Appendix L

Traffic Impact Study

Quail Acres 1
Project Traffic Impact Study



Prepared for the Town of Windsor

Submitted by
W-Trans

April 5, 2024

TRAFFIC ENGINEERING
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Introduction

This report presents an analysis of the potential mobility impacts that would be associated with the development of the Quail Acres 1 residential project in the northern portion of the Town of Windsor. The traffic study was completed in accordance with the criteria established by the Town of Windsor and is consistent with standard traffic engineering techniques.

Project Description

The proposed Quail Acres 1 project is a residential subdivision consisting of for sale single-family detached and single-family attached duplex units. The 59-acre project site is generally located to the northeast of the current eastern intersection of Los Amigos Road/Arata Lane. The project would include a central park as well as a linear park along the site's northern and eastern boundaries. The segment of Los Amigos Road to the north of Arata Lane would be realigned along the southwestern boundary of the project site in a right-of-way previously acquired by the Town of Windsor. At the Arata Lane/Los Amigos Road intersection, the new southbound approach would consist of a single through/left-turn lane and a right-turn pocket.

The project includes an area that would be developed as a later phase and could be occupied either by residential units or become a potential future Windsor Unified School District (WUSD) school site. The proposed project without the potential school site would include a total of 255 detached single-family homes and 46 attached single-family homes. The alternative project with a school would include a total of 190 single-family homes, 46 attached single-family homes, and a site for a future potential school with enrollment of 500 students. Of the 46 total attached residential units included in either option, 30 would be deed-restricted affordable units, with 15 designated for low-income households and 15 designated for moderate-income households.

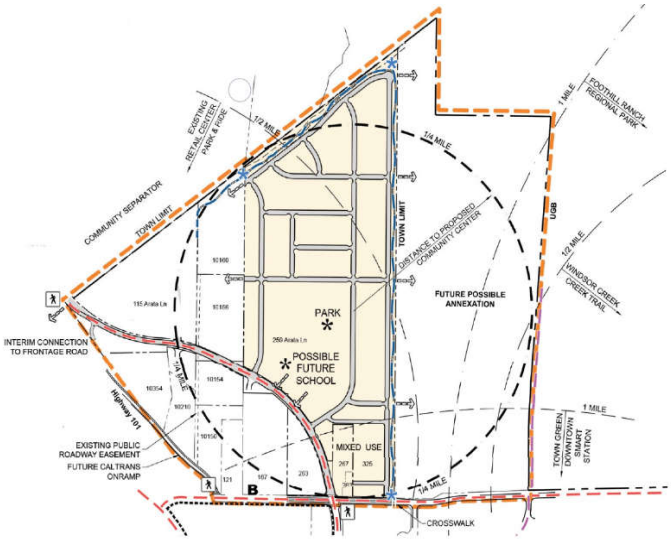


Plate 1 Project Site Context

The proposed Quail Acres 1 site context is shown in Plate 1, and the project site plan is shown in Figure 1.

Study Area

The traffic impact study assesses mobility for all modes of travel. Pedestrian circulation is analyzed for areas extending one-quarter mile beyond the project site, and bicycle and transit modes are analyzed for areas within one-half mile of the project site. The analysis of vehicular facilities includes the streets and roadways within and surrounding the project site as well as the following intersections:

1. Old Redwood Highway/US 101 South Ramps
2. Old Redwood Highway/Starr Road
3. Old Redwood Highway/Arata Lane
4. Los Amigos Road-US 101 North Off-Ramp/Arata Lane (existing configuration), Los Amigos Road/US 101 North Ramps (future configuration)
5. Los Amigos Road/Arata Lane



Source: Civil Design Consultants 10/25

win164.ai 10/23

Quail Acres 1 Project Traffic Impact Study

Figure 1 – Site Plan

Pedestrian Facilities

Existing and Planned Pedestrian Facilities

Pedestrian facilities include sidewalks, crosswalks, pedestrian signal phases, curb ramps, curb extensions, and various streetscape amenities such as lighting, benches, etc. Existing pedestrian facilities along the proposed project site frontages as well as within a one-quarter mile distance of the project site were reviewed.

There are no existing pedestrian facilities along the project frontage on Arata Lane. Sidewalks are present on both the north and south sides of Arata Lane between the intersections of Old Redwood Highway/Arata Lane and Los Amigos Road-US 101 North Off-Ramp/Arata Lane, and on the north side along the frontage of Newsong Church. There is an approximately 300-foot-long sidewalk gap on the north side of Arata Lane between Newsong Church and Los Amigos Road. On Arata Lane to the east of Los Amigos Road, continuous sidewalks exist on the south side of the street to Hembree Lane, except for an approximately 90-foot gap in front of 300 Arata Lane.

Sidewalks are present on the east and west sides of Los Amigos Road from its intersection with Arata Lane southward to Manzanita Drive, after which sidewalks are present only along the eastern side of the street. Sidewalks exist on both sides of Camelot Drive, Biggs Way, and Brooks Road for their entire lengths. There are marked crosswalks on the north and east legs of Old Redwood Highway/Arata Lane and on the south leg of Los Amigos Road/Arata Lane.

As identified in the *Windsor Bicycle and Pedestrian Master Plan*, additional pedestrian crossings are planned in the future at the intersections of Old Redwood Highway/Starr Road and Los Amigos Road-US 101 North Off-Ramp/Arata Lane, as well as rapid rectangular flashing beacons (RRFB) at Los Amigos Road/Arata Lane.

Pedestrian Safety

The collision history for the study area was reviewed to determine any trends or patterns that may indicate a safety issue for pedestrians. During the five-year study period of January 1, 2018, through December 31, 2022, there were no reported collisions involving pedestrians at the study intersections.

Project Impact on Pedestrian Facilities

Given the location of the site in northern Windsor adjacent to the urban growth boundary along with a lack of major pedestrian attractors in the vicinity, pedestrian trips are expected to be primarily related to recreation, transit, and schools in surrounding neighborhood including Brooks Elementary School and Windsor Middle School. Some pedestrian travel to shopping may also occur if neighborhood commercial uses are ultimately built in the future near the project's southwestern corner, as envisioned in the Town's General Plan. Sidewalks should be provided along all project streets within the site and should include connections to the surrounding network.

Based on review of the site plan, sidewalks would be constructed along the project's frontage of the Los Amigos Road extension and along the project frontage on Arata Lane. Additional sidewalks on the Los Amigos Road extension beyond those to be constructed by the project would be built by other developments in the future, including along the west side of the extension and along the east side of the road to the north of A Street; these sidewalks would primarily serve residents of future development and are not necessary in the near-term to establish a continuous pedestrian network for the Quail Acres 1 project. All internal project roadways would include sidewalks on both sides of the street, except for the streets on the project's northern and eastern boundaries, where an off-street pathway would be provided on the side of the street opposite homes. The Quail Acres site plan depicts a crosswalk with a rapid rectangular flashing beacon (RRFB) system on the eastern leg of the proposed minor street connection of B Street to Arata Lane near the eastern project boundary, approximately 500 feet from the intersection at Arata Lane/Los Amigos Road. This proposed crosswalk would be on an uncontrolled leg of the intersection and may attract recreational pedestrian demand given its linkage between

neighborhoods and the proposed linear park at the Quail Acres 1 project, as well as school-related demand generated by the Quail Acres project associated with Brooks Elementary School and Windsor Middle School. Given the anticipated demand and need to provide effective pedestrian connectivity between the project and nearby schools, the RRFB crossing should be installed with Phase 1 of the Quail Acres project.

With the proposed pedestrian improvements to be constructed by the project, effective pedestrian connectivity to the surrounding sidewalk network would be established, except for areas to the west of the Arata Lane/Los Amigos Road intersection. Adding an approximately 300-foot-long sidewalk or path on the north side of Arata Lane between the Los Amigos Road intersection and Newsong Church would fill this sidewalk gap, addressing the lack of pedestrian connectivity to the west, including access to the nearest Sonoma County Transit bus stop. If the Town determines that other development projects are unlikely to complete this sidewalk gap prior to Quail Acres being occupied, the Quail Acres project should be responsible for constructing the sidewalk or an interim all-weather path along this segment as part of Phase 1. Requiring the project to fill this sidewalk gap is consistent with Policy M-2.10 in the Town of Windsor 2040 General Plan, which calls for the Town to ensure that development projects provide connections to the nearest existing bikeways, pedestrian ways, and public transit facilities.

To the south of Arata Lane, continuous sidewalks exist on the east side of Los Amigos Road all the way to existing shopping areas on Lakewood Drive. With the proposed pedestrian crossing on Arata Lane at the eastern project boundary, continuous pedestrian linkages to Brooks Elementary School and Windsor Middle School would also exist. The surrounding pedestrian network is also anticipated to expand, including filling of gaps, as future development occurs in northern Windsor.

Finding – The project would have effective linkages to the surrounding pedestrian network including schools, recreation areas, and shopping areas during all phases of development, except for areas to the west of the project along Arata Road where an existing 300-foot gap in sidewalk connectivity exists.

Recommendation – The pedestrian crossing with RRFB at the Arata Lane/B Street intersection should be constructed with Phase 1 of the Quail Acres project.

Recommendation – If pending development project(s) are not anticipated to fill the 300-foot sidewalk gap on the north side of Arata Lane to the west of Los Amigos Road prior to Quail Acres being occupied, the Quail Acres project should be responsible for constructing the sidewalk or an interim all-weather path along this segment as part of Phase 1.

Bicycle Facilities

The *Highway Design Manual*, Caltrans, 2019, classifies bikeways into four categories:

- **Class I Multi-Use Path** – a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flows of motorized traffic minimized.
- **Class II Bike Lane** – a striped and signed lane for one-way bike travel on a street or highway.
- **Class III Bike Route** – signing only for shared use with motor vehicles within the same travel lane on a street or highway.
- **Class IV Bikeway** – also known as a separated bikeway, a Class IV Bikeway is for the exclusive use of bicycles and includes a separation between the bikeway and the motor vehicle traffic lane. The separation may include, but is not limited to, grade separation, striping with flexible posts, inflexible physical barriers, or on-street parking.

Existing and proposed bicycle facilities within one-half mile of the proposed project site, as contained in the *Windsor Bicycle and Pedestrian Master Plan*, were reviewed.

Existing and Planned Bicycle Facilities

In the project area Class II bike lanes exist on Arata Lane between Old Redwood Highway and Foothill Drive and on Los Amigos Road between Arata Lane and Lakewood Drive. According to the *Windsor Bicycle and Pedestrian Master Plan*, a bicycle route is planned along Camelot Drive between Arata Lane and Jane Drive. Bicyclists ride in the roadway and/or on sidewalks along all other streets within the project study area. Table 1 summarizes the existing and planned bicycle facilities in the project vicinity, as contained in the *Windsor Bicycle and Pedestrian Master Plan*.

Table 1 – Bicycle Facility Summary

Status Location	Class	Length (miles)	Begin Point	End Point
Existing				
Arata Ln	II	1.57	Old Redwood Hwy	Foothill Dr
Los Amigos Rd	II	1.30	Arata Ln	Lakewood Dr
Planned				
Camelot Dr	III	0.33	Arata Ln	Jane Dr

Source: *Windsor Bicycle and Pedestrian Master Plan*, Sonoma County Transportation Authority, 2014

As of Winter 2024, the Town Windsor is in the process of updating the *Bicycle and Pedestrian Master Plan*. Draft projects in the updated plan for the project area include replacing the existing Class II bike lanes on Arata Lane (Old Redwood Highway to Brooks Road North) and Los Amigos Road (Arata Lane to Brooks Road South) with Class IV protected bike lanes. The Los Amigos Road extension is planned to include buffered bike lanes between Arata Lane and the Town limits.

Bicyclist Safety

Collision records for the study area were reviewed to determine if there had been any bicyclist-involved crashes. During the five-year study period there were no collisions involving a bicyclist at the study intersections.

Project Impact on Bicycle Facilities

Based on the site plan, Class II bicycle facilities would be included along the project frontage of Arata Lane, consistent with the Town's existing bicycle plan. Because the Town is in the process of updating the plan and may reclassify this segment of Arata Lane to include Class IV protected bike lanes, the Quail Acres development team should coordinate with Staff to ensure that frontage improvement plans for Arata Lane accommodate the bike facilities that are ultimately adopted in the Town's bicycle plan update.

The proposed project would include Class II buffered bicycle lanes on the entirety of the Los Amigos Road extension, consistent with guidance provided by the Town of Windsor.

To access destinations such as the Town Green and the Windsor Sonoma-Marin Rail Transit (SMART) Station from the project site, bicyclists would use existing and planned bicycle facilities along Arata Lane and Old Redwood Highway. These bicycle facilities, including bicycle lanes on Arata Lane, together with shared use of minor streets including those constructed within the development, would effectively link the Quail Acres project to the surrounding bicycle network.

Finding – Bicycle facilities serving the project site would effectively link to the surrounding bicycle network during all development phases.

Recommendation – Prior to preparing improvement plans for the project's Arata Lane frontage, the Quail Acres development team should collaborate with the Town to confirm that bike facilities are consistent with those ultimately identified in the Town's updated bicycle plan.

Transit Facilities

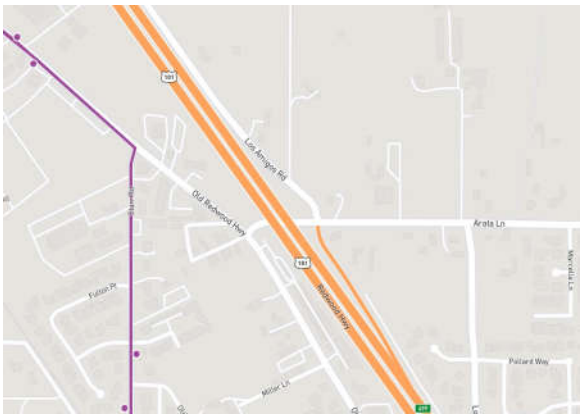
Existing transit facilities and routes serviced within one-half mile walking distance from the proposed project site were reviewed.

Existing Transit Facilities

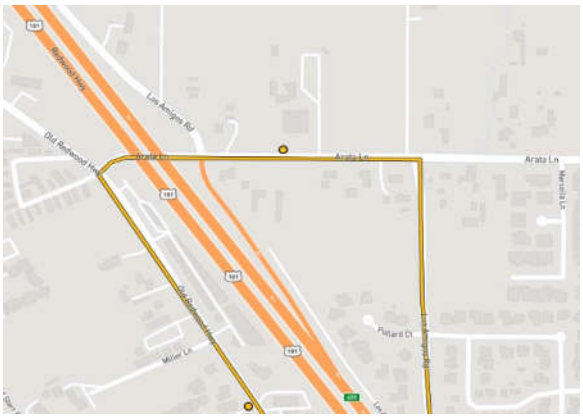
Sonoma County Transit

Sonoma County Transit (SCT) provides regional fixed route bus service in Sonoma County. Transit stops for Routes 60 and 66 are within a half mile of the project site. Route 60 runs between Cloverdale City Hall and the Santa Rosa Transit Mall, operating from 6:00 a.m. to 9:40 p.m. on weekdays and 6:45 a.m. to 9:40 p.m. on weekends with headways of 35 minutes to two hours. Route 66 runs from the Shiloh Center to the Windsor Transit Depot from 7:45 a.m. to 5:30 p.m. with headways of 45 minutes to one-and-a-half hours Monday through Saturday.

The two SCT routes and stops in the vicinity of the project area are shown in Plate 2.



Route 60



Route 66 (Windsor Shuttle)

Plate 2 Sonoma County Transit Routes Near Project Site
Source: https://sctransit.com/maps-schedules/

Two bicycles can be carried on most SCT buses. Bike rack space is on a first-come, first-served basis. Additional bicycles are allowed on SCT buses at the discretion of the driver.

Dial-a-ride, also known as paratransit, or door-to-door service, is available for those who are unable to independently use the transit system due to a physical or mental disability. SCT Paratransit is designed to serve the needs of individuals with disabilities within the Town of Windsor and the greater Sonoma County area.

Windsor Unified School District

The Windsor Unified School District operates school bus service throughout the Town. The nearest WUSD bus stop to the project site is approximately one-quarter mile to the south at Los Amigos Road/Pollard Court.

Project Impact on Transit

Existing public transit routes and school bus routes are adequate to accommodate project-generated transit trips. The nearest bus stop served by Sonoma County Transit is located on the north side of Arata Lane near Newsong Church. The bus stop is served by Route 66 which provides local loop service throughout the Town of Windsor in a counterclockwise direction. As previously identified in the assessment of pedestrian facilities, a continuous

sidewalk or path should be provided on the north side of Arata Lane between Newsong Church and Los Amigos Road, filling the existing sidewalk gap that is approximately 300-feet long. Once this gap is filled, continuous pedestrian facilities would link the project to the existing Sonoma County Transit bus stop.

Upon completion of internal streets, the Los Amigos Road extension, and intersection improvements at the intersection of Los Amigos Road/Arata Lane, continuous pedestrian facilities would exist between Quail Acres and the Windsor Unified School District bus stop at Los Amigos Road/Pollard Court. This school bus stop is located within one-half mile of most of the proposed project's residential units, though units in the northernmost project area would be beyond one-half mile walking distance. In the future as residential units in the project become occupied, it would be appropriate for the Quail Acres development team to coordinate with WUSD to establish a school bus stop within the project area.

Finding – Transit facilities serving the project site are generally adequate and compliant with Town policy.

Finding – Transit access would be improved upon the completion of continuous sidewalk from the project site to the nearest Sonoma County Transit bus stop.

Recommendation – As identified in the assessment of pedestrian facilities, the project should be responsible for filling the 300-foot sidewalk gap on the north side of Arata Lane to the west of Los Amigos Road if this gap has not yet been filled by other pending development projects prior to occupancy of Quail Acres Phase 1.

Recommendation – The development team should request that the WUSD consider initiating a route to serve the Quail Acres project site once occupied.

Vehicle Miles Traveled

The potential for the project to conflict or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b) was evaluated based the project's anticipated Vehicle Miles Traveled (VMT).

Significance Threshold

The Town of Windsor passed a resolution in April 2023 adopting a VMT policy that identifies significance thresholds and screening criteria for CEQA environmental review. Residential development projects are assessed using a home-based VMT per capita metric, with VMT significance thresholds set at a level of 15 percent below the existing countywide average. The Sonoma County Transportation Authority (SCTA) operates and maintains the regional travel demand model that produces VMT estimates. The VMT data applied in this analysis were obtained from the SCTM19 model version released in December 2021, which is the most currently-available model available from SCTA.

Based on output from the SCTA model, the existing residential VMT per capita in the County of Sonoma is 16.60 miles. VMT significance thresholds are set at 15 percent below this level, or 14.11 miles. Accordingly, the applied VMT significance threshold applied to the project is as follows.

- The project would have a potentially significant impact on VMT if its projected residential VMT per Capita exceeds 14.11 miles.

The proposed project would also include a park, and the alternative project would include space for a potential future school that would be constructed by the Windsor Unified School District. The Town's VMT policy includes screening criteria for projects that may be presumed to have a less-than-significant VMT impact; parks are included in the local-serving community facilities category so are not subject to further VMT analysis. The potential future school would be constructed by WUSD in the future rather than constructed as part of the project. As such, the potential school would be subject to VMT analysis if and when the WUSD chooses to proceed with its implementation. The potential effects of a future school on the Quail Acres project's residential VMT are considered qualitatively in this analysis.

VMT Screening

As noted above, the Town's VMT policy includes provisions allowing certain projects to be "screened" from needing to complete VMT analyses. This screening applies to specified land use and transportation projects that the Town has found would result in less-than-significant VMT impacts. Following is an assessment of the project's likelihood of qualifying for one or more of the screening criteria that pertain to residential development projects.

Small Project

The small project screening criteria applies to residential development projects consisting of 23 or fewer units. The proposed project is considerably larger and would not qualify for this screening parameter.

Map-Based Screening

Areas identified on the Town's Residential VMT Screening Map are considered to be low-VMT areas that qualify for screening. The project is not located in a designated low-VMT area so would not qualify for this screening parameter.

Transit Screening

Projects that are located within one-half mile of the downtown SMART station and meet certain criteria qualify for VMT screening. The project is located just over a mile from the SMART station so would not qualify for this screening parameter.

Affordable Residential Development

Residential development that is 100 percent deed-restricted affordable housing qualifies for VMT screening. The project includes some affordable housing but is predominantly market rate, so would not qualify for this screening parameter.

Residential Multiple-Criteria Screening

Residential projects that meet all four of the following criteria may be screened from VMT analysis:

- Within one-half mile of a Neighborhood Center/Mixed Use (NCMU) land use designated property;
- Within one-half mile of an existing or designated school site as confirmed in writing by WUSD;
- Within one-half mile of a park;
- Within one mile of a Sonoma County Transit stop, with a pedestrian connection, running at least six days per week and average service intervals not exceeding 60 minutes.

The project would satisfy three of the four criteria. The criteria pertaining to the project being within one-half mile of an existing or designated school site would not currently apply, since it is understood that WUSD has not formally designated a site for a future school in the project area and cannot provide such confirmation at this time. Accordingly, the project would not qualify for this screening parameter.

VMT Screening Conclusion

The project would not qualify for small project, map-based, transit, or affordable development screening criteria specified by the Town. The project would meet three of the Town's four criteria for residential multiple-criteria screening given its proximity to parks, transit stops, and neighborhood commercial designated land, but would not meet the fourth parameter related to school proximity. As such, the project does not qualify for VMT screening.

Finding – The residential component of the project would not qualify for any of the VMT screening parameters identified by the Town of Windsor.

Project VMT Assessment

No Project and Unadjusted Project VMT

The SCTA model includes traffic analysis zones (TAZ) covering geographic areas throughout Sonoma County. The project site is located within TAZ 876, which currently has a baseline "no project" VMT per capita of 16.52 miles. Because the TAZ currently has limited rural residential uses, a custom run of the SCTA model was performed, adding the project's residential units to the TAZ to provide a refined estimate of the projected per capita VMT generated by residential uses in this area of Windsor. With these refinements, the projected residential VMT for the TAZ as output by the custom SCTA model run is 14.30 VMT per capita.

Adjusted Project VMT

Consideration was given to whether adjustments to the baseline per-capita VMT estimates produced by the SCTA model are warranted to reflect the project's overall density, inclusion of affordable housing, school proximity, and provision of offsite improvements to non-auto travel. SCTA has developed and made available a VMT Reduction Tool to assist in making project-specific VMT adjustments as well as quantify VMT mitigation measures.

Residential Density

The overall residential density associated with the project would vary depending on whether a school would or would not be included, though would be no greater than 6.0 units per acre. The SCTA VMT Reduction Tool indicates that average residential densities generally need to exceed 9.1 units per acre to effectively reduce per capita VMT. Since the proposed project's residential density would fall well below this level, no density-related adjustments to VMT per capita have been made.

Provision of Affordable Housing

With respect to affordable housing, the project would designate 15 of the 46 total attached residential units as deed-restricted affordable units for low-income households. Affordable housing has been shown to produce lower per capita VMT than market rate housing; the level of reduction is based on the percentage of a project's overall units that are affordable. Based on output from the SCTA VMT Reduction Tool, the estimated reduction in the Quail Acres 1 projects' residential per capita VMT due to provision of affordable units is 1.4 percent without a school and 1.8 percent with a school (while the school option would result in fewer residential units, the percentage of total units that are affordable would be higher, leading to a greater reduction in per capita VMT). It is noted that the project would designate an additional 15 attached residential units at the moderate income level; for VMT purposes, no deductions are applied to these moderate-income units per the methodology contained in the SCTA VMT Reduction Tool.

Effect of School

The effect that a school within the Quail Acres 1 project area would have on the amount of VMT generated by the project's residents was considered. Assuming a traditional model wherein a school's student population is comprised of residents in surrounding neighborhoods, the presence of a school could result in meaningful reductions in residential VMT, since many students would be able to walk or bike to school and those vehicle-based school trips that do occur would be short in length. WUSD's current operational model differs, however, from this traditional neighborhood school-oriented approach; schools are grouped by grades and students may or may not attend the school that is closest to their home. Further, the type of school that WUSD would potentially construct within the project area as well as its effects on operations at other WUSD schools is unknown. For these reasons, applying reductions to the Quail Acres 1 project's VMT to reflect school proximity would be considered speculative, and has therefore not been included in the analysis.

Pedestrian and Bicycle Network Improvements

In some cases, a project's VMT may be reduced by making off-site improvements to the pedestrian and bicycle networks, particularly where gaps in these networks are filled in a manner that would have a meaningful effect on whether residents walk or drive. With respect to offsite pedestrian and bicycle improvements, the project would construct a new pedestrian crossing including rapid rectangular flashing beacons on Arata Lane near the site's eastern edge. This would be considered an enhanced pedestrian crossing and would effectively link the project's linear park to the existing neighborhoods south of Arata Lane, as well as provide another non-auto connection between Quail Acres 1 and areas to the south.

In considering the effectiveness of such improvements, the proximity of nearby pedestrian and bicycle "attractors" must be considered. Shifting resident travel modes from automobiles to walking and biking can be difficult in suburban contexts like the Quail Acres 1 project area given the lack of nearby attractors (such as shopping and employment centers) and location on the urban edge. While the proposed enhanced pedestrian crossing on Arata Lane would establish an effective non-auto connection between the project site and southern neighborhoods, based on research as well as the methodologies contained in the SCTA VMT Reduction Tool, it would likely have a negligible effect on measurably altering the amount or distance of auto travel generated by residents on a typical day. For this reason, no deductions to the unadjusted project VMT to account for offsite non-auto improvements were taken.

It should be noted that pedestrian and bicycle amenities *within* the project site are provided by the project and would be required by the Town regardless of the development proposal. These facilities are, however, considered standard improvements that, while very important, do not reduce the project's overall VMT below levels exhibited by similar types of development in Windsor.

Project VMT Findings

Upon applying adjustments to reflect provision of onsite deed-restricted affordable housing, the project is anticipated to generate 14.10 VMT per capita without a school and 14.04 VMT per capita with a school. Both values would be below the applicable significance threshold of 14.11 VMT per capita. Accordingly, the proposed Quail Acres 1 project would be considered to have a less than significant impact on VMT. A summary of the VMT findings is shown in Table 2.

Table 2– Vehicle Miles Traveled Analysis Summary

Quail Acres 1 Land Use Option	Countywide VMT per Capita		Project VMT per Capita		
	Average	Threshold	Unadjusted	Adjusted	Threshold Met?
Without School – 301 units	16.60	14.11	14.30	14.10	Yes
With School – 236 units				14.04	Yes

Notes: VMT is measured in VMT per Capita, or the number of daily miles driven per resident; Threshold is the applicable VMT significance threshold of 15 percent below the existing countywide average; Adjusted values reflect effects of providing onsite affordable housing

Finding – The project would be expected to result in a less-than-significant VMT impact.

Transportation VMT Assessment

In addition to assessment of VMT associated with development projects, the Town's VMT policy requires consideration of the VMT associated with transportation projects such as the realignment and extension of Los Amigos Road to be implemented by the project. The intent of analyzing transportation VMT is to determine if the project would result in induced vehicle travel, which is typically associated with projects that increase roadway capacity in a manner that encourages people to drive more (because of factors including shorter driving times, or improved ease of driving compared to using other modes of travel). Induced travel consists of driving that otherwise would not have occurred without the transportation project.

The Town's VMT policy includes screening provisions for projects that result in new roadway capacity on local or collector streets, provided the project also substantially improves conditions for non-auto modes. The Los Amigos Road extension would be a 2-Lane Crosstown Street that functions as a collector, serving as a connection between local residential streets in northern Windsor (including those in the proposed project) to Arata Lane. The roadway would include new on-street bicycle lanes and sidewalks that would be separated from moving traffic by landscape strips and on-street parking. The Los Amigos Road extension would also be a realignment of an existing street rather than an entirely new street and would continue to include one travel lane in each direction, as does the current Los Amigos Road segment that would be abandoned. This segment of Los Amigos Road also crosses Windsor's Urban Growth Boundary (UGB) just beyond the Quail Acres 1 site, limiting the amount of existing and future development in unincorporated areas that the roadway could reasonably serve in the future. With limited development potential beyond the UGB, any roadway capacity increases associated with the roadway extension and realignment would be unlikely to induce vehicle travel.

Because the Los Amigos Road extension and realignment would function primarily as a collector street serving the Quail Acres 1 project and adjacent parcels and would have little potential to induce vehicle travel beyond the Town's UGB, it would be expected to have a less-than-significant impact on transportation VMT.

Finding – The extension and realignment of Los Amigos Road would be expected to result in a less-than-significant transportation VMT impact.

Vehicular Traffic Facilities

Setting

While the operation of local intersections is no longer evaluated for purposes of determining potential impacts under CEQA, an analysis of the potential effects on operation was performed to determine consistency with the Town's adopted General Plan policies.

The *Town of Windsor 2040 General Plan*, adopted in April 2018, contains the following policies applicable to the operational analysis.

> **Policy M-3.16 – Level of Service Application.** *The Town shall maintain level of service standards that define the minimum acceptable operating characteristics for intersections and streets. A level of service D (LOS D) is defined as the minimum acceptable level of congestion during the weekday morning and evening peak periods for high-volume facilities such as freeways, crosstown streets, and signalized or all-way stop-controlled intersections. This standard should apply at all these locations except the following intersections, which are regional gateways to the Town's commercial and civic areas, and where a Level of Service E is tolerated by the Town and considered acceptable:*
>
> - *Old Redwood Highway/US 101 Northbound off ramp/Lakewood Drive*
> - *Old Redwood Highway/US 101 Southbound ramps*
> - *Old Redwood Highway/Conde Lane/Windsor River Road*
>
> *At side-street stop-controlled unsignalized intersections, levels of service shall be determined for both controlled movements and for the overall intersection. Controlled movements operating at LOS E or LOS F are allowable if: 1) the intersection is projected to operate at LOS C or better overall, and 2) the projected traffic volume on the controlled movement is 30 vehicles or less per hour on approaches with single lanes, or on multilane approaches, 30 vehicles or less per hour per lane. If an intersection is operating at LOS E or F without project-generated traffic added, the project's impact shall be considered less-than-significant if it does not cause operation to fall from LOS E to LOS F and it increases average delay for the intersection as a whole by 5 seconds or less. Level of service standards shall not apply to minor intersections comprised of only local streets.*

A description of the Level of Service methodology applied in the analysis is provided in Appendix A.

Study Area and Periods

The study area consists of the following intersections:

1. Old Redwood Highway/US 101 South Ramps
2. Old Redwood Highway/Starr Road
3. Old Redwood Highway/Arata Lane
4. Los Amigos Road-US 101 North Off-Ramp/Arata Lane (existing configuration), Los Amigos Road/US 101 North Ramps (future configuration)
5. Los Amigos Road/Arata Lane

The Town's General Plan identified the intersection of Los Amigos Road-US 101 North Off-Ramp/Arata Lane as an area for improvement to accommodate projected year 2040 traffic volumes. The planned improvements include completing a new northbound on-ramp to US 101 from Arata Lane, including re-routing Los Amigos Road north of Arata Lane to connect through the proposed Quail Acres 1 project site to the existing segment of Los Amigos Road to the south. The Quail Acres 1 project would construct the full width of Los Amigos Road from Arata Lane to the north limit of the project absent a sidewalk on the non-project side of the road. The sidewalk on the non-project side of Los Amigos Road would be constructed with development of those parcels. The Quail Acres 1 project would continue to construct an improved, but reduced, section of Los Amigos Road from the north limit

of the project to where it ties into the existing Los Amigos Road alignment to the north. The reduced section would include two travel lanes and six-foot bike lanes with three-foot striped bike buffers.

Operating conditions during the a.m. and p.m. peak periods were evaluated to capture the highest potential effects due to the proposed project as well as the highest volumes on the local transportation network. The morning peak hour occurs between 7:00 and 9:00 a.m. and reflects conditions during the home to work or school commute, while the p.m. peak hour occurs between 4:00 and 6:00 p.m. and typically reflects the highest level of congestion during the homeward bound commute.

Study Intersections

Old Redwood Highway/US 101 South Ramps is a signalized four-legged intersection with protected left-turn phasing on the northbound and southbound approaches of Old Redwood Highway, and split phasing on the eastbound and westbound approaches. The northbound approach includes a right-turn overlap phase. The westbound approach is comprised of the US 101 southbound ramps. A crosswalk is provided on the west leg. Bicycle lanes are present along Old Redwood Highway in the southbound direction.

Old Redwood Highway/Starr Road is a signalized tee intersection with protected left-turn phasing on the northbound approach of Old Redwood Highway. Bicycle lanes are present on all intersection approaches. Sidewalks are present only on the southwest intersection corner and the intersection includes no crosswalks.

Old Redwood Highway/Arata Lane is a signalized four-legged intersection with protected left-turn phasing on the northbound and southbound approaches of Old Redwood Highway. The eastbound and westbound approaches operate with split phasing, with the western leg being a private street to a small cluster of residences. A right-turn overlap phase exists on the westbound approach. Sidewalks are present on the northeast and southeast intersection corners, and crosswalks are marked on the north and east legs. Bicycle lanes are present on all approaches.

Los Amigos Road-US 101 North Off-Ramp/Arata Lane is a signalized four-legged intersection with split phasing on the northbound approach of US 101 North Off-Ramp and the southbound approach of Los Amigos Road. Sidewalks are present on the west leg of the intersection, and bicycle lanes are present on the east and west approaches. The intersection includes no crosswalks.

US 101 North Ramps/Arata Lane is a future planned intersection at the location of the existing intersection of Los Amigos Road-US 101 North Off-Ramp/Arata Lane. The north leg of the intersection would be a new northbound on-ramp to US 101

Los Amigos Road/Arata Lane is an unsignalized intersection that is stop-controlled on the northbound approach. Left-turn lanes are provided on the westbound and northbound approaches. There is a two-way left-turn lane on the west leg. Bicycle lanes are present on all approaches. Sidewalks are present only on the south leg of the intersection, and the intersection includes no crosswalks.

The locations of the study intersections and the existing lane configurations and controls are shown in Figure 2.



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Figure 2 – Study Area and Existing Lane Configurations

Collision History

The collision history for the study area was reviewed to determine any trends or patterns that may indicate a safety issue. Collision rates were calculated based on records available from the California Highway Patrol as published in their Statewide Integrated Traffic Records System (SWITRS) reports. The most current five-year period available is January 1, 2018, through December 31, 2022.

As presented in Table 3, the calculated collision rates for the study intersections were compared to average collision rates for similar facilities statewide, as indicated in *2021 Crash Data on California State Highways*, California Department of Transportation (Caltrans). These average rates statewide are for intersections in the same environment (urban, suburban, or rural), with the same number of approaches (three or four), and the same controls (all-way stop, two-way stop, or traffic signal). Only the intersection of Los Amigos Road/Arata Lane had a calculated collision rate above the statewide average, so this location was reviewed further. The collision rate calculations are provided in Appendix B.

Table 3 – Collision Rates for the Study Intersections

Study Intersection	Number of Collisions (2015-2020)	Calculated Collision Rate (c/mve)	Statewide Average Collision Rate (c/mve)
1. ORH/US 101 Southbound Ramps	1	0.04	0.33
2. ORH/Starr Rd	4	0.10	0.33
3. ORH/Arata Ln	3	0.08	0.33
4. US 101 North Ramp/Arata Ln	5	0.17	0.33
5. Los Amigos Rd/Arata Ln	3	**0.13**	0.11

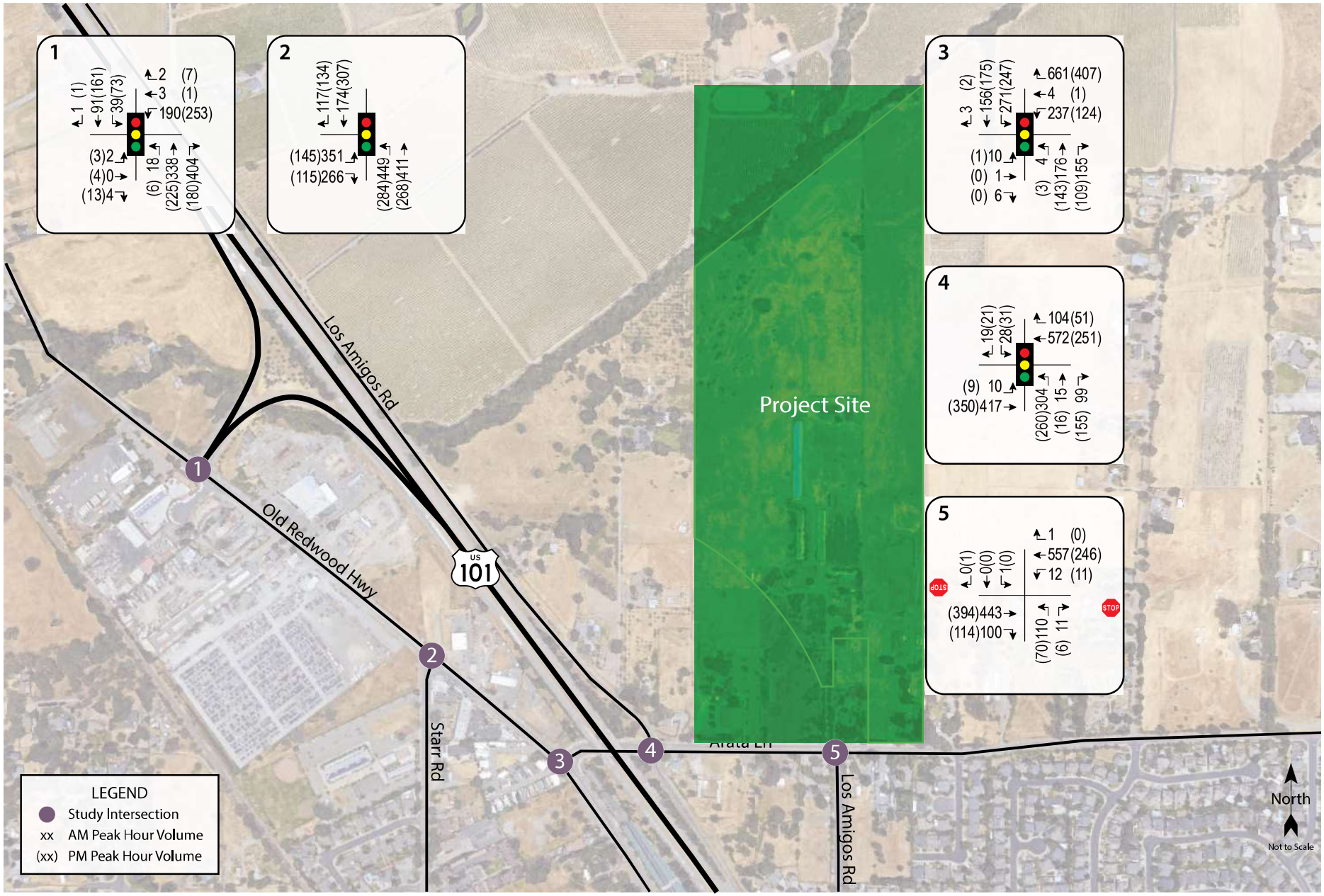
Note: c/mve = collisions per million vehicles entering; ORH = Old Redwood Highway; **Bold** = above statewide average collision rate for similar intersections

The three collisions that occurred at the intersection of Los Amigos Road/Arata Lane included one involving a hit object, one head-on, and one broadside. These collisions were caused by driving under the influence, improper turning, and auto right-of-way violations, respectively. Since the types of collisions, time of collision, and causes are varied and the rate is only slightly above average, no clear pattern of driver behavior or pre-existing safety condition(s) have been identified. It is noted that the installation of a roundabout at the intersection as being considered by the Town would be expected to reduce the collision rate and significantly reduce the potential for severe collision types such as head-ons to occur.

Existing Intersection Operation

The Existing Conditions scenario provides an evaluation of current operation based on existing traffic volumes during the a.m. and p.m. peak periods. This condition does not include project-generated traffic volumes. Volume data was collected in September 2023.

Under Existing Conditions, all study intersections operate at acceptable Levels of Service during both peak hours except for the stop-controlled approach at Los Amigos Road/Arata Lane during the a.m. peak hour. While this intersection is operating acceptably overall at LOS A, because the northbound approach is operating below LOS D during the a.m. peak period and serves more than 30 vehicles per lane, according to the Town's guidelines, this is unacceptable and therefore warrants additional considerations when evaluating project impacts. The existing traffic volumes are shown in Figure 3. A summary of the intersection Level of Service calculations is contained in Table 4, and copies are provided in Appendix C.



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Figure 3 – Existing Traffic Volumes

Table 4 – Existing Peak Hour Intersection Levels of Service					
Study Intersection		**AM Peak**		**PM Peak**	
	Approach	**Delay**	**LOS**	**Delay**	**LOS**
1.	Old Redwood Hwy/US 101 South Ramps	16.6	B	19.1	B
2.	Old Redwood Hwy/Starr Rd	17.4	B	10.5	B
3.	Old Redwood Hwy/Arata Ln	18.7	B	12.1	B
4.	Los Amigos Rd-US 101 North Off-Ramp/Arata Ln	8.6	A	8.8	A
5.	Los Amigos Rd/Arata Ln	6.2	A	1.9	A
	Northbound (Los Amigos Rd) Approach	***61.8***	***F***	*19.8*	*C*

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*; **Bold** text = unacceptable operation

Future Intersection Operation

Future a.m. and p.m. peak hour volume projections were developed using the SCTA travel demand model. The SCTA model's forecast year land use inventory reflects continued buildout of General Plans throughout the County through the year 2040, including the land that would be occupied by the Quail Acres 1 project. The project-specific traffic volumes were removed from the SCTA model's projections to establish future traffic projections that are reflective of conditions *without* the Quail Acres 1 project. There are also two important roadway network modifications planned by the Town of Windsor that will affect future traffic volumes.

- Realignment of the northern segment of Los Amigos Road to the west, along the southwestern edge of the Quail Acres site, creating a new northern fourth leg at the existing Arata Lane/Los Amigos Road intersection (study intersection 5).
- Completion of a new northbound onramp to US 101, with the new onramp forming the north leg of the existing Arata Lane/US 101 North Offramp intersection. The current northern leg of the intersection, which is the northern segment of Los Amigos Road, would be eliminated as part of the realignment described in the prior bullet.

The Town's General Plan and Traffic Impact Fee identify future roadway improvements on the following streets in the study area.

- Widen Old Redwood Highway between the US 101 South Ramps and Arata Lane to five lanes.
- Widen Arata Lane between Old Redwood Highway and the southern segment of Los Amigos Road to five lanes, including replacement of the US 101 freeway overpasses to accommodate the additional lanes.
- Add a second northbound left-turn lane on northbound Old Redwood Highway at Starr Road and widen the segment of Starr Road near the intersection to include two accepting lanes.

To present a conservative analysis, the future traffic analysis by default does not include the above three roadway widenings and associated improvements. Instead, conditions without improvements are first presented, followed by conditions with potential modifications that would result in acceptable operation. Any such modifications identified in this traffic analysis are within the scope of those assumed in the General Plan and Traffic Impact Fee.

Finally, for all projected future intersection turning movements, a minimum annual growth rate of 0.5-percent was assumed even if the SCTA model predicts lower growth. This is a common technique used to ensure that future projections are conservative and to account for typical daily fluctuations in traffic volumes.

Under the anticipated Future volumes, the study intersection at Arata Lane/US 101 North Ramps would be expected to operate unacceptably at LOS E during both peak hours. Adding an eastbound left-turn lane with protected left-turn phase, which would also require widening of the US 101 underpass as identified in the Traffic Impact Fee, would result in acceptable LOS C operation. The Los Amigos Road/Arata Lane intersection would be

expected to operate at LOS F during both peak hours. With signalization or implementation of a single-lane roundabout, operation would be improved to LOS B during both peak hours. Operating conditions are summarized in Table 5, and future volumes are shown in Figure 4.

Table 5 – Future Peak Hour Intersection Levels of Service

Study Intersection		AM Peak		PM Peak	
	Approach	**Delay**	**LOS**	**Delay**	**LOS**
1.	Old Redwood Hwy/US 101 South Ramps	19.2	B	27.4	C
2.	Old Redwood Hwy/Starr Rd	38.9	D	40.9	D
3.	Old Redwood Hwy/Arata Ln	41.3	D	40.6	D
4.	US 101 North Ramps/Arata Ln	**61.9**	**E**	**78.0**	**E**
	Added Eastbound Left-Turn Lane[1]	23.4	C	21.9	C
5.	Los Amigos Rd/Arata Ln	**	**F**	**	**F**
	Northbound (Los Amigos Rd) Approach	**	***F***	**	***F***
	Southbound (Los Amigos Rd) Approach	**	***F***	**	***F***
	Signalized[2]	18.6	B	19.8	B
	Single-Lane Roundabout	10.4	B	11.9	B

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*; **Bold** text = unacceptable operation; Shaded cells = conditions with improvements;

[1] includes widening of US 101 underpass

[2] includes right-turn pocket with overlap phase on southbound approach

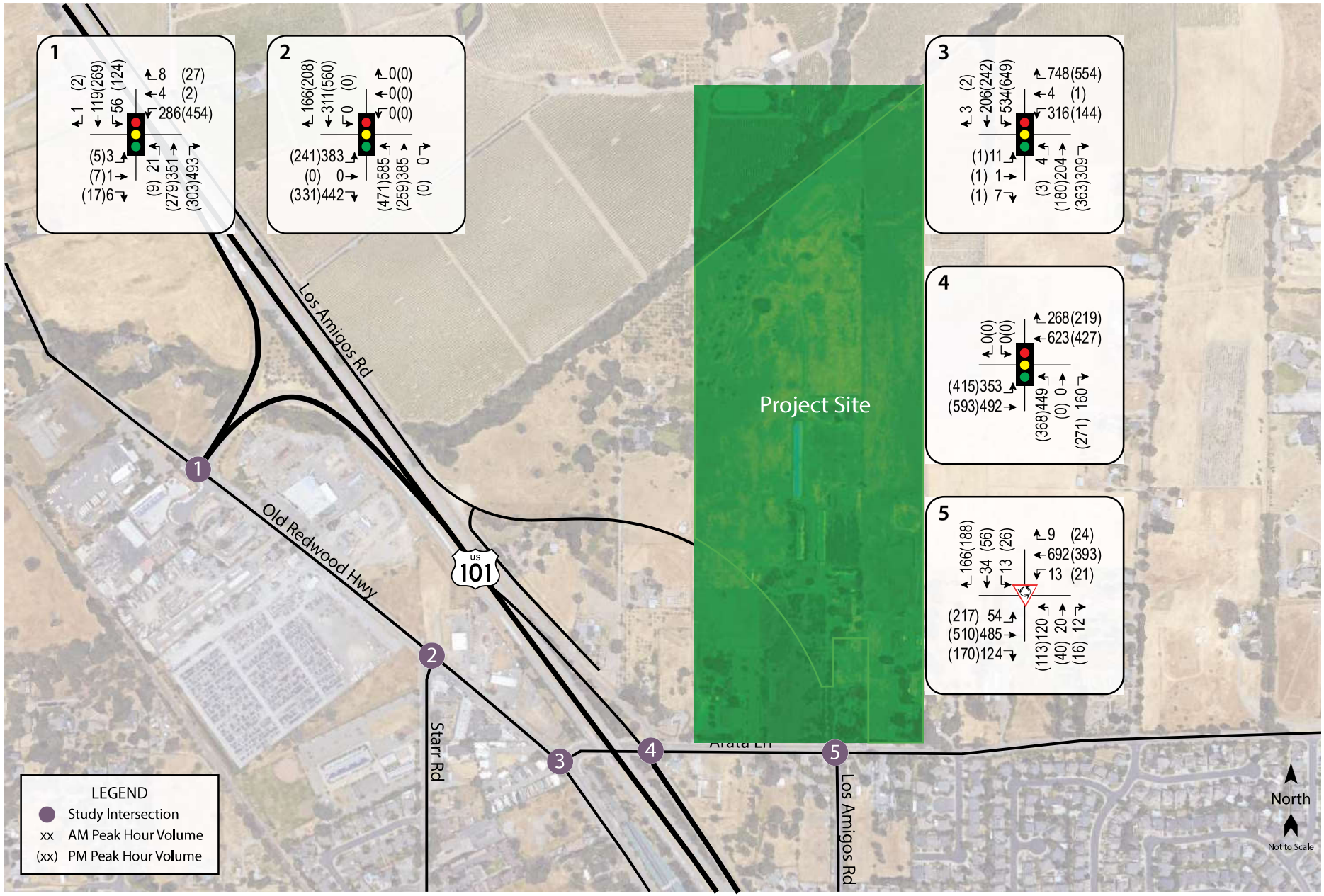
Project Effect on Intersection Operation

Quail Acres 1 Project Trip Generation

The anticipated trip generation for the proposed project was estimated using standard rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual*, 11th Edition, 2021, for "Single Family Detached Housing" (ITE LU 210). Duplex units were assessed using "Single Family Attached Housing" (ITE LU 215) trip generation rates. For the alternative project with a 500-student school site, rates for the "Elementary School" (ITE LU 520) were chosen; note that Windsor Unified School District has determined neither the likelihood of a school being built nor the type of school, so elementary school rates were conservatively chosen since they result in the greatest number of trips.

The project site plan identifies lots that could accommodate optional accessory dwelling units (ADU) either in rear yards or over the home's detached garage. The number of ADUs that will ultimately be built is unknown. The potential for an ADU to generate more traffic than the single-family home it would accompany is also dependent on how it is used; second units that are used by members of the same household as the primary house (such as an elderly parent), as a home office, or as guest quarters would generate little to no more traffic than the primary house, whereas ADUs rented as a separate household would. For the purposes of the traffic analysis, it was assumed that 25 percent of the lots that could accommodate an ADU would include such a unit and function as a household separate from the primary unit.

The *Trip Generation Manual* does not contain rates for accessory dwelling units; since units occupied by separate households than the primary residence would function similarly to an apartment, albeit at lower household occupancies, rates for multi-family housing were applied. Based on census data obtained from the 2021 *American Housing Survey*, residential units of less than 500 square feet on average house 1.28 persons per unit, while residences ranging from 500 to 749 square feet have an average of 1.34 persons per unit. For the purposes of this



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Figure 4 – Future Traffic Volumes

analysis, ADU trip generation was assessed using person-based ITE rates, conservatively assuming an average occupancy of 1.5 persons per ADU. For the proposed project's 217 potential parcels that could accommodate 98 ADUs and 119 JADUs, 54 are assumed to be built and occupied by separate households, with a total of 81 residents. For the alternative project with a potential school site, the 169 potential parcels that could accommodate ADUs are assumed to result in 42 added households with 63 residents.

As shown in Table 6, the proposed Quail Acres 1 project is expected to generate an average of 2,951 trips per day, including 218 trips during the a.m. peak hour and 289 during the p.m. peak hour. The alternative project with the school would be expected to generate an average of 3,425 trips per day, including 538 trips during the a.m. peak hour and 303 during the p.m. peak hour.

Table 6 – Quail Acres 1 Project Trip Generation Summary

Land Use	Units	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
Proposed Quail Acres 1 Project											
Single Family Detached Housing	255 du	9.43	2,405	0.70	179	45	134	0.94	240	151	89
Single Family Attached Housing	46 du	7.20	331	0.48	22	6	16	0.57	26	15	11
Potential Accessory and Junior Accessory Units[1]	81 residents	2.65	215	0.21	17	5	12	0.28	23	15	8
Proposed Project Total			**2,951**		**218**	**56**	**162**		**289**	**181**	**108**
Alternative Project with School											
Single Family Detached Housing	190 du	9.43	1,792	0.70	133	33	100	0.94	179	113	66
Single Family Attached Housing	46 du	7.20	331	0.48	22	6	16	0.57	26	15	11
Potential Accessory and Junior Accessory Units[1]	63 residents	2.65	167	0.21	13	4	9	0.28	18	12	6
School	500 students	2.27	1,135	0.74	370	200	170	0.16	80	37	43
Alternative Project Total			**3,425**		**538**	**243**	**295**		**303**	**177**	**126**

Note: SF = Single-family; du = dwelling unit; stu = students; school trip rates are based on an elementary school for analysis purposes (WUSD has not identified the type of school)

[1] Approximately 25 percent of the parcels that could accommodate optional ADUs are assumed to be built and occupied as separate households at an average of 1.5 residents per ADU (proposed project includes 217 parcels that could accommodate an ADU or JADU, and alternative project with school includes 169 potential ADU/JADU parcels)

Trip Distribution

The pattern used to allocate new project trips to the street network was based on a review of existing turning movements at the study intersections, knowledge of the area and surrounding region, and assessment of a "select zone" model run performed in the SCTA travel demand model. Note that while the project site plan depicts a minor street connection to Arata Lane along the eastern project boundary, all project traffic was routed to the Los Amigos Road extension to capture the project's maximum effects on the Arata Lane/Los Amigos Road intersection. The applied distribution assumptions are shown in Table 7.

Table 7 – Trip Distribution Assumptions		
Route	**Residential Trips**	**School Trips**
US 101 South	42%	15%
US 101 North*	12%	10%
Old Redwood Highway (South of Arata Ln)	12%	15%
Arata Ln (East of Los Amigos Rd)	12%	15%
Los Amigos Rd (South of Arata Ln)	10%	15%
Starr Rd	10%	15%
Old Redwood Highway (North of US 101 South Ramps)	2%	5%
Internal Neighborhood	0%	10%
Total	**100%**	**100%**

* = Outbound trips assumed to occur via Los Amigos Road, Limerick Lane, Old Redwood Highway, and the Healdsburg Avenue interchange until the new US 101 North On-Ramp is built on Arata Lane

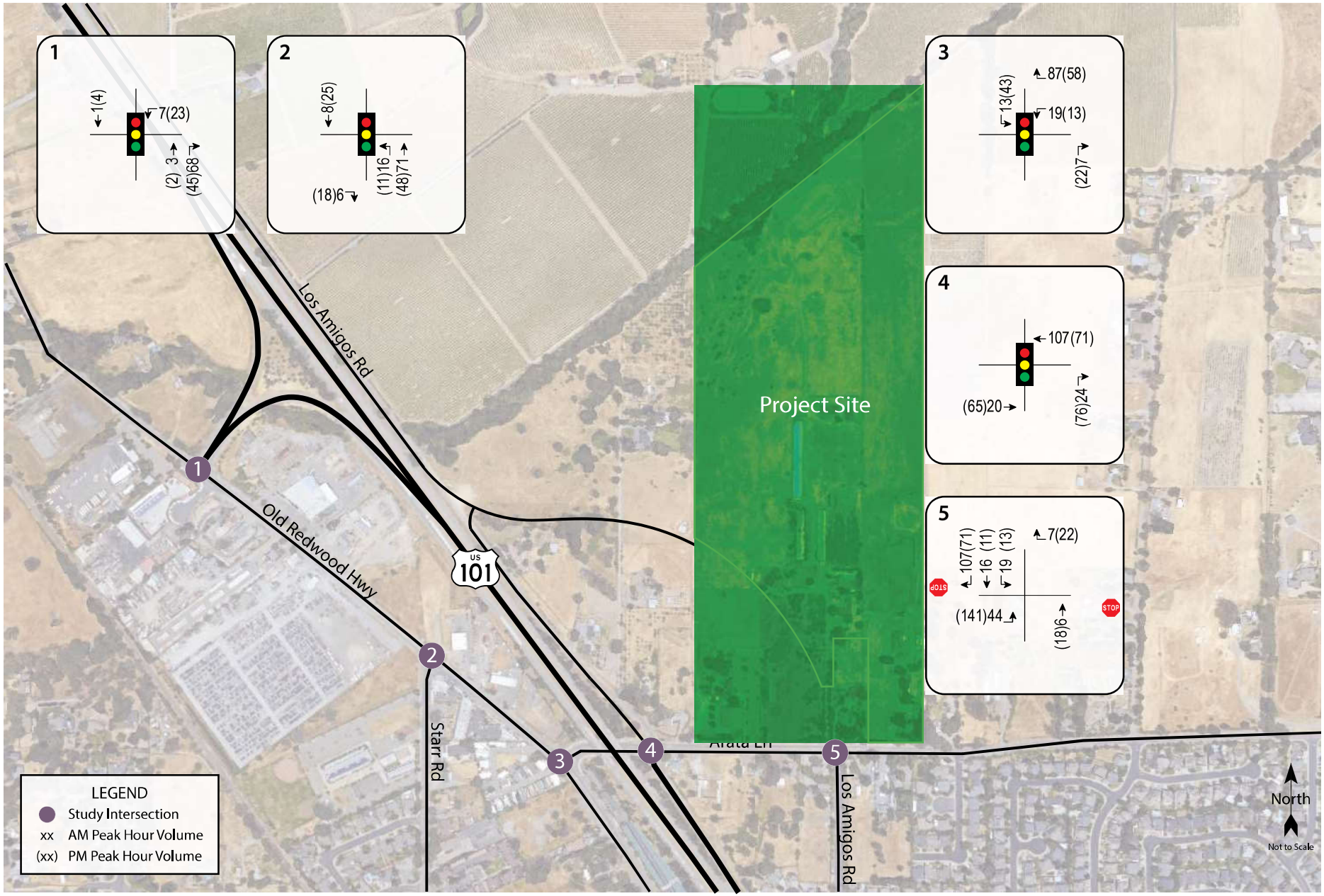
Selection of Project Land Use Scenarios for Analysis

As previously discussed, the proposed Quail Acres 1 project includes provisions for accommodation of a potential future school site. If the school site is established, fewer residential units would be built as part of the project, though the trip generation would be higher since the school would generate more trips than the offset residential units. In addition to there being two land use options for the project, two different transportation networks were assessed. One transportation network reflects near-term conditions, which include the project's extension and realignment of Los Amigos Road but not the new US 101 northbound on-ramp at the Arata Lane interchange that would be constructed by the Town in the future. The other transportation network reflects long-range conditions including the new on-ramp.

The traffic analysis was structured to capture the worst-case conditions that could realistically occur in the near- and long-term. The Existing plus Project traffic analysis scenario does not include the school alternative since a school would not be built in this timeframe, and it also does not include the new US 101 onramp. The Future plus Project scenario includes the school alternative, which would generate more trips than the project would without a school, and includes the new US 101 onramp planned by the Town. For reference, the parameters assumed under the Existing plus Project and Future plus Project traffic analysis scenarios, including the peak hour trips generated by uses within the Quail Acres 1 site, are summarized in Table 8.

Table 8 – Parameters Assumed in Traffic Analysis Scenarios				
Traffic Analysis Scenario	**School Included**	**New On-Ramp at Interchange**	**AM Peak Hour Trip Generation**	**PM Peak Hour Trip Generation**
Existing plus Project Analysis	No	No	218	289
Future plus Project Analysis	Yes	Yes	538	303

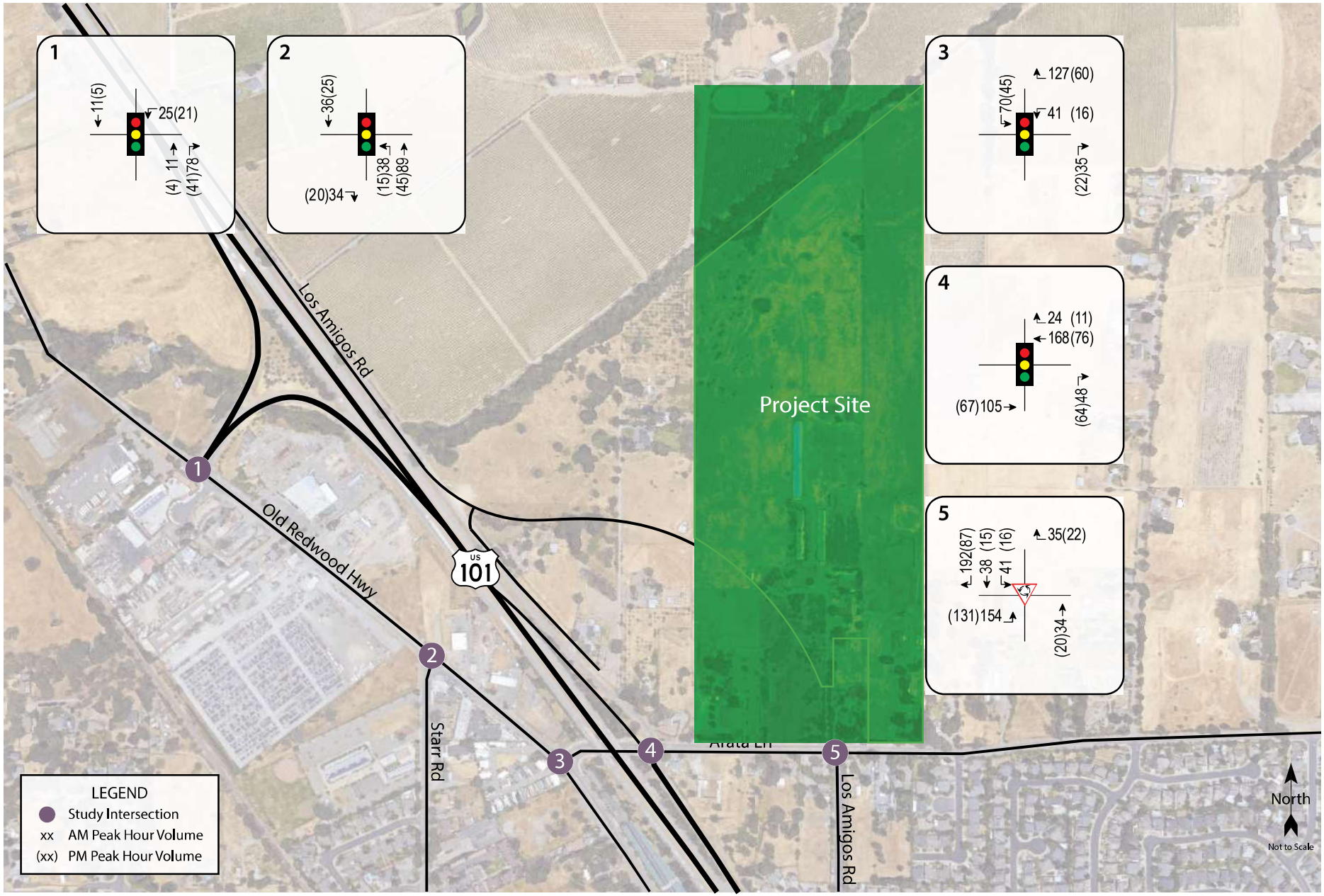
The project-generated traffic volumes at the study intersections under near-term conditions are shown in Figure 5, and the project alternative traffic volumes under future conditions are shown in Figure 6.



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Figure 5 – Near-Term Proposed Project Traffic Volumes



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Figure 6 – Future Project Alternative Traffic Volumes with School and On-Ramp

Consideration of Afternoon School Peak Period

The Town of Windsor's LOS policy requires assessment of traffic operation during weekday morning and evening peak periods. While the policy does not require analysis of afternoon school peak conditions, consideration was given to the project's potential effect on operation during this time. Based on time-of-day trip generation data available in the *Trip Generation Manual*, it was determined that the proposed project would generate approximately one-third fewer trips during the afternoon school peak than the evening commute peak. The alternative project that includes a potential school site would generate approximately five to eight percent more traffic during the afternoon school peak if a school is established; because it is estimated that at least 10 percent of the school's traffic would be oriented to the neighborhoods immediately surrounding the school, however, the amount of traffic added to the broader street network (i.e., on Arata Lane and Los Amigos Road) would likely be slightly less during the school peak than the evening commute peak. Accordingly, the morning and evening peak periods analyzed in this study were determined to capture the project's greatest traffic effects on the Town's circulation network.

Existing plus Project Conditions

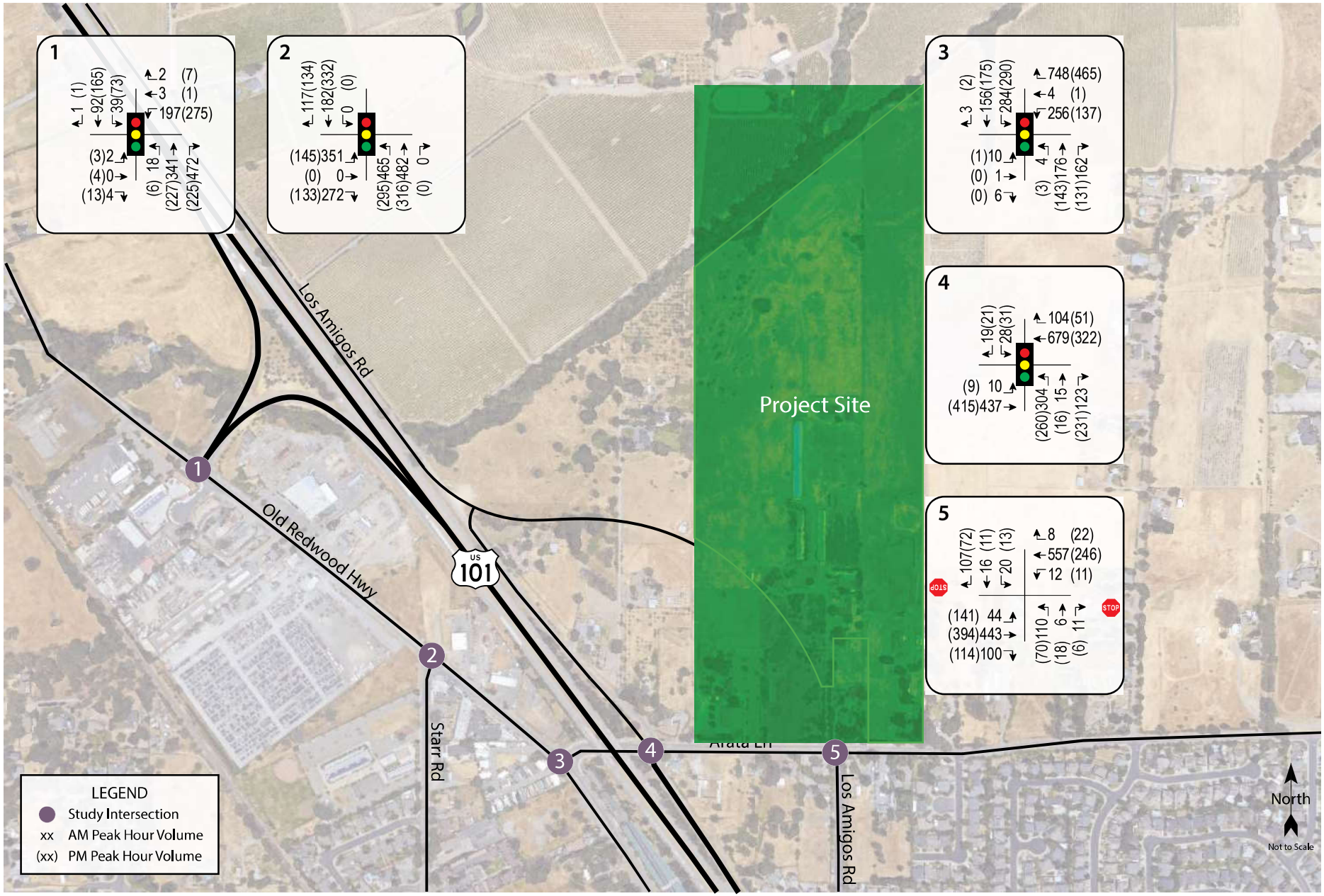
Upon the addition of project traffic (without school) to existing volumes, the study intersections are expected to continue operating acceptably overall except for Los Amigos Road/Arata Lane, which would be expected to operate at LOS F on the northbound and southbound approaches during both peak hours. The project would increase delays by greater than five seconds, and both the northbound and southbound approaches would have volumes exceeding 30 vehicles per lane. This would be an adverse project effect on traffic operation according to the Town's LOS criteria.

These results are summarized in Table 9. Existing plus Project traffic volumes are shown in Figure 7.

Table 9 – Existing and Existing plus Project (No School) Peak Hour Intersection Levels of Service

Study Intersection ***Approach***	**Existing Conditions**				**Existing plus Project**			
	AM Peak		**PM Peak**		**AM Peak**		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
1. ORH/US 101 S Ramps	16.6	B	19.1	B	16.7	B	19.2	B
2. ORH/Starr Rd	17.4	B	10.5	B	18.3	B	10.7	B
3. ORH/Arata Ln	18.7	B	12.1	B	21.6	C	13.0	B
4. Los Amigos Rd-US 101 N Off-Ramp/Arata Ln	8.6	A	8.8	A	8.8	A	12.9	B
5. Los Amigos Rd/Arata Ln	6.2	A	1.9	A	26.6	D	6.8	A
NB (Los Amigos Rd) Approach	***61.8***	***F***	*19.8*	*C*	**	***F***	***51.9***	***F***
SB (Los Amigos Rd) Approach	-	-	-	-	*21.4*	*D*	*15.7*	*C*
Signalized	-	-	-	-	14.1	B	12.9	B
Single-Lane Roundabout	-	-	-	-	8.1	A	6.9	A

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; ORH = Old Redwood Hwy; NB = northbound; SB = southbound; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*; ** = delay greater than 120 seconds; **Bold** text = unacceptable operation; Shaded cells = conditions with improvements



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Figure 7 – Existing Plus Project Traffic Volumes

Traffic Control Warrants

A warrant analysis was performed to identify the need for a traffic signal or roundabout at the intersection of Los Amigos Road/Arata Lane. Chapter 4C of the *California Manual on Uniform Traffic Control Devices for Streets and Highways* (CA-MUTCD) provides guidance on when a traffic signal should be considered; such warrants may also be used for roundabouts. The CA-MUTCD includes nine different warrants, or criteria; for the purposes of this study, Warrant 3 (the peak hour warrant) was evaluated since it is often the first of the warrants to be met.

Warrant 3: Under the Peak Hour Warrant the need for a traffic control signal shall be considered if an engineering study finds that the criteria in either of the following two categories are met:

A. If all three of the following conditions exist for the same one hour (any four consecutive 15-minute periods) of an average day:

    1. The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: four vehicle-hours for a one-lane approach; or five vehicle-hours for a two-lane approach, and
    2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes, and
    3. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.

B. The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.

The intersection of Los Amigos Road/Arata Lane does not warrant a traffic signal under existing volumes but would warrant one upon the addition of the full Quail Acres 1 project's traffic during the a.m. peak hour. Copies of the Signal Warrant Spreadsheets are provided in Appendix D.

Signalization of Arata Lane/Los Amigos Road with Initial Project Phases

The Quail Acres 1 project would be developed in several phases. A focused analysis was conducted to determine the project phase that would "trigger" signalization of the Arata Lane/Los Amigos Road intersection. As indicated above, signal Warrant 3 (the peak hour warrant) is currently unmet at the Arata Lane/Los Amigos Road intersection but would be met with development of the full project. The intersection also currently already encounters LOS F operation on the stop-controlled northbound Los Amigos Road approach during the a.m. peak hour. Based on the Town's LOS policies outlined in Policy M-3.16 of the General Plan in addition to assessment of signal Warrant 3, signalization of the intersection is recommended when all three of the following conditions would be met upon the addition of traffic generated by one or more project phases:

- One or more intersection approaches projected to encounter LOS E or F operation have controlled movements serving greater than 30 vehicles per hour per lane;
- The project would cause the overall intersection's average vehicle delay to increase by greater than 5.0 seconds; and
- Signal Warrant 3 would be met during one or more peak hours.

Quail Acres Phase 1 would include development of 36 single-family detached and eight single-family attached units. Up to 39 optional ADUs would also be possible during Phase 1; for the purposes of this analysis 25 percent of ADUs were assumed to be constructed with an average occupancy of 1.5 persons, totaling 15 ADU residents. With this level of development, Phase 1 is estimated to generate approximately 32 trips during the a.m. peak hour and 43 trips during the p.m. peak hour. Additional information on the number of units by phase and estimated cumulative trip generation by phase is included in Appendix E.

Existing plus Quail Acres Phase 1 traffic volumes were analyzed for the a.m. and p.m. peak hours. During worst-case a.m. peak hour conditions, the northbound Los Amigos Road approach is projected to operate at LOS F with more than 30 vehicles per hour per lane. The addition of traffic associated with Quail Acres Phase 1 is projected to increase average delay per vehicle for the overall intersection by 8.7 seconds, and signal Warrant 3 would be met. Based on this assessment, Phase 1 of the project would be considered to have an adverse effect on traffic operation, and installation of a signal is therefore recommended. A summary of the findings is shown in Table 10.

Table 10 – Arata Lane/Los Amigos Road Signal Assessment with Quail Acres Phase 1

	AM Peak Hour		PM Peak Hour	
Criteria	**Existing**	**Existing+Phase 1**	**Existing**	**Existing+Phase 1**
Approach with worst operation	Northbound	Northbound	Northbound	Northbound
Level of Service	F	F	C	D
Volume >30 per lane	Yes	Yes	Yes	Yes
Overall Intersection Delay	6.2 sec	14.9 sec	1.9 sec	4.3 sec
Project Delay Increase	-	**8.7 sec**	-	2.4 sec
Signal Warrant 3 Met	No	Yes	No	No

Notes: sec=seconds; **Bold**=project delay increase exceeds 5.0 seconds

Potential for Future Roundabout

The Town of Windsor is considering conversion of the Arata Lane/Los Amigos Road intersection to a single-lane roundabout in the future. Implementation of a roundabout would be feasible in the future but may not be achievable in the near-term since it would require right-of-way from several parcels on the intersection corners. As such, it may not be possible for the Quail Acres project to construct the roundabout as part of the broader Los Amigos Road extension project. It is therefore recommended that the project be required to install a temporary traffic signal at the intersection to accommodate traffic until the roundabout can be constructed. The temporary traffic signal would require no roadway widening beyond that associated with the Los Amigos Road extension to be constructed as part of the project. To improve pedestrian connectivity, pedestrian crossings and phasing should be provided at the temporary signal.

Finding – Under Existing plus Project conditions, the intersection of Los Amigos Road/Arata Lane would operate unacceptably, with the Quail Acres 1 project resulting in an adverse project effect. Signal warrants would not be met under existing conditions but would be met upon the addition of project-generated traffic, including with development of only Phase 1.

Finding – While the Town has identified the Los Amigos Road/Arata Lane intersection as a potential location for a future roundabout, implementation of a roundabout may not be possible in the near-term since it would require right-of-way acquisition from parcels that are not under the control of the Town or Quail Acres developer.

Recommendation – The project should be required to install a temporary traffic signal at the Los Amigos Road/Arata Lane intersection as part of Phase 1, including pedestrian crossings and signal phasing.

Future plus Project Conditions

The project's effects on future year 2040 traffic operation were assessed. As previously discussed, the project alternative that would include a future potential school site would generate substantially more a.m. peak hour trips and slightly more p.m. peak hour trips than the proposed project without a school. Accordingly, to present a conservative analysis, the project alternative including a school was analyzed in the Future plus Project traffic analysis scenario.

Upon the addition of project-generated traffic to the anticipated future volumes, the study intersections at US 101 North Ramps/Arata Lane and Los Amigos Road/Arata Lane are anticipated to continue operating unacceptably at LOS E or F during both peak hours. The intersection at Old Redwood Highway/Arata Lane is also projected to deteriorate to LOS E operation during the a.m. peak hour under Future plus Project conditions. The project would increase delays by more than five seconds at all three affected intersections, which according to Town policy constitutes an adverse project effect on traffic operation.

The Future plus Project operating conditions are summarized in Table 11. Future plus project traffic volumes are shown in Figure 8.

Table 11 – Future and Future plus Project (with School) Peak Hour Intersection Levels of Service

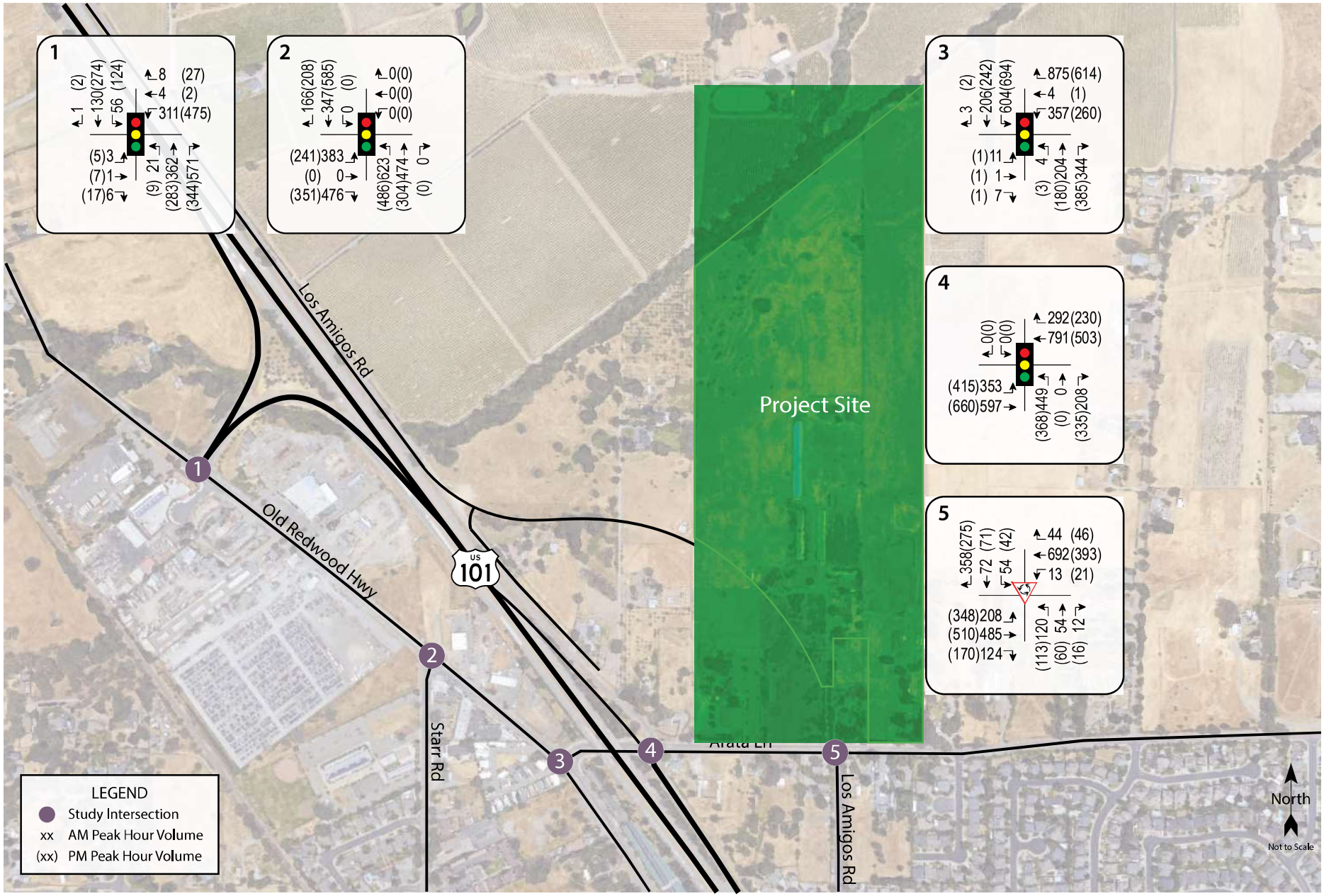
Study Intersection		**Future Conditions**				**Future plus Project**			
	Approach	**AM Peak**		**PM Peak**		**AM Peak**		**PM Peak**	
		Delay	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
1.	ORH/US 101 S Ramps	19.2	B	27.4	C	20.4	C	28.5	C
2.	ORH/Starr Rd	38.9	D	40.9	D	53.3	D	50.1	D
3.	ORH/Arata Ln	41.3	D	40.6	D	**57.4**	**E**	49.8	D
	NB RTOL Phase	-	-	-	-	33.2	C	29.0	C
4.	US 101 N Ramps/Arata Ln	**61.9**	**E**	**78.0**	**E**	**110.6**	**F**	**123.4**	**F**
	Added EB Left-Turn Lane[1]	23.4	C	21.9	C	33.7	C	27.4	C
5.	Los Amigos Rd/Arata Ln	**	**F**	**	**F**	**	**F**	**	**F**
	NB (Los Amigos Rd) Approach	**	***F***	**	***F***	**	***F***	**	***F***
	SB (Los Amigos Rd) Approach	**	***F***	**	***F***	**	***F***	**	***F***
	Signalized	18.6	B	19.8	B	46.0	D	26.3	C
	Single-Lane Roundabout	10.4	B	11.9	B	23.5	C	17.2	C

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; NB = northbound; SB = southbound; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*; **Bold** text indicates unacceptable operation; Shaded cells = conditions with improvements; RTOL = right turn overlap;

[1] includes widening of US 101 underpass

Operation of the intersection at Old Redwood Highway/Arata Lane could be improved to LOS C by adding a northbound right-turn overlap phase. Operation at the US 101 North Ramps/Arata Lane intersection could be improved to LOS C by adding an eastbound left-turn lane. This modification was previously discussed under the assessment of Future (no project) conditions. Note that both intersections would require additional improvements to address queuing deficiencies, as discussed later in this report. All modifications identified at the intersections would be within the scope of those identified in the Town's traffic impact fee; payment of these fees would satisfy the project's obligation toward implementing these future improvements.

The intersection at Los Amigos Road/Arata Lane would require installation of a roundabout or traffic signal to address operational deficiencies, as previously discussed under the Future (no project) analysis. A single-lane roundabout would be expected to operate acceptably at LOS C during both peak hours. While the Town is considering converting the intersection to a roundabout in the future, operation was also assessed under conditions with a traffic signal. Under future conditions with a signal, a right-turn pocket with an overlap phase would be required on the southbound Los Amigos Road extension approach. With this signal configuration the intersection would be expected to operate at LOS D during the a.m. peak hour and LOS C during the p.m. peak hour. As recommended under the Existing plus Project scenario analysis, the Quail Acres project should be responsible for constructing a temporary traffic signal at the intersection until such time that the Town can construct the planned roundabout; this near-term improvement along with construction of the Los Amigos Road extension would satisfy the project's obligation toward making improvements at this intersection.



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Quail Acres 1 Project Traffic Impact Study

Figure 8 – Future Plus Project Traffic Volumes

Finding – Upon the addition of project-related traffic to future volumes, the intersections of Old Redwood Highway/Arata Lane, US 101 North Ramps/Arata Lane, and Los Amigos Road/Arata Lane would be anticipated to operate unacceptably, with each encountering an adverse project effect according to the Town's guidelines.

Finding – Payment of traffic impact fees along with construction of the Los Amigos Road extension and near-term installation of a temporary traffic signal at Arata Lane/Los Amigos Road would satisfy the project's obligation to contribute to necessary future improvements at the study intersections.

Queuing

The *Town of Windsor 2040 General Plan* contains the following policy applicable to queuing.

> **Policy M-3.17 - Queuing**. *Intersection queuing shall be evaluated in tandem with LOS. Projected 95th percentile queues in left-turn pockets do not exceed the available stacking length. A queuing impact shall be considered significant if:*
>
> *a) The 95th percentile queue length can be contained within the available stacking length without the project, and the project causes the queue to exceed the stacking length; or*
>
> *b) The queue length exceeds the available stacking length without the project and the project increases the 95th percentile queue by more than 10 feet, or approximately one-half a car-length.*
>
> *Exceptions to this policy may be granted by the Town Engineer, where there is sufficient block length to accommodate projected queuing or physical constraints that make it infeasible to construct the improvement that would be necessary to achieve adequate stacking length, such as geometrics, a lack of right-of-way, adjacent slopes or hills, and soil conditions.*

As with the LOS analysis, queues under Existing plus Project conditions assume no potential school site within the project, while queues under Future plus Project conditions do include an operating school at the potential school site. Queues were determined using Synchro for all signalized and unsignalized locations, and in SIDRA for the intersection of Los Amigos Road/Arata Lane for scenarios with a roundabout. Under existing conditions, the projected 95th percentile queues in left-turn pockets remain within the available storage except for the northbound left-turn pocket at Old Redwood Highway/Starr Road during the a.m. peak hour.

Summarized in Table 12 are the predicted 95th percentile queue lengths in left-turn pockets and on off-ramps for all analysis scenarios at study intersections. The projected 95th percentile queues on key movements or approaches at Los Amigos Road/Arata Lane are shown in Table 13. Copies of the queuing calculations are contained in Appendix F.

Table 12 – 95th Percentile Queues at Intersections 1 through 4

Study Intersection Left-Turn Pocket Approach	Storage	95th Percentile Left-Turn Queues							
		AM Peak Hour				PM Peak Hour			
		E	E+P	F	F+P	E	E+P	F	F+P
1. ORH/US 101 S Ramps									
Northbound ORH	170	33	33	37	37	18	18	21	21
Southbound ORH	215	54	54	72	72	87	87	136	136
Off-Ramp	1,360	165	169	258	286	227	248	528	560
2. ORH/Starr Rd									
Northbound ORH	360	**455**	**481**	**599**	**661**	186	220	**506**	**531**
Implement AM School Peak Signal Timing	360	-	358	-	-	-	-	-	-
Extend NB Turn Lane	600	-	-	499	557	-	-	415	432
3. ORH/Arata Ln									
Northbound ORH	135	13	13	16	16	9	9	13	13
Southbound ORH	300	232	247	**520**	**672**	164	202	**678**	**765**
Westbound Arata Ln	330	212	237	**350**	**438**	99	117	323	**355**
Extend SB Turn Lane, add NB Overlap, Coordinate Signals									
Southbound ORH	650	-	-	501	606	-	-	599	647
Westbound Arata Ln	330	-	-	311	315	-	-	270	283
4. US 101 N Ramps/Arata Ln									
Off-Ramp	1,050	90	90	217	217	80	81	178	178
Eastbound Arata Ln	330	200	212	**738**	**991**	157	191	**1,188**	**1,336**
Add Eastbound Left-Turn Lane, Coordinate Signals									
Off-Ramp	1,050	-	-	335	391	-	-	316	325
Eastbound Arata Ln	330	-	-	278	279	-	-	321	321

Notes: Reported queues are measured in feet; E = existing conditions; E+P = existing plus project conditions; F = future conditions; F+P = future plus project conditions; **Bold** text = queue length exceeds available storage; Shaded cells = conditions with improvements; NB=Northbound; SB=Southbound

Table 13 – 95th Percentile Queues Los Amigos Road/Arata Lane									
Movement	**Storage**	**95th Percentile Left-Turn Queues**							
		AM Peak Hour				**PM Peak Hour**			
		E	**E+P**	**F**	**F+P**	**E**	**E+P**	**F**	**F+P**
Existing Configuration									
Northbound Left-Turn	110	108	**225**	**358**	**	25	70	**390**	**
Eastbound Left-Turn	125	0	5	5	**	0	10	20	**
Westbound Left-Turn	75	0	0	0	0	0	0	3	3
Traffic Signal[1]									
Northbound Left-Turn	110	-	97	98	96	-	61	98	91
Southbound Approach	420	-	47	55	122	-	32	85	111
Eastbound Left-Turn	150/400[2]	-	66	77	293	-	137	263	377
Westbound Left-Turn	75	-	27	29	28	-	23	38	38
Single-Lane Roundabout									
Northbound Approach	700	-	18	22	35	-	14	30	41
Southbound Approach	420	-	25	47	269	-	11	45	87
Eastbound Approach	770	-	92	110	199	-	110	240	738
Westbound Approach	500	-	99	207	475	-	36	89	125

Notes: Reported queues are measured in feet; E = existing conditions; E+P = existing plus project conditions; F = future conditions; F+P = future plus project conditions; **Bold** text = queue length exceeds available storage; **=exceeds parameters of methodology; Shaded cells = conditions with improvements; [1] includes southbound right-turn pocket with overlap phase; [2] 150 ft existing with no widening, 400 ft future as Arata Lane is widened to include center turn lane

Following is a summary of queuing conditions at each of the intersections where existing storage lengths are projected to be exceeded.

Old Redwood Highway/Starr Road

The project would increase queues in the northbound left-turn pocket during the a.m. peak hour under existing plus project conditions, with the 26-foot increase constituting an adverse project effect. In cases such as this intersection where school traffic substantially affects signal operation, implementation of school period signal timing to provide additional green time on critical movements can help to reduce delays and queues during these periods of particularly high traffic volumes. The Quail Acres 1 project should submit funds to the Town of Windsor to develop and implement school period signal timing parameters at the intersection; based on the estimated trip generation needed to constitute an adverse project effect, these funds should be submitted to the Town prior to completion of Phase 2 of development. With these changes, the 95th percentile queues under existing plus project conditions would be accommodated within the available storage.

Under future conditions both without and with the project, queues in the northbound left-turn pocket would substantially exceed the existing storage. To alleviate this condition, northbound left-turn storage should be increased to approximately 600 feet, extending nearly to Arata Lane. As discussed below, southbound left-turn storage on Old Redwood Highway at Arata Lane would require a left-turn pocket of similar length in the future. This configuration results in back-to-back left-turn lanes, and effectively requires Old Redwood Highway to be widened by a full lane width between Starr Road and Arata Lane. With this modification, queues at Old Redwood Highway would be acceptable in the future both without and with the project. Widening the intersection and Old Redwood Highway to accommodate this and/or more extensive improvements is identified in the General Plan and included in the Town's Traffic Impact Fee. As such, the Quail Acres 1 project would satisfy its obligation toward completion of this future improvement through payment of traffic impact fees.

Old Redwood Highway/Arata Lane

Left-turn queues would remain within the available storage upon the addition of project traffic to existing volumes. Under future conditions, however, queues on southbound Old Redwood Highway and westbound Arata Lane would exceed available storage both without and with the project under one or both peak hours. The southbound left-turn pocket storage should be increased to approximately 650 feet to alleviate this condition; adding a northbound right-turn overlap phase as recommended above in the operational (LOS) analysis, plus coordination of the Old Redwood Highway/Arata Lane and Arata Lane/US 101 North Ramps traffic signals, would also be required. With these modifications, future queues are projected to remain within the available storage both without and with the Quail Acres 1 project. These improvements would be within the scope of those identified in the General Plan and included in the Town's Traffic Impact Fee for Old Redwood Highway and the Arata Lane interchange. As such, the Quail Acres 1 project would satisfy its obligation toward completion of these future improvements through payment of traffic impact fees.

US 101 North Ramps/Arata Lane

Under existing plus project conditions, queues would remain within the available storage with the Quail Acres 1 project. Under future conditions, however, queues on eastbound Arata Lane would exceed storage both without and with the project. The addition of an eastbound left-turn lane as identified in the operational analysis, as well as coordination of the Arata Lane signals at this intersection and the adjacent Old Redwood Highway intersection, would alleviate the adverse queuing, though it is noted that projected queues would consume nearly all the available storage. These improvements would be within the scope of those identified in the General Plan and included in the Town's Traffic Impact Fee for the Arata Lane interchange. As such, the Quail Acres 1 project would satisfy its obligation toward completion of these future improvements through payment of traffic impact fees.

Los Amigos Road/Arata Lane

The addition of project-generated traffic to existing volumes would result in adverse queuing in the northbound and eastbound left-turn pockets. As identified above in the operational analysis, the intersection will need to be controlled by a single-lane roundabout or a temporary traffic signal (until such time that the future roundabout can be constructed). With signalization, the projected 95th percentile queues would remain within the available storage. While the Town is considering conversion of the intersection to a single-lane roundabout in the future, if it were to remain under signalized control, queues would remain within storage as long as a southbound right-turn pocket is added and Arata Lane is widened to allow lengthening of the eastbound left-turn pocket to 400 feet.

In the future with a single-lane roundabout, queues on all four intersection approaches would remain within the available storage.

The proposed Quail Acres 1 project would construct the Los Amigos Road extension on the north side of the intersection. As indicated in the operational analysis, it is recommended that the project be fully responsible for installing a temporary traffic signal at the intersection. Upon constructing these improvements, the project would effectively satisfy its obligation toward planned future improvements at the Los Amigos Road/Arata Lane intersection.

Finding – The proposed project would have an adverse effect on 95th percentile queues at the Old Redwood Highway/Starr Road intersection under existing plus project conditions.

Finding – Under future conditions both without and with the proposed project, queues would exceed available storage at four of the five study intersections. Future improvements that are within the scope of those included in the Traffic Impact Fee would address future queuing constraints. By contributing to the Town's traffic impact fee program, the project will satisfy its obligation toward funding these future improvements.

Recommendation – Prior to completion of Phase 2, the project should submit funds to the Town of Windsor to develop and implement school period signal timing parameters at the Old Redwood Highway/Starr Road intersection to address near-term queuing deficiencies.

Site Vehicle Access and Circulation

Site Access

The project site would be accessible via two public street intersections on the planned extension of Los Amigos Road, referred to as A Street and D Street, and one new minor public street connection to Arata Lane near the project's eastern boundary, referred to as B Street. The new minor street connection would be located approximately 360 feet east of Los Amigos Road and 150 feet west of Marcella Lane.

Access Analysis

Minor Project Access on Arata Lane

The project site plan depicts a new street intersection on Arata Lane near the eastern project boundary, referred to as B Street. The intersection would be located approximately 150 feet to the west of an existing unsignalized intersection at Arata Lane/Marcella Lane. The site plan also reflects widening of Arata Lane to a three-lane cross-section with two-way left-turn lane along the Quail Acres 1 project frontage. Given the projected volumes on Arata Lane, relatively low anticipated volumes on the new project street, and future provision of a center turn lane on Arata Lane, this minor access point is anticipated to function acceptably in the future assuming the new street approach is stop-controlled.

Shorter-term conditions with development of the project by phase were also assessed using methodologies outlined in the *Intersection Channelization Design Guide*, National Cooperative Highway Research Program (NCHRP) Report No. 279, Transportation Research Board, 1985, as well as the *Caltrans Highway Design Manual*. Warrants for the installation of an eastbound left-turn lane at B Street were tested using future a.m. and p.m. peak hour volumes, determining how many left-turn movements would be needed to meet the warrant. This sensitivity analysis revealed that the left-turn lane would be needed once a.m. peak hour left-turns exceed 20 or p.m. peak hour left-turns exceed 36.

The estimated maximum number of eastbound left-turns at the Arata Lane/B Street intersection was then determined considering the anticipated trip generation by phase, convenience of using B Street instead of the Los Amigos Road extension, and applied trip distribution assumptions. As shown in Table 14, development of phases 1 through 3 could occur without meeting the left-turn lane warrant. The left-turn lane would, however, need to be installed prior to occupation of the full project.

Table 14 – Estimated Maximum Eastbound Left-Turns at Arata Lane/B Street

Phase	AM Peak Hour	PM Peak Hour
Phase 1	6	19
Phases 1 and 2	7	24
Phases 1, 2, and 3	10	34
Full Project (Phases 1, 2, 3, and 1B)	13	43

Project Intersections on Los Amigos Road Extension

The project site plan shows two new public street connections to the Los Amigos Road extension. The southern D Street intersection would be located approximately 500 feet north of Arata Lane, and the northern A Street intersection would be located approximately 520 feet further to the north. This proposed spacing of intersections is appropriate given the function of Los Amigos Road as a crosstown street. Los Amigos Road would include one lane in each direction. Future traffic projections for this segment indicate bidirectional peak hour volumes of 830 to 870 vehicles; of these, it is estimated that 50 to 70 percent would enter and exit via the project's proposed southern access street. Based on testing of various volume scenarios completed using the NCHRP methodologies

noted above, it has been determined that the installation of left-turn pockets on the Los Amigos Road extension at the proposed access points would not be warranted.

Access to Hindmarsh Parcel

The Quail Acres 1 project excludes a portion of land on the east side of Los Amigos Road between Arata Lane and D Street that is referred to as the Hindmarsh parcel. Currently, this parcel is served by a driveway on Arata Lane, but would need to be relocated to access Los Amigos Road once the Los Amigos Road extension is constructed. Based on information provided by the applicant as shown in Plate 3, vehicular access to the Hindmarsh parcel would be provided via a driveway located midway between Arata Lane and D Street. The driveway's separation from both the Arata Lane and D Street intersections would be about 230 feet, minimizing the potential for the driveway to interfere with operations or safety at those intersections. During peak commute periods, southbound queues on Los Amigos Road at the Arata Lane intersection may extend through the Hindmarsh driveway area. While drivers attempting to turn left out of the driveway would be delayed during these occurrences, private driveways are not subject to LOS requirements, and such conditions are not uncommon for commercial driveways on major streets. While not mandatory for traffic operation requirements, the project would also establish a secondary emergency access point to the Hindmarsh parcel from the Quail Acres 1 site.

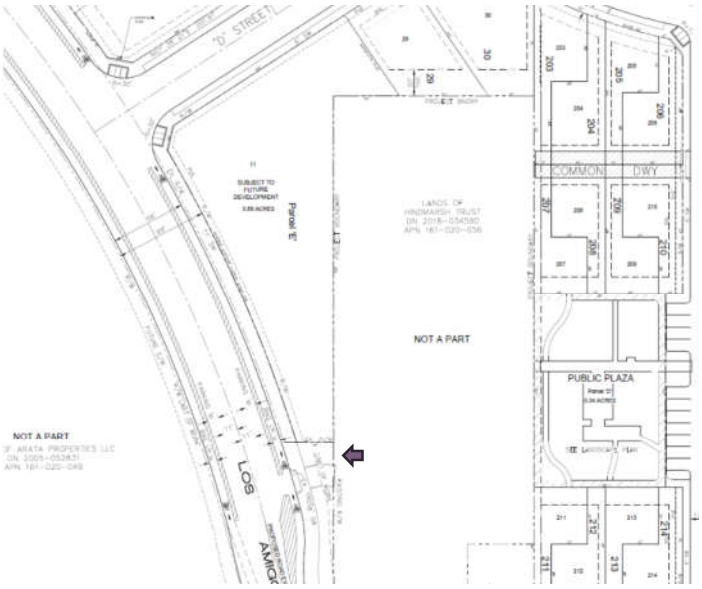


Plate 3 Proposed Access to Hindmarsh Parcel

Consideration was also given to the need for a left-turn lane to serve the driveway on Los Amigos Road. Based on estimates provided by the Quail Acres 1 applicant in consideration of the Town's current land use designations, the Hindmarsh parcel could theoretically accommodate 17,500 square feet of retail uses and ten multifamily residential units. Application of standard ITE rates indicates that this level of development would generate approximately 45 vehicle trips during the a.m. peak hour (26 inbound and 19 outbound) and 120 trips during the p.m. peak hour (61 inbound and 59 outbound). Considering projected future volumes on Los Amigos Road, provision of a left-turn lane at the Hindmarsh parcel's driveway would not be warranted.

Finding – The proposed project's public street intersections on Los Amigos Road and Arata Lane are anticipated to function acceptably.

Finding – The proposed project's relocated vehicular access point to the Hindmarsh parcel is anticipated to function acceptably.

Recommendation – The residential streets to be constructed by the project should be controlled by stop signs at their intersections with Arata Lane and Los Amigos Road.

Recommendation – The project should construct the two-way left turn lane on Arata Lane at B Street to serve additional development beyond Phase 3, or when the project's lots fronting Arata Lane are developed in Phase 1B, whichever occurs first.

Emergency Vehicle Circulation and Access

The site plans for the Quail Acres 1 project depict an interconnected internal roadway network with no dead-end streets, and three near-term connections to the surrounding roadway network: two on the Los Amigos Road extension and one on Arata Lane. The plan also indicates the potential for up to four future street extensions to the east and two to the west, which would be established once development on those neighboring parcels occurs. While improvement plans for the project will remain subject to approval by the Town's Fire Marshal, from a transportation perspective the proposed street configuration and connectivity would provide adequate emergency vehicle circulation and access.

The adequacy of emergency evacuation routes was assessed in consideration of potential fire threats approaching from the north, south, east, and west. The primary evacuation route for Windsor leading to designated evacuation centers is US 101; evacuation staging schemes established by emergency responders would in most circumstances focus on moving traffic along arterial streets to the freeway. For the Quail Acres 1 project, emergency evacuation staging for fire threats from the north would focus on directing drivers to Arata Lane; such routes would exist via both Los Amigos Road and the project's eastern access street. For fire threats from the east, which may be the most likely scenario (and similar to the Kincade fire), evacuation routes would also likely focus on directing residents to Arata Lane, though secondary evacuation routes would also exist to the north on Los Amigos Road, accessing US 101 via Limerick Lane to Old Redwood Highway in southern Healdsburg. While fire threats from the south and west may be less likely than threats from the north and east, several evacuation staging options would exist, including directing drivers to either Arata Lane or north on Los Amigos Road.

It is important to reiterate that the Town's Fire Marshal has final authority over the adequacy of the project's emergency access and compliance with applicable codes and requirements.

Findings – The proposed roadway network, including connectivity to existing and future roads, would provide adequate emergency circulation and access. The proposed roadway configuration, including construction of the entire Los Amigos Road extension, would accommodate multiple evacuation staging schemes that could be used in the case of fire threats approaching from the north, south, east, or west. The proposed project, including all future improvement plans, when submitted will be subject to review and approval by the Town's Fire Marshal; any requirements imposed by the Fire Marshal shall take precedence over the emergency access and circulation findings contained herein.

Complete Streets Design

Dimensions for the streets proposed to be constructed by the project were evaluated based on the Town of Windsor's *Complete Street Design Guidelines* (CSDG), published 2013. The internal streets serving the project's residential areas would be 34 feet wide, consisting of 10-foot-wide travel lanes and 7-foot-wide parking areas on both sides of the street. The streets would include five-foot wide planter strips and six-foot wide sidewalks on both sides, except in locations adjacent to the linear park where sidewalks and planter strips would exist only on the west side of the street in front of residences. The proposed configurations are consistent with those specified for local streets in the CSDG.

The General Plan designates the Los Amigos Road extension as a two-lane crosstown street. The roadway's cross section proposed by the project includes a 56-foot curb to curb width consisting of 11-foot-wide travel lanes, six-foot wide bike lanes with three-foot buffers, and eight-foot-wide parking stalls in each direction. The project would include construction of 11-foot-wide sidewalks with planter strips along its Los Amigos Road frontage, extending southward to Arata Lane. This configuration differs slightly from the CSDG, which was developed prior to common use of buffered bike lanes, but has been approved by the Town of Windsor for application along the project's Los Amigos Road frontage. Future development on the west side of the Los Amigos Road extension would be expected to provide sidewalks and planter strips on that side of the street. The proposed configuration is therefore generally consistent with the 2-Lane Boulevard Crosstown Street type in the CSDG.

The project would improve Arata Lane along its frontage to include a 46-foot curb-to-curb width accommodating 11-foot-wide travel lanes in each direction, a 10-foot-wide center turn lane, an eight-foot-wide eastbound bike

lane, and a six-foot wide westbound bike lane. The project would provide eight-foot-wide sidewalks with six-foot planter strips on its frontage. The configuration proposed by the project between the roadway centerline and property line is consistent with the 3-Lane Boulevard Crosstown Street type in the CSDG. The Town has modified the street's southern half section to eliminate the landscape strip due to existing constraints.

Finding – The proposed configurations of local streets, the Los Amigos Road extension, and the project's Arata Lane frontage are generally consistent with the Town's complete street design guidelines.

Conclusions and Recommendations

Conclusions

- The project would have effective linkages to the surrounding pedestrian network including schools, recreation areas, and shopping areas during all phases of development, except for areas to the west of the project along Arata Road where an existing 300-foot sidewalk gap exists.
- Bicycle facilities serving the project site would effectively link to the surrounding bicycle network during all development phases.
- Transit facilities serving the project site are generally adequate and compliant with Town policy.
- Transit access would be improved upon the completion of continuous sidewalk from the project site to the nearest Sonoma County Transit bus stop.
- The residential component of the project would not qualify for any of the VMT screening parameters identified by the Town of Windsor.
- The project's land use components would be expected to result in a less-than-significant VMT impact.
- The extension and realignment of Los Amigos Road would be expected to result in a less-than-significant transportation VMT impact.
- Four of the five study intersections have collision rates that are lower than the statewide average. The intersection of Los Amigos Road/Arata Lane had a collision rate above the statewide average, but no pattern of behavior could be identified based on the reported collisions and as such no safety recommendations are made. No crashes involving either pedestrians or bicyclists were reported at any of the study intersections.
- The proposed project is expected to generate an average of 2,951 trips per day, including 218 trips during the a.m. peak hour and 289 during the p.m. peak hour. The alternative project with potential future school would be expected to generate an average of 3,425 trips per day, including 538 trips during the a.m. peak hour and 303 during the p.m. peak hour.
- Under Existing plus Project conditions, the intersection of Los Amigos Road/Arata Lane would operate unacceptably, with the Quail Acres 1 project resulting in an adverse project effect. Signal warrants would not be met under existing conditions but would be met upon the addition of project-generated traffic, including with development of only Phase 1.
- While the Town has identified the Los Amigos Road/Arata Lane intersection as a location for a potential future roundabout, implementation of a roundabout may not be possible in the near-term since it would require right-of-way acquisition from parcels that are not under the control of the Town or Quail Acres developer.
- Upon the addition of project-related traffic to future volumes, the intersections of Old Redwood Highway/Arata Lane. US 101 North Ramps/Arata Lane, and Los Amigos Road/Arata Lane would be anticipated to operate unacceptably, with each encountering an adverse project effect according to the Town's guidelines.
- In addition to installing a temporary traffic signal at Arata Lane/Los Amigos Road as a near-term improvement, payment of traffic impact fees along with construction of the Los Amigos Road extension would satisfy the project's obligation to contribute to necessary future improvements at the study intersections.

- The proposed project would have an adverse effect on 95th percentile queues at the Old Redwood Highway/Starr Road intersection under Existing plus Project Conditions.

- Under Future Conditions both without and with the proposed project, queues would exceed available storage at four of the five study intersections. Future improvements that are within the scope of those included in the Traffic Impact Fee would address future queuing constraints. By contributing to the Town's traffic impact fee program, the project will satisfy its obligation toward funding these future improvements.

- The proposed project's public street intersections on Los Amigos Road and Arata Lane are anticipated to function acceptably.

- On-site circulation is expected to operate acceptably.

- The proposed project's relocated vehicular access points to the Hindmarsh parcel are anticipated to function acceptably.

- The proposed roadway network, including connectivity to existing and future roads, would provide adequate emergency circulation and access, and the proposed roadway configuration would accommodate multiple evacuation staging schemes that could be used in the case of fire threats.

- The proposed configurations of local streets, the Los Amigos Road extension, and the project's Arata Lane frontage are generally consistent with the Town's complete street design guidelines.

Recommendations

- The pedestrian crossing with RRFB at the Arata Lane/B Street intersection should be constructed with Phase 1 of the Quail Acres project.

- If pending development project(s) are not anticipated to fill the 300-foot sidewalk gap on the north side of Arata Lane to the west of Los Amigos Road prior to Quail Acres being occupied, the Quail Acres project should be responsible for constructing the sidewalk or an interim all-weather path along this segment as part of Phase 1.

- Prior to preparing improvement plans for the project's Arata Lane frontage, the Quail Acres development team should collaborate with the Town to confirm that bike facilities are consistent with those ultimately identified in the Town's updated bicycle plan.

- The development team should request that the WUSD consider initiating a route to serve the Quail Acres project site once the homes are occupied.

- The project should be required to install a temporary traffic signal at the Los Amigos Road/Arata Lane intersection as part of Phase 1, including pedestrian crossings and signal phasing.

- Prior to completion of Phase 2, the project should submit funds to the Town of Windsor to develop and implement school period signal timing parameters at the Old Redwood Highway/Starr Road intersection to address near-term queuing deficiencies.

- The residential streets to be constructed by the project should be controlled by stop signs at their intersections with Arata Lane and Los Amigos Road.

- The project should construct the two-way left turn lane on Arata Lane at B Street to serve additional development beyond Phase 3, or when the project's lots fronting Arata Lane are developed in Phase 1B, whichever occurs first.

Study Participants and References

Study Participants

Principal in Charge	Zachary Matley, AICP
Assistant Engineer	William Andrews, EIT
Graphics	Cameron Wong
Editing/Formatting	Jessica Bender
Quality Control	Dalene J. Whitlock, PE (Civil, Traffic), PTOE

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Appendix A

LOS Methodology

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Intersection Level of Service

Level of Service (LOS) is used to rank traffic operation on various types of facilities based on traffic volumes and roadway capacity using a series of letter designations ranging from A to F. Generally, Level of Service A represents free flow conditions and Level of Service F represents forced flow or breakdown conditions. A unit of measure that indicates a level of delay generally accompanies the LOS designation.

The study intersections were analyzed using the "Two-Way Stop-Controlled," "Signalized," and "Roundabout" intersection capacity methodologies published in the *Highway Capacity Manual* (HCM), 6th Edition, Transportation Research Board, 2018. This source contains methodologies for various types of intersection control, all of which are related to a measurement of delay in average number of seconds per vehicle.

The Levels of Service for the intersections with side street stop controls, or those which are unsignalized and have one or two approaches stop controlled, were analyzed using the "Two-Way Stop-Controlled" intersection capacity method from the HCM. This methodology determines a level of service for each minor turning movement by estimating the level of average delay in seconds per vehicle. Results are presented for individual movements together with the weighted overall average delay for the intersection.

The study intersections that are currently controlled by a traffic signal, or may be in the future, were evaluated using the signalized methodology from the HCM. This methodology is based on factors including traffic volumes, green time for each movement, phasing, whether the signals are coordinated or not, truck traffic, and pedestrian activity. Average stopped delay per vehicle in seconds is used as the basis for evaluation in this LOS methodology. For purposes of this study, delays were calculated using signal timing obtained from the Town of Windsor and Caltrans.

Intersections that may be controlled by a modern roundabout in the future were evaluated using the FHWA Roundabout Method, also contained within the Unsignalized Methodology of the HCM 6th Edition. This methodology determines intersection operation using a gap acceptance method along with basic geometric and volume data to calculate entering and circulating flows. This information is then translated to average vehicle delays, with LOS break points at the same delays as used in the two-way stop-controlled methodology.

The ranges of delay associated with the various levels of service are indicated in the following table.

Intersection Level of Service Criteria			
LOS	**Two-Way Stop-Controlled**	**Signalized**	**Roundabout**
A	Delay of 0 to 10 seconds. Gaps in traffic are readily available for drivers exiting the minor street.	Delay of 0 to 10 seconds. Most vehicles arrive during the green phase, so do not stop at all.	Delay of 0 to 10 seconds.
B	Delay of 10 to 15 seconds. Gaps in traffic are somewhat less readily available than with LOS A, but no queuing occurs on the minor street.	Delay of 10 to 20 seconds. More vehicles stop than with LOS A, but many drivers still do not have to stop.	Delay of 10 to 15 seconds.
C	Delay of 15 to 25 seconds. Acceptable gaps in traffic are less frequent, and drivers may approach while another vehicle is already waiting to exit the side street.	Delay of 20 to 35 seconds. The number of vehicles stopping is significant, although many still pass through without stopping.	Delay of 15 to 25 seconds.
D	Delay of 25 to 35 seconds. There are fewer acceptable gaps in traffic, and drivers may enter a queue of one or two vehicles on the side street.	Delay of 35 to 55 seconds. The influence of congestion is noticeable, and most vehicles have to stop.	Delay of 25 to 35 seconds.
E	Delay of 35 to 50 seconds. Few acceptable gaps in traffic are available, and longer queues may form on the side street.	Delay of 55 to 80 seconds. Most, if not all, vehicles must stop and drivers consider the delay excessive.	Delay of 35 to 50 seconds.
F	Delay of more than 50 seconds. Drivers may wait for long periods before there is an acceptable gap in traffic for exiting the side streets, creating long queues.	Delay of more than 80 seconds. Vehicles may wait through more than one cycle to clear the intersection.	Delay of more than 50 seconds.

Reference: *Highway Capacity Manual,* 6th Edition, Transportation Research Board, 2018

Appendix B

Collision Rate Calculations

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Intersection Collision Rate Worksheet

Quail Arces 1 TIS

Intersection # 1: Old Redwood Highway & US 101 Southbound Ramps
Date of Count: 9/27/2023

Number of Collisions: 1
Number of Injuries: 0
Number of Fatalities: 0
Average Daily Traffic (ADT): 13300
Start Date: January 1, 2018
End Date: December 31, 2022
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Urban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{1 \times 1{,}000{,}000}{13{,}300 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.04 c/mve**	**0.0%**	**0.0%**
Statewide Average*	**0.33 c/mve**	**0.6%**	**47.7%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2020 Collision Data on California State Highways, Caltrans

Intersection # 2: Old Redwood Highway & Starr Road
Date of Count: Wednesday, September 27, 2023

Number of Collisions: 4
Number of Injuries: 0
Number of Fatalities: 0
Average Daily Traffic (ADT): 22100
Start Date: January 1, 2018
End Date: December 31, 2022
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Urban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{4 \times 1{,}000{,}000}{22{,}100 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.10 c/mve**	**0.0%**	**0.0%**
Statewide Average*	**0.33 c/mve**	**0.6%**	**47.7%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2020 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Worksheet

Quail Arces 1 TIS

Intersection # 3: Old Redwood Highway & Arata Lane
Date of Count: Wednesday, September 27, 2023

Number of Collisions: 3
Number of Injuries: 0
Number of Fatalities: 0
Average Daily Traffic (ADT): 21100
Start Date: January 1, 2018
End Date: December 31, 2022
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Urban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{3 \times 1{,}000{,}000}{21{,}100 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.08 c/mve**	**0.0%**	**0.0%**
Statewide Average*	**0.33 c/mve**	**0.6%**	**47.7%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2020 Collision Data on California State Highways, Caltrans

Intersection # 4: Arata Lane & US 101 Northbound Ramps
Date of Count: Wednesday, September 27, 2023

Number of Collisions: 5
Number of Injuries: 3
Number of Fatalities: 0
Average Daily Traffic (ADT): 15700
Start Date: January 1, 2018
End Date: December 31, 2022
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Urban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{5 \times 1{,}000{,}000}{15{,}700 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.17 c/mve**	**0.0%**	**60.0%**
Statewide Average*	**0.33 c/mve**	**0.6%**	**47.7%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2020 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Worksheet

Quail Arces 1 TIS

Intersection # 5: Los Amigos Road & Arata Lane
Date of Count: Wednesday, September 27, 2023

Number of Collisions: 3
Number of Injuries: 2
Number of Fatalities: 0
Average Daily Traffic (ADT): 12400
Start Date: January 1, 2018
End Date: December 31, 2022
Number of Years: 5

Intersection Type: Tee
Control Type: 4 Way Stop
Area: Urban

$$\text{Collision Rate} = \frac{\text{Number of Collisions x 1 Million}}{\text{ADT x Days per Year x Number of Years}}$$

$$\text{Collision Rate} = \frac{3 \times 1{,}000{,}000}{12{,}400 \times 365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	**0.13 c/mve**	**0.0%**	**66.7%**
Statewide Average*	**0.11 c/mve**	**1.1%**	**43.5%**

Notes
ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2020 Collision Data on California State Highways, Caltrans

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Appendix C

Intersection Level of Service Calculations

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	4	190	3	2	18	338	404	39	91	1
Future Volume (veh/h)	2	0	4	190	3	2	18	338	404	39	91	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	2	0	4	207	3	2	20	367	439	42	99	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	5	0	11	284	4	256	52	563	733	78	590	500
Arrive On Green	0.01	0.00	0.01	0.16	0.16	0.16	0.03	0.30	0.30	0.04	0.32	0.32
Sat Flow, veh/h	548	0	1097	1757	25	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	6	0	0	210	0	2	20	367	439	42	99	1
Grp Sat Flow(s),veh/h/ln	1645	0	0	1783	0	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.2	0.0	0.0	5.9	0.0	0.1	0.6	9.0	10.8	1.2	2.0	0.0
Cycle Q Clear(g_c), s	0.2	0.0	0.0	5.9	0.0	0.1	0.6	9.0	10.8	1.2	2.0	0.0
Prop In Lane	0.33		0.67	0.99		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	16	0	0	288	0	256	52	563	733	78	590	500
V/C Ratio(X)	0.38	0.00	0.00	0.73	0.00	0.01	0.39	0.65	0.60	0.54	0.17	0.00
Avail Cap(c_a), veh/h	323	0	0	846	0	752	333	877	1000	503	1055	894
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.8	0.0	0.0	20.9	0.0	18.5	25.0	15.9	10.5	24.6	13.0	12.3
Incr Delay (d2), s/veh	14.4	0.0	0.0	3.5	0.0	0.0	1.8	1.3	0.8	4.3	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	2.4	0.0	0.0	0.2	3.3	4.3	0.5	0.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.3	0.0	0.0	24.4	0.0	18.5	26.8	17.2	11.3	28.8	13.1	12.3
LnGrp LOS	D	A	A	C	A	B	C	B	B	C	B	B
Approach Vol, veh/h		6			212			826			142	
Approach Delay, s/veh		40.3			24.4			14.3			17.8	
Approach LOS		D			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.5	23.2		7.2	5.7	24.0		15.6				
Change Period (Y+Rc), s	* 4.2	7.4		* 6.7	* 4.2	7.4		7.1				
Max Green Setting (Gmax), s	* 15	24.6		* 10	* 9.8	29.6		24.9				
Max Q Clear Time (g_c+I1), s	3.2	12.8		2.2	2.6	4.0		7.9				
Green Ext Time (p_c), s	0.0	3.0		0.0	0.0	0.4		1.0				

Intersection Summary	
HCM 6th Ctrl Delay	16.6
HCM 6th LOS	B

Notes

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

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	351	266	449	411	174	117
Future Volume (veh/h)	351	266	449	411	174	117
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	382	289	488	447	189	127
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	510	454	551	1015	317	269
Arrive On Green	0.29	0.29	0.31	0.54	0.17	0.17
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	382	289	488	447	189	127
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	9.1	7.5	12.2	6.7	4.4	3.4
Cycle Q Clear(g_c), s	9.1	7.5	12.2	6.7	4.4	3.4
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	510	454	551	1015	317	269
V/C Ratio(X)	0.75	0.64	0.89	0.44	0.60	0.47
Avail Cap(c_a), veh/h	1521	1354	647	2396	1597	1354
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.2	14.6	15.4	6.4	18.0	17.6
Incr Delay (d2), s/veh	2.2	1.5	11.4	0.3	1.8	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.4	0.2	5.9	1.9	1.8	1.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.4	16.1	26.8	6.7	19.8	18.9
LnGrp LOS	B	B	C	A	B	B
Approach Vol, veh/h	671			935	316	
Approach Delay, s/veh	16.8			17.2	19.4	
Approach LOS	B			B	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		29.9		16.9	17.5	12.4
Change Period (Y+Rc), s		4.5		3.5	3.0	4.5
Max Green Setting (Gmax), s		60.0		40.0	17.0	40.0
Max Q Clear Time (g_c+I1), s		8.7		11.1	14.2	6.4
Green Ext Time (p_c), s		3.2		2.3	0.3	1.6

Intersection Summary	
HCM 6th Ctrl Delay	17.4
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	1	6	237	4	661	4	176	155	271	156	3
Future Volume (veh/h)	10	1	6	237	4	661	4	176	155	271	156	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	1	7	258	4	718	4	191	168	295	170	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	27	2	17	694	11	923	6	283	233	350	632	11
Arrive On Green	0.03	0.03	0.03	0.40	0.40	0.40	0.00	0.15	0.15	0.20	0.34	0.34
Sat Flow, veh/h	989	90	629	1755	27	1544	1781	1870	1541	1781	1831	32
Grp Volume(v), veh/h	19	0	0	262	0	718	4	191	168	295	0	173
Grp Sat Flow(s),veh/h/ln	1708	0	0	1783	0	1544	1781	1870	1541	1781	0	1864
Q Serve(g_s), s	0.7	0.0	0.0	6.6	0.0	22.4	0.1	6.1	6.6	10.1	0.0	4.2
Cycle Q Clear(g_c), s	0.7	0.0	0.0	6.6	0.0	22.4	0.1	6.1	6.6	10.1	0.0	4.2
Prop In Lane	0.58		0.37	0.98		1.00	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	46	0	0	705	0	923	6	283	233	350	0	643
V/C Ratio(X)	0.41	0.00	0.00	0.37	0.00	0.78	0.70	0.67	0.72	0.84	0.00	0.27
Avail Cap(c_a), veh/h	351	0	0	733	0	947	197	873	719	1043	0	1754
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.3	0.0	0.0	13.5	0.0	9.8	31.5	25.3	25.5	24.4	0.0	15.0
Incr Delay (d2), s/veh	2.2	0.0	0.0	0.1	0.0	3.7	43.9	1.0	1.6	2.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	2.4	0.0	6.7	0.1	2.6	2.4	4.2	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.5	0.0	0.0	13.7	0.0	13.5	75.4	26.4	27.1	26.6	0.0	15.0
LnGrp LOS	C	A	A	B	A	B	E	C	C	C	A	B
Approach Vol, veh/h		19			980			363			468	
Approach Delay, s/veh		32.5			13.5			27.3			22.3	
Approach LOS		C			B			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.4	14.1		4.7	3.2	26.3		29.0				
Change Period (Y+Rc), s	3.0	4.5		3.0	3.0	4.5		4.0				
Max Green Setting (Gmax), s	7.0	29.5		13.0	7.0	59.5		26.0				
Max Q Clear Time (g_c+I1), s	12.1	8.6		2.7	2.1	6.2		24.4				
Green Ext Time (p_c), s	0.4	1.0		0.0	0.0	0.7		0.6				

Intersection Summary	
HCM 6th Ctrl Delay	18.7
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	417	0	0	572	104	304	15	99	28	0	19
Future Volume (veh/h)	10	417	0	0	572	104	304	15	99	28	0	19
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	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	1870	1870	0	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	453	0	0	622	113	341	0	108	30	0	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	139	664	0	0	1084	196	605	0	269	47	0	33
Arrive On Green	0.36	0.36	0.00	0.00	0.36	0.36	0.17	0.00	0.17	0.05	0.00	0.05
Sat Flow, veh/h	16	1830	0	0	3083	542	3563	0	1585	997	0	698
Grp Volume(v), veh/h	464	0	0	0	369	366	341	0	108	51	0	0
Grp Sat Flow(s),veh/h/ln	1845	0	0	0	1777	1754	1781	0	1585	1695	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	4.6	4.6	2.4	0.0	1.7	0.8	0.0	0.0
Cycle Q Clear(g_c), s	5.8	0.0	0.0	0.0	4.6	4.6	2.4	0.0	1.7	0.8	0.0	0.0
Prop In Lane	0.02		0.00	0.00		0.31	1.00		1.00	0.59		0.41
Lane Grp Cap(c), veh/h	803	0	0	0	644	636	605	0	269	80	0	0
V/C Ratio(X)	0.58	0.00	0.00	0.00	0.57	0.58	0.56	0.00	0.40	0.64	0.00	0.00
Avail Cap(c_a), veh/h	1509	0	0	0	1340	1323	3397	0	1512	694	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.5	0.0	0.0	0.0	7.1	7.1	10.5	0.0	10.2	12.9	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.0	0.3	0.3	0.3	0.0	0.4	3.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.0	0.0	1.0	1.0	0.7	0.0	0.4	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.7	0.0	0.0	0.0	7.4	7.4	10.8	0.0	10.6	16.1	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	B	A	B	B	A	A
Approach Vol, veh/h		464			735			449			51	
Approach Delay, s/veh		7.7			7.4			10.8			16.1	
Approach LOS		A			A			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		14.2		5.0		14.2		8.4				
Change Period (Y+Rc), s		* 4.2		3.7		* 4.2		3.7				
Max Green Setting (Gmax), s		* 21		11.3		* 21		26.3				
Max Q Clear Time (g_c+I1), s		7.8		2.8		6.6		4.4				
Green Ext Time (p_c), s		1.6		0.1		2.7		0.4				

Intersection Summary	
HCM 6th Ctrl Delay	8.6
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

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

Intersection	
Int Delay, s/veh	6.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	443	100	12	557	1	110	0	11	1	0	0
Future Vol, veh/h	0	443	100	12	557	1	110	0	11	1	0	0
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	120	-	-	165	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	482	109	13	605	1	120	0	12	1	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	607	0	0	591	0	0	1169	1170	538	1177	1224	607
Stage 1	-	-	-	-	-	-	537	537	-	633	633	-
Stage 2	-	-	-	-	-	-	632	633	-	544	591	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	971	-	-	985	-	-	170	193	543	168	179	496
Stage 1	-	-	-	-	-	-	528	523	-	468	473	-
Stage 2	-	-	-	-	-	-	468	473	-	523	494	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	970	-	-	985	-	-	168	190	543	162	176	496
Mov Cap-2 Maneuver	-	-	-	-	-	-	168	190	-	162	176	-
Stage 1	-	-	-	-	-	-	528	523	-	468	466	-
Stage 2	-	-	-	-	-	-	462	466	-	511	494	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	61.8	27.4
HCM LOS			F	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	168	543	970	-	-	985	-	-	162
HCM Lane V/C Ratio	0.712	0.022	-	-	-	0.013	-	-	0.007
HCM Control Delay (s)	66.8	11.8	0	-	-	8.7	-	-	27.4
HCM Lane LOS	F	B	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	4.3	0.1	0	-	-	0	-	-	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	4	13	253	1	7	6	225	180	73	161	1
Future Volume (veh/h)	3	4	13	253	1	7	6	225	180	73	161	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	4	14	275	1	8	7	245	196	79	175	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	7	10	34	369	1	329	20	366	632	118	469	386
Arrive On Green	0.03	0.03	0.03	0.21	0.21	0.21	0.01	0.20	0.20	0.07	0.25	0.25
Sat Flow, veh/h	237	316	1106	1775	6	1585	1781	1870	1544	1781	1870	1539
Grp Volume(v), veh/h	21	0	0	276	0	8	7	245	196	79	175	1
Grp Sat Flow(s),veh/h/ln	1659	0	0	1782	0	1585	1781	1870	1544	1781	1870	1539
Q Serve(g_s), s	0.6	0.0	0.0	7.4	0.0	0.2	0.2	6.2	4.4	2.2	3.9	0.0
Cycle Q Clear(g_c), s	0.6	0.0	0.0	7.4	0.0	0.2	0.2	6.2	4.4	2.2	3.9	0.0
Prop In Lane	0.14		0.67	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	50	0	0	370	0	329	20	366	632	118	469	386
V/C Ratio(X)	0.42	0.00	0.00	0.75	0.00	0.02	0.35	0.67	0.31	0.67	0.37	0.00
Avail Cap(c_a), veh/h	336	0	0	873	0	777	344	906	1077	519	1090	897
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.2	0.0	0.0	18.9	0.0	16.0	24.9	18.9	10.3	23.2	15.7	14.3
Incr Delay (d2), s/veh	5.4	0.0	0.0	3.0	0.0	0.0	3.9	2.1	0.3	4.8	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	2.9	0.0	0.1	0.1	2.5	1.8	1.0	1.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.6	0.0	0.0	21.9	0.0	16.0	28.9	21.0	10.6	28.0	16.2	14.3
LnGrp LOS	C	A	A	C	A	B	C	C	B	C	B	B
Approach Vol, veh/h		21			284			448			255	
Approach Delay, s/veh		29.6			21.7			16.6			19.9	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.6	17.3		8.2	4.8	20.1		17.7				
Change Period (Y+Rc), s	* 4.2	7.4		* 6.7	* 4.2	7.4		7.1				
Max Green Setting (Gmax), s	* 15	24.6		* 10	* 9.8	29.6		24.9				
Max Q Clear Time (g_c+I1), s	4.2	8.2		2.6	2.2	5.9		9.4				
Green Ext Time (p_c), s	0.1	1.8		0.0	0.0	0.8		1.4				

Intersection Summary	
HCM 6th Ctrl Delay	19.1
HCM 6th LOS	B

Notes

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

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	145	115	284	268	307	134
Future Volume (veh/h)	145	115	284	268	307	134
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	153	121	299	282	323	141
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	297	264	382	1107	537	444
Arrive On Green	0.17	0.17	0.21	0.59	0.29	0.29
Sat Flow, veh/h	1781	1585	1781	1870	1870	1545
Grp Volume(v), veh/h	153	121	299	282	323	141
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1545
Q Serve(g_s), s	2.6	2.3	5.3	2.4	4.9	2.4
Cycle Q Clear(g_c), s	2.6	2.3	5.3	2.4	4.9	2.4
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	297	264	382	1107	537	444
V/C Ratio(X)	0.52	0.46	0.78	0.25	0.60	0.32
Avail Cap(c_a), veh/h	2151	1914	914	3388	2259	1866
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.6	12.5	12.3	3.2	10.2	9.3
Incr Delay (d2), s/veh	1.4	1.2	1.4	0.1	1.1	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.1	1.7	0.3	1.6	0.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.0	13.7	13.6	3.4	11.3	9.7
LnGrp LOS	B	B	B	A	B	A
Approach Vol, veh/h	274			581	464	
Approach Delay, s/veh	13.8			8.7	10.8	
Approach LOS	B			A	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		24.1		9.0	10.1	14.0
Change Period (Y+Rc), s		4.5		3.5	3.0	4.5
Max Green Setting (Gmax), s		60.0		40.0	17.0	40.0
Max Q Clear Time (g_c+I1), s		4.4		4.6	7.3	6.9
Green Ext Time (p_c), s		1.9		0.9	0.3	2.6

Intersection Summary	
HCM 6th Ctrl Delay	10.5
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	0	124	1	407	3	143	109	247	175	2
Future Volume (veh/h)	1	0	0	124	1	407	3	143	109	247	175	2
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1	0	0	135	1	442	3	155	118	268	190	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	4	0	0	502	4	755	4	295	247	343	642	7
Arrive On Green	0.00	0.00	0.00	0.28	0.28	0.28	0.00	0.16	0.16	0.19	0.35	0.35
Sat Flow, veh/h	1781	0	0	1769	13	1585	1781	1870	1565	1781	1847	19
Grp Volume(v), veh/h	1	0	0	136	0	442	3	155	118	268	0	192
Grp Sat Flow(s),veh/h/ln	1781	0	0	1782	0	1585	1781	1870	1565	1781	0	1867
Q Serve(g_s), s	0.0	0.0	0.0	2.4	0.0	8.1	0.1	3.0	2.7	5.7	0.0	3.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	2.4	0.0	8.1	0.1	3.0	2.7	5.7	0.0	3.0
Prop In Lane	1.00		0.00	0.99		1.00	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	4	0	0	506	0	755	4	295	247	343	0	649
V/C Ratio(X)	0.22	0.00	0.00	0.27	0.00	0.59	0.67	0.53	0.48	0.78	0.00	0.30
Avail Cap(c_a), veh/h	582	0	0	1164	0	1340	313	1386	1160	1656	0	2791
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.8	0.0	0.0	11.0	0.0	7.6	19.8	15.4	15.3	15.3	0.0	9.4
Incr Delay (d2), s/veh	9.0	0.0	0.0	0.1	0.0	0.3	49.2	0.5	0.5	1.5	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.8	0.0	1.8	0.1	1.1	0.9	2.0	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.9	0.0	0.0	11.2	0.0	7.8	69.1	15.9	15.8	16.8	0.0	9.5
LnGrp LOS	C	A	A	B	A	A	E	B	B	B	A	A
Approach Vol, veh/h		1			578			276			460	
Approach Delay, s/veh		28.9			8.6			16.5			13.7	
Approach LOS		C			A			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.7	10.8		3.1	3.1	18.3		15.3				
Change Period (Y+Rc), s	3.0	4.5		3.0	3.0	4.5		4.0				
Max Green Setting (Gmax), s	37.6	29.5		13.0	7.0	59.5		26.0				
Max Q Clear Time (g_c+I1), s	17.7	5.0		2.0	2.1	5.0		10.1				
Green Ext Time (p_c), s	0.4	0.7		0.0	0.0	0.7		1.3				
Intersection Summary												
HCM 6th Ctrl Delay			12.1									
HCM 6th LOS			B									



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	350	0	0	251	51	260	16	155	31	0	21
Future Volume (veh/h)	9	350	0	0	251	51	260	16	155	31	0	21
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	10	380	0	0	273	55	295	0	168	34	0	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, %	2	2	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	142	677	0	0	1082	214	551	0	245	52	0	35
Arrive On Green	0.37	0.37	0.00	0.00	0.37	0.37	0.15	0.00	0.15	0.05	0.00	0.05
Sat Flow, veh/h	17	1841	0	0	3038	583	3563	0	1585	1012	0	685
Grp Volume(v), veh/h	390	0	0	0	163	165	295	0	168	57	0	0
Grp Sat Flow(s),veh/h/ln	1857	0	0	0	1777	1751	1781	0	1585	1697	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	1.7	1.8	2.1	0.0	2.7	0.9	0.0	0.0
Cycle Q Clear(g_c), s	4.5	0.0	0.0	0.0	1.7	1.8	2.1	0.0	2.7	0.9	0.0	0.0
Prop In Lane	0.03		0.00	0.00		0.33	1.00		1.00	0.60		0.40
Lane Grp Cap(c), veh/h	818	0	0	0	653	643	551	0	245	87	0	0
V/C Ratio(X)	0.48	0.00	0.00	0.00	0.25	0.26	0.54	0.00	0.69	0.65	0.00	0.00
Avail Cap(c_a), veh/h	1546	0	0	0	1358	1338	3444	0	1532	705	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.9	0.0	0.0	0.0	6.0	6.0	10.6	0.0	10.9	12.7	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.0	0.1	0.1	0.3	0.0	1.3	3.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	0.0	0.4	0.4	0.6	0.0	0.7	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.0	0.0	0.0	0.0	6.1	6.1	10.9	0.0	12.1	15.7	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	B	A	B	B	A	A
Approach Vol, veh/h		390			328			463			57	
Approach Delay, s/veh		7.0			6.1			11.4			15.7	
Approach LOS		A			A			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		14.2		5.1		14.2		7.9				
Change Period (Y+Rc), s		* 4.2		3.7		* 4.2		3.7				
Max Green Setting (Gmax), s		* 21		11.3		* 21		26.3				
Max Q Clear Time (g_c+I1), s		6.5		2.9		3.8		4.1				
Green Ext Time (p_c), s		1.3		0.1		1.1		0.3				
Intersection Summary												
HCM 6th Ctrl Delay			8.8									
HCM 6th LOS			A									

Notes

User approved volume balancing among the lanes for turning movement.

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

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	394	114	11	246	0	70	0	6	0	0	1
Future Vol, veh/h	0	394	114	11	246	0	70	0	6	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	120	-	-	165	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	428	124	12	267	0	76	0	7	0	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	267	0	0	552	0	0	783	781	490	785	843	268
Stage 1	-	-	-	-	-	-	490	490	-	291	291	-
Stage 2	-	-	-	-	-	-	293	291	-	494	552	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1297	-	-	1018	-	-	311	326	578	310	300	771
Stage 1	-	-	-	-	-	-	560	549	-	717	672	-
Stage 2	-	-	-	-	-	-	715	672	-	557	515	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1297	-	-	1018	-	-	308	322	578	304	296	770
Mov Cap-2 Maneuver	-	-	-	-	-	-	308	322	-	304	296	-
Stage 1	-	-	-	-	-	-	560	549	-	717	664	-
Stage 2	-	-	-	-	-	-	705	664	-	551	515	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.4	19.8	9.7
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	308	578	1297	-	-	1018	-	-	770
HCM Lane V/C Ratio	0.247	0.011	-	-	-	0.012	-	-	0.001
HCM Control Delay (s)	20.5	11.3	0	-	-	8.6	-	-	9.7
HCM Lane LOS	C	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	1	0	0	-	-	0	-	-	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	4	197	3	2	18	341	472	39	92	1
Future Volume (veh/h)	2	0	4	197	3	2	18	341	472	39	92	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	2	0	4	214	3	2	20	371	513	42	100	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	5	0	10	289	4	261	51	615	782	76	642	544
Arrive On Green	0.01	0.00	0.01	0.16	0.16	0.16	0.03	0.33	0.33	0.04	0.34	0.34
Sat Flow, veh/h	548	0	1097	1758	25	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	6	0	0	217	0	2	20	371	513	42	100	1
Grp Sat Flow(s),veh/h/ln	1645	0	0	1782	0	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.2	0.0	0.0	6.5	0.0	0.1	0.6	9.3	13.6	1.3	2.1	0.0
Cycle Q Clear(g_c), s	0.2	0.0	0.0	6.5	0.0	0.1	0.6	9.3	13.6	1.3	2.1	0.0
Prop In Lane	0.33		0.67	0.99		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	16	0	0	293	0	261	51	615	782	76	642	544
V/C Ratio(X)	0.38	0.00	0.00	0.74	0.00	0.01	0.39	0.60	0.66	0.55	0.16	0.00
Avail Cap(c_a), veh/h	303	0	0	794	0	706	312	823	958	471	990	839
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.5	0.0	0.0	22.2	0.0	19.6	26.7	15.7	10.6	26.2	12.7	12.1
Incr Delay (d2), s/veh	14.5	0.0	0.0	3.7	0.0	0.0	1.8	1.0	1.2	4.5	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	2.7	0.0	0.0	0.3	3.4	5.6	0.6	0.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.1	0.0	0.0	25.9	0.0	19.6	28.5	16.7	11.8	30.8	12.9	12.1
LnGrp LOS	D	A	A	C	A	B	C	B	B	C	B	B
Approach Vol, veh/h		6			219			904			143	
Approach Delay, s/veh		42.1			25.8			14.2			18.1	
Approach LOS		D			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.6	25.8		7.2	5.8	26.6		16.3				
Change Period (Y+Rc), s	* 4.2	7.4		* 6.7	* 4.2	7.4		7.1				
Max Green Setting (Gmax), s	* 15	24.6		* 10	* 9.8	29.6		24.9				
Max Q Clear Time (g_c+I1), s	3.3	15.6		2.2	2.6	4.1		8.5				
Green Ext Time (p_c), s	0.0	2.8		0.0	0.0	0.4		1.0				

Intersection Summary												
HCM 6th Ctrl Delay			16.7									
HCM 6th LOS			B									

Notes

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

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	351	272	465	482	182	117
Future Volume (veh/h)	351	272	465	482	182	117
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	382	296	505	524	198	127
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	507	451	563	1030	323	274
Arrive On Green	0.28	0.28	0.32	0.55	0.17	0.17
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	382	296	505	524	198	127
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	9.5	8.0	13.1	8.5	4.8	3.5
Cycle Q Clear(g_c), s	9.5	8.0	13.1	8.5	4.8	3.5
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	507	451	563	1030	323	274
V/C Ratio(X)	0.75	0.66	0.90	0.51	0.61	0.46
Avail Cap(c_a), veh/h	1469	1307	624	2313	1542	1307
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.8	15.3	15.8	6.8	18.6	18.0
Incr Delay (d2), s/veh	2.3	1.6	13.9	0.4	1.9	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.6	0.2	6.6	2.4	2.0	1.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	18.1	16.9	29.7	7.2	20.5	19.3
LnGrp LOS	B	B	C	A	C	B
Approach Vol, veh/h	678			1029	325	
Approach Delay, s/veh	17.6			18.2	20.0	
Approach LOS	B			B	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		31.2		17.3	18.3	12.9
Change Period (Y+Rc), s		4.5		3.5	3.0	4.5
Max Green Setting (Gmax), s		60.0		40.0	17.0	40.0
Max Q Clear Time (g_c+I1), s		10.5		11.5	15.1	6.8
Green Ext Time (p_c), s		3.9		2.3	0.2	1.6

Intersection Summary						
HCM 6th Ctrl Delay			18.3			
HCM 6th LOS			B			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	1	6	256	4	748	4	176	162	284	156	3
Future Volume (veh/h)	10	1	6	256	4	748	4	176	162	284	156	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	1	7	278	4	813	4	191	176	309	170	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	26	2	17	694	10	932	6	290	239	362	650	11
Arrive On Green	0.03	0.03	0.03	0.39	0.39	0.39	0.00	0.15	0.15	0.20	0.36	0.36
Sat Flow, veh/h	989	90	629	1757	25	1544	1781	1870	1541	1781	1831	32
Grp Volume(v), veh/h	19	0	0	282	0	813	4	191	176	309	0	173
Grp Sat Flow(s),veh/h/ln	1708	0	0	1782	0	1544	1781	1870	1541	1781	0	1864
Q Serve(g_s), s	0.7	0.0	0.0	7.5	0.0	26.0	0.1	6.3	7.2	11.0	0.0	4.3
Cycle Q Clear(g_c), s	0.7	0.0	0.0	7.5	0.0	26.0	0.1	6.3	7.2	11.0	0.0	4.3
Prop In Lane	0.58		0.37	0.99		1.00	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	46	0	0	704	0	932	6	290	239	362	0	662
V/C Ratio(X)	0.42	0.00	0.00	0.40	0.00	0.87	0.70	0.66	0.74	0.85	0.00	0.26
Avail Cap(c_a), veh/h	337	0	0	704	0	932	189	838	690	1001	0	1684
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.5	0.0	0.0	14.3	0.0	11.2	32.8	26.2	26.6	25.3	0.0	15.1
Incr Delay (d2), s/veh	2.2	0.0	0.0	0.1	0.0	8.7	44.1	1.0	1.7	2.2	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	2.8	0.0	9.9	0.1	2.8	2.6	4.6	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.8	0.0	0.0	14.5	0.0	20.0	76.9	27.2	28.2	27.5	0.0	15.2
LnGrp LOS	C	A	A	B	A	B	E	C	C	C	A	B
Approach Vol, veh/h		19			1095			371			482	
Approach Delay, s/veh		33.8			18.5			28.2			23.1	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.4	14.7		4.8	3.2	27.9		30.0				
Change Period (Y+Rc), s	3.0	4.5		3.0	3.0	4.5		4.0				
Max Green Setting (Gmax), s	7.0	29.5		13.0	7.0	59.5		26.0				
Max Q Clear Time (g_c+I1), s	3.0	9.2		2.7	2.1	6.3		28.0				
Green Ext Time (p_c), s	0.4	1.0		0.0	0.0	0.7		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	21.6
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	437	0	0	679	104	304	15	123	28	0	19
Future Volume (veh/h)	10	437	0	0	679	104	304	15	123	28	0	19
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	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	1870	1870	0	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	475	0	0	738	113	341	0	134	30	0	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	135	690	0	0	1161	178	598	0	266	47	0	33
Arrive On Green	0.38	0.38	0.00	0.00	0.38	0.38	0.17	0.00	0.17	0.05	0.00	0.05
Sat Flow, veh/h	14	1829	0	0	3169	471	3563	0	1585	997	0	698
Grp Volume(v), veh/h	486	0	0	0	426	425	341	0	134	51	0	0
Grp Sat Flow(s),veh/h/ln	1843	0	0	0	1777	1770	1781	0	1585	1695	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	5.6	5.6	2.5	0.0	2.2	0.8	0.0	0.0
Cycle Q Clear(g_c), s	6.2	0.0	0.0	0.0	5.6	5.6	2.5	0.0	2.2	0.8	0.0	0.0
Prop In Lane	0.02		0.00	0.00		0.27	1.00		1.00	0.59		0.41
Lane Grp Cap(c), veh/h	825	0	0	0	671	668	598	0	266	79	0	0
V/C Ratio(X)	0.59	0.00	0.00	0.00	0.64	0.64	0.57	0.00	0.50	0.65	0.00	0.00
Avail Cap(c_a), veh/h	1461	0	0	0	1301	1295	3297	0	1467	674	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.4	0.0	0.0	0.0	7.2	7.2	10.9	0.0	10.8	13.3	0.0	0.0
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.0	0.4	0.4	0.3	0.0	0.6	3.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	0.0	0.0	1.2	1.2	0.7	0.0	0.6	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.7	0.0	0.0	0.0	7.6	7.6	11.2	0.0	11.3	16.6	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	B	A	B	B	A	A
Approach Vol, veh/h		486			851			475			51	
Approach Delay, s/veh		7.7			7.6			11.2			16.6	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		14.9		5.0		14.9		8.5				
Change Period (Y+Rc), s		* 4.2		3.7		* 4.2		3.7				
Max Green Setting (Gmax), s		* 21		11.3		* 21		26.3				
Max Q Clear Time (g_c+I1), s		8.2		2.8		7.6		4.5				
Green Ext Time (p_c), s		1.7		0.1		3.1		0.4				

Intersection Summary	
HCM 6th Ctrl Delay	8.8
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	26.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	443	100	12	557	8	110	6	11	20	16	107
Future Vol, veh/h	44	443	100	12	557	8	110	6	11	20	16	107
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	120	-	-	165	-	-	-	-	50
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	48	482	109	13	605	9	120	7	12	22	17	116

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	615	0	0	591	0	0	1335	1274	538	1280	1324	611
Stage 1	-	-	-	-	-	-	633	633	-	637	637	-
Stage 2	-	-	-	-	-	-	702	641	-	643	687	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	965	-	-	985	-	-	131	167	543	143	156	494
Stage 1	-	-	-	-	-	-	468	473	-	465	471	-
Stage 2	-	-	-	-	-	-	429	469	-	462	447	-
Platoon blocked, %			-			-						
Mov Cap-1 Maneuver	964	-	-	985	-	-	~ 87	156	543	129	146	494
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 87	156	-	129	146	-
Stage 1	-	-	-	-	-	-	445	449	-	441	464	-
Stage 2	-	-	-	-	-	-	312	462	-	423	425	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.2	272.2	21.4
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	87	290	964	-	-	985	-	-	136	494
HCM Lane V/C Ratio	1.374	0.064	0.05	-	-	0.013	-	-	0.288	0.235
HCM Control Delay (s)	$ 311.4	18.3	8.9	-	-	8.7	-	-	41.8	14.5
HCM Lane LOS	F	C	A	-	-	A	-	-	E	B
HCM 95th %tile Q(veh)	9	0.2	0.2	-	-	0	-	-	1.1	0.9

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

MOVEMENT SUMMARY

Site: 5 [AM Existing plus Quail 1 (Site Folder: Arata/Los Amigos Roundabout)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

Quail Acres TIS
Site Category: (None)
Roundabout

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. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: NB Los Amigos															
3	L2	All MCs	116	2.0	116	2.0	0.174	6.5	LOS A	0.7	18.4	0.58	0.47	0.58	28.1
8	T1	All MCs	6	2.0	6	2.0	0.174	6.5	LOS A	0.7	18.4	0.58	0.47	0.58	28.5
18	R2	All MCs	12	2.0	12	2.0	0.174	6.5	LOS A	0.7	18.4	0.58	0.47	0.58	28.3
Approach			134	2.0	134	2.0	0.174	6.5	LOS A	0.7	18.4	0.58	0.47	0.58	28.1
East: WB Arata															
1	L2	All MCs	13	2.0	13	2.0	0.536	9.2	LOS A	3.9	99.0	0.54	0.29	0.54	28.5
6	T1	All MCs	586	2.0	586	2.0	0.536	9.2	LOS A	3.9	99.0	0.54	0.29	0.54	29.0
16	R2	All MCs	8	2.0	8	2.0	0.536	9.2	LOS A	3.9	99.0	0.54	0.29	0.54	28.8
Approach			607	2.0	607	2.0	0.536	9.2	LOS A	3.9	99.0	0.54	0.29	0.54	29.0
North: SB Los Amigos															
7	L2	All MCs	21	2.0	21	2.0	0.238	8.6	LOS A	1.0	24.6	0.65	0.59	0.65	28.5
4	T1	All MCs	17	2.0	17	2.0	0.238	8.6	LOS A	1.0	24.6	0.65	0.59	0.65	28.9
14	R2	All MCs	113	2.0	113	2.0	0.238	8.6	LOS A	1.0	24.6	0.65	0.59	0.65	28.7
Approach			151	2.0	151	2.0	0.238	8.6	LOS A	1.0	24.6	0.65	0.59	0.65	28.7
West: EB Arata															
5	L2	All MCs	46	2.0	46	2.0	0.481	7.3	LOS A	3.6	91.9	0.28	0.09	0.28	29.1
2	T1	All MCs	466	2.0	466	2.0	0.481	7.3	LOS A	3.6	91.9	0.28	0.09	0.28	29.6
12	R2	All MCs	105	2.0	105	2.0	0.481	7.3	LOS A	3.6	91.9	0.28	0.09	0.28	29.4
Approach			618	2.0	618	2.0	0.481	7.3	LOS A	3.6	91.9	0.28	0.09	0.28	29.6
All Vehicles			1509	2.0	1509	2.0	0.536	8.1	LOS A	3.9	99.0	0.45	0.26	0.45	29.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Organisation: W-TRANS | Licence: PLUS / FLOATING | Processed: Thursday, November 2, 2023 11:31:44 AM
Project: N:\AAA\SOX\WIN\164WIN Quail Acres 2 VMT Analysis\SIDRA\Arata Los Amigos unsig los comps.sip9



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	44	443	100	12	557	8	110	6	11	20	16	107
Future Volume (veh/h)	44	443	100	12	557	8	110	6	11	20	16	107
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	48	482	109	13	605	9	120	7	12	22	17	116
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	122	648	147	41	727	11	427	178	304	206	126	319
Arrive On Green	0.07	0.44	0.44	0.02	0.40	0.40	0.08	0.29	0.29	0.13	0.13	0.13
Sat Flow, veh/h	1781	1469	332	1781	1837	27	1781	609	1044	688	943	1579
Grp Volume(v), veh/h	48	0	591	13	0	614	120	0	19	39	0	116
Grp Sat Flow(s),veh/h/ln	1781	0	1801	1781	0	1865	1781	0	1653	1631	0	1579
Q Serve(g_s), s	1.3	0.0	13.4	0.4	0.0	14.6	2.7	0.0	0.4	0.0	0.0	3.1
Cycle Q Clear(g_c), s	1.3	0.0	13.4	0.4	0.0	14.6	2.7	0.0	0.4	0.9	0.0	3.1
Prop In Lane	1.00		0.18	1.00		0.01	1.00		0.63	0.56		1.00
Lane Grp Cap(c), veh/h	122	0	795	41	0	738	427	0	482	332	0	319
V/C Ratio(X)	0.39	0.00	0.74	0.32	0.00	0.83	0.28	0.00	0.04	0.12	0.00	0.36
Avail Cap(c_a), veh/h	254	0	1722	254	0	1782	508	0	1143	887	0	879
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.9	0.0	11.4	23.6	0.0	13.4	14.9	0.0	12.5	18.9	0.0	16.9
Incr Delay (d2), s/veh	0.8	0.0	0.5	1.6	0.0	1.0	0.1	0.0	0.0	0.1	0.0	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(50%),veh/ln	0.5	0.0	4.3	0.2	0.0	5.1	1.0	0.0	0.1	0.4	0.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.7	0.0	11.9	25.2	0.0	14.3	15.0	0.0	12.5	18.9	0.0	17.2
LnGrp LOS	C	A	B	C	A	B	B	A	B	B	A	B
Approach Vol, veh/h		639			627			139			155	
Approach Delay, s/veh		12.8			14.6			14.7			17.6	
Approach LOS		B			B			B			B	

Timer - Assigned Phs		2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s		18.3	5.1	25.7	7.8	10.6	7.4	23.5				
Change Period (Y+Rc), s		4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s		34.0	7.0	47.0	6.0	24.0	7.0	47.0				
Max Q Clear Time (g_c+I1), s		2.4	2.4	15.4	4.7	5.1	3.3	16.6				
Green Ext Time (p_c), s		0.0	0.0	2.8	0.0	0.3	0.0	2.9				

Intersection Summary			
HCM 6th Ctrl Delay		14.1	
HCM 6th LOS		B	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	4	13	275	1	7	6	227	225	73	165	1
Future Volume (veh/h)	3	4	13	275	1	7	6	227	225	73	165	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	4	14	299	1	8	7	247	245	79	179	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	7	10	33	394	1	351	20	370	657	116	471	388
Arrive On Green	0.03	0.03	0.03	0.22	0.22	0.22	0.01	0.20	0.20	0.07	0.25	0.25
Sat Flow, veh/h	237	316	1106	1776	6	1585	1781	1870	1544	1781	1870	1539
Grp Volume(v), veh/h	21	0	0	300	0	8	7	247	245	79	179	1
Grp Sat Flow(s),veh/h/ln	1659	0	0	1782	0	1585	1781	1870	1544	1781	1870	1539
Q Serve(g_s), s	0.7	0.0	0.0	8.3	0.0	0.2	0.2	6.4	5.7	2.3	4.1	0.0
Cycle Q Clear(g_c), s	0.7	0.0	0.0	8.3	0.0	0.2	0.2	6.4	5.7	2.3	4.1	0.0
Prop In Lane	0.14		0.67	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	50	0	0	395	0	351	20	370	657	116	471	388
V/C Ratio(X)	0.42	0.00	0.00	0.76	0.00	0.02	0.35	0.67	0.37	0.68	0.38	0.00
Avail Cap(c_a), veh/h	326	0	0	847	0	754	333	879	1077	504	1057	870
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.9	0.0	0.0	19.1	0.0	15.9	25.7	19.4	10.5	23.9	16.2	14.7
Incr Delay (d2), s/veh	5.5	0.0	0.0	3.0	0.0	0.0	4.0	2.1	0.4	5.1	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	3.3	0.0	0.1	0.1	2.6	2.5	1.0	1.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.4	0.0	0.0	22.1	0.0	16.0	29.7	21.5	10.8	29.0	16.7	14.7
LnGrp LOS	C	A	A	C	A	B	C	C	B	C	B	B
Approach Vol, veh/h		21			308			499			259	
Approach Delay, s/veh		30.4			21.9			16.4			20.5	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.6	17.8		8.3	4.8	20.6		18.7				
Change Period (Y+Rc), s	* 4.2	7.4		* 6.7	* 4.2	7.4		7.1				
Max Green Setting (Gmax), s	* 15	24.6		* 10	* 9.8	29.6		24.9				
Max Q Clear Time (g_c+I1), s	4.3	8.4		2.7	2.2	6.1		10.3				
Green Ext Time (p_c), s	0.1	2.0		0.0	0.0	0.8		1.5				

Intersection Summary			
HCM 6th Ctrl Delay			19.2
HCM 6th LOS			B

Notes

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

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	145	133	295	316	332	134
Future Volume (veh/h)	145	133	295	316	332	134
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	153	140	311	333	349	141
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	290	258	393	1134	559	462
Arrive On Green	0.16	0.16	0.22	0.61	0.30	0.30
Sat Flow, veh/h	1781	1585	1781	1870	1870	1545
Grp Volume(v), veh/h	153	140	311	333	349	141
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1545
Q Serve(g_s), s	2.7	2.8	5.7	3.0	5.6	2.4
Cycle Q Clear(g_c), s	2.7	2.8	5.7	3.0	5.6	2.4
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	290	258	393	1134	559	462
V/C Ratio(X)	0.53	0.54	0.79	0.29	0.62	0.31
Avail Cap(c_a), veh/h	2057	1830	874	3239	2160	1784
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.3	13.3	12.7	3.3	10.5	9.4
Incr Delay (d2), s/veh	1.5	1.8	1.4	0.1	1.1	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.1	1.9	0.4	1.8	0.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.8	15.1	14.1	3.4	11.6	9.7
LnGrp LOS	B	B	B	A	B	A
Approach Vol, veh/h	293			644	490	
Approach Delay, s/veh	14.9			8.6	11.1	
Approach LOS	B			A	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		25.5		9.1	10.6	14.9
Change Period (Y+Rc), s		4.5		3.5	3.0	4.5
Max Green Setting (Gmax), s		60.0		40.0	17.0	40.0
Max Q Clear Time (g_c+I1), s		5.0		4.8	7.7	7.6
Green Ext Time (p_c), s		2.2		0.9	0.3	2.8

Intersection Summary			
HCM 6th Ctrl Delay			10.7
HCM 6th LOS			B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	0	137	1	465	3	143	131	290	175	2
Future Volume (veh/h)	1	0	0	137	1	465	3	143	131	290	175	2
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1	0	0	149	1	505	3	155	142	315	190	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	4	0	0	533	4	823	4	287	240	389	682	7
Arrive On Green	0.00	0.00	0.00	0.30	0.30	0.30	0.00	0.15	0.15	0.22	0.37	0.37
Sat Flow, veh/h	1781	0	0	1770	12	1585	1781	1870	1564	1781	1847	19
Grp Volume(v), veh/h	1	0	0	150	0	505	3	155	142	315	0	192
Grp Sat Flow(s),veh/h/ln	1781	0	0	1782	0	1585	1781	1870	1564	1781	0	1867
Q Serve(g_s), s	0.0	0.0	0.0	2.9	0.0	10.0	0.1	3.4	3.8	7.5	0.0	3.2
Cycle Q Clear(g_c), s	0.0	0.0	0.0	2.9	0.0	10.0	0.1	3.4	3.8	7.5	0.0	3.2
Prop In Lane	1.00		0.00	0.99		1.00	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	4	0	0	536	0	823	4	287	240	389	0	690
V/C Ratio(X)	0.25	0.00	0.00	0.28	0.00	0.61	0.69	0.54	0.59	0.81	0.00	0.28
Avail Cap(c_a), veh/h	520	0	0	1040	0	1271	280	1238	1036	1479	0	2493
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.2	0.0	0.0	11.9	0.0	7.5	22.2	17.4	17.6	16.5	0.0	9.9
Incr Delay (d2), s/veh	11.6	0.0	0.0	0.1	0.0	0.3	52.6	0.6	0.9	1.5	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	1.0	0.0	2.3	0.1	1.3	1.2	2.8	0.0	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.9	0.0	0.0	12.0	0.0	7.8	74.8	18.0	18.4	18.1	0.0	10.0
LnGrp LOS	C	A	A	B	A	A	E	B	B	B	A	A
Approach Vol, veh/h		1			655			300			507	
Approach Delay, s/veh		33.9			8.8			18.8			15.0	
Approach LOS		C			A			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	12.7	11.3		3.1	3.1	21.0		17.4
Change Period (Y+Rc), s	3.0	4.5		3.0	3.0	4.5		4.0
Max Green Setting (Gmax), s	37.0	29.5		13.0	7.0	59.5		26.0
Max Q Clear Time (g_c+I1), s	9.5	5.8		2.0	2.1	5.2		12.0
Green Ext Time (p_c), s	0.5	0.8		0.0	0.0	0.7		1.4

Intersection Summary	
HCM 6th Ctrl Delay	13.0
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	415	0	0	322	51	260	16	231	31	0	21
Future Volume (veh/h)	9	415	0	0	322	51	260	16	231	31	0	21
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	10	451	0	0	350	55	295	0	251	34	0	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, %	2	2	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	140	678	0	0	1130	176	549	0	244	52	0	35
Arrive On Green	0.37	0.37	0.00	0.00	0.37	0.37	0.15	0.00	0.15	0.05	0.00	0.05
Sat Flow, veh/h	14	1843	0	0	3165	478	3563	0	1585	1012	0	685
Grp Volume(v), veh/h	461	0	0	0	201	204	295	0	251	57	0	0
Grp Sat Flow(s),veh/h/ln	1858	0	0	0	1777	1772	1781	0	1585	1697	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	2.2	2.2	2.1	0.0	4.2	0.9	0.0	0.0
Cycle Q Clear(g_c), s	5.6	0.0	0.0	0.0	2.2	2.2	2.1	0.0	4.2	0.9	0.0	0.0
Prop In Lane	0.02		0.00	0.00		0.27	1.00		1.00	0.60		0.40
Lane Grp Cap(c), veh/h	818	0	0	0	653	652	549	0	244	87	0	0
V/C Ratio(X)	0.56	0.00	0.00	0.00	0.31	0.31	0.54	0.00	1.03	0.65	0.00	0.00
Avail Cap(c_a), veh/h	1547	0	0	0	1359	1356	3446	0	1533	705	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.2	0.0	0.0	0.0	6.1	6.1	10.6	0.0	11.5	12.7	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.0	0.1	0.1	0.3	0.0	23.8	3.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.0	0.0	0.4	0.4	0.6	0.0	2.6	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.4	0.0	0.0	0.0	6.2	6.2	10.9	0.0	35.3	15.7	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	B	A	F	B	A	A
Approach Vol, veh/h		461			405			546			57	
Approach Delay, s/veh		7.4			6.2			22.1			15.7	
Approach LOS		A			A			C			B	

Timer - Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		14.2		5.1		14.2		7.9
Change Period (Y+Rc), s		* 4.2		3.7		* 4.2		3.7
Max Green Setting (Gmax), s		* 21		11.3		* 21		26.3
Max Q Clear Time (g_c+I1), s		7.6		2.9		4.2		4.1
Green Ext Time (p_c), s		1.6		0.1		1.4		0.2

Intersection Summary	
HCM 6th Ctrl Delay	12.9
HCM 6th LOS	B

Notes
User approved volume balancing among the lanes for turning movement.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	141	394	114	11	246	22	70	18	6	13	11	72
Future Vol, veh/h	141	394	114	11	246	22	70	18	6	13	11	72
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	120	-	-	165	-	-	-	-	50
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	153	428	124	12	267	24	76	20	7	14	12	78

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	291	0	0	552	0	0	1145	1111	490	1113	1161	280
Stage 1	-	-	-	-	-	-	796	796	-	303	303	-
Stage 2	-	-	-	-	-	-	349	315	-	810	858	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1271	-	-	1018	-	-	177	209	578	186	195	759
Stage 1	-	-	-	-	-	-	380	399	-	706	664	-
Stage 2	-	-	-	-	-	-	667	656	-	374	374	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1271	-	-	1018	-	-	135	182	578	152	169	758
Mov Cap-2 Maneuver	-	-	-	-	-	-	135	182	-	152	169	-
Stage 1	-	-	-	-	-	-	334	351	-	621	656	-
Stage 2	-	-	-	-	-	-	580	648	-	307	329	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.8	0.3	51.9	15.7
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	135	220	1271	-	-	1018	-	-	159	758
HCM Lane V/C Ratio	0.564	0.119	0.121	-	-	0.012	-	-	0.164	0.103
HCM Control Delay (s)	61.6	23.6	8.2	-	-	8.6	-	-	32	10.3
HCM Lane LOS	F	C	A	-	-	A	-	-	D	B
HCM 95th %tile Q(veh)	2.8	0.4	0.4	-	-	0	-	-	0.6	0.3

MOVEMENT SUMMARY

Site: 5 [PM Existing plus Quail 1 (Site Folder: Arata/Los Amigos Roundabout)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

Quail Acres TIS
Site Category: (None)
Roundabout

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. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: NB Los Amigos															
3	L2	All MCs	74	2.0	74	2.0	0.135	6.3	LOS A	0.5	13.7	0.58	0.49	0.58	28.3
8	T1	All MCs	19	2.0	19	2.0	0.135	6.3	LOS A	0.5	13.7	0.58	0.49	0.58	28.8
18	R2	All MCs	6	2.0	6	2.0	0.135	6.3	LOS A	0.5	13.7	0.58	0.49	0.58	28.6
Approach			99	2.0	99	2.0	0.135	6.3	LOS A	0.5	13.7	0.58	0.49	0.58	28.4
East: WB Arata															
1	L2	All MCs	12	2.0	12	2.0	0.280	6.1	LOS A	1.4	35.9	0.46	0.28	0.46	29.7
6	T1	All MCs	259	2.0	259	2.0	0.280	6.1	LOS A	1.4	35.9	0.46	0.28	0.46	30.2
16	R2	All MCs	23	2.0	23	2.0	0.280	6.1	LOS A	1.4	35.9	0.46	0.28	0.46	30.0
Approach			294	2.0	294	2.0	0.280	6.1	LOS A	1.4	35.9	0.46	0.28	0.46	30.1
North: SB Los Amigos															
7	L2	All MCs	14	2.0	14	2.0	0.107	4.8	LOS A	0.5	11.4	0.46	0.33	0.46	29.9
4	T1	All MCs	12	2.0	12	2.0	0.107	4.8	LOS A	0.5	11.4	0.46	0.33	0.46	30.4
14	R2	All MCs	76	2.0	76	2.0	0.107	4.8	LOS A	0.5	11.4	0.46	0.33	0.46	30.2
Approach			101	2.0	101	2.0	0.107	4.8	LOS A	0.5	11.4	0.46	0.33	0.46	30.2
West: EB Arata															
5	L2	All MCs	148	2.0	148	2.0	0.524	7.6	LOS A	4.3	110.1	0.25	0.08	0.25	28.8
2	T1	All MCs	415	2.0	415	2.0	0.524	7.6	LOS A	4.3	110.1	0.25	0.08	0.25	29.2
12	R2	All MCs	120	2.0	120	2.0	0.524	7.6	LOS A	4.3	110.1	0.25	0.08	0.25	29.0
Approach			683	2.0	683	2.0	0.524	7.6	LOS A	4.3	110.1	0.25	0.08	0.25	29.1
All Vehicles			1177	2.0	1177	2.0	0.524	6.9	LOS A	4.3	110.1	0.35	0.18	0.35	29.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Organisation: W-TRANS | Licence: PLUS / FLOATING | Processed: Thursday, November 2, 2023 11:33:38 AM
Project: N:\AAA\SOX\WIN\164WIN Quail Acres 2 VMT Analysis\SIDRA\Arata Los Amigos unsig los comps.sip9



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	141	394	114	11	246	22	70	18	6	13	11	72
Future Volume (veh/h)	141	394	114	11	246	22	70	18	6	13	11	72
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	153	428	124	12	267	24	76	20	7	14	12	78
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	253	537	156	39	452	41	443	386	135	222	143	443
Arrive On Green	0.14	0.39	0.39	0.02	0.27	0.27	0.06	0.29	0.29	0.14	0.14	0.14
Sat Flow, veh/h	1781	1385	401	1781	1687	152	1781	1315	460	615	1035	1580
Grp Volume(v), veh/h	153	0	552	12	0	291	76	0	27	26	0	78
Grp Sat Flow(s),veh/h/ln	1781	0	1787	1781	0	1839	1781	0	1775	1651	0	1580
Q Serve(g_s), s	3.3	0.0	11.1	0.3	0.0	5.6	1.4	0.0	0.4	0.0	0.0	1.5
Cycle Q Clear(g_c), s	3.3	0.0	11.1	0.3	0.0	5.6	1.4	0.0	0.4	0.5	0.0	1.5
Prop In Lane	1.00		0.22	1.00		0.08	1.00		0.26	0.54		1.00
Lane Grp Cap(c), veh/h	253	0	693	39	0	492	443	0	521	365	0	443
V/C Ratio(X)	0.60	0.00	0.80	0.31	0.00	0.59	0.17	0.00	0.05	0.07	0.00	0.18
Avail Cap(c_a), veh/h	793	0	2120	308	0	1682	518	0	1448	1118	0	1202
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.3	0.0	11.0	19.5	0.0	12.9	12.1	0.0	10.2	15.2	0.0	11.0
Incr Delay (d2), s/veh	0.9	0.0	0.8	1.6	0.0	0.4	0.2	0.0	0.0	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	3.3	0.1	0.0	1.9	0.5	0.0	0.1	0.2	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.2	0.0	11.8	21.1	0.0	13.3	12.3	0.0	10.3	15.3	0.0	11.1
LnGrp LOS	B	A	B	C	A	B	B	A	B	B	A	B
Approach Vol, veh/h		705			303			103			104	
Approach Delay, s/veh		12.9			13.6			11.8			12.1	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.9	4.9	19.7	6.3	9.6	9.7	14.8
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	33.0	7.0	48.0	4.0	25.0	18.0	37.0
Max Q Clear Time (g_c+I1), s	2.4	2.3	13.1	3.4	3.5	5.3	7.6
Green Ext Time (p_c), s	0.1	0.0	2.6	0.0	0.2	0.2	1.1

Intersection Summary	
HCM 6th Ctrl Delay	12.9
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	1	6	286	4	8	21	351	493	56	119	1
Future Volume (veh/h)	3	1	6	286	4	8	21	351	493	56	119	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	1	7	311	4	9	23	382	536	61	129	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	8	3	18	388	5	350	56	583	844	92	621	526
Arrive On Green	0.02	0.02	0.02	0.22	0.22	0.22	0.03	0.31	0.31	0.05	0.33	0.33
Sat Flow, veh/h	452	151	1055	1760	23	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	11	0	0	315	0	9	23	382	536	61	129	1
Grp Sat Flow(s),veh/h/ln	1658	0	0	1782	0	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.4	0.0	0.0	10.6	0.0	0.3	0.8	11.2	15.2	2.1	3.1	0.0
Cycle Q Clear(g_c), s	0.4	0.0	0.0	10.6	0.0	0.3	0.8	11.2	15.2	2.1	3.1	0.0
Prop In Lane	0.27		0.64	0.99		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	28	0	0	393	0	350	56	583	844	92	621	526
V/C Ratio(X)	0.40	0.00	0.00	0.80	0.00	0.03	0.41	0.66	0.64	0.66	0.21	0.00
Avail Cap(c_a), veh/h	268	0	0	697	0	620	274	723	963	414	870	737
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.0	0.0	0.0	23.5	0.0	19.4	30.2	18.9	10.5	29.6	15.3	14.2
Incr Delay (d2), s/veh	9.0	0.0	0.0	3.8	0.0	0.0	1.8	1.5	1.1	5.9	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	4.5	0.0	0.1	0.3	4.5	7.4	1.0	1.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.0	0.0	0.0	27.3	0.0	19.5	32.0	20.5	11.6	35.5	15.4	14.2
LnGrp LOS	D	A	A	C	A	B	C	C	B	D	B	B
Approach Vol, veh/h		11			324			941			191	
Approach Delay, s/veh		40.0			27.1			15.7			21.8	
Approach LOS		D			C			B			C	

Timer - Assigned Phs	1	2	4	5	6	8
Phs Duration (G+Y+Rc), s	7.5	27.2	7.8	6.2	28.5	21.1
Change Period (Y+Rc), s	* 4.2	7.4	* 6.7	* 4.2	7.4	7.1
Max Green Setting (Gmax), s	* 15	24.6	* 10	* 9.8	29.6	24.9
Max Q Clear Time (g_c+I1), s	4.1	17.2	2.4	2.8	5.1	12.6
Green Ext Time (p_c), s	0.1	2.6	0.0	0.0	0.6	1.4

Intersection Summary	
HCM 6th Ctrl Delay	19.2
HCM 6th LOS	B

Notes

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

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	383	442	585	385	311	166
Future Volume (veh/h)	383	442	585	385	311	166
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	403	465	616	405	327	175
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	540	480	653	1139	391	332
Arrive On Green	0.30	0.30	0.37	0.61	0.21	0.21
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	403	465	616	405	327	175
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	18.5	26.3	30.4	9.8	15.2	8.9
Cycle Q Clear(g_c), s	18.5	26.3	30.4	9.8	15.2	8.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	540	480	653	1139	391	332
V/C Ratio(X)	0.75	0.97	0.94	0.36	0.84	0.53
Avail Cap(c_a), veh/h	540	480	844	1494	546	463
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.5	31.2	27.8	8.9	34.4	31.9
Incr Delay (d2), s/veh	5.6	32.8	14.7	0.2	7.8	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.5	4.4	15.0	3.7	7.6	3.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	34.1	64.0	42.5	9.1	42.2	33.2
LnGrp LOS	C	E	D	A	D	C
Approach Vol, veh/h	868			1021	502	
Approach Delay, s/veh	50.1			29.2	39.1	
Approach LOS	D			C	D	

Timer - Assigned Phs	2	4	5	6
Phs Duration (G+Y+Rc), s	59.7	31.0	36.3	23.5
Change Period (Y+Rc), s	4.5	3.5	3.0	4.5
Max Green Setting (Gmax), s	72.5	27.5	43.0	26.5
Max Q Clear Time (g_c+I1), s	11.8	28.3	32.4	17.2
Green Ext Time (p_c), s	2.8	0.0	0.9	1.8

Intersection Summary	
HCM 6th Ctrl Delay	38.9
HCM 6th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	1	7	316	4	748	4	204	309	534	206	3
Future Volume (veh/h)	11	1	7	316	4	748	4	204	309	534	206	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	12	1	7	333	4	787	4	215	325	562	217	3
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	2	2	2	2	2	2
Cap, veh/h	26	2	15	537	6	1001	6	359	296	596	963	13
Arrive On Green	0.03	0.03	0.03	0.31	0.31	0.31	0.00	0.19	0.19	0.33	0.52	0.52
Sat Flow, veh/h	1027	86	599	1761	21	1542	1781	1870	1543	1781	1840	25
Grp Volume(v), veh/h	20	0	0	337	0	787	4	215	325	562	0	220
Grp Sat Flow(s),veh/h/ln	1711	0	0	1782	0	1542	1781	1870	1543	1781	0	1865
Q Serve(g_s), s	1.2	0.0	0.0	16.5	0.0	31.0	0.2	10.7	19.5	31.2	0.0	6.5
Cycle Q Clear(g_c), s	1.2	0.0	0.0	16.5	0.0	31.0	0.2	10.7	19.5	31.2	0.0	6.5
Prop In Lane	0.60		0.35	0.99		1.00	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	44	0	0	544	0	1001	6	359	296	596	0	976
V/C Ratio(X)	0.46	0.00	0.00	0.62	0.00	0.79	0.71	0.60	1.10	0.94	0.00	0.23
Avail Cap(c_a), veh/h	101	0	0	544	0	1001	53	359	296	859	0	1203
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	48.8	0.0	0.0	30.2	0.0	13.4	50.6	37.5	41.0	32.8	0.0	13.1
Incr Delay (d2), s/veh	2.8	0.0	0.0	1.6	0.0	3.9	46.8	1.9	80.8	12.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	7.2	0.0	12.8	0.2	5.0	13.9	15.1	0.0	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.6	0.0	0.0	31.8	0.0	17.3	97.4	39.4	121.9	45.1	0.0	13.1
LnGrp LOS	D	A	A	C	A	B	F	D	F	D	A	B
Approach Vol, veh/h		20			1124			544			782	
Approach Delay, s/veh		51.6			21.7			89.1			36.1	
Approach LOS		D			C			F			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	37.0	24.0		5.6	3.3	57.7		35.0				
Change Period (Y+Rc), s	3.0	4.5		3.0	3.0	4.5		4.0				
Max Green Setting (Gmax), s	49.0	19.5		6.0	3.0	65.5		31.0				
Max Q Clear Time (g_c+I1), s	33.2	21.5		3.2	2.2	8.5		33.0				
Green Ext Time (p_c), s	0.8	0.0		0.0	0.0	0.9		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	41.3
HCM 6th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	1	7	316	4	748	4	204	309	534	206	3
Future Volume (veh/h)	11	1	7	316	4	748	4	204	309	534	206	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	12	1	7	333	4	787	4	215	325	562	217	3
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	2	2	2	2	2	2
Cap, veh/h	27	2	15	570	7	1031	6	306	767	598	913	13
Arrive On Green	0.03	0.03	0.03	0.32	0.32	0.32	0.00	0.16	0.16	0.34	0.50	0.50
Sat Flow, veh/h	1027	86	599	1761	21	1542	1781	1870	1559	1781	1840	25
Grp Volume(v), veh/h	20	0	0	337	0	787	4	215	325	562	0	220
Grp Sat Flow(s),veh/h/ln	1711	0	0	1782	0	1542	1781	1870	1559	1781	0	1865
Q Serve(g_s), s	1.1	0.0	0.0	15.1	0.0	31.0	0.2	10.4	13.0	29.3	0.0	6.5
Cycle Q Clear(g_c), s	1.1	0.0	0.0	15.1	0.0	31.0	0.2	10.4	13.0	29.3	0.0	6.5
Prop In Lane	0.60		0.35	0.99		1.00	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	44	0	0	577	0	1031	6	306	767	598	0	925
V/C Ratio(X)	0.45	0.00	0.00	0.58	0.00	0.76	0.71	0.70	0.42	0.94	0.00	0.24
Avail Cap(c_a), veh/h	107	0	0	577	0	1031	56	381	830	911	0	1275
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	46.0	0.0	0.0	27.0	0.0	11.3	47.7	37.9	15.9	30.9	0.0	13.8
Incr Delay (d2), s/veh	2.7	0.0	0.0	1.0	0.0	3.1	46.4	2.7	0.1	10.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	6.5	0.0	10.8	0.2	4.9	7.7	13.8	0.0	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.7	0.0	0.0	28.1	0.0	14.4	94.1	40.6	16.1	40.9	0.0	13.8
LnGrp LOS	D	A	A	C	A	B	F	D	B	D	A	B
Approach Vol, veh/h		20			1124			544			782	
Approach Delay, s/veh		48.7			18.5			26.4			33.3	
Approach LOS		D			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	35.2	20.2		5.5	3.3	52.1		35.0				
Change Period (Y+Rc), s	3.0	4.5		3.0	3.0	4.5		4.0				
Max Green Setting (Gmax), s	49.0	19.5		6.0	3.0	65.5		31.0				
Max Q Clear Time (g_c+I1), s	31.3	15.0		3.1	2.2	8.5		33.0				
Green Ext Time (p_c), s	0.9	0.7		0.0	0.0	0.9		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	25.2
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	353	492	0	0	623	268	449	0	160	0	0	0
Future Volume (veh/h)	353	492	0	0	623	268	449	0	160	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00			
Parking Bus, Adj	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				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	372	518	0	0	656	282	473	0	168			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	330	381	0	0	1804	776	563	0	250			
Arrive On Green	0.75	0.75	0.00	0.00	0.75	0.75	0.16	0.00	0.16			
Sat Flow, veh/h	362	507	0	0	2493	1032	3563	0	1585			
Grp Volume(v), veh/h	890	0	0	0	486	452	473	0	168			
Grp Sat Flow(s),veh/h/ln	869	0	0	0	1777	1655	1781	0	1585			
Q Serve(g_s), s	57.6	0.0	0.0	0.0	8.2	8.2	11.3	0.0	8.7			
Cycle Q Clear(g_c), s	65.8	0.0	0.0	0.0	8.2	8.2	11.3	0.0	8.7			
Prop In Lane	0.42		0.00	0.00		0.62	1.00		1.00			
Lane Grp Cap(c), veh/h	712	0	0	0	1336	1244	563	0	250			
V/C Ratio(X)	1.25	0.00	0.00	0.00	0.36	0.36	0.84	0.00	0.67			
Avail Cap(c_a), veh/h	712	0	0	0	1336	1244	1071	0	476			
HCM Platoon Ratio	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	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	17.2	0.0	0.0	0.0	3.7	3.7	35.8	0.0	34.7			
Incr Delay (d2), s/veh	124.0	0.0	0.0	0.0	0.1	0.1	1.3	0.0	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			
%ile BackOfQ(50%),veh/ln	38.1	0.0	0.0	0.0	2.1	2.0	4.9	0.0	3.4			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	141.2	0.0	0.0	0.0	3.8	3.8	37.1	0.0	35.9			
LnGrp LOS	F	A	A	A	A	A	D	A	D			
Approach Vol, veh/h		890			938			641				
Approach Delay, s/veh		141.2			3.8			36.8				
Approach LOS		F			A			D				
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		70.0				70.0		17.5				
Change Period (Y+Rc), s		* 4.2				* 4.2		3.7				
Max Green Setting (Gmax), s		* 66				* 66		26.3				
Max Q Clear Time (g_c+I1), s		67.8				10.2		13.3				
Green Ext Time (p_c), s		0.0				4.7		0.5				

Intersection Summary	
HCM 6th Ctrl Delay	61.9
HCM 6th LOS	E

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th 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)	353	492	0	0	623	268	449	0	160	0	0	0
Future Volume (veh/h)	353	492	0	0	623	268	449	0	160	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	372	518	0	0	656	282	320	213	168			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	429	1180	0	0	794	341	461	251	198			
Arrive On Green	0.24	0.63	0.00	0.00	0.33	0.33	0.26	0.26	0.26			
Sat Flow, veh/h	1781	1870	0	0	2489	1030	1781	969	764			
Grp Volume(v), veh/h	372	518	0	0	487	451	320	0	381			
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1777	1648	1781	0	1733			
Q Serve(g_s), s	14.4	10.1	0.0	0.0	18.1	18.1	11.6	0.0	15.0			
Cycle Q Clear(g_c), s	14.4	10.1	0.0	0.0	18.1	18.1	11.6	0.0	15.0			
Prop In Lane	1.00		0.00	0.00		0.62	1.00		0.44			
Lane Grp Cap(c), veh/h	429	1180	0	0	589	547	461	0	448			
V/C Ratio(X)	0.87	0.44	0.00	0.00	0.83	0.83	0.69	0.00	0.85			
Avail Cap(c_a), veh/h	690	1716	0	0	837	777	653	0	635			
HCM Platoon Ratio	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	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	26.1	6.8	0.0	0.0	22.1	22.1	24.0	0.0	25.3			
Incr Delay (d2), s/veh	6.8	0.1	0.0	0.0	3.2	3.4	0.7	0.0	5.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	6.6	3.2	0.0	0.0	7.5	7.0	4.7	0.0	6.5			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.9	6.8	0.0	0.0	25.2	25.5	24.7	0.0	30.8			
LnGrp LOS	C	A	A	A	C	C	C	A	C			
Approach Vol, veh/h		890			938			701				
Approach Delay, s/veh		17.7			25.4			28.0				
Approach LOS		B			C			C				
Timer - Assigned Phs		2				5	6	8				
Phs Duration (G+Y+Rc), s		49.5				21.5	28.0	22.3				
Change Period (Y+Rc), s		* 4.2				* 4.2	* 4.2	3.7				
Max Green Setting (Gmax), s		* 66				* 28	* 34	26.3				
Max Q Clear Time (g_c+I1), s		12.1				16.4	20.1	17.0				
Green Ext Time (p_c), s		2.3				0.9	3.7	1.6				

Intersection Summary	
HCM 6th Ctrl Delay	23.4
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

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

Intersection	
Int Delay, s/veh	97.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	54	485	124	13	692	9	120	20	12	13	34	166
Future Vol, veh/h	54	485	124	13	692	9	120	20	12	13	34	166
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	120	-	-	165	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	57	511	131	14	728	9	126	21	13	14	36	175

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	738	0	0	642	0	0	1557	1457	578	1471	1518	734
Stage 1	-	-	-	-	-	-	691	691	-	762	762	-
Stage 2	-	-	-	-	-	-	866	766	-	709	756	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	868	-	-	943	-	-	~ 92	130	516	105	119	420
Stage 1	-	-	-	-	-	-	435	446	-	397	414	-
Stage 2	-	-	-	-	-	-	348	412	-	425	416	-
Platoon blocked, %			-			-						
Mov Cap-1 Maneuver	867	-	-	943	-	-	~ 38	119	516	83	109	420
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 38	119	-	83	109	-
Stage 1	-	-	-	-	-	-	406	417	-	370	407	-
Stage 2	-	-	-	-	-	-	183	405	-	367	389	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	0.2	$ 1007	78.7
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	38	167	867	-	-	943	-	-	247
HCM Lane V/C Ratio	3.324	0.202	0.066	-	-	0.015	-	-	0.908
HCM Control Delay (s)	$ 1267	31.9	9.4	-	-	8.9	-	-	78.7
HCM Lane LOS	F	D	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	14.3	0.7	0.2	-	-	0	-	-	7.9

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

MOVEMENT SUMMARY

Site: 5 [AM Future No Project (Site Folder: Arata/Los Amigos Roundabout)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

Quail Acres TIS
Site Category: (None)
Roundabout

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. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: NB Los Amigos															
3	L2	All MCs	122	2.0	122	2.0	0.208	7.1	LOS A	0.9	22.3	0.60	0.50	0.60	28.0
8	T1	All MCs	20	2.0	20	2.0	0.208	7.1	LOS A	0.9	22.3	0.60	0.50	0.60	28.4
18	R2	All MCs	12	2.0	12	2.0	0.208	7.1	LOS A	0.9	22.3	0.60	0.50	0.60	28.2
Approach			155	2.0	155	2.0	0.208	7.1	LOS A	0.9	22.3	0.60	0.50	0.60	28.1
East: WB Arata															
1	L2	All MCs	13	2.0	13	2.0	0.663	12.4	LOS B	8.1	206.9	0.70	0.50	0.86	27.4
6	T1	All MCs	706	2.0	706	2.0	0.663	12.4	LOS B	8.1	206.9	0.70	0.50	0.86	27.9
16	R2	All MCs	9	2.0	9	2.0	0.663	12.4	LOS B	8.1	206.9	0.70	0.50	0.86	27.7
Approach			729	2.0	729	2.0	0.663	12.4	LOS B	8.1	206.9	0.70	0.50	0.86	27.9
North: SB Los Amigos															
7	L2	All MCs	13	2.0	13	2.0	0.393	12.5	LOS B	1.9	47.3	0.73	0.76	0.91	27.2
4	T1	All MCs	35	2.0	35	2.0	0.393	12.5	LOS B	1.9	47.3	0.73	0.76	0.91	27.6
14	R2	All MCs	169	2.0	169	2.0	0.393	12.5	LOS B	1.9	47.3	0.73	0.76	0.91	27.5
Approach			217	2.0	217	2.0	0.393	12.5	LOS B	1.9	47.3	0.73	0.76	0.91	27.5
West: EB Arata															
5	L2	All MCs	55	2.0	55	2.0	0.533	8.2	LOS A	4.3	110.4	0.33	0.12	0.33	28.8
2	T1	All MCs	495	2.0	495	2.0	0.533	8.2	LOS A	4.3	110.4	0.33	0.12	0.33	29.3
12	R2	All MCs	127	2.0	127	2.0	0.533	8.2	LOS A	4.3	110.4	0.33	0.12	0.33	29.1
Approach			677	2.0	677	2.0	0.533	8.2	LOS A	4.3	110.4	0.33	0.12	0.33	29.2
All Vehicles			1778	2.0	1778	2.0	0.663	10.4	LOS B	8.1	206.9	0.56	0.39	0.64	28.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Organisation: W-TRANS | Licence: PLUS / FLOATING | Processed: Wednesday, November 1, 2023 10:19:28 AM
Project: N:\AAA\SOX\WIN\164WIN Quail Acres 2 VMT Analysis\SIDRA\Arata Los Amigos unsig los comps.sip9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	485	124	13	692	9	120	20	12	13	34	166
Future Volume (veh/h)	54	485	124	13	692	9	120	20	12	13	34	166
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	57	511	131	14	728	9	126	21	13	14	36	175
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	2	2	2	2	2	2
Cap, veh/h	123	700	180	43	820	10	426	323	200	108	209	329
Arrive On Green	0.07	0.49	0.49	0.02	0.45	0.45	0.10	0.30	0.30	0.14	0.14	0.14
Sat Flow, veh/h	1781	1428	366	1781	1843	23	1781	1070	663	266	1507	1579
Grp Volume(v), veh/h	57	0	642	14	0	737	126	0	34	50	0	175
Grp Sat Flow(s),veh/h/ln	1781	0	1795	1781	0	1866	1781	0	1733	1773	0	1579
Q Serve(g_s), s	2.0	0.0	18.5	0.5	0.0	23.6	3.6	0.0	0.9	0.0	0.0	6.4
Cycle Q Clear(g_c), s	2.0	0.0	18.5	0.5	0.0	23.6	3.6	0.0	0.9	1.5	0.0	6.4
Prop In Lane	1.00		0.20	1.00		0.01	1.00		0.38	0.28		1.00
Lane Grp Cap(c), veh/h	123	0	880	43	0	830	426	0	523	317	0	329
V/C Ratio(X)	0.46	0.00	0.73	0.33	0.00	0.89	0.30	0.00	0.07	0.16	0.00	0.53
Avail Cap(c_a), veh/h	191	0	1238	191	0	1287	436	0	957	732	0	715
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.2	0.0	13.2	31.3	0.0	16.6	18.8	0.0	16.2	24.8	0.0	23.0
Incr Delay (d2), s/veh	1.0	0.0	0.6	1.6	0.0	3.4	0.1	0.0	0.0	0.1	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	6.5	0.2	0.0	9.5	1.4	0.0	0.3	0.7	0.0	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.2	0.0	13.8	32.9	0.0	20.0	18.9	0.0	16.2	24.9	0.0	23.5
LnGrp LOS	C	A	B	C	A	C	B	A	B	C	A	C
Approach Vol, veh/h		699			751			160			225	
Approach Delay, s/veh		15.2			20.3			18.3			23.8	
Approach LOS		B			C			B			C	

Timer - Assigned Phs	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.7	5.6	36.0	10.6	13.1	8.5	33.0
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	36.0	7.0	45.0	7.0	25.0	7.0	45.0
Max Q Clear Time (g_c+I1), s	2.9	2.5	20.5	5.6	8.4	4.0	25.6
Green Ext Time (p_c), s	0.1	0.0	3.1	0.0	0.4	0.0	3.4

Intersection Summary	
HCM 6th Ctrl Delay	18.6
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	7	17	454	2	27	9	279	303	124	269	2
Future Volume (veh/h)	5	7	17	454	2	27	9	279	303	124	269	2
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	7	18	478	2	28	9	294	319	131	283	2
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	2	2	2	2	2	2
Cap, veh/h	11	15	38	538	2	481	24	388	801	168	538	444
Arrive On Green	0.04	0.04	0.04	0.30	0.30	0.30	0.01	0.21	0.21	0.09	0.29	0.29
Sat Flow, veh/h	279	391	1005	1774	7	1585	1781	1870	1545	1781	1870	1541
Grp Volume(v), veh/h	30	0	0	480	0	28	9	294	319	131	283	2
Grp Sat Flow(s),veh/h/ln	1675	0	0	1782	0	1585	1781	1870	1545	1781	1870	1541
Q Serve(g_s), s	1.2	0.0	0.0	18.3	0.0	0.9	0.4	10.5	9.0	5.1	9.0	0.1
Cycle Q Clear(g_c), s	1.2	0.0	0.0	18.3	0.0	0.9	0.4	10.5	9.0	5.1	9.0	0.1
Prop In Lane	0.17		0.60	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	63	0	0	540	0	481	24	388	801	168	538	444
V/C Ratio(X)	0.47	0.00	0.00	0.89	0.00	0.06	0.37	0.76	0.40	0.78	0.53	0.00
Avail Cap(c_a), veh/h	243	0	0	624	0	555	246	647	1015	371	779	642
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.5	0.0	0.0	23.6	0.0	17.6	34.7	26.5	10.7	31.5	21.2	18.0
Incr Delay (d2), s/veh	5.4	0.0	0.0	13.4	0.0	0.1	3.4	3.0	0.3	5.8	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	9.0	0.0	0.3	0.2	4.6	5.0	2.3	3.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.9	0.0	0.0	37.0	0.0	17.6	38.1	29.5	11.0	37.3	22.0	18.0
LnGrp LOS	D	A	A	D	A	B	D	C	B	D	C	B
Approach Vol, veh/h		30			508			622			416	
Approach Delay, s/veh		38.9			35.9			20.2			26.8	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.9	22.2		9.4	5.2	27.9		28.7				
Change Period (Y+Rc), s	* 4.2	7.4		* 6.7	* 4.2	7.4		7.1				
Max Green Setting (Gmax), s	* 15	24.6		* 10	* 9.8	29.6		24.9				
Max Q Clear Time (g_c+I1), s	7.1	12.5		3.2	2.4	11.0		20.3				
Green Ext Time (p_c), s	0.1	2.2		0.0	0.0	1.3		1.3				

Intersection Summary			
HCM 6th Ctrl Delay			27.4
HCM 6th LOS			C

Notes

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

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	241	331	471	259	560	208
Future Volume (veh/h)	241	331	471	259	560	208
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	254	348	496	273	589	219
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	375	334	534	1306	681	563
Arrive On Green	0.21	0.21	0.30	0.70	0.36	0.36
Sat Flow, veh/h	1781	1585	1781	1870	1870	1547
Grp Volume(v), veh/h	254	348	496	273	589	219
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1547
Q Serve(g_s), s	11.5	18.5	23.7	4.5	25.7	9.2
Cycle Q Clear(g_c), s	11.5	18.5	23.7	4.5	25.7	9.2
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	375	334	534	1306	681	563
V/C Ratio(X)	0.68	1.04	0.93	0.21	0.86	0.39
Avail Cap(c_a), veh/h	375	334	710	1735	926	766
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.9	34.7	29.8	4.7	25.9	20.7
Incr Delay (d2), s/veh	4.8	60.8	13.7	0.1	6.5	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	20.2	11.8	1.5	12.1	3.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	36.7	95.5	43.5	4.8	32.5	21.1
LnGrp LOS	D	F	D	A	C	C
Approach Vol, veh/h	602			769	808	
Approach Delay, s/veh	70.7			29.7	29.4	
Approach LOS	E			C	C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		65.9		22.0	29.4	36.5
Change Period (Y+Rc), s		4.5		3.5	3.0	4.5
Max Green Setting (Gmax), s		81.5		18.5	35.0	43.5
Max Q Clear Time (g_c+I1), s		6.5		20.5	25.7	27.7
Green Ext Time (p_c), s		1.8		0.0	0.6	4.3

Intersection Summary			
HCM 6th Ctrl Delay			40.9
HCM 6th LOS			D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	1	1	244	1	554	3	180	363	649	242	2
Future Volume (veh/h)	1	1	1	244	1	554	3	180	363	649	242	2
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1	1	1	257	1	583	3	189	382	683	255	2
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	2	2	2	2	2	2
Cap, veh/h	3	3	3	392	2	988	4	423	355	717	1160	9
Arrive On Green	0.00	0.00	0.00	0.22	0.22	0.22	0.00	0.23	0.23	0.40	0.63	0.63
Sat Flow, veh/h	579	579	579	1775	7	1585	1781	1870	1571	1781	1853	15
Grp Volume(v), veh/h	3	0	0	258	0	583	3	189	382	683	0	257
Grp Sat Flow(s),veh/h/ln	1737	0	0	1782	0	1585	1781	1870	1571	1781	0	1868
Q Serve(g_s), s	0.2	0.0	0.0	13.1	0.0	21.8	0.2	8.7	22.5	37.0	0.0	5.9
Cycle Q Clear(g_c), s	0.2	0.0	0.0	13.1	0.0	21.8	0.2	8.7	22.5	37.0	0.0	5.9
Prop In Lane	0.33		0.33	1.00		1.00	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	8	0	0	394	0	988	4	423	355	717	0	1170
V/C Ratio(X)	0.36	0.00	0.00	0.66	0.00	0.59	0.70	0.45	1.08	0.95	0.00	0.22
Avail Cap(c_a), veh/h	105	0	0	394	0	988	54	423	355	984	0	1398
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	49.4	0.0	0.0	35.3	0.0	11.2	49.6	33.2	38.5	28.8	0.0	8.1
Incr Delay (d2), s/veh	9.4	0.0	0.0	3.1	0.0	0.6	56.1	0.3	69.5	13.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	6.0	0.0	7.1	0.1	3.9	15.3	17.8	0.0	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.8	0.0	0.0	38.4	0.0	11.8	105.7	33.5	108.0	42.3	0.0	8.1
LnGrp LOS	E	A	A	D	A	B	F	C	F	D	A	A
Approach Vol, veh/h		3			841			574			940	
Approach Delay, s/veh		58.8			20.0			83.5			32.9	
Approach LOS		E			B			F			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	43.1	27.0		3.5	3.2	66.8		26.0				
Change Period (Y+Rc), s	3.0	4.5		3.0	3.0	4.5		4.0				
Max Green Setting (Gmax), s	55.0	22.5		6.0	3.0	74.5		22.0				
Max Q Clear Time (g_c+I1), s	39.0	24.5		2.2	2.2	7.9		23.8				
Green Ext Time (p_c), s	1.1	0.0		0.0	0.0	1.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			40.6									
HCM 6th LOS			D									



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	1	1	244	1	554	3	180	363	649	242	2
Future Volume (veh/h)	1	1	1	244	1	554	3	180	363	649	242	2
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1	1	1	257	1	583	3	189	382	683	255	2
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	2	2	2	2	2	2
Cap, veh/h	3	3	3	411	2	1007	4	387	694	719	1127	9
Arrive On Green	0.00	0.00	0.00	0.23	0.23	0.23	0.00	0.21	0.21	0.40	0.61	0.61
Sat Flow, veh/h	579	579	579	1775	7	1585	1781	1870	1576	1781	1853	15
Grp Volume(v), veh/h	3	0	0	258	0	583	3	189	382	683	0	257
Grp Sat Flow(s),veh/h/ln	1737	0	0	1782	0	1585	1781	1870	1576	1781	0	1868
Q Serve(g_s), s	0.2	0.0	0.0	12.3	0.0	20.1	0.2	8.5	17.0	35.2	0.0	5.9
Cycle Q Clear(g_c), s	0.2	0.0	0.0	12.3	0.0	20.1	0.2	8.5	17.0	35.2	0.0	5.9
Prop In Lane	0.33		0.33	1.00		1.00	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	8	0	0	413	0	1007	4	387	694	719	0	1136
V/C Ratio(X)	0.36	0.00	0.00	0.62	0.00	0.58	0.70	0.49	0.55	0.95	0.00	0.23
Avail Cap(c_a), veh/h	110	0	0	413	0	1007	56	443	741	1032	0	1466
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	47.1	0.0	0.0	32.7	0.0	10.0	47.3	33.2	19.7	27.4	0.0	8.4
Incr Delay (d2), s/veh	9.4	0.0	0.0	2.2	0.0	0.6	55.8	0.4	0.3	11.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	5.5	0.0	6.3	0.1	3.8	9.0	16.6	0.0	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.5	0.0	0.0	35.0	0.0	10.5	103.1	33.6	20.1	39.1	0.0	8.5
LnGrp LOS	E	A	A	C	A	B	F	C	C	D	A	A
Approach Vol, veh/h		3			841			574			940	
Approach Delay, s/veh		56.5			18.0			24.9			30.8	
Approach LOS		E			B			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	41.3	24.1		3.5	3.2	62.2		26.0				
Change Period (Y+Rc), s	3.0	4.5		3.0	3.0	4.5		4.0				
Max Green Setting (Gmax), s	55.0	22.5		6.0	3.0	74.5		22.0				
Max Q Clear Time (g_c+I1), s	37.2	19.0		2.2	2.2	7.9		22.1				
Green Ext Time (p_c), s	1.1	0.6		0.0	0.0	1.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			24.8									
HCM 6th LOS			C									



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	415	593	0	0	427	219	368	0	271	0	0	0
Future Volume (veh/h)	415	593	0	0	427	219	368	0	271	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00			
Parking Bus, Adj	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				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	437	624	0	0	449	231	387	0	285			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	405	493	0	0	1750	892	472	0	210			
Arrive On Green	0.77	0.77	0.00	0.00	0.77	0.77	0.13	0.00	0.13			
Sat Flow, veh/h	446	637	0	0	2353	1152	3563	0	1585			
Grp Volume(v), veh/h	1061	0	0	0	352	328	387	0	285			
Grp Sat Flow(s),veh/h/ln	1083	0	0	0	1777	1635	1781	0	1585			
Q Serve(g_s), s	61.0	0.0	0.0	0.0	4.7	4.8	9.0	0.0	11.3			
Cycle Q Clear(g_c), s	65.8	0.0	0.0	0.0	4.7	4.8	9.0	0.0	11.3			
Prop In Lane	0.41		0.00	0.00		0.70	1.00		1.00			
Lane Grp Cap(c), veh/h	898	0	0	0	1376	1266	472	0	210			
V/C Ratio(X)	1.18	0.00	0.00	0.00	0.26	0.26	0.82	0.00	1.36			
Avail Cap(c_a), veh/h	898	0	0	0	1376	1266	1103	0	491			
HCM Platoon Ratio	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	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	14.0	0.0	0.0	0.0	2.7	2.7	35.9	0.0	36.8			
Incr Delay (d2), s/veh	93.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	167.7			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	87.9	0.0	0.0	0.0	1.1	1.0	3.9	0.0	14.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	107.0	0.0	0.0	0.0	2.7	2.7	37.2	0.0	204.6			
LnGrp LOS	F	A	A	A	A	A	D	A	F			
Approach Vol, veh/h		1061			680			672				
Approach Delay, s/veh		107.0			2.7			108.2				
Approach LOS		F			A			F				
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		70.0				70.0		15.0				
Change Period (Y+Rc), s		* 4.2				* 4.2		3.7				
Max Green Setting (Gmax), s		* 66				* 66		26.3				
Max Q Clear Time (g_c+I1), s		67.8				6.8		11.0				
Green Ext Time (p_c), s		0.0				3.1		0.3				

Intersection Summary	
HCM 6th Ctrl Delay	78.0
HCM 6th LOS	E

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th 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)	415	593	0	0	427	219	368	0	271	0	0	0
Future Volume (veh/h)	415	593	0	0	427	219	368	0	271	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00			
Parking Bus, Adj	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				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	437	624	0	0	449	231	336	71	285			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	526	1261	0	0	1523	777	432	79	317			
Arrive On Green	0.67	0.67	0.00	0.00	0.67	0.67	0.24	0.24	0.24			
Sat Flow, veh/h	760	1870	0	0	2353	1152	1781	326	1309			
Grp Volume(v), veh/h	437	624	0	0	352	328	336	0	356			
Grp Sat Flow(s),veh/h/ln	760	1870	0	0	1777	1634	1781	0	1635			
Q Serve(g_s), s	52.2	15.5	0.0	0.0	7.6	7.7	16.7	0.0	20.0			
Cycle Q Clear(g_c), s	60.0	15.5	0.0	0.0	7.6	7.7	16.7	0.0	20.0			
Prop In Lane	1.00		0.00	0.00		0.70	1.00		0.80			
Lane Grp Cap(c), veh/h	526	1261	0	0	1198	1102	432	0	396			
V/C Ratio(X)	0.83	0.49	0.00	0.00	0.29	0.30	0.78	0.00	0.90			
Avail Cap(c_a), veh/h	541	1298	0	0	1233	1135	494	0	454			
HCM Platoon Ratio	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	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	18.5	7.5	0.0	0.0	6.3	6.3	33.5	0.0	34.8			
Incr Delay (d2), s/veh	9.6	0.1	0.0	0.0	0.1	0.1	5.7	0.0	17.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	9.5	5.4	0.0	0.0	2.5	2.3	7.7	0.0	9.7			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.1	7.7	0.0	0.0	6.3	6.3	39.2	0.0	52.3			
LnGrp LOS	C	A	A	A	A	A	D	A	D			
Approach Vol, veh/h		1061			680			692				
Approach Delay, s/veh		16.1			6.3			46.0				
Approach LOS		B			A			D				
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		68.1				68.1		26.7				
Change Period (Y+Rc), s		* 4.2				* 4.2		3.7				
Max Green Setting (Gmax), s		* 66				* 66		26.3				
Max Q Clear Time (g_c+I1), s		62.0				9.7		22.0				
Green Ext Time (p_c), s		1.9				3.1		1.0				

Intersection Summary	
HCM 6th Ctrl Delay	21.9
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

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

Intersection	
Int Delay, s/veh	261.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	217	510	170	21	393	24	113	40	16	26	56	188
Future Vol, veh/h	217	510	170	21	393	24	113	40	16	26	56	188
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	120	-	-	165	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	228	537	179	22	414	25	119	42	17	27	59	198

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	439	0	0	716	0	0	1683	1566	627	1583	1643	428
Stage 1	-	-	-	-	-	-	1083	1083	-	471	471	-
Stage 2	-	-	-	-	-	-	600	483	-	1112	1172	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1121	-	-	885	-	-	~ 75	111	484	88	100	627
Stage 1	-	-	-	-	-	-	263	293	-	573	560	-
Stage 2	-	-	-	-	-	-	488	553	-	253	266	-
Platoon blocked, %			-			-						
Mov Cap-1 Maneuver	1121	-	-	885	-	-	~ 17	86	484	44	78	626
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 17	86	-	44	78	-
Stage 1	-	-	-	-	-	-	210	234	-	457	546	-
Stage 2	-	-	-	-	-	-	290	539	-	160	212	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.2	0.4	$ 2124.3	$ 383.4
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	17	112	1121	-	-	885	-	-	168
HCM Lane V/C Ratio	6.997	0.526	0.204	-	-	0.025	-	-	1.692
HCM Control Delay (s)	$ 3143.2	68.3	9	-	-	9.2	-	-	$ 383.4
HCM Lane LOS	F	F	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	15.6	2.4	0.8	-	-	0.1	-	-	19.9

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

MOVEMENT SUMMARY

Site: 5 [PM Future No Project (Site Folder: Arata/Los Amigos Roundabout)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

Quail Acres TIS
Site Category: (None)
Roundabout

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. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: NB Los Amigos															
3	L2	All MCs	115	2.0	115	2.0	0.288	9.8	LOS A	1.2	30.1	0.68	0.63	0.69	27.3
8	T1	All MCs	41	2.0	41	2.0	0.288	9.8	LOS A	1.2	30.1	0.68	0.63	0.69	27.7
18	R2	All MCs	16	2.0	16	2.0	0.288	9.8	LOS A	1.2	30.1	0.68	0.63	0.69	27.5
Approach			172	2.0	172	2.0	0.288	9.8	LOS A	1.2	30.1	0.68	0.63	0.69	27.4
East: WB Arata															
1	L2	All MCs	21	2.0	21	2.0	0.492	10.1	LOS B	3.5	88.7	0.67	0.55	0.81	28.2
6	T1	All MCs	401	2.0	401	2.0	0.492	10.1	LOS B	3.5	88.7	0.67	0.55	0.81	28.6
16	R2	All MCs	24	2.0	24	2.0	0.492	10.1	LOS B	3.5	88.7	0.67	0.55	0.81	28.4
Approach			447	2.0	447	2.0	0.492	10.1	LOS B	3.5	88.7	0.67	0.55	0.81	28.6
North: SB Los Amigos															
7	L2	All MCs	27	2.0	27	2.0	0.360	9.1	LOS A	1.8	44.5	0.65	0.55	0.69	28.4
4	T1	All MCs	57	2.0	57	2.0	0.360	9.1	LOS A	1.8	44.5	0.65	0.55	0.69	28.8
14	R2	All MCs	192	2.0	192	2.0	0.360	9.1	LOS A	1.8	44.5	0.65	0.55	0.69	28.6
Approach			276	2.0	276	2.0	0.360	9.1	LOS A	1.8	44.5	0.65	0.55	0.69	28.7
West: EB Arata															
5	L2	All MCs	221	2.0	221	2.0	0.755	14.1	LOS B	9.5	240.3	0.71	0.32	0.71	26.5
2	T1	All MCs	520	2.0	520	2.0	0.755	14.1	LOS B	9.5	240.3	0.71	0.32	0.71	26.9
12	R2	All MCs	173	2.0	173	2.0	0.755	14.1	LOS B	9.5	240.3	0.71	0.32	0.71	26.8
Approach			915	2.0	915	2.0	0.755	14.1	LOS B	9.5	240.3	0.71	0.32	0.71	26.8
All Vehicles			1810	2.0	1810	2.0	0.755	11.9	LOS B	9.5	240.3	0.69	0.44	0.73	27.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Project: N:\AAA\SOX\WIN\164WIN Quail Acres 2 VMT Analysis\SIDRA\Arata Los Amigos unsig los comps.sip9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	217	510	170	21	393	24	113	40	16	26	56	188
Future Volume (veh/h)	217	510	170	21	393	24	113	40	16	26	56	188
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	228	537	179	22	414	25	119	42	17	27	59	198
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	2	2	2	2	2	2
Cap, veh/h	278	607	202	63	584	35	423	398	161	123	207	477
Arrive On Green	0.16	0.45	0.45	0.04	0.33	0.33	0.11	0.32	0.32	0.15	0.15	0.15
Sat Flow, veh/h	1781	1333	444	1781	1743	105	1781	1256	509	324	1418	1580
Grp Volume(v), veh/h	228	0	716	22	0	439	119	0	59	86	0	198
Grp Sat Flow(s),veh/h/ln	1781	0	1778	1781	0	1848	1781	0	1765	1742	0	1580
Q Serve(g_s), s	7.7	0.0	22.9	0.8	0.0	12.9	3.2	0.0	1.5	0.0	0.0	6.2
Cycle Q Clear(g_c), s	7.7	0.0	22.9	0.8	0.0	12.9	3.2	0.0	1.5	2.6	0.0	6.2
Prop In Lane	1.00		0.25	1.00		0.06	1.00		0.29	0.31		1.00
Lane Grp Cap(c), veh/h	278	0	809	63	0	619	423	0	559	330	0	477
V/C Ratio(X)	0.82	0.00	0.89	0.35	0.00	0.71	0.28	0.00	0.11	0.26	0.00	0.42
Avail Cap(c_a), veh/h	457	0	1283	200	0	1067	433	0	1019	754	0	880
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.5	0.0	15.5	29.4	0.0	18.1	17.3	0.0	15.0	23.8	0.0	17.4
Incr Delay (d2), s/veh	2.3	0.0	3.0	1.2	0.0	0.6	0.1	0.0	0.0	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	0.0	8.5	0.3	0.0	5.1	1.2	0.0	0.6	1.1	0.0	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.8	0.0	18.5	30.6	0.0	18.7	17.4	0.0	15.1	24.0	0.0	17.6
LnGrp LOS	C	A	B	C	A	B	B	A	B	C	A	B
Approach Vol, veh/h		944			461			178			284	
Approach Delay, s/veh		20.8			19.2			16.6			19.5	
Approach LOS		C			B			B			B	

Timer - Assigned Phs		2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s		23.8	6.2	32.4	10.7	13.1	13.7	24.9				
Change Period (Y+Rc), s		4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s		36.0	7.0	45.0	7.0	25.0	16.0	36.0				
Max Q Clear Time (g_c+I1), s		3.5	2.8	24.9	5.2	8.2	9.7	14.9				
Green Ext Time (p_c), s		0.2	0.0	3.5	0.0	0.6	0.2	1.8				

Intersection Summary												
HCM 6th Ctrl Delay			19.8									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	1	6	311	4	8	21	362	571	56	130	1
Future Volume (veh/h)	3	1	6	311	4	8	21	362	571	56	130	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	1	7	338	4	9	23	393	621	61	141	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	7	2	17	409	5	368	55	622	895	89	657	557
Arrive On Green	0.02	0.02	0.02	0.23	0.23	0.23	0.03	0.33	0.33	0.05	0.35	0.35
Sat Flow, veh/h	452	151	1055	1761	21	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	11	0	0	342	0	9	23	393	621	61	141	1
Grp Sat Flow(s),veh/h/ln	1658	0	0	1782	0	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	0.5	0.0	0.0	12.6	0.0	0.3	0.9	12.2	19.3	2.3	3.6	0.0
Cycle Q Clear(g_c), s	0.5	0.0	0.0	12.6	0.0	0.3	0.9	12.2	19.3	2.3	3.6	0.0
Prop In Lane	0.27		0.64	0.99		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	27	0	0	414	0	368	55	622	895	89	657	557
V/C Ratio(X)	0.40	0.00	0.00	0.83	0.00	0.02	0.42	0.63	0.69	0.68	0.21	0.00
Avail Cap(c_a), veh/h	248	0	0	645	0	573	254	668	934	383	804	681
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.5	0.0	0.0	25.1	0.0	20.4	32.7	19.4	10.7	32.2	15.7	14.5
Incr Delay (d2), s/veh	9.2	0.0	0.0	5.1	0.0	0.0	1.9	1.7	2.1	6.7	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	5.5	0.0	0.1	0.4	5.0	10.2	1.1	1.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.7	0.0	0.0	30.2	0.0	20.4	34.6	21.2	12.9	38.9	15.8	14.5
LnGrp LOS	D	A	A	C	A	C	C	C	B	D	B	B
Approach Vol, veh/h		11			351			1037			203	
Approach Delay, s/veh		42.7			30.0			16.5			22.8	
Approach LOS		D			C			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.6	30.3		7.8	6.3	31.6		23.1				
Change Period (Y+Rc), s	* 4.2	7.4		* 6.7	* 4.2	7.4		7.1				
Max Green Setting (Gmax), s	* 15	24.6		* 10	* 9.8	29.6		24.9				
Max Q Clear Time (g_c+I1), s	4.3	21.3		2.5	2.9	5.6		14.6				
Green Ext Time (p_c), s	0.0	1.6		0.0	0.0	0.6		1.5				

Intersection Summary	
HCM 6th Ctrl Delay	20.4
HCM 6th LOS	C

Notes

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

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	383	476	623	474	347	166
Future Volume (veh/h)	383	476	623	474	347	166
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	403	501	656	499	365	175
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	497	442	687	1196	418	354
Arrive On Green	0.28	0.28	0.39	0.64	0.22	0.22
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	403	501	656	499	365	175
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	20.8	27.5	35.3	12.9	18.5	9.5
Cycle Q Clear(g_c), s	20.8	27.5	35.3	12.9	18.5	9.5
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	497	442	687	1196	418	354
V/C Ratio(X)	0.81	1.13	0.95	0.42	0.87	0.49
Avail Cap(c_a), veh/h	497	442	777	1376	503	426
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.1	35.5	29.4	8.7	36.9	33.4
Incr Delay (d2), s/veh	9.8	84.2	19.9	0.2	13.6	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.1	10.3	18.3	4.8	9.9	3.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	42.8	119.7	49.4	9.0	50.5	34.5
LnGrp LOS	D	F	D	A	D	C
Approach Vol, veh/h	904			1155	540	
Approach Delay, s/veh	85.4			31.9	45.3	
Approach LOS	F			C	D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		67.5		31.0	41.0	26.5
Change Period (Y+Rc), s		4.5		3.5	3.0	4.5
Max Green Setting (Gmax), s		72.5		27.5	43.0	26.5
Max Q Clear Time (g_c+I1), s		14.9		29.5	37.3	20.5
Green Ext Time (p_c), s		3.7		0.0	0.7	1.5

Intersection Summary	
HCM 6th Ctrl Delay	53.3
HCM 6th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	1	7	357	4	875	4	204	344	604	206	3
Future Volume (veh/h)	11	1	7	357	4	875	4	204	344	604	206	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	12	1	7	376	4	921	4	215	362	636	217	3
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	2	2	2	2	2	2
Cap, veh/h	26	2	15	505	5	1035	6	337	278	666	1014	14
Arrive On Green	0.03	0.03	0.03	0.29	0.29	0.29	0.00	0.18	0.18	0.37	0.55	0.55
Sat Flow, veh/h	1027	86	599	1763	19	1541	1781	1870	1543	1781	1840	25
Grp Volume(v), veh/h	20	0	0	380	0	921	4	215	362	636	0	220
Grp Sat Flow(s),veh/h/ln	1711	0	0	1782	0	1541	1781	1870	1543	1781	0	1865
Q Serve(g_s), s	1.2	0.0	0.0	20.9	0.0	31.0	0.2	11.5	19.5	37.6	0.0	6.5
Cycle Q Clear(g_c), s	1.2	0.0	0.0	20.9	0.0	31.0	0.2	11.5	19.5	37.6	0.0	6.5
Prop In Lane	0.60		0.35	0.99		1.00	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	43	0	0	511	0	1035	6	337	278	666	0	1028
V/C Ratio(X)	0.47	0.00	0.00	0.74	0.00	0.89	0.71	0.64	1.30	0.95	0.00	0.21
Avail Cap(c_a), veh/h	95	0	0	511	0	1035	49	337	278	807	0	1129
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	52.0	0.0	0.0	35.0	0.0	15.4	53.9	41.1	44.3	33.0	0.0	12.4
Incr Delay (d2), s/veh	2.9	0.0	0.0	5.2	0.0	9.5	47.3	3.1	159.6	18.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	9.7	0.0	19.3	0.2	5.6	19.7	19.1	0.0	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.9	0.0	0.0	40.2	0.0	24.8	101.2	44.1	204.0	51.2	0.0	12.4
LnGrp LOS	D	A	A	D	A	C	F	D	F	D	A	B
Approach Vol, veh/h		20			1301			581			856	
Approach Delay, s/veh		54.9			29.3			144.1			41.2	
Approach LOS		D			C			F			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	43.5	24.0		5.7	3.3	64.1		35.0				
Change Period (Y+Rc), s	3.0	4.5		3.0	3.0	4.5		4.0				
Max Green Setting (Gmax), s	40.5	19.5		6.0	3.0	65.5		31.0				
Max Q Clear Time (g_c+I1), s	39.6	21.5		3.2	2.2	8.5		33.0				
Green Ext Time (p_c), s	0.9	0.0		0.0	0.0	0.9		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			57.4									
HCM 6th LOS			E									



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	1	7	357	4	875	4	204	344	604	206	3
Future Volume (veh/h)	11	1	7	357	4	875	4	204	344	604	206	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	12	1	7	376	4	921	4	215	362	636	217	3
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	2	2	2	2	2	2
Cap, veh/h	26	2	15	506	5	1035	6	336	735	666	1013	14
Arrive On Green	0.03	0.03	0.03	0.29	0.29	0.29	0.00	0.18	0.18	0.37	0.55	0.55
Sat Flow, veh/h	1027	86	599	1763	19	1541	1781	1870	1560	1781	1840	25
Grp Volume(v), veh/h	20	0	0	380	0	921	4	215	362	636	0	220
Grp Sat Flow(s),veh/h/ln	1711	0	0	1782	0	1541	1781	1870	1560	1781	0	1865
Q Serve(g_s), s	1.2	0.0	0.0	20.9	0.0	31.0	0.2	11.5	17.4	37.6	0.0	6.5
Cycle Q Clear(g_c), s	1.2	0.0	0.0	20.9	0.0	31.0	0.2	11.5	17.4	37.6	0.0	6.5
Prop In Lane	0.60		0.35	0.99		1.00	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	43	0	0	511	0	1035	6	336	735	666	0	1027
V/C Ratio(X)	0.47	0.00	0.00	0.74	0.00	0.89	0.71	0.64	0.49	0.95	0.00	0.21
Avail Cap(c_a), veh/h	95	0	0	511	0	1035	49	337	736	808	0	1130
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	52.0	0.0	0.0	34.9	0.0	15.3	53.8	41.1	20.0	32.9	0.0	12.4
Incr Delay (d2), s/veh	2.9	0.0	0.0	5.2	0.0	9.4	47.3	3.1	0.2	18.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	9.7	0.0	19.2	0.2	5.6	9.9	19.1	0.0	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.9	0.0	0.0	40.1	0.0	24.7	101.1	44.2	20.2	51.2	0.0	12.4
LnGrp LOS	D	A	A	D	A	C	F	D	C	D	A	B
Approach Vol, veh/h		20			1301			581			856	
Approach Delay, s/veh		54.9			29.2			29.6			41.2	
Approach LOS		D			C			C			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	43.4	23.9		5.7	3.3	64.0		35.0				
Change Period (Y+Rc), s	3.0	4.5		3.0	3.0	4.5		4.0				
Max Green Setting (Gmax), s	40.5	19.5		6.0	3.0	65.5		31.0				
Max Q Clear Time (g_c+I1), s	39.6	19.4		3.2	2.2	8.5		33.0				
Green Ext Time (p_c), s	0.9	0.0		0.0	0.0	0.9		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			33.2									
HCM 6th LOS			C									



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	353	597	0	0	791	292	449	0	208	0	0	0
Future Volume (veh/h)	353	597	0	0	791	292	449	0	208	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00			
Parking Bus, Adj	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				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	372	628	0	0	833	307	473	0	219			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	272	366	0	0	1899	699	560	0	249			
Arrive On Green	0.75	0.75	0.00	0.00	0.75	0.75	0.16	0.00	0.16			
Sat Flow, veh/h	286	486	0	0	2618	928	3563	0	1585			
Grp Volume(v), veh/h	1000	0	0	0	586	554	473	0	219			
Grp Sat Flow(s),veh/h/ln	772	0	0	0	1777	1676	1781	0	1585			
Q Serve(g_s), s	55.1	0.0	0.0	0.0	10.7	10.7	11.3	0.0	11.8			
Cycle Q Clear(g_c), s	65.8	0.0	0.0	0.0	10.7	10.7	11.3	0.0	11.8			
Prop In Lane	0.37		0.00	0.00		0.55	1.00		1.00			
Lane Grp Cap(c), veh/h	637	0	0	0	1337	1261	560	0	249			
V/C Ratio(X)	1.57	0.00	0.00	0.00	0.44	0.44	0.84	0.00	0.88			
Avail Cap(c_a), veh/h	637	0	0	0	1337	1261	1071	0	477			
HCM Platoon Ratio	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	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	18.5	0.0	0.0	0.0	4.0	4.0	35.8	0.0	36.0			
Incr Delay (d2), s/veh	263.7	0.0	0.0	0.0	0.1	0.1	1.4	0.0	3.9			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	59.3	0.0	0.0	0.0	2.8	2.6	4.9	0.0	4.7			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	282.2	0.0	0.0	0.0	4.1	4.1	37.2	0.0	39.9			
LnGrp LOS	F	A	A	A	A	A	D	A	D			
Approach Vol, veh/h		1000			1140			692				
Approach Delay, s/veh		282.2			4.1			38.0				
Approach LOS		F			A			D				
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		70.0				70.0		17.5				
Change Period (Y+Rc), s		* 4.2				* 4.2		3.7				
Max Green Setting (Gmax), s		* 66				* 66		26.3				
Max Q Clear Time (g_c+I1), s		67.8				12.7		13.3				
Green Ext Time (p_c), s		0.0				6.2		0.5				

Intersection Summary	
HCM 6th Ctrl Delay	110.6
HCM 6th LOS	F

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th 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)	353	597	0	0	791	292	449	0	208	0	0	0
Future Volume (veh/h)	353	597	0	0	791	292	449	0	208	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	372	628	0	0	833	307	346	178	219			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	413	1216	0	0	935	344	463	198	244			
Arrive On Green	0.23	0.65	0.00	0.00	0.37	0.37	0.26	0.26	0.26			
Sat Flow, veh/h	1781	1870	0	0	2615	927	1781	763	939			
Grp Volume(v), veh/h	372	628	0	0	587	553	346	0	397			
Grp Sat Flow(s),veh/h/ln	1781	1870	0	0	1777	1672	1781	0	1701			
Q Serve(g_s), s	17.9	15.6	0.0	0.0	27.3	27.5	15.7	0.0	19.9			
Cycle Q Clear(g_c), s	17.9	15.6	0.0	0.0	27.3	27.5	15.7	0.0	19.9			
Prop In Lane	1.00		0.00	0.00		0.55	1.00		0.55			
Lane Grp Cap(c), veh/h	413	1216	0	0	659	620	463	0	443			
V/C Ratio(X)	0.90	0.52	0.00	0.00	0.89	0.89	0.75	0.00	0.90			
Avail Cap(c_a), veh/h	501	1396	0	0	741	698	531	0	507			
HCM Platoon Ratio	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	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	32.9	8.1	0.0	0.0	26.1	26.1	29.9	0.0	31.5			
Incr Delay (d2), s/veh	17.1	0.1	0.0	0.0	11.1	12.0	4.0	0.0	15.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	9.5	5.4	0.0	0.0	13.0	12.4	7.1	0.0	9.8			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.0	8.2	0.0	0.0	37.2	38.1	33.9	0.0	47.3			
LnGrp LOS	D	A	A	A	D	D	C	A	D			
Approach Vol, veh/h		1000			1140			743				
Approach Delay, s/veh		23.8			37.6			41.1				
Approach LOS		C			D			D				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		61.5			24.6	36.9		26.6				
Change Period (Y+Rc), s		* 4.2			* 4.2	* 4.2		3.7				
Max Green Setting (Gmax), s		* 66			* 25	* 37		26.3				
Max Q Clear Time (g_c+I1), s		17.6			19.9	29.5		21.9				
Green Ext Time (p_c), s		3.0			0.6	3.2		1.1				

Intersection Summary	
HCM 6th Ctrl Delay	33.7
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

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

Intersection	
Int Delay, s/veh	2916.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	208	485	124	13	692	44	120	54	12	54	72	358
Future Vol, veh/h	208	485	124	13	692	44	120	54	12	54	72	358
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	120	-	-	165	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	219	511	131	14	728	46	126	57	13	57	76	377

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	775	0	0	642	0	0	2021	1818	578	1831	1860	752
Stage 1	-	-	-	-	-	-	1015	1015	-	780	780	-
Stage 2	-	-	-	-	-	-	1006	803	-	1051	1080	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	841	-	-	943	-	-	~ 43	78	516	59	~ 73	410
Stage 1	-	-	-	-	-	-	287	316	-	388	406	-
Stage 2	-	-	-	-	-	-	291	396	-	274	294	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	840	-	-	943	-	-	-	57	516	~ 2	~ 53	410
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	57	-	~ 2	~ 53	-
Stage 1	-	-	-	-	-	-	212	234	-	287	400	-
Stage 2	-	-	-	-	-	-	~ 19	390	-	149	217	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.7	0.2		$ 13468.3
HCM LOS			-	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	68	840	-	-	943	-	-	17
HCM Lane V/C Ratio	-	1.022	0.261	-	-	0.015	-	-	-29.969
HCM Control Delay (s)	-	218.9	10.8	-	-	8.9	-	-	$ 13468.3
HCM Lane LOS	-	F	B	-	-	A	-	-	F
HCM 95th %tile Q(veh)	-	5.2	1	-	-	0	-	-	64.5

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

MOVEMENT SUMMARY

Site: 5 [AM Future plus Quail 1 School (Site Folder: Arata/Los Amigos Roundabout)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

Quail Acres TIS
Site Category: (None)
Roundabout

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. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: NB Los Amigos															
3	L2	All MCs	122	2.0	122	2.0	0.315	10.2	LOS B	1.4	34.6	0.69	0.65	0.74	27.2
8	T1	All MCs	55	2.0	55	2.0	0.315	10.2	LOS B	1.4	34.6	0.69	0.65	0.74	27.6
18	R2	All MCs	12	2.0	12	2.0	0.315	10.2	LOS B	1.4	34.6	0.69	0.65	0.74	27.4
Approach			190	2.0	190	2.0	0.315	10.2	LOS B	1.4	34.6	0.69	0.65	0.74	27.3
East: WB Arata															
1	L2	All MCs	13	2.0	13	2.0	0.853	25.6	LOS D	18.7	474.5	1.00	1.33	2.24	23.6
6	T1	All MCs	706	2.0	706	2.0	0.853	25.6	LOS D	18.7	474.5	1.00	1.33	2.24	24.0
16	R2	All MCs	45	2.0	45	2.0	0.853	25.6	LOS D	18.7	474.5	1.00	1.33	2.24	23.8
Approach			764	2.0	764	2.0	0.853	25.6	LOS D	18.7	474.5	1.00	1.33	2.24	23.9
North: SB Los Amigos															
7	L2	All MCs	55	2.0	55	2.0	0.893	42.4	LOS E	10.6	268.7	0.98	1.43	2.44	19.9
4	T1	All MCs	73	2.0	73	2.0	0.893	42.4	LOS E	10.6	268.7	0.98	1.43	2.44	20.1
14	R2	All MCs	365	2.0	365	2.0	0.893	42.4	LOS E	10.6	268.7	0.98	1.43	2.44	20.0
Approach			494	2.0	494	2.0	0.893	42.4	LOS E	10.6	268.7	0.98	1.43	2.44	20.0
West: EB Arata															
5	L2	All MCs	212	2.0	212	2.0	0.715	13.3	LOS B	7.8	199.1	0.70	0.37	0.72	26.8
2	T1	All MCs	495	2.0	495	2.0	0.715	13.3	LOS B	7.8	199.1	0.70	0.37	0.72	27.2
12	R2	All MCs	127	2.0	127	2.0	0.715	13.3	LOS B	7.8	199.1	0.70	0.37	0.72	27.0
Approach			834	2.0	834	2.0	0.715	13.3	LOS B	7.8	199.1	0.70	0.37	0.72	27.0
All Vehicles			2282	2.0	2282	2.0	0.893	23.5	LOS C	18.7	474.5	0.86	0.95	1.60	24.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Project: N:\AAA\SOX\WIN\164WIN Quail Acres 2 VMT Analysis\SIDRA\Arata Los Amigos unsig los comps.sip9



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	208	485	124	13	692	44	120	54	12	54	72	358
Future Volume (veh/h)	208	485	124	13	692	44	120	54	12	54	72	358
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	219	511	131	14	728	46	126	57	13	57	76	377
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	2	2	2	2	2	2
Cap, veh/h	223	726	186	40	705	45	359	505	115	192	236	562
Arrive On Green	0.12	0.51	0.51	0.02	0.41	0.41	0.07	0.34	0.34	0.23	0.23	0.23
Sat Flow, veh/h	1781	1428	366	1781	1737	110	1781	1467	334	600	1025	1582
Grp Volume(v), veh/h	219	0	642	14	0	774	126	0	70	133	0	377
Grp Sat Flow(s),veh/h/ln	1781	0	1795	1781	0	1847	1781	0	1801	1625	0	1582
Q Serve(g_s), s	11.8	0.0	26.3	0.7	0.0	39.0	4.9	0.0	2.5	3.6	0.0	19.4
Cycle Q Clear(g_c), s	11.8	0.0	26.3	0.7	0.0	39.0	4.9	0.0	2.5	6.2	0.0	19.4
Prop In Lane	1.00		0.20	1.00		0.06	1.00		0.19	0.43		1.00
Lane Grp Cap(c), veh/h	223	0	912	40	0	750	359	0	620	427	0	562
V/C Ratio(X)	0.98	0.00	0.70	0.35	0.00	1.03	0.35	0.00	0.11	0.31	0.00	0.67
Avail Cap(c_a), veh/h	223	0	912	130	0	750	359	0	694	492	0	626
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	41.9	0.0	18.1	46.2	0.0	28.5	24.1	0.0	21.5	30.8	0.0	26.2
Incr Delay (d2), s/veh	55.5	0.0	2.1	1.9	0.0	41.4	0.2	0.0	0.0	0.2	0.0	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.5	0.0	10.8	0.3	0.0	25.0	2.1	0.0	1.1	2.6	0.0	7.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	97.4	0.0	20.2	48.1	0.0	69.9	24.3	0.0	21.5	30.9	0.0	28.0
LnGrp LOS	F	A	C	D	A	F	C	A	C	C	A	C
Approach Vol, veh/h		861			788			196			510	
Approach Delay, s/veh		39.8			69.5			23.3			28.7	
Approach LOS		D			E			C			C	

Timer - Assigned Phs		2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s		37.0	6.2	52.8	11.0	26.1	16.0	43.0				
Change Period (Y+Rc), s		4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s		37.0	7.0	44.0	7.0	26.0	12.0	39.0				
Max Q Clear Time (g_c+I1), s		4.5	2.7	28.3	6.9	21.4	13.8	41.0				
Green Ext Time (p_c), s		0.2	0.0	2.7	0.0	0.6	0.0	0.0				

Intersection Summary	
HCM 6th Ctrl Delay	46.0
HCM 6th LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	7	17	475	2	27	9	283	344	124	274	2
Future Volume (veh/h)	5	7	17	475	2	27	9	283	344	124	274	2
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	5	7	18	500	2	28	9	298	362	131	288	2
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	2	2	2	2	2	2
Cap, veh/h	10	15	38	552	2	493	24	392	817	167	542	447
Arrive On Green	0.04	0.04	0.04	0.31	0.31	0.31	0.01	0.21	0.21	0.09	0.29	0.29
Sat Flow, veh/h	279	391	1005	1775	7	1585	1781	1870	1545	1781	1870	1541
Grp Volume(v), veh/h	30	0	0	502	0	28	9	298	362	131	288	2
Grp Sat Flow(s),veh/h/ln	1675	0	0	1782	0	1585	1781	1870	1545	1781	1870	1541
Q Serve(g_s), s	1.3	0.0	0.0	19.7	0.0	0.9	0.4	10.9	10.7	5.3	9.4	0.1
Cycle Q Clear(g_c), s	1.3	0.0	0.0	19.7	0.0	0.9	0.4	10.9	10.7	5.3	9.4	0.1
Prop In Lane	0.17		0.60	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	63	0	0	554	0	493	24	392	817	167	542	447
V/C Ratio(X)	0.48	0.00	0.00	0.91	0.00	0.06	0.37	0.76	0.44	0.78	0.53	0.00
Avail Cap(c_a), veh/h	236	0	0	607	0	540	239	630	1014	361	758	625
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.5	0.0	0.0	24.1	0.0	17.6	35.7	27.1	10.9	32.4	21.8	18.4
Incr Delay (d2), s/veh	5.5	0.0	0.0	16.3	0.0	0.0	3.4	3.0	0.4	5.9	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	10.1	0.0	0.3	0.2	4.8	6.1	2.4	3.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.0	0.0	0.0	40.5	0.0	17.7	39.1	30.2	11.3	38.2	22.6	18.4
LnGrp LOS	D	A	A	D	A	B	D	C	B	D	C	B
Approach Vol, veh/h		30			530			669			421	
Approach Delay, s/veh		40.0			39.3			20.1			27.4	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.1	22.7		9.4	5.2	28.6		29.8				
Change Period (Y+Rc), s	* 4.2	7.4		* 6.7	* 4.2	7.4		7.1				
Max Green Setting (Gmax), s	* 15	24.6		* 10	* 9.8	29.6		24.9				
Max Q Clear Time (g_c+I1), s	7.3	12.9		3.3	2.4	11.4		21.7				
Green Ext Time (p_c), s	0.1	2.4		0.0	0.0	1.4		1.0				

Intersection Summary	
HCM 6th Ctrl Delay	28.5
HCM 6th LOS	C

Notes

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

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	241	351	486	304	585	208
Future Volume (veh/h)	241	351	486	304	585	208
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	254	369	512	320	616	219
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	356	317	547	1335	699	578
Arrive On Green	0.20	0.20	0.31	0.71	0.37	0.37
Sat Flow, veh/h	1781	1585	1781	1870	1870	1547
Grp Volume(v), veh/h	254	369	512	320	616	219
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1547
Q Serve(g_s), s	12.3	18.5	25.9	5.5	28.4	9.6
Cycle Q Clear(g_c), s	12.3	18.5	25.9	5.5	28.4	9.6
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	356	317	547	1335	699	578
V/C Ratio(X)	0.71	1.16	0.94	0.24	0.88	0.38
Avail Cap(c_a), veh/h	356	317	674	1648	879	727
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.5	37.0	31.2	4.6	27.0	21.1
Incr Delay (d2), s/veh	6.6	102.8	16.8	0.1	8.7	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	9.1	13.3	1.8	13.8	3.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	41.1	139.8	48.0	4.7	35.7	21.5
LnGrp LOS	D	F	D	A	D	C
Approach Vol, veh/h	623			832	835	
Approach Delay, s/veh	99.6			31.3	32.0	
Approach LOS	F			C	C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		70.5		22.0	31.4	39.1
Change Period (Y+Rc), s		4.5		3.5	3.0	4.5
Max Green Setting (Gmax), s		81.5		18.5	35.0	43.5
Max Q Clear Time (g_c+I1), s		7.5		20.5	27.9	30.4
Green Ext Time (p_c), s		2.2		0.0	0.6	4.1

Intersection Summary	
HCM 6th Ctrl Delay	50.1
HCM 6th LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	1	1	260	1	614	3	180	385	694	242	2
Future Volume (veh/h)	1	1	1	260	1	614	3	180	385	694	242	2
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1	1	1	274	1	646	3	189	405	731	255	2
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	2	2	2	2	2	2
Cap, veh/h	3	3	3	375	1	1014	4	405	340	763	1190	9
Arrive On Green	0.00	0.00	0.00	0.21	0.21	0.21	0.00	0.22	0.22	0.43	0.64	0.64
Sat Flow, veh/h	579	579	579	1775	6	1585	1781	1870	1570	1781	1853	15
Grp Volume(v), veh/h	3	0	0	275	0	646	3	189	405	731	0	257
Grp Sat Flow(s),veh/h/ln	1737	0	0	1782	0	1585	1781	1870	1570	1781	0	1868
Q Serve(g_s), s	0.2	0.0	0.0	15.0	0.0	22.0	0.2	9.2	22.5	41.4	0.0	5.9
Cycle Q Clear(g_c), s	0.2	0.0	0.0	15.0	0.0	22.0	0.2	9.2	22.5	41.4	0.0	5.9
Prop In Lane	0.33		0.33	1.00		1.00	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	8	0	0	377	0	1014	4	405	340	763	0	1199
V/C Ratio(X)	0.36	0.00	0.00	0.73	0.00	0.64	0.70	0.47	1.19	0.96	0.00	0.21
Avail Cap(c_a), veh/h	100	0	0	377	0	1014	51	405	340	942	0	1338
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	51.6	0.0	0.0	38.2	0.0	11.4	51.9	35.5	40.8	28.9	0.0	7.7
Incr Delay (d2), s/veh	9.5	0.0	0.0	6.2	0.0	1.0	56.4	0.3	112.0	16.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	7.1	0.0	8.5	0.1	4.2	19.1	20.5	0.0	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.1	0.0	0.0	44.4	0.0	12.4	108.3	35.9	152.7	45.7	0.0	7.8
LnGrp LOS	E	A	A	D	A	B	F	D	F	D	A	A
Approach Vol, veh/h		3			921			597			988	
Approach Delay, s/veh		61.1			22.0			115.5			35.9	
Approach LOS		E			C			F			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	47.5	27.0		3.5	3.2	71.3		26.0				
Change Period (Y+Rc), s	3.0	4.5		3.0	3.0	4.5		4.0				
Max Green Setting (Gmax), s	65.0	22.5		6.0	3.0	74.5		22.0				
Max Q Clear Time (g_c+I1), s	43.4	24.5		2.2	2.2	7.9		24.0				
Green Ext Time (p_c), s	1.1	0.0		0.0	0.0	1.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			49.8									
HCM 6th LOS			D									



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	1	1	260	1	614	3	180	385	694	242	2
Future Volume (veh/h)	1	1	1	260	1	614	3	180	385	694	242	2
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1	1	1	274	1	646	3	189	405	731	255	2
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	2	2	2	2	2	2
Cap, veh/h	3	3	3	375	1	1014	4	405	676	763	1190	9
Arrive On Green	0.00	0.00	0.00	0.21	0.21	0.21	0.00	0.22	0.22	0.43	0.64	0.64
Sat Flow, veh/h	579	579	579	1775	6	1585	1781	1870	1576	1781	1853	15
Grp Volume(v), veh/h	3	0	0	275	0	646	3	189	405	731	0	257
Grp Sat Flow(s),veh/h/ln	1737	0	0	1782	0	1585	1781	1870	1576	1781	0	1868
Q Serve(g_s), s	0.2	0.0	0.0	15.0	0.0	22.0	0.2	9.2	20.6	41.4	0.0	5.9
Cycle Q Clear(g_c), s	0.2	0.0	0.0	15.0	0.0	22.0	0.2	9.2	20.6	41.4	0.0	5.9
Prop In Lane	0.33		0.33	1.00		1.00	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	8	0	0	377	0	1014	4	405	676	763	0	1199
V/C Ratio(X)	0.36	0.00	0.00	0.73	0.00	0.64	0.70	0.47	0.60	0.96	0.00	0.21
Avail Cap(c_a), veh/h	100	0	0	377	0	1014	51	405	676	942	0	1338
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	51.6	0.0	0.0	38.2	0.0	11.4	51.9	35.5	22.9	28.9	0.0	7.7
Incr Delay (d2), s/veh	9.5	0.0	0.0	6.2	0.0	1.0	56.4	0.3	1.0	16.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	7.1	0.0	8.5	0.1	4.2	10.7	20.5	0.0	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.1	0.0	0.0	44.4	0.0	12.4	108.3	35.9	24.0	45.7	0.0	7.8
LnGrp LOS	E	A	A	D	A	B	F	D	C	D	A	A
Approach Vol, veh/h		3			921			597			988	
Approach Delay, s/veh		61.1			22.0			28.1			35.9	
Approach LOS		E			C			C			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	47.5	27.0		3.5	3.2	71.3		26.0				
Change Period (Y+Rc), s	3.0	4.5		3.0	3.0	4.5		4.0				
Max Green Setting (Gmax), s	65.0	22.5		6.0	3.0	74.5		22.0				
Max Q Clear Time (g_c+I1), s	43.4	22.6		2.2	2.2	7.9		24.0				
Green Ext Time (p_c), s	1.1	0.0		0.0	0.0	1.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			29.0									
HCM 6th LOS			C									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	415	660	0	0	503	230	368	0	335	0	0	0
Future Volume (veh/h)	415	660	0	0	503	230	368	0	335	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00			
Parking Bus, Adj	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				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	437	695	0	0	529	242	387	0	353			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	370	494	0	0	1825	832	470	0	209			
Arrive On Green	0.78	0.78	0.00	0.00	0.78	0.78	0.13	0.00	0.13			
Sat Flow, veh/h	401	638	0	0	2448	1073	3563	0	1585			
Grp Volume(v), veh/h	1132	0	0	0	399	372	387	0	353			
Grp Sat Flow(s),veh/h/ln	1039	0	0	0	1777	1651	1781	0	1585			
Q Serve(g_s), s	60.2	0.0	0.0	0.0	5.5	5.6	9.0	0.0	11.2			
Cycle Q Clear(g_c), s	65.8	0.0	0.0	0.0	5.5	5.6	9.0	0.0	11.2			
Prop In Lane	0.39		0.00	0.00		0.65	1.00		1.00			
Lane Grp Cap(c), veh/h	864	0	0	0	1377	1279	470	0	209			
V/C Ratio(X)	1.31	0.00	0.00	0.00	0.29	0.29	0.82	0.00	1.69			
Avail Cap(c_a), veh/h	864	0	0	0	1377	1279	1104	0	491			
HCM Platoon Ratio	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	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	14.4	0.0	0.0	0.0	2.8	2.8	35.9	0.0	36.8			
Incr Delay (d2), s/veh	147.8	0.0	0.0	0.0	0.0	0.0	1.4	0.0	319.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	49.9	0.0	0.0	0.0	1.3	1.2	3.9	0.0	22.8			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	162.2	0.0	0.0	0.0	2.8	2.8	37.3	0.0	356.4			
LnGrp LOS	F	A	A	A	A	A	D	A	F			
Approach Vol, veh/h		1132			771			740				
Approach Delay, s/veh		162.2			2.8			189.5				
Approach LOS		F			A			F				
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		70.0				70.0		14.9				
Change Period (Y+Rc), s		* 4.2				* 4.2		3.7				
Max Green Setting (Gmax), s		* 66				* 66		26.3				
Max Q Clear Time (g_c+I1), s		67.8				7.6		11.0				
Green Ext Time (p_c), s		0.0				3.6		0.2				

Intersection Summary	
HCM 6th Ctrl Delay	123.4
HCM 6th LOS	F

Notes

User approved volume balancing among the lanes for turning movement.
* HCM 6th 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)	415	660	0	0	503	230	368	0	335	0	0	0
Future Volume (veh/h)	415	660	0	0	503	230	368	0	335	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00			
Parking Bus, Adj	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				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	437	695	0	0	529	242	370	24	353			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	469	1245	0	0	1567	714	454	26	382			
Arrive On Green	0.67	0.67	0.00	0.00	0.67	0.67	0.25	0.25	0.25			
Sat Flow, veh/h	698	1870	0	0	2448	1073	1781	102	1499			
Grp Volume(v), veh/h	437	695	0	0	399	372	370	0	377			
Grp Sat Flow(s),veh/h/ln	698	1870	0	0	1777	1651	1781	0	1601			
Q Serve(g_s), s	56.2	19.6	0.0	0.0	9.6	9.6	19.3	0.0	22.7			
Cycle Q Clear(g_c), s	65.8	19.6	0.0	0.0	9.6	9.6	19.3	0.0	22.7			
Prop In Lane	1.00		0.00	0.00		0.65	1.00		0.94			
Lane Grp Cap(c), veh/h	469	1245	0	0	1182	1098	454	0	408			
V/C Ratio(X)	0.93	0.56	0.00	0.00	0.34	0.34	0.82	0.00	0.92			
Avail Cap(c_a), veh/h	469	1245	0	0	1182	1098	474	0	426			
HCM Platoon Ratio	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	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	24.0	8.8	0.0	0.0	7.1	7.1	34.7	0.0	35.9			
Incr Delay (d2), s/veh	25.0	0.3	0.0	0.0	0.1	0.1	9.4	0.0	24.7			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	28.8	7.1	0.0	0.0	3.3	3.1	9.4	0.0	11.5			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.9	9.2	0.0	0.0	7.2	7.2	44.1	0.0	60.7			
LnGrp LOS	D	A	A	A	A	A	D	A	E			
Approach Vol, veh/h		1132			771			747				
Approach Delay, s/veh		24.5			7.2			52.4				
Approach LOS		C			A			D				
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		70.0				70.0		28.9				
Change Period (Y+Rc), s		* 4.2				* 4.2		3.7				
Max Green Setting (Gmax), s		* 66				* 66		26.3				
Max Q Clear Time (g_c+I1), s		67.8				11.6		24.7				
Green Ext Time (p_c), s		0.0				3.6		0.5				

Intersection Summary	
HCM 6th Ctrl Delay	27.4
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	348	510	170	21	393	46	113	60	16	42	71	275
Future Vol, veh/h	348	510	170	21	393	46	113	60	16	42	71	275
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	120	-	-	165	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	366	537	179	22	414	48	119	63	17	44	75	289

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	462	0	0	716	0	0	2024	1865	627	1881	1930	439
Stage 1	-	-	-	-	-	-	1359	1359	-	482	482	-
Stage 2	-	-	-	-	-	-	665	506	-	1399	1448	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1099	-	-	885	-	-	~ 43	73	484	54	~ 66	618
Stage 1	-	-	-	-	-	-	183	217	-	565	553	-
Stage 2	-	-	-	-	-	-	449	540	-	174	196	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1099	-	-	885	-	-	-	~ 47	484	-	~ 43	617
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	~ 47	-	-	~ 43	-
Stage 1	-	-	-	-	-	-	122	145	-	377	539	-
Stage 2	-	-	-	-	-	-	200	527	-	63	131	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	3.4	0.4		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	58	1099	-	-	885	-	-	-
HCM Lane V/C Ratio	-	1.379	0.333	-	-	0.025	-	-	-
HCM Control Delay (s)	-$	366.4	9.9	-	-	9.2	-	-	-
HCM Lane LOS	-	F	A	-	-	A	-	-	-
HCM 95th %tile Q(veh)	-	7	1.5	-	-	0.1	-	-	-

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

MOVEMENT SUMMARY

Site: 5 [PM Future plus Quail 1 School (Site Folder: Arata/Los Amigos Roundabout)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

Quail Acres TIS
Site Category: (None)
Roundabout

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. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: NB Los Amigos															
3	L2	All MCs	113	2.0	113	2.0	0.364	12.6	LOS B	1.6	40.5	0.73	0.75	0.85	26.5
8	T1	All MCs	60	2.0	60	2.0	0.364	12.6	LOS B	1.6	40.5	0.73	0.75	0.85	26.9
18	R2	All MCs	16	2.0	16	2.0	0.364	12.6	LOS B	1.6	40.5	0.73	0.75	0.85	26.7
Approach			189	2.0	189	2.0	0.364	12.6	LOS B	1.6	40.5	0.73	0.75	0.85	26.6
East: WB Arata															
1	L2	All MCs	21	2.0	21	2.0	0.590	13.8	LOS B	4.9	124.9	0.78	0.80	1.19	26.9
6	T1	All MCs	393	2.0	393	2.0	0.590	13.8	LOS B	4.9	124.9	0.78	0.80	1.19	27.3
16	R2	All MCs	46	2.0	46	2.0	0.590	13.8	LOS B	4.9	124.9	0.78	0.80	1.19	27.2
Approach			460	2.0	460	2.0	0.590	13.8	LOS B	4.9	124.9	0.78	0.80	1.19	27.3
North: SB Los Amigos															
7	L2	All MCs	42	2.0	42	2.0	0.501	11.6	LOS B	3.4	86.6	0.73	0.70	0.98	27.5
4	T1	All MCs	71	2.0	71	2.0	0.501	11.6	LOS B	3.4	86.6	0.73	0.70	0.98	27.9
14	R2	All MCs	275	2.0	275	2.0	0.501	11.6	LOS B	3.4	86.6	0.73	0.70	0.98	27.7
Approach			388	2.0	388	2.0	0.501	11.6	LOS B	3.4	86.6	0.73	0.70	0.98	27.7
West: EB Arata															
5	L2	All MCs	348	2.0	348	2.0	0.874	21.7	LOS C	29.0	737.5	1.00	0.83	1.46	24.3
2	T1	All MCs	510	2.0	510	2.0	0.874	21.7	LOS C	29.0	737.5	1.00	0.83	1.46	24.6
12	R2	All MCs	170	2.0	170	2.0	0.874	21.7	LOS C	29.0	737.5	1.00	0.83	1.46	24.5
Approach			1028	2.0	1028	2.0	0.874	21.7	LOS C	29.0	737.5	1.00	0.83	1.46	24.5
All Vehicles			2065	2.0	2065	2.0	0.874	17.2	LOS C	29.0	737.5	0.88	0.79	1.26	25.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Organisation: W-TRANS | Licence: PLUS / FLOATING | Processed: Thursday, November 2, 2023 12:07:38 PM
Project: N:\AAA\SOX\WIN\164WIN Quail Acres 2 VMT Analysis\SIDRA\Arata Los Amigos unsig los comps.sip9



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	348	510	170	21	393	46	113	60	16	42	71	275
Future Volume (veh/h)	348	510	170	21	393	46	113	60	16	42	71	275
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	366	537	179	22	414	48	119	63	17	44	75	289
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	2	2	2	2	2	2
Cap, veh/h	411	641	214	61	467	54	382	454	123	145	216	642
Arrive On Green	0.23	0.48	0.48	0.03	0.28	0.28	0.09	0.32	0.32	0.17	0.17	0.17
Sat Flow, veh/h	1781	1333	444	1781	1640	190	1781	1411	381	448	1233	1581
Grp Volume(v), veh/h	366	0	716	22	0	462	119	0	80	119	0	289
Grp Sat Flow(s),veh/h/ln	1781	0	1778	1781	0	1831	1781	0	1791	1681	0	1581
Q Serve(g_s), s	14.7	0.0	25.9	0.9	0.0	17.8	3.7	0.0	2.3	1.1	0.0	9.8
Cycle Q Clear(g_c), s	14.7	0.0	25.9	0.9	0.0	17.8	3.7	0.0	2.3	4.3	0.0	9.8
Prop In Lane	1.00		0.25	1.00		0.10	1.00		0.21	0.37		1.00
Lane Grp Cap(c), veh/h	411	0	855	61	0	521	382	0	577	361	0	642
V/C Ratio(X)	0.89	0.00	0.84	0.36	0.00	0.89	0.31	0.00	0.14	0.33	0.00	0.45
Avail Cap(c_a), veh/h	579	0	1059	169	0	669	385	0	897	647	0	922
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.5	0.0	16.7	34.9	0.0	25.3	20.0	0.0	17.8	26.9	0.0	16.0
Incr Delay (d2), s/veh	9.6	0.0	4.1	1.3	0.0	9.8	0.2	0.0	0.0	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.0	0.0	10.3	0.4	0.0	8.7	1.5	0.0	0.9	1.8	0.0	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.1	0.0	20.8	36.2	0.0	35.1	20.1	0.0	17.8	27.1	0.0	16.1
LnGrp LOS	D	A	C	D	A	D	C	A	B	C	A	B
Approach Vol, veh/h		1082			484			199			408	
Approach Delay, s/veh		26.3			35.1			19.2			19.3	
Approach LOS		C			D			B			B	

Timer - Assigned Phs		2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s		27.8	6.5	39.5	10.9	16.9	21.1	25.0				
Change Period (Y+Rc), s		4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s		37.0	7.0	44.0	7.0	26.0	24.0	27.0				
Max Q Clear Time (g_c+I1), s		4.3	2.9	27.9	5.7	11.8	16.7	19.8				
Green Ext Time (p_c), s		0.3	0.0	3.2	0.0	0.8	0.4	1.2				

Intersection Summary												
HCM 6th Ctrl Delay			26.3									
HCM 6th LOS			C									

Appendix D

Traffic Signal Warrant Analysis

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Warrant 3: Peak-Hour Volumes and Delay

Arata Lane & Los Amigos Road
Town of Windsor

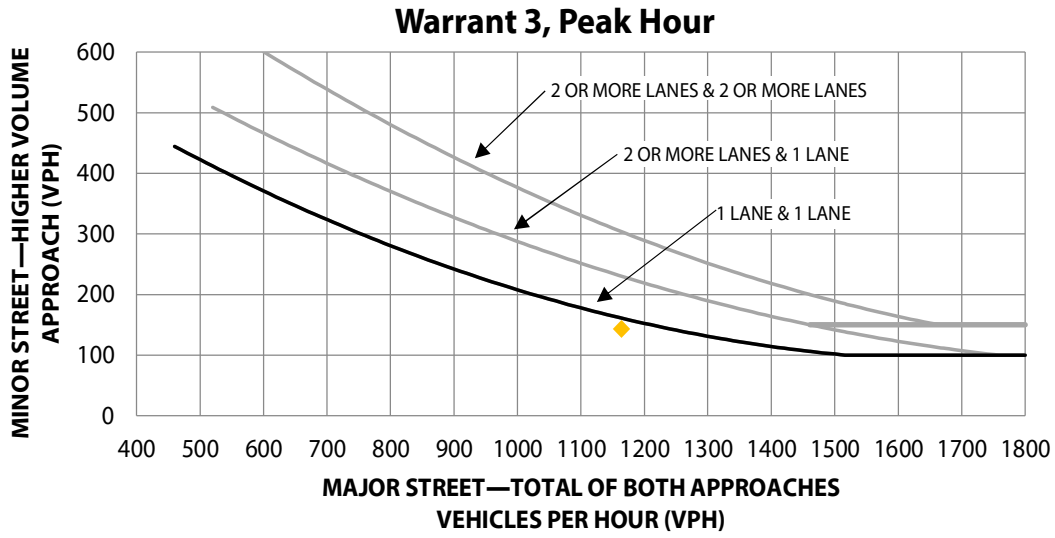
Project Name: Quail Acres 1 TIS

Intersection: 5

	Major Street	Minor Street
Street Name	Arata Lane	Los Amigos Road
Direction	E-W	N-S
Number of Lanes	1	1
Approach Speed	40	40

Population less than 10,000? No
Date of Count: September 2023
Scenario: Existing plus Project AM Peak Hour

Warrant 3 Met?: Met when either Condition A or B is met	**Yes**
Condition A: Met when conditions A1, A2, and A3 are met	Met
Condition A1	Met
The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one lane approach, or five vehicle-hours for a two-lane approach	
Minor Approach Delay: 9.6 vehicle-hours	
Condition A2	Met
The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic of 150 vph for two moving lanes	
Minor Approach Volume: 143 vph	
Condition A3	Met
The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more appraches or 650 vph for intersections with three approaches	
Total Entering Volume: 1434 vph	
Condition B	Not Met
The plotted point falls above the curve	



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Appendix E

Trip Generation by Project Phase

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Quail Acres 1 Cumulative Trip Generation by Project Phase											
Land Use	**Units**	**Daily**		**AM Peak Hour**				**PM Peak Hour**			
		Rate	**Trips**	**Rate**	**Trips**	**In**	**Out**	**Rate**	**Trips**	**In**	**Out**
Phase 1											
Single Family Detached Housing	36 du	9.43	339	0.70	25	6	19	0.94	34	21	13
Single Family Attached Housing	8 du	7.20	58	0.48	4	1	3	0.57	5	3	2
Potential Accessory and Junior Accessory Units[1]	15 residents	2.65	40	0.21	3	1	2	0.28	4	3	1
Phase 1 Total			**437**		**32**	**8**	**24**		**43**	**27**	**16**
Phases 1 and 2											
Single Family Detached Housing	116 du	9.43	1,094	0.70	81	20	61	0.94	109	69	40
Single Family Attached Housing	16 du	7.20	115	0.48	8	2	6	0.57	9	5	4
Potential Accessory and Junior Accessory Units[1]	36 residents	2.65	95	0.21	8	2	6	0.28	10	7	3
Phases 1 and 2 Total			**1,304**		**97**	**24**	**73**		**128**	**81**	**47**
Phases 1, 2, and 3											
Single Family Detached Housing	188 du	9.43	1,773	0.70	132	33	99	0.94	177	111	66
Single Family Attached Housing	20 du	7.20	144	0.48	10	2	8	0.57	11	7	4
Potential Accessory and Junior Accessory Units[1]	60 residents	2.65	159	0.21	13	4	9	0.28	17	11	6
Phases 1, 2, and 3 Total			**2,076**		**155**	**39**	**116**		**205**	**129**	**76**
Project Buildout (1, 2, 3, and 1B)											
Single Family Detached Housing	255 du	9.43	2,405	0.70	179	45	134	0.94	240	151	89
Single Family Attached Housing	46 du	7.20	331	0.48	22	6	16	0.57	26	15	11
Potential Accessory and Junior Accessory Units[1]	81 residents	2.65	215	0.21	17	5	12	0.28	23	15	8
Project Buildout Total			**2,951**		**218**	**56**	**162**		**289**	**181**	**108**

Note: du = dwelling unit; [1] Approximately 25 percent of the parcels that could accommodate optional ADUs are assumed to be built and occupied as separate households at an average of 1.5 residents per ADU

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Appendix F

Queuing Calculations

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1: Old Redwood Hwy & US 101 South Ramps



Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	6	210	2	20	367	439	42	99	1
v/c Ratio	0.02	0.47	0.00	0.09	0.62	0.33	0.19	0.13	0.00
Control Delay	0.0	24.8	0.0	32.8	25.0	1.2	31.6	14.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	0.0	24.8	0.0	32.8	25.0	1.2	31.6	14.5	0.0
Queue Length 50th (ft)	0	61	0	6	104	0	13	16	0
Queue Length 95th (ft)	0	165	0	33	285	18	54	79	0
Internal Link Dist (ft)	149	369			1300			528	
Turn Bay Length (ft)				85		120	215		35
Base Capacity (vph)	521	900	907	353	933	1419	533	1141	1033
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.23	0.00	0.06	0.39	0.31	0.08	0.09	0.00

Intersection Summary

2: Old Redwood Hwy & Starr Rd



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	382	289	488	447	189	127
v/c Ratio	0.70	0.42	0.93	0.43	0.49	0.30
Control Delay	25.9	4.4	53.1	10.4	26.5	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.9	4.4	53.1	10.4	26.5	6.9
Queue Length 50th (ft)	114	0	160	80	58	0
Queue Length 95th (ft)	223	46	#455	191	129	38
Internal Link Dist (ft)	541			754	1300	
Turn Bay Length (ft)		250	320			65
Base Capacity (vph)	1228	1187	522	1769	1293	1137
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.24	0.93	0.25	0.15	0.11

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

3: Old Redwood Hwy & Arata Ln

10/23/2023



Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	19	262	718	4	191	168	295	173
v/c Ratio	0.09	0.59	0.64	0.03	0.50	0.38	0.60	0.18
Control Delay	29.5	28.8	4.9	37.0	30.4	8.2	27.0	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.5	28.8	4.9	37.0	30.4	8.2	27.0	10.9
Queue Length 50th (ft)	3	69	15	1	51	0	74	21
Queue Length 95th (ft)	29	212	106	13	169	52	232	104
Internal Link Dist (ft)	242	339			419			754
Turn Bay Length (ft)				80		200	265	
Base Capacity (vph)	434	885	1434	237	1055	945	1229	1643
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.30	0.50	0.02	0.18	0.18	0.24	0.11

Intersection Summary

4: US 101 NB Ramp/Los Amigos Rd & Arata Ln

10/23/2023



Lane Group	EBT	WBT	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	464	735	172	174	108	51
v/c Ratio	0.56	0.46	0.41	0.41	0.23	0.17
Control Delay	12.7	9.4	16.7	16.7	5.8	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.7	9.4	16.7	16.7	5.8	5.8
Queue Length 50th (ft)	47	35	25	26	1	0
Queue Length 95th (ft)	200	130	90	91	29	17
Internal Link Dist (ft)	339	805		421		371
Turn Bay Length (ft)					25	
Base Capacity (vph)	1077	2043	1253	1262	1206	599
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.36	0.14	0.14	0.09	0.09

Intersection Summary

1: Old Redwood Hwy & US 101 South Ramps



Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	21	276	8	7	245	196	79	175	1
v/c Ratio	0.10	0.61	0.01	0.04	0.52	0.22	0.32	0.24	0.00
Control Delay	24.4	30.2	0.0	37.3	28.9	1.6	34.7	17.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.4	30.2	0.0	37.3	28.9	1.6	34.7	17.3	0.0
Queue Length 50th (ft)	2	76	0	2	68	0	23	30	0
Queue Length 95th (ft)	27	227	0	18	203	14	87	132	0
Internal Link Dist (ft)	149	369			1300			528	
Turn Bay Length (ft)				85		120	215		35
Base Capacity (vph)	331	816	843	320	846	1106	483	1034	927
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.34	0.01	0.02	0.29	0.18	0.16	0.17	0.00

Intersection Summary

2: Old Redwood Hwy & Starr Rd



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	153	121	299	282	323	141
v/c Ratio	0.45	0.31	0.53	0.23	0.62	0.29
Control Delay	24.8	7.2	21.5	4.7	22.9	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.8	7.2	21.5	4.7	22.9	9.2
Queue Length 50th (ft)	42	0	74	28	88	14
Queue Length 95th (ft)	100	37	#186	68	170	51
Internal Link Dist (ft)	541			754	1300	
Turn Bay Length (ft)		250	320			65
Base Capacity (vph)	1333	1193	566	1829	1403	1184
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.10	0.53	0.15	0.23	0.12

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

3: Old Redwood Hwy & Arata Ln

10/23/2023



Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1	136	442	3	155	118	268	192
v/c Ratio	0.00	0.34	0.42	0.01	0.36	0.27	0.50	0.16
Control Delay	24.0	20.9	2.2	25.3	20.6	6.9	18.7	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	20.9	2.2	25.3	20.6	6.9	18.7	7.6
Queue Length 50th (ft)	0	26	0	1	30	0	49	16
Queue Length 95th (ft)	5	99	35	9	109	38	164	91
Internal Link Dist (ft)	242	339			419			754
Turn Bay Length (ft)				80		200	265	
Base Capacity (vph)	634	1181	1517	341	1356	1144	1508	1802
Starvation Cap Reductn	0	0	42	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.12	0.30	0.01	0.11	0.10	0.18	0.11

Intersection Summary

4: US 101 NB Ramp/Los Amigos Rd & Arata Ln

10/23/2023



Lane Group	EBT	WBT	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	390	328	150	150	168	57
v/c Ratio	0.49	0.22	0.36	0.35	0.32	0.18
Control Delay	11.8	7.6	15.1	15.0	5.2	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.8	7.6	15.1	15.0	5.2	6.4
Queue Length 50th (ft)	34	11	16	16	0	0
Queue Length 95th (ft)	157	53	80	80	35	20
Internal Link Dist (ft)	339	805		421		371
Turn Bay Length (ft)					25	
Base Capacity (vph)	1187	2227	1339	1350	1295	648
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.15	0.11	0.11	0.13	0.09

Intersection Summary

1: Old Redwood Hwy & US 101 South Ramps

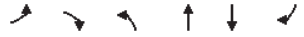


Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	6	217	2	20	371	513	42	100	1
v/c Ratio	0.02	0.47	0.00	0.09	0.63	0.38	0.19	0.14	0.00
Control Delay	0.0	24.6	0.0	33.7	25.8	1.3	32.5	15.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	0.0	24.6	0.0	33.7	25.8	1.3	32.5	15.0	0.0
Queue Length 50th (ft)	0	64	0	6	109	0	14	17	0
Queue Length 95th (ft)	0	169	0	33	#301	18	54	82	0
Internal Link Dist (ft)	149	369			1300			528	
Turn Bay Length (ft)				85		120	215		35
Base Capacity (vph)	516	884	895	347	916	1421	524	1126	1021
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.25	0.00	0.06	0.41	0.36	0.08	0.09	0.00

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

2: Old Redwood Hwy & Starr Rd



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	382	296	505	524	198	127
v/c Ratio	0.70	0.43	0.97	0.51	0.51	0.30
Control Delay	26.1	4.4	61.5	11.4	26.7	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.1	4.4	61.5	11.4	26.7	7.4
Queue Length 50th (ft)	115	0	170	100	61	1
Queue Length 95th (ft)	226	47	#481	237	135	40
Internal Link Dist (ft)	541			754	1300	
Turn Bay Length (ft)		250	320			65
Base Capacity (vph)	1219	1182	518	1763	1283	1128
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.25	0.97	0.30	0.15	0.11

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	382	296	505	524	198	127
v/c Ratio	0.74	0.44	0.79	0.48	0.60	0.35
Control Delay	33.6	5.3	30.6	10.8	40.4	15.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.6	5.3	30.6	10.8	40.4	15.3
Queue Length 50th (ft)	148	0	191	114	78	11
Queue Length 95th (ft)	302	56	358	242	#220	69
Internal Link Dist (ft)	541			754	1300	
Turn Bay Length (ft)		250	320			65
Base Capacity (vph)	818	890	1206	1588	381	400
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.33	0.42	0.33	0.52	0.32

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



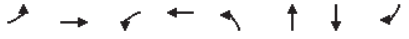
Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	19	282	813	4	191	176	309	173
v/c Ratio	0.10	0.61	0.72	0.03	0.51	0.39	0.61	0.18
Control Delay	30.6	29.9	7.0	38.8	31.9	8.4	27.8	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.6	29.9	7.0	38.8	31.9	8.4	27.8	11.1
Queue Length 50th (ft)	4	78	26	1	54	0	82	23
Queue Length 95th (ft)	30	237	183	13	174	54	247	105
Internal Link Dist (ft)	242	339			419			754
Turn Bay Length (ft)				80		200	265	
Base Capacity (vph)	416	848	1429	227	1010	916	1191	1622
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.33	0.57	0.02	0.19	0.19	0.26	0.11

Intersection Summary



Lane Group	EBT	WBT	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	486	851	172	174	134	51
v/c Ratio	0.54	0.50	0.44	0.44	0.29	0.19
Control Delay	12.3	9.6	18.2	18.2	6.0	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.3	9.6	18.2	18.2	6.0	6.0
Queue Length 50th (ft)	50	43	31	31	1	0
Queue Length 95th (ft)	212	156	90	91	33	17
Internal Link Dist (ft)	339	805		421		371
Turn Bay Length (ft)					25	
Base Capacity (vph)	992	1891	1157	1165	1129	558
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.45	0.15	0.15	0.12	0.09

Intersection Summary



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	48	591	13	614	120	19	39	116
v/c Ratio	0.16	0.49	0.04	0.61	0.33	0.04	0.12	0.21
Control Delay	34.5	11.7	34.6	18.3	23.0	13.7	28.5	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.5	11.7	34.6	18.3	23.0	13.7	28.5	5.8
Queue Length 50th (ft)	16	112	4	191	33	2	13	0
Queue Length 95th (ft)	66	392	27	415	97	19	47	37
Internal Link Dist (ft)		805		295		315	144	
Turn Bay Length (ft)	150		120					50
Base Capacity (vph)	300	1440	311	1481	376	1082	784	555
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.41	0.04	0.41	0.32	0.02	0.05	0.21

Intersection Summary

1: Old Redwood Hwy & US 101 South Ramps



Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	21	300	8	7	247	245	79	179	1
v/c Ratio	0.10	0.64	0.01	0.04	0.52	0.26	0.33	0.25	0.00
Control Delay	24.8	30.8	0.0	37.8	29.5	1.6	35.3	17.7	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.8	30.8	0.0	37.8	29.5	1.6	35.3	17.7	0.0
Queue Length 50th (ft)	2	85	0	2	72	0	24	34	0
Queue Length 95th (ft)	27	248	0	18	205	16	87	135	0
Internal Link Dist (ft)	149	369			1300			528	
Turn Bay Length (ft)				85		120	215		35
Base Capacity (vph)	325	799	830	313	829	1112	473	1015	914
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.38	0.01	0.02	0.30	0.22	0.17	0.18	0.00

Intersection Summary

2: Old Redwood Hwy & Starr Rd



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	153	140	311	333	349	141
v/c Ratio	0.45	0.34	0.56	0.27	0.64	0.28
Control Delay	25.4	7.2	23.6	4.9	23.2	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.4	7.2	23.6	4.9	23.2	9.5
Queue Length 50th (ft)	44	0	83	35	97	15
Queue Length 95th (ft)	103	40	#220	83	187	53
Internal Link Dist (ft)	541			754	1300	
Turn Bay Length (ft)		250	320			65
Base Capacity (vph)	1301	1172	553	1820	1369	1156
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.12	0.56	0.18	0.25	0.12

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



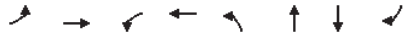
Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	1	150	505	3	155	142	315	192
v/c Ratio	0.00	0.38	0.46	0.01	0.37	0.32	0.55	0.16
Control Delay	28.0	22.9	2.2	28.0	22.7	7.2	19.5	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.0	22.9	2.2	28.0	22.7	7.2	19.5	7.5
Queue Length 50th (ft)	0	32	0	1	33	0	63	17
Queue Length 95th (ft)	5	117	36	9	120	44	202	93
Internal Link Dist (ft)	242	339			419			754
Turn Bay Length (ft)				80		200	265	
Base Capacity (vph)	596	1124	1524	321	1288	1100	1445	1771
Starvation Cap Reductn	0	0	60	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.13	0.34	0.01	0.12	0.13	0.22	0.11

Intersection Summary



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	153	552	12	291	76	27	104
v/c Ratio	0.27	0.45	0.02	0.39	0.12	0.05	0.18
Control Delay	19.6	8.1	21.9	13.1	16.2	14.3	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.6	8.1	21.9	13.1	16.2	14.3	8.3
Queue Length 50th (ft)	27	47	2	48	13	3	4
Queue Length 95th (ft)	117	272	20	143	55	23	42
Internal Link Dist (ft)		805		295		315	144
Turn Bay Length (ft)	150		120		165		
Base Capacity (vph)	773	1466	514	1406	1132	1086	980
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.38	0.02	0.21	0.07	0.02	0.11

Intersection Summary



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	153	552	12	291	76	27	26	78
v/c Ratio	0.24	0.42	0.02	0.35	0.19	0.04	0.04	0.10
Control Delay	22.2	10.0	28.5	16.6	17.4	14.4	21.8	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.2	10.0	28.5	16.6	17.4	14.4	21.8	3.6
Queue Length 50th (ft)	28	48	2	50	14	4	5	0
Queue Length 95th (ft)	137	347	23	200	61	25	32	22
Internal Link Dist (ft)		805		295		315	144	
Turn Bay Length (ft)	150		120					50
Base Capacity (vph)	947	1598	597	1506	398	1379	1186	1023
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.35	0.02	0.19	0.19	0.02	0.02	0.08

Intersection Summary

1: Old Redwood Hwy & US 101 South Ramps



Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	11	315	9	23	382	536	61	129	1
v/c Ratio	0.06	0.58	0.01	0.12	0.66	0.39	0.28	0.19	0.00
Control Delay	26.5	27.4	0.0	37.0	29.3	1.4	35.7	18.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.5	27.4	0.0	37.0	29.3	1.4	35.7	18.5	0.0
Queue Length 50th (ft)	2	109	0	9	135	0	24	28	0
Queue Length 95th (ft)	19	258	0	37	#345	20	72	103	0
Internal Link Dist (ft)	149	369			1300			528	
Turn Bay Length (ft)				85		120	215		35
Base Capacity (vph)	307	771	808	302	800	1388	457	979	909
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.41	0.01	0.08	0.48	0.39	0.13	0.13	0.00

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

2: Old Redwood Hwy & Starr Rd



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	403	465	616	405	327	175
v/c Ratio	0.85	0.61	0.90	0.34	0.78	0.41
Control Delay	53.7	7.0	46.8	8.5	49.6	21.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.7	7.0	46.8	8.5	49.6	21.1
Queue Length 50th (ft)	258	0	373	106	205	49
Queue Length 95th (ft)	#448	84	#599	154	310	114
Internal Link Dist (ft)	541			754	1300	
Turn Bay Length (ft)		250	320			65
Base Capacity (vph)	532	801	831	1432	539	518
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.58	0.74	0.28	0.61	0.34

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	403	465	616	405	327	175
v/c Ratio	0.84	0.61	0.89	0.34	0.82	0.44
Control Delay	50.6	6.8	42.7	8.6	55.2	23.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.6	6.8	42.7	8.6	55.2	23.9
Queue Length 50th (ft)	228	0	348	106	192	50
Queue Length 95th (ft)	#448	84	499	154	#393	127
Internal Link Dist (ft)	541			754	1300	
Turn Bay Length (ft)		250				65
Base Capacity (vph)	541	807	965	1472	425	422
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.58	0.64	0.28	0.77	0.41

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	20	337	787	4	215	325	562	220
v/c Ratio	0.14	0.75	0.69	0.06	0.66	0.61	0.81	0.20
Control Delay	42.1	44.5	8.0	56.0	49.6	10.4	36.1	10.4
Queue Delay	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Total Delay	42.1	44.6	8.1	56.0	49.6	10.4	36.1	10.4
Queue Length 50th (ft)	6	154	78	2	101	0	241	41
Queue Length 95th (ft)	36	350	274	16	#259	85	520	129
Internal Link Dist (ft)	242	339			419			754
Turn Bay Length (ft)				80		200	265	
Base Capacity (vph)	141	719	1374	69	475	634	1126	1467
Starvation Cap Reductn	0	17	55	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.48	0.60	0.06	0.45	0.51	0.50	0.15

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	20	337	787	4	215	325	562	220
v/c Ratio	0.18	0.54	0.65	0.06	0.78	0.35	0.91	0.23
Control Delay	37.2	33.7	2.8	47.8	60.3	3.2	50.7	13.2
Queue Delay	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0
Total Delay	37.2	33.7	3.1	47.8	60.3	3.2	50.7	13.2
Queue Length 50th (ft)	8	134	11	2	129	9	316	63
Queue Length 95th (ft)	32	m#311	4	14	#220	48	#501	116
Internal Link Dist (ft)	242	339			419			754
Turn Bay Length (ft)				80		200	650	
Base Capacity (vph)	112	621	1252	71	313	936	668	999
Starvation Cap Reductn	0	0	128	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	20	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.54	0.70	0.06	0.69	0.35	0.84	0.22

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBT	WBT	NBL	NBT	NBR
Lane Group Flow (vph)	890	938	236	237	168
v/c Ratio	1.53	0.38	0.73	0.73	0.47
Control Delay	268.5	5.2	48.0	48.2	23.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	268.5	5.2	48.0	48.2	23.1
Queue Length 50th (ft)	~396	76	135	136	50
Queue Length 95th (ft)	#738	146	217	218	108
Internal Link Dist (ft)	339	805		421	
Turn Bay Length (ft)					25
Base Capacity (vph)	580	2456	484	484	505
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.53	0.38	0.49	0.49	0.33

Intersection Summary

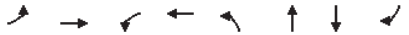
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBT	NBL	NBT
Lane Group Flow (vph)	372	518	938	331	310
v/c Ratio	0.86	0.40	0.68	0.86	0.76
Control Delay	37.3	2.7	26.4	58.0	40.3
Queue Delay	0.0	0.4	0.0	0.0	0.0
Total Delay	37.4	3.2	26.4	58.0	40.3
Queue Length 50th (ft)	230	40	247	202	149
Queue Length 95th (ft)	m278	m51	331	#335	249
Internal Link Dist (ft)		339	805		421
Turn Bay Length (ft)					
Base Capacity (vph)	484	1286	1389	433	454
Starvation Cap Reductn	1	357	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.77	0.56	0.68	0.76	0.68

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	57	642	14	737	126	34	50	175
v/c Ratio	0.27	0.52	0.07	0.80	0.41	0.08	0.19	0.34
Control Delay	40.0	12.9	38.8	25.1	26.8	16.3	31.8	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.0	12.9	38.8	25.1	26.8	16.3	31.8	6.0
Queue Length 50th (ft)	24	134	6	263	45	7	21	0
Queue Length 95th (ft)	77	482	29	#651	98	29	55	43
Internal Link Dist (ft)		805		295		315	144	
Turn Bay Length (ft)	150		120		165			80
Base Capacity (vph)	215	1318	215	1323	311	1066	724	513
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.49	0.07	0.56	0.41	0.03	0.07	0.34

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

1: Old Redwood Hwy & US 101 South Ramps



Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	30	480	28	9	294	319	131	283	2
v/c Ratio	0.18	0.78	0.04	0.06	0.67	0.30	0.53	0.41	0.00
Control Delay	26.8	39.0	0.1	41.9	37.4	1.6	42.5	20.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.8	39.0	0.1	41.9	37.4	1.6	42.5	20.8	0.0
Queue Length 50th (ft)	5	195	0	4	119	0	55	77	0
Queue Length 95th (ft)	36	#528	0	21	254	20	136	213	0
Internal Link Dist (ft)	149	369			1300			528	
Turn Bay Length (ft)				85		120	215		35
Base Capacity (vph)	258	614	687	241	637	1049	364	846	788
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.78	0.04	0.04	0.46	0.30	0.36	0.33	0.00

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

2: Old Redwood Hwy & Starr Rd



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	254	348	496	273	589	219
v/c Ratio	0.79	0.62	0.88	0.20	0.84	0.35
Control Delay	58.5	9.7	50.4	4.3	39.3	15.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.5	9.7	50.4	4.3	39.3	15.7
Queue Length 50th (ft)	164	0	303	46	348	64
Queue Length 95th (ft)	#308	84	#506	70	496	124
Internal Link Dist (ft)	541			754	1300	
Turn Bay Length (ft)		250	320			65
Base Capacity (vph)	362	591	686	1575	897	783
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.59	0.72	0.17	0.66	0.28

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	254	348	496	273	589	219
v/c Ratio	0.77	0.61	0.87	0.20	0.86	0.36
Control Delay	54.0	9.2	46.0	4.7	43.9	19.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.0	9.2	46.0	4.7	43.9	19.0
Queue Length 50th (ft)	145	0	282	48	332	66
Queue Length 95th (ft)	#285	81	415	76	#635	150
Internal Link Dist (ft)	541			754	1300	
Turn Bay Length (ft)		250				65
Base Capacity (vph)	396	615	813	1585	703	624
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.57	0.61	0.17	0.84	0.35

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	3	258	583	3	189	382	683	257
v/c Ratio	0.02	0.70	0.46	0.04	0.60	0.66	0.85	0.21
Control Delay	44.3	46.2	2.7	53.7	45.0	10.5	33.1	7.1
Queue Delay	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0
Total Delay	44.3	46.2	3.1	53.7	45.0	10.5	33.1	7.1
Queue Length 50th (ft)	1	124	17	2	93	0	297	44
Queue Length 95th (ft)	12	#323	84	13	211	90	#678	123
Internal Link Dist (ft)	242	339			419			754
Turn Bay Length (ft)				80		200	265	
Base Capacity (vph)	137	506	1448	68	543	716	1227	1582
Starvation Cap Reductn	0	0	378	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.51	0.54	0.04	0.35	0.53	0.56	0.16

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	3	258	583	3	189	382	683	257
v/c Ratio	0.03	0.47	0.44	0.05	0.75	0.45	0.92	0.24
Control Delay	40.0	39.2	0.8	48.7	60.2	7.0	46.2	10.7
Queue Delay	0.0	0.0	0.2	0.0	0.0	0.0	0.5	0.0
Total Delay	40.0	39.2	1.1	48.7	60.2	7.1	46.7	10.7
Queue Length 50th (ft)	1	104	0	2	116	41	383	66
Queue Length 95th (ft)	11	m#270	0	12	188	105	#599	117
Internal Link Dist (ft)	242	339			419			754
Turn Bay Length (ft)				80		200	650	
Base Capacity (vph)	105	554	1359	63	298	855	796	1116
Starvation Cap Reductn	0	0	249	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	21	12	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.47	0.53	0.05	0.63	0.46	0.87	0.23

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBT	WBT	NBL	NBT	NBR
Lane Group Flow (vph)	1061	680	193	194	285
v/c Ratio	1.39	0.27	0.66	0.66	0.72
Control Delay	203.8	3.5	45.0	45.2	27.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	203.8	3.5	45.0	45.2	27.4
Queue Length 50th (ft)	~803	36	107	108	74
Queue Length 95th (ft)	#1188	81	178	180	159
Internal Link Dist (ft)	339	805		421	
Turn Bay Length (ft)					25
Base Capacity (vph)	761	2506	494	494	567
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.39	0.27	0.39	0.39	0.50

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

4: US 101 NB Ramps & Arata Ln

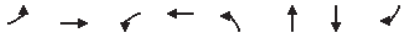


Lane Group	EBL	EBT	WBT	NBL	NBT
Lane Group Flow (vph)	437	624	680	348	324
v/c Ratio	0.86	0.50	0.56	0.85	0.55
Control Delay	35.1	3.4	26.9	54.4	9.2
Queue Delay	1.8	0.8	0.0	0.0	0.0
Total Delay	36.9	4.2	26.9	54.4	9.2
Queue Length 50th (ft)	261	49	165	218	20
Queue Length 95th (ft)	m321	m67	249	316	94
Internal Link Dist (ft)		339	805		421
Turn Bay Length (ft)					
Base Capacity (vph)	585	1259	1218	492	648
Starvation Cap Reductn	53	332	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.82	0.67	0.56	0.71	0.50

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

5: Los Amigos Rd & Arata Ln



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	228	716	22	439	119	59	86	198
v/c Ratio	0.60	0.64	0.10	0.68	0.32	0.11	0.30	0.30
Control Delay	38.1	18.4	38.8	27.1	23.7	16.6	32.8	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.1	18.4	38.8	27.1	23.7	16.6	32.8	4.0
Queue Length 50th (ft)	82	168	8	157	36	12	32	0
Queue Length 95th (ft)	#263	#627	38	340	98	45	85	38
Internal Link Dist (ft)		805		295		315	144	
Turn Bay Length (ft)	150		120		165			80
Base Capacity (vph)	524	1237	229	1093	375	1057	760	774
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.58	0.10	0.40	0.32	0.06	0.11	0.26

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

1: Old Redwood Hwy & US 101 South Ramps



Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	11	342	9	23	393	626	61	141	1
v/c Ratio	0.06	0.61	0.01	0.13	0.67	0.45	0.29	0.21	0.00
Control Delay	26.8	28.2	0.0	37.5	30.3	1.6	36.6	19.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.8	28.2	0.0	37.5	30.3	1.6	36.6	19.0	0.0
Queue Length 50th (ft)	2	124	0	10	150	0	25	34	0
Queue Length 95th (ft)	19	#286	0	37	#360	22	72	111	0
Internal Link Dist (ft)	149	369			1300			528	
Turn Bay Length (ft)				85		120	215		35
Base Capacity (vph)	294	738	782	289	765	1397	437	941	880
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.46	0.01	0.08	0.51	0.45	0.14	0.15	0.00

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

2: Old Redwood Hwy & Starr Rd



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	403	502	657	504	365	175
v/c Ratio	0.89	0.64	0.94	0.41	0.84	0.41
Control Delay	59.8	7.3	52.6	9.1	55.5	22.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.8	7.3	52.6	9.1	55.5	22.5
Queue Length 50th (ft)	270	0	428	142	238	55
Queue Length 95th (ft)	#448	89	#661	202	#379	120
Internal Link Dist (ft)	541			754	1300	
Turn Bay Length (ft)		250	320			65
Base Capacity (vph)	495	804	774	1375	502	482
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.62	0.85	0.37	0.73	0.36

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

2: Old Redwood Hwy & Starr Rd



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	403	501	656	499	365	175
v/c Ratio	0.87	0.64	0.91	0.41	0.91	0.44
Control Delay	56.3	7.2	45.0	9.2	68.2	26.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.3	7.2	45.0	9.2	68.2	26.1
Queue Length 50th (ft)	244	0	384	140	234	57
Queue Length 95th (ft)	#448	89	#557	200	#454	133
Internal Link Dist (ft)	541			754	1300	
Turn Bay Length (ft)		250	600			65
Base Capacity (vph)	511	813	911	1418	401	396
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.62	0.72	0.35	0.91	0.44

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

3: Old Redwood Hwy & Arata Ln



Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	20	381	927	4	215	362	637	220
v/c Ratio	0.17	0.82	0.78	0.07	0.71	0.66	0.86	0.20
Control Delay	44.2	51.4	11.7	58.5	56.2	11.0	41.2	10.7
Queue Delay	0.0	0.3	0.4	0.0	0.0	0.0	0.0	0.0
Total Delay	44.2	51.7	12.1	58.5	56.2	11.0	41.2	10.7
Queue Length 50th (ft)	8	226	151	3	132	0	349	52
Queue Length 95th (ft)	36	#438	449	16	#259	91	#672	129
Internal Link Dist (ft)	242	339			419			754
Turn Bay Length (ft)				80		200	265	
Base Capacity (vph)	121	613	1314	59	405	618	967	1339
Starvation Cap Reductn	0	30	91	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.65	0.76	0.07	0.53	0.59	0.66	0.16

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
3: Old Redwood Hwy & Arata Ln

Future plus Quail 1 w school AM Peak MITIGATED
11/02/2023



Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	20	380	921	4	215	362	636	220
v/c Ratio	0.18	0.67	0.76	0.06	0.79	0.41	0.95	0.22
Control Delay	37.2	39.4	4.7	48.2	61.4	5.2	55.4	12.2
Queue Delay	0.0	1.0	0.6	0.0	0.0	0.0	0.0	0.0
Total Delay	37.2	40.4	5.4	48.2	61.4	5.2	55.4	12.2
Queue Length 50th (ft)	8	168	32	2	128	29	380	62
Queue Length 95th (ft)	32	m#315	m49	14	#226	76	#606	117
Internal Link Dist (ft)	242	339			419			754
Turn Bay Length (ft)				80		200	650	
Base Capacity (vph)	112	571	1226	65	304	881	679	1018
Starvation Cap Reductn	0	54	87	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.74	0.81	0.06	0.71	0.41	0.94	0.22

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Queues
4: US 101 NB Ramps & Arata Ln

Future plus Quail 1 w school AM Peak
11/02/2023



Lane Group	EBT	WBT	NBL	NBT	NBR
Lane Group Flow (vph)	1001	1148	236	237	220
v/c Ratio	2.00	0.47	0.72	0.73	0.58
Control Delay	474.7	6.2	47.4	47.6	25.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	474.7	6.2	47.4	47.6	25.1
Queue Length 50th (ft)	~630	111	135	136	66
Queue Length 95th (ft)	#991	204	217	218	137
Internal Link Dist (ft)	339	805		421	
Turn Bay Length (ft)					25
Base Capacity (vph)	501	2457	483	483	519
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	2.00	0.47	0.49	0.49	0.42

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

4: US 101 NB Ramps & Arata Ln



Lane Group	EBL	EBT	WBT	NBL	NBT
Lane Group Flow (vph)	372	628	1140	359	333
v/c Ratio	0.90	0.49	0.81	0.91	0.76
Control Delay	42.7	3.1	30.3	65.3	36.8
Queue Delay	0.0	0.7	0.0	3.7	0.7
Total Delay	42.7	3.8	30.3	69.0	37.5
Queue Length 50th (ft)	232	47	320	226	145
Queue Length 95th (ft)	m#279	m67	412	#391	#260
Internal Link Dist (ft)		339	805		421
Turn Bay Length (ft)					
Base Capacity (vph)	429	1276	1413	416	459
Starvation Cap Reductn	0	326	0	0	0
Spillback Cap Reductn	0	0	0	22	21
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.87	0.66	0.81	0.91	0.76

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

5: Los Amigos Rd & Arata Ln



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	219	642	14	774	126	70	133	377
v/c Ratio	0.90	0.58	0.10	0.93	0.42	0.14	0.58	0.60
Control Delay	76.5	15.4	41.8	44.0	28.7	20.0	44.4	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.5	15.4	41.8	44.0	28.7	20.0	44.4	18.0
Queue Length 50th (ft)	117	164	7	373	54	23	69	98
Queue Length 95th (ft)	#293	484	28	#771	96	53	122	184
Internal Link Dist (ft)		805		295		315	144	
Turn Bay Length (ft)	150		120		165			80
Base Capacity (vph)	244	1104	142	829	297	775	464	627
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.58	0.10	0.93	0.42	0.09	0.29	0.60

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

1: Old Redwood Hwy & US 101 South Ramps



Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	30	503	28	9	298	365	131	288	2
v/c Ratio	0.18	0.82	0.04	0.06	0.68	0.34	0.53	0.42	0.00
Control Delay	26.8	41.7	0.1	42.0	37.5	1.7	42.7	20.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.8	41.7	0.1	42.0	37.5	1.7	42.7	20.9	0.0
Queue Length 50th (ft)	5	210	0	4	121	0	56	79	0
Queue Length 95th (ft)	36	#560	0	21	257	21	136	216	0
Internal Link Dist (ft)	149	369			1300			528	
Turn Bay Length (ft)				85		120	215		35
Base Capacity (vph)	258	613	686	240	636	1069	363	847	789
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.82	0.04	0.04	0.47	0.34	0.36	0.34	0.00

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

2: Old Redwood Hwy & Starr Rd



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	254	371	512	323	618	219
v/c Ratio	0.81	0.64	0.90	0.24	0.86	0.34
Control Delay	61.6	10.0	54.0	4.5	41.8	16.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.6	10.0	54.0	4.5	41.8	16.1
Queue Length 50th (ft)	171	0	332	56	376	67
Queue Length 95th (ft)	#308	87	#531	84	#569	126
Internal Link Dist (ft)	541			754	1300	
Turn Bay Length (ft)		250	320			65
Base Capacity (vph)	348	600	658	1540	861	752
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.62	0.78	0.21	0.72	0.29

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	254	369	512	320	616	219
v/c Ratio	0.78	0.63	0.88	0.24	0.90	0.36
Control Delay	55.3	9.4	48.0	4.9	48.4	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.3	9.4	48.0	4.9	48.4	19.6
Queue Length 50th (ft)	148	0	296	58	364	69
Queue Length 95th (ft)	#285	84	432	91	#678	152
Internal Link Dist (ft)	541			754	1300	
Turn Bay Length (ft)		250	600			65
Base Capacity (vph)	388	625	796	1573	688	610
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.59	0.64	0.20	0.90	0.36

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	3	276	651	3	189	407	734	257
v/c Ratio	0.02	0.74	0.51	0.05	0.63	0.69	0.86	0.21
Control Delay	46.0	51.0	3.3	55.7	49.3	11.1	34.8	7.1
Queue Delay	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0
Total Delay	46.0	51.0	3.9	55.7	49.3	11.1	34.8	7.1
Queue Length 50th (ft)	1	155	29	2	109	0	376	51
Queue Length 95th (ft)	12	#355	124	13	211	94	#765	123
Internal Link Dist (ft)	242	339			419			754
Turn Bay Length (ft)				80		200	265	
Base Capacity (vph)	122	452	1411	61	485	699	1127	1509
Starvation Cap Reductn	0	0	388	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.61	0.64	0.05	0.39	0.58	0.65	0.17

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

3: Old Redwood Hwy & Arata Ln

11/02/2023



Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	3	275	646	3	189	405	731	257
v/c Ratio	0.03	0.52	0.49	0.05	0.77	0.49	0.95	0.24
Control Delay	40.0	41.3	1.2	48.7	62.5	8.8	50.5	10.4
Queue Delay	0.0	0.0	0.3	0.0	0.0	0.1	1.3	0.0
Total Delay	40.0	41.3	1.4	48.7	62.5	8.9	51.8	10.4
Queue Length 50th (ft)	1	125	5	2	116	57	424	65
Queue Length 95th (ft)	11	m#283	2	12	#204	130	#647	120
Internal Link Dist (ft)	242	339			419			754
Turn Bay Length (ft)				80		200	650	
Base Capacity (vph)	105	533	1344	63	279	826	796	1114
Starvation Cap Reductn	0	0	222	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	24	14	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.52	0.58	0.05	0.68	0.50	0.93	0.23

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

4: US 101 NB Ramps & Arata Ln

11/02/2023



Lane Group	EBT	WBT	NBL	NBT	NBR
Lane Group Flow (vph)	1136	777	193	194	358
v/c Ratio	1.61	0.31	0.62	0.62	0.81
Control Delay	298.0	4.4	42.4	42.6	32.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	298.0	4.4	42.4	42.6	32.2
Queue Length 50th (ft)	~935	51	107	108	99
Queue Length 95th (ft)	#1336	109	178	178	201
Internal Link Dist (ft)	339	805		421	
Turn Bay Length (ft)					25
Base Capacity (vph)	707	2477	488	488	587
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.61	0.31	0.40	0.40	0.61

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

4: US 101 NB Ramps & Arata Ln

11/02/2023



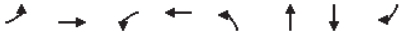
Lane Group	EBL	EBT	WBT	NBL	NBT
Lane Group Flow (vph)	437	695	771	348	392
v/c Ratio	0.87	0.55	0.63	0.85	0.69
Control Delay	35.6	3.7	28.7	55.0	17.3
Queue Delay	2.3	1.1	0.0	0.0	0.0
Total Delay	37.9	4.8	28.7	55.0	17.3
Queue Length 50th (ft)	261	56	203	217	69
Queue Length 95th (ft)	m311	m80	289	#325	176
Internal Link Dist (ft)		339	805		421
Turn Bay Length (ft)					
Base Capacity (vph)	566	1260	1228	475	620
Starvation Cap Reductn	51	318	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.85	0.74	0.63	0.73	0.63

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

5: Los Amigos Rd & Arata Ln

11/02/2023



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	366	716	22	462	119	80	119	289
v/c Ratio	0.74	0.62	0.12	0.75	0.39	0.16	0.47	0.37
Control Delay	39.6	18.1	41.4	36.0	27.3	20.0	39.3	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.6	18.1	41.4	36.0	27.3	20.0	39.3	5.2
Queue Length 50th (ft)	174	187	11	213	50	26	60	20
Queue Length 95th (ft)	#377	#630	38	#471	91	59	111	60
Internal Link Dist (ft)		805		295		315	144	
Turn Bay Length (ft)	150		120		165			80
Base Capacity (vph)	610	1159	177	712	309	960	588	858
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.62	0.12	0.65	0.39	0.08	0.20	0.34

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.