

TRAFFIC IMPACT REPORT

PROPOSED FARMSTEAD AT LONG MEADOW RANCH PROJECT

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Prepared for: CITY OF ST. HELENA

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I. INTRODUCTION

This report has been prepared at the request of the City of St. Helena to determine if the traffic associated with two development scenarios for the Farmstead at Long Meadow Ranch project would result in any significant traffic, pedestrian or bicycle rider impacts. The first would be a proposed 65-unit lodging facility to be located along the east side of State Route 29 north of Mills Lane, while the second would include the 65-unit lodge as well as a new retail butcher shop within the Farmstead Farmers Market along Charter Oak Avenue east of SR 29 and traffic from a 200-guest event at the Charter Oak Avenue facility. The project location is shown in **Figures 1 & 2**. At City request, impacts due to both scenarios have been determined for harvest Friday AM and PM peak hour and Saturday afternoon peak hour traffic conditions for existing (2018), year 2022 and Cumulative (year 2040) conditions. Both year 2022 and 2040 “Without Project” analyses have been conducted assuming no improvements to Mills Lane, while all “With Project” analyses have assumed Mills Lane widening and realignment to intersect SR 29 at the Grayson Avenue signal. “With Project” conditions for both scenarios have also included construction of an improved parking lot in the southwest corner of the Dowdell Lane/McCormick Street intersection for use by lodging as well as Farmstead restaurant and farmers market employees in conjunction with elimination of the existing Farmstead restaurant and farmers market employee parking in a lot along Charter Oak Avenue west of SR 29. Evaluation has been conducted at the Pope Street-Mitchell Street, Charter Oak, Grayson Avenue-Mills Lane and Dowdell Lane intersections along SR 29 as well as along Mills Lane, Dowdell Lane and La Fata Street. Significant impacts, if any, have been identified and measures recommended to reduce all impacts to a less than significant level.

II. EXECUTIVE SUMMARY OF PROJECT IMPACTS & MITIGATIONS

A. LODGE ONLY

- **SIGNIFICANT OFF-SITE OPERATIONAL IMPACTS**
 - **SR 29/Grayson Avenue-Mills Lane** signalized intersection (2040).
Operation as a four-leg signalized intersection will be an unacceptable Level of Service E during the Friday AM peak hour. Before Mills Lane realignment, operation of the SR 29/Grayson signal would be an acceptable Level of Service D.
- **SIGNIFICANT PEDESTRIAN/BICYCLE IMPACTS.**
 - **SR 29/Charter Oak Avenue** intersection (Existing, 2022 & 2040). Lodge guests will use the SR 29 crosswalk at Charter Oak Avenue which will continue to have pedestrian crossing numbers exceeding Caltrans’ warrant criteria for a pedestrian hybrid flashing beacon.

- **RECOMMENDED MITIGATIONS.**

- **SR 29/Grayson Avenue-Mills Lane** intersection. Minor additional improvements are needed when Mills Lane is realigned and widened to connect to SR 29 at Grayson Avenue. The Mills Lane approach should be striped to provide an exclusive left turn lane and a combined through/right turn lane. In addition, the Grayson Avenue approach should be widened to provide a two-lane approach, one exclusively for left turns and one for combined through/right turns. Protected left turn phasing should be provided on the Mills-Grayson approaches.
- **SR 29/Charter Oak Avenue** intersection. Provide a fair share contribution towards a pedestrian hybrid flashing beacon (a High Intensity Activated Crosswalk (HAWK) pedestrian signal) on SR 29 at the Charter Oak Avenue intersection.

B. TOTAL PROJECT

- **SIGNIFICANT OFF-SITE OPERATIONAL IMPACTS**

- **SR 29/Grayson Avenue-Mills Lane** (2040) – None additional, see impact listed above for the lodge.
- **SR 29/Dowdell Lane** intersection (Existing & 2022) – signal warrant
- **SR 29/Charter Oak Avenue** intersection (Existing, 2022 & 2040) – signal warrant

- **SIGNIFICANT PEDESTRIAN/BICYCLE IMPACTS.**

- None additional, see impact listed above for the lodge.

- **RECOMMENDED MITIGATIONS**

- **SR 29/Grayson Avenue-Mills Lane intersection**
Minor additional improvements are needed when Mills Lane is realigned and widened to connect to SR 29 at Grayson Lane. The Mills Lane approach should be striped to provide an additional left turn lane and a combined through/right turn lane. In addition, the Grayson Avenue approach should be widened to provide a two-lane approach, one exclusively for left turns and one for combined through/right turns. Protected left turn phasing should be provided on the Mills-Grayson approaches.
- **SR 29/Dowdell Lane intersection**
Provide a fair share contribution towards future signalization.
- **SR 29/Charter Oak Avenue intersection**
Because City Public Works has indicated they are not in favor of a signal at this location, there are two possible options:

1. Schedule all large events to preclude any event traffic on the roadway system from 3:30-6:00 PM on weekdays and from 1:30-4:00 PM on weekend days. Measure 3 would also eliminate the need for the SR 29/Dowdell Lane mitigation.

— or —

2. Provide additional funding to fully install the HAWK pedestrian signal at the SR 29/Charter Oak Avenue intersection – assuming Caltrans approval.

III. SUMMARY OF “WITH” VERSUS “WITHOUT” PROJECT CONDITIONS

A. WITHOUT PROJECT CONDITIONS

1. EXISTING (2018) HARVEST VOLUMES

Peak hour traffic volumes along Main Street (SR 29) in the project vicinity are similar during the Friday AM and PM commute and Saturday afternoon peak traffic hours (1,511 to 1,643 vehicles per hour [VPH]). Volumes on Mills Lane are minimal during all peak hours (11-25 VPH), while those on La Fata Street are higher on weekdays (31-36 VPH) compared to Saturday (13 VPH). Peak hour volumes on Dowdell Lane are also higher during the week (172 VPH) compared to Saturday (66 VPH).

2-WAY PEAK HOUR VOLUMES – HARVEST 2017

LOCATION	FRIDAY		SATURDAY AFTERNOON
	AM PEAK HOUR	PM PEAK HOUR	PEAK HOUR
Mills Lane (just east of SR 29)	25	20	11
La Fata Street (just north of Dowdell Lane)	31	36	13
Dowdell Lane (just east of SR 29)	172	172	66
SR 29 (just north of Mills Lane)	1,643	1,560	1,511

Source: Komes Traffic Study by Omni Means (2017)

2. UNACCEPTABLE WITHOUT PROJECT INTERSECTION LEVEL OF SERVICE

a. EXISTING (2018) HARVEST

- **SR 29/Pope Street (signal)**
 - Friday AM & PM + Saturday PM peak hours
- **SR 29/Charter Oak Avenue (unsignalized)**
 - Friday AM peak hour – westbound stop sign controlled approach

b. YEAR 2022 HARVEST – MILLS LANE NOT IMPROVED OR REALIGNED

- **SR 29/Pope Street (signal)**
 - Friday AM & PM + Saturday PM peak hours
- **SR 29/ Charter Oak Avenue (unsignalized)**
 - Friday AM peak hour – westbound stop sign controlled approach

c. CUMULATIVE (YEAR 2040) HARVEST – MILLS LANE NOT IMPROVED OR REALIGNED

- **SR 29/Pope Street (signal)**
 - Friday AM & PM + Saturday PM peak hours
- **SR 29/Charter Oak Avenue (unsignalized)**
 - Friday AM & PM peak hours – westbound stop sign controlled approach

3. INTERSECTIONS WITH VOLUMES MEETING CALTRANS PEAK HOUR RURAL SIGNAL WARRANT #3 CRITERIA (WITHOUT PROJECT)

a. EXISTING HARVEST

- **SR 29/Dowdell Lane**
 - Friday AM & PM peak hours
- **SR 29/Charter Oak Avenue**
 - Friday AM & Saturday PM peak hours

b. YEAR 2022 HARVEST

- **SR 29/Dowdell Lane**
 - Friday AM & PM peak hours
 - Saturday PM peak hour
- **SR 29/Charter Oak Avenue**
 - Friday AM & PM peak hours
 - Saturday PM peak hour

c. CUMULATIVE (YEAR 2040) HARVEST

- **SR 29/Dowdell Lane**
 - Friday AM & PM peak hours
 - Saturday PM peak hour
- **SR 29/Charter Oak Avenue**
 - Friday AM & PM peak hours
 - Saturday PM peak hour

4. EXISTING PEDESTRIAN ACTIVITY

There is minimal pedestrian activity along either Mills Lane, Dowdell Lane or La Fata Street in the immediate project area, while some pedestrians (in particular high school students) walk along SR 29 both north and south of the Grayson Avenue signal. The location along SR 29 in the study area having the highest pedestrian crossings was at Charter Oak Avenue. There were from 9 to 73 crossings per hour during the 10 hours surveyed on Friday and Saturday for the report. This crossing, which now has pedestrian activated in-pavement lights, also has combined pedestrian and traffic volumes meeting Caltrans warrant guidelines for provision of a pedestrian hybrid flashing beacon (also called a High Intensity Activated Crosswalk – or HAWK pedestrian signal).

5. EXISTING BICYCLE ACTIVITY

There is minimal bicycle activity now along SR 29 in the study area due to the high traffic volumes and lack of bicycle lanes or paths (1 to 7 riders per hour depending upon the hour and the location). There is little or no bicycle activity along Mills Lane, La Fata Street or Dowdell Lane.

B. PROJECT TRIP GENERATION, DISTRIBUTION & IMPROVEMENTS

1. LODGE

a. Lodging Trip Generation

During a harvest Friday the proposed 65-unit lodging facility at 100 percent occupancy would be expected to generate 544 daily two-way trips with 19 inbound and 13 outbound trips during the AM commute peak traffic hour, as well as 20 inbound and 20 outbound trips during the PM commute peak traffic hour.

During a harvest Saturday the lodging facility at 100 percent occupancy would be expected to generate 534 daily two-way trips, with 17 inbound and 14 outbound trips during the peak traffic hour on SR 29, which would occur in the middle of the afternoon.

All project guests will park at the lodging facility which will be accessed at the Mills Lane/La Fata Street intersection, while all lodging employees will park in an improved parking lot on the southwest corner of the Dowdell Lane/McCormick Street intersection, about a quarter mile south of the lodging facility.

b. Relocation of Farmstead Restaurant/Farmers Market Employee Parking

All restaurant/farmers market employees will relocate from a lot on Charter Oak Avenue west of SR 29 to the new improved parking lot at the Dowdell Lane/McCormick Street intersection.

c. Mills Lane Improvements

Mills Lane will be widened with hotel development from La Fata Street to SR 29 to a 40-foot curb-to-curb width adjacent to the site and a 44-foot width near SR 29 at the signalized Grayson Avenue intersection. In addition, a 10-foot-wide Class I bicycle path/pedestrian walkway will be constructed on the north side of Mills Lane from SR 29 to La Fata Street.

d. La Fata Street Improvements

Large boulders along both side of La Fata Street near Mills Lane will be removed and the street section widened to 40 feet, curb to curb. In addition, a paved walkway will be provided on the west side of La Fata Street between Dowdell Lane and Mills Lane. This will complete the paved walkway system between the lodge and the improved parking lot at the Dowdell Lane/McCormick Street intersection.

e. Lodge Traffic Trip Distribution

Project employees will park in the new lot on the southwest corner of the Dowdell Lane/McCormick Street intersection, while project guests will park on site. Guest parking will be accessed via a driveway connecting to Mills Lane opposite La Fata Street.

Project guest and employee traffic was projected to distribute 50 percent south on SR 29, with 45 percent north on SR 29 and 5 percent on Grayson Avenue during all time periods except the Friday PM peak hour. During this period up to 60 percent of inbound guest traffic would be expected to come from the south on SR 29.

2. TOTAL PROJECT

a. Retail Butcher Shop Trip Generation & Distribution

Three retail customers are projected to be driving to/from the farmers market on Charter Oak Avenue during the Friday & Saturday PM peak hours. The shop will be closed during the Friday AM peak hour.

b. 200-Person Event Trip Generation & Distribution

Fourteen shuttle buses (applicant estimate) and a minor level of non-shuttle auto traffic are projected during the hour before and after an event. All access will be via Charter Oak Avenue and buses will park off site during an event. A vast majority of buses are projected to use SR 29 to/from south of the site.

C. PROJECT SIGNIFICANT OFF-SITE CIRCULATION IMPACTS

1. EXISTING (2018)

a. LODGE ONLY

- i. Intersection Level of Service**
None.
- ii. Signal Warrant**
None.
- iii. Local Roadways**
None.

b. TOTAL PROJECT

- i. Intersection Level of Service**
None.
- ii. Signal Warrant**
 - **SR 29/Dowdell Lane**
 - Friday PM peak hour
 - **SR 29/Charter Oak Avenue**
 - Friday PM peak hour
 - Saturday PM peak hour

- iii. **Local Roadways**
None.

Less than significant with mitigation.

2. YEAR 2022

a. LODGE ONLY

- i. **Intersection Level of Service**
None.
- ii. **Signal Warrant**
None.
- iii. **Local Roadways**
None.

b. TOTAL PROJECT

- i. **Intersection Level of Service**
None.
- ii. **Signal Warrant**
 - **SR 29/Dowdell Lane**
 - Friday PM peak hour
 - Saturday PM peak hour
 - **SR 29/Charter Oak Avenue**
 - Friday PM peak hour
 - Saturday PM peak hour
- iii. **Local Roadways**
None.

Less than significant with mitigation.

3. CUMULATIVE (YEAR 2040)

a. LODGE ONLY

- i. **Intersection Level of Service**
 - **SR 29/Grayson Avenue-Mills Lane**
 - Friday AM peak hour – unacceptable signalized operation
- ii. **Signal Warrant**
None.
- iii. **Local Roadways**
None.

b. TOTAL PROJECT

i. Intersection Level of Service

- **SR 29/Grayson Avenue-Mills Lane**
 - Friday AM peak hour – unacceptable signalized operation

ii. Signal Warrant

- **SR 29/Charter Oak Avenue**
 - Friday PM peak hour
 - Saturday PM peak hour

iii. Local Roadways

None.

Less than significant with mitigation.

D. PROJECT SIGNIFICANT PEDESTRIAN IMPACTS

- Existing Farmstead restaurant and farmers market employee parking will be moved from a lot along Charter Oak Avenue west of SR 29 to a new lot in the southwest corner of the Dowdell Lane/McCormick Street intersection. This will reduce, or at a minimum not increase pedestrian crossings of SR 29 at Charter Oak Avenue. Lodge guests would primarily walk to/from downtown St. Helena via SR 29, traveling through the Farmstead property to Charter Oak Avenue. Some guests will cross SR 29 at Charter Oak Avenue. Since the SR 29 crosswalk at Charter Oak Avenue already meets traffic and pedestrian criteria for provision of a pedestrian hybrid flashing beacon, continued use of the crossing due to project guests would be considered significant.

Less than significant with mitigation.

E. PROJECT BICYCLE RIDER IMPACTS

- There are no bicycle lanes or paths currently in the project area and little bike riding on local streets would initially be expected by lodging guests. However, a Class I bicycle path/pedestrian walkway will be constructed on the north side of Mills Lane from La Fata Street to SR 29. In addition, bicycles will be provided in each room for guests and bicycle lockers will be provided for employees.

Less than significant impact.

F. PROPOSED DOWDELL LANE EMPLOYEE PARKING LOT – SPACES PROVIDED VERSUS DEMAND

- The employee parking lot at the Dowdell Lane/McCormick Street intersection would be paved and have 73 striped parking spaces. Based upon applicant supplied total project employee numbers and shift change times, the maximum parking demand would occur for a one half hour period during the day (2:30-3:00 PM) when there would be up to 73 employees on-site at the same time. However, parking demand would be expected to be 15 to 20 percent less than this total due to car/vanpooling, transit use, drop off/pickup by friends and walking/biking by employees living near the project. The number of spaces to be provided in this lot should be adequate for the employee parking demand as detailed by the applicant.

Less than significant impact.

G. RECOMMENDED MITIGATIONS

A. LODGE

1. SR 29/GRAYSON AVENUE-MILLS LANE – LEVEL OF SERVICE IMPACT

- Minor additional improvements are needed when Mills Lane is realigned and widened to connect to SR 29 at Grayson Lane. The Mills Lane approach should be striped to provide an additional left turn lane and a combined through/right turn lane. In addition, the Grayson Avenue approach should be widened to provide a two-lane approach, one exclusively for left turns and one for combined through/right turns. Protected left turn phasing should be provided on the Mills-Grayson approaches.

2. SR 29/CHARTER OAK AVENUE INTERSECTION – SR 29 PEDESTRIAN CROSSINGS

- Provide a fair share contribution to the “HAWK” pedestrian hybrid flashing beacon proposed for the SR 29/Charter Oak Avenue intersection.

Impacts reduced to less than significant level.

B. TOTAL PROJECT

1. SR 29/GRAYSON AVENUE-MILLS LANE – LEVEL OF SERVICE IMPACT

- Minor additional improvements are needed when Mills Lane is realigned and widened to connect to SR 29 at Grayson Lane. The Mills Lane approach should be striped to provide an additional left turn lane and a combined through/right turn lane. In addition, the Grayson Avenue approach should be widened to provide a two-lane approach, one exclusively for left turns and one for combined through/right turns. Protected left turn phasing should be provided on the Mills-Grayson approaches.

2. SR 29/DOWDELL LANE INTERSECTION – SIGNAL WARRANT IMPACT

- Provide a fair share contribution towards the signal planned at the SR 29/Dowell Lane intersection (as detailed in the Highway 29 Specific Plan).

3. SR 29/CHARTER OAK AVENUE INTERSECTION – SIGNAL WARRANT IMPACTS

- Provide one of the following two measures.
 - a. Start and end all special events with more than 75 people at times that will not add traffic to SR 29 during the weekday and Saturday PM peak traffic periods (3:30-6:00 PM on weekdays and 1:30-4:00 PM on weekend days).
 - or —
 - b. Provide additional funding for the “HAWK” pedestrian hybrid flashing beacon. The beacon will need to be in operation before major events are allowed to add traffic to the existing weekday and weekend peak traffic hours along SR 29. Should Caltrans not approve installation of the HAWK hybrid flashing beacon, then the only measure to reduce the impact to a level of insignificance is measure “a” – eliminating 200-person event traffic during the Friday and Saturday PM peak traffic hours.

Impacts reduced to less than significant level.

IV. PROJECT LOCATION & DESCRIPTION

A. LODGE

The proposed 65-unit Farmstead at Long Meadow Ranch lodging facility would be located east of SR 29 and north of Mills Lane in the southern section of the City of St. Helena (see **Figures 1 & 2 – Regional and Local Area Maps, Figure 3 – Existing Intersection Geometrics & Control, and Figure 4 – Site Plan**). Currently, the vast majority of the lodge site is vacant with the exception of a vegetable garden. The only street bordering the lodge site is Mills Lane, on the south. The site extends along Mills Lane from the Napa Valley Wine Train right-of-way to just east of the La Fata Street intersection. Lodge guest parking would be on-site and accessed via a driveway which would be the north leg of the Mills Lane/La Fata Street intersection, while lodge employee parking would be in a new paved lot on the southwest corner of the Dowdell Lane/McCormick Street intersection (see **Figure 5**). This lot is currently undeveloped and will also be used by employees of the existing Farmstead restaurant and farmers market. Overall the lodge will employ 65 staff, with a maximum of 47 on site during any given day. An on-call shuttle bus will be provided for all staff unable to walk between the new lot and either the lodge or restaurant/farmers market. A shelter will also be provided adjacent to the lot.

Mills Lane is planned to be widened between La Fata Street and SR 29 as well as realigned to intersect SR 29 as the fourth leg of the signalized Grayson Avenue intersection in conjunction with development of the Farmstead Lodge. The existing Mills Lane crossing of the Wine Train track would be eliminated and a new at-grade crossing provided. The new Mills Lane at-grade crossing of the Napa Valley Wine Train track would be protected by gates and flashing lights. Mills Lane will have two travel lanes, on-street parking on both sides of the street adjacent to the lodge and a Class I bicycle path and pedestrian walkway on the north side of the street from SR 29 to La Fata Street. The Mills Lane approach to the SR 29/Grayson Avenue signal will have two lanes, one exclusively for right turns and one for combined through/left turns.

The northwest end of the project site would extend to the Napa Valley Wine Train right-of-way and be adjacent to the existing Farmstead at Long Meadow Ranch restaurant and farmers market. Access between the two parcels would be possible for pedestrians and bicycles, but not autos. Guests walking to/from downtown St. Helena would use this route through the restaurant property to access SR 29 at the Charter Oak intersection.

The proposed lodging facility will contain 65 rooms as well as spa facilities for guests only. The existing Farmstead restaurant will be available for meals. There will be an expansion of existing cooking classes as well as gardening and crafts demonstrations (now taking place at the Farmstead restaurant to the north) in conjunction with the new lodging units. However, classes will be during non-peak restaurant and farmers market traffic hours (9:00 a.m. to noon).

As part of project development a Class I paved path/pedestrian walkway will be provided on the north side of Mills Lane between La Fata Street and SR 29. In addition, a paved pathway will be provided along the west side of La Fata Street between Mills Lane and Dowdell Lane that will complete a paved walkway system between the employee improved parking lot and the lodge entrance.

La Fata Street will be widened to 40 feet (curb to curb) just south of Mills Lane in conjunction with removal of the boulders that now line both sides of the street in this area. Finally, stop signs will be provided on the La Fata Street-Lodge driveway approaches to Mills Lane.

A Transportation Demand Management (TDM) coordinator will be provided in order to establish and maintain ongoing programs to reduce vehicle trips by guests and employees. Such measures will include car and vanpooling programs for employees, winery tours for guests with pickup/drop off at the lodge, etc.

B. RETAIL BUTCHER SHOP & 200-PERSON EVENT

A 408-square-foot butcher shop will be added to the farmers market and be open to the public. Hours will be 10:00 AM to 6:00 PM. Existing farmers market butchers and staff will work in the new retail facility. Local customers will either walk or drive to/from the site.

Based upon the applicant's request for four 200-person events per week with no restrictions on beginning or end times, for analysis purposes the City has requested that traffic from this size event be assumed on the local roadway network during the Friday and Saturday PM peak traffic hours. Access would be via 14 shuttle buses, although a few attendees would also be likely to drive. All shuttle buses will access the restaurant/farmers market parking lot along Charter Oak Avenue. They are assumed to park off site during the event.

V. SCOPE OF SERVICES

The following scope of services was requested by City of St. Helena staff for the traffic analysis.

I. ANALYSIS LOCATIONS

- SR 29/Pope Street-Mitchell Street intersection (signal)
- SR 29/Charter Oak Avenue intersection
- SR 29/Mills Lane intersection
- SR 29/Grayson Avenue intersection (signal)
- SR 29/Dowdell Lane intersection
- Mills Lane
- La Fata Street
- Dowdell Lane

II. ANALYSIS TIME PERIODS

- Harvest Friday AM and PM commute peak traffic hours
- Harvest Saturday afternoon peak traffic hour

III. ANALYSIS SCENARIOS

- A. **Existing Without Project** (with Mills Lane remaining unimproved and not realigned at SR 29)
- B. **Existing + Lodge** (with Mills Lane widened and realigned as the fourth leg of the SR 29/Grayson Avenue signal)
- C. **Existing + Total Project** (lodge, retail butcher shop + 200-person event)
- D. **Year 2022 Without Project** (with Mills Lane remaining unimproved and not realigned at SR 29)
- E. **Year 2022 + Lodge** (with Mills Lane widened and realigned as the fourth leg of the SR 29/Grayson Avenue signal)
- F. **Year 2022 + Total Project** (lodge, retail butcher shop + 200-person event)
- G. **Cumulative (Year 2040) Without Project** (with Mills Lane remaining unimproved and not realigned at SR 29)
- H. **Cumulative (Year 2040) + Lodge** (with Mills Lane widened and realigned as the fourth leg of the SR 29/Grayson Avenue signal)
- I. **Cumulative (Year 2040) + Total Project** (lodge, retail butcher shop + 200-person event)

VI. EXISTING CONDITIONS (WITHOUT PROJECT)

A. ROADWAYS

Main Street (State Routes 29 & 128) is the primary north-south travel route through the Napa Valley and the major north-south route through the City of St. Helena. In this study it is referred to as SR 29. North of St. Helena SR 29 extends to Calistoga and Lake County, while to the south it extends to the cities of Napa and American Canyon. Main Street is classified as a Regional Connector Street in the St. Helena General Plan Update 2030 Circulation Element. In the project vicinity SR 29 has recently been reconstructed and has single travel lanes in each direction and a median continuous two-way left turn lane extending south for about three miles to the Mee Lane intersection. The posted speed limit in the vicinity of Mills Lane is 35 miles per hour and no on-street parking is allowed, while just south of Charter Oak Avenue the speed limit is reduced to 25 miles per hour. Curb and gutter along with two- to four-foot-wide paved shoulder are in place along both sides of the street. The SR 29/Grayson Avenue intersection was signalized about two years ago. There is a crosswalk on the west leg of the intersection (across Grayson Avenue), but none across SR 29. The signal is vehicle activated on the Grayson Avenue approach with SR 29 traffic receiving a continuous green light unless traffic approaches on Grayson Avenue, or a left turn is made from northbound SR 29 to Grayson Avenue. The SR 29 Specific Plan indicates that the SR 29/Dowdell Lane intersection will ultimately be signalized, while the SR 29/Pope Street-Mitchell Street intersection has been signalized for more than 50 years.

Mills Lane is a 14- to 15-foot-wide street extending easterly from SR 29 for about 0.85 miles before ending. It provides access to vineyards and intermittent residences. There are no curbs, gutters, sidewalks or paved shoulders, but grass and gravel shoulders are in place. Two-way

traffic flow is possible by slow-moving vehicles, but it requires one or both drivers to partially pull off to the gravel and grass shoulders. Mills Lane is stop sign controlled on its approach to SR 29 and the posted speed limit is 25 miles per hour. Mills Lane also has about a 20-foot-wide at-grade crossing of the Napa Valley Wine Train single track about 20 feet from the east edge of SR 29. The crossing is protected by stop signs and “Railroad Crossing” crossbucks.

La Fata Street is primarily a 40-foot-wide curb-to-curb street extending southerly from Mills Lane to Dowdell Lane and then further south to Vintage Avenue. The La Fata Street centerlines are offset by about 40 feet at Dowdell Lane. Along the 40-foot section curb and gutter are in place along both sides of the street and on-street parking is allowed. La Fata Street primarily serves wine-related warehousing and production facilities. It is stop sign controlled on both approaches to Dowdell Lane, but not on its approach to Mills Lane. La Fata Street has been narrowed to about 14 to 15 feet for the first 60 feet south of Mills Lane by dirt being placed in the street. Large rocks also line the narrowed roadway and the north side of Mills Lane, potentially to preclude truck turns. There are no sidewalks or pathways along La Fata Street between Mills Lane and Dowdell Lane.

Dowdell Lane is a 40-foot-wide curb-to-curb street extending easterly from SR 29 to the east of La Fata Street, where it continues through a light industrial area and then narrows to serve vineyards and residences. Dowdell Lane between SR 29 and La Fata Street has curb, gutter and sidewalk along the south side of the street and on-street parking is allowed, while curb, gutter, minimal sidewalk and on-street parking is provided on the north side of the street. The posted speed limit is 25 miles per hour. Dowdell Lane is wide enough to allow right and left turning vehicles to separate on its stop sign controlled approach to SR 29. Dowdell Lane also has an at-grade crossing of the Napa Valley Wine Train single track about 20 feet from the east edge of SR 29. The crossing is protected by gates and flashing lights.

Charter Oak Avenue is a two-lane, 38-foot-wide street east and west of SR 29. Their “Tee” intersections with SR 29 are offset by about 90 feet, the west leg being to the north. Both Charter Oak Avenue approaches to SR 29 are stop sign controlled. There is a crosswalk across SR 29 between the offset intersections. The east leg of Charter Oak Avenue also has an at-grade crossing of the Napa Valley Wine Train about 20 feet from the east edge of SR 29. It is protected by gates and flashing lights.

Figure 3 provides a schematic presentation of analysis intersection approach lanes and control. For description purposes in this study, SR 29 and La Fata Street were designated to run in a north-south direction, while Mills Lane, Grayson Avenue, Dowdell Lane and Charter Oak Avenue were designated to run in an east-west direction.

B. RAILWAY

The Napa Valley Wine Train has a single track line extending between St. Helena and the City of Napa. In the project area it runs parallel to and about 20 feet to the east of the east curb of SR 29. Gates and flashing red lights are in place at the railroad’s at-grade crossings of Pope Street, Dowdell Lane and Charter Oak Avenue, but not at Mills Lane. The Mills Lane crossing has top signs and “Railroad Crossing” crossbucks on both approaches. Currently, there are, at most, three round trips per day during the summer and fall. The train speed limit is 15 miles per hour.

C. VOLUMES

1. EXISTING COUNTS (2017-2019)

The Napa County Travel Behavioral Study¹ shows that the highest weekday volumes in Napa Valley occur on a Friday, with the highest weekend volumes occurring on a Saturday. In addition, historical count data from the City of Napa show that Friday has the highest volumes of any weekday, while Caltrans historical counts for SR 29 between St. Helena and Napa also show that weekday AM and PM peak hour volumes are higher on a Friday than on either a Wednesday or Thursday. Therefore, Friday and Saturday peak traffic conditions were evaluated in this study at the request of St. Helena City staff.

Year 2018 fall weekday AM and PM peak hour and Saturday afternoon peak hour turn movement traffic counts were obtained from the City's General Plan Update Draft EIR traffic analysis for the SR 29 intersections with Pope Street-Mitchell Street, Mills Lane and Grayson Avenue. Year 2019 Friday and Saturday peak hour turn movement counts were conducted by Crane Transportation Group at the SR 29/Charter Oak Avenue intersection, while 2017 Friday and Saturday peak hour turn movement counts at the SR 29/Dowdell, Mills/La Fata and Dowdell/La Fata intersections were obtained from the Komes Winery traffic study by Omni Means (March 2018). The SR 29/Grayson Avenue signal was in operation and all local schools were open and had normal schedules on all count days. The peak traffic hours were determined to be 7:45-8:45 AM and 4:30-5:30 PM on Friday, and 2:00-3:00 PM on Saturday. The 2017 and 2019 counts were adjusted to match the 2018 count system used in the General Plan Update Circulation Element. No hose counts were utilized to obtain volume data or peak traffic hours for this study.

Traffic volumes along northbound SR 29 in the project area frequently exhibited stop-and-go flow, particularly during the Friday and Saturday afternoon peak traffic periods. This was due to capacity constraints at the signalized intersections along SR 29 in downtown St. Helena, particularly Pope Street-Mitchell Street. However, many drivers on SR 29 were courteous and stopped to allow turns to or from all side streets and driveways.

2. SEASONAL ADJUSTMENT

Project traffic impacts have been evaluated during September harvest conditions at the request of St. Helena City staff. Based upon more than four years of historical information from Caltrans PeMS (Performance Measurement System) count surveys along SR 29 in the Napa Valley, September has the highest daily volumes of the year (during harvest).

February 2017 peak hour traffic counts in the Komes traffic study and May 2019 traffic counts by Crane Transportation Group were seasonally adjusted to reflect September 2018 harvest conditions based upon historical traffic count data from Caltrans. Resultant harvest 2018 Friday AM and PM peak hour and Saturday afternoon peak hour volumes are presented in **Figures 6, 7 and 8**.

¹ Fehr & Peers, December 8, 2014.

The following chart presents a comparison of projected Harvest 2018 two-way peak hour traffic flows on the roads in close proximity to the project site.

2-WAY PEAK HOUR VOLUMES – HARVEST 2018

LOCATION	FRIDAY		SATURDAY AFTERNOON
	AM PEAK HOUR	PM PEAK HOUR	PEAK HOUR
Mills Lane (just east of SR 29)	25	20	11
La Fata Street (just north of Dowdell Lane)	31	36	13
Dowdell Lane (just east of SR 29)	172	172	66
SR 29 (just north of Mills Lane)	1,643	1,560	1,511

Source: Crane Transportation Group

As shown, two-way volumes along SR 29 are projected to be similar during the Friday AM and PM and Saturday afternoon peak traffic hours (between about 1,511 to 1,643 VPH). Volumes on Mills Lane are minimal during all peak hours (11-25 VPH), while those on La Fata Street are higher on weekdays (31-36 VPH) compared to Saturday (13 VPH). Peak hour volumes on Dowdell Lane are also higher during the week (172 VPH) compared to Saturday (66 VPH).

D. INTERSECTION LEVEL OF SERVICE

1. ANALYSIS METHODOLOGY

Transportation engineers and planners commonly use a grading system called level of service (LOS) to measure and describe the operational status of the local roadway network. LOS is a description of the quality of a roadway facility's operation, ranging from LOS A (indicating free-flow traffic conditions with little or no delay) to LOS F (representing oversaturated conditions where traffic flows exceed design capacity, resulting in long queues and delays). Intersections, rather than roadway segments between intersections, are almost always the capacity controlling locations for any circulation system.

Signalized Intersections. For signalized intersections, the Year 2017 6th Edition *Highway Capacity Manual* (Transportation Research Board, National Research Council) methodology was utilized. With this methodology, operations are defined by the level of service and average control delay per vehicle (measured in seconds) for the entire intersection. For a signalized intersection, control delay is the portion of the total delay attributed to traffic signal operation. This includes delay associated with deceleration, acceleration, stopping, and moving up in the queue. **Table 1** summarizes the relationship between delay and LOS for signalized intersections.

Unsignalized Intersections. For unsignalized (all-way stop-controlled and side-street stop-controlled) intersections, the Year 2017 6th Edition *Highway Capacity Manual* (Transportation Research Board, National Research Council) methodology for unsignalized intersections was utilized. For side-street stop-controlled intersections, operations are defined by the level of service and average control delay per vehicle (measured in seconds), with delay reported for the

stop sign controlled approaches or turn movements. For all-way stop-controlled intersections, operations are defined by the average control delay for the entire intersection (measured in seconds per vehicle). The delay at an unsignalized intersection incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue. **Table 2** summarizes the relationship between delay and LOS for unsignalized intersections.

The Synchro software program was utilized for all level of service analysis. The software is not impacted by speed limits. However, methodology to reflect the impact of vehicle queuing along Main Street was worked out between the City and Fehr & Peers as part of their General Plan Update Circulation Element analysis. This same methodology was utilized in this revised Farmstead Traffic Impact Study.

2. MINIMUM ACCEPTABLE OPERATION

a. Signalized Intersections on Main Street (SR 29)

The City of St. Helena uses LOS D as the poorest acceptable operation at a signalized intersection along Main Street.

b. Unsignalized Intersections on Main Street (SR 29)

The City of St. Helena uses LOS D at unsignalized intersections along Main Street as the poorest acceptable operation for the side street stop sign controlled approach.

3. EXISTING INTERSECTION OPERATION

Table 3 shows that for harvest 2018 conditions three of the five analyzed intersections were experiencing acceptable operation during both the Friday and Saturday peak traffic hours.

HARVEST 2018 ACCEPTABLE OPERATION (FRIDAY & SATURDAY PEAK TRAFFIC HOURS)

SR 29/Mills Lane (Mills Lane single lane stop sign controlled approach)	LOS B
SR 29/Grayson Avenue (signal)	LOS C or D
SR 29/Dowdell Lane (Dowdell Lane 2-lane stop sign controlled approach)	LOS C

It should be noted that the new median continuous two-way left turn lane provided on SR 29 greatly facilitates left turn movements from Dowdell Lane, as do the older continuous two-way left turn lanes north and south of Charter Oak Avenue.

Table 3 also shows that two of the intersections were experiencing unacceptable operation.

HARVEST 2018 UNACCEPTABLE OPERATION

SR 29/Pope Street-Mitchell Street
SR 29/Charter Oak Avenue

LOS F during all Friday & Saturday peak hours
LOS E during the Friday AM peak hour

The SR 29/Charter Oak Avenue intersection experienced acceptable levels of service (LOS C or D) on both Charter Oak Avenue stop sign controlled intersection approaches during the Friday and Saturday PM peak traffic hours. However, during the Friday AM peak hour, while the eastbound approach was operating at an acceptable LOS C, the westbound approach was operating at an unacceptable LOS E. Level of service worksheets are contained in **Appendix A**.

E. INTERSECTION SIGNAL WARRANTS

1. ANALYSIS METHODOLOGY

Traffic signals are used to provide an orderly flow of traffic through an intersection. Many times they are needed to offer side street traffic an opportunity to access a major road where high volumes and/or high vehicle speeds block crossing or turn movements. They do not, however, increase the capacity of an intersection (i.e., increase the overall intersection's ability to accommodate additional vehicles) and, in fact, often slightly reduce the number of total vehicles that can pass through an intersection in a given period of time. Signals can also cause an increase in traffic accidents if installed at inappropriate locations.

There are 10 possible tests for determining whether a traffic signal should be considered for installation. These tests, called "warrants", consider criteria such as actual traffic volume, pedestrian volume, presence of school children, and accident history. The intersection volume data together with the available collision histories were compared to warrants contained in the *California Manual on Uniform Traffic Control Devices, 2014, Revision 3 (2014 CMUTCD Rev. 2)*. Section 4C of the 2014 CMUTCD Rev. 3 provides guidelines, or warrants, which may indicate need for a traffic signal at an unsignalized intersection. As indicated in the 2014 CMUTCD Rev. 3, satisfaction of one or more warrants does not necessarily require immediate installation of a traffic signal. It is merely an indication that the local jurisdiction should begin monitoring conditions at that location and that a signal may ultimately be required.

Warrant 3, the peak hour volume warrant, is often used as an initial check of signalization needs since peak hour volume data is typically available and this warrant is usually the first one to be met. Warrant 3 is based on a logarithmic curve and takes only the hour with the highest volume of the day into account. Please see **Appendix B Figures A-1 to A-2** for the warrant charts.

Caltrans "rural" peak hour volume signal warrant has been used for all unsignalized intersection analysis along SR 29 in this study. Rural warrant criteria are used where speeds on the uncontrolled approaches are 40 mph or greater, or where the local population is less than 10,000 people. Although the speeds on SR 29 at the analysis intersections in this study are less than 40 mph, the St. Helena population is less than 10,000 people. Therefore, based upon direction from the City, rural warrants were used for evaluation purposes.

2. MINIMUM ACCEPTABLE OPERATION

Table 4 shows that the **SR 29/Charter Oak Avenue** intersection would have volumes meeting rural signal warrant criteria during the Friday AM and Saturday PM peak hours, while the **SR 29/Dowdell Lane** intersection would have volumes meeting rural warrant criteria during the Friday AM and PM peak hours.

F. PLANNED OR ONGOING IMPROVEMENTS

Mills Lane widening and realignment at SR 29. Mills Lane is planned to be widened between La Fata Street and SR 29 as well as realigned to intersect SR 29 as the fourth leg of the signalized Grayson Avenue intersection in conjunction with development of the Farmstead Lodge. Mills Lane will have a two-lane approach to SR 29, currently planned as an exclusive right turn lane and a shared through/left turn lane. This will necessitate split signal phasing on the Mills Lane and Grayson Avenue intersection approaches.

SR 29/Dowdell Lane signalization. The Highway 29 Specific Plan (February 2005) indicates that the SR 29/Dowdell Lane intersection will be signalized at some unspecified time in the future. At direction of City staff, this intersection has not been assumed signalized for any analysis horizon year.

G. PEDESTRIAN & BICYCLE FACILITIES AND VOLUMES

1. PEDESTRIAN

a. Facilities

Sidewalks are provided along the following streets in the project area.

- SR 29 along both sides of street north of Charter Oak Avenue.
- SR 29 along the west side of the street, Charter Oak Avenue to Grayson Avenue.
- SR 29 gravel pathway along west side of street from Grayson Avenue to Dowdell Lane.
- Grayson Avenue along both sides of the street.
- Charter Oak Avenue east of SR 29, both sides of the street.
- Charter Oak Avenue west side of SR 29, south side of the street (sidewalk or paved path).
- Dowdell Lane, south side of the street from La Fata Street to McCormick Street.

There are no sidewalks along Mills Lane or along La Fata Street between Mills Lane and Dowdell Lane. There are crosswalks of SR 29 at the following locations.

- Charter Oak Avenue between the two offset Charter Oak Tee intersections. This crossing also includes pedestrian activated “in pavement” flashing lights on each side of the crosswalk.

b. Volumes

Figure 9 presents pedestrian volumes at the five analysis intersections along SR 29 as well as along Mills Lane, La Fata Street and Dowdell Lane during the Friday AM & PM and Saturday afternoon peak traffic hours. Counts at the Pope Street-Mitchell Street, Charter Oak, Mills Lane and Grayson Avenue intersections were from 2018 or 2019 unless a 2016 count had a higher pedestrian total. Counts along Mills Lane, La Fata Street and Dowdell Lane were from 2016. As shown, the highest volume location for pedestrian crossings of SR 29 was at the Charter Oak Avenue crosswalk. **Table 5** provides the total pedestrian crossings by hour at this location. Friday and Saturday pedestrian crossings of SR 29 at Charter Oak Avenue were conducted in both 2016 (May and June) and 2019 (September). As shown, the 2016 crossings were typically higher each hour than those in 2019.

SR 29 PEDESTRIAN CROSSINGS AT CHARTER OAK AVENUE

DAY & TIME	HIGHEST HOURLY VOLUME	
	2016	2019
Friday AM Peak Period (7:00-9:00 AM)	31	20
Friday PM Peak Period (3:00-6:00 PM)	58	45
Saturday PM Peak Period (1:00-6:00 PM)	73	41

Source: Crane Transportation Group

Pedestrian crossings of SR 29 in 2016 at Grayson Avenue-Mills Lane intersections ranged from 5 to 14 people per hour during the three peak traffic hours evaluated, while crossings at Dowdell Lane ranged from 7 to 10 people per hour during the same hours.

c. Pedestrian Hybrid Beacon Guidelines

The California Manual of Uniform Traffic Control Devices 2014 (California MUTCD, Revision 4, March 29, 2019) has guidelines for the installation of pedestrian hybrid beacons on high and low speed roadways. These devices are also referred to as High Intensity Activated Crosswalk or “HAWK” pedestrian signals. Low speed roadways are those where vehicle speeds are 35 mile per hour or less, which would be appropriate for SR 29 at Charter Oak Avenue. The chart for installation with vehicular and pedestrian input values is presented in **Appendix C-Figure A-3**. With two-way hourly volumes on SR 29 of more than 1,350 vehicles per hour and a crosswalk length of about 46 feet at Charter Oak Avenue, the chart indicates that a pedestrian hybrid beacon would be appropriate with more than 20 pedestrian crossings an hour. The number of pedestrian crossings during 9 of the 10 survey hours exceeded this number of pedestrians. It should be noted that activation of the HAWK beacon will provide a red light to north and southbound traffic flow on SR 29. This will allow left turn movements to proceed from both Charter Oak Avenue approaches.

In contrast, at the Dowdell Lane intersection based upon similar vehicular volumes and a curb-to-curb width of about 40 feet on SR 29, the number of pedestrian crossings would not meet guideline criteria for provision of a beacon at this location.

2. BICYCLE

a. Facilities

There are no Class I bicycle paths, signed and striped Class II bicycle lanes or signed Class III bike routes in the project vicinity.

b. Volumes

Figure 10 presents 2018, 2019 and 2016 bicycle rider counts. As shown, there were more bicycle riders along SR 29 at Charter Oak Avenue than at Dowdell Lane: During the Friday AM peak hour there were 9 at Charter Oak Avenue and 7 at Dowdell Lane; during the Friday PM peak hour there were 10 at Charter Oak Avenue and 2 at Dowdell Lane; and during the Saturday afternoon peak hour there were 6 at Charter Oak Avenue and 2 at Dowdell Lane. Bike ridership along Mills Lane, La Fata Street and Dowdell Lane was minimal during all peak hours; one or zero bike riders on any of these three streets.

H. PLANNED PEDESTRIAN AND BICYCLE FACILITIES

1. PEDESTRIAN

A combined sidewalk/Class I bike path will be provided by the project along the north side of Mills Lane when it is widened between SR 29 and La Fata Street as part of project development. In addition, a paved pathway will be provided on the west side of La Fata Street between Mills and Dowdell lanes as part of project development.

2. BICYCLE

Based upon the St. Helena Bicycle Plan and current updates provided by City staff,² bike routes are planned in the following locations in the project area.

- SR 29 – Class II bicycle lanes.
- Mills Lane – Class II bicycle lanes extending from SR 29 to the east of La Fata Street. However, the City has agreed that a Class I path on the north side of Mills Lane between SR 29 and La Fata Street can replace the previously proposed Class II bike lanes as part of the Farmstead lodge project.
- Charter Oak Avenue (east of SR 29) – Class I multiuse path.
- It was formerly planned that the Class I Vine Trail bicycle/pedestrian path be located along the Wine Train right-of-way. However, it has been determined by the City that there is insufficient right-of-way to accommodate the Vine Trail in this location.

² By Whitlock & Weinberger Transportation, Inc. & Questa Engineering Corp., January 2012.

VII.FUTURE HORIZON (WITHOUT PROJECT) ANALYSIS CONDITIONS

Traffic analysis has also been conducted in this study for two future horizon years as requested by St. Helena City staff:

- The year after estimated project completion – year 2022
- Cumulative Conditions – year 2040

A. YEAR 2022 WITHOUT PROJECT CONDITIONS

1. NO MILLS LANE WIDENING OR REALIGNMENT

a. Volumes

Year 2022 peak hour traffic volumes have been developed using both a specific list of known projects supplied by the City of St. Helena Planning Department and a 1 percent per year growth rate along SR 29 to reflect regional growth. Specific projects and their projected Friday AM & PM peak hour and Saturday afternoon peak hour trip generation are presented in **Table 6** with resultant year 2022 harvest Friday AM and PM peak hour and Saturday afternoon peak hour (Without Project) traffic volumes presented in **Figures 11, 12 and 13**, respectively.

b. Intersection Level of Service

Table 7 shows that for harvest 2022 conditions three of the five analyzed intersections would be experiencing acceptable operation during the harvest Friday and Saturday peak traffic hours.

HARVEST 2022 ACCEPTABLE OPERATION (FRIDAY & SATURDAY PEAK TRAFFIC HOURS)

SR 29/Mills Lane (Mills Lane stop sign controlled)	LOS B or C
SR 29/Grayson Avenue (signal)	LOS C or D
SR 29/Dowdell Lane (Dowdell Lane 2-lane stop sign controlled approach)	LOS C

Table 7 also shows that two of the intersections were experiencing unacceptable operation.

HARVEST 2018 UNACCEPTABLE OPERATION

SR 29/Pope Street-Mitchell Street	LOS F during all peak hour
SR 29/Charter Oak Avenue	LOS E during the Friday AM peak hour

The SR 29/Charter Oak Avenue intersection would experience acceptable levels of service (LOS C or D) on both Charter Oak Avenue stop sign controlled intersection approaches during the Friday and Saturday PM peak traffic hours. However, during the Friday AM peak hour, while the eastbound approach would be operating at an acceptable LOS C, the westbound approach

would be operating at an unacceptable LOS E. Level of service worksheets are contained in **Appendix A**.

c. Intersection Signal Warrant

Table 4 shows that both the SR 29/Charter Oak Avenue and SR 29/Dowdell Lane intersections would have harvest 2022 Friday AM & PM peak hour and Saturday PM peak hour volumes meeting rural signal Warrant #3 volume criteria levels.

B. CUMULATIVE (YEAR 2040) WITHOUT PROJECT CONDITIONS

1. NO MILLS LANE WIDENING OR REALIGNMENT

a. Volumes

Cumulative (year 2040) weekday AM and PM peak hour and Saturday PM peak hour volumes for the SR 29/Pope Street-Mitchell Street, SR 29/Grayson Avenue and SR 29/Mills Lane intersections were obtained from the City's General Plan Update Circulation Element traffic analysis as directed by St. Helena Planning staff. In addition, cumulative projections were developed for the SR 29/Charter Oak Avenue and SR 29/Dowdell Lane intersections as well as for Dowdell Lane, Mills Lane and La Fata Street based upon traffic from the list of cumulative projects considered in the General Plan Update Circulation Element for the project area (see **Table 6**).

Resultant cumulative (year 2040) harvest Friday AM and PM peak hour and Saturday afternoon peak hour Without Project volumes are presented in **Figures 14, 15 and 16**, respectively. It should be noted that cumulative traffic projections from the 2040 General Plan Update analysis included a 75-unit hotel on the Farmstead project site. Trip generation from this lodging facility (using standard Institute of Transportation Engineers *Trip Generation Manual*, 10th Edition trip rates)³ was removed from the Cumulative projections to reflect a true "Without Project" condition for the analysis roadways.

b. Intersection Level of Service

Table 8 shows that for cumulative (year 2040) conditions three of the five analyzed intersections would be experiencing acceptable operation during both the Friday and Saturday peak traffic hours.

³ Institute of Transportation Engineers, 2017.

CUMULATIVE (YEAR 2040) ACCEPTABLE OPERATION (FRIDAY & SATURDAY PEAK TRAFFIC HOURS)

SR 29/Mills Lane (Mills Lane stop sign controlled)	LOS B or C
SR 29/Grayson Avenue (signal)	LOS C or D
SR 29/Dowdell Lane (Dowdell Lane 2-lane stop sign controlled approach)	LOS C

Table 8 also shows that there would be unacceptable operation at two intersections.

CUMULATIVE (YEAR 2040) UNACCEPTABLE OPERATION

SR 29/Pope Street-Mitchell Street (signal): LOS F during all Friday & Saturday peak hours

SR 29/Charter Oak Avenue (Charter Oak stop sign controlled approach): LOS F westbound approach Friday AM peak hour, LOS E westbound approach Friday PM peak hour

c. Intersection Signal Warrant

Table 4 shows that both the SR 29/Charter Oak Avenue and SR 29/Dowdell Lane intersections would have 2040 harvest Friday AM and PM peak hour and Saturday PM peak hour volumes meeting rural signal warrant #3 volume criteria levels.

VIII. PROJECT IMPACTS

A. SIGNIFICANCE CRITERIA

The significance criteria utilized in this study are based on the City of St. Helena's General Plan Circulation Element documentation for roadway and intersection operations.

The City's current LOS standard is LOS D for signalized intersections on Main Street (SR 29/128) and LOS C elsewhere. Based on City of St. Helena and CEQA standards, a project's impact would be considered significant if any of the following conditions occur.

- If operating conditions at a signalized intersection on Main Street (SR 29/128) deteriorate from LOS D without the project to LOS E or F with the project and an increase in delay of five seconds or greater.
- If operating conditions at a signalized intersection on Main Street (SR 29/128) operating at LOS E without the project deteriorate to LOS F with the project.
- If the average intersection delays at a signalized intersection on Main Street (SR 29/128) operating at LOS E or F without the project increases by more than five seconds with the project.

- If operating conditions at an unsignalized intersection on Main Street (SR 29/128) operating at LOS D or better without the project degrade to LOS E or F with the project and the volumes would qualify for signalization under the Caltrans peak hour volume warrants for signalization. If operating conditions at an unsignalized intersection not on Main Street operating at LOS C or better without the project degrade to LOS D, E or F with the project and the volumes would qualify for signalization under the Caltrans peak hour volume warrants for signalization.
- If average delay at an unsignalized intersection on Main Street (SR 29/128) operating at LOS E or F without the project increases by five or more seconds with the project and the volumes qualify for signalization under the Caltrans peak hour volume warrants for signalization. If average delay at an unsignalized intersection not on Main Street operating at LOS D, E or F without the project increases by five or more seconds with the project and the volumes qualify for signalization under the Caltrans peak hour volume warrants for signalization.
- If traffic volumes at an unsignalized intersection meet the peak hour signal warrant thresholds, then a significant impact is considered if total volumes passing through the intersection increase by 1 percent or greater with the project.
- For vehicle queuing, if the lane storage length sufficiently accommodates the 95th percentile vehicle queue length without the project and the vehicle queue length would increase to exceed the available storage with the project. If the 95th percentile queue length exceeds the available storage length without the project and the turning movement volume would increase by 3 percent or more with the project and increase the total intersection volume by 1 percent.
- If, in the opinion of the registered traffic engineer conducting this study, the addition of project traffic, pedestrians or bicycle riders would result in a significant safety impact.

B. PROJECT TRIP GENERATION & REASSIGNMENT OF LOCAL AREA VOLUMES

1. FARMSTEAD LODGE

a. TRIP GENERATION

Project lodging trip generation has been developed assuming 100 percent occupancy using the traffic engineering profession's standard source of trip rate data: *Trip Generation Manual*, 10th Edition, by the Institute of Transportation Engineers (ITE), 2017.

There are five lodging categories in the ITE manual.

Hotel
All Suites Hotel
Business Hotel
Motel
Resort Hotel

- Hotel trip rates were used because they provided the most conservative projection of lodge traffic activity.
- The Business Hotel and Motel uses were dismissed immediately from consideration.
- The All Suites Hotel category was dismissed because of a limited survey sample size and the description of a small restaurant, limited kitchen facilities and small amounts of meeting space did not seem to fit the proposed use. Also, Hotel trip rates are much higher.
- The Resort Hotel category also has a limited survey sample size (only 6 to 9 facilities surveyed in the 1980s and 1990s in California, Florida and South Carolina). Surveyed facilities provided golf courses, tennis courts, beach access, etc. Due to the significant number of attractions in the Napa Valley requiring use of an automobile, and due to Hotel trip rates being conservatively higher than those from the resort facilities, the Resort Hotel trip rates were also dismissed.

Table 9 shows that on a harvest Friday the proposed 65-unit lodging facility at 100 percent occupancy would be expected to generate 544 daily two-way trips (272 in and 272 out), with 19 inbound and 13 outbound trips during the AM commute peak traffic hour and 20 inbound and 20 outbound trips during the PM commute peak traffic hour. For a harvest Saturday, lodging peak hour trip rates are only available for the facility's peak traffic generation hour, and not during the local roadway system peak traffic hour. On a Saturday midafternoon the peak traffic hour on SR 29 is 2:00-3:00 when less traffic activity would be expected at the lodging facility, whereas the lodging facility's peak traffic hour would likely be in the early evening as some guests are leaving for dinner while others are arriving from a day's tourist activities. It was projected that the lodging facility trip generation on a Saturday afternoon during the time of peak traffic volumes on SR 29 (2:00-3:00) would be about 65 percent of the trip generation during the lodging facility's busiest traffic hour during the day, resulting in 17 inbound and 14 outbound trips during the SR 29 peak traffic hour on Saturday afternoon. This projection is supported by hourly hotel parking demand data from both the Institute of Transportation Engineers⁴ and the Urban Land Institute, which show low parking accumulation at hotels during the middle of the afternoon. In addition, hourly hotel trip generation data from the 10th Edition *Trip Generation Manual* also support the 65 percent of maximum trip generation occurring during the middle of a Saturday afternoon.

Lodge employee trip generation by shift was developed by the project applicant for each hour of the day and is presented in **Appendix D**, while a summary presentation is contained in **Table 10**. Based upon this data, projected lodge employee versus guest trip generation was determined for each of the three peak analysis hours on Friday and Saturday and is presented in **Table 11**.

⁴ *Parking Generation*, 4th Edition, 2010.

It is likely that a small proportion of traffic during the Friday and Saturday PM peak traffic hours would be traveling along SR 29 with or without the project being in operation. After consultation with City staff, 90 percent of project traffic was projected to be newly added to SR 29, with 10 percent captured from the ambient traffic flow on the state highway. This passby capture would result in 100 percent of guest traffic being newly added to Mills Lane, La Fata Street and Dowdell Lane, while only 90 percent would be newly added to SR 29.

b. TRIP DISTRIBUTION

Based upon discussion with City of St. Helena staff, project guest traffic was distributed to SR 29 as shown in **Table 12** for the Friday and Saturday peak traffic hours. Overall, a 50-50 north-south distribution pattern on SR 29 was projected for all in and outbound guest traffic, with an exception during the Friday PM peak hour when 60 percent of the inbound traffic was projected to come from the south. The same 50-50 distribution was also considered acceptable for employee traffic during all peak time periods. **Appendix E Figures A-4 to A-7** present lodge guest and employee trip distribution during the Friday AM and PM and Saturday PM peak traffic hours, respectively.

c. REASSIGNMENT OF FARMSTEAD RESTAURANT/FARMERS MARKET EMPLOYEE TRAFFIC TO THE NEW DOWDELL IMPROVED PARKING LOT

In addition to the 65-unit lodging facility, the proposed project would also result in the transfer of Farmstead restaurant/farmers market employee traffic from a lot on Charter Oak Avenue west of SR 29 to the new improved parking lot at the Dowdell/McCormick intersection. **Table 13** presents the amount of restaurant/farmers market employee traffic that would be transferred to the new parking lot.

d. MILLS LANE WIDENING & REALIGNMENT TO THE SR 29/GRAYSON AVENUE SIGNALIZED INTERSECTION

The widening and realignment of Mills Lane to connect to SR 29 at the signalized Grayson Avenue intersection by itself will produce a change in traffic patterns east of SR 29. Some traffic now using Dowdell Lane to access SR 29 will shift to Mills Lane due to the easier signalized access provided to the state highway and Grayson Avenue. **Figure 5** presents the intersection approach lanes and control after proposed improvements.

2. TOTAL PROJECT

a. LODGE

Trip generation and distribution are detailed above.

b. RETAIL BUTCHER SHOP

Butcher shop traffic is estimated to be three local customer auto trips in/out during the Friday and Saturday PM peak traffic hours. The shop will be closed during the Friday AM peak hour. Volumes are shown on **Appendix E Figure A-7**. The majority of local area customers driving to/from the butcher shop during the PM peak traffic hours on SR 29 would be expected to use Charter Oak Avenue east of the project driveway.

c. 200-PERSON EVENT

Shuttle buses will be required by the City for events this large. The applicant will be providing 14 shuttle buses to provide access for guests staying in Napa and Sonoma Valley lodging facilities. Also, it is projected that a few guests will drive to the event (up to five vehicles/hour) or walk from nearby lodging. Event traffic volumes are shown on **Appendix E Figure A-8**. The majority of shuttle buses would be expected to travel to/from the south on SR 29.

C. EXISTING + PROJECT CIRCULATION IMPACTS

1. LODGE ONLY

a. Volumes

Resultant Existing + Lodge Friday AM and PM and Saturday afternoon peak hour harvest volumes are presented in **Figures 17, 18 and 19**, respectively.

b. Intersection Level of Service Impacts

Table 3 shows that acceptable operation would result at the following two intersections along SR 29 with the addition of lodge traffic during Friday AM and PM and Saturday afternoon peak hour conditions.

SR 29/Dowdell Lane (Dowdell Lane 2-lane stop sign controlled approach)	LOS C
SR 29/Grayson Avenue-Mills Lane (signal)	LOS C or D

Table 3 also shows that the **SR 29/Charter Oak Avenue** intersection would maintain acceptable operation during the Friday and Saturday PM peak hour analysis time periods with the addition of lodge traffic (LOS C or D), while during the Friday AM peak hour operation of the westbound approach would remain an unacceptable LOS E. However, there would only be a 2.8-second increase in delay on the westbound approach during this time period, which would be less than the 5-second minimum change significance criteria limit. In addition, **Table 3** shows that the

SR 29/Pope Street-Mitchell Street intersection, which would already be experiencing unacceptable LOS F operation during the Friday and Saturday peak hours would have delay increased by lodge traffic. However, the increases during each peak hour would be less than 3 seconds, which would also be less than the 5-second minimum change significance criteria limits.

Less than significant.

c. Signal Warrant Impacts

Table 4 shows that while the **SR 29/Charter Oak Avenue** intersection volumes would already be exceeding rural signal warrant #3 volume criteria levels during the Friday AM peak hour and Saturday PM peak hour, the addition of project traffic would not increase volumes passing through the intersection by 1 percent or greater during either time period, which is the City's significance criteria limit. Also, the addition of project traffic to Friday PM peak hour volumes would not increase traffic to meet rural warrant #3 volume criteria during this time period.

At the **SR 29/Dowdell Lane** intersection volumes would already be exceeding rural signal warrant #3 volume criteria levels during the Friday AM and PM peak hours. However, project traffic would not increase volumes passing through the intersection by 1 percent or greater during either time period. Also, the addition of project traffic to Saturday PM peak hour volumes would not increase traffic to meet rural warrant #3 volume criteria during this time period.

Less than significant.

d. Impacts to Mills Lane, La Fata Street and Dowdell Lane

The net change in traffic due to the 65-unit lodging facility, relocation of Farmstead restaurant/farmers market employee parking and change in traffic patterns east of SR 29 due to the realignment of an improved Mills Lane to the SR 29/Grayson Avenue signal would increase existing volumes on Mills Lane, La Fata Street and Dowdell Lane by the following amounts.

YEAR 2018 HARVEST VOLUMES WITH & W/O THE LODGE

TIME PERIOD	MILLS LANE 2-WAY VOLUMES		LA FATA STREET 2-WAY VOLUMES		DOWDELL LANE 2-WAY VOLUMES	
	W/O PROJECT	WITH PROJECT	W/O PROJECT	WITH PROJECT	W/O PROJECT	WITH PROJECT
Friday AM Peak Hour	25	71	31	46	172	163
Friday PM Peak Hour	20	77	36	63	172	161
Saturday Afternoon Peak Hour	11	33	13	26	66	68

Source: Crane Transportation Group

The 40-foot-wide curb-to-curb sections of Mills Lane, La Fata Street and Dowdell Lane could easily accommodate the expected volume increases due to the lodge and improvement/realignment of Mills Lane to the SR 29/Grayson Avenue signal.

2. TOTAL PROJECT

a. Volumes

Resultant Existing + Total Project Friday AM and PM and Saturday afternoon peak hour harvest volumes are presented in **Figures 20, 21 and 22**, respectively.

b. Intersection Level of Service Impacts

Table 3 shows that acceptable operation would remain at the following two intersections along SR 29 with the addition of total project traffic during Friday AM and PM and Saturday afternoon peak hour conditions.

SR 29/Dowdell Lane (Dowdell Lane 2-lane stop sign controlled approach)	LOS C
SR 29/Grayson Avenue-Mills Lane (signal)	LOS C or D

Table 3 also shows that the **SR 29/Charter Oak Avenue** intersection would maintain acceptable operation during the Friday and Saturday PM peak hour analysis time periods with the addition of total project traffic (LOS C or D), while during the Friday AM peak hour operation of the westbound approach would remain an unacceptable LOS E. However, there would only be a 2.8-second increase in delay on the westbound approach during this time period, which would be less than the 5-second minimum change significance criteria limit. In addition, **Table 3** shows that the **SR 29/Pope Street-Mitchell Street** intersection, which would already be experiencing unacceptable LOS F operation during the Friday and Saturday peak hours would have delay increased by total project traffic. However, the increases during each peak hour would be less than 4.3 seconds, which would also be less than the 5-second minimum change significance criteria limits.

Less than significant.

c. Signal Warrant Impacts

Table 4 shows that at the **SR 29/Charter Oak Avenue** intersection the addition of project traffic would increase Friday PM peak hour volumes to exceed rural signal warrant #3 volume criteria levels, while during the Saturday PM peak hour project traffic would increase total volumes entering the intersection by 2.3 percent during a period when “Without Project” volumes would already be exceeding warrant criteria. This would be a significant impact. During the AM peak hour, a time period when “Without Project” traffic would already be exceeding rural warrant #3 volume criteria the addition of project traffic would increase volumes by less than 1 percent, and not produce a significant impact.

At the **SR 29/Dowdell Lane** intersection the addition of project traffic would only produce a significant impact during the Friday PM peak hour, when volumes passing through the intersection would increase by 1.6 percent during a period when “Without Project” volumes would already be exceeding rural warrant volume criteria. During the AM peak hour, a time

period when “Without Project” traffic would already be exceeding rural warrant #3 volume criteria the addition of project traffic would increase volumes by less than 1 percent, and not produce a significant impact. Finally, during the Saturday PM peak hour project traffic would not increase volumes to meet rural warrant #3 volume criteria levels. It should be noted that levels of service at the Dowdell Lane intersection will remain acceptable even though rural signal warrant criteria are met during the Friday peak hours.

Less than significant with mitigation.

d. Impacts to Mills Lane, La Fata Street and Dowdell Lane

The net change in traffic due to the total project would increase existing volumes on Mills Lane, La Fata Street and Dowdell Lane by the following amounts.

YEAR 2018 HARVEST VOLUMES WITH & W/O THE TOTAL PROJECT

TIME PERIOD	MILLS LANE @ SR 29 2-WAY VOLUMES		LA FATA STREET @ DOWDELL LANE 2-WAY VOLUMES		DOWDELL LANE @ SR 29 2-WAY VOLUMES	
	W/O PROJECT	WITH TOTAL PROJECT	W/O PROJECT	WITH TOTAL PROJECT	W/O PROJECT	WITH TOTAL PROJECT
Friday AM Peak Hour	25	71	31	46	172	163
Friday PM Peak Hour	20	77	36	63	172	161
Saturday Afternoon Peak Hour	11	33	13	26	66	68

Source: Crane Transportation Group

The 40-foot-wide curb-to-curb sections of Mills Lane, La Fata Street and Dowdell Lane could easily accommodate the expected volume increases due to the total project.

D. YEAR 2022 + PROJECT VEHICLE IMPACTS

1. LODGE ONLY

a. Volumes

Year 2022 + Lodge Friday AM and PM and Saturday afternoon peak hour volumes are presented in **Figures 23, 24 and 25**, respectively.

b. Intersection Level of Service Impacts

Table 7 shows that acceptable operation would remain at the following two intersections along SR 29 with the addition of lodge traffic during Friday AM and PM and Saturday afternoon peak hour conditions.

SR 29/Dowdell Lane (Dowdell Lane 2-lane stop sign controlled approach)	LOS C
SR 29/Grayson Avenue-Mills Lane (signal)	LOS D

Table 7 also shows that the **SR 29/Charter Oak Avenue** intersection would maintain acceptable operation during the Friday and Saturday PM peak hours with the addition of lodge traffic (LOS D), while during the Friday AM peak hour operation of the westbound approach would remain an unacceptable LOS E. However, there would only be a 2.6-second increase in delay on the westbound approach during this time period, which would be less than the City's 5-second minimum change significance criteria limit. In addition, **Table 3** shows that the **SR 29/Pope Street-Mitchell Street** intersection, which would already be experiencing unacceptable LOS F operation during the Friday and Saturday peak hours would have delay increased by lodge traffic. However, the increases during each peak hour would be 3 seconds or less, which would also be less than the 5-second minimum change significance criteria limits.

Less than significant.

c. Signal Warrant Impacts

Table 4 shows that at the **SR 29/Charter Oak Avenue** intersection, volumes would be exceeding rural peak hour signal warrant volume criteria levels with or without lodge traffic during the Friday AM and PM peak hours and the Saturday PM peak hour. However, volume increases due to the lodge would be less than the City's minimum significance criteria limit of 1 percent during all peak hours.

At the **SR 29/Dowdell Lane** intersection, volumes would be exceeding rural peak hour signal warrant volume criteria levels with or without lodge traffic during the Friday AM and PM peak hours and the Saturday PM peak hour. However, volume increases due to the lodge would be less than the City's minimum significance criteria limit of 1 percent during all peak hours.

Less than significant.

d. Impacts to Mills Lane, La Fata Street and Dowdell Lane

The net change in traffic due to the 65-unit lodging facility, relocation of Farmstead restaurant/farmers market employee parking and change in traffic patterns east of SR 29 due to the realignment of an improved Mills Lane to the SR 29/Grayson Avenue signal would increase 2022 Without Project volumes on Mills Lane, La Fata Street and Dowdell Lane by the following amounts.

YEAR 2022 HARVEST VOLUMES WITH & W/O THE LODGE

TIME PERIOD	MILLS LANE @ SR 29 2-WAY VOLUMES		LA FATA STREET @ DOWDELL LANE 2-WAY VOLUMES		DOWDELL LANE @ SR 29 2-WAY VOLUMES	
	W/O PROJECT	WITH LODGE	W/O PROJECT	WITH LODGE	W/O PROJECT	WITH LODGE
Friday AM Peak Hour	26	77	43	62	235	223
Friday PM Peak Hour	29	91	53	84	227	208
Saturday Afternoon Peak Hour	11	41	30	53	137	131

Source: Crane Transportation Group

The 40-foot-wide curb-to-curb sections of Mills Lane, La Fata Street and Dowdell Lane could easily accommodate the expected volume increases due to the lodge and improvement/realignment of Mills Lane to the SR 29/Grayson Avenue signal.

Less than significant.

2. TOTAL PROJECT

a. Volumes

Year 2022 + Total Project Friday AM and PM and Saturday afternoon peak hour volumes are presented in **Figures 26, 27 and 28**, respectively.

b. Intersection Level of Service Impacts

Table 7 shows that acceptable operation would remain at the following two intersections along SR 29 with the addition of lodge traffic during the Friday AM and PM and Saturday afternoon peak hour conditions with the addition of project traffic.

SR 29/Dowdell Lane (Dowdell Lane 2-lane stop sign controlled approach)	LOS C
SR 29/Grayson Avenue-Mills Lane (signal)	LOS D

Table 7 also shows that the **SR 29/Charter Oak Avenue** intersection would maintain acceptable operation during the Saturday PM peak hour with the addition of total project traffic (LOS D), while during the Friday AM peak hour operation of the westbound approach would remain an unacceptable LOS E. However, there would only be a 2.6-second increase in delay on the westbound approach during this time period, which would be less than the 5-second minimum change significance criteria limit. During the Friday PM peak hour operations of the westbound approach would change from an acceptable LOS D to an unacceptable LOS E. However, the delay increase would only be 3.3 seconds. For these reasons, the impact is considered less than significant.

Less than significant.

c. Signal Warrant Impacts

Table 4 shows that at the SR 29/Charter Oak Avenue intersection, volumes would be exceeding rural peak hour signal warrant volume criteria levels with or without total project traffic during the Friday AM and PM peak hours and the Saturday PM peak hour. While the volume increase would be less than 1 percent during the AM peak hour, the increases during the Friday PM peak hour and Saturday PM peak hour would be greater than 1 percent and would therefore be a significant impact (2.3% during the Friday PM peak hour and 2.2% during the Saturday PM peak hour).

At the **SR 29/Dowdell Lane** intersection, volumes would be exceeding rural peak hour signal warrant volume criteria levels with or without total project traffic during the Friday AM and PM peak hours and the Saturday PM peak hour. While the volume increase would be less than 1 percent during the AM peak hour, the increases during the Friday PM peak hour and Saturday PM peak hour would be greater than 1 percent and would therefore be a significant impact (1.1% both hours).

Less than significant with mitigation.

d. Impacts to Mills Lane, La Fata Street and Dowdell Lane

The net change in traffic due to the total project would increase 2022 Without Project volumes on Mills Lane, La Fata Street and Dowdell Lane by the following amounts.

YEAR 2022 HARVEST VOLUMES WITH & W/O THE TOTAL PROJECT

TIME PERIOD	MILLS LANE @ SR 29 2-WAY VOLUMES		LA FATA STREET @ MILLS LANE 2-WAY VOLUMES		DOWDELL LANE @ SR 29 2-WAY VOLUMES	
	W/O PROJECT	WITH TOTAL PROJECT	W/O PROJECT	WITH TOTAL PROJECT	W/O PROJECT	WITH TOTAL PROJECT
Friday AM Peak Hour	26	77	43	62	235	223
Friday PM Peak Hour	29	91	53	84	227	208
Saturday Afternoon Peak Hour	11	41	30	53	137	131

Source: Crane Transportation Group

The 40-foot-wide curb-to-curb sections of Mills Lane, La Fata Street and Dowdell Lane could easily accommodate the expected volume increases due to the total project.

Less than significant.

E. CUMULATIVE (YEAR 2040) CIRCULATION IMPACTS

1. LODGE ONLY

a. Volumes

Cumulative (year 2040) + Lodge Friday AM and PM and Saturday afternoon peak hour volumes are presented in **Figures 29, 30 and 31**, respectively.

b. Intersection Level of Service Impacts

Table 8 shows that acceptable operation would remain at the following intersection along SR 29 with the addition of lodge traffic during the Friday AM and PM and Saturday afternoon peak hour conditions.

SR 29/Dowdell Lane (Dowdell Lane 2-lane stop sign controlled approach)	LOS C
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Table 8 shows that at the **SR 29/Pope Street-Mitchell Street** intersection signalized operation would remain an unacceptable LOS F with or without lodge traffic during the Friday AM and PM peak hours and the Saturday PM peak hour. However, the increases in delay due to lodge traffic would be less than 5 seconds during each peak hour (3.2 seconds Friday AM, 2.9 seconds Friday PM and 3.0 seconds Saturday PM).

At the **SR 29/Charter Oak Avenue** intersection operation of the stop sign controlled westbound Charter Oak Avenue approach would remain an unacceptable LOS F with or without lodge traffic during the Friday AM peak hour and an unacceptable LOS E during the Friday PM peak hour. However, the increases in delay due to lodge traffic would be less than 5 seconds during either peak hour (3.7 seconds Friday AM & 0.3 seconds Friday PM). Operation would remain acceptable during the Saturday PM peak hour with the addition of lodge traffic.

At the **SR 29/Grayson Avenue-Mills Lane** signalized intersection operation would be an unacceptable LOS E during the Friday AM peak hour with a fourth intersection leg. Friday AM peak hour operation would change from an acceptable LOS D to an unacceptable LOS E (with a 23.7 second increase in delay). This would be a significant impact.

Less than significant with mitigation.

c. Signal Warrant Impacts

Table 4 shows that at the **SR 29/Charter Oak Avenue** intersection, volumes would be exceeding rural peak hour signal warrant volume criteria levels with or without total project traffic during the Friday AM and PM peak hours and the Saturday PM peak hour. However, volume increases would be less than 1 percent during all three peak hours.

At the **SR 29/Dowdell Lane** intersection, volumes would be exceeding rural peak hour signal warrant volume criteria levels with or without total project traffic during the Friday AM and PM peak hours and the Saturday PM peak hour. However, volume increases would be less than 1 percent during all three peak hours.

Less than significant.

d. Impacts to Mills Lane, La Fata Street and Dowdell Lane

The net change in traffic due to the 65-unit lodging facility, relocation of Farmstead restaurant/farmers market employee parking and change in traffic patterns east of SR 29 due to the realignment of an improved Mills Lane to the SR 29/Grayson Avenue signal would increase year 2040 Without Project volumes on Mills Lane, La Fata Street and Dowdell Lane by the following amounts.

CUMULATIVE (YEAR 2040) HARVEST VOLUMES WITH & W/O THE LODGE

TIME PERIOD	MILLS LANE @ SR 29 2-WAY VOLUMES		LA FATA STREET @ DOWDELL LANE 2-WAY VOLUMES		DOWDELL LANE @ SR 29 2-WAY VOLUMES	
	W/O PROJECT	WITH PROJECT	W/O PROJECT	WITH PROJECT	W/O PROJECT	WITH PROJECT
Friday AM Peak Hour	26	80	43	69	235	216
Friday PM Peak Hour	29	100	53	96	227	202
Saturday Afternoon Peak Hour	12	47	30	58	137	126

Source: Crane Transportation Group

The 40-foot-wide curb-to-curb sections of Mills Lane, La Fata Street and Dowdell Lane could easily accommodate the expected volume increases due to the lodge, and improvement/realignment of Mills Lane to the SR 29/Grayson Avenue signal.

Less than significant.

2. TOTAL PROJECT

a. Volumes

Cumulative (year 2040) + Total Project Friday AM and PM and Saturday afternoon peak hour volumes are presented in **Figures 32, 33 and 34**, respectively.

b. Intersection Level of Service Impacts

Table 8 shows that acceptable operation would remain at the following intersection along SR 29 with the addition of total project traffic during the Friday AM and PM and Saturday afternoon peak hour conditions.

SR 29/Dowdell Lane (Dowdell Lane 2-lane stop sign controlled approach) LOS C

Table 8 shows that at the **SR 29/Pope Street-Mitchell Street** intersection signalized operation would remain an unacceptable LOS F with or without lodge traffic during the Friday AM and PM peak hours and the Saturday PM peak hour. However, the increases in delay due to lodge traffic would be less than 5 seconds during each peak hour (3.2 seconds Friday AM, 4.4 seconds Friday PM and 4.8 seconds Saturday PM).

At **SR 29/Charter Oak Avenue** operation of the stop sign controlled westbound Charter Oak Avenue approach would remain an unacceptable LOS F with or without lodge traffic during the Friday AM peak hour and an unacceptable LOS E during the Friday PM peak hour. However, the increases in delay due to lodge traffic would be less than 5 seconds during either peak hour (3.7 seconds Friday AM & 4.6 seconds Friday PM). Operation would remain acceptable during the Saturday PM peak hour with the addition of lodge traffic.

At the **SR 29/Grayson Avenue-Mills Lane** signalized intersection operation would be an unacceptable LOS E during the Friday AM peak hour. Friday AM peak hour operation with a fourth intersection leg would change from an acceptable LOS D to an unacceptable LOS E (with a 23.7 second increase in delay). This change would all be due to lodge traffic.

Less than significant with mitigation.

c. Signal Warrant Impacts

Table 4 shows that at the **SR 29/Charter Oak Avenue** intersection, volumes would be exceeding rural peak hour signal warrant volume criteria levels with or without total project traffic during the Friday AM and PM peak hours and the Saturday PM peak hour. While the volume increase would be less than 1 percent during the AM peak hour, the increases during the Friday PM peak hour and Saturday PM peak hour would be greater than 1 percent and would therefore be a significant impact (2.2% during the Friday PM peak hour and 2.1% during the Saturday PM peak hour).

At the **SR 29/Dowdell Lane** intersection, volumes would be exceeding rural peak hour signal warrant volume criteria levels with or without total project traffic during the Friday AM and PM peak hours and the Saturday PM peak hour. The volume increase would be less than 1 percent during the all three peak hours.

Less than significant with mitigation.

d. Impacts to Mills Lane, La Fata Street and Dowdell Lane

The net change in traffic due to the total project would increase 2035 Without Project volumes on Mills Lane, La Fata Street and Dowdell Lane by the following amounts.

**CUMULATIVE (YEAR 2040) HARVEST VOLUMES
WITH & W/O THE TOTAL PROJECT**

TIME PERIOD	MILLS LANE @ SR 29 2-WAY VOLUMES		LA FATA STREET @ DOWDELL LANE 2-WAY VOLUMES		DOWDELL LANE @ SR 29 2-WAY VOLUMES	
	W/O PROJECT	WITH TOTAL PROJECT	W/O PROJECT	WITH TOTAL PROJECT	W/O PROJECT	WITH TOTAL PROJECT
Friday AM Peak Hour	26	80	43	69	235	216
Friday PM Peak Hour	29	100	53	96	227	202
Saturday Afternoon Peak Hour	12	47	30	58	137	126

Source: Crane Transportation Group

The 40-foot-wide curb-to-curb sections of Mills Lane, La Fata Street and Dowdell Lane could easily accommodate the expected volume increases due to the lodge, which includes realignment of Mills Lane to the SR 29/Grayson Avenue signal.

Less than significant.

F. PROJECT PEDESTRIAN IMPACTS & CONCERNS

1. PEDESTRIAN ACTIVITY ALONG MILLS LANE AND LA FATA STREET

Figure 35 shows the project employee walking route between the proposed Dowdell Lane/McCormick Street parking lot and the lodge/restaurant/farmers market facilities, while **Table 14** shows the maximum number of total project employees (lodge/restaurant & farmers market) that would be expected to walk between the Dowdell Lane employee parking lot and the uses on the project site. The lodge will be providing a pedestrian walkway system throughout their site connecting to the Farmstead restaurant and farmers market. There would be at most a total of about 100 walking trips in each direction over a 24-hour period if all employees drove alone. However, this number would potentially be reduced a little due to a few employees being dropped off/picked up, taking transit or walking and biking if they lived nearby. Paved pathways

will be provided along the west side of La Fata Street (Mills Lane to Dowdell Lane) and along the north side of Mills Lane (from La Fata Street to SR 29). Due to the distance between the employee improved parking lot at the Dowdell Lane/McCormick Street intersection and the lodging facility (a quarter mile to the north) and the restaurant-farmers market facilities (about half a mile to the north), there may be some employees unable to walk this distance – or – bad weather may make this walk difficult. In addition, there would be safety concerns regarding employees walking at night to/from the Dowdell Lane parking lot through a deserted industrial area. As shown in **Table 14**, about a third of all employees would be walking at night.

In order to reduce concerns about employees walking between the Dowdell Lane parking lot and the lodge/restaurant-farmers market, the project will be providing on-call shuttle service during all hours. A shelter will also be provided at the Dowdell Lane parking lot.

Less than significant.

2. SR 29 CROSSING AT CHARTER OAK AVENUE

The project would result in minor changes in pedestrian crossings of SR 29 at Charter Oak Avenue, and potentially there may even be a reduction during some hours due to the removal of restaurant-farmers market employee traffic formerly crossing at this location being greater than the increase from lodge guests. The vast majority of lodge guest pedestrian activity would be to/from downtown St. Helena, with a much smaller amount to/from the Grayson Avenue signal. (See **Figure 36**) Those pedestrians traveling between the project and downtown would walk through the Farmstead restaurant property and travel along SR 29 north of Charter Oak Avenue. Some would cross SR 29 at Charter Oak Avenue on their way to or from downtown.

The City of St. Helena does not have a significance criteria for pedestrian crossing impacts. However, the SR 29 crosswalk at Charter Oak Avenue already has existing traffic and pedestrian crossing volumes exceeding minimum guidelines for provision of a pedestrian hybrid flashing beacon during 9 of the 10 surveyed hours in 2016 and eight of the nine surveyed hours in 2019. Therefore, it is projected that the additional lodge traffic and pedestrians would continue to result in a significant safety impact for pedestrian crossings at the SR 29 Charter Oak crosswalk.

Less than significant with mitigation.

G. PROJECT BICYCLE IMPACTS

The project is proposing a Class I bicycle path along the north side of Mills Lane between SR 29 and La Fata Street. In addition, bicycles will be provided in each guest's room and bicycle lockers will be provided for employees.

Less than significant.

H. PROPOSED DOWDELL LANE EMPLOYEE PARKING LOT ADEQUACY

The proposed Farmstead employee paved parking lot at the southwest corner of the Dowdell Lane/McCormick Street intersection would provide 73 parking spaces. Three driveway connections would be provided to Dowdell Lane. See **Figure 37**. The most westerly would be for inbound vehicles only and would serve a “U” shaped parking lot with one-way flow parking aisles that would have an exit just west of McCormick Street. A third driveway for two-way flow would be provided between the one-way inbound and outbound driveways and would serve a dead end parking aisle with 90-degree parking. All parking spaces would be striped, so it would be possible to drive across empty parking stalls between the two distinct parking areas.

Based upon applicant provided lodge and restaurant/farmers market employee numbers and shift change times, there would be one time during the day (between 2:30 and 3:00 PM) when there would be an overlap of 73 employees on the project site at the same time (see **Appendix D**). However, the employee parking demand would potentially be at least 15 to 20 percent less than 73 spaces due to TDM program car and vanpooling, employee drop off and pickup by a friend or family member, and walking or biking by employees living nearby. Therefore, the proposed employee parking lot should have an adequate parking supply for the currently proposed total project employee levels. Surveys by the project applicant of employee travel modes at the existing restaurant-farmers market facilities show about a 30 percent elimination of drive alone auto travel.

Less than significant.

IX. RECOMMENDED MITIGATIONS

A. LODGE – See Figure 38

1. SR 29/GRAYSON AVENUE-MILLS LANE INTERSECTION

- Minor additional improvements are needed when Mills Lane is realigned and widened to connect to SR 29 at Grayson Lane. The Mills Lane approach should be striped to provide an exclusive left turn lane and a combined through/right turn lane. In addition, the Grayson Avenue approach should be widened to provide a two-lane approach, one exclusively for left turns and one for combined through/right turns. Protected left turn phasing should be provided on the Mills-Grayson approaches.

Resultant AM peak hour operation: LOS D-52.7 seconds delay

2. SR 29/CHARTER OAK AVENUE INTERSECTION – SR 29 PEDESTRIAN CROSSINGS

- Provide a fair share contribution to the “HAWK” pedestrian hybrid flashing beacon proposed for the SR 29/Charter Oak Avenue intersection.

Impacts reduced to a less than significant level.

B. TOTAL PROJECT – See Figure 39

1. SR 29/DOWDELL LANE INTERSECTION – SIGNAL WARRANT IMPACT

- Provide a fair share contribution towards the signal planned at the SR 29/Dowell Lane intersection (as detailed in the Highway 29 Specific Plan).

There is sufficient storage between the Dowdell and Grayson-Mills intersections (when both are signalized) to accommodate southbound left turns to Dowdell Lane and northbound left turns to Grayson Avenue in the SR 29 median storage lane during the Friday AM and PM peak hours as well as during the Saturday PM peak hour. As shown below, there is a total of 450 feet of storage in the continuous two-way left turn lane between intersections and the maximum 95th percentile left turn lane queues total (NB + SB) between intersections (if both are signalized) is 175 feet.

**VEHICLE 95TH PERCENTILE QUEUING
@ SR 29 SIGNALIZED INTERSECTIONS WITH
DOWDELL LANE & GRAYSON-MILLS**

CUMULATIVE (YEAR 2040) + TOTAL PROJECT

TIME PERIOD	TOTAL STORAGE BETWEEN INTERSECTIONS (FT.)	95% QUEUES (FT.)		
		NB LT TO GRAYSON-MILLS	SB LT TO DOWDELL	TOTAL NB + SB LT STORAGE DEMAND
Weekday AM Peak Hour	450	100	75	175
Weekday PM Peak Hour	450	150	25	175
Saturday PM Peak Hour	450	75	25	100

Synchro software results

Source: Crane Transportation Group

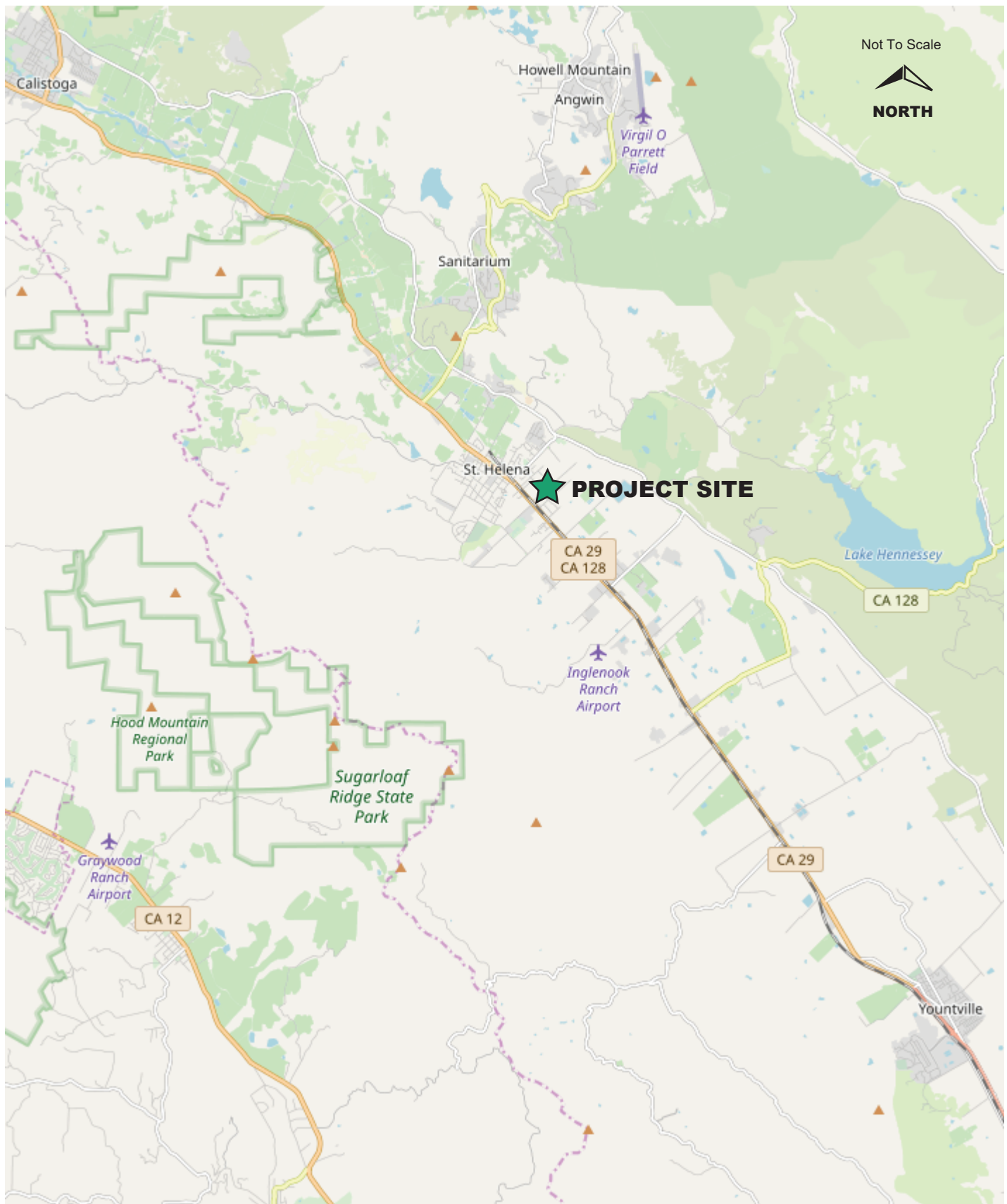
2. SR 29/CHARTER OAK AVENUE INTERSECTION – SIGNAL WARRANT IMPACTS

- Since City Public Works has indicated they are not in favor of signalizing this intersection, provide one of the following two measures.
 - a. Start and end all special events with more than 75 people at times that will not add traffic to SR 29 during the weekday and Saturday PM peak traffic periods (3:30-6:00 PM on weekdays and 1:30-4:00 PM on weekend days).
 - or —
 - b. Provide additional funding for the “HAWK” pedestrian hybrid flashing beacon. The beacon will need to be in operation before major events are allowed to add traffic to the existing weekday and weekend peak traffic hours along SR 29. Please note that Caltrans approval will be required for provision of the HAWK hybrid flashing beacon. If they do not approve of its installation, then the only measure to reduce the project impact to a level of insignificance is to eliminate traffic from the 200-person events during the Friday and Saturday PM peak hours.

Impacts reduced to a less than significant level.

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Figures



Farmstead Lodge and Total Project Traffic Study

Figure 1
Regional Area Map



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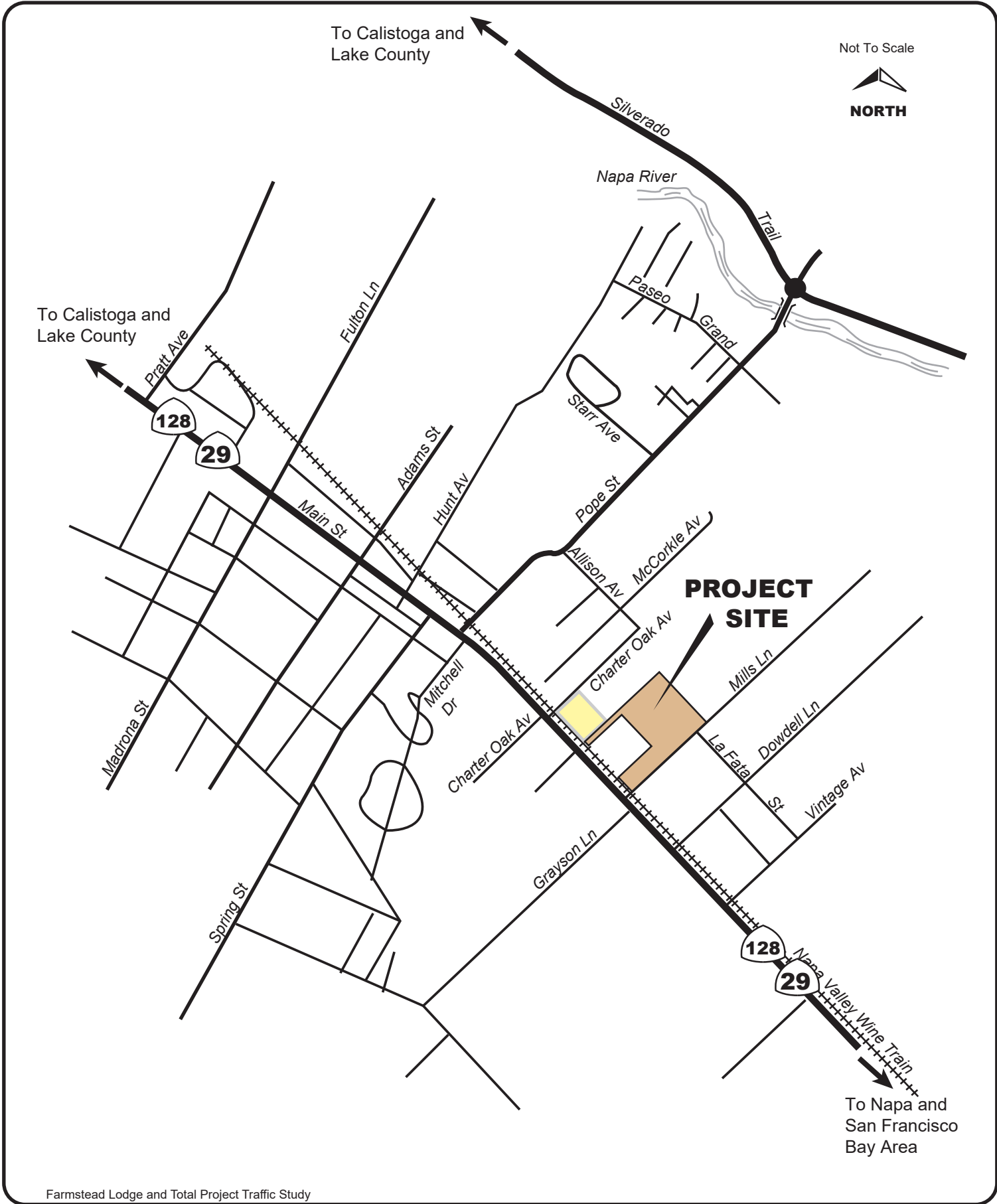
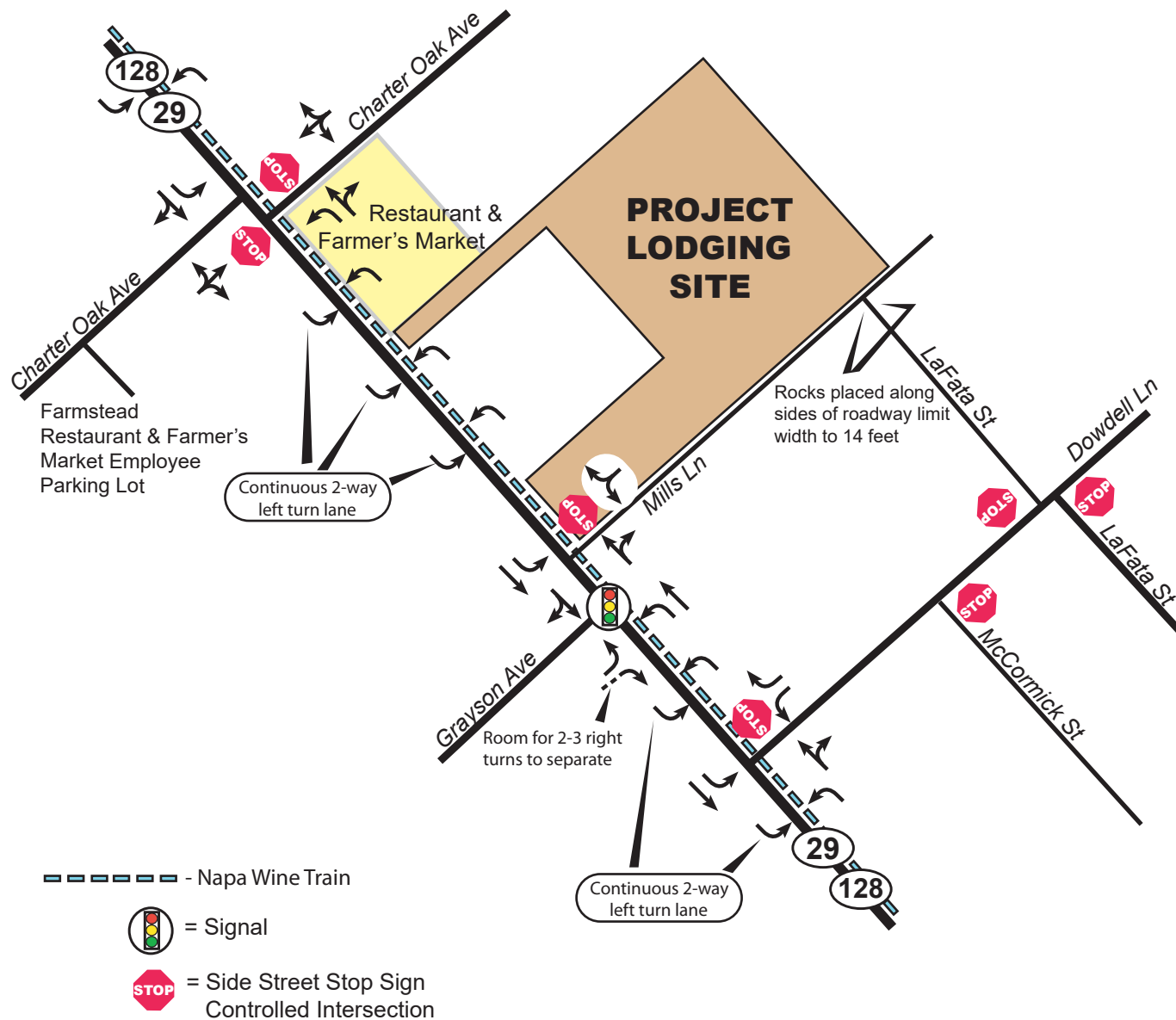


Figure 2
Local Area Map



Not To Scale



Farmstead Lodge and Total Project Traffic Study

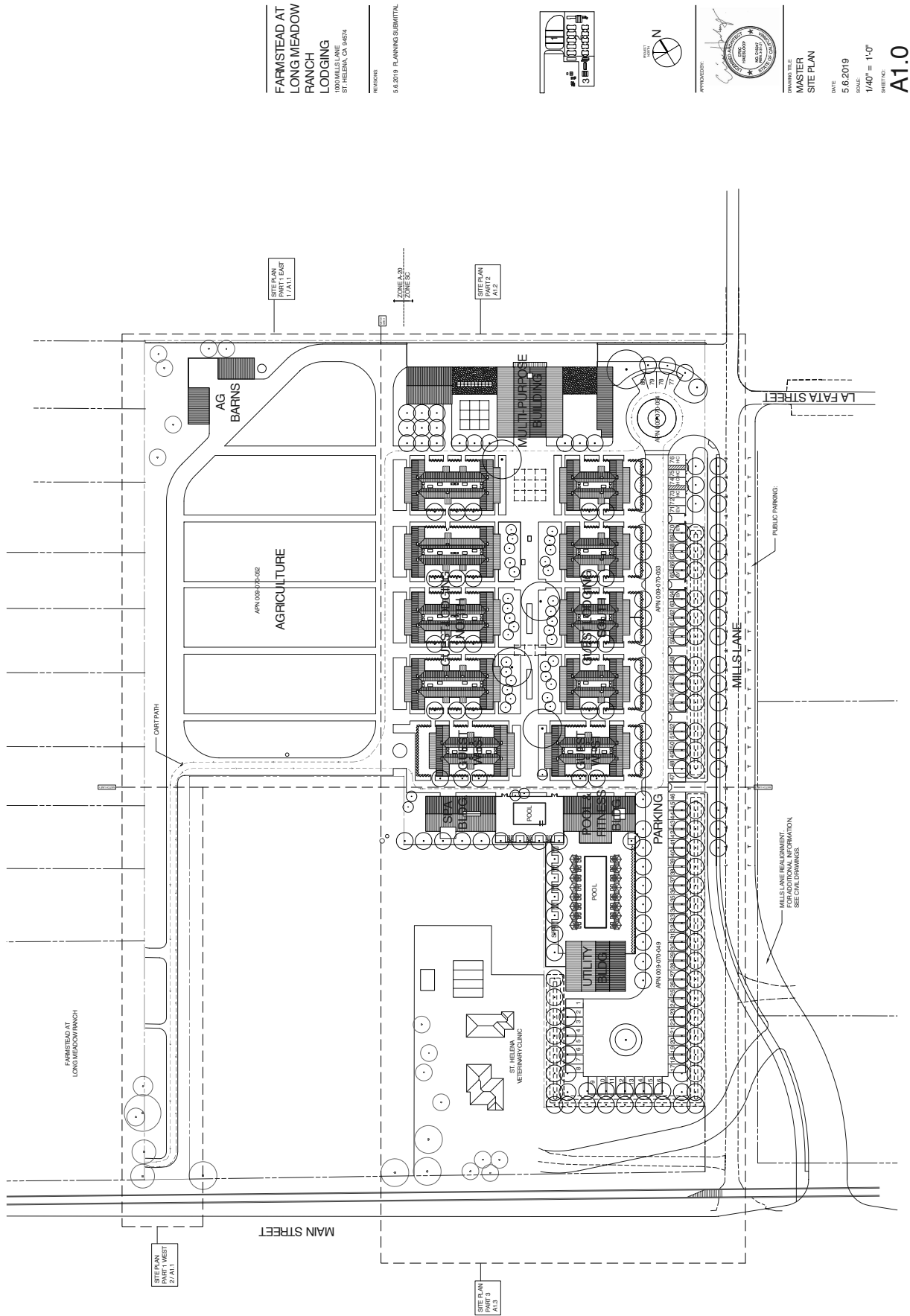


CRANE TRANSPORTATION GROUP

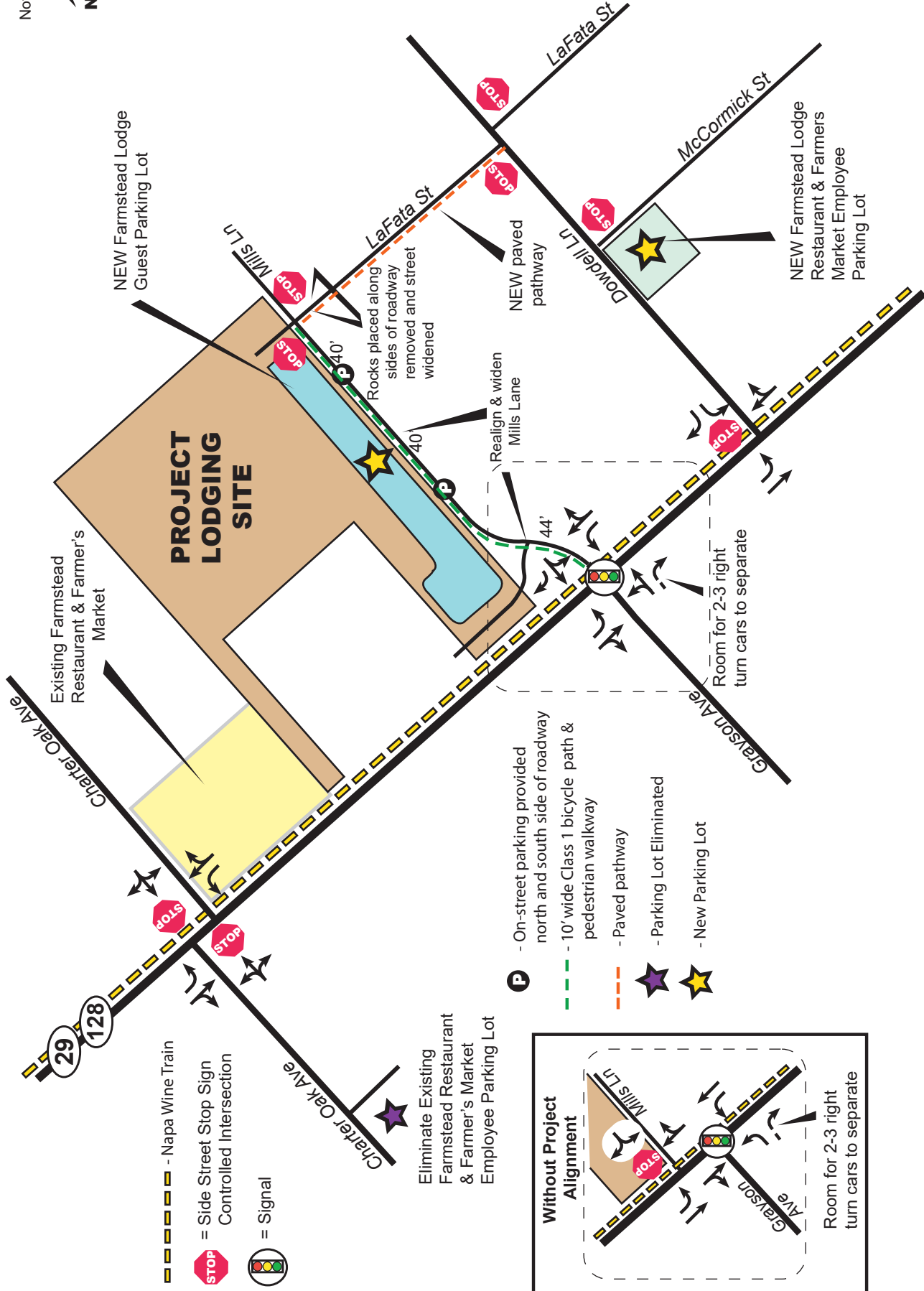
Figure 3
Existing Intersection
Lane Geometrics and Control



Figure 4
Lodge Site Plan

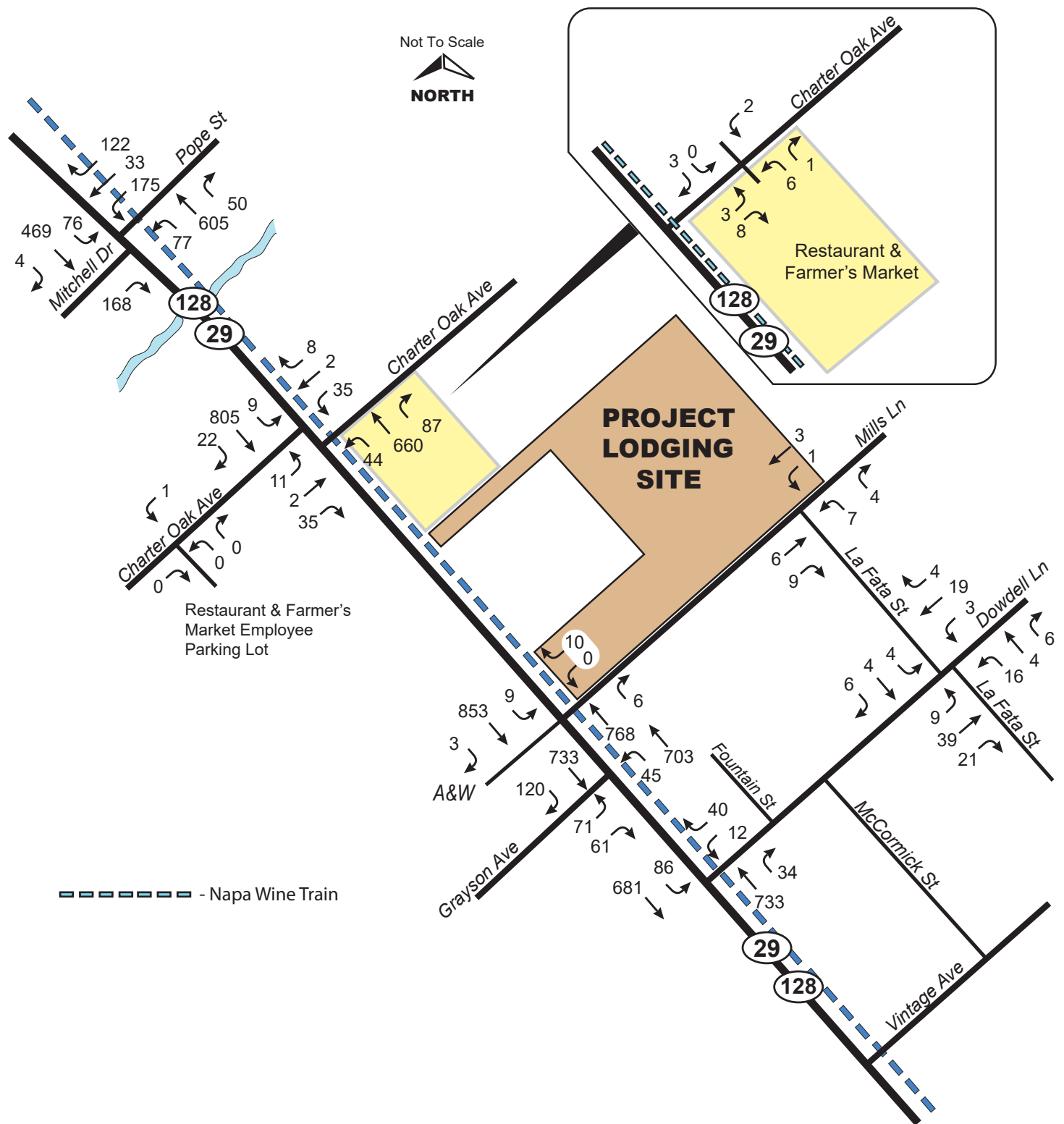


Not To Scale



Farmstead Lodge and Total Project Traffic Study

Figure 5
Lodge Roadway, Pedestrian, Bicycle & Parking Changes



Farmstead Lodge and Total Project Traffic Study

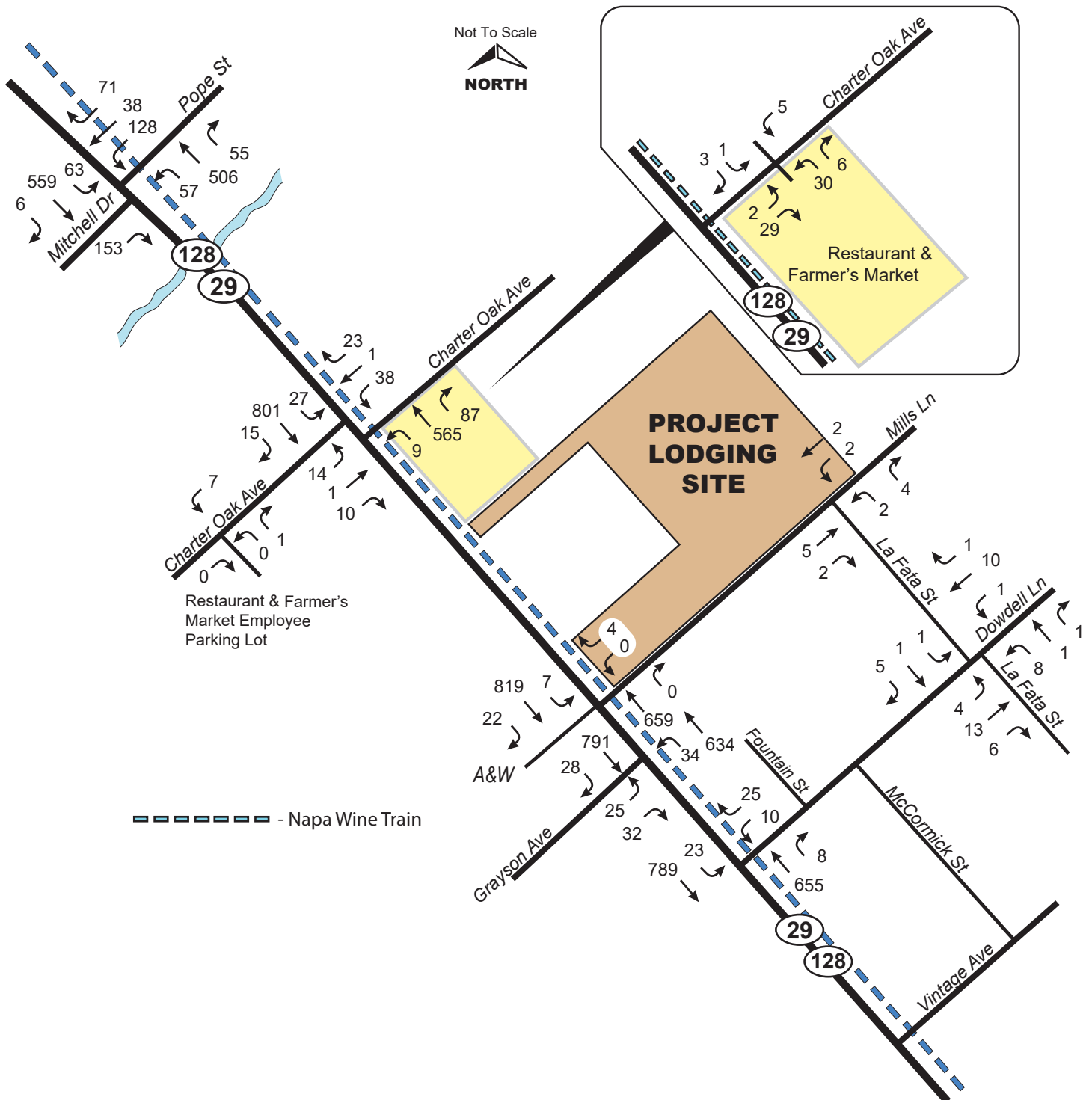
Figure 6

**Existing Harvest Friday (without Project)
AM Peak Hour Volumes**



CRANE TRANSPORTATION GROUP

Not To Scale



Farmstead Lodge and Total Project Traffic Study

Figure 8
Existing Harvest Saturday (without Project)
PM Peak Hour Volumes

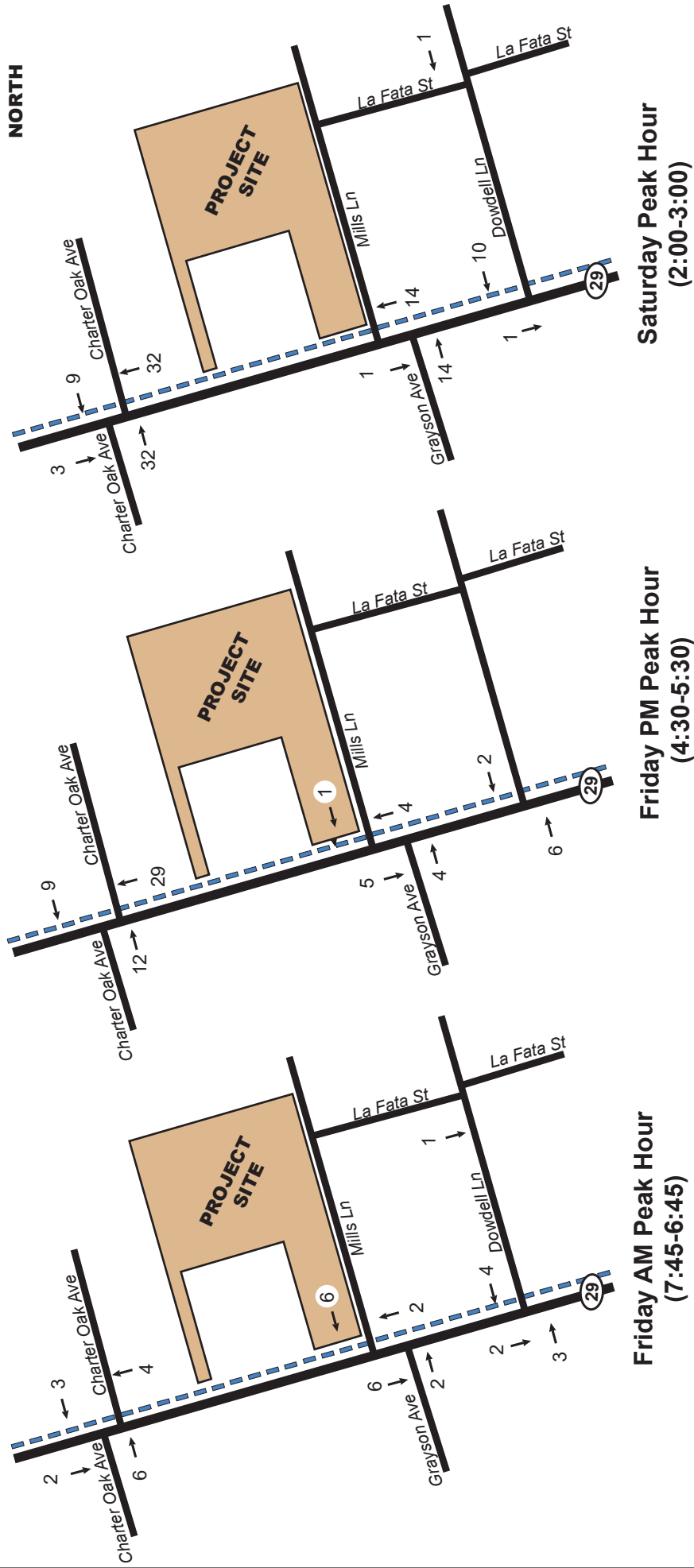


CRANE TRANSPORTATION GROUP

Not To Scale



NORTH



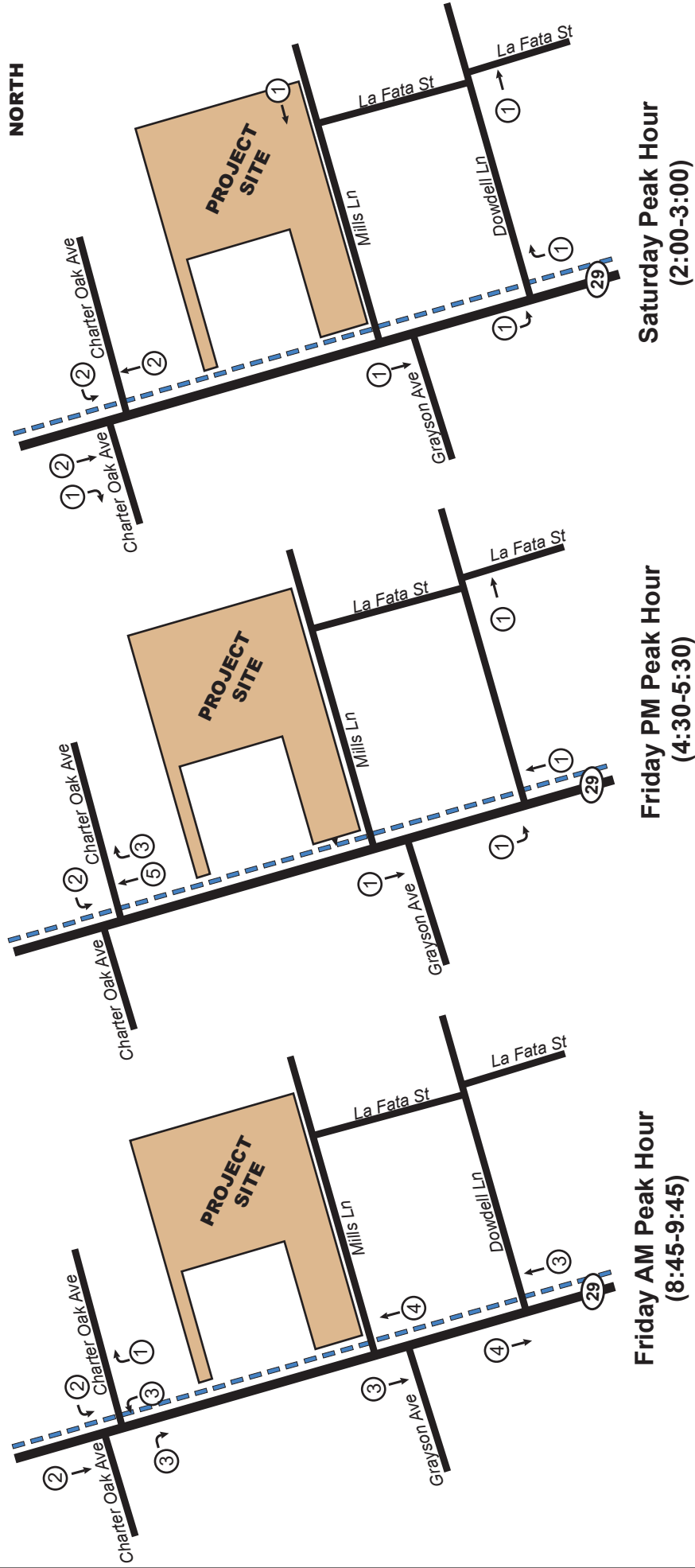
Farmstead Lodge and Total Project Traffic Study

Figure 9
Existing Friday AM, PM & Saturday Peak Hour
Pedestrian Volumes

Not To Scale



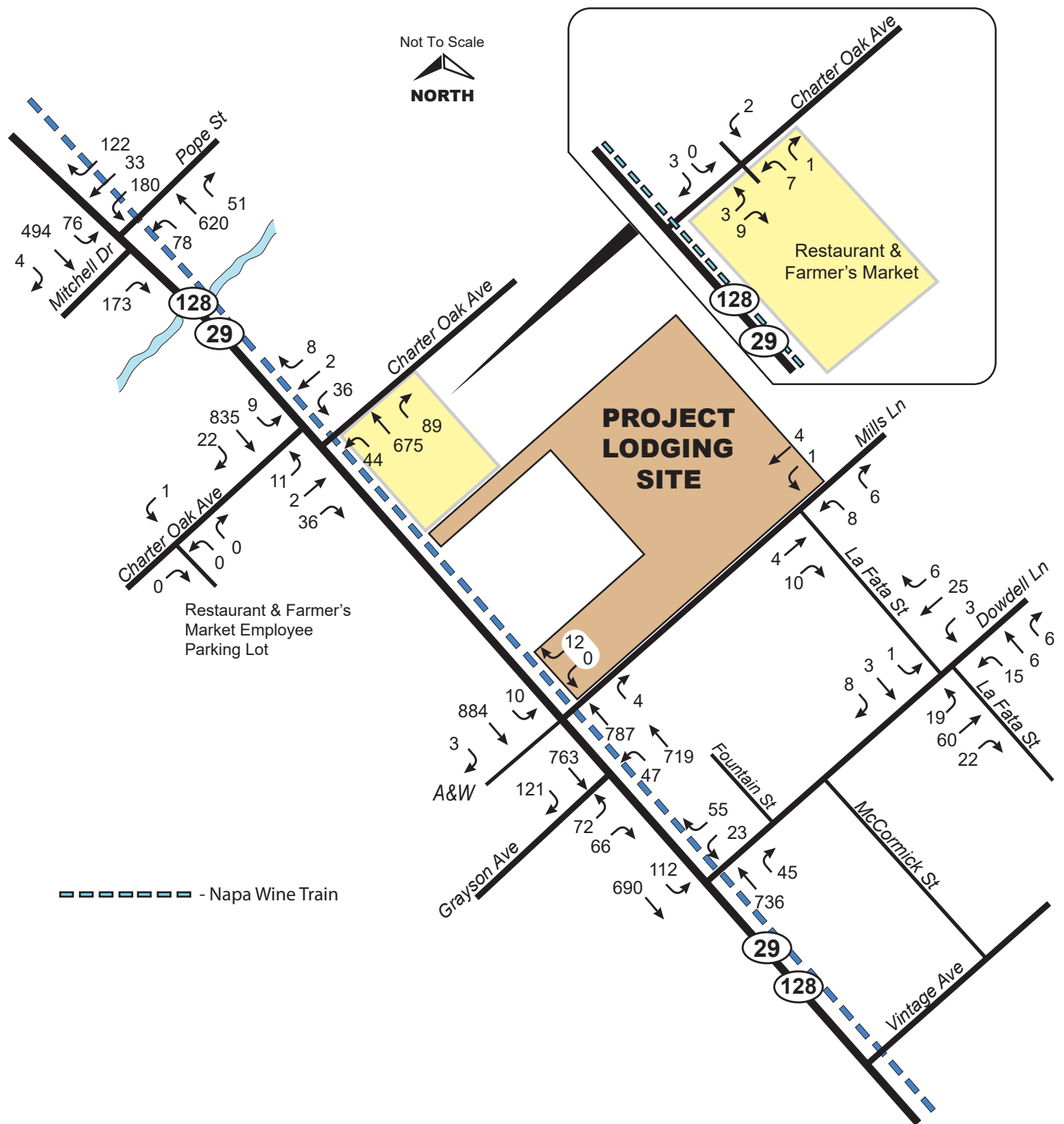
NORTH



Farmstead Lodge and Total Project Traffic Study

Figure 10

**Existing Friday AM, PM & Saturday Peak Hour
Bicycle Volumes**



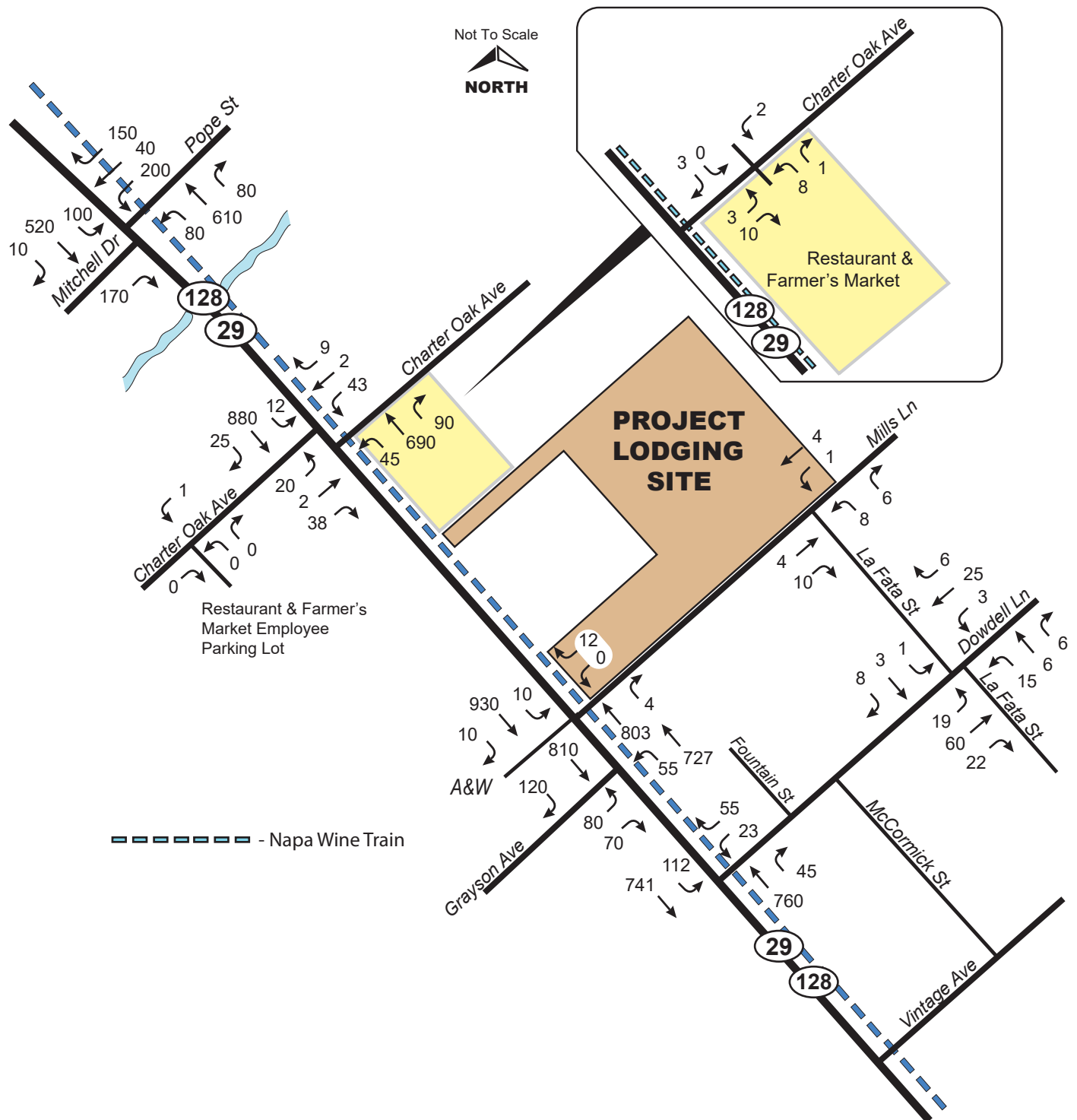
Farmstead Lodge and Total Project Traffic Study

Figure 11

**2022 Harvest Friday (without Project)
AM Peak Hour Volumes**



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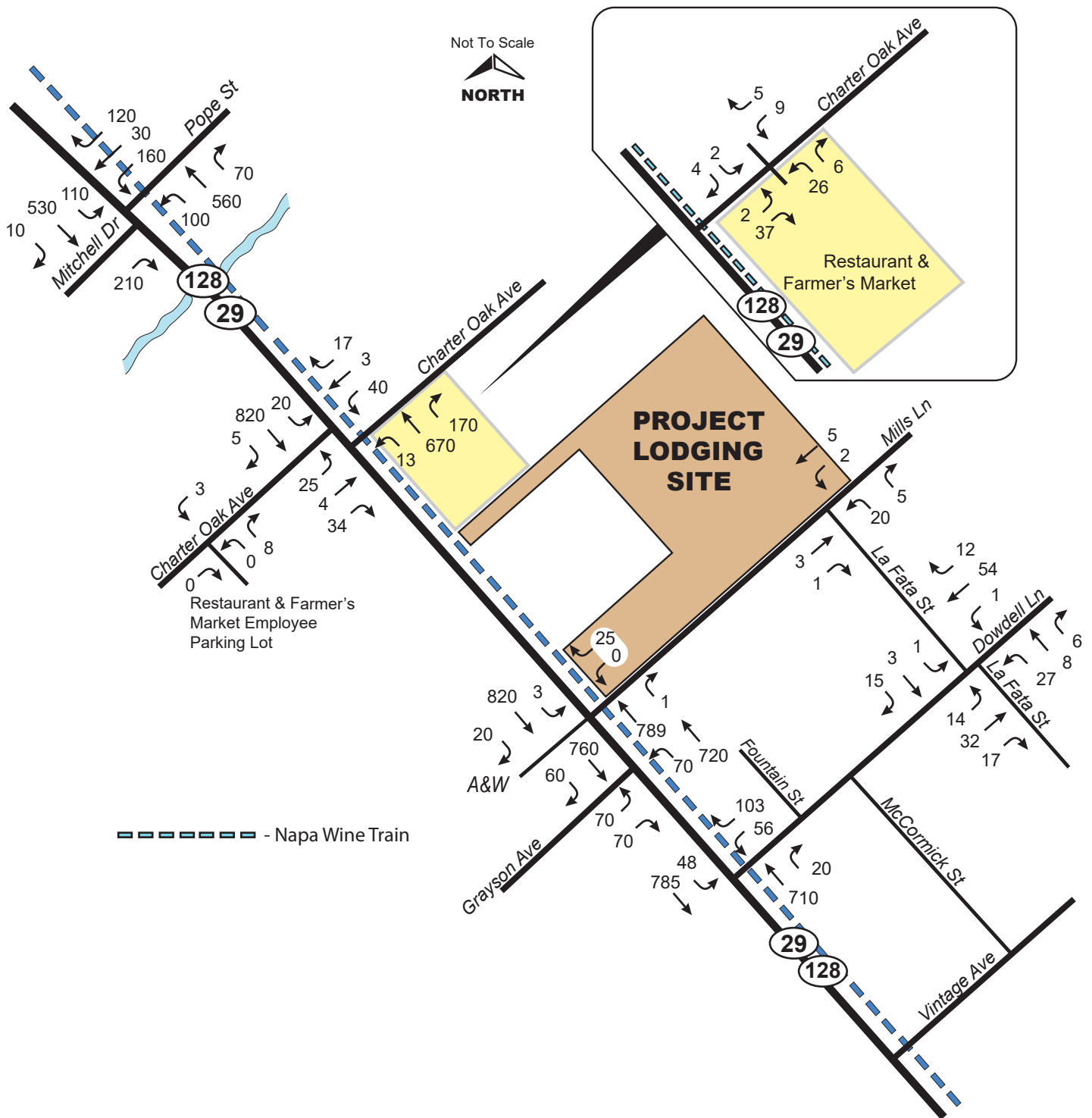
Farmstead Lodge and Total Project Traffic Study

Figure 14

**2040 Harvest Friday (without Project)
AM Peak Hour Volumes**



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Farmstead Lodge and Total Project Traffic Study

Figure 15
2040 Harvest Friday (without Project)
PM Peak Hour Volumes



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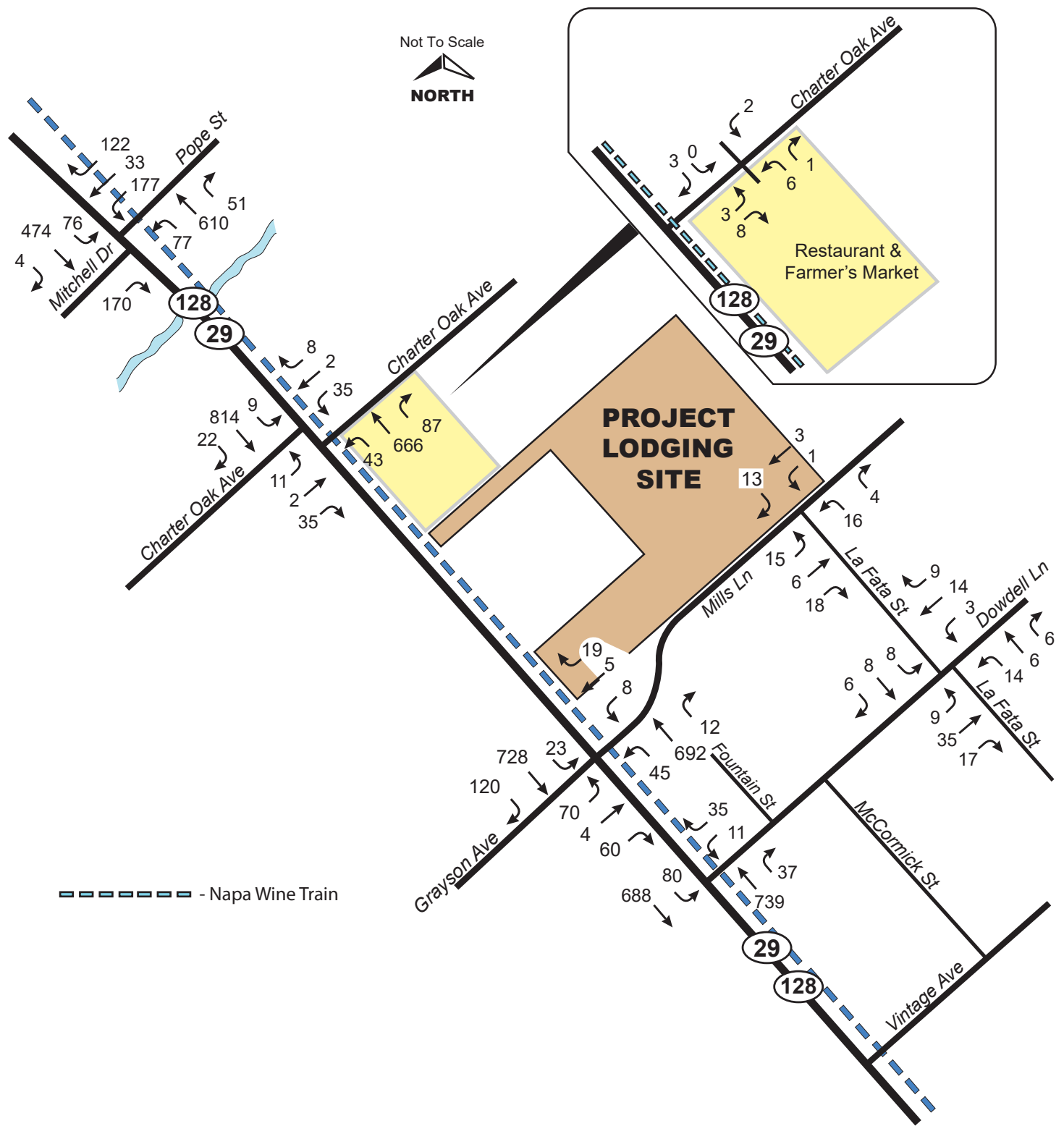


Farmstead Lodge and Total Project Traffic Study

Figure 16
2040 Harvest Saturday (without Project)
PM Peak Hour Volumes



CRANE TRANSPORTATION GROUP



Farmstead Lodge and Total Project Traffic Study

Figure 17

**Existing Harvest Friday + Lodge
AM Peak Hour Volumes**



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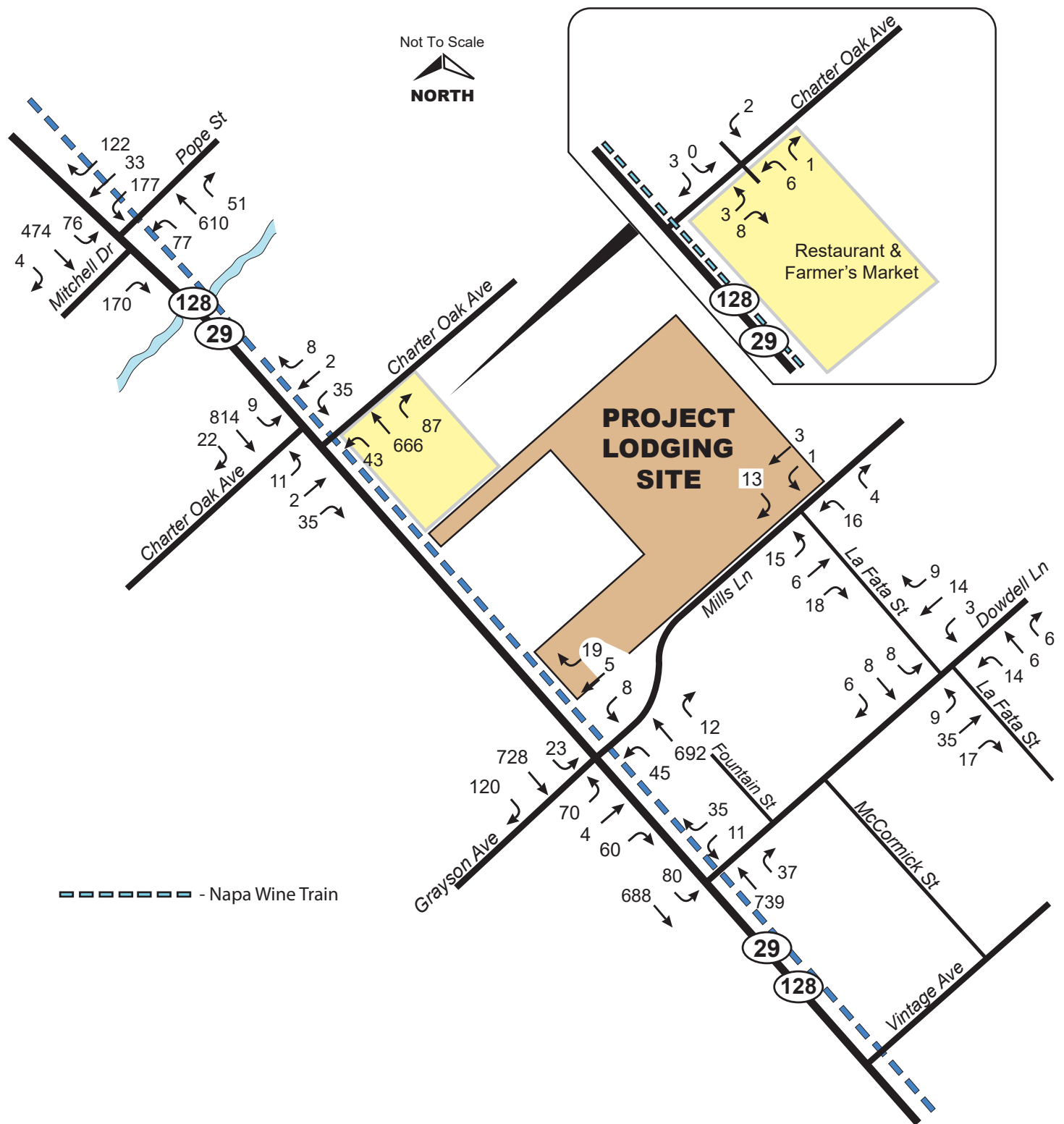


Farmstead Lodge and Total Project Traffic Study

Figure 18
Existing Harvest Friday with Lodge
PM Peak Hour Volumes



CRANE TRANSPORTATION GROUP



Farmstead Lodge and Total Project Traffic Study

Figure 20

**Existing Harvest Friday + Total Project
AM Peak Hour Volumes**



CRANE TRANSPORTATION GROUP

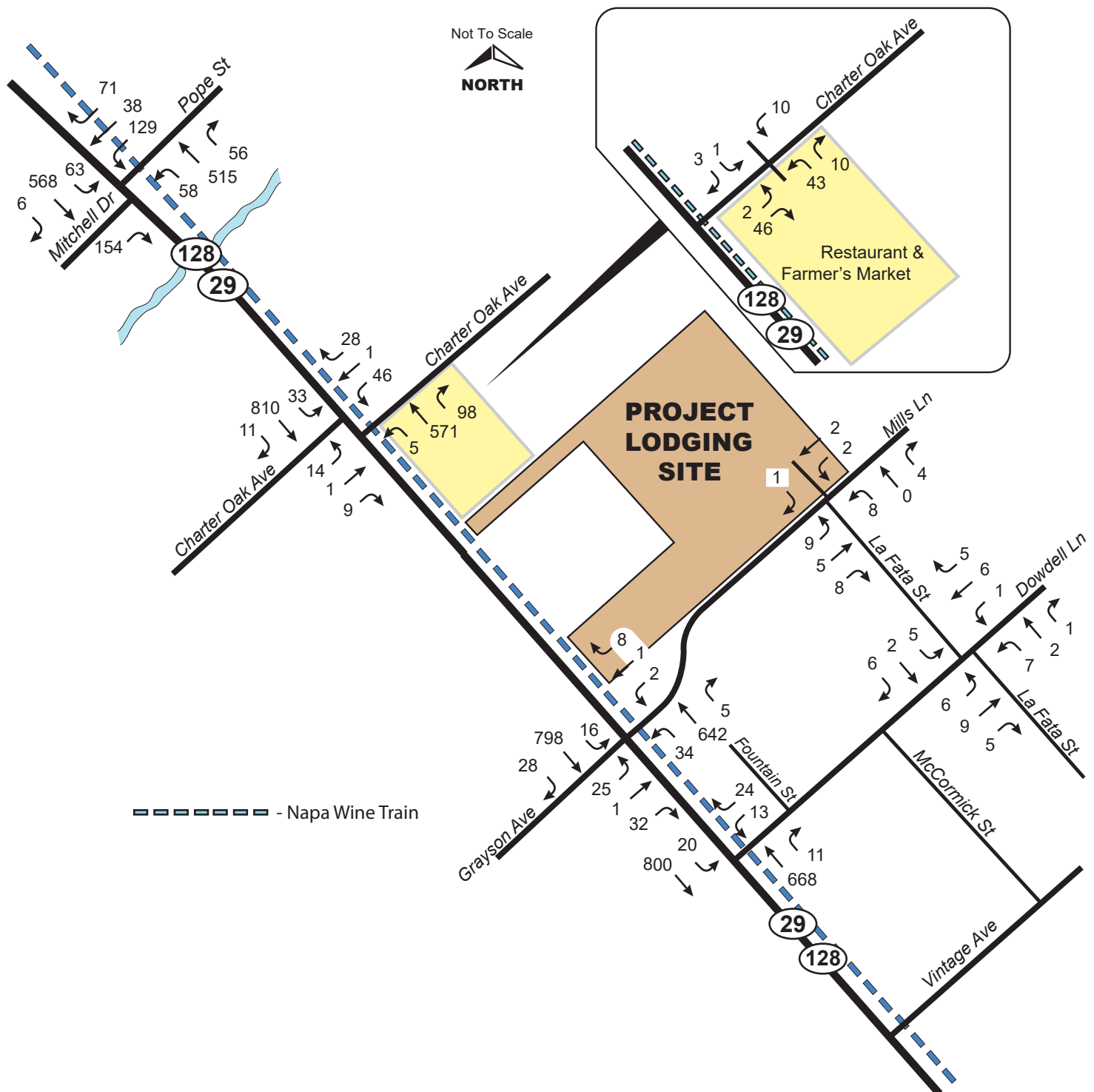


Farmstead Lodge and Total Project Traffic Study

Figure 21
Existing Harvest Friday with Total Project
PM Peak Hour Volumes



CRANE TRANSPORTATION GROUP

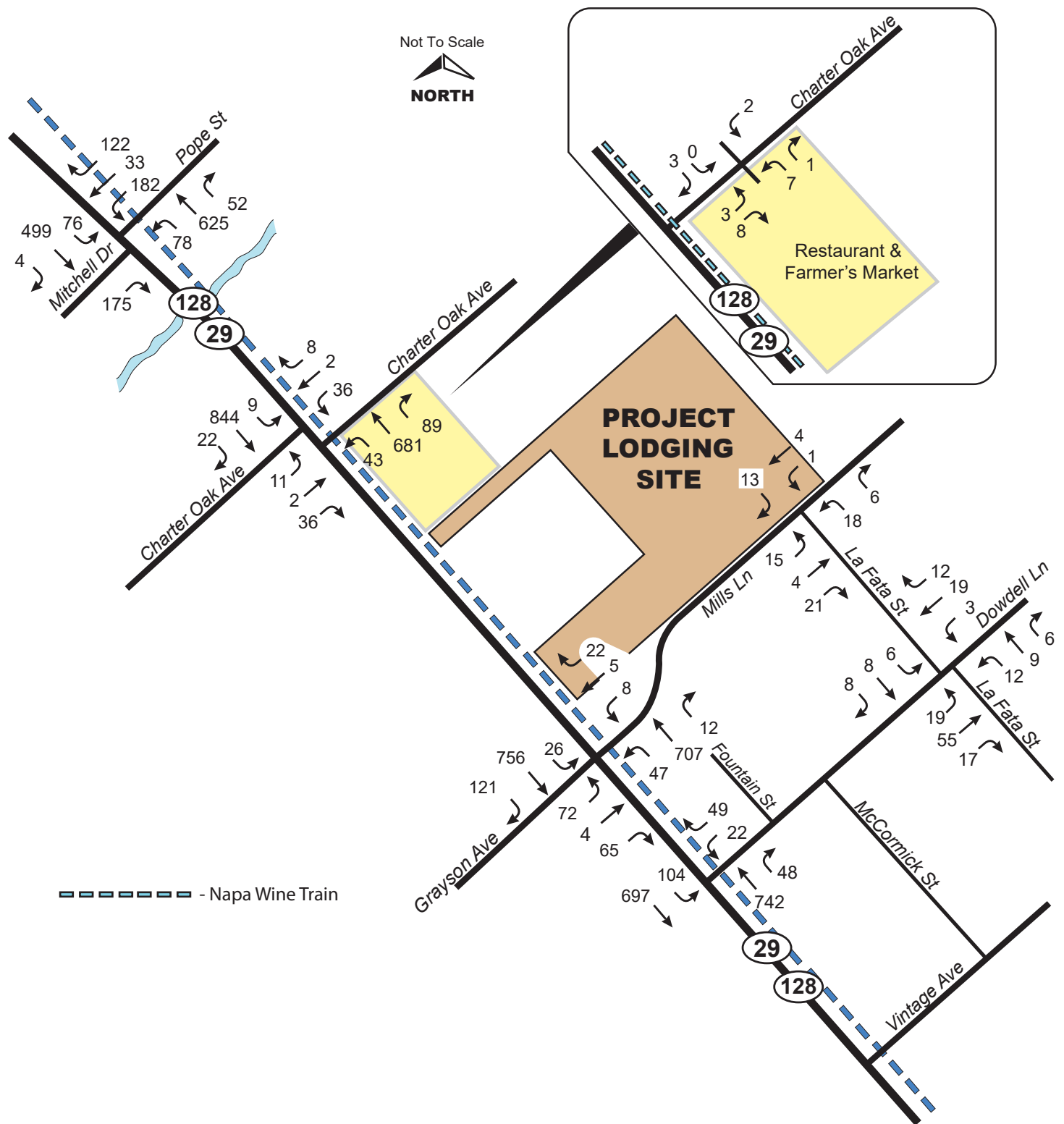


Farmstead Lodge and Total Project Traffic Study

Figure 22
Existing Harvest Saturday with Total Project
PM Peak Hour Volumes



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Farmstead Lodge and Total Project Traffic Study

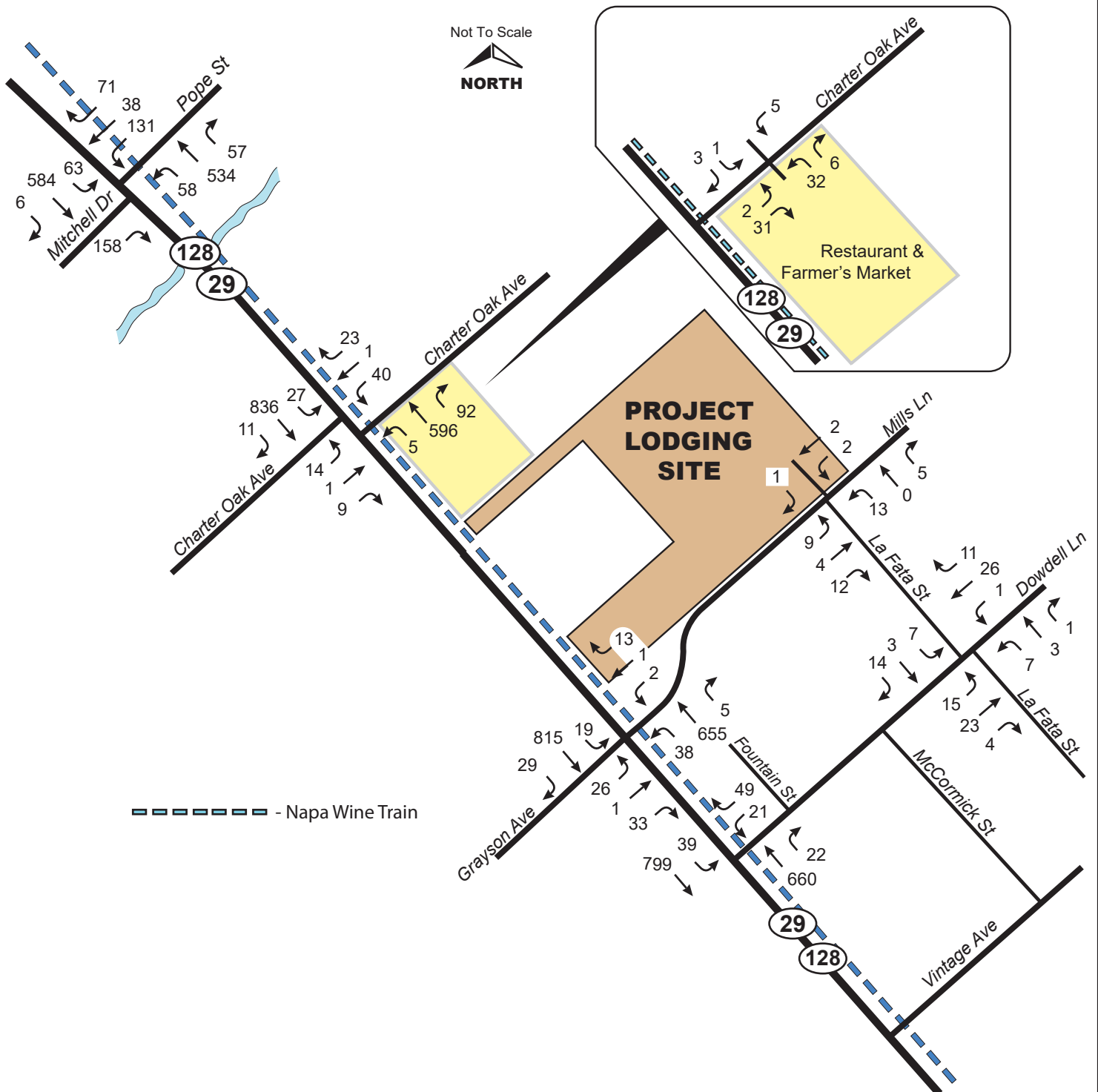
Figure 23

**Year 2022 Harvest Friday + Lodge
AM Peak Hour Volumes**



CRANE TRANSPORTATION GROUP

Not To Scale

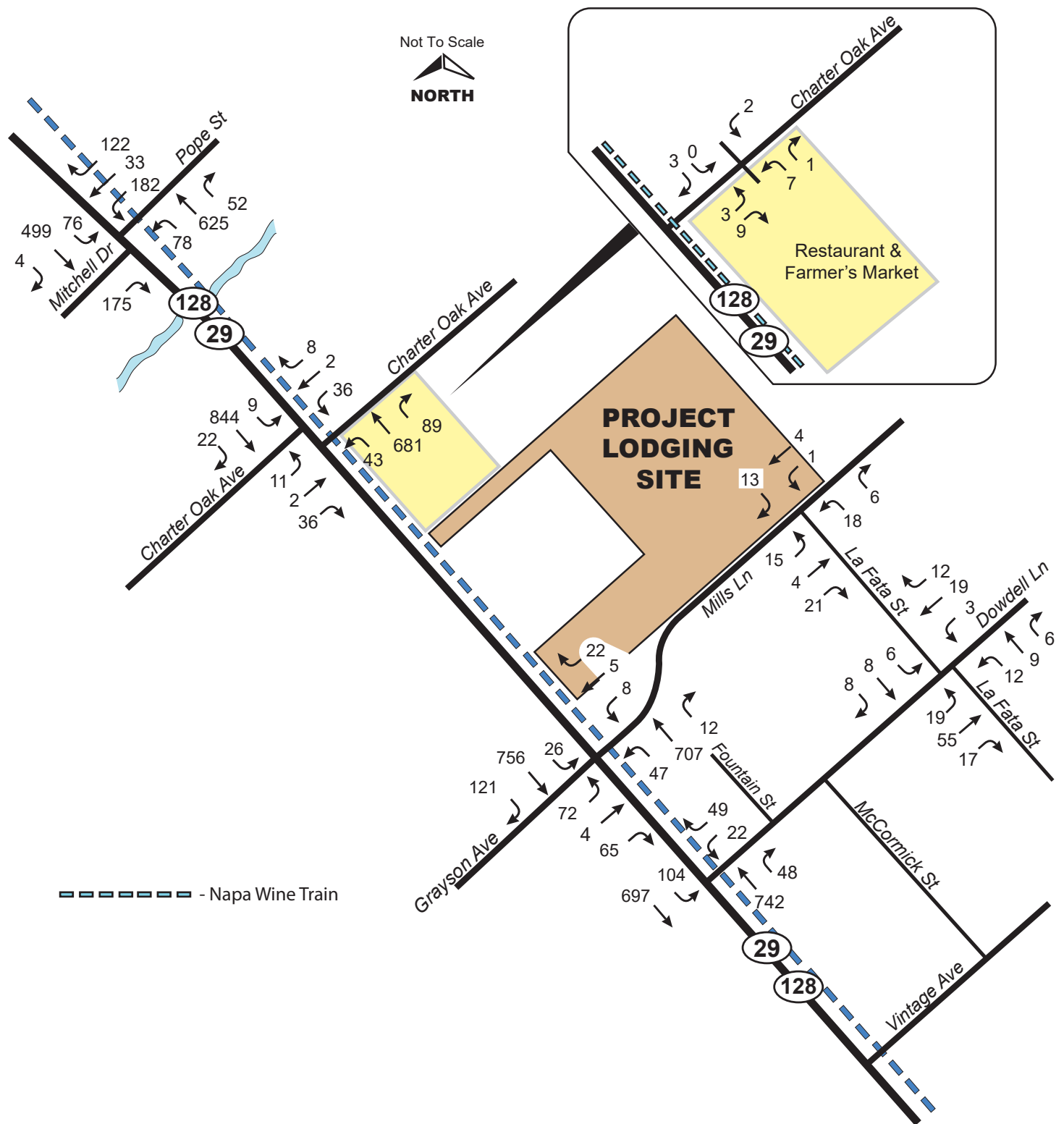


Farmstead Lodge and Total Project Traffic Study

Figure 25
Year 2022 Harvest Saturday with Lodge
PM Peak Hour Volumes



CRANE TRANSPORTATION GROUP



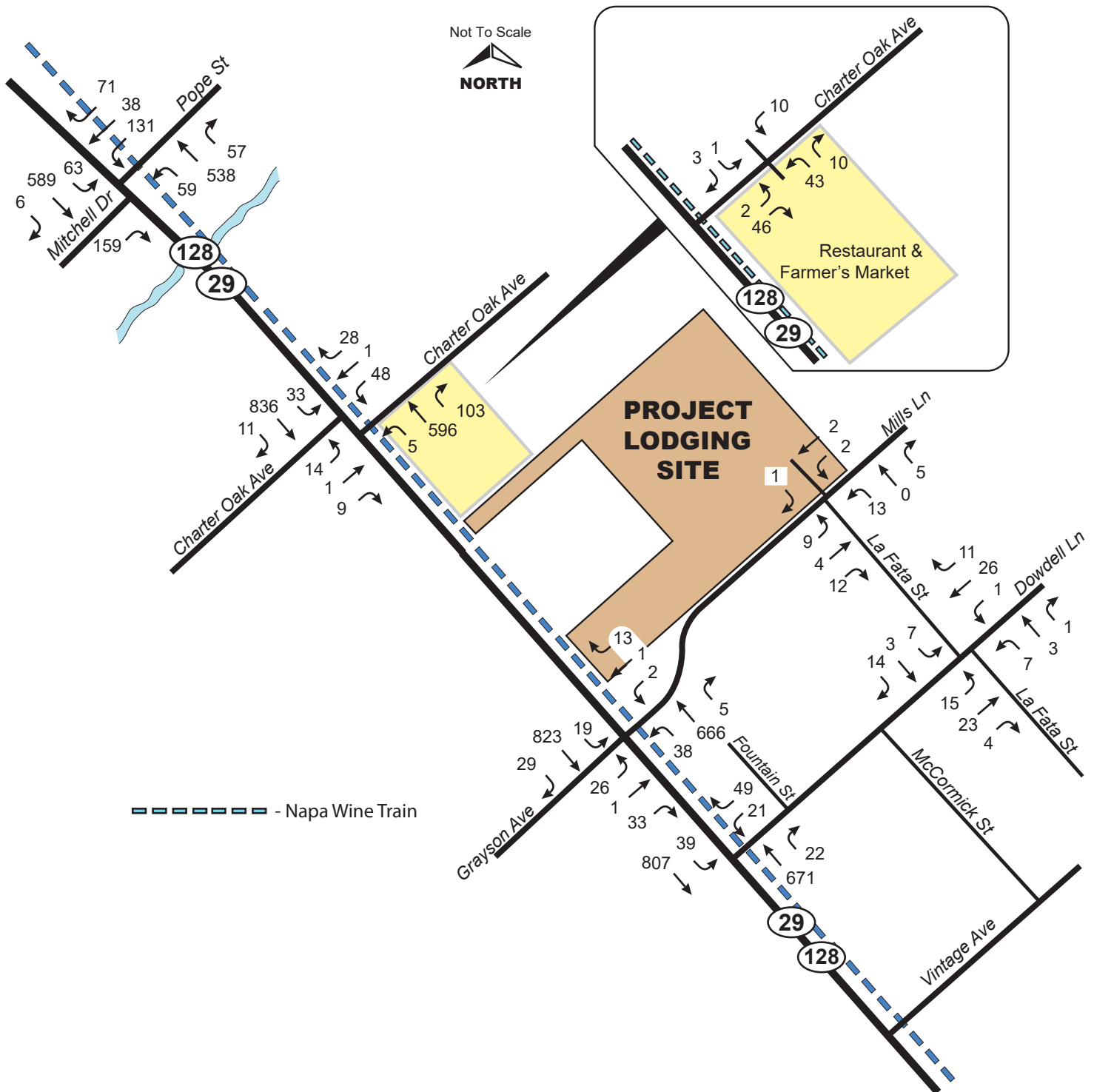
Farmstead Lodge and Total Project Traffic Study

Figure 26
Year 2022 Harvest Friday + Total Project
AM Peak Hour Volumes



CRANE TRANSPORTATION GROUP

Not To Scale

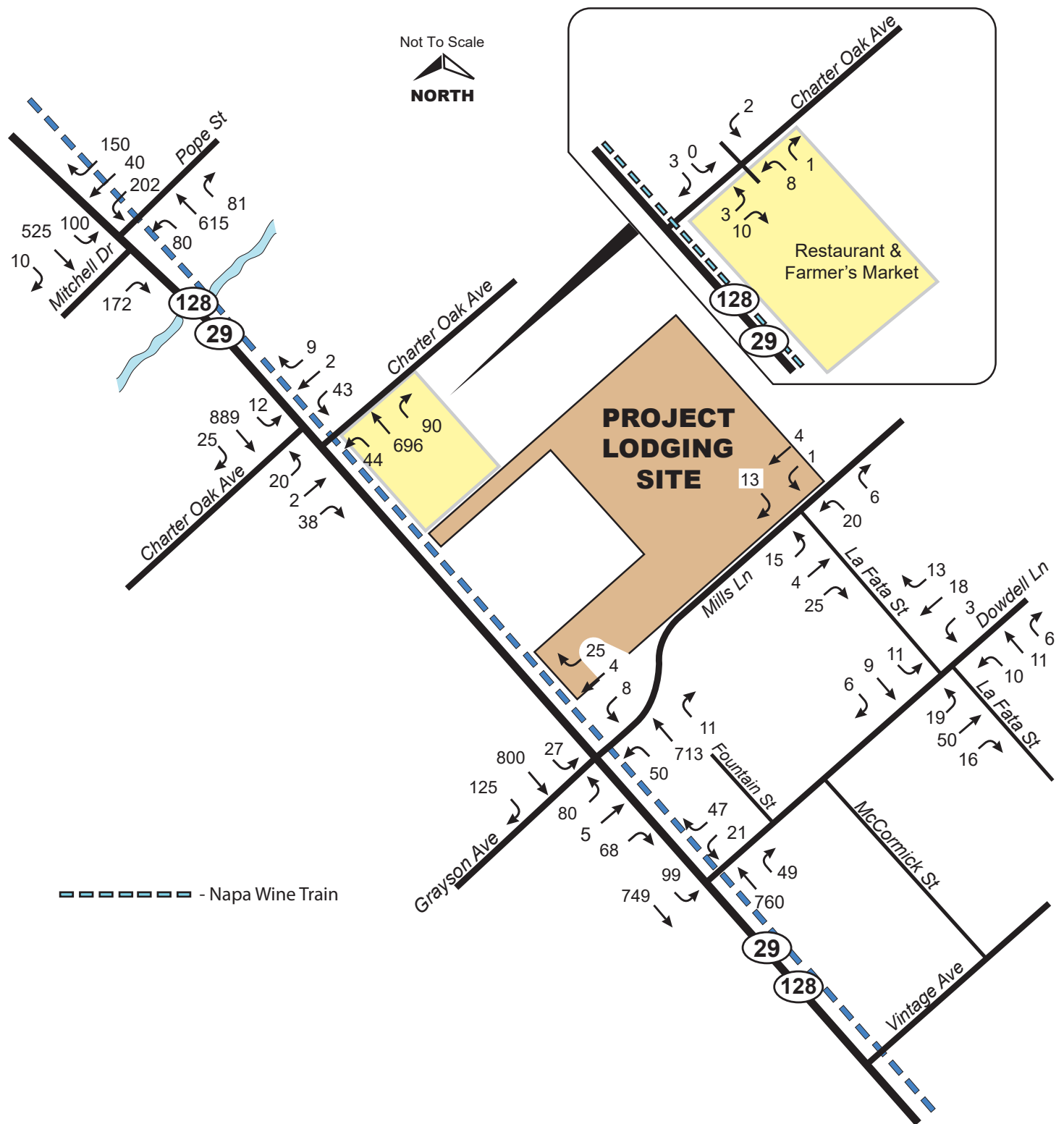


Farmstead Lodge and Total Project Traffic Study

Figure 28
Year 2022 Harvest Saturday with Total Project
PM Peak Hour Volumes



CRANE TRANSPORTATION GROUP



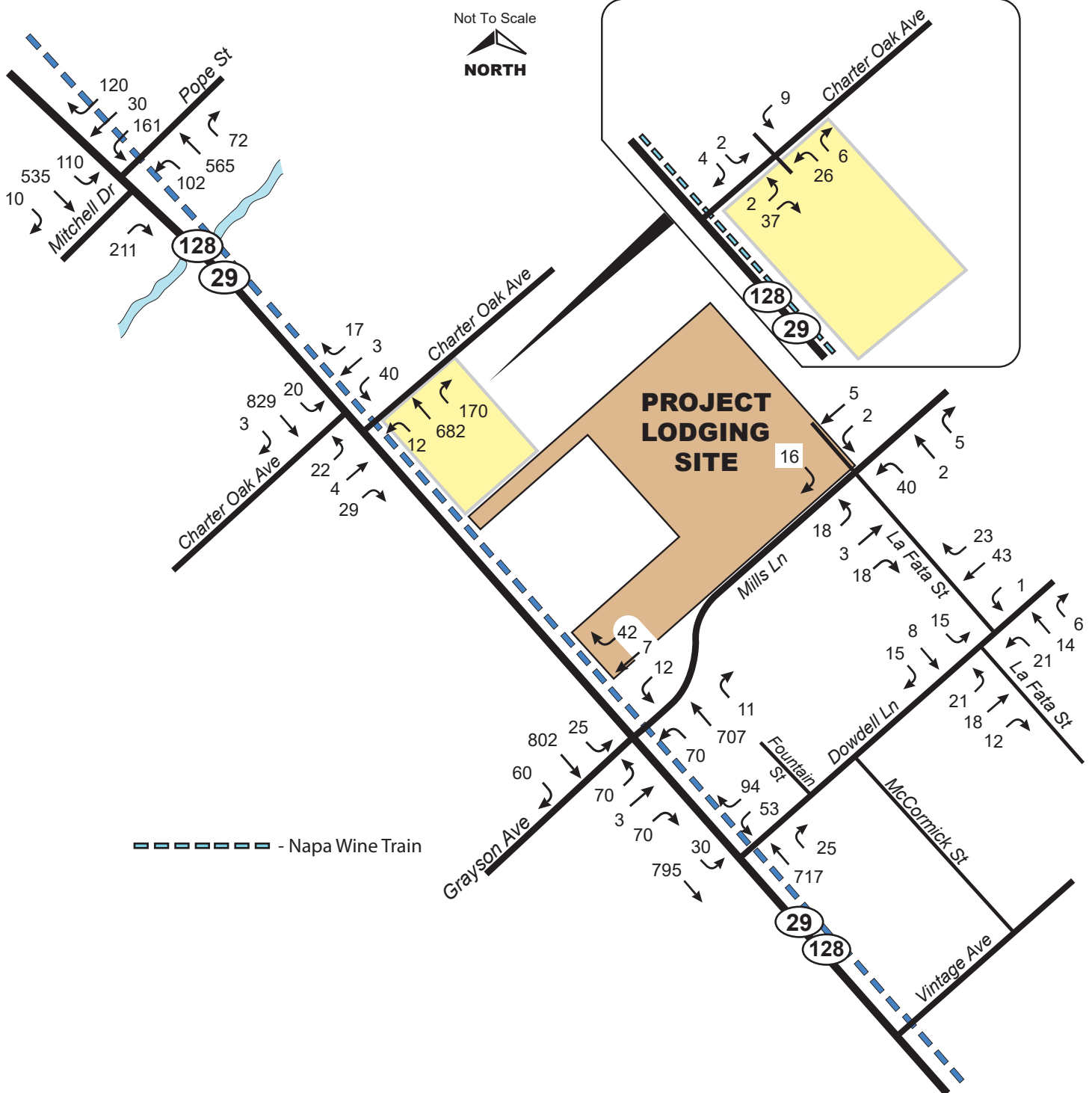
Farmstead Lodge and Total Project Traffic Study

Figure 29

**Year 2040 Harvest Friday + Lodge
AM Peak Hour Volumes**



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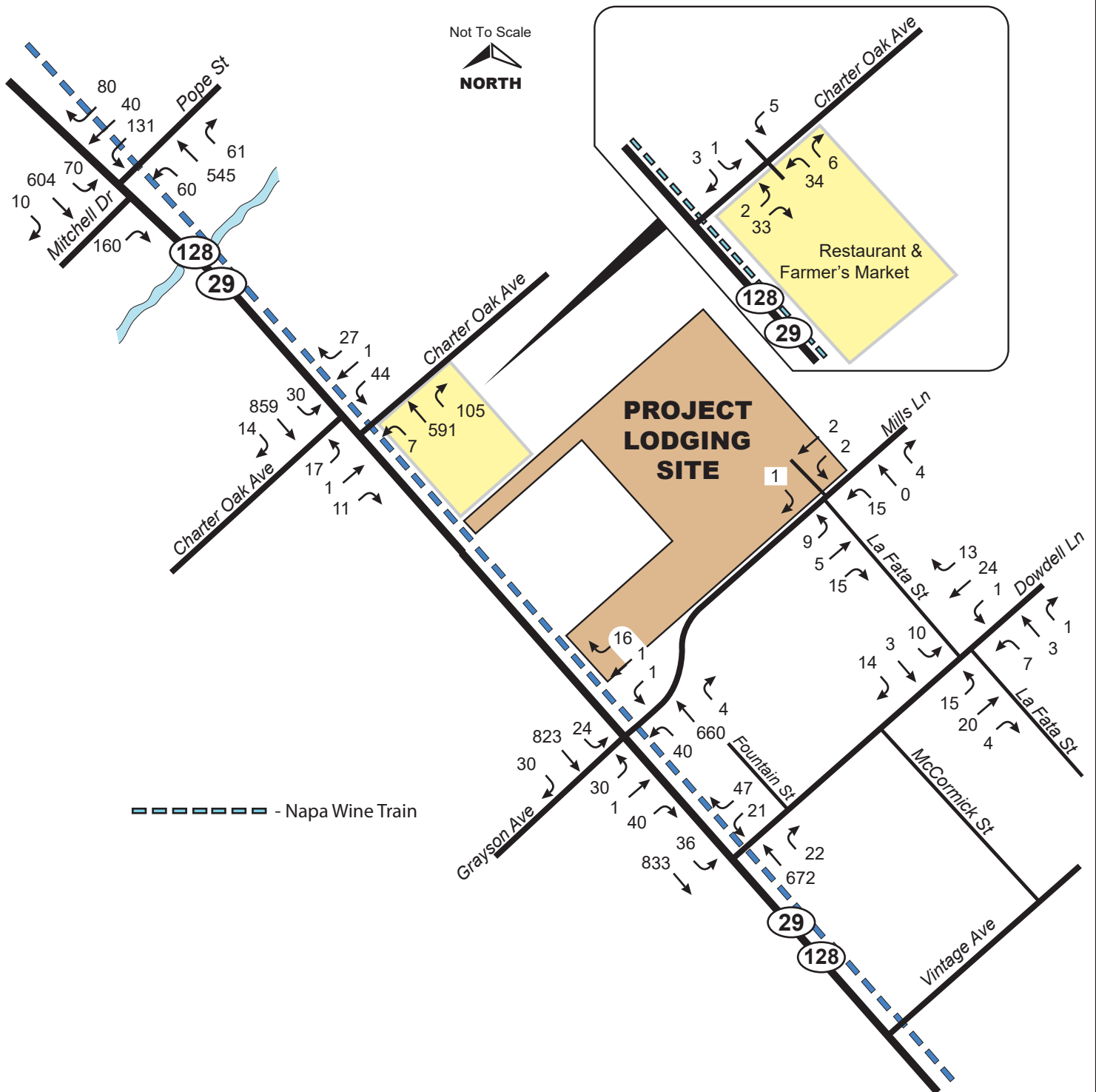
Farmstead Lodge and Total Project Traffic Study

Figure 30
Year 2040 Harvest Friday with Lodge
PM Peak Hour Volumes



CRANE TRANSPORTATION GROUP

Not To Scale

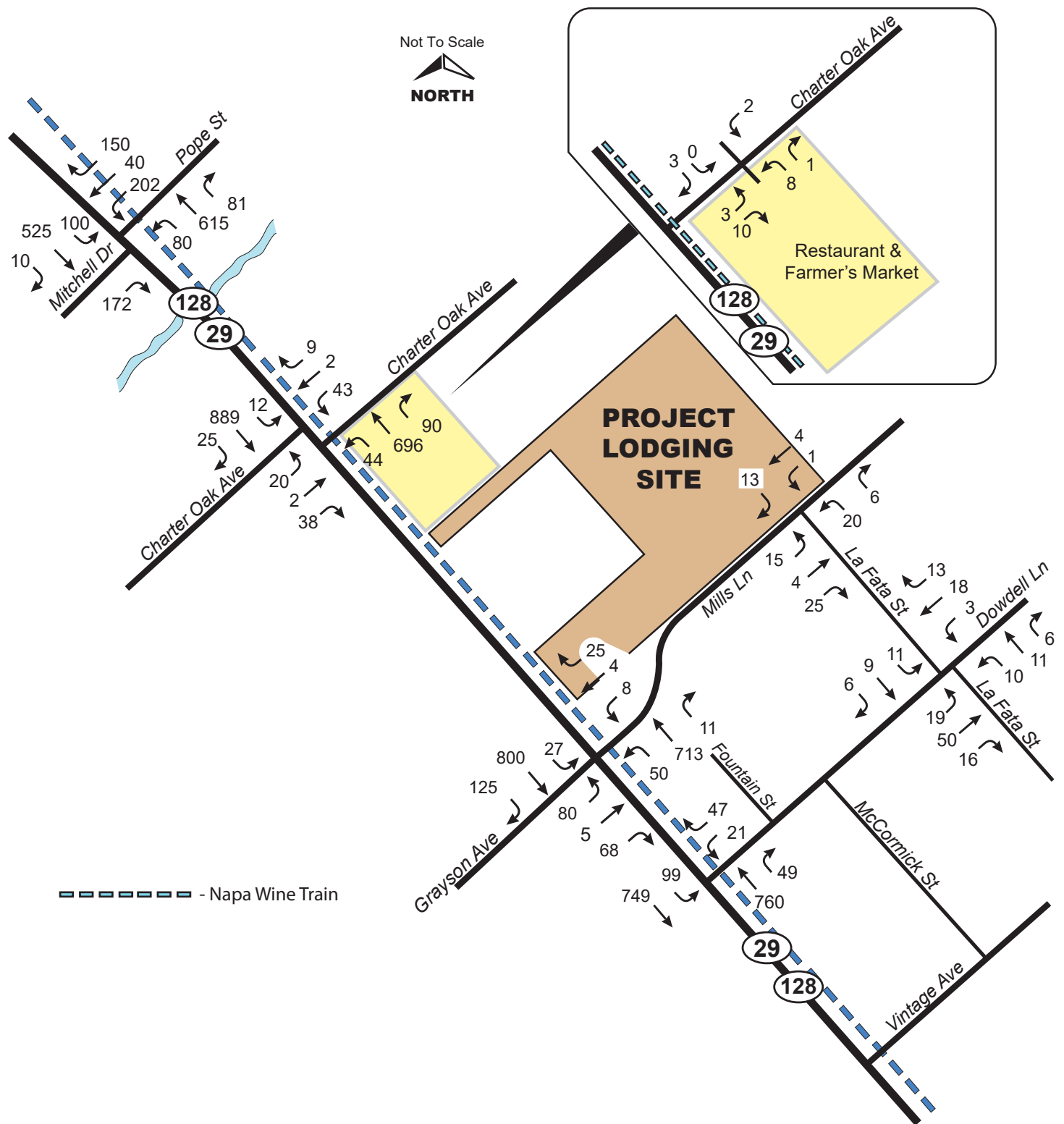


Farmstead Lodge and Total Project Traffic Study

Figure 31
Year 2040 Harvest Saturday with Lodge
PM Peak Hour Volumes



CRANE TRANSPORTATION GROUP



Farmstead Lodge and Total Project Traffic Study

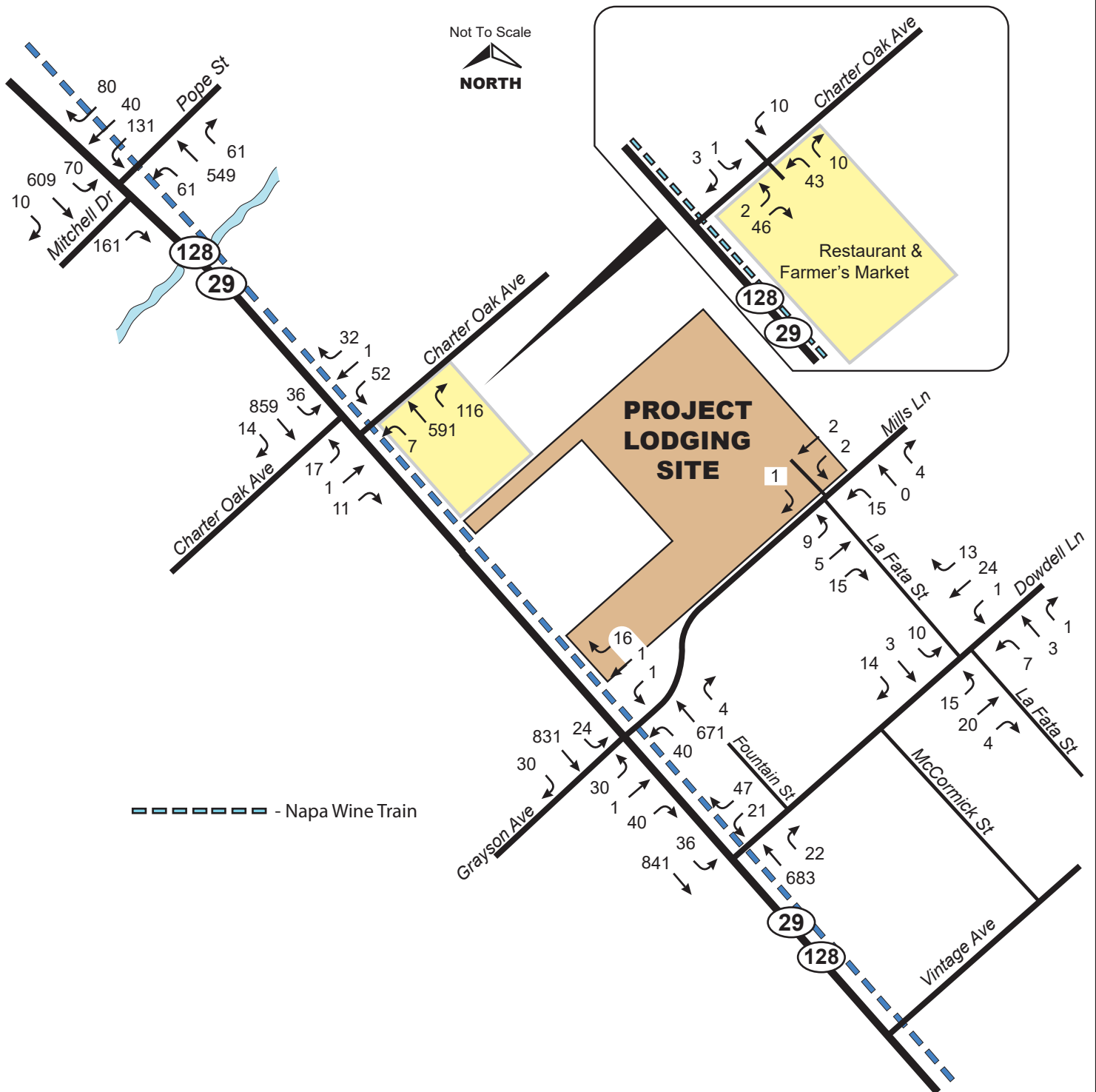
Figure 32

**Year 2040 Harvest Friday + Total Project
AM Peak Hour Volumes**



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Not To Scale



----- - Napa Wine Train

Farmstead Lodge and Total Project Traffic Study

Figure 34
Year 2040 Harvest Saturday with Total Project
PM Peak Hour Volumes



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**Employees walking to/from Lodge,
Restaurant & Farmers Market**

Trips After Dark (7PM - 6AM)

***Employees walking to/from Lodge
Restaurant & Farmers Market***

Restaurant & Farmers Market

Maximum Hourly Walking Trips

***Employees walking to/from Lodge
Restaurant & Farmers Market***

Total 2-Way Trips	
Lodge	13 (5:30-6:00 AM or 2:00-2:30 PM)
Restaurant etc	11 (4:30-5:00 PM or Midnight to 12:30 AM)

✓ **Employee
Parking Lot**

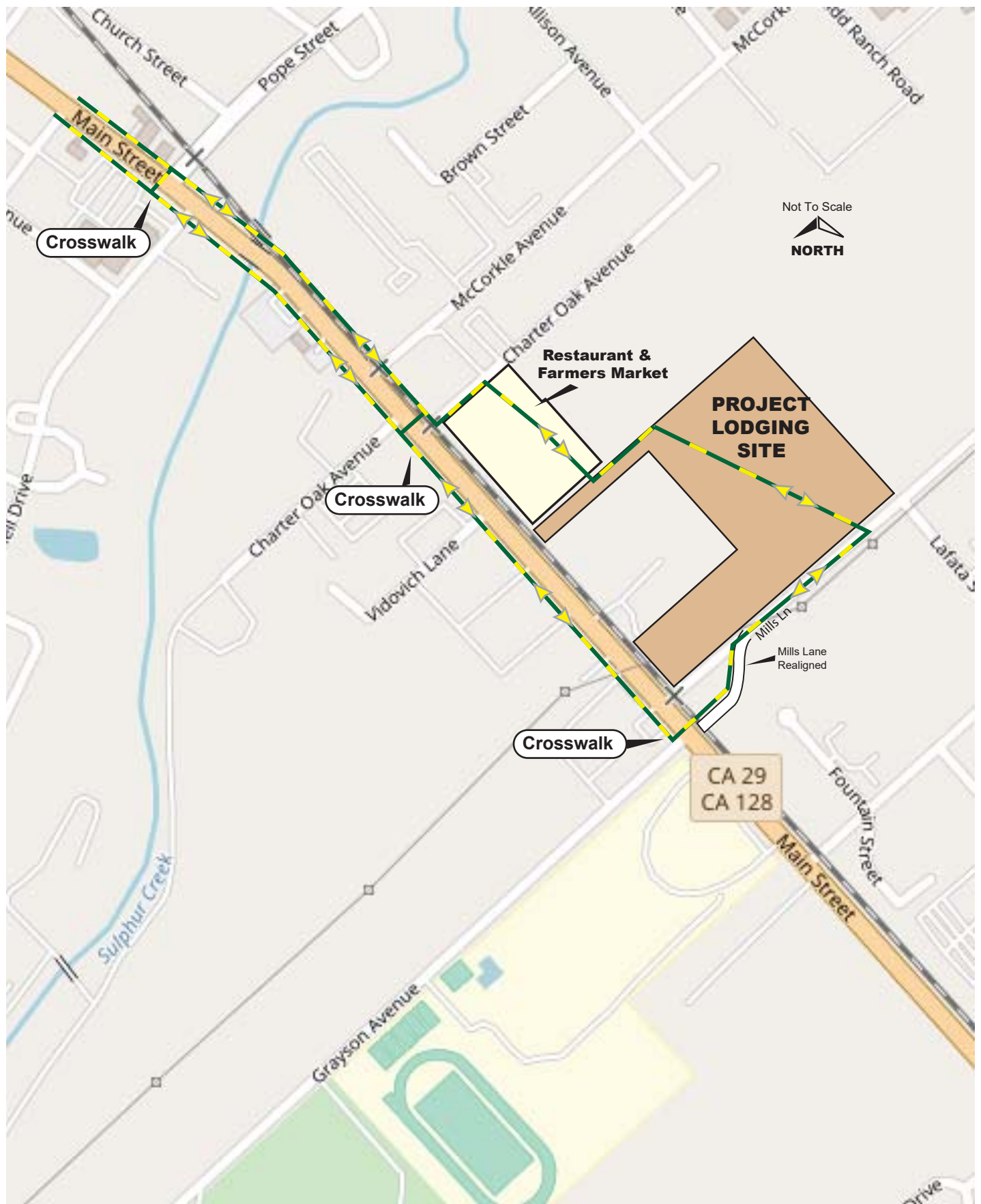
Farmstead Lodge and Total Project Traffic Study



CRANE TRANSPORTATION GROUP

Figure 35

Employees Walking between Dowdell Lane Parking Lot and Project Restaurant/Farmers Marker & Lodge



Farmstead Lodge and Total Project Traffic Study

Figure 36
Guest Walking Routes between
Project Site and Downtown St Helena



CRANE TRANSPORTATION GROUP



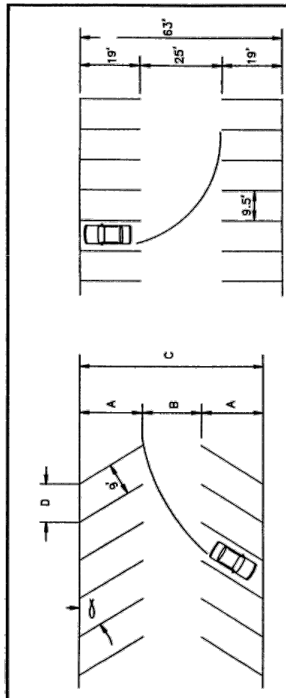
SHERWOOD
DESIGN ENGINEERS
2548 Mission Street
San Francisco, CA 94110
www.sherwoodengr.com

Farmstead Lodge and Total Project Traffic Study

DOWDELL AND MCCORMICK PARKING - 73 STALLS

FARMSTEAD
ST HELENA, CA

April 12, 2019



ANGLED

90°

ANGLED PARKING DIMENSIONS	75'	60'	45'	30'
STALL DEPTH TO WALL	A	19.5'	20'	18.5'
STALL DEPTH (ONE WAY)	B	21'	18'	14'
WALL TO WALL MODULE	C	60'	58'	48'
STALL WIDTH, PARALLEL TO AISLE	D	9.32'	10.35'	12.73'
				18'

NOTES:

1. COMPACT CAR SPACES:

- A. STALL WIDTH MAY BE REDUCED BY ONE FOOT.
- B. STALL LENGTH MAY BE REDUCED BY THREE FEET.
- C. COMPACT CAR SPACES SHALL BE LOCATED ON THE PAVEMENT AT THE ENTRANCE TO EACH STALL WITH A MINIMUM HEIGHT LETTERS.
- D. THE ALLOWABLE PERCENTAGE OF COMPACT CAR SPACES IS CONTAINED IN THE CITY'S ZONING ORDINANCE.
- E. WHEN PROVIDED, COMPACT CAR SPACE CLUSTERS SHALL BE DISPERSED THROUGHOUT THE PARKING LOT, NOT CONCENTRATED IN ONE AREA.

2. PARALLEL SPACES:

- A. PARALLEL SPACES ALONG A WALL, FENCE OR HEDGE SHALL BE TEN FEET WIDE.
- B. PARALLEL SPACES HAVING NO OBSTRUCTION OR ADJACENT PARKING SPACE WITHIN TEN FEET OF ONE END MAY REDUCE THE LENGTH TO 20 FEET. IF BOTH ENDS ARE SIMILARLY CLEAR, THE SPACE MAY BE REDUCED TO 18 FEET.

SCALE: NONE	CITY OF ST. HELENA	DATE: NOV. 19--
DRAWN: DRH	STANDARD OFF STREET PARKING REQUIREMENTS	STD. NO. 321A
CHK:		
APPVD:		

NOTE

- 1. ASSUME ENTIRE PARKING LOT IS PERVIOUS MATERIAL. THEREFORE STORMWATER TREATMENT MEASURES WILL NOT BE IMPLEMENTED.

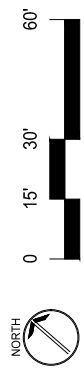
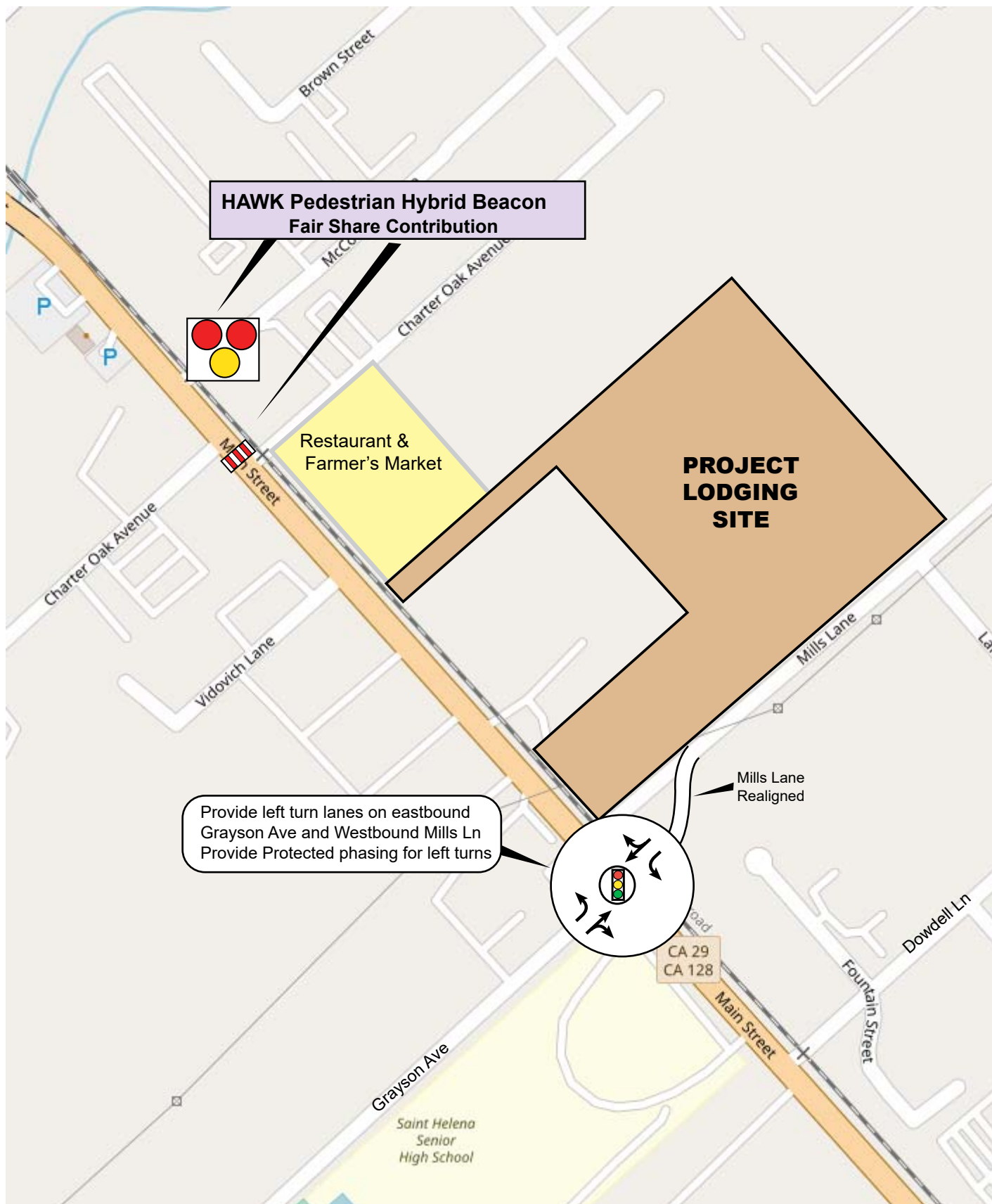


Figure 37
Dowdell Lane Employee Parking Lot
Site Plan

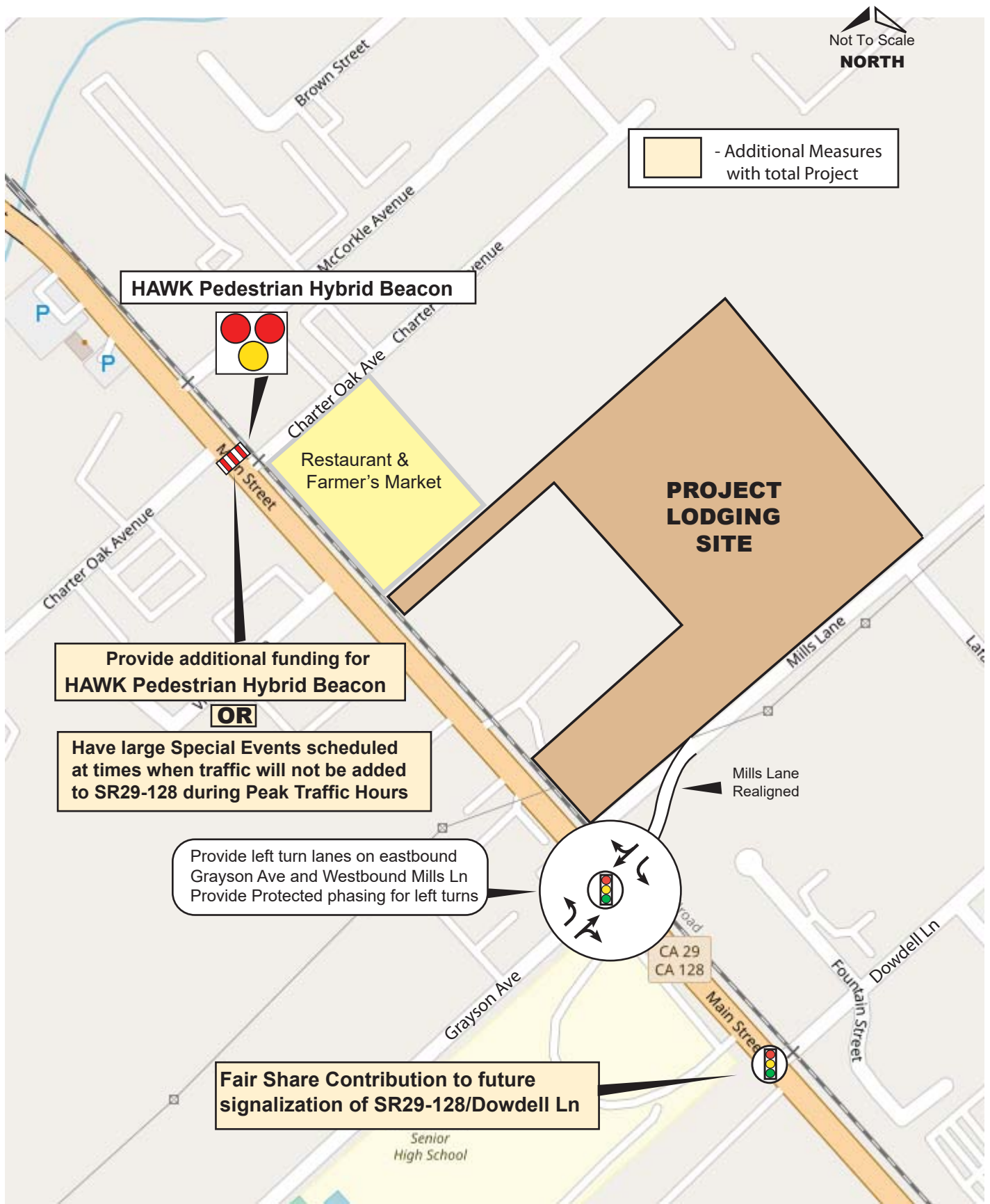


Farmstead Lodge and Total Project Traffic Study

Figure 38
Lodge only Mitigations



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Farmstead Lodge and Total Project Traffic Study

Figure 39
Total Project Mitigations



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Tables

Table 1**SIGNALIZED INTERSECTION LOS CRITERIA**

Level of Service	Description	Average Control Delay (Seconds Per Vehicle)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	≤ 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	10.0 to 20.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.0 to 35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and/or high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable.	35.0 to 55.0
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.0 to 80.0
F	Operation with delays unacceptable to most drivers occurring due to oversaturation, poor progression, or very long cycle lengths.	> 80.0

Source: Year 2017 6th Edition Highway Capacity Manual (Transportation Research Board).

Table 2**UNSIGNALIZED INTERSECTION LOS CRITERIA**

Level of Service	Description	Average Control Delay (Seconds Per Vehicle)
A	Little or no delays	≤ 10.0
B	Short traffic delays	10.0 to 15.0
C	Average traffic delays	15.0 to 25.0
D	Long traffic delays	25.0 to 35.0
E	Very long traffic delays	35.0 to 50.0
F	Extreme traffic delays with intersection capacity exceeded (for an all-way stop), or with approach/turn movement capacity exceeded (for a side street stop controlled intersection)	> 50.0

Source: Year 2017 6th Edition Highway Capacity Manual (Transportation Research Board).

Table 3

INTERSECTION LEVEL OF SERVICE EXISTING (2018)

(No Mills Lane Realignment to the Signalized SR 29/Grayson Avenue Intersection W/O Project)

HARVEST

INTERSECTION	FRIDAY						SATURDAY		
	AM PEAK HOUR			PM PEAK HOUR			PM PEAK HOUR		
	EXISTING	EXISTING		EXISTING	EXISTING		EXISTING	EXISTING	
		+ HOTEL	+ TOTAL PROJECT		+ HOTEL	+ TOTAL PROJECT		+ HOTEL	+ TOTAL PROJECT
SR 29/Pope St-Mitchell St. (Signal)	F-147.7 ⁽¹⁾	F-150.6	F-150.6	F-109.4	F-111.9	F-113.6	F-122.8	F-124.8	F-126.8
SR 29/Charter Oak Ave. (Charter Oak Ave. Stop Sign Controlled Approaches)	C-23.7/ E-37.4 ⁽²⁾	C-25.1/ E-40.2	C-25.1/ E-40.2	D-25.9/ D-30.9	D-25.4/ D-30.9	D-26.0/ D-34.0	C-22.7/ D-25.2	C-22.9/ D-25.1	C-23.5/ D-27.1
SR 29/Mills Lane (Mills Lane Stop Sign Controlled Approach)	B-14.7*	na	na	B-14.4 ⁽³⁾	na	na	B-13.0	na	na
SR 29/Grayson Ave. (Signal)	D-36.7 ⁽⁴⁾	na	na	C-21.9	na	na	C-26.1	na	na
SR 29/Grayson Ave./Mills Lane (Signal)	na	D-41.5 ⁽⁵⁾	D-41.5	na	C-33.1	C-33.9	na	C-31.6	C-32.5
SR 29/Dowdell Lane (Dowdell Lane Stop Sign Controlled Approach)	C-17.5 ⁽⁶⁾	C-17.5	C-17.5	C-17.4	C-17.4	C-17.6	C-15.1	C-15.5	C-15.7

⁽¹⁾ Signalized level of service – control delay in seconds for SR 29/Pope Street-Mitchell Street.

⁽²⁾ Unsignalized level of service – control delay in seconds: Charter Oak Ave. eastbound stop sign controlled approach/Charter Oak Ave. westbound stop sign controlled approach.

⁽³⁾ Unsignalized level of service – control delay in seconds: Mills Lane stop sign controlled approach.

⁽⁴⁾ Signalized level of service – control delay in seconds for SR 29/Grayson Ave.

⁽⁵⁾ Signalized level of service – control delay in seconds for SR 29/Grayson Ave.-Mills Lane.

⁽⁶⁾ Unsignalized level of service – control delay in seconds: Dowdell Lane stop sign controlled approach.

* - Level of Service/Delay is not applicable – no westbound approach vehicles

Year 2017 6th Edition Highway Capacity Manual Methodology

Source: Crane Transportation Group

Table 4
INTERSECTION SIGNALIZATION NEEDS
Do Harvest Volumes Meet Peak Hour
Rural Warrant #3 Volume Criteria?

YEAR 2018

INTERSECTION	FRIDAY						SATURDAY		
	AM PEAK HOUR			PM PEAK HOUR			PM PEAK HOUR		
	W/O PROJECT	+ PROJECT		W/O PROJECT	+ PROJECT		W/O PROJECT	+ PROJECT	
		HOTEL ONLY	TOTAL PROJECT		HOTEL ONLY	TOTAL PROJECT		HOTEL ONLY	TOTAL PROJECT
SR 29/Charter Oak Ave.	Yes	Yes (<1%)	Yes (<1%)	No	No	Yes (2.4%)	Yes	Yes (<1%)	Yes (2.3%)
SR 29/Dowdell Lane	Yes	Yes (<1%)	Yes (<1%)	Yes	Yes (<1%)	Yes (1.6%)	No	No	No

YEAR 2022

INTERSECTION	FRIDAY						SATURDAY		
	AM PEAK HOUR			PM PEAK HOUR			PM PEAK HOUR		
	W/O PROJECT	+ PROJECT		W/O PROJECT	+ PROJECT		W/O PROJECT	+ PROJECT	
		HOTEL ONLY	TOTAL PROJECT		HOTEL ONLY	TOTAL PROJECT		HOTEL ONLY	TOTAL PROJECT
SR 29/Charter Oak Ave.	Yes	Yes (<1%)	Yes (<1%)	Yes	Yes (<1%)	Yes (2.3%)	Yes	Yes (<1%)	Yes (2.2%)
SR 29/Dowdell Lane	Yes	Yes (<1%)	Yes (<1%)	Yes	Yes (<1%)	Yes (1.1%)	Yes	Yes (<1%)	Yes (1.1%)

CUMULATIVE (YEAR 2040)

INTERSECTION	FRIDAY						SATURDAY		
	AM PEAK HOUR			PM PEAK HOUR			PM PEAK HOUR		
	W/O PROJECT	+ PROJECT		W/O PROJECT	+ PROJECT		W/O PROJECT	+ PROJECT	
		HOTEL ONLY	TOTAL PROJECT		HOTEL ONLY	TOTAL PROJECT		HOTEL ONLY	TOTAL PROJECT
SR 29/Charter Oak Ave.	Yes	Yes (<1%)	Yes (<1%)	Yes	Yes (<1%)	Yes (2.2%)	Yes	Yes (<1%)	Yes (2.1%)
SR 29/Dowdell Lane	Yes	Yes (<1%)	Yes (<1%)	Yes	Yes (<1%)	Yes (<1%)	Yes	Yes (<1%)	Yes (<1%)

* Percent traffic increase entering intersection due to project

Bolded = Significant impact (an increase of 1% or greater).

California Manual on Uniform Traffic Control Devices, 2014, Revision 3 (2014 CMUTCD Rev. 3) Source: Crane Transportation Group

Table 5

**EXISTING PEDESTRIANS CROSSING SR 29
AT CHARTER OAK AVENUE CROSSWALK
(W/O PROJECT)**

FRIDAY

	MAY 20, 2016			SEPT. 20, 2019
	EASTBOUND	WESTBOUND	TOTAL 2-WAY	
7:00-8:00 AM	30	1	31	20
8:00-9:00 AM	6 (1)	3	9 (1)	20
3:00-4:00 PM	51	8	59	45
4:00-5:00 PM	17 (2)	21 (6)	38 (8)	45
5:00-6:00 PM	13 (1)	16 (2)	29 (3)	24

SATURDAY

	JUNE 4, 2016			SEPT. 21, 2019
	EASTBOUND	WESTBOUND	TOTAL 2-WAY	
1:00-2:00 PM	60	13	73	28
2:00-3:00 PM	34 (7)	16 (1)	50 (8)	18
3:00-4:00 PM	29	9	38	32
4:00-5:00 PM	34	11	45	41
5:00-6:00 PM	20	14	34	—

(XX) = Existing Farmstead restaurant & farmers market employees walking to/from employee parking lot on Charter Oak Avenue west of SR 29.

Source: Crane Transportation Group

Table 6

APPROVED & PROPOSED PROJECTS CONTAINED IN THE 2018 GENERAL PLAN UPDATE CIRCULATION ELEMENT

PROJECT NAME	QUANTITY (UNITS)	AM PEAK HOUR TRIPS (8:00-9:00)			PM PEAK HOUR TRIPS (3:15-4:15)			SATURDAY PEAK HOUR TRIPS (3:45-4:45)		
		TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT
Redmond Winery Conversion (867 Dowdell Lane)	24,000 gallons/year winery uses + commercial kitchen	9	6	3	9	3	6	12	3	9
Vineland Station Hotel & Commercial (633 Main Street)	60-unit hotel 75,000 SQ.FT. service commercial	126	81	45	231	103	128	243	124	119
Montessori Middle School	25 students	32	16	16	32	16	16	0	0	0
Hunter Subdivision Single & Multi Family	51 SF units 36 MF units	55	13	42	72	45	27	74	39	35
Komes Custom Crush Facility 890 Dowdell Lane, La Fata Street	15,000 gallons	11	9	2	11	2	9	18	9	9
Salvestrin Winery	Production increase from 11,500 to 20,000 gallons	3	3	0	0	0	0	0	0	0
Davies Winery	75,000 gallons + tours	9	7	2	33	12	21	27	13	14
St. Helena Estates & Winery	20 SF units, 20 ADU units, 15 farmworker rental units, 15,000 gallon winery	40	9	31	46	31	17	43	24	21
Fulton Office Building (1030 Fulton Lane)	6,000 SQ.FT.	18	15	3	17	3	14	6	3	3
OK Tire (1025 Dowdell Lane)	4,700 SQ.FT.	13	8	5	19	8	11	24	11	13
Herdell Printing (office/industrial) (320 McCormick Street)	21,000 SQ.FT.	15	13	2	14	2	12	9	4	5
500 Mills Lane	1 S.F. unit	1	0	1	1	1	0	1	1	0
2525 Madron Ave	1 S.F. unit	1	0	1	1	1	0	1	1	0

Trip generation sources: 1030 Fulton Project Traffic Analysis, Crane Transportation Group, January 2018.
 Redmon Kitchen and Commercial Kitchen Project – Focused Traffic Impact Analysis, Omni Means, April 2016.
 Brenkle Court Project Traffic Impact Analysis, Transpedia Consulting Engineers, June 2016.
 McCorkle Apartments Project Traffic Impact Analysis, Transpedia Consulting Engineers, June 2016.
 St. Helena Apartments and Montessori Farm School Phase II Traffic Impact Analysis, Crane Transportation Group, January 2008.
 Hunter Residential Subdivision Traffic Impact Analysis, Crane Transportation Group, April 2012, updated to July 2018 with current unit mix.
 Komes Custom Crush Winery Project – Focused Traffic Impact Analysis, Omni Means, March 2017.
 St. Helena Estates & Winery Traffic Study, Crane Transportation Group, January 2018.

Project list source: City of St. Helena General Plan Update EIR Buildout Projections, by Dyett & Bhatia, July 20, 2018

Trip generation projections compiled by: Crane Transportation Group

Table 7

INTERSECTION LEVEL OF SERVICE YEAR 2022

(No Mills Lane Realignment to the Signalized SR 29/Grayson Avenue Intersection W/O Project)

HARVEST

INTERSECTION	FRIDAY						SATURDAY		
	AM PEAK HOUR			PM PEAK HOUR			PM PEAK HOUR		
	W/O PROJECT	YEAR 2022		W/O PROJECT	YEAR 2022		W/O PROJECT	YEAR 2022	
		+ HOTEL	+ TOTAL PROJECT		+ HOTEL	+ TOTAL PROJECT		+ HOTEL	+ TOTAL PROJECT
SR 29/Pope St-Mitchell St. (Signal)	F-153.2 ⁽¹⁾	F-154.8	F-154.8	F-117.0	F-120.0	F-121.6	F-132.2	F-134.8	F-136.6
SR 29/Charter Oak Ave. (Charter Oak Ave. Stop Sign Controlled Approaches)	C-24.9/ E-40.9 ⁽²⁾	C-26.1/ E-43.5	C-26.1/ E-43.5	D-26.9/ D-32.5	D-26.2/ D-32.7	D-26.7/ E-36.0	C-23.6/ D-26.7	C-23.8/ D-26.6	C-24.4/ D-29.2
SR 29/Mills Lane (Mills Lane Stop Sign Controlled Approach)	C-15.0*	na	na	B-14.8 ⁽³⁾	na	na	B-13.3	na	na
SR 29/Grayson Ave. (Signal)	D-43.4 ⁽⁴⁾	na	na	C-23.3	na	na	C-29.5	na	na
SR 29/Grayson Ave./Mills Lane (Signal)	na	D-54.6 ⁽⁵⁾	D-54.6 ⁽⁵⁾	na	D-36.5	D-37.4	na	D-37.6	D-38.8
SR 29/Dowdell Lane (Dowdell Lane Stop Sign Controlled Approach)	C-19.3 ⁽⁶⁾	C-19.3	C-19.3	C-18.8	C-18.6	C-18.8	C-15.8	C-16.0	C-16.2

⁽¹⁾ Signalized level of service – control delay in seconds for SR 29/Pope Street-Mitchell Street.

⁽²⁾ Unsignalized level of service – control delay in seconds: Charter Oak Ave. eastbound stop sign controlled approach/Charter Oak Ave. westbound stop sign controlled approach.

⁽³⁾ Unsignalized level of service – control delay in seconds: Mills Lane stop sign controlled approach.

⁽⁴⁾ Signalized level of service – control delay in seconds for SR 29/Grayson Ave.

⁽⁵⁾ Signalized level of service – control delay in seconds for SR 29/Grayson Ave.-Mills Lane.

⁽⁶⁾ Unsignalized level of service – control delay in seconds: Dowdell Lane stop sign controlled approach.

* - Level of Service/Delay is not applicable – no westbound approach vehicles

Year 2017 6th Edition Highway Capacity Manual Methodology

Source: Crane Transportation Group

Table 8

INTERSECTION LEVEL OF SERVICE CUMULATIVE (YEAR 2040)

(No Mills Lane Realignment to the Signalized SR 29/Grayson Avenue Intersection W/O Project)

HARVEST

INTERSECTION	FRIDAY						SATURDAY		
	AM PEAK HOUR			PM PEAK HOUR			PM PEAK HOUR		
	W/O PROJECT	YEAR 2035		W/O PROJECT	YEAR 2035		W/O PROJECT	YEAR 2035	
		+ HOTEL	+ TOTAL PROJECT		+ HOTEL	+ TOTAL PROJECT		+ HOTEL	+TOTAL PROJECT
SR 29/Pope St-Mitchell St. (Signal)	F-157.1 ⁽¹⁾	F-158.8	F-158.8	F-130.4	F-133.3	F-134.8	F-140.3	F-143.3	F-145.1
SR 29/Charter Oak Ave. (Charter Oak Ave. Stop Sign Controlled Approaches)	D-31.1/ F-51.3 ⁽²⁾	D-32.9/ F-55.0	D-32.9/ F-55.0	D-30.4/ E-35.7	D-29.9/ E-36.0	D-30.6/ E-40.3	C-24.9/ D-28.9	D-25.3/ D-28.7	D-25.9/ D-31.6
SR 29/Mills Lane (Mills Lane Stop Sign Controlled Approach)	C-15.2 ⁽³⁾	na	na	C-15.2	na	na	B-13.5	na	na
SR 29/Grayson Ave. (Signal)	D-43.3 ⁽⁴⁾	na	na	C-28.0	na	na	C-32.0	na	na
SR 29/Grayson Ave./Mills Lane (Signal)	na	E-67.0 ⁽⁵⁾ mitigated: D-52.7	E-67.0 ⁽⁵⁾ mitigated: D-52.7	na	D-45.4	D46.9	na	D-41.5	D-42.9
SR 29/Dowdell Lane (Dowdell Lane Stop Sign Controlled Approach)	C-20.1 ⁽⁶⁾	C-19.8	C-19.8	C-19.4	C-19.1	C-19.3	C-15.1	C-16.4	C-16.5

Bold = Significant impact.

⁽¹⁾ Signalized level of service – control delay in seconds for SR 29/Pope Street-Mitchell Street.

⁽²⁾ Unsignalized level of service – control delay in seconds: Charter Oak Ave. eastbound stop sign controlled approach/Charter Oak Ave. westbound stop sign controlled approach.

⁽³⁾ Unsignalized level of service – control delay in seconds: Mills Lane stop sign controlled approach.

⁽⁴⁾ Signalized level of service – control delay in seconds for SR 29/Grayson Ave.

⁽⁵⁾ Signalized level of service – control delay in seconds for SR 29/Grayson Ave.-Mills Lane.

⁽⁶⁾ Unsignalized level of service – control delay in seconds: Dowdell Lane stop sign controlled approach.

* - Level of Service/Delay is not applicable – no westbound approach vehicles

Year 2017 6th Edition Highway Capacity Manual Methodology; Source: Crane Transportation Group

Table 9

PROJECT LODGE TRIP GENERATION**FRIDAY (WITH 100% OCCUPANCY)
(HOURS OF PEAK TRAFFIC ON SR 29)**

# ROOMS	DAILY 2-WAY TRIPS		AMBIENT AM PEAK HOUR (7:45-8:45)				AMBIENT PM PEAK HOUR (4:30-5:30)			
			INBOUND		OUTBOUND		INBOUND		OUTBOUND	
	RATE	VOL	RATE	VOL	RATE	VOL	RATE	VOL	RATE	VOL
65	8.36	544	.28	19	.19	13	.30	20	.30	20

SATURDAY (WITH 100% OCCUPANCY)

# ROOMS	DAILY 2-WAY TRIPS		LODGING PEAK TRIP GENERATION HOUR*				HOUR OF PEAK TRAFFIC ON SR 29 (2:00-3:00 PM)			
			INBOUND		OUTBOUND		INBOUND		OUTBOUND	
	RATE	VOL	RATE	VOL	RATE	VOL	RATE	VOL	RATE	VOL
65	8.19	534	.40	26	.32	21	.26	17	.21	14

* Potentially between 6:00 and 8:00 PM. Trip generation from 2:00-3:00 PM = 65% of peak hour trip generation during the day based upon ITE research.

FRIDAY TRIPS				SATURDAY TRIPS	
AM PEAK HOUR		PM PEAK HOUR		IN	OUT
IN	OUT	IN	OUT		
19	13	20	20	17	14

Trip rate source: *Trip Generation Manual, 10th Edition, by the Institute of Transportation Engineers, 2017.*
Compiled by: *Crane Transportation Group*

Table 10

**FARMSTEAD LODGE EMPLOYEE ARRIVALS
& DEPARTURES
47 EMPLOYEES/DAY**

TIME	ARRIVE	DEPART
5:00-6:00 AM	13	0
6:00-7:00 AM	9	2
7:00-8:00 AM	4	0
8:00-9:00 AM	0	0
1:00-2:00 PM	10	0
2:00-3:00 PM	7	13
3:00-4:00 PM	2	9
4:00-5:00 PM	0	4
5:00-6:00 PM	0	0
10:00-11:00 PM	0	11
11:00 PM-12:00 AM	0	7
12:00-1:00 AM	0	2

Source: Farmstead project applicant

Table 11

**PROJECT LODGE GUEST VERSUS EMPLOYEE
TRIP GENERATION DURING PEAK TRAFFIC HOURS
47 EMPLOYEES**

CATEGORY	FRIDAY				SATURDAY	
	AM PEAK HOUR (7:45-8:45)		PM PEAK HOUR (4:30-5:30)		PM PEAK HOUR (2:00-3:00)	
	IN	OUT	IN	OUT	IN	OUT
Employee/Delivery	5	1*	0	4	7	13
Guests/Friends of Guests/ Limo Pickup & Drop Off	14	12	20	16	10	1
Total	19	13	20	20	17	14

* Includes one delivery vehicle in/out via lodge driveway.

Source: Crane Transportation Group, based upon total trip generation from Institute of Transportation Engineers trip rates and applicant's projection of employee numbers and shift change times.

Table 12

DISTRIBUTION OF PROJECT LODGE GUEST TRAFFIC ALONG SR 29

INTERSECTION	FRIDAY				SATURDAY	
	AM PEAK HOUR		PM PEAK HOUR		PM PEAK HOUR	
	INBOUND	OUTBOUND	INBOUND	OUTBOUND	INBOUND	OUTBOUND
SR 29 to the North	50%	50%	40%	50%	50%	50%
SR 29 to the South	50%	50%	60%	50%	50%	50%

Source: Crane Transportation Group, City of St. Helena

Table 13

FARMSTEAD RESTAURANT/FARMERS MARKET EMPLOYEE VEHICLES THAT WILL TRANSFER FROM THE EXISTING CHARTER OAK PARKING LOT TO THE PROPOSED EMPLOYEE PARKING LOT AT THE DOWDELL LANE/McCORMICK INTERSECTION

FRIDAY TRIPS				SATURDAY	
AM PEAK HOUR (7:45-8:45)		PM PEAK HOUR (4:30-5:30)		PM PEAK HOUR (2:00-3:00)	
IN	OUT	IN	OUT	IN	OUT
1	0	3	8	8	1

Source: Based upon counts at the Charter Oak employee parking lot by Crane Transportation Group

Table 14

**FARMSTEAD EMPLOYEES WALKING TO/FROM
DOWDELL LANE PARKING LOT
(assuming 1 employee/vehicle and all employees driving)**

A. DAILY TRIPS

USE	EMPLOYEES	TOTAL 2-WAY DAILY WALKING TRIPS
Lodging	47	94
Restaurant	54	108
TOTAL	101	202

B. WALKING TRIPS AFTER DARK (BETWEEN 7:00 PM & 6:00 AM)

Lodging	32
Restaurant	<u>36</u>
TOTAL	68

C. MAXIMUM HOURLY WALKING TRIPS

Lodging	13	5:30-6:00 AM or 2:00-2:30 PM
Restaurant	11	4:30-5:00 PM or midnight to 12:30 AM

*Source: Project Applicant
Compiled by: Crane Transportation Group*

Appendix

Appendix A

HCM 6th Signalized Intersection Summary

18: Main St & Mitchell Dr/Pope Street

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	168	175	33	122	77	605	50	76	469	4
Future Volume (veh/h)	0	0	168	175	33	122	77	605	50	76	469	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	50	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.91	1.00		0.91	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1318	1856	1318	1318
Adj Flow Rate, veh/h	0	0	181	188	35	131	83	651	54	82	504	4
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	0	121	192	231	43	221	111	693	21	111	712	6
Arrive On Green	0.00	0.00	0.07	0.15	0.15	0.15	0.06	0.55	0.55	0.06	0.54	0.54
Sat Flow, veh/h	0	1856	1428	1501	279	1434	1767	1198	99	1767	1306	10
Grp Volume(v), veh/h	0	0	181	223	0	131	83	0	705	82	0	508
Grp Sat Flow(s),veh/h/ln	0	1856	1428	1780	0	1434	1767	0	1297	1767	0	1316
Q Serve(g_s), s	0.0	0.0	9.0	16.7	0.0	11.7	6.4	0.0	74.6	6.3	0.0	39.4
Cycle Q Clear(g_c), s	0.0	0.0	9.0	16.7	0.0	11.7	6.4	0.0	74.6	6.3	0.0	39.4
Prop In Lane	0.00		1.00	0.84		1.00	1.00		0.08	1.00		0.01
Lane Grp Cap(c), veh/h	0	121	192	274	0	221	111	0	714	111	0	717
V/C Ratio(X)	0.00	0.00	0.94	0.81	0.00	0.59	0.75	0.00	0.99	0.74	0.00	0.71
Avail Cap(c_a), veh/h	0	121	192	453	0	365	321	0	707	321	0	717
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	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	0.0	0.0	59.7	56.3	0.0	54.2	63.4	0.0	31.3	63.4	0.0	23.2
Incr Delay (d2), s/veh	0.0	0.0	48.2	5.8	0.0	2.5	3.8	0.0	30.7	3.6	0.0	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	246.4	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	8.9	8.0	0.0	4.4	3.0	0.0	78.1	3.0	0.0	12.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	107.9	62.0	0.0	56.7	67.2	0.0	308.4	67.0	0.0	26.0
LnGrp LOS	A	A	F	E	A	E	E	A	F	E	A	C
Approach Vol, veh/h		181			354			788			590	
Approach Delay, s/veh		107.9			60.1			283.0			31.7	
Approach LOS		F			E			F			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.3	82.7		28.9	12.3	82.7		13.7				
Change Period (Y+Rc), s	3.7	* 7.7		* 7.7	3.7	* 7.7		4.7				
Max Green Setting (Gmax), s	25.0	* 75		* 35	25.0	* 75		9.0				
Max Q Clear Time (g_c+I1), s	8.4	41.4		18.7	8.3	76.6		11.0				
Green Ext Time (p_c), s	0.1	2.4		1.7	0.1	0.0		0.0				

Intersection Summary

HCM 6th Ctrl Delay 147.7

HCM 6th LOS F

Notes

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

HCM 6th Signalized Intersection Summary

19: Main St & Grayson Avenue

11-13-2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	71	61	45	703	733	120
Future Volume (veh/h)	71	61	45	703	733	120
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	0.92	1.00			0.96
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	1900	1900	1856	1318	1318	1318
Adj Flow Rate, veh/h	75	64	47	740	772	126
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	3	3	3	3
Cap, veh/h	95	81	118	1038	738	120
Arrive On Green	0.11	0.11	0.07	0.79	0.67	0.67
Sat Flow, veh/h	859	733	1767	1318	1098	179
Grp Volume(v), veh/h	140	0	47	740	0	898
Grp Sat Flow(s),veh/h/ln	1604	0	1767	1318	0	1277
Q Serve(g_s), s	8.2	0.0	2.5	26.3	0.0	65.0
Cycle Q Clear(g_c), s	8.2	0.0	2.5	26.3	0.0	65.0
Prop In Lane	0.54	0.46	1.00			0.14
Lane Grp Cap(c), veh/h	178	0	118	1038	0	859
V/C Ratio(X)	0.79	0.00	0.40	0.71	0.00	1.05
Avail Cap(c_a), veh/h	663	0	731	1038	0	859
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	41.9	0.0	43.3	5.0	0.0	15.8
Incr Delay (d2), s/veh	2.9	0.0	0.8	2.3	0.0	43.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	0.0	1.1	5.1	0.0	25.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	44.7	0.0	44.1	7.3	0.0	59.2
LnGrp LOS	D	A	D	A	A	F
Approach Vol, veh/h	140			787	898	
Approach Delay, s/veh	44.7			9.5	59.2	
Approach LOS	D			A	E	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	11.2	70.1			81.3	15.4
Change Period (Y+Rc), s	* 4.7	5.1			5.1	4.7
Max Green Setting (Gmax), s	* 40	65.0			65.0	40.0
Max Q Clear Time (g_c+I1), s	4.5	67.0			28.3	10.2
Green Ext Time (p_c), s	0.0	0.0			6.0	0.1

Intersection Summary

HCM 6th Ctrl Delay	36.7
HCM 6th LOS	D

Notes

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

HCM 6th TWSC
27: Main St & Mills Ln

11-13-2019

Intersection												
Int Delay, s/veh	0.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↔	↔	
Traffic Vol, veh/h	0	0	0	0	0	10	0	768	6	9	853	3
Future Vol, veh/h	0	0	0	0	0	10	0	768	6	9	853	3
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	98	98	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	0	0	0	0	10	0	784	6	9	870	3
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1692	1690	882	1687	1688	797	-	0	0	795	0	0
Stage 1	895	895	-	792	792	-	-	-	-	-	-	-
Stage 2	797	795	-	895	896	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	-	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	-	-	-	2.227	-	-
Pot Cap-1 Maneuver	73	93	344	74	93	385	0	-	-	822	-	-
Stage 1	334	358	-	381	399	-	0	-	-	-	-	-
Stage 2	379	398	-	334	357	-	0	-	-	-	-	-
Platoon blocked, %							-	-	-	-	-	-
Mov Cap-1 Maneuver	70	91	341	73	91	381	-	-	-	818	-	-
Mov Cap-2 Maneuver	190	210	-	194	211	-	-	-	-	-	-	-
Stage 1	334	352	-	381	397	-	-	-	-	-	-	-
Stage 2	367	396	-	329	351	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	0		14.7		0		0.1					
HCM LOS	A		B									
Minor Lane/Major Mvmt	NBT		NBR		EBLn1WBLn1		SBL	SBT	SBR			
Capacity (veh/h)	-		-		-		381	818	-			
HCM Lane V/C Ratio	-		-		0.027		0.011	-	-			
HCM Control Delay (s)	-		-		0		14.7	9.5	-			
HCM Lane LOS	-		-		A		B	A	-			
HCM 95th %tile Q(veh)	-		-		-		0.1	0	-			

HCM 6th TWSC
41: Charter Oak & Main St

11-13-2019

Intersection													
Int Delay, s/veh	2												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR	
Lane Configurations													
Traffic Vol, veh/h	9	805	22	44	660	87	11	2	35	35	2	8	
Future Vol, veh/h	9	805	22	44	660	87	11	2	35	35	2	8	
Conflicting Peds, #/hr	0	0	25	0	0	5	22	0	5	25	0	42	
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None	
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-	
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	
Mvmt Flow	10	875	24	48	717	95	12	2	38	38	2	9	
Major/Minor	Major1			Major2			Minor1			Minor2			
Conflicting Flow All	817	0	0	924	0	0	1840	1845	937	1818	1810	812	
Stage 1	-	-	-	-	-	-	932	932	-	866	866	-	
Stage 2	-	-	-	-	-	-	908	913	-	952	944	-	
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-	
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327	
Pot Cap-1 Maneuver	807	-	-	735	-	-	58	74	320	60	78	377	
Stage 1	-	-	-	-	-	-	318	344	-	347	369	-	
Stage 2	-	-	-	-	-	-	328	351	-	310	340	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	803	-	-	718	-	-	49	66	305	48	70	360	
Mov Cap-2 Maneuver	-	-	-	-	-	-	155	178	-	140	172	-	
Stage 1	-	-	-	-	-	-	307	332	-	341	342	-	
Stage 2	-	-	-	-	-	-	285	326	-	260	328	-	
Approach	SE			NW			NE			SW			
HCM Control Delay, s	0.1			0.6			23.7			37.4			
HCM LOS							C			E			
Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1						
Capacity (veh/h)	244	718	-	-	803	-	-	159					
HCM Lane V/C Ratio	0.214	0.067	-	-	0.012	-	-	0.308					
HCM Control Delay (s)	23.7	10.4	-	-	9.5	-	-	37.4					
HCM Lane LOS	C	B	-	-	A	-	-	E					
HCM 95th %tile Q(veh)	0.8	0.2	-	-	0	-	-	1.2					

Intersection

Int Delay, s/veh 1.1

Movement SEL SET NWT NWR SWL SWR

Lane Configurations      

Traffic Vol, veh/h 86 681 733 34 12 40

Future Vol, veh/h 86 681 733 34 12 40

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Free Free Free Free Stop Stop

RT Channelized - None - None - None

Storage Length 0 - - - 0 0

Veh in Median Storage, # - 0 0 - 1 -

Grade, % - 0 0 - 0 -

Peak Hour Factor 92 92 92 92 92 92

Heavy Vehicles, % 3 3 3 3 3 3

Mvmt Flow 93 740 797 37 13 43

Major/Minor Major1 Major2 Minor2

Conflicting Flow All 834 0 - 0 1742 816

Stage 1 - - - - 816 -

Stage 2 - - - - 926 -

Critical Hdwy 4.13 - - - 6.43 6.23

Critical Hdwy Stg 1 - - - - 5.43 -

Critical Hdwy Stg 2 - - - - 5.43 -

Follow-up Hdwy 2.227 - - - 3.527 3.327

Pot Cap-1 Maneuver 795 - - - 95 375

Stage 1 - - - - 433 -

Stage 2 - - - - 384 -

Platoon blocked, % - - - -

Mov Cap-1 Maneuver 795 - - - 84 375

Mov Cap-2 Maneuver - - - - 213 -

Stage 1 - - - - 382 -

Stage 2 - - - - 384 -

Approach SE NW SW

HCM Control Delay, s 1.1 0 17.5

HCM LOS C

Minor Lane/Major Mvmt NWT NWR SEL SETSWLn1SWLn2

Capacity (veh/h) - - 795 - 213 375

HCM Lane V/C Ratio - - 0.118 - 0.061 0.116

HCM Control Delay (s) - - 10.1 - 23 15.9

HCM Lane LOS - - B - C C

HCM 95th %tile Q(veh) - - 0.4 - 0.2 0.4

HCM 6th Signalized Intersection Summary

18: Main St & Mitchell Dr/Pope Street

11-15-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	191	139	26	91	83	549	51	85	513	4
Future Volume (veh/h)	0	0	191	139	26	91	83	549	51	85	513	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	50	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.93	1.00		0.95	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1329	1329	1870	1329	1329
Adj Flow Rate, veh/h	0	0	203	148	28	97	88	584	54	90	546	4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	126	204	192	36	188	115	720	22	116	740	5
Arrive On Green	0.00	0.00	0.08	0.13	0.13	0.13	0.07	0.51	0.51	0.07	0.51	0.51
Sat Flow, veh/h	0	1870	1511	1509	286	1479	1781	1192	110	1781	1317	10
Grp Volume(v), veh/h	0	0	203	176	0	97	88	0	638	90	0	550
Grp Sat Flow(s),veh/h/ln	0	1870	1511	1795	0	1479	1781	0	1303	1781	0	1327
Q Serve(g_s), s	0.0	0.0	9.0	11.0	0.0	7.1	5.6	0.0	54.5	5.7	0.0	40.2
Cycle Q Clear(g_c), s	0.0	0.0	9.0	11.0	0.0	7.1	5.6	0.0	54.5	5.7	0.0	40.2
Prop In Lane	0.00		1.00	0.84		1.00	1.00		0.08	1.00		0.01
Lane Grp Cap(c), veh/h	0	126	204	229	0	188	115	0	741	116	0	746
V/C Ratio(X)	0.00	0.00	1.00	0.77	0.00	0.52	0.76	0.00	0.86	0.78	0.00	0.74
Avail Cap(c_a), veh/h	0	145	233	540	0	445	383	0	840	383	0	856
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	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	0.0	0.0	58.0	56.3	0.0	54.4	61.4	0.0	29.3	61.5	0.0	21.9
Incr Delay (d2), s/veh	0.0	0.0	54.0	2.1	0.0	0.8	3.9	0.0	7.5	4.2	0.0	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	180.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	10.0	5.9	0.0	3.1	3.1	0.0	61.6	3.2	0.0	13.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	112.1	58.4	0.0	55.2	65.3	0.0	216.7	65.6	0.0	24.2
LnGrp LOS	A	A	F	E	A	E	E	A	F	E	A	C
Approach Vol, veh/h		203			273			726			640	
Approach Delay, s/veh		112.1			57.3			198.3			30.0	
Approach LOS		F			E			F			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.2	67.2		23.2	12.2	67.2		13.7				
Change Period (Y+Rc), s	3.7	* 7.7		* 7.7	3.7	* 7.7		4.7				
Max Green Setting (Gmax), s	25.0	* 75		* 35	25.0	* 75		9.0				
Max Q Clear Time (g_c+I1), s	7.6	42.2		13.0	7.7	56.5		11.0				
Green Ext Time (p_c), s	0.1	2.7		0.9	0.1	3.0		0.0				

Intersection Summary

HCM 6th Ctrl Delay 109.4

HCM 6th LOS F

Notes

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

HCM 6th Signalized Intersection Summary

19: Main St & Grayson Avenue

11-15-2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	55	43	56	698	720	56
Future Volume (veh/h)	55	43	56	698	720	56
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	1900	1900	1856	1318	1318	1318
Adj Flow Rate, veh/h	56	43	57	705	727	57
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	0	0	3	3	3	3
Cap, veh/h	111	85	139	1010	763	60
Arrive On Green	0.12	0.12	0.08	0.77	0.63	0.63
Sat Flow, veh/h	940	722	1767	1318	1207	95
Grp Volume(v), veh/h	100	0	57	705	0	784
Grp Sat Flow(s),veh/h/ln	1679	0	1767	1318	0	1301
Q Serve(g_s), s	4.7	0.0	2.6	22.7	0.0	47.1
Cycle Q Clear(g_c), s	4.7	0.0	2.6	22.7	0.0	47.1
Prop In Lane	0.56	0.43	1.00			0.07
Lane Grp Cap(c), veh/h	198	0	139	1010	0	823
V/C Ratio(X)	0.51	0.00	0.41	0.70	0.00	0.95
Avail Cap(c_a), veh/h	890	0	822	1014	0	938
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	35.0	0.0	37.1	5.0	0.0	14.4
Incr Delay (d2), s/veh	0.7	0.0	0.7	2.1	0.0	17.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.0	1.1	4.2	0.0	15.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	35.7	0.0	37.8	7.1	0.0	32.3
LnGrp LOS	D	A	D	A	A	C
Approach Vol, veh/h	100			762	784	
Approach Delay, s/veh	35.7			9.4	32.3	
Approach LOS	D			A	C	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	11.3	58.5			69.8	14.6
Change Period (Y+Rc), s	* 4.7	5.1			5.1	4.7
Max Green Setting (Gmax), s	* 39	60.9			65.0	44.8
Max Q Clear Time (g_c+I1), s	4.6	49.1			24.7	6.7
Green Ext Time (p_c), s	0.0	4.3			5.6	0.1

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.

HCM 6th TWSC
27: Main St & Mills Ln

11-13-2019

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↔	↔	
Traffic Vol, veh/h	0	0	0	0	0	17	0	751	0	3	774	15
Future Vol, veh/h	0	0	0	0	0	17	0	751	0	3	774	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	98	98	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	0	0	0	0	17	0	766	0	3	790	15

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1579	1570	798	1570	1577	766	-	0	0	766	0	0
Stage 1	804	804	-	766	766	-	-	-	-	-	-	-
Stage 2	775	766	-	804	811	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	-	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	-	-	-	2.227	-	-
Pot Cap-1 Maneuver	88	110	384	89	109	401	0	-	-	843	-	-
Stage 1	375	394	-	394	410	-	0	-	-	-	-	-
Stage 2	389	410	-	375	391	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	84	110	384	89	109	401	-	-	-	843	-	-
Mov Cap-2 Maneuver	208	232	-	216	232	-	-	-	-	-	-	-
Stage 1	375	392	-	394	410	-	-	-	-	-	-	-
Stage 2	372	410	-	374	389	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	14.4	0	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	-	401	843	-
HCM Lane V/C Ratio	-	-	-	0.043	0.004	-
HCM Control Delay (s)	-	-	0	14.4	9.3	-
HCM Lane LOS	-	-	A	B	A	-
HCM 95th %tile Q(veh)	-	-	-	0.1	0	-

HCM 6th TWSC
41: Charter Oak & Main St

11-13-2019

Intersection												
Int Delay, s/veh	2											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	19	770	4	12	635	151	19	4	31	36	3	14
Future Vol, veh/h	19	770	4	12	635	151	19	4	31	36	3	14
Conflicting Peds, #/hr	11	0	30	71	0	41	30	0	30	52	0	11
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	19	786	4	12	648	154	19	4	32	37	3	14

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	843	0	0	861	0	0	1685	1764	911	1686	1689	796
Stage 1	-	-	-	-	-	-	897	897	-	790	790	-
Stage 2	-	-	-	-	-	-	788	867	-	896	899	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	789	-	-	776	-	-	74	84	331	74	93	385
Stage 1	-	-	-	-	-	-	333	357	-	382	400	-
Stage 2	-	-	-	-	-	-	383	369	-	333	356	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	758	-	-	724	-	-	62	72	293	57	80	359
Mov Cap-2 Maneuver	-	-	-	-	-	-	172	182	-	163	192	-
Stage 1	-	-	-	-	-	-	303	325	-	358	378	-
Stage 2	-	-	-	-	-	-	348	349	-	272	324	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0.2	0.2	25.9	30.9
HCM LOS			D	D

Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1
Capacity (veh/h)	227	724	-	-	758	-	192
HCM Lane V/C Ratio	0.243	0.017	-	-	0.026	-	0.282
HCM Control Delay (s)	25.9	10.1	-	-	9.9	-	30.9
HCM Lane LOS	D	B	-	-	A	-	D
HCM 95th %tile Q(veh)	0.9	0.1	-	-	0.1	-	1.1

Intersection

Int Delay, s/veh 1.6

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	32	725	691	11	43	86
Future Vol, veh/h	32	725	691	11	43	86
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	33	740	705	11	44	88

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	716	0	0 1517 711
Stage 1	-	-	- 711 -
Stage 2	-	-	- 806 -
Critical Hdwy	4.13	-	- 6.43 6.23
Critical Hdwy Stg 1	-	-	- 5.43 -
Critical Hdwy Stg 2	-	-	- 5.43 -
Follow-up Hdwy	2.227	-	- 3.527 3.327
Pot Cap-1 Maneuver	880	-	- 131 431
Stage 1	-	-	- 485 -
Stage 2	-	-	- 438 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	880	-	- 126 431
Mov Cap-2 Maneuver	-	-	- 264 -
Stage 1	-	-	- 467 -
Stage 2	-	-	- 438 -

Approach	SE	NW	SW
HCM Control Delay, s	0.4	0	17.4
HCM LOS			C

Minor Lane/Major Mvmt	NWT	NWR	SEL	SETSWLn1SWLn2
Capacity (veh/h)	-	-	880	- 264 431
HCM Lane V/C Ratio	-	-	0.037	- 0.166 0.204
HCM Control Delay (s)	-	-	9.2	- 21.3 15.5
HCM Lane LOS	-	-	A	- C C
HCM 95th %tile Q(veh)	-	-	0.1	- 0.6 0.8

HCM 6th Signalized Intersection Summary

18: Main St & Mitchell Dr/Pope Street

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	153	128	38	71	57	506	55	63	559	6
Future Volume (veh/h)	0	0	153	128	38	71	57	506	55	63	559	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	50	0	0	25	0
Ped-Bike Adj(A_pbT)	1.00		0.69	1.00		0.74	1.00		0.90	1.00		0.92
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1318	1856	1318	1318
Adj Flow Rate, veh/h	0	0	156	131	39	72	58	516	56	64	570	6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	0	125	165	221	66	179	105	668	21	108	701	4
Arrive On Green	0.00	0.00	0.08	0.18	0.18	0.18	0.07	0.47	0.47	0.07	0.47	0.47
Sat Flow, veh/h	0	1856	1088	1377	410	1157	1767	1155	125	1767	1301	14
Grp Volume(v), veh/h	0	0	156	170	0	72	58	0	572	64	0	576
Grp Sat Flow(s),veh/h/ln	0	1856	1088	1787	0	1157	1767	0	1280	1767	0	1315
Q Serve(g_s), s	0.0	0.0	9.0	10.0	0.0	6.3	3.7	0.0	49.6	4.1	0.0	47.7
Cycle Q Clear(g_c), s	0.0	0.0	9.0	10.0	0.0	6.3	3.7	0.0	49.6	4.1	0.0	47.7
Prop In Lane	0.00		1.00	0.77		1.00	1.00		0.10	1.00		0.01
Lane Grp Cap(c), veh/h	0	125	165	287	0	179	105	0	712	108	0	689
V/C Ratio(X)	0.00	0.00	0.94	0.59	0.00	0.40	0.55	0.00	0.80	0.59	0.00	0.84
Avail Cap(c_a), veh/h	0	144	188	541	0	350	382	0	830	382	0	852
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	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	0.0	0.0	59.1	52.4	0.0	50.7	61.5	0.0	31.3	61.5	0.0	30.5
Incr Delay (d2), s/veh	0.0	0.0	44.9	1.9	0.0	1.5	1.7	0.0	4.2	1.9	0.0	5.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	164.3	0.0	0.0	57.6
%ile BackOfQ(50%),veh/ln	0.0	0.0	7.4	5.5	0.0	2.3	2.0	0.0	56.4	2.2	0.0	32.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	104.0	54.3	0.0	52.1	63.2	0.0	199.9	63.4	0.0	93.1
LnGrp LOS	A	A	F	D	A	D	E	A	F	E	A	F
Approach Vol, veh/h		156			242			630			640	
Approach Delay, s/veh		104.0			53.7			187.3			90.1	
Approach LOS		F			D			F			F	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.3	62.3		28.4	11.5	62.0		13.7				
Change Period (Y+Rc), s	3.7	* 7.7		* 7.7	3.7	* 7.7		4.7				
Max Green Setting (Gmax), s	25.0	* 75		* 35	25.0	* 75		9.0				
Max Q Clear Time (g_c+I1), s	5.7	49.7		12.0	6.1	51.6		11.0				
Green Ext Time (p_c), s	0.1	2.8		1.3	0.1	2.8		0.0				

Intersection Summary

HCM 6th Ctrl Delay 122.8

HCM 6th LOS F

Notes

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

HCM 6th Signalized Intersection Summary

19: Main St & Grayson Avenue

11-13-2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	32	34	634	791	28
Future Volume (veh/h)	25	32	34	634	791	28
Initial Q (Qb), veh	0	0	0	30	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	1900	1900	1856	1318	1318	1318
Adj Flow Rate, veh/h	25	32	34	640	799	28
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	0	0	3	3	3	3
Cap, veh/h	70	90	105	1031	843	30
Arrive On Green	0.10	0.10	0.06	0.78	0.66	0.66
Sat Flow, veh/h	714	913	1767	1318	1266	44
Grp Volume(v), veh/h	58	0	34	640	0	827
Grp Sat Flow(s),veh/h/ln	1655	0	1767	1318	0	1310
Q Serve(g_s), s	2.7	0.0	1.5	16.8	0.0	46.9
Cycle Q Clear(g_c), s	2.7	0.0	1.5	16.8	0.0	46.9
Prop In Lane	0.43	0.55	1.00			0.03
Lane Grp Cap(c), veh/h	163	0	105	1031	0	873
V/C Ratio(X)	0.36	0.00	0.33	0.62	0.00	0.95
Avail Cap(c_a), veh/h	810	0	865	1049	0	1042
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	34.6	0.0	37.0	5.4	0.0	12.4
Incr Delay (d2), s/veh	0.5	0.0	0.7	1.1	0.0	15.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	16.1	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.7	9.3	0.0	13.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	35.1	0.0	37.7	22.5	0.0	27.7
LnGrp LOS	D	A	D	C	A	C
Approach Vol, veh/h	58			674	827	
Approach Delay, s/veh	35.1			23.3	27.7	
Approach LOS	D			C	C	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.5	59.4			69.0	12.8
Change Period (Y+Rc), s	* 4.7	5.1			5.1	4.7
Max Green Setting (Gmax), s	* 40	65.0			65.0	40.0
Max Q Clear Time (g_c+l1), s	3.5	48.9			18.8	4.7
Green Ext Time (p_c), s	0.0	5.5			4.9	0.0

Intersection Summary

HCM 6th Ctrl Delay	26.1
HCM 6th LOS	C

Notes

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

Intersection												
Int Delay, s/veh	0.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↔	↔	
Traffic Vol, veh/h	0	0	0	0	0	4	0	659	0	7	819	22
Future Vol, veh/h	0	0	0	0	0	4	0	659	0	7	819	22
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	98	98	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	0	0	0	0	4	0	672	0	7	836	22
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1535	1533	847	1533	1544	672	-	0	0	672	0	0
Stage 1	861	861	-	672	672	-	-	-	-	-	-	-
Stage 2	674	672	-	861	872	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	-	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	-	-	-	2.227	-	-
Pot Cap-1 Maneuver	94	116	360	95	114	454	0	-	-	914	-	-
Stage 1	349	371	-	444	453	-	0	-	-	-	-	-
Stage 2	443	453	-	349	367	-	0	-	-	-	-	-
Platoon blocked, %							-	-	-	-	-	-
Mov Cap-1 Maneuver	93	115	360	94	113	454	-	-	-	914	-	-
Mov Cap-2 Maneuver	218	236	-	220	235	-	-	-	-	-	-	-
Stage 1	349	368	-	444	453	-	-	-	-	-	-	-
Stage 2	439	453	-	346	364	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	0		13		0		0.1					
HCM LOS	A		B									
Minor Lane/Major Mvmt	NBT		NBR		EBLn1WBLn1		SBL	SBT	SBR			
Capacity (veh/h)	-		-		-		454	914	-			
HCM Lane V/C Ratio	-		-		-		0.009	0.008	-			
HCM Control Delay (s)	-		-		0		13	9	-			
HCM Lane LOS	-		-		A		B	A	-			
HCM 95th %tile Q(veh)	-		-		-		0	0	-			

Intersection												
Int Delay, s/veh	1.5											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	27	801	15	9	565	87	14	1	10	38	1	23
Future Vol, veh/h	27	801	15	9	565	87	14	1	10	38	1	23
Conflicting Peds, #/hr	25	0	25	25	0	25	25	0	25	25	0	25
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	28	817	15	9	577	89	14	1	10	39	1	23
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	691	0	0	857	0	0	1583	1615	875	1576	1578	672
Stage 1	-	-	-	-	-	-	906	906	-	665	665	-
Stage 2	-	-	-	-	-	-	677	709	-	911	913	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	899	-	-	779	-	-	87	103	347	88	109	454
Stage 1	-	-	-	-	-	-	329	354	-	448	456	-
Stage 2	-	-	-	-	-	-	441	436	-	327	351	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	878	-	-	760	-	-	76	94	331	78	99	433
Mov Cap-2 Maneuver	-	-	-	-	-	-	189	207	-	191	214	-
Stage 1	-	-	-	-	-	-	311	335	-	423	440	-
Stage 2	-	-	-	-	-	-	401	420	-	299	332	-
Approach	SE			NW			NE			SW		
HCM Control Delay, s	0.3			0.1			22.7			25.2		
HCM LOS							C			D		
Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1					
Capacity (veh/h)	229	760	-	-	878	-	-	241				
HCM Lane V/C Ratio	0.111	0.012	-	-	0.031	-	-	0.263				
HCM Control Delay (s)	22.7	9.8	-	-	9.2	-	-	25.2				
HCM Lane LOS	C	A	-	-	A	-	-	D				
HCM 95th %tile Q(veh)	0.4	0	-	-	0.1	-	-	1				

Intersection

Int Delay, s/veh 0.5

Movement SEL SET NWT NWR SWL SWR

Lane Configurations						
Traffic Vol, veh/h	23	789	655	8	10	25
Future Vol, veh/h	23	789	655	8	10	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	23	805	668	8	10	26

Major/Minor Major1 Major2 Minor2

Conflicting Flow All	676	0	-	0	1523	672
Stage 1	-	-	-	-	672	-
Stage 2	-	-	-	-	851	-
Critical Hdwy	4.13	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	911	-	-	-	129	454
Stage 1	-	-	-	-	506	-
Stage 2	-	-	-	-	417	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	911	-	-	-	126	454
Mov Cap-2 Maneuver	-	-	-	-	263	-
Stage 1	-	-	-	-	493	-
Stage 2	-	-	-	-	417	-

Approach SE NW SW

HCM Control Delay, s	0.3	0	15.1
HCM LOS			C

Minor Lane/Major Mvmt NWT NWR SEL SETSWLn1SWLn2

Capacity (veh/h)	-	-	911	-	263	454
HCM Lane V/C Ratio	-	-	0.026	-	0.039	0.056
HCM Control Delay (s)	-	-	9.1	-	19.2	13.4
HCM Lane LOS	-	-	A	-	C	B
HCM 95th %tile Q(veh)	-	-	0.1	-	0.1	0.2

HCM 6th Signalized Intersection Summary

18: Main St & Mitchell Dr/Pope Street

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	173	180	33	122	78	620	51	76	494	4
Future Volume (veh/h)	0	0	173	180	33	122	78	620	51	76	494	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	50	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.91	1.00		0.91	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1318	1856	1318	1318
Adj Flow Rate, veh/h	0	0	186	194	35	131	84	667	55	82	531	4
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	0	121	192	236	43	224	111	691	21	110	710	5
Arrive On Green	0.00	0.00	0.07	0.16	0.16	0.16	0.06	0.54	0.54	0.06	0.54	0.54
Sat Flow, veh/h	0	1856	1428	1508	272	1435	1767	1198	99	1767	1307	10
Grp Volume(v), veh/h	0	0	186	229	0	131	84	0	722	82	0	535
Grp Sat Flow(s),veh/h/ln	0	1856	1428	1780	0	1435	1767	0	1297	1767	0	1317
Q Serve(g_s), s	0.0	0.0	9.0	17.2	0.0	11.7	6.5	0.0	75.0	6.3	0.0	43.1
Cycle Q Clear(g_c), s	0.0	0.0	9.0	17.2	0.0	11.7	6.5	0.0	75.0	6.3	0.0	43.1
Prop In Lane	0.00		1.00	0.85		1.00	1.00		0.08	1.00		0.01
Lane Grp Cap(c), veh/h	0	121	192	278	0	224	111	0	712	110	0	715
V/C Ratio(X)	0.00	0.00	0.97	0.82	0.00	0.58	0.76	0.00	1.01	0.74	0.00	0.75
Avail Cap(c_a), veh/h	0	121	192	452	0	364	320	0	705	320	0	716
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	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	0.0	0.0	60.1	56.4	0.0	54.0	63.6	0.0	31.5	63.6	0.0	24.2
Incr Delay (d2), s/veh	0.0	0.0	56.1	6.3	0.0	2.4	4.0	0.0	37.3	3.7	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	252.8	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	9.5	8.3	0.0	4.4	3.1	0.0	80.5	3.0	0.0	14.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	116.2	62.7	0.0	56.4	67.6	0.0	321.5	67.3	0.0	28.1
LnGrp LOS	A	A	F	E	A	E	E	A	F	E	A	C
Approach Vol, veh/h		186			360			806			617	
Approach Delay, s/veh		116.2			60.4			295.1			33.3	
Approach LOS		F			E			F			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.3	82.7		29.3	12.3	82.7		13.7				
Change Period (Y+Rc), s	3.7	* 7.7		* 7.7	3.7	* 7.7		4.7				
Max Green Setting (Gmax), s	25.0	* 75		* 35	25.0	* 75		9.0				
Max Q Clear Time (g_c+I1), s	8.5	45.1		19.2	8.3	77.0		11.0				
Green Ext Time (p_c), s	0.1	2.6		1.7	0.1	0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			153.2									
HCM 6th LOS			F									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary

19: Main St & Grayson Avenue

11-13-2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	72	66	47	719	763	121
Future Volume (veh/h)	72	66	47	719	763	121
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	0.92	1.00			0.96
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	1900	1900	1856	1318	1318	1318
Adj Flow Rate, veh/h	76	69	49	757	803	127
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	3	3	3	3
Cap, veh/h	93	84	120	1038	741	117
Arrive On Green	0.11	0.11	0.07	0.79	0.67	0.67
Sat Flow, veh/h	832	755	1767	1318	1104	175
Grp Volume(v), veh/h	146	0	49	757	0	930
Grp Sat Flow(s),veh/h/ln	1598	0	1767	1318	0	1278
Q Serve(g_s), s	8.7	0.0	2.6	27.8	0.0	65.0
Cycle Q Clear(g_c), s	8.7	0.0	2.6	27.8	0.0	65.0
Prop In Lane	0.52	0.47	1.00			0.14
Lane Grp Cap(c), veh/h	178	0	120	1038	0	858
V/C Ratio(X)	0.82	0.00	0.41	0.73	0.00	1.08
Avail Cap(c_a), veh/h	660	0	730	1038	0	858
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	42.1	0.0	43.3	5.1	0.0	15.9
Incr Delay (d2), s/veh	3.5	0.0	0.8	2.6	0.0	56.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.0	1.1	5.4	0.0	28.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	45.6	0.0	44.1	7.8	0.0	72.1
LnGrp LOS	D	A	D	A	A	F
Approach Vol, veh/h	146			806	930	
Approach Delay, s/veh	45.6			10.0	72.1	
Approach LOS	D			A	E	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	11.3	70.1			81.4	15.5
Change Period (Y+Rc), s	* 4.7	5.1			5.1	4.7
Max Green Setting (Gmax), s	* 40	65.0			65.0	40.0
Max Q Clear Time (g_c+I1), s	4.6	67.0			29.8	10.7
Green Ext Time (p_c), s	0.0	0.0			6.1	0.1

Intersection Summary

HCM 6th Ctrl Delay	43.4
HCM 6th LOS	D

Notes

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

HCM 6th TWSC
27: Main St & Mills Ln

11-13-2019

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↕	↕	
Traffic Vol, veh/h	0	0	0	0	0	12	0	787	4	10	884	3
Future Vol, veh/h	0	0	0	0	0	12	0	787	4	10	884	3
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	98	98	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	0	0	0	0	12	0	803	4	10	902	3

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1745	1741	914	1739	1740	815	-	0	0	812	0	0
Stage 1	929	929	-	810	810	-	-	-	-	-	-	-
Stage 2	816	812	-	929	930	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	-	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	-	-	-	2.227	-	-
Pot Cap-1 Maneuver	67	86	330	68	86	376	0	-	-	810	-	-
Stage 1	320	345	-	372	392	-	0	-	-	-	-	-
Stage 2	369	391	-	320	345	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	64	84	327	67	84	372	-	-	-	806	-	-
Mov Cap-2 Maneuver	181	202	-	186	204	-	-	-	-	-	-	-
Stage 1	320	339	-	372	390	-	-	-	-	-	-	-
Stage 2	355	389	-	315	339	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	15	0	0.1
HCM LOS	A	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	- 372	806	-	-
HCM Lane V/C Ratio	-	-	- 0.033	0.013	-	-
HCM Control Delay (s)	-	-	0 15	9.5	-	-
HCM Lane LOS	-	-	A C	A	-	-
HCM 95th %tile Q(veh)	-	-	- 0.1	0	-	-

HCM 6th TWSC
41: Charter Oak & Main St

11-13-2019

Intersection												
Int Delay, s/veh	2.1											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	9	835	22	44	675	89	11	2	36	36	2	8
Future Vol, veh/h	9	835	22	44	675	89	11	2	36	36	2	8
Conflicting Peds, #/hr	0	0	25	0	0	5	22	0	5	25	0	42
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	10	908	24	48	734	97	12	2	39	39	2	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	836	0	0	957	0	0	1891	1897	970	1870	1861	830
Stage 1	-	-	-	-	-	-	965	965	-	884	884	-
Stage 2	-	-	-	-	-	-	926	932	-	986	977	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	793	-	-	715	-	-	53	69	306	55	73	368
Stage 1	-	-	-	-	-	-	305	332	-	339	362	-
Stage 2	-	-	-	-	-	-	321	344	-	297	328	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	789	-	-	698	-	-	45	62	292	43	65	352
Mov Cap-2 Maneuver	-	-	-	-	-	-	148	172	-	131	165	-
Stage 1	-	-	-	-	-	-	294	320	-	333	335	-
Stage 2	-	-	-	-	-	-	278	319	-	246	316	-

Approach	SE			NW			NE			SW		
HCM Control Delay, s	0.1			0.6			24.9			40.9		
HCM LOS							C			E		

Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1
Capacity (veh/h)	234	698	-	-	789	-	149
HCM Lane V/C Ratio	0.228	0.069	-	-	0.012	-	0.336
HCM Control Delay (s)	24.9	10.5	-	-	9.6	-	40.9
HCM Lane LOS	C	B	-	-	A	-	E
HCM 95th %tile Q(veh)	0.9	0.2	-	-	0	-	1.4

Intersection						
Int Delay, s/veh	1.6					
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	112	690	736	45	23	55
Future Vol, veh/h	112	690	736	45	23	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	122	750	800	49	25	60
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	849	0	-	0	1819	825
Stage 1	-	-	-	-	825	-
Stage 2	-	-	-	-	994	-
Critical Hdwy	4.13	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	785	-	-	-	85	371
Stage 1	-	-	-	-	429	-
Stage 2	-	-	-	-	357	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	785	-	-	-	72	371
Mov Cap-2 Maneuver	-	-	-	-	197	-
Stage 1	-	-	-	-	363	-
Stage 2	-	-	-	-	357	-
Approach	SE	NW		SW		
HCM Control Delay, s	1.5	0		19.3		
HCM LOS	C					
Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1	SWLn2
Capacity (veh/h)	-	-	785	-	197	371
HCM Lane V/C Ratio	-	-	0.155	-	0.127	0.161
HCM Control Delay (s)	-	-	10.4	-	25.9	16.6
HCM Lane LOS	-	-	B	-	D	C
HCM 95th %tile Q(veh)	-	-	0.5	-	0.4	0.6

HCM 6th Signalized Intersection Summary

18: Main St & Mitchell Dr/Pope Street

11-15-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	191	139	26	91	83	549	51	85	513	4
Future Volume (veh/h)	0	0	191	139	26	91	83	549	51	85	513	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	50	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.93	1.00		0.95	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1329	1329	1870	1329	1329
Adj Flow Rate, veh/h	0	0	203	148	28	97	88	584	54	90	546	4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	126	204	192	36	188	115	720	22	116	740	5
Arrive On Green	0.00	0.00	0.08	0.13	0.13	0.13	0.07	0.51	0.51	0.07	0.51	0.51
Sat Flow, veh/h	0	1870	1511	1509	286	1479	1781	1192	110	1781	1317	10
Grp Volume(v), veh/h	0	0	203	176	0	97	88	0	638	90	0	550
Grp Sat Flow(s),veh/h/ln	0	1870	1511	1795	0	1479	1781	0	1303	1781	0	1327
Q Serve(g_s), s	0.0	0.0	9.0	11.0	0.0	7.1	5.6	0.0	54.5	5.7	0.0	40.2
Cycle Q Clear(g_c), s	0.0	0.0	9.0	11.0	0.0	7.1	5.6	0.0	54.5	5.7	0.0	40.2
Prop In Lane	0.00		1.00	0.84		1.00	1.00		0.08	1.00		0.01
Lane Grp Cap(c), veh/h	0	126	204	229	0	188	115	0	741	116	0	746
V/C Ratio(X)	0.00	0.00	1.00	0.77	0.00	0.52	0.76	0.00	0.86	0.78	0.00	0.74
Avail Cap(c_a), veh/h	0	145	233	540	0	445	383	0	840	383	0	856
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	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	0.0	0.0	58.0	56.3	0.0	54.4	61.4	0.0	29.3	61.5	0.0	21.9
Incr Delay (d2), s/veh	0.0	0.0	54.0	2.1	0.0	0.8	3.9	0.0	7.5	4.2	0.0	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	180.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	10.0	5.9	0.0	3.1	3.1	0.0	61.6	3.2	0.0	13.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	112.1	58.4	0.0	55.2	65.3	0.0	216.7	65.6	0.0	24.2
LnGrp LOS	A	A	F	E	A	E	E	A	F	E	A	C
Approach Vol, veh/h		203			273			726			640	
Approach Delay, s/veh		112.1			57.3			198.3			30.0	
Approach LOS		F			E			F			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.2	67.2		23.2	12.2	67.2		13.7				
Change Period (Y+Rc), s	3.7	* 7.7		* 7.7	3.7	* 7.7		4.7				
Max Green Setting (Gmax), s	25.0	* 75		* 35	25.0	* 75		9.0				
Max Q Clear Time (g_c+I1), s	7.6	42.2		13.0	7.7	56.5		11.0				
Green Ext Time (p_c), s	0.1	2.7		0.9	0.1	3.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			109.4									
HCM 6th LOS			F									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary

19: Main St & Grayson Avenue

11-15-2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	55	43	56	698	720	56
Future Volume (veh/h)	55	43	56	698	720	56
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	1900	1900	1856	1318	1318	1318
Adj Flow Rate, veh/h	56	43	57	705	727	57
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	0	0	3	3	3	3
Cap, veh/h	111	85	139	1010	763	60
Arrive On Green	0.12	0.12	0.08	0.77	0.63	0.63
Sat Flow, veh/h	940	722	1767	1318	1207	95
Grp Volume(v), veh/h	100	0	57	705	0	784
Grp Sat Flow(s),veh/h/ln	1679	0	1767	1318	0	1301
Q Serve(g_s), s	4.7	0.0	2.6	22.7	0.0	47.1
Cycle Q Clear(g_c), s	4.7	0.0	2.6	22.7	0.0	47.1
Prop In Lane	0.56	0.43	1.00			0.07
Lane Grp Cap(c), veh/h	198	0	139	1010	0	823
V/C Ratio(X)	0.51	0.00	0.41	0.70	0.00	0.95
Avail Cap(c_a), veh/h	890	0	822	1014	0	938
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	35.0	0.0	37.1	5.0	0.0	14.4
Incr Delay (d2), s/veh	0.7	0.0	0.7	2.1	0.0	17.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.0	1.1	4.2	0.0	15.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	35.7	0.0	37.8	7.1	0.0	32.3
LnGrp LOS	D	A	D	A	A	C
Approach Vol, veh/h	100			762	784	
Approach Delay, s/veh	35.7			9.4	32.3	
Approach LOS	D			A	C	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	11.3	58.5			69.8	14.6
Change Period (Y+Rc), s	* 4.7	5.1			5.1	4.7
Max Green Setting (Gmax), s	* 39	60.9			65.0	44.8
Max Q Clear Time (g_c+I1), s	4.6	49.1			24.7	6.7
Green Ext Time (p_c), s	0.0	4.3			5.6	0.1

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.

HCM 6th TWSC
27: Main St & Mills Ln

11-13-2019

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↔	↔	
Traffic Vol, veh/h	0	0	0	0	0	17	0	751	0	3	774	15
Future Vol, veh/h	0	0	0	0	0	17	0	751	0	3	774	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	98	98	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	0	0	0	0	17	0	766	0	3	790	15

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1579	1570	798	1570	1577	766	-	0	0	766	0	0
Stage 1	804	804	-	766	766	-	-	-	-	-	-	-
Stage 2	775	766	-	804	811	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	-	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	-	-	-	2.227	-	-
Pot Cap-1 Maneuver	88	110	384	89	109	401	0	-	-	843	-	-
Stage 1	375	394	-	394	410	-	0	-	-	-	-	-
Stage 2	389	410	-	375	391	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	84	110	384	89	109	401	-	-	-	843	-	-
Mov Cap-2 Maneuver	208	232	-	216	232	-	-	-	-	-	-	-
Stage 1	375	392	-	394	410	-	-	-	-	-	-	-
Stage 2	372	410	-	374	389	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	14.4	0	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	-	401	843	-
HCM Lane V/C Ratio	-	-	-	0.043	0.004	-
HCM Control Delay (s)	-	-	0	14.4	9.3	-
HCM Lane LOS	-	-	A	B	A	-
HCM 95th %tile Q(veh)	-	-	-	0.1	0	-

HCM 6th TWSC
41: Charter Oak & Main St

11-13-2019

Intersection												
Int Delay, s/veh	2											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	19	770	4	12	635	151	19	4	31	36	3	14
Future Vol, veh/h	19	770	4	12	635	151	19	4	31	36	3	14
Conflicting Peds, #/hr	11	0	30	71	0	41	30	0	30	52	0	11
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	19	786	4	12	648	154	19	4	32	37	3	14
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	843	0	0	861	0	0	1685	1764	911	1686	1689	796
Stage 1	-	-	-	-	-	-	897	897	-	790	790	-
Stage 2	-	-	-	-	-	-	788	867	-	896	899	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	789	-	-	776	-	-	74	84	331	74	93	385
Stage 1	-	-	-	-	-	-	333	357	-	382	400	-
Stage 2	-	-	-	-	-	-	383	369	-	333	356	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	758	-	-	724	-	-	62	72	293	57	80	359
Mov Cap-2 Maneuver	-	-	-	-	-	-	172	182	-	163	192	-
Stage 1	-	-	-	-	-	-	303	325	-	358	378	-
Stage 2	-	-	-	-	-	-	348	349	-	272	324	-
Approach	SE			NW			NE			SW		
HCM Control Delay, s	0.2			0.2			25.9			30.9		
HCM LOS							D			D		
Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1					
Capacity (veh/h)	227	724	-	-	758	-	-	192				
HCM Lane V/C Ratio	0.243	0.017	-	-	0.026	-	-	0.282				
HCM Control Delay (s)	25.9	10.1	-	-	9.9	-	-	30.9				
HCM Lane LOS	D	B	-	-	A	-	-	D				
HCM 95th %tile Q(veh)	0.9	0.1	-	-	0.1	-	-	1.1				

Intersection

Int Delay, s/veh 1.6

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	32	725	691	11	43	86
Future Vol, veh/h	32	725	691	11	43	86
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	33	740	705	11	44	88

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	716	0	0 1517 711
Stage 1	-	-	- 711 -
Stage 2	-	-	- 806 -
Critical Hdwy	4.13	-	- 6.43 6.23
Critical Hdwy Stg 1	-	-	- 5.43 -
Critical Hdwy Stg 2	-	-	- 5.43 -
Follow-up Hdwy	2.227	-	- 3.527 3.327
Pot Cap-1 Maneuver	880	-	- 131 431
Stage 1	-	-	- 485 -
Stage 2	-	-	- 438 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	880	-	- 126 431
Mov Cap-2 Maneuver	-	-	- 264 -
Stage 1	-	-	- 467 -
Stage 2	-	-	- 438 -

Approach	SE	NW	SW
HCM Control Delay, s	0.4	0	17.4
HCM LOS			C

Minor Lane/Major Mvmt	NWT	NWR	SEL	SETSWLn1SWLn2
Capacity (veh/h)	-	-	880	- 264 431
HCM Lane V/C Ratio	-	-	0.037	- 0.166 0.204
HCM Control Delay (s)	-	-	9.2	- 21.3 15.5
HCM Lane LOS	-	-	A	- C C
HCM 95th %tile Q(veh)	-	-	0.1	- 0.6 0.8

HCM 6th Signalized Intersection Summary

18: Main St & Mitchell Dr/Pope Street

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	153	128	38	71	57	506	55	63	559	6
Future Volume (veh/h)	0	0	153	128	38	71	57	506	55	63	559	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	50	0	0	25	0
Ped-Bike Adj(A_pbT)	1.00		0.69	1.00		0.74	1.00		0.90	1.00		0.92
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1318	1856	1318	1318
Adj Flow Rate, veh/h	0	0	156	131	39	72	58	516	56	64	570	6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	0	125	165	221	66	179	105	668	21	108	701	4
Arrive On Green	0.00	0.00	0.08	0.18	0.18	0.18	0.07	0.47	0.47	0.07	0.47	0.47
Sat Flow, veh/h	0	1856	1088	1377	410	1157	1767	1155	125	1767	1301	14
Grp Volume(v), veh/h	0	0	156	170	0	72	58	0	572	64	0	576
Grp Sat Flow(s),veh/h/ln	0	1856	1088	1787	0	1157	1767	0	1280	1767	0	1315
Q Serve(g_s), s	0.0	0.0	9.0	10.0	0.0	6.3	3.7	0.0	49.6	4.1	0.0	47.7
Cycle Q Clear(g_c), s	0.0	0.0	9.0	10.0	0.0	6.3	3.7	0.0	49.6	4.1	0.0	47.7
Prop In Lane	0.00		1.00	0.77		1.00	1.00		0.10	1.00		0.01
Lane Grp Cap(c), veh/h	0	125	165	287	0	179	105	0	712	108	0	689
V/C Ratio(X)	0.00	0.00	0.94	0.59	0.00	0.40	0.55	0.00	0.80	0.59	0.00	0.84
Avail Cap(c_a), veh/h	0	144	188	541	0	350	382	0	830	382	0	852
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	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	0.0	0.0	59.1	52.4	0.0	50.7	61.5	0.0	31.3	61.5	0.0	30.5
Incr Delay (d2), s/veh	0.0	0.0	44.9	1.9	0.0	1.5	1.7	0.0	4.2	1.9	0.0	5.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	164.3	0.0	0.0	57.6
%ile BackOfQ(50%),veh/ln	0.0	0.0	7.4	5.5	0.0	2.3	2.0	0.0	56.4	2.2	0.0	32.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	104.0	54.3	0.0	52.1	63.2	0.0	199.9	63.4	0.0	93.1
LnGrp LOS	A	A	F	D	A	D	E	A	F	E	A	F
Approach Vol, veh/h		156			242			630			640	
Approach Delay, s/veh		104.0			53.7			187.3			90.1	
Approach LOS		F			D			F			F	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.3	62.3		28.4	11.5	62.0		13.7				
Change Period (Y+Rc), s	3.7	* 7.7		* 7.7	3.7	* 7.7		4.7				
Max Green Setting (Gmax), s	25.0	* 75		* 35	25.0	* 75		9.0				
Max Q Clear Time (g_c+I1), s	5.7	49.7		12.0	6.1	51.6		11.0				
Green Ext Time (p_c), s	0.1	2.8		1.3	0.1	2.8		0.0				

Intersection Summary

HCM 6th Ctrl Delay 122.8

HCM 6th LOS F

Notes

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

HCM 6th Signalized Intersection Summary

19: Main St & Grayson Avenue

11-13-2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	32	34	634	791	28
Future Volume (veh/h)	25	32	34	634	791	28
Initial Q (Qb), veh	0	0	0	30	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	1900	1900	1856	1318	1318	1318
Adj Flow Rate, veh/h	25	32	34	640	799	28
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	0	0	3	3	3	3
Cap, veh/h	70	90	105	1031	843	30
Arrive On Green	0.10	0.10	0.06	0.78	0.66	0.66
Sat Flow, veh/h	714	913	1767	1318	1266	44
Grp Volume(v), veh/h	58	0	34	640	0	827
Grp Sat Flow(s),veh/h/ln	1655	0	1767	1318	0	1310
Q Serve(g_s), s	2.7	0.0	1.5	16.8	0.0	46.9
Cycle Q Clear(g_c), s	2.7	0.0	1.5	16.8	0.0	46.9
Prop In Lane	0.43	0.55	1.00			0.03
Lane Grp Cap(c), veh/h	163	0	105	1031	0	873
V/C Ratio(X)	0.36	0.00	0.33	0.62	0.00	0.95
Avail Cap(c_a), veh/h	810	0	865	1049	0	1042
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	34.6	0.0	37.0	5.4	0.0	12.4
Incr Delay (d2), s/veh	0.5	0.0	0.7	1.1	0.0	15.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	16.1	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.7	9.3	0.0	13.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	35.1	0.0	37.7	22.5	0.0	27.7
LnGrp LOS	D	A	D	C	A	C
Approach Vol, veh/h	58			674	827	
Approach Delay, s/veh	35.1			23.3	27.7	
Approach LOS	D			C	C	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.5	59.4			69.0	12.8
Change Period (Y+Rc), s	* 4.7	5.1			5.1	4.7
Max Green Setting (Gmax), s	* 40	65.0			65.0	40.0
Max Q Clear Time (g_c+I1), s	3.5	48.9			18.8	4.7
Green Ext Time (p_c), s	0.0	5.5			4.9	0.0

Intersection Summary

HCM 6th Ctrl Delay	26.1
HCM 6th LOS	C

Notes

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

Intersection												
Int Delay, s/veh	0.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↔	↔	
Traffic Vol, veh/h	0	0	0	0	0	4	0	659	0	7	819	22
Future Vol, veh/h	0	0	0	0	0	4	0	659	0	7	819	22
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	98	98	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	0	0	0	0	4	0	672	0	7	836	22

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1535	1533	847	1533	1544	672	-	0	0	672	0	0
Stage 1	861	861	-	672	672	-	-	-	-	-	-	-
Stage 2	674	672	-	861	872	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	-	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	-	-	-	2.227	-	-
Pot Cap-1 Maneuver	94	116	360	95	114	454	0	-	-	914	-	-
Stage 1	349	371	-	444	453	-	0	-	-	-	-	-
Stage 2	443	453	-	349	367	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	93	115	360	94	113	454	-	-	-	914	-	-
Mov Cap-2 Maneuver	218	236	-	220	235	-	-	-	-	-	-	-
Stage 1	349	368	-	444	453	-	-	-	-	-	-	-
Stage 2	439	453	-	346	364	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	13	0	0.1
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	- 454	914	-	-
HCM Lane V/C Ratio	-	-	- 0.009	0.008	-	-
HCM Control Delay (s)	-	-	0 13	9	-	-
HCM Lane LOS	-	-	A B	A	-	-
HCM 95th %tile Q(veh)	-	-	- 0	0	-	-

HCM 6th TWSC
41: Charter Oak & Main St

11-13-2019

Intersection												
Int Delay, s/veh	1.5											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	27	801	15	9	565	87	14	1	10	38	1	23
Future Vol, veh/h	27	801	15	9	565	87	14	1	10	38	1	23
Conflicting Peds, #/hr	25	0	25	25	0	25	25	0	25	25	0	25
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	28	817	15	9	577	89	14	1	10	39	1	23
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	691	0	0	857	0	0	1583	1615	875	1576	1578	672
Stage 1	-	-	-	-	-	-	906	906	-	665	665	-
Stage 2	-	-	-	-	-	-	677	709	-	911	913	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	899	-	-	779	-	-	87	103	347	88	109	454
Stage 1	-	-	-	-	-	-	329	354	-	448	456	-
Stage 2	-	-	-	-	-	-	441	436	-	327	351	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	878	-	-	760	-	-	76	94	331	78	99	433
Mov Cap-2 Maneuver	-	-	-	-	-	-	189	207	-	191	214	-
Stage 1	-	-	-	-	-	-	311	335	-	423	440	-
Stage 2	-	-	-	-	-	-	401	420	-	299	332	-
Approach	SE			NW			NE			SW		
HCM Control Delay, s	0.3			0.1			22.7			25.2		
HCM LOS							C			D		
Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1					
Capacity (veh/h)	229	760	-	-	878	-	-	241				
HCM Lane V/C Ratio	0.111	0.012	-	-	0.031	-	-	0.263				
HCM Control Delay (s)	22.7	9.8	-	-	9.2	-	-	25.2				
HCM Lane LOS	C	A	-	-	A	-	-	D				
HCM 95th %tile Q(veh)	0.4	0	-	-	0.1	-	-	1				

Intersection

Int Delay, s/veh 0.5

Movement SEL SET NWT NWR SWL SWR

Lane Configurations						
Traffic Vol, veh/h	23	789	655	8	10	25
Future Vol, veh/h	23	789	655	8	10	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	23	805	668	8	10	26

Major/Minor Major1 Major2 Minor2

Conflicting Flow All	676	0	-	0	1523	672
Stage 1	-	-	-	-	672	-
Stage 2	-	-	-	-	851	-
Critical Hdwy	4.13	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	911	-	-	-	129	454
Stage 1	-	-	-	-	506	-
Stage 2	-	-	-	-	417	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	911	-	-	-	126	454
Mov Cap-2 Maneuver	-	-	-	-	263	-
Stage 1	-	-	-	-	493	-
Stage 2	-	-	-	-	417	-

Approach SE NW SW

HCM Control Delay, s	0.3	0	15.1
HCM LOS			C

Minor Lane/Major Mvmt NWT NWR SEL SETSWLn1SWLn2

Capacity (veh/h)	-	-	911	-	263	454
HCM Lane V/C Ratio	-	-	0.026	-	0.039	0.056
HCM Control Delay (s)	-	-	9.1	-	19.2	13.4
HCM Lane LOS	-	-	A	-	C	B
HCM 95th %tile Q(veh)	-	-	0.1	-	0.1	0.2

Min green cannot be greater than Max Green.

HCM 6th Signalized Intersection Summary

19: Main St & Grayson Avenue

11-15-2019



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	80	70	55	727	810	120
Future Volume (veh/h)	80	70	55	727	810	120
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	0.94	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	1900	1900	1856	1318	1318	1318
Adj Flow Rate, veh/h	84	74	58	765	853	126
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	3	3	3	3
Cap, veh/h	96	85	107	1072	801	118
Arrive On Green	0.11	0.11	0.06	0.81	0.72	0.72
Sat Flow, veh/h	857	755	1767	1318	1117	165
Grp Volume(v), veh/h	159	0	58	765	0	979
Grp Sat Flow(s),veh/h/ln	1623	0	1767	1318	0	1282
Q Serve(g_s), s	12.6	0.0	4.2	33.8	0.0	93.9
Cycle Q Clear(g_c), s	12.6	0.0	4.2	33.8	0.0	93.9
Prop In Lane	0.53	0.47	1.00			0.13
Lane Grp Cap(c), veh/h	182	0	107	1072	0	919
V/C Ratio(X)	0.87	0.00	0.54	0.71	0.00	1.06
Avail Cap(c_a), veh/h	444	0	206	1146	0	919
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	57.2	0.0	59.8	5.4	0.0	18.5
Incr Delay (d2), s/veh	5.1	0.0	1.6	2.0	0.0	48.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.0	1.9	7.3	0.0	35.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	62.3	0.0	61.4	7.4	0.0	67.1
LnGrp LOS	E	A	E	A	A	F
Approach Vol, veh/h	159			823	979	
Approach Delay, s/veh	62.3			11.2	67.1	
Approach LOS	E			B	E	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	12.6	99.0			111.6	19.4
Change Period (Y+Rc), s	* 4.7	5.1			5.1	4.7
Max Green Setting (Gmax), s	* 15	93.9			113.9	35.8
Max Q Clear Time (g_c+I1), s	6.2	95.9			35.8	14.6
Green Ext Time (p_c), s	0.0	0.0			6.6	0.1

Intersection Summary

HCM 6th Ctrl Delay	43.3
HCM 6th LOS	D

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.

HCM 6th TWSC
27: Main St & Mills Ln

11-13-2019

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↕	↕	
Traffic Vol, veh/h	0	0	0	0	0	12	0	803	4	10	930	3
Future Vol, veh/h	0	0	0	0	0	12	0	803	4	10	930	3
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	98	98	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	0	0	0	0	12	0	819	4	10	949	3

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1808	1804	961	1802	1803	831	-	0	0	828	0	0
Stage 1	976	976	-	826	826	-	-	-	-	-	-	-
Stage 2	832	828	-	976	977	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	-	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	-	-	-	2.227	-	-
Pot Cap-1 Maneuver	61	79	310	61	79	368	0	-	-	799	-	-
Stage 1	301	328	-	365	385	-	0	-	-	-	-	-
Stage 2	362	384	-	301	328	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	58	77	307	60	77	365	-	-	-	795	-	-
Mov Cap-2 Maneuver	172	192	-	176	194	-	-	-	-	-	-	-
Stage 1	301	322	-	365	383	-	-	-	-	-	-	-
Stage 2	348	382	-	296	322	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	15.2	0	0.1
HCM LOS	A	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	-	365	795	-
HCM Lane V/C Ratio	-	-	-	0.034	0.013	-
HCM Control Delay (s)	-	-	0	15.2	9.6	-
HCM Lane LOS	-	-	A	C	A	-
HCM 95th %tile Q(veh)	-	-	-	0.1	0	-

HCM 6th TWSC
41: Charter Oak & Main St

11-13-2019

Intersection												
Int Delay, s/veh	2.8											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	12	880	25	45	690	90	20	2	38	43	2	9
Future Vol, veh/h	12	880	25	45	690	90	20	2	38	43	2	9
Conflicting Peds, #/hr	0	0	25	0	0	5	22	0	5	25	0	42
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	13	957	27	49	750	98	22	2	41	47	2	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	853	0	0	1009	0	0	1967	1973	1021	1945	1937	846
Stage 1	-	-	-	-	-	-	1022	1022	-	902	902	-
Stage 2	-	-	-	-	-	-	945	951	-	1043	1035	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	782	-	-	683	-	-	47	62	286	49	65	361
Stage 1	-	-	-	-	-	-	283	312	-	331	355	-
Stage 2	-	-	-	-	-	-	313	337	-	276	308	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	778	-	-	667	-	-	39	55	273	~ 37	58	345
Mov Cap-2 Maneuver	-	-	-	-	-	-	138	161	-	118	154	-
Stage 1	-	-	-	-	-	-	272	299	-	324	327	-
Stage 2	-	-	-	-	-	-	269	311	-	223	295	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0.1	0.6	31.1	51.3
HCM LOS			D	F

Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1
Capacity (veh/h)	202	667	-	-	778	-	134
HCM Lane V/C Ratio	0.323	0.073	-	-	0.017	-	0.438
HCM Control Delay (s)	31.1	10.8	-	-	9.7	-	51.3
HCM Lane LOS	D	B	-	-	A	-	F
HCM 95th %tile Q(veh)	1.3	0.2	-	-	0.1	-	1.9

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

Intersection

Int Delay, s/veh 1.6

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	112	741	760	45	23	55
Future Vol, veh/h	112	741	760	45	23	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	122	805	826	49	25	60

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	875	0	0 1900 851
Stage 1	-	-	- 851 -
Stage 2	-	-	- 1049 -
Critical Hdwy	4.13	-	- 6.43 6.23
Critical Hdwy Stg 1	-	-	- 5.43 -
Critical Hdwy Stg 2	-	-	- 5.43 -
Follow-up Hdwy	2.227	-	- 3.527 3.327
Pot Cap-1 Maneuver	767	-	- 76 358
Stage 1	-	-	- 417 -
Stage 2	-	-	- 336 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	767	-	- 64 358
Mov Cap-2 Maneuver	-	-	- 186 -
Stage 1	-	-	- 351 -
Stage 2	-	-	- 336 -

Approach	SE	NW	SW
HCM Control Delay, s	1.4	0	20.1
HCM LOS			C

Minor Lane/Major Mvmt	NWT	NWR	SEL	SETSWLn1SWLn2
Capacity (veh/h)	-	-	767	- 186 358
HCM Lane V/C Ratio	-	-	0.159	- 0.134 0.167
HCM Control Delay (s)	-	-	10.6	- 27.3 17.1
HCM Lane LOS	-	-	B	- D C
HCM 95th %tile Q(veh)	-	-	0.6	- 0.5 0.6

HCM 6th Signalized Intersection Summary

18: Main St & Mitchell Dr/Pope Street

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	170	177	33	122	77	610	51	76	474	4
Future Volume (veh/h)	0	0	170	177	33	122	77	610	51	76	474	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	50	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.91	1.00		0.91	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1318	1856	1318	1318
Adj Flow Rate, veh/h	0	0	183	190	35	131	83	656	55	82	510	4
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	0	121	192	233	43	222	111	692	21	110	711	6
Arrive On Green	0.00	0.00	0.07	0.15	0.15	0.15	0.06	0.54	0.54	0.06	0.54	0.54
Sat Flow, veh/h	0	1856	1428	1503	277	1434	1767	1196	100	1767	1306	10
Grp Volume(v), veh/h	0	0	183	225	0	131	83	0	711	82	0	514
Grp Sat Flow(s),veh/h/ln	0	1856	1428	1780	0	1434	1767	0	1297	1767	0	1316
Q Serve(g_s), s	0.0	0.0	9.0	16.8	0.0	11.7	6.4	0.0	75.0	6.3	0.0	40.2
Cycle Q Clear(g_c), s	0.0	0.0	9.0	16.8	0.0	11.7	6.4	0.0	75.0	6.3	0.0	40.2
Prop In Lane	0.00		1.00	0.84		1.00	1.00		0.08	1.00		0.01
Lane Grp Cap(c), veh/h	0	121	192	276	0	222	111	0	713	110	0	717
V/C Ratio(X)	0.00	0.00	0.95	0.82	0.00	0.59	0.75	0.00	1.00	0.74	0.00	0.72
Avail Cap(c_a), veh/h	0	121	192	452	0	365	321	0	706	321	0	717
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	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	0.0	0.0	59.9	56.3	0.0	54.1	63.5	0.0	31.4	63.5	0.0	23.5
Incr Delay (d2), s/veh	0.0	0.0	51.3	5.9	0.0	2.5	3.8	0.0	32.9	3.7	0.0	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	250.9	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	9.1	8.1	0.0	4.4	3.0	0.0	79.4	3.0	0.0	13.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	111.2	62.2	0.0	56.6	67.3	0.0	315.2	67.1	0.0	26.4
LnGrp LOS	A	A	F	E	A	E	E	A	F	E	A	C
Approach Vol, veh/h		183			356			794			596	
Approach Delay, s/veh		111.2			60.1			289.3			32.0	
Approach LOS		F			E			F			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.3	82.7		29.0	12.3	82.7		13.7				
Change Period (Y+Rc), s	3.7	* 7.7		* 7.7	3.7	* 7.7		4.7				
Max Green Setting (Gmax), s	25.0	* 75		* 35	25.0	* 75		9.0				
Max Q Clear Time (g_c+I1), s	8.4	42.2		18.8	8.3	77.0		11.0				
Green Ext Time (p_c), s	0.1	2.5		1.7	0.1	0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			150.6									
HCM 6th LOS			F									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary

19: Main St & Grayson Avenue/Mills

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	4	60	8	5	19	45	692	12	23	728	120
Future Volume (veh/h)	70	4	60	8	5	19	45	692	12	23	728	120
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.92	1.00		0.68	1.00		0.96	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1856	1856	1318	1318
Adj Flow Rate, veh/h	74	4	63	8	5	20	47	728	13	24	766	68
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	101	5	86	26	16	25	60	764	14	192	793	70
Arrive On Green	0.12	0.12	0.12	0.02	0.02	0.02	0.03	0.59	0.59	0.11	0.67	0.67
Sat Flow, veh/h	846	46	720	1108	692	1064	1767	1290	23	1767	1189	106
Grp Volume(v), veh/h	141	0	0	13	0	20	47	0	741	24	0	834
Grp Sat Flow(s),veh/h/ln	1611	0	0	1800	0	1064	1767	0	1313	1767	0	1294
Q Serve(g_s), s	10.3	0.0	0.0	0.9	0.0	2.3	3.2	0.0	64.1	1.5	0.0	73.4
Cycle Q Clear(g_c), s	10.3	0.0	0.0	0.9	0.0	2.3	3.2	0.0	64.1	1.5	0.0	73.4
Prop In Lane	0.52		0.45	0.62		1.00	1.00		0.02	1.00		0.08
Lane Grp Cap(c), veh/h	192	0	0	43	0	25	60	0	778	192	0	863
V/C Ratio(X)	0.74	0.00	0.00	0.30	0.00	0.79	0.78	0.00	0.95	0.13	0.00	0.97
Avail Cap(c_a), veh/h	259	0	0	153	0	90	135	0	1047	192	0	979
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	51.7	0.0	0.0	58.3	0.0	59.0	58.2	0.0	23.2	48.9	0.0	19.0
Incr Delay (d2), s/veh	7.1	0.0	0.0	1.5	0.0	18.3	7.8	0.0	14.9	0.3	0.0	19.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	0.0	0.0	0.4	0.0	0.7	1.6	0.0	21.3	0.7	0.0	23.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.7	0.0	0.0	59.8	0.0	77.4	66.1	0.0	38.0	49.2	0.0	38.9
LnGrp LOS	E	A	A	E	A	E	E	A	D	D	A	D
Approach Vol, veh/h	141				33				788		858	
Approach Delay, s/veh	58.7				70.4				39.7		39.2	
Approach LOS	E				E				D		D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	17.9	77.1		19.0	8.8	86.1		7.6				
Change Period (Y+Rc), s	4.7	* 5.1		4.5	4.7	* 5.1		4.7				
Max Green Setting (Gmax), s	4.5	* 97		19.5	9.3	* 92		10.3				
Max Q Clear Time (g_c+I1), s	3.5	66.1		12.3	5.2	75.4		4.3				
Green Ext Time (p_c), s	0.0	5.8		0.4	0.0	5.6		0.0				

Intersection Summary

HCM 6th Ctrl Delay 41.5

HCM 6th LOS D

Notes

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

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

HCM 6th TWSC
41: Charter Oak & Main St

11-13-2019

Intersection												
Int Delay, s/veh	2.1											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	9	814	22	43	666	87	11	2	35	35	2	8
Future Vol, veh/h	9	814	22	43	666	87	11	2	35	35	2	8
Conflicting Peds, #/hr	10	0	35	10	0	15	32	0	15	35	0	52
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	10	885	24	47	724	95	12	2	38	38	2	9
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	834	0	0	944	0	0	1875	1880	967	1853	1845	839
Stage 1	-	-	-	-	-	-	952	952	-	881	881	-
Stage 2	-	-	-	-	-	-	923	928	-	972	964	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	795	-	-	723	-	-	54	71	307	56	74	364
Stage 1	-	-	-	-	-	-	310	337	-	340	363	-
Stage 2	-	-	-	-	-	-	322	345	-	302	332	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	784	-	-	699	-	-	45	62	287	43	65	341
Mov Cap-2 Maneuver	-	-	-	-	-	-	148	172	-	132	166	-
Stage 1	-	-	-	-	-	-	296	321	-	331	334	-
Stage 2	-	-	-	-	-	-	276	317	-	248	317	-
Approach	SE			NW			NE			SW		
HCM Control Delay, s	0.1			0.6			25.1			40.2		
HCM LOS							D			E		
Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1					
Capacity (veh/h)	231	699	-	-	784	-	-	150				
HCM Lane V/C Ratio	0.226	0.067	-	-	0.012	-	-	0.326				
HCM Control Delay (s)	25.1	10.5	-	-	9.7	-	-	40.2				
HCM Lane LOS	D	B	-	-	A	-	-	E				
HCM 95th %tile Q(veh)	0.8	0.2	-	-	0	-	-	1.3				

Intersection

Int Delay, s/veh 1

Movement SEL SET NWT NWR SWL SWR

Lane Configurations      

Traffic Vol, veh/h 80 688 739 37 11 35

Future Vol, veh/h 80 688 739 37 11 35

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Free Free Free Free Stop Stop

RT Channelized - None - None - None

Storage Length 0 - - - 0 0

Veh in Median Storage, # - 0 0 - 1 -

Grade, % - 0 0 - 0 -

Peak Hour Factor 92 92 92 92 92 92

Heavy Vehicles, % 3 3 3 3 3 3

Mvmt Flow 87 748 803 40 12 38

Major/Minor Major1 Major2 Minor2

Conflicting Flow All 843 0 - 0 1745 823

Stage 1 - - - - 823 -

Stage 2 - - - - 922 -

Critical Hdwy 4.13 - - - 6.43 6.23

Critical Hdwy Stg 1 - - - - 5.43 -

Critical Hdwy Stg 2 - - - - 5.43 -

Follow-up Hdwy 2.227 - - - 3.527 3.327

Pot Cap-1 Maneuver 789 - - - 94 372

Stage 1 - - - - 430 -

Stage 2 - - - - 386 -

Platoon blocked, % - - - -

Mov Cap-1 Maneuver 789 - - - 84 372

Mov Cap-2 Maneuver - - - - 214 -

Stage 1 - - - - 383 -

Stage 2 - - - - 386 -

Approach SE NW SW

HCM Control Delay, s 1.1 0 17.5

HCM LOS C

Minor Lane/Major Mvmt NWT NWR SEL SETSWLn1SWLn2

Capacity (veh/h) - - 789 - 214 372

HCM Lane V/C Ratio - - 0.11 - 0.056 0.102

HCM Control Delay (s) - - 10.1 - 22.8 15.8

HCM Lane LOS - - B - C C

HCM 95th %tile Q(veh) - - 0.4 - 0.2 0.3

HCM 6th Signalized Intersection Summary

18: Main St & Mitchell Dr/Pope Street

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	192	140	26	91	85	554	53	85	518	4
Future Volume (veh/h)	0	0	192	140	26	91	85	554	53	85	518	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	50	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.93	1.00		0.95	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1329	1329	1870	1329	1329
Adj Flow Rate, veh/h	0	0	204	149	28	97	90	589	56	90	551	4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	126	204	193	36	189	116	719	22	116	740	5
Arrive On Green	0.00	0.00	0.08	0.13	0.13	0.13	0.07	0.52	0.52	0.07	0.52	0.52
Sat Flow, veh/h	0	1870	1510	1511	284	1479	1781	1189	113	1781	1317	10
Grp Volume(v), veh/h	0	0	204	177	0	97	90	0	645	90	0	555
Grp Sat Flow(s),veh/h/ln	0	1870	1510	1795	0	1479	1781	0	1302	1781	0	1327
Q Serve(g_s), s	0.0	0.0	9.0	11.2	0.0	7.2	5.8	0.0	56.0	5.8	0.0	41.0
Cycle Q Clear(g_c), s	0.0	0.0	9.0	11.2	0.0	7.2	5.8	0.0	56.0	5.8	0.0	41.0
Prop In Lane	0.00		1.00	0.84		1.00	1.00		0.09	1.00		0.01
Lane Grp Cap(c), veh/h	0	126	204	230	0	189	116	0	741	116	0	745
V/C Ratio(X)	0.00	0.00	1.00	0.77	0.00	0.51	0.78	0.00	0.87	0.78	0.00	0.75
Avail Cap(c_a), veh/h	0	143	230	533	0	439	378	0	828	378	0	844
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	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	0.0	0.0	58.1	56.3	0.0	54.4	61.5	0.0	29.3	61.5	0.0	22.1
Incr Delay (d2), s/veh	0.0	0.0	56.0	2.1	0.0	0.8	4.2	0.0	8.5	4.2	0.0	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	184.7	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	10.1	6.0	0.0	3.1	3.2	0.0	62.7	3.2	0.0	13.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	114.0	58.4	0.0	55.2	65.7	0.0	222.4	65.7	0.0	24.6
LnGrp LOS	A	A	F	E	A	E	E	A	F	E	A	C
Approach Vol, veh/h		204			274			735			645	
Approach Delay, s/veh		114.0			57.3			203.2			30.4	
Approach LOS		F			E			F			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.2	68.6		23.4	12.2	68.6		13.7				
Change Period (Y+Rc), s	3.7	* 7.7		* 7.7	3.7	* 7.7		4.7				
Max Green Setting (Gmax), s	25.0	* 75		* 35	25.0	* 75		9.0				
Max Q Clear Time (g_c+I1), s	7.8	43.0		13.2	7.8	58.0		11.0				
Green Ext Time (p_c), s	0.1	2.7		0.9	0.1	3.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			111.9									
HCM 6th LOS			F									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary

19: Main St & Grayson Avenue/Mills

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	3	43	12	5	29	56	691	11	17	709	56
Future Volume (veh/h)	55	3	43	12	5	29	56	691	11	17	709	56
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.94	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1856	1856	1318	1318
Adj Flow Rate, veh/h	56	3	43	12	5	29	57	698	11	17	716	57
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	79	4	61	90	37	105	111	866	14	32	749	60
Arrive On Green	0.09	0.09	0.09	0.07	0.07	0.07	0.06	0.67	0.67	0.02	0.62	0.62
Sat Flow, veh/h	899	48	690	1265	527	1484	1767	1294	20	1767	1202	96
Grp Volume(v), veh/h	102	0	0	17	0	29	57	0	709	17	0	773
Grp Sat Flow(s),veh/h/ln	1637	0	0	1792	0	1484	1767	0	1314	1767	0	1298
Q Serve(g_s), s	7.4	0.0	0.0	1.1	0.0	2.3	3.8	0.0	47.4	1.2	0.0	68.1
Cycle Q Clear(g_c), s	7.4	0.0	0.0	1.1	0.0	2.3	3.8	0.0	47.4	1.2	0.0	68.1
Prop In Lane	0.55		0.42	0.71		1.00	1.00		0.02	1.00		0.07
Lane Grp Cap(c), veh/h	144	0	0	127	0	105	111	0	880	32	0	809
V/C Ratio(X)	0.71	0.00	0.00	0.13	0.00	0.28	0.51	0.00	0.81	0.54	0.00	0.96
Avail Cap(c_a), veh/h	242	0	0	162	0	134	134	0	1038	74	0	979
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	54.4	0.0	0.0	53.4	0.0	54.0	55.6	0.0	14.5	59.7	0.0	21.5
Incr Delay (d2), s/veh	6.3	0.0	0.0	0.2	0.0	0.5	1.4	0.0	4.1	13.4	0.0	17.3
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	3.3	0.0	0.0	0.5	0.0	0.9	1.8	0.0	14.2	0.6	0.0	23.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.6	0.0	0.0	53.6	0.0	54.5	57.0	0.0	18.6	73.1	0.0	38.8
LnGrp LOS	E	A	A	D	A	D	E	A	B	E	A	D
Approach Vol, veh/h	102			46			766			790		
Approach Delay, s/veh	60.6			54.2			21.4			39.5		
Approach LOS	E			D			C			D		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.7	87.2		15.3	12.4	81.5		13.4				
Change Period (Y+Rc), s	4.5	5.1		4.5	* 4.7	5.1		4.7				
Max Green Setting (Gmax), s	5.1	96.9		18.1	* 9.3	92.5		11.1				
Max Q Clear Time (g_c+I1), s	3.2	49.4		9.4	5.8	70.1		4.3				
Green Ext Time (p_c), s	0.0	6.5		0.3	0.0	6.3		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			33.1									
HCM 6th LOS			C									
Notes												

Intersection												
Int Delay, s/veh	1.8											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	19	779	2	11	647	151	16	4	26	36	3	14
Future Vol, veh/h	19	779	2	11	647	151	16	4	26	36	3	14
Conflicting Peds, #/hr	11	0	30	71	0	41	30	0	30	52	0	11
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	19	795	2	11	660	154	16	4	27	37	3	14
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	855	0	0	868	0	0	1703	1782	919	1702	1706	808
Stage 1	-	-	-	-	-	-	905	905	-	800	800	-
Stage 2	-	-	-	-	-	-	798	877	-	902	906	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	781	-	-	772	-	-	72	81	327	72	91	379
Stage 1	-	-	-	-	-	-	330	354	-	377	396	-
Stage 2	-	-	-	-	-	-	378	365	-	331	354	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	751	-	-	720	-	-	60	70	290	57	78	354
Mov Cap-2 Maneuver	-	-	-	-	-	-	170	180	-	163	190	-
Stage 1	-	-	-	-	-	-	300	322	-	353	375	-
Stage 2	-	-	-	-	-	-	344	346	-	275	322	-
Approach	SE			NW			NE			SW		
HCM Control Delay, s	0.2			0.1			25.4			30.9		
HCM LOS							D			D		
Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1					
Capacity (veh/h)	223	720	-	-	751	-	-	192				
HCM Lane V/C Ratio	0.21	0.016	-	-	0.026	-	-	0.282				
HCM Control Delay (s)	25.4	10.1	-	-	9.9	-	-	30.9				
HCM Lane LOS	D	B	-	-	A	-	-	D				
HCM 95th %tile Q(veh)	0.8	0	-	-	0.1	-	-	1.1				

Intersection

Int Delay, s/veh 1.5

Movement SEL SET NWT NWR SWL SWR

Lane Configurations						
Traffic Vol, veh/h	23	733	700	14	42	82
Future Vol, veh/h	23	733	700	14	42	82
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	23	748	714	14	43	84

Major/Minor Major1 Major2 Minor2

Conflicting Flow All	728	0	-	0	1515	721
Stage 1	-	-	-	-	721	-
Stage 2	-	-	-	-	794	-
Critical Hdwy	4.13	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	871	-	-	-	131	426
Stage 1	-	-	-	-	480	-
Stage 2	-	-	-	-	443	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	871	-	-	-	128	426
Mov Cap-2 Maneuver	-	-	-	-	266	-
Stage 1	-	-	-	-	468	-
Stage 2	-	-	-	-	443	-

Approach SE NW SW

HCM Control Delay, s	0.3	0	17.4
HCM LOS			C

Minor Lane/Major Mvmt NWT NWR SEL SETSWLn1SWLn2

Capacity (veh/h)	-	-	871	-	266	426
HCM Lane V/C Ratio	-	-	0.027	-	0.161	0.196
HCM Control Delay (s)	-	-	9.2	-	21.1	15.5
HCM Lane LOS	-	-	A	-	C	C
HCM 95th %tile Q(veh)	-	-	0.1	-	0.6	0.7

HCM 6th Signalized Intersection Summary

18: Main St & Mitchell Dr/Pope Street

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	153	129	38	71	57	511	56	63	563	6
Future Volume (veh/h)	0	0	153	129	38	71	57	511	56	63	563	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	50	0	0	25	0
Ped-Bike Adj(A_pbT)	1.00		0.69	1.00		0.73	1.00		0.90	1.00		0.92
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1318	1856	1318	1318
Adj Flow Rate, veh/h	0	0	156	132	39	72	58	521	57	64	574	6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	0	124	165	221	65	178	105	670	22	107	703	4
Arrive On Green	0.00	0.00	0.08	0.18	0.18	0.18	0.07	0.47	0.47	0.07	0.48	0.48
Sat Flow, veh/h	0	1856	1087	1379	407	1155	1767	1154	126	1767	1301	14
Grp Volume(v), veh/h	0	0	156	171	0	72	58	0	578	64	0	580
Grp Sat Flow(s),veh/h/ln	0	1856	1087	1787	0	1155	1767	0	1280	1767	0	1315
Q Serve(g_s), s	0.0	0.0	9.0	10.2	0.0	6.4	3.7	0.0	50.6	4.1	0.0	48.3
Cycle Q Clear(g_c), s	0.0	0.0	9.0	10.2	0.0	6.4	3.7	0.0	50.6	4.1	0.0	48.3
Prop In Lane	0.00		1.00	0.77		1.00	1.00		0.10	1.00		0.01
Lane Grp Cap(c), veh/h	0	124	165	286	0	178	105	0	712	107	0	693
V/C Ratio(X)	0.00	0.00	0.95	0.60	0.00	0.40	0.55	0.00	0.81	0.60	0.00	0.84
Avail Cap(c_a), veh/h	0	143	186	535	0	346	378	0	822	378	0	844
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	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	0.0	0.0	59.3	52.6	0.0	50.8	61.7	0.0	31.3	61.7	0.0	30.5
Incr Delay (d2), s/veh	0.0	0.0	46.1	2.0	0.0	1.5	1.7	0.0	4.7	2.0	0.0	5.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	168.3	0.0	0.0	57.5
%ile BackOfQ(50%),veh/ln	0.0	0.0	7.5	5.6	0.0	2.3	2.0	0.0	57.3	2.2	0.0	33.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	105.4	54.6	0.0	52.3	63.4	0.0	204.4	63.6	0.0	93.3
LnGrp LOS	A	A	F	D	A	D	E	A	F	E	A	F
Approach Vol, veh/h		156			243			636			644	
Approach Delay, s/veh		105.4			53.9			191.5			90.3	
Approach LOS		F			D			F			F	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.3	63.3		28.5	11.6	63.1		13.7				
Change Period (Y+Rc), s	3.7	* 7.7		* 7.7	3.7	* 7.7		4.7				
Max Green Setting (Gmax), s	25.0	* 75		* 35	25.0	* 75		9.0				
Max Q Clear Time (g_c+I1), s	5.7	50.3		12.2	6.1	52.6		11.0				
Green Ext Time (p_c), s	0.1	2.8		1.4	0.1	2.8		0.0				

Intersection Summary

HCM 6th Ctrl Delay 124.8

HCM 6th LOS F

Notes

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

HCM 6th Signalized Intersection Summary

19: Main St & Grayson Avenue/Mills

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	1	32	2	1	8	34	631	5	16	790	28
Future Volume (veh/h)	25	1	32	2	1	8	34	631	5	16	790	28
Initial Q (Qb), veh	0	0	0	0	0	0	0	30	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.93	1.00		0.95	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1856	1856	1318	1318
Adj Flow Rate, veh/h	25	1	32	2	1	8	34	637	5	16	798	28
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	43	2	55	34	17	43	94	940	6	31	861	30
Arrive On Green	0.06	0.06	0.06	0.03	0.03	0.03	0.05	0.70	0.70	0.02	0.66	0.66
Sat Flow, veh/h	682	27	873	1197	599	1496	1767	1306	10	1767	1264	44
Grp Volume(v), veh/h	58	0	0	3	0	8	34	0	642	16	0	826
Grp Sat Flow(s),veh/h/ln	1582	0	0	1796	0	1496	1767	0	1316	1767	0	1309
Q Serve(g_s), s	3.6	0.0	0.0	0.2	0.0	0.5	1.9	0.0	28.5	0.9	0.0	57.9
Cycle Q Clear(g_c), s	3.6	0.0	0.0	0.2	0.0	0.5	1.9	0.0	28.5	0.9	0.0	57.9
Prop In Lane	0.43		0.55	0.67		1.00	1.00		0.01	1.00		0.03
Lane Grp Cap(c), veh/h	100	0	0	51	0	43	94	0	945	31	0	891
V/C Ratio(X)	0.58	0.00	0.00	0.06	0.00	0.19	0.36	0.00	0.68	0.51	0.00	0.93
Avail Cap(c_a), veh/h	291	0	0	220	0	183	181	0	1242	97	0	1170
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	50.1	0.0	0.0	52.0	0.0	52.2	50.3	0.0	11.3	53.6	0.0	15.0
Incr Delay (d2), s/veh	5.3	0.0	0.0	0.2	0.0	0.8	0.9	0.0	1.0	12.6	0.0	10.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.6	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	0.0	0.1	0.0	0.2	0.9	0.0	18.4	0.5	0.0	17.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.4	0.0	0.0	52.2	0.0	53.0	51.2	0.0	34.9	66.1	0.0	25.6
LnGrp LOS	E	A	A	D	A	D	D	A	C	E	A	C
Approach Vol, veh/h	58			11			676			842		
Approach Delay, s/veh	55.4			52.7			35.7			26.3		
Approach LOS	E			D			D			C		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.3	75.8		10.9	10.2	71.9		7.6				
Change Period (Y+Rc), s	4.5	5.1		4.5	* 4.7	5.1		4.7				
Max Green Setting (Gmax), s	5.5	94.9		18.5	* 10	89.9		12.3				
Max Q Clear Time (g_c+I1), s	2.9	30.5		5.6	3.9	59.9		2.5				
Green Ext Time (p_c), s	0.0	5.0		0.2	0.0	6.9		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			31.6									
HCM 6th LOS			C									
Notes												

HCM 6th TWSC
41: Charter Oak & Main St

11-13-2019

Intersection												
Int Delay, s/veh	1.5											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	27	810	11	5	571	87	14	1	9	38	1	23
Future Vol, veh/h	27	810	11	5	571	87	14	1	9	38	1	23
Conflicting Peds, #/hr	25	0	25	25	0	25	25	0	25	25	0	25
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	28	827	11	5	583	89	14	1	9	39	1	23

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	697	0	0	863	0	0	1589	1621	883	1582	1582	678
Stage 1	-	-	-	-	-	-	914	914	-	663	663	-
Stage 2	-	-	-	-	-	-	675	707	-	919	919	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	895	-	-	775	-	-	87	102	343	88	108	450
Stage 1	-	-	-	-	-	-	326	351	-	449	457	-
Stage 2	-	-	-	-	-	-	442	437	-	324	349	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	874	-	-	757	-	-	76	93	327	79	99	429
Mov Cap-2 Maneuver	-	-	-	-	-	-	189	207	-	192	215	-
Stage 1	-	-	-	-	-	-	308	332	-	424	443	-
Stage 2	-	-	-	-	-	-	404	423	-	297	330	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0.3	0.1	22.9	25.1
HCM LOS			C	D

Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1
Capacity (veh/h)	226	757	-	-	874	-	242
HCM Lane V/C Ratio	0.108	0.007	-	-	0.032	-	0.261
HCM Control Delay (s)	22.9	9.8	-	-	9.3	-	25.1
HCM Lane LOS	C	A	-	-	A	-	D
HCM 95th %tile Q(veh)	0.4	0	-	-	0.1	-	1

Intersection

Int Delay, s/veh 0.5

Movement SEL SET NWT NWR SWL SWR

Lane Configurations      

Traffic Vol, veh/h 20 792 657 11 13 24

Future Vol, veh/h 20 792 657 11 13 24

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Free Free Free Free Stop Stop

RT Channelized - None - None - None

Storage Length 0 - - - 0 0

Veh in Median Storage, # - 0 0 - 1 -

Grade, % - 0 0 - 0 -

Peak Hour Factor 98 98 98 98 98 98

Heavy Vehicles, % 3 3 3 3 3 3

Mvmt Flow 20 808 670 11 13 24

Major/Minor Major1 Major2 Minor2

Conflicting Flow All 681 0 - 0 1524 676

Stage 1 - - - - 676 -

Stage 2 - - - - 848 -

Critical Hdwy 4.13 - - - 6.43 6.23

Critical Hdwy Stg 1 - - - - 5.43 -

Critical Hdwy Stg 2 - - - - 5.43 -

Follow-up Hdwy 2.227 - - - 3.527 3.327

Pot Cap-1 Maneuver 907 - - - 129 452

Stage 1 - - - - 503 -

Stage 2 - - - - 418 -

Platoon blocked, % - - - -

Mov Cap-1 Maneuver 907 - - - 126 452

Mov Cap-2 Maneuver - - - - 263 -

Stage 1 - - - - 492 -

Stage 2 - - - - 418 -

Approach SE NW SW

HCM Control Delay, s 0.2 0 15.5

HCM LOS C

Minor Lane/Major Mvmt NWT NWR SEL SETSWLn1SWLn2

Capacity (veh/h) - - 907 - 263 452

HCM Lane V/C Ratio - - 0.023 - 0.05 0.054

HCM Control Delay (s) - - 9.1 - 19.4 13.4

HCM Lane LOS - - A - C B

HCM 95th %tile Q(veh) - - 0.1 - 0.2 0.2

HCM 6th TWSC
41: Charter Oak & Main St

11-13-2019

Intersection												
Int Delay, s/veh	2.2											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	9	844	22	43	681	89	11	2	36	36	2	8
Future Vol, veh/h	9	844	22	43	681	89	11	2	36	36	2	8
Conflicting Peds, #/hr	10	0	35	10	0	15	32	0	15	35	0	52
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	10	917	24	47	740	97	12	2	39	39	2	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	852	0	0	976	0	0	1924	1930	999	1903	1894	856
Stage 1	-	-	-	-	-	-	984	984	-	898	898	-
Stage 2	-	-	-	-	-	-	940	946	-	1005	996	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	783	-	-	703	-	-	50	66	294	52	69	356
Stage 1	-	-	-	-	-	-	298	325	-	333	357	-
Stage 2	-	-	-	-	-	-	315	339	-	290	321	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	772	-	-	680	-	-	42	58	275	~ 39	60	334
Mov Cap-2 Maneuver	-	-	-	-	-	-	143	166	-	125	159	-
Stage 1	-	-	-	-	-	-	284	310	-	324	328	-
Stage 2	-	-	-	-	-	-	270	311	-	236	306	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0.1	0.6	26.1	43.5
HCM LOS			D	E

Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1
Capacity (veh/h)	223	680	-	-	772	-	142
HCM Lane V/C Ratio	0.239	0.069	-	-	0.013	-	0.352
HCM Control Delay (s)	26.1	10.7	-	-	9.7	-	43.5
HCM Lane LOS	D	B	-	-	A	-	E
HCM 95th %tile Q(veh)	0.9	0.2	-	-	0	-	1.4

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

Intersection						
Int Delay, s/veh	1.5					
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	104	697	742	48	22	49
Future Vol, veh/h	104	697	742	48	22	49
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	113	758	807	52	24	53
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	859	0	-	0	1817	833
Stage 1	-	-	-	-	833	-
Stage 2	-	-	-	-	984	-
Critical Hdwy	4.13	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	778	-	-	-	85	367
Stage 1	-	-	-	-	425	-
Stage 2	-	-	-	-	361	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	778	-	-	-	73	367
Mov Cap-2 Maneuver	-	-	-	-	199	-
Stage 1	-	-	-	-	363	-
Stage 2	-	-	-	-	361	-
Approach	SE	NW		SW		
HCM Control Delay, s	1.4	0		19.3		
HCM LOS	C					
Minor Lane/Major Mvmt		NWT	NWR	SEL	SETSWLn1	SWLn2
Capacity (veh/h)		-	-	778	-	199 367
HCM Lane V/C Ratio		-	-	0.145	-	0.12 0.145
HCM Control Delay (s)		-	-	10.4	-	25.5 16.5
HCM Lane LOS		-	-	B	-	D C
HCM 95th %tile Q(veh)		-	-	0.5	-	0.4 0.5

HCM 6th Signalized Intersection Summary

18: Main St & Mitchell Dr/Pope Street

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	195	142	26	91	86	573	54	85	528	4
Future Volume (veh/h)	0	0	195	142	26	91	86	573	54	85	528	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	50	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.93	1.00		0.95	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1329	1329	1870	1329	1329
Adj Flow Rate, veh/h	0	0	207	151	28	97	91	610	57	90	562	4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	126	204	195	36	190	116	717	23	116	739	5
Arrive On Green	0.00	0.00	0.07	0.13	0.13	0.13	0.07	0.53	0.53	0.07	0.53	0.53
Sat Flow, veh/h	0	1870	1507	1514	281	1479	1781	1191	111	1781	1317	9
Grp Volume(v), veh/h	0	0	207	179	0	97	91	0	667	90	0	566
Grp Sat Flow(s),veh/h/ln	0	1870	1507	1795	0	1479	1781	0	1302	1781	0	1327
Q Serve(g_s), s	0.0	0.0	9.0	11.8	0.0	7.5	6.2	0.0	60.5	6.1	0.0	42.9
Cycle Q Clear(g_c), s	0.0	0.0	9.0	11.8	0.0	7.5	6.2	0.0	60.5	6.1	0.0	42.9
Prop In Lane	0.00		1.00	0.84		1.00	1.00		0.09	1.00		0.01
Lane Grp Cap(c), veh/h	0	126	204	231	0	190	116	0	740	116	0	744
V/C Ratio(X)	0.00	0.00	1.01	0.77	0.00	0.51	0.79	0.00	0.90	0.78	0.00	0.76
Avail Cap(c_a), veh/h	0	137	221	511	0	421	363	0	795	363	0	810
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	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	0.0	0.0	58.1	56.4	0.0	54.3	61.6	0.0	29.4	61.6	0.0	22.5
Incr Delay (d2), s/veh	0.0	0.0	62.9	2.1	0.0	0.8	4.4	0.0	12.2	4.2	0.0	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	198.8	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	10.5	6.0	0.0	3.1	3.2	0.0	66.4	3.2	0.0	14.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	121.0	58.5	0.0	55.1	66.0	0.0	240.4	65.8	0.0	25.8
LnGrp LOS	A	A	F	E	A	E	E	A	F	E	A	C
Approach Vol, veh/h		207			276			758			656	
Approach Delay, s/veh		121.0			57.3			219.4			31.3	
Approach LOS		F			E			F			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.3	72.9		23.9	12.3	72.9		13.7				
Change Period (Y+Rc), s	3.7	* 7.7		* 7.7	3.7	* 7.7		4.7				
Max Green Setting (Gmax), s	25.0	* 75		* 35	25.0	* 75		9.0				
Max Q Clear Time (g_c+l1), s	8.2	44.9		13.8	8.1	62.5		11.0				
Green Ext Time (p_c), s	0.1	2.8		0.9	0.1	2.7		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			120.0									
HCM 6th LOS			F									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary

19: Main St & Grayson Avenue/Mills

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	3	43	12	5	39	58	707	11	21	729	57
Future Volume (veh/h)	55	3	43	12	5	39	58	707	11	21	729	57
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.94	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1856	1856	1318	1318
Adj Flow Rate, veh/h	56	3	43	12	5	39	59	714	11	21	736	58
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	78	4	60	93	39	108	107	875	13	36	763	60
Arrive On Green	0.09	0.09	0.09	0.07	0.07	0.07	0.06	0.68	0.68	0.02	0.63	0.63
Sat Flow, veh/h	898	48	690	1265	527	1479	1767	1294	20	1767	1203	95
Grp Volume(v), veh/h	102	0	0	17	0	39	59	0	725	21	0	794
Grp Sat Flow(s),veh/h/ln	1636	0	0	1792	0	1479	1767	0	1314	1767	0	1298
Q Serve(g_s), s	7.9	0.0	0.0	1.2	0.0	3.3	4.2	0.0	52.1	1.5	0.0	75.4
Cycle Q Clear(g_c), s	7.9	0.0	0.0	1.2	0.0	3.3	4.2	0.0	52.1	1.5	0.0	75.4
Prop In Lane	0.55		0.42	0.71		1.00	1.00		0.02	1.00		0.07
Lane Grp Cap(c), veh/h	142	0	0	131	0	108	107	0	888	36	0	823
V/C Ratio(X)	0.72	0.00	0.00	0.13	0.00	0.36	0.55	0.00	0.82	0.58	0.00	0.96
Avail Cap(c_a), veh/h	227	0	0	152	0	126	126	0	974	69	0	919
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	58.1	0.0	0.0	56.7	0.0	57.6	59.6	0.0	15.3	63.4	0.0	22.5
Incr Delay (d2), s/veh	6.7	0.0	0.0	0.2	0.0	0.7	1.6	0.0	5.1	14.0	0.0	20.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.0	0.0	0.5	0.0	1.3	2.0	0.0	16.0	0.8	0.0	26.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.8	0.0	0.0	56.8	0.0	58.4	61.2	0.0	20.4	77.4	0.0	43.1
LnGrp LOS	E	A	A	E	A	E	E	A	C	E	A	D
Approach Vol, veh/h	102			56			784			815		
Approach Delay, s/veh	64.8			57.9			23.5			44.0		
Approach LOS	E			E			C			D		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.2	93.4		15.8	12.6	88.0		14.3				
Change Period (Y+Rc), s	4.5	5.1		4.5	* 4.7	5.1		4.7				
Max Green Setting (Gmax), s	5.1	96.9		18.1	* 9.3	92.5		11.1				
Max Q Clear Time (g_c+I1), s	3.5	54.1		9.9	6.2	77.4		5.3				
Green Ext Time (p_c), s	0.0	6.7		0.3	0.0	5.5		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			36.5									
HCM 6th LOS			D									
Notes												

HCM 6th TWSC
41: Charter Oak & Main St

11-13-2019

Intersection													
Int Delay, s/veh	1.8												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR	
Lane Configurations													
Traffic Vol, veh/h	20	794	3	11	669	156	16	4	27	37	3	14	
Future Vol, veh/h	20	794	3	11	669	156	16	4	27	37	3	14	
Conflicting Peds, #/hr	11	0	30	71	0	41	30	0	30	52	0	11	
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None	
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-	
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98	
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	
Mvmt Flow	20	810	3	11	683	159	16	4	28	38	3	14	
Major/Minor	Major1			Major2			Minor1			Minor2			
Conflicting Flow All	883	0	0	884	0	0	1746	1828	935	1746	1750	834	
Stage 1	-	-	-	-	-	-	923	923	-	826	826	-	
Stage 2	-	-	-	-	-	-	823	905	-	920	924	-	
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-	
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327	
Pot Cap-1 Maneuver	762	-	-	761	-	-	67	76	320	67	85	367	
Stage 1	-	-	-	-	-	-	322	347	-	365	385	-	
Stage 2	-	-	-	-	-	-	366	354	-	323	347	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	732	-	-	710	-	-	56	65	284	53	73	343	
Mov Cap-2 Maneuver	-	-	-	-	-	-	163	173	-	157	184	-	
Stage 1	-	-	-	-	-	-	292	315	-	341	365	-	
Stage 2	-	-	-	-	-	-	333	335	-	266	315	-	
Approach	SE			NW			NE			SW			
HCM Control Delay, s	0.2			0.1			26.2			32.7			
HCM LOS							D			D			
Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1						
Capacity (veh/h)	217	710	-	-	732	-	-	184					
HCM Lane V/C Ratio	0.221	0.016	-	-	0.028	-	-	0.299					
HCM Control Delay (s)	26.2	10.2	-	-	10.1	-	-	32.7					
HCM Lane LOS	D	B	-	-	B	-	-	D					
HCM 95th %tile Q(veh)	0.8	0	-	-	0.1	-	-	1.2					

Intersection

Int Delay, s/veh 1.9

Movement SEL SET NWT NWR SWL SWR

Lane Configurations      

Traffic Vol, veh/h 34 744 703 23 54 97

Future Vol, veh/h 34 744 703 23 54 97

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Free Free Free Free Stop Stop

RT Channelized - None - None - None

Storage Length 0 - - - 0 0

Veh in Median Storage, # - 0 0 - 1 -

Grade, % - 0 0 - 0 -

Peak Hour Factor 98 98 98 98 98 98

Heavy Vehicles, % 3 3 3 3 3 3

Mvmt Flow 35 759 717 23 55 99

Major/Minor Major1 Major2 Minor2

Conflicting Flow All 740 0 - 0 1558 729

Stage 1 - - - - 729 -

Stage 2 - - - - 829 -

Critical Hdwy 4.13 - - - 6.43 6.23

Critical Hdwy Stg 1 - - - - 5.43 -

Critical Hdwy Stg 2 - - - - 5.43 -

Follow-up Hdwy 2.227 - - - 3.527 3.327

Pot Cap-1 Maneuver 862 - - - 123 421

Stage 1 - - - - 476 -

Stage 2 - - - - 427 -

Platoon blocked, % - - - -

Mov Cap-1 Maneuver 862 - - - 118 421

Mov Cap-2 Maneuver - - - - 255 -

Stage 1 - - - - 456 -

Stage 2 - - - - 427 -

Approach SE NW SW

HCM Control Delay, s 0.4 0 18.6

HCM LOS C

Minor Lane/Major Mvmt NWT NWR SEL SETSWLn1SWLn2

Capacity (veh/h) - - 862 - 255 421

HCM Lane V/C Ratio - - 0.04 - 0.216 0.235

HCM Control Delay (s) - - 9.4 - 23 16.2

HCM Lane LOS - - A - C C

HCM 95th %tile Q(veh) - - 0.1 - 0.8 0.9

HCM 6th Signalized Intersection Summary

18: Main St & Mitchell Dr/Pope Street

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	158	131	38	71	58	534	57	63	584	6
Future Volume (veh/h)	0	0	158	131	38	71	58	534	57	63	584	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	50	0	0	25	0
Ped-Bike Adj(A_pbT)	1.00		0.69	1.00		0.73	1.00		0.91	1.00		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1318	1856	1318	1318
Adj Flow Rate, veh/h	0	0	161	134	39	72	59	545	58	64	596	6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	0	122	163	220	64	176	104	681	22	106	711	3
Arrive On Green	0.00	0.00	0.07	0.17	0.17	0.17	0.06	0.49	0.49	0.07	0.49	0.49
Sat Flow, veh/h	0	1856	1083	1384	403	1145	1767	1158	123	1767	1302	13
Grp Volume(v), veh/h	0	0	161	173	0	72	59	0	603	64	0	602
Grp Sat Flow(s),veh/h/ln	0	1856	1083	1786	0	1145	1767	0	1281	1767	0	1315
Q Serve(g_s), s	0.0	0.0	9.0	10.8	0.0	6.7	3.9	0.0	54.9	4.3	0.0	52.0
Cycle Q Clear(g_c), s	0.0	0.0	9.0	10.8	0.0	6.7	3.9	0.0	54.9	4.3	0.0	52.0
Prop In Lane	0.00		1.00	0.77		1.00	1.00		0.10	1.00		0.01
Lane Grp Cap(c), veh/h	0	122	163	284	0	176	104	0	712	106	0	709
V/C Ratio(X)	0.00	0.00	0.99	0.61	0.00	0.41	0.57	0.00	0.85	0.60	0.00	0.85
Avail Cap(c_a), veh/h	0	137	181	514	0	330	364	0	791	364	0	811
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	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	0.0	0.0	60.5	53.5	0.0	51.7	62.6	0.0	31.4	62.6	0.0	30.9
Incr Delay (d2), s/veh	0.0	0.0	59.6	2.1	0.0	1.5	1.8	0.0	7.2	2.0	0.0	6.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	184.4	0.0	0.0	59.5
%ile BackOfQ(50%),veh/ln	0.0	0.0	8.3	5.8	0.0	2.3	2.1	0.0	60.9	2.3	0.0	35.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	120.1	55.6	0.0	53.2	64.4	0.0	222.9	64.6	0.0	97.3
LnGrp LOS	A	A	F	E	A	D	E	A	F	E	A	F
Approach Vol, veh/h		161			245			662			666	
Approach Delay, s/veh		120.1			54.9			208.8			94.2	
Approach LOS		F			D			F			F	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.5	67.6		28.8	11.7	67.4		13.7				
Change Period (Y+Rc), s	3.7	* 7.7		* 7.7	3.7	* 7.7		4.7				
Max Green Setting (Gmax), s	25.0	* 75		* 35	25.0	* 75		9.0				
Max Q Clear Time (g_c+I1), s	5.9	54.0		12.8	6.3	56.9		11.0				
Green Ext Time (p_c), s	0.1	2.8		1.4	0.1	2.8		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			134.8									
HCM 6th LOS			F									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary

19: Main St & Grayson Avenue/Mills

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	1	33	2	1	13	38	655	5	19	815	29
Future Volume (veh/h)	28	1	33	2	1	13	38	655	5	19	815	29
Initial Q (Qb), veh	0	0	0	0	0	0	0	30	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.93	1.00		0.95	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1856	1856	1318	1318
Adj Flow Rate, veh/h	28	1	33	2	1	13	38	662	5	19	823	29
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	46	2	55	45	23	56	95	944	5	35	866	31
Arrive On Green	0.07	0.07	0.07	0.04	0.04	0.04	0.06	0.71	0.71	0.02	0.68	0.68
Sat Flow, veh/h	718	26	846	1197	599	1488	1767	1306	10	1767	1264	45
Grp Volume(v), veh/h	62	0	0	3	0	13	38	0	667	19	0	852
Grp Sat Flow(s),veh/h/ln	1589	0	0	1796	0	1488	1767	0	1316	1767	0	1309
Q Serve(g_s), s	4.4	0.0	0.0	0.2	0.0	1.0	2.4	0.0	33.8	1.2	0.0	69.4
Cycle Q Clear(g_c), s	4.4	0.0	0.0	0.2	0.0	1.0	2.4	0.0	33.8	1.2	0.0	69.4
Prop In Lane	0.45		0.53	0.67		1.00	1.00		0.01	1.00		0.03
Lane Grp Cap(c), veh/h	103	0	0	68	0	56	95	0	950	35	0	897
V/C Ratio(X)	0.60	0.00	0.00	0.04	0.00	0.23	0.40	0.00	0.70	0.55	0.00	0.95
Avail Cap(c_a), veh/h	256	0	0	193	0	160	159	0	1089	85	0	1026
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	54.8	0.0	0.0	55.9	0.0	56.3	55.1	0.0	12.6	58.6	0.0	17.0
Incr Delay (d2), s/veh	5.6	0.0	0.0	0.1	0.0	0.8	1.0	0.0	1.7	13.0	0.0	16.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.1	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.0	0.0	0.1	0.0	0.4	1.1	0.0	21.1	0.7	0.0	22.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.4	0.0	0.0	56.0	0.0	57.0	56.1	0.0	38.5	71.5	0.0	33.3
LnGrp LOS	E	A	A	E	A	E	E	A	D	E	A	C
Approach Vol, veh/h	62			16			705			871		
Approach Delay, s/veh	60.4			56.8			39.4			34.1		
Approach LOS	E			E			D			C		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.8	86.8		12.0	11.0	82.6		9.1				
Change Period (Y+Rc), s	4.5	5.1		4.5	* 4.7	5.1		4.7				
Max Green Setting (Gmax), s	5.5	94.9		18.5	* 10	89.9		12.3				
Max Q Clear Time (g_c+I1), s	3.2	35.8		6.4	4.4	71.4		3.0				
Green Ext Time (p_c), s	0.0	5.3		0.2	0.0	6.1		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	37.6											
HCM 6th LOS	D											
Notes												

HCM 6th TWSC
41: Charter Oak & Main St

11-13-2019

Intersection												
Int Delay, s/veh	1.6											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	27	836	11	5	596	92	14	1	9	40	1	23
Future Vol, veh/h	27	836	11	5	596	92	14	1	9	40	1	23
Conflicting Peds, #/hr	25	0	25	25	0	25	25	0	25	25	0	25
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	28	853	11	5	608	94	14	1	9	41	1	23

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	727	0	0	889	0	0	1642	1677	909	1635	1635	705
Stage 1	-	-	-	-	-	-	940	940	-	690	690	-
Stage 2	-	-	-	-	-	-	702	737	-	945	945	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	872	-	-	758	-	-	79	95	332	80	100	435
Stage 1	-	-	-	-	-	-	315	341	-	434	445	-
Stage 2	-	-	-	-	-	-	427	423	-	313	339	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	851	-	-	740	-	-	69	87	316	72	92	415
Mov Cap-2 Maneuver	-	-	-	-	-	-	180	199	-	184	207	-
Stage 1	-	-	-	-	-	-	297	322	-	410	431	-
Stage 2	-	-	-	-	-	-	390	410	-	286	320	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0.3	0.1	23.8	26.6
HCM LOS			C	D

Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1
Capacity (veh/h)	216	740	-	-	851	-	231
HCM Lane V/C Ratio	0.113	0.007	-	-	0.032	-	0.283
HCM Control Delay (s)	23.8	9.9	-	-	9.4	-	26.6
HCM Lane LOS	C	A	-	-	A	-	D
HCM 95th %tile Q(veh)	0.4	0	-	-	0.1	-	1.1

Intersection

Int Delay, s/veh 0.9

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	39	799	660	11	21	49
Future Vol, veh/h	39	799	660	11	21	49
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	40	815	673	11	21	50

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	684	0	0 1574 679
Stage 1	-	-	- 679 -
Stage 2	-	-	- 895 -
Critical Hdwy	4.13	-	- 6.43 6.23
Critical Hdwy Stg 1	-	-	- 5.43 -
Critical Hdwy Stg 2	-	-	- 5.43 -
Follow-up Hdwy	2.227	-	- 3.527 3.327
Pot Cap-1 Maneuver	905	-	- 120 450
Stage 1	-	-	- 502 -
Stage 2	-	-	- 397 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	905	-	- 115 450
Mov Cap-2 Maneuver	-	-	- 250 -
Stage 1	-	-	- 480 -
Stage 2	-	-	- 397 -

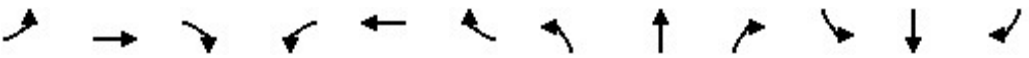
Approach	SE	NW	SW
HCM Control Delay, s	0.4	0	16
HCM LOS			C

Minor Lane/Major Mvmt	NWT	NWR	SEL	SETSWLn1SWLn2
Capacity (veh/h)	-	-	905	- 250 450
HCM Lane V/C Ratio	-	-	0.044	- 0.086 0.111
HCM Control Delay (s)	-	-	9.2	- 20.7 14
HCM Lane LOS	-	-	A	- C B
HCM 95th %tile Q(veh)	-	-	0.1	- 0.3 0.4

HCM 6th Signalized Intersection Summary

18: Main St & Mitchell Dr/Pope Street

11-15-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↩	↩		↩	↩	↩	↩		↩	↩	
Traffic Volume (veh/h)	0	0	172	202	40	150	80	615	81	100	525	10
Future Volume (veh/h)	0	0	172	202	40	150	80	615	81	100	525	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	50	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.90	1.00		0.91	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1318	1856	1318	1318
Adj Flow Rate, veh/h	0	0	185	217	43	161	86	661	87	108	565	11
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	0	114	181	234	46	226	105	701	34	128	743	14
Arrive On Green	0.00	0.00	0.06	0.16	0.16	0.16	0.06	0.56	0.56	0.07	0.58	0.58
Sat Flow, veh/h	0	1856	1419	1487	295	1436	1767	1136	150	1767	1289	25
Grp Volume(v), veh/h	0	0	185	260	0	161	86	0	748	108	0	576
Grp Sat Flow(s),veh/h/ln	0	1856	1419	1781	0	1436	1767	0	1286	1767	0	1314
Q Serve(g_s), s	0.0	0.0	10.1	23.6	0.0	17.4	7.9	0.0	92.3	9.9	0.0	54.2
Cycle Q Clear(g_c), s	0.0	0.0	10.1	23.6	0.0	17.4	7.9	0.0	92.3	9.9	0.0	54.2
Prop In Lane	0.00		1.00	0.83		1.00	1.00		0.12	1.00		0.02
Lane Grp Cap(c), veh/h	0	114	181	280	0	226	105	0	735	128	0	757
V/C Ratio(X)	0.00	0.00	1.02	0.93	0.00	0.71	0.82	0.00	1.02	0.84	0.00	0.76
Avail Cap(c_a), veh/h	0	114	181	286	0	231	197	0	724	197	0	757
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	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	0.0	0.0	72.3	68.1	0.0	65.5	76.2	0.0	35.8	75.1	0.0	26.2
Incr Delay (d2), s/veh	0.0	0.0	72.8	34.4	0.0	9.7	5.8	0.0	37.6	11.0	0.0	4.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	244.8	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	11.3	13.5	0.0	7.1	3.8	0.0	86.7	4.9	0.0	17.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	145.1	102.5	0.0	75.2	82.0	0.0	318.1	86.0	0.0	30.3
LnGrp LOS	A	A	F	F	A	E	F	A	F	F	A	C
Approach Vol, veh/h		185			421			834			684	
Approach Delay, s/veh		145.1			92.1			293.8			39.1	
Approach LOS		F			F			F			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.4	102.1		33.5	15.6	100.0		14.8				
Change Period (Y+Rc), s	3.7	* 7.7		* 7.7	3.7	* 7.7		4.7				
Max Green Setting (Gmax), s	18.3	* 89		* 26	18.3	* 92		10.1				
Max Q Clear Time (g_c+I1), s	9.9	56.2		25.6	11.9	94.3		12.1				
Green Ext Time (p_c), s	0.1	2.9		0.2	0.1	0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			158.8									
HCM 6th LOS			F									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary

19: Main St & Grayson Avenue/Mills

11-15-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	5	68	8	4	25	50	713	11	27	800	125
Future Volume (veh/h)	80	5	68	8	4	25	50	713	11	27	800	125
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.92	1.00		0.72	1.00		0.96	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1856	1856	1318	1318
Adj Flow Rate, veh/h	84	5	72	8	4	26	53	751	12	28	842	106
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	102	6	87	34	17	32	68	780	12	191	768	97
Arrive On Green	0.12	0.12	0.12	0.03	0.03	0.03	0.04	0.60	0.60	0.11	0.67	0.67
Sat Flow, veh/h	841	50	721	1197	599	1130	1767	1293	21	1767	1142	144
Grp Volume(v), veh/h	161	0	0	12	0	26	53	0	763	28	0	948
Grp Sat Flow(s),veh/h/ln	1612	0	0	1796	0	1130	1767	0	1314	1767	0	1286
Q Serve(g_s), s	13.3	0.0	0.0	0.9	0.0	3.1	4.1	0.0	75.1	2.0	0.0	91.9
Cycle Q Clear(g_c), s	13.3	0.0	0.0	0.9	0.0	3.1	4.1	0.0	75.1	2.0	0.0	91.9
Prop In Lane	0.52		0.45	0.67		1.00	1.00		0.02	1.00		0.11
Lane Grp Cap(c), veh/h	195	0	0	52	0	32	68	0	793	191	0	865
V/C Ratio(X)	0.83	0.00	0.00	0.23	0.00	0.80	0.78	0.00	0.96	0.15	0.00	1.10
Avail Cap(c_a), veh/h	230	0	0	135	0	85	120	0	932	191	0	865
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	58.6	0.0	0.0	64.9	0.0	65.9	65.1	0.0	25.6	55.2	0.0	22.3
Incr Delay (d2), s/veh	18.7	0.0	0.0	0.8	0.0	15.3	7.0	0.0	19.4	0.4	0.0	60.3
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	6.5	0.0	0.0	0.4	0.0	1.0	2.0	0.0	26.0	0.9	0.0	39.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	77.3	0.0	0.0	65.7	0.0	81.2	72.1	0.0	45.1	55.6	0.0	82.6
LnGrp LOS	E	A	A	E	A	F	E	A	D	E	A	F
Approach Vol, veh/h		161			38			816			976	
Approach Delay, s/veh		77.3			76.3			46.8			81.8	
Approach LOS		E			E			D			F	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	19.4	87.5		21.0	10.0	97.0		8.6				
Change Period (Y+Rc), s	4.7	* 5.1		4.5	4.7	* 5.1		4.7				
Max Green Setting (Gmax), s	4.5	* 97		19.5	9.3	* 92		10.3				
Max Q Clear Time (g_c+I1), s	4.0	77.1		15.3	6.1	93.9		5.1				
Green Ext Time (p_c), s	0.0	5.3		0.3	0.0	0.0		0.0				

Intersection Summary

HCM 6th Ctrl Delay 67.0

HCM 6th LOS E

Notes

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

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

HCM 6th TWSC
41: Charter Oak & Main St

11-15-2019

Intersection												
Int Delay, s/veh	3											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	12	889	25	44	696	90	20	2	38	43	2	9
Future Vol, veh/h	12	889	25	44	696	90	20	2	38	43	2	9
Conflicting Peds, #/hr	10	0	35	10	0	15	32	0	15	35	0	52
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	13	966	27	48	757	98	22	2	41	47	2	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	870	0	0	1028	0	0	2001	2007	1050	1979	1971	873
Stage 1	-	-	-	-	-	-	1041	1041	-	917	917	-
Stage 2	-	-	-	-	-	-	960	966	-	1062	1054	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	770	-	-	672	-	-	44	59	275	~ 46	62	348
Stage 1	-	-	-	-	-	-	277	306	-	325	349	-
Stage 2	-	-	-	-	-	-	307	332	-	269	302	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	759	-	-	650	-	-	36	51	257	~ 34	54	326
Mov Cap-2 Maneuver	-	-	-	-	-	-	133	156	-	113	149	-
Stage 1	-	-	-	-	-	-	263	291	-	315	319	-
Stage 2	-	-	-	-	-	-	260	303	-	213	287	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0.1	0.6	32.9	55
HCM LOS			D	F

Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1
Capacity (veh/h)	193	650	-	-	759	-	128
HCM Lane V/C Ratio	0.338	0.074	-	-	0.017	-	0.459
HCM Control Delay (s)	32.9	11	-	-	9.8	-	55
HCM Lane LOS	D	B	-	-	A	-	F
HCM 95th %tile Q(veh)	1.4	0.2	-	-	0.1	-	2.1

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

Intersection

Int Delay, s/veh 1.4

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	99	749	760	49	21	47
Future Vol, veh/h	99	749	760	49	21	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	108	814	826	53	23	51

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	879	0	0 1883 853
Stage 1	-	-	- 853 -
Stage 2	-	-	- 1030 -
Critical Hdwy	4.13	-	- 6.43 6.23
Critical Hdwy Stg 1	-	-	- 5.43 -
Critical Hdwy Stg 2	-	-	- 5.43 -
Follow-up Hdwy	2.227	-	- 3.527 3.327
Pot Cap-1 Maneuver	764	-	- 77 357
Stage 1	-	-	- 416 -
Stage 2	-	-	- 343 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	764	-	- 66 357
Mov Cap-2 Maneuver	-	-	- 190 -
Stage 1	-	-	- 357 -
Stage 2	-	-	- 343 -

Approach	SE	NW	SW
HCM Control Delay, s	1.2	0	19.8
HCM LOS			C

Minor Lane/Major Mvmt	NWT	NWR	SEL	SETSWLn1SWLn2
Capacity (veh/h)	-	-	764	- 190 357
HCM Lane V/C Ratio	-	-	0.141	- 0.12 0.143
HCM Control Delay (s)	-	-	10.5	- 26.5 16.8
HCM Lane LOS	-	-	B	- D C
HCM 95th %tile Q(veh)	-	-	0.5	- 0.4 0.5

HCM 6th Signalized Intersection Summary

18: Main St & Mitchell Dr/Pope Street

11-18-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	211	161	30	120	102	565	72	110	535	10
Future Volume (veh/h)	0	0	211	161	30	120	102	565	72	110	535	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	50	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.94	1.00		0.95	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1329	1329	1870	1329	1329
Adj Flow Rate, veh/h	0	0	224	171	32	128	109	601	77	117	569	11
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	122	216	210	39	206	133	687	29	141	712	14
Arrive On Green	0.00	0.00	0.07	0.14	0.14	0.14	0.07	0.54	0.54	0.08	0.54	0.54
Sat Flow, veh/h	0	1870	1500	1512	283	1483	1781	1147	147	1781	1298	25
Grp Volume(v), veh/h	0	0	224	203	0	128	109	0	678	117	0	580
Grp Sat Flow(s),veh/h/ln	0	1870	1500	1795	0	1483	1781	0	1294	1781	0	1323
Q Serve(g_s), s	0.0	0.0	9.0	14.7	0.0	10.9	8.1	0.0	68.5	8.7	0.0	48.1
Cycle Q Clear(g_c), s	0.0	0.0	9.0	14.7	0.0	10.9	8.1	0.0	68.5	8.7	0.0	48.1
Prop In Lane	0.00		1.00	0.84		1.00	1.00		0.11	1.00		0.02
Lane Grp Cap(c), veh/h	0	122	216	249	0	206	133	0	716	141	0	726
V/C Ratio(X)	0.00	0.00	1.04	0.81	0.00	0.62	0.82	0.00	0.95	0.83	0.00	0.80
Avail Cap(c_a), veh/h	0	125	219	468	0	387	332	0	723	332	0	739
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	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	0.0	0.0	59.4	57.6	0.0	55.9	62.9	0.0	31.4	62.6	0.0	25.0
Incr Delay (d2), s/veh	0.0	0.0	71.5	2.5	0.0	1.1	4.7	0.0	21.1	4.7	0.0	5.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	227.5	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	11.9	7.1	0.0	4.3	4.0	0.0	72.7	4.3	0.0	16.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	131.0	60.1	0.0	57.1	67.6	0.0	280.0	67.2	0.0	30.6
LnGrp LOS	A	A	F	E	A	E	E	A	F	E	A	C
Approach Vol, veh/h		224			331			787			697	
Approach Delay, s/veh		131.0			58.9			250.6			36.8	
Approach LOS		F			E			F			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.7	80.3		26.5	14.4	79.7		13.7				
Change Period (Y+Rc), s	3.7	* 7.7		* 7.7	3.7	* 7.7		4.7				
Max Green Setting (Gmax), s	25.0	* 75		* 35	25.0	* 75		9.0				
Max Q Clear Time (g_c+I1), s	10.1	50.1		16.7	10.7	70.5		11.0				
Green Ext Time (p_c), s	0.1	2.8		1.0	0.1	1.5		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			133.3									
HCM 6th LOS			F									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary

19: Main St & Grayson Avenue/Mills

11-18-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Traffic Volume (veh/h)	70	3	70	12	7	42	70	707	11	25	802	60
Future Volume (veh/h)	70	3	70	12	7	42	70	707	11	25	802	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.89	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1856	1856	1318	1318
Adj Flow Rate, veh/h	71	3	71	12	7	42	71	714	11	25	810	61
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	83	4	83	45	26	56	89	917	14	31	815	61
Arrive On Green	0.10	0.10	0.10	0.04	0.04	0.04	0.05	0.71	0.71	0.02	0.67	0.67
Sat Flow, veh/h	795	34	795	1136	663	1399	1767	1294	20	1767	1208	91
Grp Volume(v), veh/h	145	0	0	19	0	42	71	0	725	25	0	871
Grp Sat Flow(s),veh/h/ln	1623	0	0	1799	0	1399	1767	0	1314	1767	0	1299
Q Serve(g_s), s	12.8	0.0	0.0	1.5	0.0	4.3	5.8	0.0	52.1	2.0	0.0	96.2
Cycle Q Clear(g_c), s	12.8	0.0	0.0	1.5	0.0	4.3	5.8	0.0	52.1	2.0	0.0	96.2
Prop In Lane	0.49		0.49	0.63		1.00	1.00		0.02	1.00		0.07
Lane Grp Cap(c), veh/h	169	0	0	72	0	56	89	0	931	31	0	876
V/C Ratio(X)	0.86	0.00	0.00	0.26	0.00	0.75	0.80	0.00	0.78	0.80	0.00	0.99
Avail Cap(c_a), veh/h	184	0	0	136	0	106	110	0	931	43	0	876
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	63.9	0.0	0.0	67.6	0.0	69.0	68.2	0.0	13.7	71.0	0.0	23.4
Incr Delay (d2), s/veh	29.1	0.0	0.0	0.7	0.0	7.4	22.3	0.0	4.3	51.4	0.0	29.0
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	6.7	0.0	0.0	0.7	0.0	1.7	3.2	0.0	15.8	1.4	0.0	34.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	93.0	0.0	0.0	68.3	0.0	76.3	90.5	0.0	18.0	122.4	0.0	52.3
LnGrp LOS	F	A	A	E	A	E	F	A	B	F	A	D
Approach Vol, veh/h	145			61			796			896		
Approach Delay, s/veh	93.0			73.9			24.5			54.3		
Approach LOS	F			E			C			D		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.1	108.0		19.6	12.0	103.0		10.5				
Change Period (Y+Rc), s	4.5	5.1		4.5	* 4.7	5.1		4.7				
Max Green Setting (Gmax), s	3.5	100.9		16.5	* 9	97.9		11.0				
Max Q Clear Time (g_c+I1), s	4.0	54.1		14.8	7.8	98.2		6.3				
Green Ext Time (p_c), s	0.0	6.7		0.1	0.0	0.0		0.0				

Intersection Summary

HCM 6th Ctrl Delay 45.4

HCM 6th LOS D

Notes

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

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

HCM 6th TWSC
41: Charter Oak & Main St

11-13-2019

Intersection												
Int Delay, s/veh	2.2											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	20	829	3	12	682	170	22	4	29	40	3	17
Future Vol, veh/h	20	829	3	12	682	170	22	4	29	40	3	17
Conflicting Peds, #/hr	11	0	30	71	0	41	30	0	30	52	0	11
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	20	846	3	12	696	173	22	4	30	41	3	17
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	910	0	0	920	0	0	1806	1893	971	1805	1808	854
Stage 1	-	-	-	-	-	-	959	959	-	848	848	-
Stage 2	-	-	-	-	-	-	847	934	-	957	960	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	744	-	-	738	-	-	61	69	305	61	78	357
Stage 1	-	-	-	-	-	-	308	334	-	355	376	-
Stage 2	-	-	-	-	-	-	355	343	-	308	334	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	715	-	-	688	-	-	50	59	270	47	67	333
Mov Cap-2 Maneuver	-	-	-	-	-	-	154	165	-	147	176	-
Stage 1	-	-	-	-	-	-	279	303	-	332	355	-
Stage 2	-	-	-	-	-	-	318	324	-	250	303	-
Approach	SE			NW			NE			SW		
HCM Control Delay, s	0.2			0.1			29.9			36		
HCM LOS							D			E		
Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1					
Capacity (veh/h)	200	688	-	-	715	-	-	176				
HCM Lane V/C Ratio	0.281	0.018	-	-	0.029	-	-	0.348				
HCM Control Delay (s)	29.9	10.3	-	-	10.2	-	-	36				
HCM Lane LOS	D	B	-	-	B	-	-	E				
HCM 95th %tile Q(veh)	1.1	0.1	-	-	0.1	-	-	1.5				

Intersection						
Int Delay, s/veh	1.8					
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	30	795	717	25	53	94
Future Vol, veh/h	30	795	717	25	53	94
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	31	811	732	26	54	96
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	758	0	-	0	1618	745
Stage 1	-	-	-	-	745	-
Stage 2	-	-	-	-	873	-
Critical Hdwy	4.13	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	849	-	-	-	113	412
Stage 1	-	-	-	-	467	-
Stage 2	-	-	-	-	407	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	849	-	-	-	109	412
Mov Cap-2 Maneuver	-	-	-	-	245	-
Stage 1	-	-	-	-	450	-
Stage 2	-	-	-	-	407	-
Approach	SE	NW		SW		
HCM Control Delay, s	0.3	0		19.1		
HCM LOS	C					
Minor Lane/Major Mvmt		NWT	NWR	SEL	SETSWLn1	SWLn2
Capacity (veh/h)		-	-	849	-	245 412
HCM Lane V/C Ratio		-	-	0.036	-	0.221 0.233
HCM Control Delay (s)		-	-	9.4	-	23.8 16.4
HCM Lane LOS		-	-	A	-	C C
HCM 95th %tile Q(veh)		-	-	0.1	-	0.8 0.9

HCM 6th Signalized Intersection Summary

18: Main St & Mitchell Dr/Pope Street

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	160	131	40	80	60	545	61	70	604	10
Future Volume (veh/h)	0	0	160	131	40	80	60	545	61	70	604	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	50	0	0	25	0
Ped-Bike Adj(A_pbT)	1.00		0.69	1.00		0.72	1.00		0.91	1.00		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1318	1856	1318	1318
Adj Flow Rate, veh/h	0	0	163	134	41	82	61	556	62	71	616	10
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	0	121	162	216	66	174	104	686	24	108	714	4
Arrive On Green	0.00	0.00	0.07	0.17	0.17	0.17	0.06	0.50	0.50	0.07	0.50	0.50
Sat Flow, veh/h	0	1856	1080	1368	419	1137	1767	1152	128	1767	1292	21
Grp Volume(v), veh/h	0	0	163	175	0	82	61	0	618	71	0	626
Grp Sat Flow(s),veh/h/ln	0	1856	1080	1787	0	1137	1767	0	1280	1767	0	1313
Q Serve(g_s), s	0.0	0.0	9.0	11.3	0.0	8.1	4.2	0.0	58.1	4.9	0.0	56.5
Cycle Q Clear(g_c), s	0.0	0.0	9.0	11.3	0.0	8.1	4.2	0.0	58.1	4.9	0.0	56.5
Prop In Lane	0.00		1.00	0.77		1.00	1.00		0.10	1.00		0.02
Lane Grp Cap(c), veh/h	0	121	162	282	0	174	104	0	710	108	0	718
V/C Ratio(X)	0.00	0.00	1.00	0.62	0.00	0.47	0.59	0.00	0.87	0.66	0.00	0.87
Avail Cap(c_a), veh/h	0	133	177	500	0	318	353	0	767	353	0	787
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	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	0.0	0.0	61.2	54.3	0.0	52.9	63.3	0.0	31.5	63.4	0.0	31.3
Incr Delay (d2), s/veh	0.0	0.0	66.3	2.2	0.0	2.0	1.9	0.0	9.4	2.6	0.0	9.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	195.3	0.0	0.0	67.4
%ile BackOfQ(50%),veh/ln	0.0	0.0	8.7	5.9	0.0	2.7	2.2	0.0	63.4	2.5	0.0	38.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	127.5	56.5	0.0	54.8	65.2	0.0	236.2	65.9	0.0	107.9
LnGrp LOS	A	A	F	E	A	D	E	A	F	E	A	F
Approach Vol, veh/h		163			257			679			697	
Approach Delay, s/veh		127.5			56.0			220.9			103.6	
Approach LOS		F			E			F			F	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.6	70.8		29.0	11.9	70.5		13.7				
Change Period (Y+Rc), s	3.7	* 7.7		* 7.7	3.7	* 7.7		4.7				
Max Green Setting (Gmax), s	25.0	* 75		* 35	25.0	* 75		9.0				
Max Q Clear Time (g_c+I1), s	6.2	58.5		13.3	6.9	60.1		11.0				
Green Ext Time (p_c), s	0.1	2.8		1.4	0.1	2.7		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			143.3									
HCM 6th LOS			F									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary

19: Main St & Grayson Avenue/Mills

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	1	40	1	1	16	40	660	4	24	823	30
Future Volume (veh/h)	30	1	40	1	1	16	40	660	4	24	823	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	30	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.93	1.00		0.94	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1856	1856	1318	1318
Adj Flow Rate, veh/h	30	1	40	1	1	16	40	667	4	24	831	30
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	47	2	63	37	37	61	95	940	4	40	864	31
Arrive On Green	0.07	0.07	0.07	0.04	0.04	0.04	0.05	0.71	0.71	0.02	0.68	0.68
Sat Flow, veh/h	669	22	893	905	905	1484	1767	1309	8	1767	1263	46
Grp Volume(v), veh/h	71	0	0	2	0	16	40	0	671	24	0	861
Grp Sat Flow(s),veh/h/ln	1584	0	0	1810	0	1484	1767	0	1317	1767	0	1309
Q Serve(g_s), s	5.3	0.0	0.0	0.1	0.0	1.3	2.7	0.0	36.6	1.6	0.0	75.6
Cycle Q Clear(g_c), s	5.3	0.0	0.0	0.1	0.0	1.3	2.7	0.0	36.6	1.6	0.0	75.6
Prop In Lane	0.42		0.56	0.50		1.00	1.00		0.01	1.00		0.03
Lane Grp Cap(c), veh/h	111	0	0	74	0	61	95	0	944	40	0	895
V/C Ratio(X)	0.64	0.00	0.00	0.03	0.00	0.26	0.42	0.00	0.71	0.60	0.00	0.96
Avail Cap(c_a), veh/h	240	0	0	183	0	150	149	0	1025	80	0	965
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	56.9	0.0	0.0	57.9	0.0	58.5	57.6	0.0	13.6	60.9	0.0	18.4
Incr Delay (d2), s/veh	5.9	0.0	0.0	0.1	0.0	0.9	1.1	0.0	2.1	13.7	0.0	19.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.1	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.0	0.0	0.1	0.0	0.5	1.3	0.0	22.6	0.9	0.0	24.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.9	0.0	0.0	58.0	0.0	59.3	58.7	0.0	40.9	74.6	0.0	38.1
LnGrp LOS	E	A	A	E	A	E	E	A	D	E	A	D
Approach Vol, veh/h		71			18			711			885	
Approach Delay, s/veh		62.9			59.2			41.9			39.1	
Approach LOS		E			E			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.3	91.8		13.1	11.4	87.7		9.7				
Change Period (Y+Rc), s	4.5	5.1		4.5	* 4.7	5.1		4.7				
Max Green Setting (Gmax), s	5.5	94.9		18.5	* 10	89.9		12.3				
Max Q Clear Time (g_c+I1), s	3.6	38.6		7.3	4.7	77.6		3.3				
Green Ext Time (p_c), s	0.0	5.3		0.2	0.0	5.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			41.5									
HCM 6th LOS			D									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th TWSC
41: Charter Oak & Main St

11-13-2019

Intersection												
Int Delay, s/veh	1.8											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	30	859	11	7	591	105	17	1	11	44	1	27
Future Vol, veh/h	30	859	11	7	591	105	17	1	11	44	1	27
Conflicting Peds, #/hr	25	0	25	25	0	25	25	0	25	25	0	25
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	31	877	11	7	603	107	17	1	11	45	1	28
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	735	0	0	913	0	0	1680	1719	933	1672	1671	707
Stage 1	-	-	-	-	-	-	970	970	-	696	696	-
Stage 2	-	-	-	-	-	-	710	749	-	976	975	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	866	-	-	742	-	-	75	89	321	76	95	434
Stage 1	-	-	-	-	-	-	303	330	-	430	442	-
Stage 2	-	-	-	-	-	-	423	418	-	301	328	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	845	-	-	724	-	-	64	81	306	67	86	414
Mov Cap-2 Maneuver	-	-	-	-	-	-	172	191	-	175	199	-
Stage 1	-	-	-	-	-	-	285	310	-	404	427	-
Stage 2	-	-	-	-	-	-	381	404	-	272	308	-
Approach	SE			NW			NE			SW		
HCM Control Delay, s	0.3			0.1			25.3			28.7		
HCM LOS							D			D		
Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1					
Capacity (veh/h)	207	724	-	-	845	-	-	224				
HCM Lane V/C Ratio	0.143	0.01	-	-	0.036	-	-	0.328				
HCM Control Delay (s)	25.3	10	-	-	9.4	-	-	28.7				
HCM Lane LOS	D	B	-	-	A	-	-	D				
HCM 95th %tile Q(veh)	0.5	0	-	-	0.1	-	-	1.4				

Intersection						
Int Delay, s/veh	0.9					
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	36	833	672	22	21	47
Future Vol, veh/h	36	833	672	22	21	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	37	850	686	22	21	48
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	708	0	-	0	1621	697
Stage 1	-	-	-	-	697	-
Stage 2	-	-	-	-	924	-
Critical Hdwy	4.13	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	886	-	-	-	113	439
Stage 1	-	-	-	-	492	-
Stage 2	-	-	-	-	385	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	886	-	-	-	108	439
Mov Cap-2 Maneuver	-	-	-	-	242	-
Stage 1	-	-	-	-	471	-
Stage 2	-	-	-	-	385	-
Approach	SE	NW		SW		
HCM Control Delay, s	0.4	0		16.4		
HCM LOS	C					
Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1	SWLn2
Capacity (veh/h)	-	-	886	-	242	439
HCM Lane V/C Ratio	-	-	0.041	-	0.089	0.109
HCM Control Delay (s)	-	-	9.2	-	21.3	14.2
HCM Lane LOS	-	-	A	-	C	B
HCM 95th %tile Q(veh)	-	-	0.1	-	0.3	0.4

HCM 6th Signalized Intersection Summary

18: Main St & Mitchell Dr/Pope Street

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	170	177	33	122	77	610	51	76	474	4
Future Volume (veh/h)	0	0	170	177	33	122	77	610	51	76	474	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	50	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.91	1.00		0.91	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1318	1856	1318	1318
Adj Flow Rate, veh/h	0	0	183	190	35	131	83	656	55	82	510	4
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	0	121	192	233	43	222	111	692	21	110	711	6
Arrive On Green	0.00	0.00	0.07	0.15	0.15	0.15	0.06	0.54	0.54	0.06	0.54	0.54
Sat Flow, veh/h	0	1856	1428	1503	277	1434	1767	1196	100	1767	1306	10
Grp Volume(v), veh/h	0	0	183	225	0	131	83	0	711	82	0	514
Grp Sat Flow(s),veh/h/ln	0	1856	1428	1780	0	1434	1767	0	1297	1767	0	1316
Q Serve(g_s), s	0.0	0.0	9.0	16.8	0.0	11.7	6.4	0.0	75.0	6.3	0.0	40.2
Cycle Q Clear(g_c), s	0.0	0.0	9.0	16.8	0.0	11.7	6.4	0.0	75.0	6.3	0.0	40.2
Prop In Lane	0.00		1.00	0.84		1.00	1.00		0.08	1.00		0.01
Lane Grp Cap(c), veh/h	0	121	192	276	0	222	111	0	713	110	0	717
V/C Ratio(X)	0.00	0.00	0.95	0.82	0.00	0.59	0.75	0.00	1.00	0.74	0.00	0.72
Avail Cap(c_a), veh/h	0	121	192	452	0	365	321	0	706	321	0	717
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	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	0.0	0.0	59.9	56.3	0.0	54.1	63.5	0.0	31.4	63.5	0.0	23.5
Incr Delay (d2), s/veh	0.0	0.0	51.3	5.9	0.0	2.5	3.8	0.0	32.9	3.7	0.0	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	250.9	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	9.1	8.1	0.0	4.4	3.0	0.0	79.4	3.0	0.0	13.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	111.2	62.2	0.0	56.6	67.3	0.0	315.2	67.1	0.0	26.4
LnGrp LOS	A	A	F	E	A	E	E	A	F	E	A	C
Approach Vol, veh/h		183			356			794			596	
Approach Delay, s/veh		111.2			60.1			289.3			32.0	
Approach LOS		F			E			F			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.3	82.7		29.0	12.3	82.7		13.7				
Change Period (Y+Rc), s	3.7	* 7.7		* 7.7	3.7	* 7.7		4.7				
Max Green Setting (Gmax), s	25.0	* 75		* 35	25.0	* 75		9.0				
Max Q Clear Time (g_c+I1), s	8.4	42.2		18.8	8.3	77.0		11.0				
Green Ext Time (p_c), s	0.1	2.5		1.7	0.1	0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			150.6									
HCM 6th LOS			F									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary

19: Main St & Grayson Avenue/Mills

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	4	60	8	5	19	45	692	12	23	728	120
Future Volume (veh/h)	70	4	60	8	5	19	45	692	12	23	728	120
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.92	1.00		0.68	1.00		0.96	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1856	1856	1318	1318
Adj Flow Rate, veh/h	74	4	63	8	5	20	47	728	13	24	766	68
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	101	5	86	26	16	25	60	764	14	192	793	70
Arrive On Green	0.12	0.12	0.12	0.02	0.02	0.02	0.03	0.59	0.59	0.11	0.67	0.67
Sat Flow, veh/h	846	46	720	1108	692	1064	1767	1290	23	1767	1189	106
Grp Volume(v), veh/h	141	0	0	13	0	20	47	0	741	24	0	834
Grp Sat Flow(s),veh/h/ln	1611	0	0	1800	0	1064	1767	0	1313	1767	0	1294
Q Serve(g_s), s	10.3	0.0	0.0	0.9	0.0	2.3	3.2	0.0	64.1	1.5	0.0	73.4
Cycle Q Clear(g_c), s	10.3	0.0	0.0	0.9	0.0	2.3	3.2	0.0	64.1	1.5	0.0	73.4
Prop In Lane	0.52		0.45	0.62		1.00	1.00		0.02	1.00		0.08
Lane Grp Cap(c), veh/h	192	0	0	43	0	25	60	0	778	192	0	863
V/C Ratio(X)	0.74	0.00	0.00	0.30	0.00	0.79	0.78	0.00	0.95	0.13	0.00	0.97
Avail Cap(c_a), veh/h	259	0	0	153	0	90	135	0	1047	192	0	979
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	51.7	0.0	0.0	58.3	0.0	59.0	58.2	0.0	23.2	48.9	0.0	19.0
Incr Delay (d2), s/veh	7.1	0.0	0.0	1.5	0.0	18.3	7.8	0.0	14.9	0.3	0.0	19.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	0.0	0.0	0.4	0.0	0.7	1.6	0.0	21.3	0.7	0.0	23.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.7	0.0	0.0	59.8	0.0	77.4	66.1	0.0	38.0	49.2	0.0	38.9
LnGrp LOS	E	A	A	E	A	E	E	A	D	D	A	D
Approach Vol, veh/h	141				33				788		858	
Approach Delay, s/veh	58.7				70.4				39.7		39.2	
Approach LOS	E				E				D		D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	17.9	77.1		19.0	8.8	86.1		7.6				
Change Period (Y+Rc), s	4.7	* 5.1		4.5	4.7	* 5.1		4.7				
Max Green Setting (Gmax), s	4.5	* 97		19.5	9.3	* 92		10.3				
Max Q Clear Time (g_c+I1), s	3.5	66.1		12.3	5.2	75.4		4.3				
Green Ext Time (p_c), s	0.0	5.8		0.4	0.0	5.6		0.0				

Intersection Summary

HCM 6th Ctrl Delay 41.5

HCM 6th LOS D

Notes

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

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

HCM 6th TWSC
41: Charter Oak & Main St

11-13-2019

Intersection												
Int Delay, s/veh	2.1											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	9	814	22	43	666	87	11	2	35	35	2	8
Future Vol, veh/h	9	814	22	43	666	87	11	2	35	35	2	8
Conflicting Peds, #/hr	10	0	35	10	0	15	32	0	15	35	0	52
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	10	885	24	47	724	95	12	2	38	38	2	9
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	834	0	0	944	0	0	1875	1880	967	1853	1845	839
Stage 1	-	-	-	-	-	-	952	952	-	881	881	-
Stage 2	-	-	-	-	-	-	923	928	-	972	964	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	795	-	-	723	-	-	54	71	307	56	74	364
Stage 1	-	-	-	-	-	-	310	337	-	340	363	-
Stage 2	-	-	-	-	-	-	322	345	-	302	332	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	784	-	-	699	-	-	45	62	287	43	65	341
Mov Cap-2 Maneuver	-	-	-	-	-	-	148	172	-	132	166	-
Stage 1	-	-	-	-	-	-	296	321	-	331	334	-
Stage 2	-	-	-	-	-	-	276	317	-	248	317	-
Approach	SE			NW			NE			SW		
HCM Control Delay, s	0.1			0.6			25.1			40.2		
HCM LOS							D			E		
Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1					
Capacity (veh/h)	231	699	-	-	784	-	-	150				
HCM Lane V/C Ratio	0.226	0.067	-	-	0.012	-	-	0.326				
HCM Control Delay (s)	25.1	10.5	-	-	9.7	-	-	40.2				
HCM Lane LOS	D	B	-	-	A	-	-	E				
HCM 95th %tile Q(veh)	0.8	0.2	-	-	0	-	-	1.3				

Intersection

Int Delay, s/veh 1

Movement SEL SET NWT NWR SWL SWR

Lane Configurations      

Traffic Vol, veh/h 80 688 739 37 11 35

Future Vol, veh/h 80 688 739 37 11 35

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Free Free Free Free Stop Stop

RT Channelized - None - None - None

Storage Length 0 - - - 0 0

Veh in Median Storage, # - 0 0 - 1 -

Grade, % - 0 0 - 0 -

Peak Hour Factor 92 92 92 92 92 92

Heavy Vehicles, % 3 3 3 3 3 3

Mvmt Flow 87 748 803 40 12 38

Major/Minor Major1 Major2 Minor2

Conflicting Flow All 843 0 - 0 1745 823

Stage 1 - - - - 823 -

Stage 2 - - - - 922 -

Critical Hdwy 4.13 - - - 6.43 6.23

Critical Hdwy Stg 1 - - - - 5.43 -

Critical Hdwy Stg 2 - - - - 5.43 -

Follow-up Hdwy 2.227 - - - 3.527 3.327

Pot Cap-1 Maneuver 789 - - - 94 372

Stage 1 - - - - 430 -

Stage 2 - - - - 386 -

Platoon blocked, % - - - -

Mov Cap-1 Maneuver 789 - - - 84 372

Mov Cap-2 Maneuver - - - - 214 -

Stage 1 - - - - 383 -

Stage 2 - - - - 386 -

Approach SE NW SW

HCM Control Delay, s 1.1 0 17.5

HCM LOS C

Minor Lane/Major Mvmt NWT NWR SEL SETSWLn1SWLn2

Capacity (veh/h) - - 789 - 214 372

HCM Lane V/C Ratio - - 0.11 - 0.056 0.102

HCM Control Delay (s) - - 10.1 - 22.8 15.8

HCM Lane LOS - - B - C C

HCM 95th %tile Q(veh) - - 0.4 - 0.2 0.3

HCM 6th Signalized Intersection Summary

18: Main St & Mitchell Dr/Pope Street

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	193	140	26	91	86	558	53	85	523	4
Future Volume (veh/h)	0	0	193	140	26	91	86	558	53	85	523	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	50	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.93	1.00		0.95	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1329	1329	1870	1329	1329
Adj Flow Rate, veh/h	0	0	205	149	28	97	91	594	56	90	556	4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	126	204	193	36	189	116	719	22	116	739	5
Arrive On Green	0.00	0.00	0.08	0.13	0.13	0.13	0.07	0.52	0.52	0.07	0.52	0.52
Sat Flow, veh/h	0	1870	1510	1511	284	1479	1781	1190	112	1781	1317	9
Grp Volume(v), veh/h	0	0	205	177	0	97	91	0	650	90	0	560
Grp Sat Flow(s),veh/h/ln	0	1870	1510	1795	0	1479	1781	0	1302	1781	0	1327
Q Serve(g_s), s	0.0	0.0	9.0	11.3	0.0	7.2	5.9	0.0	56.9	5.9	0.0	41.7
Cycle Q Clear(g_c), s	0.0	0.0	9.0	11.3	0.0	7.2	5.9	0.0	56.9	5.9	0.0	41.7
Prop In Lane	0.00		1.00	0.84		1.00	1.00		0.09	1.00		0.01
Lane Grp Cap(c), veh/h	0	126	204	230	0	189	116	0	741	116	0	745
V/C Ratio(X)	0.00	0.00	1.00	0.77	0.00	0.51	0.79	0.00	0.88	0.78	0.00	0.75
Avail Cap(c_a), veh/h	0	142	228	528	0	435	374	0	821	374	0	837
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	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	0.0	0.0	58.1	56.3	0.0	54.4	61.5	0.0	29.3	61.5	0.0	22.2
Incr Delay (d2), s/veh	0.0	0.0	57.7	2.1	0.0	0.8	4.4	0.0	9.2	4.2	0.0	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	187.7	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	10.2	6.0	0.0	3.1	3.2	0.0	63.5	3.2	0.0	13.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	115.8	58.4	0.0	55.2	65.9	0.0	226.2	65.7	0.0	25.0
LnGrp LOS	A	A	F	E	A	E	E	A	F	E	A	C
Approach Vol, veh/h		205			274			741			650	
Approach Delay, s/veh		115.8			57.3			206.5			30.7	
Approach LOS		F			E			F			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.3	69.5		23.5	12.2	69.5		13.7				
Change Period (Y+Rc), s	3.7	* 7.7		* 7.7	3.7	* 7.7		4.7				
Max Green Setting (Gmax), s	25.0	* 75		* 35	25.0	* 75		9.0				
Max Q Clear Time (g_c+I1), s	7.9	43.7		13.3	7.9	58.9		11.0				
Green Ext Time (p_c), s	0.1	2.7		0.9	0.1	2.9		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			113.6									
HCM 6th LOS			F									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary

19: Main St & Grayson Avenue/Mills

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	3	43	12	5	29	56	702	11	17	717	56
Future Volume (veh/h)	55	3	43	12	5	29	56	702	11	17	717	56
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.94	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1856	1856	1318	1318
Adj Flow Rate, veh/h	56	3	43	12	5	29	57	709	11	17	724	57
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	79	4	60	89	37	104	110	872	14	32	755	59
Arrive On Green	0.09	0.09	0.09	0.07	0.07	0.07	0.06	0.67	0.67	0.02	0.63	0.63
Sat Flow, veh/h	899	48	690	1265	527	1482	1767	1294	20	1767	1203	95
Grp Volume(v), veh/h	102	0	0	17	0	29	57	0	720	17	0	781
Grp Sat Flow(s),veh/h/ln	1637	0	0	1792	0	1482	1767	0	1314	1767	0	1298
Q Serve(g_s), s	7.6	0.0	0.0	1.1	0.0	2.3	3.9	0.0	49.4	1.2	0.0	70.2
Cycle Q Clear(g_c), s	7.6	0.0	0.0	1.1	0.0	2.3	3.9	0.0	49.4	1.2	0.0	70.2
Prop In Lane	0.55		0.42	0.71		1.00	1.00		0.02	1.00		0.07
Lane Grp Cap(c), veh/h	143	0	0	126	0	104	110	0	885	32	0	815
V/C Ratio(X)	0.71	0.00	0.00	0.14	0.00	0.28	0.52	0.00	0.81	0.54	0.00	0.96
Avail Cap(c_a), veh/h	237	0	0	159	0	132	132	0	1020	72	0	962
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	55.4	0.0	0.0	54.5	0.0	55.0	56.7	0.0	14.7	60.8	0.0	21.7
Incr Delay (d2), s/veh	6.4	0.0	0.0	0.2	0.0	0.5	1.4	0.0	4.5	13.6	0.0	18.2
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	3.4	0.0	0.0	0.5	0.0	0.9	1.8	0.0	14.9	0.7	0.0	24.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.8	0.0	0.0	54.7	0.0	55.6	58.1	0.0	19.2	74.4	0.0	39.9
LnGrp LOS	E	A	A	D	A	E	E	A	B	E	A	D
Approach Vol, veh/h		102			46			777			798	
Approach Delay, s/veh		61.8			55.2			22.1			40.6	
Approach LOS		E			E			C			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.7	89.2		15.4	12.5	83.5		13.5				
Change Period (Y+Rc), s	4.5	5.1		4.5	* 4.7	5.1		4.7				
Max Green Setting (Gmax), s	5.1	96.9		18.1	* 9.3	92.5		11.1				
Max Q Clear Time (g_c+l1), s	3.2	51.4		9.6	5.9	72.2		4.3				
Green Ext Time (p_c), s	0.0	6.6		0.3	0.0	6.2		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				33.9								
HCM 6th LOS				C								
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th TWSC
41: Charter Oak & Main St

11-13-2019

Intersection												
Int Delay, s/veh	2.2											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	25	779	2	11	647	162	16	4	26	44	3	19
Future Vol, veh/h	25	779	2	11	647	162	16	4	26	44	3	19
Conflicting Peds, #/hr	11	0	30	71	0	41	30	0	30	52	0	11
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	26	795	2	11	660	165	16	4	27	45	3	19
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	866	0	0	868	0	0	1725	1807	919	1722	1726	814
Stage 1	-	-	-	-	-	-	919	919	-	806	806	-
Stage 2	-	-	-	-	-	-	806	888	-	916	920	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	773	-	-	772	-	-	69	79	327	70	88	376
Stage 1	-	-	-	-	-	-	324	349	-	374	393	-
Stage 2	-	-	-	-	-	-	374	360	-	325	348	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	743	-	-	720	-	-	56	67	290	55	75	351
Mov Cap-2 Maneuver	-	-	-	-	-	-	163	174	-	159	186	-
Stage 1	-	-	-	-	-	-	292	314	-	347	372	-
Stage 2	-	-	-	-	-	-	335	341	-	267	313	-
Approach	SE			NW			NE			SW		
HCM Control Delay, s	0.3			0.1			26			34		
HCM LOS							D			D		
Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1					
Capacity (veh/h)	218	720	-	-	743	-	-	190				
HCM Lane V/C Ratio	0.215	0.016	-	-	0.034	-	-	0.354				
HCM Control Delay (s)	26	10.1	-	-	10	-	-	34				
HCM Lane LOS	D	B	-	-	B	-	-	D				
HCM 95th %tile Q(veh)	0.8	0	-	-	0.1	-	-	1.5				

Intersection

Int Delay, s/veh 1.5

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	23	741	711	14	42	82
Future Vol, veh/h	23	741	711	14	42	82
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	23	756	726	14	43	84

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	740	0	0 1535 733
Stage 1	-	-	- 733 -
Stage 2	-	-	- 802 -
Critical Hdwy	4.13	-	- 6.43 6.23
Critical Hdwy Stg 1	-	-	- 5.43 -
Critical Hdwy Stg 2	-	-	- 5.43 -
Follow-up Hdwy	2.227	-	- 3.527 3.327
Pot Cap-1 Maneuver	862	-	- 127 419
Stage 1	-	-	- 474 -
Stage 2	-	-	- 440 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	862	-	- 124 419
Mov Cap-2 Maneuver	-	-	- 262 -
Stage 1	-	-	- 461 -
Stage 2	-	-	- 440 -

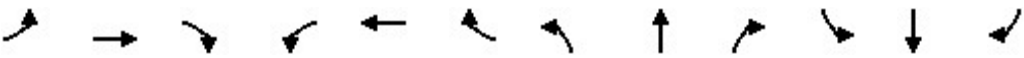
Approach	SE	NW	SW
HCM Control Delay, s	0.3	0	17.6
HCM LOS			C

Minor Lane/Major Mvmt	NWT	NWR	SEL	SETSWLn1SWLn2
Capacity (veh/h)	-	-	862	- 262 419
HCM Lane V/C Ratio	-	-	0.027	- 0.164 0.2
HCM Control Delay (s)	-	-	9.3	- 21.4 15.7
HCM Lane LOS	-	-	A	- C C
HCM 95th %tile Q(veh)	-	-	0.1	- 0.6 0.7

HCM 6th Signalized Intersection Summary

18: Main St & Mitchell Dr/Pope Street

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↩	↩		↩	↩	↩	↩		↩	↩	
Traffic Volume (veh/h)	0	0	154	129	38	71	58	515	56	63	568	6
Future Volume (veh/h)	0	0	154	129	38	71	58	515	56	63	568	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	50	0	0	25	0
Ped-Bike Adj(A_pbT)	1.00		0.69	1.00		0.73	1.00		0.91	1.00		0.92
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1318	1856	1318	1318
Adj Flow Rate, veh/h	0	0	157	132	39	72	59	526	57	64	580	6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	0	124	165	220	65	178	105	673	22	107	705	3
Arrive On Green	0.00	0.00	0.08	0.18	0.18	0.18	0.07	0.48	0.48	0.07	0.48	0.48
Sat Flow, veh/h	0	1856	1086	1379	407	1153	1767	1155	125	1767	1301	13
Grp Volume(v), veh/h	0	0	157	171	0	72	59	0	583	64	0	586
Grp Sat Flow(s),veh/h/ln	0	1856	1086	1787	0	1153	1767	0	1280	1767	0	1315
Q Serve(g_s), s	0.0	0.0	9.0	10.3	0.0	6.5	3.8	0.0	51.4	4.1	0.0	49.3
Cycle Q Clear(g_c), s	0.0	0.0	9.0	10.3	0.0	6.5	3.8	0.0	51.4	4.1	0.0	49.3
Prop In Lane	0.00		1.00	0.77		1.00	1.00		0.10	1.00		0.01
Lane Grp Cap(c), veh/h	0	124	165	286	0	178	105	0	712	107	0	697
V/C Ratio(X)	0.00	0.00	0.95	0.60	0.00	0.41	0.56	0.00	0.82	0.60	0.00	0.84
Avail Cap(c_a), veh/h	0	142	186	531	0	343	375	0	816	375	0	837
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	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	0.0	0.0	59.6	52.8	0.0	51.1	61.9	0.0	31.3	61.9	0.0	30.7
Incr Delay (d2), s/veh	0.0	0.0	48.2	2.0	0.0	1.5	1.8	0.0	5.1	2.0	0.0	5.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	171.5	0.0	0.0	58.2
%ile BackOfQ(50%),veh/ln	0.0	0.0	7.6	5.6	0.0	2.3	2.0	0.0	58.0	2.2	0.0	33.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	107.7	54.8	0.0	52.6	63.7	0.0	207.9	63.9	0.0	94.5
LnGrp LOS	A	A	F	D	A	D	E	A	F	E	A	F
Approach Vol, veh/h		157			243			642			650	
Approach Delay, s/veh		107.7			54.2			194.7			91.5	
Approach LOS		F			D			F			F	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.4	64.1		28.5	11.6	63.9		13.7				
Change Period (Y+Rc), s	3.7	* 7.7		* 7.7	3.7	* 7.7		4.7				
Max Green Setting (Gmax), s	25.0	* 75		* 35	25.0	* 75		9.0				
Max Q Clear Time (g_c+I1), s	5.8	51.3		12.3	6.1	53.4		11.0				
Green Ext Time (p_c), s	0.1	2.8		1.4	0.1	2.8		0.0				

Intersection Summary

HCM 6th Ctrl Delay 126.8

HCM 6th LOS F

Notes

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

HCM 6th Signalized Intersection Summary

19: Main St & Grayson Avenue/Mills

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	1	32	2	1	8	34	642	5	16	798	28
Future Volume (veh/h)	25	1	32	2	1	8	34	642	5	16	798	28
Initial Q (Qb), veh	0	0	0	0	0	0	0	30	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.93	1.00		0.95	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1856	1856	1318	1318
Adj Flow Rate, veh/h	25	1	32	2	1	8	34	648	5	16	806	28
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	43	2	55	34	17	42	93	944	6	31	865	30
Arrive On Green	0.06	0.06	0.06	0.03	0.03	0.03	0.05	0.71	0.71	0.02	0.67	0.67
Sat Flow, veh/h	682	27	873	1197	599	1495	1767	1306	10	1767	1265	44
Grp Volume(v), veh/h	58	0	0	3	0	8	34	0	653	16	0	834
Grp Sat Flow(s),veh/h/ln	1582	0	0	1796	0	1495	1767	0	1316	1767	0	1309
Q Serve(g_s), s	3.7	0.0	0.0	0.2	0.0	0.5	1.9	0.0	29.7	0.9	0.0	59.9
Cycle Q Clear(g_c), s	3.7	0.0	0.0	0.2	0.0	0.5	1.9	0.0	29.7	0.9	0.0	59.9
Prop In Lane	0.43		0.55	0.67		1.00	1.00		0.01	1.00		0.03
Lane Grp Cap(c), veh/h	99	0	0	51	0	42	93	0	949	31	0	896
V/C Ratio(X)	0.58	0.00	0.00	0.06	0.00	0.19	0.37	0.00	0.69	0.52	0.00	0.93
Avail Cap(c_a), veh/h	285	0	0	215	0	179	177	0	1215	95	0	1145
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	50.9	0.0	0.0	52.8	0.0	53.0	51.1	0.0	11.5	54.4	0.0	15.2
Incr Delay (d2), s/veh	5.3	0.0	0.0	0.2	0.0	0.8	0.9	0.0	1.1	12.7	0.0	11.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	0.0	0.1	0.0	0.2	0.9	0.0	19.0	0.6	0.0	18.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.3	0.0	0.0	53.0	0.0	53.8	52.0	0.0	35.6	67.1	0.0	26.6
LnGrp LOS	E	A	A	D	A	D	D	A	D	E	A	C
Approach Vol, veh/h	58			11			687			850		
Approach Delay, s/veh	56.3			53.6			36.4			27.4		
Approach LOS	E			D			D			C		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.3	77.8		11.0	10.3	73.8		7.7				
Change Period (Y+Rc), s	4.5	5.1		4.5	* 4.7	5.1		4.7				
Max Green Setting (Gmax), s	5.5	94.9		18.5	* 10	89.9		12.3				
Max Q Clear Time (g_c+I1), s	2.9	31.7		5.7	3.9	61.9		2.5				
Green Ext Time (p_c), s	0.0	5.1		0.2	0.0	6.9		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			32.5									
HCM 6th LOS			C									
Notes												

HCM 6th TWSC
41: Charter Oak & Main St

11-13-2019

Intersection												
Int Delay, s/veh	1.8											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	33	810	11	5	571	98	14	1	9	46	1	28
Future Vol, veh/h	33	810	11	5	571	98	14	1	9	46	1	28
Conflicting Peds, #/hr	25	0	25	25	0	25	25	0	25	25	0	25
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	34	827	11	5	583	100	14	1	9	47	1	29

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	708	0	0	863	0	0	1609	1644	883	1599	1599	683
Stage 1	-	-	-	-	-	-	926	926	-	668	668	-
Stage 2	-	-	-	-	-	-	683	718	-	931	931	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	886	-	-	775	-	-	84	99	343	85	106	448
Stage 1	-	-	-	-	-	-	321	346	-	446	455	-
Stage 2	-	-	-	-	-	-	438	432	-	319	344	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	865	-	-	757	-	-	72	90	327	76	96	427
Mov Cap-2 Maneuver	-	-	-	-	-	-	182	202	-	188	211	-
Stage 1	-	-	-	-	-	-	301	325	-	418	441	-
Stage 2	-	-	-	-	-	-	395	419	-	290	323	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0.4	0.1	23.5	27.1
HCM LOS			C	D

Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1
Capacity (veh/h)	219	757	-	-	865	-	238
HCM Lane V/C Ratio	0.112	0.007	-	-	0.039	-	0.322
HCM Control Delay (s)	23.5	9.8	-	-	9.3	-	27.1
HCM Lane LOS	C	A	-	-	A	-	D
HCM 95th %tile Q(veh)	0.4	0	-	-	0.1	-	1.3

Intersection						
Int Delay, s/veh	0.5					
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	20	800	668	11	13	24
Future Vol, veh/h	20	800	668	11	13	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	20	816	682	11	13	24
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	693	0	-	0	1544	688
Stage 1	-	-	-	-	688	-
Stage 2	-	-	-	-	856	-
Critical Hdwy	4.13	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	898	-	-	-	126	445
Stage 1	-	-	-	-	497	-
Stage 2	-	-	-	-	415	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	898	-	-	-	123	445
Mov Cap-2 Maneuver	-	-	-	-	260	-
Stage 1	-	-	-	-	486	-
Stage 2	-	-	-	-	415	-
Approach	SE	NW		SW		
HCM Control Delay, s	0.2	0		15.7		
HCM LOS	C					
Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1	SWLn2
Capacity (veh/h)	-	-	898	-	260	445
HCM Lane V/C Ratio	-	-	0.023	-	0.051	0.055
HCM Control Delay (s)	-	-	9.1	-	19.6	13.6
HCM Lane LOS	-	-	A	-	C	B
HCM 95th %tile Q(veh)	-	-	0.1	-	0.2	0.2

HCM 6th Signalized Intersection Summary

18: Main St & Mitchell Dr/Pope Street

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	175	182	33	122	78	625	52	76	499	4
Future Volume (veh/h)	0	0	175	182	33	122	78	625	52	76	499	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	50	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.91	1.00		0.91	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1318	1856	1318	1318
Adj Flow Rate, veh/h	0	0	188	196	35	131	84	672	56	82	537	4
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	0	121	191	237	42	226	111	690	21	110	709	5
Arrive On Green	0.00	0.00	0.07	0.16	0.16	0.16	0.06	0.54	0.54	0.06	0.54	0.54
Sat Flow, veh/h	0	1856	1428	1510	270	1436	1767	1197	100	1767	1307	10
Grp Volume(v), veh/h	0	0	188	231	0	131	84	0	728	82	0	541
Grp Sat Flow(s),veh/h/ln	0	1856	1428	1780	0	1436	1767	0	1297	1767	0	1317
Q Serve(g_s), s	0.0	0.0	9.0	17.4	0.0	11.7	6.5	0.0	75.0	6.3	0.0	44.0
Cycle Q Clear(g_c), s	0.0	0.0	9.0	17.4	0.0	11.7	6.5	0.0	75.0	6.3	0.0	44.0
Prop In Lane	0.00		1.00	0.85		1.00	1.00		0.08	1.00		0.01
Lane Grp Cap(c), veh/h	0	121	191	280	0	226	111	0	711	110	0	715
V/C Ratio(X)	0.00	0.00	0.98	0.83	0.00	0.58	0.76	0.00	1.02	0.74	0.00	0.76
Avail Cap(c_a), veh/h	0	121	191	451	0	364	320	0	704	320	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)	0.00	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	0.0	0.0	60.3	56.4	0.0	54.0	63.7	0.0	31.6	63.7	0.0	24.5
Incr Delay (d2), s/veh	0.0	0.0	59.5	6.6	0.0	2.4	4.0	0.0	39.8	3.7	0.0	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	253.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	9.8	8.4	0.0	4.4	3.1	0.0	81.0	3.0	0.0	14.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	119.8	63.0	0.0	56.3	67.7	0.0	324.4	67.4	0.0	28.7
LnGrp LOS	A	A	F	E	A	E	E	A	F	E	A	C
Approach Vol, veh/h		188			362			812			623	
Approach Delay, s/veh		119.8			60.6			297.9			33.8	
Approach LOS		F			E			F			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.3	82.7		29.4	12.3	82.7		13.7				
Change Period (Y+Rc), s	3.7	* 7.7		* 7.7	3.7	* 7.7		4.7				
Max Green Setting (Gmax), s	25.0	* 75		* 35	25.0	* 75		9.0				
Max Q Clear Time (g_c+I1), s	8.5	46.0		19.4	8.3	77.0		11.0				
Green Ext Time (p_c), s	0.1	2.6		1.7	0.1	0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			154.8									
HCM 6th LOS			F									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary

19: Main St & Grayson Avenue/Mills

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	4	65	8	5	22	47	707	12	26	756	121
Future Volume (veh/h)	72	4	65	8	5	22	47	707	12	26	756	121
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.92	1.00		0.70	1.00		0.96	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1856	1856	1318	1318
Adj Flow Rate, veh/h	76	4	68	8	5	23	49	744	13	27	796	101
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	96	5	86	29	18	29	63	774	14	206	776	98
Arrive On Green	0.12	0.12	0.12	0.03	0.03	0.03	0.04	0.60	0.60	0.12	0.68	0.68
Sat Flow, veh/h	825	43	738	1108	692	1096	1767	1291	23	1767	1141	145
Grp Volume(v), veh/h	148	0	0	13	0	23	49	0	757	27	0	897
Grp Sat Flow(s),veh/h/ln	1606	0	0	1800	0	1096	1767	0	1313	1767	0	1285
Q Serve(g_s), s	12.1	0.0	0.0	1.0	0.0	2.8	3.7	0.0	73.6	1.9	0.0	91.9
Cycle Q Clear(g_c), s	12.1	0.0	0.0	1.0	0.0	2.8	3.7	0.0	73.6	1.9	0.0	91.9
Prop In Lane	0.51		0.46	0.62		1.00	1.00		0.02	1.00		0.11
Lane Grp Cap(c), veh/h	187	0	0	48	0	29	63	0	788	206	0	875
V/C Ratio(X)	0.79	0.00	0.00	0.27	0.00	0.79	0.78	0.00	0.96	0.13	0.00	1.03
Avail Cap(c_a), veh/h	232	0	0	137	0	84	122	0	942	206	0	875
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	58.0	0.0	0.0	64.5	0.0	65.4	64.6	0.0	25.5	53.5	0.0	21.6
Incr Delay (d2), s/veh	13.6	0.0	0.0	1.1	0.0	16.1	7.5	0.0	18.8	0.3	0.0	37.1
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	5.7	0.0	0.0	0.5	0.0	0.9	1.8	0.0	25.4	0.8	0.0	33.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	71.7	0.0	0.0	65.6	0.0	81.5	72.1	0.0	44.4	53.8	0.0	58.7
LnGrp LOS	E	A	A	E	A	F	E	A	D	D	A	F
Approach Vol, veh/h	148			36			806			924		
Approach Delay, s/veh	71.7			75.7			46.1			58.5		
Approach LOS	E			E			D			E		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	20.4	86.1		20.3	9.5	97.0		8.3				
Change Period (Y+Rc), s	4.7	* 5.1		4.5	4.7	* 5.1		4.7				
Max Green Setting (Gmax), s	4.5	* 97		19.5	9.3	* 92		10.3				
Max Q Clear Time (g_c+I1), s	3.9	75.6		14.1	5.7	93.9		4.8				
Green Ext Time (p_c), s	0.0	5.4		0.3	0.0	0.0		0.0				

Intersection Summary

HCM 6th Ctrl Delay 54.6

HCM 6th LOS D

Notes

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

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

HCM 6th TWSC
41: Charter Oak & Main St

11-13-2019

Intersection												
Int Delay, s/veh	2.2											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	9	844	22	43	681	89	11	2	36	36	2	8
Future Vol, veh/h	9	844	22	43	681	89	11	2	36	36	2	8
Conflicting Peds, #/hr	10	0	35	10	0	15	32	0	15	35	0	52
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	10	917	24	47	740	97	12	2	39	39	2	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	852	0	0	976	0	0	1924	1930	999	1903	1894	856
Stage 1	-	-	-	-	-	-	984	984	-	898	898	-
Stage 2	-	-	-	-	-	-	940	946	-	1005	996	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	783	-	-	703	-	-	50	66	294	52	69	356
Stage 1	-	-	-	-	-	-	298	325	-	333	357	-
Stage 2	-	-	-	-	-	-	315	339	-	290	321	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	772	-	-	680	-	-	42	58	275	~ 39	60	334
Mov Cap-2 Maneuver	-	-	-	-	-	-	143	166	-	125	159	-
Stage 1	-	-	-	-	-	-	284	310	-	324	328	-
Stage 2	-	-	-	-	-	-	270	311	-	236	306	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0.1	0.6	26.1	43.5
HCM LOS			D	E

Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1
Capacity (veh/h)	223	680	-	-	772	-	142
HCM Lane V/C Ratio	0.239	0.069	-	-	0.013	-	0.352
HCM Control Delay (s)	26.1	10.7	-	-	9.7	-	43.5
HCM Lane LOS	D	B	-	-	A	-	E
HCM 95th %tile Q(veh)	0.9	0.2	-	-	0	-	1.4

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

Intersection						
Int Delay, s/veh	1.5					
Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	104	697	742	48	22	49
Future Vol, veh/h	104	697	742	48	22	49
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	113	758	807	52	24	53
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	859	0	-	0	1817	833
Stage 1	-	-	-	-	833	-
Stage 2	-	-	-	-	984	-
Critical Hdwy	4.13	-	-	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.327
Pot Cap-1 Maneuver	778	-	-	-	85	367
Stage 1	-	-	-	-	425	-
Stage 2	-	-	-	-	361	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	778	-	-	-	73	367
Mov Cap-2 Maneuver	-	-	-	-	199	-
Stage 1	-	-	-	-	363	-
Stage 2	-	-	-	-	361	-
Approach	SE	NW		SW		
HCM Control Delay, s	1.4	0		19.3		
HCM LOS	C					
Minor Lane/Major Mvmt		NWT	NWR	SEL	SETSWLn1SWLn2	
Capacity (veh/h)		-	-	778	-	199 367
HCM Lane V/C Ratio		-	-	0.145	-	0.12 0.145
HCM Control Delay (s)		-	-	10.4	-	25.5 16.5
HCM Lane LOS		-	-	B	-	D C
HCM 95th %tile Q(veh)		-	-	0.5	-	0.4 0.5

HCM 6th Signalized Intersection Summary

18: Main St & Mitchell Dr/Pope Street

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	196	142	26	91	87	577	54	85	533	4
Future Volume (veh/h)	0	0	196	142	26	91	87	577	54	85	533	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	50	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.93	1.00		0.95	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1329	1329	1870	1329	1329
Adj Flow Rate, veh/h	0	0	209	151	28	97	93	614	57	90	567	4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	126	204	195	36	190	116	717	23	116	739	5
Arrive On Green	0.00	0.00	0.07	0.13	0.13	0.13	0.07	0.53	0.53	0.07	0.53	0.53
Sat Flow, veh/h	0	1870	1507	1514	281	1478	1781	1192	111	1781	1317	9
Grp Volume(v), veh/h	0	0	209	179	0	97	93	0	671	90	0	571
Grp Sat Flow(s),veh/h/ln	0	1870	1507	1795	0	1478	1781	0	1303	1781	0	1327
Q Serve(g_s), s	0.0	0.0	9.0	11.9	0.0	7.5	6.3	0.0	61.3	6.1	0.0	43.6
Cycle Q Clear(g_c), s	0.0	0.0	9.0	11.9	0.0	7.5	6.3	0.0	61.3	6.1	0.0	43.6
Prop In Lane	0.00		1.00	0.84		1.00	1.00		0.08	1.00		0.01
Lane Grp Cap(c), veh/h	0	126	204	231	0	190	116	0	740	116	0	744
V/C Ratio(X)	0.00	0.00	1.02	0.77	0.00	0.51	0.80	0.00	0.91	0.78	0.00	0.77
Avail Cap(c_a), veh/h	0	136	220	508	0	418	360	0	790	360	0	805
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	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	0.0	0.0	58.1	56.4	0.0	54.3	61.6	0.0	29.4	61.6	0.0	22.7
Incr Delay (d2), s/veh	0.0	0.0	66.0	2.1	0.0	0.8	4.8	0.0	13.0	4.2	0.0	3.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	201.2	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	10.7	6.0	0.0	3.1	3.3	0.0	67.1	3.2	0.0	14.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	124.1	58.5	0.0	55.1	66.4	0.0	243.6	65.8	0.0	26.3
LnGrp LOS	A	A	F	E	A	E	E	A	F	E	A	C
Approach Vol, veh/h		209			276			764			661	
Approach Delay, s/veh		124.1			57.3			222.0			31.6	
Approach LOS		F			E			F			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.3	73.6		24.0	12.3	73.7		13.7				
Change Period (Y+Rc), s	3.7	* 7.7		* 7.7	3.7	* 7.7		4.7				
Max Green Setting (Gmax), s	25.0	* 75		* 35	25.0	* 75		9.0				
Max Q Clear Time (g_c+I1), s	8.3	45.6		13.9	8.1	63.3		11.0				
Green Ext Time (p_c), s	0.1	2.8		0.9	0.1	2.7		0.0				

Intersection Summary

HCM 6th Ctrl Delay 121.6

HCM 6th LOS F

Notes

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

HCM 6th TWSC
41: Charter Oak & Main St

11-13-2019

Intersection												
Int Delay, s/veh	2.2											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	26	794	3	11	669	167	16	4	27	45	3	19
Future Vol, veh/h	26	794	3	11	669	167	16	4	27	45	3	19
Conflicting Peds, #/hr	11	0	30	71	0	41	30	0	30	52	0	11
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	27	810	3	11	683	170	16	4	28	46	3	19
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	894	0	0	884	0	0	1768	1853	935	1765	1769	839
Stage 1	-	-	-	-	-	-	937	937	-	831	831	-
Stage 2	-	-	-	-	-	-	831	916	-	934	938	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	755	-	-	761	-	-	65	74	320	65	83	364
Stage 1	-	-	-	-	-	-	316	342	-	362	383	-
Stage 2	-	-	-	-	-	-	362	350	-	318	342	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	726	-	-	710	-	-	53	63	284	51	71	340
Mov Cap-2 Maneuver	-	-	-	-	-	-	157	168	-	153	181	-
Stage 1	-	-	-	-	-	-	284	307	-	335	363	-
Stage 2	-	-	-	-	-	-	324	331	-	259	307	-
Approach	SE			NW			NE			SW		
HCM Control Delay, s	0.3			0.1			26.7			36		
HCM LOS							D			E		
Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1					
Capacity (veh/h)	213	710	-	-	726	-	-	183				
HCM Lane V/C Ratio	0.225	0.016	-	-	0.037	-	-	0.374				
HCM Control Delay (s)	26.7	10.2	-	-	10.1	-	-	36				
HCM Lane LOS	D	B	-	-	B	-	-	E				
HCM 95th %tile Q(veh)	0.8	0	-	-	0.1	-	-	1.6				

Intersection

Int Delay, s/veh 1.9

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	34	752	714	23	54	97
Future Vol, veh/h	34	752	714	23	54	97
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	35	767	729	23	55	99

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	752	0	0 1578 741
Stage 1	-	-	- 741 -
Stage 2	-	-	- 837 -
Critical Hdwy	4.13	-	- 6.43 6.23
Critical Hdwy Stg 1	-	-	- 5.43 -
Critical Hdwy Stg 2	-	-	- 5.43 -
Follow-up Hdwy	2.227	-	- 3.527 3.327
Pot Cap-1 Maneuver	853	-	- 120 415
Stage 1	-	-	- 470 -
Stage 2	-	-	- 423 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	853	-	- 115 415
Mov Cap-2 Maneuver	-	-	- 252 -
Stage 1	-	-	- 451 -
Stage 2	-	-	- 423 -

Approach	SE	NW	SW
HCM Control Delay, s	0.4	0	18.8
HCM LOS			C

Minor Lane/Major Mvmt	NWT	NWR	SEL	SETSWLn1SWLn2
Capacity (veh/h)	-	-	853	- 252 415
HCM Lane V/C Ratio	-	-	0.041	- 0.219 0.239
HCM Control Delay (s)	-	-	9.4	- 23.2 16.4
HCM Lane LOS	-	-	A	- C C
HCM 95th %tile Q(veh)	-	-	0.1	- 0.8 0.9

HCM 6th Signalized Intersection Summary

18: Main St & Mitchell Dr/Pope Street

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	159	131	38	71	59	538	57	63	589	6
Future Volume (veh/h)	0	0	159	131	38	71	59	538	57	63	589	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	50	0	0	25	0
Ped-Bike Adj(A_pbT)	1.00		0.69	1.00		0.73	1.00		0.91	1.00		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1318	1856	1318	1318
Adj Flow Rate, veh/h	0	0	162	134	39	72	60	549	58	64	601	6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	0	122	163	219	64	175	104	683	22	106	712	3
Arrive On Green	0.00	0.00	0.07	0.17	0.17	0.17	0.06	0.49	0.49	0.07	0.50	0.50
Sat Flow, veh/h	0	1856	1082	1384	403	1143	1767	1159	122	1767	1302	13
Grp Volume(v), veh/h	0	0	162	173	0	72	60	0	607	64	0	607
Grp Sat Flow(s),veh/h/ln	0	1856	1082	1786	0	1143	1767	0	1282	1767	0	1315
Q Serve(g_s), s	0.0	0.0	9.0	10.9	0.0	6.8	4.0	0.0	55.7	4.3	0.0	52.9
Cycle Q Clear(g_c), s	0.0	0.0	9.0	10.9	0.0	6.8	4.0	0.0	55.7	4.3	0.0	52.9
Prop In Lane	0.00		1.00	0.77		1.00	1.00		0.10	1.00		0.01
Lane Grp Cap(c), veh/h	0	122	163	283	0	175	104	0	712	106	0	712
V/C Ratio(X)	0.00	0.00	0.99	0.61	0.00	0.41	0.58	0.00	0.85	0.60	0.00	0.85
Avail Cap(c_a), veh/h	0	137	180	511	0	327	361	0	786	361	0	806
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	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	0.0	0.0	60.7	53.7	0.0	51.9	62.8	0.0	31.4	62.8	0.0	31.1
Incr Delay (d2), s/veh	0.0	0.0	61.8	2.1	0.0	1.5	1.9	0.0	7.6	2.1	0.0	7.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	186.9	0.0	0.0	60.5
%ile BackOfQ(50%),veh/ln	0.0	0.0	8.5	5.8	0.0	2.3	2.1	0.0	61.5	2.3	0.0	35.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	122.5	55.8	0.0	53.4	64.6	0.0	225.9	64.8	0.0	98.7
LnGrp LOS	A	A	F	E	A	D	E	A	F	E	A	F
Approach Vol, veh/h		162			245			667			671	
Approach Delay, s/veh		122.5			55.1			211.4			95.5	
Approach LOS		F			E			F			F	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.5	68.3		28.8	11.7	68.1		13.7				
Change Period (Y+Rc), s	3.7	* 7.7		* 7.7	3.7	* 7.7		4.7				
Max Green Setting (Gmax), s	25.0	* 75		* 35	25.0	* 75		9.0				
Max Q Clear Time (g_c+I1), s	6.0	54.9		12.9	6.3	57.7		11.0				
Green Ext Time (p_c), s	0.1	2.8		1.4	0.1	2.8		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			136.6									
HCM 6th LOS			F									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary

19: Main St & Grayson Avenue/Mills

11-13-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	1	33	2	1	13	38	666	5	19	823	29
Future Volume (veh/h)	28	1	33	2	1	13	38	666	5	19	823	29
Initial Q (Qb), veh	0	0	0	0	0	0	0	30	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.93	1.00		0.95	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1856	1856	1318	1318
Adj Flow Rate, veh/h	28	1	33	2	1	13	38	673	5	19	831	29
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	46	2	55	45	23	56	94	948	5	34	870	30
Arrive On Green	0.07	0.07	0.07	0.04	0.04	0.04	0.05	0.72	0.72	0.02	0.68	0.68
Sat Flow, veh/h	718	26	846	1197	599	1487	1767	1307	10	1767	1265	44
Grp Volume(v), veh/h	62	0	0	3	0	13	38	0	678	19	0	860
Grp Sat Flow(s),veh/h/ln	1589	0	0	1796	0	1487	1767	0	1316	1767	0	1309
Q Serve(g_s), s	4.4	0.0	0.0	0.2	0.0	1.0	2.4	0.0	35.2	1.2	0.0	71.8
Cycle Q Clear(g_c), s	4.4	0.0	0.0	0.2	0.0	1.0	2.4	0.0	35.2	1.2	0.0	71.8
Prop In Lane	0.45		0.53	0.67		1.00	1.00		0.01	1.00		0.03
Lane Grp Cap(c), veh/h	103	0	0	68	0	56	94	0	953	34	0	901
V/C Ratio(X)	0.60	0.00	0.00	0.04	0.00	0.23	0.40	0.00	0.71	0.55	0.00	0.95
Avail Cap(c_a), veh/h	251	0	0	189	0	156	156	0	1068	83	0	1006
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	55.6	0.0	0.0	56.6	0.0	57.0	55.9	0.0	12.8	59.3	0.0	17.3
Incr Delay (d2), s/veh	5.6	0.0	0.0	0.1	0.0	0.8	1.0	0.0	2.0	13.1	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	24.7	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.0	0.0	0.1	0.0	0.4	1.2	0.0	21.8	0.7	0.0	23.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.2	0.0	0.0	56.7	0.0	57.8	56.9	0.0	39.5	72.4	0.0	34.8
LnGrp LOS	E	A	A	E	A	E	E	A	D	E	A	C
Approach Vol, veh/h	62		16				716			879		
Approach Delay, s/veh	61.2		57.6				40.4			35.6		
Approach LOS	E		E				D			D		
Timer - Assigned Phs	1	2	4		5	6	8					
Phs Duration (G+Y+Rc), s	6.8	88.9	12.1		11.1	84.6	9.2					
Change Period (Y+Rc), s	4.5	5.1	4.5		* 4.7	5.1	4.7					
Max Green Setting (Gmax), s	5.5	94.9	18.5		* 10	89.9	12.3					
Max Q Clear Time (g_c+I1), s	3.2	37.2	6.4		4.4	73.8	3.0					
Green Ext Time (p_c), s	0.0	5.4	0.2		0.0	5.8	0.0					
Intersection Summary												
HCM 6th Ctrl Delay			38.8									
HCM 6th LOS			D									
Notes												

HCM 6th TWSC
41: Charter Oak & Main St

11-13-2019

Intersection												
Int Delay, s/veh	1.9											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	33	836	11	5	596	103	14	1	9	48	1	28
Future Vol, veh/h	33	836	11	5	596	103	14	1	9	48	1	28
Conflicting Peds, #/hr	25	0	25	25	0	25	25	0	25	25	0	25
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	34	853	11	5	608	105	14	1	9	49	1	29

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	738	0	0	889	0	0	1663	1700	909	1653	1653	711
Stage 1	-	-	-	-	-	-	952	952	-	696	696	-
Stage 2	-	-	-	-	-	-	711	748	-	957	957	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	863	-	-	758	-	-	77	92	332	78	98	431
Stage 1	-	-	-	-	-	-	310	337	-	430	442	-
Stage 2	-	-	-	-	-	-	422	418	-	308	335	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	842	-	-	740	-	-	66	84	316	69	89	411
Mov Cap-2 Maneuver	-	-	-	-	-	-	174	194	-	179	203	-
Stage 1	-	-	-	-	-	-	290	316	-	403	428	-
Stage 2	-	-	-	-	-	-	380	405	-	279	314	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0.4	0.1	24.4	29.2
HCM LOS			C	D

Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1
Capacity (veh/h)	210	740	-	-	842	-	226
HCM Lane V/C Ratio	0.117	0.007	-	-	0.04	-	0.348
HCM Control Delay (s)	24.4	9.9	-	-	9.5	-	29.2
HCM Lane LOS	C	A	-	-	A	-	D
HCM 95th %tile Q(veh)	0.4	0	-	-	0.1	-	1.5

Intersection

Int Delay, s/veh 0.9

Movement SEL SET NWT NWR SWL SWR

Lane Configurations      

Traffic Vol, veh/h 39 807 671 11 21 49

Future Vol, veh/h 39 807 671 11 21 49

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Free Free Free Free Stop Stop

RT Channelized - None - None - None

Storage Length 0 - - - 0 0

Veh in Median Storage, # - 0 0 - 1 -

Grade, % - 0 0 - 0 -

Peak Hour Factor 98 98 98 98 98 98

Heavy Vehicles, % 3 3 3 3 3 3

Mvmt Flow 40 823 685 11 21 50

Major/Minor Major1 Major2 Minor2

Conflicting Flow All 696 0 - 0 1594 691

Stage 1 - - - - 691 -

Stage 2 - - - - 903 -

Critical Hdwy 4.13 - - - 6.43 6.23

Critical Hdwy Stg 1 - - - - 5.43 -

Critical Hdwy Stg 2 - - - - 5.43 -

Follow-up Hdwy 2.227 - - - 3.527 3.327

Pot Cap-1 Maneuver 895 - - - 117 443

Stage 1 - - - - 495 -

Stage 2 - - - - 394 -

Platoon blocked, % - - - -

Mov Cap-1 Maneuver 895 - - - 112 443

Mov Cap-2 Maneuver - - - - 247 -

Stage 1 - - - - 473 -

Stage 2 - - - - 394 -

Approach SE NW SW

HCM Control Delay, s 0.4 0 16.2

HCM LOS C

Minor Lane/Major Mvmt NWT NWR SEL SETSWLn1SWLn2

Capacity (veh/h) - - 895 - 247 443

HCM Lane V/C Ratio - - 0.044 - 0.087 0.113

HCM Control Delay (s) - - 9.2 - 21 14.2

HCM Lane LOS - - A - C B

HCM 95th %tile Q(veh) - - 0.1 - 0.3 0.4

HCM 6th Signalized Intersection Summary

18: Main St & Mitchell Dr/Pope Street

11-15-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	170	200	40	150	80	610	80	100	520	10
Future Volume (veh/h)	0	0	170	200	40	150	80	610	80	100	520	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	50	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.91	1.00		0.91	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1318	1856	1318	1318
Adj Flow Rate, veh/h	0	0	183	215	43	161	86	656	86	108	559	11
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	0	125	190	237	47	229	105	692	33	128	733	14
Arrive On Green	0.00	0.00	0.07	0.16	0.16	0.16	0.06	0.56	0.56	0.07	0.57	0.57
Sat Flow, veh/h	0	1856	1433	1484	297	1438	1767	1137	149	1767	1288	25
Grp Volume(v), veh/h	0	0	183	258	0	161	86	0	742	108	0	570
Grp Sat Flow(s),veh/h/ln	0	1856	1433	1781	0	1438	1767	0	1286	1767	0	1314
Q Serve(g_s), s	0.0	0.0	11.1	23.4	0.0	17.4	7.9	0.0	91.3	9.9	0.0	54.3
Cycle Q Clear(g_c), s	0.0	0.0	11.1	23.4	0.0	17.4	7.9	0.0	91.3	9.9	0.0	54.3
Prop In Lane	0.00		1.00	0.83		1.00	1.00		0.12	1.00		0.02
Lane Grp Cap(c), veh/h	0	125	190	284	0	229	105	0	726	128	0	747
V/C Ratio(X)	0.00	0.00	0.96	0.91	0.00	0.70	0.82	0.00	1.02	0.85	0.00	0.76
Avail Cap(c_a), veh/h	0	125	190	318	0	256	175	0	715	165	0	747
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	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	0.0	0.0	71.6	67.8	0.0	65.3	76.4	0.0	36.5	75.3	0.0	27.0
Incr Delay (d2), s/veh	0.0	0.0	53.9	26.7	0.0	7.3	5.8	0.0	39.3	21.6	0.0	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	248.1	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	10.6	12.9	0.0	6.9	3.8	0.0	86.7	5.3	0.0	18.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	125.4	94.6	0.0	72.6	82.2	0.0	323.9	97.0	0.0	31.2
LnGrp LOS	A	A	F	F	A	E	F	A	F	F	A	C
Approach Vol, veh/h		183			419			828			678	
Approach Delay, s/veh		125.4			86.2			298.8			41.7	
Approach LOS		F			F			F			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.5	101.1		33.9	15.6	99.0		15.8				
Change Period (Y+Rc), s	3.7	* 7.7		* 7.7	3.7	* 7.7		4.7				
Max Green Setting (Gmax), s	16.3	* 87		* 29	15.3	* 91		11.1				
Max Q Clear Time (g_c+I1), s	9.9	56.3		25.4	11.9	93.3		13.1				
Green Ext Time (p_c), s	0.0	2.8		0.8	0.0	0.0		0.0				

Intersection Summary

HCM 6th Ctrl Delay 158.8

HCM 6th LOS F

Notes

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

HCM 6th Signalized Intersection Summary

19: Main St & Grayson Avenue/Mills

11-15-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	4	65	8	5	22	47	707	12	26	756	121
Future Volume (veh/h)	72	4	65	8	5	22	47	707	12	26	756	121
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.92	1.00		0.70	1.00		0.96	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1856	1856	1318	1318
Adj Flow Rate, veh/h	76	4	68	8	5	23	49	744	13	27	796	101
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	97	5	87	29	18	29	63	774	14	199	772	98
Arrive On Green	0.12	0.12	0.12	0.03	0.03	0.03	0.04	0.60	0.60	0.11	0.68	0.68
Sat Flow, veh/h	825	43	738	1108	692	1096	1767	1291	23	1767	1141	145
Grp Volume(v), veh/h	148	0	0	13	0	23	49	0	757	27	0	897
Grp Sat Flow(s),veh/h/ln	1606	0	0	1800	0	1096	1767	0	1313	1767	0	1285
Q Serve(g_s), s	11.9	0.0	0.0	0.9	0.0	2.8	3.7	0.0	72.3	1.8	0.0	89.9
Cycle Q Clear(g_c), s	11.9	0.0	0.0	0.9	0.0	2.8	3.7	0.0	72.3	1.8	0.0	89.9
Prop In Lane	0.51		0.46	0.62		1.00	1.00		0.02	1.00		0.11
Lane Grp Cap(c), veh/h	189	0	0	48	0	29	63	0	788	199	0	870
V/C Ratio(X)	0.78	0.00	0.00	0.27	0.00	0.79	0.78	0.00	0.96	0.14	0.00	1.03
Avail Cap(c_a), veh/h	248	0	0	140	0	85	137	0	938	199	0	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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	56.9	0.0	0.0	63.4	0.0	64.3	63.5	0.0	25.1	53.1	0.0	21.4
Incr Delay (d2), s/veh	11.3	0.0	0.0	1.1	0.0	16.2	7.5	0.0	18.9	0.3	0.0	38.7
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	5.5	0.0	0.0	0.4	0.0	0.9	1.8	0.0	25.0	0.8	0.0	33.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.2	0.0	0.0	64.5	0.0	80.4	71.0	0.0	44.0	53.4	0.0	60.1
LnGrp LOS	E	A	A	E	A	F	E	A	D	D	A	F
Approach Vol, veh/h	148				36				806			
Approach Delay, s/veh	68.2				74.7				45.6			
Approach LOS	E				E				D			
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	19.7	84.8		20.1	9.4	95.0		8.2				
Change Period (Y+Rc), s	4.7	* 5.1		4.5	4.7	* 5.1		4.7				
Max Green Setting (Gmax), s	5.5	* 95		20.5	10.3	* 90		10.3				
Max Q Clear Time (g_c+I1), s	3.8	74.3		13.9	5.7	91.9		4.8				
Green Ext Time (p_c), s	0.0	5.3		0.4	0.0	0.0		0.0				

Intersection Summary

HCM 6th Ctrl Delay 54.8

HCM 6th LOS D

Notes

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

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

HCM 6th TWSC
41: Charter Oak & Main St

11-15-2019

Intersection												
Int Delay, s/veh	3											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	12	889	25	44	696	90	20	2	38	43	2	9
Future Vol, veh/h	12	889	25	44	696	90	20	2	38	43	2	9
Conflicting Peds, #/hr	10	0	35	10	0	15	32	0	15	35	0	52
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	13	966	27	48	757	98	22	2	41	47	2	10
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	870	0	0	1028	0	0	2001	2007	1050	1979	1971	873
Stage 1	-	-	-	-	-	-	1041	1041	-	917	917	-
Stage 2	-	-	-	-	-	-	960	966	-	1062	1054	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	770	-	-	672	-	-	44	59	275	~ 46	62	348
Stage 1	-	-	-	-	-	-	277	306	-	325	349	-
Stage 2	-	-	-	-	-	-	307	332	-	269	302	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	759	-	-	650	-	-	36	51	257	~ 34	54	326
Mov Cap-2 Maneuver	-	-	-	-	-	-	133	156	-	113	149	-
Stage 1	-	-	-	-	-	-	263	291	-	315	319	-
Stage 2	-	-	-	-	-	-	260	303	-	213	287	-
Approach	SE			NW			NE			SW		
HCM Control Delay, s	0.1			0.6			32.9			55		
HCM LOS							D			F		
Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1					
Capacity (veh/h)	193	650	-	-	759	-	-	128				
HCM Lane V/C Ratio	0.338	0.074	-	-	0.017	-	-	0.459				
HCM Control Delay (s)	32.9	11	-	-	9.8	-	-	55				
HCM Lane LOS	D	B	-	-	A	-	-	F				
HCM 95th %tile Q(veh)	1.4	0.2	-	-	0.1	-	-	2.1				
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s				+: Computation Not Defined				*: All major volume in platoon		

Intersection

Int Delay, s/veh 1.4

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	99	749	760	49	21	47
Future Vol, veh/h	99	749	760	49	21	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	108	814	826	53	23	51

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	879	0	0 1883 853
Stage 1	-	-	- 853 -
Stage 2	-	-	- 1030 -
Critical Hdwy	4.13	-	- 6.43 6.23
Critical Hdwy Stg 1	-	-	- 5.43 -
Critical Hdwy Stg 2	-	-	- 5.43 -
Follow-up Hdwy	2.227	-	- 3.527 3.327
Pot Cap-1 Maneuver	764	-	- 77 357
Stage 1	-	-	- 416 -
Stage 2	-	-	- 343 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	764	-	- 66 357
Mov Cap-2 Maneuver	-	-	- 190 -
Stage 1	-	-	- 357 -
Stage 2	-	-	- 343 -

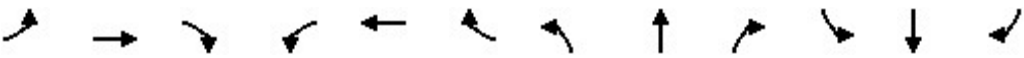
Approach	SE	NW	SW
HCM Control Delay, s	1.2	0	19.8
HCM LOS			C

Minor Lane/Major Mvmt	NWT	NWR	SEL	SETSWLn1SWLn2
Capacity (veh/h)	-	-	764	- 190 357
HCM Lane V/C Ratio	-	-	0.141	- 0.12 0.143
HCM Control Delay (s)	-	-	10.5	- 26.5 16.8
HCM Lane LOS	-	-	B	- D C
HCM 95th %tile Q(veh)	-	-	0.5	- 0.4 0.5

HCM 6th Signalized Intersection Summary

18: Main St & Mitchell Dr/Pope Street

11-18-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↩	↩		↩	↩	↩	↩		↩	↩	
Traffic Volume (veh/h)	0	0	212	161	30	120	103	569	72	110	540	10
Future Volume (veh/h)	0	0	212	161	30	120	103	569	72	110	540	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	50	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.94	1.00		0.95	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1329	1329	1870	1329	1329
Adj Flow Rate, veh/h	0	0	226	171	32	128	110	605	77	117	574	11
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	122	217	210	39	206	134	687	29	141	712	14
Arrive On Green	0.00	0.00	0.07	0.14	0.14	0.14	0.08	0.54	0.54	0.08	0.54	0.54
Sat Flow, veh/h	0	1870	1499	1512	283	1483	1781	1148	146	1781	1298	25
Grp Volume(v), veh/h	0	0	226	203	0	128	110	0	682	117	0	585
Grp Sat Flow(s),veh/h/ln	0	1870	1499	1795	0	1483	1781	0	1294	1781	0	1323
Q Serve(g_s), s	0.0	0.0	9.0	14.8	0.0	11.0	8.2	0.0	69.5	8.7	0.0	49.0
Cycle Q Clear(g_c), s	0.0	0.0	9.0	14.8	0.0	11.0	8.2	0.0	69.5	8.7	0.0	49.0
Prop In Lane	0.00		1.00	0.84		1.00	1.00		0.11	1.00		0.02
Lane Grp Cap(c), veh/h	0	122	217	249	0	206	134	0	716	141	0	725
V/C Ratio(X)	0.00	0.00	1.04	0.81	0.00	0.62	0.82	0.00	0.95	0.83	0.00	0.81
Avail Cap(c_a), veh/h	0	125	219	465	0	384	330	0	718	330	0	734
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	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	0.0	0.0	59.4	57.6	0.0	55.9	62.9	0.0	31.4	62.6	0.0	25.2
Incr Delay (d2), s/veh	0.0	0.0	72.8	2.5	0.0	1.1	4.7	0.0	22.4	4.7	0.0	6.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	230.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	12.0	7.1	0.0	4.3	4.0	0.0	73.4	4.3	0.0	16.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	132.2	60.1	0.0	57.1	67.6	0.0	283.8	67.2	0.0	31.3
LnGrp LOS	A	A	F	E	A	E	E	A	F	E	A	C
Approach Vol, veh/h		226			331			792			702	
Approach Delay, s/veh		132.2			58.9			253.8			37.3	
Approach LOS		F			E			F			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.9	81.0		26.6	14.4	80.4		13.7				
Change Period (Y+Rc), s	3.7	* 7.7		* 7.7	3.7	* 7.7		4.7				
Max Green Setting (Gmax), s	25.0	* 75		* 35	25.0	* 75		9.0				
Max Q Clear Time (g_c+I1), s	10.2	51.0		16.8	10.7	71.5		11.0				
Green Ext Time (p_c), s	0.1	2.8		1.0	0.1	1.2		0.0				

Intersection Summary

HCM 6th Ctrl Delay 134.8

HCM 6th LOS F

Notes

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

HCM 6th Signalized Intersection Summary

19: Main St & Grayson Avenue/Mills

11-18-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	3	70	12	7	42	70	718	11	25	810	60
Future Volume (veh/h)	70	3	70	12	7	42	70	718	11	25	810	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.89	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1856	1856	1318	1318
Adj Flow Rate, veh/h	71	3	71	12	7	42	71	725	11	25	818	61
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	85	4	85	45	26	56	89	910	14	31	808	60
Arrive On Green	0.11	0.11	0.11	0.04	0.04	0.04	0.05	0.70	0.70	0.02	0.67	0.67
Sat Flow, veh/h	795	34	795	1136	663	1400	1767	1295	20	1767	1209	90
Grp Volume(v), veh/h	145	0	0	19	0	42	71	0	736	25	0	879
Grp Sat Flow(s),veh/h/ln	1624	0	0	1799	0	1400	1767	0	1314	1767	0	1299
Q Serve(g_s), s	12.4	0.0	0.0	1.5	0.0	4.2	5.6	0.0	53.8	2.0	0.0	94.9
Cycle Q Clear(g_c), s	12.4	0.0	0.0	1.5	0.0	4.2	5.6	0.0	53.8	2.0	0.0	94.9
Prop In Lane	0.49		0.49	0.63		1.00	1.00		0.01	1.00		0.07
Lane Grp Cap(c), veh/h	174	0	0	72	0	56	89	0	923	31	0	868
V/C Ratio(X)	0.83	0.00	0.00	0.26	0.00	0.75	0.79	0.00	0.80	0.80	0.00	1.01
Avail Cap(c_a), veh/h	212	0	0	142	0	110	116	0	934	44	0	868
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	62.1	0.0	0.0	66.1	0.0	67.5	66.7	0.0	14.3	69.5	0.0	23.6
Incr Delay (d2), s/veh	20.3	0.0	0.0	0.7	0.0	7.3	18.7	0.0	4.9	49.5	0.0	33.7
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	6.2	0.0	0.0	0.7	0.0	1.6	3.0	0.0	16.4	1.3	0.0	35.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	82.5	0.0	0.0	66.9	0.0	74.8	85.4	0.0	19.1	119.0	0.0	57.3
LnGrp LOS	F	A	A	E	A	E	F	A	B	F	A	F
Approach Vol, veh/h		145			61			807			904	
Approach Delay, s/veh		82.5			72.3			25.0			59.0	
Approach LOS		F			E			C			E	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.0	104.9		19.8	11.9	100.0		10.4				
Change Period (Y+Rc), s	4.5	5.1		4.5	* 4.7	5.1		4.7				
Max Green Setting (Gmax), s	3.5	100.9		18.5	* 9.3	94.9		11.2				
Max Q Clear Time (g_c+I1), s	4.0	55.8		14.4	7.6	96.9		6.2				
Green Ext Time (p_c), s	0.0	6.9		0.3	0.0	0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			46.9									
HCM 6th LOS			D									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th TWSC
41: Charter Oak & Main St

11-13-2019

Intersection												
Int Delay, s/veh	2.7											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	26	829	3	12	682	181	22	4	29	48	3	22
Future Vol, veh/h	26	829	3	12	682	181	22	4	29	48	3	22
Conflicting Peds, #/hr	11	0	30	71	0	41	30	0	30	52	0	11
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	27	846	3	12	696	185	22	4	30	49	3	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	922	0	0	920	0	0	1828	1919	971	1825	1828	860
Stage 1	-	-	-	-	-	-	973	973	-	854	854	-
Stage 2	-	-	-	-	-	-	855	946	-	971	974	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	737	-	-	738	-	-	59	67	305	59	76	354
Stage 1	-	-	-	-	-	-	302	329	-	352	374	-
Stage 2	-	-	-	-	-	-	351	339	-	303	329	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	708	-	-	688	-	-	47	57	270	~ 45	64	330
Mov Cap-2 Maneuver	-	-	-	-	-	-	148	160	-	143	172	-
Stage 1	-	-	-	-	-	-	271	295	-	325	353	-
Stage 2	-	-	-	-	-	-	310	320	-	243	295	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	0.3	0.1	30.6	40.3
HCM LOS			D	E

Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1
Capacity (veh/h)	196	688	-	-	708	-	174
HCM Lane V/C Ratio	0.286	0.018	-	-	0.037	-	0.428
HCM Control Delay (s)	30.6	10.3	-	-	10.3	-	40.3
HCM Lane LOS	D	B	-	-	B	-	E
HCM 95th %tile Q(veh)	1.1	0.1	-	-	0.1	-	1.9

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

Intersection

Int Delay, s/veh 1.8

Movement SEL SET NWT NWR SWL SWR

Lane Configurations      

Traffic Vol, veh/h 30 803 728 25 53 94

Future Vol, veh/h 30 803 728 25 53 94

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Free Free Free Free Stop Stop

RT Channelized - None - None - None

Storage Length 0 - - - 0 0

Veh in Median Storage, # - 0 0 - 1 -

Grade, % - 0 0 - 0 -

Peak Hour Factor 98 98 98 98 98 98

Heavy Vehicles, % 3 3 3 3 3 3

Mvmt Flow 31 819 743 26 54 96

Major/Minor Major1 Major2 Minor2

Conflicting Flow All 769 0 - 0 1637 756

Stage 1 - - - - 756 -

Stage 2 - - - - 881 -

Critical Hdwy 4.13 - - - 6.43 6.23

Critical Hdwy Stg 1 - - - - 5.43 -

Critical Hdwy Stg 2 - - - - 5.43 -

Follow-up Hdwy 2.227 - - - 3.527 3.327

Pot Cap-1 Maneuver 841 - - - 110 406

Stage 1 - - - - 462 -

Stage 2 - - - - 403 -

Platoon blocked, % - - - -

Mov Cap-1 Maneuver 841 - - - 106 406

Mov Cap-2 Maneuver - - - - 241 -

Stage 1 - - - - 445 -

Stage 2 - - - - 403 -

Approach SE NW SW

HCM Control Delay, s 0.3 0 19.3

HCM LOS C

Minor Lane/Major Mvmt NWT NWR SEL SETSWLn1SWLn2

Capacity (veh/h) - - 841 - 241 406

HCM Lane V/C Ratio - - 0.036 - 0.224 0.236

HCM Control Delay (s) - - 9.4 - 24.2 16.6

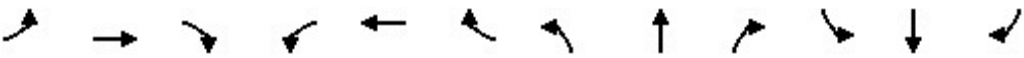
HCM Lane LOS - - A - C C

HCM 95th %tile Q(veh) - - 0.1 - 0.8 0.9

HCM 6th Signalized Intersection Summary

18: Main St & Mitchell Dr/Pope Street

11-17-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↩	↩		↩	↩	↩	↩		↩	↩	
Traffic Volume (veh/h)	0	0	161	131	40	80	61	549	61	70	609	10
Future Volume (veh/h)	0	0	161	131	40	80	61	549	61	70	609	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	50	0	0	25	0
Ped-Bike Adj(A_pbT)	1.00		0.71	1.00		0.71	1.00		0.91	1.00		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1318	1856	1318	1318
Adj Flow Rate, veh/h	0	0	164	134	41	82	62	560	62	71	621	10
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	0	154	180	206	63	164	100	687	24	103	715	4
Arrive On Green	0.00	0.00	0.09	0.16	0.16	0.16	0.06	0.50	0.50	0.06	0.51	0.51
Sat Flow, veh/h	0	1856	1117	1368	419	1118	1767	1153	128	1767	1292	21
Grp Volume(v), veh/h	0	0	164	175	0	82	62	0	622	71	0	631
Grp Sat Flow(s),veh/h/ln	0	1856	1117	1787	0	1118	1767	0	1280	1767	0	1313
Q Serve(g_s), s	0.0	0.0	12.1	12.1	0.0	8.8	4.5	0.0	62.1	5.2	0.0	60.6
Cycle Q Clear(g_c), s	0.0	0.0	12.1	12.1	0.0	8.8	4.5	0.0	62.1	5.2	0.0	60.6
Prop In Lane	0.00		1.00	0.77		1.00	1.00		0.10	1.00		0.02
Lane Grp Cap(c), veh/h	0	154	180	270	0	164	100	0	711	103	0	719
V/C Ratio(X)	0.00	0.00	0.91	0.65	0.00	0.50	0.62	0.00	0.87	0.69	0.00	0.88
Avail Cap(c_a), veh/h	0	169	198	422	0	264	324	0	765	324	0	755
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	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	0.0	0.0	62.7	58.2	0.0	56.8	67.2	0.0	33.2	67.3	0.0	33.1
Incr Delay (d2), s/veh	0.0	0.0	36.5	2.6	0.0	2.4	2.3	0.0	9.9	3.0	0.0	10.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	197.0	0.0	0.0	70.3
%ile BackOfQ(50%),veh/ln	0.0	0.0	7.9	6.3	0.0	2.9	2.3	0.0	65.4	2.7	0.0	41.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	99.2	60.8	0.0	59.2	69.5	0.0	240.0	70.3	0.0	113.9
LnGrp LOS	A	A	F	E	A	E	E	A	F	E	A	F
Approach Vol, veh/h		164			257			684			702	
Approach Delay, s/veh		99.2			60.3			224.6			109.5	
Approach LOS		F			E			F			F	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.8	74.8		29.2	12.0	74.6		16.8				
Change Period (Y+Rc), s	3.7	* 7.7		* 7.7	3.7	* 7.7		4.7				
Max Green Setting (Gmax), s	24.3	* 76		* 31	24.3	* 79		12.1				
Max Q Clear Time (g_c+I1), s	6.5	62.6		14.1	7.2	64.1		14.1				
Green Ext Time (p_c), s	0.1	2.6		1.3	0.1	2.7		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			145.1									
HCM 6th LOS			F									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary

19: Main St & Grayson Avenue/Mills

11-17-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	
Traffic Volume (veh/h)	30	1	40	1	1	16	40	671	4	24	831	30
Future Volume (veh/h)	30	1	40	1	1	16	40	671	4	24	831	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	30	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.93	1.00		0.94	1.00		0.97	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1856	1856	1318	1318
Adj Flow Rate, veh/h	30	1	40	1	1	16	40	678	4	24	839	30
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	47	2	63	37	37	60	95	943	4	40	867	31
Arrive On Green	0.07	0.07	0.07	0.04	0.04	0.04	0.05	0.71	0.71	0.02	0.68	0.68
Sat Flow, veh/h	669	22	892	905	905	1483	1767	1309	8	1767	1263	45
Grp Volume(v), veh/h	71	0	0	2	0	16	40	0	682	24	0	869
Grp Sat Flow(s),veh/h/ln	1584	0	0	1810	0	1483	1767	0	1317	1767	0	1309
Q Serve(g_s), s	5.4	0.0	0.0	0.1	0.0	1.3	2.7	0.0	38.1	1.7	0.0	78.2
Cycle Q Clear(g_c), s	5.4	0.0	0.0	0.1	0.0	1.3	2.7	0.0	38.1	1.7	0.0	78.2
Prop In Lane	0.42		0.56	0.50		1.00	1.00		0.01	1.00		0.03
Lane Grp Cap(c), veh/h	111	0	0	74	0	60	95	0	947	40	0	898
V/C Ratio(X)	0.64	0.00	0.00	0.03	0.00	0.27	0.42	0.00	0.72	0.60	0.00	0.97
Avail Cap(c_a), veh/h	236	0	0	179	0	147	147	0	1007	78	0	948
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	57.5	0.0	0.0	58.6	0.0	59.1	58.3	0.0	13.8	61.6	0.0	18.6
Incr Delay (d2), s/veh	6.0	0.0	0.0	0.1	0.0	0.9	1.1	0.0	2.4	13.9	0.0	21.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.9	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.0	0.0	0.1	0.0	0.5	1.3	0.0	23.3	0.9	0.0	26.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.5	0.0	0.0	58.6	0.0	60.0	59.4	0.0	42.1	75.4	0.0	39.9
LnGrp LOS	E	A	A	E	A	E	E	A	D	E	A	D
Approach Vol, veh/h	71			18			722			893		
Approach Delay, s/veh	63.5			59.8			43.0			40.9		
Approach LOS	E			E			D			D		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.3	93.7		13.2	11.4	89.6		9.8				
Change Period (Y+Rc), s	4.5	5.1		4.5	* 4.7	5.1		4.7				
Max Green Setting (Gmax), s	5.5	94.9		18.5	* 10	89.9		12.3				
Max Q Clear Time (g_c+I1), s	3.7	40.1		7.4	4.7	80.2		3.3				
Green Ext Time (p_c), s	0.0	5.4		0.2	0.0	4.3		0.0				

Intersection Summary

HCM 6th Ctrl Delay 42.9

HCM 6th LOS D

Notes

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

HCM 6th TWSC
41: Charter Oak & Main St

11-13-2019

Intersection												
Int Delay, s/veh	2.2											
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	36	859	11	7	591	116	17	1	11	52	1	32
Future Vol, veh/h	36	859	11	7	591	116	17	1	11	52	1	32
Conflicting Peds, #/hr	25	0	25	25	0	25	25	0	25	25	0	25
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	37	877	11	7	603	118	17	1	11	53	1	33
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	746	0	0	913	0	0	1700	1742	933	1689	1688	712
Stage 1	-	-	-	-	-	-	982	982	-	701	701	-
Stage 2	-	-	-	-	-	-	718	760	-	988	987	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	858	-	-	742	-	-	72	86	321	74	93	431
Stage 1	-	-	-	-	-	-	299	326	-	428	439	-
Stage 2	-	-	-	-	-	-	419	413	-	296	324	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	838	-	-	724	-	-	60	78	306	65	84	411
Mov Cap-2 Maneuver	-	-	-	-	-	-	166	186	-	171	196	-
Stage 1	-	-	-	-	-	-	279	304	-	399	424	-
Stage 2	-	-	-	-	-	-	372	399	-	265	302	-
Approach	SE			NW			NE			SW		
HCM Control Delay, s	0.4			0.1			25.9			31.6		
HCM LOS							D			D		
Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SERSWLn1					
Capacity (veh/h)	202	724	-	-	838	-	-	220				
HCM Lane V/C Ratio	0.146	0.01	-	-	0.044	-	-	0.394				
HCM Control Delay (s)	25.9	10	-	-	9.5	-	-	31.6				
HCM Lane LOS	D	B	-	-	A	-	-	D				
HCM 95th %tile Q(veh)	0.5	0	-	-	0.1	-	-	1.8				

Intersection

Int Delay, s/veh 0.9

Movement SEL SET NWT NWR SWL SWR

Lane Configurations      

Traffic Vol, veh/h 36 841 683 22 21 47

Future Vol, veh/h 36 841 683 22 21 47

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Free Free Free Free Stop Stop

RT Channelized - None - None - None

Storage Length 0 - - - 0 0

Veh in Median Storage, # - 0 0 - 1 -

Grade, % - 0 0 - 0 -

Peak Hour Factor 98 98 98 98 98 98

Heavy Vehicles, % 3 3 3 3 3 3

Mvmt Flow 37 858 697 22 21 48

Major/Minor Major1 Major2 Minor2

Conflicting Flow All 719 0 - 0 1640 708

Stage 1 - - - - 708 -

Stage 2 - - - - 932 -

Critical Hdwy 4.13 - - - 6.43 6.23

Critical Hdwy Stg 1 - - - - 5.43 -

Critical Hdwy Stg 2 - - - - 5.43 -

Follow-up Hdwy 2.227 - - - 3.527 3.327

Pot Cap-1 Maneuver 878 - - - 110 433

Stage 1 - - - - 486 -

Stage 2 - - - - 382 -

Platoon blocked, % - - - -

Mov Cap-1 Maneuver 878 - - - 105 433

Mov Cap-2 Maneuver - - - - 239 -

Stage 1 - - - - 466 -

Stage 2 - - - - 382 -

Approach SE NW SW

HCM Control Delay, s 0.4 0 16.5

HCM LOS C

Minor Lane/Major Mvmt NWT NWR SEL SETSWLn1SWLn2

Capacity (veh/h) - - 878 - 239 433

HCM Lane V/C Ratio - - 0.042 - 0.09 0.111

HCM Control Delay (s) - - 9.3 - 21.5 14.3

HCM Lane LOS - - A - C B

HCM 95th %tile Q(veh) - - 0.1 - 0.3 0.4

HCM 6th Signalized Intersection Summary

19: Main St & Grayson Avenue/Mills

11-18-2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	5	68	8	4	25	50	713	11	27	800	125
Future Volume (veh/h)	80	5	68	8	4	25	50	713	11	27	800	125
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.87	1.00		0.68	1.00		0.96	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1318	1856	1856	1318	1318
Adj Flow Rate, veh/h	84	5	72	8	4	26	53	751	12	28	842	106
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	93	6	91	9	3	23	66	782	13	327	860	108
Arrive On Green	0.05	0.07	0.07	0.01	0.02	0.02	0.04	0.61	0.61	0.18	0.75	0.75
Sat Flow, veh/h	1767	91	1308	1767	150	976	1767	1293	21	1767	1142	144
Grp Volume(v), veh/h	84	0	77	8	0	30	53	0	763	28	0	948
Grp Sat Flow(s),veh/h/ln	1767	0	1399	1767	0	1126	1767	0	1314	1767	0	1286
Q Serve(g_s), s	6.7	0.0	7.7	0.6	0.0	3.3	4.2	0.0	77.6	1.9	0.0	98.5
Cycle Q Clear(g_c), s	6.7	0.0	7.7	0.6	0.0	3.3	4.2	0.0	77.6	1.9	0.0	98.5
Prop In Lane	1.00		0.94	1.00		0.87	1.00		0.02	1.00		0.11
Lane Grp Cap(c), veh/h	93	0	97	9	0	26	66	0	795	327	0	968
V/C Ratio(X)	0.90	0.00	0.79	0.90	0.00	1.15	0.80	0.00	0.96	0.09	0.00	0.98
Avail Cap(c_a), veh/h	93	0	97	29	0	26	66	0	1054	327	0	1041
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	66.8	0.0	65.0	70.6	0.0	69.3	67.8	0.0	26.4	47.9	0.0	16.5
Incr Delay (d2), s/veh	61.5	0.0	34.2	61.3	0.0	223.7	46.5	0.0	16.2	0.1	0.0	22.3
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	4.7	0.0	3.7	0.4	0.0	2.6	2.8	0.0	26.3	0.8	0.0	29.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	128.3	0.0	99.2	131.9	0.0	293.0	114.2	0.0	42.6	48.0	0.0	38.9
LnGrp LOS	F	A	F	F	A	F	F	A	D	D	A	D
Approach Vol, veh/h	161			38			816			976		
Approach Delay, s/veh	114.4			259.0			47.2			39.1		
Approach LOS	F			F			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	30.9	91.0	5.4	14.6	10.0	111.9	12.0	8.0				
Change Period (Y+Rc), s	4.7	* 5.1	* 4.7	* 4.7	4.7	* 5.1	4.5	* 4.7				
Max Green Setting (Gmax), s	6.5	* 1.1E2	* 2.3	* 8.5	5.3	* 1.1E2	7.5	* 3.3				
Max Q Clear Time (g_c+I1), s	3.9	79.6	2.6	9.7	6.2	100.5	8.7	5.3				
Green Ext Time (p_c), s	0.0	6.2	0.0	0.0	0.0	6.3	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay 52.7

HCM 6th LOS D

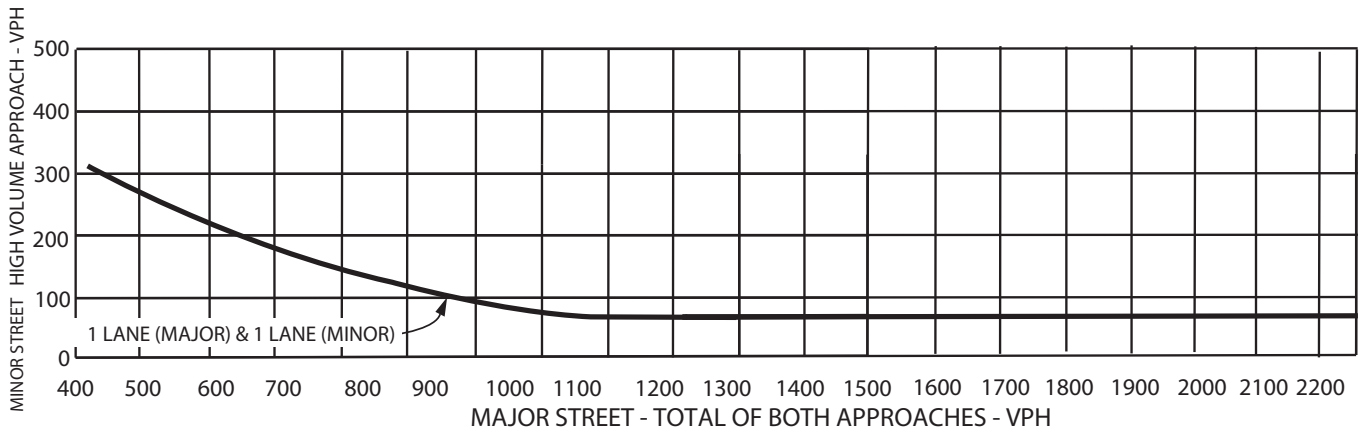
Notes

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

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

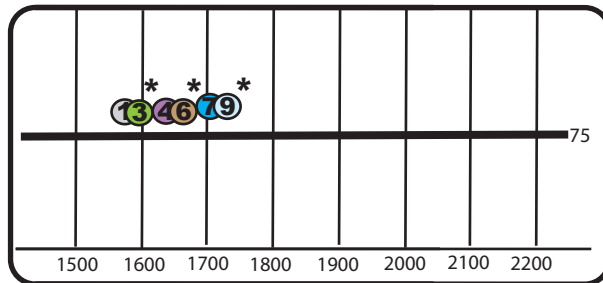
Appendix B

SR29/128 at Charter Oak Ave **PEAK HOUR VOLUME WARRANT #3** **(Rural Area)**

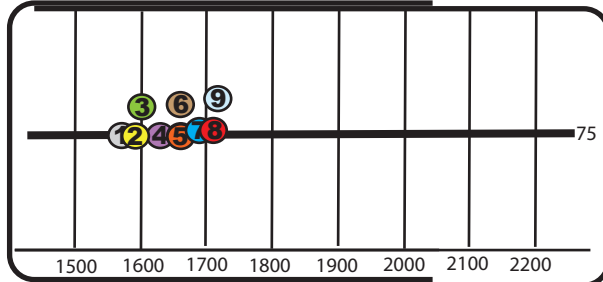


* Friday AM with Hotel and Friday AM with Total Project are the same

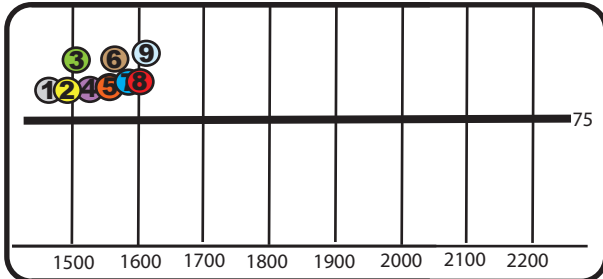
**FRIDAY
AM PEAK HOUR**



**FRIDAY
PM PEAK HOUR**



**SATURDAY
PM PEAK HOUR**



	Major Street Approaches	Minor Street Approach
① Existing Friday AM w-o Project	1583	92
② Existing Friday AM with Hotel	1598	91
③ Existing Friday AM w-Total Project	1598	91
④ 2022 Friday AM w-o Project	1630	93
⑤ 2022 Friday AM with Hotel	1645	92
⑥ 2022 Friday AM w-Total Project	1645	92
⑦ 2040 Friday AM w-o Project	1697	105
⑧ 2040 Friday AM with Hotel	1712	104
⑨ 2040 Friday AM w-Total Project	1712	104
① Existing Friday PM w-o Project	1572	72
② Existing Friday PM with Hotel	1590	72
③ Existing Friday PM w-Total Project	1601	91
④ 2022 Friday PM w-o Project	1615	74
⑤ 2022 Friday PM with Hotel	1633	74
⑥ 2022 Friday PM w-Total Project	1644	93
⑦ 2040 Friday PM w-o Project	1678	80
⑧ 2040 Friday PM with Hotel	1696	80
⑨ 2040 Friday PM w-Total Project	1707	99
① Existing SAT w-o Project	1478	89
② Existing SAT with Hotel	1485	89
③ Existing SAT w-Total Project	1496	108
④ 2022 SAT w-o Project	1533	91
⑤ 2022 SAT with Hotel	1540	91
⑥ 2022 SAT w-Total Project	1551	110
⑦ 2040 SAT w-o Project	1569	102
⑧ 2040 SAT with Hotel	1576	105
⑨ 2040 SAT w-Total Project	1587	121

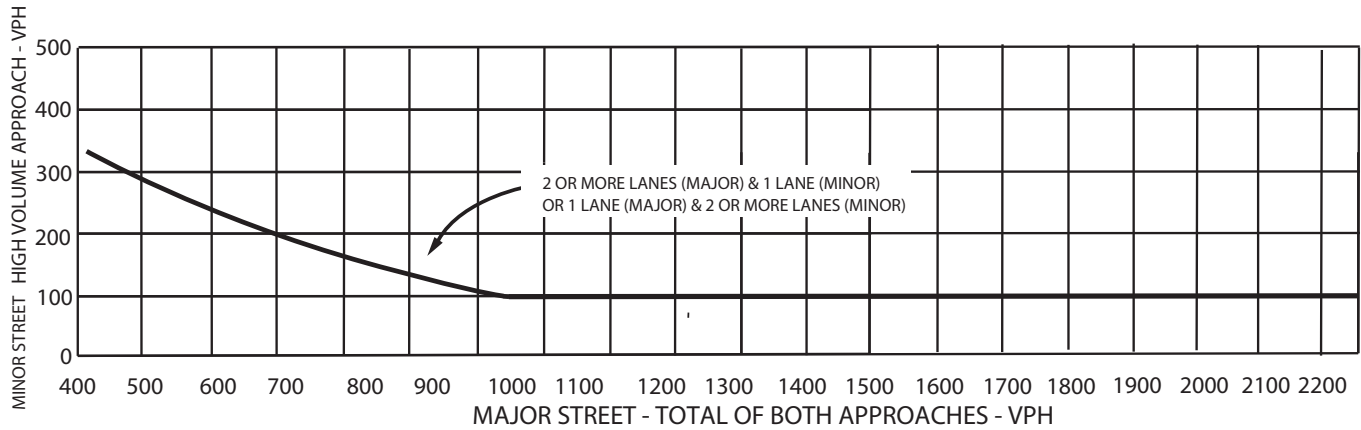
Source: Year 2014 Manual on Uniform Traffic Control Devices, Federal Highway Administration

Figure A-1
SR29/128 at Charter Oak Ave
PEAK HOUR VOLUME WARRANT #3
(Rural Area)

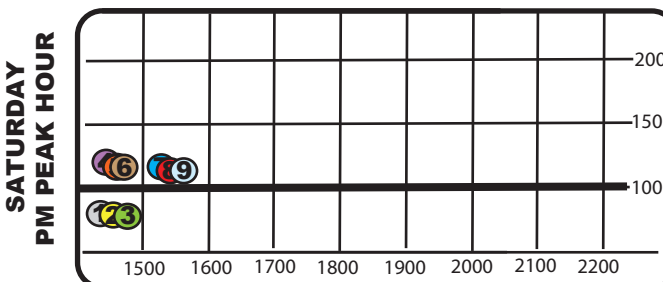
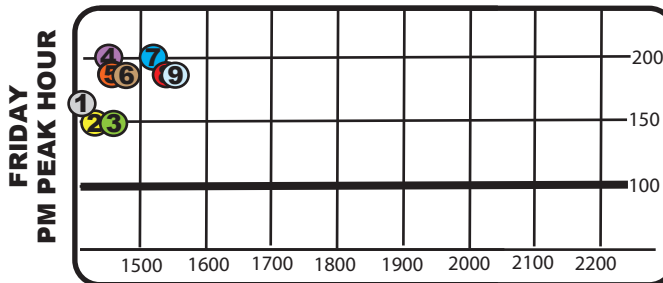
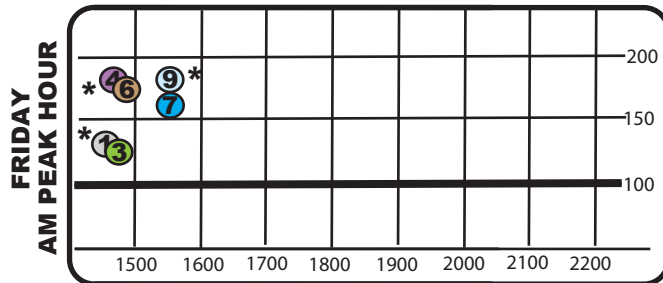


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SR29/128 at Dowdell Lane **PEAK HOUR VOLUME WARRANT #3** **(Rural Area)**



* Friday AM with Hotel and Friday AM with Total Project are the same



	Major Street Approaches	Minor Street Approach
① Existing Friday AM w-o Project	1448	138
② Existing Friday AM with Hotel	1464	126
③ Existing Friday AM w-Total Project	1464	126
④ 2022 Friday AM w-o Project	1471	190
⑤ 2022 Friday AM with Hotel	1487	175
⑥ 2022 Friday AM w-Total Project	1487	175
⑦ 2040 Friday AM w-o Project	1546	190
⑧ 2040 Friday AM with Hotel	1558	167
⑨ 2040 Friday AM w-Total Project	1558	167
① Existing Friday PM w-o Project	1427	161
② Existing Friday PM with Hotel	1447	147
③ Existing Friday PM w-Total Project	1466	147
④ 2022 Friday PM w-o Project	1449	207
⑤ 2022 Friday PM with Hotel	1470	185
⑥ 2022 Friday PM w-Total Project	1489	185
⑦ 2040 Friday PM w-o Project	1515	207
⑧ 2040 Friday PM with Hotel	1537	177
⑨ 2040 Friday PM w-Total Project	1556	177
① Existing SAT w-o Project	1452	58
② Existing SAT with Hotel	1460	57
③ Existing SAT w-Total Project	1479	57
④ 2022 SAT w-o Project	1473	118
⑤ 2022 SAT with Hotel	1481	109
⑥ 2022 SAT w-Total Project	1500	109
⑦ 2040 SAT w-o Project	1519	118
⑧ 2040 SAT with Hotel	1527	104
⑨ 2040 SAT w-Total Project	1546	104

Source: Year 2014 Manual on Uniform Traffic Control Devices, Federal Highway Administration

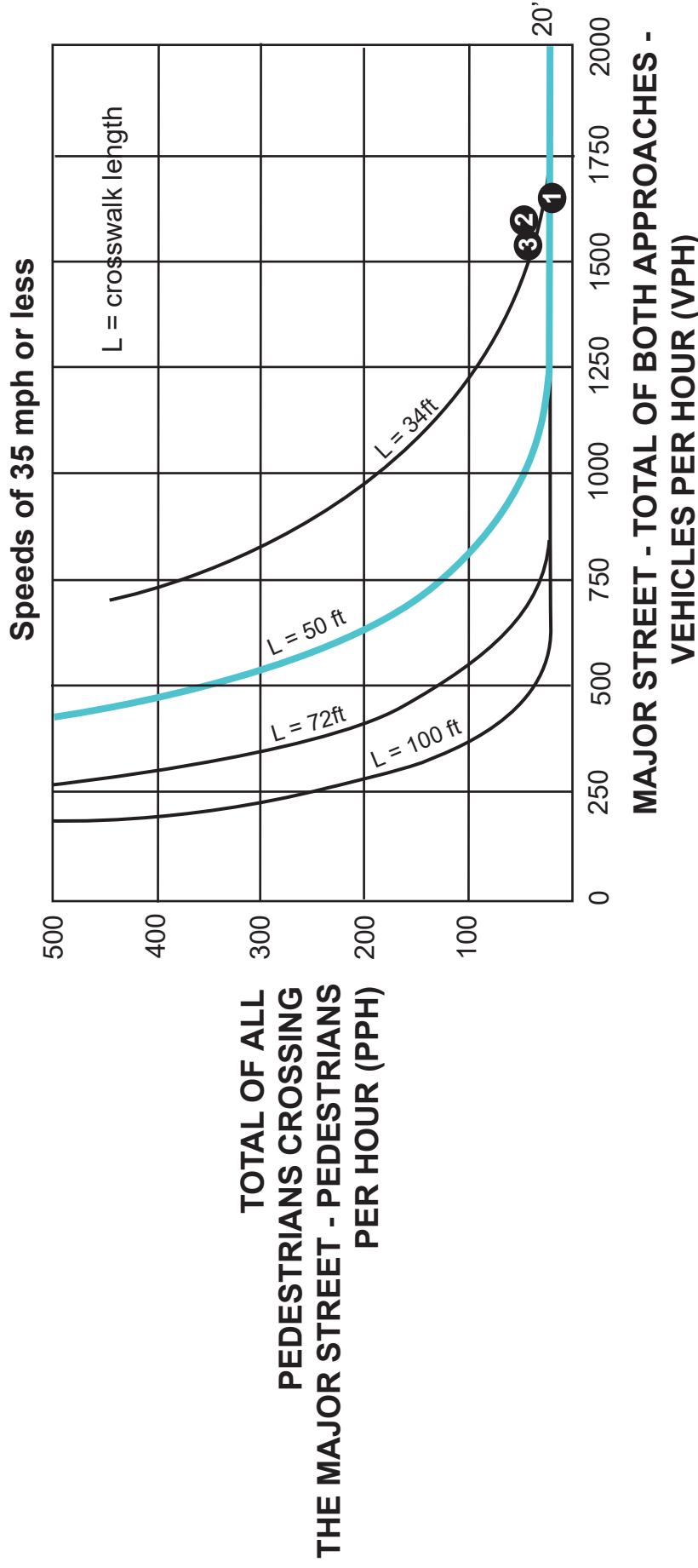
Figure A-2
SR29/128 at Dowdell Lane
PEAK HOUR VOLUME WARRANT #3
(Rural Area)



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Appendix C

Figure 4F-1. Guidelines for the Installation of Pedestrian Hybrid Beacons on Low-Speed Roadways



- 1 Harvest Friday AM Peak Hour Existing without Project
- 2 Harvest Friday PM Peak Hour Existing without Project
- 3 Harvest Saturday PM Peak Hour Existing without Project

* Note: 20 pph applies as the lower threshold volume

Source: 2014 California Manual on Uniform Traffic Control Devices
Farmstead Lodge and Total Project Traffic Study

Figure A-3

Guidelines for the Installation of Pedestrian Hybrid Beacons on Low-Speed Roadways Existing Volumes - SR29/Charter Oak Ave

Appendix D

Appendix D (page 1 of 4)

	Start	End	Lot Start	Lot End	# Employees	12:00 AM	12:30 AM	1:00 AM	1:30 AM	2:00 AM	2:30 AM	3:00 AM	3:30 AM	4:00 AM	4:30 AM	5:00 AM
Lodging	6:00 AM	2:00 PM	5:30 AM	2:30 PM	13											
Lodging	7:00 AM	3:00 PM	6:30 AM	3:30 PM	9											
Lodging	8:00 AM	4:00 PM	7:30 AM	4:30 PM	4											
Lodging	2:00 PM	10:00 PM	1:30 PM	10:30 PM	10											
Lodging	3:00 PM	11:00 PM	2:30 PM	11:30 PM	7											
Lodging	4:00 PM	12:00 AM	3:30 PM	12:30 AM	2	2	2									
Lodging	10:00 PM	6:00 AM	9:30 PM	6:30 AM	2	2	2	2	2	2	2	2	2	2	2	2
Lodging	11:00 PM	7:00 AM	10:30 PM	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
					47	4	4	2	2	2	2	2	2	2	2	2
Restaurant																
Restaurant	5:00 AM	1:00 PM	4:30 AM	1:30 PM	4										4	4
Restaurant	6:30 AM	3:00 PM	6:00 AM	3:30 PM	3											
Restaurant	7:30 AM	4:00 PM	7:00 AM	4:30 PM	2											
Restaurant	9:30 AM	7:30 PM	9:00 AM	8:00 PM	2											
Restaurant	10:00 AM	5:00 PM	9:30 AM	5:30 PM	10											
Restaurant	11:00 AM	7:00 PM	10:30 AM	7:30 PM	3											
Restaurant	11:00 AM	9:00 PM	10:30 AM	9:30 PM	7											
Restaurant	12:00 PM	5:30 PM	11:30 AM	6:00 PM	3											
Restaurant	4:00 PM	12:00 AM	3:30 PM	12:30 AM	9	9	9									
Restaurant	5:00 PM	12:30 AM	4:30 PM	1:00 AM	11	11	11	11								
					54	20	20	11	0	0	0	0	0	0	4	4
					73	24	24	13	2	2	2	2	2	2	6	6

Appendix D (page 2 of 4)

	Start	End	Lot Start	Lot End	# Employees	5:30 AM	6:00 AM	6:30 AM	7:00 AM	7:30 AM	8:00 AM	8:30 AM	9:00 AM	9:30 AM	10:00 AM	10:30 AM	11:00 AM
Lodging	6:00 AM	2:00 PM	5:30 AM	2:30 PM	13	13	13	13	13	13	13	13	13	13	13	13	13
Lodging	7:00 AM	3:00 PM	6:30 AM	3:30 PM	9			9	9	9	9	9	9	9	9	9	9
Lodging	8:00 AM	4:00 PM	7:30 AM	4:30 PM	4					4	4	4	4	4	4	4	4
Lodging	2:00 PM	10:00 PM	1:30 PM	10:30 PM	10												
Lodging	3:00 PM	11:00 PM	2:30 PM	11:30 PM	7												
Lodging	4:00 PM	12:00 AM	3:30 PM	12:30 AM	2												
Lodging	10:00 PM	6:00 AM	9:30 PM	6:30 AM	2	2	2	2									
Lodging	11:00 PM	7:00 AM	10:30 PM	7:30 AM	0	0	0	0	0	0							
					47	15	15	24	22	26	26	26	26	26	26	26	26
Restaurant																	
Restaurant	5:00 AM	1:00 PM	4:30 AM	1:30 PM	4	4	4	4	4	4	4	4	4	4	4	4	4
Restaurant	6:30 AM	3:00 PM	6:00 AM	3:30 PM	3		3	3	3	3	3	3	3	3	3	3	3
Restaurant	7:30 AM	4:00 PM	7:00 AM	4:30 PM	2				2	2	2	2	2	2	2	2	2
Restaurant	9:30 AM	7:30 PM	9:00 AM	8:00 PM	2								2	2	2	2	2
Restaurant	10:00 AM	5:00 PM	9:30 AM	5:30 PM	10									10	10	10	10
Restaurant	11:00 AM	7:00 PM	10:30 AM	7:30 PM	3											3	3
Restaurant	11:00 AM	9:00 PM	10:30 AM	9:30 PM	7											7	7
Restaurant	12:00 PM	5:30 PM	11:30 AM	6:00 PM	3												
Restaurant	4:00 PM	12:00 AM	3:30 PM	12:30 AM	9												
Restaurant	5:00 PM	12:30 AM	4:30 PM	1:00 AM	11												
					54	4	7	7	9	9	9	9	11	21	21	31	31
					73	19	22	31	31	35	35	35	37	47	47	57	57

Appendix D (page 3 of 4)

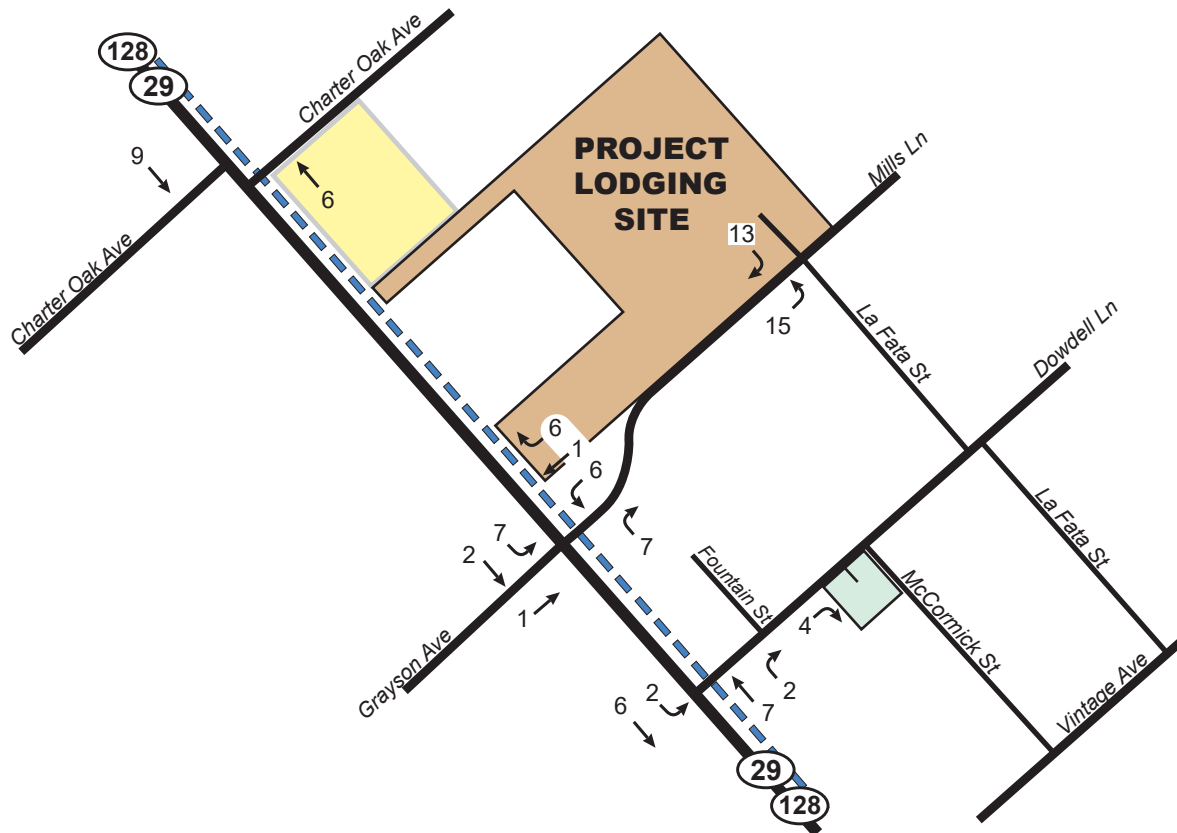
	Start	End	Lot Start	Lot End	# Employees	11:30 AM	12:00 PM	12:30 PM	1:00 PM	1:30 PM	2:00 PM	2:30 PM	3:00 PM	3:30 PM	4:00 PM	4:30 PM	5:00 PM
Lodging	6:00 AM	2:00 PM	5:30 AM	2:30 PM	13	13	13	13	13	13	13	13					
Lodging	7:00 AM	3:00 PM	6:30 AM	3:30 PM	9	9	9	9	9	9	9	9	9	9			
Lodging	8:00 AM	4:00 PM	7:30 AM	4:30 PM	4	4	4	4	4	4	4	4	4	4	4	4	
Lodging	2:00 PM	10:00 PM	1:30 PM	10:30 PM	10					10	10	10	10	10	10	10	10
Lodging	3:00 PM	11:00 PM	2:30 PM	11:30 PM	7							7	7	7	7	7	7
Lodging	4:00 PM	12:00 AM	3:30 PM	12:30 AM	2									2	2	2	2
Lodging	10:00 PM	6:00 AM	9:30 PM	6:30 AM	2												
Lodging	11:00 PM	7:00 AM	10:30 PM	7:30 AM	0												
					47	26	26	26	26	36	36	43	30	32	23	23	19
Restaurant																	
Restaurant	5:00 AM	1:00 PM	4:30 AM	1:30 PM	4	4	4	4	4	4							
Restaurant	6:30 AM	3:00 PM	6:00 AM	3:30 PM	3	3	3	3	3	3	3	3	3	3			
Restaurant	7:30 AM	4:00 PM	7:00 AM	4:30 PM	2	2	2	2	2	2	2	2	2	2	2	2	
Restaurant	9:30 AM	7:30 PM	9:00 AM	8:00 PM	2	2	2	2	2	2	2	2	2	2	2	2	2
Restaurant	10:00 AM	5:00 PM	9:30 AM	5:30 PM	10	10	10	10	10	10	10	10	10	10	10	10	10
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Restaurant	11:00 AM	9:00 PM	10:30 AM	9:30 PM	7	7	7	7	7	7	7	7	7	7	7	7	7
Restaurant	12:00 PM	5:30 PM	11:30 AM	6:00 PM	3	3	3	3	3	3	3	3	3	3	3	3	3
Restaurant	4:00 PM	12:00 AM	3:30 PM	12:30 AM	9									9	9	9	9
Restaurant	5:00 PM	12:30 AM	4:30 PM	1:00 AM	11											11	11
					54	34	34	34	34	34	30	30	30	39	36	47	45
					73	60	60	60	60	70	66	73	60	71	59	70	64

Appendix D (page 4 of 4)

	Start	End	Lot Start	Lot End	# Employees	5:30 PM	6:00 PM	6:30 PM	7:00 PM	7:30 PM	8:00 PM	8:30 PM	9:00 PM	9:30 PM	10:00 PM	10:30 PM	11:00 PM	11:30 PM
Lodging	6:00 AM	2:00 PM	5:30 AM	2:30 PM	13													
Lodging	7:00 AM	3:00 PM	6:30 AM	3:30 PM	9													
Lodging	8:00 AM	4:00 PM	7:30 AM	4:30 PM	4													
Lodging	2:00 PM	10:00 PM	1:30 PM	10:30 PM	10	10	10	10	10	10	10	10	10	10	10	10		
Lodging	3:00 PM	11:00 PM	2:30 PM	11:30 PM	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Lodging	4:00 PM	12:00 AM	3:30 PM	12:30 AM	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Lodging	10:00 PM	6:00 AM	9:30 PM	6:30 AM	2									2	2	2	2	2
Lodging	11:00 PM	7:00 AM	10:30 PM	7:30 AM	0											0	0	0
					47	19	19	19	19	19	19	19	19	21	21	21	11	11
Restaurant																		
Restaurant	5:00 AM	1:00 PM	4:30 AM	1:30 PM	4													
Restaurant	6:30 AM	3:00 PM	6:00 AM	3:30 PM	3													
Restaurant	7:30 AM	4:00 PM	7:00 AM	4:30 PM	2													
Restaurant	9:30 AM	7:30 PM	9:00 AM	8:00 PM	2	2	2	2	2	2	2							
Restaurant	10:00 AM	5:00 PM	9:30 AM	5:30 PM	10	10												
Restaurant	11:00 AM	7:00 PM	10:30 AM	7:30 PM	3	3	3	3	3	3								
Restaurant	11:00 AM	9:00 PM	10:30 AM	9:30 PM	7	7	7	7	7	7	7	7	7	7				
Restaurant	12:00 PM	5:30 PM	11:30 AM	6:00 PM	3	3	3											
Restaurant	4:00 PM	12:00 AM	3:30 PM	12:30 AM	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Restaurant	5:00 PM	12:30 AM	4:30 PM	1:00 AM	11	11	11	11	11	11	11	11	11	11	11	11	11	11
					54	45	35	32	32	32	29	27	27	27	20	20	20	20
					73	64	54	51	51	51	48	46	46	48	41	41	31	31

Appendix E

Not To Scale



FRIDAY AM PEAK HOUR



Farmstead Restaurant
& Farmers Market



- Proposed Lodge, Restaurant and
Farmers Market Employee Parking Lot

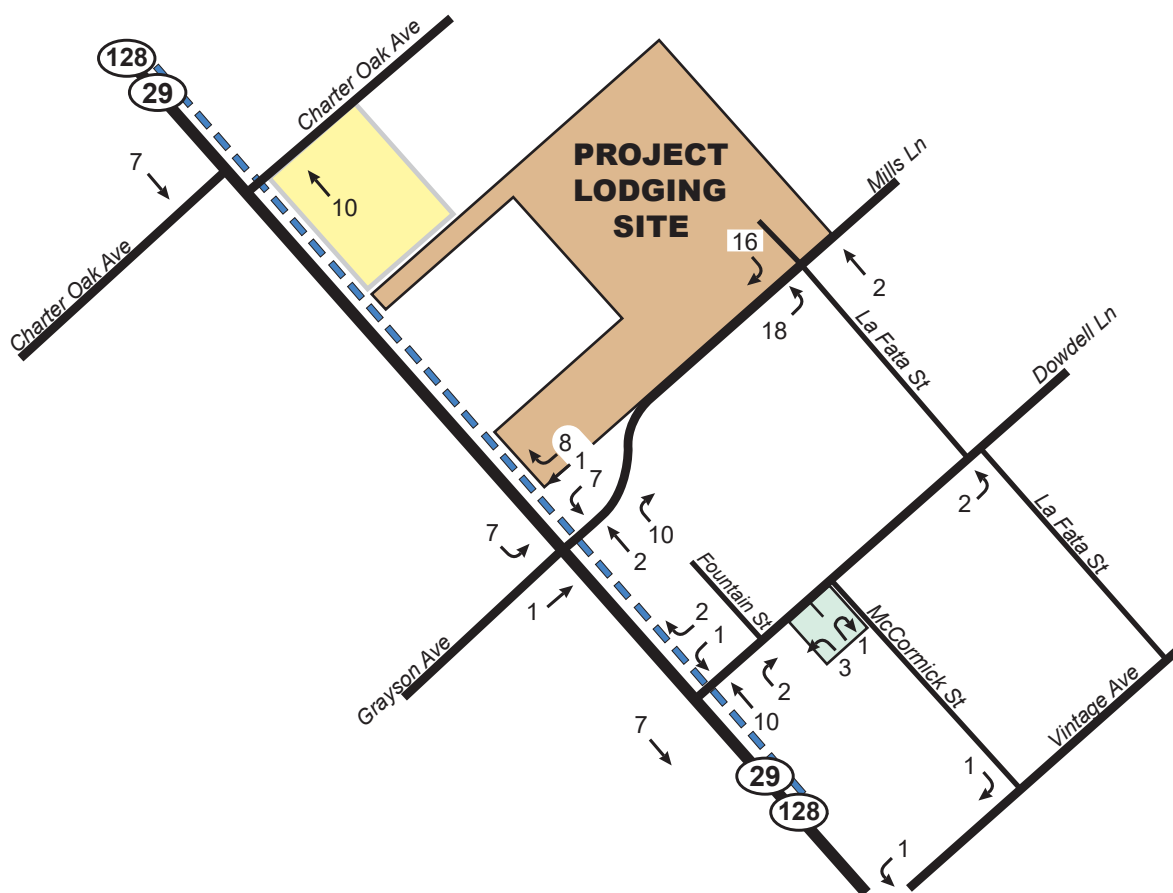
--- - Napa Wine Train

Farmstead Lodge and Total Project Traffic Study

Figure A-4
Friday AM Peak Hour
Lodging Employee & Guest Traffic Distribution



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FRIDAY PM PEAK HOUR



Farmstead Restaurant
& Farmers Market



- Proposed Lodge, Restaurant and
Farmers Market Employee Parking Lot

— — — — — - Napa Wine Train

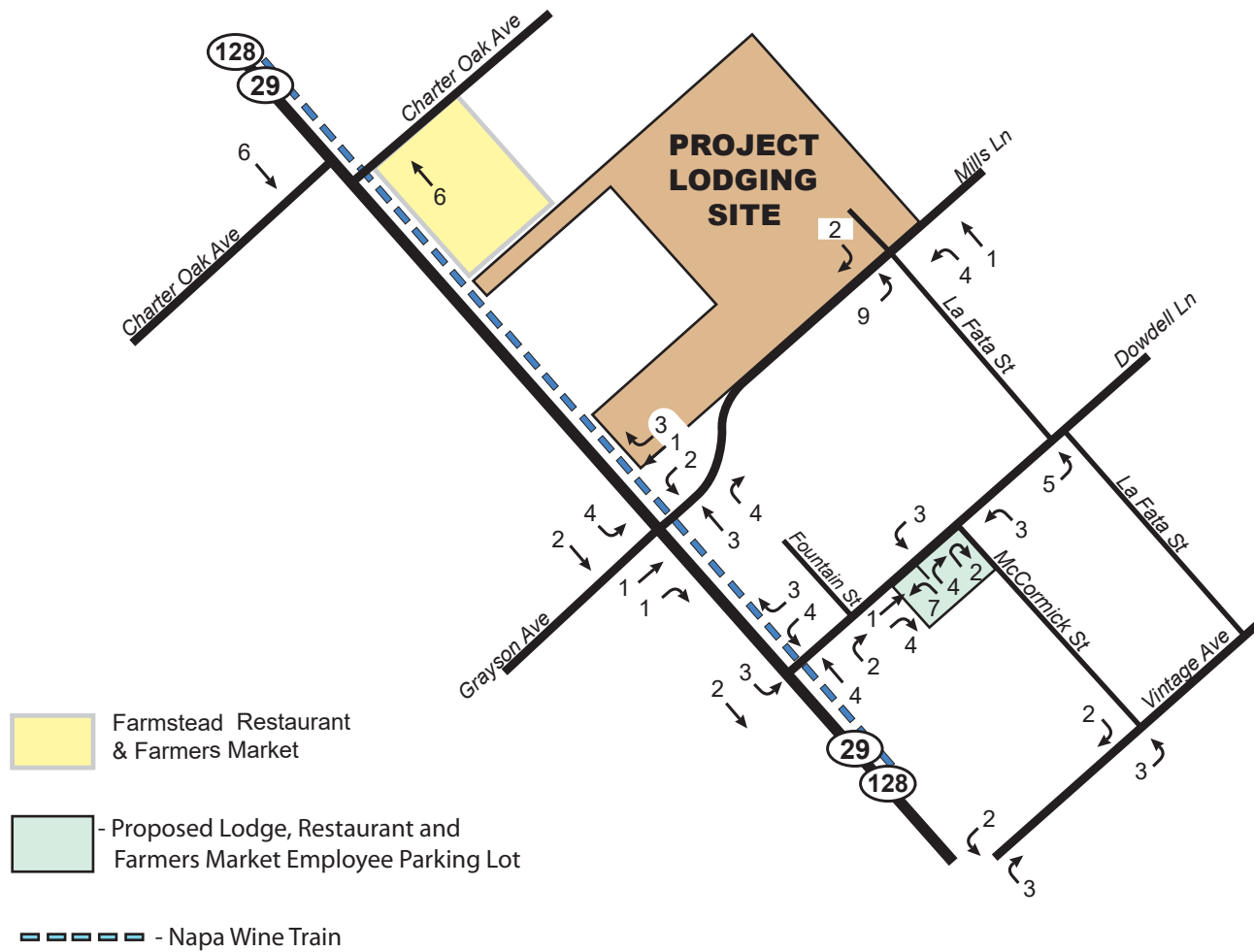
Farmstead Lodge and Total Project Traffic Study



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Figure A-5
Friday PM Peak Hour
Lodging Employee & Guest Traffic Distribution

Not To Scale



SATURDAY PM PEAK HOUR

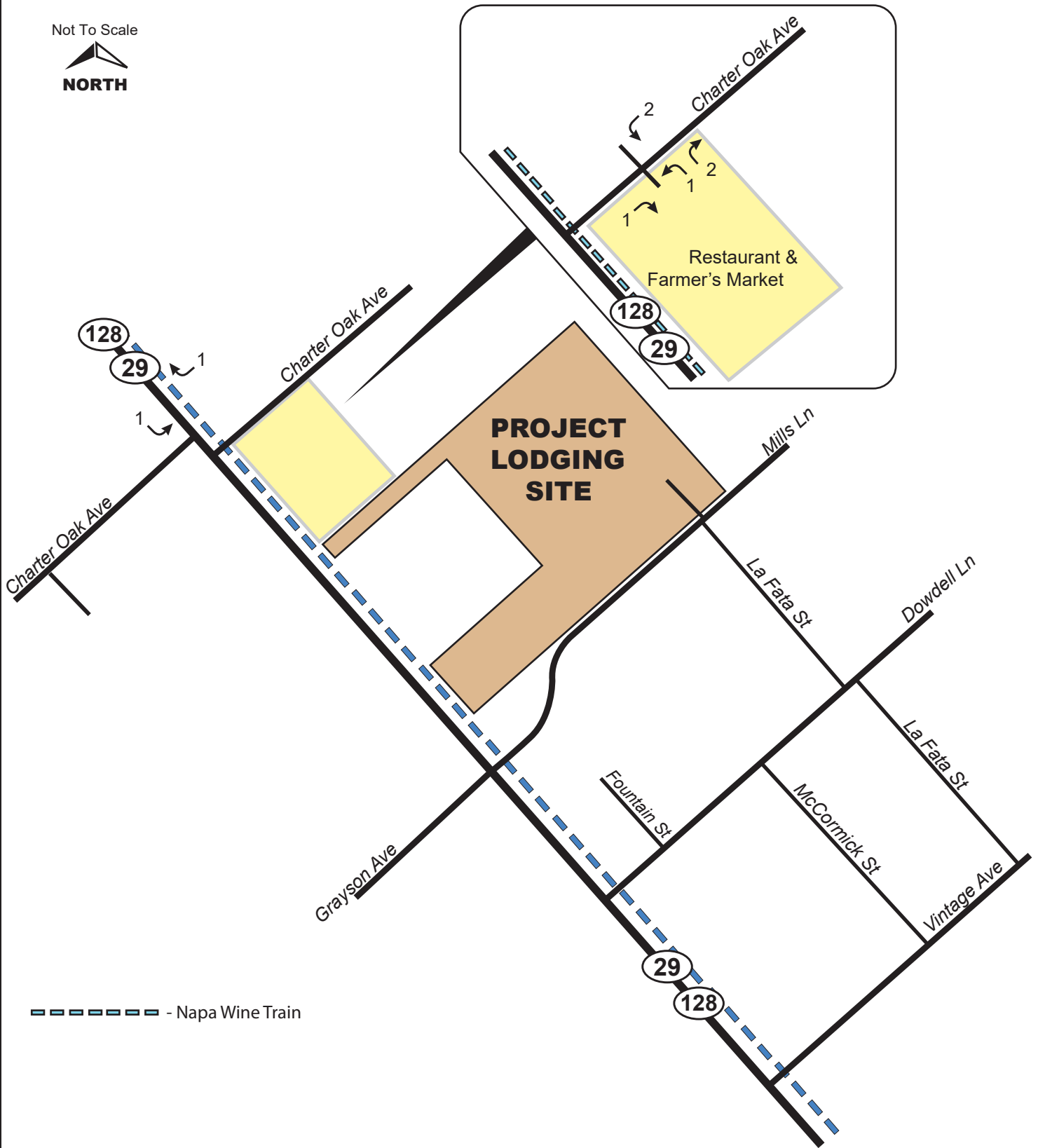
Farmstead Lodge and Total Project Traffic Study

Figure A-6
Saturday PM Peak Hour
Lodging Employee & Guest Traffic Distribution



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Not To Scale



--- - Napa Wine Train

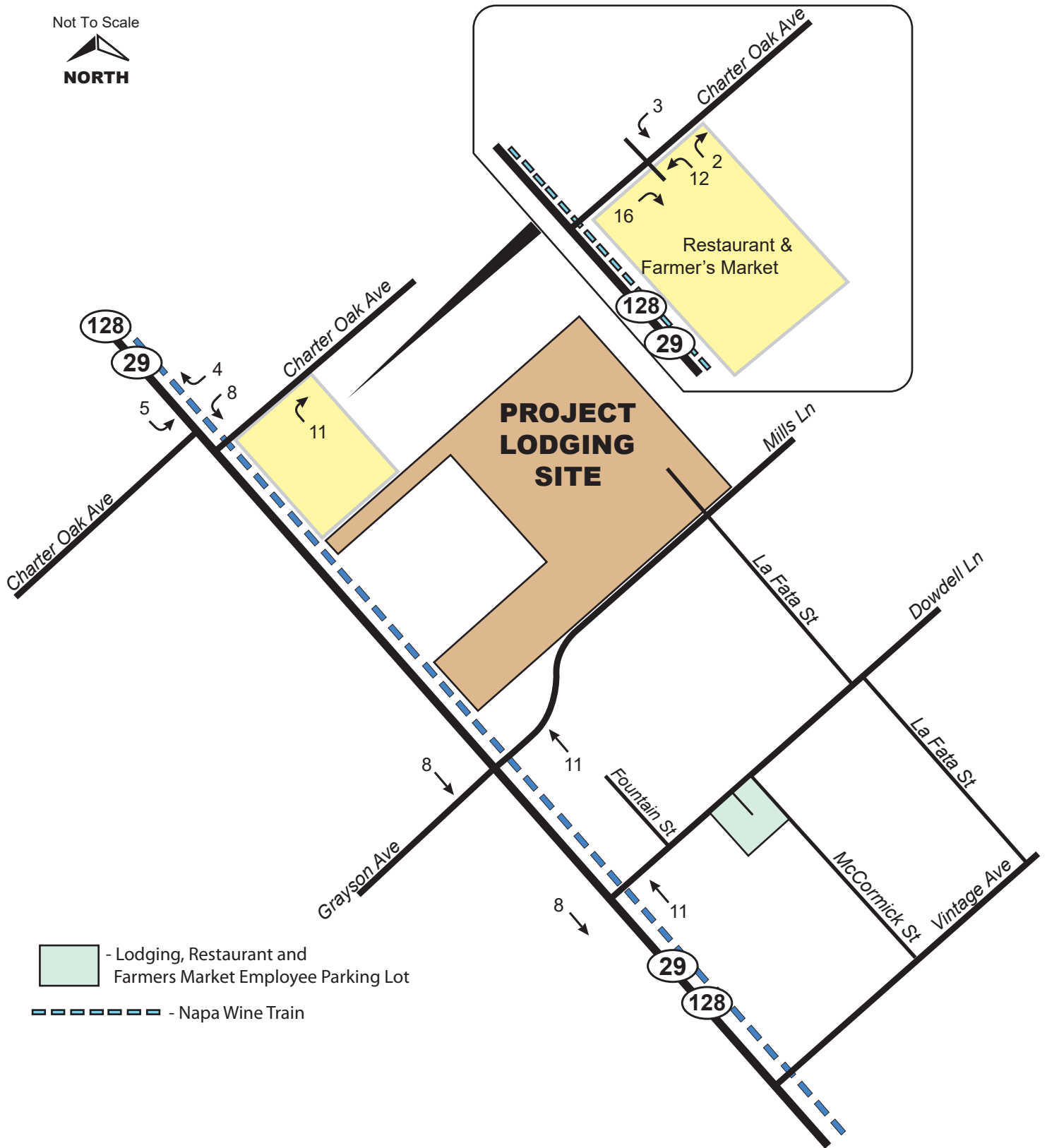
Farmstead Lodge and Total Project Traffic Study

Figure A-7
Butcher Shop Customers
Friday and Saturday PM Peak Hour Volumes



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Not To Scale



Farmstead Lodge and Total Project Traffic Study

Figure A-8
Harvest Friday or Saturday
200 Person Event - PM Peak Hour Volumes
with Mills Lane Improved and Realigned



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