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Traffic Study

Grassi Family Winery P15-00339-UP
Planning Commission Hearing Date (February 1, 2017)

TRAFFIC IMPACT REPORT

GRASSI WINERY

December 8, 2015

Prepared for: **GRASSI WINERY**

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I. INTRODUCTION

This traffic report has been prepared at the request of the Napa County Public Works and Planning, Building and Environmental Sciences Departments as authorized by the Grassi Winery applicant. It has determined if traffic from the proposed Grassi Winery will result in any significant impacts to the local circulation system and the need for any mitigation measures. **Figure 1** shows the winery location along the Silverado Trail corridor in the Napa Valley.

II. SCOPE OF SERVICES

The scope of service for this traffic study was approved by the Napa County Public Works and the Planning, Building and Environmental Sciences departments. Evaluation was conducted for harvest Friday PM commute and Saturday afternoon peak traffic conditions. Existing (2015), year 2020 and year 2030 (Cumulative – General Plan Buildout) horizons were evaluated both with and without project traffic. Operating conditions along Soda Canyon Road and Silverado Trail as well as at the Silverado Trail intersections with Oak Knoll Avenue, Soda Canyon Road and Trancas Street were evaluated for all analysis scenarios based upon significance criteria contained in the General Plan and/or utilized in all recent County traffic studies. In addition, the project driveway intersection with Soda Canyon Road was evaluated for sight line adequacy as well as the need for a left turn lane. Significant impacts, if any, were identified and measures listed, if needed, to mitigate all impacts to a less than significant level.

III. SUMMARY OF FINDINGS

A. "WITHOUT PROJECT" OPERATING CONDITIONS

1. Existing Volumes – Harvest 2015

Analysis peak traffic hours were based upon the highest volumes surveyed along Silverado Trail found during counts for this study as well as from counts for three other studies for nearby wineries completed over the past two years. Along Silverado Trail, two-way volumes north of Trancas Street and north of Soda Canyon Road are higher during the Friday PM peak hour compared to the Saturday PM peak hour (north of Trancas Street about 1,625 Friday PM peak hour vehicles versus about 1,210 Saturday PM peak hour vehicles and north of Soda Canyon Road about 1,555 Friday PM peak hour vehicles versus about 1,285 Saturday PM peak hour vehicles). Volumes along Soda Canyon Road at the project entrance were also higher during the Friday PM peak hour compared to the Saturday PM peak hour (180 vehicles during the Friday PM peak hour versus about 155 vehicles during the Saturday PM peak hour). The driveway serving the project site had 1 vehicle during the Friday PM peak hour versus 3 vehicles during the Saturday PM peak hour.

2. Year 2015 Harvest – Circulation System Unacceptable Operation

INTERSECTIONS

- **Silverado Trail/Soda Canyon Road**
  - Friday & Saturday PM peak traffic hours

ROADWAY SEGMENTS

- **Silverado Trail**
  - Friday PM Peak Hour – Southbound from north of Oak Knoll Avenue to Trancas Street
  - Saturday PM Peak Hour – Southbound from Soda Canyon Road to Trancas Street

3. Year 2020 Harvest – Circulation System Unacceptable Operation

INTERSECTIONS

- **Silverado Trail/Soda Canyon Road**
  - Friday & Saturday PM peak traffic hours

ROADWAY SEGMENTS

- **Silverado Trail**
  - Friday PM Peak Hour – Southbound from north of Oak Knoll Avenue to Trancas Street
  - Saturday PM Peak Hour – Southbound from Soda Canyon Road to Trancas Street

4. Year 2030 Harvest – Circulation System Unacceptable Operation

INTERSECTIONS

- **Silverado Trail/Soda Canyon Road**
  - Friday & Saturday PM peak traffic hours

ROADWAY SEGMENTS

- **Silverado Trail**
  - Friday and Saturday PM Peak Hours – Southbound from north of Oak Knoll Avenue to Trancas Street

B. PROJECT IMPACTS

1. **Project Trip Generation**
The proposed project will result in the following trip generation during harvest Friday and Saturday PM peak traffic hours.

PROJECT TRIP GENERATION

HARVEST

FRIDAY PM PEAK HOUR* (4:30-5:30)		SATURDAY PM PEAK HOUR* (4:00-5:00)	
INBOUND TRIPS	OUTBOUND TRIPS	INBOUND TRIPS	OUTBOUND TRIPS
0	1	1	1

* Peak traffic hours along Silverado Trail.

Trips during the Friday and Saturday PM peak hours will be visitors by appointment.

2. Year 2015 Existing + Project Off-Cite Circulation Impacts – Harvest
The proposed project would not result in any significant off-site level of service impacts to Silverado Trail or Soda Canyon Road or to the Silverado Trail intersections with Trancas Street, Soda Canyon Road or Oak Knoll Avenue. The project would not degrade operation from acceptable to unacceptable at any analyzed location and/or increase peak hour volumes by 1 percent or greater at any location already experiencing unacceptable "Without Project" operation.

3. Year 2020 Existing + Project Off-Site Circulation Impacts – Harvest
The proposed project would not result in any significant off-site level of service impacts to Silverado Trail or Soda Canyon Road or to the Silverado Trail intersections with Trancas Street, Soda Canyon Road or Oak Knoll Avenue. The project would not degrade operation from acceptable to unacceptable at any analyzed location and/or increase peak hour volumes by 1 percent or greater at any location already experiencing unacceptable "Without Project" operation.

4. Year 2030 Existing + Project Off-Site Circulation Impacts – Harvest
The proposed project would not result in any significant off-site level of service impacts to Silverado Trail or Soda Canyon Road or to the Silverado Trail intersections with Trancas Street, Soda Canyon Road or Oak Knoll Avenue. The project would not degrade operation from acceptable to unacceptable at any analyzed location and/or increase peak hour volumes by 1 percent or greater at any location already experiencing unacceptable "Without Project" operation.

5. **Left Turn Lane on Soda Canyon Road at Project Entrance**
Daily volumes on Soda Canyon Road in combination with those on the project driveway will not meet County left turn lane warrant criteria.

6. **Sight Lines at Project Driveway**
The project driveway connects to Soda Canyon Road at a 30-degree angle. Although sight lines are acceptable at the project's driveway connection, the angled connection forces drivers to turn excessively in their seats to see westbound traffic.

7. **Marketing Events**
The three proposed marketing events each year would not add traffic to the local circulation system during peak weekday or weekend traffic hours.

8. **Recommendations**
The project driveway connection to Soda Canyon Road should be realigned to provide a 90-degree approach.

C. CONCLUSIONS & RECOMMENDATIONS

The project will result in no significant off-site circulation system operational impacts to Silverado Trail, Soda Canyon Road or to the Silverado Trail intersections with Trancas Street, Soda Canyon Road or Oak Knoll Avenue. A left turn lane will not be warranted on the westbound Soda Canyon Road approach to the project driveway. In addition, sight lines at the project driveway connection to Soda Canyon Road are and will be acceptable. The only recommendation is to realign the project driveway connection to Soda Canyon Road from its existing 30-degree approach to a 90-degree approach.

IV. PROJECT LOCATION & DESCRIPTION

The Grassi Winery site is located on the south side of Soda Canyon Road with a driveway located about 660 feet east of the Silverado Trail/Soda Canyon Road intersection (see **Figure 2**). The current driveway connection will be maintained.

The proposed Grassi Winery production and visitation would be as follows.

- 25,000 gallons per year production.
- 8 employees.
- Bottling on-site.
- 80% grapes will be grown off site. New grapes will be transported to the site in about 25 trucks spread over about 9 days. Five truck trips now hauling grapes from the site will be eliminated.
- Tours and tasting by appointment only – 7 days per week from 10:00 AM to 6:00 PM, 10 visitors/day maximum on weekdays and 12 visitors/day maximum on weekend days.

- Marketing event – 1 per year, maximum 75 visitors per event. Any day of the week starting after 6:00 PM.
- Marketing events – 2 per year, maximum 40 visitors per event. Any day of the week starting after 6:00 PM.

V. CIRCULATION SYSTEM EVALUATION PROCEDURES

A. ANALYSIS LOCATIONS

At County direction, the following locations have been evaluated.

1. **Silverado Trail/Soda Canyon Road intersection (the Soda Canyon Road approach is stop sign controlled).**

2. **Silverado Trail/Oak Knoll Avenue intersection (the Oak Knoll Avenue approach is stop sign controlled).**

3. **Silverado Trail/Trancas Street intersection (signalized).**

4. **Soda Canyon Road/Project Driveway intersection.**

5. **Silverado Trail two-lane highway segments just north of Oak Knoll Avenue, just north and south of Soda Canyon Road and north of Trancas Street, and Soda Canyon Road just east of Silverado Trail.**

The three major intersections along Silverado Trail requested for analysis are shown in **Figure 3** along with schematic presentation of intersection approach lanes and control.

B. ROADWAY DESCRIPTION

Silverado Trail provides subregional access to the project vicinity, while Soda Canyon Road provides direct access to the project entrance. Silverado Trail is a two-lane highway with a 55 mile per hour posted speed limit near the project site. It extends from Trancas Street on the south near the City of Napa northerly through the Napa Valley to its terminus at State Route 29 in the City of Calistoga. Silverado Trail has two well-paved travel lanes and wide paved shoulders that are signed and striped as Class II bicycle lanes in the project study area.

Soda Canyon Road is a two-lane collector roadway extending in a general northeasterly direction from its intersection with Silverado Trail. It ends about 7 miles from Silverado Trail. There is no posted speed limit between the project driveway and Silverado Trail intersection. However, the posted speed limit east of the project driveway is 45 miles per hour, with 30 mile

per hour speed advisory signs posted on the approaches to a curve just east of the project driveway intersection.

C. VOLUMES

1. ANALYSIS SEASONS AND DAYS OF THE WEEK

At County request project traffic impacts have been evaluated during harvest conditions. 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).

In regards to the peak traffic days of the week, the recently released Napa County Travel Behavioral Study[1] 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 at all analysis locations in this study. In addition, Sunday noon to 5:00 PM turn movement counts were conducted at the Soda Canyon Road/Grassi driveway intersection.

2. COUNT RESULTS

Friday 3:00 to 6:00 PM and Saturday noon to 6:00 PM turn movement counts were conducted by Crane Transportation Group (CTG) in mid November 2015 at the Silverado Trail intersections with Trancas Street, Soda Canyon Road and Oak Knoll Avenue as well as at the Soda Canyon Road intersection with the Grassi residence driveway (that will serve as the project entrance). In addition, Sunday noon to 5:00 PM turn movement counts were conducted at the Silverado Trail and Soda Canyon Road/Grassi driveway intersections. Resultant November 2015 peak hour counts are presented in **Appendix Figures 1, 2** and **3**. Since Sunday PM peak hour volumes passing through the Silverado Trail/Soda Canyon Road intersection were about 33 percent less than during the Saturday PM peak hour, no further Sunday analysis was conducted. Daily traffic counts were also conducted as part of this study on Soda Canyon Road at the Grassi project entrance as well as on the Grassi driveway from Tuesday to Friday, November 16-20, 2015. Results are also presented in the **Appendix**.

3. SEASONAL ADJUSTMENTS

Review was conducted of the 2015 mid November traffic counts in comparison to harvest (September) 2014 Friday and Saturday PM peak hour volumes surveyed and developed as part of other recent winery traffic studies[2] at the Silverado Trail/Soda Canyon Road intersection.

[1] Fehr & Peers, December 8, 2014.

[2] Mountain Peak Winery, Reynolds Winery Expansion, Corona Winery.

Seasonal factors were developed to adjust the November 2015 volumes to harvest 2015 conditions at this location, and were then utilized to increase November volumes at the Silverado Trail intersections with Trancas Street and Oak Knoll Avenue to also reflect harvest conditions. Overall, mid November PM peak hour volumes along Silverado Trail would be expected to increase by about 20 percent on Friday and 12 percent on Saturday to reflect harvest conditions, while November PM peak hour volumes along Soda Canyon Road would be expected to increase by about 30 percent on Friday and 90 percent on Saturday.

Resultant 2015 harvest Friday and Saturday PM peak hour volumes are presented in **Figures 4** and **5**, respectively.

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 2000 *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 2010 *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, although overall delay is also typically reported for intersections along major highways. 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.

2. MINIMUM ACCEPTABLE OPERATION

Napa County has no published minimum level of service standards for unsignalized public road or private driveway intersections. The County General Plan (Policy CIR-16) states that the County shall seek to maintain an arterial Level of Service D or better on all County roadways except where maintaining this desired level of service would require installation of more travel lanes than shown on the Circulation Map. For this study, LOS D has been used for unsignalized intersections as the poorest acceptable operation for the entire intersection, with LOS E as the poorest acceptable operation for a side street stop sign controlled intersection approach. The reason for use of LOS E as the criteria for individual movements and LOS D as the criteria for the overall intersection is that the poorest operation at an unsignalized intersection is typically a specific stop sign controlled movement, unless side street volumes are high, in which case both the overall intersection and stop sign controlled movement are LOS F. Stop sign controlled intersections along Silverado Trail with low volumes of side street traffic tend to have poor stop sign controlled levels of service, but good to acceptable overall operation. As side street volumes increase, overall intersection operation also tends to degrade, but will usually remain one or more levels of service better than the stop sign controlled movement. When overall operation also degrades to LOS E or F operation, it is an indication of large volumes on the stop sign controlled approach, and the potential need for intersection signalization. The combined use of both criteria allows the County to identify those stop sign controlled intersections that have unacceptable delay for side street traffic as well as a sufficient amount of side street traffic that may meet signal warrant criteria levels.

E. ROADWAY SEGMENT LEVEL OF SERVICE

1. ANALYSIS METHODOLOGY

Roadway segment operation for Silverado Trail and Soda Canyon Road has been evaluated based upon criteria developed for Napa County roadways as part of the County General Plan Update in 2007: Napa County General Plan Update EIR – Technical Memorandum for Traffic and Circulation Supporting the Findings and Recommendations by Dowling Associates, February 2007. Table 5 in this report, "Peak Hour Roadway Capacities," shows the following directional capacity limit-level of service relationships for a two-lane rural highway, such as Silverado Trail, and a two-lane rural collector, such as Soda Canyon Road.

ROADWAY SEGMENT CAPACITIES

		LOS A	LOS B	LOS C	LOS D	LOS E
2-Lane Rural Highway – Silverado Trail	Maximum Peak Direction Volumes	100	330	620	870	1200
	Volume/Capacity Ratio	(.08)	(.28)	(.52)	(.73)	(1.00)
2-Lane Collector – Soda Canyon Road (Near Silverado Trail)	Maximum Peak Direction Volumes	73	97	480	760	810
	Volume/Capacity Ratio	(.09)	(.12)	(.59)	(.94)	(1.00)

2. MINIMUM ACCEPTABLE OPERATION

Level of service D (LOS D) is the poorest acceptable roadway segment operation in Napa County.

F. PLANNED IMPROVEMENTS

There are no planned and funded circulation system capacity improvements at any location evaluated in this study.[3]

VI. FUTURE HORIZON TRAFFIC VOLUME PROJECTIONS

Traffic analysis has been conducted for existing, year 2020 and year 2030 horizons at County request. The 2030 horizon reflects the County General Plan Buildout year, while 2020 reflects a near term horizon year after the proposed winery should be at full production. Traffic modeling for the General Plan shows about a 13 to 16 percent growth in two-way weekday PM peak hour traffic along Silverado Trail in the project area between 2015 and 2030, with a 10 to 15 percent growth along Trancas Street and a 9 percent growth along Oak Knoll Avenue. Projecting straight line traffic growth for analysis purposes, this translates into about a 5 percent growth in two-way PM peak hour traffic along Silverado Trail, 4 to 5 percent along Trancas Street and 3 percent along Oak Knoll Avenue from 2015 to 2020.

No traffic modeling projections were available for Soda Canyon Road. Therefore, County staff provided information about four wineries that are approved or proposed along Soda Canyon Road and have been assumed constructed and in full operation by 2020. The list of projects and their expected Friday and Saturday PM peak hour harvest trip generation are provided in **Table 3**. In addition to traffic from these specific developments, a 1 percent per year growth rate was also projected for Soda Canyon Road traffic. These developments and growth rate result in about a 30 percent growth in weekday PM peak hour harvest traffic along Soda Canyon Road near Silverado Trail from 2015 to 2030.

Traffic modeling projections were also not available for Saturday PM peak hour conditions along any analysis roadway. Therefore, volumes on all roadways were uniformly increased by the PM percentages detailed above for weekday PM peak hour conditions.

Resultant year 2020 harvest "Without Project" PM peak hour volumes are presented in **Figures 6** and **7** for Friday and Saturday conditions, respectively, while year 2030 harvest "Without Project" PM peak hour volumes are presented in **Figures 8** and **9** for Friday and Saturday conditions, respectively.

[3] Mr. Rick Marshall, P.E., Napa County Public Works Department, November 2015.

VII. OFF-SITE CIRCULATION SYSTEM OPERATION – WITHOUT PROJECT

1. EXISTING OPERATING CONDITIONS (WITHOUT PROJECT)

A. HARVEST

1. INTERSECTION LEVEL OF SERVICE (Silverado Trail/Trancas Street, Silverado Trail/Soda Canyon Road, Silverado Trail/Oak Knoll Avenue) – Table 4

a) Friday PM Peak Hour

Acceptable overall operation at all three intersections.
Unacceptable Soda Canyon Road stop sign controlled operation: LOS F

b) Saturday PM Peak Hour

Acceptable overall operation at all three intersections.
Unacceptable Soda Canyon Road stop sign controlled operation: LOS F

2. ROADWAY SEGMENT LEVEL OF SERVICE (Silverado Trail & Soda Canyon Road) – Table 5

a) Friday PM Peak Hour

Silverado Trail: Acceptable operation northbound, but **unacceptable LOS E or F operation southbound from north of Soda Canyon Road to Trancas Street.**

Soda Canyon Road (near Silverado Trail): Acceptable operation.

b) Saturday PM Peak Hour

Silverado Trail: Acceptable operation northbound, but **unacceptable LOS E or F operation southbound from Soda Canyon Road to Trancas Street**.

Soda Canyon Road (near Silverado Trail): Acceptable operation.

2. YEAR 2020 OPERATING CONDITIONS (WITHOUT PROJECT)

A. HARVEST

1. INTERSECTION LEVEL OF SERVICE (Silverado Trail/Trancas Street, Silverado Trail/Soda Canyon Road, Silverado Trail/Oak Knoll Avenue) – Table 6

a) Friday PM Peak Hour

Acceptable overall operation at Silverado Trail/Trancas Street and Silverado Trail/Oak Knoll Avenue.
Unacceptable overall operation at Silverado Trail/Soda Canyon Road: LOS F
Unacceptable Soda Canyon Road stop sign controlled operation: LOS F

b) Saturday PM Peak Hour

Acceptable overall operation at all three intersections.
Unacceptable Soda Canyon Road stop sign controlled operation: LOS F

3. ROADWAY SEGMENT LEVEL OF SERVICE (Silverado Trail & Soda Canyon Road) – Table 7

a) Friday PM Peak Hour

Silverado Trail: Acceptable operation northbound, but **unacceptable LOS E or F operation southbound from north of Oak Knoll Avenue to Trancas Street.**

Soda Canyon Road (near Silverado Trail): Acceptable operation.

b) Saturday PM Peak Hour

Silverado Trail: Acceptable operation northbound, but **unacceptable LOS E or F operation southbound from Soda Canyon Road to Trancas Street.**

Soda Canyon Road (near Silverado Trail): Acceptable operation.

3. YEAR 2030 OPERATING CONDITIONS (WITHOUT PROJECT)

A. HARVEST

1. INTERSECTION LEVEL OF SERVICE (Silverado Trail/Trancas Street, Silverado Trail/Soda Canyon Road, Silverado Trail/Oak Knoll Avenue) – Table 8

a) Friday PM Peak Hour

Acceptable overall operation at Silverado Trail/Trancas Street and Silverado Trail/Oak Knoll Avenue.
Unacceptable overall operation at Silverado Trail/Soda Canyon Road: LOS F
Unacceptable Soda Canyon Road stop sign controlled operation: LOS F

b) Saturday PM Peak Hour

Acceptable overall operation at all three intersections.
Unacceptable Soda Canyon Road stop sign controlled operation: LOS F

3. ROADWAY SEGMENT LEVEL OF SERVICE (Silverado Trail & Soda Canyon Road) – Table 9

a) Friday PM Peak Hour

Silverado Trail: Acceptable operation northbound, but **unacceptable LOS F operation southbound from north of Oak Knoll Avenue to Trancas Street.**

Soda Canyon Road (near Silverado Trail): Acceptable operation.

b) Saturday PM Peak Hour

Silverado Trail: Acceptable operation northbound, but **unacceptable LOS E or F operation southbound from north of Oak Knoll Avenue to Trancas Street.**

Soda Canyon Road (near Silverado Trail): Acceptable operation.

VIII. PROJECT IMPACT EVALUATION SIGNIFICANCE CRITERIA

A. SIGNIFICANCE CRITERIA

The following criteria were developed for recent traffic impact analyses in the County. These same criteria have been utilized in this study to determine the significance of impacts due to the project. An impact is considered to be significant if any of the following conditions are met.

- If a roadway segment has "Without Project" LOS A, B, C or D operation and deteriorates to LOS E or F operation with the addition of project traffic (and increases volumes by 1 percent or more), the impact is significant and would require mitigation.

- If a roadway segment already has "Without Project" unacceptable LOS E or F operation, an increase in directional traffic of 1 percent or greater is considered significant and would require mitigation.

- If an unsignalized intersection has "Without Project" overall LOS A, B, C or D operation and deteriorates to LOS E or F operation with the addition of project traffic (and increases volumes by 1 percent or more) – or – has a stop sign controlled movement operating at LOS A, B, C, D or E and deteriorates to LOS F with the additional project traffic (and increases volumes by 1 percent or more), the impact is considered significant and would require mitigation.

- If an unsignalized intersection already has "Without Project" overall LOS E or F operation – or – if a stop sign controlled movement or approach is already operating at LOS F, an increase in traffic passing through the intersection of 1 percent or more due to the project is considered to be significant and would require mitigation.

- If projected daily volumes on the project driveway in combination with volumes on the roadway providing access to the project driveway meet County warrant criteria for provision of a left turn lane on the approach to the project entrance.

- If sight lines at project access driveways do not meet Caltrans stopping sight distance criteria based upon prevailing vehicle speeds.

IX. PROJECT TRIP GENERATION & DISTRIBUTION

A. TRIP GENERATION

Friday AM and PM peak hour and Saturday afternoon peak hour harvest trip generation projections were developed with the assistance of the project applicant and their representative for all components of the proposed Grassi Winery (see worksheets in the **Appendix**). Results are presented on an hourly basis in **Tables 10** and **11** for harvest Friday and Saturday conditions, respectively. A summary of peak hour trips associated with the winery is presented in **Table 12**. During the harvest Friday PM peak traffic hour there would be a projected 0 new inbound and 1 new outbound vehicle. During the harvest Saturday PM peak traffic hour, there would be a projected 1 new inbound and 1 new outbound vehicle. All traffic during these peak hours would be associated with visitation. The three expected grape deliveries per day during harvest could be scheduled any time between 8:00 AM and 2:00 PM.

B. TRIP DISTRIBUTION

Project traffic was distributed to Silverado Trail in a pattern reflective of existing vehicle distribution patterns. During the Friday PM peak hour there would only be 1 trip (an outbound visitor vehicle) and it would be expected to make a left turn from the site to Soda Canyon Road and then another left turn to southbound Silverado Trail. The vast majority (about 85%) of Friday PM peak hour traffic now turning from Soda Canyon Road to Silverado Trail now turns left to go southbound. During the Saturday afternoon peak traffic hour, there would be about a 40/60 distribution of inbound traffic from the north and south on Silverado Trail, while about 80 percent of outbound traffic would be expected to make a left turn from the site to go southbound on Silverado Trail.

The harvest Friday and Saturday project traffic increments expected on Soda Canyon Road and Silverado Trail during the times of ambient peak traffic flows through the Silverado Trail/Soda Canyon Road intersection are presented in **Figures 10** and **11**. Friday and Saturday Existing "With Project" peak hour volumes are presented in **Figure 12** and **13**; Friday and Saturday year 2020 "With Project" peak hour volumes are presented in **Figures 14** and **15**, and Friday and Saturday year 2030 "With Project" peak hour volumes are presented in **Figures 16** and **17**.

C. PLANNED ROADWAY IMPROVEMENTS

There are no capacity increasing roadway improvements planned by the County on the local roadway network serving the project site.[4]

[4] Rick Marshall, Napa County Public Works Department, November 2015.

X. PROJECT IMPACTS

A. EXISTING WITH PROJECT CONDITIONS

1. HARVEST

a) Summary

Project traffic would not result in any significant level of service impacts at the Silverado Trail intersections with Trancas Street, Soda Canyon Road or Oak Knoll Avenue, or any level of service impacts along any analyzed Silverado Trail or Soda Canyon Road roadway segments during any Friday or Saturday peak traffic hour. ***Less than Significant***.

b) Intersection Level of Service (Silverado Trail at Trancas Street, Soda Canyon Road and Oak Knoll Avenue) – Table 4

Friday and Saturday PM peak hour operation would remain acceptable at the Silverado Trail intersections with Trancas Street and Oak Knoll Avenue. The Silverado Trail/Soda Canyon Road intersection would already have unacceptable "Without Project" stop sign controlled approach operation during both the Friday and Saturday PM peak hours. However, the project would only increase volumes by .06 percent during the Friday peak hour and by 0.17 percent during the Saturday peak hour, which would be less than the minimum 1 percent traffic added significance criteria limit. ***Less than Significant.***

c) Roadway Segments (Silverado Trail & Soda Canyon Road) – Table 5

During both the Friday and Saturday PM peak hours when "Without Project" operation would be an unacceptable LOS E or F in the southbound direction, project traffic would only increase segment volumes by .08 to .11 percent, which would be less than the minimum 1 percent traffic added significance criteria limit. ***Less than Significant.***

B. YEAR 2020 WITH PROJECT CONDITIONS

1. HARVEST

a) Summary

Project traffic would not result in any significant level of service impacts at the Silverado Trail intersections with Trancas Street, Soda Canyon Road or Oak Knoll Avenue, or any level of service impacts along any analyzed Silverado Trail or Soda Canyon Road roadway segments during any Friday or Saturday peak traffic hour. ***Less than Significant***.

b) Intersection Level of Service (Silverado Trail at Trancas Street, Soda Canyon Road and Oak Knoll Avenue) – Table 6

Friday and Saturday PM peak hour operation would remain acceptable at the Silverado Trail intersections with Trancas Street and Oak Knoll Avenue. The Silverado Trail/Soda Canyon Road intersection would already have unacceptable "Without Project" stop sign controlled approach operation during both the Friday and Saturday PM peak hours as well as unacceptable overall operation during the Friday PM peak hour. However, the project would only increase volumes by .06 percent during the Friday peak hour and 0.13 percent during the Saturday peak hour, which would be less than the minimum 1 percent traffic added significance criteria limit. ***Less than Significant.***

c) Roadway Segments (Silverado Trail & Soda Canyon Road) – Table 7

During both the Friday and Saturday PM peak hours when "Without Project" operation would be an unacceptable LOS E or F in the southbound direction during both peak hours, project traffic would only increase segment volumes by 0.08 to 0.10 percent, which would be less than the minimum 1 percent traffic added significance criteria limit. ***Less than Significant.***

C. YEAR 2030 WITH PROJECT CONDITIONS

1. HARVEST

a) Summary

Project traffic would not result in any significant level of service impacts at the Silverado Trail intersections with Trancas Street, Soda Canyon Road or Oak Knoll Avenue, or any level of service impacts along any analyzed Silverado Trail or Soda Canyon Road roadway segments during any Friday or Saturday peak traffic hour. ***Less than Significant***.

b) Intersection Level of Service (Silverado Trail/Trancas Street, Silverado Trail/Soda Canyon Road and Silverado Trail/Oak Knoll Avenue) – Table 8

Friday and Saturday PM peak hour operation would remain acceptable at the Silverado Trail intersections with Trancas Street and Oak Knoll Avenue. The Silverado Trail/Soda Canyon Road intersection would already have unacceptable "Without Project" stop sign controlled approach operation during both the Friday and Saturday PM peak hours as well as unacceptable overall operation during the Friday PM peak hour. However, the project would only increase volumes by .05 percent during the Friday peak hour and 0.12 percent during the Saturday peak hour, which would be less than the minimum 1 percent traffic added significance criteria limit. ***Less than Significant.***

c) Roadway Segments (Silverado Trail & Soda Canyon Road) – Table 9

During both the Friday and Saturday PM peak hours when "Without Project" operation would be an unacceptable LOS E or F in the southbound direction, project traffic would only increase segment volumes by 0.7 to 0.11 percent, which would be less than the minimum 1 percent traffic added significance criteria limit. ***Less than Significant.***

XI. PROJECT ACCESS IMPACTS

A. SIGHT LINE ADEQUACY AT PROJECT DRIVEWAYS

Project Driveway Connection to Soda Canyon Road
Soda Canyon Road is level and straight at the project entrance. It has no posted speed for eastbound traffic between Silverado Trail and the project entrance. There is a 30 mile per hour (mph) speed advisory sign on the approach to a curve just east of the project driveway, and a 45 mph posted limit once east of the curve. In the westbound direction the posted speed limit is 45 mph, with a 30 mph speed advisory sign on the westbound approach to the curve just east of the project driveway. Observed speeds on Soda Canyon Road at the project entrance ranged from 30 to 35 mph in the westbound direction and up to 45 mph in the eastbound direction.

Sight lines for drivers turning from the project driveway to see Soda Canyon Road traffic are about 450 feet to the west and about 300 feet to the east. Corner sight line criteria at a private driveway connection to a public road are based upon minimum stopping sight distance. Shown below are Caltrans maximum stopping sight distance Highway Design Manual criteria.[5]

SPEED (MPH)	MINIMUM STOPPING SIGHT DISTANCE
30	200'
35	250'
40	300'
45	360'

Based upon available sight lines and observed vehicle speeds along Soda Canyon Road at the project entrance, sight lines are acceptable. ***Less than Significant.***

It should be noted that the project driveway now intersects Soda Canyon Road at about a 30-degree angle. This requires that drivers exiting the driveway must turn excessively in their seats to see westbound traffic. This angle of connection is not considered ideal from a traffic engineering standpoint. ***Potentially Significant Impact.***

[5] Caltrans *Highway Design Manual*, 2014.

XII. LEFT TURN LANE WARRANT EVALUATION

Napa County warrant criteria[6] were utilized to determine the need for a left turn lane on the westbound Soda Canyon Road approach to the project entrance. Based upon four days of mid November counts along Soda Canyon Road at the project entrance as well as on the existing Grassi driveway, the four-day average two-way volumes were 1,304 vehicles on Soda Canyon Road and 32 vehicles on the Grassi driveway. Seasonally adjusting the counts to reflect harvest conditions would give about 1,680 vehicles on Soda Canyon Road and up to 40 vehicles on the Grassi driveway.

The proposed project's four full-time and four part-time employees, up to 10 visitors per day on a weekday and up to 3 grape deliveries would be expected to add an additional 34 daily vehicles on Soda Canyon Road and on the Grassi driveway. Based upon review of the Left Turn Lane Warrant Chart in **Table 13**, with Existing + Project daily volumes of about 1,714 vehicles on Soda Canyon Road and 74 vehicles on the Grassi driveway, a left turn lane would not be warranted on the westbound Soda Canyon Road approach to the Grassi Winery driveway. ***Less than Significant.***

XIII. MARKETING EVENTS

Table 14 presents details of the number of guests, employees and hired event staffing that would likely be present for the project's three proposed marketing events.

Two marketing events would be held each year with up to 40 guests (resulting in about 15 to 16 vehicle trips to/from the winery) as well as one marketing event per year with up to 75 guests (resulting in about 27 to 29 vehicles to/from the winery). Hired event staffing for each of these events would result in an additional 5 vehicles accessing the winery for the largest event, and 3 vehicles for the two smaller events. All events could occur on any day of the week and would start after 6:00 PM.

There will be no regular visitation allowed during any marketing events. ***Less than Significant.***

XIV. MITIGATION MEASURES

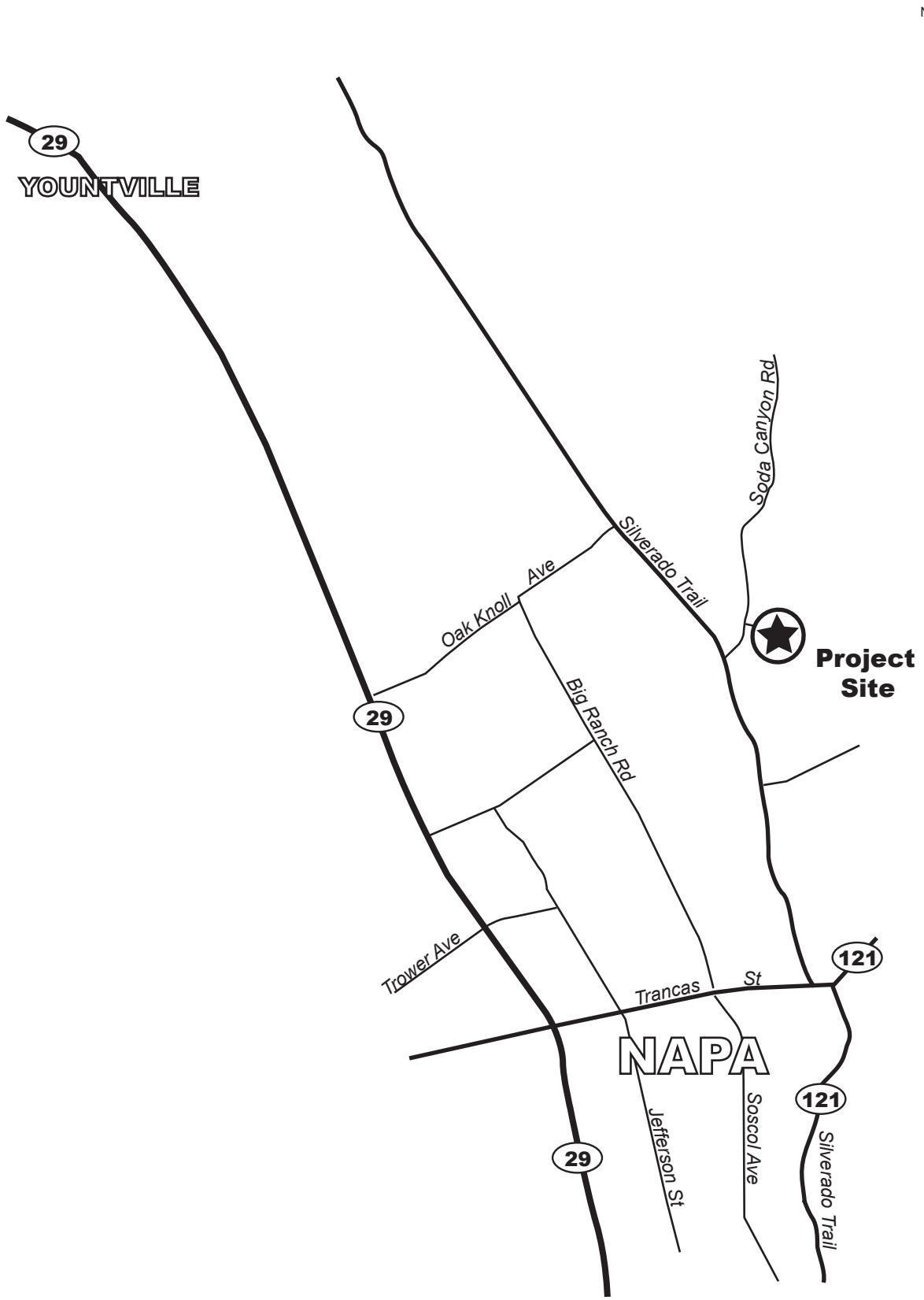
- It is recommended that the project driveway be realigned near Soda Canyon Road to provide a 90-degree connection rather than the existing 30-degree connection.

[6] County of Napa Left Turn Warrant Graph at Private Road and Driveway Intersections.

XV. CONCLUSIONS & RECOMMENDATIONS

The project will result in no significant off-site circulation system operational impacts to Silverado Trail, Soda Canyon Road or to the Silverado Trail intersections with Trancas Street, Soda Canyon Road or Oak Knoll Avenue. A left turn lane will not be warranted on the westbound Soda Canyon Road approach to the project driveway. In addition, sight lines at the project driveway connection to Soda Canyon Road are and will be acceptable. The only recommendation is to realign the project driveway connection to Soda Canyon Road from its existing 30-degree approach to a 90-degree approach.

Figures



Grassi Winery Traffic Study

Figure 1

Area Map

CRANE TRANSPORTATION GROUP

Not To Scale

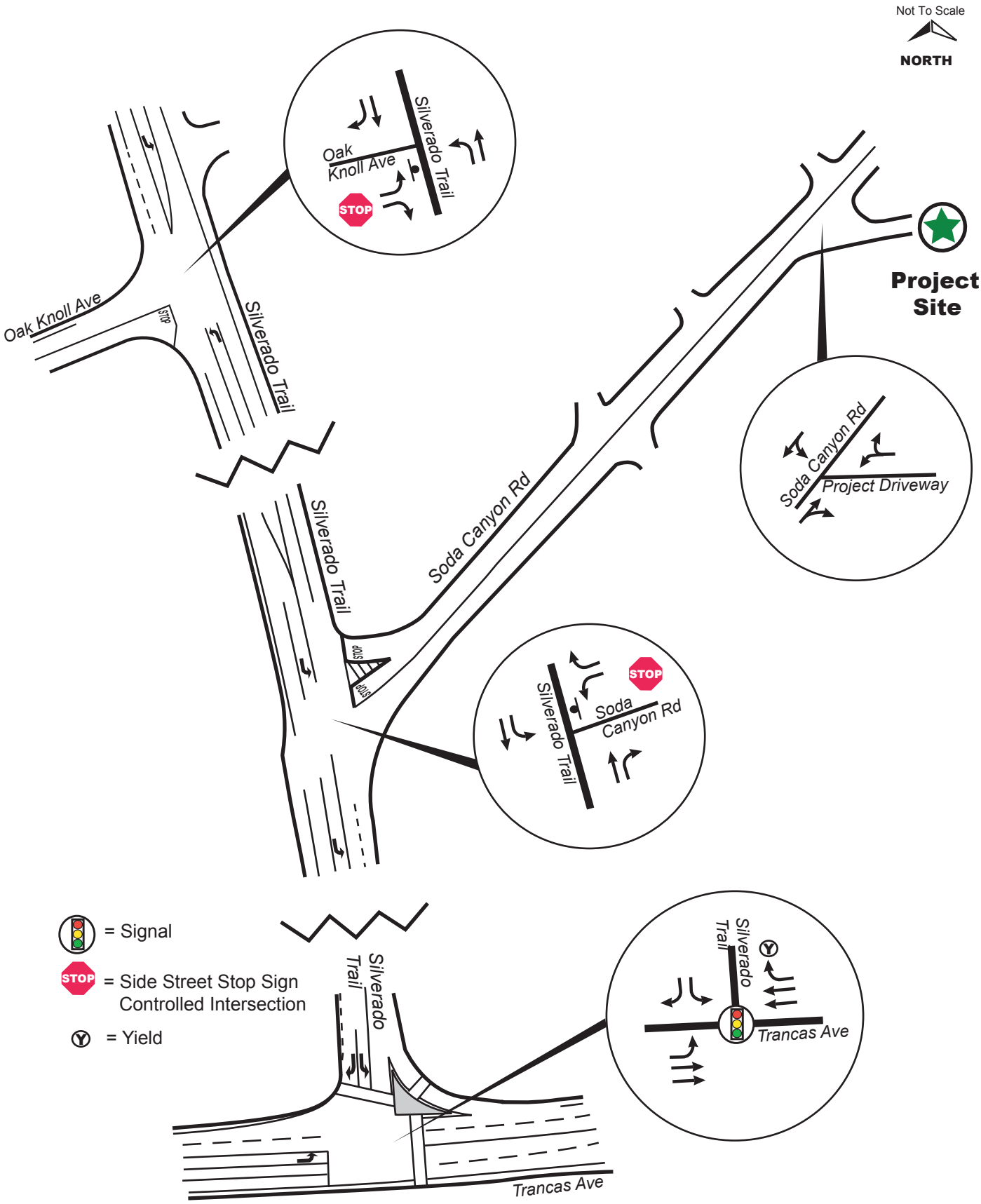
NORTH

Map data @2015 Google

Figure 2

Local Area Map

CRANE TRANSPORTATION GROUP



Grassi Winery Traffic Study

CRANE TRANSPORTATION GROUP

Figure 3

Intersection Control and Lane Geometrics

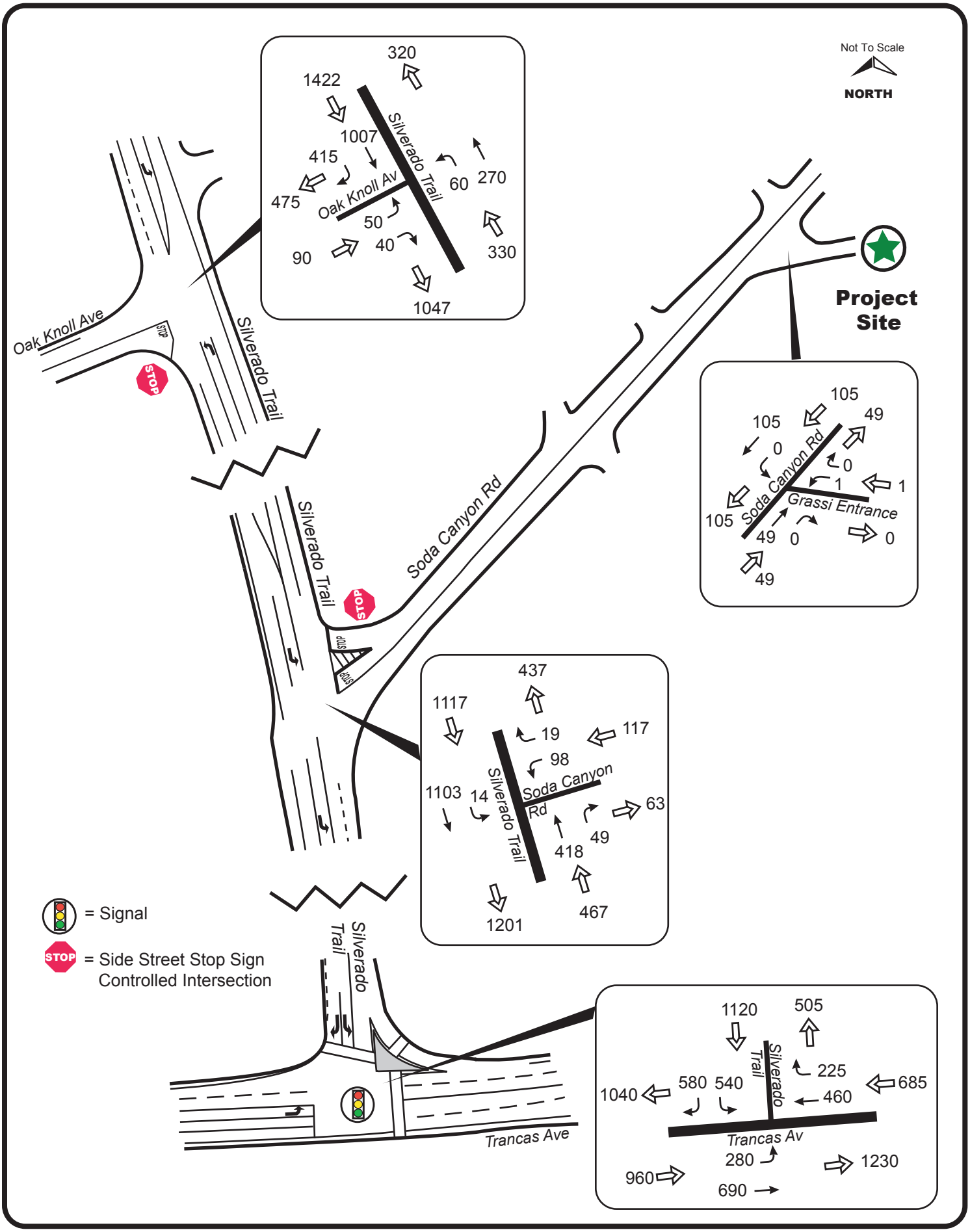
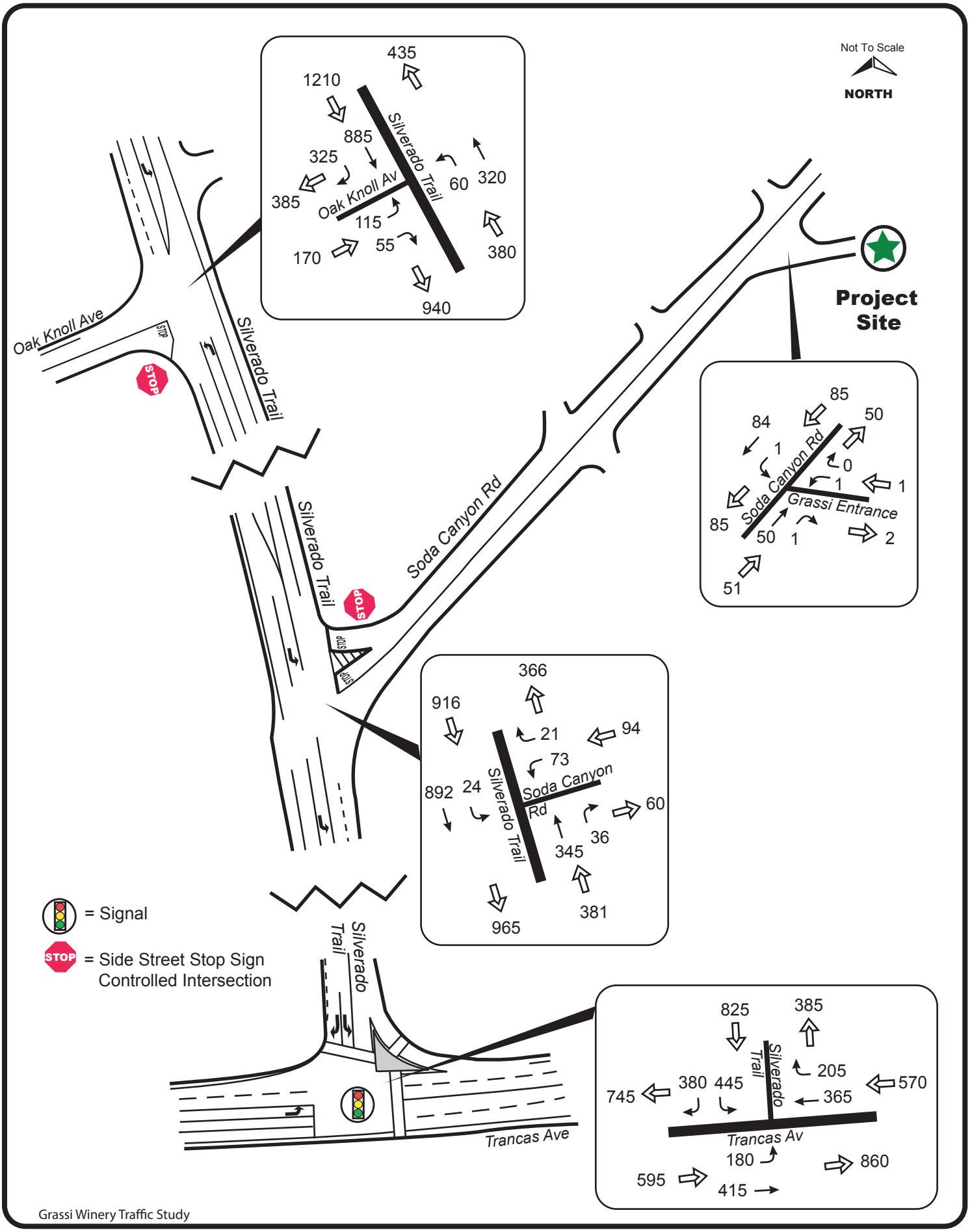


Figure 4

Existing (2015) Harvest Friday (without Project)
PM Peak Hour Volumes (4:30-5:30)

CRANE TRANSPORTATION GROUP

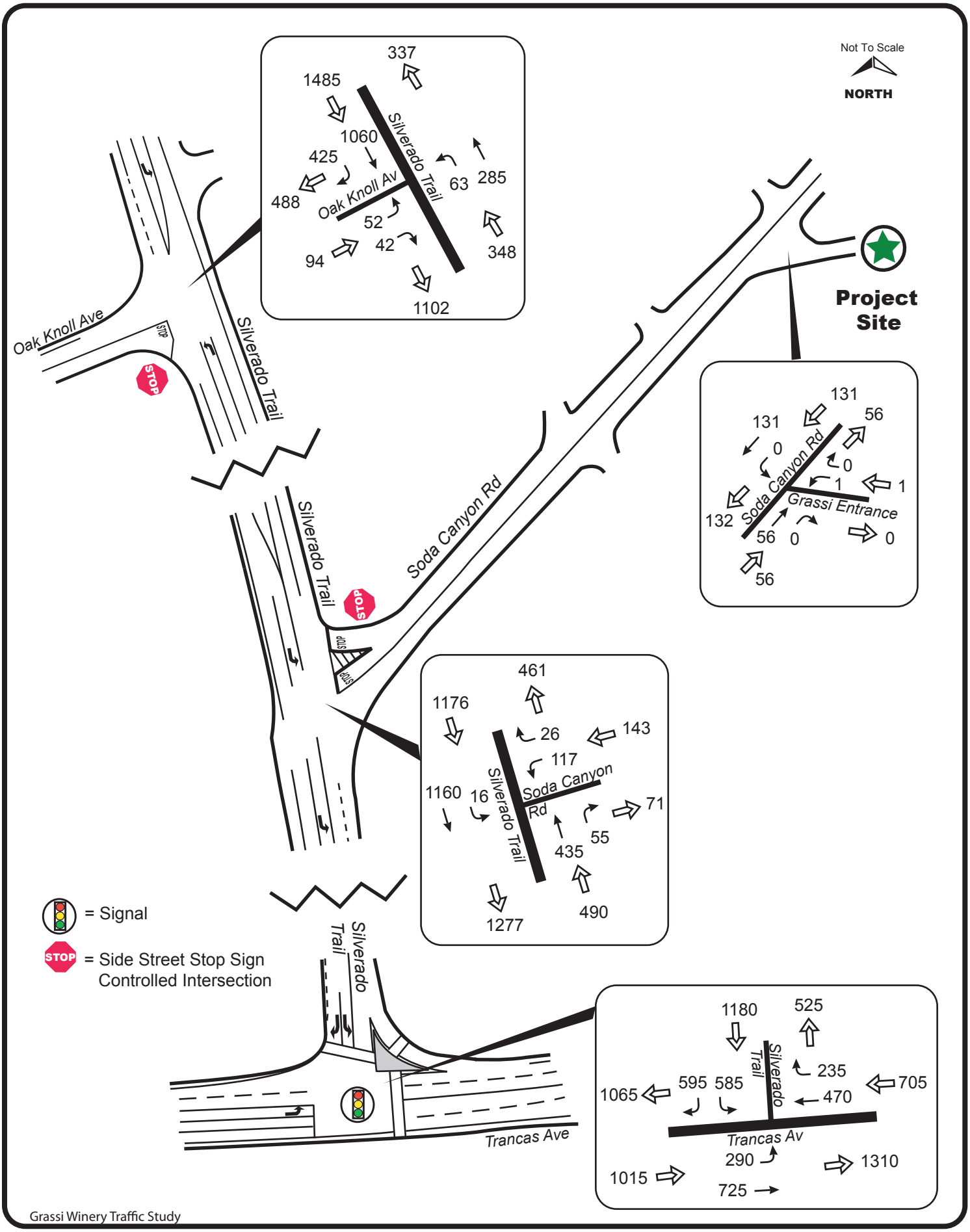


Grassi Winery Traffic Study

Figure 5

Existing (2015) Harvest Saturday (without Project)
PM Peak Hour Volumes (4:00-5:00)

CRANE TRANSPORTATION GROUP



Grassi Winery Traffic Study

Figure 6

2020 Harvest Friday (without Project)
PM Peak Hour Volumes (4:30-5:30)

CRANE TRANSPORTATION GROUP

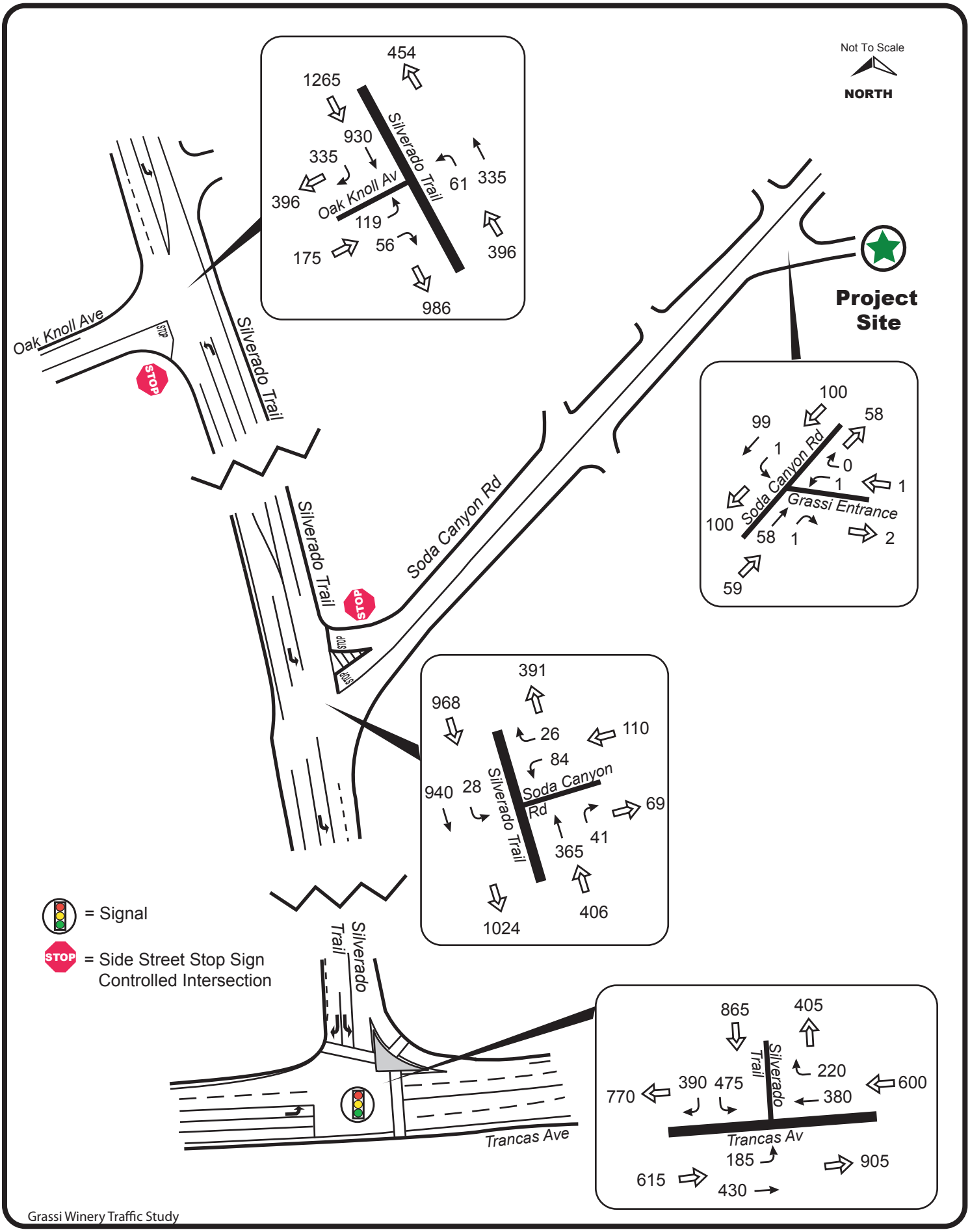
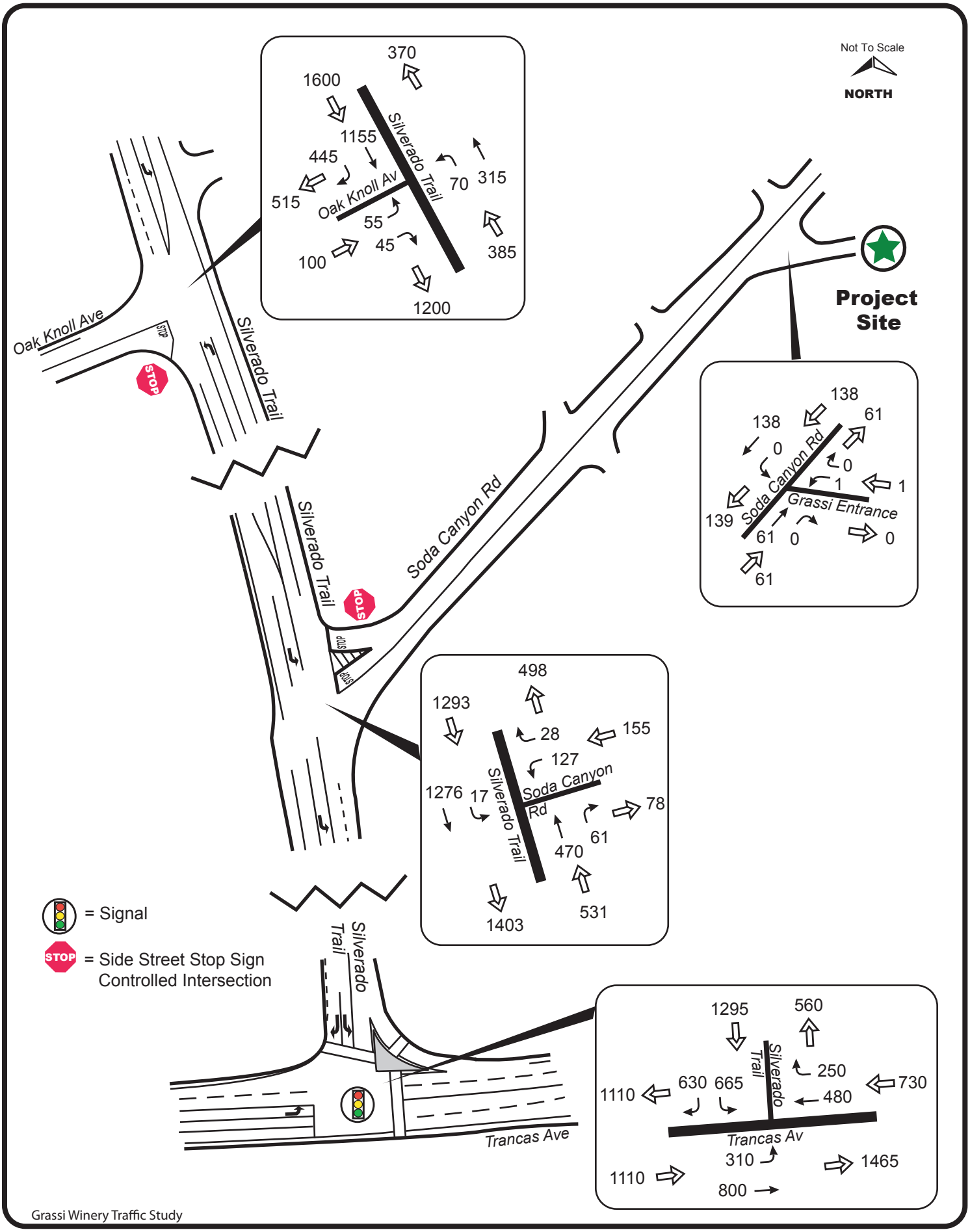


Figure 7

2020 Harvest Saturday (without Project)
PM Peak Hour Volumes (4:00-5:00)

CRANE TRANSPORTATION GROUP

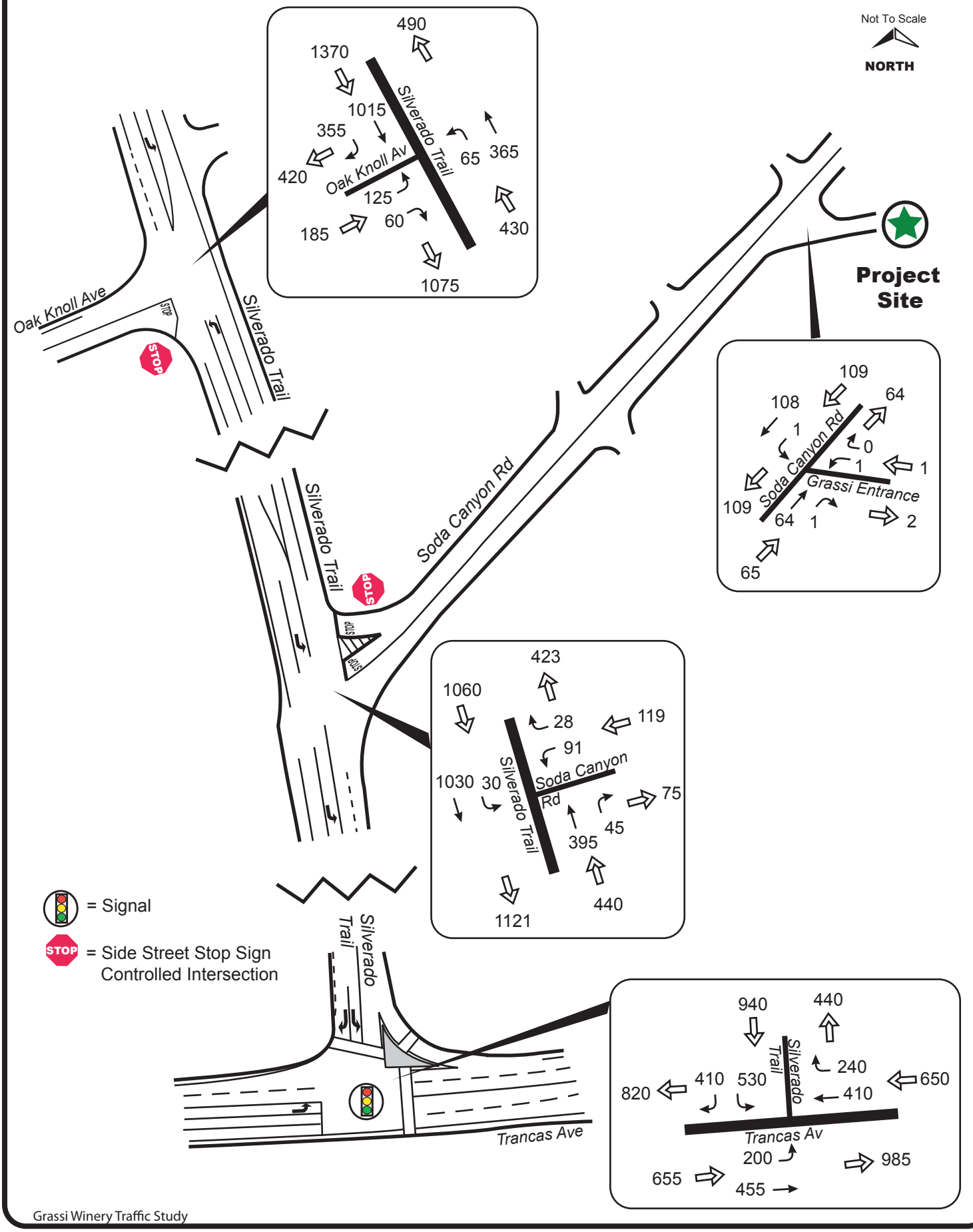


Grassi Winery Traffic Study

Figure 8

2030 Harvest Friday (without Project)
PM Peak Hour Volumes (4:30-5:30)

CRANE TRANSPORTATION GROUP

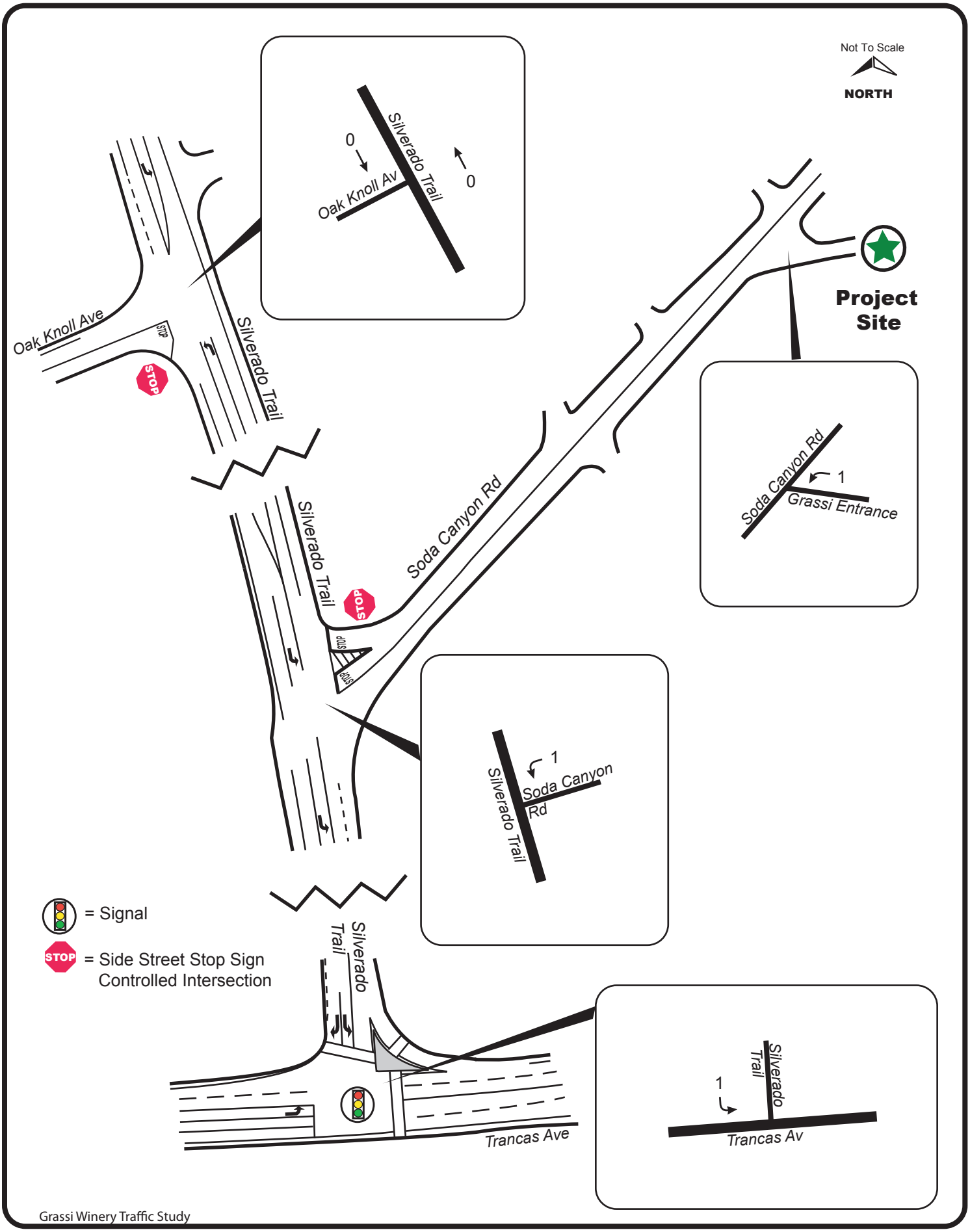


Grassi Winery Traffic Study

Figure 9

2030 Harvest Saturday (without Project)
PM Peak Hour Volumes (4:00-5:00)

CRANE TRANSPORTATION GROUP

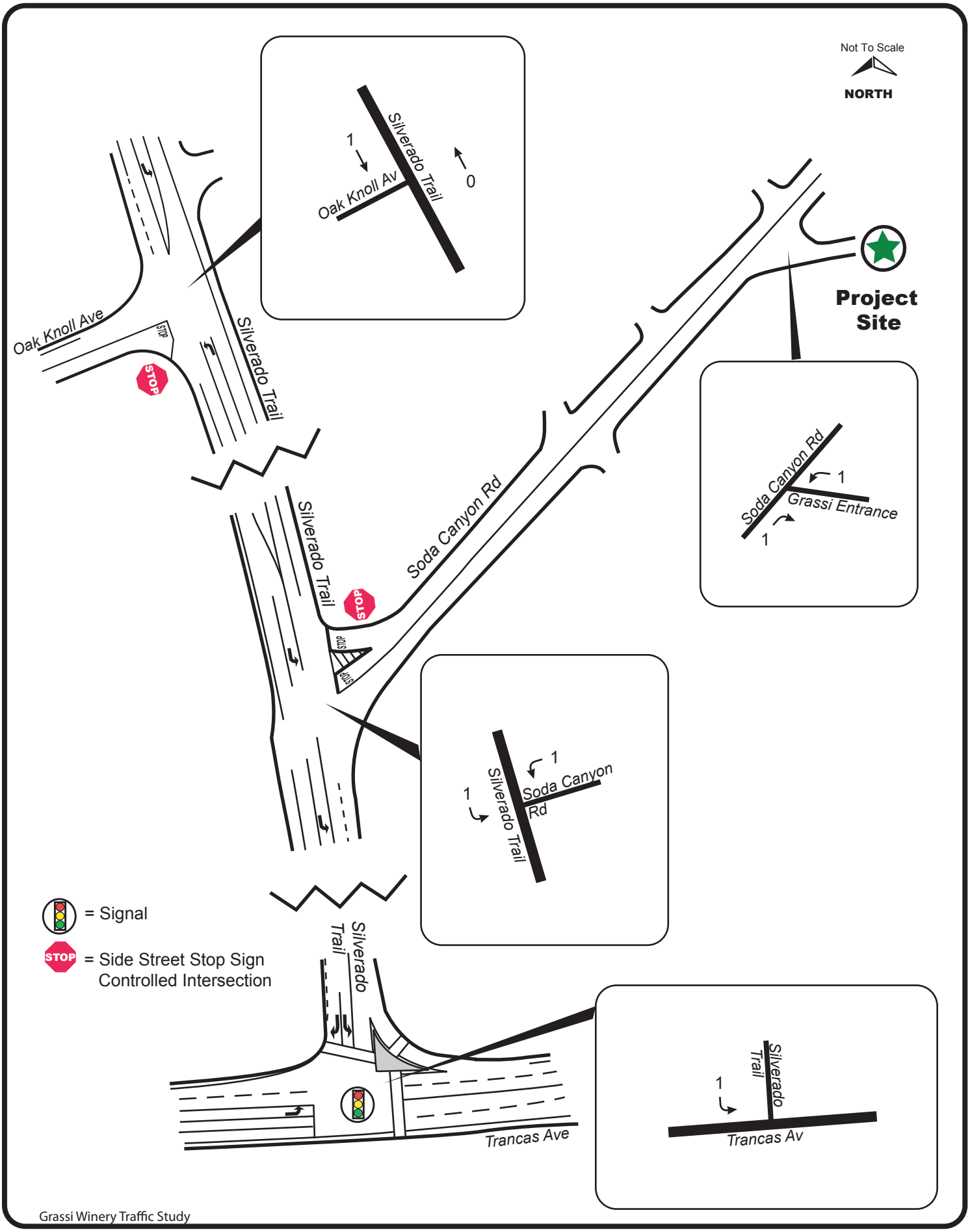


Grassi Winery Traffic Study

Figure 10

Friday Harvest
Project Increment

CRANE TRANSPORTATION GROUP

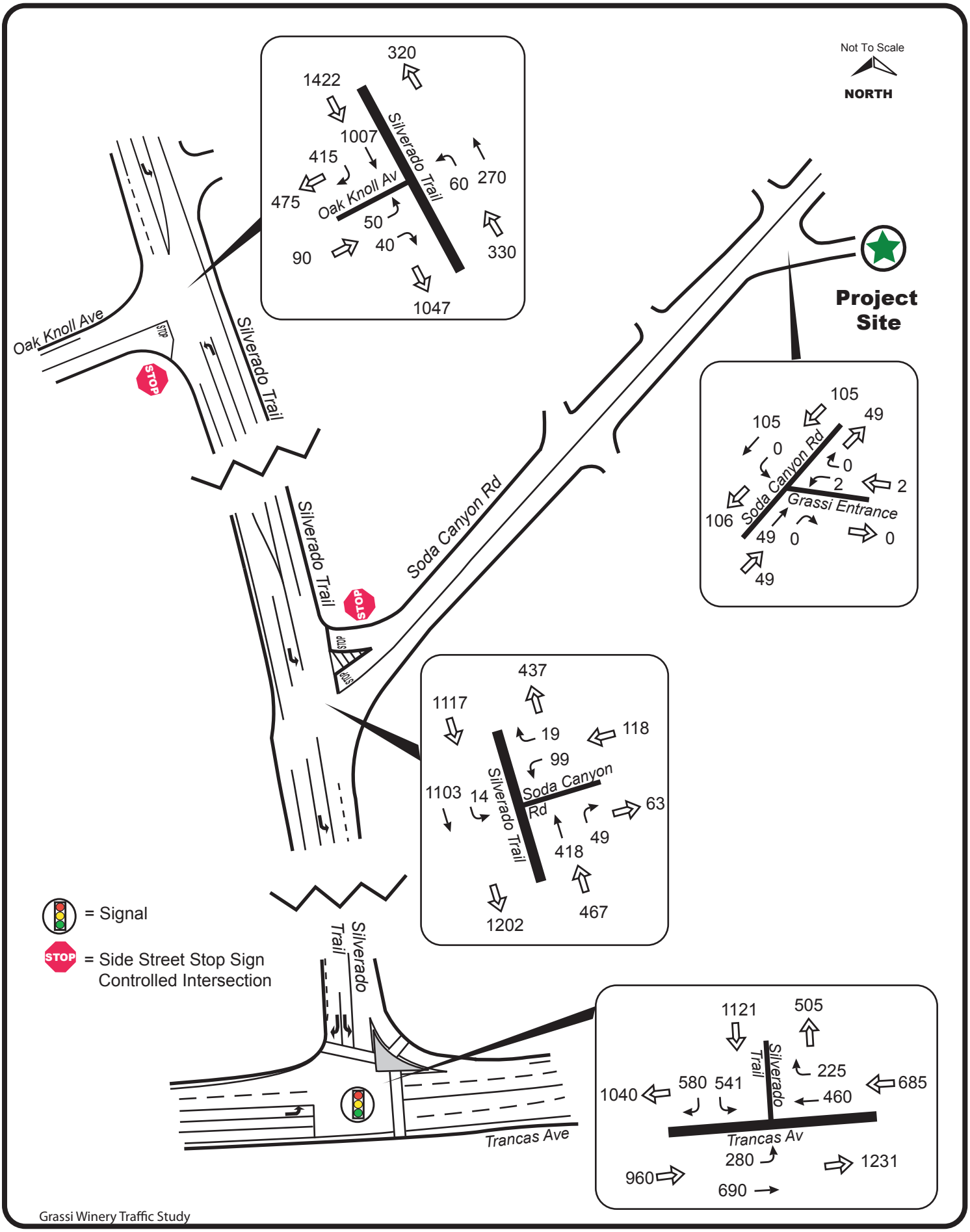


Grassi Winery Traffic Study

Figure 11

Saturday Harvest
Project Increment

CRANE TRANSPORTATION GROUP

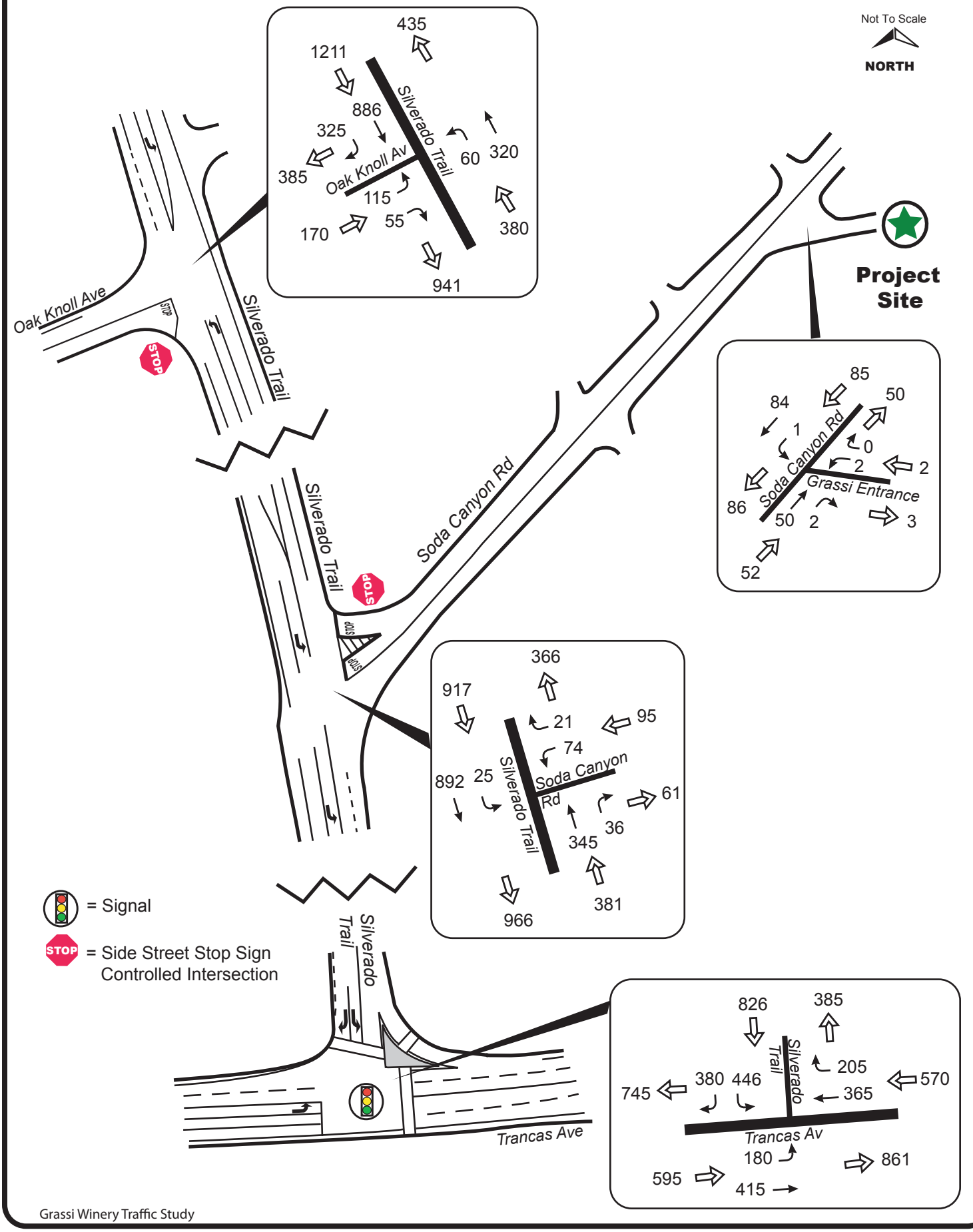


Grassi Winery Traffic Study

Figure 12

Existing (2015) Harvest Friday (with Project)
PM Peak Hour Volumes (4:30-5:30)

CRANE TRANSPORTATION GROUP

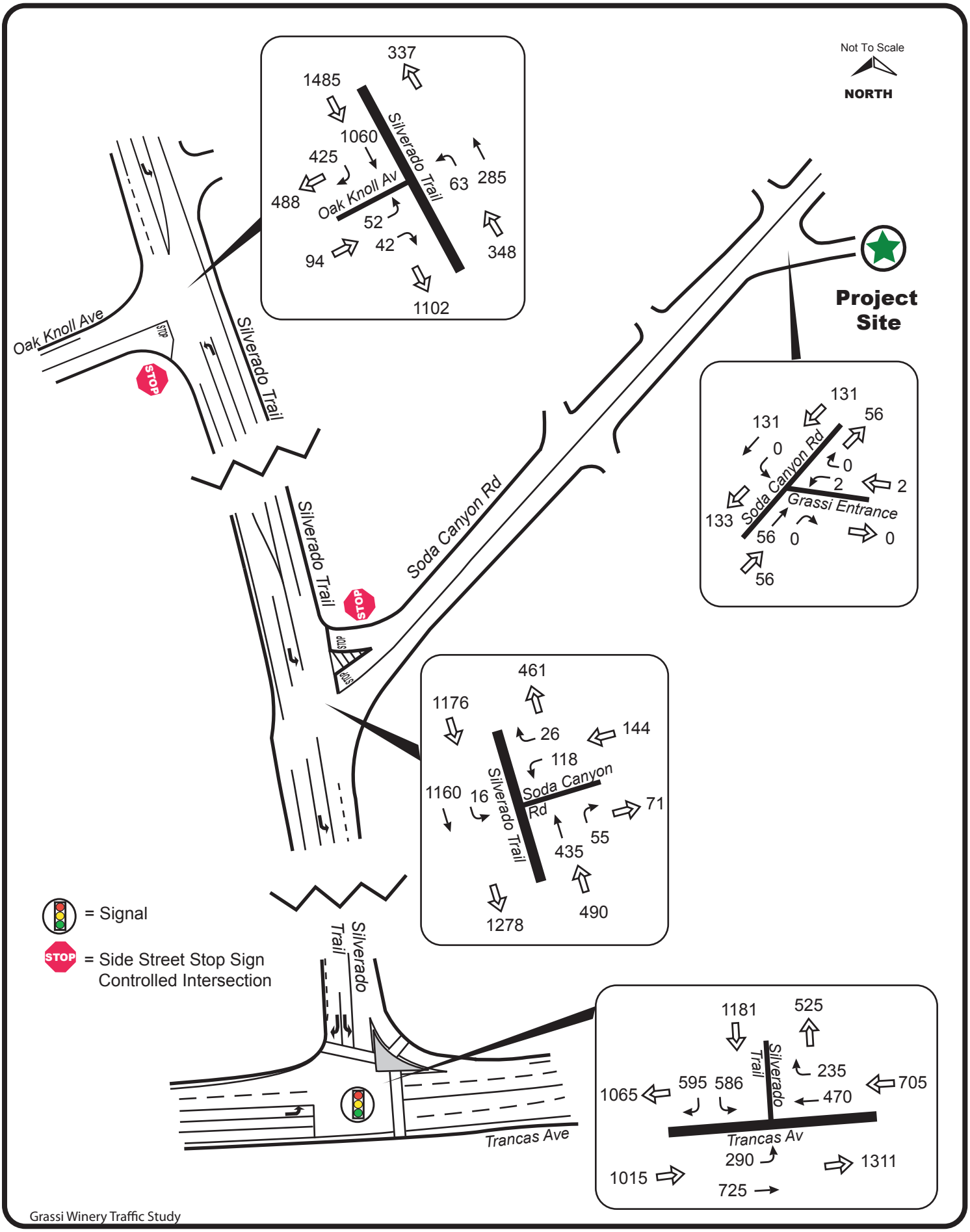


Grassi Winery Traffic Study

Figure 13

Existing (2015) Harvest Saturday (with Project)
PM Peak Hour Volumes (4:00-5:00)

CRANE TRANSPORTATION GROUP



Grassi Winery Traffic Study

Figure 14

2020 Harvest Friday (with Project)
PM Peak Hour Volumes (4:30-5:30)

CRANE TRANSPORTATION GROUP

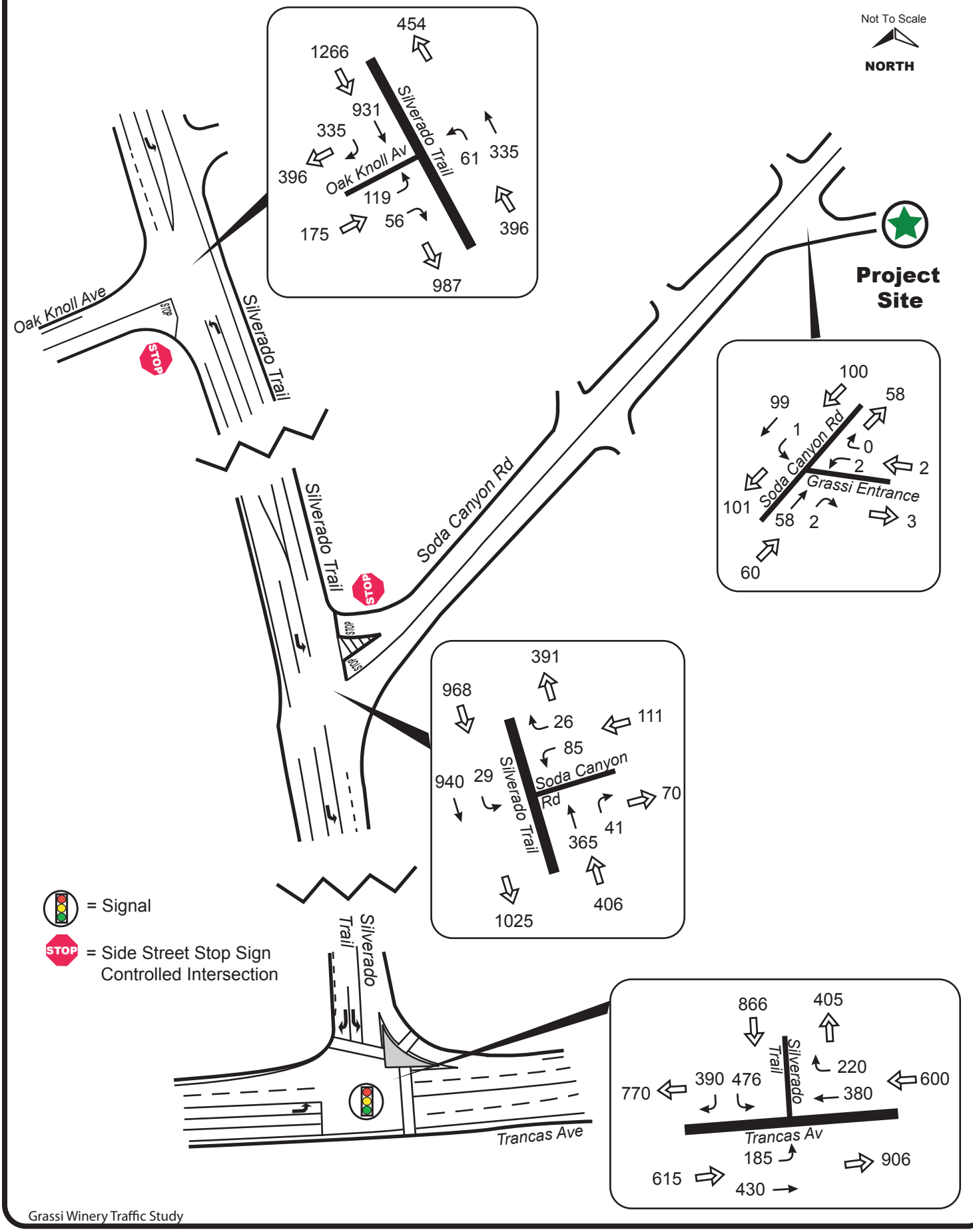
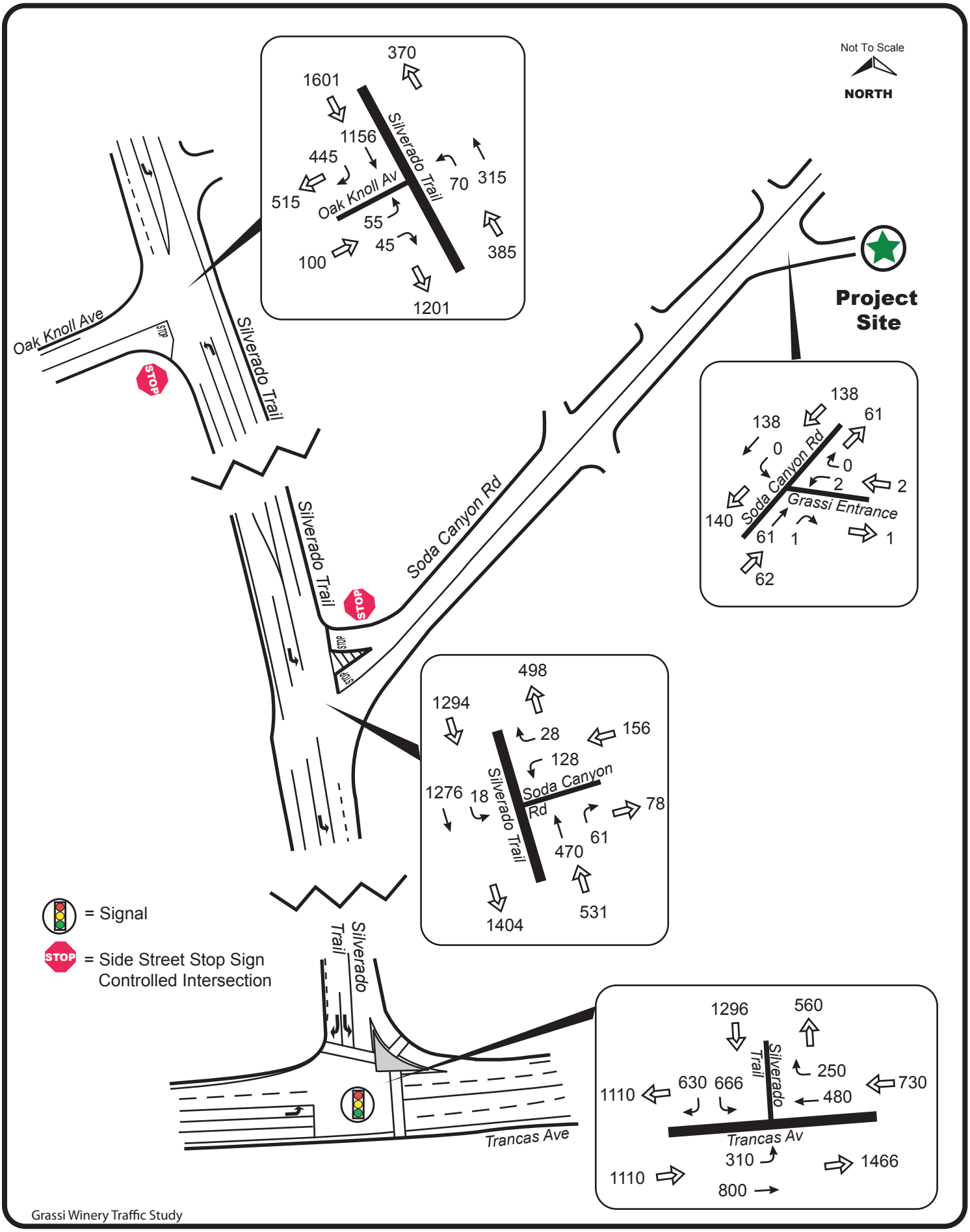


Figure 15

2020 Harvest Saturday (with Project)
PM Peak Hour Volumes (4:00-5:00)

CRANE TRANSPORTATION GROUP

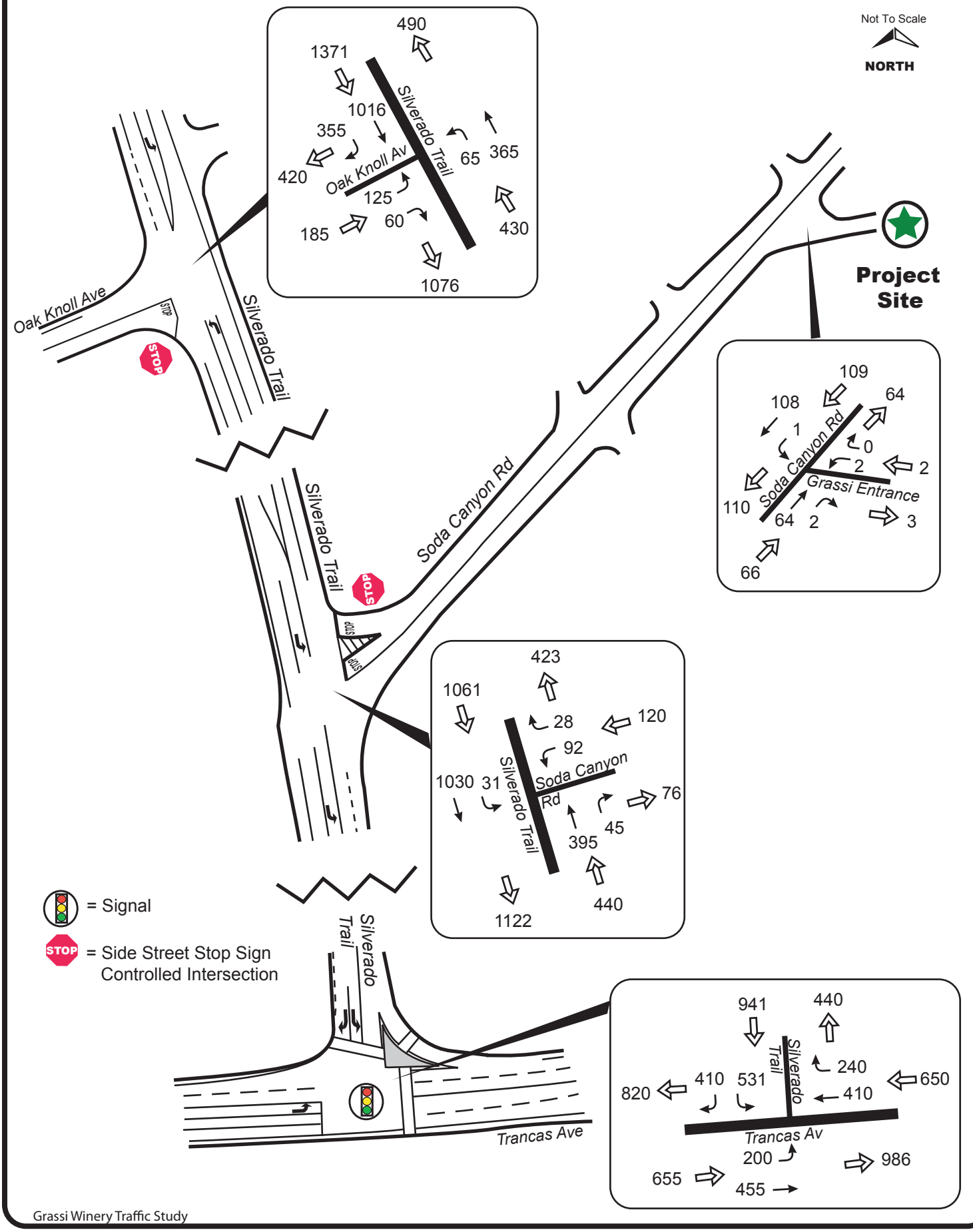


Grassi Winery Traffic Study

Figure 16

2030 Harvest Friday (with Project)
PM Peak Hour Volumes (4:30-5:30)

CRANE TRANSPORTATION GROUP



Grassi Winery Traffic Study

Figure 17

2030 Harvest Saturday (with Project)
PM Peak Hour Volumes (4:00-5:00)

CRANE TRANSPORTATION GROUP

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: 2000 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: 2010 Highway Capacity Manual (Transportation Research Board).

Table 3

TRIP GENERATION
PROPOSED AND APPROVED DEVELOPMENTS
SERVED BY SODA CANYON ROAD

PROJECT	FRIDAY PM PEAK HOUR TRIPS (4:30-5:30)		SATURDAY PM PEAK HOUR TRIPS (4:00-5:00)	
	IN	OUT	IN	OUT
Mountain Peak Winery	5	6	5	5
Relic Wine Cellars	0	6	0	2
V-12 Winery	0	4	0	2
Roy Estates Vineyards	0	4	0	2
TOTAL	5	20	5	11

Source: Crane Transportation Group after review of traffic reports for all projects.

Table 4

INTERSECTION LEVEL OF SERVICE

EXISTING – 2015

HARVEST

LOCATION	FRIDAY PM PEAK HOUR		SATURDAY PM PEAK HOUR	
	W/O PROJECT	WITH PROJECT	W/O PROJECT	WITH PROJECT
Silverado Trail/Trancas St. (Signal)	C-20.0[1]	C-20.1	B-14.4	B-14.4
Silverado Trail/Soda Canyon Rd. (Soda Canyon Rd. Approach Stop Sign Controlled)	F-302/A-8.3[2] **D-32.3**[4]	F-307/A-8.3 **D-33.2** **[+.06%]**	F-87.9/A-8.2 **A-9.0**	F-93.6/A-8/2 **A-9.7** **[+.17%]**
Silverado Trail/Oak Knoll Ave. (Oak Knoll Ave. Approach Stop Sign Controlled)	C-22.1[3] **A-1.5**[4]	C-22.1 **A-1.5**	D-28.7 **A-3.7**	D-28.9 **A-3.7**

(1) Signalized level of service – control delay in seconds for entire intersection.
(2) Unsignalized level of service – control delay in seconds. Soda Canyon Road westbound stop sign controlled approach/Silverado Trail southbound left turn.
(3) Unsignalized level of service – control delay in seconds. Oak Knoll Avenue eastbound stop sign controlled approach.
(4) **Unsignalized level of service – control delay in seconds (entire intersection).**

[xx] – Percent project traffic added to intersection) Less than a 1% increase is not considered a significant impact.

Theoretical control delay results above 120 seconds with LOS F operation are presented for "with" versus "without" project comparison purposes only. Doubtful if some drivers would wait this long to make a left turn.

Year 2000 Highway Capacity Manual (HCM) Analysis Methodology for signalized intersection
Year 2010 Highway Capacity Manual (HCM) Analysis Methodology for unsignalized intersections
Source: Crane Transportation Group

Table 5

ROADWAY SEGMENT LEVEL OF SERVICE

EXISTING – 2015

HARVEST

LOCATION	DIRECTION	DIRECTIONAL CAPACITY (VEH/HR)	FRIDAY PM PEAK HOUR				SATURDAY PM PEAK HOUR			
			W/O PROJECT		WITH PROJECT		W/O PROJECT		WITH PROJECT	
			VOL	LOS	VOL	LOS	VOL	LOS	VOL	LOS
Silverado Trail North of Trancas St.	NB	1200	505	C	505	C	385	C	385	C
	SB	1200	1120	E	1121	E [+.09%]	825	D	826	D
Silverado Trail South of Soda Canyon Rd.	NB	1200	467	C	467	C	381	C	381	C
	SB	1200	1201	F	1202	F [+.08%]	965	E	966	E [+.1%]
Silverado Trail North of Soda Canyon Rd.	NB	1200	437	C	437	C	366	C	366	C
	SB	1200	1117	E	1117	E [+0%]	916	E	917	E [+.11%]
Silverado Trail North of Oak Knoll Ave.	NB	1200	320	B	320	B	435	C	435	C
	SB	1200	1422	F	1422	F [0%]	1210	F	1211	F [+.08%]
Soda Canyon Rd. Just East of Silverado Trail	EB	810	63	A	63	A	60	A	61	A
	WB	810	117	C	118	C	94	B	95	B

(1) Vol = volume

(2) LOS (V/C) = level of service (volume to capacity ratio) at locations with unacceptable "Without Project" operation.

(3) [ ] = % project traffic added to road segment at locations with unacceptable "Without Project" operation. Less than a 1% increase is not considered a significant impact.

Analysis Methodology Source: Napa County General Plan Update EIR Technical Memorandum for Traffic and Circulation Supporting the Findings and recommendations, Dowling Associates, February 9, 2007.

Compiled by: Crane Transportation Group

Table 6

INTERSECTION LEVEL OF SERVICE

YEAR 2020

HARVEST

LOCATION	FRIDAY PM PEAK HOUR		SATURDAY PM PEAK HOUR	
	W/O PROJECT	WITH PROJECT	W/O PROJECT	WITH PROJECT
Silverado Trail/Trancas St. (Signal)	C-24.4[1]	C-24.5	B-15.1	B-15.1
Silverado Trail/Soda Canyon Rd. (Soda Canyon Rd. Approach Stop Sign Controlled)	F-486/A-8.4[2] **F-59.5**[4]	F-493/A-8.4 **F-60.7** **[+.06%]**	F-159/A-8.3 **C-17.6**	F-163/A-8.3 **C-18.2** **[+.13%]**
Silverado Trail/Oak Knoll Ave. (Oak Knoll Ave. Approach Stop Sign Controlled)	C-23.8[3] **A-1.6**[4]	C-23.8 **A-1.6**	D-32.5 **A-4.0**	D-32.5 **A-4.0**

(1) Signalized level of service – control delay in seconds for entire intersection.
(2) Unsignalized level of service – control delay in seconds. Soda Canyon Road westbound stop sign controlled approach/Silverado Trail southbound left turn.
(3) Unsignalized level of service – control delay in seconds. Oak Knoll Avenue eastbound stop sign controlled approach.
(4) **Unsignalized level of service – control delay in seconds (entire intersection).**

[xx] – Percent project traffic added to intersection) Less than a 1% increase is not considered a significant impact.

Theoretical control delay results above 120 seconds with LOS F operation are presented for "with" versus "without" project comparison purposes only. Doubtful if some drivers would wait this long to make a left turn.

Year 2000 Highway Capacity Manual (HCM) Analysis Methodology for signalized intersection
Year 2010 Highway Capacity Manual (HCM) Analysis Methodology for unsignalized intersections
Source: Crane Transportation Group

Table 7

ROADWAY SEGMENT LEVEL OF SERVICE

YEAR 2020

HARVEST

LOCATION	DIRECTION	DIRECTIONAL CAPACITY (VEH/HR)	FRIDAY PM PEAK HOUR				SATURDAY PM PEAK HOUR			
			W/O PROJECT		WITH PROJECT		W/O PROJECT		WITH PROJECT	
			VOL	LOS	VOL	LOS	VOL	LOS	VOL	LOS
Silverado Trail North of Trancas St.	NB	1200	525	C	525	C	405	C	405	C
	SB	1200	1180	E	1181	E [+.08%]	865	D	866	D
Silverado Trail South of Soda Canyon Rd.	NB	1200	490	C	490	C	406	C	406	C
	SB	1200	1277	F	1278	F [+.08%]	1024	E	1025	E [+.10%]
Silverado Trail North of Soda Canyon Rd.	NB	1200	461	C	461	C	391	C	391	C
	SB	1200	1176	E	1176	E [+0%]	968	E	969	E [+.10%]
Silverado Trail North of Oak Knoll Ave.	NB	1200	337	C	337	C	454	C	455	C
	SB	1200	1485	F	1485	F [+0%]	1265	F	1266	F [+.08%]
Soda Canyon Rd. Just East of Silverado Trail	EB	810	71	A	71	A	69	A	70	A
	WB	810	143	C	144	C	110	C	111	C

(1) Vol = volume

(2) LOS (V/C) = level of service (volume to capacity ratio) at locations with unacceptable "Without Project" operation.

(3) [ ] = % project traffic added to road segment at locations with unacceptable "Without Project" operation. Less than a 1% increase is not considered a significant impact.

Analysis Methodology Source: Napa County General Plan Update EIR Technical Memorandum for Traffic and Circulation Supporting the Findings and recommendations, Dowling Associates, February 9, 2007.

Compiled by: Crane Transportation Group

Table 8

INTERSECTION LEVEL OF SERVICE

YEAR 2030

HARVEST

LOCATION	FRIDAY PM PEAK HOUR		SATURDAY PM PEAK HOUR	
	W/O PROJECT	WITH PROJECT	W/O PROJECT	WITH PROJECT
Silverado Trail/Trancas St. (Signal)	C-34.9[1]	D-35.0	**B-16.9**	**B-17.0**
Silverado Trail/Soda Canyon Rd. (Soda Canyon Rd. Approach Stop Sign Controlled)	F-705/A-8.5[2] **F-83.7**[4]	F-713/A-8.5 **F-85.2** **[+.05%]**	F-257/A-8.4 **D-28.1**	F-262/A-8.4 **D-28.9** **[+.12%]**
Silverado Trail/Oak Knoll Ave. (Oak Knoll Ave. Approach Stop Sign Controlled)	D-27.0 **A-1.8**[4]	D-27.0 **A-1.8**	E-40.2 **A-4.8**	E-40.2 **A-4.8**

(1) Signalized level of service – control delay in seconds for entire intersection.
(2) Unsignalized level of service – control delay in seconds. Soda Canyon Road westbound stop sign controlled approach/Silverado Trail southbound left turn.
(3) Unsignalized level of service – control delay in seconds. Oak Knoll Avenue eastbound stop sign controlled approach.
(4) **Unsignalized level of service – control delay in seconds (entire intersection).**

[xx] – Percent project traffic added to intersection) Less than a 1% increase is not considered a significant impact.

Theoretical control delay results above 120 seconds with LOS F operation are presented for "with" versus "without" project comparison purposes only. Doubtful if some drivers would wait this long to make a left turn.

Year 2000 Highway Capacity Manual (HCM) Analysis Methodology for signalized intersection
Year 2010 Highway Capacity Manual (HCM) Analysis Methodology for unsignalized intersections
Source: Crane Transportation Group

Table 9

ROADWAY SEGMENT LEVEL OF SERVICE

YEAR 2030

HARVEST

LOCATION	DIRECTION	DIRECTIONAL CAPACITY (VEH/HR)	FRIDAY PM PEAK HOUR				SATURDAY PM PEAK HOUR			
			W/O PROJECT		WITH PROJECT		W/O PROJECT		WITH PROJECT	
			VOL	LOS	VOL	LOS	VOL	LOS	VOL	LOS
Silverado Trail North of Trancas St.	NB	1200	560	C	560	C	440	C	440	C
	SB	1200	1295	F	1296	F [+.07%]	940	E	941	E [+.11%]
Silverado Trail South of Soda Canyon Rd.	NB	1200	531	C	531	C	440	C	440	C
	SB	1200	1403	F	1404	F [+.07%]	1121	E	1122	E [+.09%]
Silverado Trail North of Soda Canyon Rd.	NB	1200	498	C	498	C	428	C	428	C
	SB	1200	1293	F	1293	F [+.08%]	1065	E	1066	E [+.09%]
Silverado Trail North of Oak Knoll Ave.	NB	1200	370	C	370	C	490	D	490	D
	SB	1200	1600	F	1600	F [+0%]	1370	F	1371	F [+.07%]
Soda Canyon Rd. Just East of Silverado Trail	EB	810	78	B	78	B	75	B	76	B
	WB	810	155	C	156	C	119	C	120	C

(1) Vol = volume

(2) LOS (V/C) = level of service (volume to capacity ratio) at locations with unacceptable "Without Project" operation.

(3) [ ] = % project traffic added to road segment at locations with unacceptable "Without Project" operation. Less than a 1% increase is not considered a significant impact.

Analysis Methodology Source: Napa County General Plan Update EIR Technical Memorandum for Traffic and Circulation Supporting the Findings and recommendations, Dowling Associates, February 9, 2007.

Compiled by: Crane Transportation Group

Table 10

PROJECT TRIP GENERATION
GRASSI WINERY

HARVEST

FRIDAY

	TOTAL	HOURS	TRIPS											
			7-8 AM		8-9 AM		3-4 PM		4-5 PM		5-6 PM		4:30-5:30*	
			IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Admin Employees – Full Time	1	10AM-6PM	0	0	0	0	0	0	0	0	0	0	0	0
Admin Employees – Part Time	1	10AM-6PM	0	0	0	0	0	0	0	0	0	0	0	0
Production Employees – Full Time	2	6AM-6PM	0	0	0	0	0	0	0	0	0	0	0	0
Production Employees – Part Time	3	6AM-6PM	0	0	0	0	0	0	0	0	0	0	0	0
Tours/Tasting Employees	1	10AM-6PM	0	0	0	0	0	0	0	0	0	0	0	0
Grape Delivery Trucks (80% grown off site)	3/day**	8AM-2PM	0	0	1	1	0	0	0	0	0	0	0	0
Visitors	10 total = 4 vehicles[(1)]	10AM-6PM	0	0	0	0	0	1	1	0	0	1	0	1
TOTAL			0	0	1	1	0	1	1	0	0	1	0	1

* Peak traffic hour along Silverado Trail.
** 25 total trucks over a 9-day period. Also, 5 truck trips now hauling grapes off the project site will be eliminated.
(1) 2.6 visitors/vehicle average on weekdays per County data.

Source: Grassi Winery project applicant; Compiled by: Crane Transportation Group

Table 11

PROJECT TRIP GENERATION
GRASSI WINERY

HARVEST

SATURDAY

	TOTAL	HOURS	TRIPS							
			2-3 PM		3-4 PM		4-5 PM*		5-6 PM	
			IN	OUT	IN	OUT	IN	OUT	IN	OUT
Admin Employees – Full & Part Time	0	–	0	0	0	0	0	0	0	0
Production Employees – Full Time	0	–	0	0	0	0	0	0	0	0
Production Employees – Part Time	3	6AM-6PM	0	0	0	0	0	0	0	0
Tours/Tasting Employees	1	10AM-6PM	0	0	0	0	0	0	0	0
Grape Delivery Trucks (80% grown off site) No Saturday Delivery	N/A	–	0	0	0	0	0	0	0	0
New Visitors	12 total = 5 vehicles[(1)]	10AM-6PM	1	1	1	1	1	1	0	1
TOTAL			1	1	1	1	1	1	0	1

* Peak traffic hour along Silverado Trail.
(1) 2.8 visitors/vehicle average on Saturdays per County data.

Source: Grassi Winery project applicant; Compiled by: Crane Transportation Group

Table 12

PROJECT TRIP GENERATION SUMMARY
GRASSI WINERY

HARVEST

FRIDAY PM PEAK HOUR* (4:30-5:30)		SATURDAY PM PEAK HOUR* (4:00-5:00)	
INBOUND TRIPS	**OUTBOUND TRIPS**	**INBOUND TRIPS**	**OUTBOUND TRIPS**
0	1	1	1

* Peak hour at the Silverado Trail/Soda Canyon Road intersection.

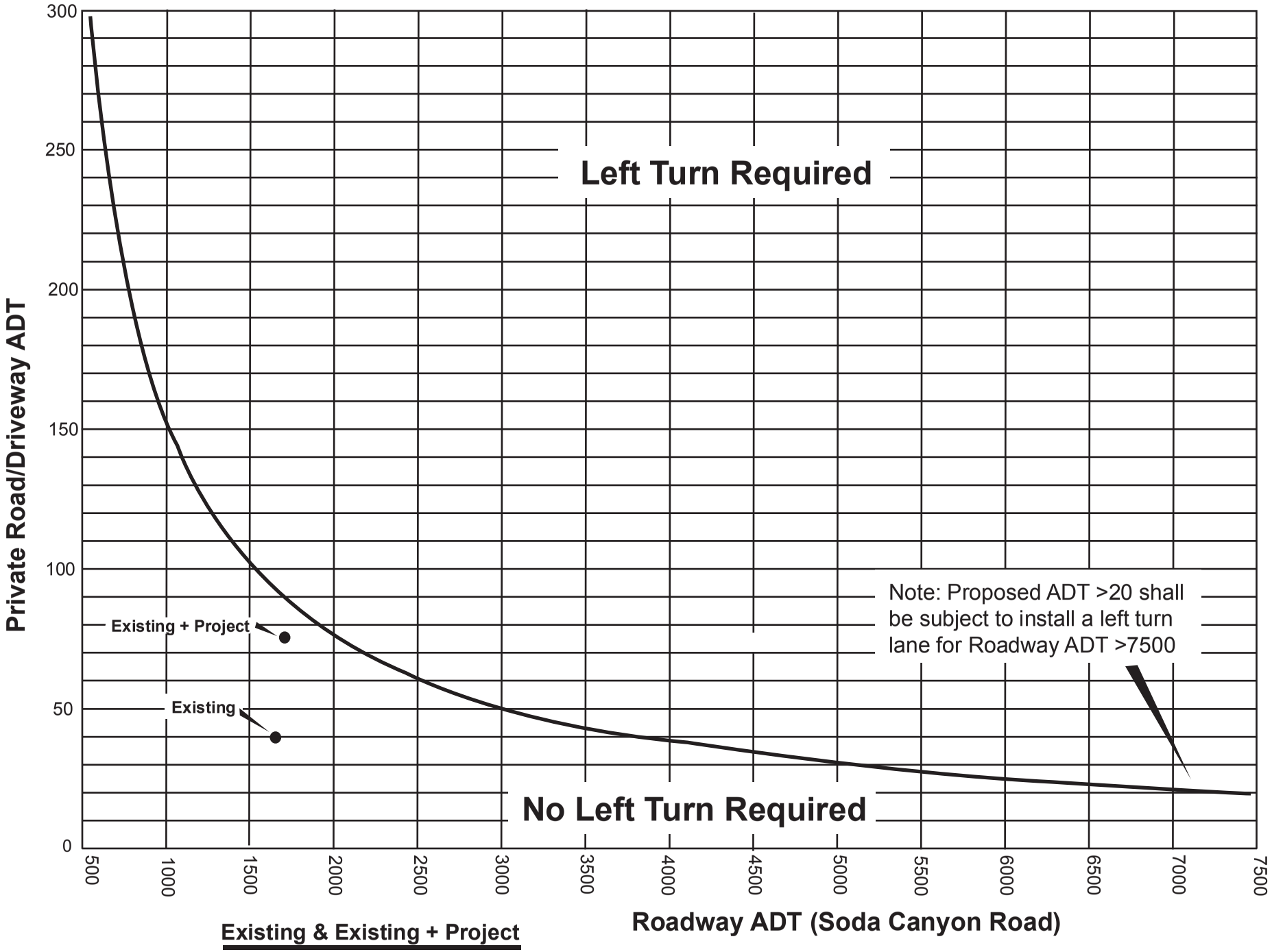
Source: Reynolds Family Winery; compiled by Crane Transportation Group

Grassi Winery

Soda Canyon Rd at the Grassi Vineyard Entrance Driveway

Table 13

COUNTY of NAPA LEFT TURN WARRANT GRAPH at Private Road and Driveway Intersections



Existing & Existing + Project

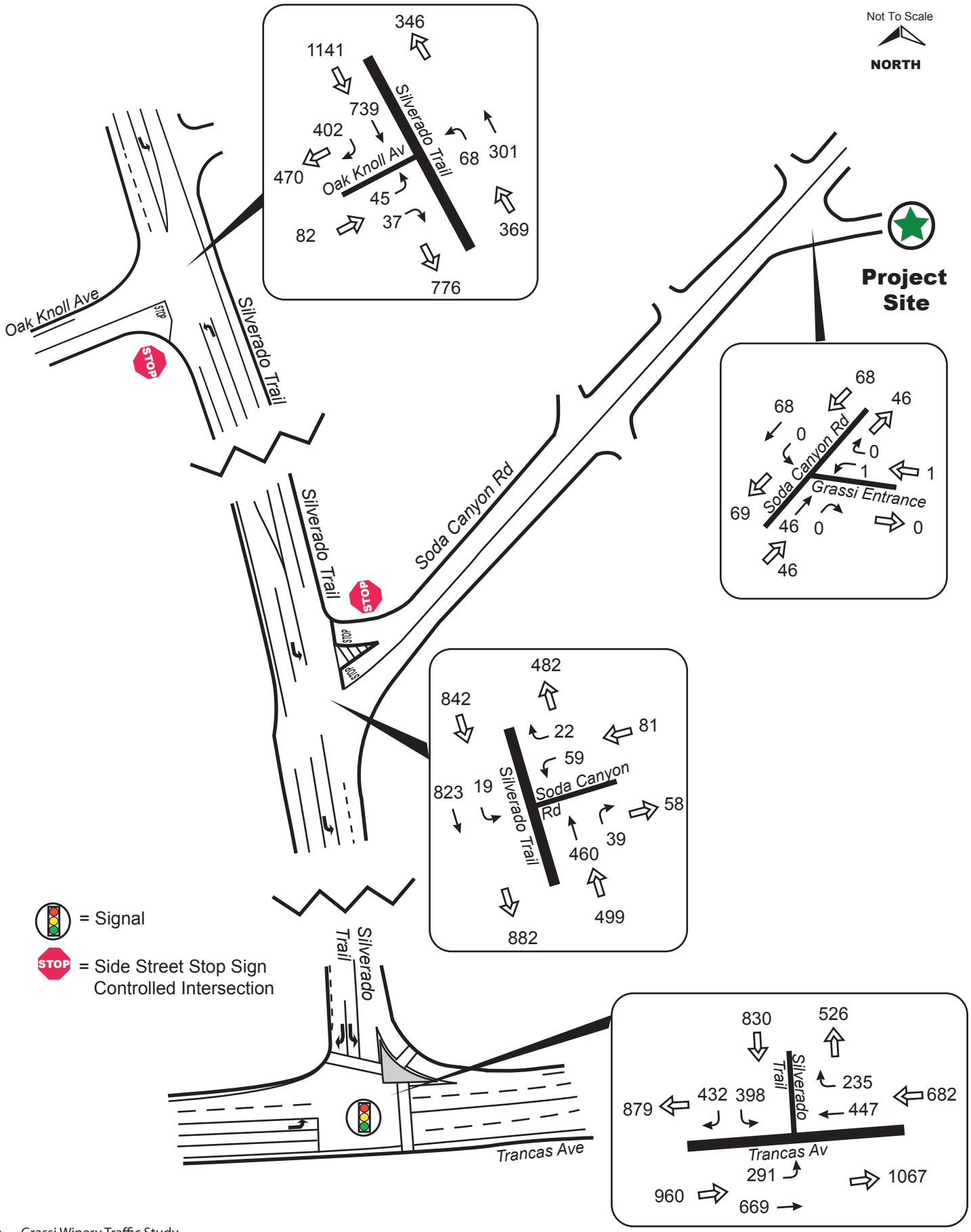
Table 14

GRASSI WINERY
MARKETING EVENT TRAFFIC DETAILS

MARKETING EVENT	STAFF/GUEST CATEGORY	# OF PEOPLE	# OF VEHICLES	DAYS & EVENT HOURS	REGULAR VISITATION ELIMINATED DURING MARKETING EVENT?
Marketing	Guests	75	27-29	Could be any day Evening off peak	Yes
	Extra Winery Staff	2	1		
	Caterers	4	2		
	Entertainers	0	0		
	Delivery vehicles	1	2		
	Other?				
Marketing	Guests	40	15-16		Yes
	Extra Winery Staff	2	1		
	Caterers	4	1		
	Entertainers	0	0		
	Delivery vehicles	2	1		
	Other?				

Source: Grassi Winery applicant

Appendix

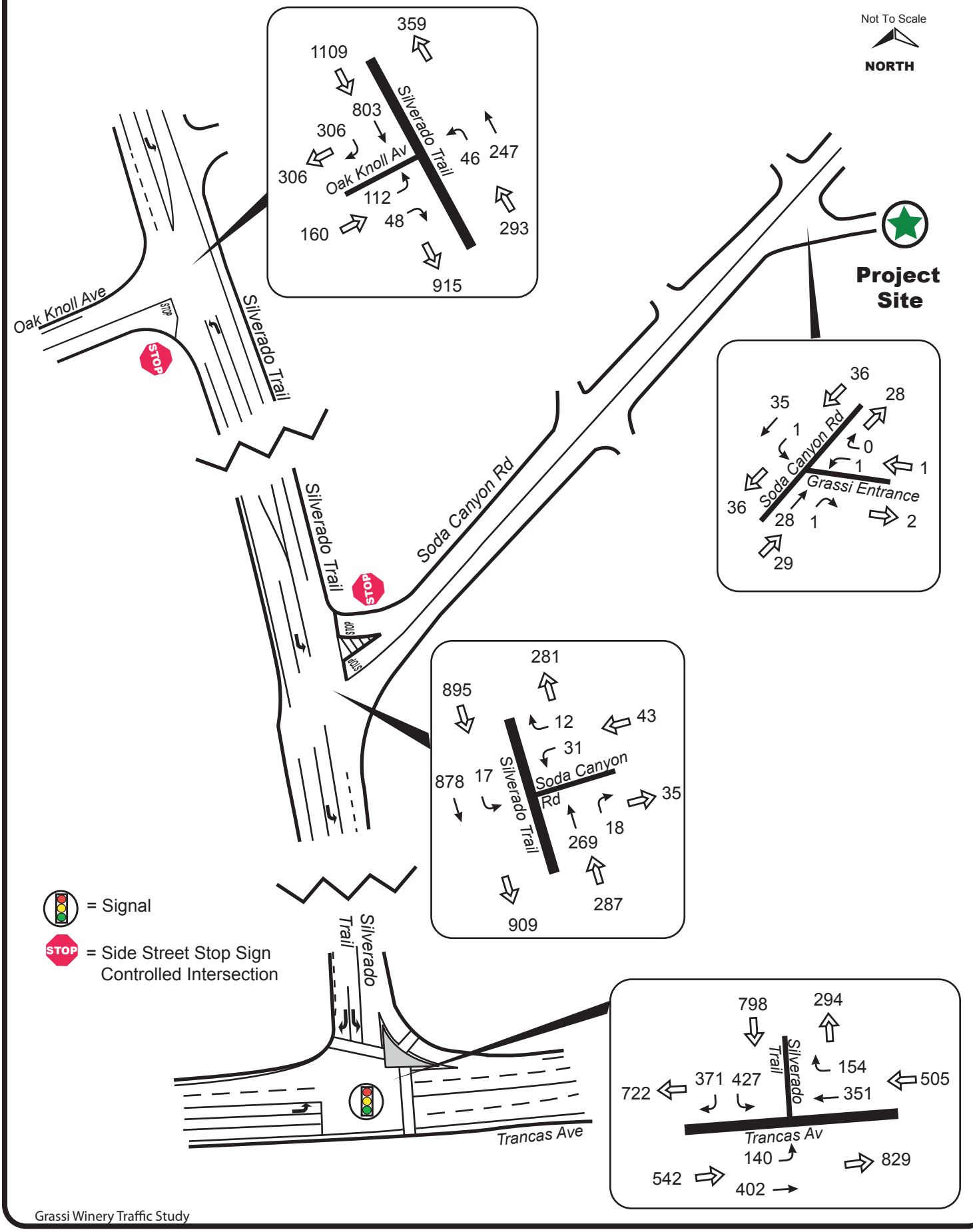


Grassi Winery Traffic Study

CRANE TRANSPORTATION GROUP

Appendix Figure 1

Existing (2015) November Friday PM Peak Hour Volumes (3:30-4:30)

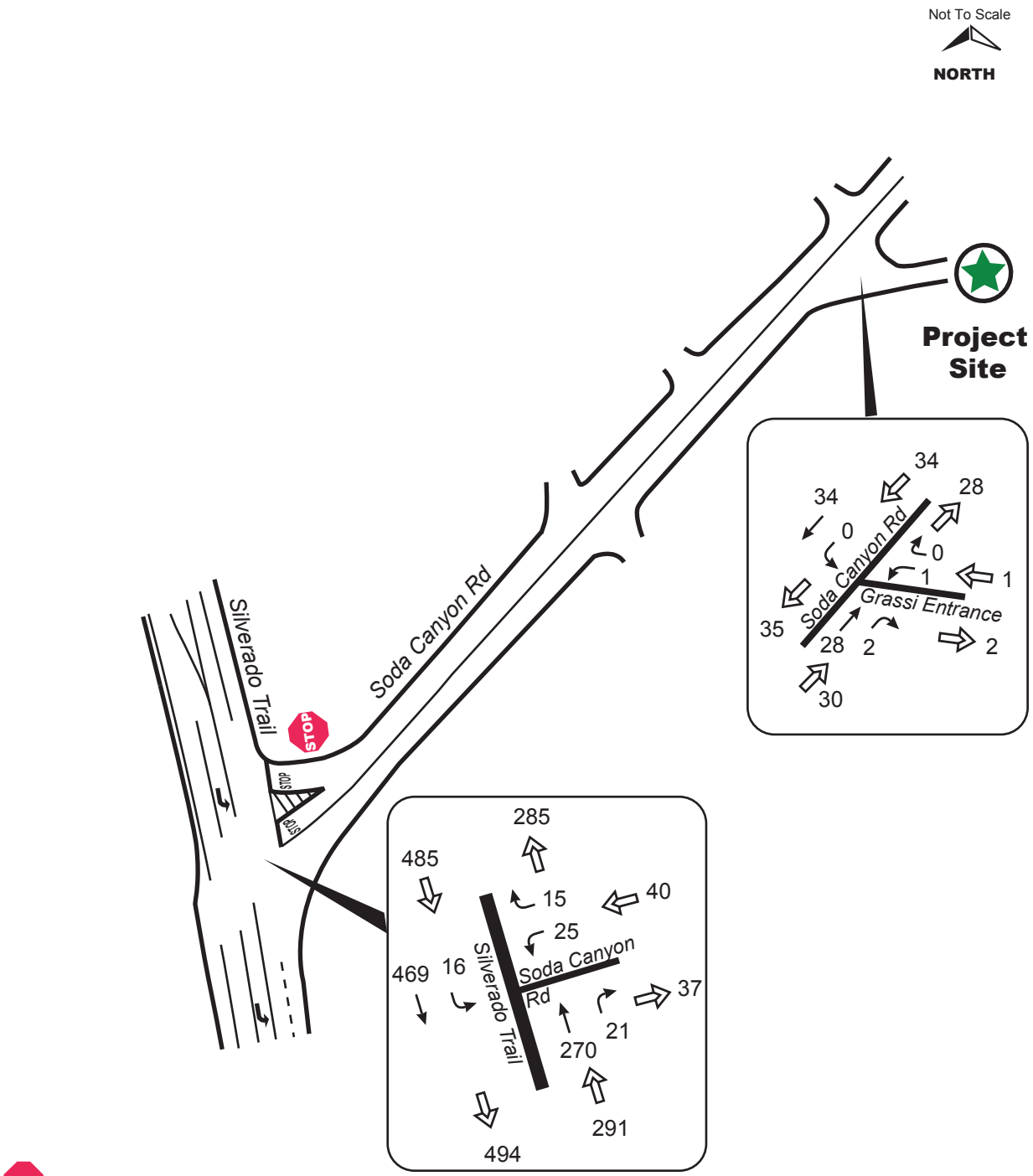


Grassi Winery Traffic Study

CRANE TRANSPORTATION GROUP

Appendix Figure 2

Existing (2015) November Saturday PM Peak Hour Volumes (4:45-5:45)



Grassi Winery Traffic Study

CRANE TRANSPORTATION GROUP

Appendix Figure 3

Existing (2015) November Sunday PM Peak Hour Volumes (3:30-4:30)

Appendix

GRASSI WINERY
2-WAY COUNT SUMMARIES

	TUESDAY NOV. 17	WEDNESDAY NOV. 18	THURSDAY NOV. 19	FRIDAY NOV. 20	4-DAY AVERAGE
Soda Canyon Rd. East of Silverado Trail	1236	1298	1349	1332	1304
Grassi Winery Entrance	25	33	34	35	32

Source: Crane Transportation Group

Appendix

GRASSI WINERY
EXPECTED PROJECT TRAFFIC ACTIVITY DETAILS

Gallons/Year Production: 25,000
1st Year of Expected Full Production: 2020

HARVEST CONDITIONS	
A. Full-time admin employees # on Weekdays _1__ # on Saturday __0__ # on Sunday __0__ Work hours: Weekday 10:00 AM to 6:00 PM Saturday NA Sunday NA	**E. Tours & tasting employees** # on Weekdays _1__ # on Saturday __1__ # on Sunday __1__ Work hours: Weekday 10:00 AM to 6:00 PM Saturday 10:00 AM to 6:00 PM Sunday 10:00 AM to 6:00 PM
B. Part-time admin employees # on Weekdays _1__ # on Saturday __0__ # on Sunday __0__ Work hours: Weekday 10:00 AM to 6:00 PM Saturday NA Sunday NA	**F. Other employees** # on Weekdays _0__ # on Saturday __0__ # on Sunday __0__ Work hours: Weekday NA Saturday NA Sunday NA
C. Full-time production employees # on Weekdays _2__ # on Saturday __0__ # on Sunday __0__ Work hours: Weekday 6:00 AM to 6:00 PM Saturday NA Sunday NA	**G. Maximum tours/tasting visitors** # on Weekdays _10__ # on Saturday __12__ # on Sunday __12__ Tasting hours: Weekday 10:00 AM to 6:00 PM Saturday 10:00 AM to 6:00 PM Sunday 10:00 AM to 6:00 PM
D. Part-time production employees # on Weekdays _3__ # on Saturday __3__ # on Sunday __3__ Work hours: Weekday 6:00 AM to 6:00 PM Saturday 6:00 AM to 6:00 PM Sunday 6:00 AM to 6:00 PM	**H. Grape delivery trucks** # on Weekdays _25__ # on Saturday __0__ # on Sunday __0__ Delivery hours: Weekday 8:00 AM to 2:00 PM Saturday NA Sunday NA # days of grape delivery: _9__

Appendix

GRASSI WINERY
EXPECTED PROJECT TRAFFIC ACTIVITY DETAILS

HARVEST CONDITIONS	
I. Other trucks # on Weekdays _2__ # on Saturday __0__ # on Sunday __0__ Delivery hours: Weekday 8:00 AM to 5:00 PM Saturday NA Sunday NA # days of grape delivery: _9__ **Please Detail:** Existing FedEx or UPS trucks (already on roadway system). Bottling and product shipment trucks on an intermittent basis throughout year.	

J. Grape Source & Trucks

Percent grapes grown on site: 20%

Grapes grown off site – access route to winery entrance
From the north on Silverado Trail: 100%
From the south on Silverado Trail: 0%
From the east on Soda Canyon Road: 0%

Number of existing grape haul truck trips eliminated due to use of on-site grapes for proposed winery: 5