shall have no application.

### PMC 17.60.010 Purpose.

Pursuant to Chapter 58.17 RCW, it is the intent of this chapter:

A. To establish processing and approval of a division of land.

B. To promote the public health, safety and general welfare, and to further the goals and policies of the city comprehensive plan.

C. To facilitate adequate provisions for water, sewer, stormwater drainage, ingress and egress, and public uses.

D. To protect critical areas and critical area buffers as designated in Chapter 16.20.

E. To require conveyance by accurate legal description.

## Connectivity:

## PMC 17.80.060 Street Connectivity

The purpose of street connectivity is threefold: (1) to implement the city's comprehensive plan's future street plan; (2) to provide redundant and efficient routes and connections within the city; and (3) provide superior emergency vehicle response time by providing multiple access to streets. Street connectivity shall be implemented as follows:

A. New streets shall be provided and located consistent with the city's comprehensive plan transportation map series and new roadway segments map:
   1. Where topography, adjacent property owner willingness, natural features or other conditions make achievement of a planned alignment impractical, the street alignment, connection and/or location shall be as approved by the city engineer consistent with the intent of planned alignment.
   2. The required improvement must be related in nature and extent to the impact of the development.
   3. When requiring a new street to be provided consistent with the city's comprehensive plan new roadway segments map, the city shall provide a finding of fact with the subdivision decision, setting forth that the requirement of the new street is supported under the city's Growth Management Act responsibility to provide for adequate streets and roads for its allocated population, and, based upon the city's adopted comprehensive plan, there is a reasonable assurance the new street shall be completed.

B. New subdivisions shall connect to or provide a future connection to adjacent property.
   1. New subdivisions shall use existing street connections, if provided, unless it is technically infeasible to do so as determined by the city engineer.
   2. When providing for street connectivity, the public streets and utilities shall be extended to the property boundary.
   3. When a street connection is required to undeveloped property zoned for residential development, a sign is required to be posted at the connection point indicating the intent of a future road connection.
   4. When a street is required to undeveloped property, a preliminary engineering analysis of the feasibility of the future street connection shall be submitted with the development permit application.
   5. Pedestrian and bicycle connection to adjacent subdivisions or property shall be provided as feasible and as consistent with the intent of the city's comprehensive plan's identified sidewalk and path connections.
   6. The city engineer may exempt the requirement for street connectivity under the following circumstances:
      a. There are existing and available connections to collector or arterial streets.
      b. The existing development and ownership pattern, site and/or surrounding area's topography make connectivity technically and physically unfeasible.
      c. Temporary emergency vehicle access is provided, and street connectivity will occur in the future.
      d. The street connection is not identified on the comprehensive plan transportation map series.

## Multiple points of access and egress:

PMC 17.80.050(C) - Preliminary plats shall provide for at least two different standard routes for ingress and egress.

1. The requirement for an existing or future street connection(s) in Section 17.80.060 shall contribute to meeting this requirement.

2. If, based upon existing development pattern, topography, adjacent property owner willingness, or street connectivity to adjacent property will occur in the future, and only one public street provides primary access to the entrance points of a new residential subdivision, the following shall apply:
    a. A secondary emergency access road of a minimum of twenty feet unobstructed width shall be established within an access easement and connect to a different street than the primary access points. The emergency access road shall be constructed as an all-weather surface as approved by the city fire official and city engineer. When street connection to adjacent property or a second public street access is provided, the emergency access road may be abandoned, if approved by the city's fire official and city engineer.
    b. If a secondary emergency vehicle access easement cannot be provided, and the plat is greater than thirty lots, the following shall be required:
        i. Sufficient evidence must be provided to the city that an emergency access road could not be acquired due to adjacent property owner willingness, topography, or other technically acceptable reason.
        ii. Additional fire protection and emergency vehicle access measures, such as but not limited to sprinklering, widening the primary access street with turn-outs, building in phases, shall be proposed by the applicant of the preliminary plat and incorporated into the plat design and/or conditions of approval.
    c. The city engineer may determine the secondary emergency access is not required, upon consultation and concurrence by the city fire official, based upon the size of plat, topography, existing land development pattern, access to public streets or other technical reasons that will be entered into as a finding for the preliminary plat.

## Construction Standards reference:

### Construction Standards adopting Code:

PMC 17.80.050(B) - All street frontage improvements, new street design, grades, widths, street lighting and construction shall comply with the standards and specifications as set forth in the city's construction standards and specifications, including current ADA standards. Additional right-of-way may be required where future conditions and development impacts warrant, or where topographical requirements necessitate cuts or fills for proper grading of the streets.

### Construction Standards Section 1:

### Section 1(B) General Considerations

B. General Considerations Well-designed projects that result in maintainable and economical public works are a goal of the City of Poulsbo Public Works Department. Although these standards are intended to apply to any physical development within the City, they may not apply for all situations. Compliance with these standards does not relieve the designer, owner or engineer of any project of the responsibility to apply sound professional judgment and acceptable engineering standards. These are minimum standards and are intended to assist, but not substitute for competent work by design professionals. The City may, at its sole discretion due to special conditions and/or environmental constraints, require more stringent requirements than would normally be required under these standards.

### Section 2(C)1:

C. Standards

1. Connectivity: In addition to specific municipal code requirements, it is the policy of the City to connect adjacent neighborhoods to one another to the extent safe and practical in conformance with

the City's adopted Comprehensive Transportation Plan. The purpose is to provide safe, redundant and efficient access, and egress to both residents and emergency and safety equipment.

## Section 1(C) Deviations from the Manual

C. Deviations from the Manual

1. Requests for changes to, or deviations from, these standards may be considered by the City. Generally the decision to grant, deny or modify the standards will be based upon evidence that the request can meet the following criteria:
   a. The change will achieve the intended result in a comparable or even superior design and a better quality of improvement; and,
   b. The change will not adversely affect safety and/or operation; and,
   c. The change will not adversely affect maintainability or economical considerations; and,
   d. The change is permitted under City Ordinance and applicable state and federal laws.
2. A request for approval of a deviation to City standards shall be submitted in writing to the City Engineer. The request shall include a description of the proposed deviation, the rationale for it, and any supporting documentation that would justify approval of the request in terms of the criteria listed above. When applicable, a drawing or other graphical material shall be included. The City Engineer will review the proposal, determine his recommendation for approval or denial, and prepare a presentation for City Council consideration. The City Council shall make their decision based upon the fulfillment of the criteria.
3. The request may be submitted prior to, with, or after, making an application; however, if submitted with or after making an application, the project timeline may be affected and an extension for additional processing time will be requested from the applicant.
4. In the Old Poulsbo district, the City Engineer shall have the authority to allow a deviation from these standards in order to allow new streets to be consistent with existing street conditions if, in the discretion of the City Engineer, the adjacent existing conditions are unlikely to be replaced in the foreseeable future, and if the deviation satisfies criteria (b) and (c) above.

### Revised Code of Washington (RCW) Reference:

RCW 58.17.110 – Approval or disapproval of subdivision and dedication – Factors to be Considered – Conditions for Approval – Finding – Release from damages.

(1) The city, town, or county legislative body shall inquire into the public use and interest proposed to be served by the establishment of the subdivision and dedication. It shall determine: (a) If appropriate provisions are made for, but not limited to, the public health, safety, and general welfare, for open spaces, drainage ways, streets or roads, alleys, other public ways, transit stops, potable water supplies, sanitary wastes, parks and recreation, playgrounds, schools and schoolgrounds, and shall consider all other relevant facts, including sidewalks and other planning features that assure safe walking conditions for students who only walk to and from school; and (b) whether the public interest will be served by the subdivision and dedication.

(2) A proposed subdivision and dedication shall not be approved unless the city, town, or county legislative body makes written findings that: (a) Appropriate provisions are made for the public health, safety, and general welfare and for such open spaces, drainage ways, streets or roads, alleys, other public ways, transit stops, potable water supplies, sanitary wastes, parks and recreation, playgrounds, schools and schoolgrounds and all other relevant facts, including sidewalks and other planning features that assure safe walking conditions for students who only walk to and from school; and (b) the public use and interest will be served by the platting of such subdivision and dedication.

If it finds that the proposed subdivision and dedication make such appropriate provisions and that the public use and interest will be served, then the legislative body shall approve the proposed subdivision and dedication. Dedication of land to any public body, provision of public improvements to serve the subdivision, and/or impact fees imposed under RCW 82.02.050 through 82.02.090 may be required as a condition of subdivision approval. Dedications shall be clearly shown on the final plat. No dedication, provision of public improvements, or impact fees imposed under RCW 82.02.050 through 82.02.090 shall be allowed that constitutes an unconstitutional taking of private property. The legislative body shall not as a condition to the approval of any subdivision require a release from damages to be procured from other property owners.

(3) If the preliminary plat includes a dedication of a public park with an area of less than two acres and the donor has designated that the park be named in honor of a deceased individual of good character, the city, town, or county legislative body must adopt the designated name.

(4) If water supply is to be provided by a groundwater withdrawal exempt from permitting under RCW 90.44.050, the applicant's compliance with RCW 90.44.050 and with applicable rules adopted pursuant to chapters 90.22 and 90.54 RCW is sufficient in determining appropriate provisions for water supply for a subdivision, dedication, or short subdivision under this chapter.

**Decision Criteria and required findings:**

**PMC 17.60.040 Decision Criteria.**

B. A proposed preliminary subdivision may be approved only if the following findings are made by the review authority:

2. The proposed preliminary subdivision conforms to the requirements of this title.

3. The proposed preliminary subdivision conforms to the site requirements for the zoning district in which the property is located and/or other applicable zoning provisions.

4. The proposed preliminary subdivision:

a. Makes adequate provision for streets, roads, alleys, other public ways, and transit stops as required; and the proposed street system provides for the safe, orderly and efficient circulation of traffic.

b. Will be adequately served with water, sewer, storm drainage, and other utilities appropriate to the nature of the subdivision, and meets all current and applicable standards.

c. Makes adequate provision for parks, recreation and playgrounds, as required.

d. Makes adequate provision for schools and school grounds, as required.

e. Makes adequate provisions for sidewalks and other planning features that provide safe walking conditions for students who walk to and from school.

f. Makes adequate provisions for critical area protection pursuant to Chapter 16.20.

g. Makes adequate provisions for fire and emergency access and protection.

h. Serves the public interest and makes appropriate provisions for the public health, safety, and welfare.

B. If the findings in subsection A of this section have not been met, the review authority shall deny the proposed preliminary plat, unless specified conditions have been issued to fully satisfy the criteria.

C. Where a preliminary plat subdivision is to be developed in divisions with a final plat approved and recorded separately for each division, the applicant shall request approval of divisions as part of the preliminary plat subdivision application. Each separate division shall be required to meet the requirements of subsection A of this section and all other applicable city codes when considered independently from any other division. When an applicant requests divisions after preliminary plat

approval has been granted but prior to recording, divisions may be approved only through modification of the preliminary plat subdivision as set forth in Section 17.60.070.

### PMC 18.260.140 Findings.

In approving a planned residential development, the review authority must make the following findings:

A. The proposal, through its design and submitted supporting documents, has clearly demonstrated it meets the stated purposes of this chapter.

B. The proposal complies with all of the applicable provisions of this title, except those provisions from which deviation has been allowed under this chapter.

C. The proposal provides overall site design features through its conceptual architectural renderings for the entire project, and has included open space areas, pedestrian walkways and connections, recreational amenities, and outdoor features.

D. The proposal would not impair the integrity and character of the zoning district in which it is to be located.

E. The site is physically suited for the type and intensity of land use being proposed.

F. The proposal would be compatible with existing and future land uses within the general area in which the proposal is to be located by providing screening or buffering between parcels and providing consistency between any existing single-family subdivisions and the proposal.

G. The proposal would preserve natural features and critical areas and would preserve and incorporate existing significant stands of trees within the project design as much as possible.

H. There are adequate provisions for water, sanitary sewer, and public utilities (electric, gas, phone) and services to ensure that the proposal would not be detrimental to public health and safety.

I. There will be adequate provisions for public access to serve the subject proposal, as well as providing for neighborhood connectivity as appropriate and as required by the city.

J. The proposal is consistent with the comprehensive plan and the city's adopted development standards.

K. There will not be significant unmitigated harmful effects upon environmental quality and natural resources.

L. The proposed location, size and design of the proposal would not be detrimental to the public interests, health, safety or welfare of the city.

## Referenced Relevant Comprehensive Plan Goals & Policies:

### GOAL TR-1: Streets shall be constructed to improve the function, safety and appearance of the citywide street system.

**Policy TR-1.1** All streets constructed or reconstructed within the City shall meet the City's Street Construction Design Standards. Roads providing access to and within each development from the City's arterial and collector system must be designed and constructed to maintain the required level of service. Each development's site access and circulation plan shall include frontage improvements and other relevant features identified in City Street Construction Standards, Transportation Comprehensive Plan Update 2024 included as Appendix B.4a to this Comprehensive Plan, and Figures TR-3 and TR-4 as applicable.

**Policy TR-1.4** Each new development in the City shall mitigate its traffic impacts by providing safety and capacity improvements to the City's transportation system in order to maintain the adopted level of service on transportation facilities and to provide for the safe and efficient movement of people and goods using multiple modes of travel. Concurrency shall be the minimum required. Mitigation required of any individual development shall be related and roughly proportional to the impacts of that development

where so required by law. Mitigation of traffic impacts may be achieved in any number of ways, including but not limited to, actual construction of improvements, financial contribution in lieu of such construction, payment of impact fees imposed under RCW 82.02, implementation of transportation demand strategies, transit services, or any other method that is acceptable to the City and that will result in actual mitigation for the impacts of the development. The City may use any and all authority granted to it under state law to require mitigation of the traffic impacts of development, including but not limited to, the State Environmental Policy Act, the State Subdivision Act, and the Growth Management Act.

### Goal TR-4: Provide a safe, efficient, equitable and reliable transportation system that works towards eliminating traffic injuries and deaths.

**Policy TR-4.5** Protect Poulsbo's transportation system against disasters by maintaining prevention and recovery strategies that are coordinated locally and regionally. Continue to participate with Kitsap County Emergency Management, with development of emergency management plans and emergency response activities.

### GOAL TR-5: Provide safe and reliable transportation facilities and services to promote and accommodate the growth that is anticipated under this plan.

**Policy TR-5.1** Develop and maintain an interconnected and overlapping transportation system grid of pedestrian walkways, bicycle facilities, shared use paths, roadways for automobiles and freight, and transit service. The system should increase safety and mobility, facilitate mode integration and intermodal connections, improve access to local centers and provide increased opportunities for healthy activities and alternatives to driving. Develop mode-share goals that reduce dependence on personal automobiles and support implementation of complete street design features. Support and implement programs such as traffic operations, transportation demand management including telecommuting, and neighborhood traffic management, which support the efficient circulation of the City's traffic system.

**Policy TR-5.2** Develop a transportation grid that provides good connections between residential and commercial activity centers and allows for multiple circulation routes to/from each location. Close gaps and complete system connections through the development and capital improvement processes.

**Policy TR-5.3** All new residential developments shall be required to provide multiple vehicular, bicycle and pedestrian through connections with adjacent existing or future residential developments, when such requirement is consistent with legal nexus parameters. When requiring a connection to undeveloped property which is zoned for residential development, the City shall require a sign be posted at the connection point indicating future road connection.

**Policy TR-5.10** Increase the resilience of the City's transportation system and support strategies for security and emergency management responses.

### GOAL TR-6: Coordinate land use and transportation planning to manage growth.

**Policy TR-6.1** Improve connectivity of the City's neighborhoods and commercial areas by planning an integrated grid of public paths, bikeways and complete streets that supports a compact, urban, and accessible transportation facilities to centers, parks, shopping, services, healthcare, residential and commercial development.

**Policy TR-6.2** Connectivity throughout the City is achieved through the Transportation Figure TR-3 2044 New Roadway Segments Map and PMC 17.80.060 and purpose is to 1) achieve redundant and efficient routes and connections within and throughout the city and 2) to provide superior emergency vehicle response time by providing multiple access to City's neighborhoods and commercial areas. The 20-year conceptual alignments identified in Figure TR-3 are based upon best available planning and technical

analysis at the time of transportation functional plan development. Future roadways depicted on Figure TR-3 should avoid pre-existing occupied structures, public parks, designated and protected open space areas and tracts. Actual alignments and construction of new roadways may vary based upon topography, natural and built environment, technical final engineering design and property owner willingness. Reasonable alternative alignments may be considered by the City Engineer consistent with the intent of the conceptual alignment, including pedestrian and bicycle connections.

**GOAL TR-10: Improve access and capacity of public transportation to help alleviate congestion and expand transportation options that provide connections within Poulsbo and connect the City to other local and regional centers.**

**Policy TR-10.6** Support transit-oriented development by promoting residential land uses and development which are within walking distances of transit service and facilities. Provide high quality pedestrian and bike facilities that link residential and commercial areas with transit service and facilities.

**GOAL TR-11: Transportation improvements within the City shall promote transportation equity through services and infrastructure improvements.**

**Policy TR-11.1** Build an accessible transportation system focused on intermodal connectivity and removal of barriers to personal physical mobility.

ENGINEERING DEPARTMENT

200 NE Moe Street | Poulsbo, Washington 98370
(360) 394-9882 | fax (360) 697-8269

# MEMO

**To:** Project file
**From:** Michael Bateman, PE | Transportation Engineer
**Subject:** ICC Code Interpretation Request | Pinnacle at Liberty Bay PRD | P-06-20-25-03
**Date:** October 27, 2026

The City of Poulsbo is a member of the International Code Council (ICC). The ICC offers code interpretation assistance to its members.

The following Project Areas and Access Points – City Determination document was developed by Engineering staff and forwarded to the ICC by the City's Building Official Matt Logue for interpretation guidance.

The response and guidance from ICC follows, indicating that the City is correctly interpreting and applying International Fire Code.

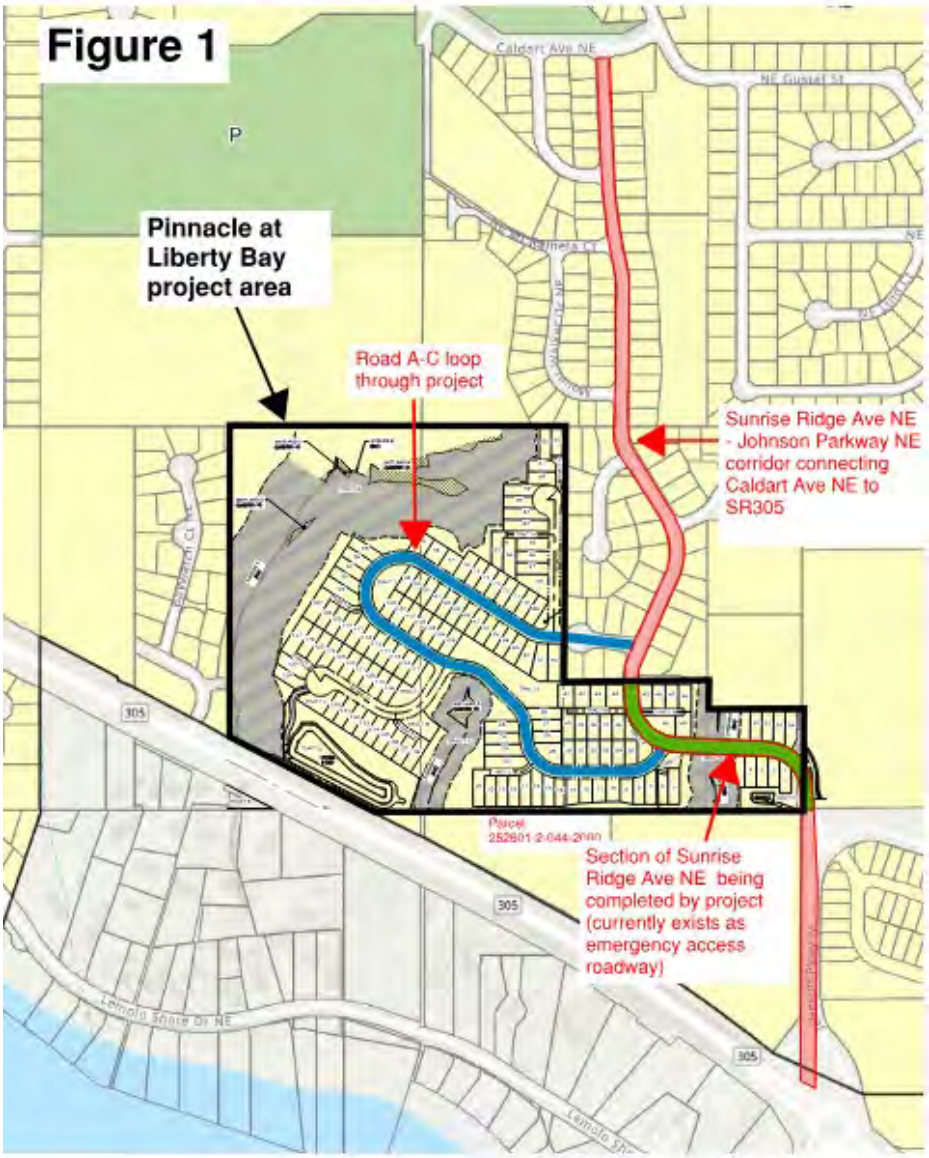
---

**Project Areas and Access Points - City Determination**

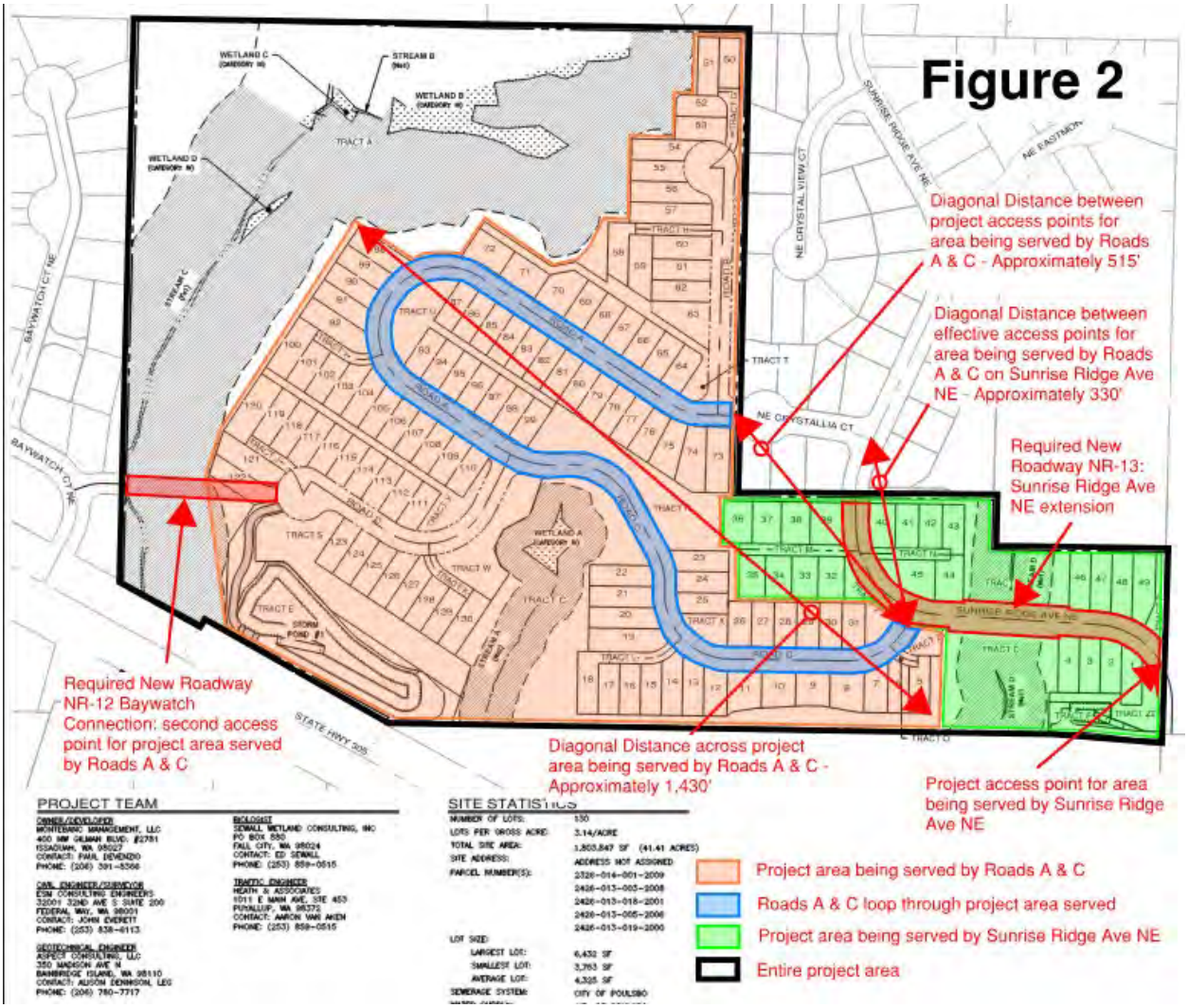
The Pinnacle At Liberty Bay project is a proposed subdivision within the City of Poulsbo. The project area is approximately 41 acres, of which 23.8 acres will be developed into 130 single family residential lots. The remaining 17.2 acres are largely critical areas and will remain undeveloped. The project area and surrounding terrain are steep with large portions of the roadway network at or near the City's maximum 12% grade.

The project as proposed connects to an existing North-South corridor (Sunrise Ridge Ave NE-Johnson Parkway NE) through existing developments, connecting Caldart Ave NE to the North with State Route 305 to the South, highlighted Red in Figure 1 below. A portion of that corridor currently exists and an emergency access roadway which will be completed to full City standards by the project as required (green section in Figure 1 below).

The project has 22 lots that will have direct access to Sunrise Ridge Ave NE either via direct driveway connection or private roads serving no more than 8 lots. The remaining 108 lots will be served by a looped roadway (Roads A and C) which connects to Sunrise Ridge Ave NE. There are two additional dead-end cul-de-sacs (Roads B and D) connecting to that looped roadway.




It is the determination of the City's Engineering Department and Fire Code Official that the project has two distinct areas within the overall project area being developed from a fire apparatus access roadway standpoint. One area highlighted in green in Figure 2 below consists of lots 1-4 and 32-49 that have direct access to City collector roadway Sunrise Ridge Avenue NE. The second area highlighted in orange below consists of lots 5-31 and 50-130 served by internal looped Roads A & C highlighted in blue which connect to Sunrise Ridge Avenue NE via existing NE Crystallia Ct to the North, and directly to Sunrise Ridge Avenue NE to the South. The project's effective connection points on Sunrise Ridge Avenue NE are approximately 330 feet apart.




The City has adopted IFC section 503 and Appendix D in their entireties.

It is the City's determination that the project area served by the Road A-C loop exceeds 30 dwelling units and per the requirements of IFC D107.1, two separate and approved fire apparatus access roads must be provided. Additionally, the City's Fire Code Official as authorized by IFC 503.1.2 has determined that a second fire apparatus access road is required for that project area due to the potential for impairment of a single road by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access. The City's Engineering Department concurs with this determination.

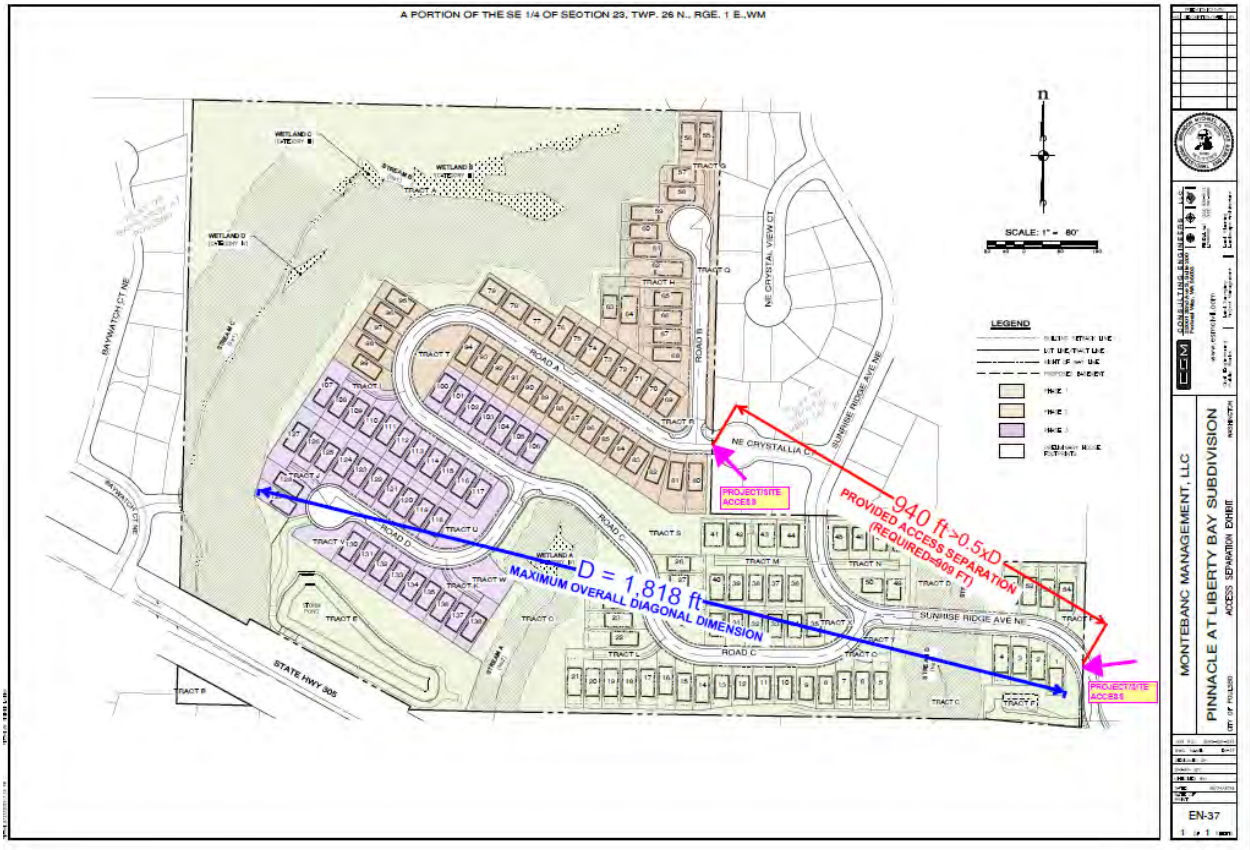
Per the remoteness requirement in IFC Appendix D 107.2, those access points must be a distance apart equal to one-half of the diagonal distance of the area being served.

It is the City's determination that the diagonal distance across the area being served by the Road A-C loop is 1,430 feet, therefore the required distance between access points for the project area being served by the road A-C loop is one-half of 1,430 feet – **715 feet**, and that as-proposed with the effective distance between Road A-C loop connections to the Sunrise Ridge Ave NE collector roadway approximately 330 feet apart, the area served by Roads A & C does not meet the requirements of IFC Appendix D, and as such will be requiring that the project complete the New Roadway NR-12 connection to the adjacent Baywatch subdivision per the City's comprehensive

plan. Reference Figure 2 above. The City has determined that with the NR-12 Baywatch connection, the project will meet the requirements of the International Fire Code as adopted, and will be including a requirement for that connection in the project conditions of approval.

**Project Areas and Access Points – Applicant Submittal**

The project applicant has submitted a figure with the application materials with a different interpretation of the IFC code requirements, contending that the project meets IFC requirements as-proposed.




**Question for ICC staff**

Is the City correctly interpreting and applying the requirements of the International Fire Code as adopted by the City?

**ICC Staff Response:**

**From: Scott W. Adams <jira@icc-ts.atlassian.net>**
**Sent: Sunday, October 18, 2026 5:44 PM**
**To: Matt Logue <mlogue@poulsbo.gov>**
**Subject: ICCTO-8135 Remoteness Measurement**

**————————**

**Reply above this line.**

**Scott W. Adams has commented on your request:**

**This Response as Provided for ICCTO-8135 Done - Remoteness Measurement**

**Mr. Logue:**

**This response is provided to your inquiry regarding the fire apparatus access road and remoteness requirements for the proposed subdivision. Unless specifically noted otherwise, our responses herein are based on the 2021 International Fire Code (IFC).**

**Under Section 101.2.1, the City of Poulsbo's specific adoption of Appendix D makes its provisions enforceable within the jurisdiction, in conjunction with the applicable fire apparatus access road requirements of Section 503.**

**Our response is based on the information provided for a subdivision that comprises more than 30 dwelling units and includes two access points that are separated by approximately 330 feet. The maximum overall diagonal dimension of the area served is approximately 1,430 feet, and a potential roadway to the adjacent subdivision. The issue presented is whether this access configuration complies with Sections D107.1, D107.2 and 503.1.2.**

**Analysis of Code Basis:**

1. **Requirement for Two Separate Access Roads (Section D107.1 and Section 503.1.2):**
    1. **Section D107.1 (One- or Two-Family Residential Developments): This section mandates that one- or two-family residential developments where the number of dwelling units exceeds 30 must be provided with two separate and approved fire apparatus access roads. The portion of the subdivision served by the internal looped roadway network exceeds the 30 dwelling-unit threshold. As such, a minimum of two fire apparatus access roads are required.**
    2. **Section 503.1.2 (Additional Access): This section authorizes the fire code official to require more than one fire apparatus access road where potential impairment of a single road could occur due to vehicle congestion, terrain conditions (such as the steep slopes and 12 percent grades present on site), climatic conditions or other factors that could limit emergency access.**
2. **Remoteness Determination and Measurement:**

1. **Section D107.2 (Remoteness): This section states that where two fire apparatus access roads are required, they must be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the property or area being served and measured in a straight line between accesses.**
2. **Application of the Area Being Served: The code permits the evaluation to be based on the property or area being served. Evaluating the development according to the distinct areas served is consistent with this provision.**
3. **Remoteness Calculation: For an overall diagonal dimension of 1,430 feet across the area served by Roads A and C, the required minimum straight-line separation distance between access points is 715 feet. (1,430 feet / 2)**
4. **Compliance with Required Access Separation: The proposed access points at Sunrise Ridge Avenue NE (NE Crystallia Court to the north and the direct connection to the south) are separated by approximately 330 feet, which does not satisfy the required minimum of 715 feet.**

3. **Purpose of Access Separation and the NR-12 Baywatch Connection:**
    1. **The purpose of Section D107.2 is to ensure that a single emergency event, roadblock, fallen tree, collision, utility failure or landslide/washout along the access route cannot simultaneously obstruct or compromise both access points to the development.**
    2. **Placing both access points only 330 feet apart along the same collector roadway creates a localized bottleneck and does not achieve true remote secondary access for this development.**
    3. **In our opinion, requiring the completion of the new Roadway NR-12 connection to the adjacent Baywatch subdivision establishes an independent secondary access route from an entirely separate roadway network, directly satisfying the remoteness intent and prescriptive criteria of Section D107.2.**
4. **Authority of the Fire Code Official: Sections 104.1 (General Authority and Responsibilities) and 503.1 authorize the fire code official to administer and enforce the code, including determining whether fire apparatus access roads provide adequate access based on site conditions, roadway configuration and operational safety considerations.**

**This response is advisory in nature, and the final interpretation, approval and enforcement rest with the fire code official, as applicable, for the jurisdiction in question.**

**Should you require any additional information, please do not hesitate to contact us.**

**Scott W. Adams, PE**
**Fire Protection Engineer**
**Technical Services**
**International Code Council**

**You may reply to this email to add comments to your request.**

**Scott W. Adams resolved this as Answered.**

**Copyright © 2026 International Code Council, Inc.  All rights reserved.**

**Code opinions issued by ICC staff are based on ICC-published codes and do not include local, state or federal codes, policies or amendments. This opinion is based on the information which you have provided. We have made no independent effort to verify the accuracy of this information nor have we conducted a review beyond the scope of your question. This opinion does not imply approval of an equivalency, specific product, specific design, or specific installation and cannot be published in any form implying such approval by the International Code Council. As this opinion is only advisory, the final decision is the responsibility of the designated authority charged with the administration and enforcement of this code..**

**ICC will make reasonable efforts to provide accurate information as part of any code opinion.  However, ICC makes no guarantees or warranties, express or implied, as to the accuracy of any information provided, including, without limitation, any warranties of merchantability or fitness for a particular purpose.  ICC will not be held liable for any damages or loss, whether direct, indirect, consequential, or punitive, that may arise through your use of any code opinion.**

**Olympic Region**

# PLANS, SPECIFICATIONS AND ESTIMATE
## Review Comment Disposition Form

| | | | |
|---|---|---|---|
| Project Title: | The Pinnacle at Liberty Bay - Poulsbo TIA 10-5-26 | Job Charge #: | |
| WSDOT Olympic Region Traffic Design – Traffic Analysis Review<br><br>Date of Review Comments: 10/21/2026 | | Responses By:<br><br>Date of Disposition: | |

| Comment No. | Sht or Pg. | Review Comment | Status Code | Designer's Response |
|---|---|---|---|---|
| 1. | GEN | WSDOT's comments dated July 30, 2026, do not appear to have been addressed. Please provide a response to each comment, including the rationale for any comments the designer elects not to address. Please also provide the requested electronic files to allow validation of the analysis. WSDOT's previous comment form is attached for reference. | | |
| 2. | GEN | Please identify any mitigation proposed to address the project's impacts on SR 305. | | |
| 3. | GEN | Please include the following disclaimer for safety data:<br><br>"Under 23 U.S. Code § 148 and 23 U.S. Code § 407, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data." | | |
| 4. | | | | |
| 5. | | | | |
| 6. | | | | |
| 7. | | | | |
| 8. | | | | |
| 9. | | | | |
| 10. | | | | |

Status Code Legend: A = Incorporated B = Open/Under Review C = Evaluated/Not Incorporated D = Beyond Scope/Not Evaluated
All "B" and "C" responses require explanatory comments.