
WINCO DRAFT EIR APPENDIX

SCH#2003102045

City of Tracy | October 11, 2005



DESIGN, COMMUNITY & ENVIRONMENT

WINCO DRAFT EIR APPENDIX

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City of Tracy | October 21, 2005



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A P P E N D I X A

MARKET IMPACT ANALYSIS





**MARKET IMPACT ANALYSIS
FOR
PROPOSED WINCO STORE
IN TRACY, CA**

Prepared for:
City of Tracy

Prepared by:
Bay Area Economics

October, 2004

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Executive Summary

Background and Study Purpose

Recently, a proposal was submitted to the City of Tracy for development of a WinCo Foods store. In addition, Wal-Mart has proposed expanding their existing store to a Supercenter format, which will include a large area dedicated to food items. As part of its evaluation of the proposed projects, the City of Tracy desires information regarding effects on existing grocery store sales and the retail real estate market, looking in particular at the potential for adverse impacts on existing centers and the potential for blight due to the long-term loss of a major anchor tenant. Bay Area Economics (BAE) has been retained to address these issues. This study focuses on the potential impacts of the WinCo project, considering the impacts of WinCo alone and the cumulative impacts if both the WinCo Foods project and Wal-Mart expansion are completed.

Project Description

The proposed project is the construction of a new WinCo Foods store at the southeast corner of Pavilion Parkway where it terminates at Power Road (which is not yet completed to the north of Pavilion Parkway). The proposed store is a very large-format full-service supermarket of 92,000 square feet. The site is currently vacant, but is near the large concentration of region-serving retail clustered around the West Valley Mall to the north of Interstate 205. The Wal-Mart is located nearby.

Key Findings

- The U.S. grocery industry is in a period of consolidations and mergers such as the one that led to the local changeover of Lucky to the Albertsons name several years ago. The predominant trend in recent years has been toward larger and newer stores, with correspondingly larger trade areas. As Wal-Mart and other discount merchandisers add grocery sections, many grocers have added additional housewares and nonfood items. By combining extremely large store size, low everyday prices, broad inventory, and additional services, WinCo has positioned itself in a niche distinct from its competitors. WinCo shoppers may continue to frequent other local stores for convenience purchases.
- For WinCo, the Trade Area has been defined as the City of Tracy and surrounding areas, primarily the newly developing community of Mountain House. This definition is based on Tracy's relative isolation from other large population nodes, especially to the west and south, and by the location of nearby existing and planned WinCo stores, and also based on the presumption that potential WinCo shoppers will go to the closest WinCo outlet. This same Trade Area is similarly surrounded by proposed Wal-Mart Supercenters in nearby cities.

- Tracy and the Trade Area have seen tremendous growth since 1990, with continued growth expected into the foreseeable future. The demographic and economic data indicate that Tracy and the Trade Area are likely to show sustained retail growth for the next several years as population, incomes, and employment increase.
- The sustained growth in population in Tracy and the Trade Area is reflected in retail sales trends. Additionally, the Trade Area's population has reached a "critical mass" allowing the introduction of region-serving retail to Tracy, resulting in retail sales growth outpacing population growth, with a strong increase in per capita spending as Tracy shoppers have a broader range of shopping opportunities locally.
- While per capita sales of taxable items in food stores has decreased in recent years, overall supermarket sales have likely increased, as the population needing non-taxable grocery items has increased.
- Tracy is currently served by five major supermarkets and a Costco. There are no additional supermarkets of more than 25,000 square feet or more in the Trade Area at this time. The total square footage of these stores is approximately 318,000 square feet (including the portion of Costco devoted to food sales).
- Current year supermarket sales in these outlets are estimated at over \$150 million, for average per square foot sales of \$473 and Tracy per capita sales of \$1,680. With no additional projects, sales per square foot and per capita would continue to increase over time. This overall average is above median industry benchmarks, as derived from Urban Land Institute's Dollars & Cents of Shopping Centers: 2004. ULI's extensive national surveys show median annual supermarket sales per square foot of \$390 for all supermarkets in U.S. community shopping centers, and well above minimum feasibility levels for supermarket operation.
- If the WinCo store opens as projected in 2006, and no other project is built (e.g., Wal-Mart Supercenter), average annual sales per square foot at Tracy's existing supermarkets would decline by an estimated 15 percent to \$403 (2004 dollars), still slightly above the ULI-derived industry median and well above minimum feasibility levels. Average sales per square foot would continue to increase and would recover to \$465 annually in 2009.
- It is likely that any impacts would be greater on those stores targeting a similar niche in the market. In Tracy, the existing store most like WinCo in terms of market concept is the Food 4 Less; this store is in North Tracy, relatively close to the proposed WinCo site. However, this store is the only store serving this market, and as such is likely achieving strong sales currently.

- If both the WinCo and Wal-Mart expansion are approved, the cumulative impacts would lead average annual sales at Tracy's existing supermarket space to decline by 25 percent to \$356 per square foot annually, somewhat below the national median ULI benchmark of \$390 per square foot but still above minimum feasibility levels. By 2009, however, sales should recover to \$409 per square foot, assuming projected population growth and no additional competitors entering the Trade Area.
- The Trade Area's growth would likely allow sufficient sales for all existing outlets to survive; however, sales per square foot at all stores are not equal, and Food 4 Less in particular serves the same market niche as both of the proposed new projects, and as a result might see the greatest impacts, although its current position as the sole store in the low-cost niche in Tracy may indicate very strong market position at this time. However, existing outlets can adjust their product mix or otherwise make changes to their operations in response to new competition; for instance, there are currently no stores in Tracy targeting high-end natural food shoppers (e.g., Whole Foods). Furthermore, the level of total sales needed to sustain profitability for any particular store is not known, and the fate of any individual store cannot be determined with certainty.
- BAE's analysis indicates that even with one or both of the proposed projects in place, existing grocery stores as a group most likely would perform near or above industry benchmarks and far above minimum feasibility levels, if not existing sales levels, within a few years. As a result, if sales were evenly distributed, all stores should be able to continue in operation, assuming they are currently profitable, and no blight potential would exist.
- However, it is possible that the impacts will not be felt equally by the existing supermarkets. For instance, as mentioned above Food 4 Less serves a market niche similar to WinCo and Wal-Mart Supercenters, so BAE concludes that the existing Food 4 Less store may suffer the greatest percentage sales losses, though perhaps from a currently high level.
- Analysis of the retail real estate market shows that Tracy has historically been very successful at re-tenanting former supermarkets that might have been of substandard design or inadequate size given today's standards and market conditions. Current vacancy rates for retail space are low, Tracy and the Trade Area have high incomes relative to the remainder of San Joaquin County, and the areas are expected to see continued population growth in both the short and long term. As a result, even if vacancies are created through closure of an existing supermarket, the growing demand for all types of retail space would prevent long-term vacancy and any resulting physical or economic blight.

Introduction

Background and Study Purpose

Recently, a proposal was submitted to the City of Tracy for development of a WinCo Foods store. In addition, Wal-Mart has proposed expanding their existing store to a Supercenter format, which will include a large area dedicated to food items. As part of its evaluation of the proposed projects, the City of Tracy desires information regarding effects on existing grocery store sales and the retail real estate market, looking in particular at the potential for adverse impacts on existing centers and the potential for blight. Blight can result from retail vacancies that remain unfilled, the failure of smaller tenants and their shopping center due to the loss of an anchor tenant, and the resulting physical decline in the improvements in these stand-alone spaces or integrated shopping centers. In Tracy, all the major competitive stores are the primary anchors of existing centers, with the exception of Costco, which shares major co-anchor status with Wal-Mart in the Tracy Market Place center. The purpose of this study, for which Bay Area Economics (BAE) has been retained, is to determine if new stores can be absorbed in the market without adverse physical effects on other areas, and to determine if adequate market demand exists to avoid blight. In some locales, existing competing outlets may also be at a competitive disadvantage if they are older and do not meet current expectations of consumers. This study addresses the potential impacts of the WinCo project alone, as well as the cumulative impacts if both the WinCo Foods project and Wal-Mart expansion are completed. It does not consider the impacts of the Wal-Mart expansion alone.

Project Description

The proposed project is the construction of a new WinCo Foods store at the southeast corner of Pavilion Parkway where it terminates at Power Road (which is not yet completed to the north of Pavilion Parkway). The proposed store is a very large-format full-service supermarket of 92,000 square feet. The site is currently vacant, but is near the large concentration of region-serving retail clustered around the West Valley Mall to the north of Interstate 205. The Wal-Mart is located nearby.

Report Organization

This report contains the following sections, providing background information and addressing issues of concern: an Executive Summary, providing a summary and key findings; this Introduction; Profile of the Retail Grocery Industry and WinCo Foods; Population and Employment Overview; Retail Sales Analysis; and Blight Analysis

Profile of the Retail Grocery Industry and WinCo Foods

Introduction

The following section presents background information on trends in the supermarket industry, including the evolution of food retailing, and changes over time in trade areas and location criteria. This will provide context for the discussion of WinCo Foods and the entire impact assessment.

Overview of the Retail Grocery Industry

Background and Evolution of Supermarket Retailing. The development of supermarkets and retail centers anchored by grocery chains took hold in the U.S. during the post-war boom. In the 1950s and 1960s the U.S. gross national product grew at an annual rate of 6.5 percent, while population increased by 1.8 percent per year. This unprecedented growth created new and expanding markets that allowed supermarket sales to continue to flourish into the 1970s and 1980s. In more recent times however, economic growth has slowed and consumers have become far more value-conscious. In addition, new competitors, such as warehouse clubs and general merchandise superstores that also sell groceries under the same roof as other items, have eroded market share previously belonging to grocery stores.

Recent Industry Trends. The U.S. grocery store sales reached \$755 billion in 2003. In a period of only a few years, Wal-Mart has rapidly emerged as a top food retailer in the country, with grocery sales at Supercenters increasing from an estimated \$19.6 billion in Fiscal Year 2001 to \$31 billion in FY Year 2003. In comparison, Albertsons had sales of \$36.2 billion and Safeway had sales of \$33.6 billion in FY 2003, and had slight declines in sales between 2001 and 2003.¹ Not only is the retail giant putting food products in all Wal-Mart Supercenters, the chain plans to undergo a massive expansion program for its 40,000 to 50,000 square-foot Neighborhood Markets.² Wal-Mart Neighborhood Markets will offer produce, deli foods, fresh meats, and general grocery items, in addition to a selection of health and beauty aids, stationery and paper goods, pet products, cosmetics and household chemicals. The Neighborhood Markets will also feature convenient drive-through pharmacies.

At this time, Wal-Mart is introducing Supercenters to California, with one store open and many more in the planning phase, some fully approved. They have not yet announced any plans to introduce the Neighborhood Market concept in the state, but it is a possibility once the company establishes the infrastructure in-state to provide their Supercenters with grocery items.

Current Market Strategies. In today's economic environment, increasing volume is key to competitive survival. Grocery retailers employ a variety of marketing strategies to increase volume, and at the same time must hold prices down by lowering costs. The predominant trend in recent years has been toward larger and newer stores, with correspondingly larger trade areas.

¹ <http://www.supermarketnews.com>

² Lewis, Len. "Markets in Motion," Progressive Grocer Annual Report, April 1999. p. 9.

As Wal-Mart and other discount merchandisers add grocery sections, many grocers have in turn added to the nonfood sections of their stores, stocking more housewares and other general merchandise, and are beginning to resemble their supercenter counterparts. As a result average grocery store sizes are gradually increasing as smaller and older stores are replaced by newer and larger outlets. Existing shopping center space often does not work for expanding grocery retailers because the new larger formats by nature require a different physical layout than is provided by most existing retail centers.

While most large operators have been able to adapt to these competitive pressures, many small regional supermarket chains find that they lack the funds to invest in technology to improve efficiency and lower costs. They are also not able to finance remodeling programs to upgrade their stores. Making stores attractive and improving the shopping experience by installing wider aisles, eye-catching food displays, and clear signage is critical to increasing store traffic and retaining customers.

For smaller grocery operations, successful strategies for building sales are often based on differentiation from major chains. These strategies include low-cost measures such as store-specific direct mail, focused neighborhood marketing, and dedicated customer assistance personnel. While adhering to an everyday low price strategy, smaller supermarkets find that they are also able to compete by offering fast checkout, friendly service, and a clean store. Many shoppers at smaller grocery stores make food purchases more than once a week, then shop at larger chains or warehouse stores for their “pantry loading,” i.e., volume purchases of food and household items. Smaller grocers have responded to this trend by repositioning themselves in the market, expanding their offerings of higher-margin specialty foods, and capitalizing on the more frequent but smaller shopping trips by generating sales of higher-margin products. While WinCo’s strategy differs from many other small regional chains, it has attempted to develop a unique market niche, as discussed below. It should be noted that the Tracy Trade Area does not contain any independent supermarket retailers at this time; all the existing stores are parts of national or regional chains.

Typical Trade Areas and Location Criteria. According to the Urban Land Institute's *Shopping Center Development Handbook*, a neighborhood shopping center is usually anchored by a supermarket, requires three to 10 acres of land, and has gross leasable area of 30,000 to 100,000 square feet. Such centers typically serve a trade area population of 3,000 to 40,000 people. Because population density can vary greatly from dense urban areas to suburbs to exurban areas, the trade area for a particular store is not tied to any specific measure of distance. Furthermore, because of differing consumer preferences, and the high mobility and multiple options available within a city, trade areas for centers or stores of a given type often overlap, rather than being a set of discrete, mutually exclusive areas with absolute boundaries. This wide variation in land requirements and trade areas indicates that there are no accepted “rules of thumb” for retail trade areas or location criteria. In response to these trends, and as market analysis has grown more sophisticated, trade area analysis has moved beyond simply plotting circles on maps around potential retail sites, to include analysis of larger areas taking into account traffic counts, commute patterns, and multiple competing nodes among which a consumer can choose.

When investigating the potential of an area, a food retailer considers average age, education level, employment patterns, current and projected population, and available retail sites. A 1994 survey of 114 experienced leasing and sales brokers, appraisers, investors, and lenders provides insight into selecting successful retail locations. Survey results indicate that the most important factors are more than 10,000 households within a one-mile radius; 85 percent visibility of tenants' signs from the primary street; strong household income; ample parking; and high daily traffic counts on adjacent streets. Intersection locations of major arterials are regarded as premium sites.³ Sometimes two grocery chain operators will locate near each other because the market segments they serve are just different enough that both stores may be supported by the same trade area. This is typically the case when the overall population is high, as it is in urban and suburban regions.

Profile of WinCo Foods

The first WinCo (then known as Waremart) was opened in 1967 in Boise, Idaho. Current CEO Bill Long led an employee takeover in 1985 when courts approved the sale to employees for \$10 million.⁴ The company is still employee-owned. Since the takeover, the company's Employee Stock Ownership Plan (Pension Plan) has grown at a 19.3% annual compound growth rate.⁵

WinCo's sales for 2004 are projected at \$22 billion, topping the previous year's mark by 23.8 percent.⁶ Headquartered in Boise, Idaho, WinCo's operations encompass over 40 stores and over 7,000 employees in Washington, Oregon, Idaho, Nevada, and California. (By way of comparison, Safeway operates 1,820 stores, Albertsons operates 2,300, and Raley's operates 134.) The company maintains full distribution centers in Woodburn, Oregon, and Ceres, California. There are 14 WinCo stores in California, with plans for expansion in Tracy and elsewhere.

Existing store sizes range from 65,000 to 96,000 square feet. The proposed store in Tracy is slated to be 92,000 square feet.

Competitive Strategies. By combining large store size, low everyday prices, and broad inventory and additional services, WinCo has positioned itself in a niche distinct from its competitors. WinCo identifies its target market as the "soccer mom demographic," which it defines as households with slightly higher than average income, lower than average per capita income (because of the number of children), and slightly higher than average levels of education. By focusing on extremely large stores with low prices, WinCo is targeting shoppers interested in "pantry loading" rather than convenience shoppers buying only a few items. WinCo shoppers may continue to frequent other local stores for these convenience purchases.

³ Ownbey, Kenton L. "Ingredients of a Successful Shopping Center." *Commercial Investment Real Estate Journal*, Fall 1994, p. 22-24.

⁴ "Bill Long Breaks The Rule on Planning: Some Can't Take It," *The Wall Street Journal*, January 1, 1998.

⁵ <http://www.wincofoods.com/history.html>

⁶ WinCo Foods correspondence with City of Tracy.

WinCo Foods stores have delis and large bulk-food sections, as well as bakery, meat, pizza, and fish departments. WinCo Foods stores do not have pharmacies.

Bay Area Economics' site tours of the Brentwood, Antelope, and Eureka stores show a store larger in scale than any other grocery operation in Northern California, with an ambience combining elements of a food warehouse, a large discount general merchandise outlet such as Wal-Mart, and a large-format supermarket such as a Safeway Marketplace.

Summary of Grocery Industry and WinCo Overview

Industry Trends. The U.S. grocery industry is in a period of consolidations and mergers such as the one that led to the local changeover of Lucky to the Albertsons name several years ago. In addition, Wal-Mart has continued to grow as a grocery retailer, with the development of Supercenters putting general merchandise and food under one roof.

The predominant trend in recent years has been toward larger and newer stores, with correspondingly larger trade areas. As Wal-Mart and other discount merchandisers add grocery sections, many grocers have added additional housewares and nonfood items. As a result, average grocery store sizes are gradually increasing as smaller and older stores are replaced by newer and larger outlets. Smaller grocers have responded to this trend by repositioning themselves in the market, expanding their offerings of higher-margin specialty foods, and capitalizing on the more frequent but smaller shopping trips by generating sales of higher-margin products. WinCo shoppers may continue to frequent other local stores for these convenience purchases.

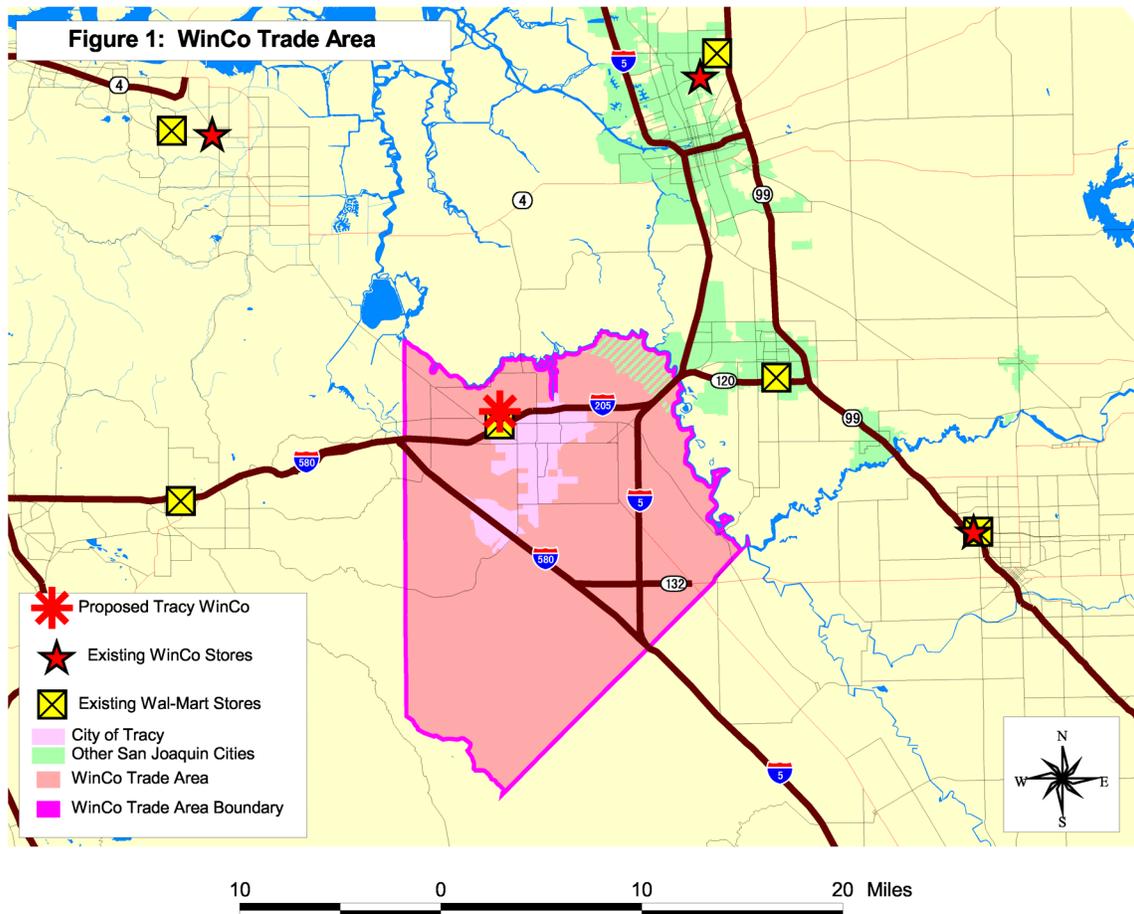
Population and Employment Overview

Introduction

This section presents background information on current and projected demographic and economic conditions in Tracy, the Trade Area, and San Joaquin County relevant to the evaluation of the potential impact of WinCo's proposed new store in Tracy. Developing an economic and demographic profile of these areas will make it possible to identify key factors influencing future retail sales in the area, and to assess the potential impacts of planned retail projects such as the proposed WinCo store on other retail outlets and centers. Data sources include the U.S. Census Bureau, including the 1990 and 2000 Census, the California Employment Development Department (EDD), the City of Tracy, the San Joaquin County Council of Governments, and Claritas, a private vendor providing estimates of current and future demographic conditions.

Definition of WinCo Trade Area

A trade area is the geographic region that encompasses most of a retail outlet's customers, or can be defined as including all the outlets that serve a particular market niche. For WinCo, the Trade Area has been defined as the City of Tracy and some surrounding areas (see Figure 1).



This definition is based on Tracy's relative isolation from other large population nodes, especially to the west and south, and by the location of nearby existing and planned WinCo stores, based on the presumption that potential WinCo shoppers will go to the closest WinCo outlet. WinCo currently has stores in Brentwood, Stockton, and Modesto, effectively covering the major population centers around Tracy, so the new store in Tracy will primarily serve Tracy residents, the developing new community of Mountain House to the west, and portions of Lathrop west of Interstate 5, in the recently approved River Islands project. Traffic congestion and distance across the Altamont Pass is likely to preclude substantial shopping trips from Livermore and other Alameda County communities, which in any case may ultimately be served by another WinCo store as the chain continues to expand.

This same Trade Area is similarly surrounded by proposed Wal-Mart Supercenters in nearby cities, including Stockton (two Supercenters), Antioch, and Manteca, so the proposed Wal-Mart Supercenter in Tracy is assumed to have the same Trade Area as WinCo. Currently, there is not a proposal for a Supercenter in Livermore.

Population Trends

Historic Population Growth. As shown in Table 1, Tracy's population has been growing rapidly since 1990, increasing from 33,558 in 1990 to 56,929 in 2000, with continued growth to an estimated population of 74,653 this year, a compound growth rate 5.9 percent per year between 1990 and 2004. In the Trade Area, the rate of population growth has been slightly lower, with growth from 46,158 in 1990 to 89,730 in 2004, for a growth rate of 4.9 percent annually. San Joaquin County as a whole has only grown at a rate of 2.0 percent per annum since 1990, reaching a current-year population estimated at 635,646. The San Joaquin Council of Governments (COG) has somewhat lower population estimates for Tracy and the County, (see Table 2 below). However, the State Department of Finance estimates the 2004 population of Tracy at 74,070, more in line with the Claritas estimates than the COG estimates.

Table 1: Population Trends, 1990-2009

Population	1990	2000	2004	Average Annual Change 1990 -2004	2009	Average Annual Change 2004-09
City of Tracy	33,558	56,929	74,653	5.9%	95,681	5.1%
Trade Area (b)	46,158	69,802	89,730	4.9%	113,501	4.8%
San Joaquin County	480,628	563,598	635,646	2.0%	724,702	2.7%

(a) Claritas provides estimates for 2004 and projections for 2009. However, assuming Measure A's growth limits are not lifted, City of Tracy Staff estimate that the 2009 population in Tracy is likely to be approximately 84,000. This may also affect the Trade Area and County projections, but if growth limitations are in place in Tracy, growth may merely be diverted to the currently under-construction Mountain House development and the planned River Islands development in Lathrop.

(b) Trade Area is defined in Appendix A.

Sources: 1990 & 2000 U.S. Census; Claritas, 2004; BAE, 2004.

Projected Future Population Growth. Estimates vary on future population growth in Tracy, the Market Area, and the County. Claritas expects continuing strong growth over the remainder of the decade, with Tracy’s population reaching 95,681 in 2009, and the Trade Area reaching 113,501 (see Table 1 above). The San Joaquin Council of Governments (COG) has projected somewhat slower growth for Tracy and the County, as shown in Table 2. Additionally, assuming Measure A growth limits in Tracy are not modified by voter initiative, City staff estimate that the 2009 population of Tracy will be approximately 84,000, more in line with the COG estimates. However, the projections for the unincorporated area do not appear to include Mountain House,⁷ which has a planned 20-year planned buildout population of 43,500 persons in the next 20 years,⁷ and the COG numbers do not appear to take into account the recent approval by Lathrop of 11,000 units in the River Islands project (on the west side of Interstate 5 and in the Trade Area). Construction is expected to commence in 2006.⁸ If growth limits remain in place in Tracy itself in the face of ongoing demand for housing in the region, these other developments in the Trade Area will likely absorb this demand and as a result, the Trade Area will continue to grow at a rapid rate as projected by Claritas.

Table 2: Population Projections

	<u>2000</u>	<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>	<u>2025</u>	Projected % Change 2000-2025
Tracy	54,200	70,828	87,456	104,084	117,788	137,341	153%
Unincorporated SJ County	131,400	133,141	134,881	136,622	138,056	140,103	7%
San Joaquin County	566,600	633,348	700,095	766,843	821,851	900,338	59%

Note: These projections do not appear to take into account the new Mountain House and River Islands developments. See text for details.

Sources: San Joaquin County Council of Governments, 2004; Bay Area Economics, 2004.

Household Trends

Household Growth. Household growth trends in Tracy, the Trade Area, and San Joaquin County mirror population growth, with the City doubling from 11,208 households in 1990 to an estimated 22,626 households in 2004, growing at a compound annual rate of 5.1 percent (see Table 3). Trade Area growth is estimated at 4.5 percent annually from 1990 to 2004, for an increase from 14,236 households to 26,412. Strong continued growth is expected for the remainder of the decade. As with the population projections, Tracy’s growth may be constrained by Measure A; if the measure remains in effect, City staff estimate that there will be only 27,000 total households in Tracy in 2009, but the remainder of the Trade Area may absorb this growth in any case.

⁷ <http://mountainhouse.net/index2.html>

⁸ <http://www.mantecabulletin.com/articles/2004/07/28/news/news1.txt>;

<http://www.lathropgov.org/whereis.html>

Table 3: Household Growth, 1990-2009

Households	1990	2000	2004 (a)	Average Annual Change 1990 -2004	2009 (a)	Average Annual Change 2004-09
City of Tracy	11,208	17,620	22,626	5.1%	28,335	4.6%
Trade Area	14,236	20,716	26,412	4.5%	32,908	4.5%
San Joaquin County	158,156	181,629	204,446	1.9%	232,366	2.6%

(a) Claritas provides estimates for 2004 and projections for 2009. However, assuming Measure A's growth limits are not lifted, City of Tracy Staff estimate that the number of households in Tracy in 2009 is likely to be approximately 27,000. This may also affect the Trade Area and County projections, but if growth limitations are in place in Tracy, growth may merely be diverted to the currently under-construction Mountain House development and the planned River Islands development in Lathrop.

Sources: 1990 & 2000 U.S. Census; Claritas, 2004; BAE, 2004.

Household Type and Tenure. Tracy, the Trade Area, and San Joaquin County are all predominantly family-oriented with approximately three-fourths of all households being families, as shown in Table 4. By comparison, 69 percent of California households in 2000 were family households. The proportions of families increased slightly for all three geographies between 1990 and 2000, with Claritas projecting very slight declines between 2004 and 2009.

Table 4: Families as Percent of All Households, 1990-2009

Household Type	1990	2000	2004	2009
Tracy				
Families	76.9%	81.2%	81.1%	80.7%
Non-Families	23.1%	18.8%	18.9%	19.3%
Trade Area				
Families	77.4%	80.5%	80.3%	79.8%
Non-Families	22.6%	19.5%	19.7%	20.2%
San Joaquin County				
Families	73.9%	74.2%	73.7%	73.1%
Non-Families	26.1%	25.8%	26.3%	26.9%

Sources: 1990 & 2000 U.S. Census; Claritas, 2004; BAE, 2004.

Tenure. Likely resulting from its growth as a “bedroom suburb,” between 1990 and 2000 Tracy’s percentage of households occupied by owners increased significantly, from 60.0 percent to 72.2 percent, as shown in Table 5. The Trade Area, which consists primarily of Tracy, shows a similar trend; while the County had a slight increase in the proportion of homeowners during the 1990s; in 2000 the owner occupancy rate in the County was still only 60.4 percent. This rate is similar to statewide, where owners make up 56.9 of all households.

Table 5: Tenure, 1990 and 2000

Tenure	1990	2000
Tracy		
Owner	60.0%	72.2%
Renter	40.0%	27.8%
Trade Area		
Owner	63.1%	72.8%
Renter	36.9%	27.2%
San Joaquin County		
Owner	57.6%	60.4%
Renter	42.4%	39.6%

Sources: 1990 & 2000 U.S. Census; Claritas, 2004; BAE, 2004.

Average Household Size. As the percentages of families and owners have increased, there has been an increase in average household size in Tracy and the Trade Area (see Table 6). In 1990, the average household size in Tracy and the Trade Area was 2.98 persons per household; by 2004, Claritas estimates this has increased to 3.28 in Tracy and 3.23 in the Trade Area. San Joaquin County has shown slower growth in household size, increasing from 2.94 persons per household in 1990 to 3.01 in 2004. Claritas projects continued growth in household sizes in Tracy and the Trade Area through 2009.

Table 6: Average Household Size, 1990-2009

Average Household Size	1990	2000	2004	2009
City of Tracy	2.98	3.21	3.28	3.36
Trade Area	2.98	3.17	3.23	3.31
San Joaquin County	2.94	3.00	3.01	3.03

Sources: 1990 & 2000 U.S. Census; Claritas, 2004; BAE, 2004.

Household Income. Household incomes and resulting consumer buying power are key indicators of the potential for additional retail development. Tracy and the Trade Area both have considerably higher median household incomes than San Joaquin County as a whole. As shown in Table 7, Claritas estimates that in 2004 the median annual household income in Tracy and the Trade Area are \$73,096 and \$71,303, respectively; in contrast, the median for the County is only \$45,427. Over one-fourth of the households in Tracy and the Trade Area have annual incomes of \$100,000 or more, indicating relatively high purchasing power.

Table 7: Estimated 2004 Household Income Distribution

2004 Income	TRACY		TRADE AREA		SAN JOAQUIN COUNTY	
	Number	%	Number	%	Number	%
Less than \$15,000	1,601	7.1%	2,017	7.6%	31,860	15.6%
\$15,000 to \$24,999	1,327	5.9%	1,720	6.5%	24,139	11.8%
\$25,000 to \$34,999	1,689	7.5%	2,107	8.0%	24,922	12.2%
\$35,000 to \$49,999	2,458	10.9%	2,928	11.1%	30,645	15.0%
\$50,000 to \$74,999	4,587	20.3%	5,203	19.7%	38,837	19.0%
\$75,000 to \$99,999	4,597	20.3%	5,118	19.4%	24,932	12.2%
\$100,000 to \$149,999	4,522	20.0%	5,103	19.3%	19,576	9.6%
\$150,000 or more	1,845	8.2%	2,216	8.4%	9,535	4.7%
Total	22,626	100%	26,412	100%	204,446	100%
Median Income	\$73,096		\$71,303		\$45,427	

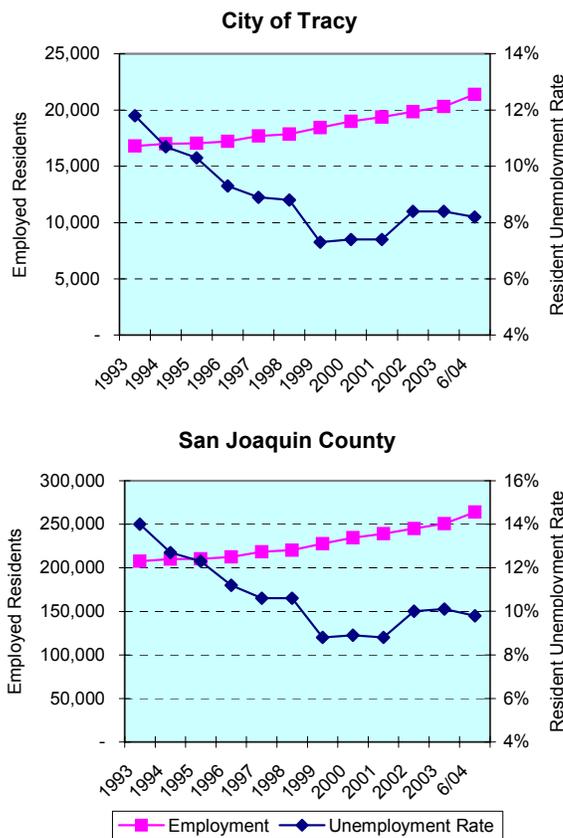
Sources: Claritas, Inc., 2004; Bay Area Economics, 2004.

Labor Force Trends

Tracy and San Joaquin County have shown sustained employment growth for their residents (see Figure 2), with Tracy's unemployment rate tracking below the county level. In 1993, unemployment rates in Tracy and the County were at 11.8 percent and 14.0 percent, respectively. Rates dropped to their lowest levels in 1999, when Tracy reached a low of 7.3 percent and the County reached 8.8 percent. Unemployment increased through 2003, but never reached the high levels of the earlier 1990s. Indications are that the economy has stabilized in 2004, with slight declines in unemployment through June, when Tracy's unemployment was 8.2 percent and the County's was 9.8 percent. The lower rates in Tracy may be reflective of its lesser dependency on the agricultural sector (both growing and processing) that is a large part of the county's economy.

Interestingly, throughout the period, total resident employment in Tracy and San Joaquin County increased every year, for a total increase of 21 percent in both geographies, even as unemployment rose after 1999. This indicates that the regional economy was still growing, but was not able to keep up with the growth in the labor force. Even at current unemployment rates, however, there are less unemployed persons in Tracy and San Joaquin County today than in 1993.

Figure 2: Employed Residents and Unemployment Rate



Data presented are for residents of the area by place of residence, not workers by place of work. Annual data are annual averages. June 2004 data are preliminary. For detailed data, see Appendix B.

Sources: California Employment Development Department; Bay Area Economics, 2004.

Summary of Demographic and Economic Overview

For WinCo, the Trade Area has been defined as the City of Tracy and surrounding areas, primarily the newly developing community of Mountain House and the recently approved River Islands development in Lathrop. This definition is based on Tracy's relative isolation from other large population nodes, especially to the west and south, and by the location of nearby existing and planned WinCo stores, based on the presumption that potential WinCo shoppers will go to the closest WinCo outlet. This same Trade Area is similarly surrounded by proposed Wal-Mart Supercenters in nearby cities.

Tracy and the Trade Area have seen tremendous growth since 1990, with continued growth expected into the foreseeable future, although Tracy's own growth may be constrained by Measure A growth limits. The current Trade Area population is estimated at slightly below 90,000 persons and is projected to reach approximately 114,000 persons by 2009. There has been a similar rate of increase in households since 1990 and projected to 2009.

Tracy, the Trade Area, and San Joaquin County are all predominantly family-oriented with approximately three-fourths of all households being families. Likely resulting from its growth as a "bedroom suburb," between 1990 and 2000 Tracy's percentage of households occupied by owners increased significantly, from 60.0 percent to 72.2 percent. The Trade Area shows a similar trend of increasing owner-occupancy.

As the percentages of families and owners have increased, there has been an increase in average household size in Tracy and the Trade Area. In 1990, the average household size in the Trade Area was 2.98 persons per household; by 2004, this has increased to an estimated 3.23 persons per household. Projections indicate continued growth in household sizes in Tracy and the Trade Area through 2009.

Tracy and the Trade Area both have considerably higher median household incomes than San Joaquin County as a whole. In 2004, the estimated median annual household income in the Trade Area is \$71,303. Over one-fourth of the households in the Trade Area have annual incomes of \$100,000 or more. These income estimates indicate relatively high purchasing power.

Tracy and San Joaquin County have shown sustained employment growth for their residents, with Tracy's unemployment rate tracking below the county level. In June 2004 Tracy unemployment was estimated at 8.2 percent. From 1993 through 2003, total employment for residents of Tracy and San Joaquin County increased every year, indicating continued growth in the regional economy.

In summary, the demographic and economic data indicate that Tracy and the Trade Area should support sustained retail growth for the next several years as population, incomes, and employment increase.

Retail Sales Analysis

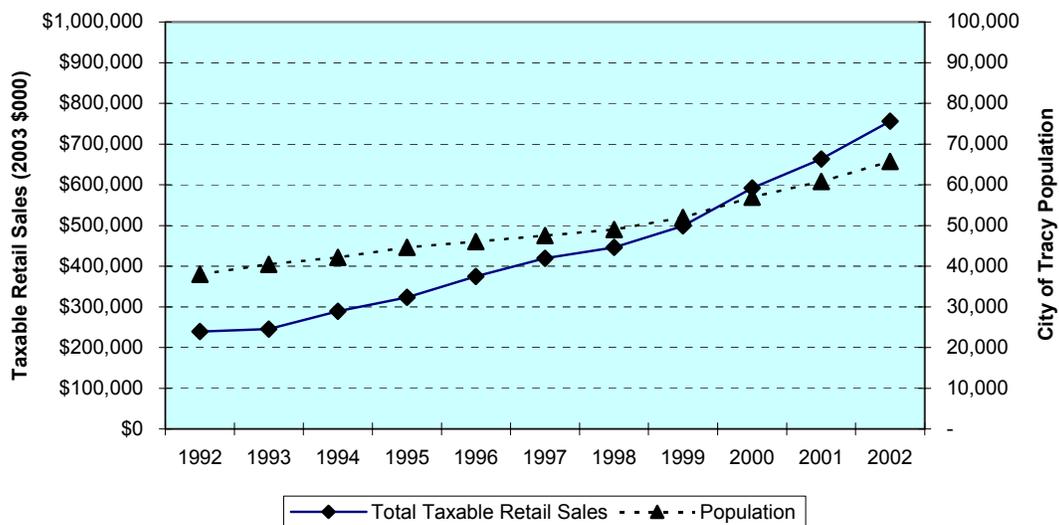
This section provides an inventory of competing supermarkets in the Trade Area, examines retail trends in Tracy and San Joaquin County, and estimates the impacts of the proposed WinCo on sales of existing retailers in Tracy. The analysis has been completed to show the impacts of WinCo alone as well as in combination with the proposed Wal-Mart Supercenter expansion.

Retail Trends in Tracy and San Joaquin County

As stated above in the demographic and economic overview, Tracy and the Trade Area are undergoing a period of rapid population and household growth, they have high income levels relative to San Joaquin County as a whole, and the City and County employment base has continued to grow. This expanding population and economy are reflected in increases in retail sales and construction of several major retail centers since 1990 as the Tracy area has reached the “critical mass” necessary to support region-serving retail. The following section analyzes retail sales trends and conditions in Tracy and San Joaquin County, using published data on taxable sales from the California State Board of Equalization, the *1997 Economic Census, Retail Trade, Geographic Area Series*, and unpublished and confidential data provided to BAE by the City of Tracy and other parties.

Overall Retail Sales. As shown in Figure 3, Tracy’s retail sales have been climbing consistently since the early 1990s, with retail sales growth outpacing population growth. Taxable retail sales in 1992 were slightly below \$240 million (in 2003 dollars), growing more than 200 percent to \$756 million in 2002, while population growth was only 73 percent during the same period.

Figure 3: Growth in Tracy's Taxable Retail Sales and Population, 1992-2002



Notes: Population data from State Department of Finance. May vary from other sources. Sales here are taxable sales only, and exclude most food sales as well as prescription drugs and certain other items. Sales are presented in 2003 dollars. For details, see Appendix C.

Sources: State Board of Equalization; U.S. Bureau of Labor Statistics; State Department of Finance; Bay Area Economics, 2004.

Demand for New Retail Space in the Trade Area. Using the sales data from Figure 3, it is possible to make an estimate of the growth in demand for retail space in the Trade Area, as shown in Table 8. Based solely on taxable sales (which excludes food items and prescription drugs), the Trade Area should be able to absorb nearly 164,000 square feet of retail space annually through 2009. This indicates a strong likelihood that existing spaces the size of current supermarkets can be re-tenanted should they become vacant through closure.

Table 8: Calculation of Annual Demand for New Retail Space in Trade Area

2002	
Total Taxable Retail Sales (a)	\$756,389,316
Trade Area Population (b)	79,141
Sales per capita	\$9,557
2009	
Trade Area Population, 2009 (c)	113,501
Estimated Total Taxable Sales (d)	\$1,084,784,672
Increase in Taxable Sales, 2002-2009	\$328,395,356
Sales per Square Foot, All Stores (e)	\$286.46
Estimated Additional Annual Retail Square Feet Demand (f)	163,770

(a) From Appendix C. All amounts in 2003 dollars. Includes only taxable sales in Tracy, thus is a conservative estimate of total sales in Trade Area.

(b) Calculated using estimated annual average growth rate from 2000-2004 for Trade Area.

(c) From Table 1.

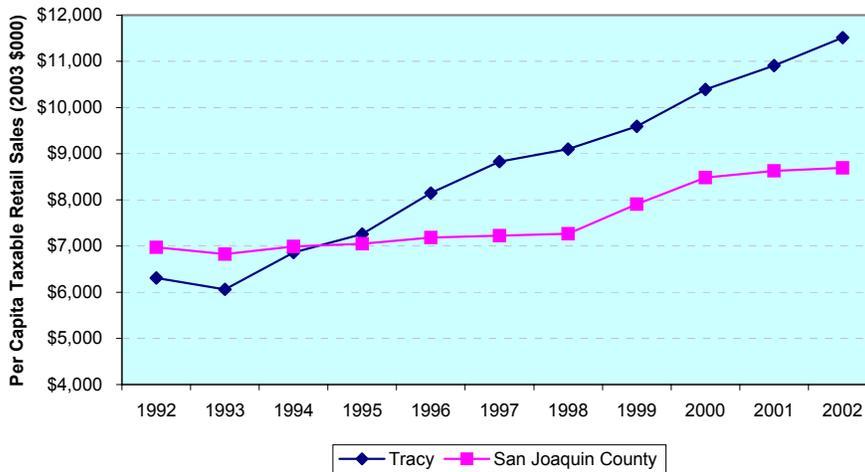
(d) 2009 population x per capita sales.

(e) Based on median sales per square foot for all stores in community shopping centers in the West, *ULI Dollars & Cents of Shopping Centers, 2004*.

Sources: BAE, based on data from Urban Land Institute, State Board of Equalization, and Claritas.

Per Capita Retail Sales. The rapid growth of retail and Tracy's rise as a region-serving center can be seen in the increase in per-capita sales over the same time period (see Figure 4). Tracy's inflation-adjusted annual per capita taxable sales rose 83 percent, from \$6,306 in 1992 to \$11,513 in 2002. In contrast, per capita taxable retail sales in San Joaquin County rose only 25 percent during the same period, from \$6,974 to \$8,692. While Tracy started the period with per capita sales lower than the County, by 2002 its per capita sales were nearly one-third higher than Countywide, reflecting Tracy's rise as a regional shopping destination as well as the relatively high household incomes in Tracy and the Trade Area.

Figure 4: Annual Per Capita Taxable Retail Sales for Tracy and San Joaquin County, 1992-2002

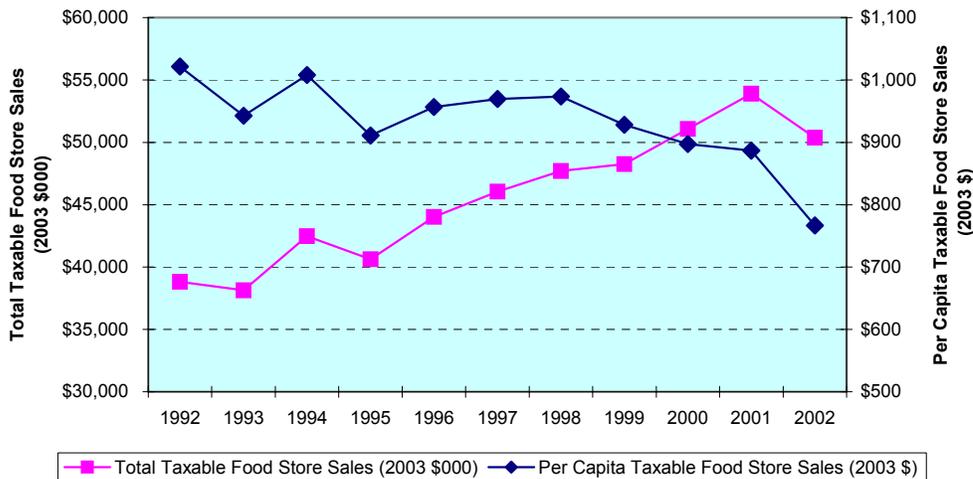


Notes: Population data from State Department of Finance. May vary from other sources. Sales here are taxable sales only, and exclude most food sales as well as prescription drugs and certain other items. For details, see Appendices C & D.

Sources: State Board of Equalization; U.S. Bureau of Labor Statistics; State Department of Finance; Bay Area Economics, 2004.

Food Store Sales. While overall taxable sales increased over 200 percent in Tracy between 1992 and 2002, overall taxable sales at food stores increased only 30 percent on an inflation adjusted basis, and per capita taxable sales actually decreased from \$1,022 in 1992 to only \$767 in 2002 (see Figure 5). This trend is likely due to a shift in sales to other types of outlets as the retail options increased dramatically in Tracy through the decade. This trend was mirrored in the County, where per capita taxable food store sales also declined, from \$794 to only \$603 in 2002 (see Appendix C). In 1992, supermarkets in Tracy (and the County) likely supplied a higher than average proportion of sales of taxable household items (e.g., brooms, paper goods) because of the limited choices available in Tracy at the time. Today, these same items can be purchased at Wal-Mart and other stores that opened between 1992 and 2002 as Tracy has matured into a regional shopping destination.

Figure 5: Food Store Taxable Sales Trends for Tracy, 1992-2002



Notes: Population data from State Department of Finance. May vary from other sources. Sales here are taxable sales only, and exclude most food sales as well as prescription drugs and certain other items. For details, see Appendix C.

Sources: State Board of Equalization; U.S. Bureau of Labor Statistics; State Department of Finance; Bay Area Economics, 2004.

Taxable vs. Non-Taxable Sales in Food Stores. One difficulty in quantifying food store sales is that in California, the annual data are only available for taxable items, and food items are for the most part non-taxable. In analyzing total sales, it becomes necessary to estimate the percentage of a supermarket's sales that are non-taxable. One way to do this is to compare the taxable sales data with data from the Economics Census, which includes all sales. As shown in Table 9, the most currently available data are from 1997.

At 43 percent, Tracy showed a comparatively high proportion of taxable sales in food stores in 1997, which fits with high per-capita taxable sales as seen above. Comparatively, San Joaquin County and California show 37 and 33 percent of sales as taxable sales, respectively. For supermarkets and grocery stores (excluding convenience stores, and specialty food stores), the percentages are lower, with San Joaquin and California both showing taxable sales at approximately 25 percent of all sales. As indicated above by the continuing decline in per capita taxable food store sales in Tracy, and the growth in general merchandise shopping options in the last several years, it is likely that the proportion of taxable sales for supermarkets in Tracy is converging on the County and State values. Confidential data provided by other sources confirms that the proportion of taxable sales in supermarkets in Tracy has declined toward the County and State benchmarks.

Table 9: Comparison of Taxable Food Store Sales with Total Food Store Sales

Retail Sales in 1997, in 2003 \$000 (a) (b)	All Sales - Economic Census	Taxable Sales - State Board of Equalization	Taxable Sales as Percent of Total
Tracy			
Food and beverage/ All food stores (c)	\$107,478	\$46,047	43%
<i>Supermarkets and other grocery stores (excl convenience stores)</i>	<i>\$102,231</i>	<i>na</i>	<i>na</i>
San Joaquin County			
Food and beverage/ All Food Stores (c)	\$868,668	\$323,690	37%
<i>Supermarkets and other grocery stores (excl convenience stores)/ Food stores selling all types of liquor</i>	<i>\$795,373</i>	<i>\$205,081</i>	<i>26%</i>
State of California			
Food and beverage/ All Food Stores (c)	\$59,712,546	\$19,498,315	33%
<i>Supermarkets and other grocery stores (excl convenience stores)/ Food stores selling all types of liquor</i>	<i>\$53,402,051</i>	<i>\$13,550,482</i>	<i>25%</i>

(a) Sales expressed in 2003 dollars using Bay Area All Consumers Price Index.

(b) n/a indicates data unavailable.

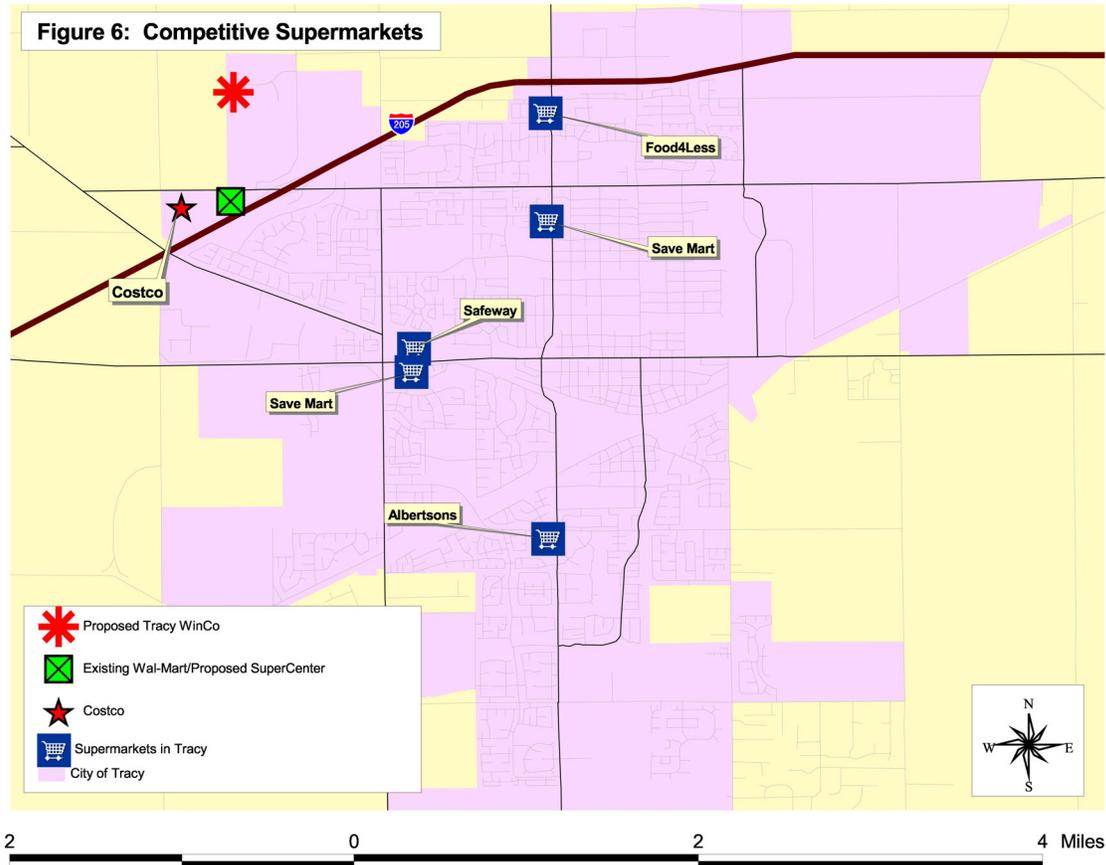
(c) Food and beverage is category name from Economic Census; All food stores is category name from State Board of Equalization. Due to differences in classification systems, these categories may describe slightly different universes.

(d) Supermarkets and other grocery stores (excl convenience stores) is category name from Economic Census; Food stores selling all types of liquor is category name from State Board of Equalization. It is likely that these categories describe slightly different universes, but most supermarkets in California carry liquor, while convenience stores do not, and liquor stores themselves are categorized separately.

Sources: 1997 Economic Census; U.S. Department of Labor, Bureau of Labor Statistics; State Board of Equalization; BAE.

Inventory of Competitive Outlets

Tracy is currently served by five major supermarkets and a Costco, as shown in Figure 6. There are no additional supermarkets of more than 25,000 square feet or more in the Trade Area at this time. The total square footage of these stores is approximately 318,000 square feet.



Following are descriptions of each of these stores. Additional detail can be found in Appendix E.

Albertsons, located in the south part of Tracy at 875 South Tracy Boulevard, opened in 1997. The store is the second-largest supermarket in Tracy, at 65,633 square feet. Offerings include a drive-through pharmacy, a bakery and deli, a half-hour photo shop, and a Bank of America branch. The store is open 6 a.m. to midnight every day. The other major anchor of the center is a Blockbuster Video; there are several other smaller shops. Albertsons declined to respond to BAE requests regarding potential impacts of the WinCo and Wal-Mart Supercenter proposals.

Food 4 Less is located in the Tracy Corners shopping center at 3225 North Tracy Boulevard, a small distance south of Interstate 205 and north of Grant Line Road. This store is 40,320 square feet, in a full-service warehouse format offering low prices. Additional offerings are limited to a bakery. The store opened in 1991. Other tenants in the same center on the same side of the street include Kragen Auto Parts and several smaller tenants. There is also a vacant space formerly

occupied by a “dollar” discount store. Food 4 Less is independently owned, and the owner contacted BAE regarding his concerns over the two proposed new stores, which he sees as competing directly in the same low-price segment of the market as Food 4 Less. He stated that his lease expires in 2006, and if sales are impacted severely by WinCo and Wal-Mart, Food 4 Less might choose not to renew its lease.

Safeway is the newest and largest supermarket in Tracy, opening their new store in the Regency Center at 1801 West 11th Street in 2002. This store comprises 65,715 square feet of space, and includes a bakery/deli, a floral department, prepared foods, a one hour photo, a pharmacy, a Starbucks, and a gas station. The store is open 24 hours a day. Other major anchors include Orchard Supply Hardware and Longs Drugs. Safeway did not respond to BAE inquiries.

Save-Mart operates two stores in Tracy. Their newer store is at 1950 West 11th Street, in a center across 11th Street from the new Safeway, and opened in 2003, after Safeway moved out of this store to their new location across the street. This store is 55,807 square feet, the third largest supermarket in Tracy, and offers a deli, prepared foods, a floral department, a pharmacy, and an in-store Union Bank of California. The store is open 6:00 a.m. to midnight seven days a week. The center’s other major anchor is a Walgreens. Save-Mart’s other Tracy store is at 2005 North Tracy Boulevard in Gateway Plaza, and is a smaller store with more limited offerings. The 46,280 square-foot store has been open since approximately 1990, and is also open 6:00 a.m. to midnight seven days a week. Save-Mart did not respond to BAE inquiries.

The other major retail food merchandiser in Tracy is Costco, a discount warehouse club selling groceries, typically in bulk quantities, and general merchandise to both businesses and individuals. Warehouse clubs occupy a special market niche, being used primarily for bulk purchases of food items rather than everyday needs. This 149,000 square-foot store is located in the Tracy Marketplace at 3250 W. Grant Line Rd., adjacent to Wal-Mart. The Tracy Costco opened in September 2002. Other major outlets in this center include Michael’s, an art supply store and Staples, an office supply outlet. Since this store is not devoted entirely to food items, the total square footage is not used in calculating the total estimated sales for these stores. Based on research regarding typical Costco sales, it is estimated that 30 percent of the store, or 44,700 square feet, is devoted to food items.

Impacts of Proposed Projects on Existing Retail Grocery Outlets

Overview. This discussion provides estimates of total sales at existing supermarkets and Costco, both under existing conditions and with the proposed WinCo store and Wal-Mart expansion in place. The impacts of WinCo alone are considered first, and then the potential cumulative impacts of both projects are discussed.

Methodology. Total estimated sales are divided by square footage to provide estimates of average store performance based on sales per square foot under existing conditions and following the opening of the proposed new projects. These measures of sales per square foot can then be used to evaluate store performance relative to industry benchmarks. The analysis in this section only considers aggregate store performance; individual store performance may vary, with some stores doing considerably better than the community average, and some doing worse. It should also be noted that industry benchmarks are not an indicator of the level of profitability of individual stores; some stores might be profitable at a lower sales level, while others may require higher market support. Additionally, retail operators have varying standards regarding satisfactory store performance. Other factors taken into consideration include percentage of food store sales derived from supermarkets, as well as local trends in per capita food store sales. One key assumption is that the proposed WinCo store's sales will primarily impact these supermarkets and Costco, their most direct competitors; to the extent that sales would be captured from other types of stores (e.g., Wal-Mart), this estimate may overstate the impacts on the supermarkets and Costco. It is also possible that because WinCo already has stores in Brentwood, Modesto, and Stockton, some pantry-loading shoppers from the Trade Area may already be using those stores, in which case the WinCo store may recapture sales currently going outside the Trade Area. If this is the case, the following impact analysis may also overstate the impacts on the supermarkets and Costco.

It should also be noted that the Trade Area growth in population will be gradual, while growth in retail space such as supermarkets, is "lumpy," with any new store opening typically adding 50,000 square feet or more to the Trade Area. As a result, any new addition of supermarket space will have a short term impact on sales at existing stores, with the impact mitigated over time as population growth continues.

Estimated Supermarket Sales at Existing Outlets. Based on confidential taxable sales data provided to BAE by the City of Tracy and on other confidential and proprietary data provided by others, and based also on the declining proportion of taxable sales as a proportion of total sales at Tracy's major supermarkets, BAE estimates 2003 "supermarket" sales in the six outlets described above of approximately \$138 million (see Table 10). Given an estimated Trade Area population of 84,269 in 2003, supermarket sales per capita for last year are estimated at \$1,639 (2003 dollars).

These sales average \$434 per square foot across all outlets. This overall average is above median industry benchmarks, as derived from Urban Land Institute's *Dollars & Cents of Shopping Centers: 2004*. ULI's extensive national surveys show median annual supermarket sales per square foot of \$390 for all supermarkets in U.S. community shopping centers, with national chains performing slightly better with a median of \$398, and local chains below the overall

median at \$358 per square foot. Estimates of sales per square foot from individual outlets indicate supermarkets in Tracy have sales ranging from numbers below the national median to well above it.⁹ The average sales per square foot are significantly above a minimum feasible level of \$275 per square foot based on BAE's previous experience.

Taking into account inflation and population growth, 2004 supermarket sales in these same outlets should surpass \$150 million, for per square foot sales of \$473 and per capita sales of \$1,680. With no additional projects, and assuming constant per capita sales, by 2006 total sales would climb to \$166 million and \$520 per square foot; by 2009, total sales would reach over \$190 million, at just under \$600 per square foot.¹⁰ Based on projections of population in the Trade Area in 2025 and no additional outlets, sales would be over double current levels, surpassing \$300 million and reaching \$954 per square foot.

Table 10: Estimated Sales at Existing Supermarkets in Tracy

	<u>2004</u>	<u>2006</u>	<u>2009</u>	<u>2025 (a)</u>
Trade Area Population (b)	89,730	98,574	113,501	216,341
Per Capita Supermarket Sales (c)	\$1,680	\$1,680	\$1,680	\$1,680
Estimated Supermarket Sales (d)	\$150,746,000	\$165,604,000	\$190,682,000	\$363,453,000
Existing Supermarket Square Feet (e)	318,455	318,455	318,455	318,455
Average Annual Sales per Square Foot	\$473	\$520	\$599	\$1,141
ULI Median, All Supermarkets (f)	\$390			
Minimum Feasible Level (g)	\$275			

(a) Based on San Joaquin County Council of Governments Projections for City of Tracy, plus projected build-out of Mountain House at 43,500 and River Islands buildout population estimate of 35,500 (based on 11,000 units and current regional HH size average of 3.23). Given the large growth in population, it is highly likely that by 2025 additional supermarket stores will be constructed in the trade area, especially Mountain House and River Islands.

(b) Trade area is constructed from 2000 Census Tracts, as listed in Appendix A. Population estimates from Claritas, except as elsewhere noted (i.e., 2025). While Tracy's population may not reach Claritas projections for 2009, the new developments in Mountain House and River Islands are likely to absorb unmet regional demand and keep the Trade Area Population growth high.

(c) Based on confidential taxable sales data as provided by City of Tracy, adjusted for non-taxable sales and inflation; in some cases, stores self-reported, or other confidential sources were available that assisted in indicating the correct proportion of non-taxable sales for each outlet. Rounded to nearest \$000. 2003 and 2006 population of market area has been estimated by using the Claritas growth rates from 2000 to 2004 and 2004 to 2009 and assuming constant rate of growth. Includes estimated Costco food sales.

2003 Population	84,269
Estimated Supermarket Sales	\$138,102,000 rounded to nearest \$000
Per Capita Sales	\$1,639
CPI Adjustor to 2004 (i)	1.025
2004 Per Capita Sales	\$1,680 rounded to nearest dollar

(d) All estimates throughout table in 2004 dollars.

(e) From Appendix E.

(f) Urban Land Institute's Dollars & Cents of Shopping Centers: 2004. Median for all supermarkets in community shopping centers nationwide.

(g) Based on BAE's experience looking at individual store data for various market areas. It is extremely important to note that sales per square foot are related to a variety of factors, and are not directly an indicator of feasibility or profitability. Many operators would likely consider this level unacceptable and unprofitable given their cost structure.

Sources: U.S. Census Bureau; U.S. Bureau of Labor Statistics; Claritas; San Joaquin Council of Governments; <http://www.mountainhouse.net>; Urban Land Institute; City of Lathrop; Bay Area Economics, 2004.

⁹ These numbers cannot be discussed in more detail due to the confidential nature of the source data.

¹⁰ All future sales estimated in 2004 dollars.

Estimated Impacts of WinCo on Existing Supermarkets. As currently proposed, the new Tracy WinCo store is sized at 92,000 square feet, which is far larger than any of the existing supermarkets; this large format is typical of newer WinCo stores. If this store opens as projected in 2006, average annual sales per square foot at Tracy's existing supermarkets would decline by an estimated 15 percent to \$403, still slightly above the ULI-derived industry median (see Table 11). By 2009, annual sales per square foot would recover to \$465, and if no additional outlets were built by 2025 (an admittedly unlikely scenario), average sales would reach \$855 per square foot at the existing outlets.

It is likely that any impacts would be greater on those stores targeting a similar niche in the market. In Tracy, the existing store most like WinCo in terms of market concept is the Food 4 Less; this store is in North Tracy, relatively close to the proposed WinCo site. While Costco offers bulk items, it caters to a different target market than WinCo, which rather than focusing on bulk packaging of specific items, offers a broad range of sizes and items carried. WinCo and Costco stores exist in close proximity in some markets (e.g., Fresno and Clovis, CA and Tigard, OR), and with some adjustments in product mix to eliminate overlap, the two stores can serve the market in a complementary fashion.

Table 11: Impacts of New WinCo Store on Sales at Existing Supermarkets in Tracy

	<u>2004</u>	<u>2006</u>	<u>2009</u>	<u>2025</u>
Trade Area Population (a)	89,730	98,574	113,501	216,341
Supermarket Sales Potential (a) (b)	\$150,746,000	\$165,604,000	\$190,682,000	\$363,453,000
Existing Supermarket Square Feet (a)	318,455	318,455	318,455	318,455
WinCo (c)		92,000	92,000	92,000
Estimated Supermarket Sales in WinCo (d)		\$37,119,000	\$42,740,000	\$81,465,000
Sales in Existing Outlets	\$150,746,000	\$128,485,000	\$147,942,000	\$281,988,000
Average Annual Sales per Square Foot at Existing Stores	\$473	\$403	\$465	\$885
Percent Change from 2004		-15%	-2%	87%
Sales per Square Foot in WinCo (e)		\$403	\$465	\$885
ULI Median, All Supermarkets (f)	\$390			
Minimum Feasible Level (g)	\$275			

(a) From Table 9.

(b) All estimates throughout table in 2004 dollars.

(c) Size estimate from City of Tracy.

(d) Rounded to nearest \$000.

(e) Sales per square foot assumed to match area supermarket average.

(f) See explanation, Table 10.

(g) See explanation, Table 10.

Sources: U.S. Census Bureau; U.S. Bureau of Labor Statistics; Claritas; San Joaquin Council of Governments; <http://www.mountainhouse.net>; Urban Land Institute; City of Lathrop; Bay Area Economics, 2004.

Estimated Combined Impacts of WinCo and Wal-Mart Supercenter on Existing Supermarkets. In addition to the WinCo proposal, the City of Tracy is also considering the application for an expansion of the existing Wal-Mart to the Supercenter format, which includes an area dedicated to a full line of food items typically found in a full-service supermarket. If the project is built, probably in the same time frame as the WinCo, it will add an additional 55,192 square feet of space dedicated to food sales to the Trade Area inventory. The combined total square footage from the WinCo and Wal-Mart proposals is slightly less than 150,000 square feet (see Table 12). Assuming both outlets are open in 2006, average annual sales at Tracy's existing supermarket space are estimated to decline by 25 percent to \$356 per square foot annually, somewhat below the national median ULI benchmark of \$390 per square foot. By 2009, however, sales should recover to \$409 per square foot, assuming projected population growth and no additional competitors entering the Trade Area. By 2025, sales at existing outlets would reach \$781 per square foot, under the unlikely assumption of no additional supermarkets in the Trade Area.

As with WinCo, Wal-Mart positions itself as a low-price supermarket alternative, so it targets a similar market segment. Once again, Food 4 Less is the existing store most competitive in this market segment. BAE staff recently toured an existing Supercenter in another state, and found that Wal-Mart, while not carrying as extensive a product line as WinCo, does carry items packaged for bulk shoppers and pantry loaders, so it would also likely compete with the Costco to a greater extent than the remaining conventional supermarkets in Tracy.

Table 12: Combined Wal-Mart and Winco Impacts on Sales at Existing Supermarkets in Tracy

	<u>2004</u>	<u>2006</u>	<u>2009</u>	<u>2025</u>
Trade Area Population (a)	89,730	98,574	113,501	216,341
Supermarket Sales Potential (a) (b)	\$150,746,000	\$165,604,000	\$190,682,000	\$363,453,000
Existing Supermarket Square Feet (a)	318,455	318,455	318,455	318,455
Winco and Wal-Mart Expansion (c)		147,192	147,192	147,192
Estimated Supermarket Sales in Winco and Wal-Mart (d)		\$52,348,000	\$60,275,000	\$114,888,000
less WinCo and Wal-Mart Capture of Sales	\$150,746,000	\$113,256,000	\$130,407,000	\$248,565,000
Average Annual Sales per Square Foot at Existing Stores	\$473	\$356	\$409	\$781
Percent Change from 2004		-25%	-13%	65%
Sales per Square Foot in WinCo and Wal-Mart Grocery Space (e)		\$356	\$409	\$781
ULI Median, All Supermarkets (f)	\$390			
Minimum Feasible Level (g)	\$275			

(a) From Table 10.

(b) All estimates throughout table in 2004 dollars.

(c) Size estimates from City of Tracy. See previous table for Winco. Includes only the portion of Wal-Mart expansion devoted to food items, as follows. Based on sales floor area devoted to grocery sales and grocery stockroom and ancillary areas from plans submitted to City of Tracy.

Grocery Sales	33,928
Grocery Stockroom & Ancillary Spaces	21,264
Total Wal-Mart "Supermarket" space	55,192

(d) Rounded to nearest \$000.

(e) Sales per square foot assumed to match area supermarket average.

(f) See explanation, Table 10.

(g) See explanation, Table 10.

Sources: U.S. Census Bureau; U.S. Bureau of Labor Statistics; Claritas; San Joaquin Council of Governments; <http://www.mountainhouse.net>; Urban Land Institute; City of Lathrop; Bay Area Economics, 2004.

Summary of Retail Sales Analysis

Tracy and the Trade Area are undergoing a period of sustained growth in population, and this is reflected in retail sales trends. Additionally, the Trade Area's population has reached a "critical mass" allowing the introduction of region-serving retail such as the West Valley Mall to Tracy, resulting in retail sales growth outpacing population growth, with a strong increase in per capita spending as Tracy shoppers have a broader range of shopping opportunities locally.

Given continued Trade Area population growth, even considering only taxable sales and not assuming any additional increase in per capita sales in the Trade Area, there is annual demand for nearly 164,000 square feet of additional retail space through 2009, indicating a likelihood that existing vacant spaces, even at the size of supermarkets, can be re-tenanted.

The exception to these trends is taxable sales at food stores, which increased only 30 percent on an inflation adjusted basis; per capital taxable sales actually decreased between 1992 and 2002. This trend is likely due to a shift in sales of housewares, sundries, and other taxable items to other types of stores, such as Wal-Mart, as they entered the Tracy market. In 1997, Tracy still had a relatively high proportion of non-taxable sales in grocery stores.

However, other data indicate that overall supermarket sales have increased, as the population needing grocery items has grown. The proportion of taxable sales for supermarkets in Tracy thus is probably converging on the County and State values. This is another indicator of Tracy maturing into a region-serving shopping destination.

Tracy is currently served by five major supermarkets and a Costco. There are no additional supermarkets of more than 25,000 square feet or more in the Trade Area at this time. The total square footage of these stores is approximately 318,000 square feet (including the portion of Costco devoted to food sales). The major competitors include Albertsons, Food 4 Less, Safeway, two Save-Marts, and Costco. There are no small independent supermarkets operating in Tracy at this time.

Based on a variety of confidential and published source data, 2004 supermarket sales in these outlets are estimated at over \$150 million, for per square foot sales of \$473 and per capita sales of \$1,680. With no additional projects, sales per square foot and per capita would continue to increase over time. This overall average is above median industry benchmarks, as derived from Urban Land Institute's Dollars & Cents of Shopping Centers: 2004. ULI's extensive national surveys show median annual supermarket sales per square foot of \$390 for all supermarkets in U.S. community shopping centers. It is also well above a minimum feasible threshold for supermarket sales per square foot.

If the WinCo store opens as projected in 2006, and no other project is built (e.g., Wal-Mart Supercenter), average annual sales per square foot at Tracy's existing supermarkets would decline by an estimated 15 percent to \$403 (2004 dollars), still slightly above the ULI-derived industry median. Sales per square foot would continue to increase and would recover to \$465 annually in 2009.

It is likely that any impacts would be greater on those stores targeting a similar niche in the market. In Tracy, the existing store most like WinCo in terms of market concept is the Food 4 Less; this store is in North Tracy, relatively close to the proposed WinCo site. However, this store is the only store serving this market, and as such is likely achieving strong sales currently.

If both the WinCo and Wal-Mart expansion are both approved, the cumulative impacts would lead average annual sales at Tracy's existing supermarket space to decline by 25 percent to \$356 per square foot annually, somewhat below the national median ULI benchmark of \$390 per square foot, but still above minimum feasibility levels. By 2009, however, sales should recover to \$409 per square foot, assuming projected population growth and no additional competitors entering the Trade Area.

As with WinCo, Wal-Mart positions itself as a low-price supermarket alternative, so it targets a similar market segment. Once again, Food 4 Less is the existing store most competitive in this market segment, but it is also the only Trade Area store serving this segment. Wal-Mart, while not carrying as extensive a product line as WinCo, does carry items packaged for bulk shoppers and pantry loaders, so it would also likely compete with the Costco in the same center to a greater extent than either the proposed WinCo or the existing conventional supermarkets in Tracy.

In summary, the Trade Area's growth will provide sufficient market demand to support the proposed project, existing stores, and the Wal-Mart expansion in the short and long term. Actual relative success of individual stores will therefore depend on management, responsiveness to consumer preferences, and other factors. Variations already exist in sales per square foot for existing stores, and Food 4 Less in particular serves the same market niche as both of the proposed new projects, and as a result might see the greatest impacts, albeit from a currently strong market position as the only "player" in its low-cost niche. However, because existing outlets can adjust their product mix or otherwise make changes to their operations in response to new competition, and because the level of total sales needed to sustain profitability for stores can vary widely, the fate of any individual store cannot be determined with certainty, and will not be determined by an overall lack of supermarket demand in the Trade Area. Even if a currently operating store closes, the increase in demand for retail space in Tracy indicates the space can be re-tenanted within a short period.

Blight Analysis

Introduction

Following is analysis and findings regarding potential physical and economic blight resulting from the impacts of the proposed WinCo project, and the cumulative effects of both WinCo and the Wal-Mart expansion. Blight or “urban decay” could result from an extended vacancy at an existing store or center due to the loss of a major anchor tenant such as a supermarket.

Definition of Blight

For the purposes of this report, blight is measured based on the following:

- An anchor tenant in an existing shopping district or shopping center (which has minor tenants which depend on it) will relocate or go out of business and the center will decline.
- A freestanding store or a center with multiple large tenants (i.e., co-anchors) will be impacted and there will be insufficient demand to re-tenant vacated stores.
- The project will result in the lack of necessary commercial facilities that are normally found in neighborhoods, including grocery stores, drug stores, and banks and other lending institutions.

Retail Real Estate Market Conditions in Tracy

Current retail real estate conditions in Tracy are very strong, with new centers under construction and limited vacancy in existing spaces. BAE’s tour of the City found few vacancies, an impression confirmed by conversations with City staff and retail brokers.

Retail Broker Interview. In addition to BAE’s “windshield survey” of retail centers, BAE contacted Chris Sill, of Lee & Associates, a retail broker working in Tracy, handling leasing for five major centers in the City, and familiar with current conditions. He described Tracy as a strong retail real estate market with continuing growth, and estimated the retail space occupancy rate well over 93 percent. He stated that if one of the large spaces such as Food 4 Less or a Save-Mart went out of business, they would be more challenging to re-tenant than smaller spaces, but would not be unleaseable. He suggested as possible tenants another grocery store, or a furniture store or discount store. He stated that it might be necessary to subdivide the space (as happened with Kmart, see discussion below) to attract tenants.

Re-tenanting of Previously Closed Supermarkets. As Tracy has grown, and the trend in the supermarket industry has been toward larger stores and consolidation, several previous grocery stores have vacated their spaces either due to closure or a move to a larger store, but because of Tracy’s growth and the demand for additional retail, these spaces have all been re-tenanted. Table 13 shows these former grocery stores, as well as current tenants. Additionally, the former Kmart store and the current tenants in its space are listed.

Table 13: Retenanted Grocery Stores in Tracy

Former Store	Closing Date (a)	Current Tenants	Location
Centromart	Early 1990s	Grocery Outlet	11th St & Tracy Blvd.
Safeway	mid 1980s	Brake Masters Grand Auto Parts	12th St & Tracy Blvd.
Fairmart	early 1990s	In-Shape Sports Club	11th St & Parker Ave.
Don Quick Market	1989	World Gym	East St. & Grant Line Rd.
Lucky	1997	Tracy Furniture	Clover & Tracy Blvd.
Savemart	2003	99 Cent Store	11th St & Lincoln Blvd.
Safeway	2002	Save Mart	1801 West 11th St
Kmart	1997	Ace Hardware Big Lots Factory 2-U	2681 North Tracy Blvd

(a) Closure dates are approximate

Sources: City of Tracy; Bay Area Economics, 2004

As can be seen, these sites have been reused by a variety of user types, including new food-store tenants. In some cases spaces have been subdivided. Furthermore, as indicated above, the Trade Area is estimated to be capable of supporting nearly 164,000 square feet of additional retail space annually through 2009. As a result, there is adequate demand for retail space so success in actual re-tenanting of a specific space would be dependent on property management practices rather than insufficient demand.

Conclusions Regarding Physical and Economic Blight

In the previous chapter, BAE's analysis indicates that even with one or both of the proposed projects in place, existing grocery stores as a group most likely would perform near or above industry benchmarks and above minimum feasibility levels, if not existing sales levels, within a few years. As a result, if sales were evenly distributed, all stores should be able to continue in operation, assuming they are currently profitable, and no blight potential would exist.

However, it is possible that the impacts will not be felt equally by the existing supermarkets. For instance, Food 4 Less is the current store best positioned to capture value-driven consumers, and Costco is positioned to capture pantry-loaders and bulk purchasers. Both WinCo and Wal-Mart

target these same market segments to some degree. Furthermore, to the extent grocery shoppers in Tracy frequent the closest outlet for convenience purchases, Food 4 Less is also relatively close to the proposed projects and might lose some convenience-oriented shoppers. Costco is very close to the WinCo site, and directly next door to the proposed Wal-Mart expansion, but Costco's market niche is distinct enough that it has shown the ability to survive in direct competition with Wal-Mart. As a result, BAE concludes that the existing Food 4 Less store may show the greatest impact from the proposed projects. However, since it is the only store currently serving the value-oriented market niche in Tracy, it may currently have very strong sales levels relative to industry standards.

Furthermore, analysis of the retail real estate market shows that Tracy has historically been very successful at re-tenanting former supermarkets. Current vacancy rates for retail space in Tracy are low, Tracy and the Trade Area have high incomes relative to the remainder of San Joaquin County, and the Trade Area is expected to see continued population growth in both the short and long term, leading to demand for additional retail space in all categories. As a result, even if vacancies are created through closure of an existing supermarket, the overall demand for retail space should prevent long-term vacancy and any resulting physical or economic blight.

Appendices

Appendix A: WinCo Trade Area Census Tracts

All tracts listed are tracts from the year 2000 for San Joaquin County

5202
5203
5205
5302
5303
5305
5306
5403
5404
5500

1990 Tract numbers used differ slightly but cover same area.

Source: U.S. Census; Bay Area Economics, 2004.

Appendix B: Unemployment and Labor Force Trends in Civilian Labor Force

	Tracy				San Joaquin County			
	Labor Force (a)	Employment	Unemployment	Unemployment Rate	Labor Force (a)	Employment	Unemployment	Unemployment Rate
1993	19,060	16,820	2,240	11.8%	241,200	207,500	33,700	14.0%
1994	19,040	17,010	2,030	10.7%	240,500	209,900	30,600	12.7%
1995	19,010	17,040	1,970	10.3%	239,900	210,300	29,600	12.3%
1996	18,990	17,220	1,770	9.3%	239,100	212,400	26,700	11.2%
1997	19,430	17,700	1,730	8.9%	244,400	218,400	26,000	10.6%
1998	19,590	17,860	1,730	8.8%	246,500	220,400	26,100	10.6%
1999	19,910	18,450	1,460	7.3%	249,500	227,600	21,900	8.8%
2000	20,510	19,000	1,510	7.4%	257,200	234,400	22,800	8.9%
2001	20,920	19,380	1,540	7.4%	262,300	239,100	23,200	8.8%
2002	21,680	19,870	1,810	8.4%	272,400	245,100	27,300	10.0%
2003	22,190	20,320	1,870	8.4%	279,000	250,800	28,200	10.1%
June 2004 (b)	23,290	21,390	1,900	8.2%	292,500	263,900	28,600	9.8%
Change, 1993-2003								
Number	3,130	3,500	(370)		37,800	43,300	(5,500)	
Percent	16%	21%	-17%	-29%	16%	21%	-16%	-28%

Notes:

(a) Civilian Labor Force refers to workers by place of residence. Sum may not equal parts due to independent rounding.

(b) Preliminary.

Sources: California Employment Development Department; Bay Area Economics, 2004.

Appendix C: Tracy Taxable Retail Sales Trends, 1992 to 2002 (Adjusted for Inflation)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
City of Tracy Sales in 2003 \$000 (a)											
Apparel Stores	\$4,978	\$5,241	\$8,899	\$20,920	\$31,097	\$33,684	\$30,249	\$26,617	\$31,565	\$36,118	\$40,916
General Merchandise Stores	\$37,998	\$42,576	\$55,884	\$65,150	\$79,726	\$88,554	\$101,892	\$109,187	\$114,732	\$118,015	\$130,040
Food Stores	\$38,818	\$38,134	\$42,476	\$40,622	\$44,013	\$46,047	\$47,701	\$48,250	\$51,066	\$53,905	\$50,369
Eating and Drinking Places	\$37,688	\$37,654	\$41,089	\$42,936	\$45,856	\$48,489	\$48,562	\$51,488	\$58,037	\$60,359	\$65,215
Home Furnishings and Appliances	\$6,243	\$5,194	\$5,508	\$7,430	\$8,687	\$9,072	\$10,558	\$12,534	\$14,091	\$13,015	\$12,315
Building Materials and Farm Implements	\$21,346	\$20,121	\$20,520	\$22,533	\$22,645	\$27,836	\$30,923	\$36,491	\$42,586	\$48,973	\$84,435
Auto Dealers and Auto Supplies	\$42,010	\$46,802	\$57,643	\$56,514	\$66,048	\$77,871	\$86,662	\$110,672	\$156,141	\$205,869	\$229,874
Service Stations	\$34,386	\$31,378	\$34,520	\$35,601	\$40,892	\$40,976	\$36,993	\$48,244	\$61,268	\$62,910	\$61,108
Other Retail Stores	\$16,156	\$18,213	\$22,704	\$32,047	\$35,861	\$46,695	\$52,267	\$55,229	\$62,019	\$64,160	\$82,117
Retail Stores Total	\$239,625	\$245,312	\$289,243	\$323,753	\$374,825	\$419,225	\$445,808	\$498,710	\$591,504	\$663,324	\$756,389

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Tracy Sales per Capita in 2003\$ (c)											
Apparel Stores	\$131	\$130	\$211	\$469	\$676	\$709	\$617	\$512	\$554	\$594	\$623
General Merchandise Stores	\$1,000	\$1,053	\$1,326	\$1,461	\$1,733	\$1,864	\$2,079	\$2,100	\$2,015	\$1,941	\$1,979
Food Stores	\$1,022	\$943	\$1,008	\$911	\$957	\$969	\$973	\$928	\$897	\$887	\$767
Eating and Drinking Places	\$992	\$931	\$975	\$963	\$997	\$1,021	\$991	\$990	\$1,019	\$993	\$993
Home Furnishings and Appliances	\$164	\$128	\$131	\$167	\$189	\$191	\$215	\$241	\$248	\$214	\$187
Building Materials and Farm Implements	\$562	\$497	\$487	\$505	\$492	\$586	\$631	\$702	\$748	\$805	\$1,285
Auto Dealers and Auto Supplies	\$1,106	\$1,157	\$1,368	\$1,267	\$1,436	\$1,639	\$1,769	\$2,128	\$2,743	\$3,386	\$3,499
Service Stations	\$905	\$776	\$819	\$798	\$889	\$863	\$755	\$928	\$1,076	\$1,035	\$930
Other Retail Stores	\$425	\$450	\$539	\$719	\$780	\$983	\$1,067	\$1,062	\$1,089	\$1,055	\$1,250
Retail Stores Total (b)	\$6,306	\$6,065	\$6,862	\$7,259	\$8,148	\$8,826	\$9,098	\$9,591	\$10,390	\$10,910	\$11,513

Population	38,000	40,450	42,150	44,600	46,000	47,500	49,000	52,000	56,929	60,800	65,700
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(a) Retail sales have been adjusted to 2003 dollars using the annual average Consumer Price Index for All Items, published by the U.S. Bureau of Labor Statistics.

(b) Analysis excludes all non-retail outlets (business and personal services) reporting taxable sales.

(c) For 1995 and 1996, Drug Store sales combined with Other Retail, combined with General Merchandise for all other years.

(c) Per capita sales calculated based on State Board of Equalization reported sales and Department of Finance population based on 1990 and 2000 census

Sources: State Board of Equalization, U.S. Bureau of Labor Statistics, 1990 and 2000 U.S. Census, and State Department of Finance, 2000, Bay Area Economics, 2003.

Appendix D: San Joaquin County Taxable Retail Sales Trends, 1992 to 2002 (Adjusted for Inflation)

San Joaquin County Sales in 2003

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
\$000 (a)											
Apparel Stores	\$104,781	\$102,046	\$105,406	\$115,820	\$121,978	\$122,549	\$116,041	\$113,525	\$129,190	\$139,208	\$142,525
General Merchandise Stores	\$655,583	\$654,258	\$672,413	\$678,356	\$686,212	\$712,609	\$767,830	\$805,708	\$840,228	\$847,664	\$875,837
Food Stores	\$396,131	\$327,468	\$316,147	\$311,531	\$309,190	\$323,690	\$311,367	\$343,723	\$368,110	\$369,941	\$360,195
Eating and Drinking Places	\$385,283	\$384,569	\$384,727	\$395,321	\$398,277	\$397,242	\$402,546	\$418,063	\$438,333	\$454,706	\$478,312
Home Furnishings and Appliances	\$137,936	\$133,465	\$136,013	\$131,664	\$123,553	\$113,253	\$124,151	\$136,274	\$141,213	\$134,295	\$143,332
Building Materials and Farm Implements	\$337,626	\$376,011	\$390,714	\$396,163	\$385,192	\$406,689	\$438,854	\$501,503	\$526,799	\$561,866	\$597,545
Auto Dealers and Auto Supplies	\$647,354	\$669,084	\$737,167	\$753,633	\$776,243	\$769,452	\$787,482	\$922,393	\$1,060,187	\$1,221,329	\$1,249,269
Service Stations	\$353,226	\$335,409	\$339,534	\$359,172	\$419,836	\$429,247	\$387,334	\$448,687	\$545,942	\$530,149	\$525,824
Other Retail Stores	\$459,515	\$469,626	\$489,324	\$508,359	\$553,188	\$574,177	\$589,230	\$652,449	\$731,410	\$723,314	\$815,550
Retail Stores Total	\$3,477,436	\$3,451,936	\$3,571,446	\$3,650,020	\$3,773,671	\$3,848,909	\$3,924,835	\$4,342,325	\$4,781,412	\$4,982,471	\$5,188,390

San Joaquin County Sales per Capita in 2003\$ (c)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Apparel Stores	\$210	\$202	\$206	\$224	\$232	\$230	\$215	\$207	\$229	\$241	\$239
General Merchandise Stores	\$1,315	\$1,294	\$1,316	\$1,310	\$1,306	\$1,338	\$1,422	\$1,467	\$1,491	\$1,468	\$1,467
Food Stores	\$794	\$647	\$619	\$602	\$588	\$608	\$576	\$626	\$653	\$640	\$603
Eating and Drinking Places	\$773	\$760	\$753	\$763	\$758	\$746	\$745	\$761	\$778	\$787	\$801
Home Furnishings and Appliances	\$277	\$264	\$266	\$254	\$235	\$213	\$230	\$248	\$251	\$233	\$240
Building Materials and Farm Implements	\$677	\$743	\$764	\$765	\$733	\$764	\$813	\$913	\$935	\$973	\$1,001
Auto Dealers and Auto Supplies	\$1,298	\$1,323	\$1,442	\$1,455	\$1,477	\$1,445	\$1,458	\$1,680	\$1,881	\$2,114	\$2,093
Service Stations	\$708	\$663	\$664	\$694	\$799	\$806	\$717	\$817	\$969	\$918	\$881
Other Retail Stores	\$922	\$928	\$957	\$982	\$1,053	\$1,078	\$1,091	\$1,188	\$1,298	\$1,252	\$1,366
Retail Stores Total (b)	\$6,974	\$6,825	\$6,988	\$7,048	\$7,182	\$7,227	\$7,267	\$7,907	\$8,484	\$8,626	\$8,692

Population 498,600 505,800 511,100 517,900 525,400 532,600 540,100 549,200 563,598 577,600 596,900

(a) Retail sales have been adjusted to 2003 dollars using the annual average Consumer Price Index for All Items, published by the U.S. Bureau of Labor Statistics.

(b) Analysis excludes all non-retail outlets (business and personal services) reporting taxable sales.

(c) For 1995 and 1996, Drug Store sales combined with Other Retail; combined with General Merchandise for all other years.

(c) Per capita sales calculated based on State Board of Equalization reported sales and Department of Finance population based on 1990 and 2000 census

Sources: State Board of Equalization, U.S. Bureau of Labor Statistics, 1990 and 2000 U.S. Census, and State Department of Finance, 2000, Bay Area Economics, 2003.

Appendix E: Competing Stores in Supermarket Trade Area Trade Area

Store	Total Square Feet	Offerings	Adjacent Retail	Hours
Albertsons 875 South Tracy Boulevard	65,633	Drive Through Pharmacy Bakery/Deli 1/2 Hour Photo Bank of America	Blockbuster Video	6am - Midnight 7 Days/Week
Food 4 Less 3225 North Tracy Boulevard	40,320	Bakery	Kragen Auto Parts \$1.00 Store	24 Hours/Day 7 Days/Week
Safeway 1801 West 11th St	65,715	Bakery/Deli Prepared Foods Garden/Floral One Hour Photo Pharmacy Starbucks Gas station	OSH Longs Drugs Starbucks	24 Hours/Day 7 Days/Week
Save Mart 1950 West 11th Street	55,807	Deli Prepared Foods Garden/Floral Pharmacy Union Bank of California	Walgreens	6am - Midnight 7 Days/Week
Save Mart 2005 North Tracy Blvd	46,280	Floral	Dental Clinic	6am - Midnight 7 Days/Week
Costco (a) 3250 W. Grant Line Rd.	44,700	1 Hour Photo Bakery Gas Station Optical Pharmacy Tire Service Center	Wal-Mart Michael's Art Supply Staples Bank of America	M-F 11am - 8:30pm Sat 9:30am - 6pm Sun 10am - 6pm
Total Square Footage	318,455			

(a) Total square footage of Costco is 149,000 square feet. Research indicates that typically, 30 percent of Costco sales are food items; this percentage is used in allocating the proportion of the store dedicated to food sales.

Sources: City of Tracy; Bay Area Economics, 2004.

A P P E N D I X B

TRAFFIC IMPACT STUDY





FEHR & PEERS
TRANSPORTATION CONSULTANTS



Final Report

Traffic Impact Study for the WinCo/Trask Project in the City of Tracy

August, 2005

*Prepared for:
City of Tracy, CA
Design Community & Environment*

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1. INTRODUCTION

This report presents the findings, conclusions, and recommendations of the transportation impact analysis conducted by Fehr & Peers Transportation Consultants for the proposed WinCo/Trask Specific Plan and General Plan Amendments in the City of Tracy. This chapter provides an overview of the project, discusses the analysis scenarios, and summarizes this report's organization.

PROJECT DESCRIPTION AND APPROACH

The proposed project consists of two parts located along Pavilion Parkway west of Naglee Road:

1. **WinCo Foods** – A 95,900 gross square-foot grocery store located on 8.5 acres of land south of Pavilion Parkway. 7.95 acres of the project site requires an I-205 Corridor Specific Plan re-designation from light industrial to general commercial.
2. **Northern Parcel** – A 10.8 acre parcel north of Pavilion Parkway. This parcel is designated as light industrial in the I-205 Corridor Specific Plan. As part of the proposed project, the parcel will be re-designated as general commercial.

As shown on Figure 1, the project sites are located north and south of Pavilion Parkway between Robertson Road and Naglee Road in the City of Tracy. Access to the project sites is provided via Pavilion Parkway.

The process for conducting this traffic analysis began by creating the background volumes, which were developed for the existing scenario by collecting traffic counts, and generating, distributing, and assigning approved projects trips. The cumulative background scenario was developed using the Tracy General Plan Travel Demand Model. The resulting traffic volumes were analyzed. Deficiencies caused by future development without improvements were identified and improvements were made to bring the cumulative background operations to acceptable levels of service. Project trips were generated, distributed, and added to the background volumes. Project-specific impacts were identified and mitigations were recommended. Details of the analysis scenarios are presented in the remainder of this section.

ANALYSIS SCENARIOS

For this study, the following four scenarios were evaluated:

Scenario 1: Existing No Project Conditions – Existing volumes obtained from counts plus estimated traffic generated by projects in the study area which are approved but not occupied as of March 31, 2005. It should be noted that Wal-Mart is proposing an expansion to its existing store on Grant Line Road near the WinCo/Trask site, and a traffic study on the Wal-Mart expansion is being prepared concurrently with this report on Winco/Trask. The traffic associated with the existing Wal-Mart store is included in the existing background volumes, but as the Wal-Mart expansion is not currently an approved project, it is not included in the existing WinCo/Trask analysis. The proposed Wal-Mart expansion is, however, considered a reasonably foreseeable project, and was therefore included in the cumulative analyses described below in scenarios 3 and 4.

Scenario 2: Existing Plus Project Conditions – This scenario used the same traffic volumes as Scenario 1 with addition of the estimated traffic generated by the proposed WinCo/Trask project. The roadway system was the same as Scenario 1.

Scenario 3: Cumulative No Project Conditions – The scenario looked at future forecast conditions, using the Tracy Finance and Implementation Plan (FIP) Travel Demand Model as the basis for generating regional

cumulative background traffic forecasts. For this analysis, the build out of the I-205 Specific Plan based on land use designations and maximum trips per acre allowed in the approved I-205 Specific Plan was used. Net new trips generated by the Wal-Mart expansion are included as part of the cumulative background growth. The development of the WinCo Foods Site and Northern Parcel was not included in the analysis.

Scenario 4: Cumulative Plus Project Conditions – The analysis for this scenario used the same assumptions as Scenario 3, plus the estimated traffic generated by the proposed WinCo/Trask.

ANALYSIS METHODS & SIGNIFICANCE CRITERIA

The analysis methods outlined in the *Highway Capacity Manual* (Transportation Research Board, 2000) were used in this study. The results of this analysis on operational performance of a roadway network are commonly described using a grading system called level of service or LOS. LOS is a description of intersection operating conditions, ranging from LOS A (free-flow traffic conditions with little or no delay) to LOS F (oversaturated conditions where traffic flows exceed design capacity, resulting in long queues and delays). The HCM methods for calculating LOS and significance criteria for signalized intersections, unsignalized intersections, and freeway segments are described below.

Signalized Intersections

At signalized intersections, traffic conditions are evaluated using the LOS method described in the 2000 *Highway Capacity Manual*. The LOS grading system is based on the weighted average control delay measured in seconds per vehicle. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration. Table 1 summarizes the relationship between the control delay and LOS for signalized intersections.

TABLE 1 SIGNALIZED INTERSECTION LOS CRITERIA		
Level of Service	Description	Average Control Delay (Seconds)
A	Operations with very low delay occurring with favorable traffic signal 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, or high 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	Operations with delays unacceptable to most drivers occurring due to over-saturation, poor progression, or very long cycle lengths.	> 80.0

Source: *Highway Capacity Manual*, Transportation Research Board, 2000.

Unsignalized Intersections

In the Transportation Research Board's 2000 *Highway Capacity Manual* method, unsignalized intersections (side-street or all-way stop controlled intersections), the LOS is defined by the average control delay per vehicle (measured in seconds) for each stop-controlled movement and for the uncontrolled left turns, if any, from the main street. The control delay incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue. For side-street stop-controlled intersections, delay is typically represented for each movement and reported for the worst movement from the minor approaches only. Table 2 summarizes the relationship between delay and LOS for unsignalized intersections.

TABLE 2 UNSIGNALIZED INTERSECTION LOS CRITERIA		
Level of Service	Description	Average Control Delay Per Vehicle (Seconds)
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	> 50.0

Source: *Highway Capacity Manual* (Transportation Research Board, 2000).

Freeway Segments

Similar to intersection operations, freeway levels of service range from LOS A (the best operating conditions) to LOS F (the worst). LOS E represents "at-capacity" operation. When the volume exceeds capacity, stop-and-go conditions result, and operations are designated as LOS F. The HCM method calculates a density for a freeway segment using input data such as the traffic volume, the number of lanes, the percentage of trucks and the free-flow speed. Based on the calculated density, each segment of the freeway can be assigned a level of service. The LOS for a freeway segment is based on the vehicle density (passenger cars/lane/mile) as shown in Table 3.

**TABLE 3
 FREEWAY MAINLINE LEVEL OF SERVICE DEFINITIONS**

Level of Service ¹	Maximum Density (Passenger Cars/Lane/Mile)
A	11
B	18
C	26
D	35
E	45
F	> 45

Notes:

1. Freeway mainline LOS based on a 65 mph free-flow speed.

Source: *Highway Capacity Manual* (Transportation Research Board, 2000).

Significance Criteria

As described above, level of service (LOS) is a measure of the level of congestion experienced at an intersection or along a facility, ranging from LOS A (free-flowing conditions) to LOS F (jammed with volume or demand exceeding capacity). Most cities and counties in California have established level of service standards of significance for intersections and facilities within the limits of the city or county.

The level of service standard for the City of Tracy is LOS C, except for intersections located within ¼ mile of a freeway, where the standard is LOS D. For San Joaquin County, the *General Plan 2010* specifies LOS D as the acceptable level of service for intersections. A project impact is considered significant when traffic generated by the proposed project will decrease the level of service at a facility past the applicable level of service criteria. The I-205 freeway segments are in the SJCOG CMP system. The study segments from the Mountain House Parkway to Tracy Boulevard have been “grandfathered” in at a LOS F standard. Under this condition, a project impact is considered significant when it increases the baseline volume by more than 5%.

For this analysis, Existing Project impacts were evaluated by comparing the results of Scenario 2 to Scenario 1, and Cumulative Project impacts were evaluated by comparing the results of Scenario 4 to Scenario 3.

REPORT ORGANIZATION

This report is divided into four chapters as described below:

- **Chapter 1 – Introduction** provides an overview of the Project and discusses the scenarios and methods used in the analysis.
- **Chapter 2 – Setting** describes the Project vicinity, including the surrounding roadway network, morning (AM) and evening (PM) peak-hour vehicle traffic volumes, and intersection levels of service for both the Existing and Cumulative background conditions.

- **Chapter 3 – Project Characteristics** presents relevant Project information, such as Project components and Project trip generation, distribution, and assignment.
- **Chapter 4 – Project Impacts and Mitigations** addresses conditions with traffic generated by the Project added to Existing and Cumulative background conditions, along with mitigation recommendations.

2. SETTING

This section describes the project study area and the existing and cumulative roadway system's traffic operations.

PROJECT STUDY AREA

The proposed project sites are located in the northwest portion of the City of Tracy, California. The City of Tracy is located in southwest San Joaquin County, east of the San Francisco Bay Area and west of the cities of Manteca and Lathrop. The project sites are located along Pavilion Parkway west of Naglee Road. The project study area - the area most likely to experience circulation impacts from the project - was selected based on consultation with city staff and a screening based on the project's percentage increase in traffic at locations in the project vicinity. The study area includes Lammers Road to the west, Corral Hollow Road to the east, Auto Plaza Drive to the north, and Eleventh Street to the south. The project study area is shown on Figure 1.

Study Intersections

The study intersections listed below were chosen in consultation with City of Tracy staff. The locations of these intersections are shown on Figure 1, and represent the locations most likely to experience traffic impacts associated with the Project.

1. Grant Line Road/Byron Road
2. Grant Line Road/Naglee Road/I-205 WB On-Ramp
3. Naglee Road/Pavilion Parkway
4. Grant Line Road/I-205 EB Ramps
5. Grant Line Road/Corral Hollow Road
6. Eleventh Street/Lammers Road
7. Eleventh Street/Corral Hollow Road
8. Robertson Drive/Naglee Road
9. Auto Plaza Drive/Naglee Road
10. Auto Plaza Drive Extension/Corral Hollow Road (future only)

All study intersections listed above are in the Tracy city limits except the Grant Line Road/Byron Road intersection, which is under the jurisdiction of San Joaquin County. Intersections 2-4 are part of the Grant Line Road/I-205 interchange.

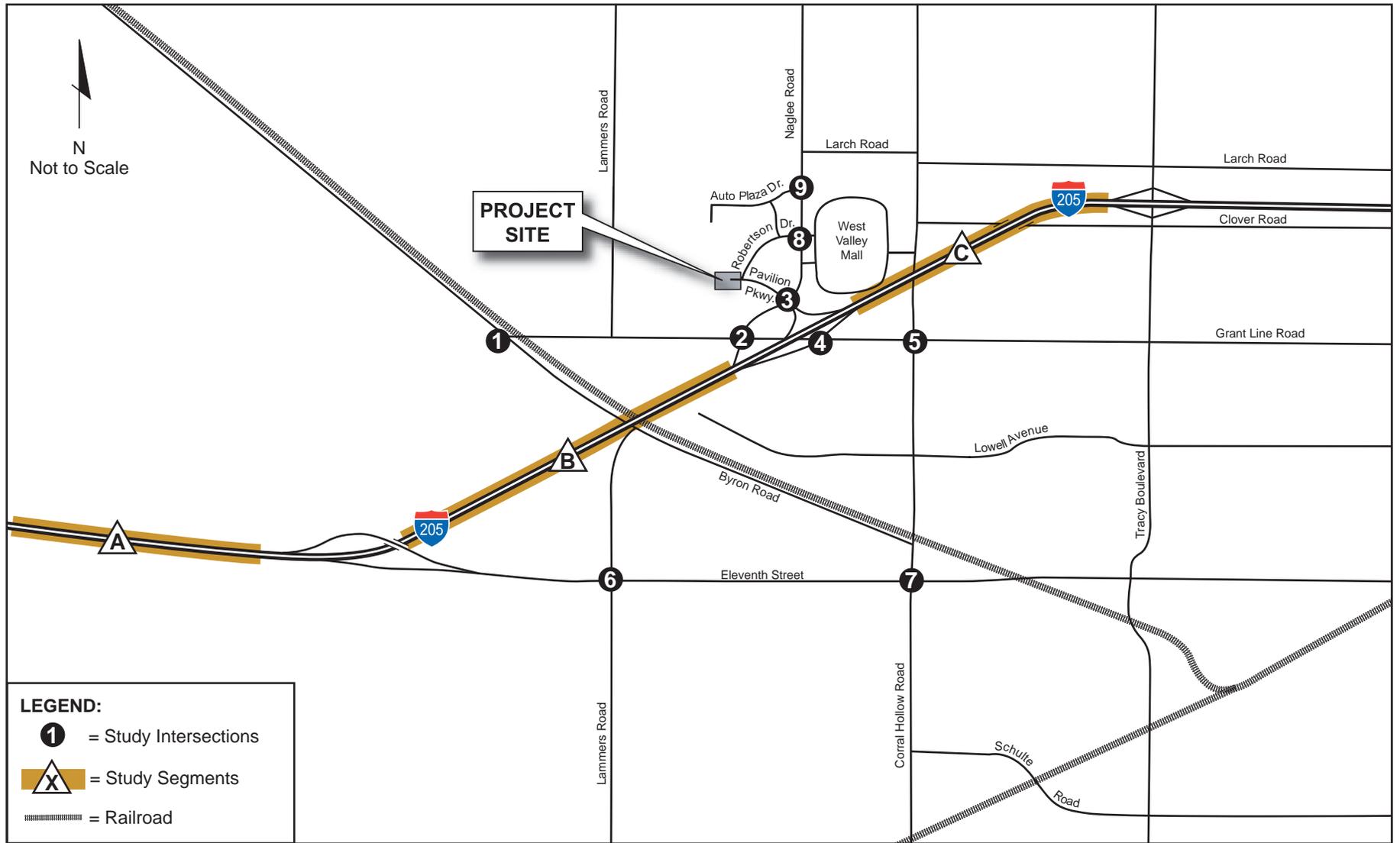
Freeway Study Segments

Operating conditions along the following freeway segments in the study area were also analyzed:

Segment A – I-205 from Mountain House Parkway to Eleventh Street

Segment B – I-205 from Eleventh Street to Grant Line Road

Segment C – I-205 from Grant Line Road to Tracy Boulevard



EXISTING SETTING

This section describes the existing roadway network, traffic volumes and lane configurations, and existing intersection operations.

Existing Roadway Network

A description of the roadway network near the project study area is provided below. Freeways and major roads in the project study area include Interstate 205 (I-205), Lammers Road, Eleventh Street, Corral Hollow Road and Grant Line Road.

Interstate 205 (I-205) – A freeway extending through the northern portion of Tracy and providing access to Interstate 580 and Interstate 5. In the study area, I-205 is a four-lane freeway with a posted speed limit of 70 mph. The interchanges nearest the project site are located at Grant Line Road/ Naglee Road, and Eleventh Street.

Pavilion Parkway – A four-lane roadway bisecting and providing access to the project sites. Near the project sites, Pavilion Parkway intersects Naglee Road, Robertson Drive, and Power Road. The Pavilion Parkway/ Naglee Road intersection is signalized.

Naglee Road – A six-lane roadway accessing I-205, Grant Line Road, Pavilion Parkway, Robertson Road, and Auto Plaza Drive in the study area. The Auto Plaza Drive/Naglee Road, Robertson Drive/Naglee Road, Naglee Road/Pavilion Parkway, and Grant Line Road/Naglee Road intersections are signalized. The posted speed limit on Naglee Road in the project study area is 35 mph.

Grant Line Road – An east-west roadway which intersects Byron Road, Lammers Road, Naglee Road, Corral Hollow Road, and Tracy Boulevard. The posted speed limit along Grant Line Road is 40 mph. Grant Line Road is six lanes between Corral Hollow Road and Naglee Road and five lanes (three eastbound and two westbound) between Naglee Road and Lammers Road. West of Lammers Road, Grant Line Road narrows to two lanes. The Grant Line Road/Corral Hollow Road and Grant Line Road/Naglee Road intersections are signalized.

Eleventh Street - A four-lane roadway with a median and a posted speed limit of 55 mph between I-205 and Lammers Road. Between Lammers Road and Corral Hollow Road, Eleventh Street has six lanes, a median and bike lanes. The posted speed limit for this segment of Eleventh Street is 45 mph.

Corral Hollow Road – A four-lane north-south divided roadway extending from I-580 at the southern City limit to north of I-205 in San Joaquin County. The posted speed limit along Corral Hollow road is 40 mph. Bike lanes and sidewalks are available along the roadway. In the project study area, Corral Hollow Road intersects Grant Line Road, Lowell Avenue, Byron Road and Eleventh Street. There is a planned future extension of Auto Plaza Drive to Corral Hollow Road.

Lammers Road - A north-south roadway running parallel to Corral Hollow Road serving the western portion of the developed Tracy. In the study area, Lammers Road is a two-lane road with a posted speed limit of 45 mph.

Byron Road is a rural two-lane roadway that runs diagonally between the northwest and southeast.

Existing Traffic Volumes and Lane Configurations

In May 2005, mid-week evening peak period (4:00 to 6:00 PM) intersection turning movement counts were collected at all study intersections. Mid-week morning peak period (7:00 to 9:00 AM) intersection turning movement counts were also collected for the Grant Line interchange intersections (Grant Line Road/Naglee Road, Naglee Road/Pavilion Parkway and Grant Line Road/I-205 EB Ramps). For each intersection, the hour within the peak period containing the highest total traffic volume was identified as the peak hour. The peak hour turning movement volumes are used as the basis for traffic operations analysis. Raw traffic count data can be found in Appendix A.

Approved Projects

Projects in the study area which have been approved, are under construction, or are built and not occupied but are expected to be occupied at approximately the same time the Project is occupied are included in the existing background volume. Traffic generated by these projects were added to existing traffic volumes and used as Existing without Project traffic volumes. The list of approved projects was provided by the City of Tracy and verified via a field visit in May 2005.

Trip generation for the approved projects was calculated using trip generation information from ITE *Trip Generation*, 7th Edition. Pass-by reduction percentages were applied for the PM peak hour based on the ITE *Trip Generation Handbook*. Table 4 contains the approved projects list, description, and trip generation information. Figure 2 shows the location of these projects by project number.

Figure 3 depicts the existing traffic volumes, lane configuration, and traffic control at each of the study intersections.

Freeway Volumes

Freeway volumes were derived from count data collected by Caltrans during 2004 and summarized for the average mid-weekday (Tuesday, Wednesday, Thursday). The volumes reported on Figure 3 represent the highest hourly volume reported within the normal morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak periods. Note that observed volumes on westbound I-205 actually peak around 5:00 - 6:00 AM, outside the normal AM peak period (see Appendix A). Actual peak hour traffic volumes are up to 20% higher during the 5:00 AM hour than the reported volumes on Figure 3.

**TABLE 4
 APPROVED PROJECTS TRIP GENERATION**

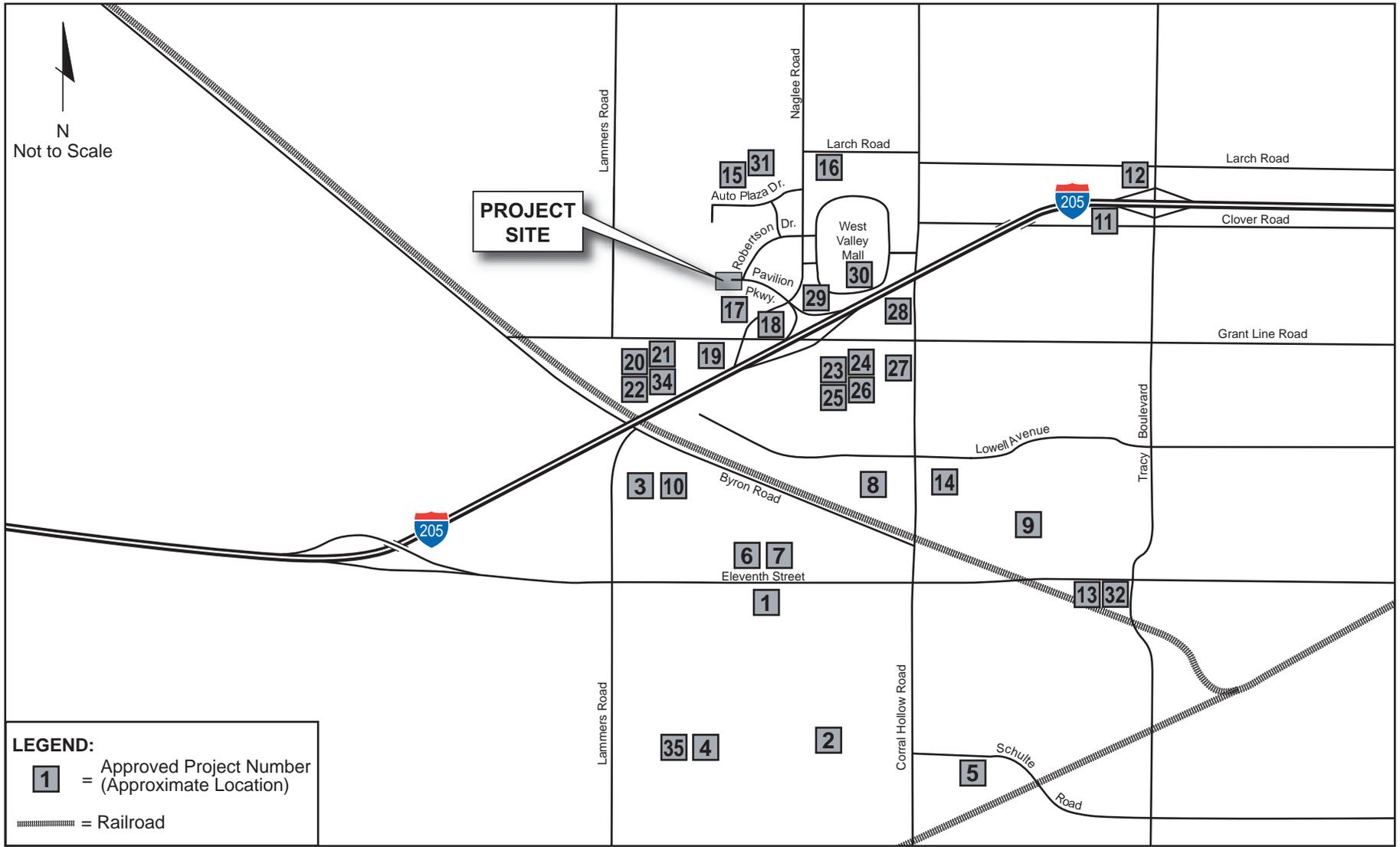
Project	Size	Units ¹	ITE LU Code	Trip Generation Rate ²		Passby % ³
				AM	PM	
1. Summer Lane	49	du	210	$T = 0.70(X) + 9.43$	$\ln(T) = 0.90 \ln(X) + 0.53$	0
2. San Marco	71	du	210	$T = 0.70(X) + 9.43$	$\ln(T) = 0.90 \ln(X) + 0.53$	0
3. Huntington Park	27	du	210	$T = 0.70(X) + 9.43$	$\ln(T) = 0.90 \ln(X) + 0.53$	0
4. Redbridge	157	du	210	$T = 0.70(X) + 9.43$	$\ln(T) = 0.90 \ln(X) + 0.53$	0
5. Corral Hollow Estates	32	du	210	$T = 0.70(X) + 9.43$	$\ln(T) = 0.90 \ln(X) + 0.53$	0
6. Lyon Crossroads	3	du	210	$T = 0.70(X) + 9.43$	$\ln(T) = 0.90 \ln(X) + 0.53$	0
7. Presidio	25	du	210	$T = 0.70(X) + 9.43$	$\ln(T) = 0.90 \ln(X) + 0.53$	0
8. Cintra Park	38	du	210	$T = 0.70(X) + 9.43$	$\ln(T) = 0.90 \ln(X) + 0.53$	0
9. Woodfield	14	du	210	$T = 0.70(X) + 9.43$	$\ln(T) = 0.90 \ln(X) + 0.53$	0
10. Westgate	80	du	220	$T = 0.49(X) + 3.73$	$T = 0.55(X) + 17.65$	0
11. Microtel Hotel	80	rooms	310	$T = 0.67(X)$	$T = 0.70(X)$	0
12. Alimi Gas Station	4.5	ksf	945	$T = 77.68(X)$	$T = 96.37(X)$	AM - 62 PM - 56
13. Ormonde Office	8.84	ksf	710	$\ln(T) = 0.80 \ln(X) + 1.55$	$T = 1.12(X) + 78.81$	0
14. Alzheimer's Care Facility	81	beds	254	$T = 0.14(X)$	$T = 0.22(X)$	0
15. Edelman Auto Repair	42.7	ksf	942	$T = 2.94(X)$	$T = 3.38(X)$	0
16. Tracy Mitsubishi	24.3	ksf	841	$T = 2.05(X)$	$T = 2.64(X)$	0
17. Duong Retail	30.18	ksf	820	$T = 1.03(X)$	$T = 3.75(X)$	AM - 0 PM - 34

**TABLE 4
 APPROVED PROJECTS TRIP GENERATION**

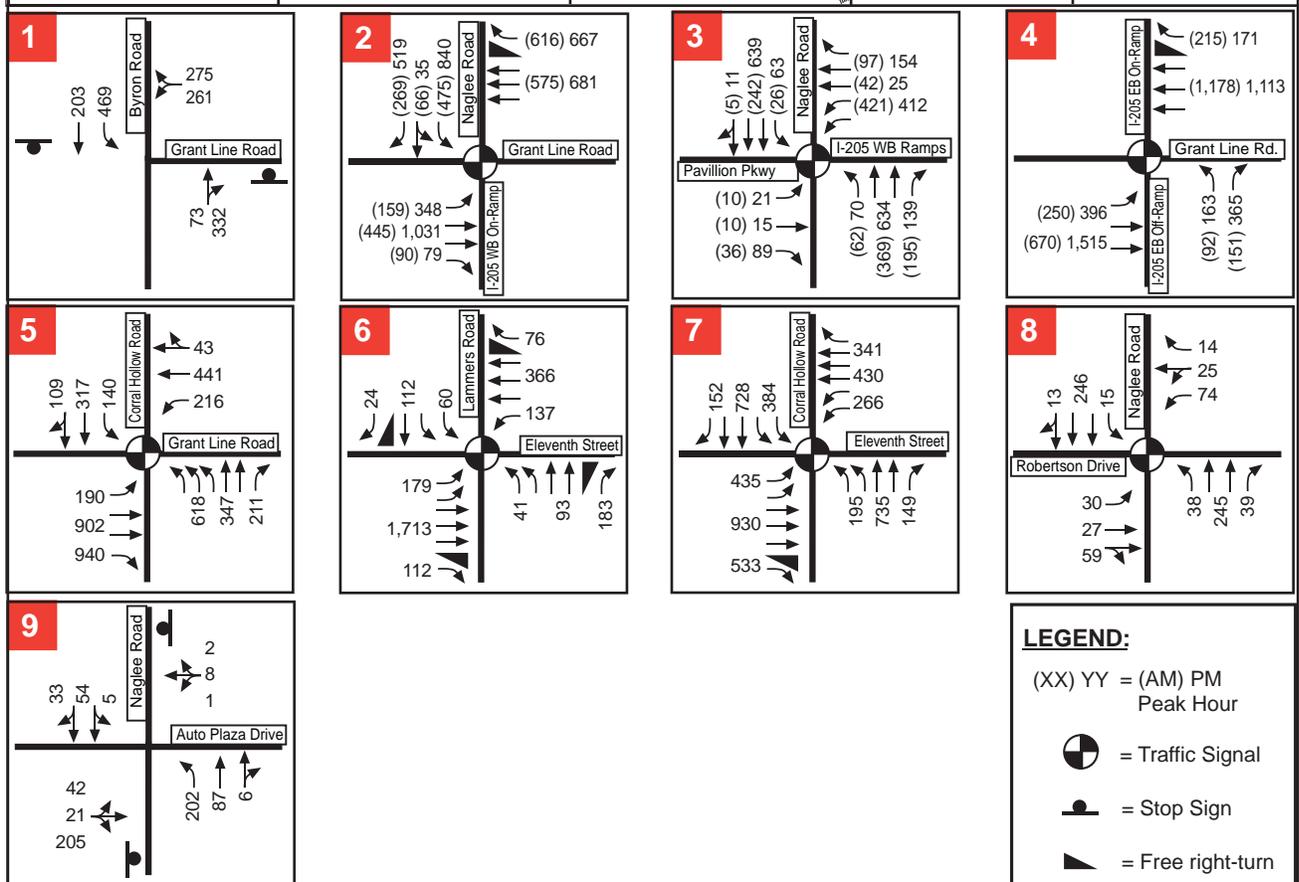
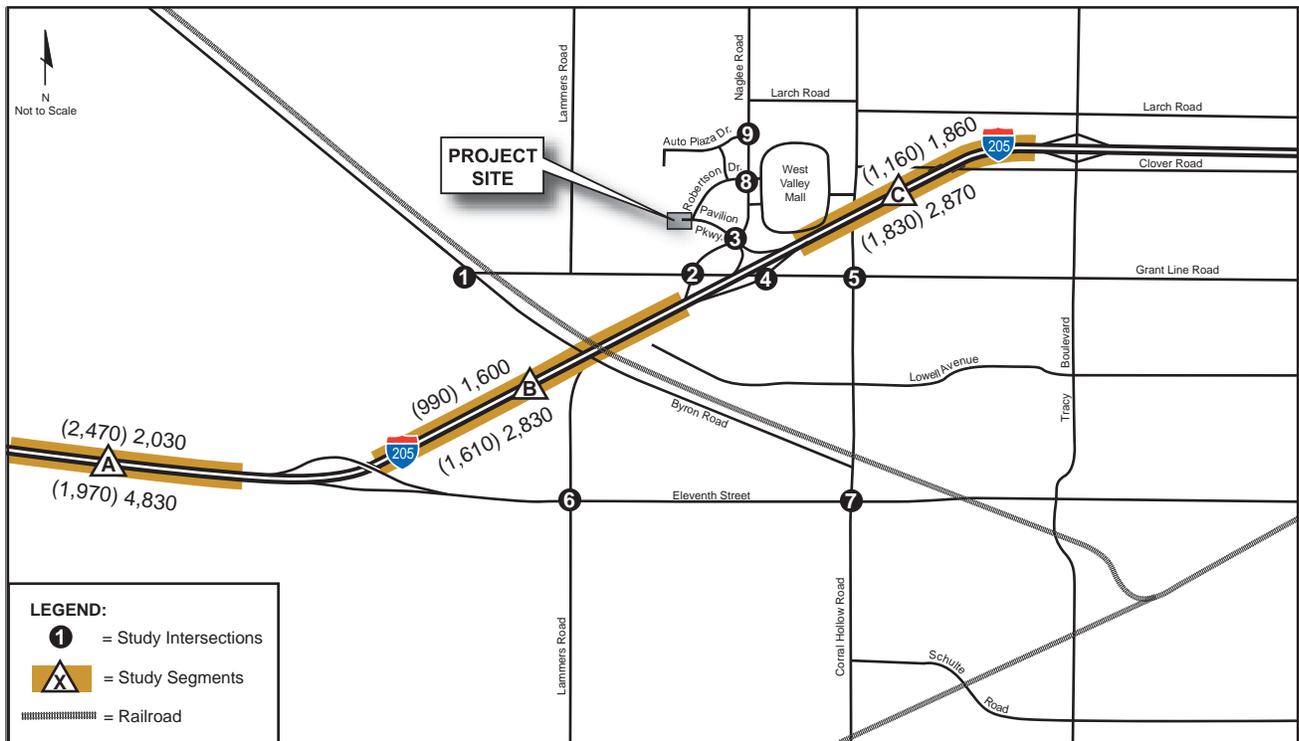
Project	Size	Units ¹	ITE LU Code	Trip Generation Rate ²		Passby % ³
				AM	PM	
18. Texas Roadhouse Restaurant	6.92	ksf	932	T=11.52(X)	T=10.92(X)	AM - 0 PM - 43
19. Golden Corral Restaurant	7.7	ksf	932	T=11.52(X)	T=10.92(X)	AM - 0 PM - 43
20. Pacific Bowie Retail	16	ksf	820	T=1.03(X)	T=3.75(X)	AM - 0 PM - 34
21. La Morinda Retail	38.5	ksf	820	T=1.03(X)	T=3.75(X)	AM - 0 PM - 34
22. Les Schwab Tires	13.8	ksf	848	T=2.89(X)	T=4.15(X)	AM - 0 PM - 28
23. Orchard Plaza Commercial	26.59	ksf	820	T=1.03(X)	T=3.75(X)	AM - 0 PM - 34
24. Sekhon Retail	14.1	ksf	820	T=1.03(X)	T=3.75(X)	AM - 0 PM - 34
25. Faith Realty Office	14.1	ksf	715	T=1.8(X)	T=1.73(X)	0
26. Triad Medical Office	75.73	ksf	720	T=2.48(X)	T=3.72(X)	0
27. La Morinda Retail	25.23	ksf	820	T=1.03(X)	T=3.75(X)	AM - 0 PM - 34
28. Office Building	39.59	ksf	710	$\ln(T) = 0.80 \ln(X) + 1.55$	$T = 1.12(X) + 78.81$	0
29. Stonegate Plaza-Retail	18	ksf	820	T=1.03(X)	T=3.75(X)	AM - 0 PM - 34
30. Target Expansion	15.96	ksf	820	T=1.03(X)	T=3.75(X)	AM - 0 PM - 34
31. Fowzer Auto Body	55	ksf	942	T=2.94(X)	T=3.38(X)	0
32. Commercial Building	6.95	ksf	710	$\ln(T) = 0.80 \ln(X) + 1.55$	$T = 1.12(X) + 78.81$	0
35. Castro	71	du	210	$T = 0.70(X) + 9.43$	$\ln(T) = 0.90 \ln(X) + 0.53$	0

Notes:

1. du = dwelling units; ksf = 1,000 square feet.
2. Trip generation information from Institute of Transportation Engineers (ITE) *Trip Generation 7th Edition*.
3. Pass-by % from Institute of Transportation Engineers (ITE) *Trip Generation Handbook 7th Edition*.



Winco/Trask EIR



Trip Distribution

Trip distributions for the approved projects were developed using the SJCOG/City of Tracy Traffic Demand Model. Because travel behavior to residential and commercial uses differs, residential and commercial approved projects were assigned separate trip distributions. The same trip distribution was used for inbound and outbound for both residential and commercial projects. These trip distributions are shown in Table 5 below.

TABLE 5 APPROVED PROJECTS TRIP DISTRIBUTION				
Location	Residential Approved Projects		Commercial Approved Projects	
	Inbound	Outbound	Inbound	Outbound
I-205 West	23	23	7	7
Byron Road Northwest	1	1	1	1
Lammers Road North	1	1	1	1
Naglee Road North	1	1	2	2
Corral Hollow North	3	3	3	3
Tracy Boulevard North	1	1	2	2
I-205 East	15	15	3	3
Grant Line Road East	1	1	2	2
Lowell East	1	1	2	2
Eleventh Street East	1	1	3	3
Tracy Boulevard South	1	1	10	10
Corral Hollow South	5	5	6	6
Lammers South	5	5	1	1
Von Sosten Road West	1	1	1	1
Grant Line Road West	1	1	1	1
Internal Zone 1	0	0	8	8
Internal Zone 2	11	11	15	15
Internal Zone 3	11	11	10	10
Internal Zone 4	9	9	0	0
Internal Zone 5	8	8	23	23
Internal Zone 6	0	0	0	0
Internal Zone 7	0	0	0	0
Internal Zone 8	0	0	0	0
Total	100	100	100	100

Source: Fehr & Peers, 2005.

Existing Intersection Operating Conditions

For each of the study intersections, the Existing intersection operating conditions were analyzed using the methods described earlier in this report. The level of service for intersections along the Grant Line interchange was calculated for AM and PM peak hours and the level of service for all other intersections was calculated for only the PM peak hour. The AM and PM peak hour intersection LOS is shown in Table 6 below. Detailed LOS worksheets for the Existing scenario can be found in Appendix B.

TABLE 6 EXISTING INTERSECTION TRAFFIC OPERATIONS					
Intersection	Traffic Control	AM Peak Hour		PM Peak Hour	
		Delay (seconds)	LOS	Delay (seconds)	LOS
1. Grant Line Road / Byron Road	SSSC ¹	n/a	n/a	>50 (SB) >50	F F
2. Grant Line Road / Naglee Road / I-205 WB On-Ramp	Signal ²	10	B	18	B
3. Naglee Road / Pavilion Parkway	Signal ²	15	B	18	B
4. Grant Line Road / I-205 EB Ramps	Signal ²	12	B	22	C
5. Grant Line Road / Corral Hollow Road	Signal ²	n/a	n/a	44	D
6. Eleventh Street / Lammers Road	Signal ²	n/a	n/a	16	B
7. Eleventh Street / Corral Hollow Road	Signal ²	n/a	n/a	32	C
8. Robertson Drive / Naglee Road	Signal ²	n/a	n/a	6	A
9. Auto Plaza Drive / Naglee Road	SSSC ¹	n/a	n/a	14 (WB) 8	B A

Note: **Bold** indicates intersection operating at deficient level of service. Significance criteria for County intersections (intersection 1) and City intersections within ¼ miles of interchange ramps (intersections 2 through 4) is LOS D. Significance criteria for City intersections (intersections 5 through 9) is LOS C.

1. Side-street stop intersection. Reported LOS based on control delay per vehicle for the worst approach and average delay per vehicle for the intersection.
2. Signalized intersection LOS based on weighted average control delay per vehicle, Highway Capacity Manual (Transportation Research Board, 2000).

Source: Fehr & Peers, 2005.

As shown in Table 6, all intersections operate at acceptable levels of service under Existing conditions except for Grant Line Road/Byron Road and Grant Line Road/Corral Hollow Road. All other intersections operate at LOS C or better during the PM peak hour. The Grant Line Road interchange intersections operate at LOS B or C during the AM and PM peak hours.

Under existing conditions, the Grant Line Road/Byron Road intersection operates at an unacceptable LOS F during the PM peak hour. This condition is a result of the stop control applied to the higher-volume movements (i.e., northbound and southbound approaches) due to the presence of railroad tracks across the westbound approach. Traffic also diverts through this intersection during peak travel times to avoid congestion along I-205. Although the intersection currently meets signal warrants, signalization of this intersection is not a planned improvement under an adopted Finance and Implementation Plan (FIP). The Grant Line Road/Byron Road intersection is located outside of the city limits and is under the jurisdiction of San Joaquin County where the acceptable level of service threshold is LOS D.

CUMULATIVE SETTING

This section describes the cumulative development, roadway network, traffic volumes, and lane configurations.

Cumulative Development

The Cumulative scenario includes reasonably foreseeable development projects in the City of Tracy. This includes commercial build-out of the following specific plan areas and projects:

- I-205 Specific Plan
- Residential Specific Plan
- Industrial Specific Plan
- Plan C
- Northeast Industrial Plan Area
- Tracy Gateway
- Tracy Hills
- South Schulte
- Tracy Unified Lammers School Site

Residential development was constrained to Measure A limits for an approximate 20-year horizon, with development assumed in the following subdivisions:

- | | |
|---------------------------------|-------------------------------|
| • Castro – 767 units | • Presidio – 550 units |
| • Elissagaray Ranch – 433 units | • Saddlebrook – 385 units |
| • Filios – 400 units | • Soucek – 203 units |
| • Kagehiro – 853 units | • South Schulte – 5,820 units |
| • Lourence Ranch – 166 units | • Tracy Hills – 5,502 units |
| • Moitoso II – 487 units | |

In San Joaquin County, development levels are consistent with SJCOG's 2004 RTP.

Cumulative Roadway Network

Roadway improvements consistent with the City of Tracy's Roadway Master Plan were included in the Cumulative roadway network.

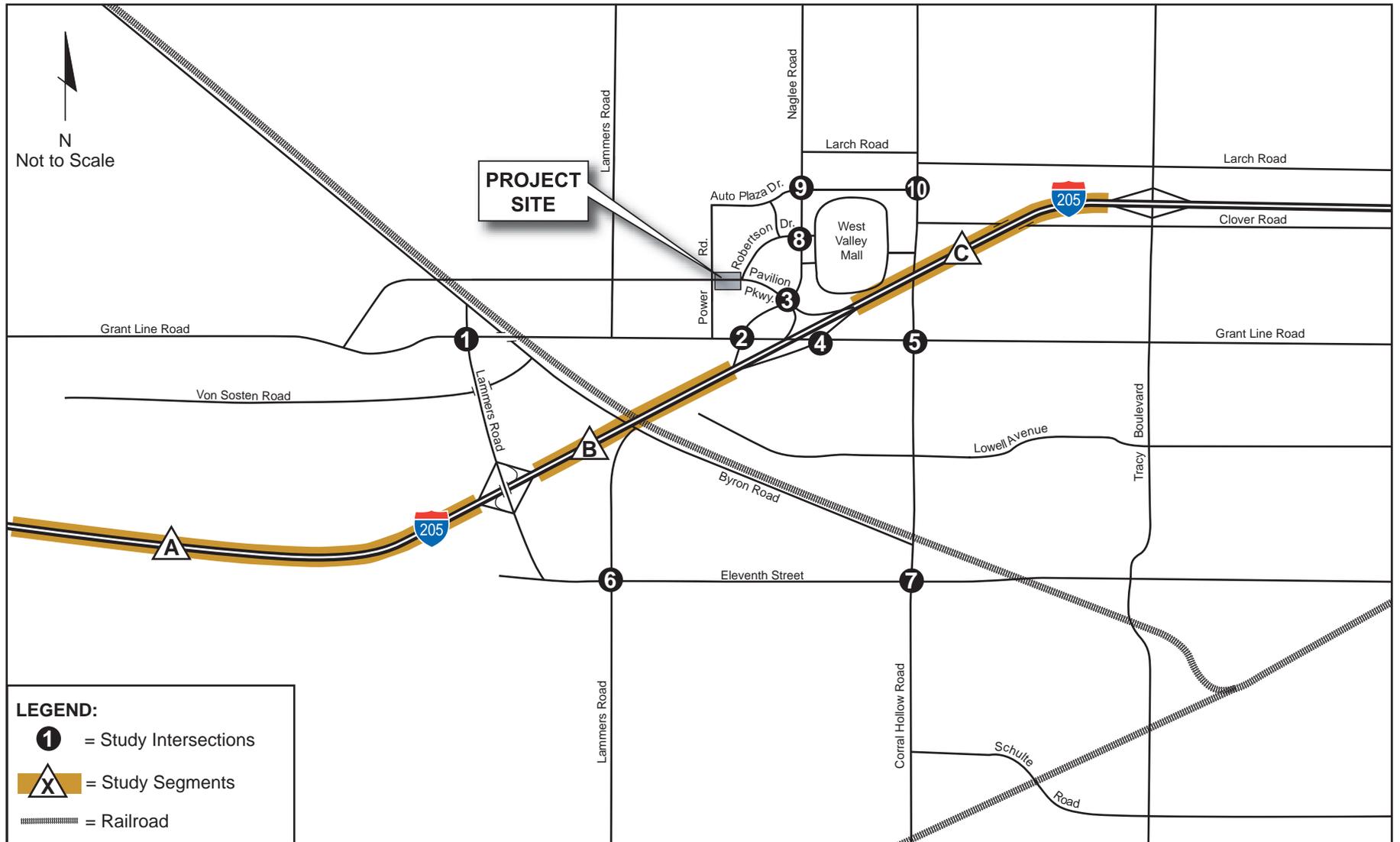
The following improvements in the project study area are under the jurisdiction of the City of Tracy:

1. Extension/re-alignment of Lammers Road north of Eleventh Street, including a new I-205 Lammers Road interchange and removal of the existing Eleventh Street interchange.
2. Widening I-205 to 3 lanes in each direction through Tracy.
3. Extension of Pavilion Parkway west to Byron Road.
4. Connecting Power Road (2 lanes) from Auto Plaza Drive to Grant Line Road along the western city limit line.
5. Extension of Auto Plaza Drive (4 lanes) east to Corral Hollow Road to form a T-intersection and add appropriate lane configurations.

The following improvements in the study area are under the jurisdiction of San Joaquin County:

1. Conversion of the Grant Line Road/Byron Road intersection to a Grant Line road overcrossing above Byron Road.
2. Addition of a new signalized intersection at Grant Line Road and Lammers Road with appropriate lane configurations.

The Cumulative roadway network including these improvements is shown on Figure 4.



Winco/Trask EIR

Cumulative Traffic Volumes and Lane Configurations

This section describes the method for generating the traffic volumes and assumed lane configurations for the Cumulative background condition.

Cumulative Traffic Volumes

The Tracy General Plan traffic demand model (modified from the SJCOG model) was used as the basis for generating regional Cumulative traffic forecasts. Buildout of the I-205 Specific Plan area based on land use designations and maximum trips per acre allowed in the approved I-205 Specific Plan was assumed. Development levels in the Mountain House community in San Joaquin County is consistent with the SJCOG estimates for 2030. In addition to the development described above, the net new trips generated by the planned Wal-Mart expansion on Grant Line Road were included in the Cumulative traffic volumes. For the Cumulative Baseline scenario, no development was assumed on the WinCo site nor on the Northern Parcel.

Cumulative Lane Configurations

Intersection operating conditions were assessed assuming no improvements over Existing configurations using the Cumulative traffic volumes described above. The service levels under these conditions are shown in Table 7. The new signalized intersection at Lammers Road/Grant Line Road replaces the intersection of Byron Road/Grant Line Road as study intersection 1 in the Cumulative scenarios. The new Auto Plaza Drive/Corral Hollow Road intersection becomes study intersection 10. Because intersections 1 and 10 are new intersections to be constructed in the Cumulative scenario, analysis under existing configurations is not applicable.

**TABLE 7
 CUMULATIVE TRAFFIC OPERATIONS WITH EXISTING CONFIGURATIONS**

Intersection	Traffic Control	AM Peak Hour		PM Peak Hour	
		Delay (seconds)	LOS	Delay (seconds)	LOS
1. Grant Line Road / Lammers Road	Signal ¹	n/a	n/a	n/a	n/a
2. Grant Line Road / Naglee Road / I-205 WB On-Ramp	Signal ¹	26	C	67	E
3. Naglee Road/Pavilion Parkway	Signal ¹	49	D	>80	F
4. Grant Line Road / I-205 EB Ramps	Signal ¹	>80	F	>80	F
5. Grant Line Road / Corral Hollow Road	Signal ¹	n/a	n/a	>80	F
6. Eleventh Street / Lammers Road	Signal ¹	n/a	n/a	>80	F
7. Eleventh Street / Corral Hollow Road	Signal ¹	n/a	n/a	>80	F
8. Robertson Drive / Naglee Road	Signal ¹	n/a	n/a	7	A
9. Auto Plaza Drive / Naglee Road	SSSC ²	n/a	n/a	28 (EB) 15	D C
10. Auto Plaza Drive/ Corral Hollow Road	SSSC ²	n/a	n/a	n/a	n/a

Note: **Bold** indicates intersection operating at deficient level of service. Significance criteria for County intersections (intersection 1) and City intersections within ¼ miles of interchange ramps (intersections 2 through 4) is LOS D. Significance criteria for City intersections (intersections 5 through 10) is LOS C.

1. Signalized intersection LOS based on weighted average control delay per vehicle, Highway Capacity Manual (Transportation Research Board, 2000).
2. Side-street stop intersection. Reported LOS based on control delay per vehicle for the worst approach and average delay per vehicle for the intersection.

Source: Fehr & Peers, 2005.

Improvements at nine out of ten study intersections have been identified to accommodate additional traffic volumes associated with Cumulative growth. Table 8 summarizes these Cumulative improvements. The elimination of the northbound through lane on Naglee Road at the Auto Plaza Drive/Naglee Road intersection is recommended to avoid confusion at the new all-way stop controlled intersection. Figure 5 displays these intersection improvements, the lane configurations for the new Grant Line Road/Lammers Road and Auto Plaza Drive/Corral Hollow Road intersections and Cumulative background traffic volumes.

**TABLE 8
 WINCO-TRASK CUMULATIVE INTERSECTION IMPROVEMENTS**

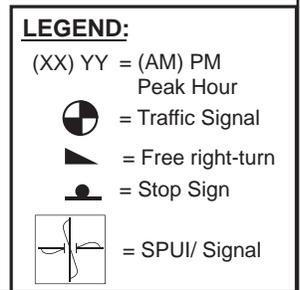
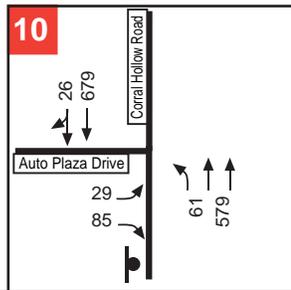
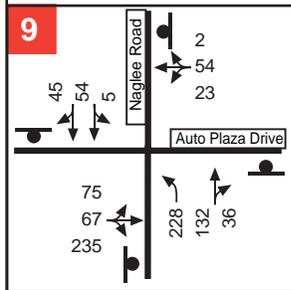
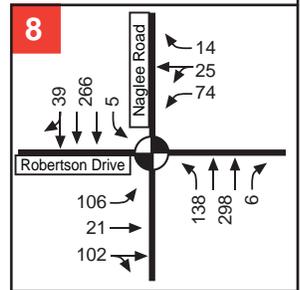
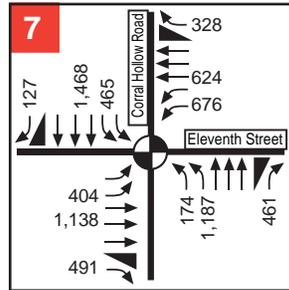
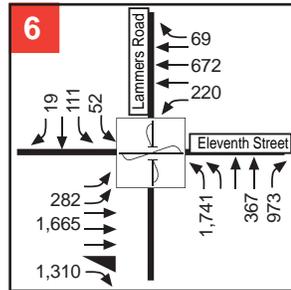
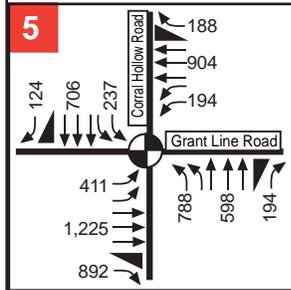
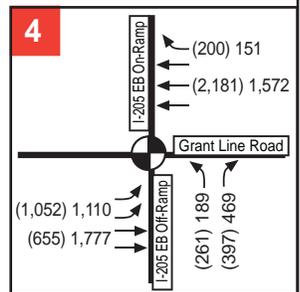
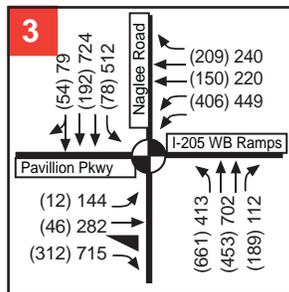
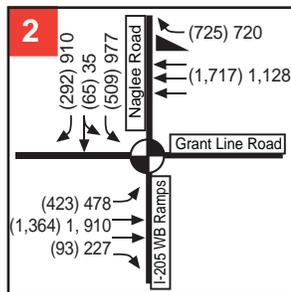
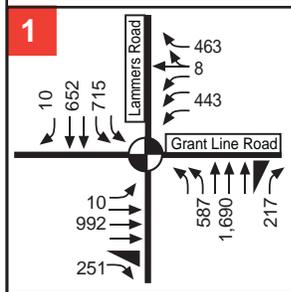
Retrofit Existing Intersections	
Location	Improvement
2. Grant Line Road / Naglee Road / I-205 WB On-Ramp	<ul style="list-style-type: none"> Optimize signal timing.
3. Naglee Road/Pavilion Parkway	<ul style="list-style-type: none"> Change existing eastbound right lane to free right on Pavilion Parkway. Optimize signal timing.
4. I-205 EB Ramps/Grant Line Road	<ul style="list-style-type: none"> Add second eastbound left turn lane on Grant Line Road onto eastbound on-ramp and modify free-flow right turn on westbound Grant Line Road to be permitted right turn.
OR	
2-4. Grant Line/I-205 Interchange	<ul style="list-style-type: none"> Implement next phase of Grant Line/I-205 Interchange.
5. Corral Hollow Road/Grant Line Road	<p>The required Cumulative configuration of this intersection to operate at LOS C/D consists of three through lanes, dual lefts and exclusive right-turn lanes on all approaches with acceleration lanes on all departures. This will involve the following modifications to the existing intersection:</p> <ul style="list-style-type: none"> Modify existing right turn lane into free-flow right turn lane on eastbound Grant Line and receiving/ acceleration lane of 400 feet on southbound Corral Hollow. Modify one northbound left turn lane into southbound receiving lane and modify remaining left turn pockets to be at least 350 feet; Eliminate southbound left turn into shopping center parking lot. Add third through lane to both southbound and northbound Corral Hollow Road. Add third through lane to both eastbound and westbound Grant Line Road. Replace existing shared through-right with one designated through lane and free-flow right turn lane on southbound Corral Hollow and receiving/ acceleration lane of 400 feet on westbound Grant Line Road. Modify existing shared through-right into one through lane and one free-flow right turn lane on westbound Grant Line Road and receiving/ acceleration lane of 400 feet on northbound Corral Hollow. Modify existing right turn to free-flow right turn lane on northbound Corral Hollow and receiving/ acceleration lane of 400 feet on eastbound Grant Line Road. Add second left turn to southbound, eastbound, and westbound approaches. Optimize signal timing.
6. Lammers Road/Eleventh Street	<p>The required Cumulative configuration for this intersection is a grade-separated urban intersection. This will involve the following modifications to the existing intersection:</p> <ul style="list-style-type: none"> Change to single point urban interchange and signal with Lammers Road over-crossing. Modify existing free-right to permitted on westbound, northbound, and southbound approaches. Optimize signal timing.
7. Corral Hollow Road/Eleventh Street	<p>The required Cumulative configuration of this intersection to operate at LOS D consists of three through lanes, dual lefts and exclusive right-turn lanes on all approaches with acceleration lanes on all departures. This will involve the following modifications to the existing intersection:</p>

**TABLE 8
 WINCO-TRASK CUMULATIVE INTERSECTION IMPROVEMENTS**

	<ul style="list-style-type: none"> • Add third through lane on northbound and southbound Corral Hollow. • Change existing right to free right on all approaches. • Optimize signal timing. <p>OR</p> <p>The required Cumulative configuration of this intersection to operate at an acceptable LOS C is a grade-separated urban intersection. This will involve the following modifications to the existing intersection:</p> <ul style="list-style-type: none"> • Change to single point urban interchange and signal with Eleventh Street over-crossing.
<p>9. Auto Plaza Drive / Naglee Road</p>	<ul style="list-style-type: none"> • Change existing side-street stop control to an all-way stop control. • Eliminate northbound through lane on Naglee Road, leaving a NB left turn lane and a northbound shared through-right turn lane.
<p>New Intersections</p>	
<p>1. Lammers Road/Grant Line Road</p>	<p>Construction of new signalized intersection with following configuration:</p> <ul style="list-style-type: none"> • Eastbound: <ul style="list-style-type: none"> ○ One left turn lane ○ Three through lanes ○ One free-right turn lane • Westbound: <ul style="list-style-type: none"> ○ Three left turn lanes ○ One shared through-right lane ○ One right turn lane • Northbound <ul style="list-style-type: none"> ○ Two left turn lanes ○ Three through lanes ○ One free right turn lane • Southbound <ul style="list-style-type: none"> ○ Two left turn lanes ○ Two through lanes ○ One right turn lane
<p>10. Auto Plaza Drive / Corral Hollow Road</p>	<p>Construction of new side-street stop controlled intersection with the following configuration:</p> <ul style="list-style-type: none"> • Northbound <ul style="list-style-type: none"> ○ One left turn lane ○ Two through lanes • Southbound <ul style="list-style-type: none"> ○ One through lane ○ One shared through right turn lane • Eastbound (stop controlled) <ul style="list-style-type: none"> ○ One left turn lane ○ One right turn lane
<p>Source: Fehr & Peers, 2005.</p>	

Cumulative Intersection Operating Conditions

Cumulative intersection operating conditions were analyzed using the traffic volumes and intersection improvements described above. Table 9 summarizes the calculated level of service under Cumulative No Project conditions. The Grant Line Road interchange intersections would operate at acceptable levels of service during the AM and PM peak hours. Other intersections would also operate at acceptable levels of service during the PM peak hour with the exception of Eleventh Street/Corral Hollow Road. The City of Tracy significance criterion for this intersection is LOS C. However, it is anticipated to operate at LOS D during the PM peak hour. Detailed LOS worksheets for the Cumulative scenario can be found in Appendix C.



**TABLE 9
 CUMULATIVE WITH IMPROVED INTERSECTION TRAFFIC OPERATIONS**

Intersection	Traffic Control	AM Peak Hour		PM Peak Hour	
		Delay (seconds)	LOS	Delay (seconds)	LOS
1. Grant Line Road / Lammers Road	Signal ¹	n/a	n/a	54	D
2. Grant Line Road / Naglee Road / I-205 WB On-Ramp	Signal ¹	24	C	39	D
3. Naglee Road/Pavilion Parkway	Signal ¹	25	C	48	D
4. Grant Line Road / I-205 EB Ramps	Signal ¹	55	D	51	D
5. Grant Line Road / Corral Hollow Road	Signal ¹	n/a	n/a	35	C/D
6. Eleventh Street / Lammers Road	SPUI ²	n/a	n/a	21	C
7A. Eleventh Street / Corral Hollow Road	Signal ¹	n/a	n/a	47	D
7B. Eleventh Street / Corral Hollow Road	SPUI ²	n/a	n/a	25	C
8. Robertson Drive / Naglee Road	Signal ¹	n/a	n/a	7	A
9. Auto Plaza Drive / Naglee Road	AWSC ³	n/a	n/a	12	B
10. Auto Plaza Drive/ Corral Hollow Road	SSSC ⁴	n/a	n/a	15 (EB) 2	C A

Note: **Bold** indicates intersection operating at deficient level of service. Significance criteria for County intersections (intersection 1) and City intersections within ¼ miles of interchange ramps (intersections 2 through 4) is LOS D. Significance criteria for City intersections (intersections 5 through 10) is LOS C.

1. Signalized intersection LOS based on weighted average control delay per vehicle, Highway Capacity Manual (Transportation Research Board, 2000).
2. Single-point urban interchange LOS based on weighted average control delay per vehicle, Highway Capacity Manual (Transportation Research Board, 2000).
3. All-way Stop-controlled intersection level of service is based on average control delay per vehicle (in seconds) according to the 2000 HCM.
4. Side-street stop intersection. Reported LOS based on control delay per vehicle for the worst approach and average delay per vehicle for the intersection.

Source: Fehr & Peers, 2005.

3. PROJECT CHARACTERISTICS

This section provides a description of the proposed Project components, including trip generation, trip distribution and trip assignment.

PROJECT DESCRIPTION

The proposed project consists of two parts located along Pavilion Parkway west of Naglee Road:

1. **WinCo Foods** – A 95,900 gross square-foot grocery store located on 8.5 acres of land south of Pavilion Parkway. 7.95 acres of the project site requires an I-205 Corridor Specific Plan re-designation from light industrial to general commercial.
2. **Northern Parcel** – A 10.8 acre parcel north of Pavilion Parkway. This parcel is designated as light industrial in the I-205 Corridor Specific Plan. As part of the proposed project, the parcel will be re-designated as general commercial.

TRIP GENERATION

WinCo Foods

The *WinCo Foods Trip Generation & Characteristics Study*, (Kittelson & Associates, September 2002) studied trip generation for 10 WinCo Foods locations in the Western United States. Four of the 10 study locations were located in the state of California. The average trip generation rates the study found for all 10 locations are shown in Table 10. The average trip generation rates for only the 4 California locations are shown in Table 11. There is not a substantial difference between the California average trip generation rates and the average trip generation rates for all study locations. Because they are based on a larger sample of WinCo stores, the average trip generation rates for all locations, shown in Table 10, were used to estimate trips generated by the WinCo Foods portion of the proposed Project.

**TABLE 10
 AVERAGE TRIP GENERATION RATES FOR WINCO FOODS – ALL STORES**

Land Use	Typical Weekday							Saturday			
	Daily Rate	AM Peak Hour Rate			PM Peak Hour Rate			Daily Rate	Midday Peak Hour Rate		
		In	Out	Total	In	Out	Total		In	Out	Total
WinCo Foods	95.2	1.7	1.4	3.1	4.4	4.3	8.7	121.5	5.4	5.2	10.6

Source: *WinCo Foods Trip Generation & Characteristics Study*, (Kittelson & Associates, September 2002).

**TABLE 11
 AVERAGE TRIP GENERATION RATES FOR WINCO FOODS – CALIFORNIA STORES**

Land Use	Typical Weekday							Saturday			
	Daily Rate	AM Peak Hour Rate			PM Peak Hour Rate			Daily Rate	Midday Peak Hour Rate		
		In	Out	Total	In	Out	Total		In	Out	Total
WinCo Foods	95.9	1.9	1.4	3.3	4.2	4.1	8.3	123.4	5.1	5.4	10.5

Source: *WinCo Foods Trip Generation & Characteristics Study*, (Kittelson & Associates, September 2002).

The *WinCo Foods Trip Generation & Characteristics Study* also separated trips generated into primary, pass-by, and diverted linked trips. Primary trips are new trips made for the specific purpose of visiting the project. Pass-by and diverted linked trips are trips visiting the project from traffic already on the roadway network. Pass-by trips are made by traffic passing on an adjacent street and do not involve any route diversion to reach the project. Diverted linked trips are made by traffic on the roadway network near the project requiring a route diversion to visit the project. Non-primary trips (pass-by and diverted linked trips) generally do not occur during the AM peak hour.

Table 12 shows the percentage of total WinCo Foods trips generated by trip type for the PM peak hour at all study locations and only California study locations. The percentage of primary trips generated by California locations is significantly higher percentage of primary trips generated by all study locations. For the proposed WinCo Foods, the trip type percentages for California locations are used to separate primary and non-primary trips. Because the proposed project location is adjacent to a low-level collector road, the number of pass-by trips is considered negligible and all non-primary trips are considered diverted linked trips.

**TABLE 12
 TRIP TYPE FOR WINCO FOODS**

Location	Trip Type			
	Primary	Non-Primary Pass-By	Non-Primary Diverted	Total Non-Primary
All 10 stores surveyed	52%	24%	24%	48%
California stores only	61%	18%	21%	39%

Source: *WinCo Foods Trip Generation & Characteristics Study*, (Kittelson & Associates, September 2002).

The estimated AM and PM peak hour trips generated by the WinCo Foods portion of the proposed Project are shown in Table 13. The proposed WinCo Foods store would generate approximately 296 AM peak hour trips. During the PM peak hour, a total of 831 trips are estimated; of these, 507 are primary trips and the other 324 are diverted linked trips.

**TABLE 13
 TRIP GENERATION FOR WINCO FOODS**

	Size	Trip Rate ¹			Trips		
		In	Out	Total	In	Out	Total
AM Peak Hour							
WinCo Foods	95.5 ksf	1.7	1.4	3.1	162	134	296
<i>Diverted (0%)</i>					0	0	0
<i>Primary</i>					162	134	296
PM Peak Hour							
WinCo Foods	95.5 ksf	4.4	4.3	8.7	420	411	831
<i>Diverted (39%)</i>					162	162	324
<i>Primary</i>					258	249	507
Notes:							
1. Average trip rates based on information provided in <i>WinCo Foods Trip Generation & Characteristics Study</i> (Kittelson & Associates, September 2002).							
Source: Fehr & Peers, 2005.							

Northern Parcel

The estimated number of trips generated by the Northern Parcel was calculated using trip generation equations associated with Land Use Code 820, Shopping Center, from the Institute of Transportation Engineers (ITE), *Trip Generation* (7th Edition). These ITE trip generation equations yield trips per 1,000 square-feet. The maximum floor-area ratio for commercial uses from the I-205 Corridor Specific Plan, 0.3, was used to convert the 10.8 acre parcel to 141,130 square-feet.

For the Northern Parcel, a 30% non-primary trip percentage was used to distinguish between primary and non-primary trips. This rate is based on the non-primary trip rate in the Institute of Transportation Engineers (ITE), *Trip Generation Handbook* (7th Edition), for ITE Land Use Code 820, Shopping Center. As with the proposed WinCo Foods, all non-primary trips are considered diverted linked trips. As shown in Table 14, the Northern Parcel would generate approximately 192 AM peak hour trips, 550 PM peak hour primary trips and 236 PM peak hour diverted linked trips.

**TABLE 14
 TRIP GENERATION FOR THE NORTHERN PARCEL**

	Size	Trip Generation Equation ¹			Trips		
		In	Out	Total	In	Out	Total
AM Peak Hour							
Northern Parcel	141 ksf	Ln(T) = 0.60 Ln(X) + 2.29; 61% In, 39% Out			117	75	192
<i>Diverted (0%)</i>					0	0	0
<i>Primary</i>					117	75	192
PM Peak Hour							
Northern Parcel	141 ksf	Ln(T) = 0.66 Ln(X) + 3.40; 48% In, 52% Out			377	409	786
<i>Diverted (30%)</i>					118	118	236
<i>Primary</i>					259	291	550
Notes:							
1. Trip generation equation from Institute of Transportation Engineers (ITE) <i>Trip Generation</i> 7 th Edition regression equations for Shopping Center (Land Use Code 820).							
Source: Fehr & Peers, 2005.							

TRIP DISTRIBUTION AND ASSIGNMENT

The City of Tracy General Plan Traffic Demand Model, which was derived from the San Joaquin County Council of Governments (SJCOG) travel demand model, was used to develop trip distributions for both parts of the proposed project. The same trip distribution was used for the WinCo Foods and the Northern Parcel. To reflect expected roadway network changes and growth patterns in Tracy and surrounding cities, separate trip distributions were used for the existing and cumulative scenarios.

To account for the lack of a special purpose designation appropriate for a grocery component in the model, modifications were made to the trip distributions obtained from the model. For trips to or from areas outside the City of Tracy, the total trip distribution was divided into primary and non-primary trips. The proportion of primary trips to or from outside the City of Tracy was reduced to account for the number of similar stores in neighboring cities and the tendency for grocery trips to occur closer to the home than other trip purposes.

Table 15 summarizes the Existing and Cumulative trip distributions for the WinCo Foods and Northern Parcel.

**TABLE 15
 PROJECT TRIP DISTRIBUTION**

Location	Existing Distribution (%)		Cumulative Distribution (%)	
	Inbound	Outbound	Inbound	Outbound
I-205 West	17	9	13	3
Byron Road Northwest	1	2	2	4
Lammers Road North	1	1	2	2
Naglee Road North	0	0	2	2
Corral Hollow North	0	0	2	6
I-205 East	13	6	7	3
Grant Line Road East	9	20	16	16
Lowell East	0	0	2	2
Eleventh Street East	12	10	4	4
Tracy Boulevard South	0	0	2	6
Corral Hollow South	15	19	10	16
Lammers South	5	4	6	20
Von Sosten West	0	0	2	2
Grant Line West	0	0	4	4
Internal Zone 1	1	4	6	2
Internal Zone 2	25	22	8	2
Internal Zone 3	1	3	6	2
Internal Zone 4	0	0	4	2
Internal Zone 5	0	0	2	2
Total	100	100	100	100

Source: Fehr & Peers, 2005.

During the PM peak hour, 324 or 39% of WinCo Foods trips and 236 or 30% of Northern Parcel trips are diverted linked trips. 162 of WinCo Foods diverted trips are inbound and 162 are outbound. Similarly, 118 of the Northern Parcel diverted linked trips are inbound and 118 are outbound. These trips are diverted from eastbound I-205, westbound I-205 and eastbound Grant Line Road. The routes these trips are diverted from are based on the trip distribution shown in Table 15. Tables 16 and 17 show the direction from which these trips are diverted for the existing and cumulative scenarios.

**TABLE 16
 WINCO FOODS DIVERTED TRIPS BREAKDOWN**

Direction	Existing		Cumulative	
	% Total Trips	Trips	% Total Trips	Trips
WB I-205	16%	66	12%	47
EB I-205	21%	86	20%	88
EB Grant Line Road	2%	10	7%	27
Total	39%	162	39%	162

Source: Fehr & Peers, 2005.

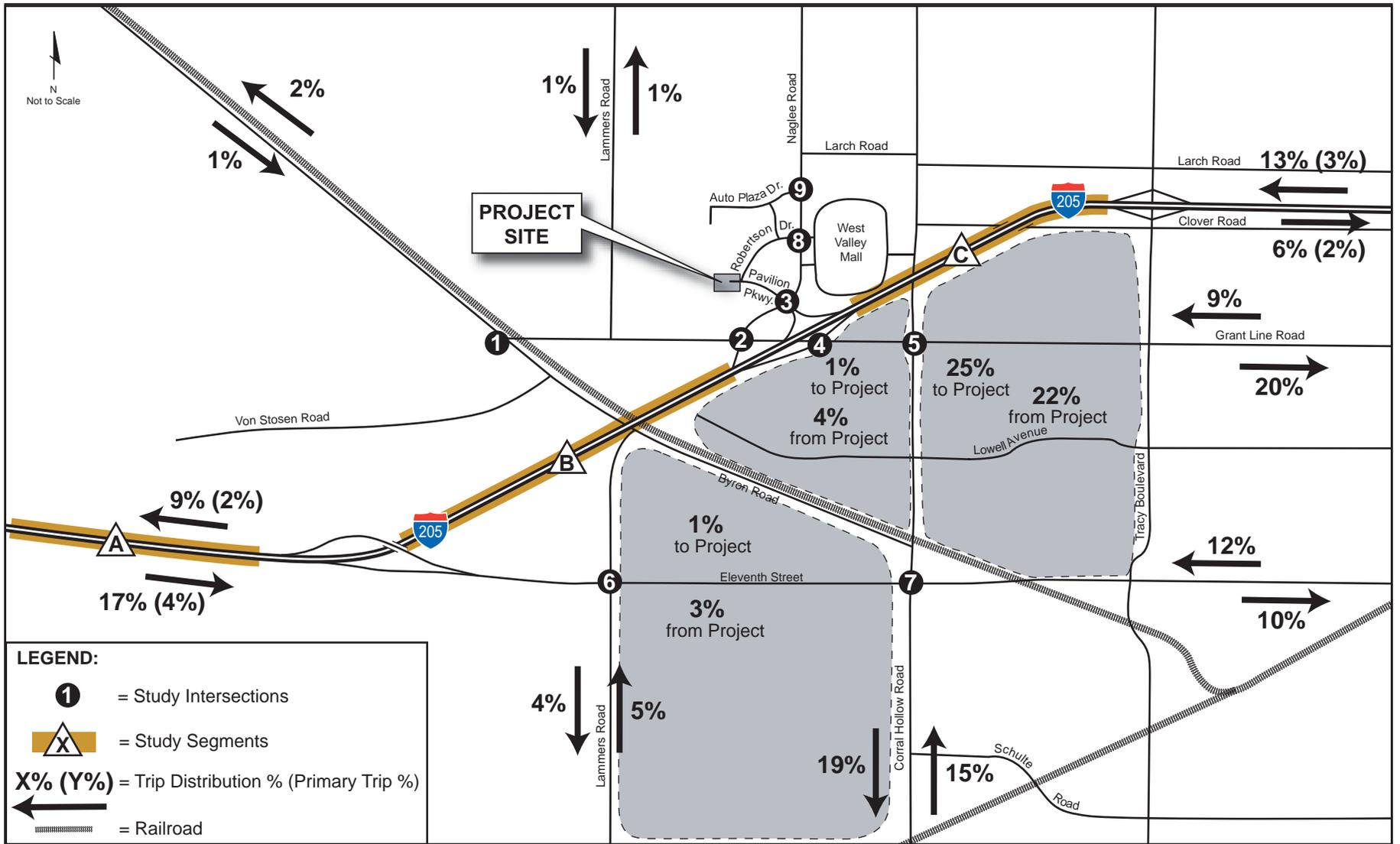
**TABLE 17
 NORTHERN PARCEL DIVERTED TRIPS BREAKDOWN**

Route	Existing		Cumulative	
	% Total Trips	Trips	% Total Trips	Trips
WB I-205	12%	48	9%	35
EB I-205	16%	63	16%	63
EB Grant Line Road	2%	7	5%	20
Total	30%	118	30%	118

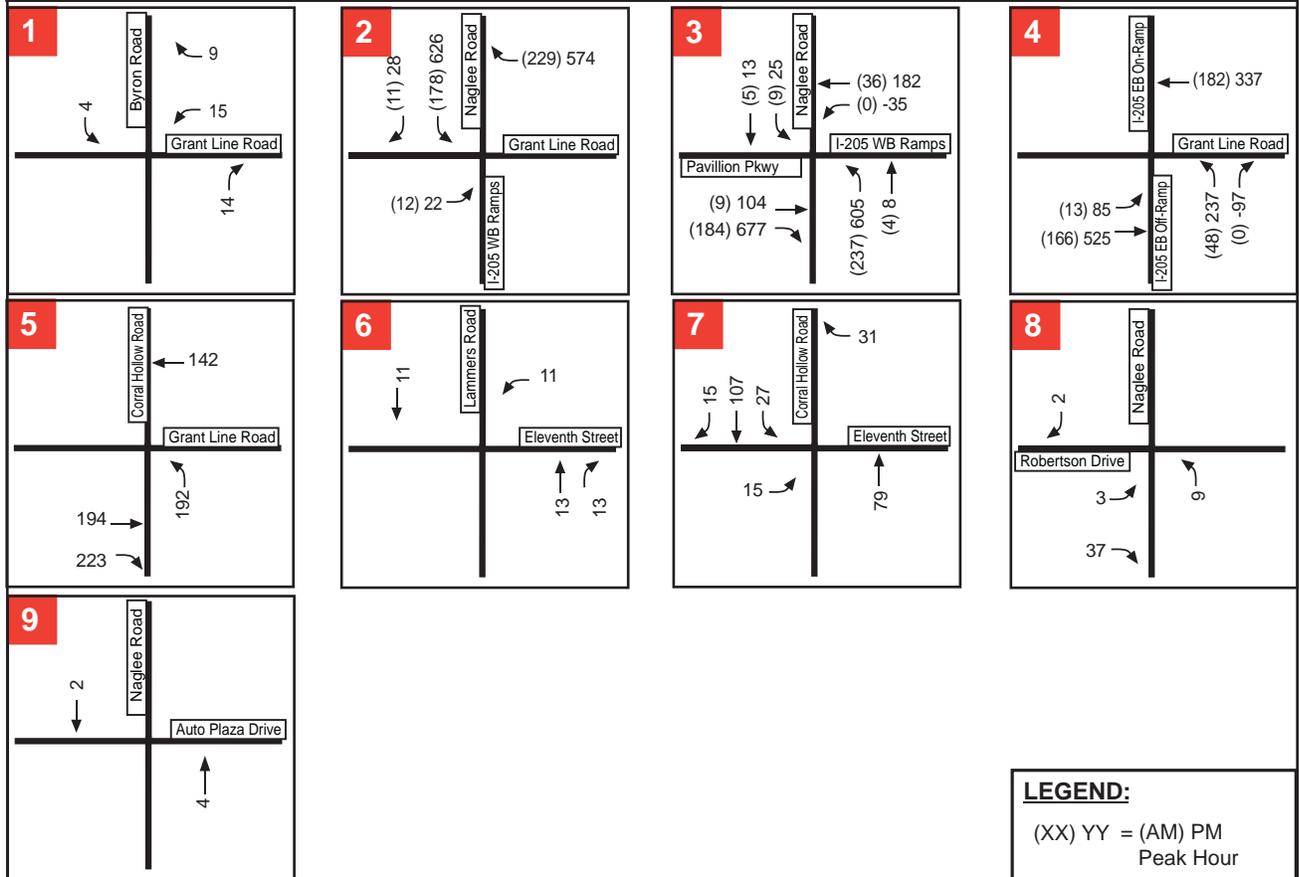
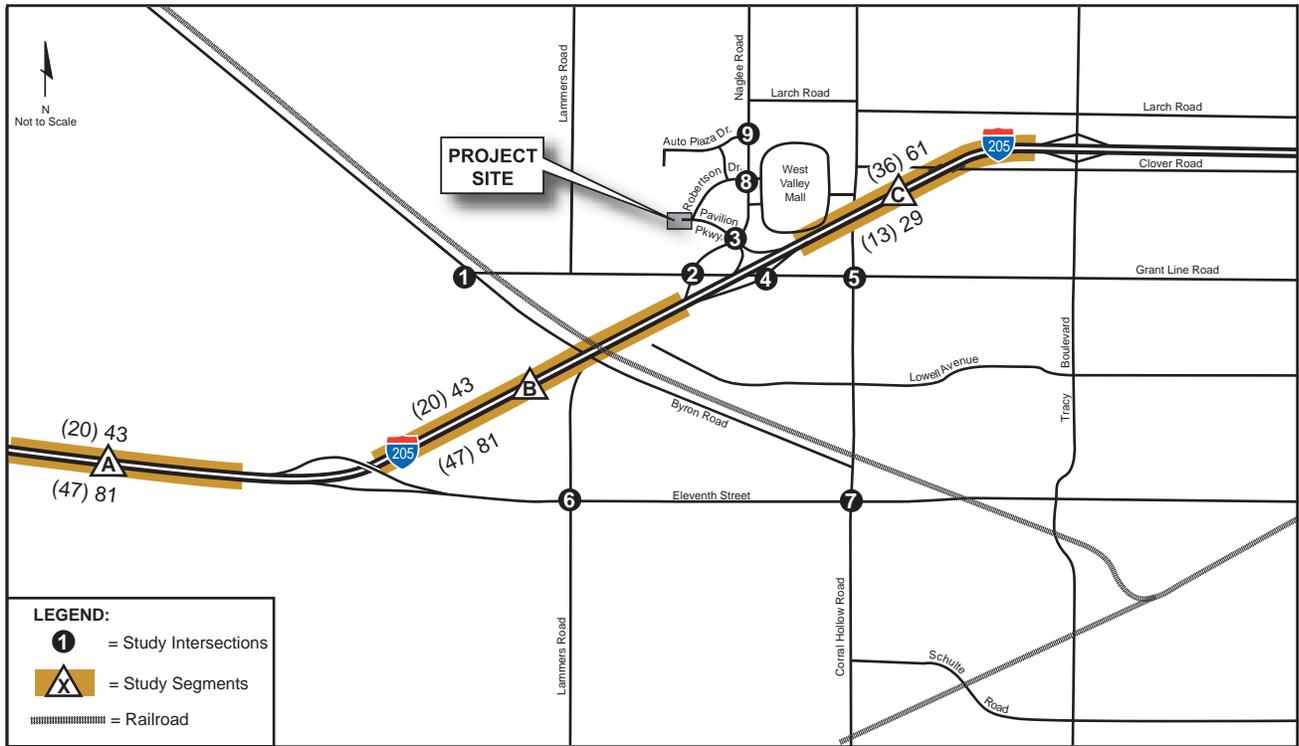
Source: Fehr & Peers, 2005.

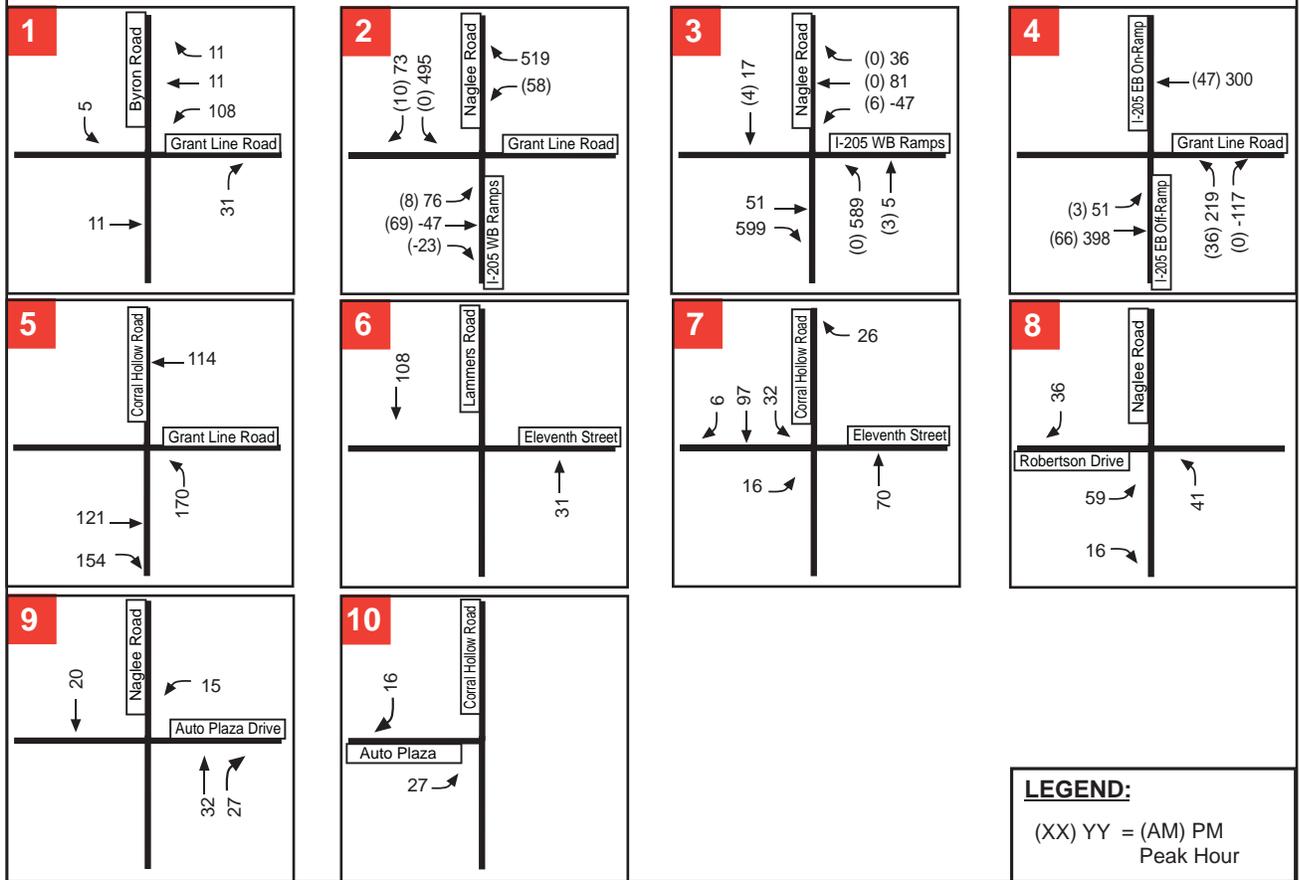
Because the proposed project consists of a discount grocery store and other commercial uses, a large proportion of the trips are distributed to nearby residential areas. Under Existing conditions, these trips are distributed to internal zones located in the study area. Existing trip distribution is shown on Figure 6. In the Cumulative trip distribution, a higher percentage of trips will leave the study area to new residential developments expected to the south and east of the study area. Cumulative trip distribution is shown on Figure 7.

Existing primary trips are assigned to the roadway network using the Existing inbound and outbound trip distribution shown in Table 15 and the Existing diverted routes in Tables 16 and 17. The Existing project trip assignment is shown in Figure 8. Similarly, Cumulative project trips are assigned to the roadway network using the Cumulative inbound and outbound trip distribution presented in Tables 15, 16 and 17. Cumulative project trip assignment is shown on Figure 9.



Winco/Trask EIR





4. PROJECT IMPACTS AND MITIGATIONS

This section describes the roadway network and traffic assumptions, analysis results, and proposed mitigation measures for the Existing plus Project and Cumulative plus Project scenarios.

ROADWAY NETWORK

For Existing with Project conditions, no additional roadway or intersection improvements were assumed above the existing setting. The cumulative roadway network described in the previous sections was used to analyze Cumulative with Project conditions.

EXISTING PLUS PROJECT

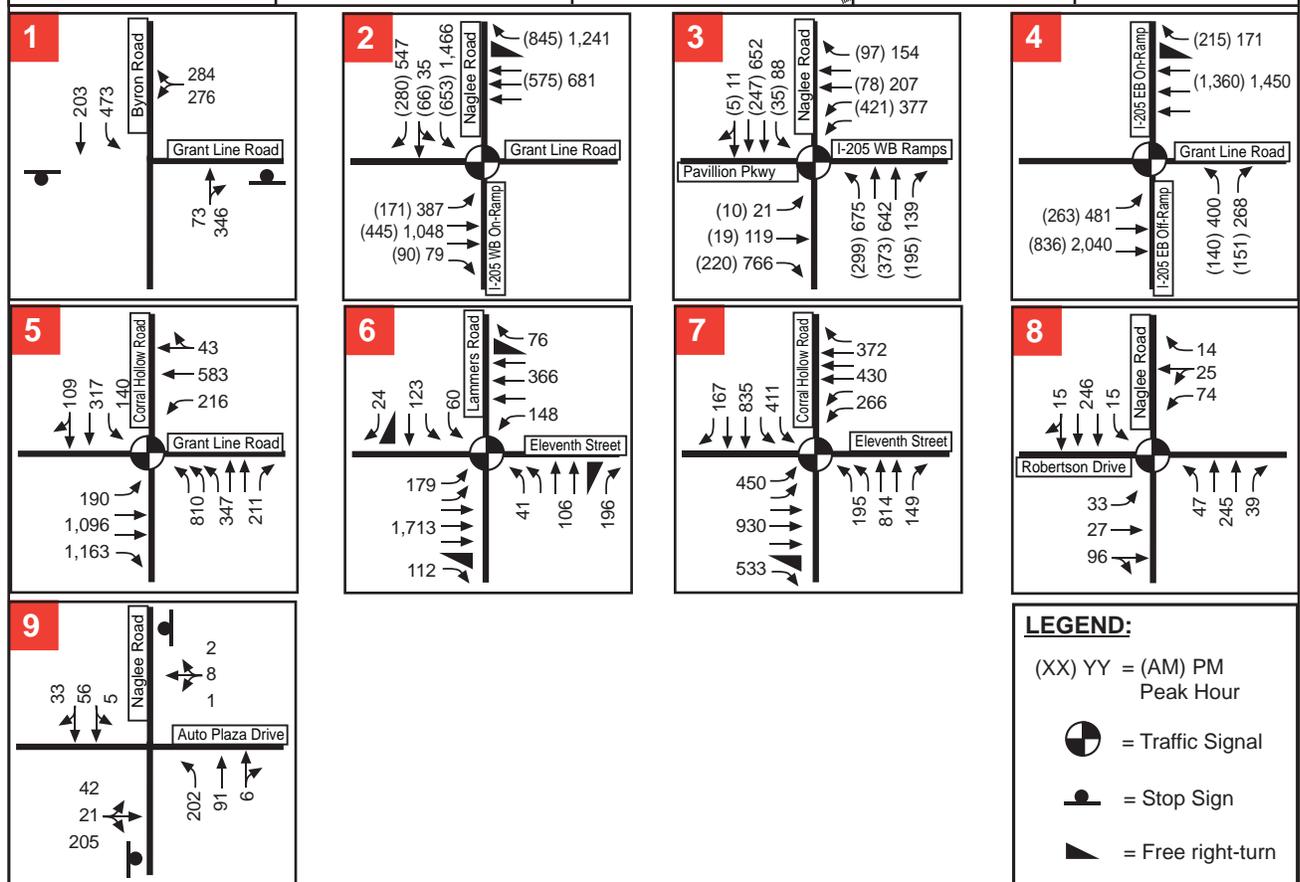
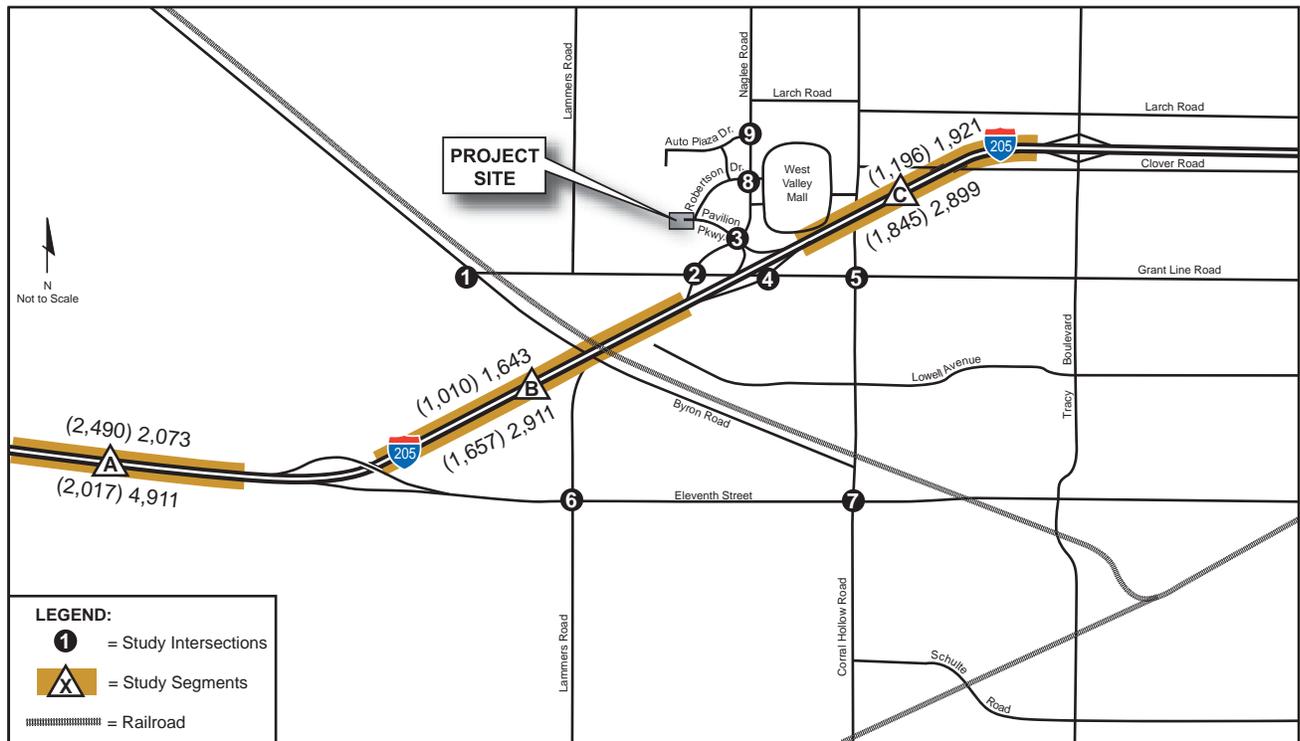
This section describes the Existing plus Project intersection operations and proposed mitigation measures.

Intersection Operating Conditions

For the Existing plus Project scenario, traffic generated by the proposed project (WinCo Foods and the Northern Parcel) is added to Existing traffic volumes. Existing plus Project traffic volumes and lane configurations are shown on Figure 10.

Intersection operating conditions were analyzed for Existing plus Project traffic volumes. The calculated LOS for the study intersections is reported in Table 18 below. Under Existing plus Project conditions, the Naglee Road/Pavilion Parkway, Grant Line Road/Corral Hollow Road, and Grant Line Road/Byron Road intersections operate at unacceptable service levels. The Naglee Road/Pavilion Parkway intersection average delay would increase to over 80 seconds (LOS F) during the PM peak hour. The Grant Line Road/Corral Hollow intersection average delay would increase to over 80 seconds (LOS F) during the PM peak hour and drop below the City of Tracy standard of LOS C. Detailed LOS worksheets for the Existing plus Project scenario can be found in Appendix B.

As a side note, the Eleventh Street/Corral Hollow Road intersection delay increases to 34 seconds, just below the LOS C/D threshold of 35 seconds. All other intersections would continue to operate at acceptable levels of service.



**TABLE 18
 EXISTING PLUS WINCO/TRASK INTERSECTION TRAFFIC OPERATIONS**

Intersection	Traffic Control	AM Peak Hour		PM Peak Hour	
		Delay (seconds)	LOS	Delay (seconds)	LOS
1. Grant Line Road / Byron Road	SSSC ¹	n/a	n/a	>50 (SB) >50	F F
2. Grant Line Road / Naglee Road / I-205 WB On-Ramp	Signal ²	11	B	45	D
3. Naglee Road / Pavilion Parkway	Signal ²	25	C	>80	F
4. Grant Line Road / I-205 EB Ramps	Signal ²	13	B	32	C
5. Grant Line Road / Corral Hollow Road	Signal ²	n/a	n/a	>80	F
6. Eleventh Street / Lammers Road	Signal ²	n/a	n/a	17	B
7. Eleventh Street / Corral Hollow Road	Signal ²	n/a	n/a	34	C
8. Robertson Drive / Naglee Road	Signal ²	n/a	n/a	7	A
9. Auto Plaza Drive / Naglee Road	SSSC ¹	n/a	n/a	14 (WB) 8	B A

Note: **Bold** indicates intersection operating at deficient level of service. Significance criteria for County intersections (intersection 1) and City intersections within ¼ miles of interchange ramps (intersections 2 through 4) is LOS D. Significance criteria for City intersections (intersections 5 through 9) is LOS C.

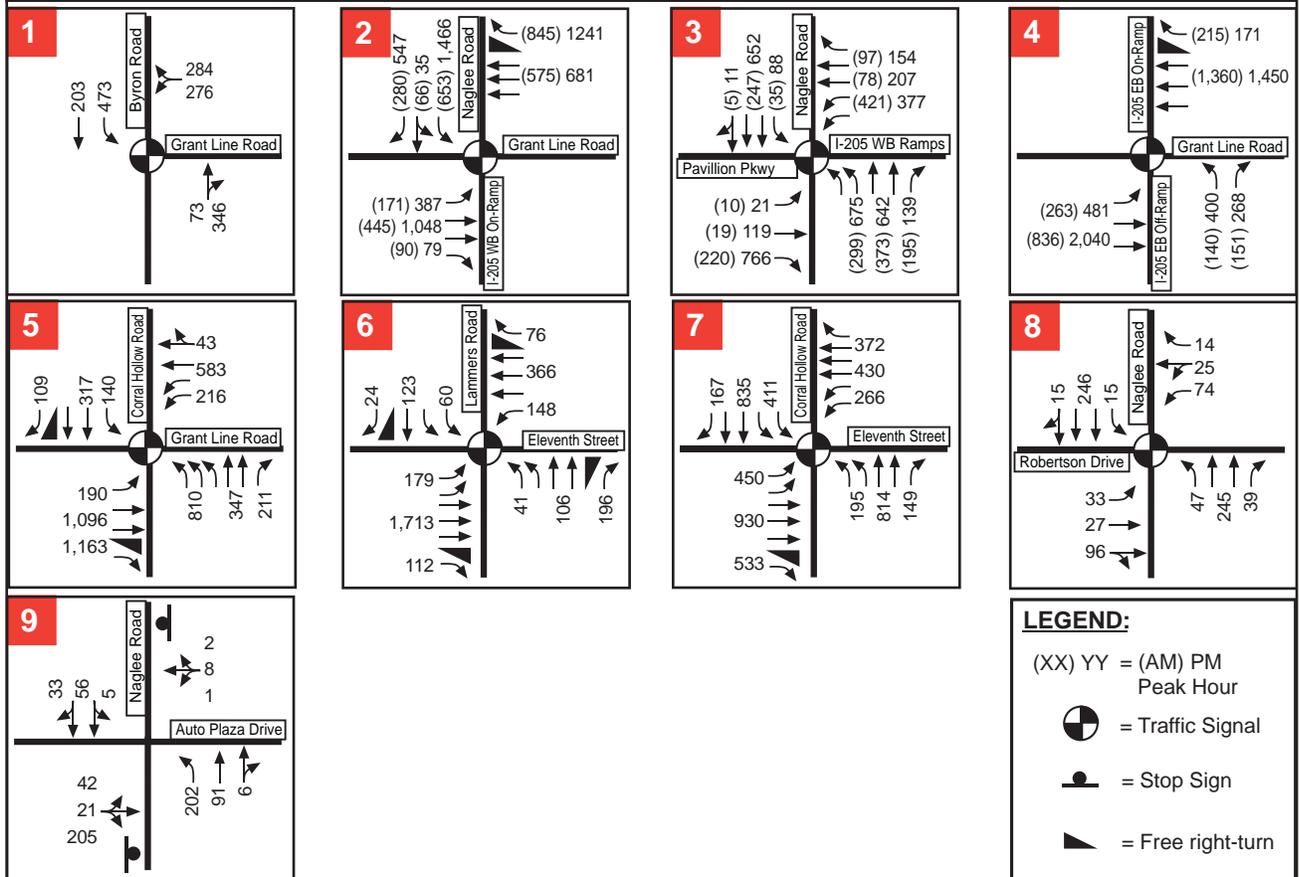
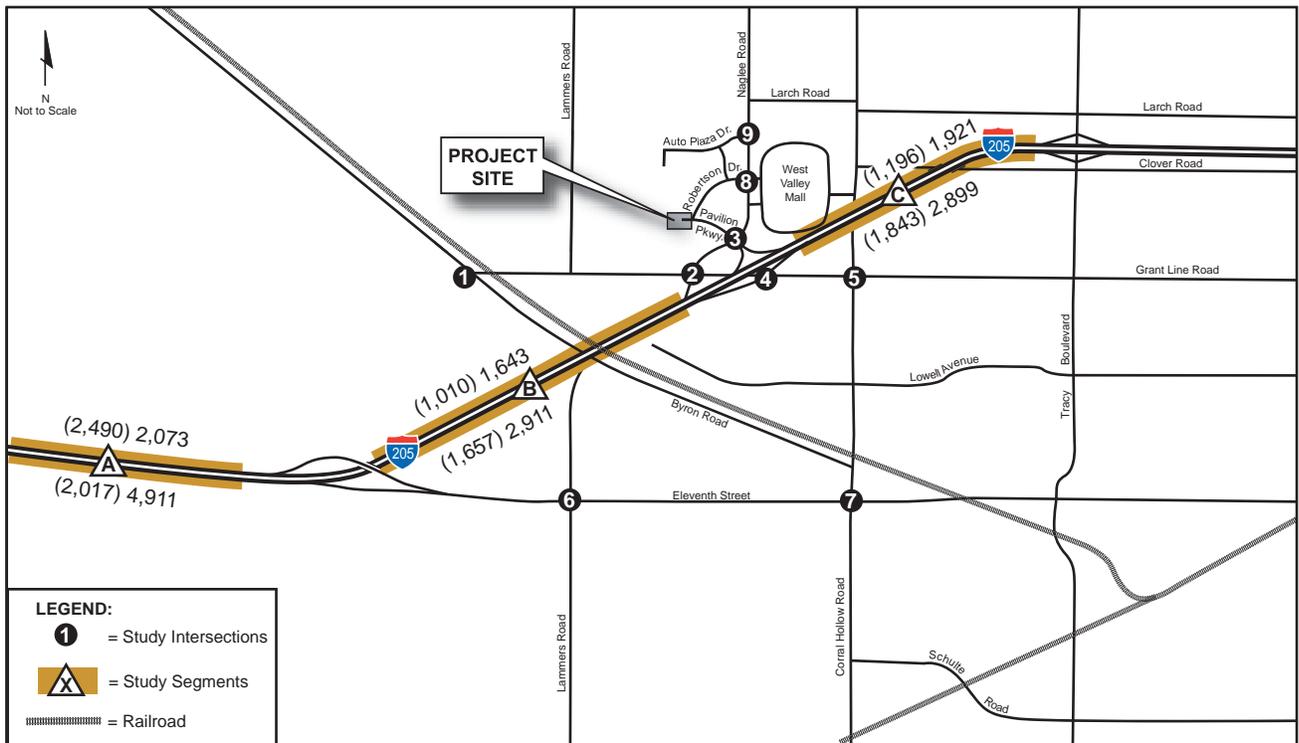
1. Side-street stop intersection. Reported LOS based on control delay per vehicle for the worst approach and average delay per vehicle for the intersection.
2. Signalized intersection LOS based on weighted average control delay per vehicle, Highway Capacity Manual (Transportation Research Board, 2000).

Source: Fehr & Peers, 2005.

It will be necessary to mitigate the effects of adding the proposed project at three intersections in the PM peak hour. Recommended project mitigations are shown on Figure 11 and presented in Table 19. The mitigated traffic operations are presented in Table 20. The intersection of Grant Line Road / Byron Road currently has northbound and southbound approaches stop-controlled and the westbound approach free to limit the queuing across the railroad tracks. The intersection currently meets the peak hour volume signal warrant and requires signalization with the addition of project traffic. By signalizing the intersection the average delay is reduced to 35 seconds, an acceptable LOS C. In addition to the installation of a signal, signal preemption and coordination with the railroad crossing and detection system is also required.

At the Naglee Road/Pavilion Parkway intersection, adding a second left turn lane from northbound Naglee to westbound Pavilion Parkway and optimizing the signal timing would improve the service level to an acceptable LOS D.

It is recommended that an eastbound free-flow right turn lane replace the existing right turn lane along Grant Line Road at the Grant Line Road/Corral Hollow Road intersection. Changing the existing southbound shared through-right to one through and one free-flow right turn and adding a second westbound left turn along Grant Line are also recommended. These Existing plus Project mitigations would improve the operation at the intersection to LOS C. As shown in Table 20 below, the mitigations listed in Table 19 improve the intersection operations to acceptable service levels.



**TABLE 19
 RECOMMENDED EXISTING PLUS WINCO/TRASK MITIGATIONS**

Location	Improvement
1. Grant Line Road / Byron Road	<ul style="list-style-type: none"> • Install traffic signal. • Coordinate signal with rail road crossing and detection system.
3. Naglee Road / Pavilion Parkway	<ul style="list-style-type: none"> • Add second left turn lane from northbound Naglee Road to westbound Pavilion Parkway. • Optimize signal timing.
5. Grant Line Road / Corral Hollow Road	<ul style="list-style-type: none"> • Add free-flow right turn lane on eastbound Grant Line and receiving/ acceleration lane of 400 feet on southbound Corral Hollow. • Replace existing shared through-right to one exclusive through lane and one free-flow right-turn lane of 300 feet on southbound Corral Hollow and receiving/ acceleration lane of 400 feet on westbound Grant Line. • Add second left turn lane from westbound Grant Line Road to southbound Corral Hollow Road. • Optimize signal timing.

Source: Fehr & Peers, 2005.

**TABLE 20
 EXISTING PLUS WINCO/TRASK MITIGATED INTERSECTION TRAFFIC OPERATIONS**

Intersection	Traffic Control	Unmitigated		Mitigated	
		PM Peak Hour		PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
1. Grant Line Road / Byron Road	SSSC/ Signal	>50 (SB) >50	F F	35	C
3. Naglee Road/Pavilion Parkway	Signal	>80	F	52	D
5. Grant Line Road / Corral Hollow Road	Signal	>80	F	34	C

Source: Fehr & Peers, 2005.

Existing Project Impacts and Mitigations

Impact #1

The addition of project traffic to the Grant Line Road / Byron Road intersection in the Existing plus Project scenario will add traffic to an already deficient intersection that is operating at LOS F with more than 50 seconds of average delay. This is considered a significant impact.

Analysis #1

The intersection of Grant Line Road / Byron Road currently has northbound and southbound stop controlled and westbound free to limit the queuing across the rail road tracks. The intersection currently meets the peak hour volume signal warrant with or without the addition of project traffic.

Mitigation #1

By signaling the intersection the average delay is reduced to 35 seconds, an acceptable LOS C. In addition to the installation of a signal, signal preemption and coordination with the rail road crossing and detection system is also required.

Implementation #1

The County of San Joaquin would be responsible for construction of the intersection improvement. The Project may be required to contribute its fair share toward a finance plan to fund the required improvements. With implementation of this mitigation, project impacts would be reduced to less-than-significant.

Impact #2

The addition of project traffic during the PM peak hour increases the average delay at the Naglee Road/Pavilion Parkway intersection from 18 to over 80 seconds, shifting the level of service from LOS B to F. The City of Tracy level of service standard for this intersection is LOS D. This is considered a significant impact.

Analysis #2

Under Existing conditions, the Naglee Road/Pavilion Parkway intersection is signalized and operates at LOS B with an average delay of 18 seconds in the PM peak hour. Addition of the proposed project traffic increases the average intersection delay to over 80 seconds, degrading operations to LOS F.

Mitigation #2

Adding a second left turn lane on northbound Naglee Road and optimizing the signal timing reduces the average delay at this intersection to 52 seconds. This change in signal control mitigates the impact of the project, improving the service level to LOS D. The first development on the proposed project site (WinCo Foods or the Northern Parcel) will be responsible for the intersection improvement as a project traffic impact mitigation measure.

Implementation #2

The City of Tracy would be responsible for the intersection improvement and acquisition of right-of-way, both of which would be funded by the proposed project. With implementation of this mitigation, project impacts would be reduced to less-than-significant.

Impact #3

The addition of project traffic increases the average delay at the Grant Line Road/Corral Hollow Road intersection from 44 to over 80 seconds, shifting the level of service from LOS D to F. The City of Tracy level of service standard for this intersection is LOS C. This is considered a significant impact.

Analysis #3

Under Existing conditions, the Grant Line Road/Corral Hollow Road intersection is signalized and operates at LOS D with an average delay of 44 seconds during the PM peak hour, an unacceptable LOS D. However, addition of the proposed traffic increases the average delay to over 80 seconds, an unacceptable LOS F. Although the City of Tracy does not have a defined policy on determining what constitutes a project impact when an intersection is currently deficient, addition of over 36 seconds of delay caused by the project is typically considered to be a significant impact.

Mitigation #3

Creating an exclusive free-flow right-turn lane of 450 feet on eastbound Grant Line Road approaching the intersection with a receiving lane of 400 feet extending south from the intersection on Corral Hollow Road is recommended. Additional mitigations include changing the existing shared through-right to an exclusive through and free-flow right-turn of 300 feet on southbound Corral Hollow and a receiving lane extending west of the intersection along Grant Line of 400 feet, and adding a second left turn on westbound Grant Line. Optimizing the signal timing for Existing plus Project traffic volumes is also recommended. These mitigations are expected to reduce the average intersection delay to 34 seconds in the PM peak hour. The first development on the proposed project site (WinCo Foods or the Northern Parcel) will be responsible for the intersection improvement as a project traffic impact mitigation measure.

Implementation #3

The City of Tracy would be responsible for the intersection improvement and acquisition of right-of-way, both of which would be funded by the proposed project. With implementation of this mitigation, project impacts would be reduced to less-than-significant. The first development on the proposed project site (WinCo Foods or the Northern Parcel) will be responsible for the intersection improvement as a project traffic impact mitigation measure.

Impact #4

The addition of project traffic increases the volume on I-205. This is a potentially significant impact.

Analysis #4

I-205 through the City of Tracy currently operates at LOS F during the peak hour. The actual peak hour of I-205 occurs at 5:00 AM, before the normal AM peak period, and before the project is expected to generate trips. Within the 4:00-6:00 PM period, the project is estimated to increase the eastbound volume by up to 81 trips. This

represents about 2% of the total eastbound volume on the freeway during this time period, which is below the significance threshold of 5%. No mitigation is proposed since project impacts are less-than-significant.

CUMULATIVE PLUS PROJECT

This section describes the Cumulative plus Project intersection operations and proposed mitigation measures.

Intersection Operating Conditions

Cumulative plus Project traffic volumes were obtained by adding the trips generated by WinCo and the Northern Parcel to the Cumulative background traffic volumes. Using these volumes and the intersections with cumulative improvements identified in Table 8, AM and PM peak hour service levels for the study intersections were calculated.

Intersection operating conditions were analyzed for Cumulative plus Project traffic volumes. The calculated LOS for the study intersections is reported in Table 21 below. Under Cumulative plus Project conditions, the Grant Line Road / I-205 EB Ramps intersection operate at an unacceptable LOS E in both the AM and PM peak periods with an average intersection delay of 59 seconds and 66 seconds, respectively.

In addition, five intersections operate at unacceptable conditions in the PM peak hour:

- The Grant Line Road / Lammers Road intersection average delay increases to over 57 seconds (LOS E)
- The Grant Line Road / Naglee Road / I-205 WB On-Ramp intersection average delay would increase to 76 seconds (LOS E)
- The Naglee Road / Pavilion Parkway intersection average delay would increase to over 80 seconds (LOS F) dropping the I-205/Grant Line interchange below the City of Tracy standard of LOS D
- The Grant Line Road / Corral Hollow Road intersection delay increases to 42 seconds, an unacceptable LOS D
- The Eleventh Street/Corral Hollow Road intersection delay increases to 50 seconds (LOS D).

All other intersections would continue to operate at acceptable levels of service. Cumulative plus Project traffic volumes and lane configurations are shown on Figure 12.

As shown in Table 21, the Grant Line Road/I-205 EB Ramps intersection is deficient in both the AM and PM peak periods. Changing the eastbound right turn at Grant Line Road/I-205 EB Ramps to a free right-turn and optimizing the signal timing would decrease the average intersection delay to 53 seconds in the AM and 54 seconds in the PM, an acceptable LOS D.

In addition to the impact described above, project traffic requires mitigation at five intersections in the PM peak. During the PM peak, the intersection of Grant Line Road/ Lammers Road can be mitigated to 53 seconds of average delay (LOS D) by optimizing the signal timing. The Grant Line Road / Naglee Road / I-205 WB On-Ramp intersection can be mitigated to 51 seconds of average delay (LOS D) by making several alternations, including changing the existing shared through left to an exclusive left lane and an exclusive through lane on southbound Naglee Road, utilizing the second left turn lane on eastbound Grant Line Road that is currently hatched out, and optimizing signal timing. Similarly, by adding a second left turn lane from northbound Naglee Road to westbound Pavilion Parkway and optimizing the signal timing, the Naglee Road/Pavilion Parkway intersection can be mitigated to LOS D with an average of 47 seconds of delay. Detailed LOS worksheets for the Cumulative plus Project scenario can be found in Appendix C.

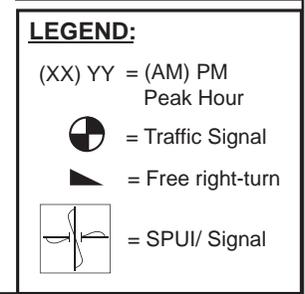
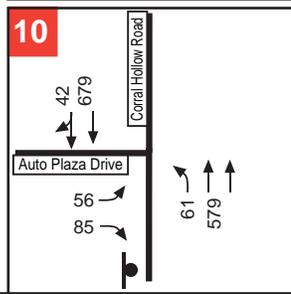
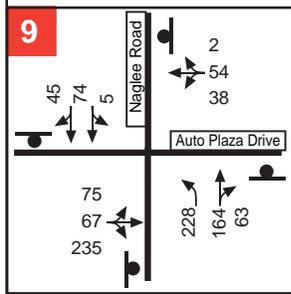
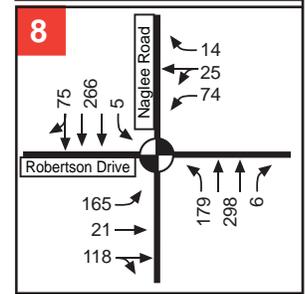
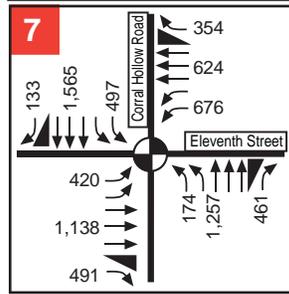
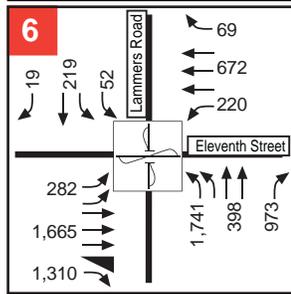
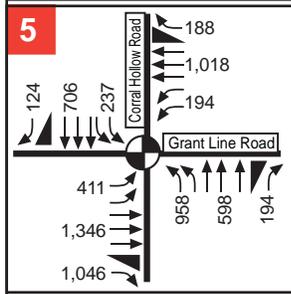
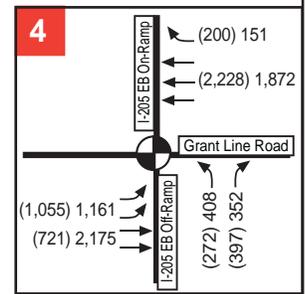
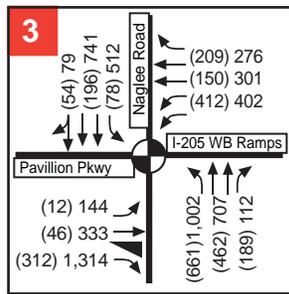
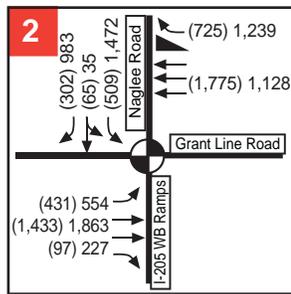
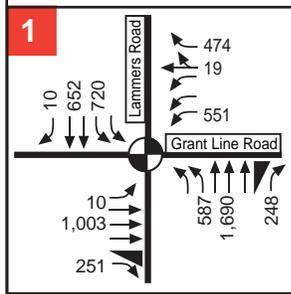
**TABLE 21
 CUMULATIVE PLUS WINCO/TRASK INTERSECTION TRAFFIC OPERATIONS**

Intersection	Traffic Control	AM Peak Hour		PM Peak Hour	
		Delay (seconds)	LOS	Delay (seconds)	LOS
1. Grant Line Road / Lammers Road	Signal ¹	n/a	n/a	57	E
2. Grant Line Road / Naglee Road / I-205 WB On-Ramp	Signal ¹	36	D	76	E
3. Naglee Road/Pavilion Parkway	Signal ¹	25	C	>80	F
4. Grant Line Road / I-205 EB Ramps	Signal ¹	59	E	66	E
5. Grant Line Road / Corral Hollow Road	Signal ¹	n/a	n/a	42	D
6. Eleventh Street / Lammers Road	SPUI ²	n/a	n/a	26	C
7A. Eleventh Street / Corral Hollow Road	Signal ¹	n/a	n/a	50	D
7B. Eleventh Street / Corral Hollow Road	SPUI ²	n/a	n/a	26	C
8. Robertson Drive / Naglee Road	Signal ¹	n/a	n/a	8	A
9. Auto Plaza Drive / Naglee Road	AWSC ³	n/a	n/a	13	B
10. Auto Plaza Drive/ Corral Hollow Road	SSSC ⁴	n/a	n/a	19 (EB) 2	C A

Note: **Bold** indicates intersection operating at deficient level of service. Significance criteria for County intersections (intersection 1) and City intersections within ¼ miles of interchange ramps (intersections 2 through 4) is LOS D. Significance criteria for City intersections (intersections 5 through 10) is LOS C.

1. Signalized intersection LOS based on weighted average control delay per vehicle, Highway Capacity Manual (Transportation Research Board, 2000).
2. Single-point urban interchange LOS based on weighted average control delay per vehicle, Highway Capacity Manual (Transportation Research Board, 2000).
3. All-way Stop-controlled intersection level of service is based on average control delay per vehicle (in seconds) according to the 2000 HCM.
4. Side-street stop intersection. Reported LOS based on control delay per vehicle for the worst approach and average delay per vehicle for the intersection.

Source: Fehr & Peers, 2005.



To fully mitigate the intersections of Corral Hollow Road/Grant Line Road and Corral Hollow Road/Eleventh Street, a grade separated urban intersection is required. Changing the at-grade intersection of Corral Hollow Road/Grant Line Road to single point urban interchange and signal with Grant Line over-crossing will reduce the average delay to 22 seconds, an acceptable LOS C. Changing the at-grade intersection of Corral Hollow Road/Eleventh Street to single point urban interchange and signal with Eleventh over-crossing will reduce the average delay to 26 seconds, an acceptable LOS C.

Although the Grant Line Road/I-205 interchange requires mitigation at all three study intersections in the PM peak and the Grant Line Road/I-205 EB Ramps intersection is deficient in both the AM and PM peak periods, implementing the next phase of the Grant Line Road/I-205 interchange will mitigate all three intersections. The next phase of the interchange consists of adding loop-ramps and re-aligning the interchange and local streets.

A summary of these configuration changes can be found on Figure 13 and are summarized in Table 22. Table 23 shows the intersection operating conditions with the recommended changes.

**TABLE 22
 CUMULATIVE PLUS WINCO-TRASK INTERSECTION MITIGATIONS**

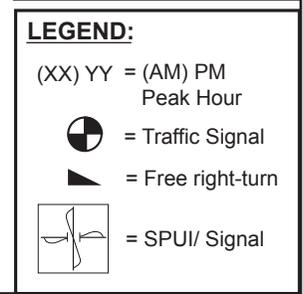
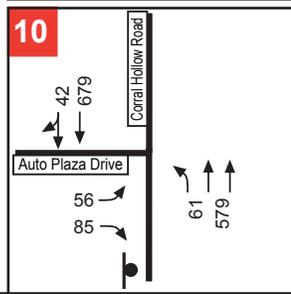
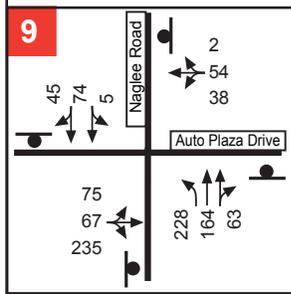
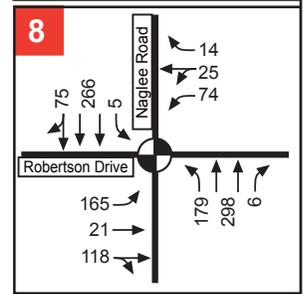
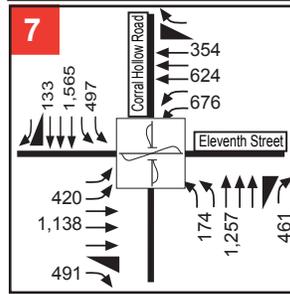
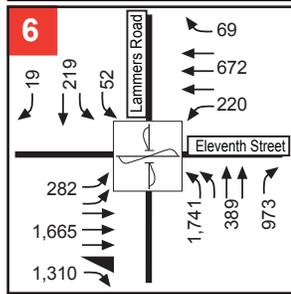
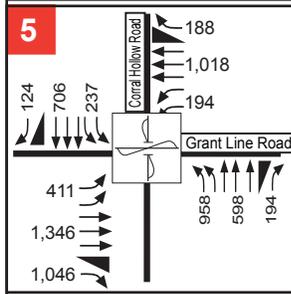
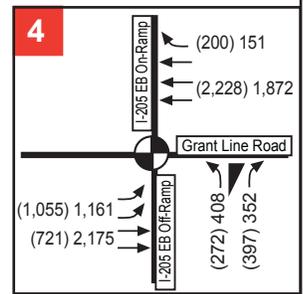
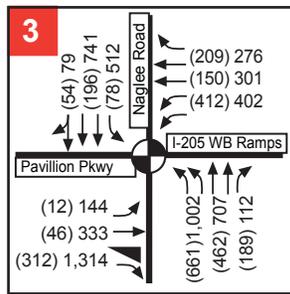
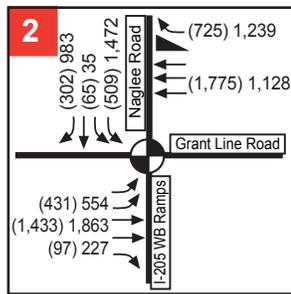
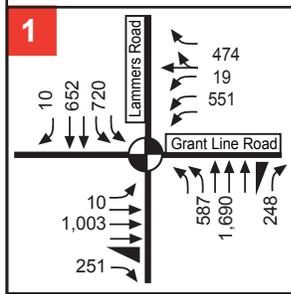
Location	Mitigation
1. Lammers Road / Grant Line Road	<ul style="list-style-type: none"> • Optimize signal timing.
2. Grant Line Road / Naglee Road / I-205 WB On-Ramp	<ul style="list-style-type: none"> • Change existing shared through left to exclusive left and through on southbound Naglee Road. • Utilize second left turn lane on eastbound Grant Line Road that is currently hatched out. • Optimize signal timing. <p>OR</p> <ul style="list-style-type: none"> • Implement next phase of Grant Line/I-205 Interchange.
3. Naglee Road / Pavilion Parkway	<ul style="list-style-type: none"> • Add second left turn lane on northbound Naglee Road. • Optimize signal timing. <p>OR</p> <ul style="list-style-type: none"> • Implement next phase of Grant Line/I-205 Interchange.
4. I-205 EB Ramps / Grant Line Road	<ul style="list-style-type: none"> • Change existing right lane to free right on I-205 EB off-ramp and receiving/acceleration lane of 400 feet on eastbound Grant Line Road. • Optimize signal timing. <p>OR</p> <ul style="list-style-type: none"> • Implement next phase of Grant Line/I-205 Interchange.
5. Corral Hollow Road / Grant Line Road	<p>The required Cumulative configuration for this intersection to be fully mitigated is a grade-separated urban intersection. This will involve the following modifications to the existing intersection:</p> <ul style="list-style-type: none"> • Change to single point urban interchange and signal with Grant Line over-crossing. • Optimize signal timing.
7. Corral Hollow Road / Eleventh Street	<p>The required Cumulative configuration for this intersection to be fully mitigated is a grade-separated urban intersection. This will involve the following modifications to the existing intersection:</p> <ul style="list-style-type: none"> • Change to single point urban interchange and signal with Eleventh Street over-crossing. • Optimize signal timing.

Source: Fehr & Peers, 2005.

**TABLE 23
 CUMULATIVE PLUS WINCO/TRASK MITIGATED INTERSECTION TRAFFIC OPERATIONS**

Intersection	Traffic Control	Unmitigated				Mitigated			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
1. Lammers Road/Grant Line Road	Signal	n/a	n/a	57	E	n/a	n/a	53	D
2. Grant Line Road / Naglee Road / I-205 WB On-Ramp	Signal	36	D	76	E	17	B	51	D
3. Naglee Road/Pavilion Parkway	Signal	25	C	>80	F	19	B	47	D
4. I-205 EB Ramps/Grant Line Road	Signal	59	E	66	E	53	D	54	D
5. Corral Hollow Road/Grant Line Road	Signal/ SPUI	n/a	n/a	42	D	n/a	n/a	22	C
7. Corral Hollow Road/Eleventh Street	Signal/ SPUI	n/a	n/a	50	D	n/a	n/a	26	C

Source: Fehr & Peers, 2005.



Cumulative Project Impacts and Mitigations

Impact #5

The addition of Project traffic, along with other Cumulative development traffic, results in unacceptable operations at seven of the ten study intersections with existing intersection geometries. The project will add traffic to two study intersections that are currently not constructed, one of which is replacing an existing study intersection.

Analysis #5

As citywide development occurs, implementation of components of the City of Tracy Roadway Master Plan will be necessary to maintain acceptable operations. The proposed project, as part of Cumulative development, would generate a portion of the traffic increase that causes LOS to degrade to unacceptable operations. The improvements listed in Table 8 above would be required to improve the intersection operations to acceptable standards.

Mitigation #5

To mitigate Cumulative impacts, the proposed project would be responsible for participating in and funding a Roadway Finance and Implementation Plan to determine its fair share of required improvements.

Implementation #5

The City of Tracy would be responsible for determining fair-share responsibilities and administering the Finance and Implementation Plan for intersections within its jurisdiction, and the project would be responsible for funding the Finance and Implementation Plan. The County of San Joaquin would be responsible for construction of the intersection improvements within its jurisdiction.

Impact #6

The addition of project traffic increases the average delay at the Lammers Road/Grant Line Road intersection from 54 to 57 seconds, resulting in an unacceptable LOS E. This is considered a significant impact.

Analysis #6

In the Cumulative no Project scenario, the Lammers Road/Grant Line Road intersection is projected to operate at LOS D with an average delay of 54 seconds. The County level of service threshold is LOS D. The addition of project traffic adds 3 seconds of delay, causing the intersection operations to degrade to LOS E. Optimizing the signal timing reduces the intersection delay to 53 seconds, an acceptable LOS D.

Mitigation #6

To mitigate the projects impacts, the signal timing should be optimized for the Cumulative plus Project traffic.

Implementation #6

The County would be responsible for modifying the signal timing. With implementation of this mitigation, project impacts would be reduced to less-than-significant.

Impact #7

The addition of Project traffic results in unacceptable operations at the Grant Line Road / Naglee Road / I-205 WB On-Ramp intersection, increasing the delay from 39 seconds (LOS D) to 76 seconds (LOS E). This is a significant project impact.

Analysis #7

In the Cumulative no Project scenario, the Grant Line Road / Naglee Road / I-205 WB On-Ramp intersection is projected to operate at LOS D with an average delay of 39 seconds. The addition of project traffic increases the average delay at the intersection to 76 seconds, reducing the LOS to E. Several modifications, including changing the existing shared through-left to one exclusive left and one exclusive through on southbound Naglee, utilizing the second eastbound left turn lane on Grant Line Road that is currently hatched out, and optimizing the signal timing would decrease the average intersection delay from an unacceptable 76 seconds, to an acceptable 51 seconds (LOS D).

Mitigation #7

Changing the existing shared through-left to one exclusive left and one exclusive through on southbound Naglee, utilizing the second eastbound left turn lane on Grant Line Road that is currently hatched out, and optimizing the signal timing will fully mitigate this impact.

Implementation #7

The City of Tracy would be responsible for the intersection improvement and acquisition of right-of-way, both of which would be funded by the proposed project. With implementation of this mitigation, project impacts would be reduced to less-than-significant.

Impact #8

The addition of Project traffic results in unacceptable operations at the Naglee Road/Pavilion Parkway intersection, increasing the delay from 48 seconds (LOS D) to over 80 seconds (LOS F). This is a significant project impact.

Analysis #8

In the Cumulative no Project scenario, Naglee Road/Pavilion Parkway intersection is projected to operate at LOS D with an average delay of 48 seconds. The addition of project traffic increases the average delay at the intersection to over 80 seconds, reducing the LOS to F. Adding a second left turn lane on northbound Naglee Road and optimizing the signal timing would decrease the average intersection delay to an acceptable 47 seconds (LOS D).

Mitigation #8

Add a second left turn lane from northbound Naglee Road to westbound Pavilion Parkway and optimize signal timing.

Implementation #8

The City of Tracy would be responsible for the intersection improvement and acquisition of right-of-way, both of which would be funded by the proposed project. With implementation of this mitigation, project impacts would be reduced to less-than-significant.

Impact #9

The addition of Project traffic results in unacceptable operations at the Grant Line Road/I-205 EB Ramps intersection, increasing the delay from 51 seconds (LOS D) to 66 seconds (LOS E). This is a significant project impact.

Analysis #9

In the Cumulative no Project scenario, the Grant Line Road/I-205 EB Ramps intersection is projected to operate at LOS D with an average delay of 51 seconds. The addition of project traffic increases the average delay at the Grant Line Road/I-205 EB Ramps intersection by 15 seconds to 66 seconds, reducing the LOS to E. Changing the existing right turn lane to a free right on I-205 eastbound off-ramp with a receiving/acceleration lane of 400 feet on eastbound Grant Line Road and optimizing the signal timing would decrease the average intersection delay from an unacceptable 66 seconds, to an acceptable 54 seconds (LOS D).

Mitigation #9

Change the existing right turn lane to a free right on I-205 eastbound off-ramp with a receiving/acceleration lane of 400 feet on eastbound Grant Line Road and optimizing the signal timing.

Implementation #9

The City of Tracy would be responsible for the intersection improvement and acquisition of right-of-way, both of which would be funded by the proposed project. With implementation of this mitigation, project impacts would be reduced to less-than-significant.

Impact #10

The addition of project traffic results in unacceptable operations at all three intersections of the Grant Line Road/I-205 interchange. This is considered a significant project impact.

Analysis #10

Instead of implementing Mitigation #7 through Mitigation #9, implementing the next phase of the Grant Line/I-205 interchange would result in acceptable operations at all three intersections. The next phase of the interchange consists of the following:

- Adding loop ramps to the interchange
- Re-aligning the interchange

Mitigation #10

Implement the next phase of the Grant Line/I-205 interchange improvements.

Implementation #10

The City of Tracy would be responsible for the interchange improvement and acquisition of right-of-way, both of which the proposed project would fund its fair share. The City of Tracy would be responsible for determining fair-share responsibilities and administering the Finance and Implementation Plan for intersections within its jurisdiction, and the project would be responsible for funding the Finance and Implementation Plan. With implementation of this mitigation, project impacts would be reduced to less-than-significant.

Impact #11

The addition of project traffic increases the average delay at the Grant Line Road/Corral Hollow Road intersection from 35 to 42 seconds, degrading operations to LOS D. The City of Tracy level of service standard for this intersection is LOS C. This is considered a significant impact.

Analysis #11

In the Cumulative no Project scenario, the Grant Line Road/Corral Hollow Road intersection is signalized and operates at an acceptable LOS C/D with an average delay of 35 seconds in the PM. However, addition of the proposed project traffic would increase the average delay to 42 seconds, degrading the operations to unacceptable LOS D. By grade separation of Grant Line Road, the average delay would be reduced to an acceptable 22 seconds.

Mitigation #11

To mitigate the projects impacts, a single-point urban interchange (SPUI) is recommended, with the through traffic being grade separated to allow for free-flow along Grant Line Road.

Implementation #11

The City of Tracy would be responsible for the intersection improvement and acquisition of right-of-way, both of which the proposed project would fund its fair share. The City of Tracy would be responsible for determining fair-share responsibilities and administering the Finance and Implementation Plan for intersections within its jurisdiction, and the project would be responsible for funding the Finance and Implementation Plan. With implementation of this mitigation, project impacts would be reduced to less-than-significant.

Impact #12

The addition of project traffic to Eleventh Street/Corral Hollow Road intersection in the Cumulative plus Project scenario will add traffic to an already deficient intersection. The additional traffic will add 3 seconds of delay to the intersection.

Analysis #12

With the addition of project traffic, the delay at the Eleventh Street/Corral Hollow Road intersection is projected to increase from 47 seconds to 50 seconds, but the level of service will remain LOS D. Although the City does not have a policy on determining what constitutes a project impact when an intersection is currently deficient, the

additional 3 seconds of delay caused by the project may be considered to be a significant impact. By grade separation of Eleventh Street, the average delay is reduced to an acceptable 26 seconds.

Mitigation #12

To mitigate the projects impacts, a single-point urban interchange (SPUI) is recommended, with the through traffic being grade separated allowing for free-flow along Eleventh Street.

Implementation #12

The City of Tracy would be responsible for the intersection improvement and acquisition of right-of-way, both of which the proposed project would fund its fair share. The City of Tracy would be responsible for determining fair-share responsibilities and administering the Finance and Implementation Plan for intersections within its jurisdiction, and the project would be responsible for funding the Finance and Implementation Plan. With implementation of this mitigation, project impacts would be reduced to less-than-significant.

Impact #13

The addition of project traffic increases the volume on I-205. This is a potentially significant impact.

Analysis #13

I-205 through the City of Tracy is expected to operate at LOS F during the peak hour. Currently, the actual peak hour of I-205 occurs at 5:00 AM, before the normal AM peak period, and before the project is expected to generate trips. Within the 4:00-6:00 PM period, the project is estimated to increase the eastbound volume by up to 36 trips. This represents less than 1% of the total eastbound volume on the freeway during this time period, which is below the significance threshold of 5%. No mitigation is proposed, as project impacts are less-than-significant.

**APPENDIX A:
TRAFFIC COUNTS**

Start Time	NAGLEE RD. Southbound				GRANT LINE RD. Westbound				I-205 E/B ON-RAMP Northbound				Eastbound				Total
	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	
7:00am	41	20	95	156	0	81	52	133	0	0	0	0	16	68	22	106	395
7:15	48	17	80	145	0	107	72	179	0	0	0	0	17	75	28	120	444
7:30	63	13	48	124	0	116	78	194	0	0	0	0	24	78	16	118	436
7:45	79	15	61	155	1	98	80	179	0	0	0	0	18	115	15	148	482
Hour Total	231	65	284	580	1	402	282	685	0	0	0	0	75	336	81	492	1757
8:00am	64	17	65	146	0	119	117	236	0	0	0	0	29	97	20	146	528
8:15	84	19	57	160	1	150	89	240	0	0	0	0	45	87	22	154	554
8:30	75	15	59	149	0	127	91	218	0	0	0	0	29	92	26	147	514
8:45	95	14	69	178	2	103	60	165	0	0	0	0	35	99	18	152	495
Hour Total	318	65	250	633	3	499	357	859	0	0	0	0	138	375	86	599	2091
Grand	549	130	534	1213	4	901	639	1544	0	0	0	0	213	711	167	1091	3848
% of Total	14.3%	3.4%	13.9%		.1%	23.4%	16.6%		0.0%	0.0%	0.0%		5.5%	18.5%	4.3%		
Approch %				31.5%				40.1%									28.4%
% of Approch	45.3%	10.7%	44.0%		.3%	58.4%	41.4%		0.0%	0.0%	0.0%		19.5%	65.2%	15.3%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 05/26/05

Direction	Street Name	Start	Peak Hr	..... Volumes .....				..... Percentages		
		Peak Hour	Factor	Left	Thru	Right	Total	Left	Thru	Right
Southbound	NAGLEE RD.	08:00am	.889	318	65	250	633	50.2	10.2	39.4
Westbound	GRANT LINE RD.		.895	3	499	357	859	.3	58.0	41.5
Northbound	I-205 E/B ON-RAMP		.0	0	0	0	0	0.0	0.0	0.0
Eastbound			.972	138	375	86	599	23.0	62.6	14.3

NAGLEE RD.		
250	65	318
		138
		0
		357
		====
		495
Inbound		633
Outbound		495
Total		1128

357

	0
749	499
	250

138

499

Inbound	599
Outbound	749
Total	1348

86

Inbound	859
Outbound	693
Total	1552

318

375

693

0

GRANT LINE RD.

Inbound	0
Outbound	154
Total	154

0

3

65

86

====

154

I-205 E/B ON-RAMP

0

Start Time	NAGLEE RD. Southbound				I-205 W/B OFF-RAMP Westbound				Northbound				PAVILLION PKWY. Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
7:00am	5	18	0	23	126	6	11	143	3	14	43	60	0	2	5	7	233
7:15	3	20	0	23	106	11	11	128	5	16	56	77	2	1	3	6	234
7:30	4	19	1	24	85	5	16	106	5	23	53	81	0	2	3	5	216
7:45	5	26	1	32	116	17	21	154	7	29	53	89	0	0	3	3	278
Hour Total	17	83	2	102	433	39	59	531	20	82	205	307	2	5	14	21	961
8:00am	5	34	1	40	97	15	16	128	15	35	66	116	1	3	9	13	297
8:15	3	35	1	39	104	6	21	131	11	34	56	101	2	0	5	7	278
8:30	7	26	2	35	93	12	26	131	6	34	37	77	2	1	6	9	252
8:45	6	29	1	36	109	8	27	144	11	48	30	89	5	1	9	15	284
Hour Total	21	124	5	150	403	41	90	534	43	151	189	383	10	5	29	44	1111
Grand	38	207	7	252	836	80	149	1065	63	233	394	690	12	10	43	65	2072
% of Total	1.8%	10.0%	.3%	12.2%	40.3%	3.9%	7.2%	51.4%	3.0%	11.2%	19.0%	33.3%	.6%	.5%	2.1%	3.1%	
Apprch %	15.1%	82.1%	2.8%		78.5%	7.5%	14.0%		9.1%	33.8%	57.1%		18.5%	15.4%	66.2%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 05/26/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	..... Volumes .....				..... Percentages		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	NAGLEE RD.	08:00am	.938	21	124	5	150	14.0	82.6	3.3
Westbound	I-205 W/B OFF-RAMP		.927	403	41	90	534	75.4	7.6	16.8
Northbound			.825	43	151	189	383	11.2	39.4	49.3
Eastbound	PAVILLION PKWY.		.733	10	5	29	44	22.7	11.3	65.9

PAVILLION PKWY.	
43	
89	41
	5
<hr/>	
10	

NAGLEE RD.	
5	124
	21
	10
	151
	90
	=====
	251
Inbound	150
Outbound	251
Total	401

90	
<hr/>	
41	

Inbound	44
Outbound	89
5	Total 133
<hr/>	
29	

Inbound	534
Outbound	215
Total	749

29	
----	--

Inbound	383
Outbound	556
Total	939
403	43
124	151
29	
=====	
556	

21
5
189
215
I-205 W/B OFF-RAMP
189

Start Time	I-205 E/B ON-RAMP Southbound				GRANTLINE RD. Westbound				I-205 E/B OFF-RAMP Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
7:00am	0	0	0	0	0	157	48	205	9	0	27	36	61	57	0	118	359
7:15	0	0	0	0	0	153	59	212	15	0	37	52	59	66	0	125	389
7:30	0	0	0	0	0	189	56	245	11	0	38	49	42	94	0	136	430
7:45	0	0	0	0	0	177	51	228	19	0	36	55	70	123	0	193	476
Hour Total	0	0	0	0	0	676	214	890	54	0	138	192	232	340	0	572	1654
8:00am	0	0	0	0	0	223	61	284	14	0	32	46	60	102	0	162	492
8:15	0	0	0	0	0	249	54	303	15	0	30	45	58	118	0	176	525
8:30	0	0	0	0	0	221	34	255	16	0	34	50	50	113	0	163	468
8:45	0	0	0	0	0	152	40	192	23	0	36	59	58	126	0	184	435
Hour Total	0	0	0	0	0	845	189	1034	69	0	132	201	226	459	0	685	1920
Grand	0	0	0	0	0	1521	403	1924	123	0	270	393	458	799	0	1257	3574
% of Total	0.0%	0.0%	0.0%		0.0%	42.6%	11.3%		3.4%	0.0%	7.6%		12.8%	22.4%	0.0%		
Approch %							53.8%				11.0%					35.2%	
% of Apprch	0.0%	0.0%	0.0%		0.0%	79.1%	20.9%		31.3%	0.0%	68.7%		36.4%	63.6%	0.0%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 05/26/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes				Percentages		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	I-205 E/B ON-RAMP	07:45am	.0	0	0	0	0	0.0	0.0	0.0
Westbound	GRANTLINE RD.		.883	0	870	200	1070	.0	81.3	18.6
Northbound	I-205 E/B OFF-RAMP		.895	65	0	132	197	32.9	.0	67.0
Eastbound			.899	238	456	0	694	34.2	65.7	.0

Start Time	BYRON RD. Southbound				GRANT LINE RD. Westbound				Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00pm	125	48	0	173	44	0	62	106	0	22	85	107	0	0	0	0	386
4:15	125	48	0	173	47	0	63	110	0	14	66	80	0	0	0	0	363
4:30	108	43	0	151	57	0	60	117	0	21	93	114	0	0	0	0	382
4:45	113	24	0	137	39	0	63	102	0	22	80	102	0	0	0	0	341
Hour Total	471	163	0	634	187	0	248	435	0	79	324	403	0	0	0	0	1472
5:00pm	112	59	0	171	48	0	67	115	0	19	78	97	0	0	0	0	383
5:15	91	46	0	137	75	0	74	149	0	21	77	98	0	0	0	0	384
5:30	117	49	0	166	66	0	67	133	0	12	91	103	0	0	0	0	402
5:45	136	42	0	178	49	0	50	99	0	16	69	85	0	0	0	0	362
Hour Total	456	196	0	652	238	0	258	496	0	68	315	383	0	0	0	0	1531
Grand	927	359	0	1286	425	0	506	931	0	147	639	786	0	0	0	0	3003
% of Total	30.9%	12.0%	0.0%		14.2%	0.0%	16.8%		0.0%	4.9%	21.3%		0.0%	0.0%	0.0%		
Approch %				42.8%				31.0%				26.2%					
% of Approach	72.1%	27.9%	0.0%		45.6%	0.0%	54.4%		0.0%	18.7%	81.3%		0.0%	0.0%	0.0%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 05/26/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	..... Volumes .....				..... Percentages		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	BYRON RD.	05:00pm	.916	456	196	0	652	69.9	30.0	.0
Westbound	GRANT LINE RD.		.832	238	0	258	496	47.9	.0	52.0
Northbound			.930	0	68	315	383	.0	17.7	82.2
Eastbound			.0	0	0	0	0	0.0	0.0	0.0

BYRON RD.

0	196	456	0
			68
			258
			====
			326
Inbound		652	
Outbound		326	
Total		978	

258

0	0
0	0
0	0

0

Inbound	0
Outbound	0
Total	0

Inbound	496	
Outbound	771	238
Total	1267	

0

456	
0	771
315	

GRANT LINE RD.

Inbound	383
Outbound	434
Total	817

238	0	68
196		
0		
====		
434		

315

Start Time	NAGLEE RD. Southbound				GRANT LINE RD. Westbound				I-205 E/B ON-RAMP Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00pm	160	6	107	273	0	139	93	232	0	0	0	0	58	261	16	335	840
4:15	131	8	112	251	0	155	99	254	0	0	0	0	94	270	15	379	884
4:30	157	11	110	278	0	145	115	260	0	0	0	0	78	244	8	330	868
4:45	150	10	121	281	0	151	92	243	0	0	0	0	78	232	22	332	856
Hour Total	598	35	450	1083	0	590	399	989	0	0	0	0	308	1007	61	1376	3448
5:00pm	147	7	100	254	0	145	91	236	0	0	0	0	96	239	20	355	845
5:15	132	7	139	278	0	171	120	291	0	0	0	0	70	242	19	331	900
5:30	158	11	132	301	0	138	95	233	0	0	0	0	85	256	14	355	889
5:45	154	7	113	274	0	91	105	196	0	0	0	0	91	234	8	333	803
Hour Total	591	32	484	1107	0	545	411	956	0	0	0	0	342	971	61	1374	3437
Grand	1189	67	934	2190	0	1135	810	1945	0	0	0	0	650	1978	122	2750	6885
% of Total	17.3%	1.0%	13.6%		0.0%	16.5%	11.8%		0.0%	0.0%	0.0%		9.4%	28.7%	1.8%		
Apprch %				31.8%				28.2%									39.9%
% of Apprch	54.3%	3.1%	42.6%		0.0%	58.4%	41.6%		0.0%	0.0%	0.0%		23.6%	71.9%	4.4%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 05/26/05

Direction	Street Name	Start	Peak Hr	..... Volumes .....				..... Percentages		
		Peak Hour	Factor	Left	Thru	Right	Total	Left	Thru	Right
Southbound	NAGLEE RD.	04:45pm	.925	587	35	492	1114	52.6	3.1	44.1
Westbound	GRANT LINE RD.		.862	0	605	398	1003	.0	60.3	39.6
Northbound	I-205 E/B ON-RAMP		.0	0	0	0	0	0.0	0.0	0.0
Eastbound			.967	329	969	75	1373	23.9	70.5	5.4

NAGLEE RD.		
492	35	587
		329
		0
		398
		=====
		727
Inbound		1114
Outbound		727
Total		1841

398

	0
1097	605
	492

329

605

Inbound	1373
Outbound	1097
969	Total 2470

75

Inbound	1003
Outbound	1556
	0
Total	2559

587

969 1556

0

GRANT LINE RD.

Inbound	0
Outbound	110
Total	110
0	0
35	
75	
=====	
110	
I-205 E/B	ON-RAMP

Start Time	NAGLEE RD. Southbound				I-205 W/B OFF-RAMP Westbound				Northbound				PAVILLION PKWY. Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00pm	13	93	6	112	92	4	45	141	8	99	27	134	8	3	17	28	415
4:15	9	101	0	110	83	9	34	126	9	96	29	134	3	0	8	11	381
4:30	19	105	2	126	102	7	38	147	12	104	28	144	1	1	17	19	436
4:45	17	106	4	127	85	1	29	115	14	91	21	126	4	4	17	25	393
Hour Total	58	405	12	475	362	21	146	529	43	390	105	538	16	8	59	83	1625
5:00pm	7	105	1	113	96	5	43	144	5	105	27	137	9	0	16	25	419
5:15	10	107	4	121	100	11	38	149	10	129	36	175	7	0	15	22	467
5:30	6	101	1	108	104	5	30	139	9	109	22	140	3	2	14	19	406
5:45	11	98	5	114	97	7	34	138	6	118	26	150	5	3	12	20	422
Hour Total	34	411	11	456	397	28	145	570	30	461	111	602	24	5	57	86	1714
Grand	92	816	23	931	759	49	291	1099	73	851	216	1140	40	13	116	169	3339
% of Total	2.8%	24.4%	.7%		22.7%	1.5%	8.7%		2.2%	25.5%	6.5%		1.2%	.4%	3.5%		
Approch %				27.9%				32.9%				34.1%					5.1%
% of Approch	9.9%	87.6%	2.5%		69.1%	4.5%	26.5%		6.4%	74.6%	18.9%		23.7%	7.7%	68.6%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 05/26/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes				Percentages		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	NAGLEE RD.	04:30pm	.959	53	423	11	487	10.8	86.8	2.2
Westbound	I-205 W/B OFF-RAMP		.931	383	24	148	555	69.0	4.3	26.6
Northbound			.831	41	429	112	582	7.0	73.7	19.2
Eastbound	PAVILLION PKWY.		.910	21	5	65	91	23.0	5.4	71.4

NAGLEE RD.	
11	423
	53
	21
	429
	148
	=====
	598
Inbound	487
Outbound	598
Total	1085

PAVILLION PKWY.

	41
76	24
	11

21

Inbound	91
Outbound	76
5 Total	167

65

Inbound	582
Outbound	871
Total	1453
383	41
423	429
65	
=====	
871	

112

I-205 W/B OFF-RAMP

53
5
170
112

Inbound	555
Outbound	170
Total	725

148

24

Start Time	I-205 E/B ON-RAMP Southbound				GRANTLINE RD. Westbound				I-205 E/B OFF-RAMP Northbound				Eastbound				Total
	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	
4:00pm	0	0	0	0	0	227	28	255	37	0	85	122	99	314	0	413	790
4:15	0	0	0	0	0	177	34	211	44	0	82	126	88	264	0	352	689
4:30	0	0	0	0	0	190	32	222	46	0	101	147	89	274	0	363	732
4:45	0	0	0	0	0	199	39	238	32	0	95	127	102	305	0	407	772
Hour Total	0	0	0	0	0	793	133	926	159	0	363	522	378	1157	0	1535	2983
5:00pm	0	0	0	0	0	199	45	244	38	0	73	111	96	297	0	383	738
5:15	0	0	0	0	0	183	33	216	43	0	105	148	92	319	0	411	775
5:30	0	0	0	0	0	213	34	247	25	0	82	107	102	293	0	395	749
5:45	0	0	0	0	0	174	26	200	39	0	88	127	103	258	0	361	688
Hour Total	0	0	0	0	0	769	138	907	145	0	348	493	363	1167	0	1550	2950
Grand	0	0	0	0	0	1562	271	1833	304	0	711	1015	761	2324	0	3085	5933
% of Total	0.0%	0.0%	0.0%		0.0%	26.3%	4.6%		5.1%	0.0%	12.0%		12.8%	39.2%	0.0%		
Approch %								30.9%				17.1%				52.0%	
% of Approch	0.0%	0.0%	0.0%		0.0%	85.2%	14.8%		30.0%	0.0%	70.0%		24.7%	75.3%	0.0%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 05/25/05

Direction	Street Name	Start	Peak Hr	Volumes				Percentages		
		Peak Hour	Factor	Left	Thru	Rght	Total	Left	Thru	Rght
Southbound	I-205 E/B ON-RAMP	04:45pm	.0	0	0	0	0	0.0	0.0	0.0
Westbound	GRANTLINE RD.		.956	0	794	151	945	.0	84.0	15.9
Northbound	I-205 E/B OFF-RAMP		.833	138	0	355	493	27.9	.0	72.0
Eastbound			.971	382	1214	0	1596	23.9	76.0	.0

I-205 E/B ON-RAMP

0	0	0	382
			0
			151
			=====
			533
	Inbound	0	
	Outbound	533	
	Total	533	

151

	138
932	794
	0

382

794

	Inbound	1596
	Outbound	932
1214	Total	2528

	Inbound	945	
	Outbound	1569	0
	Total	2514	

0

	0	
	1214	1569
	355	

GRANTLINE RD.

	Inbound	493
	Outbound	0
	Total	493

0	138	0	355
0			
0			
0			
=====			
0			

I-205 E/B OFF-RAMP

Start Time	CORRAL HOLLOW RD. Southbound				GRANT LINE RD. Westbound				Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00pm	47	55	8	110	64	98	18	180	102	85	58	245	38	185	96	319	854
4:15	41	64	12	117	39	81	17	137	76	88	61	225	23	149	94	266	745
4:30	35	67	13	115	59	71	6	136	96	74	44	214	13	162	86	261	726
4:45	38	62	19	119	63	102	12	177	106	81	51	238	20	181	110	311	845
Hour Total	161	248	52	461	225	352	53	630	380	328	214	922	94	677	386	1157	3170
5:00pm	36	83	13	132	41	87	9	137	74	92	52	218	30	160	124	314	801
5:15	25	58	15	98	39	90	5	134	93	79	38	210	23	230	186	439	881
5:30	26	55	13	94	51	69	10	130	101	60	53	214	26	200	173	399	837
5:45	34	80	7	121	50	75	1	126	89	99	55	243	41	142	127	310	800
Hour Total	121	276	48	445	181	321	25	527	357	330	198	885	120	732	610	1462	3319
Grand	282	524	100	906	406	673	78	1157	737	658	412	1807	214	1409	996	2619	6489
% of Total	4.3%	8.1%	1.5%		6.3%	10.4%	1.2%		11.4%	10.1%	6.3%		3.3%	21.7%	15.3%		
Apprch %				14.0%				17.8%				27.8%					40.4%
% of Apprch	31.1%	57.8%	11.0%		35.1%	58.2%	6.7%		40.8%	36.4%	22.8%		8.2%	53.8%	38.0%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 05/25/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	..... Volumes .....				..... Percentages		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	CORRAL HOLLOW RD.	04:45pm	.839	125	258	50	443	28.2	58.2	13.5
Westbound	GRANT LINE RD.		.816	194	348	36	578	33.5	60.2	6.2
Northbound			.924	374	312	194	880	42.5	35.4	22.0
Eastbound			.833	99	771	593	1463	6.7	52.6	40.5

CORRAL HOLLOW RD.

60	258	125	99
			312
			36
			====
			447
	Inbound	443	
	Outbound	447	
	Total	890	

36

	374
782	348
	60

99

348

	Inbound	1463
	Outbound	782
771	Total	2245

593

	Inbound	578
	Outbound	1090 194
	Total	1668

	125
	771 1090
	194

	Inbound	880
	Outbound	1045
	Total	1925

GRANT LINE RD.

194	374	312	194
258			
593			
====			
1045			

Start Time	LAMMERS RD. Southbound				11TH ST. Westbound				Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00pm	14	13	4	31	14	82	26	122	4	25	25	54	44	292	9	345	552
4:15	14	18	4	36	16	94	24	134	11	20	30	61	61	304	18	383	614
4:30	14	17	9	40	11	79	16	106	8	18	21	47	48	342	12	402	595
4:45	12	11	5	28	10	82	18	110	11	27	30	68	57	354	10	421	627
Hour Total	54	59	22	135	51	337	84	472	34	90	106	230	210	1292	49	1551	2388
5:00pm	9	14	4	27	18	94	21	133	8	19	39	66	43	359	26	428	654
5:15	14	25	4	43	21	77	14	112	9	26	33	68	36	407	24	467	690
5:30	19	29	6	54	14	68	18	100	4	19	38	61	42	438	23	503	718
5:45	10	24	5	39	12	82	16	110	6	15	25	46	49	461	16	526	721
Hour Total	52	92	19	163	65	321	69	455	27	79	135	241	170	1665	89	1924	2783
Grand	106	151	41	298	116	658	153	927	61	169	241	471	380	2957	138	3475	5171
% of Total	2.0%	2.9%	.8%		2.2%	12.7%	3.0%		1.2%	3.3%	4.7%		7.3%	57.2%	2.7%		
Approch %				5.8%				17.9%				9.1%				67.2%	
% of Approch	35.6%	50.7%	13.8%		12.5%	71.0%	16.5%		13.0%	35.9%	51.2%		10.9%	85.1%	4.0%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 05/26/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	..... Volumes .....				..... Percentages		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	LAMMERS RD.	05:00pm	.755	52	92	19	163	31.9	56.4	11.6
Westbound	11TH ST.		.855	65	321	69	455	14.2	70.5	15.1
Northbound			.886	27	79	135	241	11.2	32.7	56.0
Eastbound			.914	170	1665	89	1924	8.8	86.5	4.6

LAMMERS RD.			
19	92	52	170
			79
			69
			===== 318
	Inbound	163	
	Outbound	318	
	Total	481	

	27
367	321
	19
=====	
	170

	69
=====	
	321

	Inbound	1924
	Outbound	367
1665	Total	2291
=====		
		89

	Inbound	455	
	Outbound	1852	65
	Total	2307	
=====			

	52	
	1665	1852
	135	
=====		

	Inbound	241		
	Outbound	246		
	Total	487		
65		27	79	135
92				
89				
	===== 246			

	52	
	1665	1852
	135	
=====		
		11TH ST.

Start Time	CORRAL HOLLOW RD. Southbound				ELEVENTH ST. Westbound				Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00pm	53	126	16	195	62	83	66	211	62	157	24	243	82	179	75	336	985
4:15	50	117	11	178	69	103	68	240	70	167	20	257	95	195	79	369	1044
4:30	65	148	36	249	73	92	61	216	57	165	27	249	71	204	94	369	1083
4:45	78	184	31	293	70	81	77	228	61	188	33	282	88	186	102	376	1179
Hour Total	246	575	94	915	274	349	272	895	250	677	104	1031	336	764	350	1450	4291
5:00pm	69	167	41	277	54	100	64	218	42	140	33	215	79	195	106	380	1090
5:15	94	154	19	267	65	100	70	235	42	202	33	277	92	234	130	456	1235
5:30	91	160	18	269	70	85	59	214	41	144	34	219	105	231	124	460	1162
5:45	76	147	20	243	50	84	86	220	39	181	35	255	125	244	131	500	1218
Hour Total	330	628	98	1056	239	369	279	887	164	667	135	966	401	904	491	1796	4705
Grand	576	1203	192	1971	513	718	551	1782	414	1344	239	1997	737	1668	841	3246	8996
% of Total	6.4%	13.4%	2.1%		5.7%	8.0%	6.1%		4.6%	14.9%	2.7%		8.2%	18.5%	9.3%		
Approch %				21.9%				19.8%				22.2%					36.1%
% of Approch	29.2%	61.0%	9.7%		28.8%	40.3%	30.9%		20.7%	67.3%	12.0%		22.7%	51.4%	25.9%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 05/25/05

Direction	Street Name	Start Peak Hour	Peak Hr Factor	..... Volumes .....				..... Percentages		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	CORRAL HOLLOW RD.	05:00pm	.953	330	628	98	1056	31.2	59.4	9.2
Westbound	ELEVENTH ST.		.944	239	369	279	887	26.9	41.6	31.4
Northbound			.872	164	667	135	966	16.9	69.0	13.9
Eastbound			.898	401	904	491	1796	22.3	50.3	27.3

CORRAL HOLLOW RD.

98	628	330	401
			667
			279
			=====
			1347
	Inbound	1056	
	Outbound	1347	
	Total	2403	

279

	164
631	369
	98

401

369

	Inbound	1796
	Outbound	631
904	Total	2427

491

	Inbound	887
	Outbound	1369
	Total	2256

	330
	904
	1369
	135

ELEVENTH ST.

	Inbound	966
	Outbound	1358
	Total	2324

135

239	164	667
628		
491		
=====		
1358		

Start Time	NAGLEE RD. Southbound				ROBERTSON RD. Westbound				Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00pm	3	10	1	14	16	2	3	21	11	30	10	51	5	2	11	18	104
4:15	1	14	4	19	10	7	4	21	9	20	9	38	2	4	10	16	94
4:30	2	10	2	14	21	4	3	28	10	14	7	31	7	9	15	31	104
4:45	7	18	0	25	18	3	2	23	7	14	8	29	3	7	12	22	99
Hour Total:	13	52	7	72	65	16	12	93	37	78	34	149	17	22	48	87	401
5:00pm	2	11	3	16	22	10	5	37	9	15	11	35	8	4	14	26	114
5:15	4	13	5	22	13	8	4	25	3	18	13	34	9	7	8	24	105
5:30	1	16	4	21	18	2	5	25	9	20	7	36	3	10	6	19	101
5:45	3	12	6	21	12	7	2	21	7	16	8	31	9	2	8	19	92
Hour Total	10	52	18	80	65	27	16	108	28	69	39	136	29	23	36	88	412
Grand	23	104	25	152	130	43	28	201	65	147	73	285	46	45	84	175	813
% of Total	2.8%	12.8%	3.1%		16.0%	5.3%	3.4%		8.0%	18.1%	9.0%		5.7%	5.5%	10.3%		
Apprch %				18.7%				24.7%				35.1%				21.5%	
% of Apprch	15.1%	68.4%	16.4%		64.7%	21.4%	13.9%		22.8%	51.6%	25.6%		26.3%	25.7%	48.0%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 05/26/05

Direction	Street Name	Start	Peak Hr	..... Volumes .....				..... Percentages		
		Peak Hour	Factor	Left	Thru	Right	Total	Left	Thru	Right
Southbound	NAGLEE RD.	C4:30pm	.770	15	52	10	77	19.4	67.5	12.9
Westbound	ROBERTSON RD.		.764	74	25	14	113	65.4	22.1	12.3
Northbound			.921	29	61	39	129	22.4	47.2	30.2
Eastbound			.831	27	27	49	103	26.2	26.2	47.5

NAGLEE RD.

10	52	15	27
			61
			14
			=====
			102
	Inbound	77	
	Outbound	102	
	Total	179	

64	29
	25
	10

27

	Inbound	103
	Outbound	64
27	Total	167

49

	Inbound	129
	Outbound	175
	Total	304

74	29	61
52		
49		
=====		
175		

14

25

	Inbound	113
	Outbound	81
	Total	194

15	81
27	
39	

ROBERTSON RD.

39

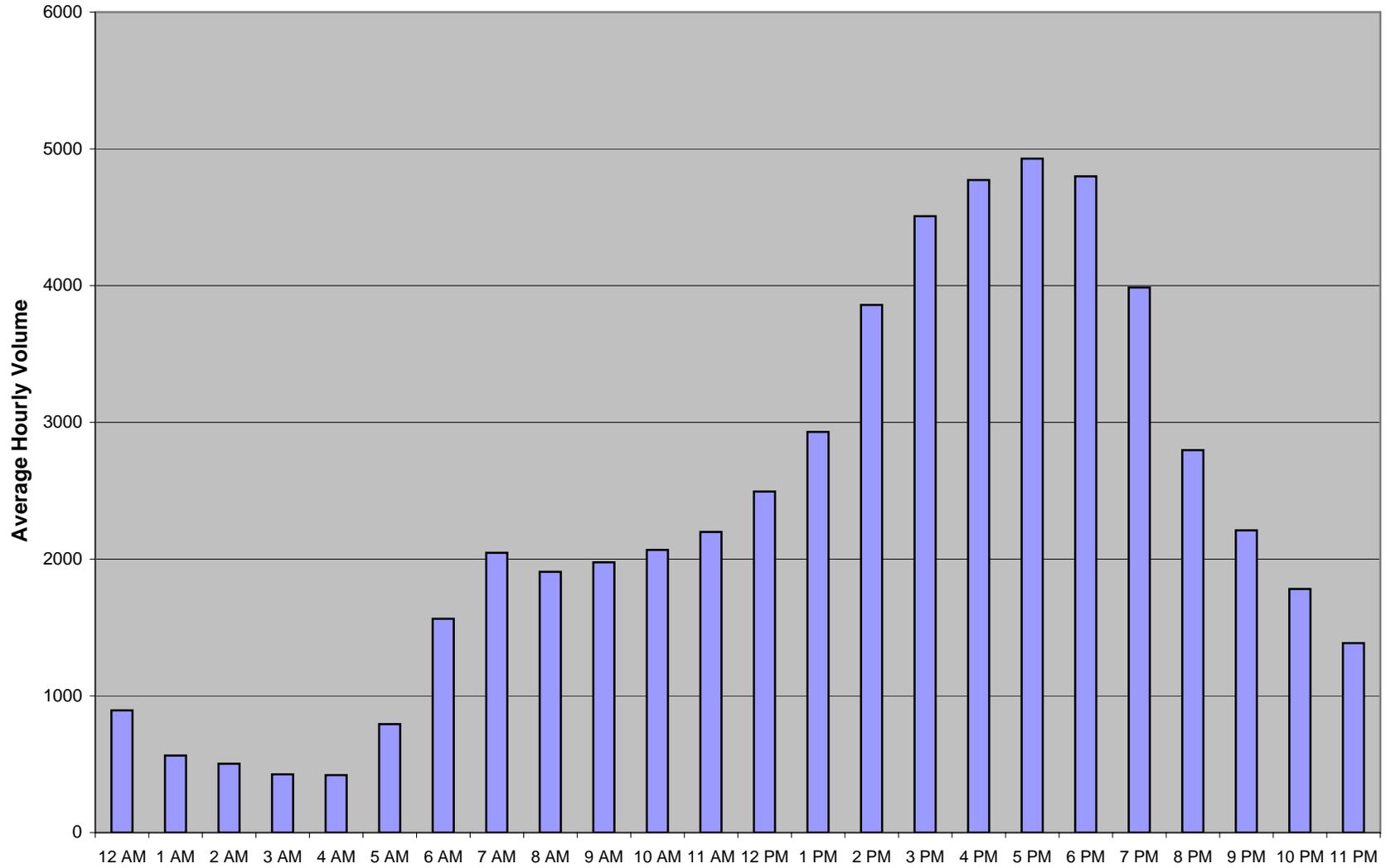
Start Time	NAGLEE RD. Southbound				AUTO PLAZA DR. Westbound				Northbound				Eastbound				Total
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	
4:00pm	1	3	6	10	0	0	1	1	17	25	0	42	7	4	4	15	68
4:15	1	11	3	15	3	1	1	5	15	16	0	31	6	5	5	16	67
4:30	2	9	3	14	0	3	0	3	6	19	1	25	4	5	3	12	54
4:45	1	12	7	20	0	2	0	2	8	10	1	19	8	4	9	21	62
Hour Total	5	35	19	59	3	6	2	11	46	69	2	117	25	18	21	64	251
5:00pm	1	6	3	10	1	1	1	3	9	20	2	31	10	8	5	23	67
5:15	1	12	6	19	0	2	1	3	9	22	2	33	5	4	6	15	70
5:30	1	9	2	12	0	0	3	3	8	14	0	22	3	6	4	13	50
5:45	0	9	1	10	1	2	0	3	2	13	2	23	8	1	7	16	52
Hour Total	3	36	12	51	2	5	5	12	28	75	6	109	26	19	22	67	239
Grand	8	71	31	110	5	11	7	23	74	144	8	226	51	37	43	131	490
% of Total	1.6%	14.5%	6.3%		1.0%	2.2%	1.4%		15.1%	29.4%	1.6%		10.4%	7.6%	8.8%		
Approch %				22.4%				4.7%				46.1%					26.7%
% of Approach	7.3%	64.5%	28.2%		21.7%	47.8%	30.4%		32.7%	63.7%	3.5%		38.9%	28.2%	32.8%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 05/26/05

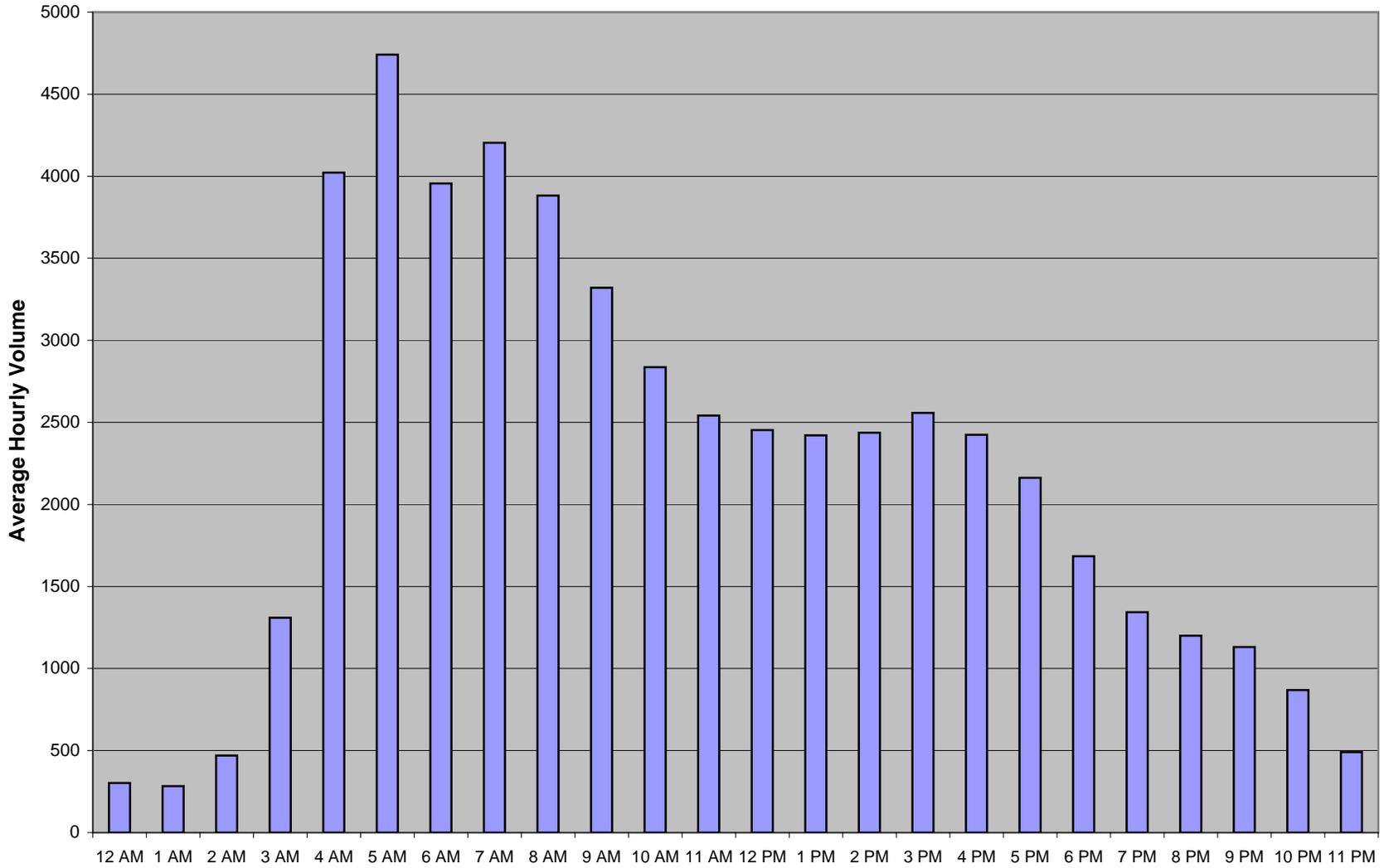
Direction	Street Name	Start Peak Hour	Peak Hr Factor	..... Volumes .....				..... Percentages		
				Left	Thru	Right	Total	Left	Thru	Right
Southbound	NAGLEE RD.	04:30pm	.788	5	39	19	63	7.9	61.9	30.1
Westbound	AUTO PLAZA DR.		.917	1	8	2	11	9.0	72.7	18.1
Northbound			.818	32	70	6	108	29.6	64.8	5.5
Eastbound			.772	27	21	23	71	38.0	29.5	32.3

West of Mountain House Parkway - Eastbound

2004 Mid-Week Average Volume Distribution by Hour



West of Mountain House Parkway - Westbound 2004 Mid-Week Average Volume Distribution by Hour



**APPENDIX B:
EXISTING CONDITIONS LOS CALCULATION WORKSHEETS**

HCM Signalized Intersection Capacity Analysis

2: Grant Line Road & Naglee Road

WinCo
Near Term AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘		↖	↗		↖	↗	↘	↗	↘
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00		0.91	1.00				0.95	0.95	1.00
Frt	1.00	1.00	0.85		1.00	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00				0.95	0.96	1.00
Satd. Flow (prot)	1770	3539	1583		5085	1583				1681	1705	1583
Flt Permitted	0.95	1.00	1.00		1.00	1.00				0.95	0.96	1.00
Satd. Flow (perm)	1770	3539	1583		5085	1583				1681	1705	1583
Volume (vph)	159	445	90	0	575	616	0	0	0	475	66	269
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	159	445	90	0	575	616	0	0	0	475	66	269
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	0	0	0	190
Lane Group Flow (vph)	159	445	49	0	575	616	0	0	0	264	277	79
Turn Type	Prot		Perm			Free				Perm		Perm
Protected Phases	5	2			6							4
Permitted Phases			2			Free				4		4
Actuated Green, G (s)	8.2	26.7	26.7		14.3	51.0				14.4	14.4	14.4
Effective Green, g (s)	8.4	28.0	28.0		15.6	51.0				15.0	15.0	15.0
Actuated g/C Ratio	0.16	0.55	0.55		0.31	1.00				0.29	0.29	0.29
Clearance Time (s)	4.2	5.3	5.3		5.3					4.6	4.6	4.6
Vehicle Extension (s)	3.0	3.0	3.0		3.0					3.0	3.0	3.0
Lane Grp Cap (vph)	292	1943	869		1555	1583				494	501	466
v/s Ratio Prot	0.09	0.13			0.11							
v/s Ratio Perm			0.03			c0.39				0.16	0.16	0.05
v/c Ratio	0.54	0.23	0.06		0.37	0.39				0.53	0.55	0.17
Uniform Delay, d1	19.5	5.9	5.4		13.9	0.0				15.1	15.2	13.4
Progression Factor	1.00	1.00	1.00		1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	2.1	0.1	0.0		0.1	0.7				1.1	1.3	0.2
Delay (s)	21.6	6.0	5.4		14.0	0.7				16.2	16.5	13.5
Level of Service	C	A	A		B	A				B	B	B
Approach Delay (s)		9.5			7.1		0.0				15.4	
Approach LOS		A			A		A				B	

Intersection Summary

HCM Average Control Delay	10.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	51.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	44.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 3: I 205 WB Ramps & Naglee Road

WinCo
 Near Term AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	3433	3539	1583	1770	3539	1583	1770	5070	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	3433	3539	1583	1770	3539	1583	1770	5070	
Volume (vph)	10	10	36	421	42	97	62	369	195	26	242	5
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	10	36	421	42	97	62	369	195	26	242	5
RTOR Reduction (vph)	0	0	34	0	0	67	0	0	141	0	1	0
Lane Group Flow (vph)	10	10	2	421	42	30	62	369	54	26	246	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	0.8	1.8	1.8	11.5	12.9	12.9	2.4	11.9	11.9	1.9	11.9	
Effective Green, g (s)	1.0	3.1	3.1	12.1	14.2	14.2	2.6	12.8	12.8	2.6	12.8	
Actuated g/C Ratio	0.02	0.07	0.07	0.26	0.30	0.30	0.06	0.27	0.27	0.06	0.27	
Clearance Time (s)	4.2	5.3	5.3	4.6	5.3	5.3	4.2	4.9	4.9	4.7	4.9	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	38	124	105	891	1078	482	99	972	435	99	1393	
v/s Ratio Prot	0.01	0.01		c0.12	0.01		c0.04	c0.10		0.01	0.05	
v/s Ratio Perm			0.00			c0.02			0.03			
v/c Ratio	0.26	0.08	0.02	0.47	0.04	0.06	0.63	0.38	0.12	0.26	0.18	
Uniform Delay, d1	22.4	20.4	20.3	14.6	11.4	11.5	21.5	13.7	12.7	21.1	12.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.7	0.3	0.1	0.4	0.0	0.1	11.7	0.2	0.1	1.4	0.1	
Delay (s)	26.1	20.7	20.4	15.0	11.4	11.5	33.3	13.9	12.8	22.5	12.9	
Level of Service	C	C	C	B	B	B	C	B	B	C	B	
Approach Delay (s)		21.5			14.1			15.5			13.9	
Approach LOS		C			B			B			B	
Intersection Summary												
HCM Average Control Delay			14.9				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.36									
Actuated Cycle Length (s)			46.6				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			43.0%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 4: Grant Line Road & I-205 EB On-Ramp

WinCo
 Near Term AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	1.00	0.95			0.91	1.00	1.00		1.00			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	1770	3539			5085	1583	1770		1583			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	1770	3539			5085	1583	1770		1583			
Volume (vph)	250	670	0	0	1178	215	92	0	151	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	250	670	0	0	1178	215	92	0	151	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	124	0	0	0
Lane Group Flow (vph)	250	670	0	0	1178	215	92	0	27	0	0	0
Turn Type	Prot						Free custom		custom			
Protected Phases	5	2					6					
Permitted Phases							Free	8		8		
Actuated Green, G (s)	11.1	40.4					25.1	60.3	10.4	10.4		
Effective Green, g (s)	11.3	41.7					26.4	60.3	10.6	10.6		
Actuated g/C Ratio	0.19	0.69					0.44	1.00	0.18	0.18		
Clearance Time (s)	4.2	5.3					5.3		4.2	4.2		
Vehicle Extension (s)	3.0	3.0					3.0		3.0	3.0		
Lane Grp Cap (vph)	332	2447					2226	1583	311	278		
v/s Ratio Prot	c0.14	0.19					c0.23					
v/s Ratio Perm								0.14	c0.05	0.02		
v/c Ratio	0.75	0.27					0.53	0.14	0.30	0.10		
Uniform Delay, d1	23.2	3.5					12.4	0.0	21.6	20.8		
Progression Factor	1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2	9.3	0.1					0.2	0.2	0.5	0.2		
Delay (s)	32.5	3.6					12.6	0.2	22.1	21.0		
Level of Service	C	A					B	A	C	C		
Approach Delay (s)	11.4						10.7	21.4		0.0		
Approach LOS	B						B	C		A		
Intersection Summary												
HCM Average Control Delay	12.0		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.53											
Actuated Cycle Length (s)	60.3		Sum of lost time (s)				12.0					
Intersection Capacity Utilization	51.7%		ICU Level of Service				A					
Analysis Period (min)	15											
c Critical Lane Group												

Level Of Service Computation Report

2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #1 Grant Line Road/Byron Road

Average Delay (sec/veh): 397.5 Worst Case Level Of Service: F[934.6]

Table with 4 columns: North Bound, South Bound, East Bound, West Bound. Rows include Movement (L, T, R), Control (Stop Sign, Uncontrolled), Rights (Include), and Lanes.

Volume Module: Table with 12 columns for volume adjustments. Rows include Base Vol, Growth Adj, Initial Bse, Added Vol, PasserByVol, Initial Fut, User Adj, PHF Adj, PHF Volume, Reduct Vol, and Final Vol.

Critical Gap Module: Table with 12 columns for critical gap values. Rows include Critical Gp and FollowUpTim.

Capacity Module: Table with 12 columns for capacity values. Rows include Cnflct Vol, Potent Cap., Move Cap., and Volume/Cap.

Level Of Service Module: Table with 12 columns for level of service metrics. Rows include Queue, Stopped Del, LOS by Move, Movement, Shared Cap., SharedQueue, Shrd StpDel, Shared LOS, ApproachDel, and ApproachLOS.

HCM Signalized Intersection Capacity Analysis
2: Grant Line Road & Naglee Road

WinCo
Near Term PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗		↑↑↑	↗				↘	↗	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00		0.91	1.00				0.95	0.95	1.00
Frt	1.00	1.00	0.85		1.00	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00				0.95	0.96	1.00
Satd. Flow (prot)	1770	3539	1583		5085	1583				1681	1692	1583
Flt Permitted	0.95	1.00	1.00		1.00	1.00				0.95	0.96	1.00
Satd. Flow (perm)	1770	3539	1583		5085	1583				1681	1692	1583
Volume (vph)	348	1031	79	0	681	667	0	0	0	840	35	519
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	348	1031	79	0	681	667	0	0	0	840	35	519
RTOR Reduction (vph)	0	0	36	0	0	0	0	0	0	0	0	280
Lane Group Flow (vph)	348	1031	43	0	681	667	0	0	0	427	448	239
Turn Type	Prot		Perm			Free				Perm		Perm
Protected Phases	5	2			6							4
Permitted Phases			2			Free				4		4
Actuated Green, G (s)	20.2	40.8	40.8		16.4	77.6				26.9	26.9	26.9
Effective Green, g (s)	20.4	42.1	42.1		17.7	77.6				27.5	27.5	27.5
Actuated g/C Ratio	0.26	0.54	0.54		0.23	1.00				0.35	0.35	0.35
Clearance Time (s)	4.2	5.3	5.3		5.3					4.6	4.6	4.6
Vehicle Extension (s)	3.0	3.0	3.0		3.0					3.0	3.0	3.0
Lane Grp Cap (vph)	465	1920	859		1160	1583				596	600	561
v/s Ratio Prot	c0.20	c0.29			0.13							
v/s Ratio Perm			0.03			0.42				0.25	0.26	0.15
v/c Ratio	0.75	0.54	0.05		0.59	0.42				0.72	0.75	0.43
Uniform Delay, d1	26.2	11.5	8.3		26.7	0.0				21.7	22.0	19.1
Progression Factor	1.00	1.00	1.00		1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	6.5	0.3	0.0		0.8	0.8				4.1	5.0	0.5
Delay (s)	32.7	11.7	8.4		27.5	0.8				25.8	27.0	19.6
Level of Service	C	B	A		C	A				C	C	B
Approach Delay (s)		16.6			14.3			0.0			23.9	
Approach LOS		B			B			A			C	

Intersection Summary

HCM Average Control Delay	18.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	77.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 3: I 205 WB Ramps & Naglee Road

WinCo
 Near Term PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	3433	3539	1583	1770	3539	1583	1770	5072	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	3433	3539	1583	1770	3539	1583	1770	5072	
Volume (vph)	21	15	89	412	25	154	70	634	139	63	639	11
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	21	15	89	412	25	154	70	634	139	63	639	11
RTOR Reduction (vph)	0	0	82	0	0	111	0	0	94	0	1	0
Lane Group Flow (vph)	21	15	7	412	25	43	70	634	45	63	649	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	2.1	3.4	3.4	13.1	14.8	14.8	4.3	17.9	17.9	4.2	18.3	
Effective Green, g (s)	2.3	4.7	4.7	13.7	16.1	16.1	4.5	18.8	18.8	4.9	19.2	
Actuated g/C Ratio	0.04	0.08	0.08	0.24	0.28	0.28	0.08	0.32	0.32	0.08	0.33	
Clearance Time (s)	4.2	5.3	5.3	4.6	5.3	5.3	4.2	4.9	4.9	4.7	4.9	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	70	151	128	810	981	439	137	1145	512	149	1676	
v/s Ratio Prot	0.01	0.01		c0.12	0.01		c0.04	c0.18		0.04	0.13	
v/s Ratio Perm			0.00			c0.03			0.03			
v/c Ratio	0.30	0.10	0.06	0.51	0.03	0.10	0.51	0.55	0.09	0.42	0.39	
Uniform Delay, d1	27.1	24.7	24.7	19.3	15.3	15.6	25.7	16.2	13.7	25.3	14.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.4	0.3	0.2	0.5	0.0	0.1	3.2	0.6	0.1	1.9	0.1	
Delay (s)	29.5	25.0	24.8	19.8	15.3	15.7	28.9	16.8	13.8	27.2	15.1	
Level of Service	C	C	C	B	B	B	C	B	B	C	B	
Approach Delay (s)		25.6			18.5			17.3			16.2	
Approach LOS		C			B			B			B	
Intersection Summary												
HCM Average Control Delay			17.7								HCM Level of Service	B
HCM Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			58.1								Sum of lost time (s)	12.0
Intersection Capacity Utilization			50.1%								ICU Level of Service	A
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: Grant Line Road & I-205 EB On-Ramp

WinCo
Near Term PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	1.00	0.95			0.91	1.00	1.00		1.00			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	1770	3539			5085	1583	1770		1583			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	1770	3539			5085	1583	1770		1583			
Volume (vph)	396	1515	0	0	1113	171	163	0	365	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	396	1515	0	0	1113	171	163	0	365	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	32	0	0	0
Lane Group Flow (vph)	396	1515	0	0	1113	171	163	0	333	0	0	0
Turn Type	Prot						Free custom		custom			
Protected Phases	5	2					6					
Permitted Phases							Free		8		8	
Actuated Green, G (s)	23.7	53.1					25.2	86.8	24.2	24.2		
Effective Green, g (s)	23.9	54.4					26.5	86.8	24.4	24.4		
Actuated g/C Ratio	0.28	0.63					0.31	1.00	0.28	0.28		
Clearance Time (s)	4.2	5.3					5.3		4.2	4.2		
Vehicle Extension (s)	3.0	3.0					3.0		3.0	3.0		
Lane Grp Cap (vph)	487	2218					1552	1583	498	445		
v/s Ratio Prot	c0.22	c0.43					0.22					
v/s Ratio Perm								0.11	0.09	c0.21		
v/c Ratio	0.81	0.68					0.72	0.11	0.33	0.75		
Uniform Delay, d1	29.4	10.6					26.8	0.0	24.7	28.4		
Progression Factor	1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2	10.0	0.9					1.6	0.1	0.4	6.8		
Delay (s)	39.4	11.5					28.4	0.1	25.1	35.2		
Level of Service	D	B					C	A	C	D		
Approach Delay (s)	17.2						24.7			32.1	0.0	
Approach LOS	B						C			C	A	
Intersection Summary												
HCM Average Control Delay			21.9					HCM Level of Service		C		
HCM Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			86.8					Sum of lost time (s)		8.0		
Intersection Capacity Utilization			71.1%					ICU Level of Service		C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: Grant Line Road & Corral Hollow Road

WinCo
Near Term PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		  	 			 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1425	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.94	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3492		3743	3539	1583	1770	3403	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3492		3743	3539	1583	1770	3403	
Volume (vph)	190	902	940	216	441	43	618	347	211	140	317	109
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	100%	100%	75%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	190	902	705	216	441	43	618	347	211	140	317	109
RTOR Reduction (vph)	0	0	279	0	6	0	0	0	168	0	33	0
Lane Group Flow (vph)	190	902	426	216	478	0	618	347	43	140	393	0
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	14.2	32.9	32.9	15.2	33.9		15.2	19.1	19.1	12.6	16.5	
Effective Green, g (s)	14.2	33.9	33.9	15.2	34.9		15.2	20.1	20.1	12.6	17.5	
Actuated g/C Ratio	0.15	0.35	0.35	0.16	0.36		0.16	0.21	0.21	0.13	0.18	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0	5.0	4.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	257	1227	549	275	1246		582	727	325	228	609	
v/s Ratio Prot	0.11	0.25		c0.12	0.14		c0.17	c0.10		0.08	c0.12	
v/s Ratio Perm			c0.27						0.03			
v/c Ratio	0.74	0.74	0.78	0.79	0.38		1.06	0.48	0.13	0.61	0.65	
Uniform Delay, d1	40.0	28.0	28.6	39.7	23.4		41.3	34.2	31.7	40.3	37.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.6	2.3	6.8	13.7	0.2		54.8	0.5	0.2	4.8	2.4	
Delay (s)	50.6	30.3	35.3	53.4	23.6		96.1	34.7	31.9	45.1	39.6	
Level of Service	D	C	D	D	C		F	C	C	D	D	
Approach Delay (s)		34.4			32.8			66.5			41.0	
Approach LOS		C			C			E			D	
Intersection Summary												
HCM Average Control Delay			43.9	HCM Level of Service				D				
HCM Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			97.8	Sum of lost time (s)				20.0				
Intersection Capacity Utilization			78.2%	ICU Level of Service				D				
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
6: Eleventh Street & Lammers Road

WinCo
Near Term PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  			  		 	 		 		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	0.97	0.95	1.00	0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	3433	3539	1583	3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	3433	3539	1583	3433	1863	1583
Volume (vph)	179	1713	112	137	366	76	41	93	183	60	112	24
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	179	1713	112	137	366	76	41	93	183	60	112	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	179	1713	112	137	366	76	41	93	183	60	112	24
Turn Type	Prot		Free	Prot	Free		Prot	Free		Prot	Free	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free			Free			Free			Free
Actuated Green, G (s)	6.0	30.3	62.0	6.0	30.3	62.0	0.8	5.9	62.0	1.8	6.9	62.0
Effective Green, g (s)	6.0	31.3	62.0	6.0	31.3	62.0	0.8	6.9	62.0	1.8	7.9	62.0
Actuated g/C Ratio	0.10	0.50	1.00	0.10	0.50	1.00	0.01	0.11	1.00	0.03	0.13	1.00
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	332	2567	1583	171	2567	1583	44	394	1583	100	237	1583
v/s Ratio Prot	0.05	c0.34		c0.08	0.07		0.01	0.03		c0.02	c0.06	
v/s Ratio Perm			0.07			0.05			c0.12			0.02
v/c Ratio	0.54	0.67	0.07	0.80	0.14	0.05	0.93	0.24	0.12	0.60	0.47	0.02
Uniform Delay, d1	26.7	11.5	0.0	27.4	8.2	0.0	30.6	25.1	0.0	29.7	25.1	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	0.7	0.1	23.0	0.0	0.1	109.0	0.3	0.1	9.7	1.5	0.0
Delay (s)	28.4	12.1	0.1	50.4	8.2	0.1	139.6	25.5	0.1	39.5	26.6	0.0
Level of Service	C	B	A	D	A	A	F	C	A	D	C	A
Approach Delay (s)	12.9				17.1		25.6				27.3	
Approach LOS	B				B		C				C	
Intersection Summary												
HCM Average Control Delay			15.9		HCM Level of Service				B			
HCM Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			62.0		Sum of lost time (s)				12.0			
Intersection Capacity Utilization			59.1%		ICU Level of Service				B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: Eleventh Street & Corral Hollow Road

WinCo
Near Term PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	  		 	 		 	 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	435	930	533	266	430	341	195	735	149	384	728	152
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	100%	100%	80%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	435	930	426	266	430	341	195	735	149	384	728	152
RTOR Reduction (vph)	0	0	0	0	0	166	0	0	101	0	0	101
Lane Group Flow (vph)	435	930	426	266	430	175	195	735	48	384	728	51
Turn Type	Prot		Free	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			Free			6			4			8
Actuated Green, G (s)	13.7	25.0	97.2	12.8	18.1	18.1	8.9	25.9	25.9	14.5	31.5	31.5
Effective Green, g (s)	20.7	27.0	97.2	12.8	19.1	19.1	8.9	26.9	26.9	14.5	32.5	32.5
Actuated g/C Ratio	0.21	0.28	1.00	0.13	0.20	0.20	0.09	0.28	0.28	0.15	0.33	0.33
Clearance Time (s)	11.0	6.0		4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	731	1413	1583	452	999	311	314	979	438	512	1183	529
v/s Ratio Prot	c0.13	c0.18		0.08	0.08		0.06	c0.21		c0.11	0.21	
v/s Ratio Perm			0.27			0.11			0.03			0.03
v/c Ratio	0.60	0.66	0.27	0.59	0.43	0.56	0.62	0.75	0.11	0.75	0.62	0.10
Uniform Delay, d1	34.5	31.0	0.0	39.7	34.3	35.3	42.5	32.1	26.2	39.6	27.1	22.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	1.1	0.4	2.0	0.3	2.3	3.8	3.3	0.1	6.1	1.0	0.1
Delay (s)	35.8	32.1	0.4	41.7	34.6	37.6	46.3	35.4	26.3	45.7	28.1	22.3
Level of Service	D	C	A	D	C	D	D	D	C	D	C	C
Approach Delay (s)		25.5			37.4			36.1			32.7	
Approach LOS		C			D			D			C	
Intersection Summary												
HCM Average Control Delay			31.9				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			97.2				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			70.2%				ICU Level of Service			C		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 8: Robertson Road & Naglee Road

WinCo
 Near Term PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			  	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3175		1681	1721	1583	1770	3539	1583	1770	5047	
Flt Permitted	0.74	1.00		0.74	0.77	1.00	0.59	1.00	1.00	0.60	1.00	
Satd. Flow (perm)	1380	3175		1311	1369	1583	1090	3539	1583	1117	5047	
Volume (vph)	30	27	59	74	25	14	38	245	39	15	246	13
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	30	27	59	74	25	14	38	245	39	15	246	13
RTOR Reduction (vph)	0	52	0	0	0	12	0	0	12	0	4	0
Lane Group Flow (vph)	30	34	0	41	58	2	38	245	27	15	255	0
Turn Type	Perm			Perm			Perm	Perm		Perm	Perm	
Protected Phases	4			8			2	2		6		
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	5.4	5.4		5.4	5.4	5.4	29.3	29.3	29.3	29.3	29.3	
Effective Green, g (s)	5.4	5.4		5.4	5.4	5.4	29.3	29.3	29.3	29.3	29.3	
Actuated g/C Ratio	0.13	0.13		0.13	0.13	0.13	0.69	0.69	0.69	0.69	0.69	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	175	402		166	173	200	748	2428	1086	766	3463	
v/s Ratio Prot		0.01						c0.07			0.05	
v/s Ratio Perm	0.02			0.03	c0.04	0.00	0.03		0.02	0.01		
v/c Ratio	0.17	0.09		0.25	0.34	0.01	0.05	0.10	0.02	0.02	0.07	
Uniform Delay, d1	16.7	16.5		16.8	17.0	16.3	2.2	2.3	2.1	2.1	2.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	0.1		0.8	1.2	0.0	0.0	0.0	0.0	0.0	0.0	
Delay (s)	17.1	16.6		17.6	18.2	16.3	2.2	2.3	2.1	2.1	2.2	
Level of Service	B	B		B	B	B	A	A	A	A	A	
Approach Delay (s)		16.7			17.7			2.3			2.2	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM Average Control Delay			6.4	HCM Level of Service				A				
HCM Volume to Capacity ratio			0.14									
Actuated Cycle Length (s)			42.7	Sum of lost time (s)				8.0				
Intersection Capacity Utilization			29.5%	ICU Level of Service				A				
Analysis Period (min)			15									
c Critical Lane Group												

Level Of Service Computation Report

2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #9 Auto Plaza Drive/Naglee Road

Average Delay (sec/veh): 7.8 Worst Case Level Of Service: B[14.2]

Table with 4 columns: North Bound, South Bound, East Bound, West Bound. Rows include Control, Rights, and Lanes.

Volume Module: Table with 12 columns for traffic volumes and adjustment factors like Growth Adj, Initial Bse, Added Vol, etc.

Critical Gap Module: Table with 12 columns for critical gap and follow-up times.

Capacity Module: Table with 12 columns for capacity-related metrics like Cnflct Vol, Potent Cap., Move Cap., etc.

Level Of Service Module: Table with 12 columns for queue, delay, LOS, and shared queue metrics.

HCM Signalized Intersection Capacity Analysis
2: Grant Line Road & Naglee Road

WinCo
NearTerm plus Project AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00		0.91	1.00				0.95	0.95	1.00
Frt	1.00	1.00	0.85		1.00	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00				0.95	0.96	1.00
Satd. Flow (prot)	1770	3539	1583		5085	1583				1681	1700	1583
Flt Permitted	0.95	1.00	1.00		1.00	1.00				0.95	0.96	1.00
Satd. Flow (perm)	1770	3539	1583		5085	1583				1681	1700	1583
Volume (vph)	171	445	90	0	575	845	0	0	0	653	66	280
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	171	445	90	0	575	845	0	0	0	653	66	280
RTOR Reduction (vph)	0	0	43	0	0	0	0	0	0	0	0	185
Lane Group Flow (vph)	171	445	47	0	575	845	0	0	0	350	369	95
Turn Type	Prot		Perm			Free				Perm		Perm
Protected Phases	5	2			6							4
Permitted Phases			2			Free				4		4
Actuated Green, G (s)	8.9	27.9	27.9		14.8	56.4				18.6	18.6	18.6
Effective Green, g (s)	9.1	29.2	29.2		16.1	56.4				19.2	19.2	19.2
Actuated g/C Ratio	0.16	0.52	0.52		0.29	1.00				0.34	0.34	0.34
Clearance Time (s)	4.2	5.3	5.3		5.3					4.6	4.6	4.6
Vehicle Extension (s)	3.0	3.0	3.0		3.0					3.0	3.0	3.0
Lane Grp Cap (vph)	286	1832	820		1452	1583				572	579	539
v/s Ratio Prot	0.10	0.13			0.11							
v/s Ratio Perm			0.03			c0.53				0.21	0.22	0.06
v/c Ratio	0.60	0.24	0.06		0.40	0.53				0.61	0.64	0.18
Uniform Delay, d1	22.0	7.5	6.8		16.2	0.0				15.5	15.7	13.1
Progression Factor	1.00	1.00	1.00		1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	3.3	0.1	0.0		0.2	1.3				1.9	2.3	0.2
Delay (s)	25.3	7.6	6.8		16.4	1.3				17.4	18.0	13.2
Level of Service	C	A	A		B	A				B	B	B
Approach Delay (s)		11.8			7.4			0.0			16.5	
Approach LOS		B			A			A			B	
Intersection Summary												
HCM Average Control Delay			11.3			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			56.4			Sum of lost time (s)				0.0		
Intersection Capacity Utilization			50.4%			ICU Level of Service				A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 3: I 205 WB Ramps & Naglee Road

WinCo
 NearTerm plus Project AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1863	1583	3433	3539	1583	1770	3539	1583	1770	5070	5070	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1863	1583	3433	3539	1583	1770	3539	1583	1770	5070	5070	
Volume (vph)	10	19	220	421	78	97	299	373	195	35	247	5	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	10	19	220	421	78	97	299	373	195	35	247	5	
RTOR Reduction (vph)	0	0	185	0	0	65	0	0	116	0	2	0	
Lane Group Flow (vph)	10	19	35	421	78	32	299	373	79	35	250	0	
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Prot	
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases			4			8			2				
Actuated Green, G (s)	1.2	11.3	11.3	14.0	24.5	24.5	22.8	31.2	31.2	3.0	11.9		
Effective Green, g (s)	1.4	12.6	12.6	14.6	25.8	25.8	23.0	32.1	32.1	3.7	12.8		
Actuated g/C Ratio	0.02	0.16	0.16	0.18	0.33	0.33	0.29	0.41	0.41	0.05	0.16		
Clearance Time (s)	4.2	5.3	5.3	4.6	5.3	5.3	4.2	4.9	4.9	4.7	4.9		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	31	297	252	634	1156	517	515	1438	643	83	821		
v/s Ratio Prot	0.01	0.01		c0.12	0.02		c0.17	c0.11		0.02	0.05		
v/s Ratio Perm			c0.02			0.02			0.05				
v/c Ratio	0.32	0.06	0.14	0.66	0.07	0.06	0.58	0.26	0.12	0.42	0.30		
Uniform Delay, d1	38.3	28.2	28.5	29.9	18.3	18.3	23.9	15.6	14.7	36.6	29.2		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	6.0	0.1	0.3	2.6	0.0	0.0	1.7	0.1	0.1	3.4	0.2		
Delay (s)	44.3	28.3	28.8	32.5	18.3	18.3	25.6	15.7	14.7	40.0	29.4		
Level of Service	D	C	C	C	B	B	C	B	B	D	C		
Approach Delay (s)		29.4			28.4			18.9			30.7		
Approach LOS		C			C			B			C		
Intersection Summary													
HCM Average Control Delay			24.7		HCM Level of Service						C		
HCM Volume to Capacity ratio			0.43										
Actuated Cycle Length (s)			79.0		Sum of lost time (s)						12.0		
Intersection Capacity Utilization			50.2%		ICU Level of Service						A		
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
4: Grant Line Road & I-205 EB On-Ramp

WinCo
NearTerm plus Project AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			  							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	1.00	0.95			0.91	1.00	1.00		1.00			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	1770	3539			5085	1583	1770		1583			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	1770	3539			5085	1583	1770		1583			
Volume (vph)	263	836	0	0	1360	215	140	0	151	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	263	836	0	0	1360	215	140	0	151	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	126	0	0	0
Lane Group Flow (vph)	263	836	0	0	1360	215	140	0	25	0	0	0
Turn Type	Prot						Free custom		custom			
Protected Phases	5	2					6					
Permitted Phases							Free		8		8	
Actuated Green, G (s)	12.1	45.6					29.3	65.6	10.5	10.5		
Effective Green, g (s)	12.3	46.9					30.6	65.6	10.7	10.7		
Actuated g/C Ratio	0.19	0.71					0.47	1.00	0.16	0.16		
Clearance Time (s)	4.2	5.3					5.3		4.2	4.2		
Vehicle Extension (s)	3.0	3.0					3.0		3.0	3.0		
Lane Grp Cap (vph)	332	2530					2372	1583	289	258		
v/s Ratio Prot	c0.15	0.24					c0.27					
v/s Ratio Perm								0.14	c0.08	0.02		
v/c Ratio	0.79	0.33					0.57	0.14	0.48	0.10		
Uniform Delay, d1	25.4	3.5					12.7	0.0	24.9	23.3		
Progression Factor	1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2	12.2	0.1					0.3	0.2	1.3	0.2		
Delay (s)	37.6	3.6					13.1	0.2	26.2	23.5		
Level of Service	D	A					B	A	C	C		
Approach Delay (s)	11.7						11.3		24.8		0.0	
Approach LOS	B						B		C		A	
Intersection Summary												
HCM Average Control Delay			12.8		HCM Level of Service				B			
HCM Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			65.6		Sum of lost time (s)				12.0			
Intersection Capacity Utilization			58.6%		ICU Level of Service				B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
2: Grant Line Road & Naglee Road

WinCo
Near Term plus Project PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			  						 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00		0.91	1.00				0.95	0.95	1.00
Frt	1.00	1.00	0.85		1.00	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00				0.95	0.95	1.00
Satd. Flow (prot)	1770	3539	1583		5085	1583				1681	1689	1583
Flt Permitted	0.95	1.00	1.00		1.00	1.00				0.95	0.95	1.00
Satd. Flow (perm)	1770	3539	1583		5085	1583				1681	1689	1583
Volume (vph)	387	1048	79	0	681	1241	0	0	0	1466	35	547
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	387	1048	79	0	681	1241	0	0	0	1466	35	547
RTOR Reduction (vph)	0	0	38	0	0	0	0	0	0	0	0	232
Lane Group Flow (vph)	387	1048	41	0	681	1241	0	0	0	733	768	315
Turn Type	Prot		Perm			Free				Perm		Perm
Protected Phases	5	2			6							4
Permitted Phases			2			Free				4		4
Actuated Green, G (s)	20.0	40.7	40.7		16.5	80.7				30.1	30.1	30.1
Effective Green, g (s)	20.2	42.0	42.0		17.8	80.7				30.7	30.7	30.7
Actuated g/C Ratio	0.25	0.52	0.52		0.22	1.00				0.38	0.38	0.38
Clearance Time (s)	4.2	5.3	5.3		5.3					4.6	4.6	4.6
Vehicle Extension (s)	3.0	3.0	3.0		3.0					3.0	3.0	3.0
Lane Grp Cap (vph)	443	1842	824		1122	1583				639	643	602
v/s Ratio Prot	0.22	0.30			0.13							
v/s Ratio Perm			0.03			c0.78				0.44	0.45	0.20
v/c Ratio	0.87	0.57	0.05		0.61	0.78				1.15	1.19	0.52
Uniform Delay, d1	29.0	13.2	9.5		28.3	0.0				25.0	25.0	19.3
Progression Factor	1.00	1.00	1.00		1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	17.1	0.4	0.0		0.9	4.0				83.6	102.2	0.8
Delay (s)	46.1	13.6	9.6		29.2	4.0				108.6	127.2	20.2
Level of Service	D	B	A		C	A				F	F	C
Approach Delay (s)		21.7			12.9			0.0			92.0	
Approach LOS		C			B			A			F	
Intersection Summary												
HCM Average Control Delay			44.9			HCM Level of Service				D		
HCM Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			80.7			Sum of lost time (s)				4.0		
Intersection Capacity Utilization			86.1%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 3: I 205 WB Ramps & Naglee Road

WinCo
 Near Term plus Project PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	3433	3539	1583	1770	3539	1583	1770	5073	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	3433	3539	1583	1770	3539	1583	1770	5073	
Volume (vph)	21	119	766	377	207	154	675	642	139	88	652	11
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	21	119	766	377	207	154	675	642	139	88	652	11
RTOR Reduction (vph)	0	0	266	0	0	98	0	0	90	0	2	0
Lane Group Flow (vph)	21	119	500	377	207	56	675	642	49	88	661	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	3.0	22.8	22.8	16.0	36.2	36.2	25.2	35.5	35.5	8.8	19.6	
Effective Green, g (s)	3.2	24.1	24.1	16.6	37.5	37.5	25.4	36.4	36.4	9.5	20.5	
Actuated g/C Ratio	0.03	0.23	0.23	0.16	0.37	0.37	0.25	0.35	0.35	0.09	0.20	
Clearance Time (s)	4.2	5.3	5.3	4.6	5.3	5.3	4.2	4.9	4.9	4.7	4.9	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	55	438	372	555	1293	579	438	1256	562	164	1014	
v/s Ratio Prot	0.01	0.06		c0.11	0.06		c0.38	0.18		0.05	c0.13	
v/s Ratio Perm			c0.32			0.04			0.03			
v/c Ratio	0.38	0.27	1.34	0.68	0.16	0.10	1.54	0.51	0.09	0.54	0.65	
Uniform Delay, d1	48.7	32.1	39.2	40.5	21.9	21.4	38.6	26.1	22.0	44.4	37.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.4	0.3	171.6	3.3	0.1	0.1	254.7	0.4	0.1	3.4	1.5	
Delay (s)	53.1	32.4	210.8	43.8	22.0	21.5	293.3	26.4	22.1	47.8	39.3	
Level of Service	D	C	F	D	C	C	F	C	C	D	D	
Approach Delay (s)		183.7			33.0			149.7			40.3	
Approach LOS		F			C			F			D	
Intersection Summary												
HCM Average Control Delay			114.0				HCM Level of Service			F		
HCM Volume to Capacity ratio			1.11									
Actuated Cycle Length (s)			102.6				Sum of lost time (s)		16.0			
Intersection Capacity Utilization			81.0%				ICU Level of Service		D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 4: Grant Line Road & I-205 EB On-Ramp

WinCo
 Near Term plus Project PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			  							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	1.00	0.95			0.91	1.00	1.00		1.00			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	1770	3539			5085	1583	1770		1583			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	1770	3539			5085	1583	1770		1583			
Volume (vph)	481	2040	0	0	1450	171	400	0	268	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	481	2040	0	0	1450	171	400	0	268	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	10	0	0	0
Lane Group Flow (vph)	481	2040	0	0	1450	171	400	0	258	0	0	0
Turn Type	Prot						Free custom		custom			
Protected Phases	5	2					6					
Permitted Phases							Free		8		8	
Actuated Green, G (s)	31.7	68.6					32.7	105.9	27.8	27.8		
Effective Green, g (s)	31.9	69.9					34.0	105.9	28.0	28.0		
Actuated g/C Ratio	0.30	0.66					0.32	1.00	0.26	0.26		
Clearance Time (s)	4.2	5.3					5.3		4.2	4.2		
Vehicle Extension (s)	3.0	3.0					3.0		3.0	3.0		
Lane Grp Cap (vph)	533	2336					1633	1583	468	419		
v/s Ratio Prot	0.27	c0.58					0.29					
v/s Ratio Perm								0.11	c0.23	0.16		
v/c Ratio	0.90	0.87					0.89	0.11	0.85	0.62		
Uniform Delay, d1	35.5	14.4					34.1	0.0	37.0	34.2		
Progression Factor	1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2	18.5	3.9					6.3	0.1	14.1	2.7		
Delay (s)	54.0	18.4					40.4	0.1	51.2	36.9		
Level of Service	D	B					D	A	D	D		
Approach Delay (s)	25.2						36.2		45.4		0.0	
Approach LOS	C						D		D		A	
Intersection Summary												
HCM Average Control Delay	31.7		HCM Level of Service				C					
HCM Volume to Capacity ratio	0.87											
Actuated Cycle Length (s)	105.9		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	86.8%		ICU Level of Service				E					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: Grant Line Road & Corral Hollow Road

WinCo
Near Term plus Project PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1425	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.94	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3503		3743	3539	1583	1770	3403	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3503		3743	3539	1583	1770	3403	
Volume (vph)	190	1096	1163	216	583	43	810	347	211	140	317	109
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	100%	100%	75%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	190	1096	872	216	583	43	810	347	211	140	317	109
RTOR Reduction (vph)	0	0	263	0	4	0	0	0	170	0	33	0
Lane Group Flow (vph)	190	1096	609	216	622	0	810	347	41	140	393	0
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	14.7	39.1	39.1	15.0	39.4		15.0	19.1	19.1	13.2	17.3	
Effective Green, g (s)	14.7	40.1	40.1	15.0	40.4		15.0	20.1	20.1	13.2	18.3	
Actuated g/C Ratio	0.14	0.38	0.38	0.14	0.39		0.14	0.19	0.19	0.13	0.18	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0	5.0	4.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	249	1359	608	254	1356		538	681	305	224	597	
v/s Ratio Prot	0.11	0.31		c0.12	0.18		c0.22	0.10		0.08	c0.12	
v/s Ratio Perm			c0.38						0.03			
v/c Ratio	0.76	0.81	1.00	0.85	0.46		1.51	0.51	0.13	0.62	0.66	
Uniform Delay, d1	43.2	28.7	32.2	43.6	23.8		44.7	37.7	34.9	43.3	40.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	13.0	3.6	36.9	22.9	0.2		237.1	0.6	0.2	5.3	2.6	
Delay (s)	56.1	32.3	69.1	66.5	24.1		281.8	38.3	35.1	48.6	42.8	
Level of Service	E	C	E	E	C		F	D	D	D	D	
Approach Delay (s)		49.2			35.0			182.0			44.2	
Approach LOS		D			C			F			D	
Intersection Summary												
HCM Average Control Delay			83.0			HCM Level of Service			F			
HCM Volume to Capacity ratio			0.99									
Actuated Cycle Length (s)			104.4			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			88.4%			ICU Level of Service			E			
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
6: Eleventh Street & Lammers Road

WinCo
Near Term plus Project PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  			  		 	 		 		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	0.97	0.95	1.00	0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	3433	3539	1583	3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	3433	3539	1583	3433	1863	1583
Volume (vph)	179	1713	112	148	366	76	41	106	196	60	123	24
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	179	1713	112	148	366	76	41	106	196	60	123	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	179	1713	112	148	366	76	41	106	196	60	123	24
Turn Type	Prot		Free	Prot	Free		Prot	Free		Prot	Free	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free			Free			Free			Free
Actuated Green, G (s)	4.9	30.6	62.3	6.0	31.7	62.3	0.8	6.0	62.3	1.7	6.9	62.3
Effective Green, g (s)	4.9	31.6	62.3	6.0	32.7	62.3	0.8	7.0	62.3	1.7	7.9	62.3
Actuated g/C Ratio	0.08	0.51	1.00	0.10	0.52	1.00	0.01	0.11	1.00	0.03	0.13	1.00
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	270	2579	1583	170	2669	1583	44	398	1583	94	236	1583
v/s Ratio Prot	0.05	c0.34		c0.08	0.07		0.01	0.03		c0.02	c0.07	
v/s Ratio Perm			0.07			0.05			c0.12			0.02
v/c Ratio	0.66	0.66	0.07	0.87	0.14	0.05	0.93	0.27	0.12	0.64	0.52	0.02
Uniform Delay, d1	27.9	11.4	0.0	27.8	7.6	0.0	30.7	25.3	0.0	30.0	25.4	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.0	0.7	0.1	35.2	0.0	0.1	109.0	0.4	0.2	13.4	2.1	0.0
Delay (s)	33.9	12.1	0.1	62.9	7.6	0.1	139.8	25.7	0.2	43.4	27.5	0.0
Level of Service	C	B	A	E	A	A	F	C	A	D	C	A
Approach Delay (s)		13.3			20.5			24.7			28.9	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM Average Control Delay			17.0			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			62.3			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			64.4%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: Eleventh Street & Corral Hollow Road

WinCo
Near Term plus Project PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	  		 	 		 		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	450	930	533	266	430	372	195	814	149	411	835	167
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	100%	100%	80%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	450	930	426	266	430	372	195	814	149	411	835	167
RTOR Reduction (vph)	0	0	0	0	0	158	0	0	88	0	0	95
Lane Group Flow (vph)	450	930	426	266	430	214	195	814	61	411	835	72
Turn Type	Prot		Free	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			Free			6			4			8
Actuated Green, G (s)	13.8	26.1	101.2	13.1	19.4	19.4	8.9	28.6	28.6	14.4	34.1	34.1
Effective Green, g (s)	20.8	28.1	101.2	13.1	20.4	20.4	8.9	29.6	29.6	14.4	35.1	35.1
Actuated g/C Ratio	0.21	0.28	1.00	0.13	0.20	0.20	0.09	0.29	0.29	0.14	0.35	0.35
Clearance Time (s)	11.0	6.0		4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	706	1412	1583	444	1025	319	302	1035	463	488	1227	549
v/s Ratio Prot	c0.13	c0.18		0.08	0.08		0.06	c0.23		c0.12	0.24	
v/s Ratio Perm			0.27			0.14			0.04			0.05
v/c Ratio	0.64	0.66	0.27	0.60	0.42	0.67	0.65	0.79	0.13	0.84	0.68	0.13
Uniform Delay, d1	36.8	32.3	0.0	41.6	35.2	37.3	44.6	32.9	26.3	42.3	28.3	22.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	1.1	0.4	2.2	0.3	5.5	4.7	4.0	0.1	12.5	1.6	0.1
Delay (s)	38.6	33.4	0.4	43.8	35.5	42.7	49.3	36.9	26.5	54.8	29.8	22.7
Level of Service	D	C	A	D	D	D	D	D	C	D	C	C
Approach Delay (s)		26.9			40.1			37.7			36.2	
Approach LOS		C			D			D			D	
Intersection Summary												
HCM Average Control Delay			34.2		HCM Level of Service					C		
HCM Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			101.2		Sum of lost time (s)					12.0		
Intersection Capacity Utilization			73.1%		ICU Level of Service					D		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 8: Robertson Road & Naglee Road

WinCo
 Near Term plus Project PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3125		1681	1720	1583	1770	3539	1583	1770	5041	
Flt Permitted	0.78	1.00		0.78	0.75	1.00	0.58	1.00	1.00	0.60	1.00	
Satd. Flow (perm)	1461	3125		1388	1327	1583	1088	3539	1583	1117	5041	
Volume (vph)	33	27	96	74	25	14	47	245	39	15	246	15
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	33	27	96	74	25	14	47	245	39	15	246	15
RTOR Reduction (vph)	0	84	0	0	0	12	0	0	13	0	5	0
Lane Group Flow (vph)	33	39	0	40	59	2	47	245	26	15	256	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2		6	
Actuated Green, G (s)	5.1	5.1		5.1	5.1	5.1	27.2	27.2	27.2	27.2	27.2	
Effective Green, g (s)	5.1	5.1		5.1	5.1	5.1	27.2	27.2	27.2	27.2	27.2	
Actuated g/C Ratio	0.13	0.13		0.13	0.13	0.13	0.67	0.67	0.67	0.67	0.67	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	185	395		176	168	200	734	2389	1068	754	3402	
v/s Ratio Prot		0.01						c0.07			0.05	
v/s Ratio Perm	0.02			0.03	c0.04	0.00	0.04		0.02	0.01		
v/c Ratio	0.18	0.10		0.23	0.35	0.01	0.06	0.10	0.02	0.02	0.08	
Uniform Delay, d1	15.7	15.6		15.8	16.1	15.4	2.2	2.3	2.2	2.2	2.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	0.1		0.7	1.3	0.0	0.0	0.0	0.0	0.0	0.0	
Delay (s)	16.2	15.7		16.5	17.4	15.4	2.3	2.3	2.2	2.2	2.3	
Level of Service	B	B		B	B	B	A	A	A	A	A	
Approach Delay (s)		15.8			16.8			2.3			2.2	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM Average Control Delay			6.6				HCM Level of Service		A			
HCM Volume to Capacity ratio			0.14									
Actuated Cycle Length (s)			40.3				Sum of lost time (s)		8.0			
Intersection Capacity Utilization			30.6%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												

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Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)
*****
Intersection #9 Auto Plaza Drive/Naglee Road
*****
Average Delay (sec/veh):      7.7 Worst Case Level Of Service:      B[ 14.3]
*****
Approach:      North Bound      South Bound      East Bound      West Bound
Movement:      L - T - R      L - T - R      L - T - R      L - T - R
-----|-----|-----|-----|
Control:      Uncontrolled      Uncontrolled      Stop Sign      Stop Sign
Rights:      Include      Include      Include      Include
Lanes:      1 0 1 1 0      0 1 0 1 0      0 0 1! 0 0      0 0 1! 0 0
-----|-----|-----|-----|
Volume Module:
Base Vol:      32 70 6 5 39 19 27 21 23 1 8 2
Growth 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
Initial Bse: 32 70 6 5 39 19 27 21 23 1 8 2
Added Vol: 170 21 0 0 17 14 15 0 182 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 202 91 6 5 56 33 42 21 205 1 8 2
User 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
PHF 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
PHF Volume: 202 91 6 5 56 33 42 21 205 1 8 2
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
Final Vol.: 202 91 6 5 56 33 42 21 205 1 8 2
Critical Gap Module:
Critical Gp: 4.1 xxxx xxxxx 4.1 xxxx xxxxx 7.5 6.5 6.9 7.5 6.5 6.9
FollowUpTim: 2.2 xxxx xxxxx 2.2 xxxx xxxxx 3.5 4.0 3.3 3.5 4.0 3.3
-----|-----|-----|-----|
Capacity Module:
Cnflct Vol: 89 xxxx xxxxxx 97 xxxx xxxxxx 536 584 45 547 597 48
Potent Cap.: 1519 xxxx xxxxxx 1509 xxxx xxxxxx 432 426 1022 425 419 1016
Move Cap.: 1519 xxxx xxxxxx 1509 xxxx xxxxxx 380 369 1022 291 362 1016
Volume/Cap: 0.13 xxxx xxxxx 0.00 xxxx xxxxx 0.11 0.06 0.20 0.00 0.02 0.00
-----|-----|-----|-----|
Level Of Service Module:
Queue: 0.5 xxxx xxxxxx 0.0 xxxx xxxxxx xxxxxx xxxxx xxxxxx xxxxxx xxxxx xxxxxx
Stopped Del: 7.7 xxxx xxxxxx 7.4 xxxx xxxxxx xxxxxx xxxxx xxxxxx xxxxxx xxxxx xxxxxx
LOS by Move: A * * A * * A * * A * *
Movement: LT - LTR - RT LT - LTR - RT LT - LTR - RT LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxxx xxxx xxxx xxxxxx xxxx 728 xxxxxx xxxx 400 xxxxxx
SharedQueue:xxxxxx xxxx xxxxxx 0.0 xxxx xxxxxx xxxxxx 1.7 xxxxxx xxxxxx 0.1 xxxxxx
Shrd StpDel:xxxxxx xxxx xxxxxx 7.4 xxxx xxxxxx xxxxxx 12.8 xxxxxx xxxxxx 14.3 xxxxxx
Shared LOS: * * * A * * * B * * *
ApproachDel: xxxxxxxx xxxxxxxx 12.8 14.3
ApproachLOS: * * B B

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HCM Signalized Intersection Capacity Analysis
 1: Grant Line Road & Byron Road

WinCo
 Near Term plus Project PM - Mitigated



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frt	0.93		0.89		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1693		1655		1770	1863
Flt Permitted	0.98		1.00		0.45	1.00
Satd. Flow (perm)	1693		1655		847	1863
Volume (vph)	276	284	73	346	473	203
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	276	284	73	346	473	203
RTOR Reduction (vph)	57	0	149	0	0	0
Lane Group Flow (vph)	503	0	270	0	473	203
Turn Type					Perm	
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	20.0		37.0		37.0	37.0
Effective Green, g (s)	20.0		37.0		37.0	37.0
Actuated g/C Ratio	0.31		0.57		0.57	0.57
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	521		942		482	1060
v/s Ratio Prot	c0.30		0.16			0.11
v/s Ratio Perm					c0.56	
v/c Ratio	0.97		0.29		0.98	0.19
Uniform Delay, d1	22.2		7.2		13.7	6.8
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	30.6		0.2		36.0	0.1
Delay (s)	52.8		7.4		49.6	6.9
Level of Service	D		A		D	A
Approach Delay (s)	52.8		7.4			36.8
Approach LOS	D		A			D
Intersection Summary						
HCM Average Control Delay			34.7		HCM Level of Service	C
HCM Volume to Capacity ratio			0.98			
Actuated Cycle Length (s)			65.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			94.1%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
 3: I 205 WB Ramps & Naglee Road

WinCo
 Near Term plus Project PM - Mitigated

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	3433	3539	1583	3433	3539	1583	1770	5073	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	3433	3539	1583	3433	3539	1583	1770	5073	
Volume (vph)	21	119	766	377	207	154	675	642	139	88	652	11
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	21	119	766	377	207	154	675	642	139	88	652	11
RTOR Reduction (vph)	0	0	239	0	0	85	0	0	96	0	2	0
Lane Group Flow (vph)	21	119	527	377	207	69	675	642	43	88	661	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	3.3	43.6	43.6	15.0	55.7	55.7	27.0	37.9	37.9	10.6	22.0	
Effective Green, g (s)	3.5	44.9	44.9	15.6	57.0	57.0	27.2	38.8	38.8	11.3	22.9	
Actuated g/C Ratio	0.03	0.35	0.35	0.12	0.45	0.45	0.21	0.31	0.31	0.09	0.18	
Clearance Time (s)	4.2	5.3	5.3	4.6	5.3	5.3	4.2	4.9	4.9	4.7	4.9	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	49	661	561	423	1593	713	738	1085	485	158	918	
v/s Ratio Prot	0.01	0.06		c0.11	0.06		c0.20	0.18		0.05	c0.13	
v/s Ratio Perm			c0.33			0.04			0.03			
v/c Ratio	0.43	0.18	0.94	0.89	0.13	0.10	0.91	0.59	0.09	0.56	0.72	
Uniform Delay, d1	60.6	28.2	39.5	54.7	20.3	20.0	48.6	37.2	31.3	55.3	48.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.9	0.1	23.5	20.3	0.0	0.1	15.8	0.9	0.1	4.2	2.8	
Delay (s)	66.5	28.3	63.0	75.0	20.4	20.1	64.4	38.1	31.4	59.5	51.6	
Level of Service	E	C	E	E	C	C	E	D	C	E	D	
Approach Delay (s)		58.6			48.2			49.6			52.6	
Approach LOS		E			D			D			D	
Intersection Summary												
HCM Average Control Delay			52.0			HCM Level of Service			D			
HCM Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			126.6			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			81.0%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: Grant Line Road & Corral Hollow Road

WinCo
Near Term plus Project PM - Mitigated

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 		 	 		  	 			 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1425	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.94	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3503		3743	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3503		3743	3539	1583	1770	3539	1583
Volume (vph)	190	1096	1163	216	583	43	810	347	211	140	317	109
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	100%	100%	75%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	190	1096	872	216	583	43	810	347	211	140	317	109
RTOR Reduction (vph)	0	0	0	0	4	0	0	0	153	0	0	93
Lane Group Flow (vph)	190	1096	872	216	622	0	810	347	58	140	317	16
Turn Type	Prot		Free	Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1		6
Permitted Phases			Free						2			6
Actuated Green, G (s)	14.1	38.8	107.9	9.1	33.8		27.2	28.7	28.7	13.3	14.8	14.8
Effective Green, g (s)	14.1	39.8	107.9	9.1	34.8		27.2	29.7	29.7	13.3	15.8	15.8
Actuated g/C Ratio	0.13	0.37	1.00	0.08	0.32		0.25	0.28	0.28	0.12	0.15	0.15
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	231	1305	1583	290	1130		944	974	436	218	518	232
v/s Ratio Prot	c0.11	c0.31		0.06	0.18		c0.22	0.10		0.08	0.09	
v/s Ratio Perm			c0.55						0.04			0.01
v/c Ratio	0.82	0.84	0.55	0.74	0.55		0.86	0.36	0.13	0.64	0.61	0.07
Uniform Delay, d1	45.7	31.1	0.0	48.3	30.1		38.5	31.4	29.4	45.0	43.2	39.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	20.5	4.9	1.4	9.9	0.6		7.8	0.2	0.1	6.3	2.1	0.1
Delay (s)	66.1	36.1	1.4	58.2	30.7		46.3	31.6	29.6	51.4	45.3	39.8
Level of Service	E	D	A	E	C		D	C	C	D	D	D
Approach Delay (s)		24.7			37.7			40.0			45.8	
Approach LOS		C			D			D			D	
Intersection Summary												
HCM Average Control Delay			33.6				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			107.9				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			79.1%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

**APPENDIX C:
CUMULATIVE LOS CALCULATION WORKSHEETS**

HCM Signalized Intersection Capacity Analysis
2: Grant Line Road & Naglee Road

WinCo
Cumulative Background AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			  						 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00		0.91	1.00				0.95	0.95	1.00
Frt	1.00	1.00	0.85		1.00	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00				0.95	0.96	1.00
Satd. Flow (prot)	1770	3539	1583		5085	1583				1681	1703	1583
Flt Permitted	0.95	1.00	1.00		1.00	1.00				0.95	0.96	1.00
Satd. Flow (perm)	1770	3539	1583		5085	1583				1681	1703	1583
Volume (vph)	423	1364	93	0	1717	725	0	0	0	509	65	292
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	423	1364	93	0	1717	725	0	0	0	509	65	292
RTOR Reduction (vph)	0	0	27	0	0	0	0	0	0	0	0	223
Lane Group Flow (vph)	423	1364	66	0	1717	725	0	0	0	280	294	69
Turn Type	Prot		Perm			Free			Perm			Perm
Protected Phases	5	2			6							4
Permitted Phases			2			Free				4		4
Actuated Green, G (s)	20.4	62.8	62.8		38.2	94.6				21.9	21.9	21.9
Effective Green, g (s)	20.6	64.1	64.1		39.5	94.6				22.5	22.5	22.5
Actuated g/C Ratio	0.22	0.68	0.68		0.42	1.00				0.24	0.24	0.24
Clearance Time (s)	4.2	5.3	5.3		5.3					4.6	4.6	4.6
Vehicle Extension (s)	3.0	3.0	3.0		3.0					3.0	3.0	3.0
Lane Grp Cap (vph)	385	2398	1073		2123	1583				400	405	377
v/s Ratio Prot	c0.24	0.39			c0.34							
v/s Ratio Perm			0.04			0.46				0.17	0.17	0.04
v/c Ratio	1.10	0.57	0.06		0.81	0.46				0.70	0.73	0.18
Uniform Delay, d1	37.0	8.0	5.1		24.2	0.0				33.0	33.2	28.7
Progression Factor	1.00	1.00	1.00		1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	75.2	0.3	0.0		2.4	1.0				5.4	6.4	0.2
Delay (s)	112.2	8.3	5.2		26.6	1.0				38.4	39.6	29.0
Level of Service	F	A	A		C	A				D	D	C
Approach Delay (s)		31.5			19.0			0.0			35.6	
Approach LOS		C			B			A			D	
Intersection Summary												
HCM Average Control Delay			26.3				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			94.6				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			82.4%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 3: I 205 WB Ramps & Naglee Road

WinCo
 Cumulative Background AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	3433	3539	1583	1770	3539	1583	1770	4918	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	3433	3539	1583	1770	3539	1583	1770	4918	
Volume (vph)	12	46	312	406	150	209	661	453	189	78	192	54
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	12	46	312	406	150	209	661	453	189	78	192	54
RTOR Reduction (vph)	0	0	260	0	0	139	0	0	123	0	43	0
Lane Group Flow (vph)	12	46	52	406	150	70	661	453	66	78	203	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	1.2	12.1	12.1	14.0	25.3	25.3	25.3	26.9	26.9	7.4	9.5	
Effective Green, g (s)	1.4	13.4	13.4	14.6	26.6	26.6	25.5	27.8	27.8	8.1	10.4	
Actuated g/C Ratio	0.02	0.17	0.17	0.18	0.33	0.33	0.32	0.35	0.35	0.10	0.13	
Clearance Time (s)	4.2	5.3	5.3	4.6	5.3	5.3	4.2	4.9	4.9	4.7	4.9	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	31	312	265	627	1178	527	565	1231	551	179	640	
v/s Ratio Prot	0.01	0.02		c0.12	0.04		c0.37	c0.13		0.04	0.04	
v/s Ratio Perm			c0.03			0.04			0.04			
v/c Ratio	0.39	0.15	0.20	0.65	0.13	0.13	1.17	0.37	0.12	0.44	0.32	
Uniform Delay, d1	38.8	28.4	28.6	30.3	18.6	18.6	27.2	19.5	17.7	33.8	31.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.8	0.2	0.4	2.3	0.0	0.1	94.3	0.2	0.1	1.7	0.3	
Delay (s)	46.7	28.6	29.0	32.6	18.6	18.7	121.5	19.7	17.8	35.4	31.8	
Level of Service	D	C	C	C	B	B	F	B	B	D	C	
Approach Delay (s)		29.5			26.0			71.0			32.7	
Approach LOS		C			C			E			C	
Intersection Summary												
HCM Average Control Delay			48.5				HCM Level of Service			D		
HCM Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			79.9				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			69.9%				ICU Level of Service		C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 4: Grant Line Road & I-205 EB On-Ramp

WinCo
 Cumulative Background AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	1.00	0.95			0.91	1.00	1.00		1.00			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	1770	3539			5085	1583	1770		1583			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	1770	3539			5085	1583	1770		1583			
Volume (vph)	1052	655	0	0	2181	200	261	0	397	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1052	655	0	0	2181	200	261	0	397	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	225	0	0	0
Lane Group Flow (vph)	1052	655	0	0	2181	200	261	0	172	0	0	0
Turn Type	Prot						Free custom		custom			
Protected Phases	5	2					6					
Permitted Phases							Free		8		8	
Actuated Green, G (s)	37.1	73.4					32.1	104.3	21.4	21.4		
Effective Green, g (s)	37.3	74.7					33.4	104.3	21.6	21.6		
Actuated g/C Ratio	0.36	0.72					0.32	1.00	0.21	0.21		
Clearance Time (s)	4.2	5.3					5.3		4.2	4.2		
Vehicle Extension (s)	3.0	3.0					3.0		3.0	3.0		
Lane Grp Cap (vph)	633	2535					1628	1583	367	328		
v/s Ratio Prot	c0.59	0.19					c0.43					
v/s Ratio Perm								0.13	c0.15	0.11		
v/c Ratio	1.66	0.26					1.34	0.13	0.71	0.52		
Uniform Delay, d1	33.5	5.2					35.4	0.0	38.4	36.8		
Progression Factor	1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2	304.8	0.1					157.1	0.2	6.4	1.5		
Delay (s)	338.3	5.2					192.5	0.2	44.8	38.3		
Level of Service	F	A					F	A	D	D		
Approach Delay (s)	210.5						176.4		40.9		0.0	
Approach LOS	F						F		D		A	
Intersection Summary												
HCM Average Control Delay	169.9		HCM Level of Service				F					
HCM Volume to Capacity ratio	1.32											
Actuated Cycle Length (s)	104.3		Sum of lost time (s)				12.0					
Intersection Capacity Utilization	124.9%		ICU Level of Service				H					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Grant Line Road & Naglee Road

WinCo
Cumulative Background PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00		0.91	1.00				0.95	0.95	1.00
Frt	1.00	1.00	0.85		1.00	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00				0.95	0.96	1.00
Satd. Flow (prot)	1770	3539	1583		5085	1583				1681	1691	1583
Flt Permitted	0.95	1.00	1.00		1.00	1.00				0.95	0.96	1.00
Satd. Flow (perm)	1770	3539	1583		5085	1583				1681	1691	1583
Volume (vph)	478	1910	227	0	1128	720	0	0	0	977	35	910
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	478	1910	227	0	1128	720	0	0	0	977	35	910
RTOR Reduction (vph)	0	0	57	0	0	0	0	0	0	0	0	256
Lane Group Flow (vph)	478	1910	170	0	1128	720	0	0	0	493	519	654
Turn Type	Prot		Perm			Free				Perm		Perm
Protected Phases	5	2			6						4	
Permitted Phases			2			Free				4		4
Actuated Green, G (s)	20.1	60.7	60.7		36.4	100.8				30.2	30.2	30.2
Effective Green, g (s)	20.3	62.0	62.0		37.7	100.8				30.8	30.8	30.8
Actuated g/C Ratio	0.20	0.62	0.62		0.37	1.00				0.31	0.31	0.31
Clearance Time (s)	4.2	5.3	5.3		5.3					4.6	4.6	4.6
Vehicle Extension (s)	3.0	3.0	3.0		3.0					3.0	3.0	3.0
Lane Grp Cap (vph)	356	2177	974		1902	1583				514	517	484
v/s Ratio Prot	c0.27	c0.54			0.22							
v/s Ratio Perm			0.11			0.45				0.29	0.31	c0.41
v/c Ratio	1.34	0.88	0.17		0.59	0.45				0.96	1.00	1.35
Uniform Delay, d1	40.2	16.2	8.4		25.4	0.0				34.4	35.0	35.0
Progression Factor	1.00	1.00	1.00		1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	172.0	4.3	0.1		0.5	0.9				29.2	40.5	171.0
Delay (s)	212.2	20.6	8.5		25.9	0.9				63.6	75.5	206.0
Level of Service	F	C	A		C	A				E	E	F
Approach Delay (s)		54.5			16.2		0.0				134.3	
Approach LOS		D			B		A				F	
Intersection Summary												
HCM Average Control Delay			67.4			HCM Level of Service				E		
HCM Volume to Capacity ratio			1.12									
Actuated Cycle Length (s)			100.8			Sum of lost time (s)				8.0		
Intersection Capacity Utilization			87.4%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 3: I 205 WB Ramps & Naglee Road

WinCo
 Cumulative Background PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	3433	3539	1583	1770	3539	1583	1770	5010	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	3433	3539	1583	1770	3539	1583	1770	5010	
Volume (vph)	144	282	715	449	220	240	413	702	112	512	724	79
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	144	282	715	449	220	240	413	702	112	512	724	79
RTOR Reduction (vph)	0	0	268	0	0	186	0	0	80	0	9	0
Lane Group Flow (vph)	144	282	447	449	220	54	413	702	32	512	794	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	14.9	20.2	20.2	21.6	27.3	27.3	25.2	30.5	30.5	35.3	41.1	
Effective Green, g (s)	15.1	21.5	21.5	22.2	28.6	28.6	25.4	31.4	31.4	36.0	42.0	
Actuated g/C Ratio	0.12	0.17	0.17	0.17	0.23	0.23	0.20	0.25	0.25	0.28	0.33	
Clearance Time (s)	4.2	5.3	5.3	4.6	5.3	5.3	4.2	4.9	4.9	4.7	4.9	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	210	315	268	600	796	356	354	874	391	501	1656	
v/s Ratio Prot	0.08	0.15		c0.13	0.06		c0.23	c0.20		c0.29	0.16	
v/s Ratio Perm			c0.28			0.03			0.02			
v/c Ratio	0.69	0.90	1.67	0.75	0.28	0.15	1.17	0.80	0.08	1.02	0.48	
Uniform Delay, d1	53.7	51.7	52.8	49.8	40.7	39.5	50.8	44.9	36.8	45.6	33.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.9	26.0	317.3	5.1	0.2	0.2	101.3	5.4	0.1	45.9	0.2	
Delay (s)	62.7	77.6	370.1	54.9	40.9	39.7	152.2	50.3	36.9	91.4	34.1	
Level of Service	E	E	F	D	D	D	F	D	D	F	C	
Approach Delay (s)		259.0			47.5			83.4			56.4	
Approach LOS		F			D			F			E	
Intersection Summary												
HCM Average Control Delay			112.2				HCM Level of Service			F		
HCM Volume to Capacity ratio			1.05									
Actuated Cycle Length (s)			127.1				Sum of lost time (s)		16.0			
Intersection Capacity Utilization			88.8%				ICU Level of Service		E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 4: Grant Line Road & I-205 EB On-Ramp

WinCo
 Cumulative Background PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	1.00	0.95			0.91	1.00	1.00		1.00			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	1770	3539			5085	1583	1770		1583			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	1770	3539			5085	1583	1770		1583			
Volume (vph)	1110	1777	0	0	1572	151	189	0	469	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1110	1777	0	0	1572	151	189	0	469	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	17	0	0	0
Lane Group Flow (vph)	1110	1777	0	0	1572	151	189	0	452	0	0	0
Turn Type	Prot						Free custom		custom			
Protected Phases	5	2					6					
Permitted Phases							Free		8		8	
Actuated Green, G (s)	37.0	73.2					32.0	117.1	34.4	34.4		
Effective Green, g (s)	37.2	74.5					33.3	117.1	34.6	34.6		
Actuated g/C Ratio	0.32	0.64					0.28	1.00	0.30	0.30		
Clearance Time (s)	4.2	5.3					5.3		4.2	4.2		
Vehicle Extension (s)	3.0	3.0					3.0		3.0	3.0		
Lane Grp Cap (vph)	562	2252					1446	1583	523	468		
v/s Ratio Prot	c0.63	0.50					c0.31					
v/s Ratio Perm								0.10	0.11	c0.29		
v/c Ratio	1.98	0.79					1.09	0.10	0.36	0.97		
Uniform Delay, d1	39.9	15.6					41.9	0.0	32.5	40.7		
Progression Factor	1.00	1.00					1.00	1.00	1.00	1.00		
Incremental Delay, d2	445.2	1.9					51.1	0.1	0.4	32.6		
Delay (s)	485.1	17.5					93.0	0.1	33.0	73.3		
Level of Service	F	B					F	A	C	E		
Approach Delay (s)	197.3						84.9		61.7		0.0	
Approach LOS	F						F		E		A	
Intersection Summary												
HCM Average Control Delay	143.6		HCM Level of Service				F					
HCM Volume to Capacity ratio	1.36											
Actuated Cycle Length (s)	117.1		Sum of lost time (s)				12.0					
Intersection Capacity Utilization	112.3%		ICU Level of Service				H					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: Grant Line Road & Corral Hollow Road

WinCo
Cumulative Background PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1425	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.94	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3448		3743	3539	1583	1770	3460	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3448		3743	3539	1583	1770	3460	
Volume (vph)	411	1225	892	194	904	188	788	598	194	237	706	124
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	100%	100%	75%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	411	1225	669	194	904	188	788	598	194	237	706	124
RTOR Reduction (vph)	0	0	215	0	15	0	0	0	145	0	12	0
Lane Group Flow (vph)	411	1225	454	194	1077	0	788	598	49	237	818	0
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	16.0	39.1	39.1	14.6	37.7		15.0	28.4	28.4	17.4	30.8	
Effective Green, g (s)	16.0	40.1	40.1	14.6	38.7		15.0	29.4	29.4	17.4	31.8	
Actuated g/C Ratio	0.14	0.34	0.34	0.12	0.33		0.13	0.25	0.25	0.15	0.27	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0	5.0	4.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	241	1208	540	220	1136		478	886	396	262	936	
v/s Ratio Prot	c0.23	c0.35		0.11	0.31		c0.21	0.17		0.13	c0.24	
v/s Ratio Perm			0.29						0.03			
v/c Ratio	1.71	1.01	0.84	0.88	0.95		1.65	0.67	0.12	0.90	0.87	
Uniform Delay, d1	50.8	38.7	35.7	50.6	38.4		51.2	39.7	34.1	49.2	40.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	334.6	29.4	11.0	31.1	15.7		301.1	2.0	0.1	31.5	9.1	
Delay (s)	385.3	68.1	46.8	81.7	54.1		352.4	41.8	34.2	80.8	50.0	
Level of Service	F	E	D	F	D		F	D	C	F	D	
Approach Delay (s)		118.5			58.3			195.8			56.8	
Approach LOS		F			E			F			E	
Intersection Summary												
HCM Average Control Delay			115.1			HCM Level of Service				F		
HCM Volume to Capacity ratio			1.10									
Actuated Cycle Length (s)			117.5			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			110.5%			ICU Level of Service			H			
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
6: Eleventh Street & Lammers Road

WinCo
Cumulative Background PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  			  		 	 		 		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	0.97	0.95	1.00	0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	3433	3539	1583	3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	3433	3539	1583	3433	1863	1583
Volume (vph)	282	1665	1310	220	672	69	1741	367	973	52	111	19
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	282	1665	1310	220	672	69	1741	367	973	52	111	19
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	282	1665	1310	220	672	69	1741	367	973	52	111	19
Turn Type	Prot		Free		Prot		Free		Prot		Free	
Protected Phases	5	2			1	6			3	8	7	4
Permitted Phases			Free				Free				Free	
Actuated Green, G (s)	6.1	24.5	57.8		6.1	24.5	57.8		3.3	7.5	57.8	
Effective Green, g (s)	6.1	25.5	57.8		6.1	25.5	57.8		3.3	8.5	57.8	
Actuated g/C Ratio	0.11	0.44	1.00		0.11	0.44	1.00		0.06	0.15	1.00	
Clearance Time (s)	4.0	5.0			4.0	5.0			4.0	5.0		
Vehicle Extension (s)	3.0	3.0			3.0	3.0			3.0	3.0		
Lane Grp Cap (vph)	362	2243	1583		187	2243	1583		196	520	1583	
v/s Ratio Prot	0.08	0.33			0.12	0.13	c0.51		0.10		0.02 0.06	
v/s Ratio Perm			c0.83				0.04				0.61 0.01	
v/c Ratio	0.78	0.74	0.83		1.18	0.30	0.04		8.88	0.71	0.61 0.51 0.50 0.01	
Uniform Delay, d1	25.2	13.4	0.0		25.8	10.4	0.0		27.2	23.5	0.0 27.6 23.8 0.0	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00 1.00 1.00	
Incremental Delay, d2	10.1	1.4	5.1		121.4	0.1	0.1		3557.5	4.3	1.8 4.4 1.8 0.0	
Delay (s)	35.3	14.8	5.1		147.2	10.5	0.1		3584.8	27.8	1.8 32.0 25.6 0.0	
Level of Service	D	B	A		F	B	A		F	C	A C C A	
Approach Delay (s)			12.7		41.0				2029.5		24.8	
Approach LOS			B		D				F		C	

Intersection Summary			
HCM Average Control Delay	847.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.33		
Actuated Cycle Length (s)	57.8	Sum of lost time (s)	4.0
Intersection Capacity Utilization	110.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: Eleventh Street & Corral Hollow Road

WinCo
Cumulative Background PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	  		 	 		 	 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	404	1138	491	676	624	328	174	1187	461	465	1468	127
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	100%	100%	80%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	404	1138	393	676	624	328	174	1187	461	465	1468	127
RTOR Reduction (vph)	0	0	0	0	0	132	0	0	177	0	0	41
Lane Group Flow (vph)	404	1138	393	676	624	196	174	1187	284	465	1468	86
Turn Type	Prot		Free	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			Free			6			4			8
Actuated Green, G (s)	14.0	33.7	127.7	22.0	35.7	35.7	8.9	39.0	39.0	14.0	44.1	44.1
Effective Green, g (s)	21.0	35.7	127.7	22.0	36.7	36.7	8.9	40.0	40.0	14.0	45.1	45.1
Actuated g/C Ratio	0.16	0.28	1.00	0.17	0.29	0.29	0.07	0.31	0.31	0.11	0.35	0.35
Clearance Time (s)	11.0	6.0		4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	565	1422	1583	591	1461	455	239	1109	496	376	1250	559
v/s Ratio Prot	0.12	c0.22		c0.20	0.12		0.05	0.34		c0.14	c0.41	
v/s Ratio Perm			c0.25			0.12			0.18			0.05
v/c Ratio	0.72	0.80	0.25	1.14	0.43	0.43	0.73	1.07	0.57	1.24	1.17	0.15
Uniform Delay, d1	50.5	42.7	0.0	52.8	37.0	37.0	58.2	43.8	36.7	56.8	41.3	28.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.3	3.3	0.4	83.5	0.2	0.7	10.5	48.0	1.6	127.4	87.2	0.1
Delay (s)	54.8	46.0	0.4	136.3	37.2	37.7	68.8	91.8	38.3	184.3	128.5	28.4
Level of Service	D	D	A	F	D	D	E	F	D	F	F	C
Approach Delay (s)		38.6			78.4			76.1			134.9	
Approach LOS		D			E			E			F	
Intersection Summary												
HCM Average Control Delay			83.1	HCM Level of Service				F				
HCM Volume to Capacity ratio			1.05									
Actuated Cycle Length (s)			127.7	Sum of lost time (s)				12.0				
Intersection Capacity Utilization			100.7%	ICU Level of Service				G				
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 8: Robertson Road & Naglee Road

WinCo
 Cumulative Background PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3099		1681	1720	1583	1770	3539	1583	1770	4988	
Flt Permitted	0.72	1.00		0.67	0.81	1.00	0.56	1.00	1.00	0.57	1.00	
Satd. Flow (perm)	1335	3099		1193	1435	1583	1041	3539	1583	1061	4988	
Volume (vph)	106	21	102	74	25	14	138	298	6	5	266	39
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	106	21	102	74	25	14	138	298	6	5	266	39
RTOR Reduction (vph)	0	76	0	0	0	10	0	0	3	0	17	0
Lane Group Flow (vph)	106	47	0	40	59	4	138	298	3	5	288	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2		6	
Actuated Green, G (s)	10.8	10.8		10.8	10.8	10.8	24.2	24.2	24.2	24.2	24.2	
Effective Green, g (s)	10.8	10.8		10.8	10.8	10.8	24.2	24.2	24.2	24.2	24.2	
Actuated g/C Ratio	0.25	0.25		0.25	0.25	0.25	0.56	0.56	0.56	0.56	0.56	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	335	778		300	360	398	586	1992	891	597	2807	
v/s Ratio Prot		0.02						0.08			0.06	
v/s Ratio Perm	c0.08			0.03	0.04	0.00	c0.13		0.00	0.00		
v/c Ratio	0.32	0.06		0.13	0.16	0.01	0.24	0.15	0.00	0.01	0.10	
Uniform Delay, d1	13.1	12.2		12.5	12.6	12.1	4.7	4.5	4.1	4.1	4.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	0.0		0.2	0.2	0.0	0.2	0.0	0.0	0.0	0.0	
Delay (s)	13.6	12.3		12.7	12.8	12.1	4.9	4.5	4.1	4.1	4.4	
Level of Service	B	B		B	B	B	A	A	A	A	A	
Approach Delay (s)		12.9			12.7			4.6			4.4	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM Average Control Delay			7.1				HCM Level of Service		A			
HCM Volume to Capacity ratio			0.26									
Actuated Cycle Length (s)			43.0				Sum of lost time (s)		8.0			
Intersection Capacity Utilization			36.2%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												

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Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)
*****
Intersection #9 Auto Plaza Drive/Naglee Road
*****
Average Delay (sec/veh):      14.8   Worst Case Level Of Service:      D[ 27.5]
*****
Approach:      North Bound      South Bound      East Bound      West Bound
Movement:      L - T - R      L - T - R      L - T - R      L - T - R
-----|-----|-----|-----|
Control:      Uncontrolled      Uncontrolled      Stop Sign      Stop Sign
Rights:      Include      Include      Include      Include
Lanes:      1 0 1 1 0      0 1 0 1 0      0 0 1! 0 0      0 0 1! 0 0
-----|-----|-----|-----|
Volume Module:
Base Vol:      32 116 13      5 39 31      60 54 23      2 42 2
Growth 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
Initial Bse:  32 116 13      5 39 31      60 54 23      2 42 2
Added Vol:    196 16 23      0 15 14      15 13 212      21 12 0
PasserByVol:  0 0 0      0 0 0      0 0 0      0 0 0
Initial Fut:  228 132 36      5 54 45      75 67 235      23 54 2
User 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
PHF 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
PHF Volume:   228 132 36      5 54 45      75 67 235      23 54 2
Reduct Vol:   0 0 0      0 0 0      0 0 0      0 0 0
Final Vol.:  228 132 36      5 54 45      75 67 235      23 54 2
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx  4.1 xxxx xxxxx  7.5 6.5 6.9  7.5 6.5 6.9
FollowUpTim:  2.2 xxxx xxxxx  2.2 xxxx xxxxx  3.5 4.0 3.3  3.5 4.0 3.3
-----|-----|-----|-----|
Capacity Module:
Cnflct Vol:   99 xxxx xxxxxx  168 xxxx xxxxxx  636 711 50  677 715 84
Potent Cap.: 1507 xxxx xxxxxx 1422 xxxx xxxxxx  367 361 1015 343 359 965
Move Cap.:   1507 xxxx xxxxxx 1422 xxxx xxxxxx  280 305 1015 194 303 965
Volume/Cap:  0.15 xxxx xxxxx  0.00 xxxx xxxxx  0.27 0.22 0.23 0.12 0.18 0.00
-----|-----|-----|-----|
Level Of Service Module:
Queue:        0.5 xxxx xxxxxx  0.0 xxxx xxxxxx  xxxxxx xxxx xxxxxx  xxxxxx xxxx xxxxxx
Stopped Del:  7.8 xxxx xxxxxx  7.5 xxxx xxxxxx  xxxxxx xxxx xxxxxx  xxxxxx xxxx xxxxxx
LOS by Move:  A * *      A * *      * * *      * * *
Movement:    LT - LTR - RT  LT - LTR - RT  LT - LTR - RT  LT - LTR - RT
Shared Cap.:  xxxx xxxx xxxxxx  xxxx xxxx xxxxxx  xxxx 524 xxxxxx  xxxx 264 xxxxxx
SharedQueue:  xxxxxx xxxx xxxxxx  0.0 xxxx xxxxxx  xxxxxx 5.8 xxxxxx  xxxxxx 1.2 xxxxxx
Shrd StpDel:  xxxxxx xxxx xxxxxx  7.5 xxxx xxxxxx  xxxxxx 27.5 xxxxxx  xxxxxx 24.3 xxxxxx
Shared LOS:   * * *      A * *      * * *      D * * *
ApproachDel:  xxxxxxx  xxxxxxx  27.5  24.3
ApproachLOS:  * *      * *      D C

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HCM Signalized Intersection Capacity Analysis
2: Grant Line Road & Naglee Road

WinCo
Cumulative Background AM-Improved

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00		0.91	1.00				0.95	0.95	1.00
Frt	1.00	1.00	0.85		1.00	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00				0.95	0.96	1.00
Satd. Flow (prot)	1770	3539	1583		5085	1583				1681	1703	1583
Flt Permitted	0.95	1.00	1.00		1.00	1.00				0.95	0.96	1.00
Satd. Flow (perm)	1770	3539	1583		5085	1583				1681	1703	1583
Volume (vph)	423	1364	93	0	1717	725	0	0	0	509	65	292
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	423	1364	93	0	1717	725	0	0	0	509	65	292
RTOR Reduction (vph)	0	0	28	0	0	0	0	0	0	0	0	222
Lane Group Flow (vph)	423	1364	65	0	1717	725	0	0	0	280	294	70
Turn Type	Prot		Perm			Free				Perm		Perm
Protected Phases	5	2			6							4
Permitted Phases			2			Free				4		4
Actuated Green, G (s)	23.9	61.4	61.4		33.3	93.0				21.7	21.7	21.7
Effective Green, g (s)	24.1	62.7	62.7		34.6	93.0				22.3	22.3	22.3
Actuated g/C Ratio	0.26	0.67	0.67		0.37	1.00				0.24	0.24	0.24
Clearance Time (s)	4.2	5.3	5.3		5.3					4.6	4.6	4.6
Vehicle Extension (s)	3.0	3.0	3.0		3.0					3.0	3.0	3.0
Lane Grp Cap (vph)	459	2386	1067		1892	1583				403	408	380
v/s Ratio Prot	c0.24	0.39			c0.34							
v/s Ratio Perm			0.04			0.46				0.17	0.17	0.04
v/c Ratio	0.92	0.57	0.06		0.91	0.46				0.69	0.72	0.18
Uniform Delay, d1	33.5	8.0	5.1		27.7	0.0				32.2	32.5	28.1
Progression Factor	1.00	1.00	1.00		1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	23.9	0.3	0.0		6.7	1.0				5.1	6.2	0.2
Delay (s)	57.5	8.4	5.2		34.4	1.0				37.4	38.6	28.4
Level of Service	E	A	A		C	A				D	D	C
Approach Delay (s)		19.3			24.5			0.0			34.8	
Approach LOS		B			C			A			C	
Intersection Summary												
HCM Average Control Delay			24.3			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			93.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			82.4%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 3: I 205 WB Ramps & Naglee Road

WinCo
 Cumulative Background AM-Improved

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	3433	3539	1583	1770	3539	1583	1770	4918	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	3433	3539	1583	1770	3539	1583	1770	4918	
Volume (vph)	12	46	312	406	150	209	661	453	189	78	192	54
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	12	46	312	406	150	209	661	453	189	78	192	54
RTOR Reduction (vph)	0	0	0	0	0	159	0	0	100	0	46	0
Lane Group Flow (vph)	12	46	312	406	150	50	661	453	89	78	200	0
Turn Type	Prot		Free	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			8			2			
Actuated Green, G (s)	1.3	5.8	89.2	15.3	20.2	20.2	39.2	40.9	40.9	7.7	9.9	
Effective Green, g (s)	1.5	7.1	89.2	15.9	21.5	21.5	39.4	41.8	41.8	8.4	10.8	
Actuated g/C Ratio	0.02	0.08	1.00	0.18	0.24	0.24	0.44	0.47	0.47	0.09	0.12	
Clearance Time (s)	4.2	5.3		4.6	5.3	5.3	4.2	4.9	4.9	4.7	4.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	30	148	1583	612	853	382	782	1658	742	167	595	
v/s Ratio Prot	0.01	c0.02		c0.12	0.04		c0.37	c0.13		0.04	0.04	
v/s Ratio Perm			0.20			0.03			0.06			
v/c Ratio	0.40	0.31	0.20	0.66	0.18	0.13	0.85	0.27	0.12	0.47	0.34	
Uniform Delay, d1	43.4	38.7	0.0	34.2	26.8	26.5	22.2	14.4	13.3	38.3	35.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.5	1.2	0.3	2.7	0.1	0.2	8.4	0.1	0.1	2.1	0.3	
Delay (s)	51.9	39.9	0.3	36.9	26.9	26.7	30.5	14.5	13.4	40.3	36.3	
Level of Service	D	D	A	D	C	C	C	B	B	D	D	
Approach Delay (s)		6.9			32.1			22.5			37.2	
Approach LOS		A			C			C			D	
Intersection Summary												
HCM Average Control Delay			24.8				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			89.2				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			69.9%				ICU Level of Service		C			
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
 4: Grant Line Road & I-205 EB On-Ramp

WinCo
 Cumulative Background AM-Improved

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	 	 			  								
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0				
Lane Util. Factor	0.97	0.95			0.91	1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85	1.00		0.85				
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00				
Satd. Flow (prot)	3433	3539			5085	1583	1770		1583				
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00				
Satd. Flow (perm)	3433	3539			5085	1583	1770		1583				
Volume (vph)	1052	655	0	0	2181	200	261	0	397	0	0	0	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	1052	655	0	0	2181	200	261	0	397	0	0	0	
RTOR Reduction (vph)	0	0	0	0	0	59	0	0	281	0	0	0	
Lane Group Flow (vph)	1052	655	0	0	2181	141	261	0	116	0	0	0	
Turn Type	Prot							Perm		custom	custom		
Protected Phases	5	2						6					
Permitted Phases								6	8			8	
Actuated Green, G (s)	47.1	116.2						65.1	65.1	27.3	27.3		
Effective Green, g (s)	47.1	117.2						66.1	66.1	27.3	27.3		
Actuated g/C Ratio	0.31	0.77						0.43	0.43	0.18	0.18		
Clearance Time (s)	4.0	5.0						5.0	5.0	4.0	4.0		
Vehicle Extension (s)	3.0	3.0						3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	1060	2720						2204	686	317	283		
v/s Ratio Prot	c0.31	0.19						c0.43					
v/s Ratio Perm								0.09	c0.15	0.07			
v/c Ratio	0.99	0.24						0.99	0.20	0.82	0.41		
Uniform Delay, d1	52.5	5.0						42.9	26.9	60.3	55.5		
Progression Factor	1.00	1.00						1.00	1.00	1.00	1.00		
Incremental Delay, d2	25.7	0.0						16.6	0.1	15.7	1.0		
Delay (s)	78.2	5.1						59.4	27.0	76.0	56.4		
Level of Service	E	A						E	C	E	E		
Approach Delay (s)	50.1							56.7	64.2		0.0		
Approach LOS	D							E	E		A		
Intersection Summary													
HCM Average Control Delay	55.4		HCM Level of Service					E					
HCM Volume to Capacity ratio	0.96												
Actuated Cycle Length (s)	152.5		Sum of lost time (s)					12.0					
Intersection Capacity Utilization	96.6%		ICU Level of Service					F					
Analysis Period (min)	15												
c Critical Lane Group													

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.94	0.95	0.95	0.97	0.91	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.86	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	4990	1516	1504	3433	5085	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	4990	1516	1504	3433	5085	1583	3433	3539	1583
Volume (vph)	10	992	251	443	8	463	587	1690	217	715	652	10
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	992	251	443	8	463	587	1690	217	715	652	10
RTOR Reduction (vph)	0	0	0	0	111	140	0	0	0	0	0	7
Lane Group Flow (vph)	10	992	251	443	62	158	587	1690	217	715	652	3
Turn Type	Prot		Free	Prot		pm+ov	Prot		Free	Prot		Perm
Protected Phases	7	4		3	8	1	5	2		1		6
Permitted Phases			Free			8			Free			6
Actuated Green, G (s)	1.5	28.2	131.2	16.0	42.7	69.7	26.6	44.0	131.2	27.0	44.4	44.4
Effective Green, g (s)	1.5	28.2	131.2	16.0	42.7	69.7	26.6	44.0	131.2	27.0	44.4	44.4
Actuated g/C Ratio	0.01	0.21	1.00	0.12	0.33	0.53	0.20	0.34	1.00	0.21	0.34	0.34
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	20	1093	1583	609	493	845	696	1705	1583	706	1198	536
v/s Ratio Prot	0.01	c0.20		c0.09	0.04	0.04	0.17	c0.33		c0.21	0.18	
v/s Ratio Perm			c0.16			0.07			0.14			0.00
v/c Ratio	0.50	0.91	0.16	0.73	0.13	0.19	0.84	0.99	0.14	1.01	0.54	0.01
Uniform Delay, d1	64.5	50.2	0.0	55.5	31.1	16.0	50.3	43.4	0.0	52.1	35.2	28.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	18.3	10.8	0.2	4.3	0.1	0.1	9.2	19.6	0.2	37.1	0.5	0.0
Delay (s)	82.8	61.0	0.2	59.8	31.2	16.1	59.5	63.0	0.2	89.2	35.7	28.8
Level of Service	F	E	A	E	C	B	E	E	A	F	D	C
Approach Delay (s)		49.0			40.2			56.7			63.4	
Approach LOS		D			D			E			E	
Intersection Summary												
HCM Average Control Delay			54.1			HCM Level of Service			D			
HCM Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			131.2	Sum of lost time (s)			16.0					
Intersection Capacity Utilization			94.0%	ICU Level of Service			F					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
2: Grant Line Road & Naglee Road

WinCo
Cumulative Background PM-Improved

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			  						 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00		0.91	1.00				0.95	0.95	1.00
Frt	1.00	1.00	0.85		1.00	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00				0.95	0.96	1.00
Satd. Flow (prot)	1770	3539	1583		5085	1583				1681	1691	1583
Flt Permitted	0.95	1.00	1.00		1.00	1.00				0.95	0.96	1.00
Satd. Flow (perm)	1770	3539	1583		5085	1583				1681	1691	1583
Volume (vph)	478	1910	227	0	1128	720	0	0	0	977	35	910
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	478	1910	227	0	1128	720	0	0	0	977	35	910
RTOR Reduction (vph)	0	0	57	0	0	0	0	0	0	0	0	363
Lane Group Flow (vph)	478	1910	170	0	1128	720	0	0	0	493	519	547
Turn Type	Prot		Perm			Free				Perm		Perm
Protected Phases	5	2			6							4
Permitted Phases			2			Free				4		4
Actuated Green, G (s)	26.5	56.2	56.2		25.5	99.4				33.3	33.3	33.3
Effective Green, g (s)	26.7	57.5	57.5		26.8	99.4				33.9	33.9	33.9
Actuated g/C Ratio	0.27	0.58	0.58		0.27	1.00				0.34	0.34	0.34
Clearance Time (s)	4.2	5.3	5.3		5.3					4.6	4.6	4.6
Vehicle Extension (s)	3.0	3.0	3.0		3.0					3.0	3.0	3.0
Lane Grp Cap (vph)	475	2047	916		1371	1583				573	577	540
v/s Ratio Prot	c0.27	c0.54			0.22							
v/s Ratio Perm			0.11			0.45				0.29	0.31	c0.35
v/c Ratio	1.01	0.93	0.19		0.82	0.45				0.86	0.90	1.01
Uniform Delay, d1	36.4	19.2	9.9		34.1	0.0				30.5	31.1	32.8
Progression Factor	1.00	1.00	1.00		1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	42.9	8.5	0.1		4.1	0.9				12.5	16.8	42.0
Delay (s)	79.2	27.7	10.0		38.2	0.9				43.1	47.9	74.7
Level of Service	E	C	A		D	A				D	D	E
Approach Delay (s)		35.6			23.7			0.0			59.4	
Approach LOS		D			C			A			E	
Intersection Summary												
HCM Average Control Delay			39.3			HCM Level of Service				D		
HCM Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			99.4			Sum of lost time (s)				8.0		
Intersection Capacity Utilization			87.4%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 3: I 205 WB Ramps & Naglee Road

WinCo
 Cumulative Background PM-Improved

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	3433	3539	1583	1770	3539	1583	1770	5010	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	3433	3539	1583	1770	3539	1583	1770	5010	
Volume (vph)	144	282	715	449	220	240	413	702	112	512	724	79
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	144	282	715	449	220	240	413	702	112	512	724	79
RTOR Reduction (vph)	0	0	0	0	0	185	0	0	84	0	10	0
Lane Group Flow (vph)	144	282	715	449	220	55	413	702	28	512	793	0
Turn Type	Prot		Free	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			8			2			
Actuated Green, G (s)	11.9	21.6	130.6	18.6	28.7	28.7	33.4	31.4	31.4	39.5	38.0	
Effective Green, g (s)	12.1	22.9	130.6	19.2	30.0	30.0	33.6	32.3	32.3	40.2	38.9	
Actuated g/C Ratio	0.09	0.18	1.00	0.15	0.23	0.23	0.26	0.25	0.25	0.31	0.30	
Clearance Time (s)	4.2	5.3		4.6	5.3	5.3	4.2	4.9	4.9	4.7	4.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	164	327	1583	505	813	364	455	875	392	545	1492	
v/s Ratio Prot	0.08	c0.15		c0.13	0.06		0.23	c0.20		c0.29	0.16	
v/s Ratio Perm			0.45			0.03			0.02			
v/c Ratio	0.88	0.86	0.45	0.89	0.27	0.15	0.91	0.80	0.07	0.94	0.53	
Uniform Delay, d1	58.5	52.3	0.0	54.7	41.3	40.1	47.0	46.2	37.7	44.0	38.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	37.3	20.2	0.9	17.2	0.2	0.2	21.5	5.4	0.1	24.1	0.4	
Delay (s)	95.8	72.5	0.9	71.8	41.5	40.3	68.5	51.5	37.7	68.1	38.6	
Level of Service	F	E	A	E	D	D	E	D	D	E	D	
Approach Delay (s)		30.6			56.2			56.0			50.1	
Approach LOS		C			E			E			D	
Intersection Summary												
HCM Average Control Delay			48.0				HCM Level of Service			D		
HCM Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			130.6				Sum of lost time (s)		16.0			
Intersection Capacity Utilization			88.8%				ICU Level of Service		E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 4: Grant Line Road & I-205 EB On-Ramp

WinCo
 Cumulative Background PM-Improved

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	 	 			  								
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0				
Lane Util. Factor	0.97	0.95			0.91	1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85	1.00		0.85				
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00				
Satd. Flow (prot)	3433	3539			5085	1583	1770		1583				
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00				
Satd. Flow (perm)	3433	3539			5085	1583	1770		1583				
Volume (vph)	1110	1777	0	0	1572	151	189	0	469	0	0	0	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	1110	1777	0	0	1572	151	189	0	469	0	0	0	
RTOR Reduction (vph)	0	0	0	0	0	80	0	0	21	0	0	0	
Lane Group Flow (vph)	1110	1777	0	0	1572	71	189	0	448	0	0	0	
Turn Type	Prot						Permcustom		custom				
Protected Phases	5	2					6						
Permitted Phases							6	8			8		
Actuated Green, G (s)	40.8	84.7					39.7	39.7	35.8	35.8			
Effective Green, g (s)	41.0	86.0					41.0	41.0	36.0	36.0			
Actuated g/C Ratio	0.32	0.66					0.32	0.32	0.28	0.28			
Clearance Time (s)	4.2	5.3					5.3	5.3	4.2	4.2			
Vehicle Extension (s)	3.0	3.0					3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	1083	2341					1604	499	490	438			
v/s Ratio Prot	c0.32	0.50					c0.31						
v/s Ratio Perm								0.04	0.11	c0.28			
v/c Ratio	1.02	0.76					0.98	0.14	0.39	1.02			
Uniform Delay, d1	44.5	15.0					44.1	31.9	38.0	47.0			
Progression Factor	1.00	1.00					1.00	1.00	1.00	1.00			
Incremental Delay, d2	33.9	1.5					17.9	0.1	0.5	49.0			
Delay (s)	78.4	16.4					61.9	32.0	38.6	96.0			
Level of Service	E	B					E	C	D	F			
Approach Delay (s)	40.2						59.3			79.5	0.0		
Approach LOS	D						E			E	A		
Intersection Summary													
HCM Average Control Delay	51.4		HCM Level of Service				D						
HCM Volume to Capacity ratio	1.01												
Actuated Cycle Length (s)	130.0		Sum of lost time (s)				12.0						
Intersection Capacity Utilization	84.8%		ICU Level of Service				E						
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
5: Grant Line Road & Corral Hollow Road

WinCo
Cumulative Background PM-Improved

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	  		 	  		  		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	411	1225	892	194	904	188	788	598	194	237	706	124
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	100%	100%	75%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	411	1225	669	194	904	188	788	598	194	237	706	124
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	411	1225	669	194	904	188	788	598	194	237	706	124
Turn Type	Prot		Free	Prot		Free	Prot		Free	Prot		Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Actuated Green, G (s)	14.2	33.3	108.8	10.5	29.6	108.8	26.4	34.7	108.8	12.3	20.6	108.8
Effective Green, g (s)	14.2	34.3	108.8	10.5	30.6	108.8	26.4	35.7	108.8	12.3	21.6	108.8
Actuated g/C Ratio	0.13	0.32	1.00	0.10	0.28	1.00	0.24	0.33	1.00	0.11	0.20	1.00
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	448	1603	1583	331	1430	1583	833	1669	1583	388	1010	1583
v/s Ratio Prot	c0.12	c0.24		0.06	0.18		c0.23	0.12		0.07	c0.14	
v/s Ratio Perm			c0.42			0.12			0.12			0.08
v/c Ratio	0.92	0.76	0.42	0.59	0.63	0.12	0.95	0.36	0.12	0.61	0.70	0.08
Uniform Delay, d1	46.7	33.6	0.0	47.1	34.2	0.0	40.5	27.8	0.0	46.0	40.6	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	23.4	2.2	0.8	2.6	0.9	0.2	19.1	0.1	0.2	2.8	2.1	0.1
Delay (s)	70.2	35.8	0.8	49.7	35.1	0.2	59.6	28.0	0.2	48.8	42.7	0.1
Level of Service	E	D	A	D	D	A	E	C	A	D	D	A
Approach Delay (s)		31.8			32.2			40.3			39.1	
Approach LOS		C			C			D			D	

Intersection Summary

HCM Average Control Delay	35.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	108.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Eleventh Street & Lammers Road

WinCo
Cumulative Background PM-Improved

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  			  		 	 		 		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	1.00		1.00	0.97	0.95	1.00	0.97	1.00	1.00
Frt	1.00		0.85	1.00		0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433		1583	1770		1583	3433	3539	1583	3433	1863	1583
Flt Permitted	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433		1583	1770		1583	3433	3539	1583	3433	1863	1583
Volume (vph)	282	0	1310	220	0	69	1741	367	973	52	111	19
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	282	0	1310	220	0	69	1741	367	973	52	111	19
RTOR Reduction (vph)	0	0	0	0	0	65	0	0	386	0	0	17
Lane Group Flow (vph)	282	0	1310	220	0	4	1741	367	587	52	111	2
Turn Type	Prot		Free	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free			6			8			4
Actuated Green, G (s)	10.3		79.9	11.7		3.4	42.3	46.6	46.6	1.6	5.9	5.9
Effective Green, g (s)	10.3		79.9	11.7		4.4	42.3	47.6	47.6	1.6	6.9	6.9
Actuated g/C Ratio	0.13		1.00	0.15		0.06	0.53	0.60	0.60	0.02	0.09	0.09
Clearance Time (s)	4.0			4.0		5.0	4.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	443		1583	259		87	1817	2108	943	69	161	137
v/s Ratio Prot	0.08			0.12			c0.51	0.10		0.02	0.06	
v/s Ratio Perm			c0.83			0.00			0.37			0.00
v/c Ratio	0.64		0.83	0.85		0.04	0.96	0.17	0.62	0.75	0.69	0.01
Uniform Delay, d1	33.0		0.0	33.2		35.8	18.0	7.3	10.4	39.0	35.5	33.4
Progression Factor	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.0		5.1	22.0		0.2	12.5	0.0	1.3	36.6	11.6	0.0
Delay (s)	36.0		5.1	55.3		36.0	30.5	7.3	11.7	75.5	47.1	33.4
Level of Service	D		A	E		D	C	A	B	E	D	C
Approach Delay (s)		10.6			50.7			21.8			53.8	
Approach LOS		B			D			C			D	
Intersection Summary												
HCM Average Control Delay			21.1									HCM Level of Service C
HCM Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			79.9									Sum of lost time (s) 0.0
Intersection Capacity Utilization			81.9%									ICU Level of Service D
Analysis Period (min)			15									
c Critical Lane Group												

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	  		 	  		  		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	404	1138	491	676	624	328	174	1187	461	465	1468	127
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	100%	100%	80%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	404	1138	393	676	624	328	174	1187	461	465	1468	127
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	404	1138	393	676	624	328	174	1187	461	465	1468	127
Turn Type	Prot		Free	Prot		Free	Prot		Free	Prot		Free
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			Free			Free			Free			Free
Actuated Green, G (s)	15.6	33.1	128.7	24.1	35.6	128.7	8.9	35.4	128.7	17.1	43.6	128.7
Effective Green, g (s)	22.6	35.1	128.7	24.1	36.6	128.7	8.9	36.4	128.7	17.1	44.6	128.7
Actuated g/C Ratio	0.18	0.27	1.00	0.19	0.28	1.00	0.07	0.28	1.00	0.13	0.35	1.00
Clearance Time (s)	11.0	6.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	603	1387	1583	643	1446	1583	237	1438	1583	456	1762	1583
v/s Ratio Prot	0.12	c0.22		c0.20	0.12		0.05	0.23		c0.14	c0.29	
v/s Ratio Perm			0.25			0.21			c0.29			0.08
v/c Ratio	0.67	0.82	0.25	1.05	0.43	0.21	0.73	0.83	0.29	1.02	0.83	0.08
Uniform Delay, d1	49.6	43.8	0.0	52.3	37.6	0.0	58.7	43.2	0.0	55.8	38.6	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.8	4.0	0.4	49.7	0.2	0.3	11.2	4.0	0.5	47.2	3.5	0.1
Delay (s)	52.4	47.9	0.4	102.0	37.8	0.3	69.9	47.2	0.5	103.0	42.2	0.1
Level of Service	D	D	A	F	D	A	E	D	A	F	D	A
Approach Delay (s)		39.2			56.9			37.5			53.3	
Approach LOS		D			E			D			D	
Intersection Summary												
HCM Average Control Delay			46.6				HCM Level of Service				D	
HCM Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			128.7			Sum of lost time (s)				12.0		
Intersection Capacity Utilization			90.8%			ICU Level of Service				E		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Eleventh Street & Corral Hollow Road

WinCo
Cumulative Background PM-SPUI

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	  		 	  		 	  	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.97		1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00		0.85	1.00		0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433		1583	3433		1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433		1583	3433		1583	3433	5085	1583	3433	5085	1583
Volume (vph)	404	0	491	676	0	328	174	1187	461	465	1468	127
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	100%	100%	80%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	404	0	393	676	0	328	174	1187	461	465	1468	127
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	404	0	393	676	0	328	174	1187	461	465	1468	127
Turn Type	Prot		Free	Prot		Free	Prot		Free	Prot		Free
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			Free			Free			Free			Free
Actuated Green, G (s)	14.7		95.6	24.1		95.6	8.7	29.4	95.6	17.1	37.8	95.6
Effective Green, g (s)	21.7		95.6	24.1		95.6	8.7	30.4	95.6	17.1	38.8	95.6
Actuated g/C Ratio	0.23		1.00	0.25		1.00	0.09	0.32	1.00	0.18	0.41	1.00
Clearance Time (s)	11.0			4.0			4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0			3.0			3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	779		1583	865		1583	312	1617	1583	614	2064	1583
v/s Ratio Prot	0.12			c0.20			0.05	0.23		c0.14	c0.29	
v/s Ratio Perm			0.25			0.21			c0.29			0.08
v/c Ratio	0.52		0.25	0.78		0.21	0.56	0.73	0.29	0.76	0.71	0.08
Uniform Delay, d1	32.4		0.0	33.3		0.0	41.6	29.0	0.0	37.3	23.7	0.0
Progression Factor	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6		0.4	4.6		0.3	2.2	1.8	0.5	5.3	1.2	0.1
Delay (s)	33.0		0.4	37.9		0.3	43.8	30.8	0.5	42.6	24.9	0.1
Level of Service	C		A	D		A	D	C	A	D	C	A
Approach Delay (s)		16.9			25.6			24.3			27.4	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM Average Control Delay			24.6		HCM Level of Service					C		
HCM Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			95.6		Sum of lost time (s)					8.0		
Intersection Capacity Utilization			72.2%		ICU Level of Service					C		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 8: Robertson Road & Naglee Road

WinCo
 Cumulative Background PM-Improved

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	
Frt	1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3099		1681	1720	1583	1770	3539	1583	1770	4988	
Flt Permitted	0.72	1.00		0.67	0.81	1.00	0.56	1.00	1.00	0.57	1.00	
Satd. Flow (perm)	1335	3099		1193	1435	1583	1041	3539	1583	1061	4988	
Volume (vph)	106	21	102	74	25	14	138	298	6	5	266	39
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	106	21	102	74	25	14	138	298	6	5	266	39
RTOR Reduction (vph)	0	76	0	0	0	10	0	0	3	0	17	0
Lane Group Flow (vph)	106	47	0	40	59	4	138	298	3	5	288	0
Turn Type	Perm			Perm			Perm	Perm		Perm	Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2		6	
Actuated Green, G (s)	10.8	10.8		10.8	10.8	10.8	24.2	24.2	24.2	24.2	24.2	
Effective Green, g (s)	10.8	10.8		10.8	10.8	10.8	24.2	24.2	24.2	24.2	24.2	
Actuated g/C Ratio	0.25	0.25		0.25	0.25	0.25	0.56	0.56	0.56	0.56	0.56	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	335	778		300	360	398	586	1992	891	597	2807	
v/s Ratio Prot		0.02						0.08			0.06	
v/s Ratio Perm	c0.08			0.03	0.04	0.00	c0.13		0.00	0.00		
v/c Ratio	0.32	0.06		0.13	0.16	0.01	0.24	0.15	0.00	0.01	0.10	
Uniform Delay, d1	13.1	12.2		12.5	12.6	12.1	4.7	4.5	4.1	4.1	4.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	0.0		0.2	0.2	0.0	0.2	0.0	0.0	0.0	0.0	
Delay (s)	13.6	12.3		12.7	12.8	12.1	4.9	4.5	4.1	4.1	4.4	
Level of Service	B	B		B	B	B	A	A	A	A	A	
Approach Delay (s)		12.9			12.7			4.6			4.4	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM Average Control Delay			7.1				HCM Level of Service		A			
HCM Volume to Capacity ratio			0.26									
Actuated Cycle Length (s)			43.0				Sum of lost time (s)		8.0			
Intersection Capacity Utilization			36.2%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												

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                          Level Of Service Computation Report
                    2000 HCM 4-Way Stop Method (Future Volume Alternative)
*****
Intersection #9 Auto Plaza Drive/Naglee Road
*****
Cycle (sec):           100                Critical Vol./Cap. (X):           0.540
Loss Time (sec):       0 (Y+R = 4 sec)    Average Delay (sec/veh):           12.0
Optimal Cycle:         0                  Level Of Service:                   B
*****
Approach:              North Bound        South Bound        East Bound        West Bound
Movement:              L - T - R         L - T - R         L - T - R         L - T - R
-----|-----|-----|-----|
Control:               Stop Sign          Stop Sign          Stop Sign          Stop Sign
Rights:                Include           Include           Include           Include
Min. Green:            0   0   0         0   0   0         0   0   0         0   0   0
Lanes:                 1 0 0 1 0       0 1 0 1 0       0 0 1! 0 0       0 0 1! 0 0
-----|-----|-----|-----|
Volume Module:
Base Vol:              32 116   13         5 39   31         60 54   23         2 42   2
Growth 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
Initial Bse:           32 116   13         5 39   31         60 54   23         2 42   2
Added Vol:             196 16   23         0 15   14         15 13  212        21 12   0
PasserByVol:          0   0   0         0 0   0         0 0   0         0 0   0
Initial Fut:          228 132  36         5 54   45         75 67  235        23 54   2
User 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
PHF 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
PHF Volume:           228 132  36         5 54   45         75 67  235        23 54   2
Reduct Vol:           0   0   0         0 0   0         0 0   0         0 0   0
Reduced Vol:          228 132  36         5 54   45         75 67  235        23 54   2
PCE 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
MLF 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
Final Vol.:           228 132  36         5 54   45         75 67  235        23 54   2
-----|-----|-----|-----|
Saturation Flow Module:
Adjustment:           1.00 1.00 1.00     1.00 1.00 1.00     1.00 1.00 1.00     1.00 1.00 1.00
Lanes:                1.00 0.79 0.21     0.10 1.04 0.86     0.20 0.18 0.62     0.29 0.68 0.03
Final Sat.:           553 482  131        51 562  511        139 124  436        168 393  15
-----|-----|-----|-----|
Capacity Analysis Module:
Vol/Sat:              0.41 0.27 0.27     0.10 0.10 0.09     0.54 0.54 0.54     0.14 0.14 0.14
Crit Moves:          ****              ****              ****              ****
Delay/Veh:            13.1 10.4 10.4     9.6 9.5  8.8     13.2 13.2 13.2     9.6 9.6  9.6
Delay 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
AdjDel/Veh:          13.1 10.4 10.4     9.6 9.5  8.8     13.2 13.2 13.2     9.6 9.6  9.6
LOS by Move:          B   B   B         A   A   A         B   B   B         A   A   A
ApproachDel:          11.9              9.2              13.2              9.6
Delay Adj:            1.00              1.00              1.00              1.00
ApprAdjDel:          11.9              9.2              13.2              9.6
LOS by Appr:          B              A              B              A
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Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)
*****
Intersection #10 Auto Plaza Drive/Corral Hollow Road
*****
Average Delay (sec/veh):      1.6   Worst Case Level Of Service:      C[ 15.2]
*****
Approach:      North Bound      South Bound      East Bound      West Bound
Movement:      L - T - R      L - T - R      L - T - R      L - T - R
-----|-----|-----|-----|
Control:      Uncontrolled      Uncontrolled      Stop Sign      Stop Sign
Rights:      Include      Include      Include      Include
Lanes:      1 0 2 0 0      0 0 1 1 0      1 0 0 0 1      0 0 0 0 0
-----|-----|-----|-----|
Volume Module:
Base Vol:      44 574 0 0 676 10 10 0 67 0 0 0
Growth 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
Initial Bse: 44 574 0 0 676 10 10 0 67 0 0 0
Added Vol: 17 5 0 0 3 16 19 0 18 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 61 579 0 0 679 26 29 0 85 0 0 0
User 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
PHF 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
PHF Volume: 61 579 0 0 679 26 29 0 85 0 0 0
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
Final Vol.: 61 579 0 0 679 26 29 0 85 0 0 0
Critical Gap Module:
Critical Gp: 4.1 xxxx xxxxxx xxxxxx xxxx xxxxxx 6.8 xxxx 6.9 xxxxxx xxxx xxxxxx
FollowUpTim: 2.2 xxxx xxxxxx xxxxxx xxxx xxxxxx 3.5 xxxx 3.3 xxxxxx xxxx xxxxxx
-----|-----|-----|-----|
Capacity Module:
Cnflct Vol: 705 xxxx xxxxxx xxxx xxxx xxxxxx 1104 xxxx 353 xxxx xxxx xxxxxx
Potent Cap.: 902 xxxx xxxxxx xxxx xxxx xxxxxx 209 xxxx 650 xxxx xxxx xxxxxx
Move Cap.: 902 xxxx xxxxxx xxxx xxxx xxxxxx 198 xxxx 650 xxxx xxxx xxxxxx
Volume/Cap: 0.07 xxxx xxxx xxxx xxxx xxxxxx 0.15 xxxx 0.13 xxxx xxxx xxxxxx
-----|-----|-----|-----|
Level Of Service Module:
Queue: 0.2 xxxx xxxxxx xxxxxx xxxx xxxxxx 0.5 xxxx 0.4 xxxxxx xxxx xxxxxx
Stopped Del: 9.3 xxxx xxxxxx xxxxxx xxxx xxxxxx 26.3 xxxx 11.4 xxxxxx xxxx xxxxxx
LOS by Move: A * * * * * D * B * * *
Movement: LT - LTR - RT LT - LTR - RT LT - LTR - RT LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxxx xxxx xxxx xxxxxx xxxx xxxx xxxxxx xxxx xxxx xxxxxx
SharedQueue:xxxxx xxxx xxxxxx xxxxxx xxxx xxxxxx xxxxxx xxxx xxxxxx xxxxxx xxxx xxxxxx
Shrd StpDel:xxxxx xxxx xxxxxx xxxxxx xxxx xxxxxx xxxxxx xxxx xxxxxx xxxxxx xxxx xxxxxx
Shared LOS: * * * * * * * * * * * * * * *
ApproachDel: xxxxxxxx xxxxxxxx 15.2 xxxxxxxx
ApproachLOS: * * C *

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HCM Signalized Intersection Capacity Analysis
2: Grant Line Road & Naglee Road

WinCo
Cumulative plus Project AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00		0.91	1.00				0.95	0.95	1.00
Frt	1.00	1.00	0.85		1.00	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00				0.95	0.96	1.00
Satd. Flow (prot)	1770	3539	1583		5085	1583				1681	1703	1583
Flt Permitted	0.95	1.00	1.00		1.00	1.00				0.95	0.96	1.00
Satd. Flow (perm)	1770	3539	1583		5085	1583				1681	1703	1583
Volume (vph)	431	1433	97	0	1775	725	0	0	0	509	65	302
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	431	1433	97	0	1775	725	0	0	0	509	65	302
RTOR Reduction (vph)	0	0	27	0	0	0	0	0	0	0	0	226
Lane Group Flow (vph)	431	1433	70	0	1775	725	0	0	0	280	294	76
Turn Type	Prot		Perm			Free				Perm		Perm
Protected Phases	5	2			6							4
Permitted Phases			2			Free				4		4
Actuated Green, G (s)	24.1	54.9	54.9		26.6	85.9				21.1	21.1	21.1
Effective Green, g (s)	24.3	56.2	56.2		27.9	85.9				21.7	21.7	21.7
Actuated g/C Ratio	0.28	0.65	0.65		0.32	1.00				0.25	0.25	0.25
Clearance Time (s)	4.2	5.3	5.3		5.3					4.6	4.6	4.6
Vehicle Extension (s)	3.0	3.0	3.0		3.0					3.0	3.0	3.0
Lane Grp Cap (vph)	501	2315	1036		1652	1583				425	430	400
v/s Ratio Prot	c0.24	0.40			c0.35							
v/s Ratio Perm			0.04			0.46				0.17	0.17	0.05
v/c Ratio	0.86	0.62	0.07		1.07	0.46				0.66	0.68	0.19
Uniform Delay, d1	29.2	8.6	5.4		29.0	0.0				28.8	29.0	25.2
Progression Factor	1.00	1.00	1.00		1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	14.0	0.5	0.0		45.2	1.0				3.7	4.5	0.2
Delay (s)	43.2	9.1	5.4		74.2	1.0				32.5	33.5	25.4
Level of Service	D	A	A		E	A				C	C	C
Approach Delay (s)		16.4			52.9			0.0			30.4	
Approach LOS		B			D			A			C	
Intersection Summary												
HCM Average Control Delay			35.8			HCM Level of Service				D		
HCM Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			85.9			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			84.0%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 3: I 205 WB Ramps & Naglee Road

WinCo
 Cumulative plus Project AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	3433	3539	1583	1770	3539	1583	1770	4921	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	3433	3539	1583	1770	3539	1583	1770	4921	
Volume (vph)	12	46	312	412	150	209	661	462	189	78	196	54
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	12	46	312	412	150	209	661	462	189	78	196	54
RTOR Reduction (vph)	0	0	0	0	0	158	0	0	101	0	45	0
Lane Group Flow (vph)	12	46	312	412	150	51	661	462	88	78	205	0
Turn Type	Prot		Free	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			8			2			
Actuated Green, G (s)	1.3	5.8	89.5	15.5	20.4	20.4	39.2	41.0	41.0	7.7	10.0	
Effective Green, g (s)	1.5	7.1	89.5	16.1	21.7	21.7	39.4	41.9	41.9	8.4	10.9	
Actuated g/C Ratio	0.02	0.08	1.00	0.18	0.24	0.24	0.44	0.47	0.47	0.09	0.12	
Clearance Time (s)	4.2	5.3		4.6	5.3	5.3	4.2	4.9	4.9	4.7	4.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	30	148	1583	618	858	384	779	1657	741	166	599	
v/s Ratio Prot	0.01	c0.02		c0.12	0.04		c0.37	c0.13		0.04	0.04	
v/s Ratio Perm			0.20			0.03			0.06			
v/c Ratio	0.40	0.31	0.20	0.67	0.17	0.13	0.85	0.28	0.12	0.47	0.34	
Uniform Delay, d1	43.6	38.9	0.0	34.2	26.8	26.5	22.4	14.6	13.4	38.4	36.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.5	1.2	0.3	2.7	0.1	0.2	8.6	0.1	0.1	2.1	0.3	
Delay (s)	52.1	40.1	0.3	36.9	26.9	26.7	30.9	14.7	13.5	40.5	36.4	
Level of Service	D	D	A	D	C	C	C	B	B	D	D	
Approach Delay (s)		6.9			32.2			22.7			37.4	
Approach LOS		A			C			C			D	
Intersection Summary												
HCM Average Control Delay			25.0				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			89.5				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			70.0%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 4: Grant Line Road & I-205 EB On-Ramp

WinCo
 Cumulative plus Project AM

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	 	 			  								
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0				
Lane Util. Factor	0.97	0.95			0.91	1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85	1.00		0.85				
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00				
Satd. Flow (prot)	3433	3539			5085	1583	1770		1583				
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00				
Satd. Flow (perm)	3433	3539			5085	1583	1770		1583				
Volume (vph)	1055	721	0	0	2228	200	272	0	397	0	0	0	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	1055	721	0	0	2228	200	272	0	397	0	0	0	
RTOR Reduction (vph)	0	0	0	0	0	59	0	0	247	0	0	0	
Lane Group Flow (vph)	1055	721	0	0	2228	141	272	0	150	0	0	0	
Turn Type	Prot						Perm custom		custom				
Protected Phases	5	2					6						
Permitted Phases							6	8			8		
Actuated Green, G (s)	47.1	116.2					65.1	65.1	28.1	28.1			
Effective Green, g (s)	47.1	117.2					66.1	66.1	28.1	28.1			
Actuated g/C Ratio	0.31	0.76					0.43	0.43	0.18	0.18			
Clearance Time (s)	4.0	5.0					5.0	5.0	4.0	4.0			
Vehicle Extension (s)	3.0	3.0					3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	1055	2706					2193	683	324	290			
v/s Ratio Prot	c0.31	0.20					c0.44						
v/s Ratio Perm								0.09	c0.15	0.09			
v/c Ratio	1.00	0.27					1.02	0.21	0.84	0.52			
Uniform Delay, d1	53.1	5.3					43.6	27.2	60.4	56.5			
Progression Factor	1.00	1.00					1.00	1.00	1.00	1.00			
Incremental Delay, d2	27.7	0.1					23.3	0.2	17.1	1.5			
Delay (s)	80.8	5.4					66.9	27.4	77.5	58.0			
Level of Service	F	A					E	C	E	E			
Approach Delay (s)	50.2						63.6			65.9	0.0		
Approach LOS	D						E			E	A		
Intersection Summary													
HCM Average Control Delay	59.1		HCM Level of Service				E						
HCM Volume to Capacity ratio	0.98												
Actuated Cycle Length (s)	153.3		Sum of lost time (s)				12.0						
Intersection Capacity Utilization	98.2%		ICU Level of Service				F						
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
1: Grant Line Road & Byron Road

WinCo
Cumulative plus Project PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.94	0.95	0.95	0.97	0.91	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.87	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	4990	1532	1504	3433	5085	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	4990	1532	1504	3433	5085	1583	3433	3539	1583
Volume (vph)	10	1003	251	551	19	474	587	1690	248	720	652	10
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	1003	251	551	19	474	587	1690	248	720	652	10
RTOR Reduction (vph)	0	0	0	0	107	144	0	0	0	0	0	7
Lane Group Flow (vph)	10	1003	251	551	72	170	587	1690	248	720	652	3
Turn Type	Prot		Free	Prot	pm+ov	Prot		Free	Prot		Perm	
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases			Free		8			Free				6
Actuated Green, G (s)	1.5	28.2	132.6	17.4	44.1	71.1	26.9	44.0	132.6	27.0	44.1	44.1
Effective Green, g (s)	1.5	28.2	132.6	17.4	44.1	71.1	26.9	44.0	132.6	27.0	44.1	44.1
Actuated g/C Ratio	0.01	0.21	1.00	0.13	0.33	0.54	0.20	0.33	1.00	0.20	0.33	0.33
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	20	1081	1583	655	510	852	696	1687	1583	699	1177	526
v/s Ratio Prot	0.01	c0.20		c0.11	0.05	0.04	0.17	c0.33		c0.21	0.18	
v/s Ratio Perm			c0.16		0.07			0.16				0.00
v/c Ratio	0.50	0.93	0.16	0.84	0.14	0.20	0.84	1.00	0.16	1.03	0.55	0.01
Uniform Delay, d1	65.2	51.2	0.0	56.3	31.0	16.0	50.8	44.3	0.0	52.8	36.2	29.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	18.3	13.3	0.2	9.6	0.1	0.1	9.2	22.3	0.2	42.0	0.6	0.0
Delay (s)	83.5	64.5	0.2	65.8	31.1	16.1	60.0	66.6	0.2	94.8	36.8	29.6
Level of Service	F	E	A	E	C	B	E	E	A	F	D	C
Approach Delay (s)		51.9			44.9			58.6			66.9	
Approach LOS		D			D			E			E	
Intersection Summary												
HCM Average Control Delay			56.8	HCM Level of Service				E				
HCM Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			132.6	Sum of lost time (s)				16.0				
Intersection Capacity Utilization			96.4%	ICU Level of Service				F				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
2: Grant Line Road & Naglee Road

WinCo
Cumulative plus Project PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			  						 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00		0.91	1.00				0.95	0.95	1.00
Frt	1.00	1.00	0.85		1.00	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00				0.95	0.95	1.00
Satd. Flow (prot)	1770	3539	1583		5085	1583				1681	1689	1583
Flt Permitted	0.95	1.00	1.00		1.00	1.00				0.95	0.95	1.00
Satd. Flow (perm)	1770	3539	1583		5085	1583				1681	1689	1583
Volume (vph)	554	1863	227	0	1128	1239	0	0	0	1472	35	983
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	554	1863	227	0	1128	1239	0	0	0	1472	35	983
RTOR Reduction (vph)	0	0	59	0	0	0	0	0	0	0	0	363
Lane Group Flow (vph)	554	1863	168	0	1128	1239	0	0	0	736	771	620
Turn Type	Prot		Perm			Free				Perm		Perm
Protected Phases	5	2			6							4
Permitted Phases			2			Free				4		4
Actuated Green, G (s)	26.5	56.2	56.2		25.5	99.4				33.3	33.3	33.3
Effective Green, g (s)	26.7	57.5	57.5		26.8	99.4				33.9	33.9	33.9
Actuated g/C Ratio	0.27	0.58	0.58		0.27	1.00				0.34	0.34	0.34
Clearance Time (s)	4.2	5.3	5.3		5.3					4.6	4.6	4.6
Vehicle Extension (s)	3.0	3.0	3.0		3.0					3.0	3.0	3.0
Lane Grp Cap (vph)	475	2047	916		1371	1583				573	576	540
v/s Ratio Prot	c0.31	c0.53			0.22							
v/s Ratio Perm			0.11			0.78				0.44	0.46	0.39
v/c Ratio	1.17	0.91	0.18		0.82	0.78				1.28	1.34	1.15
Uniform Delay, d1	36.4	18.6	9.9		34.1	0.0				32.8	32.8	32.8
Progression Factor	1.00	1.00	1.00		1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	95.6	6.6	0.1		4.1	3.9				140.9	163.8	86.5
Delay (s)	132.0	25.2	10.0		38.2	3.9				173.6	196.6	119.3
Level of Service	F	C	A		D	A				F	F	F
Approach Delay (s)		46.3			20.3			0.0			159.3	
Approach LOS		D			C			A			F	
Intersection Summary												
HCM Average Control Delay			75.6			HCM Level of Service				E		
HCM Volume to Capacity ratio			1.13									
Actuated Cycle Length (s)			99.4			Sum of lost time (s)				8.0		
Intersection Capacity Utilization			104.2%			ICU Level of Service				G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 3: I 205 WB Ramps & Naglee Road

WinCo
 Cumulative plus Project PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	3433	3539	1583	1770	3539	1583	1770	5012	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	3433	3539	1583	1770	3539	1583	1770	5012	
Volume (vph)	144	333	1314	402	301	276	1002	707	112	512	741	79
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	144	333	1314	402	301	276	1002	707	112	512	741	79
RTOR Reduction (vph)	0	0	0	0	0	212	0	0	84	0	10	0
Lane Group Flow (vph)	144	333	1314	402	301	64	1002	707	28	512	810	0
Turn Type	Prot		Free	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			8			2			
Actuated Green, G (s)	11.8	22.8	131.3	17.9	29.3	29.3	38.5	31.7	31.7	39.4	33.1	
Effective Green, g (s)	12.0	24.1	131.3	18.5	30.6	30.6	38.7	32.6	32.6	40.1	34.0	
Actuated g/C Ratio	0.09	0.18	1.00	0.14	0.23	0.23	0.29	0.25	0.25	0.31	0.26	
Clearance Time (s)	4.2	5.3		4.6	5.3	5.3	4.2	4.9	4.9	4.7	4.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	162	342	1583	484	825	369	522	879	393	541	1298	
v/s Ratio Prot	0.08	c0.18		0.12	0.09		c0.57	0.20		0.29	0.16	
v/s Ratio Perm			c0.83			0.04			0.02			
v/c Ratio	0.89	0.97	0.83	0.83	0.36	0.17	1.92	0.80	0.07	0.95	0.62	
Uniform Delay, d1	59.0	53.3	0.0	54.9	42.2	40.3	46.3	46.4	37.8	44.5	43.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	39.9	41.3	5.2	11.5	0.3	0.2	420.9	5.4	0.1	25.7	0.9	
Delay (s)	98.9	94.6	5.2	66.4	42.5	40.5	467.2	51.7	37.8	70.3	43.9	
Level of Service	F	F	A	E	D	D	F	D	D	E	D	
Approach Delay (s)		29.4			51.7			279.5			54.1	
Approach LOS		C			D			F			D	
Intersection Summary												
HCM Average Control Delay			115.5			HCM Level of Service			F			
HCM Volume to Capacity ratio			1.20									
Actuated Cycle Length (s)			131.3	Sum of lost time (s)			8.0					
Intersection Capacity Utilization			113.9%	ICU Level of Service			H					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: Grant Line Road & I-205 EB On-Ramp

WinCo
Cumulative plus Project PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			  							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	0.97	0.95			0.91	1.00	1.00		1.00			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	3433	3539			5085	1583	1770		1583			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3433	3539			5085	1583	1770		1583			
Volume (vph)	1161	2175	0	0	1872	151	408	0	352	0	0	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1161	2175	0	0	1872	151	408	0	352	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	66	0	0	9	0	0	0
Lane Group Flow (vph)	1161	2175	0	0	1872	85	408	0	343	0	0	0
Turn Type	Prot				Perm		custom	custom				
Protected Phases	5	2			6							
Permitted Phases							6	8			8	
Actuated Green, G (s)	40.9	84.9			39.8	39.8	32.4			32.4		
Effective Green, g (s)	41.1	86.2			41.1	41.1	32.6			32.6		
Actuated g/C Ratio	0.32	0.68			0.32	0.32	0.26			0.26		
Clearance Time (s)	4.2	5.3			5.3	5.3	4.2			4.2		
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0			3.0		
Lane Grp Cap (vph)	1113	2406			1648	513	455			407		
v/s Ratio Prot	c0.34	0.61			c0.37							
v/s Ratio Perm							0.05	c0.23			0.22	
v/c Ratio	1.04	0.90			1.14	0.17	0.90			0.84		
Uniform Delay, d1	42.8	16.9			42.8	30.6	45.5			44.7		
Progression Factor	1.00	1.00			1.00	1.00	1.00			1.00		
Incremental Delay, d2	38.9	5.3			69.2	0.2	19.8			14.6		
Delay (s)	81.8	22.1			112.1	30.8	65.3			59.3		
Level of Service	F	C			F	C	E			E		
Approach Delay (s)	42.9				106.0		62.5				0.0	
Approach LOS	D				F		E				A	
Intersection Summary												
HCM Average Control Delay	66.2				HCM Level of Service		E					
HCM Volume to Capacity ratio	1.03											
Actuated Cycle Length (s)	126.8				Sum of lost time (s)		12.0					
Intersection Capacity Utilization	101.9%				ICU Level of Service		G					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: Grant Line Road & Corral Hollow Road

WinCo
Cumulative plus Project PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	  		 	  		  		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	411	1346	1046	194	1018	188	958	598	194	237	706	124
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	100%	100%	75%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	411	1346	784	194	1018	188	958	598	194	237	706	124
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	411	1346	784	194	1018	188	958	598	194	237	706	124
Turn Type	Prot		Free	Prot		Free	Prot		Free	Prot		Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Actuated Green, G (s)	16.1	39.4	125.3	9.7	33.0	125.3	35.3	45.2	125.3	13.0	22.9	125.3
Effective Green, g (s)	16.1	40.4	125.3	9.7	34.0	125.3	35.3	46.2	125.3	13.0	23.9	125.3
Actuated g/C Ratio	0.13	0.32	1.00	0.08	0.27	1.00	0.28	0.37	1.00	0.10	0.19	1.00
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	441	1640	1583	266	1380	1583	967	1875	1583	356	970	1583
v/s Ratio Prot	c0.12	c0.26		0.06	0.20		c0.28	0.12		0.07	c0.14	
v/s Ratio Perm			0.50			0.12			0.12			0.08
v/c Ratio	0.93	0.82	0.50	0.73	0.74	0.12	0.99	0.32	0.12	0.67	0.73	0.08
Uniform Delay, d1	54.1	39.1	0.0	56.5	41.6	0.0	44.8	28.3	0.0	54.1	47.6	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	26.6	3.4	1.1	9.6	2.1	0.2	26.6	0.1	0.2	4.6	2.8	0.1
Delay (s)	80.6	42.5	1.1	66.1	43.7	0.2	71.4	28.4	0.2	58.7	50.4	0.1
Level of Service	F	D	A	E	D	A	E	C	A	E	D	A
Approach Delay (s)		35.9			40.9			48.8			46.4	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM Average Control Delay			42.0				HCM Level of Service			D		
HCM Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			125.3				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			85.8%				ICU Level of Service		E			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Eleventh Street & Lammers Road

WinCo
Cumulative plus Project PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  			  		 	 		 		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	1.00		1.00	0.97	0.95	1.00	0.97	1.00	1.00
Frt	1.00		0.85	1.00		0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433		1583	1770		1583	3433	3539	1583	3433	1863	1583
Flt Permitted	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433		1583	1770		1583	3433	3539	1583	3433	1863	1583
Volume (vph)	282	0	1310	220	0	69	1741	398	973	52	219	19
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	282	0	1310	220	0	69	1741	398	973	52	219	19
RTOR Reduction (vph)	0	0	0	0	0	66	0	0	339	0	0	16
Lane Group Flow (vph)	282	0	1310	220	0	3	1741	398	634	52	219	3
Turn Type	Prot		Free	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			Free			6			8			4
Actuated Green, G (s)	11.2		91.4	12.8		3.6	47.0	56.8	56.8	1.8	11.6	11.6
Effective Green, g (s)	11.2		91.4	12.8		4.6	47.0	57.8	57.8	1.8	12.6	12.6
Actuated g/C Ratio	0.12		1.00	0.14		0.05	0.51	0.63	0.63	0.02	0.14	0.14
Clearance Time (s)	4.0			4.0		5.0	4.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	421		1583	248		80	1765	2238	1001	68	257	218
v/s Ratio Prot	0.08			0.12			c0.51	0.11		0.02	0.12	
v/s Ratio Perm			c0.83			0.00			0.40			0.00
v/c Ratio	0.67		0.83	0.89		0.04	0.99	0.18	0.63	0.76	0.85	0.01
Uniform Delay, d1	38.3		0.0	38.6		41.3	21.9	7.0	10.3	44.6	38.5	34.0
Progression Factor	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.0		5.1	29.2		0.2	18.1	0.0	1.3	39.2	22.8	0.0
Delay (s)	42.4		5.1	67.8		41.5	40.0	7.0	11.6	83.8	61.3	34.0
Level of Service	D		A	E		D	D	A	B	F	E	C
Approach Delay (s)		11.7			61.6			26.9			63.6	
Approach LOS		B			E			C			E	
Intersection Summary												
HCM Average Control Delay			26.2									HCM Level of Service C
HCM Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			91.4									Sum of lost time (s) 0.0
Intersection Capacity Utilization			90.0%									ICU Level of Service E
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: Eleventh Street & Corral Hollow Road

WinCo
Cumulative plus Project PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	  		 	  		  		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	420	1138	491	676	624	354	174	1257	461	497	1565	133
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	100%	100%	80%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	420	1138	393	676	624	354	174	1257	461	497	1565	133
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	420	1138	393	676	624	354	174	1257	461	497	1565	133
Turn Type	Prot		Free	Prot		Free	Prot		Free	Prot		Free
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			Free			Free			Free			Free
Actuated Green, G (s)	15.7	33.5	130.5	24.1	35.9	130.5	8.9	36.8	130.5	17.1	45.0	130.5
Effective Green, g (s)	22.7	35.5	130.5	24.1	36.9	130.5	8.9	37.8	130.5	17.1	46.0	130.5
Actuated g/C Ratio	0.17	0.27	1.00	0.18	0.28	1.00	0.07	0.29	1.00	0.13	0.35	1.00
Clearance Time (s)	11.0	6.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	597	1383	1583	634	1438	1583	234	1473	1583	450	1792	1583
v/s Ratio Prot	0.12	c0.22		c0.20	0.12		0.05	0.25		c0.14	c0.31	
v/s Ratio Perm			0.25			0.22			c0.29			0.08
v/c Ratio	0.70	0.82	0.25	1.07	0.43	0.22	0.74	0.85	0.29	1.10	0.87	0.08
Uniform Delay, d1	50.7	44.6	0.0	53.2	38.3	0.0	59.7	43.7	0.0	56.7	39.5	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.8	4.1	0.4	54.7	0.2	0.3	12.0	5.0	0.5	73.9	5.0	0.1
Delay (s)	54.5	48.6	0.4	107.9	38.5	0.3	71.7	48.8	0.5	130.6	44.6	0.1
Level of Service	D	D	A	F	D	A	E	D	A	F	D	A
Approach Delay (s)		40.2			58.7			39.1			61.4	
Approach LOS		D			E			D			E	
Intersection Summary												
HCM Average Control Delay			49.9	HCM Level of Service				D				
HCM Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			130.5	Sum of lost time (s)				12.0				
Intersection Capacity Utilization			93.1%	ICU Level of Service				F				
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 7: Eleventh Street & Corral Hollow Road

WinCo
 Cumulative plus Project PM-SPUI

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	  		 	  		 	  	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.97		1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00		0.85	1.00		0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433		1583	3433		1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433		1583	3433		1583	3433	5085	1583	3433	5085	1583
Volume (vph)	420	0	491	676	0	354	174	1257	461	497	1565	133
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	100%	100%	80%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	420	0	393	676	0	354	174	1257	461	497	1565	133
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	420	0	393	676	0	354	174	1257	461	497	1565	133
Turn Type	Prot		Free	Prot		Free	Prot		Free	Prot		Free
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			Free			Free			Free			Free
Actuated Green, G (s)	14.9		97.3	24.1		97.3	8.7	31.1	97.3	17.1	39.5	97.3
Effective Green, g (s)	21.9		97.3	24.1		97.3	8.7	32.1	97.3	17.1	40.5	97.3
Actuated g/C Ratio	0.23		1.00	0.25		1.00	0.09	0.33	1.00	0.18	0.42	1.00
Clearance Time (s)	11.0			4.0			4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0			3.0			3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	773		1583	850		1583	307	1678	1583	603	2117	1583
v/s Ratio Prot	0.12			c0.20			0.05	0.25		c0.14	c0.31	
v/s Ratio Perm			0.25			0.22			c0.29			0.08
v/c Ratio	0.54		0.25	0.80		0.22	0.57	0.75	0.29	0.82	0.74	0.08
Uniform Delay, d1	33.3		0.0	34.3		0.0	42.5	29.0	0.0	38.7	23.9	0.0
Progression Factor	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8		0.4	5.2		0.3	2.4	1.9	0.5	9.0	1.4	0.1
Delay (s)	34.1		0.4	39.5		0.3	44.9	30.9	0.5	47.6	25.3	0.1
Level of Service	C		A	D		A	D	C	A	D	C	A
Approach Delay (s)		17.8			26.0			24.8			28.8	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM Average Control Delay			25.5				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			97.3				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			74.4%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 8: Robertson Road & Naglee Road

WinCo
 Cumulative plus Project PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			  	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	
Frt	1.00	0.87		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3089		1681	1720	1583	1770	3539	1583	1770	4918	
Flt Permitted	0.72	1.00		0.66	0.81	1.00	0.54	1.00	1.00	0.57	1.00	
Satd. Flow (perm)	1335	3089		1175	1441	1583	1004	3539	1583	1061	4918	
Volume (vph)	165	21	118	74	25	14	179	298	6	5	266	75
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	165	21	118	74	25	14	179	298	6	5	266	75
RTOR Reduction (vph)	0	86	0	0	0	10	0	0	3	0	34	0
Lane Group Flow (vph)	165	53	0	40	59	4	179	298	3	5	307	0
Turn Type	Perm			Perm			Perm	Perm		Perm	Perm	
Protected Phases	4			8			2	2		6		
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	12.6	12.6		12.6	12.6	12.6	25.4	25.4	25.4	25.4	25.4	
Effective Green, g (s)	12.6	12.6		12.6	12.6	12.6	25.4	25.4	25.4	25.4	25.4	
Actuated g/C Ratio	0.27	0.27		0.27	0.27	0.27	0.55	0.55	0.55	0.55	0.55	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	366	846		322	395	434	554	1954	874	586	2716	
v/s Ratio Prot		0.02						0.08			0.06	
v/s Ratio Perm	c0.12			0.03	0.04	0.00	c0.18		0.00	0.00		
v/c Ratio	0.45	0.06		0.12	0.15	0.01	0.32	0.15	0.00	0.01	0.11	
Uniform Delay, d1	13.8	12.3		12.6	12.6	12.2	5.6	5.0	4.6	4.6	4.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	0.0		0.2	0.2	0.0	0.3	0.0	0.0	0.0	0.0	
Delay (s)	14.7	12.4		12.7	12.8	12.2	6.0	5.1	4.6	4.6	4.9	
Level of Service	B	B		B	B	B	A	A	A	A	A	
Approach Delay (s)		13.6			12.7			5.4			4.9	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM Average Control Delay			7.9	HCM Level of Service				A				
HCM Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			46.0	Sum of lost time (s)				8.0				
Intersection Capacity Utilization			42.5%	ICU Level of Service				A				
Analysis Period (min)			15									
c Critical Lane Group												

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                          Level Of Service Computation Report
                    2000 HCM 4-Way Stop Method (Future Volume Alternative)
*****
Intersection #9 Auto Plaza Drive/Naglee Road
*****
Cycle (sec):           100                Critical Vol./Cap. (X):           0.562
Loss Time (sec):       0 (Y+R = 4 sec)    Average Delay (sec/veh):           12.5
Optimal Cycle:         0                  Level Of Service:                   B
*****
Approach:              North Bound        South Bound        East Bound        West Bound
Movement:              L - T - R         L - T - R         L - T - R         L - T - R
-----|-----|-----|-----|
Control:               Stop Sign          Stop Sign          Stop Sign          Stop Sign
Rights:                Include            Include            Include            Include
Min. Green:            0  0  0            0  0  0            0  0  0            0  0  0
Lanes:                 1  0  0  1  0      0  1  0  1  0      0  0  1!  0  0      0  0  1!  0  0
-----|-----|-----|-----|
Volume Module:
Base Vol:              32  116   13         5  39   31         60  54   23         2  42   2
Growth 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
Initial Bse:           32  116   13         5  39   31         60  54   23         2  42   2
Added Vol:             196  48   50         0  35   14         15  13  212        36  12   0
PasserByVol:           0  0  0            0  0  0            0  0  0            0  0  0
Initial Fut:           228  164   63         5  74   45         75  67  235        38  54   2
User 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
PHF 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
PHF Volume:           228  164   63         5  74   45         75  67  235        38  54   2
Reduct Vol:            0  0  0            0  0  0            0  0  0            0  0  0
Reduced Vol:          228  164   63         5  74   45         75  67  235        38  54   2
PCE 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
MLF 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
Final Vol.:           228  164   63         5  74   45         75  67  235        38  54   2
-----|-----|-----|-----|
Saturation Flow Module:
Adjustment:            1.00 1.00  1.00      1.00 1.00  1.00      1.00 1.00  1.00      1.00 1.00  1.00
Lanes:                1.00 0.72  0.28      0.08 1.19  0.73      0.20 0.18  0.62      0.40 0.58  0.02
Final Sat.:           544  439   169        42  632  409        133 119  418        223 317  12
-----|-----|-----|-----|
Capacity Analysis Module:
Vol/Sat:              0.42 0.37  0.37      0.12 0.12  0.11      0.56 0.56  0.56      0.17 0.17  0.17
Crit Moves:           ****                ****                ****                ****
Delay/Veh:            13.5 11.6  11.6       9.9  9.8   9.2      14.1 14.1  14.1      10.1 10.1  10.1
Delay 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
AdjDel/Veh:          13.5 11.6  11.6       9.9  9.8   9.2      14.1 14.1  14.1      10.1 10.1  10.1
LOS by Move:          B  B  B         A  A  A         B  B  B         B  B  B
ApproachDel:          12.5                9.6                14.1                10.1
Delay Adj:            1.00                1.00                1.00                1.00
ApprAdjDel:          12.5                9.6                14.1                10.1
LOS by Appr:          B                A                B                B
*****

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Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)
*****
Intersection #10 Auto Plaza Drive/Corral Hollow Road
*****
Average Delay (sec/veh):      2.2   Worst Case Level Of Service:      C[ 19.1]
*****
Approach:      North Bound      South Bound      East Bound      West Bound
Movement:      L - T - R      L - T - R      L - T - R      L - T - R
-----|-----|-----|-----|
Control:      Uncontrolled      Uncontrolled      Stop Sign      Stop Sign
Rights:      Include      Include      Include      Include
Lanes:      1 0 2 0 0      0 0 1 1 0      1 0 0 0 1      0 0 0 0 0
-----|-----|-----|-----|
Volume Module:
Base Vol:      44 574 0 0 676 10 10 0 67 0 0 0
Growth 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
Initial Bse: 44 574 0 0 676 10 10 0 67 0 0 0
Added Vol: 17 5 0 0 3 32 46 0 18 0 0 0
PasserByVol: 0 0 0 0 0 0 0 0 0 0 0 0
Initial Fut: 61 579 0 0 679 42 56 0 85 0 0 0
User 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
PHF 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
PHF Volume: 61 579 0 0 679 42 56 0 85 0 0 0
Reduct Vol: 0 0 0 0 0 0 0 0 0 0 0 0
Final Vol.: 61 579 0 0 679 42 56 0 85 0 0 0
Critical Gap Module:
Critical Gp: 4.1 xxxx xxxxx xxxxx xxxx xxxxx 6.8 xxxx 6.9 xxxxx xxxx xxxxx
FollowUpTim: 2.2 xxxx xxxxx xxxxx xxxx xxxxx 3.5 xxxx 3.3 xxxxx xxxx xxxxx
-----|-----|-----|-----|
Capacity Module:
Cnflct Vol: 721 xxxx xxxxx xxxx xxxx xxxxx 1112 xxxx 361 xxxx xxxx xxxxx
Potent Cap.: 890 xxxx xxxxx xxxx xxxx xxxxx 206 xxxx 642 xxxx xxxx xxxxx
Move Cap.: 890 xxxx xxxxx xxxx xxxx xxxxx 195 xxxx 642 xxxx xxxx xxxxx
Volume/Cap: 0.07 xxxx xxxx xxxx xxxx xxxxx 0.29 xxxx 0.13 xxxx xxxx xxxxx
-----|-----|-----|-----|
Level Of Service Module:
Queue: 0.2 xxxx xxxxx xxxxx xxxx xxxxx 1.1 xxxx 0.5 xxxxx xxxx xxxxx
Stopped Del: 9.3 xxxx xxxxx xxxxx xxxx xxxxx 30.7 xxxx 11.5 xxxxx xxxx xxxxx
LOS by Move: A * * * * D * B * *
Movement: LT - LTR - RT LT - LTR - RT LT - LTR - RT LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx xxxx xxxx xxxxx xxxx xxxx xxxxx xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS: * * * * * * * * * * * * * * *
ApproachDel: xxxxxxx xxxxxxx 19.1 xxxxxxx
ApproachLOS: * * C *

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HCM Signalized Intersection Capacity Analysis
2: Grant Line Road & Naglee Road

WinCo
Cumulative plus Project AM-Mitigated

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			  					 	 	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00		0.91	1.00				0.97	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583		5085	1583				3433	1863	1583
Flt Permitted	0.95	1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583		5085	1583				3433	1863	1583
Volume (vph)	431	1433	97	0	1775	725	0	0	0	509	65	302
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	431	1433	97	0	1775	725	0	0	0	509	65	302
RTOR Reduction (vph)	0	0	30	0	0	0	0	0	0	0	0	227
Lane Group Flow (vph)	431	1433	67	0	1775	725	0	0	0	509	65	75
Turn Type	Prot		Perm			Free			Perm			Perm
Protected Phases	5	2			6							4
Permitted Phases			2			Free				4		4
Actuated Green, G (s)	12.3	48.9	48.9		32.4	76.7				17.9	17.9	17.9
Effective Green, g (s)	12.5	50.2	50.2		33.7	76.7				18.5	18.5	18.5
Actuated g/C Ratio	0.16	0.65	0.65		0.44	1.00				0.24	0.24	0.24
Clearance Time (s)	4.2	5.3	5.3		5.3					4.6	4.6	4.6
Vehicle Extension (s)	3.0	3.0	3.0		3.0					3.0	3.0	3.0
Lane Grp Cap (vph)	559	2316	1036		2234	1583				828	449	382
v/s Ratio Prot	c0.13	0.40			c0.35							0.03
v/s Ratio Perm			0.04			0.46				c0.15		0.05
v/c Ratio	0.77	0.62	0.06		0.79	0.46				0.61	0.14	0.20
Uniform Delay, d1	30.7	7.7	4.8		18.5	0.0				25.9	22.9	23.2
Progression Factor	1.00	1.00	1.00		1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	6.5	0.5	0.0		2.0	1.0				1.4	0.1	0.3
Delay (s)	37.2	8.2	4.8		20.5	1.0				27.3	23.0	23.4
Level of Service	D	A	A		C	A				C	C	C
Approach Delay (s)		14.4			14.9			0.0			25.6	
Approach LOS		B			B			A			C	
Intersection Summary												
HCM Average Control Delay			16.5				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			76.7				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			71.1%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 3: I 205 WB Ramps & Naglee Road

WinCo
 Cumulative plus Project AM-Mitigated

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	3433	3539	1583	3433	3539	1583	1770	4921	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	3433	3539	1583	3433	3539	1583	1770	4921	
Volume (vph)	12	46	312	412	150	209	661	462	189	78	196	54
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	12	46	312	412	150	209	661	462	189	78	196	54
RTOR Reduction (vph)	0	0	0	0	0	149	0	0	119	0	42	0
Lane Group Flow (vph)	12	46	312	412	150	60	661	462	70	78	208	0
Turn Type	Prot		Free	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			8			2			
Actuated Green, G (s)	1.0	4.8	66.2	13.5	17.7	17.7	17.5	23.5	23.5	4.9	11.4	
Effective Green, g (s)	1.2	6.1	66.2	14.1	19.0	19.0	17.7	24.4	24.4	5.6	12.3	
Actuated g/C Ratio	0.02	0.09	1.00	0.21	0.29	0.29	0.27	0.37	0.37	0.08	0.19	
Clearance Time (s)	4.2	5.3		4.6	5.3	5.3	4.2	4.9	4.9	4.7	4.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	32	172	1583	731	1016	454	918	1304	583	150	914	
v/s Ratio Prot	0.01	0.02		c0.12	0.04		c0.19	c0.13		0.04	0.04	
v/s Ratio Perm			c0.20			0.04			0.04			
v/c Ratio	0.38	0.27	0.20	0.56	0.15	0.13	0.72	0.35	0.12	0.52	0.23	
Uniform Delay, d1	32.1	28.0	0.0	23.3	17.6	17.5	22.0	15.2	13.8	29.0	22.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.2	0.8	0.3	1.0	0.1	0.1	2.8	0.2	0.1	3.2	0.1	
Delay (s)	39.4	28.8	0.3	24.3	17.6	17.6	24.8	15.3	13.9	32.2	23.0	
Level of Service	D	C	A	C	B	B	C	B	B	C	C	
Approach Delay (s)		5.1			21.2			19.9			25.2	
Approach LOS		A			C			B			C	
Intersection Summary												
HCM Average Control Delay			18.9				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			66.2				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			52.3%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 4: Grant Line Road & I-205 EB On-Ramp

WinCo
 Cumulative plus Project AM-Mitigated

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	 	 			  								
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0				
Lane Util. Factor	0.97	0.95			0.91	1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85	1.00		0.85				
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00				
Satd. Flow (prot)	3433	3539			5085	1583	1770		1583				
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00				
Satd. Flow (perm)	3433	3539			5085	1583	1770		1583				
Volume (vph)	1055	721	0	0	2228	200	272	0	397	0	0	0	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	1055	721	0	0	2228	200	272	0	397	0	0	0	
RTOR Reduction (vph)	0	0	0	0	0	58	0	0	0	0	0	0	
Lane Group Flow (vph)	1055	721	0	0	2228	142	272	0	397	0	0	0	
Turn Type	Prot							Permcustom		Free			
Protected Phases	5	2						6					
Permitted Phases								6	8	Free			
Actuated Green, G (s)	46.1	116.2						66.1	66.1	27.7	152.9		
Effective Green, g (s)	46.1	117.2						67.1	67.1	27.7	152.9		
Actuated g/C Ratio	0.30	0.77						0.44	0.44	0.18	1.00		
Clearance Time (s)	4.0	5.0						5.0	5.0	4.0			
Vehicle Extension (s)	3.0	3.0						3.0	3.0	3.0			
Lane Grp Cap (vph)	1035	2713						2232	695	321	1583		
v/s Ratio Prot	c0.31	0.20						c0.44					
v/s Ratio Perm								0.09	c0.15	0.25			
v/c Ratio	1.02	0.27						1.00	0.20	0.85	0.25		
Uniform Delay, d1	53.4	5.2						42.8	26.4	60.6	0.0		
Progression Factor	1.00	1.00						1.00	1.00	1.00	1.00		
Incremental Delay, d2	32.9	0.1						18.5	0.1	18.3	0.4		
Delay (s)	86.3	5.3						61.3	26.6	78.8	0.4		
Level of Service	F	A						E	C	E	A		
Approach Delay (s)	53.4							58.5	32.3		0.0		
Approach LOS	D							E	C		A		
Intersection Summary													
HCM Average Control Delay	53.0		HCM Level of Service					D					
HCM Volume to Capacity ratio	0.98												
Actuated Cycle Length (s)	152.9		Sum of lost time (s)					12.0					
Intersection Capacity Utilization	98.2%		ICU Level of Service					F					
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis

1: Grant Line Road & Byron Road

WinCo

Cumulative plus Project PM-Mitigated

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.94	0.95	0.95	0.97	0.91	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.87	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	4990	1541	1504	3433	5085	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	4990	1541	1504	3433	5085	1583	3433	3539	1583
Volume (vph)	10	1003	251	551	19	474	587	1690	248	720	652	10
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	1003	251	551	19	474	587	1690	248	720	652	10
RTOR Reduction (vph)	0	0	0	0	80	0	0	0	0	0	0	7
Lane Group Flow (vph)	10	1003	251	551	57	356	587	1690	248	720	652	3
Turn Type	Prot		Free	Prot		Free	Prot		Free	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			6
Actuated Green, G (s)	0.6	25.2	118.2	13.0	37.6	118.2	23.7	40.0	118.2	24.0	40.3	40.3
Effective Green, g (s)	0.6	25.2	118.2	13.0	37.6	118.2	23.7	40.0	118.2	24.0	40.3	40.3
Actuated g/C Ratio	0.01	0.21	1.00	0.11	0.32	1.00	0.20	0.34	1.00	0.20	0.34	0.34
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	9	1084	1583	549	490	1504	688	1721	1583	697	1207	540
v/s Ratio Prot	0.01	c0.20		c0.11	0.04		0.17	c0.33		c0.21	0.18	
v/s Ratio Perm			0.16			c0.24			0.16			0.00
v/c Ratio	1.11	0.93	0.16	1.00	0.12	0.24	0.85	0.98	0.16	1.03	0.54	0.01
Uniform Delay, d1	58.8	45.6	0.0	52.6	28.5	0.0	45.6	38.7	0.0	47.1	31.5	25.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	342.2	12.9	0.2	39.3	0.1	0.4	10.0	17.5	0.2	42.9	0.5	0.0
Delay (s)	401.0	58.5	0.2	91.9	28.6	0.4	55.6	56.2	0.2	90.0	32.0	25.7
Level of Service	F	E	A	F	C	A	E	E	A	F	C	C
Approach Delay (s)		49.7			52.4			50.6			62.1	
Approach LOS		D			D			D			E	
Intersection Summary												
HCM Average Control Delay			53.3	HCM Level of Service				D				
HCM Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			118.2	Sum of lost time (s)				16.0				
Intersection Capacity Utilization			96.4%	ICU Level of Service				F				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
2: Grant Line Road & Naglee Road

WinCo
Cumulative plus Project PM-Mitigated

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			  					 		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00		0.91	1.00				0.97	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583		5085	1583				3433	1863	1583
Flt Permitted	0.95	1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583		5085	1583				3433	1863	1583
Volume (vph)	554	1863	227	0	1128	1239	0	0	0	1472	35	983
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	554	1863	227	0	1128	1239	0	0	0	1472	35	983
RTOR Reduction (vph)	0	0	49	0	0	0	0	0	0	0	0	374
Lane Group Flow (vph)	554	1863	178	0	1128	1239	0	0	0	1472	35	609
Turn Type	Prot		Perm			Free			Prot		Perm	
Protected Phases	5	2			6					7	4	
Permitted Phases			2			Free						4
Actuated Green, G (s)	23.4	65.0	65.0		37.4	119.3				45.0	44.4	44.4
Effective Green, g (s)	23.6	66.3	66.3		38.7	119.3				45.0	45.0	45.0
Actuated g/C Ratio	0.20	0.56	0.56		0.32	1.00				0.38	0.38	0.38
Clearance Time (s)	4.2	5.3	5.3		5.3					4.0	4.6	4.6
Vehicle Extension (s)	3.0	3.0	3.0		3.0					3.0	3.0	3.0
Lane Grp Cap (vph)	679	1967	880		1650	1583				1295	703	597
v/s Ratio Prot	0.16	c0.53			0.22					c0.43	0.02	
v/s Ratio Perm			0.11			0.78						0.38
v/c Ratio	0.82	0.95	0.20		0.68	0.78				1.14	0.05	1.02
Uniform Delay, d1	45.8	24.9	13.3		35.0	0.0				37.2	23.6	37.2
Progression Factor	1.00	1.00	1.00		1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	7.5	10.3	0.1		1.2	3.9				71.5	0.0	42.1
Delay (s)	53.3	35.2	13.4		36.2	3.9				108.6	23.6	79.3
Level of Service	D	D	B		D	A				F	C	E
Approach Delay (s)		37.1			19.3			0.0			95.8	
Approach LOS		D			B			A			F	
Intersection Summary												
HCM Average Control Delay			51.0				HCM Level of Service			D		
HCM Volume to Capacity ratio			1.02									
Actuated Cycle Length (s)			119.3				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			100.2%				ICU Level of Service			G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 3: I 205 WB Ramps & Naglee Road

WinCo
 Cumulative plus Project PM-Mitigated

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	3433	3539	1583	3433	3539	1583	1770	5012	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	3433	3539	1583	3433	3539	1583	1770	5012	
Volume (vph)	144	333	1314	402	301	276	1002	707	112	512	741	79
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	144	333	1314	402	301	276	1002	707	112	512	741	79
RTOR Reduction (vph)	0	0	0	0	0	211	0	0	84	0	10	0
Lane Group Flow (vph)	144	333	1314	402	301	65	1002	707	28	512	810	0
Turn Type	Prot		Free	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			8			2			
Actuated Green, G (s)	11.8	24.6	131.7	16.4	29.6	29.6	40.9	31.8	31.8	39.4	30.8	
Effective Green, g (s)	12.0	25.9	131.7	17.0	30.9	30.9	41.1	32.7	32.7	40.1	31.7	
Actuated g/C Ratio	0.09	0.20	1.00	0.13	0.23	0.23	0.31	0.25	0.25	0.30	0.24	
Clearance Time (s)	4.2	5.3		4.6	5.3	5.3	4.2	4.9	4.9	4.7	4.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	161	366	1583	443	830	371	1071	879	393	539	1206	
v/s Ratio Prot	0.08	0.18		0.12	0.09		c0.29	0.20		0.29	0.16	
v/s Ratio Perm			c0.83			0.04			0.02			
v/c Ratio	0.89	0.91	0.83	0.91	0.36	0.17	0.94	0.80	0.07	0.95	0.67	
Uniform Delay, d1	59.2	51.8	0.0	56.6	42.2	40.2	44.0	46.5	37.9	44.8	45.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	41.6	25.6	5.2	21.9	0.3	0.2	14.5	5.4	0.1	26.4	1.5	
Delay (s)	100.8	77.3	5.2	78.5	42.4	40.4	58.5	51.9	38.0	71.2	46.8	
Level of Service	F	E	A	E	D	D	E	D	D	E	D	
Approach Delay (s)		26.3			56.7			54.7			56.2	
Approach LOS		C			E			D			E	
Intersection Summary												
HCM Average Control Delay			46.8				HCM Level of Service			D		
HCM Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			131.7				Sum of lost time (s)			4.0		
Intersection Capacity Utilization			90.2%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 4: Grant Line Road & I-205 EB On-Ramp

WinCo
 Cumulative plus Project PM-Mitigated

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	 	 			  								
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0				
Lane Util. Factor	0.97	0.95			0.91	1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85	1.00		0.85				
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00				
Satd. Flow (prot)	3433	3539			5085	1583	1770		1583				
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00				
Satd. Flow (perm)	3433	3539			5085	1583	1770		1583				
Volume (vph)	1161	2175	0	0	1872	151	408	0	352	0	0	0	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	1161	2175	0	0	1872	151	408	0	352	0	0	0	
RTOR Reduction (vph)	0	0	0	0	0	58	0	0	0	0	0	0	
Lane Group Flow (vph)	1161	2175	0	0	1872	93	408	0	352	0	0	0	
Turn Type	Prot							Permcustom		Free			
Protected Phases	5	2						6					
Permitted Phases								6	8	Free			
Actuated Green, G (s)	49.0	105.5						52.3	52.3	35.0	150.0		
Effective Green, g (s)	49.2	106.8						53.6	53.6	35.2	150.0		
Actuated g/C Ratio	0.33	0.71						0.36	0.36	0.23	1.00		
Clearance Time (s)	4.2	5.3						5.3	5.3	4.2			
Vehicle Extension (s)	3.0	3.0						3.0	3.0	3.0			
Lane Grp Cap (vph)	1126	2520						1817	566	415	1583		
v/s Ratio Prot	c0.34	0.61						c0.37					
v/s Ratio Perm								0.06	c0.23	0.22			
v/c Ratio	1.03	0.86						1.03	0.16	0.98	0.22		
Uniform Delay, d1	50.4	16.1						48.2	32.9	57.1	0.0		
Progression Factor	1.00	1.00						1.00	1.00	1.00	1.00		
Incremental Delay, d2	35.1	3.3						29.3	0.1	39.5	0.3		
Delay (s)	85.5	19.5						77.5	33.1	96.6	0.3		
Level of Service	F	B						E	C	F	A		
Approach Delay (s)	42.4							74.2	52.0		0.0		
Approach LOS	D							E	D		A		
Intersection Summary													
HCM Average Control Delay	54.1		HCM Level of Service					D					
HCM Volume to Capacity ratio	1.02												
Actuated Cycle Length (s)	150.0		Sum of lost time (s)					12.0					
Intersection Capacity Utilization	101.9%		ICU Level of Service					G					
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
5: Grant Line Road & Corral Hollow Road

WinCo
Cumulative plus Project PM-Mitigated

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	  		 	  		  		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.97		1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00		0.85	1.00		0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433		1583	3433		1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433		1583	3433		1583	3433	5085	1583	3433	5085	1583
Volume (vph)	411	0	1046	194	0	188	958	598	194	237	706	124
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	100%	100%	75%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	411	0	784	194	0	188	958	598	194	237	706	124
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	411	0	784	194	0	188	958	598	194	237	706	124
Turn Type	Prot		Free	Prot		Free	Prot		Free	Prot		Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Actuated Green, G (s)	15.0		92.1	9.5		92.1	35.1	42.0	92.1	11.5	18.4	92.1
Effective Green, g (s)	15.0		92.1	9.5		92.1	35.1	43.0	92.1	11.5	19.4	92.1
Actuated g/C Ratio	0.16		1.00	0.10		1.00	0.38	0.47	1.00	0.12	0.21	1.00
Clearance Time (s)	4.0			4.0			4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0			3.0			3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	559		1583	354		1583	1308	2374	1583	429	1071	1583
v/s Ratio Prot	c0.12			0.06			c0.28	0.12		0.07	c0.14	
v/s Ratio Perm			c0.50			0.12			0.12			0.08
v/c Ratio	0.74		0.50	0.55		0.12	0.73	0.25	0.12	0.55	0.66	0.08
Uniform Delay, d1	36.7		0.0	39.3		0.0	24.5	14.8	0.0	37.9	33.3	0.0
Progression Factor	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.0		1.1	1.7		0.2	2.2	0.1	0.2	1.5	1.5	0.1
Delay (s)	41.7		1.1	41.0		0.2	26.6	14.9	0.2	39.4	34.8	0.1
Level of Service	D		A	D		A	C	B	A	D	C	A
Approach Delay (s)		15.1			20.9			19.7			31.8	
Approach LOS		B			C			B			C	
Intersection Summary												
HCM Average Control Delay			21.5				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			92.1				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			69.4%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 7: Eleventh Street & Corral Hollow Road

WinCo
 Cumulative plus Project PM-Mitigated

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	  		 	  		  		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.97		1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00		0.85	1.00		0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433		1583	3433		1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433		1583	3433		1583	3433	5085	1583	3433	5085	1583
Volume (vph)	420	0	491	676	0	354	174	1257	461	497	1565	133
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	100%	100%	80%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	420	0	393	676	0	354	174	1257	461	497	1565	133
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	420	0	393	676	0	354	174	1257	461	497	1565	133
Turn Type	Prot		Free	Prot		Free	Prot		Free	Prot		Free
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			Free			Free			Free			Free
Actuated Green, G (s)	14.9		97.3	24.1		97.3	8.7	31.1	97.3	17.1	39.5	97.3
Effective Green, g (s)	21.9		97.3	24.1		97.3	8.7	32.1	97.3	17.1	40.5	97.3
Actuated g/C Ratio	0.23		1.00	0.25		1.00	0.09	0.33	1.00	0.18	0.42	1.00
Clearance Time (s)	11.0			4.0			4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0			3.0			3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	773		1583	850		1583	307	1678	1583	603	2117	1583
v/s Ratio Prot	0.12			c0.20			0.05	0.25		c0.14	c0.31	
v/s Ratio Perm			0.25			0.22			c0.29			0.08
v/c Ratio	0.54		0.25	0.80		0.22	0.57	0.75	0.29	0.82	0.74	0.08
Uniform Delay, d1	33.3		0.0	34.3		0.0	42.5	29.0	0.0	38.7	23.9	0.0
Progression Factor	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8		0.4	5.2		0.3	2.4	1.9	0.5	9.0	1.4	0.1
Delay (s)	34.1		0.4	39.5		0.3	44.9	30.9	0.5	47.6	25.3	0.1
Level of Service	C		A	D		A	D	C	A	D	C	A
Approach Delay (s)		17.8			26.0			24.8			28.8	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM Average Control Delay			25.5				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			97.3				Sum of lost time (s)				8.0	
Intersection Capacity Utilization			74.4%				ICU Level of Service				D	
Analysis Period (min)			15									

c Critical Lane Group

A P P E N D I X C

A I R Q U A L I T Y R E P O R T



URBEMIS 2002 For Windows 8.7.0

File Name: C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\winco.urb
Project Name: Winco
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

SUMMARY REPORT
(Tons/Year)

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (tpy, unmitigated)	0.49	0.42	0.49	0.00	0.00

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (tpy, unmitigated)	22.60	26.94	241.50	0.19	18.22

SUM OF AREA AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (tpy, unmitigated)	23.09	27.35	241.99	0.19	18.22



URBEMIS 2002 For Windows 8.7.0

File Name: C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\winco.urb
Project Name: Winco
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Tons/Year)

AREA SOURCE EMISSION ESTIMATES (Tons per Year, Unmitigated)					
Source	ROG	NOx	CO	SO2	PM10
Natural Gas	0.03	0.42	0.35	0.00	0.00
Hearth	0.00	0.00	0.00	0.00	0.00
Landscaping	0.02	0.00	0.14	0.00	0.00
Consumer Prdcts	0.00	-	-	-	-
Architectural Coatings	0.44	-	-	-	-
TOTALS (tpy, unmitigated)	0.49	0.42	0.49	0.00	0.00

UNMITIGATED OPERATIONAL EMISSIONS

	ROG	NOx	CO	SO2	PM10
Commercial	9.38	11.56	102.87	0.08	7.92
Winco Foods	13.22	15.38	138.62	0.11	10.29
TOTAL EMISSIONS (tons/yr)	22.60	26.94	241.50	0.19	18.22

Includes correction for passby trips.
Does not include double counting adjustment for internal trips.

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2005 Season: Annual

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

Unit Type	Acreage	Trip Rate	No. Units	Total Trips
Commercial		42.90 trips/1000 sq. ft.	141.00	6,048.90
Winco Foods		95.20 trips/1000 sq. ft.	95.50	9,091.60
Sum of Total Trips				15,140.50
Total Vehicle Miles Traveled				65,622.04

Vehicle Assumptions:

Fleet Mix:

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	56.10	2.30	97.10	0.60
Light Truck < 3,750 lbs	15.10	4.00	93.40	2.60
Light Truck 3,751- 5,750	15.50	1.90	96.80	1.30
Med Truck 5,751- 8,500	6.80	1.50	95.60	2.90
Lite-Heavy 8,501-10,000	1.00	0.00	80.00	20.00
Lite-Heavy 10,001-14,000	0.30	0.00	66.70	33.30
Med-Heavy 14,001-33,000	1.00	10.00	20.00	70.00
Heavy-Heavy 33,001-60,000	0.80	0.00	12.50	87.50
Line Haul > 60,000 lbs	0.00	0.00	0.00	100.00
Urban Bus	0.10	0.00	0.00	100.00
Motorcycle	1.60	87.50	12.50	0.00
School Bus	0.30	0.00	0.00	100.00
Motor Home	1.40	14.30	78.60	7.10

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
Trip Speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Commercial				2.0	1.0	97.0
Winco Foods				2.0	1.0	97.0

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Area

Changes made to the default values for Operations

The pass by trips option switch changed from off to on.

A P P E N D I X D

NOISE DATA



FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Data Input Sheet

Project #: 2004-344 Tracy Winco EIR
 Description: Near Term Project
 Ldn/CNEL: Ldn
 Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Naglee Rd & Grantline Rd	North	24030	87		13	2	2	40	100	
2		South	1140	87		13	2	2	40	100	
3		West	26580	87		13	2	2	40	100	
4		East	32090	87		13	2	2	40	100	
5	Corral Hollow Rd & Grantline Rd	North	11530	87		13	2	2	40	100	
6		South	26240	87		13	2	2	40	100	
7		West	31340	87		13	2	2	40	100	
8		East	19470	87		13	2	2	40	100	
9	Byron Rd & Grantline	North	10220	87		13	2	2	40	100	
10		South	8690	87		13	2	2	40	100	
11		West	0	87		13	2	2	40	100	
12		East	13390	87		13	2	2	40	100	

FHWA-RD-77-108 Highway Traffic Noise Prediction Model Predicted Levels

Project #: 2004-344 Tracy Winco EIR
 Description: Near Term Project
 Ldn/CNEL: Ldn
 Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	Naglee Rd & Grantline Rd	North	63.4	55.5	60.4	66
2		South	50.2	42.3	47.1	52
3		West	63.9	56.0	60.8	66
4		East	64.7	56.8	61.6	67
5	Corral Hollow Rd & Grantline Rd	North	60.2	52.3	57.2	62
6		South	63.8	55.9	60.7	66
7		West	64.6	56.7	61.5	67
8		East	62.5	54.6	59.4	65
9	Byron Rd & Grantline	North	59.7	51.8	56.6	62
10		South	59.0	51.1	55.9	61
11		West	0	0	0	0
12		East	60.9	53.0	57.8	63

**FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Noise Contour Output**

Project #: 2004-344 Tracy Winco EIR
 Description: Near Term Project
 Ldn/CNEL: Ldn
 Hard/Soft: Soft

Segment	Roadway Name	Segment Description	----- Distances to Traffic Noise Contours -----					
			75	70	65	60	55	
1	Naglee Rd & Grantline Rd	North	24	51	110	237	510	
2		South	3	7	14	31	67	
3		West	25	55	118	253	546	
4		East	29	62	133	287	619	
5	Corral Hollow Rd & Grantline Rd	North	15	31	67	145	313	
6		South	25	54	117	251	541	
7		West	28	61	131	283	609	
8		East	21	44	96	206	443	
9	Byron Rd & Grantline	North	13	29	62	134	289	
10		South	12	26	56	120	259	
11		West	0	0	0	0	0	
12		East	16	35	74	160	345	

**FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet**

Project #: 2004-344 Tracy Winco EIR
 Description: Near Term Plus Project
 Ldn/CNEL: Ldn
 Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Naglee Rd & Grantline Rd	North	24100	87		13	2	2	40	100	
2		South	1210	87		13	2	2	40	100	
3		West	27750	87		13	2	2	40	100	
4		East	33120	87		13	2	2	40	100	
5	Corral Hollow Rd & Grantline Rd	North	11530	87		13	2	2	40	100	
6		South	26700	87		13	2	2	40	100	
7		West	32210	87		13	2	2	40	100	
8		East	19880	87		13	2	2	40	100	
9	Byron Rd & Grantline	North	10260	87		13	2	2	40	100	
10		South	8760	87		13	2	2	40	100	
11		West	0	87		13	2	2	40	100	
12		East	13500	87		13	2	2	40	100	

FHWA-RD-77-108 Highway Traffic Noise Prediction Model Predicted Levels

Project #: 2004-344 Tracy Winco EIR
 Description: Near Term Plus Project
 Ldn/CNEL: Ldn
 Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	Naglee Rd & Grantline Rd	North	63.4	55.5	60.4	66
2		South	50.4	42.6	47.4	53
3		West	64.0	56.2	61.0	66
4		East	64.8	56.9	61.8	67
5	Corral Hollow Rd & Grantline Rd	North	60.2	52.3	57.2	62
6		South	63.9	56.0	60.8	66
7		West	64.7	56.8	61.6	67
8		East	62.6	54.7	59.5	65
9	Byron Rd & Grantline	North	59.7	51.8	56.7	62
10		South	59.0	51.2	56.0	61
11		West	0	0	0	0
12		East	60.9	53.0	57.9	63

**FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Noise Contour Output**

Project #: 2004-344 Tracy Winco EIR
 Description: Near Term Plus Project
 Ldn/CNEL: Ldn
 Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Distances to Traffic Noise Contours -----					
			75	70	65	60	55	
1	Naglee Rd & Grantline Rd	North	24	51	110	237	511	
2		South	3	7	15	32	70	
3		West	26	56	121	261	562	
4		East	29	63	136	293	632	
5	Corral Hollow Rd & Grantline Rd	North	15	31	67	145	313	
6		South	25	55	118	254	547	
7		West	29	62	134	288	620	
8		East	21	45	97	209	450	
9	Byron Rd & Grantline	North	13	29	62	134	289	
10		South	12	26	56	121	260	
11		West	0	0	0	0	0	
12		East	16	35	75	161	347	

**FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet**

Project #: 2004-344 Tracy Winco EIR
 Description: Cumulative No Project
 Ldn/CNEL: Ldn
 Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Naglee Rd & Grantline Rd	North	36470	87		13	2	2	40	100	
2		South	2690	87		13	2	2	40	100	
3		West	48050	87		13	2	2	40	100	
4		East	52550	87		13	2	2	40	100	
5	Corral Hollow Rd & Grantline Rd	North	22640	87		13	2	2	40	100	
6		South	35950	87		13	2	2	40	100	
7		West	47290	87		13	2	2	40	100	
8		East	31040	87		13	2	2	40	100	
9	Lammers Rd & Grantline	North	35520	87		13	2	2	40	100	
10		South	39360	87		13	2	2	40	100	
11		West	18730	87		13	2	2	40	100	
12		East	29610	87		13	2	2	40	100	

FHWA-RD-77-108 Highway Traffic Noise Prediction Model Predicted Levels

Project #: 2004-344 Tracy Winco EIR
 Description: Cumulative No Project
 Ldn/CNEL: Ldn
 Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	Naglee Rd & Grantline Rd	North	65.2	57.3	62.2	67
2		South	53.9	46.0	50.9	56
3		West	66.4	58.5	63.4	69
4		East	66.8	58.9	63.8	69
5	Corral Hollow Rd & Grantline Rd	North	63.2	55.3	60.1	65
6		South	65.2	57.3	62.1	67
7		West	66.4	58.5	63.3	69
8		East	64.5	56.6	61.5	67
9	Lammers Rd & Grantline	North	65.1	57.2	62.1	67
10		South	65.6	57.7	62.5	68
11		West	62.3	54.5	59.3	65
12		East	64.3	56.4	61.3	67

**FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Noise Contour Output**

Project #: 2004-344 Tracy Winco EIR
 Description: Cumulative No Project
 Ldn/CNEL: Ldn
 Hard/Soft: Soft

Segment	Roadway Name	Segment Description	----- Distances to Traffic Noise Contours -----				
			75	70	65	60	55
1	Naglee Rd & Grantline Rd	North	31	67	145	313	674
2		South	6	12	26	55	118
3		West	38	81	174	376	810
4		East	40	86	185	399	860
5	Corral Hollow Rd & Grantline Rd	North	23	49	106	228	490
6		South	31	67	144	310	667
7		West	37	80	173	372	801
8		East	28	61	130	281	605
9	Lammers Rd & Grantline	North	31	66	143	307	662
10		South	33	71	153	329	709
11		West	20	43	93	201	432
12		East	27	59	126	272	586

**FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet**

Project #: 2004-344 Tracy Winco EIR
 Description: Cumulative Plus Project
 Ldn/CNEL: Ldn
 Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Naglee Rd & Grantline Rd	North	36470	87		13	2	2	40	100	
2		South	2690	87		13	2	2	40	100	
3		West	48050	87		13	2	2	40	100	
4		East	52550	87		13	2	2	40	100	
5	Corral Hollow Rd & Grantline Rd	North	22640	87		13	2	2	40	100	
6		South	35950	87		13	2	2	40	100	
7		West	47290	87		13	2	2	40	100	
8		East	31040	87		13	2	2	40	100	
9	Lammers Rd & Grantline	North	35520	87		13	2	2	40	100	
10		South	39360	87		13	2	2	40	100	
11		West	18730	87		13	2	2	40	100	
12		East	29610	87		13	2	2	40	100	

**FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Predicted Levels**

Project #: 2004-344 Tracy Winco EIR
 Description: Cumulative Plus Project
 Ldn/CNEL: Ldn
 Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	Naglee Rd & Grantline Rd	North	65.2	57.3	62.2	67
2		South	53.9	46.0	50.9	56
3		West	66.4	58.5	63.4	69
4		East	66.8	58.9	63.8	69
5	Corral Hollow Rd & Grantline Rd	North	63.2	55.3	60.1	65
6		South	65.2	57.3	62.1	67
7		West	66.4	58.5	63.3	69
8		East	64.5	56.6	61.5	67
9	Lammers Rd & Grantline	North	65.1	57.2	62.1	67
10		South	65.6	57.7	62.5	68
11		West	62.3	54.5	59.3	65
12		East	64.3	56.4	61.3	67

**FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Noise Contour Output**

Project #: 2004-344 Tracy Winco EIR
 Description: Cumulative Plus Project
 Ldn/CNEL: Ldn
 Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Distances to Traffic Noise Contours -----				
			75	70	65	60	55
1	Naglee Rd & Grantline Rd	North	31	67	145	313	674
2		South	6	12	26	55	118
3		West	38	81	174	376	810
4		East	40	86	185	399	860
5	Corral Hollow Rd & Grantline Rd	North	23	49	106	228	490
6		South	31	67	144	310	667
7		West	37	80	173	372	801
8		East	28	61	130	281	605
9	Lammers Rd & Grantline	North	31	66	143	307	662
10		South	33	71	153	329	709
11		West	20	43	93	201	432
12		East	27	59	126	272	586