LINSCOTT LAW & GREENSPAN
engineers

TECHNICAL APPENDICES

VALIANO

County of San Diego, California
December 14, 2015

PSD2013-SP-13-001, PDS2013-GPA-13-001, PDS2013-STP-13-003,
PDS2013-TM-5575, PDS2013-REZ-13-001, PDS2013-ER-12-08-002

LLG Ref. 3-12-2152

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APPENDICES

APPENDIX

A. TransNet SR 78 Improvement Fact Sheet

B. Harmony Grove Village Conditions of Approval and Grading and Improvement Plan for Country Club Drive

C. Intersection and Segment Manual Count Sheets, Caltrans PeMS Volumes

D. *Highway Capacity Manual 2000* Intersection Methodology

E. County of San Diego, City of Escondido, and City of San Marcos Roadway Classification Tables

F. Existing Intersection Analysis Worksheets

F_1 Excerpt from the South Santa Fe Reconstruction Project Traffic Study, LLG 2002 – Light Rail Effect on Intersection Delay

G. Existing + Project Intersection Analysis Worksheets

H. Existing + Cumulative Projects Intersection Analysis Worksheets

I. Existing + Project + Cumulative Projects Intersection Analysis Worksheets

J. Country Club Drive Queuing Analysis Worksheets

J_1 Sight Distance Certification Letters

K. Escondido City Council Agenda: Approval of Significant and Unavoidable Impacts for the Auto Park Way/ Mission Road intersection – *Escondido General Plan Update FEIR*, certified May 2012

L. Alternative Access Scenario Intersection Analysis Worksheets

M. SANDAG Select Zone Assignment and Year 2035 Forecast Volumes

N. Kauana Loa Drive Proposed Traffic Calming Features

O. Exhibit B1; Escondido City Council Approved Agreement for Improvements to Off-Site Roadways, December 9, 2015

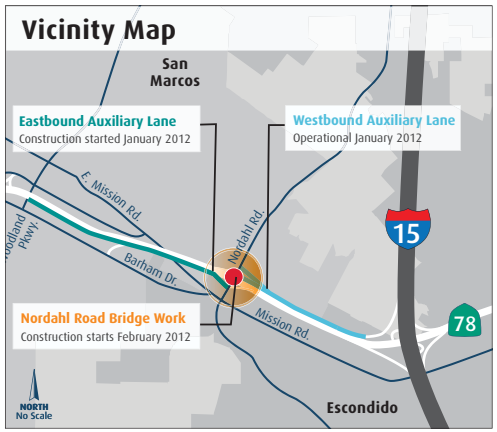
APPENDIX A

TRANSNET SR 78 IMPROVEMENT FACT SHEET

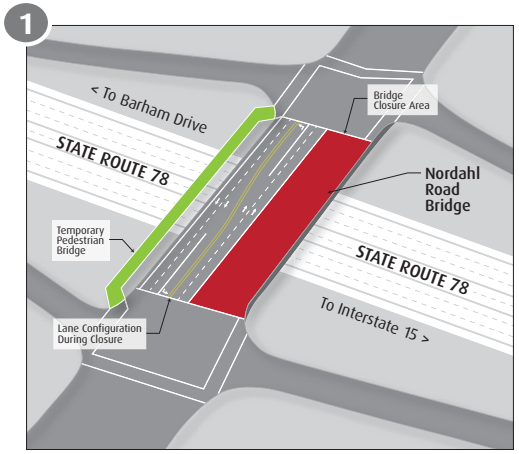
STATE ROUTE 78
Nordahl Road Bridge Project

Keep San Diego Moving
TransNet

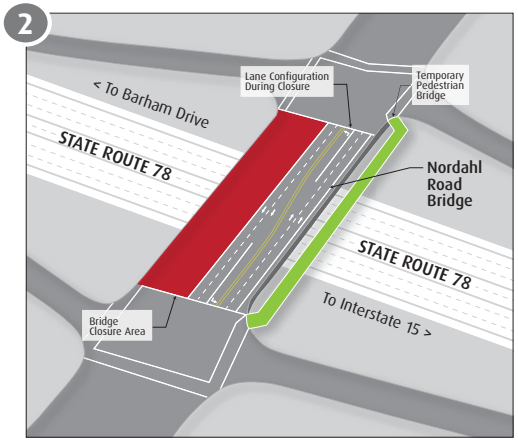
Construction Phasing Plan:
This project will be built in three phases that are described here. Future construction advisories will be issued to provide details about each phase as the project progresses.



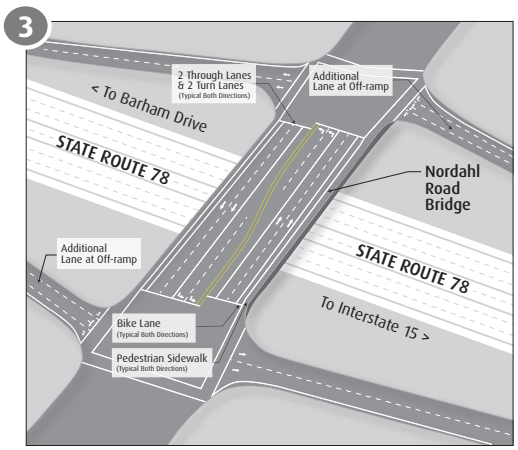
Vicinity Map
This map is an overview of all three construction projects along State Route 78 including the Nordahl Road Bridge replacement.



Phase 1:
Phase 1 includes building a temporary pedestrian bridge on the west side and moving pedestrian traffic to it. It also includes restriping the lanes that will remain open while the east side of the bridge is demolished and rebuilt.



Phase 2:
Phase 2 includes building a temporary pedestrian bridge on the east side and moving pedestrian traffic to it. It also includes restriping the lanes that will remain open while the west side of the bridge is demolished and rebuilt.



Phase 3:
Phase 3, the last phase of the project includes new storm drains, utility hookups, sidewalks and final paving.

Caltrans SANDAG ESCONDIDO City of Choice MOVE OVER

Date: 2.22.12

Keep San Diego Moving
TransNet

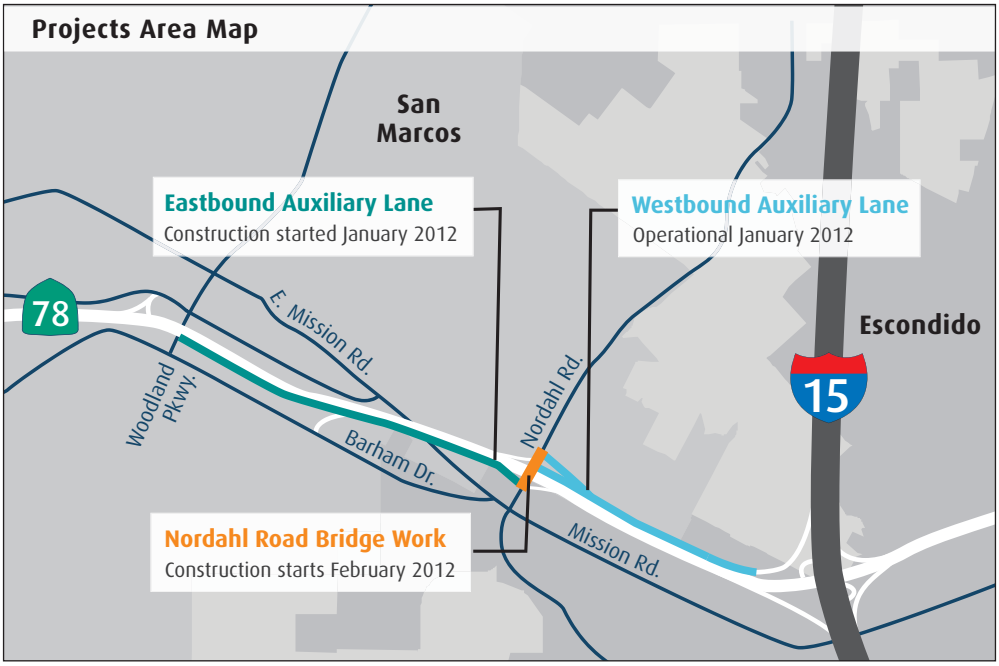
State Route 78:
Improvements Fact Sheet

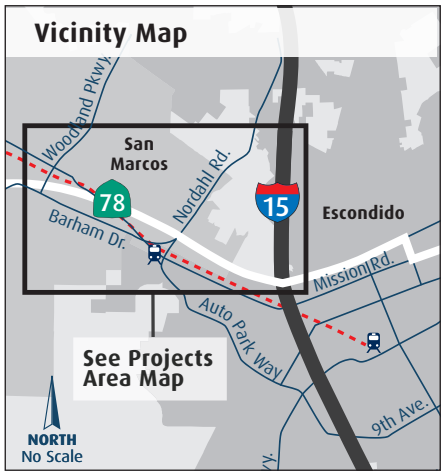
February 2012

$41.1 Million To Improve Traffic Congestion at SR 78 and I-15

To address severe traffic congestion during morning and afternoon commutes, the California Department of Transportation (Caltrans), the San Diego Association of Governments (SANDAG) and the cities of Escondido and San Marcos are working together on three improvements near the I-15/SR 78 interchange.

All of the projects are fully funded through federal grants provided to the cities of Escondido and San Marcos; the voter-approved, half-cent sales tax, *TransNet*; and Caltrans.





Improvements For The Three Projects Include:

Westbound SR 78 Widening:

- Widen the connector on-ramp from I-15 to westbound SR 78
- Add a fifth westbound lane on SR 78 between the end of the I-15 connector ramp and Nordahl Road
- Add one lane on the westbound SR 78 off-ramp to Nordahl Road

Eastbound SR 78 Widening:

- Add an eastbound lane between Woodland Parkway and Barham Drive on-ramp
- Add two eastbound lanes from the Barham Drive on-ramp to the end of the Nordahl Road off-ramp

Nordahl Road Bridge Replacement:

- Add a lane on the bridge to provide additional vehicle capacity for turn pockets to the SR 78 on-ramps
- Add an additional turn pocket to the westbound and eastbound off ramps to Nordahl Road
- Increase height clearance under the bridge
- Accommodate future SR 78 widening and HOV lanes

Project Schedule

Westbound SR 78 Widening Construction Schedule:
July 2011 - Spring 2012

Eastbound SR 78 Widening Construction Schedule:
January 2012 - Winter 2012/2013

Nordahl Road Bridge Replacement Construction Schedule:
February 2012 - Fall 2012

Stay Informed

For more information, log-on to the website:
KeepSanDiegoMoving.com

Follow us on Twitter:
Twitter.com/SDCaltrans

For questions, call: Caltrans Public Affairs:
(858) 668-3368

FACT SHEET
FEB-12

APPENDIX B

HARMONY GROVE VILLAGE CONDITIONS OF APPROVAL AND GRADING AND IMPROVEMENT PLAN FOR COUNTRY CLUB DRIVE

Resolution No.07-021
02/07/07 (5)

February 7, 2007

RESOLUTION OF SAN DIEGO COUNTY)
BOARD OF SUPERVISORS)
CONDITIONALLY APPROVING)
VESTING TENTATIVE MAP NO. 5365RPL^2)

WHEREAS, Vesting Tentative Map No. 5365RPL^2 proposing the division of property located on both sides of Harmony Grove Road at the intersection with Country Club Drive and generally described as:

> A portion of Section 30, a portion of the northeast quarter and the southeast quarter of Section 25, a portion of the southeast quarter of Section 24, and a portion of the southwest quarter of Section 19, all in Township 12 South, Range 2 West, San Bernardino Meridian;

was filed with the County of San Diego pursuant to the Subdivision Map Act and San Diego County Subdivision Ordinance on October 27, 2006; and

WHEREAS, on February 7, 2007, the Board of Supervisors of the County of San Diego pursuant to Section 81.307 of the San Diego County Subdivision Ordinance held a duly advertised public hearing on said Tentative Map and received for its consideration, documentation, written and oral testimony, recommendations from all affected public agencies, and heard from all interested parties present at said hearing; and

WHEREAS, the Board of Supervisors of the County of San Diego has determined that the conditions hereinafter enumerated are necessary to ensure that the subdivision and the improvement thereof will comply with the Subdivision Map Act and conform to all ordinances, plans, rules, standards, and improvement and design requirements of San Diego County.

IT IS RESOLVED, THEREFORE, that the Board of Supervisors of the County of San Diego hereby makes the following findings as supported by the minutes, maps, exhibits, and documentation of said Tentative Map all of which are herein incorporated by reference:

1. The Vesting Tentative Map is consistent with all elements of the San Diego County General Plan and with the (21) Specific Plan Area (1.6) Land Use Designation of the North County Metropolitan Subregional Plan because it proposes a mixed use rural village in accordance with the provision of the Harmony Grove Specific Plan (SP 04-003) with a residential density that does not exceed 1.6 dwelling units per acre and complies with the provisions of the State Subdivision Map Act and the Subdivision Ordinance of the San Diego County Code;

IT IS FURTHER RESOLVED, DETERMINED, AND ORDERED, that based on these findings, said Vesting Tentative Map is hereby approved subject to the following conditions:

A. The approval of this Tentative Map TM 5365RPL^2 shall take effect and be in force on March 9, 2007, but only if GPA 07-001, SP 04-003 and R04-010, also are approved and become effective that day.

The approval of this Tentative Map expires on March 9, 2010 at 4:00 p.m., unless prior to that date a request for a Time Extension has been filed and is subsequently approved as provided by Section 81.308 of the County Subdivision Ordinance

PLEASE NOTE: Condition compliance, preparation of grading and improvement plans and final mapping may take a year or more to complete. Applicants are advised to begin this process at least one year prior to expiration of this Tentative Map.

PLEASE NOTE: Time Extension requests cannot be processed without updated project information including new Department of Environmental Health certification of septic systems. Since Department of Environmental Health review may take several months, applicants anticipating the need for Time Extensions for their projects are advised to submit applications for septic certification to the Department of Environmental Health several months prior to the expiration of their Tentative Maps.

B. The "Standard Conditions for Tentative Subdivision Maps" approved by the Board of Supervisors on June 16, 2000, and filed with the Clerk as Resolution No. 00-199, shall be made conditions of this Tentative Map approval. Only those exceptions to the Standard Conditions set forth in this Resolution or shown on the Tentative Map will be authorized.

C. The following conditions shall be complied with before a Final Map is approved by the Board of Supervisors and filed with the County Recorder of San Diego County (and, where specifically, indicated, shall also be complied with prior to issuance of grading or other permits as specified):

PLANS AND SPECIFICATIONS

(Street Improvements and Access)

1. Standard Conditions 1 through 12.

2. Specific Conditions:

a. Prior to approval of the First Final Map, improve or agree to improve and provide security for **Harmony Grove Road (SC 1370)**, on-site, within the project boundary, in accordance with Public Road Standards for a Town Collector, to a graded width of seventy-four feet (74') with fifty-four feet (54') of asphalt concrete pavement over approved base with Portland cement concrete curb and gutter with face of curb at twenty-seven feet (27') from centerline to the satisfaction of the Director of Public Works.

b. Prior to approval of the First Final Map, improve or agree to improve and provide security for Harmony Grove Road (SC 1370), from Country Club Drive easterly and northerly to Village Road northeast of POA 41, as an interim improvement, to a graded width of thirty-six feet (36') and an improved width of (28') of asphalt concrete pavement over approved base. The existing pavement may remain and shall be widened with asphalt concrete to provide a constant width of twenty-eight feet (28') to the satisfaction of the Director of Public Works. Where the twenty-eight foot improved width is infeasible, the applicant shall submit a design exception to the Satisfaction of the Director of Public Works.

c. Prior to approval of the First Final Map, improve or agree to improve and provide security for **Country Club Drive (SC 1375)**, within and along the project frontage north of Village Drive, in accordance with Public Road Standards for a Rural Light Collector, to a graded width of sixty feet (60') with forty-feet (40') of asphalt concrete pavement over approved base with Portland cement concrete curb, gutter and sidewalks with face of curb at twenty (20') from centerline to the satisfaction of the Director of Public Works. Where infeasible or inappropriate to meet the 40-mph design speed as specified in the Public Road Standards for a Rural Light Collector, the applicant may submit to the Director of Public Works a design exception that is in substantial conformance with the "Safety Enhancement Alternative" exhibit submitted to the Board of Supervisors February 7, 2007.

d. Prior to approval of the First Final Map, improve or agree to improve and provide security for **Village Road and Country Club Drive (SC 1375)**, from Harmony Grove Road northerly along existing Country Club Drive to the easterly subdivision boundary at existing Harmony Grove Road, in accordance with Public Road Standards for a Town Collector, to a graded width of seventy-four (74') with fifty-four feet (54') of asphalt concrete pavement over approved base with Portland cement concrete curb, gutter and sidewalks with face of curb at twenty-seven feet (27') from centerline to the satisfaction of the Director of Public Works.

e. **Improve roads or agree to improve and provide security for them, with the recordation of the Final Map for the Unit the road is within, abuts, or provides access to.**

f. Prior to approval of the Final Map for Unit 1, improve or agree to improve and provide security for **'R' Street**, from Country Club Drive to 'Q' Street in accordance with Public Road Standards for a modified Residential Collector, to a graded width of sixty feet (60') with thirty-six feet (36') of asphalt concrete pavement over approved base with Portland cement concrete curb, gutter and five foot (5') sidewalks to the satisfaction of the Director of Public Works.

g. Prior to approval of the Final Map for Unit 1, improve or agree to improve and provide security for **'Q' Street**, from Village Road to the cul-de-sac southwest of Lot 574 in accordance with Public Road Standards for a modified Residential Road, to a graded width of fifty-one feet (51') with thirty-six feet (36') of asphalt concrete pavement over approved base with Portland cement concrete curb, gutter and five foot (5') sidewalk to the satisfaction of the Director of Public Works.

h. 'Q' Street shall terminate with a cul-de-sac southwest of Lot 574, graded to a radius of forty-six feet (46') and surfaced to a radius of thirty-eight feet (38') with asphalt concrete pavement over approved base with Portland cement concrete curb gutter and sidewalk with face of curb at thirty-eight feet (38') from the radius point.

i. Prior to approval of the Final Map for Unit 1, improve or agree to improve and provide security for the unnamed private easement roads serving Lots 571 – 574, 576 – 625, 634 - 650 to an improved width of twenty-four feet (24') with asphalt concrete pavement over approved base with asphalt concrete dike at twelve feet (12') from centerline. The improvement and design standards of Section 3.1(C) of the County Standards for Private Streets for one hundred (100) or less trips shall apply to the satisfaction of DPLU Fire and the Director of Public Works.

j. Provide standard street knuckle (modified as necessary) in accordance with Regional Standard Drawing DS-15 for 'Q' Street at Lot 656 to the satisfaction of the Director of Public Works.

k. The unnamed private easement roads serving Lots 571 – 574, 576 – 625, 634 - 650 each shall terminate to the satisfaction of DPLU Fire and the County of San Diego, Director of Public Works.

uuuu. POA 39 shall terminate to the satisfaction of DPLU Fire and the County of San Diego, Director of Public Works.

vvvv. Prior to approval of the Final Map for Unit 11, improve or agree to improve and provide security for the unnamed private easement road serving Lots 1 and 2 to a graded width of twenty eight feet (28') and to an improved width of twenty-four feet (24') with asphalt concrete pavement over approved base with asphalt concrete curb and gutter at twelve feet (12') from centerline. The improvement and design standards of Section 3.1(C) of the County Standards for Private Streets for one hundred (100) or less trips shall apply to the satisfaction of the Director of Public Works.

wwww. The unnamed private easement road serving Lots 1 and 2 shall terminate to the satisfaction of DPLU Fire and the County of San Diego, Director of Public Works.

xxxx. Asphalt concrete surfacing material shall be hand-raked and compacted to form smooth tapered connections along all edges including those edges adjacent to soil. The edges of asphalt concrete shall be hand-raked at 45 degrees or flatter, so as to provide a smooth transition next to existing soil, including those areas scheduled for shoulder backing. The above shall be done to the satisfaction of the Director of Public Works.

yyyy. Adequate sight distance per County Standards shall be provided at all proposed intersections to the satisfaction of the Director of Public Works.

zzzz. Where height of fill bank for a 2:1 slope is greater than twelve feet (12'); or where height of fill bank for a 1.5:1 slope is greater than ten feet (10'), guardrail shall be installed per CALTRANS standards to the satisfaction of the Director of Public Works.

aaaaa. If pathways are dedicated, improve the pathway, or agree to improve and provide security for them, with the approval of the unit they are within. Contact the DPW Pathway Coordinator, CIP Project Development at (858) 694-2830 for design requirements within proposed public right-of-way.

3. Off-Site Traffic Mitigations:

a. Prior to approval of the First (1st) Final Map, contribute a fair share to the City of Escondido towards the future upgrade of Hale Avenue to City Local Collector Standards, between West 9th Street and Harmony Grove Road. Upgrade the road to City Local Collector Standards.

b. Prior to approval of the First (1st) Final Map, improve or agree to improve and provide security for an additional Northbound through-lane and a dedicated northbound right-turn lane at the Via Rancho Parkway / Valley Parkway intersection as depicted in Figure 1.1-31 of the Draft Environmental Impact Report dated June 21, 2006.

c. Prior to approval of the First (1st) Final Map, modify the traffic signal at the Citracado Parkway / Valley Parkway intersection to install left-turn phasing on all four approaches to the satisfaction of both the City of Escondido and the County of San Diego.

d. Prior to approval of the First (1st) Final Map, contribute a fair share to the County of San Diego and City of Escondido towards the widening of Valley Parkway between Citracado Parkway and Via Rancho Parkway to 4-lanes to the satisfaction of both the City of Escondido and the County of San Diego.

e. Prior to approval of the First (1st) Final Map, contribute a fair share toward the City of Escondido / Caltrans planned improvement of the SR-78 / Nordahl Road interchange to provide a six-lane bridge with dual left-turn lanes onto the ramps.

f. Prior to approval of the First (1st) Final Map, contribute a fair share toward the City of Escondido's planned widening of Nordahl Road between SR-78 and East Mission Road to six lanes.

g. Prior to approval of the First (1st) Final Map, contribute a fair share to the City of Escondido towards the re-striping of eastbound West 9th Street at Auto Parkway to provide a right-turn lane, a shared through / right-turn lane, and left-turn lane.

h. Prior to approval of the First (1st) Final Map, modify the traffic signal at the West 9th Street / Autopark Way intersection to provide a right-turn overlap phasing at the eastbound approach.

i. Prior to approval of the First (1st) Final Map, contribute a fair share to the City of Escondido and Caltrans towards the future improvements of the I-15 / Via Rancho Parkway interchange.

j. Prior to approval of the First (1st) Final Map, contribute a fair share to the City of Escondido towards the future signalization of the Citracado Parkway / Country Club Drive intersection.

k. Prior to approval of the First (1st) Final Map, agree to construct and provide security for a traffic signal at the Harmony Grove Road / Village Road intersection when signal warrants are met.

l. Prior to approval of the First (1st) Final Map, construct or agree to construct and provide security for an eastbound left-turn lane on Harmony Grove Road at Village Road.

m. Prior to approval of the First (1st) Final Map, construct or agree to construct and provide security for a traffic signal at the Hale Avenue / Harmony Grove Road intersection.

n. Prior to approval of the First (1st) Final Map, contribute a fair share to the City of Escondido towards improvements to the Hale Avenue / Harmony Grove Road intersection (dual eastbound left-turn lanes).

o. Prior to approval of the First (1st) Final Map, construct or agree to construct and provide security for a traffic signal and an eastbound left-turn lane at the Hale Avenue / Avenida Del Diablo intersection to the satisfaction of the City Engineer, or cul-de-sac Avenida Del Diablo just east of Citracado Parkway to the satisfaction of the City Engineer.

p. Prior to approval of the First (1st) Final Map, agree to construct and provide security for a traffic signal at the Harmony Grove Road / 'V' Street (main project entrance) intersection when signal warrants are met.

q. Prior to approval of the First (1st) Final Map, construct or agree to construct and provide security for dedicated left-turn and right-turn lanes on Harmony Grove Road at the Harmony Grove Road / 'V' Street (main project entrance) intersection.

r. Prior to approval of the First (1st) Final Map, construct or agree to construct and provide security for dedicated left-turn and right-turn lanes in the southbound direction on 'V' Street at the Harmony Grove Road / 'V' Street (main project entrance) intersection.

s. Prior to approval of the First (1st) Final Map, provide or agree to provide and secure for the lane configuration depicted on Figure 15-1 of the approved Traffic Impact Analysis by Linscott, Law, and Greenspan dated July 18, 2006 to the Country Club Drive / Village Road road segments. Ensure that County intersection standards are met and agree to install and provide security of the installation of signals when warrants are met to the satisfaction of the Director of Public Works.

t. Prior to approval of the First (1st) Final Map, construct or agree to construct and provide security for an eastbound left-turn pocket on Harmony Grove Road at the Harmony Grove Road / 'A' Street (Wilgen Road) intersection.

u. Prior to approval of the First (1st) Final Map, prepare traffic control plans to manage construction traffic and to identify designated truck routes to the satisfaction of the City of Escondido and Director of Public Works.

v. Prior to approval of the First (1st) Final Map, improve or agree to improve and provide security for **new Village Road**, from the proposed Village Road / Harmony Grove Road intersection to the future extension of Citracado Parkway as shown in Figure 2-3 of the Traffic Impact Analysis by Linscott, Law, and Greenspan, dated July 18, 2006 and Figure 1.1-30 of the Draft Environmental Impact Report dated June 21, 2006, consistent with the City of Escondido's Citracado Parkway Alignment Study to the satisfaction of the City of Escondido and the Director of Public Works.

w. Prior to approval of the First (1st) Final Map, improve or agree to improve and provide security for **Citracado Parkway**, from the future extension of Citracado Parkway to existing Citracado Parkway at Avenida Del Diablo as shown in Figure 2-3 of the Traffic Impact Analysis by Linscott, Law, and Greenspan, dated July 18, 2006 and Figure 1.1-30 of the Draft Environmental Impact Report dated June 21, 2006, consistent with the City of Escondido's Citracado Parkway Alignment Study to the satisfaction of the City of Escondido and the Director of Public Works.

x. Prior to approval of the First (1st) Final Map, improve or agree to improve and provide security for **Country Club Drive (SC 1375)**, from the northerly project boundary at existing Country Club Drive to Kauana Loa Drive, in accordance with Public Road Standards for a Rural Light Collector, to a minimum interim graded width of forty-eight feet (48') and a minimum interim improved width of twenty-eight feet (28') of asphalt concrete pavement over approved base. The existing pavement may remain and shall be widened with asphalt concrete to provide a constant minimum width of twenty-eight feet (28') to the satisfaction of the Director of Public Works. Where infeasible or inappropriate to meet the 40-mph design speed as specified in the Public Road Standards for a Rural Light Collector, the applicant may submit to the Director of Public Works a design speed exception that is in substantial conformance with the "Safety Enhancement Alternative" exhibit submitted to the Board of Supervisors February 7, 2007.

y. Prior to approval of the Final Map for the One Hundredth (100th) Unit, contribute a fair share to the City of Escondido toward the improvement of Harmony Grove Road between Enterprise Street and Howard Avenue to Local Collector Standards, including dedicated left-turn lanes on Harmony Grove Road and Enterprise Street, Howard Avenue and Hale Avenue.

z. Prior to approval of the Final Map for the One Hundredth (100th) Unit, contribute a fair share to the City of Escondido toward the improvement of Harmony Grove Road between Howard Avenue and Hale Avenue to Local Collector Standards, including dedicated left-turn lanes on Harmony Grove Road and Enterprise Street, Howard Avenue and Hale Avenue.

aa. Prior to approval of the Final Map for the One Hundredth (100th) Unit, contribute a fair share to the City of Escondido toward the restriping of eastbound West 9th Street at Auto Park Way to provide a right-turn lane, a shared through / right-turn lane and a left-turn lane.

bb. Prior to approval of the Final Map for the One Hundredth (100th) Unit, modify the signal at the Valley Parkway / Auto Park Way intersection to provide right-turn overlap phasing at the eastbound approach to the satisfaction of the City of Escondido.

cc. Prior to approval of the Final Map for the One Hundredth (100th) Unit, contribute a fair share to the City of Escondido toward the widening of Valley Parkway between West 11th Street and Avenida Del Diablo to 4 lanes.

dd. Prior to approval of the Final Map for the One Hundredth (100th) Unit, contribute a fair share to the County of San Diego toward an additional Northbound through lane and a dedicated Northbound right-turn lane at the Via Rancho Parkway / Valley Parkway intersection.

ee. Prior to approval of the Final Map for the One Hundredth (100th) Unit, contribute a fair share to the City of Escondido toward the signalization of the Hale Avenue / West 11th Street intersection.

ff. Prior to approval of the Final Map for the Two Hundredth (200th) Unit, contribute a fair share to the City of Escondido toward the City's planned widening of Nordahl Road between SR-78 westbound ramps and East Mission Road (including the bridge) to six lanes.

gg. Prior to approval of the Final Map for the Two Hundredth (200th) Unit, contribute a fair share to the City of Escondido toward the City's planned improvements of the Nordahl Road / East Mission Road intersection.

hh. Prior to approval of the Final Map for the Two Hundredth (200th) Unit, contribute a fair share to the City of Escondido toward the widening of West 9th Street to City of Escondido Collector Standards between Hale Avenue and Valley Parkway.

ii. Prior to approval of the Final Map for the Three-hundredth (300th) Unit, contribute a fair share to the City of Escondido towards the widening of Andreason Drive to City of Escondido 4-lane Collector Standards.

jj. Prior to approval of the Final Map for the Three-hundredth (300th) Unit, contribute a fair share to the City of Escondido towards the re-striping of the eastbound approach on West 9th Street at Auto Park Way to a right-turn lane, a shared through / right-turn lane, and a left-turn lane with the provision of a right-turn overlap phasing on the eastbound approach.

kk. Prior to approval of the Final Map for the Three-hundredth (300th) Unit, construct or agree to construct and provide security for a cul-de-sac or turn restrictions on Avenida Del Diablo, from Citracado Parkway to Hale Avenue, east of Citracado Parkway to the satisfaction of the City of Engineer.

ll. Prior to approval of the Final Map for the Three-hundredth (300th) Unit, contribute a fair share to the Caltrans towards the future improvements of SR-78 between Twin Oaks Valley Road and I-15.

mm. Prior to approval of the Final Map for the Five-hundredth (500th) Unit, contribute a fair share to the City of Escondido towards the signalization of the Harmony Grove Road / Enterprise Street intersection, the provision of dedicated left-turn lanes on each approach and northbound right-turn overlap phasing.

nn. Prior to approval of the Final Map for the Six-hundredth (600th) Unit, contribute a fair share to the City of Escondido / Caltrans towards the future improvements of the Valley Parkway / I-15 Interchange.

oo. Prior to approval of the Final Map for the Six-hundredth (600th) Unit, contribute a fair share to Caltrans towards the future improvement of I-15, between SR-78 and SR-56.

(Drainage and Flood Control)

4. Standard Conditions 13 through 18.

5. Specific Conditions:

GRADING AND IMPROVEMENT PLANS FOR:
HARMONY GROVE VILLAGE
COUNTY CLUB DRIVE (OFF-SITE)

GENERAL IMPROVEMENT NOTES

1. A PERMIT SHALL BE OBTAINED FROM THE COUNTY OF SAN DIEGO DEPARTMENT OF PUBLIC WORKS FOR ANY WORK WITHIN THE STREET RIGHT-OF-WAY.
2. THE STRUCTURAL SECTION SHALL BE IN ACCORDANCE WITH COUNTY OF SAN DIEGO STANDARDS AND AS APPROVED BY THE MATERIALS LABORATORY.
3. APPROVAL OF THESE IMPROVEMENT PLANS AS SHOWN DOES NOT CONSTITUTE APPROVAL OF ANY CONSTRUCTION OUTSIDE THE PROJECT BOUNDARY.
4. ALL UNDERGROUND UTILITIES WITHIN THE STREET RIGHT-OF-WAY SHALL BE CONSTRUCTED, CONNECTED AND TESTED PRIOR TO CONSTRUCTION OF DIKE, BERM, CURB, CROSS-GUTTER AND PAVING.
5. THE EXISTENCE AND LOCATION OF EXISTING UNDERGROUND FACILITIES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE THERE ARE NO OTHER EXISTING FACILITIES EXCEPT AS SHOWN ON THESE PLANS, HOWEVER, THE CONTRACTOR IS REQUIRED TO TAKE PRECAUTIONARY MEASURES TO PROTECT ANY EXISTING FACILITY SHOWN HEREON AND ANY OTHER WHICH IS NOT ON RECORD OR NOT SHOWN ON THESE PLANS.
6. THE LOCATION AND ELEVATION OF IMPROVEMENTS TO BE MET BY WORK TO BE DONE SHALL BE CONFIRMED BY FIELD MEASUREMENTS PRIOR TO CONSTRUCTION OF NEW WORK. THE CONTRACTOR WILL MAKE EXPLORATORY EXCAVATIONS AND LOCATE EXISTING UNDERGROUND FACILITIES SUFFICIENTLY AHEAD OF CONSTRUCTION TO PERMIT REVISIONS TO PLANS IF REVISIONS ARE NECESSARY BECAUSE OF ACTUAL LOCATION OF EXISTING FACILITIES.
7. THE CONTRACTOR SHALL NOTIFY THE SAN DIEGO GAS & ELECTRIC COMPANY PRIOR TO STARTING WORK NEAR COMPANY FACILITIES AND SHALL COORDINATE HIS WORK WITH COMPANY REPRESENTATIVES NOTICE: ALL ELECTRICAL AND GAS SERVICES WITHIN THIS PROJECT ARE "UNDERGROUND INSTALLATIONS." FOR LOCATION OF ELECTRICAL CABLES AND GAS PIPING AND APPURTENANCES CONTACT THE SAN DIEGO GAS AND ELECTRIC COMPANY-TELEPHONE: 232-4252.
8. THE CONTRACTOR SHALL NOTIFY THE AT&T TELEPHONE COMPANY PRIOR TO STARTING WORK NEAR COMPANY FACILITIES AND SHALL COORDINATE HIS WORK WITH COMPANY REPRESENTATIVES. NOTICE: ALL TELEPHONE SERVICES WITHIN THIS PROJECT BOUNDARY ARE "UNDERGROUND INSTALLATIONS." FOR LOCATION OF CABLES AND APPURTENANCES CONTACT THE AT&T TELEPHONE COMPANY TELEPHONE: 1-800-422-4133.
9. IT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER TO CONTACT THE UTILITY AGENCIES, ADVISE THEM OF THE PROPOSED IMPROVEMENTS, AND BEAR THE COST OF RELOCATIONS, IF NEEDED.
10. ALL TELEVISION SERVICES WITHIN THIS PROJECT ARE "UNDERGROUND INSTALLATIONS." FOR LOCATION OF CABLES AND APPURTENANCES CONTACT: COX CABLE T.V. 262-5793 EXT. 5198
11. POWER SOURCES AND RUNS SERVING STREET LIGHTS SHALL BE SHOWN ON THE "RECORD PLAN" IMPROVEMENT DRAWINGS. ALL POWER SOURCES SHALL BE LOCATED WITHIN THE DEDICATED RIGHT-OF-WAY, OR WITHIN EASEMENTS DEDICATED TO THE COUNTY OF SAN DIEGO
12. NO PAVING SHALL BE DONE UNLESS ALL EXISTING POWER POLES ARE RELOCATED OUTSIDE THE AREA TO BE PAVED.
13. PRIVATE ROAD IMPROVEMENTS SHOWN HEREON ARE FOR INFORMATION ONLY COUNTY OFFICIALS SIGNATURE HEREON DOES NOT CONSTITUTE APPROVAL OR RESPONSIBILITY OF ANY KIND FOR THE DESIGN OR CONSTRUCTION OF THESE PRIVATE IMPROVEMENTS. (IF APPLICABLE)
14. ALL SIGNS TO BE ALUMINUM WITH 3M HIGH INTENSITY TYPE REFLECTIVE FACE OR EQUIVALENT.
15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPLACEMENT OF ANY STRIPING, PAVEMENT MARKERS, OR LEGENDS OBLITERATED BY THE CONSTRTUCTION OF THIS PROJECT.
16. ALL NEW STRIPING AND SANDBLASTING OF REDUNDANT STRIPING SHALL BE DONE BY THE CONTRACTOR.
17. ALL CUT AND FILL SLOPES OVER THREE (3) FEET CREATED BY GRADING FOR STREETS AND DRIVEWAYS SHALL BE HYDROSEEDED WITH SAN DIEGO COUNTY APPROVED MIXTURE. HYDROSEEDED SLOPES SHALL BE IRRIGATED BY WATER TRUCK UNTIL MIXTURE GERMINATES AND 70% GROWTH IS ESTABLISHED.
18. ASPHALT CONCRETE SURFACING MATERIAL SHALL BE HAND-RAKED AND COMPACTED TO FORM SMOOTH TAPERED CONNECTIONS ALONG ALL EDGES ADJACENT TO SOIL. THE EDGES OF ASPHALT CONCRETE SHALL BE HAND-RAKED AT 45 DEGREES OR FLATTER, SO AS TO PROVIDE A SMOOTH TRANSITION NEXT TO EXISTING SOIL, INCLUDING THOSE AREAS SCHEDULED FOR SHOULDER BACKING. THE ABOVE SHALL BE DONE TO THE SATISFACTION OF THE DIRECTOR OF PUBLIC WORKS.
19. CONTRACTOR SHALL APPLY FOR A TRAFFIC CONTROL PERMIT TWO WEEKS PRIOR TO COMMENCEMENT OF WORK. NO WORK SHALL COMMENCE UNTIL ISSUANCE OF SAID PERMIT. FOR INFORMATION CALL (858) 874-4025. THE TRAFFIC CONTROL PERMIT SHALL REQUIRE SPECIFICATIONS FOR THE INFORMATIONAL SIGNS.
20. STREET IMPROVEMENTS AND DRAINAGE STRUCTURES SHALL BE CONSTRUCTED ACCORDING TO THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION AND THE COUNTY OF SAN DIEGO SPECIAL PROVISIONS AND SPECIFICATIONS FOR THE IMPROVEMENT OF NEW STREETS.

ASSESSORS PARCEL NUMBER

235-031-41,42; 235-032-35; 232-500-07; 232-511-14,15,18

ADDRESS

COUNTRY CLUB DRIVE FROM THE NORTHERLY PROJECT BOUNDARY (VTM NO. 5365) TO MT. WHITNEY ROAD.

OWNER'S CERTIFICATE

IT IS AGREED THAT FIELD CONDITIONS MAY REQUIRE CHANGES TO THESE PLANS. IT IS FURTHER AGREED THAT THE DEVELOPER SHALL HAVE A REGISTERED CIVIL ENGINEER MAKE SUCH CHANGES, ALTERATIONS, OR ADDITIONS TO THESE PLANS WHICH THE DIRECTOR OF PUBLIC WORKS DETERMINES ARE NECESSARY AND DESIRABLE FOR THEN PROPER COMPLETION OF THE IMPROVEMENTS.

I FURTHER AGREE TO COMMENCE WORK ON ANY IMRPOVEMENTS SHOWN ON THESE PLANS WITHIN 60 DAYS AFTER ISSUEANCE OF CONSTRUCTION PERMIT AND THE PURSUE SUCH WORK ACTIVELY ON EVERY NORMAL WORKING DAY UNTIL COMPLETED, IRRESPECTIVE AND INDEPENDENT OF ANY OTHER WORK ASSOCIATED WITH THIS PROJECT UNDER MY CONTROL.

PROPERTY APN: ______ ACRES: ______

BY: ______ DATE: ______
PETER J. KIESECKER, SENIOR VP

STANDARD PACIFIC CORP.
15360 BARRANCA PARKWAY
IRVINE, CA 92618
PHONE: (949) 789-1600
FAX: (949) 789-1609

CONTRACTOR'S NOTE

CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCITON OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD COUNTY OF SAN DIEGO HARMLESS FROM ANY LIABILTY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF COUNTY OF SAN DIEGO PROFESSIONALS.

DECLARATION OF RESPONSIBLE CHARGE

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE, AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS.

I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE COUNTY OF SAN DIEGO AND RINCON DEL DIABLO MUNICIPAL WATER DISTRICT IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

TIMOTHY J. MURPHY
5620 FRIARS ROAD
SAN DIEGO, CA 92110
PHONE: 619/291-0707

BY: ______ DATE: ______
TIMOTHY J. MURPHY R.C.E. 035171

LEGAL DESCRIPTION

PORTION OF COUNTRY CLUB DRIVE SOUTH OF MT. WHITNEY ROAD, BEING A PORTION OF LOT 4 OF SECTION 30 AND A PORTION OF THE NORTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 30, ALL IN TOWNSHIP 12 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN.

ENGINEER'S NOTE

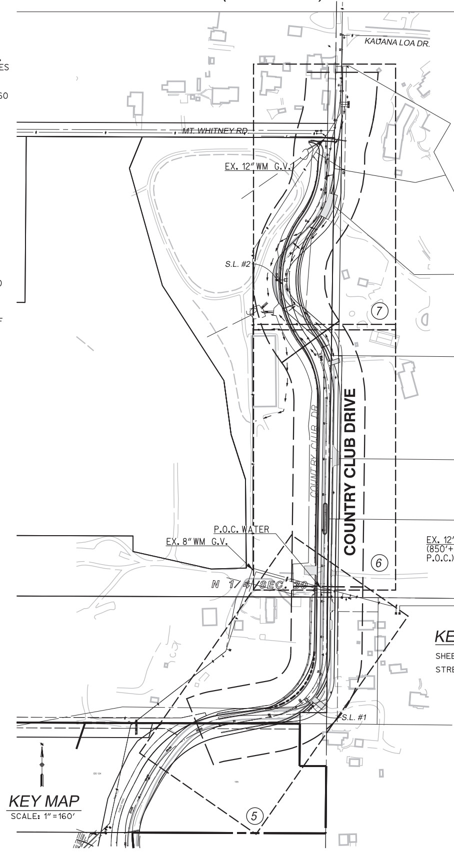
UNAUTHORIZED CHANGES & USES: THE ENGINEER OF WORK PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES TO THE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE PLANS.

SOILS ENGINEER'S CERTIFICATE

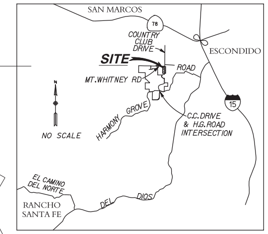
THIS PLAN HAS BEEN REVIEWED BY GEOCON INCORPORATED AND APPEARS TO BE IN GENERAL CONFORMANCE WITH THE INTENTIONS OF THE SPECIFIC SOIL RELATED SPECIFICATIONS AND RECOMMENDATIONS WHICH CAN BE VERIFIED ON THE PLAN, AND WHICH ARE FOUND IN THE REPORT TITLED "GEOLOGIC RECONNAISSANCE HARMONY GROVE VILLAGE OFF-SITE IMPROVEMENTS FOR COUNTRY CLUB DRIVE (STATION 30+58 THROUGH 49+65), SAN DIEGO COUNTY, CALIFORNIA," DATED MAY 18, 2011.

BY: ______ DATE: ______
NAME: TROY K. REIST CEG NO. 2408

BY: ______ DATE: ______
NAME: TREVOR MYERS RCE NO. 63773



KEY MAP
SCALE: 1" = 160'



VICINITY MAP
THOMAS GUIDE PG 1129, SECTION C-5

OWNER/PERMITEE

BY: ______ DATE: ______
PETER J. KIESECKER, SENIOR VP

STANDARD PACIFIC CORP.
15360 BARRANCA PARKWAY
IRVINE, CA 92618
PHONE: (949) 789-1600
FAX: (949) 789-1609

KEYMAP LEGEND

SHEET NUMBER ...... (12)
STREET LIGHT

DIGALERT 811

CALL 811 BEFORE YOU DIG

SHEET INDEX

* NOT REVIEWED OR APPROVED BY RDDMWD

WORK TO BE DONE

THE IMPROVEMENTS CONSIST OF THE FOLLOWING WORK TO BE DONE ACCORDING TO THESE PLANS, THE CURRENT SAN DIEGO COUNTY ENGINEER DEPARTMENT STANDARD SPECIFICATIONS AND SPECIAL PROVISIONS FOR IMPROVEMENT OF SUBDIVISION STREETS AND STANDARD DRAWINGS

STANDARD SPECIFICATIONS:

1. STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 2009 EDITION (GREENBOOK) AND SUPPLEMENTS.
2. RINCON DEL DIABLO MUNICIPAL WATER DISTRICT-GENERAL SPECIFICATIONS FOR CONSTRUCTION OF WATER TRANSMISSION FACILITIES AND RECYCLED WATER SERVICE RULES AND REGULATIONS PER RESOLUTION 2001-927, 7TH EDITION.

STANDARD DRAWINGS:

1. SAN DIEGO REGIONAL STANDARD DRAWINGS (2009)
2. RINCON DEL DIABLO MUNICIPAL WATER DISTRICT STANDARD DRAWINGS

LEGEND

EXISTING IMPROVEMENTS

IMPROVEMENT	STANDARD DWGS.	SYMBOL
EXISTING STORM DRAIN		
EXISTING MANHOLE/CLEANOUT		
EXISTING EDGE OF PAVEMENT		
EXISTING POWER POLE		
EXISTING FIRE HYDRANT		
EXISTING GATE VALVES		
EXISTING FENCE		

PROPOSED IMPROVEMENTS

IMPROVEMENT	STANDARD DWGS.	SYMBOL
5' CONTOUR		450
CUT SLOPE		
FILL SLOPE		
DAYLIGHT LINE		
BROW DITCH	MODIFIED D-75, SEE SHT. 2	
VEGETATED SWALE		
TYPE "F" DIKE	SDG-100, G-5	
AC PAVEMENT	PER SOILS ENGINEER	
AC OVERLAY (6" MAX.)		
REMOVE EXISTING PAVEMENT		
4" PCC MEDIAN		
TYPE 4 RETAINING WALL	C-4	
STORM DRAIN		
TYPE "B" STRAIGHT HEADWALL	D-32, D-35	
WING TYPE HEADWALL	D-34, D-35	
RIP-RAP ENERGY DISSIPATOR	SDD-100, D-40	
TYPE "B" INLET (MODIFIED W/ CLEARWATER FILTER INSERT)	D-2	
WATER MAIN		W
RECYCLED WATER MAIN		RW
2" COMBINATION AIR & VACUUM ASSEMBLY	RDDMWD W-9B, W-10	
WATER CAP	RDDMWD W-18	
GATE VALVES	RDDWMD W-11	
CONCRETE THRUST BLOCK	RDDWMD W-18	
STREET SURVEY MONUMENT	M-10	
STREET LIGHT (TYPE 15)	SDE-101,E-1,E-2	
WOOD/WIRE FENCE (PVT)		
ASPHALT CONCRETE DRIVEWAY	DS-07	

PURPOSE OF IMPROVEMENTS

TO IMPROVE THE HORIZONTAL GEOMETRY OF COUNTRY CLUB DRIVE IN ACCORDANCE WITH THE CONDITIONS OF TM-4365 IN THE COUNTY OF SAN DIEGO, CALIFORNIA

CENTERLINE REFERENCE NOTE

CENTERLINE FOR THIS PROJECT IS INTEDED TO BE A CONSTRUCTION CENTERLINE AND IS NOT BASED ON PRIOR ROAD SURVEYS OR MAPS.

NOTICE:

THE ISSUANCE OF THIS PERMIT/APPROVAL BY THE COUNTY OF SAN DIEGO DOES NOT AUTHORIZE THE APPLICANT FOR SAID PERMIT/APPROVAL TO VIOLATE ANY FEDERAL, STATE, OR COUNTY LAWS, ORDINANCES, REGULATIONS, OR POLICIES INCLUDING, BUT NOT LIMITED TO, THE FEDERAL ENDANGERED SPECIES ACT AND ANY AMENDMENTS THERETO.

J - 16412

SAN DIEGO GAS & ELECTRIC COMPANY

REVIEWED BY: ______ DATE: ______
JEFF SYKES
LEAD LAND MANAGER

VALID FOR 18 MONTHS FROM DATE OF SIGNATURE. SEE NOTES ON SHEET 2

STORMWATER TREATMENT CONTROL BMP

DESCRIPTION / TYPE	SHEET	MAINT. CATEGORY	REVISIONS
IMP–1 / CLEARWATER BMP	5	FOURTH	
IMP–2 / CLEARWATER BMP	5	FOURTH	
IMP–3 / CLEARWATER BMP	7	FOURTH	
IMP–4 / CLEARWATER BMP	7	FOURTH	

* BMP's APPROVED AS PART OF STORM WATER MANAGEMENT PLAN (SWMP) DATED / / ON FILE WITH DPW. ANY CHANGES TO THE ABOVE BMP's WILL REQUIRE SWMP REVISION AND PLAN CHANGE APPROVAL.

COUNTY OF SAN DIEGO-DPW WASTEWATER MANAGEMENT

REVIEWED BY: ______ DATE: ______
PLANS SHALL BE VALID TWO YEARS FROM THE DATE APPROVED

RECORD PLAN

BY: ______ (NAME) DATE: ______
R.C.E. ______
EXPIRES: ______

DISTURBED AREA CALCS

SLOPES:	1.6 AC
PADS:	NA
ROADS:	1.5 AC
OTHER:	NA
TOTAL:	3.1 AC

COUNTY APPROVED CHANGES

NO.	DESCRIPTION:	APPROVED BY:	DATE:

PERMITS

REZONE PERMIT NO. N/A
SPECIAL USE PERMIT NO. P-74-006W3
TENTATIVE MAP NO. VTM 5365 RPL2
LANDSCAPE & IRRIGATION LP # 10-045
NOTICE OF INTENT WDID# ______

BENCH MARK

DESCRIPTION: THE BENCH MARK FOR THIS SURVEY IS THE 3.5" USGS STANDARD BRASS DISK STAMPED "GWM 85" 1946" ON WEST END OF NORTH HEADWALL BOX CULVERT, LOCATED ON THE NORTH SIDE OF HARMONY GROVE RD., 300 FEET WEST OF COUNTRY CLUB RD. BENCH MARK DESIGNATION GWM 0085 PER COUNTY OF SAN DIEGO VERTICAL CONTROL.
RECORD FROM: SAN DIEGO COUNTY VERTICAL BENCHMARK CONTROL
ELEVATION: 569,909 DATUM: NGVD 29

RINCON DEL DIABLO MUNICIPAL WATER DISTRICT

REVIEWED BY: ______
DATE: ______
REVIEWED BY: ______
DATE: ______
NOTE SIGNATURES EXPIRE AFTER TWO YEARS

SAN DIEGO COUNTY FIRE AUTHORITY

APPROVED BY: ______
DATE: ______

ENVIRONMENTAL SERVICES UNIT

APPROVED FOR COMPLIANCE WITH THE ENVIRONMENTAL REVIEW.
APPROVED BY: ______
DATE: ______

REGISTERED PROFESSIONAL ENGINEER
TIMOTHY J. MURPHY
NO. 35171
CIVIL
STATE OF CALIFORNIA

RICK ENGINEERING COMPANY
5620 FRIARS ROAD
SAN DIEGO, CA 92110
619.291.0707
(FAX)619.291.4165
rickengineering.com
San Diego Riverside - Orange - San Luis Obispo - Bakersfield - Sacramento - Phoenix - Tucson

PRIVATE CONTRACT

SHEET 1	COUNTY OF SAN DIEGO DEPARTMENT OF PUBLIC WORKS	12 SHEETS

OFFSITE IMPROVEMENT PLANS FOR:
HARMONY GROVE VILLAGE
COUNTRY CLUB DRIVE

CALIFORNIA COORDINATE INDEX 334–1785

APPROVED FOR
MOHAMAD K. FAKHRRIDDINE
COUNTY ENGINEER
BY: ______ DATE: ______

ENGINEER OF WORK
R.C.E. ______ DATE: ______

CG–4779
CURB GRADE PERMIT NO:

RICK ENGINEERING CO. (619) 291-0707

APPENDIX C

INTERSECTION AND SEGMENT MANUAL COUNT SHEETS , CALTRANS PEMS VOLUMES

Turn Count Summary

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

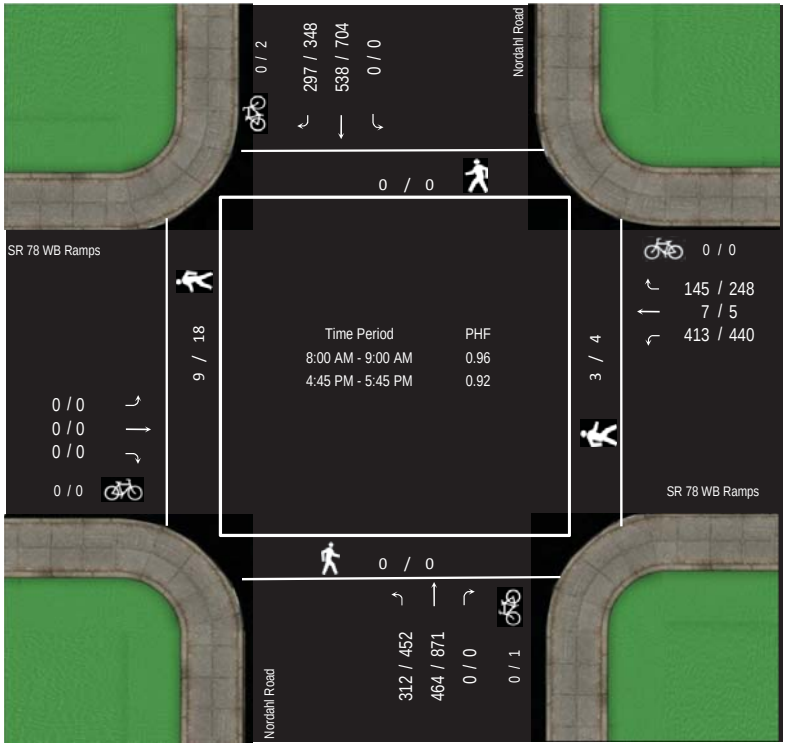
Location: SR 78 WB Ramps @ Nordahl Road

Date of Count: *Wednesday, June 04, 2014*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *14-0213*



Turn Count Summary

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

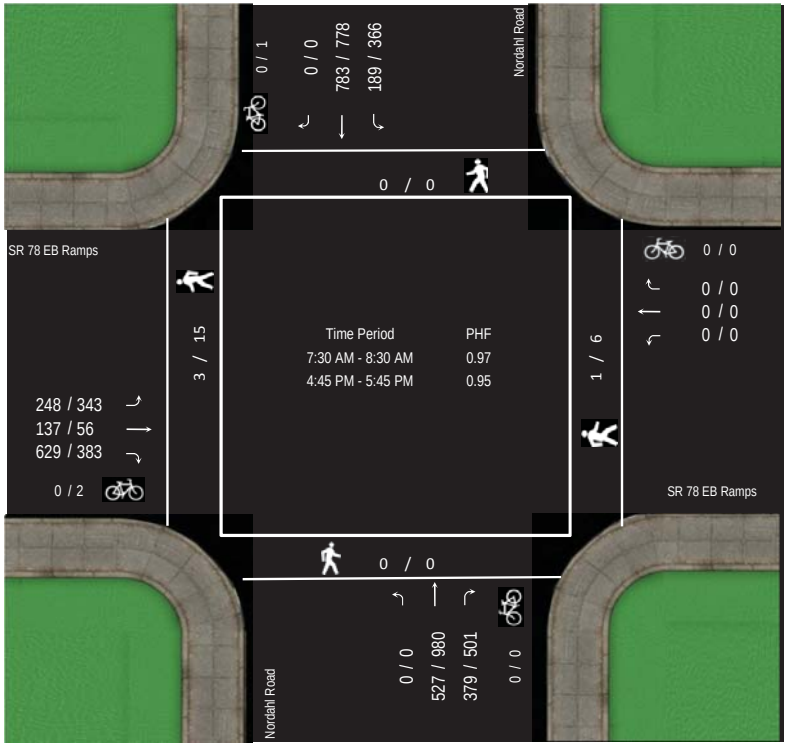
Location: SR 78 EB Ramps @ Nordahl Road

Date of Count: *Wednesday, June 04, 2014*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *14-0213*



Turn Count Summary

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-1536

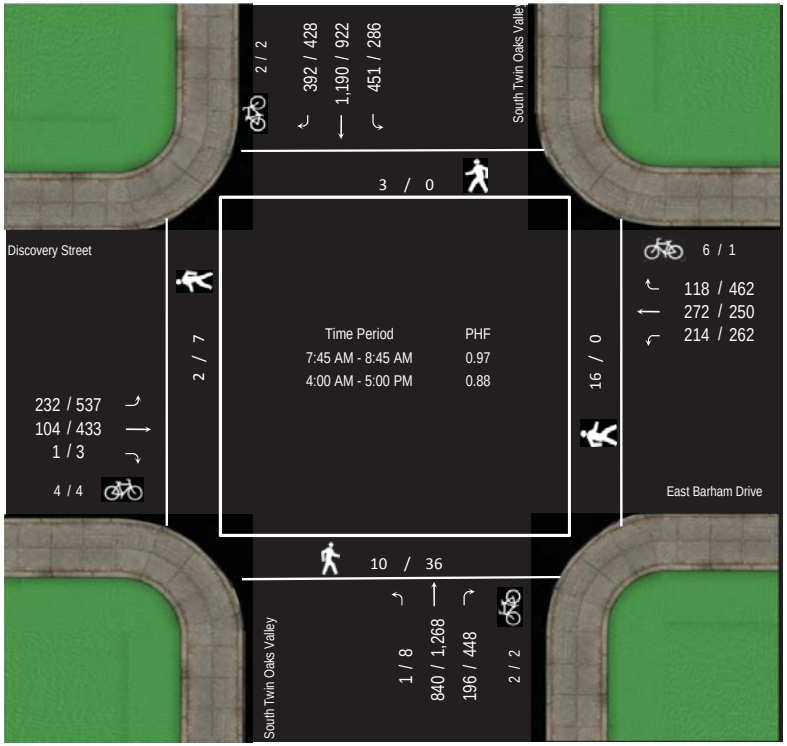
Location: East Barham Drive @ South Twin Oaks Valley Road

Date of Count: *Tuesday, August 28, 2012*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *12-0003*



Turn Count Summary

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-1536

Location: Barham Drive @ Woodland Parkway

Date of Count: *Tuesday, August 28, 2012*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *12-0003*

Turn Count Summary

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

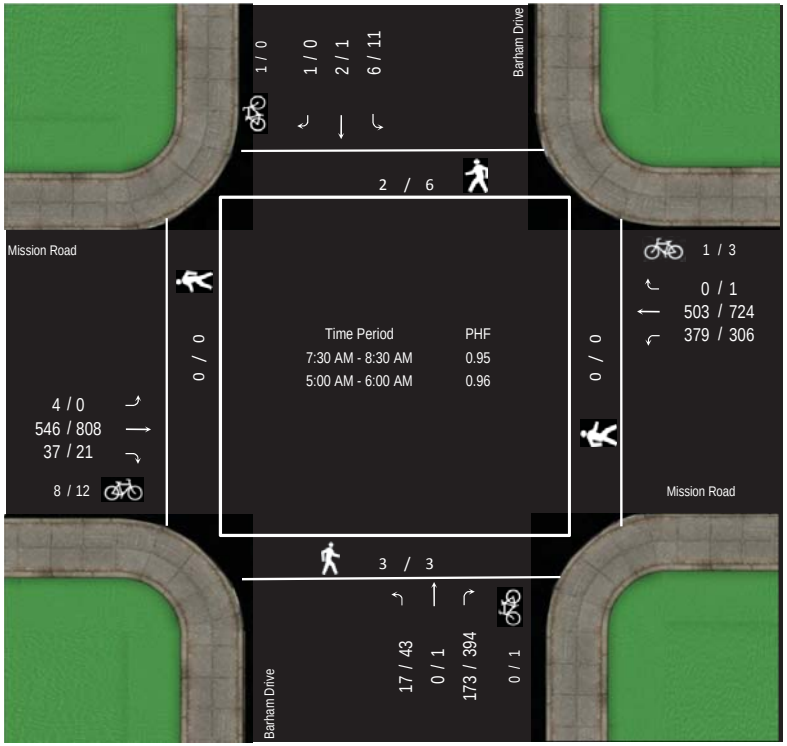
Location: Mission Road @ Barham Drive

Date of Count: *Thursday, October 04, 2012*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *12-0009*



Turn Count Summary

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-1536

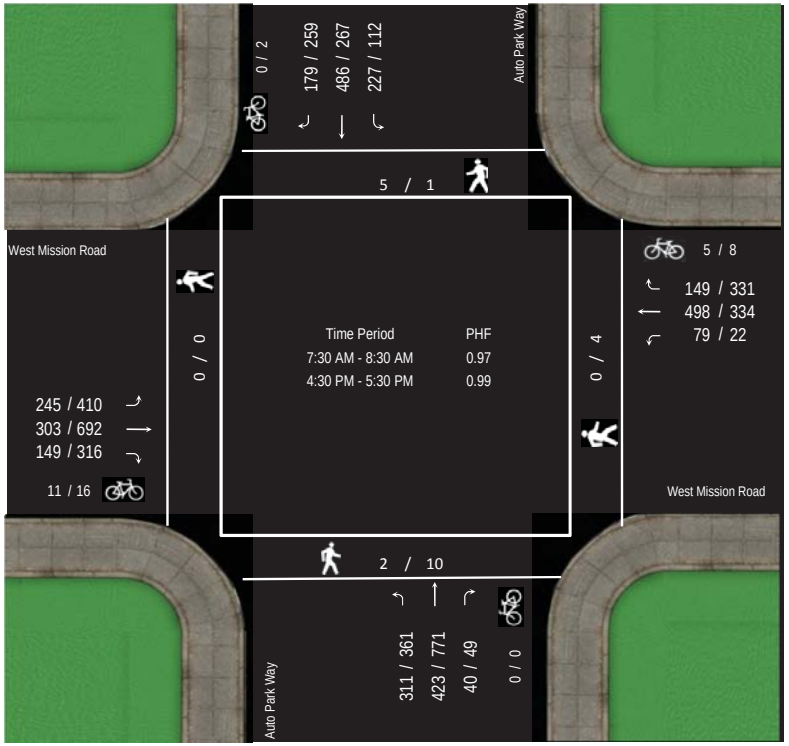
Location: West Mission Road @ Auto Park Way

Date of Count: *Tuesday, August 28, 2012*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *12-0003*



Turn Count Summary

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-1536

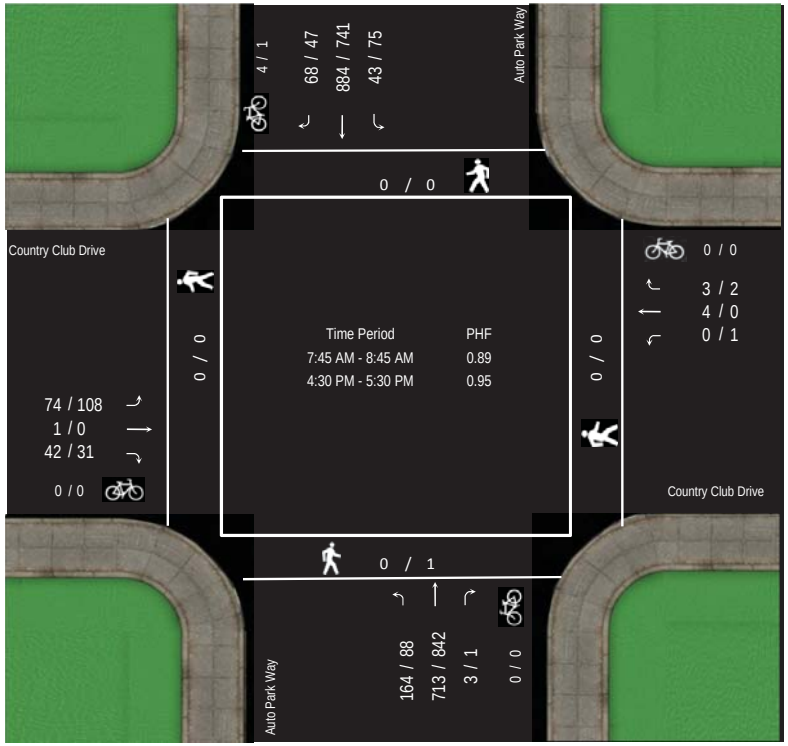
Location: Country Club Drive @ Auto Park Way

Date of Count: *Tuesday, August 28, 2012*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *12-0003*



Turn Count Summary

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

Location: Hill Valley Road @ Country Club Dr

Date of Count: *Thursday, October 04, 2012*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *12-0009*

Turn Count Summary

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

Location: Eden Valley Lane @ Country Club Drive

Date of Count: *Wednesday, April 09, 2014*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *14-0188*

Turn Count Summary

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-1536

Location: Kauana Loa Drive @ Country Club Dr

Date of Count: *Tuesday, August 28, 2012*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *12-0003*

Turn Count Summary

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

Location: Mt. Whitney Road @ Country Club Dr

Date of Count: *Thursday, October 04, 2012*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *12-0009*

Turn Count Summary

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-1536

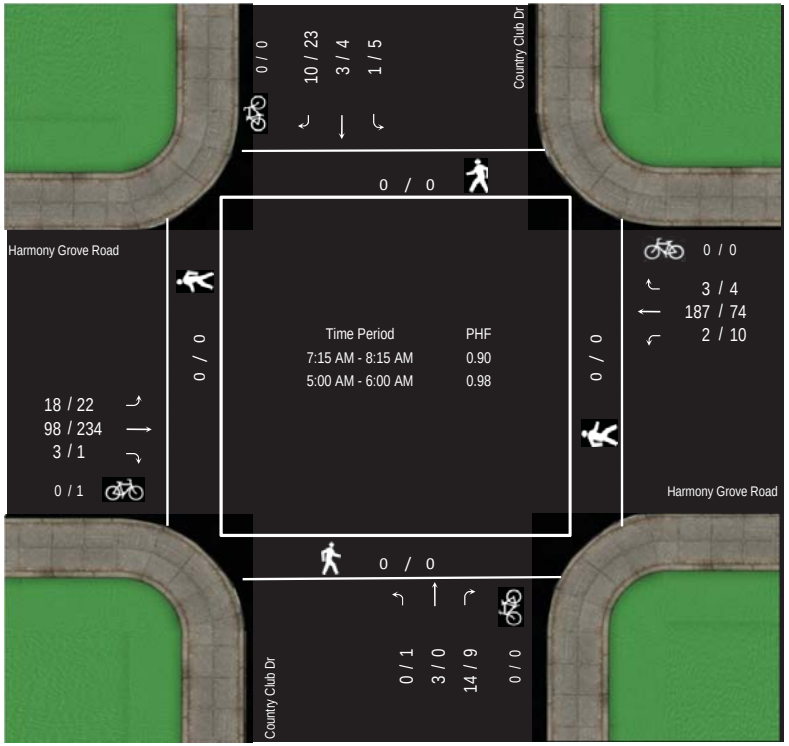
Location: Harmony Grove Road @ Country Club Dr

Date of Count: *Tuesday, August 28, 2012*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *12-0003*



Turn Count Summary

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-1536

Location: Kauana Loa Drive @ Harmony Grove Road

Date of Count: *Tuesday, August 28, 2012*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *12-0003*

Turn Count Summary

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

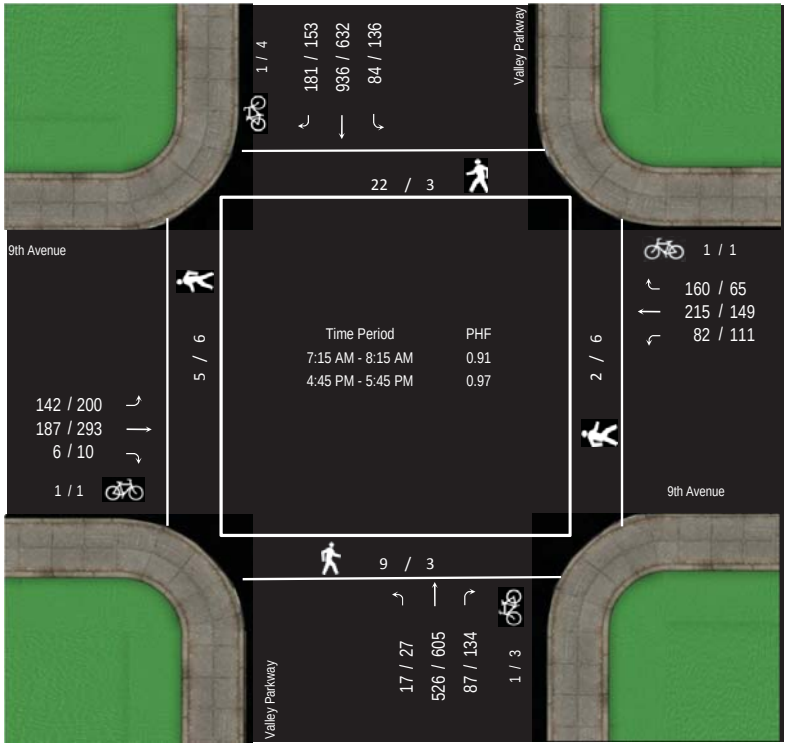
Location: 9th Avenue @ Valley Parkway

Date of Count: *Thursday, October 04, 2012*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *12-0009*



Turn Count Summary

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

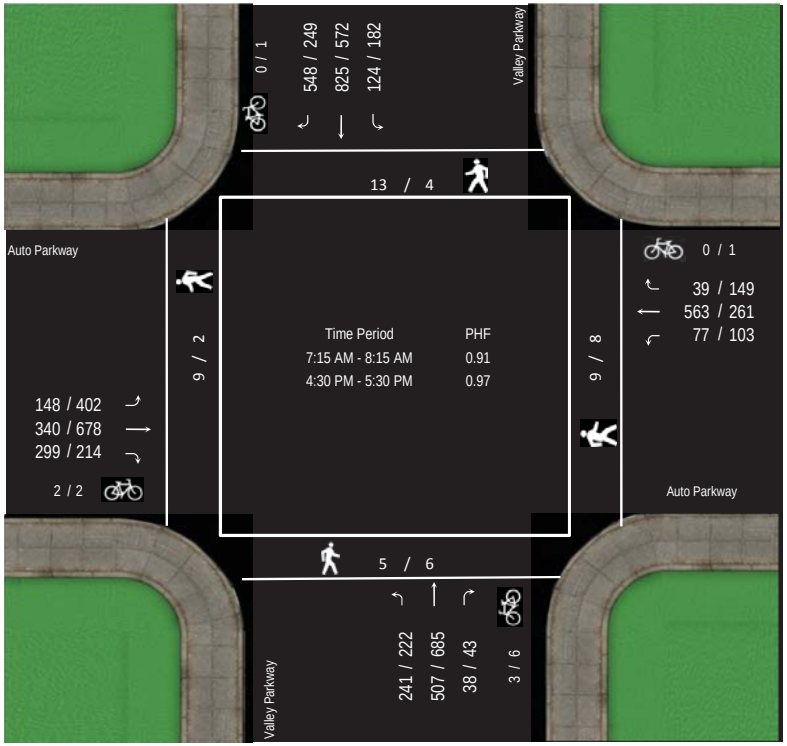
Location: Auto Parkway @ Valley Parkway

Date of Count: *Thursday, October 04, 2012*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *12-0009*



Turn Count Summary

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

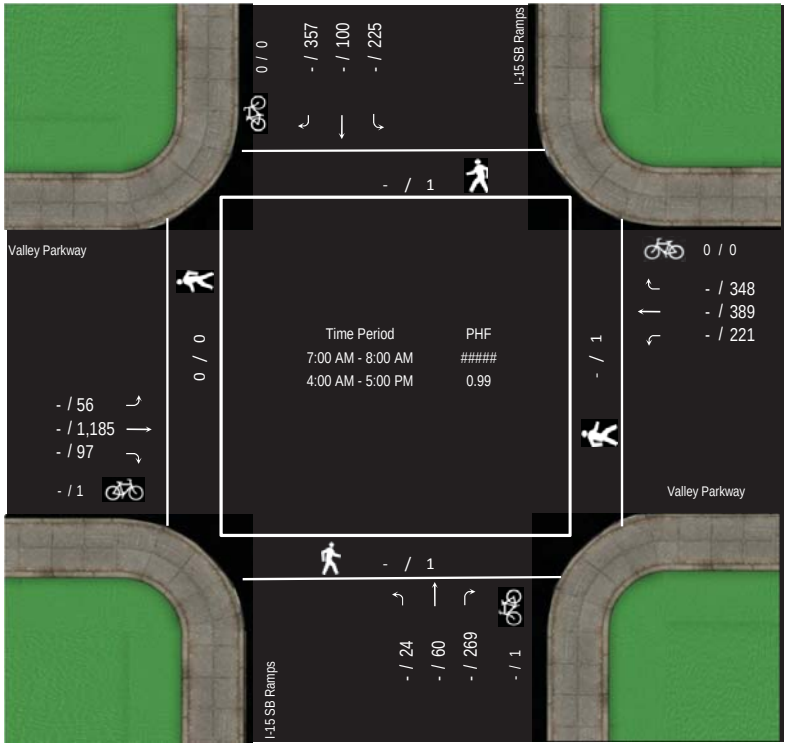
Location: Valley Parkway @ I-15 SB Ramps

Date of Count: *Thursday, October 04, 2012*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *12-0009*

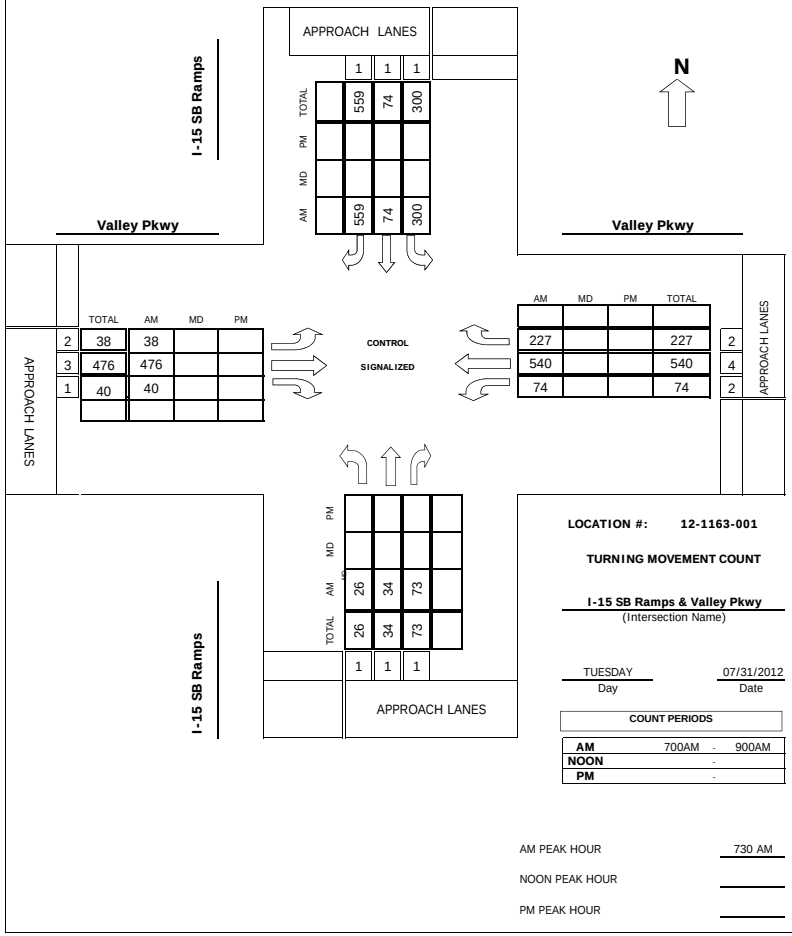


Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

Project #: 12-1163-001

TMC SUMMARY OF I-15 SB Ramps & Valley Pkwy



LINSCOTT LAW & GREENSPAN engineers

Turn Count Summary

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

AVC

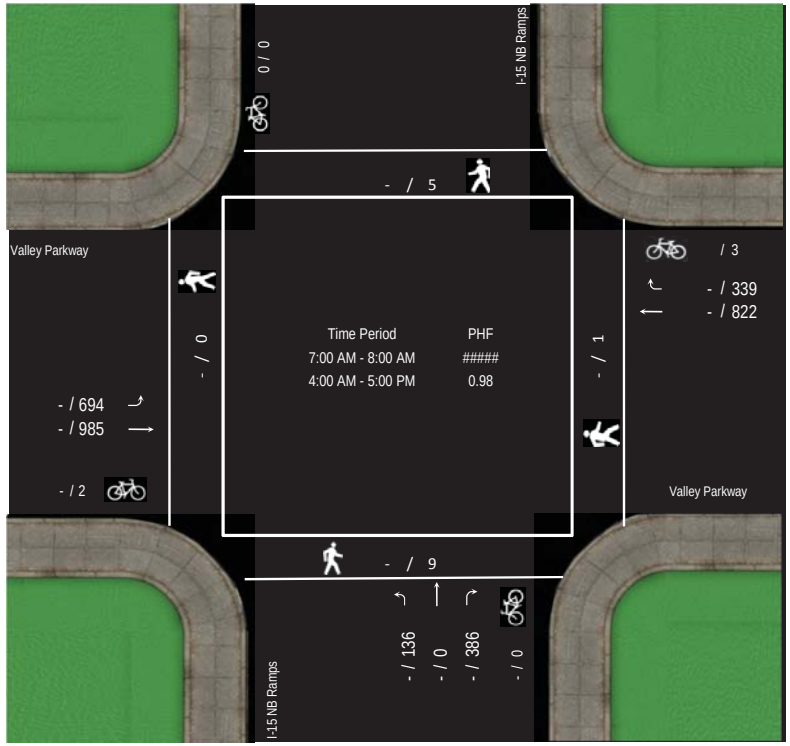
Location: Valley Parkway @ I-15 NB Ramps

Date of Count: *Thursday, October 04, 2012*

Analysts: *LV/CD*

Weather: *Sunny*

AVC Proj No: *12-0009*

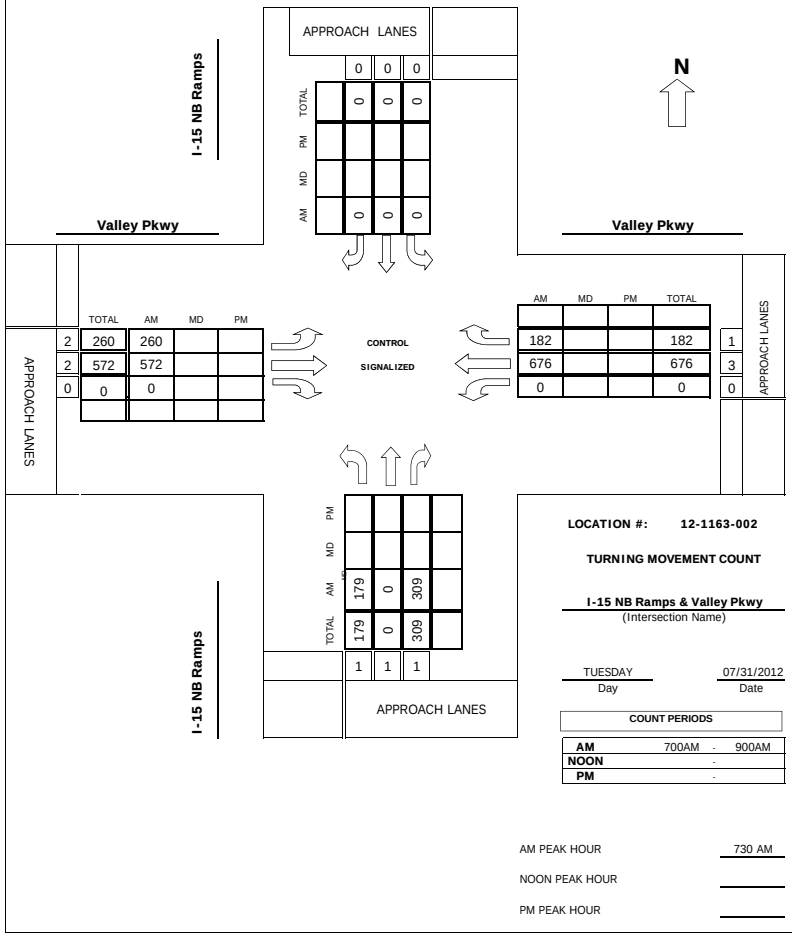


Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

Project #: 12-1163-002

TMC SUMMARY OF I-15 NB Ramps & Valley Pkwy



	TOTAL	AM	MD	PM
2	260	260		
2	572	572		
0	0	0		

	AM	MD	PM	TOTAL
1	182			182
3	676			676
0	0			0

	AM	MD	PM	TOTAL
0	0	0	0	0
0	0	0	0	0
1	1	1	1	1

	AM	MD	PM	TOTAL
1	179	0	309	179

LOCATION #: 12-1163-002

TURNING MOVEMENT COUNT

I-15 NB Ramps & Valley Pkwy
(Intersection Name)

TUESDAY (Day) 07/31/2012 (Date)

COUNT PERIODS			
AM	700AM	-	900AM
NOON		-	
PM		-	

AM PEAK HOUR 730 AM

NOON PEAK HOUR

PM PEAK HOUR

LINSCOTT LAW & GREENSPAN engineers

Vehicular Turn Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-1536

AVC

Location: East Barham Drive between Campus Way and Industrial Street

Orientation: *east-west*

Date of Count: *Tuesday, August 28, 2012*

Analysts: *DASH*

Weather: *Sunny*

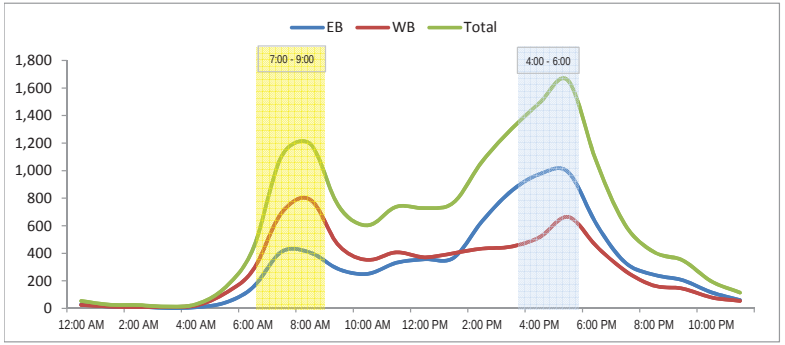
AVC Proj. No: *12-0003*

24 Hour Segment Volume ***14,842***

Time	Hourly Volume EB	WB	Total
12:00 AM - 1:00 AM	29	25	54
1:00 AM - 2:00 AM	13	14	27
2:00 AM - 3:00 AM	14	10	24
3:00 AM - 4:00 AM	2	12	14
4:00 AM - 5:00 AM	9	21	30
5:00 AM - 6:00 AM	40	107	147
6:00 AM - 7:00 AM	153	278	431
7:00 AM - 8:00 AM	412	694	1,106
8:00 AM - 9:00 AM	405	789	1,194
9:00 AM - 10:00 AM	284	455	739
10:00 AM - 11:00 AM	251	352	603
11:00 AM - 12:00 PM	331	407	738
Total	**1,943**	**3,164**	**5,107**

Time	Hourly Volume EB	WB	Total
12:00 PM - 1:00 PM	357	371	728
1:00 PM - 2:00 PM	367	401	768
2:00 PM - 3:00 PM	633	434	1,067
3:00 PM - 4:00 PM	849	448	1,297
4:00 PM - 5:00 PM	974	516	1,490
5:00 PM - 6:00 PM	990	664	1,654
6:00 PM - 7:00 PM	608	449	1,057
7:00 PM - 8:00 PM	332	272	604
8:00 PM - 9:00 PM	244	165	409
9:00 PM - 10:00 PM	205	144	349
10:00 PM - 11:00 PM	117	80	197
11:00 PM - 12:00 AM	61	54	115
Total	**5,737**	**3,998**	**9,735**

24-Hour	***EB***	***Volume***	***7,680***	***24-Hour***	***WB***	***Volume***	***7,162***



24 Hour Segment Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

Location: Barham Dr btwn SR 78 EB Off Ramps and Woodland Parkway

Orientation: East-West

Date of Count: Thursday, December 20, 2012

Analysts: DASH

Weather: Sunny

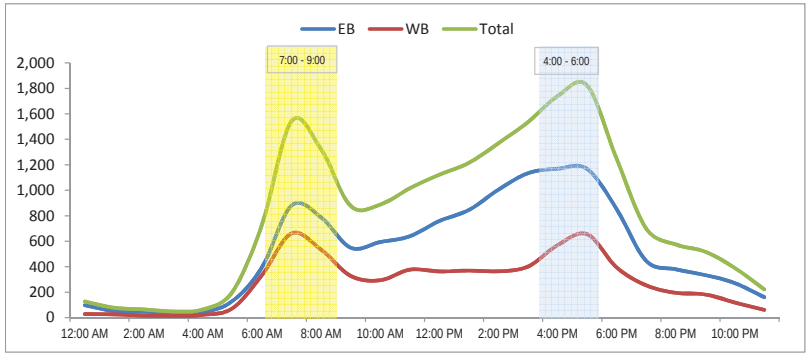
AVC Proj. No: 12-0025

24 Hour Segment Volume			19,423

Time	Hourly Volume		
	EB	WB	Total
12:00 AM - 1:00 AM	98	29	127
1:00 AM - 2:00 AM	52	26	78
2:00 AM - 3:00 AM	48	17	65
3:00 AM - 4:00 AM	35	14	49
4:00 AM - 5:00 AM	43	22	65
5:00 AM - 6:00 AM	130	74	204
6:00 AM - 7:00 AM	396	335	731
7:00 AM - 8:00 AM	881	662	1,543
8:00 AM - 9:00 AM	787	534	1,321
9:00 AM - 10:00 AM	549	328	877
10:00 AM - 11:00 AM	594	294	888
11:00 AM - 12:00 PM	639	377	1016
Total	4,252	2,712	6,964

Time	Hourly Volume		
	EB	WB	Total
12:00 PM - 1:00 PM	759	363	1,122
1:00 PM - 2:00 PM	845	370	1,215
2:00 PM - 3:00 PM	1,005	364	1,369
3:00 PM - 4:00 PM	1,134	401	1,535
4:00 PM - 5:00 PM	1,169	569	1,738
5:00 PM - 6:00 PM	1,168	656	1,824
6:00 PM - 7:00 PM	854	395	1,249
7:00 PM - 8:00 PM	447	254	701
8:00 PM - 9:00 PM	380	195	575
9:00 PM - 10:00 PM	335	183	518
10:00 PM - 11:00 PM	272	119	391
11:00 PM - 12:00 AM	161	61	222
Total	8,529	3,930	12,459

24-Hour EB Volume	12,781	24-Hour WB Volume	6,642



Vehicular Turn Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-1536

Location: Barham Drive between Woodland Parkway and La Moree Road

Orientation: east-west

Date of Count: Tuesday, August 28, 2012

Analysts: DASH

Weather: Sunny

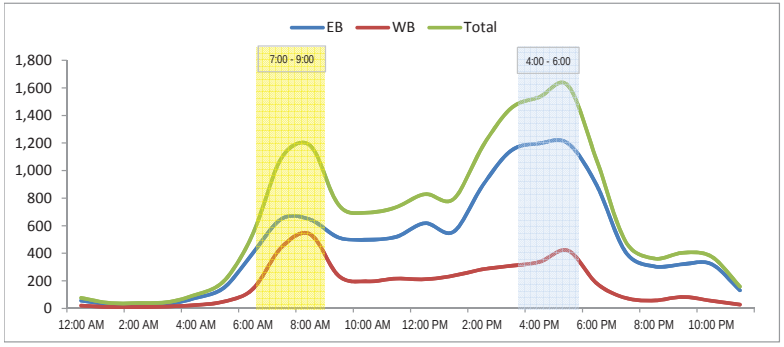
AVC Proj. No: 12-0003

24 Hour Segment Volume			15,749

Time	Hourly Volume		
	EB	WB	Total
12:00 AM - 1:00 AM	56	20	76
1:00 AM - 2:00 AM	30	9	39
2:00 AM - 3:00 AM	29	10	39
3:00 AM - 4:00 AM	32	13	45
4:00 AM - 5:00 AM	75	24	99
5:00 AM - 6:00 AM	152	50	202
6:00 AM - 7:00 AM	402	141	543
7:00 AM - 8:00 AM	650	444	1,094
8:00 AM - 9:00 AM	644	538	1,182
9:00 AM - 10:00 AM	513	234	747
10:00 AM - 11:00 AM	499	196	695
11:00 AM - 12:00 PM	519	216	735
Total	3,601	1,895	5,496

Time	Hourly Volume		
	EB	WB	Total
12:00 PM - 1:00 PM	618	211	829
1:00 PM - 2:00 PM	556	237	793
2:00 PM - 3:00 PM	886	283	1,169
3:00 PM - 4:00 PM	1,143	308	1,451
4:00 PM - 5:00 PM	1,197	337	1,534
5:00 PM - 6:00 PM	1,197	419	1,616
6:00 PM - 7:00 PM	893	181	1,074
7:00 PM - 8:00 PM	411	76	487
8:00 PM - 9:00 PM	305	57	362
9:00 PM - 10:00 PM	320	83	403
10:00 PM - 11:00 PM	322	55	377
11:00 PM - 12:00 AM	131	27	158
Total	7,979	2,274	10,253

24-Hour EB Volume	11,580	24-Hour WB Volume	4,169



Vehicular Turn Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-1536

Location: Barham Drive between Bennett Court and Meyers Avenue

Orientation: *east-west*

Date of Count: *Tuesday, August 28, 2012*

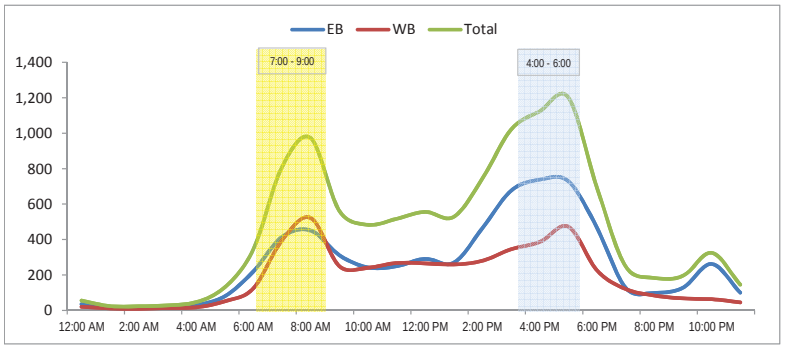
Analysts: *DASH*

Weather: *Sunny*

AVC Proj. No: *12-0003*

24 Hour Segment Volume				10,955				
Time	Hourly Volume			Time	Hourly Volume		
	EB	WB	Total		EB	WB	Total
12:00 AM - 1:00 AM	35	20	55	12:00 PM - 1:00 PM	291	265	556
1:00 AM - 2:00 AM	13	11	24	1:00 PM - 2:00 PM	269	259	528
2:00 AM - 3:00 AM	14	9	23	2:00 PM - 3:00 PM	465	280	745
3:00 AM - 4:00 AM	15	13	28	3:00 PM - 4:00 PM	676	345	1,021
4:00 AM - 5:00 AM	30	17	47	4:00 PM - 5:00 PM	738	386	1,124
5:00 AM - 6:00 AM	79	51	130	5:00 PM - 6:00 PM	729	472	1,201
6:00 AM - 7:00 AM	220	124	344	6:00 PM - 7:00 PM	465	225	690
7:00 AM - 8:00 AM	414	395	809	7:00 PM - 8:00 PM	127	120	247
8:00 AM - 9:00 AM	451	522	973	8:00 PM - 9:00 PM	99	84	183
9:00 AM - 10:00 AM	312	250	562	9:00 PM - 10:00 PM	128	67	195
10:00 AM - 11:00 AM	242	241	483	10:00 PM - 11:00 PM	262	63	325
11:00 AM - 12:00 PM	249	268	517	11:00 PM - 12:00 AM	100	45	145
Total	2,074	1,921	3,995	Total	4,349	2,611	6,960

24-Hour EB Volume	6,423	24-Hour WB Volume	4,532



24 Hour Segment Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

Location: Mission Road between Auto Park Way and Enterprise Street

Orientation: *east-west*

Date of Count: *Thursday, October 04, 2012*

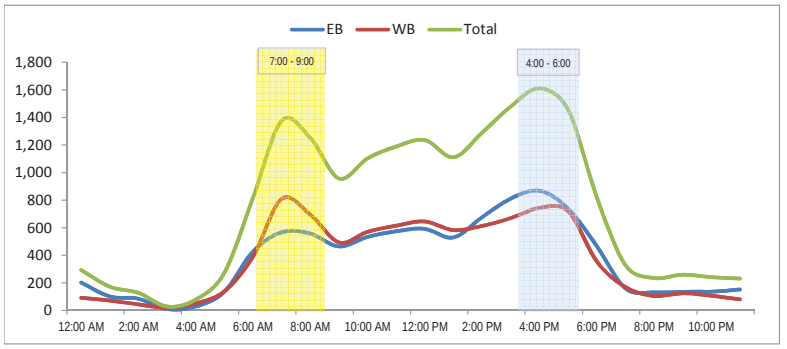
Analysts: *DASH*

Weather: *Sunny*

AVC Proj. No: *12-0009*

24 Hour Segment Volume				17,968				
Time	Hourly Volume			Time	Hourly Volume		
	EB	WB	Total		EB	WB	Total
12:00 AM - 1:00 AM	202	91	293	12:00 PM - 1:00 PM	591	645	1,236
1:00 AM - 2:00 AM	101	71	172	1:00 PM - 2:00 PM	529	582	1,111
2:00 AM - 3:00 AM	84	43	127	2:00 PM - 3:00 PM	677	613	1,290
3:00 AM - 4:00 AM	9	19	28	3:00 PM - 4:00 PM	811	669	1,480
4:00 AM - 5:00 AM	28	50	78	4:00 PM - 5:00 PM	868	744	1,612
5:00 AM - 6:00 AM	135	138	273	5:00 PM - 6:00 PM	738	719	1,457
6:00 AM - 7:00 AM	427	390	817	6:00 PM - 7:00 PM	466	356	822
7:00 AM - 8:00 AM	567	809	1,376	7:00 PM - 8:00 PM	160	169	329
8:00 AM - 9:00 AM	557	695	1,252	8:00 PM - 9:00 PM	130	105	235
9:00 AM - 10:00 AM	464	493	957	9:00 PM - 10:00 PM	135	124	259
10:00 AM - 11:00 AM	533	570	1,103	10:00 PM - 11:00 PM	135	106	241
11:00 AM - 12:00 PM	574	615	1189	11:00 PM - 12:00 AM	151	80	231
Total	3,681	3,984	7,665	Total	5,391	4,912	10,303

24-Hour EB Volume	9,072	24-Hour WB Volume	8,896



Vehicular Turn Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-1536

Location: Auto Park Way between West Mission Road and Country Club Drive

Orientation: *north-south*

Date of Count: *Tuesday, August 28, 2012*

Analysts: *DASH*

Weather: *Sunny*

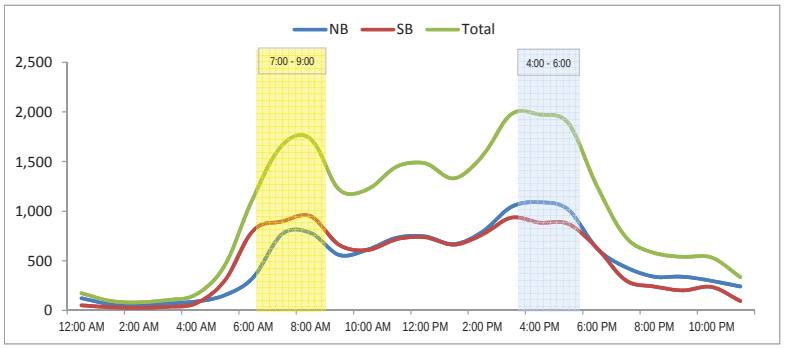
AVC Proj. No: *12-0003*

24 Hour Segment Volume			23,666

Time	Hourly Volume		
	NB	SB	Total
12:00 AM - 1:00 AM	122	51	173
1:00 AM - 2:00 AM	63	32	95
2:00 AM - 3:00 AM	55	26	81
3:00 AM - 4:00 AM	69	36	105
4:00 AM - 5:00 AM	89	71	160
5:00 AM - 6:00 AM	152	300	452
6:00 AM - 7:00 AM	333	807	1,140
7:00 AM - 8:00 AM	768	896	1,664
8:00 AM - 9:00 AM	781	949	1,730
9:00 AM - 10:00 AM	558	659	1,217
10:00 AM - 11:00 AM	613	609	1,222
11:00 AM - 12:00 PM	732	716	1448
Total	**4,335**	**5,152**	**9,487**

Time	Hourly Volume		
	NB	SB	Total
12:00 PM - 1:00 PM	745	737	1,482
1:00 PM - 2:00 PM	668	662	1,330
2:00 PM - 3:00 PM	792	765	1,557
3:00 PM - 4:00 PM	1,042	934	1,976
4:00 PM - 5:00 PM	1,090	884	1,974
5:00 PM - 6:00 PM	1,014	871	1,885
6:00 PM - 7:00 PM	623	627	1,250
7:00 PM - 8:00 PM	435	303	738
8:00 PM - 9:00 PM	339	240	579
9:00 PM - 10:00 PM	339	201	540
10:00 PM - 11:00 PM	297	236	533
11:00 PM - 12:00 AM	241	94	335
Total	**7,625**	**6,554**	**14,179**

24-Hour NB Volume	11,960	24-Hour SB Volume	11,706



Vehicular Turn Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-1536

Location: Country Club Drive between Country Club Way and Auto Park Way

Orientation: *east-west*

Date of Count: *Tuesday, August 28, 2012*

Analysts: *DASH*

Weather: *Sunny*

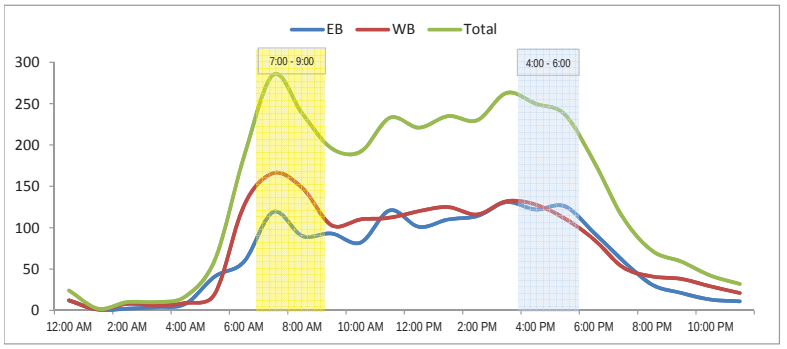
AVC Proj. No: *12-0003*

24 Hour Segment Volume			3,387

Time	Hourly Volume		
	EB	WB	Total
12:00 AM - 1:00 AM	12	12	24
1:00 AM - 2:00 AM	1	1	2
2:00 AM - 3:00 AM	2	8	10
3:00 AM - 4:00 AM	4	6	10
4:00 AM - 5:00 AM	8	9	17
5:00 AM - 6:00 AM	41	20	61
6:00 AM - 7:00 AM	59	127	186
7:00 AM - 8:00 AM	119	166	285
8:00 AM - 9:00 AM	90	148	238
9:00 AM - 10:00 AM	93	103	196
10:00 AM - 11:00 AM	82	110	192
11:00 AM - 12:00 PM	121	112	233
Total	**632**	**822**	**1,454**

Time	Hourly Volume		
	EB	WB	Total
12:00 PM - 1:00 PM	101	120	221
1:00 PM - 2:00 PM	110	125	235
2:00 PM - 3:00 PM	114	116	230
3:00 PM - 4:00 PM	131	132	263
4:00 PM - 5:00 PM	122	128	250
5:00 PM - 6:00 PM	126	111	237
6:00 PM - 7:00 PM	94	86	180
7:00 PM - 8:00 PM	60	52	112
8:00 PM - 9:00 PM	31	41	72
9:00 PM - 10:00 PM	21	38	59
10:00 PM - 11:00 PM	13	29	42
11:00 PM - 12:00 AM	11	21	32
Total	**934**	**999**	**1,933**

24-Hour EB Volume	1,566	24-Hour WB Volume	1,821



24 Hour Segment Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-1536

Location: Country Club Drive between Hill Valley Drive and Surrey Lane

Orientation: *north-south*

Date of Count: *Wednesday, September 12, 2012*

Analysts: *DASH*

Weather: *Sunny*

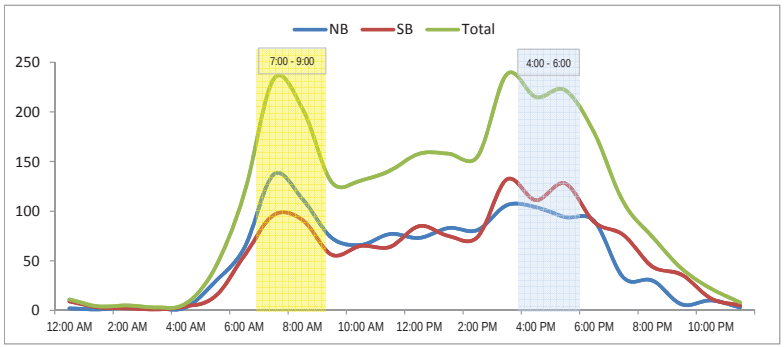
AVC Proj. No: *12-0006*

24 Hour Segment Volume			2,608

Time	Hourly Volume		
	NB	SB	Total
12:00 AM - 1:00 AM	2	9	11
1:00 AM - 2:00 AM	1	3	4
2:00 AM - 3:00 AM	3	2	5
3:00 AM - 4:00 AM	2	1	3
4:00 AM - 5:00 AM	3	4	7
5:00 AM - 6:00 AM	29	14	43
6:00 AM - 7:00 AM	63	55	118
7:00 AM - 8:00 AM	137	96	233
8:00 AM - 9:00 AM	112	91	203
9:00 AM - 10:00 AM	73	56	129
10:00 AM - 11:00 AM	66	65	131
11:00 AM - 12:00 PM	77	64	141
Total	568	460	1,028

Time	Hourly Volume		
	NB	SB	Total
12:00 PM - 1:00 PM	73	85	158
1:00 PM - 2:00 PM	83	75	158
2:00 PM - 3:00 PM	81	74	155
3:00 PM - 4:00 PM	106	132	238
4:00 PM - 5:00 PM	104	111	215
5:00 PM - 6:00 PM	94	128	222
6:00 PM - 7:00 PM	90	89	179
7:00 PM - 8:00 PM	33	76	109
8:00 PM - 9:00 PM	30	44	74
9:00 PM - 10:00 PM	6	36	42
10:00 PM - 11:00 PM	10	12	22
11:00 PM - 12:00 AM	3	5	8
Total	713	867	1,580

24-Hour NB Volume	1,281	24-Hour SB Volume	1,327



Vehicular Turn Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-1536

Location: Country Club Drive between Kauana Loa Drive and Harmony Grove Road

Orientation: *north-south*

Date of Count: *Tuesday, August 28, 2012*

Analysts: *DASH*

Weather: *Sunny*

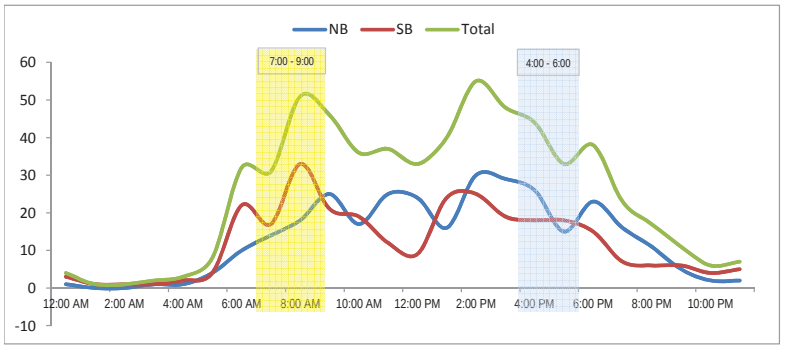
AVC Proj. No: *12-0003*

24 Hour Segment Volume			607

Time	Hourly Volume		
	NB	SB	Total
12:00 AM - 1:00 AM	1	3	4
1:00 AM - 2:00 AM	0	1	1
2:00 AM - 3:00 AM	0	1	1
3:00 AM - 4:00 AM	1	1	2
4:00 AM - 5:00 AM	1	2	3
5:00 AM - 6:00 AM	4	4	8
6:00 AM - 7:00 AM	10	22	32
7:00 AM - 8:00 AM	14	17	31
8:00 AM - 9:00 AM	18	33	51
9:00 AM - 10:00 AM	25	21	46
10:00 AM - 11:00 AM	17	19	36
11:00 AM - 12:00 PM	25	12	37
Total	116	136	252

Time	Hourly Volume		
	NB	SB	Total
12:00 PM - 1:00 PM	24	9	33
1:00 PM - 2:00 PM	16	24	40
2:00 PM - 3:00 PM	30	25	55
3:00 PM - 4:00 PM	29	19	48
4:00 PM - 5:00 PM	26	18	44
5:00 PM - 6:00 PM	15	18	33
6:00 PM - 7:00 PM	23	15	38
7:00 PM - 8:00 PM	16	7	23
8:00 PM - 9:00 PM	11	6	17
9:00 PM - 10:00 PM	5	6	11
10:00 PM - 11:00 PM	2	4	6
11:00 PM - 12:00 AM	2	5	7
Total	199	156	355

24-Hour NB Volume	315	24-Hour SB Volume	292



Vehicular Turn Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-1536

Location: Kauana Loa Drive between Country Club Drive and Harmony Grove Road

Orientation: *north-south*

Date of Count: *Tuesday, August 28, 2012*

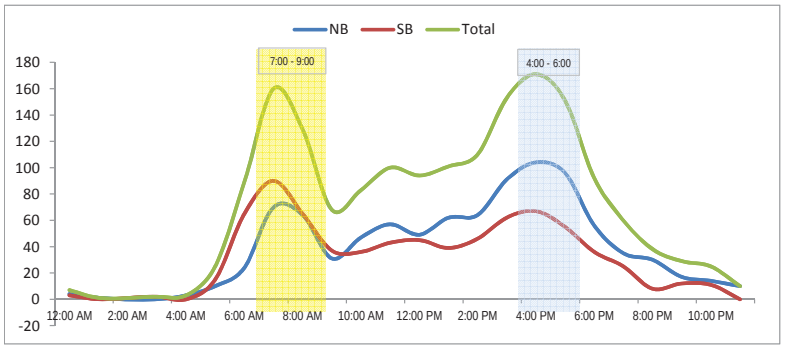
Analysts: *DASH*

Weather: *Sunny*

AVC Proj. No: *12-0003*

24 Hour Segment Volume				1,702				
Time			Hourly Volume			Time			Hourly Volume		
			NB	SB	Total				NB	SB	Total
12:00 AM	-	1:00 AM	4	3	7	12:00 PM	-	1:00 PM	49	45	94
1:00 AM	-	2:00 AM	1	0	1	1:00 PM	-	2:00 PM	62	39	101
2:00 AM	-	3:00 AM	0	1	1	2:00 PM	-	3:00 PM	64	46	110
3:00 AM	-	4:00 AM	0	2	2	3:00 PM	-	4:00 PM	91	62	153
4:00 AM	-	5:00 AM	3	0	3	4:00 PM	-	5:00 PM	104	67	171
5:00 AM	-	6:00 AM	10	15	25	5:00 PM	-	6:00 PM	96	55	151
6:00 AM	-	7:00 AM	24	65	89	6:00 PM	-	7:00 PM	56	36	92
7:00 AM	-	8:00 AM	70	90	160	7:00 PM	-	8:00 PM	35	25	60
8:00 AM	-	9:00 AM	64	65	129	8:00 PM	-	9:00 PM	30	8	38
9:00 AM	-	10:00 AM	31	37	68	9:00 PM	-	10:00 PM	17	12	29
10:00 AM	-	11:00 AM	47	36	83	10:00 PM	-	11:00 PM	14	11	25
11:00 AM	-	12:00 PM	57	43	100	11:00 PM	-	12:00 AM	10	0	10
Total			311	357	668	Total			628	406	1,034

24-Hour	NB	Volume	939	24-Hour	SB	Volume	763



24 Hour Segment Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-1536

Location: Hill Valley Drive. East of Country Club Drive

Orientation: *east-west*

Date of Count: *Wednesday, September 12, 2012*

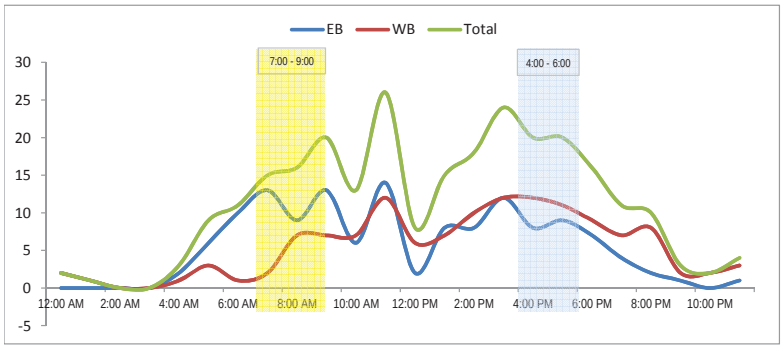
Analysts: *DASH*

Weather: *Sunny*

AVC Proj. No: *12-0006*

24 Hour Segment Volume				267				
Time			Hourly Volume			Time			Hourly Volume		
			EB	WB	Total				EB	WB	Total
12:00 AM	-	1:00 AM	0	2	2	12:00 PM	-	1:00 PM	2	6	8
1:00 AM	-	2:00 AM	0	1	1	1:00 PM	-	2:00 PM	8	7	15
2:00 AM	-	3:00 AM	0	0	0	2:00 PM	-	3:00 PM	8	10	18
3:00 AM	-	4:00 AM	0	0	0	3:00 PM	-	4:00 PM	12	12	24
4:00 AM	-	5:00 AM	2	1	3	4:00 PM	-	5:00 PM	8	12	20
5:00 AM	-	6:00 AM	6	3	9	5:00 PM	-	6:00 PM	9	11	20
6:00 AM	-	7:00 AM	10	1	11	6:00 PM	-	7:00 PM	7	9	16
7:00 AM	-	8:00 AM	13	2	15	7:00 PM	-	8:00 PM	4	7	11
8:00 AM	-	9:00 AM	9	7	16	8:00 PM	-	9:00 PM	2	8	10
9:00 AM	-	10:00 AM	13	7	20	9:00 PM	-	10:00 PM	1	2	3
10:00 AM	-	11:00 AM	6	7	13	10:00 PM	-	11:00 PM	0	2	2
11:00 AM	-	12:00 PM	14	12	26	11:00 PM	-	12:00 AM	1	3	4
Total			73	43	116	Total			62	89	151

24-Hour	EB	Volume	135	24-Hour	WB	Volume	132



24 Hour Segment Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

Location: Eden Valley Lane west of County Club Drive

Orientation: East-West

Date of Count: Wednesday, April 09, 2014

Analysts: DASH

Weather: Sunny

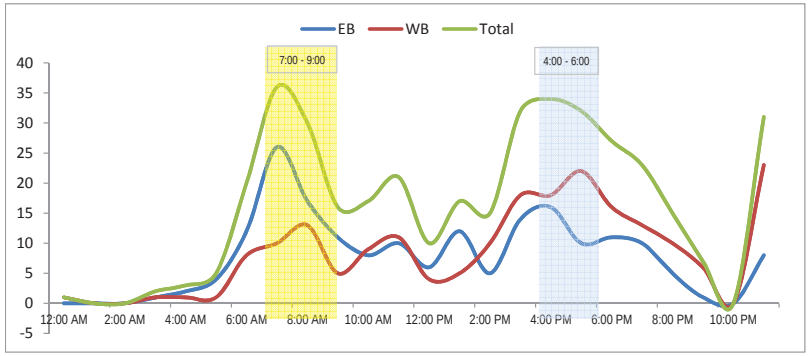
AVC Proj. No: 14-0188

24 Hour Segment Volume			394

Time	Hourly Volume		
	EB	WB	Total
12:00 AM - 1:00 AM	0	1	1
1:00 AM - 2:00 AM	0	0	0
2:00 AM - 3:00 AM	0	0	0
3:00 AM - 4:00 AM	1	1	2
4:00 AM - 5:00 AM	2	1	3
5:00 AM - 6:00 AM	4	1	5
6:00 AM - 7:00 AM	12	8	20
7:00 AM - 8:00 AM	26	10	36
8:00 AM - 9:00 AM	17	13	30
9:00 AM - 10:00 AM	11	5	16
10:00 AM - 11:00 AM	8	9	17
11:00 AM - 12:00 PM	10	11	21
Total	91	60	151

Time	Hourly Volume		
	EB	WB	Total
12:00 PM - 1:00 PM	6	4	10
1:00 PM - 2:00 PM	12	5	17
2:00 PM - 3:00 PM	5	10	15
3:00 PM - 4:00 PM	14	18	32
4:00 PM - 5:00 PM	16	18	34
5:00 PM - 6:00 PM	10	22	32
6:00 PM - 7:00 PM	11	16	27
7:00 PM - 8:00 PM	10	13	23
8:00 PM - 9:00 PM	5	10	15
9:00 PM - 10:00 PM	1	6	7
10:00 PM - 11:00 PM	0	0	0
11:00 PM - 12:00 AM	8	23	31
Total	98	145	243

24-Hour EB Volume	189	24-Hour WB Volume	205



24 Hour Segment Count

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-1536

Location: Mount Whitney Road between Calico Lane and Country Club Drive

Orientation: east-west

Date of Count: Wednesday, September 12, 2012

Analysts: DASH

Weather: Sunny

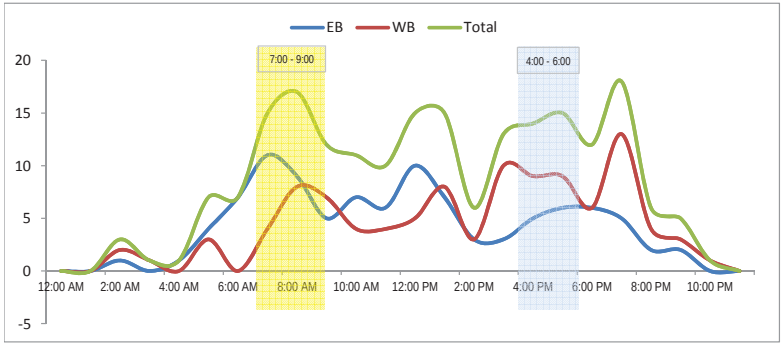
AVC Proj. No: 12-0006

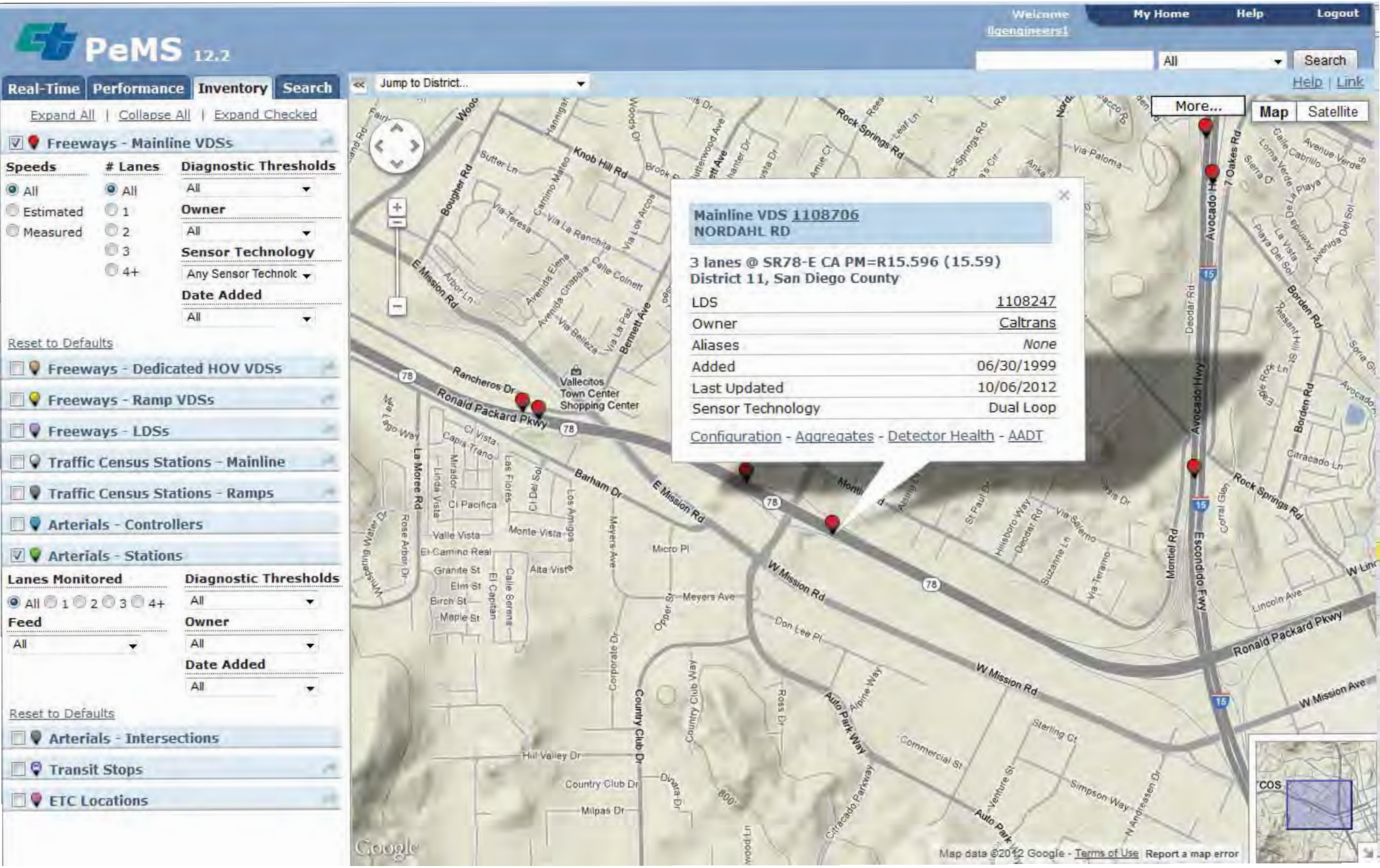
24 Hour Segment Volume			204

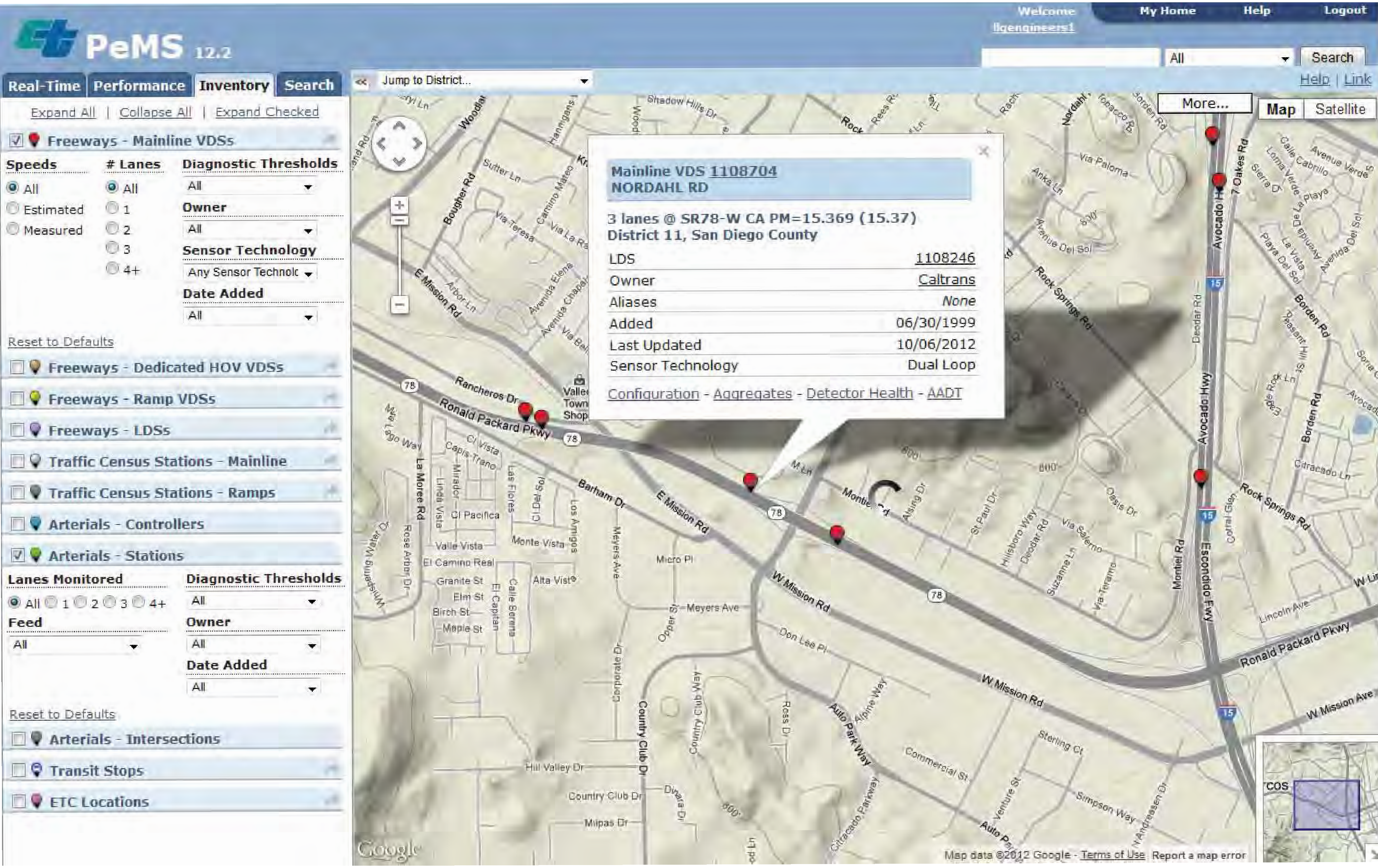
Time	Hourly Volume		
	EB	WB	Total
12:00 AM - 1:00 AM	0	0	0
1:00 AM - 2:00 AM	0	0	0
2:00 AM - 3:00 AM	1	2	3
3:00 AM - 4:00 AM	0	1	1
4:00 AM - 5:00 AM	1	0	1
5:00 AM - 6:00 AM	4	3	7
6:00 AM - 7:00 AM	7	0	7
7:00 AM - 8:00 AM	11	4	15
8:00 AM - 9:00 AM	9	8	17
9:00 AM - 10:00 AM	5	7	12
10:00 AM - 11:00 AM	7	4	11
11:00 AM - 12:00 PM	6	4	10
Total	51	33	84

Time	Hourly Volume		
	EB	WB	Total
12:00 PM - 1:00 PM	10	5	15
1:00 PM - 2:00 PM	7	8	15
2:00 PM - 3:00 PM	3	3	6
3:00 PM - 4:00 PM	3	10	13
4:00 PM - 5:00 PM	5	9	14
5:00 PM - 6:00 PM	6	9	15
6:00 PM - 7:00 PM	6	6	12
7:00 PM - 8:00 PM	5	13	18
8:00 PM - 9:00 PM	2	4	6
9:00 PM - 10:00 PM	2	3	5
10:00 PM - 11:00 PM	0	1	1
11:00 PM - 12:00 AM	0	0	0
Total	49	71	120

24-Hour EB Volume	100	24-Hour WB Volume	104




PeMS 12.2
Welcome
tlgengineers1
My Home
Help
Logout
All
Search
Real-Time
Performance
Inventory
Search
Jump to District...
Help | Link
Expand All | Collapse All | Expand Checked
Freeways - Mainline VDSs
Speeds
All
Estimated
Measured
Lanes
All
1
2
3
4+
Diagnostic Thresholds
All
Owner
All
Sensor Technology
Any Sensor Technolc
Date Added
All
Reset to Defaults
Freeways - Dedicated HOV VDSs
Freeways - Ramp VDSs
Freeways - LDSs
Traffic Census Stations - Mainline
Traffic Census Stations - Ramps
Arterials - Controllers
Arterials - Stations
Lanes Monitored
All 1 2 3 4+
Diagnostic Thresholds
All
Feed
All
Owner
All
Date Added
All
Reset to Defaults
Arterials - Intersections
Transit Stops
ETC Locations
More...
Map
Satellite
Mainline VDS 1108706
NORDAHL RD
3 lanes @ SR78-E CA PM=R15.596 (15.59)
District 11, San Diego County
LDS 1108247
Owner Caltrans
Aliases None
Added 06/30/1999
Last Updated 10/06/2012
Sensor Technology Dual Loop
Configuration - Aggregates - Detector Health - AADT
Rancheros Dr
Ronald Packard Pkwy
Vallecitos Town Center Shopping Center
E Mission Rd
Barham Dr
W Mission Rd
Rock Springs Rd
Avocado Hwy
Escondido Fwy
Borden Rd
Bougher Rd
Knob Hill Rd
Bernett Ave
La Moree Rd
Meyers Ave
Country Club Dr
Auto Park Way
Montiel Rd
Google
Map data ©2012 Google - Terms of Use Report a map error


PeMS 12.2
Welcome llgengineers1
My Home
Help
Logout
All
Search
Real-Time
Performance
Inventory
Search
Jump to District...
Help | Link
Expand All | Collapse All | Expand Checked
Freeways - Mainline VDSs
Speeds
All
Estimated
Measured
Lanes
All
1
2
3
4+
Diagnostic Thresholds
All
Owner
All
Sensor Technology
Any Sensor Technolc
Date Added
All
Reset to Defaults
Freeways - Dedicated HOV VDSs
Freeways - Ramp VDSs
Freeways - LDSs
Traffic Census Stations - Mainline
Traffic Census Stations - Ramps
Arterials - Controllers
Arterials - Stations
Lanes Monitored
All 1 2 3 4+
Feed
All
Diagnostic Thresholds
All
Owner
All
Date Added
All
Reset to Defaults
Arterials - Intersections
Transit Stops
ETC Locations
More...
Map
Satellite
Mainline VDS 1108704
NORDAHL RD
3 lanes @ SR78-W CA PM=15.369 (15.37)
District 11, San Diego County
LDS 1108246
Owner Caltrans
Aliases None
Added 06/30/1999
Last Updated 10/06/2012
Sensor Technology Dual Loop
Configuration - Aggregates - Detector Health - AADT
Ronald Packard Pkwy
Rancheros Dr
Barham Dr
E Mission Rd
W Mission Rd
Escondido Fwy
Avocado Hwy
Rock Springs Rd
Map data ©2012 Google - Terms of Use Report a map error

PeMS CAPM **M15.596**
Abs 15.6

Lane Flow 1	Lane Flow 2	Lane Flow 3	Lane Flow 4	Lane Flow 5	Total
1483	1107	1554			4144
1475	1538	2084			5097

PeMS CAPM **M14.86**
Abs 14.9

Lane Flow 1	Lane Flow 2	Lane Flow 3	Lane Flow 4	Total
1932	1695	1367		4994
1890	1667	1426		4983

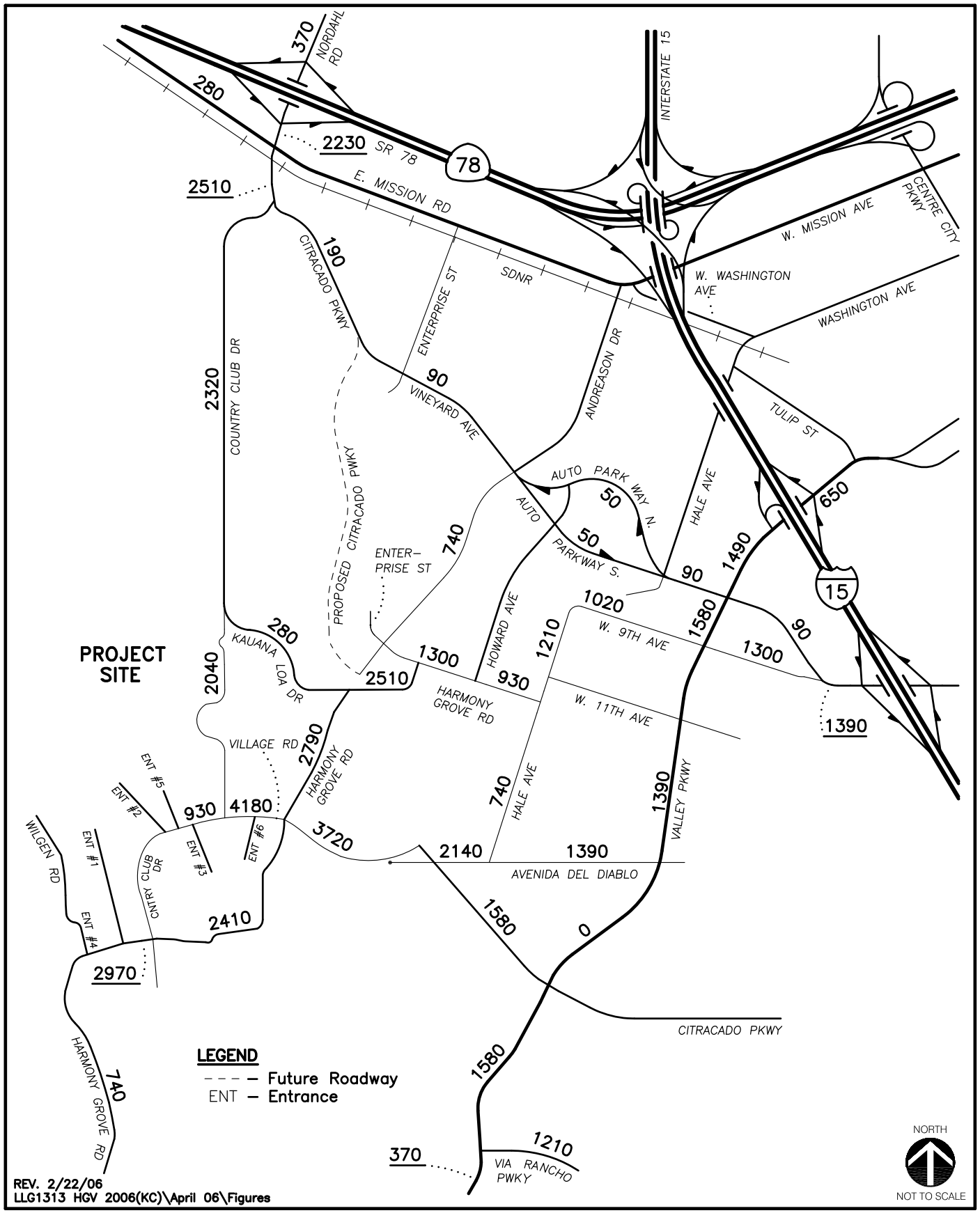
WESTBOUND

Segment #1: PeMS CAPM **M15.369**
Mainline East of Nordahl **Abs 15.4**

Sample Time	Lane Flow 1	Lane Flow 2	Lane Flow 3	Lane Flow 4	Lane Flow 5	Total
10/11/2011 7:00	2225	1956	1482			5663
10/11/2011 16:00	1757	1842	1471			5070

Segment #2: PeMS CAPM **M14.14**
Mainline West of Nordahl **Abs 14.1**

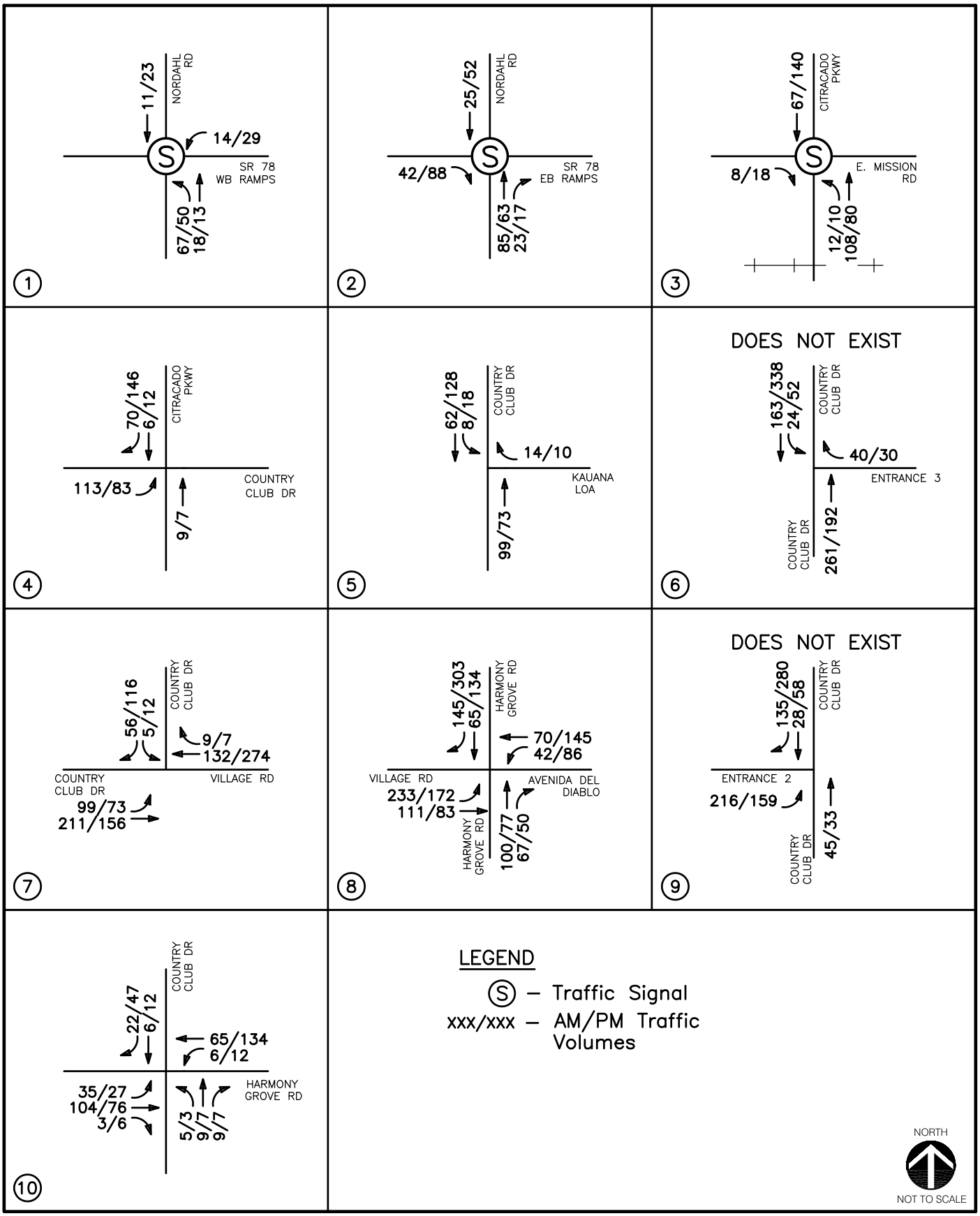
Sample Time	Lane Flow 1	Lane Flow 2	Lane Flow 3	Lane Flow 4	Lane Flow 5	Total
10/11/2011 8:00	2394	2112	1356			5862
10/11/2011 16:00	2140	2036	1449			5625



LINSCOTT LAW & GREENSPAN engineers

Figure 10-4

OPTION B: Project Average Daily Traffic Volumes



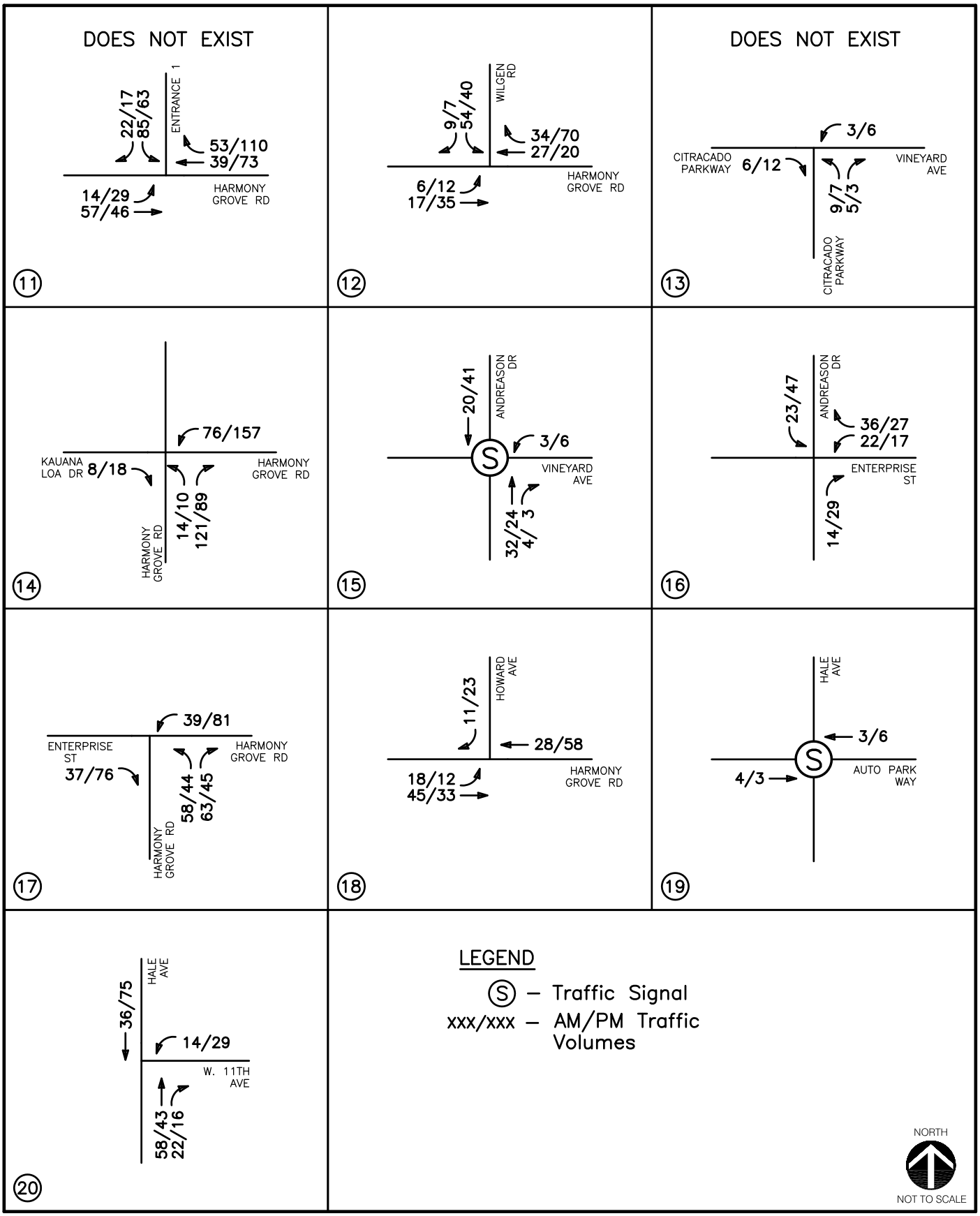
REV. 2/28/06
GRID1313 HGV January 2006

SHEET (1 OF 4)

Figure 10-5

OPTION B: Project Peak Hour Traffic Volumes

LINSCOTT LAW & GREENSPAN engineers



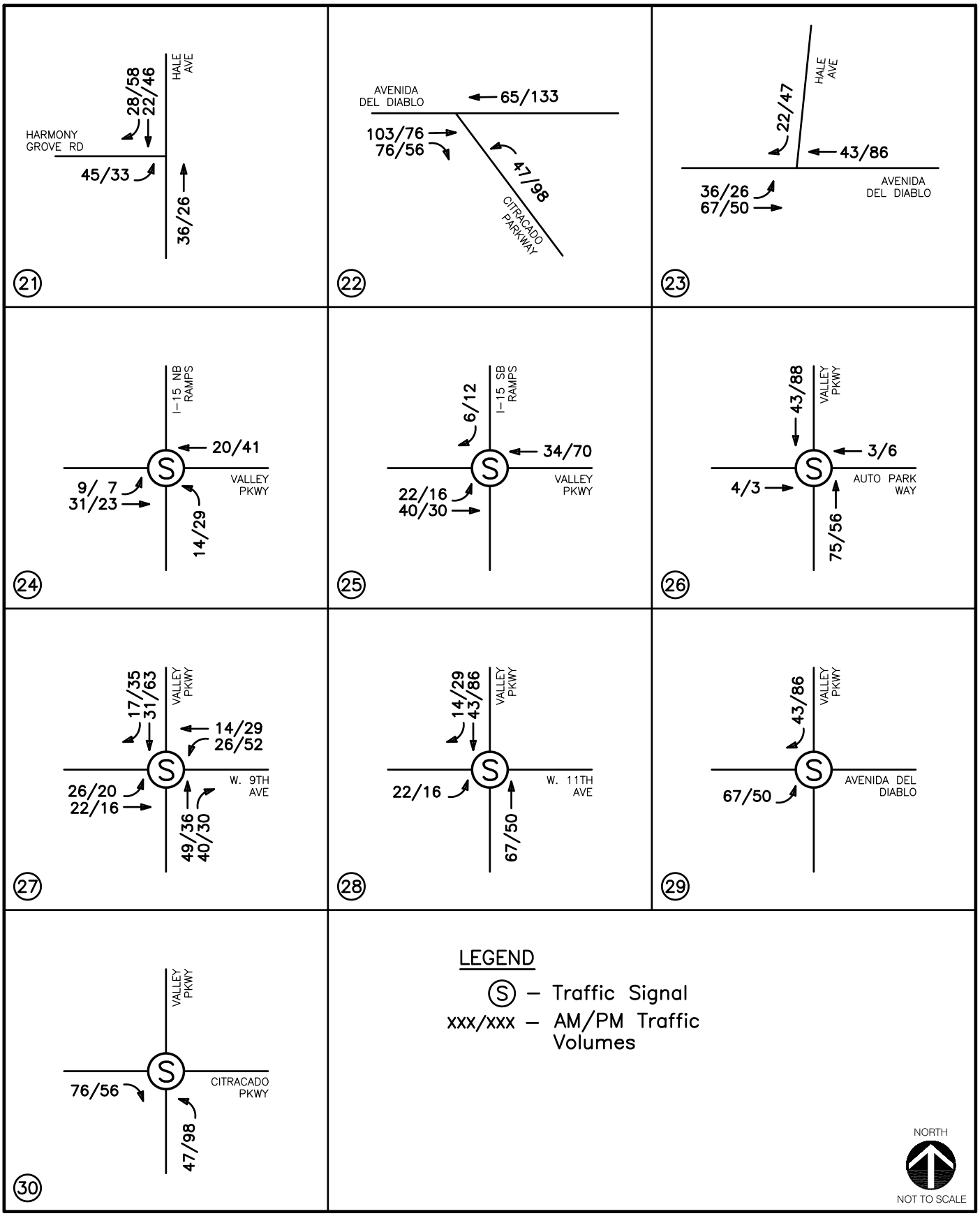
REV. 1/5/06
GRID1313 HGV January 2006

SHEET (2 OF 4)

LINSCOTT LAW & GREENSPAN engineers

Figure 10-5

OPTION B: Project Peak Hour Traffic Volumes



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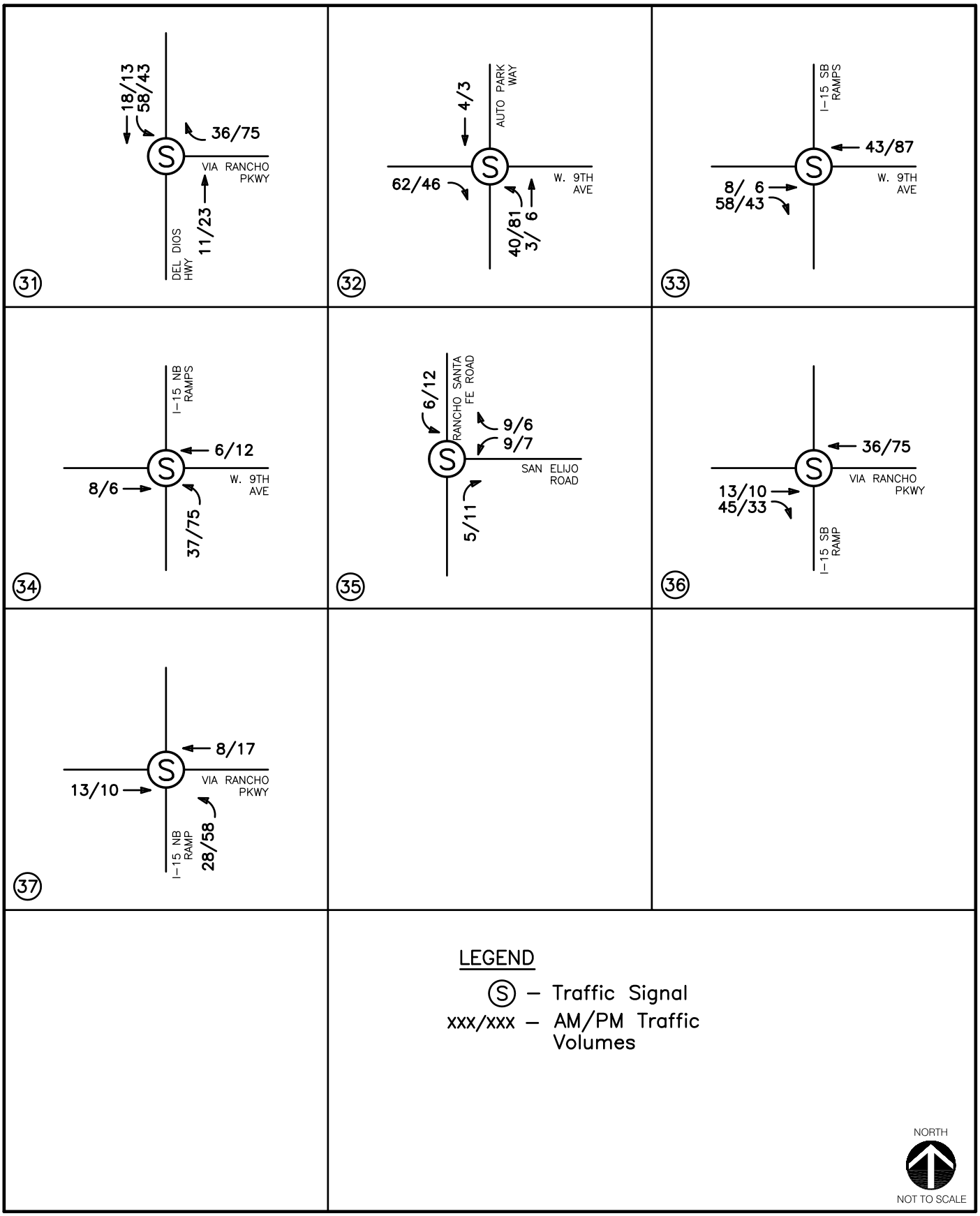
REV. 1/5/06
GRID1313 HGV January 2006

SHEET (3 OF 4)

Figure 10-5

OPTION B: Project Peak Hour Traffic Volumes



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REV. 1/5/06
GRID1313 HGV January 2006

SHEET (4 OF 4)

Figure 10-5

OPTION B: Project Peak Hour Traffic Volumes

APPENDIX D

HIGHWAY CAPACITY MANUAL 2000
INTERSECTION METHODOLOGY

2000 HIGHWAY CAPACITY MANUAL LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

In the 2000 Highway Capacity Manual (HCM), Level of Service for unsignalized intersections is determined by the computed or measured control delay and is defined for each minor movement. Level of Service is not defined for the intersection as a whole. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. The criteria are given in the following the table, and are based on the average control delay for any particular minor movement.

LEVEL OF SERVICE	AVERAGE CONTROL DELAY SEC/VEH			EXPECTED DELAY TO MINOR STREET TRAFFIC
A	0.0	≤	10.0	Little or no delay
B	10.1	to	15.0	Short traffic delays
C	15.1	to	25.0	Average traffic delays
D	25.1	to	35.0	Long traffic delays
E	35.1	to	50.0	Very long traffic delays
F		>	50.0	Severe congestion

Level of Service F exists when there are insufficient gaps of suitable size to allow a side street demand to safely cross through a major street traffic stream. This Level of Service is generally evident from extremely long control delays experienced by side-street traffic and by queuing on the minor-street approaches. The method, however, is based on a constant critical gap size; that is, the critical gap remains constant no matter how long the side-street motorist waits. LOS F may also appear in the form on side-street vehicles selecting smaller-than-usual gaps. In such cases, safety may be a problem, and some disruption to the major traffic stream may result. It is important to note that LOS F may not always result in long queues but may result in adjustments to normal gap acceptance behavior, which are more difficult to observe in the field than queuing.

In most cases at Two-Way Stop Controlled (TWSC) intersections, the critical movement is the minor-street left-turn movement. As such, the minor-street left-turn movement can generally be considered the primary factor affecting overall intersection performance. The lower threshold for LOS F is set at 50 seconds of delay per vehicle. There are many instances, particularly in urban areas, in which the delay equations will predict delays of 50 seconds (LOS F) or more for minor-street movements under very low volume conditions on the minor street (less than 25 vehicle/hour). Since the first term of the equation is a function only of the capacity, the LOS F threshold of 50 sec/vehicle is reached with a movement capacity of approximately 85 vehicle/hour or less.

This procedure assumes random arrivals on the major street. For a typical four-lane arterial with average daily traffic volumes in the range of 15,000 to 20,000 vehicles per day (peak hour, 1,500 to 2,000 vehicle/hour), the delay equation used in the TWSC capacity analysis procedure will predict 50 seconds of delay or more (LOS F) for many urban TWSC intersections that allow minor-street left-turn movements. **The LOS F threshold will be reached regardless of the volume of minor-street left-turn traffic.** Not-withstanding this fact, most low-volume minor-street approaches would not meet any of the volume or delay warrants for signalization of the *Manual on Uniform Traffic Control Devices* (MUTCD) since the warrants define an asymptote at 100 vehicle/hour on the minor approach. As a result, many public agencies that use the HCM Level of Service thresholds to determine the design adequacy of TWSC intersections may be forced to eliminate the minor-street left-turn movement, even when the movement may not present any operational problem, such as the formation of long queues on the minor street or driveway approach.

2000 HIGHWAY CAPACITY MANUAL LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

In the 2000 Highway Capacity Manual (HCM), Level of Service for signalized intersections is defined in terms of delay. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. Specifically, Level of Service criteria are stated in terms of the average control delay per vehicle for a 15-minute analysis period. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

Delay is a complex measure, and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group or approach in question.

LEVEL OF SERVICE	CONTROLLED DELAY PER VEHICLE (SEC)		
A		≤	10.0
B	10.1	to	20.0
C	20.1	to	35.0
D	35.1	to	55.0
E	55.1	to	80.0
F		>	80.0

Level of Service A describes operations with very low delay, (i.e. less than 10.0 seconds per vehicle). This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

Level of Service B describes operations with delay in the range of 10.1 to 20.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.

Level of Service C describes operations with delay in the range of 20.1 to 35.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in the level. The number of vehicles stopping is significant at this level, although many still pass through the intersections without stopping.

Level of Service D describes operations with delay in the range of 35.1 to 55.0 seconds per vehicle. At Level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

Level of Service E describes operations with delay in the range of 55.1 to 80.0 seconds per vehicle. This is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.

Level of Service F describes operations with delay in excess of 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over-saturation (i.e. when arrival flow rates exceed the capacity of the intersection). It may also occur at high v/c ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

APPENDIX E

COUNTY OF SAN DIEGO, CITY OF ESCONDIDO, CITY OF SAN MARCOS ROADWAY CLASSIFICATION TABLES

TABLE 1
AVERAGE DAILY VEHICLE TRIPS*

CIRCULATION ELEMENT ROADS			LEVELS OF SERVICE				
Road Classification		# of Travel Lanes	A	B	C	D	E
Expressway (6.1)		6	<36,000	<54,000	<70,000	<86,000	<108,000
Prime Arterial (6.2)		6	<22,200	<37,000	<44,600	<50,000	<57,000
Major Road	(4.1A)	4	<14,800	<24,700	<29,600	<33,400	<37,000
	w/ Intermittent Turn Lanes (4.1B)	4	<13,700	<22,800	<27,400	<30,800	<34,200
Collector		4	<13,700	<22,800	<27,400	<30,800	<34,200
Boulevard	w/ Raised Median (4.2A)	4	<18,000	<21,000	<24,000	<27,000	<30,000
	w/ Intermittent Turn Lanes (4.2B)	4	<16,800	<19,600	<22,500	<25,000	<28,000
Town Collector		2	<3,000	<6,000	<9,500	<13,500	<19,000
Community Collector	w/ Raised Median (2.1A)	2	<10,000	<11,700	<13,400	<15,000	<19,000
	w/ Continuous Left Turn Lane (2.1B)	2	<3,000	<6,000	<9,500	<13,500	<19,000
	w/ Intermittent Turn Lane (2.1C)	2	<3,000	<6,000	<9,500	<13,500	<19,000
	w/ Passing Lane (2.1D)	2	<3,000	<6,000	<9,500	<13,500	<19,000
	No Median (2.1E)	2	<1,900	<4,100	<7,100	<10,900	<16,200
Light Collector	w/ Raised Median (2.2A)	2	<3,000	<6,000	<9,500	<13,500	<19,000
	w/ Continuous Left Turn Lane (2.2B)	2	<3,000	<6,000	<9,500	<13,500	<19,000
	w/ Intermittent Turn Lane (2.2C)	2	<3,000	<6,000	<9,500	<13,500	<19,000
	w/ Passing Lane (2.2D)	2	<3,000	<6,000	<9,500	<13,500	<19,000
	No Median (2.2E)	2	<1,900	<4,100	<7,100	<10,900	<16,200
		2	<1,900	<4,100	<7,100	<10,900	<16,200
	w/ Reduced Shoulder (2.2F)	2	<5,800	<6,800	<7,800	<8,700	<9,700
Rural Collector		2	<1,900	<4,100	<7,100	<10,900	<16,200
Rural Light Collector		2	<1,900	<4,100	<7,100	<10,900	<16,200
Rural Mountain		2	<1,900	<4,100	<7,100	<10,900	<16,200
Recreational Parkway		2	<1,900	<4,100	<7,100	<10,900	<16,200
Minor Collector	w/ Raised Median (2.3A)	2	<3,000	<6,000	<7,000	<8,000	<9,000
	w/ Intermittent Turn Lane (2.3B)	2	<3,000	<6,000	<7,000	<8,000	<9,000
	No Median (2.3C)	2	<1,900	<4,100	<6,000	<7,000	<8,000
NON-CIRCULATION ELEMENT ROADS**			LEVELS OF SERVICE				
Residential Collector		2	-	-	<4,500	-	-
Rural Residential Collector***		2	-	-	<4,500	-	-
Residential Road		2	-	-	<1,500	-	-
Rural Residential Road***		2	-	-	<1,500	-	-
Residential Cul-de-Sac or Loop Road		2	-	-	<200	-	-

* The values shown are subject to adjustment based on the geometry of the roadway, side frictions, and other relevant factors as determined by the Director, Department of Public Works.

** Levels of service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic. Levels of service normally apply to roads carrying through traffic between major trip generators and attractors.

*** Rural Residential Collectors and Rural Residential Roads are intended to serve areas with lot sizes of 2 acres or more which do not have a demand for on-street parking. On-street parking is not assured for these cross sections. Additional right-of-way is needed if on-street parking is in paved area.

**** See Tables 2A and 2B for roadway surfacing and right-of-way widths.

Table

CITY OF ESCONDIDO PROPOSED LEVEL OF SERVICE STANDARDS

STREET SEGMENT AVERAGE DAILY VEHICLE TRIP THRESHOLDS

Street Classification	Lanes	Cross Sections	Level of Service				
			A	B	C	D	E
Prime Arterial	(8lanes) (6lanes)	116/136 (NP) 106/126 (NP)	23,800 20,400	37,800 32,400	51,800 44,400	62,300 53,400	70,000 60,000
Major Road	(6lanes) (4lanes)	90/110 (NP) 82/102 (NP)	17,000 12,600	27,000 20,000	37,000 27,400	44,500 32,900	50,000 37,000
Collector	(4lanes) (4lanes)	64/84 (NP) (WP)	11,600 6,800	18,500 10,800	25,300 14,800	30,400 17,800	34,200 20,000
Local Collector	(2lanes)	42/66 (NP) (WP)	5,100 3,400	8,100 5,400	11,100 7,400	13,400 8,900	15,000 10,000
Rural collector	(2lanes)						

(NP) No Parking
(WP) With Parking

The following V/C Ratios were utilized for determining Existing and Future Level of Service.

Level of Service		**Volume/Capacity (V/C) Ratio**
A-	Less than or Equal to	0.00 to 0. 34
B-	Less than or Equal to	0.35 to 0. 54
C-	Less than or Equal to	0.55 to 0. 74
D-	Less than or Equal to	0.75 to 0. 89
E-	Less than or Equal to	0.90 to 1. 00

V/C 0.74

CITY OF SAN MARCOS

ROADWAY LEVELS OF SERVICE

Roadway Classification	Volume/Capacity X-SECTION	(0.25) A	(0.5) B	(0.7) C	(0.85) D	(1.00) E
Prime Arterial	106/126 (NP)*	15,000	30,000	42,000	51,000	60,000
Major Arterial						
6 Lane	94/114 (NP)*	12,500	25,000	35,000	42,500	50,000
4 Lane	82/102 (NP)*	10,000	20,000	28,000	34,000	40,000
Secondary						
4 lane Arterial	64/84 (NP)*	7,500	15,000	21,000	25,500	30,000
Collector						
2 Lane	40/60 (NP)*	4,000	7,500	10,000	12,500	15,000
2 Lane	40/60	2,500	5,000	7,000	8,500	10,000
Industrial **						
2 Lane	64/68	5,000	10,000	14,000	17,000	20,000
2 Lane	40/60 (NP)*	2,500	5,000	7,000	8,500	10,000
Residential						
	48/68	2,500	5,000	7,000	8,500	10,000
	40/60 (NP)*	2,500	5,000	7,000	8,500	10,000
Residential						
Cul-de-Sac or Loop Street	48/68	**	**	500	**	**
Interim Road	24/40 or 60	**	**	2,800	**	**

*NP - No Parking

** - Levels of service are not generally applied to residential streets since their primary purpose is to sevice abutting lots, no carry through traffic.

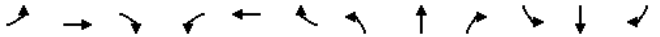
Levels of service are normally apply to roads carrying through traffic between major trip operators and generators.

APPENDIX F

PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS
EXISTING

HCM Signalized Intersection Capacity Analysis
1: Discovery St & S Twin Oaks Valley Rd

4/14/2014

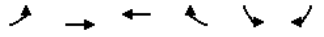


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	232	104	1	214	272	118	1	840	196	451	1190	392
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.91		1.00	1.00	1.00	1.00	0.91		0.97	0.91	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	5079		1770	1863	1583	1770	4941		3433	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	5079		1770	1863	1583	1770	4941		3433	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	252	113	1	233	296	128	1	913	213	490	1293	426
RTOR Reduction (vph)	0	1	0	0	0	100	0	48	0	0	0	240
Lane Group Flow (vph)	252	113	0	233	296	28	1	1078	0	490	1293	186
Turn Type	Prot			Prot		Perm	Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	8.7	11.9		13.4	16.6	16.6	0.8	22.4		11.0	32.6	32.6
Effective Green, g (s)	8.7	11.9		13.4	16.6	16.6	0.8	22.4		11.0	32.6	32.6
Actuated g/C Ratio	0.12	0.16		0.18	0.22	0.22	0.01	0.30		0.15	0.44	0.44
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)	400	809		318	414	352	19	1482		506	2219	691
v/s Ratio Prot	0.07	0.02		c0.13	c0.16		0.00	c0.22		c0.14	0.25	
v/s Ratio Perm						0.02						0.12
v/c Ratio	0.63	0.14		0.73	0.71	0.08	0.05	0.73		0.97	0.58	0.27
Uniform Delay, d1	31.5	27.0		29.0	26.9	23.0	36.6	23.4		31.7	15.9	13.4
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	3.2	0.1		8.4	5.8	0.1	1.2	3.2		31.6	1.1	1.0
Delay (s)	34.7	27.1		37.4	32.6	23.1	37.7	26.6		63.3	17.0	14.4
Level of Service	C	C		D	C	C	D	C		E	B	B
Approach Delay (s)		32.3			32.5			26.6			26.8	
Approach LOS		C			C			C			C	

Intersection Summary				
HCM Average Control Delay	28.1	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.75			
Actuated Cycle Length (s)	74.7	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	67.7%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
2: Barham Dr & Woodland Pkwy

4/14/2014



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	399	490	389	186	235	517
Ideal Flow (vphpl)	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	1.00	1.00	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	1863	1863	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	434	533	423	202	255	562
RTOR Reduction (vph)	0	0	0	0	0	66
Lane Group Flow (vph)	434	533	423	202	255	496
Turn Type	Prot			pm+ov		pm+ov
Protected Phases	7	4	8	6	6	7
Permitted Phases				8		6
Actuated Green, G (s)	15.7	35.0	15.3	27.9	12.6	28.3
Effective Green, g (s)	15.7	35.0	15.3	27.9	12.6	28.3
Actuated g/C Ratio	0.28	0.63	0.28	0.50	0.23	0.51
Clearance Time (s)	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
Lane Grp Cap (vph)	500	1173	513	908	401	920
v/s Ratio Prot	c0.25	0.29	c0.23	0.05	c0.14	0.15
v/s Ratio Perm				0.08		0.16
v/c Ratio	0.87	0.45	0.82	0.22	0.64	0.54
Uniform Delay, d1	19.0	5.3	18.9	7.8	19.4	9.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.7	0.3	10.4	0.1	3.3	0.6
Delay (s)	33.7	5.6	29.3	7.9	22.7	9.8
Level of Service	C	A	C	A	C	A
Approach Delay (s)		18.2	22.4		13.9	
Approach LOS		B	C		B	

Intersection Summary				
HCM Average Control Delay	17.8	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.79			
Actuated Cycle Length (s)	55.6	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	65.6%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
3: Mission Rd & Driveway

4/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	546	37	391	503	0	17	0	181	6	2	1
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	1.00	0.95			1.00	0.88		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.97	
Satd. Flow (prot)	1770	3539	1583	1770	3539			1770	2787		1775	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539			1770	2787		1838	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	593	40	425	547	0	18	0	197	7	2	1
RTOR Reduction (vph)	0	0	31	0	0	0	0	0	151	0	1	0
Lane Group Flow (vph)	4	593	9	425	547	0	0	18	46	0	9	0
Turn Type	Prot		Perm	Prot			Split		Perm	Perm		
Protected Phases	7	4		3	8		2	2			6	
Permitted Phases			4						2	6		
Actuated Green, G (s)	0.7	16.6	16.6	25.4	41.3			18.1	18.1		1.2	
Effective Green, g (s)	0.7	16.6	16.6	25.4	41.3			18.1	18.1		1.2	
Actuated g/C Ratio	0.01	0.21	0.21	0.33	0.53			0.23	0.23		0.02	
Clearance Time (s)	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	
Lane Grp Cap (vph)	16	760	340	582	1891			414	653		29	
v/s Ratio Prot	0.00	c0.17		c0.24	0.15			0.01				
v/s Ratio Perm			0.01						c0.02		c0.00	
v/c Ratio	0.25	0.78	0.03	0.73	0.29			0.04	0.07		0.31	
Uniform Delay, d1	38.0	28.6	24.0	22.9	9.9			22.9	23.1		37.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	8.1	5.2	0.0	4.7	0.1			0.2	0.2		6.0	
Delay (s)	46.1	33.8	24.0	27.6	10.0			23.1	23.3		43.7	
Level of Service	D	C	C	C	B			C	C		D	
Approach Delay (s)		33.3			17.7			23.2			43.7	
Approach LOS		C			B			C			D	

Intersection Summary				
HCM Average Control Delay	23.9	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.54			
Actuated Cycle Length (s)	77.3	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	52.3%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
4: SR-78 WB On Ramp & Nordahl Rd

4/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	307	2	211	448	363	0	0	421	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Lane Util. Factor				0.95	0.91	0.95	0.97	0.95			0.91	1.00
Frt				1.00	0.96	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.97	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1569	1504	3433	3539			5085	1583
Flt Permitted				0.95	0.97	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1569	1504	3433	3539			5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	334	2	229	487	395	0	0	458	337
RTOR Reduction (vph)	0	0	0	0	18	144	0	0	0	0	0	186
Lane Group Flow (vph)	0	0	0	197	174	32	487	395	0	0	458	151
Turn Type				Split		Perm	Prot					Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				18.1	18.1	18.1	20.8	70.7			44.7	44.7
Effective Green, g (s)				18.1	18.1	18.1	20.8	70.7			44.7	44.7
Actuated g/C Ratio				0.18	0.18	0.18	0.21	0.71			0.45	0.45
Clearance Time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				304	284	272	714	2502			2273	708
v/s Ratio Prot				c0.12	0.11		c0.14	0.11			0.09	
v/s Ratio Perm						0.02						c0.10
v/c Ratio				0.65	0.61	0.12	0.68	0.16			0.20	0.21
Uniform Delay, d1				38.0	37.7	34.3	36.5	4.8			16.8	16.9
Progression Factor				1.00	1.00	1.00	0.67	0.65			1.00	1.00
Incremental Delay, d2				4.7	3.9	0.2	2.6	0.1			0.2	0.7
Delay (s)				42.7	41.6	34.5	27.0	3.3			17.0	17.6
Level of Service				D	D	C	C	A			B	B
Approach Delay (s)		0.0			39.8			16.4			17.2	
Approach LOS		A			D			B			B	

Intersection Summary				
HCM Average Control Delay	22.6	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.42			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	56.3%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
4: SR 78 WB Ramps & Nordahl Rd

Existing AM
7/20/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	437	7	145	379	482	0	0	560	297
Future Volume (vph)	0	0	0	437	7	145	379	482	0	0	560	297
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Lane Util. Factor				0.95	0.91	0.95	0.97	0.95			0.91	1.00
Frt				1.00	0.99	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1606	1504	3433	3539			5085	1583
Flt Permitted				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1606	1504	3433	3539			5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	475	8	158	412	524	0	0	609	323
RTOR Reduction (vph)	0	0	0	0	3	110	0	0	0	0	0	189
Lane Group Flow (vph)	0	0	0	252	244	32	412	524	0	0	609	134
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				22.3	22.3	22.3	19.8	66.5			41.5	41.5
Effective Green, g (s)				22.3	22.3	22.3	19.8	66.5			41.5	41.5
Actuated g/C Ratio				0.22	0.22	0.22	0.20	0.66			0.42	0.42
Clearance Time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				374	358	335	679	2353			2110	656
v/s Ratio Prot				0.15	c0.15		c0.12	0.15			c0.12	
v/s Ratio Perm						0.02						0.08
v/c Ratio				0.67	0.68	0.09	0.61	0.22			0.29	0.20
Uniform Delay, d1				35.5	35.6	30.8	36.6	6.6			19.4	18.7
Progression Factor				1.00	1.00	1.00	0.73	0.55			1.00	1.00
Incremental Delay, d2				4.7	5.3	0.1	1.5	0.2			0.3	0.7
Delay (s)				40.3	40.9	31.0	28.0	3.8			19.8	19.4
Level of Service				D	D	C	C	A			B	B
Approach Delay (s)		0.0			38.4			14.5			19.7	
Approach LOS		A			D			B			B	

Intersection Summary				
HCM 2000 Control Delay	22.5	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.47			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	61.3%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Nordahl Rd & SR 78 EB Ramps

Existing AM
7/20/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	248	137	671	0	0	0	0	613	402	189	808	0
Future Volume (vph)	248	137	671	0	0	0	0	613	402	189	808	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.5	
Lane Util. Factor	0.95	0.91	0.95					0.91	1.00	0.97	0.95	
Frt	1.00	0.91	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1532	1504					5085	1583	3433	3539	
Flt Permitted	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1681	1532	1504					5085	1583	3433	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	270	149	729	0	0	0	0	666	437	205	878	0
RTOR Reduction (vph)	0	58	58	0	0	0	0	0	268	0	0	0
Lane Group Flow (vph)	243	410	379	0	0	0	0	666	169	205	878	0
Turn Type	Split	NA	Perm					NA	Perm	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	34.6	34.6	34.6					38.6	38.6	10.4	54.3	
Effective Green, g (s)	34.6	34.6	34.6					38.6	38.6	10.4	54.3	
Actuated g/C Ratio	0.35	0.35	0.35					0.39	0.39	0.10	0.54	
Clearance Time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.5	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	581	530	520					1962	611	357	1921	
v/s Ratio Prot	0.14	c0.27						0.13		0.06	c0.25	
v/s Ratio Perm			0.25						0.11			
v/c Ratio	0.42	0.77	0.73					0.34	0.28	0.57	0.46	
Uniform Delay, d1	25.0	29.2	28.6					21.7	21.1	42.7	13.9	
Progression Factor	1.00	1.00	1.00					0.61	1.29	1.11	0.38	
Incremental Delay, d2	0.5	6.9	5.1					0.4	1.0	2.1	0.8	
Delay (s)	25.5	36.1	33.7					13.7	28.3	49.6	6.0	
Level of Service	C	D	C					B	C	D	A	
Approach Delay (s)		32.9			0.0			19.5			14.2	
Approach LOS		C			A			B			B	

Intersection Summary				
HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	61.3%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: SR-78 EB Off Ramp & Nordahl Rd

4/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	0	643	0	0	0	0	636	280	163	565	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.6	
Lane Util. Factor	0.95	0.91	0.95					0.95	0.88	0.97	0.95	
Frt	1.00	0.86	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1450	1504					3539	2787	3433	3539	
Flt Permitted	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1681	1450	1504					3539	2787	3433	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	190	0	699	0	0	0	0	691	304	177	614	0
RTOR Reduction (vph)	0	175	175	0	0	0	0	0	146	0	0	0
Lane Group Flow (vph)	171	187	181	0	0	0	0	691	158	177	614	0
Turn Type	Split		Perm						Perm	Prot		
Protected Phases	4	4						2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	21.1	21.1	21.1					52.0	52.0	10.5	67.7	
Effective Green, g (s)	21.1	21.1	21.1					52.0	52.0	10.5	67.7	
Actuated g/C Ratio	0.21	0.21	0.21					0.52	0.52	0.10	0.68	
Clearance Time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.6	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	355	306	317					1840	1449	360	2396	
v/s Ratio Prot	0.10	c0.13						c0.20		c0.05	0.17	
v/s Ratio Perm			0.12						0.06			
v/c Ratio	0.48	0.61	0.57					0.38	0.11	0.49	0.26	
Uniform Delay, d1	34.6	35.7	35.4					14.3	12.2	42.2	6.3	
Progression Factor	1.00	1.00	1.00					0.47	0.74	0.56	1.51	
Incremental Delay, d2	1.0	3.6	2.5					0.5	0.1	1.0	0.3	
Delay (s)	35.7	39.3	37.9					7.2	9.2	24.7	9.8	
Level of Service	D	D	D					A	A	C	A	
Approach Delay (s)		38.0			0.0			7.8			13.1	
Approach LOS		D			A			A			B	

Intersection Summary				
HCM Average Control Delay	19.4	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.45			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	56.3%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
6: Mission Rd & Nordahl Rd

4/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	245	331	157	79	498	149	323	531	40	265	634	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
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)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	4896	
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)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	4896	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	266	360	171	86	541	162	351	577	43	288	689	227
RTOR Reduction (vph)	0	0	0	0	0	126	0	0	0	0	56	0
Lane Group Flow (vph)	266	360	171	86	541	36	351	577	43	288	860	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)	12.8	31.0	31.0	4.0	22.2	22.2	12.0	33.3	33.3	11.7	33.0	
Effective Green, g (s)	12.8	31.0	31.0	4.0	22.2	22.2	12.0	33.3	33.3	11.7	33.0	
Actuated g/C Ratio	0.13	0.31	0.31	0.04	0.22	0.22	0.12	0.33	0.33	0.12	0.33	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	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)	439	1097	491	137	786	351	412	1693	527	402	1616	
v/s Ratio Prot	c0.08	0.10		0.03	c0.15		c0.10	0.11		c0.08	c0.18	
v/s Ratio Perm			0.11			0.02			0.03			
v/c Ratio	0.61	0.33	0.35	0.63	0.69	0.10	0.85	0.34	0.08	0.72	0.53	
Uniform Delay, d1	41.2	26.5	26.7	47.3	35.7	31.0	43.1	25.1	22.9	42.6	27.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	0.61	
Incremental Delay, d2	2.4	0.2	0.4	8.7	2.5	0.1	15.5	0.5	0.3	5.6	1.2	
Delay (s)	43.6	26.7	27.1	55.9	38.2	31.1	58.6	25.6	23.2	41.8	17.8	
Level of Service	D	C	C	E	D	C	E	C	C	D	B	
Approach Delay (s)		32.4			38.7			37.5			23.5	
Approach LOS		C			D			D			C	

Intersection Summary				
HCM Average Control Delay	32.2	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.65			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	63.6%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
7: Country Club Dr & Auto Park Way

4/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	187	1	42	0	4	3	164	722	3	43	890	138
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	1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85		0.94		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583		1743		1770	3537		1770	3468	
Flt Permitted	0.75	1.00	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1403	1863	1583		1743		1770	3537		1770	3468	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	203	1	46	0	4	3	178	785	3	47	967	150
RTOR Reduction (vph)	0	0	36	0	2	0	0	0	0	0	18	0
Lane Group Flow (vph)	203	1	10	0	5	0	178	788	0	47	1099	0
Turn Type	Perm		Perm	Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)	12.8	12.8	12.8		12.8		8.6	31.4		1.9	24.7	
Effective Green, g (s)	12.8	12.8	12.8		12.8		8.6	31.4		1.9	24.7	
Actuated g/C Ratio	0.22	0.22	0.22		0.22		0.15	0.54		0.03	0.43	
Clearance Time (s)	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	
Lane Grp Cap (vph)	309	410	349		384		262	1912		58	1474	
v/s Ratio Prot		0.00			0.00		c0.10	0.22		0.03	c0.32	
v/s Ratio Perm	c0.14		0.01									
v/c Ratio	0.66	0.00	0.03		0.01		0.68	0.41		0.81	0.75	
Uniform Delay, d1	20.6	17.7	17.8		17.7		23.4	7.9		27.9	14.1	
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.0	0.0	0.0		0.0		6.8	0.7		55.8	3.5	
Delay (s)	25.6	17.7	17.8		17.7		30.3	8.5		83.7	17.5	
Level of Service	C	B	B		B		C	A		F	B	
Approach Delay (s)		24.2			17.7			12.6			20.2	
Approach LOS		C			B			B			C	

Intersection Summary				
HCM Average Control Delay	17.5	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.71			
Actuated Cycle Length (s)	58.1	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	65.1%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
8: W. 9th Ave & Valley Pkwy

4/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	168	209	6	108	229	160	17	560	127	84	867	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.91		1.00	0.91	
Frt	1.00	1.00		1.00	0.94		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3523		1770	3321		1770	4944		1770	4944	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3523		1770	3321		1770	4944		1770	4944	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	183	227	7	117	249	174	18	609	138	91	942	215
RTOR Reduction (vph)	0	3	0	0	144	0	0	34	0	0	32	0
Lane Group Flow (vph)	183	231	0	117	279	0	18	713	0	91	1125	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	6.1	13.4		6.1	13.4		0.7	34.6		4.0	37.9	
Effective Green, g (s)	6.1	13.4		6.1	13.4		0.7	34.6		4.0	37.9	
Actuated g/C Ratio	0.08	0.17		0.08	0.17		0.01	0.44		0.05	0.49	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	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)	138	604		138	570		16	2190		91	2399	
v/s Ratio Prot	c0.10	0.07		0.07	c0.08		0.01	0.14		c0.05	c0.23	
v/s Ratio Perm												
v/c Ratio	1.33	0.38		0.85	0.49		1.12	0.33		1.00	0.47	
Uniform Delay, d1	36.0	28.7		35.5	29.3		38.7	14.2		37.0	13.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	188.1	0.4		35.6	0.7		268.4	0.4		94.3	0.7	
Delay (s)	224.1	29.1		71.1	29.9		307.1	14.6		131.4	14.1	
Level of Service	F	C		E	C		F	B		F	B	
Approach Delay (s)		114.7			38.8			21.4			22.6	
Approach LOS		F			D			C			C	

Intersection Summary				
HCM Average Control Delay	38.2	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	78.1	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	61.9%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
9: Valley Pkwy & Auto Park Wy

4/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	261	585	42	124	768	404	77	566	31	118	344	299
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3511		3433	3292	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3511		3433	3292	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	284	636	46	135	835	439	84	615	34	128	374	325
RTOR Reduction (vph)	0	0	33	0	0	30	0	3	0	0	153	0
Lane Group Flow (vph)	284	636	13	135	835	409	84	646	0	128	546	0
Turn Type	Prot		Perm	Prot		pm+ov	Prot			Prot		
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	12.2	28.2	28.2	7.8	21.8	33.2	4.0	34.6		11.4	42.0	
Effective Green, g (s)	12.2	28.2	28.2	7.8	21.8	33.2	4.0	34.6		11.4	42.0	
Actuated g/C Ratio	0.12	0.28	0.28	0.08	0.22	0.33	0.04	0.35		0.11	0.42	
Clearance Time (s)	5.0	5.0	5.0	3.0	5.0	5.0	5.0	5.0		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)	419	1434	446	268	1109	605	137	1215		391	1383	
v/s Ratio Prot	c0.08	0.13		0.04	0.16	c0.08	0.02	c0.18		0.04	0.17	
v/s Ratio Perm			0.01			0.18						
v/c Ratio	0.68	0.44	0.03	0.50	0.75	0.68	0.61	0.53		0.33	0.39	
Uniform Delay, d1	42.0	29.5	26.0	44.2	36.6	28.8	47.2	26.2		40.8	20.2	
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	4.3	1.0	0.1	1.5	4.7	3.0	7.9	1.7		0.5	0.8	
Delay (s)	46.3	30.5	26.1	45.7	41.3	31.8	55.1	27.9		41.3	21.0	
Level of Service	D	C	C	D	D	C	E	C		D	C	
Approach Delay (s)		34.9			38.8			31.0			24.1	
Approach LOS		C			D			C			C	

Intersection Summary				
HCM Average Control Delay	33.3	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	61.6%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
10: Valley Pkwy & I-15 SB Ramps

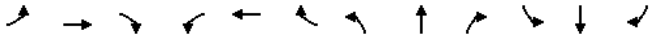
4/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	536	40	74	688	227	26	34	73	300	74	565
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.6	5.5	5.5	5.5	5.5	5.5		5.5	
Lane Util. Factor	0.97	0.91	1.00	0.97	0.81	0.81	1.00	1.00	1.00		0.95	
Frt	1.00	1.00	0.85	1.00	0.99	0.85	1.00	1.00	0.85		0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	3433	5085	1583	3433	5956	1282	1770	1863	1583		3169	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	
Satd. Flow (perm)	3433	5085	1583	3433	5956	1282	1770	1863	1583		3169	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	583	43	80	748	247	28	37	79	326	80	614
RTOR Reduction (vph)	0	0	32	0	12	123	0	0	68	0	228	0
Lane Group Flow (vph)	65	583	11	80	808	52	28	37	11	0	792	0
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6			3			
Actuated Green, G (s)	4.0	30.8	30.8	8.1	35.5	35.5	16.5	16.5	16.5		43.5	
Effective Green, g (s)	4.0	30.8	30.8	8.1	35.5	35.5	16.5	16.5	16.5		43.5	
Actuated g/C Ratio	0.03	0.26	0.26	0.07	0.30	0.30	0.14	0.14	0.14		0.36	
Clearance Time (s)	4.0	5.5	5.5	4.6	5.5	5.5	5.5	5.5	5.5		5.5	
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)	114	1305	406	232	1762	379	243	256	218		1149	
v/s Ratio Prot	c0.02	0.11		0.02	c0.14		0.02	c0.02			c0.25	
v/s Ratio Perm			0.01			0.04			0.01			
v/c Ratio	0.57	0.45	0.03	0.34	0.46	0.14	0.12	0.14	0.05		0.69	
Uniform Delay, d1	57.2	37.4	33.4	53.4	34.4	31.0	45.4	45.5	44.9		32.5	
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	6.7	1.1	0.1	0.9	0.9	0.7	1.0	1.2	0.4		3.4	
Delay (s)	63.9	38.6	33.5	54.3	35.3	31.8	46.3	46.7	45.4		35.9	
Level of Service	E	D	C	D	D	C	D	D	D		D	
Approach Delay (s)		40.6			36.1			45.9			35.9	
Approach LOS		D			D			D			D	

Intersection Summary				
HCM Average Control Delay	37.6	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.51			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.5	
Intersection Capacity Utilization	64.1%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
11: Valley Pkwy & I-15 NB Ramps

4/14/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	289	620	0	0	746	182	243	0	309	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	5.5			5.5	5.5		4.6	4.6			
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			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	314	674	0	0	811	198	264	0	336	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	133	0	0	117	0	0	0
Lane Group Flow (vph)	314	674	0	0	811	65	0	264	219	0	0	0
Turn Type	Prot					Perm	Split		Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases						6			8			
Actuated Green, G (s)	14.8	53.5			34.5	34.5		41.4	41.4			
Effective Green, g (s)	14.8	53.5			34.5	34.5		41.4	41.4			
Actuated g/C Ratio	0.14	0.51			0.33	0.33		0.39	0.39			
Clearance Time (s)	4.2	5.5			5.5	5.5		4.6	4.6			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	484	1803			1671	520		698	624			
v/s Ratio Prot	c0.09	0.19			c0.16			c0.15				
v/s Ratio Perm						0.04			0.14			
v/c Ratio	0.65	0.37			0.49	0.13		0.38	0.35			
Uniform Delay, d1	42.6	15.6			28.2	24.7		22.6	22.4			
Progression Factor	1.00	1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2	3.0	0.6			1.0	0.5		1.6	1.6			
Delay (s)	45.6	16.2			29.2	25.2		24.2	23.9			
Level of Service	D	B			C	C		C	C			
Approach Delay (s)		25.6			28.4			24.0			0.0	
Approach LOS		C			C			C			A	

Intersection Summary				
HCM Average Control Delay	26.3	HCM Level of Service		C
HCM Volume to Capacity ratio	0.46			
Actuated Cycle Length (s)	105.0	Sum of lost time (s)		14.3
Intersection Capacity Utilization	48.0%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
12: Eden Valley Ln & Country Club Dr

4/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	22	6	1	83	70	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	7	1	90	76	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	174	82	88			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	174	82	88			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	100			
cM capacity (veh/h)	815	978	1508			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	30	91	88
Volume Left	24	1	0
Volume Right	7	0	12
cSH	845	1508	1700
Volume to Capacity	0.04	0.00	0.05
Queue Length 95th (ft)	3	0	0
Control Delay (s)	9.4	0.1	0.0
Lane LOS	A	A	
Approach Delay (s)	9.4	0.1	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	15.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
13: Kauana Loa Dr & Country Club Dr

4/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	10	84	131	8	43	86
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	91	142	9	47	93

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	102	151	140
Volume Left (vph)	11	0	47
Volume Right (vph)	91	9	0
Hadj (s)	-0.48	0.00	0.10
Departure Headway (s)	4.1	4.3	4.4
Degree Utilization, x	0.12	0.18	0.17
Capacity (veh/h)	818	813	788
Control Delay (s)	7.6	8.2	8.3
Approach Delay (s)	7.6	8.2	8.3
Approach LOS	A	A	A

Intersection Summary			
Delay	8.1		
HCM Level of Service	A		
Intersection Capacity Utilization	30.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
14: Mt. Whitney Rd & Country Club Dr

4/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	10	2	1	115	94	6
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	2	1	125	102	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				917		
pX, platoon unblocked						
vC, conflicting volume	233	105	109			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	233	105	109			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	755	949	1482			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	13	126	109
Volume Left	11	1	0
Volume Right	2	0	7
cSH	782	1482	1700
Volume to Capacity	0.02	0.00	0.06
Queue Length 95th (ft)	1	0	0
Control Delay (s)	9.7	0.1	0.0
Lane LOS	A	A	
Approach Delay (s)	9.7	0.1	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	16.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
15: New Access #1 & Country Club Dr

4/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	116	96	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	126	104	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				507		
pX, platoon unblocked						
vC, conflicting volume	230	104	104			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	230	104	104			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	758	950	1487			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	126	104
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1487	1700
Volume to Capacity	0.00	0.00	0.06
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		9.4%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
16: New Access #2 & Country Club Dr

4/14/2014

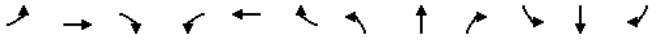
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	116	96	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	126	104	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				307		
pX, platoon unblocked						
vC, conflicting volume	230	104	104			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	230	104	104			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	758	950	1487			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	126	104
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1487	1700
Volume to Capacity	0.00	0.00	0.06
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		9.4%	ICU Level of Service A
Analysis Period (min)		15	

HCM Signalized Intersection Capacity Analysis
17: Harmony Grove Rd & Country Club Dr

4/14/2014

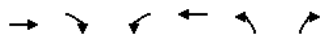


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	53	202	6	8	252	3	5	12	23	1	9	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00			0.92		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1681	1759		1770	1860			1707		1770	1645	
Flt Permitted	0.95	1.00		0.95	1.00			0.96		0.73	1.00	
Satd. Flow (perm)	1681	1755		1770	1860			1653		1358	1645	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	58	220	7	9	274	3	5	13	25	1	10	35
RTOR Reduction (vph)	0	0	0	0	0	0	0	22	0	0	31	0
Lane Group Flow (vph)	52	233	0	9	277	0	0	21	0	1	14	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	5.8	51.3		1.9	41.6			6.9		6.9	6.9	
Effective Green, g (s)	5.8	51.3		1.9	41.6			6.9		6.9	6.9	
Actuated g/C Ratio	0.09	0.77		0.03	0.63			0.10		0.10	0.10	
Clearance Time (s)	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	
Lane Grp Cap (vph)	147	1358		51	1167			172		141	171	
v/s Ratio Prot	c0.03	c0.01		0.01	c0.15						0.01	
v/s Ratio Perm		0.12						c0.01		0.00		
v/c Ratio	0.35	0.17		0.18	0.24			0.12		0.01	0.08	
Uniform Delay, d1	28.5	2.0		31.4	5.4			26.9		26.6	26.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	1.5	0.1		1.7	0.1			0.3		0.0	0.2	
Delay (s)	30.0	2.0		33.1	5.5			27.3		26.6	27.0	
Level of Service	C	A		C	A			C		C	C	
Approach Delay (s)		7.1			6.4			27.3			27.0	
Approach LOS		A			A			C			C	

Intersection Summary				
HCM Average Control Delay	9.5	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.25			
Actuated Cycle Length (s)	66.3	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	40.8%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
18: Kauna Loa Dr & Harmony Grove Rd

4/14/2014



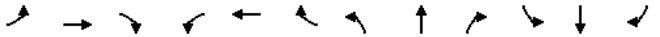
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	80	10	261	74	14	237
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	11	284	80	15	258
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				268		
pX, platoon unblocked						
vC, conflicting volume			98		740	92
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			98		740	92
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			81		95	73
cM capacity (veh/h)			1495		311	965

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	98	364	273
Volume Left	0	284	15
Volume Right	11	0	258
cSH	1700	1495	864
Volume to Capacity	0.06	0.19	0.32
Queue Length 95th (ft)	0	17	34
Control Delay (s)	0.0	6.6	11.1
Lane LOS		A	B
Approach Delay (s)	0.0	6.6	11.1
Approach LOS			B

Intersection Summary			
Average Delay	7.4		
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
1: Discovery St & S Twin Oaks Valley Rd

4/14/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	537	433	3	262	250	462	8	1268	448	286	922	428
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	0.91		1.00	1.00	1.00	1.00	0.91		0.97	0.91	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	5080		1770	1863	1583	1770	4886		3433	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	5080		1770	1863	1583	1770	4886		3433	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	584	471	3	285	272	502	9	1378	487	311	1002	465
RTOR Reduction (vph)	0	1	0	0	0	138	0	62	0	0	0	247
Lane Group Flow (vph)	584	473	0	285	272	364	9	1803	0	311	1002	218
Turn Type	Prot			Prot		Perm	Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	17.0	19.2		18.8	21.0	21.0	0.8	40.2		9.0	48.4	48.4
Effective Green, g (s)	17.0	19.2		18.8	21.0	21.0	0.8	40.2		9.0	48.4	48.4
Actuated g/C Ratio	0.16	0.19		0.18	0.20	0.20	0.01	0.39		0.09	0.47	0.47
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)	566	945		322	379	322	14	1903		299	2385	742
v/s Ratio Prot	c0.17	0.09		0.16	0.15		0.01	c0.37		c0.09	0.20	
v/s Ratio Perm						c0.23						0.14
v/c Ratio	1.03	0.50		0.89	0.72	1.13	0.64	0.95		1.04	0.42	0.29
Uniform Delay, d1	43.1	37.7		41.1	38.3	41.1	51.1	30.5		47.1	18.1	16.9
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	46.2	0.4		23.8	6.4	90.4	71.2	11.5		62.9	0.5	1.0
Delay (s)	89.3	38.1		65.0	44.7	131.5	122.3	42.0		110.0	18.7	17.9
Level of Service	F	D		E	D	F	F	D		F	B	B
Approach Delay (s)		66.4			91.3			42.4			34.4	
Approach LOS		E			F			D			C	

Intersection Summary					
HCM Average Control Delay	53.3	HCM Level of Service		D	
HCM Volume to Capacity ratio	0.97				
Actuated Cycle Length (s)	103.2	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	88.4%	ICU Level of Service		E	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
2: Barham Dr & Woodland Pkwy

4/14/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	413	763	201	253	449	282
Ideal Flow (vphpl)	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	1.00	1.00	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	1863	1863	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	449	829	218	275	488	307
RTOR Reduction (vph)	0	0	0	0	0	118
Lane Group Flow (vph)	449	829	218	275	488	189
Turn Type	Prot			pm+ov		pm+ov
Protected Phases	7	4	8	6	6	7
Permitted Phases				8		6
Actuated Green, G (s)	18.9	35.5	12.6	33.1	20.5	39.4
Effective Green, g (s)	18.9	35.5	12.6	33.1	20.5	39.4
Actuated g/C Ratio	0.30	0.55	0.20	0.52	0.32	0.62
Clearance Time (s)	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
Lane Grp Cap (vph)	523	1033	367	918	567	1073
v/s Ratio Prot	0.25	c0.45	0.12	0.10	c0.28	0.05
v/s Ratio Perm				0.08		0.07
v/c Ratio	0.86	0.80	0.59	0.30	0.86	0.18
Uniform Delay, d1	21.3	11.4	23.4	8.8	20.4	5.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.2	4.6	2.6	0.2	12.7	0.1
Delay (s)	34.4	16.0	25.9	9.0	33.1	5.4
Level of Service	C	B	C	A	C	A
Approach Delay (s)		22.5	16.5		22.4	
Approach LOS		C	B		C	

Intersection Summary					
HCM Average Control Delay	21.3	HCM Level of Service		C	
HCM Volume to Capacity ratio	0.82				
Actuated Cycle Length (s)	64.0	Sum of lost time (s)		8.0	
Intersection Capacity Utilization	71.7%	ICU Level of Service		C	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
3: Mission Rd & Driveway

4/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	831	21	316	724	1	43	1	424	11	1	0
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	
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	0.88		1.00	
Frt		1.00	0.85	1.00	1.00			1.00	0.85		1.00	
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00		0.96	
Satd. Flow (prot)		3539	1583	1770	3539			1776	2787		1781	
Flt Permitted		1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (perm)		3539	1583	1770	3539			1776	2787		1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	903	23	343	787	1	47	1	461	12	1	0
RTOR Reduction (vph)	0	0	16	0	0	0	0	0	351	0	0	0
Lane Group Flow (vph)	0	903	7	343	788	0	0	48	110	0	13	0
Turn Type	Prot		Perm	Prot			Split		Perm	Perm		
Protected Phases	7	4		3	8		2	2			6	
Permitted Phases			4						2	6		
Actuated Green, G (s)		23.1	23.1	17.1	44.2			18.1	18.1		1.3	
Effective Green, g (s)		23.1	23.1	17.1	44.2			18.1	18.1		1.3	
Actuated g/C Ratio		0.31	0.31	0.23	0.58			0.24	0.24		0.02	
Clearance Time (s)		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	
Lane Grp Cap (vph)		1081	484	400	2069			425	667		32	
v/s Ratio Prot		c0.26		c0.19	0.22			0.03				
v/s Ratio Perm			0.00						c0.04		c0.01	
v/c Ratio		0.84	0.01	0.86	0.38			0.11	0.17		0.41	
Uniform Delay, d1		24.5	18.3	28.1	8.4			22.5	22.8		36.8	
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		5.7	0.0	16.4	0.1			0.5	0.5		8.2	
Delay (s)		30.2	18.3	44.5	8.5			23.0	23.3		45.0	
Level of Service		C	B	D	A			C	C		D	
Approach Delay (s)		29.9			19.4			23.3			45.0	
Approach LOS		C			B			C			D	

Intersection Summary				
HCM Average Control Delay	24.1	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	75.6	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	57.8%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
4: SR-78 WB On Ramp & Nordahl Rd

4/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	343	8	506	550	770	0	0	736	455
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Lane Util. Factor				0.95	0.91	0.95	0.97	0.95			0.91	1.00
Frt				1.00	0.88	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1477	1504	3433	3539			5085	1583
Flt Permitted				0.95	0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1477	1504	3433	3539			5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	373	9	550	598	837	0	0	800	495
RTOR Reduction (vph)	0	0	0	0	102	102	0	0	0	0	0	321
Lane Group Flow (vph)	0	0	0	325	203	200	598	837	0	0	800	174
Turn Type				Split		Perm	Prot					Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				27.1	27.1	27.1	21.3	61.7			35.2	35.2
Effective Green, g (s)				27.1	27.1	27.1	21.3	61.7			35.2	35.2
Actuated g/C Ratio				0.27	0.27	0.27	0.21	0.62			0.35	0.35
Clearance Time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				456	400	408	731	2184			1790	557
v/s Ratio Prot				c0.19	0.14		c0.17	0.24			c0.16	
v/s Ratio Perm						0.13						0.11
v/c Ratio				0.71	0.51	0.49	0.82	0.38			0.45	0.31
Uniform Delay, d1				32.9	30.8	30.6	37.5	9.6			24.9	23.6
Progression Factor				1.00	1.00	1.00	1.04	0.24			1.00	1.00
Incremental Delay, d2				5.2	1.0	0.9	5.7	0.4			0.8	1.5
Delay (s)				38.1	31.8	31.6	44.8	2.7			25.7	25.1
Level of Service				D	C	C	D	A			C	C
Approach Delay (s)		0.0			33.9			20.3			25.5	
Approach LOS		A			C			C			C	

Intersection Summary				
HCM Average Control Delay	25.6	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	72.4%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
4: SR 78 WB Ramps & Nordahl Rd

Existing PM
7/20/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	469	5	248	502	884	0	0	727	348
Future Volume (vph)	0	0	0	469	5	248	502	884	0	0	727	348
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Lane Util. Factor				0.95	0.91	0.95	0.97	0.95			0.91	1.00
Frt				1.00	0.99	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1599	1504	3433	3539			5085	1583
Flt Permitted				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1599	1504	3433	3539			5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	510	5	270	546	961	0	0	790	378
RTOR Reduction (vph)	0	0	0	0	5	76	0	0	0	0	0	232
Lane Group Flow (vph)	0	0	0	270	267	167	546	961	0	0	790	146
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				24.2	24.2	24.2	20.8	64.6			38.6	38.6
Effective Green, g (s)				24.2	24.2	24.2	20.8	64.6			38.6	38.6
Actuated g/C Ratio				0.24	0.24	0.24	0.21	0.65			0.39	0.39
Clearance Time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				406	386	363	714	2286			1962	611
v/s Ratio Prot				0.16	c0.17		c0.16	c0.27			0.16	
v/s Ratio Perm						0.11						0.09
v/c Ratio				0.67	0.69	0.46	0.76	0.42			0.40	0.24
Uniform Delay, d1				34.2	34.5	32.3	37.3	8.6			22.3	20.8
Progression Factor				1.00	1.00	1.00	1.37	0.10			1.00	1.00
Incremental Delay, d2				4.1	5.3	0.9	4.0	0.5			0.6	0.9
Delay (s)				38.3	39.8	33.3	55.1	1.3			22.9	21.7
Level of Service				D	D	C	E	A			C	C
Approach Delay (s)		0.0			37.3			20.8			22.5	
Approach LOS		A			D			C			C	

Intersection Summary				
HCM 2000 Control Delay	25.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.60			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	71.9%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Nordahl Rd & SR 78 EB Ramps

Existing PM
7/20/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	343	56	471	0	0	0	0	1043	518	366	830	0
Future Volume (vph)	343	56	471	0	0	0	0	1043	518	366	830	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.6	
Lane Util. Factor	0.95	0.91	0.95					0.91	1.00	0.97	0.95	
Frt	1.00	0.90	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1515	1504					5085	1583	3433	3539	
Flt Permitted	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1681	1515	1504					5085	1583	3433	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	373	61	512	0	0	0	0	1134	563	398	902	0
RTOR Reduction (vph)	0	77	94	0	0	0	0	0	346	0	0	0
Lane Group Flow (vph)	328	239	208	0	0	0	0	1134	217	398	902	0
Turn Type	Split	NA	Perm					NA	Perm	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	27.0	27.0	27.0					38.5	38.5	18.1	61.8	
Effective Green, g (s)	27.0	27.0	27.0					38.5	38.5	18.1	61.8	
Actuated g/C Ratio	0.27	0.27	0.27					0.38	0.38	0.18	0.62	
Clearance Time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.6	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	453	409	406					1957	609	621	2187	
v/s Ratio Prot	c0.20	0.16						c0.22		c0.12	0.25	
v/s Ratio Perm			0.14						0.14			
v/c Ratio	0.72	0.58	0.51					0.58	0.36	0.64	0.41	
Uniform Delay, d1	33.1	31.6	30.9					24.3	21.9	37.9	9.8	
Progression Factor	1.00	1.00	1.00					0.51	0.44	1.08	1.24	
Incremental Delay, d2	5.7	2.1	1.1					1.0	1.2	2.1	0.5	
Delay (s)	38.8	33.7	32.0					13.4	10.9	43.2	12.7	
Level of Service	D	C	C					B	B	D	B	
Approach Delay (s)		34.9			0.0			12.6			22.0	
Approach LOS		C			A			B			C	

Intersection Summary				
HCM 2000 Control Delay	21.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.64			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	71.9%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: SR-78 EB Off Ramp & Nordahl Rd

4/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	296	1	303	0	0	0	0	1024	468	428	651	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.6	
Lane Util. Factor	0.95	0.91	0.95					0.95	0.88	0.97	0.95	
Frt	1.00	0.92	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1521	1504					3539	2787	3433	3539	
Flt Permitted	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1681	1521	1504					3539	2787	3433	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	322	1	329	0	0	0	0	1113	509	465	708	0
RTOR Reduction (vph)	0	53	165	0	0	0	0	0	273	0	0	0
Lane Group Flow (vph)	225	167	42	0	0	0	0	1113	236	465	708	0
Turn Type	Split		Perm						Perm	Prot		
Protected Phases	4	4						2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	20.4	20.4	20.4					46.4	46.4	16.8	68.4	
Effective Green, g (s)	20.4	20.4	20.4					46.4	46.4	16.8	68.4	
Actuated g/C Ratio	0.20	0.20	0.20					0.46	0.46	0.17	0.68	
Clearance Time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.6	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	343	310	307					1642	1293	577	2421	
v/s Ratio Prot	c0.13	0.11						c0.31		c0.14	0.20	
v/s Ratio Perm			0.03						0.08			
v/c Ratio	0.66	0.54	0.14					0.68	0.18	0.81	0.29	
Uniform Delay, d1	36.6	35.6	32.6					21.0	15.7	40.0	6.2	
Progression Factor	1.00	1.00	1.00					0.46	0.11	0.86	0.96	
Incremental Delay, d2	4.5	1.8	0.2					1.9	0.3	7.3	0.3	
Delay (s)	41.0	37.4	32.8					11.6	2.0	41.7	6.3	
Level of Service	D	D	C					B	A	D	A	
Approach Delay (s)		37.2			0.0			8.6			20.3	
Approach LOS		D			A			A			C	

Intersection Summary				
HCM Average Control Delay	18.0	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	72.4%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
6: Mission Rd & Nordahl Rd

4/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	321	622	323	22	334	331	371	851	49	112	407	259
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	
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)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	4788	
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)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	4788	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	349	676	351	24	363	360	403	925	53	122	442	282
RTOR Reduction (vph)	0	0	0	0	0	167	0	0	0	0	119	0
Lane Group Flow (vph)	349	676	351	24	363	193	403	925	53	122	605	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)	18.2	35.9	35.9	1.6	19.3	19.3	14.9	35.5	35.5	7.0	27.6	
Effective Green, g (s)	18.2	35.9	35.9	1.6	19.3	19.3	14.9	35.5	35.5	7.0	27.6	
Actuated g/C Ratio	0.18	0.36	0.36	0.02	0.19	0.19	0.15	0.36	0.36	0.07	0.28	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	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)	625	1271	568	55	683	306	512	1805	562	240	1321	
v/s Ratio Prot	c0.10	0.19		0.01	0.10		c0.12	c0.18		0.04	c0.13	
v/s Ratio Perm			c0.22			0.12			0.03			
v/c Ratio	0.56	0.53	0.62	0.44	0.53	0.63	0.79	0.51	0.09	0.51	0.46	
Uniform Delay, d1	37.2	25.4	26.4	48.8	36.3	37.1	41.0	25.4	21.5	44.8	30.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.79	0.67	
Incremental Delay, d2	1.1	0.4	2.0	5.5	0.8	4.2	7.8	1.0	0.3	1.6	1.1	
Delay (s)	38.3	25.8	28.4	54.2	37.1	41.3	48.9	26.5	21.9	37.2	21.1	
Level of Service	D	C	C	D	D	D	D	C	C	D	C	
Approach Delay (s)		29.7			39.6			32.8			23.4	
Approach LOS		C			D			C			C	

Intersection Summary				
HCM Average Control Delay	31.2	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.55			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	61.4%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
7: Country Club Dr & Auto Park Way

4/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	191	0	31	1	0	2	88	849	1	75	753	193
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		1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00		0.85	1.00	0.85		1.00	1.00		1.00	0.97	
Flt Protected	0.95		1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770		1583	1770	1583		1770	3539		1770	3431	
Flt Permitted	0.76		1.00	0.76	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1409		1583	1410	1583		1770	3539		1770	3431	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	208	0	34	1	0	2	96	923	1	82	818	210
RTOR Reduction (vph)	0	0	26	0	2	0	0	0	0	0	33	0
Lane Group Flow (vph)	208	0	8	1	0	0	96	924	0	82	995	0
Turn Type	Perm		Perm	Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)	12.9		12.9	12.9	12.9		6.2	28.3		4.1	26.2	
Effective Green, g (s)	12.9		12.9	12.9	12.9		6.2	28.3		4.1	26.2	
Actuated g/C Ratio	0.23		0.23	0.23	0.23		0.11	0.49		0.07	0.46	
Clearance Time (s)	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	
Lane Grp Cap (vph)	317		356	317	356		192	1748		127	1569	
v/s Ratio Prot					0.00		c0.05	0.26		0.05	c0.29	
v/s Ratio Perm	c0.15		0.00	0.00								
v/c Ratio	0.66		0.02	0.00	0.00		0.50	0.53		0.65	0.63	
Uniform Delay, d1	20.2		17.3	17.2	17.2		24.1	9.9		25.9	11.9	
Progression Factor	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.8		0.0	0.0	0.0		2.0	1.1		10.7	2.0	
Delay (s)	25.0		17.3	17.2	17.2		26.1	11.1		36.6	13.9	
Level of Service	C		B	B	B		C	B		D	B	
Approach Delay (s)		23.9			17.2			12.5			15.5	
Approach LOS		C			B			B			B	

Intersection Summary				
HCM Average Control Delay	15.1	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	57.3	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
8: W. 9th Ave & Valley Pkwy

4/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	309	10	163	178	65	27	641	164	97	745	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.91		1.00	0.91	
Frt	1.00	1.00		1.00	0.96		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3522		1770	3396		1770	4930		1770	4961	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3522		1770	3396		1770	4930		1770	4961	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	239	336	11	177	193	71	29	697	178	105	810	158
RTOR Reduction (vph)	0	3	0	0	51	0	0	43	0	0	26	0
Lane Group Flow (vph)	239	344	0	177	213	0	29	832	0	105	942	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	8.1	14.5		8.1	14.5		1.5	32.4		4.0	34.9	
Effective Green, g (s)	8.1	14.5		8.1	14.5		1.5	32.4		4.0	34.9	
Actuated g/C Ratio	0.10	0.18		0.10	0.18		0.02	0.41		0.05	0.44	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	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)	181	646		181	623		34	2022		90	2192	
v/s Ratio Prot	c0.14	c0.10		0.10	0.06		0.02	0.17		c0.06	c0.19	
v/s Ratio Perm												
v/c Ratio	1.32	0.53		0.98	0.34		0.85	0.41		1.17	0.43	
Uniform Delay, d1	35.5	29.2		35.4	28.1		38.6	16.5		37.5	15.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	177.5	0.8		59.8	0.3		95.5	0.6		146.6	0.6	
Delay (s)	212.9	30.0		95.1	28.4		134.2	17.2		184.1	15.8	
Level of Service	F	C		F	C		F	B		F	B	
Approach Delay (s)		104.6			55.2			20.9			32.3	
Approach LOS		F			E			C			C	

Intersection Summary				
HCM Average Control Delay	46.3	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.59			
Actuated Cycle Length (s)	79.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	57.3%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
9: Valley Pkwy & Auto Park Wy

4/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	222	661	43	102	660	219	103	267	149	402	681	214
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3349		3433	3412	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3349		3433	3412	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	241	718	47	111	717	238	112	290	162	437	740	233
RTOR Reduction (vph)	0	0	33	0	0	99	0	94	0	0	36	0
Lane Group Flow (vph)	241	718	14	111	717	139	112	358	0	437	937	0
Turn Type	Prot		Perm	Prot		pm+ov	Prot			Prot		
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	8.0	23.0	23.0	4.0	19.0	32.4	3.2	19.6		13.4	29.8	
Effective Green, g (s)	8.0	23.0	23.0	4.0	19.0	32.4	3.2	19.6		13.4	29.8	
Actuated g/C Ratio	0.10	0.29	0.29	0.05	0.24	0.40	0.04	0.25		0.17	0.37	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		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)	343	1462	455	172	1208	740	137	821		575	1271	
v/s Ratio Prot	c0.07	c0.14		0.03	c0.14	0.03	0.03	0.11		c0.13	c0.27	
v/s Ratio Perm			0.01			0.06						
v/c Ratio	0.70	0.49	0.03	0.65	0.59	0.19	0.82	0.44		0.76	0.74	
Uniform Delay, d1	34.8	23.6	20.5	37.3	27.1	15.3	38.1	25.5		31.8	21.7	
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	6.4	1.2	0.1	8.0	2.2	0.1	30.0	1.7		5.9	3.8	
Delay (s)	41.2	24.8	20.6	45.4	29.2	15.4	68.1	27.2		37.6	25.6	
Level of Service	D	C	C	D	C	B	E	C		D	C	
Approach Delay (s)		28.6			27.8			35.3			29.3	
Approach LOS		C			C			D			C	

Intersection Summary				
HCM Average Control Delay	29.6	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.72			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	64.7%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
10: Valley Pkwy & I-15 SB Ramps

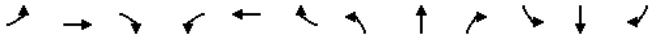
4/14/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	72	1215	97	221	459	348	24	60	269	225	100	369
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.6	5.5	5.5	5.5	5.5	5.5		5.5	
Lane Util. Factor	0.97	0.91	1.00	0.97	0.81	0.81	1.00	1.00	1.00		0.95	
Frt	1.00	1.00	0.85	1.00	0.96	0.85	1.00	1.00	0.85		0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	3433	5085	1583	3433	5787	1282	1770	1863	1583		3205	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	
Satd. Flow (perm)	3433	5085	1583	3433	5787	1282	1770	1863	1583		3205	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	1321	105	240	499	378	26	65	292	245	109	401
RTOR Reduction (vph)	0	0	71	0	56	121	0	0	240	0	172	0
Lane Group Flow (vph)	78	1321	34	240	632	68	26	65	52	0	583	0
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6			3			
Actuated Green, G (s)	4.0	35.3	35.3	11.1	43.0	43.0	16.5	16.5	16.5		36.0	
Effective Green, g (s)	4.0	35.3	35.3	11.1	43.0	43.0	16.5	16.5	16.5		36.0	
Actuated g/C Ratio	0.03	0.29	0.29	0.09	0.36	0.36	0.14	0.14	0.14		0.30	
Clearance Time (s)	4.0	5.5	5.5	4.6	5.5	5.5	5.5	5.5	5.5		5.5	
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)	114	1496	466	318	2074	459	243	256	218		962	
v/s Ratio Prot	0.02	c0.26		c0.07	0.11		0.01	c0.03			c0.18	
v/s Ratio Perm			0.02			0.05			0.03			
v/c Ratio	0.68	0.88	0.07	0.75	0.30	0.15	0.11	0.25	0.24		0.61	
Uniform Delay, d1	57.4	40.4	30.5	53.1	27.7	26.1	45.3	46.2	46.2		35.9	
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	15.7	7.9	0.3	9.8	0.4	0.7	0.9	2.4	2.6		2.8	
Delay (s)	73.0	48.3	30.8	62.9	28.1	26.8	46.2	48.6	48.7		38.8	
Level of Service	E	D	C	E	C	C	D	D	D		D	
Approach Delay (s)		48.3			35.4			48.5			38.8	
Approach LOS		D			D			D			D	

Intersection Summary				
HCM Average Control Delay	42.6	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.66			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.1	
Intersection Capacity Utilization	75.1%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
11: Valley Pkwy & I-15 NB Ramps

4/14/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	701	1008	0	0	863	339	165	0	386	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	5.5			5.5	5.5		4.6	4.6			
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			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	762	1096	0	0	938	368	179	0	420	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	272	0	0	52	0	0	0
Lane Group Flow (vph)	762	1096	0	0	938	96	0	179	368	0	0	0
Turn Type	Prot					Perm	Split		Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases						6			8			
Actuated Green, G (s)	27.0	58.5			27.3	27.3		36.4	36.4			
Effective Green, g (s)	27.0	58.5			27.3	27.3		36.4	36.4			
Actuated g/C Ratio	0.26	0.56			0.26	0.26		0.35	0.35			
Clearance Time (s)	4.2	5.5			5.5	5.5		4.6	4.6			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	883	1972			1322	412		614	549			
v/s Ratio Prot	c0.22	0.31			c0.18			0.10				
v/s Ratio Perm						0.06			c0.23			
v/c Ratio	0.86	0.56			0.71	0.23		0.29	0.67			
Uniform Delay, d1	37.2	14.9			35.3	30.6		24.9	29.2			
Progression Factor	1.00	1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2	8.7	1.1			3.2	1.3		1.2	6.4			
Delay (s)	46.0	16.1			38.5	31.9		26.1	35.6			
Level of Service	D	B			D	C		C	D			
Approach Delay (s)		28.3			36.6			32.7			0.0	
Approach LOS		C			D			C			A	

Intersection Summary				
HCM Average Control Delay	31.9	HCM Level of Service		C
HCM Volume to Capacity ratio	0.74			
Actuated Cycle Length (s)	105.0	Sum of lost time (s)		14.3
Intersection Capacity Utilization	62.0%	ICU Level of Service		B
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
12: Eden Valley Ln & Country Club Dr

4/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	16	2	6	105	72	17
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	2	7	114	78	18
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	215	88	97			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	215	88	97			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	100	100			
cM capacity (veh/h)	770	971	1497			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	20	121	97
Volume Left	17	7	0
Volume Right	2	0	18
cSH	788	1497	1700
Volume to Capacity	0.02	0.00	0.06
Queue Length 95th (ft)	2	0	0
Control Delay (s)	9.7	0.4	0.0
Lane LOS	A	A	
Approach Delay (s)	9.7	0.4	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	20.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
13: Kauana Loa Dr & Country Club Dr

4/14/2014

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	10	76	109	9	87	156
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	83	118	10	95	170

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	93	128	264
Volume Left (vph)	11	0	95
Volume Right (vph)	83	10	0
Hadj (s)	-0.47	-0.01	0.11
Departure Headway (s)	4.3	4.4	4.4
Degree Utilization, x	0.11	0.16	0.32
Capacity (veh/h)	763	789	798
Control Delay (s)	7.8	8.2	9.4
Approach Delay (s)	7.8	8.2	9.4
Approach LOS	A	A	A

Intersection Summary			
Delay	8.8		
HCM Level of Service	A		
Intersection Capacity Utilization	31.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
14: Mt. Whitney Rd & Country Club Dr

4/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	3	1	0	113	154	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	1	0	123	167	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				917		
pX, platoon unblocked						
vC, conflicting volume	296	173	178			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	296	173	178			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	695	871	1398			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	4	123	178
Volume Left	3	0	0
Volume Right	1	0	11
cSH	732	1398	1700
Volume to Capacity	0.01	0.00	0.10
Queue Length 95th (ft)	0	0	0
Control Delay (s)	9.9	0.0	0.0
Lane LOS	A		
Approach Delay (s)	9.9	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	18.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
15: New Access #1 & Country Club Dr

4/14/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	113	155	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	123	168	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				507		
pX, platoon unblocked						
vC, conflicting volume	291	168	168			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	291	168	168			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	699	876	1409			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	123	168
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1409	1700
Volume to Capacity	0.00	0.00	0.10
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		11.5%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
16: New Access #2 & Country Club Dr

4/14/2014

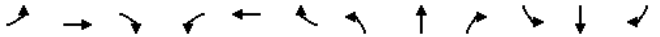
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	113	155	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	123	168	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				327		
pX, platoon unblocked						
vC, conflicting volume	291	168	168			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	291	168	168			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	699	876	1409			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	123	168
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1409	1700
Volume to Capacity	0.00	0.00	0.10
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		11.5%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Signalized Intersection Capacity Analysis
17: Harmony Grove Rd & Country Club Dr

4/14/2014

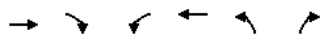


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	49	310	7	22	208	4	4	7	16	5	16	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00			0.92		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1770	1856		1770	1858			1704		1770	1634	
Flt Permitted	0.95	1.00		0.95	1.00			0.95		0.74	1.00	
Satd. Flow (perm)	1770	1856		1770	1858			1635		1375	1634	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	53	337	8	24	226	4	4	8	17	5	17	76
RTOR Reduction (vph)	0	1	0	0	1	0	0	13	0	0	60	0
Lane Group Flow (vph)	53	344	0	24	229	0	0	16	0	5	33	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	2.3	12.6		0.9	11.2			6.7		6.7	6.7	
Effective Green, g (s)	2.3	12.6		0.9	11.2			6.7		6.7	6.7	
Actuated g/C Ratio	0.07	0.39		0.03	0.35			0.21		0.21	0.21	
Clearance Time (s)	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	
Lane Grp Cap (vph)	126	726		49	646			340		286	340	
v/s Ratio Prot	c0.03	c0.19		0.01	0.12						c0.02	
v/s Ratio Perm								0.01		0.00		
v/c Ratio	0.42	0.47		0.49	0.36			0.05		0.02	0.10	
Uniform Delay, d1	14.3	7.3		15.4	7.8			10.2		10.1	10.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	2.3	0.5		7.5	0.3			0.1		0.0	0.1	
Delay (s)	16.6	7.8		22.9	8.1			10.2		10.2	10.4	
Level of Service	B	A		C	A			B		B	B	
Approach Delay (s)		9.0			9.5			10.2			10.4	
Approach LOS		A			A			B			B	

Intersection Summary				
HCM Average Control Delay	9.4	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.31			
Actuated Cycle Length (s)	32.2	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	35.2%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
18: Kauna Loa Dr & Harmony Grove Rd

4/14/2014



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	57	18	241	103	12	307
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	62	20	262	112	13	334
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				268		
pX, platoon unblocked						
vC, conflicting volume			82		708	72
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			82		708	72
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			83		96	66
cM capacity (veh/h)			1516		332	991

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	82	374	347
Volume Left	0	262	13
Volume Right	20	0	334
cSH	1700	1516	922
Volume to Capacity	0.05	0.17	0.38
Queue Length 95th (ft)	0	16	44
Control Delay (s)	0.0	5.9	11.2
Lane LOS		A	B
Approach Delay (s)	0.0	5.9	11.2
Approach LOS			B

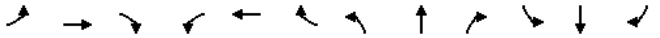
Intersection Summary				
Average Delay	7.6			
Intersection Capacity Utilization	51.8%	ICU Level of Service	A	
Analysis Period (min)	15			

APPENDIX G

PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS
EXISTING + PROJECT

HCM Signalized Intersection Capacity Analysis
1: S Twin Oaks Valley Rd & Discovery St/E Barham Dr

2/27/2015

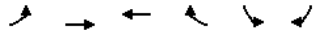


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	233	105	1	214	276	118	1	840	196	451	1190	396
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.91		1.00	1.00	1.00	1.00	0.91		0.97	0.91	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	5079		1770	1863	1583	1770	4941		3433	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	5079		1770	1863	1583	1770	4941		3433	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	253	114	1	233	300	128	1	913	213	490	1293	430
RTOR Reduction (vph)	0	1	0	0	0	99	0	48	0	0	0	243
Lane Group Flow (vph)	253	114	0	233	300	29	1	1078	0	490	1293	187
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	8.7	12.0		13.4	16.7	16.7	0.8	22.4		11.0	32.6	32.6
Effective Green, g (s)	8.7	12.0		13.4	16.7	16.7	0.8	22.4		11.0	32.6	32.6
Actuated g/C Ratio	0.12	0.16		0.18	0.22	0.22	0.01	0.30		0.15	0.44	0.44
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)	399	814		317	415	353	18	1479		504	2216	689
v/s Ratio Prot	0.07	0.02		c0.13	c0.16		0.00	c0.22		c0.14	0.25	
v/s Ratio Perm						0.02						0.12
v/c Ratio	0.63	0.14		0.74	0.72	0.08	0.06	0.73		0.97	0.58	0.27
Uniform Delay, d1	31.5	27.0		29.0	26.9	23.0	36.6	23.5		31.7	16.0	13.5
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	3.3	0.1		8.6	6.1	0.1	1.3	3.2		32.8	1.1	1.0
Delay (s)	34.8	27.0		37.6	33.0	23.1	37.9	26.7		64.6	17.1	14.5
Level of Service	C	C		D	C	C	D	C		E	B	B
Approach Delay (s)		32.4			32.7			26.7			27.1	
Approach LOS		C			C			C			C	

Intersection Summary					
HCM 2000 Control Delay	28.3	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.80				
Actuated Cycle Length (s)	74.8	Sum of lost time (s)	16.0		
Intersection Capacity Utilization	68.0%	ICU Level of Service	C		
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
2: Barham Dr & Woodland Pkwy

2/27/2015



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	399	495	393	186	235	517
Ideal Flow (vphpl)	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	1.00	1.00	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	1863	1863	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	434	538	427	202	255	562
RTOR Reduction (vph)	0	0	0	0	0	64
Lane Group Flow (vph)	434	538	427	202	255	498
Turn Type	Prot	NA	NA	pm+ov	Prot	pm+ov
Protected Phases	7	4	8	6	6	7
Permitted Phases				8		6
Actuated Green, G (s)	15.7	35.0	15.3	27.9	12.6	28.3
Effective Green, g (s)	15.7	35.0	15.3	27.9	12.6	28.3
Actuated g/C Ratio	0.28	0.63	0.28	0.50	0.23	0.51
Clearance Time (s)	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
Lane Grp Cap (vph)	499	1172	512	908	401	919
v/s Ratio Prot	c0.25	0.29	c0.23	0.05	c0.14	0.15
v/s Ratio Perm				0.08		0.16
v/c Ratio	0.87	0.46	0.83	0.22	0.64	0.54
Uniform Delay, d1	19.0	5.4	19.0	7.8	19.4	9.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.9	0.3	11.2	0.1	3.3	0.7
Delay (s)	33.9	5.7	30.1	7.9	22.7	9.9
Level of Service	C	A	C	A	C	A
Approach Delay (s)		18.3	23.0		13.9	
Approach LOS		B	C		B	

Intersection Summary					
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.79				
Actuated Cycle Length (s)	55.6	Sum of lost time (s)	12.0		
Intersection Capacity Utilization	65.8%	ICU Level of Service	C		
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
3: Barham Dr/Driveway & Mission Rd

2/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	550	37	396	523	0	17	0	187	6	2	1
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	1.00	0.95			1.00	0.88		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.97	
Satd. Flow (prot)	1770	3539	1583	1770	3539			1770	2787		1775	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539			1770	2787		1838	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	598	40	430	568	0	18	0	203	7	2	1
RTOR Reduction (vph)	0	0	31	0	0	0	0	0	156	0	1	0
Lane Group Flow (vph)	4	598	9	430	568	0	0	18	47	0	9	0
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8		2	2			6	
Permitted Phases			4						2	6		
Actuated Green, G (s)	0.7	16.7	16.7	25.4	41.4			18.1	18.1		1.2	
Effective Green, g (s)	0.7	16.7	16.7	25.4	41.4			18.1	18.1		1.2	
Actuated g/C Ratio	0.01	0.22	0.22	0.33	0.53			0.23	0.23		0.02	
Clearance Time (s)	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	
Lane Grp Cap (vph)	16	763	341	580	1892			413	651		28	
v/s Ratio Prot	0.00	c0.17		c0.24	0.16			0.01				
v/s Ratio Perm			0.01						c0.02		c0.00	
v/c Ratio	0.25	0.78	0.03	0.74	0.30			0.04	0.07		0.32	
Uniform Delay, d1	38.1	28.6	23.9	23.1	10.0			23.0	23.1		37.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	8.1	5.3	0.0	5.1	0.1			0.2	0.2		6.6	
Delay (s)	46.1	33.9	24.0	28.2	10.1			23.1	23.3		44.3	
Level of Service	D	C	C	C	B			C	C		D	
Approach Delay (s)		33.4			17.9			23.3			44.3	
Approach LOS		C			B			C			D	

Intersection Summary				
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.55			
Actuated Cycle Length (s)	77.4	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	52.7%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
4: Nordahl Rd & SR-78 WB On Ramp/SR-78 WB Off Ramp

2/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	337	2	211	487	368	0	0	422	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Lane Util. Factor				0.95	0.91	0.95	0.97	0.95			0.91	1.00
Frt				1.00	0.97	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1582	1504	3433	3539			5085	1583
Flt Permitted				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1582	1504	3433	3539			5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	366	2	229	529	400	0	0	459	337
RTOR Reduction (vph)	0	0	0	0	11	152	0	0	0	0	0	189
Lane Group Flow (vph)	0	0	0	205	193	36	529	400	0	0	459	148
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				18.9	18.9	18.9	20.8	69.9			43.9	43.9
Effective Green, g (s)				18.9	18.9	18.9	20.8	69.9			43.9	43.9
Actuated g/C Ratio				0.19	0.19	0.19	0.21	0.70			0.44	0.44
Clearance Time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				317	298	284	714	2473			2232	694
v/s Ratio Prot				c0.12	0.12		c0.15	0.11			0.09	
v/s Ratio Perm						0.02						c0.09
v/c Ratio				0.65	0.65	0.13	0.74	0.16			0.21	0.21
Uniform Delay, d1				37.5	37.5	33.7	37.1	5.1			17.3	17.4
Progression Factor				1.00	1.00	1.00	0.66	0.76			1.00	1.00
Incremental Delay, d2				4.5	4.8	0.2	3.9	0.1			0.2	0.7
Delay (s)				42.0	42.2	33.9	28.3	4.0			17.5	18.1
Level of Service				D	D	C	C	A			B	B
Approach Delay (s)		0.0			39.5			17.8			17.7	
Approach LOS		A			D			B			B	

Intersection Summary				
HCM 2000 Control Delay	23.4	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.44			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	58.3%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
4: SR 78 WB Ramps & Nordahl Rd

Existing+Project AM
7/20/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	467	7	145	418	487	0	0	561	297
Future Volume (vph)	0	0	0	467	7	145	418	487	0	0	561	297
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Lane Util. Factor				0.95	0.91	0.95	0.97	0.95			0.91	1.00
Frt				1.00	0.99	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1607	1504	3433	3539			5085	1583
Flt Permitted				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1607	1504	3433	3539			5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	508	8	158	454	529	0	0	610	323
RTOR Reduction (vph)	0	0	0	0	3	109	0	0	0	0	0	193
Lane Group Flow (vph)	0	0	0	269	260	33	454	529	0	0	610	130
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				23.4	23.4	23.4	19.8	65.4			40.4	40.4
Effective Green, g (s)				23.4	23.4	23.4	19.8	65.4			40.4	40.4
Actuated g/C Ratio				0.23	0.23	0.23	0.20	0.65			0.40	0.40
Clearance Time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				393	376	351	679	2314			2054	639
v/s Ratio Prot				0.16	c0.16		c0.13	0.15			c0.12	
v/s Ratio Perm						0.02						0.08
v/c Ratio				0.68	0.69	0.09	0.67	0.23			0.30	0.20
Uniform Delay, d1				34.9	35.0	30.0	37.1	7.0			20.2	19.4
Progression Factor				1.00	1.00	1.00	0.80	0.72			1.00	1.00
Incremental Delay, d2				4.9	5.4	0.1	2.4	0.2			0.4	0.7
Delay (s)				39.8	40.4	30.1	32.1	5.3			20.6	20.1
Level of Service				D	D	C	C	A			C	C
Approach Delay (s)		0.0			38.0			17.7			20.4	
Approach LOS		A			D			B			C	

Intersection Summary				
HCM 2000 Control Delay	23.9	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.50			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	65.8%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Nordahl Rd & SR 78 EB Ramps

Existing+Project AM
7/20/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	248	137	687	0	0	0	0	657	472	189	839	0
Future Volume (vph)	248	137	687	0	0	0	0	657	472	189	839	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.5	
Lane Util. Factor	0.95	0.91	0.95					0.91	1.00	0.97	0.95	
Frt	1.00	0.91	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1531	1504					5085	1583	3433	3539	
Flt Permitted	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1681	1531	1504					5085	1583	3433	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	270	149	747	0	0	0	0	714	513	205	912	0
RTOR Reduction (vph)	0	59	59	0	0	0	0	0	309	0	0	0
Lane Group Flow (vph)	243	416	389	0	0	0	0	714	204	205	912	0
Turn Type	Split	NA	Perm					NA	Perm	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	34.0	34.0	34.0					39.8	39.8	9.8	54.9	
Effective Green, g (s)	34.0	34.0	34.0					39.8	39.8	9.8	54.9	
Actuated g/C Ratio	0.34	0.34	0.34					0.40	0.40	0.10	0.55	
Clearance Time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.5	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	571	520	511					2023	630	336	1942	
v/s Ratio Prot	0.14	c0.27						0.14		c0.06	c0.26	
v/s Ratio Perm			0.26						0.13			
v/c Ratio	0.43	0.80	0.76					0.35	0.32	0.61	0.47	
Uniform Delay, d1	25.5	29.9	29.4					21.1	20.8	43.3	13.7	
Progression Factor	1.00	1.00	1.00					0.56	1.62	1.09	0.39	
Incremental Delay, d2	0.5	8.4	6.6					0.4	1.2	3.1	0.8	
Delay (s)	26.0	38.3	36.0					12.4	34.9	50.1	6.2	
Level of Service	C	D	D					B	C	D	A	
Approach Delay (s)		34.8			0.0			21.8			14.2	
Approach LOS		C			A			C			B	

Intersection Summary				
HCM 2000 Control Delay	23.7	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	65.8%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Nordahl Rd & SR-78 EB Off Ramp/SR-78 EB On Ramp

2/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	0	659	0	0	0	0	680	350	163	596	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.6	
Lane Util. Factor	0.95	0.91	0.95					0.95	0.88	0.97	0.95	
Frt	1.00	0.86	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1450	1504					3539	2787	3433	3539	
Flt Permitted	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1681	1450	1504					3539	2787	3433	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	190	0	716	0	0	0	0	739	380	177	648	0
RTOR Reduction (vph)	0	157	157	0	0	0	0	0	188	0	0	0
Lane Group Flow (vph)	171	213	208	0	0	0	0	739	192	177	648	0
Turn Type	Split	NA	Perm					NA	Perm	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	22.5	22.5	22.5					50.6	50.6	10.5	66.3	
Effective Green, g (s)	22.5	22.5	22.5					50.6	50.6	10.5	66.3	
Actuated g/C Ratio	0.22	0.22	0.22					0.51	0.51	0.10	0.66	
Clearance Time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.6	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	378	326	338					1790	1410	360	2346	
v/s Ratio Prot	0.10	c0.15						c0.21		c0.05	0.18	
v/s Ratio Perm			0.14						0.07			
v/c Ratio	0.45	0.65	0.61					0.41	0.14	0.49	0.28	
Uniform Delay, d1	33.4	35.2	34.8					15.4	13.1	42.2	7.0	
Progression Factor	1.00	1.00	1.00					0.42	0.76	0.57	1.68	
Incremental Delay, d2	0.9	4.6	3.3					0.6	0.2	1.0	0.3	
Delay (s)	34.3	39.8	38.1					7.2	10.1	25.0	12.0	
Level of Service	C	D	D					A	B	C	B	
Approach Delay (s)		38.1			0.0			8.2			14.8	
Approach LOS		D			A			A			B	

Intersection Summary				
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.49			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	58.3%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
6: Nordahl Rd & Mission Rd

2/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	245	331	167	83	498	149	348	645	49	265	682	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
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)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	4906	
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)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	4906	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	266	360	182	90	541	162	378	701	53	288	741	227
RTOR Reduction (vph)	0	0	0	0	0	126	0	0	0	0	52	0
Lane Group Flow (vph)	266	360	182	90	541	36	378	701	53	288	916	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	12.8	31.0	31.0	4.0	22.2	22.2	12.0	33.3	33.3	11.7	33.0	
Effective Green, g (s)	12.8	31.0	31.0	4.0	22.2	22.2	12.0	33.3	33.3	11.7	33.0	
Actuated g/C Ratio	0.13	0.31	0.31	0.04	0.22	0.22	0.12	0.33	0.33	0.12	0.33	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	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)	439	1097	490	137	785	351	411	1693	527	401	1618	
v/s Ratio Prot	c0.08	0.10		0.03	c0.15		c0.11	0.14		c0.08	c0.19	
v/s Ratio Perm			0.11			0.02			0.03			
v/c Ratio	0.61	0.33	0.37	0.66	0.69	0.10	0.92	0.41	0.10	0.72	0.57	
Uniform Delay, d1	41.2	26.5	26.9	47.3	35.7	31.0	43.5	25.8	23.0	42.6	27.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.90	0.62	
Incremental Delay, d2	2.4	0.2	0.5	10.8	2.5	0.1	25.3	0.7	0.4	5.6	1.3	
Delay (s)	43.6	26.7	27.4	58.1	38.3	31.1	68.8	26.6	23.4	43.9	18.4	
Level of Service	D	C	C	E	D	C	E	C	C	D	B	
Approach Delay (s)		32.4			39.1			40.5			24.3	
Approach LOS		C			D			D			C	

Intersection Summary				
HCM 2000 Control Delay	33.5	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.66			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	65.2%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
7: Auto Park Way & Country Club Dr/Driveway

2/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	335	1	49	0	4	3	167	722	3	43	890	200
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	1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85		0.94		1.00	1.00		1.00	0.97	
Flt Protected	0.95	1.00	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583		1743		1770	3537		1770	3442	
Flt Permitted	0.75	1.00	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1403	1863	1583		1743		1770	3537		1770	3442	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	364	1	53	0	4	3	182	785	3	47	967	217
RTOR Reduction (vph)	0	0	38	0	2	0	0	1	0	0	31	0
Lane Group Flow (vph)	364	1	15	0	5	0	182	787	0	47	1153	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)	17.2	17.2	17.2		17.2		8.6	28.4		2.9	22.7	
Effective Green, g (s)	17.2	17.2	17.2		17.2		8.6	28.4		2.9	22.7	
Actuated g/C Ratio	0.28	0.28	0.28		0.28		0.14	0.47		0.05	0.38	
Clearance Time (s)	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	
Lane Grp Cap (vph)	398	529	450		495		251	1660		84	1291	
v/s Ratio Prot		0.00			0.00		c0.10	0.22		0.03	c0.34	
v/s Ratio Perm	c0.26		0.01									
v/c Ratio	0.91	0.00	0.03		0.01		0.73	0.47		0.56	0.89	
Uniform Delay, d1	20.9	15.5	15.6		15.5		24.8	11.0		28.2	17.8	
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	25.1	0.0	0.0		0.0		9.9	1.0		7.9	9.7	
Delay (s)	46.0	15.5	15.7		15.5		34.8	11.9		36.0	27.5	
Level of Service	D	B	B		B		C	B		D	C	
Approach Delay (s)		42.1			15.5			16.2			27.8	
Approach LOS		D			B			B			C	

Intersection Summary				
HCM 2000 Control Delay	25.8	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.87			
Actuated Cycle Length (s)	60.5	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	75.5%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
8: Valley Pkwy & W. 9th Ave

2/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	176	229	6	108	238	160	17	560	127	84	867	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.91		1.00	0.91	
Frt	1.00	1.00		1.00	0.94		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3525		1770	3326		1770	4944		1770	4942	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3525		1770	3326		1770	4944		1770	4942	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	191	249	7	117	259	174	18	609	138	91	942	217
RTOR Reduction (vph)	0	2	0	0	143	0	0	34	0	0	32	0
Lane Group Flow (vph)	191	254	0	117	290	0	18	713	0	91	1127	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	6.1	13.6		6.1	13.6		0.7	33.6		4.0	36.9	
Effective Green, g (s)	6.1	13.6		6.1	13.6		0.7	33.6		4.0	36.9	
Actuated g/C Ratio	0.08	0.18		0.08	0.18		0.01	0.43		0.05	0.48	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	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)	139	620		139	585		16	2149		91	2359	
v/s Ratio Prot	c0.11	0.07		0.07	c0.09		0.01	0.14		c0.05	c0.23	
v/s Ratio Perm												
v/c Ratio	1.37	0.41		0.84	0.50		1.12	0.33		1.00	0.48	
Uniform Delay, d1	35.6	28.3		35.1	28.8		38.3	14.4		36.6	13.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	207.0	0.4		34.5	0.7		268.4	0.4		94.3	0.7	
Delay (s)	242.6	28.7		69.6	29.4		306.7	14.8		131.0	14.4	
Level of Service	F	C		E	C		F	B		F	B	
Approach Delay (s)		120.1			38.0			21.7			22.9	
Approach LOS		F			D			C			C	

Intersection Summary				
HCM 2000 Control Delay	39.8	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	77.3	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	62.7%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
9: Auto Park Wy & Valley Pkwy

2/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	261	592	42	124	770	408	77	567	31	127	346	299
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3511		3433	3293	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3511		3433	3293	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	284	643	46	135	837	443	84	616	34	138	376	325
RTOR Reduction (vph)	0	0	33	0	0	74	0	3	0	0	151	0
Lane Group Flow (vph)	284	643	13	135	837	369	84	647	0	138	550	0
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	12.2	28.2	28.2	7.8	21.8	32.3	3.2	35.5		10.5	42.8	
Effective Green, g (s)	12.2	28.2	28.2	7.8	21.8	32.3	3.2	35.5		10.5	42.8	
Actuated g/C Ratio	0.12	0.28	0.28	0.08	0.22	0.32	0.03	0.36		0.10	0.43	
Clearance Time (s)	5.0	5.0	5.0	3.0	5.0	5.0	5.0	5.0		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)	418	1433	446	267	1108	590	109	1246		360	1409	
v/s Ratio Prot	c0.08	0.13		0.04	c0.16	c0.07	0.02	c0.18		0.04	0.17	
v/s Ratio Perm			0.01			0.17						
v/c Ratio	0.68	0.45	0.03	0.51	0.76	0.63	0.77	0.52		0.38	0.39	
Uniform Delay, d1	42.0	29.5	26.0	44.2	36.6	28.7	48.0	25.5		41.7	19.6	
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	4.4	1.0	0.1	1.5	4.8	2.1	27.9	1.5		0.7	0.8	
Delay (s)	46.4	30.5	26.1	45.8	41.4	30.8	75.9	27.0		42.4	20.5	
Level of Service	D	C	C	D	D	C	E	C		D	C	
Approach Delay (s)		34.9			38.5			32.6			24.1	
Approach LOS		C			D			C			C	

Intersection Summary				
HCM 2000 Control Delay	33.5	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.64			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	61.9%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
10: Shopping Ctr Dwy/I-15 SB Ramps & Valley Pkwy

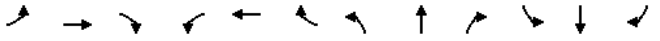
2/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	71	542	40	74	694	227	26	34	73	303	74	565
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.6	5.5	5.5	5.5	5.5	5.5		5.5	
Lane Util. Factor	0.97	0.91	1.00	0.97	0.81	0.81	1.00	1.00	1.00		0.95	
Frt	1.00	1.00	0.85	1.00	0.99	0.85	1.00	1.00	0.85		0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	3433	5085	1583	3433	5959	1282	1770	1863	1583		3170	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	
Satd. Flow (perm)	3433	5085	1583	3433	5959	1282	1770	1863	1583		3170	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	77	589	43	80	754	247	28	37	79	329	80	614
RTOR Reduction (vph)	0	0	32	0	11	125	0	0	68	0	228	0
Lane Group Flow (vph)	77	589	11	80	812	53	28	37	11	0	795	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6			3			
Actuated Green, G (s)	4.0	30.8	30.8	8.1	35.5	35.5	16.5	16.5	16.5		43.5	
Effective Green, g (s)	4.0	30.8	30.8	8.1	35.5	35.5	16.5	16.5	16.5		43.5	
Actuated g/C Ratio	0.03	0.26	0.26	0.07	0.30	0.30	0.14	0.14	0.14		0.36	
Clearance Time (s)	4.0	5.5	5.5	4.6	5.5	5.5	5.5	5.5	5.5		5.5	
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)	114	1305	406	231	1762	379	243	256	217		1149	
v/s Ratio Prot	c0.02	0.12		0.02	c0.14		0.02	c0.02			c0.25	
v/s Ratio Perm			0.01			0.04			0.01			
v/c Ratio	0.68	0.45	0.03	0.35	0.46	0.14	0.12	0.14	0.05		0.69	
Uniform Delay, d1	57.4	37.5	33.4	53.4	34.4	31.0	45.4	45.5	44.9		32.6	
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	14.7	1.1	0.1	0.9	0.9	0.8	1.0	1.2	0.4		3.4	
Delay (s)	72.0	38.6	33.5	54.3	35.3	31.8	46.3	46.7	45.4		36.0	
Level of Service	E	D	C	D	D	C	D	D	D		D	
Approach Delay (s)		41.9			36.1			45.9			36.0	
Approach LOS		D			D			D			D	

Intersection Summary				
HCM 2000 Control Delay	38.0	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.52			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.1	
Intersection Capacity Utilization	64.3%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
11: I-15 NB Ramps & Valley Pkwy

2/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	289	629	0	0	748	183	247	0	309	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	5.5			5.5	5.5		4.6	4.6			
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			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	314	684	0	0	813	199	268	0	336	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	134	0	0	114	0	0	0
Lane Group Flow (vph)	314	684	0	0	813	65	0	268	222	0	0	0
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases						6			8			
Actuated Green, G (s)	14.8	53.5			34.5	34.5		41.4	41.4			
Effective Green, g (s)	14.8	53.5			34.5	34.5		41.4	41.4			
Actuated g/C Ratio	0.14	0.51			0.33	0.33		0.39	0.39			
Clearance Time (s)	4.2	5.5			5.5	5.5		4.6	4.6			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	483	1803			1670	520		697	624			
v/s Ratio Prot	c0.09	0.19			c0.16			c0.15				
v/s Ratio Perm						0.04			0.14			
v/c Ratio	0.65	0.38			0.49	0.13		0.38	0.36			
Uniform Delay, d1	42.7	15.7			28.2	24.7		22.7	22.4			
Progression Factor	1.00	1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2	3.1	0.6			1.0	0.5		1.6	1.6			
Delay (s)	45.8	16.3			29.2	25.2		24.3	24.0			
Level of Service	D	B			C	C		C	C			
Approach Delay (s)		25.5			28.4			24.1			0.0	
Approach LOS		C			C			C			A	

Intersection Summary				
HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.47			
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	14.3	
Intersection Capacity Utilization	48.3%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
12: Country Club Dr & Eden Valley Ln

2/27/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	95	15	5	165	105	41
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	103	16	5	179	114	45
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	327	136	159			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	327	136	159			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	84	98	100			
cM capacity (veh/h)	665	912	1421			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	120	185	159
Volume Left	103	5	0
Volume Right	16	0	45
cSH	691	1421	1700
Volume to Capacity	0.17	0.00	0.09
Queue Length 95th (ft)	16	0	0
Control Delay (s)	11.3	0.3	0.0
Lane LOS	B	A	
Approach Delay (s)	11.3	0.3	0.0
Approach LOS	B		

Intersection Summary				
Average Delay	3.0			
Intersection Capacity Utilization	25.6%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
13: Country Club Dr & Kauana Loa Dr

2/27/2015

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	23	86	215	42	48	125
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	93	234	46	52	136

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	118	279	188
Volume Left (vph)	25	0	52
Volume Right (vph)	93	46	0
Hadj (s)	-0.40	-0.06	0.09
Departure Headway (s)	4.6	4.3	4.6
Degree Utilization, x	0.15	0.34	0.24
Capacity (veh/h)	719	803	752
Control Delay (s)	8.4	9.5	9.0
Approach Delay (s)	8.4	9.5	9.0
Approach LOS	A	A	A

Intersection Summary			
Delay	9.1		
Level of Service	A		
Intersection Capacity Utilization	39.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
14: Country Club Dr & Mt. Whitney Rd

2/27/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	82	14	5	161	116	36
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	89	15	5	175	126	39
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				917		
pX, platoon unblocked						
vC, conflicting volume	332	146	165			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	332	146	165			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	87	98	100			
cM capacity (veh/h)	661	901	1413			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	104	180	165
Volume Left	89	5	0
Volume Right	15	0	39
cSH	688	1413	1700
Volume to Capacity	0.15	0.00	0.10
Queue Length 95th (ft)	13	0	0
Control Delay (s)	11.2	0.3	0.0
Lane LOS	B	A	
Approach Delay (s)	11.2	0.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	24.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
15: Country Club Dr & New Access #1

2/27/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	22	2	1	144	121	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	2	1	157	132	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				507		
pX, platoon unblocked						
vC, conflicting volume	295	136	141			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	295	136	141			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	100	100			
cM capacity (veh/h)	695	912	1442			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	26	158	141
Volume Left	24	1	0
Volume Right	2	0	10
cSH	709	1442	1700
Volume to Capacity	0.04	0.00	0.08
Queue Length 95th (ft)	3	0	0
Control Delay (s)	10.3	0.1	0.0
Lane LOS	B	A	
Approach Delay (s)	10.3	0.1	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		0.9		
Intersection Capacity Utilization		18.4%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
16: Country Club Dr & New Access #2

2/27/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	22	4	1	123	114	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	4	1	134	124	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				307		
pX, platoon unblocked						
vC, conflicting volume	265	129	134			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	265	129	134			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	100	100			
cM capacity (veh/h)	724	921	1451			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	28	135	134
Volume Left	24	1	0
Volume Right	4	0	10
cSH	749	1451	1700
Volume to Capacity	0.04	0.00	0.08
Queue Length 95th (ft)	3	0	0
Control Delay (s)	10.0	0.1	0.0
Lane LOS	A	A	
Approach Delay (s)	10.0	0.1	0.0
Approach LOS	A		

Intersection Summary				
Average Delay		1.0		
Intersection Capacity Utilization		17.3%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Signalized Intersection Capacity Analysis
17: Country Club Dr & Harmony Grove Rd

2/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	202	6	8	252	3	5	12	23	1	9	45
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	
Lane Util. Factor	0.95	0.95		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00			0.92		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1681	1759		1770	1860			1707		1770	1631	
Flt Permitted	0.95	1.00		0.95	1.00			0.96		0.73	1.00	
Satd. Flow (perm)	1681	1755		1770	1860			1651		1358	1631	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	63	220	7	9	274	3	5	13	25	1	10	49
RTOR Reduction (vph)	0	0	0	0	0	0	0	22	0	0	44	0
Lane Group Flow (vph)	57	233	0	9	277	0	0	21	0	1	15	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	6.0	51.6		1.9	41.6			7.0		7.0	7.0	
Effective Green, g (s)	6.0	51.6		1.9	41.6			7.0		7.0	7.0	
Actuated g/C Ratio	0.09	0.77		0.03	0.62			0.11		0.11	0.11	
Clearance Time (s)	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	
Lane Grp Cap (vph)	151	1360		50	1161			173		142	171	
v/s Ratio Prot	c0.03	0.02		0.01	c0.15						0.01	
v/s Ratio Perm		0.12						c0.01		0.00		
v/c Ratio	0.38	0.17		0.18	0.24			0.12		0.01	0.09	
Uniform Delay, d1	28.5	1.9		31.6	5.5			27.0		26.7	26.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	1.6	0.1		1.7	0.1			0.3		0.0	0.2	
Delay (s)	30.1	2.0		33.3	5.6			27.3		26.7	27.1	
Level of Service	C	A		C	A			C		C	C	
Approach Delay (s)		7.5			6.5			27.3			27.1	
Approach LOS		A			A			C			C	

Intersection Summary				
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.24			
Actuated Cycle Length (s)	66.6	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	40.8%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
18: Harmony Grove Rd & Kauna Loa Dr

2/27/2015

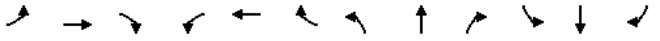
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	119	10	261	89	14	237
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	129	11	284	97	15	258
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				268		
pX, platoon unblocked						
vC, conflicting volume			140		799	135
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			140		799	135
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			80		95	72
cM capacity (veh/h)			1443		285	914

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	140	380	273
Volume Left	0	284	15
Volume Right	11	0	258
cSH	1700	1443	814
Volume to Capacity	0.08	0.20	0.34
Queue Length 95th (ft)	0	18	37
Control Delay (s)	0.0	6.5	11.6
Lane LOS		A	B
Approach Delay (s)	0.0	6.5	11.6
Approach LOS			B

Intersection Summary			
Average Delay	7.1		
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
1: S Twin Oaks Valley Rd & Discovery St/E Barham Dr

2/25/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	542	438	3	262	252	462	8	1268	448	286	922	430
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	0.91		1.00	1.00	1.00	1.00	0.91		0.97	0.91	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	5081		1770	1863	1583	1770	4886		3433	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	5081		1770	1863	1583	1770	4886		3433	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	589	476	3	285	274	502	9	1378	487	311	1002	467
RTOR Reduction (vph)	0	1	0	0	0	138	0	62	0	0	0	248
Lane Group Flow (vph)	589	478	0	285	274	364	9	1803	0	311	1002	219
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	17.0	19.2		18.8	21.0	21.0	0.8	40.2		9.0	48.4	48.4
Effective Green, g (s)	17.0	19.2		18.8	21.0	21.0	0.8	40.2		9.0	48.4	48.4
Actuated g/C Ratio	0.16	0.19		0.18	0.20	0.20	0.01	0.39		0.09	0.47	0.47
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)	565	945		322	379	322	13	1903		299	2384	742
v/s Ratio Prot	c0.17	0.09		0.16	0.15		0.01	c0.37		c0.09	0.20	
v/s Ratio Perm						c0.23						0.14
v/c Ratio	1.04	0.51		0.89	0.72	1.13	0.69	0.95		1.04	0.42	0.30
Uniform Delay, d1	43.1	37.7		41.1	38.4	41.1	51.1	30.5		47.1	18.1	16.9
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	49.4	0.4		23.8	6.7	90.4	96.3	11.5		62.9	0.5	1.0
Delay (s)	92.5	38.2		65.0	45.1	131.5	147.4	42.0		110.0	18.7	17.9
Level of Service	F	D		E	D	F	F	D		F	B	B
Approach Delay (s)		68.1			91.3			42.5			34.4	
Approach LOS		E			F			D			C	

Intersection Summary					
HCM 2000 Control Delay	53.7	HCM 2000 Level of Service	D		
HCM 2000 Volume to Capacity ratio	1.02				
Actuated Cycle Length (s)	103.2	Sum of lost time (s)	16.0		
Intersection Capacity Utilization	88.6%	ICU Level of Service	E		
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
2: Barham Dr & Woodland Pkwy

2/25/2015

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	413	779	203	253	449	282
Ideal Flow (vphpl)	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	1.00	1.00	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	1863	1863	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	449	847	221	275	488	307
RTOR Reduction (vph)	0	0	0	0	0	118
Lane Group Flow (vph)	449	847	221	275	488	189
Turn Type	Prot	NA	NA	pm+ov	Prot	pm+ov
Protected Phases	7	4	8	6	6	7
Permitted Phases				8		6
Actuated Green, G (s)	19.0	35.6	12.6	33.2	20.6	39.6
Effective Green, g (s)	19.0	35.6	12.6	33.2	20.6	39.6
Actuated g/C Ratio	0.30	0.55	0.20	0.52	0.32	0.62
Clearance Time (s)	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
Lane Grp Cap (vph)	523	1033	365	917	567	1075
v/s Ratio Prot	0.25	c0.45	0.12	0.10	c0.28	0.05
v/s Ratio Perm				0.08		0.07
v/c Ratio	0.86	0.82	0.61	0.30	0.86	0.18
Uniform Delay, d1	21.3	11.7	23.5	8.9	20.5	5.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.2	5.2	2.8	0.2	12.7	0.1
Delay (s)	34.5	16.9	26.4	9.0	33.1	5.4
Level of Service	C	B	C	A	C	A
Approach Delay (s)		23.0	16.8		22.4	
Approach LOS		C	B		C	

Intersection Summary					
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.90				
Actuated Cycle Length (s)	64.2	Sum of lost time (s)	12.0		
Intersection Capacity Utilization	72.5%	ICU Level of Service	C		
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
3: Barham Dr/Driveway & Mission Rd

2/25/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	844	21	320	734	1	43	1	443	11	1	0
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	
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	0.88		1.00	
Frt		1.00	0.85	1.00	1.00			1.00	0.85		1.00	
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00		0.96	
Satd. Flow (prot)		3539	1583	1770	3539			1776	2787		1781	
Flt Permitted		1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (perm)		3539	1583	1770	3539			1776	2787		1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	917	23	348	798	1	47	1	482	12	1	0
RTOR Reduction (vph)	0	0	16	0	0	0	0	0	367	0	0	0
Lane Group Flow (vph)	0	917	7	348	799	0	0	48	115	0	13	0
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8		2	2			6	
Permitted Phases			4						2	6		
Actuated Green, G (s)		23.1	23.1	17.1	44.2			18.1	18.1		1.3	
Effective Green, g (s)		23.1	23.1	17.1	44.2			18.1	18.1		1.3	
Actuated g/C Ratio		0.31	0.31	0.23	0.58			0.24	0.24		0.02	
Clearance Time (s)		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	
Lane Grp Cap (vph)		1081	483	400	2069			425	667		32	
v/s Ratio Prot		c0.26		c0.20	0.23			0.03				
v/s Ratio Perm			0.00						c0.04		c0.01	
v/c Ratio		0.85	0.01	0.87	0.39			0.11	0.17		0.41	
Uniform Delay, d1		24.6	18.3	28.2	8.4			22.5	22.8		36.8	
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		6.3	0.0	17.9	0.1			0.5	0.6		8.2	
Delay (s)		30.9	18.3	46.1	8.5			23.0	23.4		45.0	
Level of Service		C	B	D	A			C	C		D	
Approach Delay (s)		30.6			19.9			23.3			45.0	
Approach LOS		C			B			C			D	

Intersection Summary				
HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.64			
Actuated Cycle Length (s)	75.6	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	58.4%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
4: Nordahl Rd & SR-78 WB On Ramp/SR-78 WB Off Ramp

2/25/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	428	8	506	570	772	0	0	741	455
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Lane Util. Factor				0.95	0.91	0.95	0.97	0.95			0.91	1.00
Frt				1.00	0.90	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.98	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1504	1504	3433	3539			5085	1583
Flt Permitted				0.95	0.98	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1504	1504	3433	3539			5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	465	9	550	620	839	0	0	805	495
RTOR Reduction (vph)	0	0	0	0	77	99	0	0	0	0	0	330
Lane Group Flow (vph)	0	0	0	358	265	225	620	839	0	0	805	165
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				29.0	29.0	29.0	21.3	59.8			33.3	33.3
Effective Green, g (s)				29.0	29.0	29.0	21.3	59.8			33.3	33.3
Actuated g/C Ratio				0.29	0.29	0.29	0.21	0.60			0.33	0.33
Clearance Time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				487	436	436	731	2116			1693	527
v/s Ratio Prot				c0.21	0.18		c0.18	0.24			c0.16	
v/s Ratio Perm						0.15						0.10
v/c Ratio				0.74	0.61	0.52	0.85	0.40			0.48	0.31
Uniform Delay, d1				32.0	30.6	29.6	37.8	10.6			26.4	24.8
Progression Factor				1.00	1.00	1.00	1.03	0.24			1.00	1.00
Incremental Delay, d2				5.7	2.4	1.0	7.0	0.4			1.0	1.5
Delay (s)				37.7	33.0	30.7	46.1	2.9			27.4	26.4
Level of Service				D	C	C	D	A			C	C
Approach Delay (s)		0.0			33.9			21.3			27.0	
Approach LOS		A			C			C			C	

Intersection Summary				
HCM 2000 Control Delay	26.7	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.66			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	75.3%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
4: SR 78 WB Ramps & Nordahl Rd

Existing+Project PM
7/20/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	554	5	248	522	886	0	0	732	348
Future Volume (vph)	0	0	0	554	5	248	522	886	0	0	732	348
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Lane Util. Factor				0.95	0.91	0.95	0.97	0.95			0.91	1.00
Frt				1.00	0.99	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1601	1504	3433	3539			5085	1583
Flt Permitted				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1601	1504	3433	3539			5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	602	5	270	567	963	0	0	796	378
RTOR Reduction (vph)	0	0	0	0	4	73	0	0	0	0	0	243
Lane Group Flow (vph)	0	0	0	319	311	170	567	963	0	0	796	135
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				26.9	26.9	26.9	21.1	61.9			35.6	35.6
Effective Green, g (s)				26.9	26.9	26.9	21.1	61.9			35.6	35.6
Actuated g/C Ratio				0.27	0.27	0.27	0.21	0.62			0.36	0.36
Clearance Time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				452	430	404	724	2190			1810	563
v/s Ratio Prot				0.19	c0.19		c0.17	c0.27			0.16	
v/s Ratio Perm						0.11						0.08
v/c Ratio				0.71	0.72	0.42	0.78	0.44			0.44	0.24
Uniform Delay, d1				33.0	33.2	30.1	37.3	10.0			24.6	22.7
Progression Factor				1.00	1.00	1.00	1.41	0.13			1.00	1.00
Incremental Delay, d2				5.0	6.0	0.7	4.6	0.5			0.8	1.0
Delay (s)				38.0	39.1	30.8	57.2	1.9			25.4	23.7
Level of Service				D	D	C	E	A			C	C
Approach Delay (s)		0.0			36.4			22.4			24.8	
Approach LOS		A			D			C			C	

Intersection Summary				
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	74.8%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Nordahl Rd & SR 78 EB Ramps

Existing+Project PM
7/20/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	343	56	518	0	0	0	0	1065	556	366	920	0
Future Volume (vph)	343	56	518	0	0	0	0	1065	556	366	920	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.6	
Lane Util. Factor	0.95	0.91	0.95					0.91	1.00	0.97	0.95	
Frt	1.00	0.89	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1507	1504					5085	1583	3433	3539	
Flt Permitted	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1681	1507	1504					5085	1583	3433	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	373	61	563	0	0	0	0	1158	604	398	1000	0
RTOR Reduction (vph)	0	73	73	0	0	0	0	0	358	0	0	0
Lane Group Flow (vph)	336	261	254	0	0	0	0	1158	246	398	1000	0
Turn Type	Split	NA	Perm					NA	Perm	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	27.3	27.3	27.3					39.5	39.5	16.8	61.5	
Effective Green, g (s)	27.3	27.3	27.3					39.5	39.5	16.8	61.5	
Actuated g/C Ratio	0.27	0.27	0.27					0.40	0.40	0.17	0.62	
Clearance Time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.6	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	458	411	410					2008	625	576	2176	
v/s Ratio Prot	c0.20	0.17						c0.23		c0.12	0.28	
v/s Ratio Perm			0.17						0.16			
v/c Ratio	0.73	0.63	0.62					0.58	0.39	0.69	0.46	
Uniform Delay, d1	33.0	32.0	31.8					23.7	21.7	39.2	10.3	
Progression Factor	1.00	1.00	1.00					0.50	0.55	1.11	1.31	
Incremental Delay, d2	6.0	3.2	2.8					0.9	1.4	3.2	0.6	
Delay (s)	39.0	35.1	34.6					12.8	13.4	46.5	14.2	
Level of Service	D	D	C					B	B	D	B	
Approach Delay (s)		36.3			0.0			13.0			23.4	
Approach LOS		D			A			B			C	

Intersection Summary				
HCM 2000 Control Delay	22.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.65			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	74.8%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Nordahl Rd & SR-78 EB Off Ramp/SR-78 EB On Ramp

2/25/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	296	1	350	0	0	0	0	1046	506	428	741	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.6	
Lane Util. Factor	0.95	0.91	0.95					0.95	0.88	0.97	0.95	
Frt	1.00	0.90	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1501	1504					3539	2787	3433	3539	
Flt Permitted	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1681	1501	1504					3539	2787	3433	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	322	1	380	0	0	0	0	1137	550	465	805	0
RTOR Reduction (vph)	0	84	129	0	0	0	0	0	301	0	0	0
Lane Group Flow (vph)	245	150	95	0	0	0	0	1137	249	465	805	0
Turn Type	Split	NA	Perm					NA	Perm	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	21.6	21.6	21.6					45.2	45.2	16.8	67.2	
Effective Green, g (s)	21.6	21.6	21.6					45.2	45.2	16.8	67.2	
Actuated g/C Ratio	0.22	0.22	0.22					0.45	0.45	0.17	0.67	
Clearance Time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.6	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	363	324	324					1599	1259	576	2378	
v/s Ratio Prot	c0.15	0.10						c0.32		c0.14	0.23	
v/s Ratio Perm			0.06						0.09			
v/c Ratio	0.67	0.46	0.29					0.71	0.20	0.81	0.34	
Uniform Delay, d1	36.0	34.2	32.8					22.1	16.5	40.0	7.0	
Progression Factor	1.00	1.00	1.00					0.51	0.21	0.90	1.04	
Incremental Delay, d2	4.9	1.1	0.5					2.3	0.3	7.1	0.3	
Delay (s)	40.9	35.2	33.3					13.5	3.8	43.2	7.6	
Level of Service	D	D	C					B	A	D	A	
Approach Delay (s)		36.6			0.0			10.4			20.6	
Approach LOS		D			A			B			C	

Intersection Summary				
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.72			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	75.3%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
6: Nordahl Rd & Mission Rd

2/25/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	321	622	355	32	334	331	385	911	52	112	544	259
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
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)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	4839	
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)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	4839	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	349	676	386	35	363	360	418	990	57	122	591	282
RTOR Reduction (vph)	0	0	0	0	0	195	0	0	0	0	88	0
Lane Group Flow (vph)	349	676	386	35	363	165	418	990	57	122	785	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	18.5	34.4	34.4	2.8	18.7	18.7	14.7	35.8	35.8	7.0	28.1	
Effective Green, g (s)	18.5	34.4	34.4	2.8	18.7	18.7	14.7	35.8	35.8	7.0	28.1	
Actuated g/C Ratio	0.18	0.34	0.34	0.03	0.19	0.19	0.15	0.36	0.36	0.07	0.28	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	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)	635	1217	544	96	661	296	504	1820	566	240	1359	
v/s Ratio Prot	c0.10	0.19		0.01	0.10		c0.12	0.19		0.04	c0.16	
v/s Ratio Perm			c0.24			0.10			0.04			
v/c Ratio	0.55	0.56	0.71	0.36	0.55	0.56	0.83	0.54	0.10	0.51	0.58	
Uniform Delay, d1	37.0	26.6	28.5	47.7	36.8	36.9	41.4	25.6	21.4	44.8	30.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.81	0.71	
Incremental Delay, d2	1.0	0.6	4.2	2.3	0.9	2.3	10.8	1.2	0.4	1.6	1.7	
Delay (s)	37.9	27.2	32.7	50.1	37.8	39.2	52.3	26.8	21.7	37.8	23.5	
Level of Service	D	C	C	D	D	D	D	C	C	D	C	
Approach Delay (s)		31.3			39.0			33.8			25.2	
Approach LOS		C			D			C			C	

Intersection Summary				
HCM 2000 Control Delay	32.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	64.5%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
7: Auto Park Way & Country Club Dr/Driveway

2/25/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	268	0	35	1	0	2	97	849	1	75	753	372
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		1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00		0.85	1.00	0.85		1.00	1.00		1.00	0.95	
Flt Protected	0.95		1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770		1583	1770	1583		1770	3539		1770	3364	
Flt Permitted	0.76		1.00	0.76	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1409		1583	1410	1583		1770	3539		1770	3364	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	291	0	38	1	0	2	105	923	1	82	818	404
RTOR Reduction (vph)	0	0	28	0	1	0	0	0	0	0	91	0
Lane Group Flow (vph)	291	0	10	1	1	0	105	924	0	82	1131	0
Turn Type	Perm		Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)	15.3		15.3	15.3	15.3		6.1	27.2		4.0	25.1	
Effective Green, g (s)	15.3		15.3	15.3	15.3		6.1	27.2		4.0	25.1	
Actuated g/C Ratio	0.26		0.26	0.26	0.26		0.10	0.46		0.07	0.43	
Clearance Time (s)	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	
Lane Grp Cap (vph)	368		414	368	414		184	1645		121	1443	
v/s Ratio Prot					0.00		c0.06	0.26		0.05	c0.34	
v/s Ratio Perm	c0.21		0.01	0.00								
v/c Ratio	0.79		0.02	0.00	0.00		0.57	0.56		0.68	0.78	
Uniform Delay, d1	20.1		16.1	16.0	16.0		25.0	11.3		26.6	14.4	
Progression Factor	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.0		0.0	0.0	0.0		4.2	1.4		14.0	4.3	
Delay (s)	31.1		16.1	16.0	16.0		29.2	12.7		40.7	18.7	
Level of Service	C		B	B	B		C	B		D	B	
Approach Delay (s)		29.4			16.0			14.4			20.1	
Approach LOS		C			B			B			C	

Intersection Summary				
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.75			
Actuated Cycle Length (s)	58.5	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	69.6%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
8: Valley Pkwy & W. 9th Ave

2/25/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	223	320	10	163	202	65	27	641	164	97	745	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.91		1.00	0.91	
Frt	1.00	1.00		1.00	0.96		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3523		1770	3410		1770	4930		1770	4954	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3523		1770	3410		1770	4930		1770	4954	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	242	348	11	177	220	71	29	697	178	105	810	168
RTOR Reduction (vph)	0	3	0	0	42	0	0	43	0	0	29	0
Lane Group Flow (vph)	242	356	0	177	249	0	29	832	0	105	949	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	8.1	14.7		8.1	14.7		1.5	32.4		4.0	34.9	
Effective Green, g (s)	8.1	14.7		8.1	14.7		1.5	32.4		4.0	34.9	
Actuated g/C Ratio	0.10	0.19		0.10	0.19		0.02	0.41		0.05	0.44	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	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)	181	653		181	632		33	2016		89	2183	
v/s Ratio Prot	c0.14	c0.10		0.10	0.07		0.02	0.17		c0.06	c0.19	
v/s Ratio Perm												
v/c Ratio	1.34	0.54		0.98	0.39		0.88	0.41		1.18	0.43	
Uniform Delay, d1	35.6	29.2		35.5	28.3		38.8	16.6		37.6	15.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	184.1	0.9		59.8	0.4		106.2	0.6		151.7	0.6	
Delay (s)	219.7	30.2		95.2	28.7		145.0	17.3		189.3	16.0	
Level of Service	F	C		F	C		F	B		F	B	
Approach Delay (s)		106.5			53.9			21.4			32.8	
Approach LOS		F			D			C			C	

Intersection Summary				
HCM 2000 Control Delay	47.1	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.65			
Actuated Cycle Length (s)	79.2	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	58.1%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
9: Auto Park Wy & Valley Pkwy

2/25/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	222	664	43	102	670	229	103	269	149	406	682	214
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3350		3433	3412	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3350		3433	3412	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	241	722	47	111	728	249	112	292	162	441	741	233
RTOR Reduction (vph)	0	0	33	0	0	98	0	92	0	0	36	0
Lane Group Flow (vph)	241	722	14	111	728	151	112	362	0	441	938	0
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	8.0	23.0	23.0	4.0	19.0	32.4	3.2	19.6		13.4	29.8	
Effective Green, g (s)	8.0	23.0	23.0	4.0	19.0	32.4	3.2	19.6		13.4	29.8	
Actuated g/C Ratio	0.10	0.29	0.29	0.05	0.24	0.40	0.04	0.25		0.17	0.37	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		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)	343	1461	455	171	1207	740	137	820		575	1270	
v/s Ratio Prot	c0.07	c0.14		0.03	c0.14	0.03	0.03	0.11		c0.13	c0.27	
v/s Ratio Perm			0.01			0.06						
v/c Ratio	0.70	0.49	0.03	0.65	0.60	0.20	0.82	0.44		0.77	0.74	
Uniform Delay, d1	34.8	23.7	20.5	37.3	27.1	15.4	38.1	25.6		31.8	21.7	
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	6.4	1.2	0.1	8.2	2.2	0.1	30.0	1.7		6.1	3.9	
Delay (s)	41.2	24.9	20.6	45.5	29.4	15.6	68.1	27.3		37.9	25.6	
Level of Service	D	C	C	D	C	B	E	C		D	C	
Approach Delay (s)		28.6			27.9			35.4			29.4	
Approach LOS		C			C			D			C	

Intersection Summary				
HCM 2000 Control Delay	29.6	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.72			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	65.0%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
10: Shopping Ctr Dwy/I-15 SB Ramps & Valley Pkwy

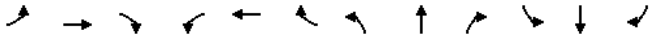
2/25/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	76	1218	97	221	479	348	24	60	269	226	100	369
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.6	5.5	5.5	5.5	5.5	5.5		5.5	
Lane Util. Factor	0.97	0.91	1.00	0.97	0.81	0.81	1.00	1.00	1.00		0.95	
Frt	1.00	1.00	0.85	1.00	0.96	0.85	1.00	1.00	0.85		0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	3433	5085	1583	3433	5794	1282	1770	1863	1583		3205	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	
Satd. Flow (perm)	3433	5085	1583	3433	5794	1282	1770	1863	1583		3205	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	83	1324	105	240	521	378	26	65	292	246	109	401
RTOR Reduction (vph)	0	0	74	0	54	121	0	0	239	0	169	0
Lane Group Flow (vph)	83	1324	31	240	656	68	26	65	53	0	587	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6			3			
Actuated Green, G (s)	4.0	35.3	35.3	11.1	43.0	43.0	16.5	16.5	16.5		36.0	
Effective Green, g (s)	4.0	35.3	35.3	11.1	43.0	43.0	16.5	16.5	16.5		36.0	
Actuated g/C Ratio	0.03	0.29	0.29	0.09	0.36	0.36	0.14	0.14	0.14		0.30	
Clearance Time (s)	4.0	5.5	5.5	4.6	5.5	5.5	5.5	5.5	5.5		5.5	
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)	114	1495	465	317	2076	459	243	256	217		961	
v/s Ratio Prot	0.02	c0.26		c0.07	0.11		0.01	c0.03			c0.18	
v/s Ratio Perm			0.02			0.05			0.03			
v/c Ratio	0.73	0.89	0.07	0.76	0.32	0.15	0.11	0.25	0.24		0.61	
Uniform Delay, d1	57.5	40.4	30.5	53.1	27.9	26.1	45.3	46.2	46.2		36.0	
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	20.6	8.1	0.3	9.9	0.4	0.7	0.9	2.4	2.7		2.9	
Delay (s)	78.0	48.5	30.8	63.0	28.3	26.8	46.2	48.6	48.9		38.9	
Level of Service	E	D	C	E	C	C	D	D	D		D	
Approach Delay (s)		48.9			35.3			48.6			38.9	
Approach LOS		D			D			D			D	

Intersection Summary				
HCM 2000 Control Delay	42.8	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.67			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.1	
Intersection Capacity Utilization	75.2%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
11: I-15 NB Ramps & Valley Pkwy

2/25/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	701	1012	0	0	871	342	177	0	386	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	5.5			5.5	5.5		4.6	4.6			
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			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	762	1100	0	0	947	372	192	0	420	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	275	0	0	52	0	0	0
Lane Group Flow (vph)	762	1100	0	0	947	97	0	192	368	0	0	0
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases						6			8			
Actuated Green, G (s)	27.0	58.5			27.3	27.3		36.4	36.4			
Effective Green, g (s)	27.0	58.5			27.3	27.3		36.4	36.4			
Actuated g/C Ratio	0.26	0.56			0.26	0.26		0.35	0.35			
Clearance Time (s)	4.2	5.5			5.5	5.5		4.6	4.6			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	882	1971			1322	411		613	548			
v/s Ratio Prot	c0.22	0.31			c0.19			0.11				
v/s Ratio Perm						0.06			c0.23			
v/c Ratio	0.86	0.56			0.72	0.24		0.31	0.67			
Uniform Delay, d1	37.2	14.9			35.3	30.6		25.1	29.2			
Progression Factor	1.00	1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2	8.8	1.1			3.4	1.3		1.3	6.5			
Delay (s)	46.0	16.1			38.7	32.0		26.5	35.7			
Level of Service	D	B			D	C		C	D			
Approach Delay (s)		28.3			36.8			32.8			0.0	
Approach LOS		C			D			C			A	

Intersection Summary				
HCM 2000 Control Delay	32.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.74			
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	14.3	
Intersection Capacity Utilization	62.9%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
12: Country Club Dr & Eden Valley Ln

2/25/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	55	7	18	147	171	106
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	8	20	160	186	115
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	442	243	301			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	442	243	301			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	99	98			
cM capacity (veh/h)	564	795	1260			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	67	179	301
Volume Left	60	20	0
Volume Right	8	0	115
cSH	583	1260	1700
Volume to Capacity	0.12	0.02	0.18
Queue Length 95th (ft)	10	1	0
Control Delay (s)	12.0	1.0	0.0
Lane LOS	B	A	
Approach Delay (s)	12.0	1.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	33.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
13: Country Club Dr & Kauana Loa Dr

2/25/2015

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	51	81	158	27	90	257
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	55	88	172	29	98	279

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	143	201	377
Volume Left (vph)	55	0	98
Volume Right (vph)	88	29	0
Hadj (s)	-0.26	-0.05	0.09
Departure Headway (s)	5.0	4.7	4.6
Degree Utilization, x	0.20	0.26	0.48
Capacity (veh/h)	653	736	755
Control Delay (s)	9.2	9.3	11.8
Approach Delay (s)	9.2	9.3	11.8
Approach LOS	A	A	B

Intersection Summary			
Delay	10.6		
Level of Service	B		
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
14: Country Club Dr & Mt. Whitney Rd

2/25/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	41	7	14	142	209	97
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	45	8	15	154	227	105
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				917		
pX, platoon unblocked						
vC, conflicting volume	465	280	333			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	465	280	333			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	99	99			
cM capacity (veh/h)	549	759	1227			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	52	170	333
Volume Left	45	15	0
Volume Right	8	0	105
cSH	572	1227	1700
Volume to Capacity	0.09	0.01	0.20
Queue Length 95th (ft)	7	1	0
Control Delay (s)	11.9	0.8	0.0
Lane LOS	B	A	
Approach Delay (s)	11.9	0.8	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	29.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
15: Country Club Dr & New Access #1

2/25/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	11	1	3	145	189	27
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	1	3	158	205	29
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				507		
pX, platoon unblocked						
vC, conflicting volume	384	220	235			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	384	220	235			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	100	100			
cM capacity (veh/h)	617	820	1333			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	13	161	235
Volume Left	12	3	0
Volume Right	1	0	29
cSH	630	1333	1700
Volume to Capacity	0.02	0.00	0.14
Queue Length 95th (ft)	2	0	0
Control Delay (s)	10.8	0.2	0.0
Lane LOS	B	A	
Approach Delay (s)	10.8	0.2	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		0.4		
Intersection Capacity Utilization		21.6%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
16: Country Club Dr & New Access #2

2/25/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	11	2	5	137	164	26
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	2	5	149	178	28
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				327		
pX, platoon unblocked						
vC, conflicting volume	352	192	207			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	352	192	207			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	100	100			
cM capacity (veh/h)	643	849	1365			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	14	154	207
Volume Left	12	5	0
Volume Right	2	0	28
cSH	668	1365	1700
Volume to Capacity	0.02	0.00	0.12
Queue Length 95th (ft)	2	0	0
Control Delay (s)	10.5	0.3	0.0
Lane LOS	B	A	
Approach Delay (s)	10.5	0.3	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		0.5		
Intersection Capacity Utilization		21.3%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Signalized Intersection Capacity Analysis
17: Country Club Dr & Harmony Grove Rd

2/25/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	310	7	22	208	4	4	7	16	5	16	77
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	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00			0.92		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1770	1856		1770	1858			1704		1770	1630	
Flt Permitted	0.95	1.00		0.95	1.00			0.95		0.74	1.00	
Satd. Flow (perm)	1770	1856		1770	1858			1635		1375	1630	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	337	8	24	226	4	4	8	17	5	17	84
RTOR Reduction (vph)	0	1	0	0	1	0	0	13	0	0	66	0
Lane Group Flow (vph)	71	344	0	24	229	0	0	16	0	5	35	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	2.4	12.8		1.0	11.4			6.8		6.8	6.8	
Effective Green, g (s)	2.4	12.8		1.0	11.4			6.8		6.8	6.8	
Actuated g/C Ratio	0.07	0.39		0.03	0.35			0.21		0.21	0.21	
Clearance Time (s)	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	
Lane Grp Cap (vph)	130	728		54	649			341		286	340	
v/s Ratio Prot	c0.04	c0.19		0.01	0.12						c0.02	
v/s Ratio Perm								0.01		0.00		
v/c Ratio	0.55	0.47		0.44	0.35			0.05		0.02	0.10	
Uniform Delay, d1	14.6	7.4		15.5	7.9			10.3		10.2	10.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	4.6	0.5		5.7	0.3			0.1		0.0	0.1	
Delay (s)	19.2	7.9		21.3	8.2			10.4		10.3	10.6	
Level of Service	B	A		C	A			B		B	B	
Approach Delay (s)		9.8			9.4			10.4			10.5	
Approach LOS		A			A			B			B	

Intersection Summary				
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.39			
Actuated Cycle Length (s)	32.6	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	35.7%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
18: Harmony Grove Rd & Kauna Loa Dr

2/25/2015

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	78	18	241	149	12	307
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	85	20	262	162	13	334
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				268		
pX, platoon unblocked						
vC, conflicting volume			104		780	95
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			104		780	95
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			82		96	65
cM capacity (veh/h)			1487		300	962

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	104	424	347
Volume Left	0	262	13
Volume Right	20	0	334
cSH	1700	1487	888
Volume to Capacity	0.06	0.18	0.39
Queue Length 95th (ft)	0	16	47
Control Delay (s)	0.0	5.5	11.6
Lane LOS		A	B
Approach Delay (s)	0.0	5.5	11.6
Approach LOS			B

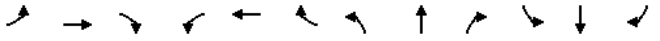
Intersection Summary				
Average Delay	7.3			
Intersection Capacity Utilization	54.2%	ICU Level of Service	A	
Analysis Period (min)	15			

APPENDIX H

PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS
EXISTING + CUMULATIVE PROJECTS

HCM Signalized Intersection Capacity Analysis
1: S Twin Oaks Valley Rd & Discovery St/E Barham Dr

2/18/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	340	310	60	240	790	330	70	1050	300	630	1440	670
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	0.91		1.00	1.00	1.00	1.00	0.91		0.97	0.91	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	4962		1770	1863	1583	1770	4916		3433	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	4962		1770	1863	1583	1770	4916		3433	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	370	337	65	261	859	359	76	1141	326	685	1565	728
RTOR Reduction (vph)	0	20	0	0	0	118	0	37	0	0	0	148
Lane Group Flow (vph)	370	382	0	261	859	241	76	1430	0	685	1565	580
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	11.0	38.8		25.2	53.0	53.0	8.0	39.0		21.0	52.0	52.0
Effective Green, g (s)	11.0	38.8		25.2	53.0	53.0	8.0	39.0		21.0	52.0	52.0
Actuated g/C Ratio	0.08	0.28		0.18	0.38	0.38	0.06	0.28		0.15	0.37	0.37
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)	269	1375		318	705	599	101	1369		514	1888	587
v/s Ratio Prot	c0.11	0.08		0.15	c0.46		0.04	c0.29		c0.20	0.31	
v/s Ratio Perm						0.15						0.37
v/c Ratio	1.38	0.28		0.82	1.22	0.40	0.75	1.04		1.33	0.83	0.99
Uniform Delay, d1	64.5	39.6		55.2	43.5	31.9	65.0	50.5		59.5	40.0	43.7
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	190.7	0.1		15.5	110.9	0.4	26.7	36.9		162.6	4.4	34.2
Delay (s)	255.2	39.7		70.7	154.4	32.3	91.7	87.4		222.1	44.3	77.9
Level of Service	F	D		E	F	C	F	F		F	D	E
Approach Delay (s)		143.0			110.0			87.6			93.4	
Approach LOS		F			F			F			F	

Intersection Summary					
HCM 2000 Control Delay	101.4	HCM 2000 Level of Service		F	
HCM 2000 Volume to Capacity ratio	1.20				
Actuated Cycle Length (s)	140.0	Sum of lost time (s)		16.0	
Intersection Capacity Utilization	109.6%	ICU Level of Service		H	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
2: Barham Dr & Woodland Pkwy

2/18/2015

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	710	840	695	210	300	790
Ideal Flow (vphpl)	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	1.00	1.00	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	1863	1863	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	772	913	755	228	326	859
RTOR Reduction (vph)	0	0	0	0	0	28
Lane Group Flow (vph)	772	913	755	228	326	831
Turn Type	Prot	NA	NA	pm+ov	Prot	pm+ov
Protected Phases	7	4	8	6	6	7
Permitted Phases				8		6
Actuated Green, G (s)	49.0	99.0	46.0	69.0	23.0	72.0
Effective Green, g (s)	49.0	99.0	46.0	69.0	23.0	72.0
Actuated g/C Ratio	0.38	0.76	0.35	0.53	0.18	0.55
Clearance Time (s)	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
Lane Grp Cap (vph)	667	1418	659	888	313	925
v/s Ratio Prot	c0.44	0.49	c0.41	0.05	c0.18	0.34
v/s Ratio Perm				0.10		0.19
v/c Ratio	1.16	0.64	1.15	0.26	1.04	0.90
Uniform Delay, d1	40.5	7.3	42.0	16.6	53.5	25.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	87.0	1.0	82.6	0.2	62.1	11.3
Delay (s)	127.5	8.3	124.6	16.7	115.6	37.1
Level of Service	F	A	F	B	F	D
Approach Delay (s)		62.9	99.6		58.7	
Approach LOS		E	F		E	

Intersection Summary					
HCM 2000 Control Delay	71.0	HCM 2000 Level of Service		E	
HCM 2000 Volume to Capacity ratio	1.13				
Actuated Cycle Length (s)	130.0	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	102.5%	ICU Level of Service		G	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
3: Barham Dr/Driveway & Mission Rd

2/18/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	689	150	450	707	20	30	10	244	30	10	10
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	1.00	0.95			1.00	0.88		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.97	
Satd. Flow (prot)	1770	3539	1583	1770	3524			1795	2787		1760	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.79	
Satd. Flow (perm)	1770	3539	1583	1770	3524			1795	2787		1433	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	749	163	489	768	22	33	11	265	33	11	11
RTOR Reduction (vph)	0	0	123	0	2	0	0	0	210	0	10	0
Lane Group Flow (vph)	11	749	40	489	788	0	0	44	55	0	45	0
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8		2	2			6	
Permitted Phases			4						2	6		
Actuated Green, G (s)	0.7	22.8	22.8	28.4	50.5			19.2	19.2		6.9	
Effective Green, g (s)	0.7	22.8	22.8	28.4	50.5			19.2	19.2		6.9	
Actuated g/C Ratio	0.01	0.24	0.24	0.30	0.54			0.21	0.21		0.07	
Clearance Time (s)	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	
Lane Grp Cap (vph)	13	864	386	538	1907			369	573		105	
v/s Ratio Prot	0.01	c0.21		c0.28	0.22			c0.02				
v/s Ratio Perm			0.03						0.02		c0.03	
v/c Ratio	0.85	0.87	0.10	0.91	0.41			0.12	0.10		0.43	
Uniform Delay, d1	46.2	33.8	27.3	31.2	12.6			30.2	30.0		41.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	166.4	9.1	0.1	19.1	0.1			0.7	0.3		2.8	
Delay (s)	212.7	42.9	27.4	50.3	12.8			30.8	30.3		44.1	
Level of Service	F	D	C	D	B			C	C		D	
Approach Delay (s)		42.2			27.1			30.4			44.1	
Approach LOS		D			C			C			D	

Intersection Summary				
HCM 2000 Control Delay	33.3	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.66			
Actuated Cycle Length (s)	93.3	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	63.4%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
4: Nordahl Rd & SR-78 WB On Ramp/SR-78 WB Off Ramp

2/18/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	385	5	270	568	540	0	0	615	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Lane Util. Factor				0.95	0.91	0.95	0.97	0.95			0.91	1.00
Frt				1.00	0.96	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.97	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1570	1504	3433	3539			5085	1583
Flt Permitted				0.95	0.97	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1570	1504	3433	3539			5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	418	5	293	617	587	0	0	668	402
RTOR Reduction (vph)	0	0	0	0	17	177	0	0	0	0	0	238
Lane Group Flow (vph)	0	0	0	247	226	49	617	587	0	0	668	164
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				21.9	21.9	21.9	20.8	66.9			40.9	40.9
Effective Green, g (s)				21.9	21.9	21.9	20.8	66.9			40.9	40.9
Actuated g/C Ratio				0.22	0.22	0.22	0.21	0.67			0.41	0.41
Clearance Time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				368	343	329	714	2367			2079	647
v/s Ratio Prot				c0.15	0.14		c0.18	0.17			c0.13	
v/s Ratio Perm						0.03						0.10
v/c Ratio				0.67	0.66	0.15	0.86	0.25			0.32	0.25
Uniform Delay, d1				35.8	35.6	31.5	38.2	6.6			20.1	19.5
Progression Factor				1.00	1.00	1.00	0.67	1.03			1.00	1.00
Incremental Delay, d2				4.8	4.5	0.2	8.7	0.2			0.4	0.9
Delay (s)				40.5	40.2	31.8	34.3	6.9			20.5	20.4
Level of Service				D	D	C	C	A			C	C
Approach Delay (s)		0.0			37.6			21.0			20.5	
Approach LOS		A			D			C			C	

Intersection Summary				
HCM 2000 Control Delay	24.8	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.55			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	66.3%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
4: SR 78 WB Ramps & Nordahl Rd

Existing+Cumulatives AM
7/20/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	481	10	270	586	571	0	0	612	370
Future Volume (vph)	0	0	0	481	10	270	586	571	0	0	612	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Lane Util. Factor				0.95	0.91	0.95	0.97	0.95			0.91	1.00
Frt				1.00	0.98	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1595	1504	3433	3539			5085	1583
Flt Permitted				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1595	1504	3433	3539			5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	523	11	293	637	621	0	0	665	402
RTOR Reduction (vph)	0	0	0	0	7	168	0	0	0	0	0	247
Lane Group Flow (vph)	0	0	0	288	277	87	637	621	0	0	665	155
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				25.3	25.3	25.3	19.8	63.5			38.5	38.5
Effective Green, g (s)				25.3	25.3	25.3	19.8	63.5			38.5	38.5
Actuated g/C Ratio				0.25	0.25	0.25	0.20	0.64			0.38	0.38
Clearance Time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				425	403	380	679	2247			1957	609
v/s Ratio Prot				0.17	c0.17		c0.19	0.18			c0.13	
v/s Ratio Perm						0.06						0.10
v/c Ratio				0.68	0.69	0.23	0.94	0.28			0.34	0.25
Uniform Delay, d1				33.7	33.8	29.6	39.5	8.1			21.8	21.0
Progression Factor				1.00	1.00	1.00	0.64	0.38			1.00	1.00
Incremental Delay, d2				4.3	4.8	0.3	18.8	0.3			0.5	1.0
Delay (s)				37.9	38.6	29.9	44.2	3.4			22.2	22.0
Level of Service				D	D	C	D	A			C	C
Approach Delay (s)		0.0			35.7			24.0			22.1	
Approach LOS		A			D			C			C	

Intersection Summary				
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.59			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	69.6%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Nordahl Rd & SR 78 EB Ramps

Existing+Cumulatives AM
7/20/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	265	140	718	0	0	0	0	892	431	220	873	0
Future Volume (vph)	265	140	718	0	0	0	0	892	431	220	873	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.5	
Lane Util. Factor	0.95	0.91	0.95					0.91	1.00	0.97	0.95	
Frt	1.00	0.91	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1530	1504					5085	1583	3433	3539	
Flt Permitted	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1681	1530	1504					5085	1583	3433	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	288	152	780	0	0	0	0	970	468	239	949	0
RTOR Reduction (vph)	0	46	54	0	0	0	0	0	299	0	0	0
Lane Group Flow (vph)	259	447	414	0	0	0	0	970	169	239	949	0
Turn Type	Split	NA	Perm					NA	Perm	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	36.4	36.4	36.4					36.1	36.1	11.1	52.5	
Effective Green, g (s)	36.4	36.4	36.4					36.1	36.1	11.1	52.5	
Actuated g/C Ratio	0.36	0.36	0.36					0.36	0.36	0.11	0.52	
Clearance Time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.5	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	611	556	547					1835	571	381	1857	
v/s Ratio Prot	0.15	c0.29						0.19		0.07	c0.27	
v/s Ratio Perm			0.28						0.11			
v/c Ratio	0.42	0.80	0.76					0.53	0.30	0.63	0.51	
Uniform Delay, d1	23.9	28.6	27.9					25.2	22.9	42.5	15.4	
Progression Factor	1.00	1.00	1.00					0.54	1.08	1.09	0.36	
Incremental Delay, d2	0.5	8.3	5.9					0.9	1.1	3.0	0.9	
Delay (s)	24.4	36.9	33.8					14.5	25.7	49.3	6.6	
Level of Service	C	D	C					B	C	D	A	
Approach Delay (s)		33.1			0.0			18.2			15.2	
Approach LOS		C			A			B			B	

Intersection Summary				
HCM 2000 Control Delay	22.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.67			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	69.6%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Nordahl Rd & SR-78 EB Off Ramp/SR-78 EB On Ramp

2/18/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	0	726	0	0	0	0	918	382	220	780	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.6	
Lane Util. Factor	0.95	0.91	0.95					0.95	0.88	0.97	0.95	
Frt	1.00	0.86	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1450	1504					3539	2787	3433	3539	
Flt Permitted	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1681	1450	1504					3539	2787	3433	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	207	0	789	0	0	0	0	998	415	239	848	0
RTOR Reduction (vph)	0	83	83	0	0	0	0	0	238	0	0	0
Lane Group Flow (vph)	186	325	319	0	0	0	0	998	177	239	848	0
Turn Type	Split	NA	Perm					NA	Perm	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	29.3	29.3	29.3					42.7	42.7	11.6	59.5	
Effective Green, g (s)	29.3	29.3	29.3					42.7	42.7	11.6	59.5	
Actuated g/C Ratio	0.29	0.29	0.29					0.43	0.43	0.12	0.60	
Clearance Time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.6	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	492	424	440					1511	1190	398	2105	
v/s Ratio Prot	0.11	c0.22						c0.28		c0.07	0.24	
v/s Ratio Perm			0.21						0.06			
v/c Ratio	0.38	0.77	0.72					0.66	0.15	0.60	0.40	
Uniform Delay, d1	28.1	32.2	31.7					22.9	17.5	42.0	10.8	
Progression Factor	1.00	1.00	1.00					0.47	0.89	0.56	1.40	
Incremental Delay, d2	0.5	8.0	5.8					1.9	0.2	2.4	0.5	
Delay (s)	28.6	40.3	37.5					12.6	15.8	25.9	15.6	
Level of Service	C	D	D					B	B	C	B	
Approach Delay (s)		37.0			0.0			13.5			17.9	
Approach LOS		D			A			B			B	

Intersection Summary				
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.69			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	66.3%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
6: Nordahl Rd & Mission Rd

2/18/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	340	420	203	100	640	190	427	760	50	350	856	290
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
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)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	4892	
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)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	4892	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	370	457	221	109	696	207	464	826	54	380	930	315
RTOR Reduction (vph)	0	0	0	0	0	153	0	0	0	0	61	0
Lane Group Flow (vph)	370	457	221	109	696	54	464	826	54	380	1184	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	12.8	34.0	34.0	5.0	26.2	26.2	12.0	30.0	30.0	11.0	29.0	
Effective Green, g (s)	12.8	34.0	34.0	5.0	26.2	26.2	12.0	30.0	30.0	11.0	29.0	
Actuated g/C Ratio	0.13	0.34	0.34	0.05	0.26	0.26	0.12	0.30	0.30	0.11	0.29	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	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)	439	1203	538	171	927	414	411	1525	474	377	1418	
v/s Ratio Prot	c0.11	0.13		0.03	c0.20		c0.14	0.16		0.11	c0.24	
v/s Ratio Perm			0.14			0.03			0.03			
v/c Ratio	0.84	0.38	0.41	0.64	0.75	0.13	1.13	0.54	0.11	1.01	0.83	
Uniform Delay, d1	42.6	25.0	25.3	46.6	33.9	28.2	44.0	29.3	25.4	44.5	33.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.02	0.69	
Incremental Delay, d2	13.7	0.2	0.5	7.6	3.5	0.1	84.4	1.4	0.5	45.2	5.2	
Delay (s)	56.3	25.2	25.8	54.2	37.4	28.3	128.4	30.6	25.9	90.5	28.3	
Level of Service	E	C	C	D	D	C	F	C	C	F	C	
Approach Delay (s)		36.3			37.3			64.2			42.8	
Approach LOS		D			D			E			D	

Intersection Summary				
HCM 2000 Control Delay	46.1	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.85			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	79.3%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
7: Auto Park Way & Country Club Dr/Driveway

2/18/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	262	5	50	5	5	5	180	855	5	50	1042	177
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	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1723		1770	3536		1770	3462	
Flt Permitted	0.75	1.00	1.00	0.75	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1399	1863	1583	1405	1723		1770	3536		1770	3462	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	285	5	54	5	5	5	196	929	5	54	1133	192
RTOR Reduction (vph)	0	0	43	0	4	0	0	0	0	0	14	0
Lane Group Flow (vph)	285	5	11	5	6	0	196	934	0	54	1311	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)	18.0	18.0	18.0	18.0	18.0		14.1	53.7		5.5	45.1	
Effective Green, g (s)	18.0	18.0	18.0	18.0	18.0		14.1	53.7		5.5	45.1	
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20		0.16	0.60		0.06	0.51	
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)	282	375	319	283	347		279	2128		109	1750	
v/s Ratio Prot		0.00			0.00		c0.11	0.26		0.03	c0.38	
v/s Ratio Perm	c0.20		0.01	0.00								
v/c Ratio	1.01	0.01	0.03	0.02	0.02		0.70	0.44		0.50	0.75	
Uniform Delay, d1	35.6	28.5	28.6	28.5	28.5		35.6	9.6		40.5	17.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	56.3	0.0	0.0	0.0	0.0		7.8	0.7		3.5	3.0	
Delay (s)	91.9	28.5	28.7	28.5	28.5		43.3	10.3		44.0	20.5	
Level of Service	F	C	C	C	C		D	B		D	C	
Approach Delay (s)		81.1			28.5			16.0			21.5	
Approach LOS		F			C			B			C	

Intersection Summary				
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.80			
Actuated Cycle Length (s)	89.2	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	75.6%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
8: Valley Pkwy & W. 9th Ave

2/18/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	225	303	10	155	321	240	20	738	183	120	1075	262
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.91		1.00	0.91	
Frt	1.00	1.00		1.00	0.94		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3522		1770	3312		1770	4934		1770	4936	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3522		1770	3312		1770	4934		1770	4936	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	245	329	11	168	349	261	22	802	199	130	1168	285
RTOR Reduction (vph)	0	2	0	0	109	0	0	39	0	0	36	0
Lane Group Flow (vph)	245	338	0	168	501	0	22	962	0	130	1417	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	13.0	21.3		11.5	19.8		1.5	35.3		5.0	38.8	
Effective Green, g (s)	13.0	21.3		11.5	19.8		1.5	35.3		5.0	38.8	
Actuated g/C Ratio	0.14	0.23		0.12	0.21		0.02	0.38		0.05	0.42	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	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)	247	805		218	704		28	1870		95	2057	
v/s Ratio Prot	c0.14	0.10		0.09	c0.15		0.01	0.19		c0.07	c0.29	
v/s Ratio Perm												
v/c Ratio	0.99	0.42		0.77	0.71		0.79	0.51		1.37	0.69	
Uniform Delay, d1	40.0	30.6		39.5	34.0		45.6	22.3		44.0	22.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	54.8	0.4		15.4	3.4		82.7	1.0		219.1	1.9	
Delay (s)	94.8	31.0		54.9	37.4		128.4	23.3		263.1	24.1	
Level of Service	F	C		D	D		F	C		F	C	
Approach Delay (s)		57.7			41.2			25.6			43.7	
Approach LOS		E			D			C			D	

Intersection Summary				
HCM 2000 Control Delay	40.6	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.81			
Actuated Cycle Length (s)	93.1	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	75.7%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
9: Auto Park Wy & Valley Pkwy

2/18/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	703	50	150	912	560	100	788	40	170	465	430
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3514		3433	3284	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3514		3433	3284	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	326	764	54	163	991	609	109	857	43	185	505	467
RTOR Reduction (vph)	0	0	38	0	0	68	0	4	0	0	166	0
Lane Group Flow (vph)	326	764	16	163	991	541	109	896	0	185	806	0
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	12.6	29.1	29.1	7.9	22.4	37.9	5.0	29.5		15.5	40.0	
Effective Green, g (s)	12.6	29.1	29.1	7.9	22.4	37.9	5.0	29.5		15.5	40.0	
Actuated g/C Ratio	0.13	0.29	0.29	0.08	0.22	0.38	0.05	0.29		0.16	0.40	
Clearance Time (s)	5.0	5.0	5.0	3.0	5.0	5.0	5.0	5.0		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)	432	1479	460	271	1139	679	171	1036		532	1313	
v/s Ratio Prot	c0.09	0.15		0.05	0.19	c0.12	0.03	c0.26		0.05	0.25	
v/s Ratio Perm			0.01			0.22						
v/c Ratio	0.75	0.52	0.03	0.60	0.87	0.80	0.64	0.87		0.35	0.61	
Uniform Delay, d1	42.2	29.6	25.4	44.5	37.4	27.6	46.6	33.4		37.7	23.9	
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	7.3	1.3	0.1	3.7	9.1	6.5	7.6	9.6		0.4	2.2	
Delay (s)	49.5	30.9	25.5	48.3	46.5	34.1	54.2	43.0		38.1	26.0	
Level of Service	D	C	C	D	D	C	D	D		D	C	
Approach Delay (s)		35.9			42.4			44.2			27.9	
Approach LOS		D			D			D			C	

Intersection Summary					
HCM 2000 Control Delay	38.0	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	0.87				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		20.0	
Intersection Capacity Utilization	78.8%	ICU Level of Service		D	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
10: Shopping Ctr Dwy/I-15 SB Ramps & Valley Pkwy

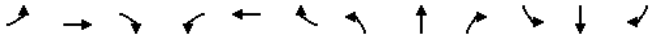
2/18/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	102	753	53	90	952	270	31	40	90	350	80	652
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.6	5.5	5.5	5.5	5.5	5.5		5.5	
Lane Util. Factor	0.97	0.91	1.00	0.97	0.81	0.81	1.00	1.00	1.00		0.95	
Frt	1.00	1.00	0.85	1.00	0.99	0.85	1.00	1.00	0.85		0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	3433	5085	1583	3433	5986	1282	1770	1863	1583		3168	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	
Satd. Flow (perm)	3433	5085	1583	3433	5986	1282	1770	1863	1583		3168	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	111	818	58	98	1035	293	34	43	98	380	87	709
RTOR Reduction (vph)	0	0	44	0	6	156	0	0	85	0	229	0
Lane Group Flow (vph)	111	818	14	98	1088	78	34	43	13	0	947	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6			3			
Actuated Green, G (s)	5.0	28.8	28.8	10.1	34.5	34.5	16.5	16.5	16.5		43.5	
Effective Green, g (s)	5.0	28.8	28.8	10.1	34.5	34.5	16.5	16.5	16.5		43.5	
Actuated g/C Ratio	0.04	0.24	0.24	0.08	0.29	0.29	0.14	0.14	0.14		0.36	
Clearance Time (s)	4.0	5.5	5.5	4.6	5.5	5.5	5.5	5.5	5.5		5.5	
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)	143	1220	379	288	1720	368	243	256	217		1148	
v/s Ratio Prot	c0.03	0.16		0.03	c0.18		0.02	c0.02			c0.30	
v/s Ratio Perm			0.01			0.06			0.01			
v/c Ratio	0.78	0.67	0.04	0.34	0.63	0.21	0.14	0.17	0.06		0.83	
Uniform Delay, d1	56.9	41.3	35.0	51.8	37.2	32.4	45.5	45.7	45.0		34.8	
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	22.7	2.9	0.2	0.7	1.8	1.3	1.2	1.4	0.5		6.8	
Delay (s)	79.7	44.2	35.1	52.5	39.0	33.7	46.7	47.1	45.6		41.6	
Level of Service	E	D	D	D	D	C	D	D	D		D	
Approach Delay (s)		47.7			39.1			46.2			41.6	
Approach LOS		D			D			D			D	

Intersection Summary					
HCM 2000 Control Delay	42.5	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	0.65				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		21.1	
Intersection Capacity Utilization	72.7%	ICU Level of Service		C	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
11: I-15 NB Ramps & Valley Pkwy

2/18/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	335	858	0	0	1018	200	294	0	340	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	5.5			5.5	5.5		4.6	4.6			
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			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	364	933	0	0	1107	217	320	0	370	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	148	0	0	58	0	0	0
Lane Group Flow (vph)	364	933	0	0	1107	69	0	320	312	0	0	0
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases						6			8			
Actuated Green, G (s)	15.9	53.5			33.4	33.4		41.4	41.4			
Effective Green, g (s)	15.9	53.5			33.4	33.4		41.4	41.4			
Actuated g/C Ratio	0.15	0.51			0.32	0.32		0.39	0.39			
Clearance Time (s)	4.2	5.5			5.5	5.5		4.6	4.6			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	519	1803			1617	503		697	624			
v/s Ratio Prot	c0.11	0.26			c0.22			0.18				
v/s Ratio Perm						0.04			c0.20			
v/c Ratio	0.70	0.52			0.68	0.14		0.46	0.50			
Uniform Delay, d1	42.3	17.2			31.2	25.5		23.5	24.0			
Progression Factor	1.00	1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2	4.3	1.1			2.4	0.6		2.2	2.8			
Delay (s)	46.6	18.2			33.6	26.1		25.7	26.8			
Level of Service	D	B			C	C		C	C			
Approach Delay (s)		26.2			32.4			26.3			0.0	
Approach LOS		C			C			C			A	

Intersection Summary				
HCM 2000 Control Delay	28.7	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.60			
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	14.3	
Intersection Capacity Utilization	57.4%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
12: Country Club Dr & Eden Valley Ln

2/18/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	30	10	5	352	227	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	11	5	383	247	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	651	258	268			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	651	258	268			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	99	100			
cM capacity (veh/h)	431	781	1295			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	43	388	268
Volume Left	33	5	0
Volume Right	11	0	22
cSH	486	1295	1700
Volume to Capacity	0.09	0.00	0.16
Queue Length 95th (ft)	7	0	0
Control Delay (s)	13.1	0.2	0.0
Lane LOS	B	A	
Approach Delay (s)	13.1	0.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	32.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
13: Country Club Dr & Kauana Loa Dr

2/18/2015

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	10	97	204	30	83	141
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	105	222	33	90	153

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	116	254	243
Volume Left (vph)	11	0	90
Volume Right (vph)	105	33	0
Hadj (s)	-0.49	-0.04	0.11
Departure Headway (s)	4.5	4.4	4.6
Degree Utilization, x	0.15	0.31	0.31
Capacity (veh/h)	718	787	757
Control Delay (s)	8.3	9.4	9.6
Approach Delay (s)	8.3	9.4	9.6
Approach LOS	A	A	A

Intersection Summary			
Delay	9.3		
Level of Service	A		
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
14: Country Club Dr & Mt. Whitney Rd

2/18/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	10	5	5	224	144	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	5	5	243	157	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				917		
pX, platoon unblocked						
vC, conflicting volume	416	162	167			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	416	162	167			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	100			
cM capacity (veh/h)	591	883	1410			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	16	249	167
Volume Left	11	5	0
Volume Right	5	0	11
cSH	664	1410	1700
Volume to Capacity	0.02	0.00	0.10
Queue Length 95th (ft)	2	0	0
Control Delay (s)	10.6	0.2	0.0
Lane LOS	B	A	
Approach Delay (s)	10.6	0.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	25.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
15: Country Club Dr & New Access #1

2/18/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	229	149	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	249	162	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				507		
pX, platoon unblocked						
vC, conflicting volume	411	162	162			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	411	162	162			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	597	883	1417			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	249	162
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1417	1700
Volume to Capacity	0.00	0.00	0.10
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		15.4%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
16: Country Club Dr & New Access #2

2/18/2015

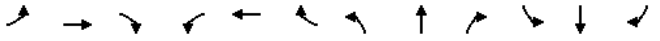
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	229	149	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	249	162	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				307		
pX, platoon unblocked						
vC, conflicting volume	411	162	162			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	411	162	162			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	597	883	1417			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	249	162
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1417	1700
Volume to Capacity	0.00	0.00	0.10
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		15.4%	ICU Level of Service A
Analysis Period (min)		15	

HCM Signalized Intersection Capacity Analysis
17: Country Club Dr & Harmony Grove Rd

2/18/2015

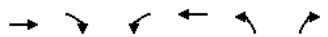


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	260	19	85	460	5	31	70	201	5	34	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00			0.91		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1681	1749		1770	1860			1687		1770	1635	
Flt Permitted	0.95	0.99		0.95	1.00			0.91		0.24	1.00	
Satd. Flow (perm)	1681	1728		1770	1860			1544		443	1635	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	283	21	92	500	5	34	76	218	5	37	163
RTOR Reduction (vph)	0	1	0	0	0	0	0	77	0	0	130	0
Lane Group Flow (vph)	108	315	0	92	505	0	0	251	0	5	70	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	9.4	64.2		6.1	51.5			18.3		18.3	18.3	
Effective Green, g (s)	9.4	64.2		6.1	51.5			18.3		18.3	18.3	
Actuated g/C Ratio	0.10	0.70		0.07	0.56			0.20		0.20	0.20	
Clearance Time (s)	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	
Lane Grp Cap (vph)	173	1218		118	1050			309		88	328	
v/s Ratio Prot	0.06	c0.03		c0.05	c0.27						0.04	
v/s Ratio Perm		0.16						c0.16		0.01		
v/c Ratio	0.62	0.26		0.78	0.48			0.81		0.06	0.21	
Uniform Delay, d1	39.2	4.9		41.9	11.9			34.8		29.5	30.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	6.8	0.1		27.1	0.3			15.0		0.3	0.3	
Delay (s)	46.1	5.0		68.9	12.2			49.8		29.7	30.8	
Level of Service	D	A		E	B			D		C	C	
Approach Delay (s)		15.5			21.0			49.8			30.7	
Approach LOS		B			C			D			C	

Intersection Summary				
HCM 2000 Control Delay	26.8	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.57			
Actuated Cycle Length (s)	91.2	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	80.5%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
18: Harmony Grove Rd & Kauna Loa Dr

2/18/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	100	23	529	80	37	528
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	109	25	575	87	40	574
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				268		
pX, platoon unblocked						
vC, conflicting volume			134		1358	121
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			134		1358	121
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			60		59	38
cM capacity (veh/h)			1451		99	930

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	134	662	614
Volume Left	0	575	40
Volume Right	25	0	574
cSH	1700	1451	600
Volume to Capacity	0.08	0.40	1.02
Queue Length 95th (ft)	0	48	402
Control Delay (s)	0.0	8.4	69.0
Lane LOS		A	F
Approach Delay (s)	0.0	8.4	69.0
Approach LOS			F

Intersection Summary			
Average Delay	34.0		
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
1: S Twin Oaks Valley Rd & Discovery St/E Barham Dr

2/18/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	940	700	90	290	500	550	75	1660	460	440	1220	620
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	0.91		1.00	1.00	1.00	1.00	0.91		0.97	0.91	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	4998		1770	1863	1583	1770	4920		3433	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	4998		1770	1863	1583	1770	4920		3433	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1022	761	98	315	543	598	82	1804	500	478	1326	674
RTOR Reduction (vph)	0	11	0	0	0	132	0	34	0	0	0	311
Lane Group Flow (vph)	1022	848	0	315	543	466	82	2270	0	478	1326	363
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	32.0	35.9		30.1	34.0	34.0	9.0	53.0		15.0	59.0	59.0
Effective Green, g (s)	32.0	35.9		30.1	34.0	34.0	9.0	53.0		15.0	59.0	59.0
Actuated g/C Ratio	0.21	0.24		0.20	0.23	0.23	0.06	0.35		0.10	0.39	0.39
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)	732	1196		355	422	358	106	1738		343	2000	622
v/s Ratio Prot	c0.30	0.17		0.18	0.29		0.05	c0.46		c0.14	0.26	
v/s Ratio Perm						c0.29						0.23
v/c Ratio	1.40	0.71		0.89	1.29	1.30	0.77	1.31		1.39	0.66	0.58
Uniform Delay, d1	59.0	52.3		58.3	58.0	58.0	69.5	48.5		67.5	37.3	35.8
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	186.6	2.0		22.4	146.0	154.5	28.8	142.1		194.1	1.8	4.0
Delay (s)	245.6	54.2		80.7	204.0	212.5	98.3	190.6		261.6	39.1	39.8
Level of Service	F	D		F	F	F	F	F		F	D	D
Approach Delay (s)		158.2			180.8			187.5			82.2	
Approach LOS		F			F			F			F	

Intersection Summary				
HCM 2000 Control Delay	147.8	HCM 2000 Level of Service	F	
HCM 2000 Volume to Capacity ratio	1.33			
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	121.4%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
2: Barham Dr & Woodland Pkwy

2/18/2015

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	820	1290	410	280	480	560
Ideal Flow (vphpl)	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	1.00	1.00	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	1863	1863	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	891	1402	446	304	522	609
RTOR Reduction (vph)	0	0	0	0	0	17
Lane Group Flow (vph)	891	1402	446	304	522	592
Turn Type	Prot	NA	NA	pm+ov	Prot	pm+ov
Protected Phases	7	4	8	6	6	7
Permitted Phases				8		6
Actuated Green, G (s)	66.0	101.0	31.0	72.0	41.0	107.0
Effective Green, g (s)	66.0	101.0	31.0	72.0	41.0	107.0
Actuated g/C Ratio	0.44	0.67	0.21	0.48	0.27	0.71
Clearance Time (s)	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
Lane Grp Cap (vph)	778	1254	385	802	483	1171
v/s Ratio Prot	c0.50	c0.75	0.24	0.10	c0.29	0.22
v/s Ratio Perm				0.09		0.15
v/c Ratio	1.15	1.12	1.16	0.38	1.08	0.51
Uniform Delay, d1	42.0	24.5	59.5	24.8	54.5	9.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	80.2	64.3	96.5	0.3	64.5	0.3
Delay (s)	122.2	88.8	156.0	25.1	119.0	10.0
Level of Service	F	F	F	C	F	A
Approach Delay (s)		101.8	103.0		60.3	
Approach LOS		F	F		E	

Intersection Summary				
HCM 2000 Control Delay	90.8	HCM 2000 Level of Service	F	
HCM 2000 Volume to Capacity ratio	1.14			
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	103.6%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
3: Barham Dr/Driveway & Mission Rd

2/18/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	999	60	380	953	10	80	10	660	20	10	10
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	1.00	0.95			1.00	0.88		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.98	
Satd. Flow (prot)	1770	3539	1583	1770	3534			1784	2787		1756	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.79	
Satd. Flow (perm)	1770	3539	1583	1770	3534			1784	2787		1425	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	1086	65	413	1036	11	87	11	717	22	11	11
RTOR Reduction (vph)	0	0	44	0	0	0	0	0	584	0	10	0
Lane Group Flow (vph)	11	1086	21	413	1047	0	0	98	133	0	34	0
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8		2	2			6	
Permitted Phases			4						2	6		
Actuated Green, G (s)	0.7	33.2	33.2	29.3	61.8			19.1	19.1		5.2	
Effective Green, g (s)	0.7	33.2	33.2	29.3	61.8			19.1	19.1		5.2	
Actuated g/C Ratio	0.01	0.32	0.32	0.29	0.60			0.19	0.19		0.05	
Clearance Time (s)	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	
Lane Grp Cap (vph)	12	1142	511	504	2124			331	517		72	
v/s Ratio Prot	0.01	c0.31		c0.23	0.30			c0.05				
v/s Ratio Perm			0.01						0.05		c0.02	
v/c Ratio	0.92	0.95	0.04	0.82	0.49			0.30	0.26		0.47	
Uniform Delay, d1	51.0	34.0	23.9	34.3	11.6			36.1	35.8		47.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	212.2	16.2	0.0	10.0	0.2			2.3	1.2		4.7	
Delay (s)	263.2	50.2	23.9	44.3	11.8			38.3	37.0		52.2	
Level of Service	F	D	C	D	B			D	D		D	
Approach Delay (s)		50.8			21.0			37.2			52.2	
Approach LOS		D			C			D			D	

Intersection Summary				
HCM 2000 Control Delay	35.1	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.73			
Actuated Cycle Length (s)	102.8	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	67.6%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
4: Nordahl Rd & SR-78 WB On Ramp/SR-78 WB Off Ramp

2/18/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	436	10	640	670	966	0	0	1053	550
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Lane Util. Factor				0.95	0.91	0.95	0.97	0.95			0.91	1.00
Frt				1.00	0.88	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1479	1504	3433	3539			5085	1583
Flt Permitted				0.95	0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1479	1504	3433	3539			5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	474	11	696	728	1050	0	0	1145	598
RTOR Reduction (vph)	0	0	0	0	69	69	0	0	0	0	0	403
Lane Group Flow (vph)	0	0	0	408	321	314	728	1050	0	0	1145	195
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				35.7	35.7	35.7	29.0	73.1			38.9	38.9
Effective Green, g (s)				35.7	35.7	35.7	29.0	73.1			38.9	38.9
Actuated g/C Ratio				0.30	0.30	0.30	0.24	0.61			0.32	0.32
Clearance Time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				500	440	447	829	2155			1648	513
v/s Ratio Prot				c0.24	0.22		c0.21	0.30			c0.23	
v/s Ratio Perm						0.21						0.12
v/c Ratio				0.82	0.73	0.70	0.88	0.49			0.69	0.38
Uniform Delay, d1				39.1	37.8	37.4	43.8	13.0			35.4	31.2
Progression Factor				1.00	1.00	1.00	1.49	0.60			1.00	1.00
Incremental Delay, d2				9.9	6.0	5.0	5.3	0.4			2.4	2.1
Delay (s)				49.0	43.8	42.4	70.4	8.2			37.8	33.4
Level of Service				D	D	D	E	A			D	C
Approach Delay (s)		0.0			45.2			33.6			36.3	
Approach LOS		A			D			C			D	

Intersection Summary				
HCM 2000 Control Delay	37.5	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.79			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	85.7%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
4: SR 78 WB Ramps & Nordahl Rd

Existing+Cumulatives PM
7/20/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	493	10	640	659	963	0	0	977	550
Future Volume (vph)	0	0	0	493	10	640	659	963	0	0	977	550
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Lane Util. Factor				0.95	0.91	0.95	0.97	0.95			0.91	1.00
Frt				1.00	0.89	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1495	1504	3433	3539			5085	1583
Flt Permitted				0.95	0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1495	1504	3433	3539			5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	536	11	696	716	1047	0	0	1062	598
RTOR Reduction (vph)	0	0	0	0	56	58	0	0	0	0	0	425
Lane Group Flow (vph)	0	0	0	429	354	346	716	1047	0	0	1062	173
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				31.8	31.8	31.8	22.8	57.0			29.0	29.0
Effective Green, g (s)				31.8	31.8	31.8	22.8	57.0			29.0	29.0
Actuated g/C Ratio				0.32	0.32	0.32	0.23	0.57			0.29	0.29
Clearance Time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				534	475	478	782	2017			1474	459
v/s Ratio Prot				c0.26	0.24		c0.21	0.30			c0.21	
v/s Ratio Perm						0.23						0.11
v/c Ratio				0.80	0.75	0.72	0.92	0.52			0.72	0.38
Uniform Delay, d1				31.2	30.5	30.2	37.7	13.1			31.9	28.3
Progression Factor				1.00	1.00	1.00	1.16	0.18			1.00	1.00
Incremental Delay, d2				8.5	6.3	5.4	12.0	0.7			3.1	2.4
Delay (s)				39.8	36.8	35.6	55.7	3.1			34.9	30.7
Level of Service				D	D	D	E	A			C	C
Approach Delay (s)		0.0			37.4			24.5			33.4	
Approach LOS		A			D			C			C	

Intersection Summary				
HCM 2000 Control Delay	31.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.80			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	87.0%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Nordahl Rd & SR 78 EB Ramps

Existing+Cumulatives PM
7/20/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	375	60	478	0	0	0	0	1247	621	570	900	0
Future Volume (vph)	375	60	478	0	0	0	0	1247	621	570	900	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.6	
Lane Util. Factor	0.95	0.91	0.95					0.91	1.00	0.97	0.95	
Frt	1.00	0.91	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1525	1504					5085	1583	3433	3539	
Flt Permitted	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1681	1525	1504					5085	1583	3433	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	408	65	520	0	0	0	0	1355	675	620	978	0
RTOR Reduction (vph)	0	61	78	0	0	0	0	0	346	0	0	0
Lane Group Flow (vph)	343	272	239	0	0	0	0	1355	329	620	978	0
Turn Type	Split	NA	Perm					NA	Perm	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	27.5	27.5	27.5					39.3	39.3	16.8	61.3	
Effective Green, g (s)	27.5	27.5	27.5					39.3	39.3	16.8	61.3	
Actuated g/C Ratio	0.28	0.28	0.28					0.39	0.39	0.17	0.61	
Clearance Time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.6	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	462	419	413					1998	622	576	2169	
v/s Ratio Prot	c0.20	0.18						c0.27		c0.18	0.28	
v/s Ratio Perm			0.16						0.21			
v/c Ratio	0.74	0.65	0.58					0.68	0.53	1.08	0.45	
Uniform Delay, d1	33.0	32.0	31.3					25.1	23.3	41.6	10.3	
Progression Factor	1.00	1.00	1.00					0.46	0.30	0.78	0.79	
Incremental Delay, d2	6.3	3.5	2.0					1.1	1.9	53.5	0.5	
Delay (s)	39.4	35.5	33.2					12.7	8.8	86.0	8.7	
Level of Service	D	D	C					B	A	F	A	
Approach Delay (s)		36.1			0.0			11.4			38.7	
Approach LOS		D			A			B			D	

Intersection Summary				
HCM 2000 Control Delay	26.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.78			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	87.0%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Nordahl Rd & SR-78 EB Off Ramp/SR-78 EB On Ramp

2/18/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	330	5	378	0	0	0	0	1306	627	570	919	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.6	
Lane Util. Factor	0.95	0.91	0.95					0.95	0.88	0.97	0.95	
Frt	1.00	0.91	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1508	1504					3539	2787	3433	3539	
Flt Permitted	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1681	1508	1504					3539	2787	3433	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	359	5	411	0	0	0	0	1420	682	620	999	0
RTOR Reduction (vph)	0	56	107	0	0	0	0	0	299	0	0	0
Lane Group Flow (vph)	269	203	140	0	0	0	0	1420	383	620	999	0
Turn Type	Split	NA	Perm					NA	Perm	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	26.0	26.0	26.0					51.3	51.3	26.3	82.8	
Effective Green, g (s)	26.0	26.0	26.0					51.3	51.3	26.3	82.8	
Actuated g/C Ratio	0.22	0.22	0.22					0.43	0.43	0.22	0.69	
Clearance Time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.6	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	364	326	325					1512	1191	752	2441	
v/s Ratio Prot	c0.16	0.13						c0.40		c0.18	0.28	
v/s Ratio Perm			0.09						0.14			
v/c Ratio	0.74	0.62	0.43					0.94	0.32	0.82	0.41	
Uniform Delay, d1	43.8	42.6	40.6					32.9	22.8	44.7	8.0	
Progression Factor	1.00	1.00	1.00					0.64	0.41	1.06	1.14	
Incremental Delay, d2	7.7	3.7	0.9					9.4	0.5	5.2	0.4	
Delay (s)	51.5	46.3	41.5					30.4	9.9	52.8	9.5	
Level of Service	D	D	D					C	A	D	A	
Approach Delay (s)		46.6			0.0			23.7			26.1	
Approach LOS		D			A			C			C	

Intersection Summary				
HCM 2000 Control Delay	28.5	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.86			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	85.7%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
6: Nordahl Rd & Mission Rd

2/18/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	450	800	429	30	430	430	483	1053	60	150	606	360
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	
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)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	4801	
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)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	4801	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	489	870	466	33	467	467	525	1145	65	163	659	391
RTOR Reduction (vph)	0	0	0	0	0	167	0	0	0	0	86	0
Lane Group Flow (vph)	489	870	466	33	467	300	525	1145	65	163	964	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	23.2	45.6	45.6	3.6	26.0	26.0	18.0	40.3	40.3	10.5	32.8	
Effective Green, g (s)	23.2	45.6	45.6	3.6	26.0	26.0	18.0	40.3	40.3	10.5	32.8	
Actuated g/C Ratio	0.19	0.38	0.38	0.03	0.22	0.22	0.15	0.34	0.34	0.09	0.27	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	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)	663	1344	601	102	766	342	514	1707	531	300	1312	
v/s Ratio Prot	0.14	0.25		0.01	0.13		c0.15	0.23		0.05	c0.20	
v/s Ratio Perm			c0.29			c0.19			0.04			
v/c Ratio	0.74	0.65	0.78	0.32	0.61	0.88	1.02	0.67	0.12	0.54	0.73	
Uniform Delay, d1	45.5	30.6	32.7	57.0	42.4	45.5	51.0	34.2	27.6	52.5	39.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.81	1.21	
Incremental Delay, d2	4.3	1.1	6.2	1.8	1.4	21.5	45.2	2.1	0.5	1.8	3.4	
Delay (s)	49.8	31.7	38.9	58.9	43.8	67.0	96.2	36.3	28.1	44.3	51.2	
Level of Service	D	C	D	E	D	E	F	D	C	D	D	
Approach Delay (s)		38.4			55.5			54.1			50.2	
Approach LOS		D			E			D			D	

Intersection Summary				
HCM 2000 Control Delay	48.5	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.85			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	75.7%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
7: Auto Park Way & Country Club Dr/Driveway

2/18/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	233	5	40	5	5	5	100	1003	5	80	886	279
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	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1723		1770	3537		1770	3412	
Flt Permitted	0.75	1.00	1.00	0.75	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1399	1863	1583	1405	1723		1770	3537		1770	3412	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	253	5	43	5	5	5	109	1090	5	87	963	303
RTOR Reduction (vph)	0	0	34	0	4	0	0	0	0	0	35	0
Lane Group Flow (vph)	253	5	9	5	6	0	109	1095	0	87	1231	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)	16.8	16.8	16.8	16.8	16.8		7.6	45.6		4.7	42.7	
Effective Green, g (s)	16.8	16.8	16.8	16.8	16.8		7.6	45.6		4.7	42.7	
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21		0.10	0.58		0.06	0.54	
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)	297	395	336	298	365		170	2039		105	1841	
v/s Ratio Prot		0.00			0.00		c0.06	c0.31		0.05	c0.36	
v/s Ratio Perm	c0.18		0.01	0.00								
v/c Ratio	0.85	0.01	0.03	0.02	0.02		0.64	0.54		0.83	0.67	
Uniform Delay, d1	30.0	24.6	24.7	24.6	24.6		34.4	10.3		36.8	13.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	20.3	0.0	0.0	0.0	0.0		8.0	1.0		39.1	1.9	
Delay (s)	50.3	24.6	24.7	24.6	24.6		42.4	11.3		75.9	15.1	
Level of Service	D	C	C	C	C		D	B		E	B	
Approach Delay (s)		46.2			24.6			14.1			19.0	
Approach LOS		D			C			B			B	

Intersection Summary				
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	79.1	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	68.5%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
8: Valley Pkwy & W. 9th Ave

2/18/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	293	441	10	236	253	100	30	829	237	140	1004	196
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.91		1.00	0.91	
Frt	1.00	1.00		1.00	0.96		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3527		1770	3389		1770	4915		1770	4961	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3527		1770	3389		1770	4915		1770	4961	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	318	479	11	257	275	109	33	901	258	152	1091	213
RTOR Reduction (vph)	0	2	0	0	47	0	0	48	0	0	26	0
Lane Group Flow (vph)	318	488	0	257	337	0	33	1111	0	152	1278	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	15.1	18.9		14.1	17.9		2.3	33.3		5.0	36.0	
Effective Green, g (s)	15.1	18.9		14.1	17.9		2.3	33.3		5.0	36.0	
Actuated g/C Ratio	0.17	0.21		0.15	0.20		0.03	0.36		0.05	0.39	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	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)	292	730		273	664		44	1792		96	1956	
v/s Ratio Prot	c0.18	c0.14		0.15	0.10		0.02	0.23		c0.09	c0.26	
v/s Ratio Perm												
v/c Ratio	1.09	0.67		0.94	0.51		0.75	0.62		1.58	0.65	
Uniform Delay, d1	38.1	33.3		38.2	32.8		44.2	23.8		43.1	22.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	78.5	2.3		38.8	0.6		51.4	1.6		306.1	1.7	
Delay (s)	116.6	35.7		77.0	33.4		95.6	25.4		349.3	24.3	
Level of Service	F	D		E	C		F	C		F	C	
Approach Delay (s)		67.5			50.8			27.4			58.2	
Approach LOS		E			D			C			E	

Intersection Summary				
HCM 2000 Control Delay	49.9	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.84			
Actuated Cycle Length (s)	91.3	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	72.2%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
9: Auto Park Wy & Valley Pkwy

2/18/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	260	881	50	130	853	310	130	381	180	560	953	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3369		3433	3412	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3369		3433	3412	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	283	958	54	141	927	337	141	414	196	609	1036	326
RTOR Reduction (vph)	0	0	38	0	0	55	0	71	0	0	38	0
Lane Group Flow (vph)	283	958	16	141	927	282	141	539	0	609	1324	0
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	8.0	23.0	23.0	5.0	20.0	34.0	4.0	18.0		14.0	28.0	
Effective Green, g (s)	8.0	23.0	23.0	5.0	20.0	34.0	4.0	18.0		14.0	28.0	
Actuated g/C Ratio	0.10	0.29	0.29	0.06	0.25	0.42	0.05	0.22		0.18	0.35	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		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)	343	1461	455	214	1271	771	171	758		600	1194	
v/s Ratio Prot	c0.08	c0.19		0.04	0.18	0.06	0.04	0.16		c0.18	c0.39	
v/s Ratio Perm			0.01			0.11						
v/c Ratio	0.83	0.66	0.03	0.66	0.73	0.37	0.82	0.71		1.01	1.11	
Uniform Delay, d1	35.3	25.0	20.5	36.7	27.5	15.7	37.7	28.6		33.0	26.0	
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	14.8	2.3	0.1	7.1	3.7	0.3	26.4	5.6		40.5	61.4	
Delay (s)	50.1	27.3	20.6	43.8	31.2	16.0	64.1	34.2		73.5	87.4	
Level of Service	D	C	C	D	C	B	E	C		E	F	
Approach Delay (s)		32.0			28.8			39.8			83.1	
Approach LOS		C			C			D			F	

Intersection Summary					
HCM 2000 Control Delay	50.8	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	0.98				
Actuated Cycle Length (s)	80.0	Sum of lost time (s)		20.0	
Intersection Capacity Utilization	80.2%	ICU Level of Service		D	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
10: Shopping Ctr Dwy/I-15 SB Ramps & Valley Pkwy

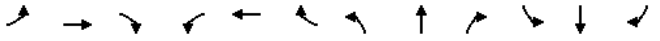
2/18/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	98	1602	121	270	713	410	33	70	330	260	110	426
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.6	5.5	5.5	5.5	5.5	5.5		5.5	
Lane Util. Factor	0.97	0.91	1.00	0.97	0.81	0.81	1.00	1.00	1.00		0.95	
Frt	1.00	1.00	0.85	1.00	0.97	0.85	1.00	1.00	0.85		0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	3433	5085	1583	3433	5833	1282	1770	1863	1583		3203	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	
Satd. Flow (perm)	3433	5085	1583	3433	5833	1282	1770	1863	1583		3203	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	107	1741	132	293	775	446	36	76	359	283	120	463
RTOR Reduction (vph)	0	0	94	0	43	145	0	0	216	0	174	0
Lane Group Flow (vph)	107	1741	39	293	955	78	36	76	143	0	692	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6			3			
Actuated Green, G (s)	5.0	35.0	35.0	11.4	42.0	42.0	16.5	16.5	16.5		36.0	
Effective Green, g (s)	5.0	35.0	35.0	11.4	42.0	42.0	16.5	16.5	16.5		36.0	
Actuated g/C Ratio	0.04	0.29	0.29	0.10	0.35	0.35	0.14	0.14	0.14		0.30	
Clearance Time (s)	4.0	5.5	5.5	4.6	5.5	5.5	5.5	5.5	5.5		5.5	
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)	143	1483	461	326	2041	448	243	256	217		960	
v/s Ratio Prot	0.03	c0.34		c0.09	0.16		0.02	0.04			c0.22	
v/s Ratio Perm			0.02			0.06			c0.09			
v/c Ratio	0.75	1.17	0.08	0.90	0.47	0.17	0.15	0.30	0.66		0.72	
Uniform Delay, d1	56.9	42.5	30.9	53.7	30.3	27.0	45.6	46.5	49.1		37.5	
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	19.1	85.8	0.4	25.8	0.8	0.8	1.3	2.9	14.7		4.7	
Delay (s)	76.0	128.3	31.2	79.5	31.1	27.8	46.8	49.5	63.8		42.2	
Level of Service	E	F	C	E	C	C	D	D	E		D	
Approach Delay (s)		119.0			40.0			60.2			42.2	
Approach LOS		F			D			E			D	

Intersection Summary					
HCM 2000 Control Delay	74.7	HCM 2000 Level of Service		E	
HCM 2000 Volume to Capacity ratio	0.89				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		21.1	
Intersection Capacity Utilization	89.5%	ICU Level of Service		E	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
11: I-15 NB Ramps & Valley Pkwy

2/18/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	813	1379	0	0	1162	370	231	0	430	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	5.5			5.5	5.5		4.6	4.6			
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			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	884	1499	0	0	1263	402	251	0	467	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	303	0	0	46	0	0	0
Lane Group Flow (vph)	884	1499	0	0	1263	99	0	251	421	0	0	0
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases						6			8			
Actuated Green, G (s)	28.5	58.5			25.8	25.8		36.4	36.4			
Effective Green, g (s)	28.5	58.5			25.8	25.8		36.4	36.4			
Actuated g/C Ratio	0.27	0.56			0.25	0.25		0.35	0.35			
Clearance Time (s)	4.2	5.5			5.5	5.5		4.6	4.6			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	931	1971			1249	388		613	548			
v/s Ratio Prot	c0.26	0.42			c0.25			0.14				
v/s Ratio Perm						0.06			c0.27			
v/c Ratio	0.95	0.76			1.01	0.25		0.41	0.77			
Uniform Delay, d1	37.5	17.9			39.6	31.9		26.1	30.6			
Progression Factor	1.00	1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2	18.2	2.8			28.3	1.6		2.0	10.0			
Delay (s)	55.8	20.7			67.9	33.4		28.1	40.5			
Level of Service	E	C			E	C		C	D			
Approach Delay (s)		33.7			59.5			36.2			0.0	
Approach LOS		C			E			D			A	

Intersection Summary				
HCM 2000 Control Delay	43.1	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.89			
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	14.3	
Intersection Capacity Utilization	73.2%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
12: Country Club Dr & Eden Valley Ln

2/18/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	20	10	10	259	345	25
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	11	11	282	375	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	692	389	402			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	692	389	402			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	98	99			
cM capacity (veh/h)	406	660	1156			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	33	292	402
Volume Left	22	11	0
Volume Right	11	0	27
cSH	466	1156	1700
Volume to Capacity	0.07	0.01	0.24
Queue Length 95th (ft)	6	1	0
Control Delay (s)	13.3	0.4	0.0
Lane LOS	B	A	
Approach Delay (s)	13.3	0.4	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	31.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
13: Country Club Dr & Kauana Loa Dr

2/18/2015

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	20	83	185	10	100	233
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	90	201	11	109	253

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	112	212	362
Volume Left (vph)	22	0	109
Volume Right (vph)	90	11	0
Hadj (s)	-0.41	0.00	0.09
Departure Headway (s)	4.8	4.6	4.5
Degree Utilization, x	0.15	0.27	0.45
Capacity (veh/h)	673	752	772
Control Delay (s)	8.6	9.3	11.2
Approach Delay (s)	8.6	9.3	11.2
Approach LOS	A	A	B

Intersection Summary			
Delay	10.2		
Level of Service	B		
Intersection Capacity Utilization	44.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
14: Country Club Dr & Mt. Whitney Rd

2/18/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	5	5	0	170	243	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	0	185	264	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				917		
pX, platoon unblocked						
vC, conflicting volume	454	270	275			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	454	270	275			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	100			
cM capacity (veh/h)	564	769	1288			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	11	185	275
Volume Left	5	0	0
Volume Right	5	0	11
cSH	651	1288	1700
Volume to Capacity	0.02	0.00	0.16
Queue Length 95th (ft)	1	0	0
Control Delay (s)	10.6	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.6	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	23.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
15: Country Club Dr & New Access #1

2/18/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	220	248	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	239	270	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				507		
pX, platoon unblocked						
vC, conflicting volume	509	270	270			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	509	270	270			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	524	769	1294			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	239	270
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1294	1700
Volume to Capacity	0.00	0.00	0.16
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		16.4%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
16: Country Club Dr & New Access #2

2/18/2015

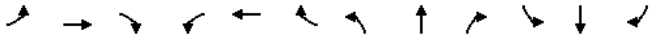
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	220	248	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	239	270	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				327		
pX, platoon unblocked						
vC, conflicting volume	509	270	270			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	509	270	270			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	524	769	1294			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	239	270
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1294	1700
Volume to Capacity	0.00	0.00	0.16
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		16.4%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Signalized Intersection Capacity Analysis
17: Country Club Dr & Harmony Grove Rd

2/18/2015

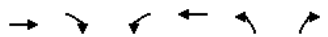


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	170	570	35	246	290	10	16	40	114	10	89	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99			0.91		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1770	1847		1770	1853			1685		1770	1679	
Flt Permitted	0.95	1.00		0.95	1.00			0.90		0.52	1.00	
Satd. Flow (perm)	1770	1847		1770	1853			1527		976	1679	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	185	620	38	267	315	11	17	43	124	11	97	185
RTOR Reduction (vph)	0	3	0	0	1	0	0	79	0	0	73	0
Lane Group Flow (vph)	185	655	0	267	325	0	0	105	0	11	209	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	12.4	30.4		11.7	29.7			14.1		14.1	14.1	
Effective Green, g (s)	12.4	30.4		11.7	29.7			14.1		14.1	14.1	
Actuated g/C Ratio	0.18	0.45		0.17	0.44			0.21		0.21	0.21	
Clearance Time (s)	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	
Lane Grp Cap (vph)	321	823		303	806			315		201	347	
v/s Ratio Prot	0.10	c0.35		c0.15	0.18						c0.12	
v/s Ratio Perm								0.07		0.01		
v/c Ratio	0.58	0.80		0.88	0.40			0.33		0.05	0.60	
Uniform Delay, d1	25.5	16.2		27.6	13.2			23.1		21.7	24.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	2.5	5.4		24.4	0.3			0.6		0.1	2.9	
Delay (s)	28.0	21.6		52.0	13.5			23.7		21.8	27.4	
Level of Service	C	C		D	B			C		C	C	
Approach Delay (s)		23.0			30.8			23.7			27.2	
Approach LOS		C			C			C			C	

Intersection Summary				
HCM 2000 Control Delay	26.2	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.76			
Actuated Cycle Length (s)	68.2	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	79.6%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
18: Harmony Grove Rd & Kauna Loa Dr

2/18/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	60	50	645	110	33	647
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	54	701	120	36	703
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				268		
pX, platoon unblocked						
vC, conflicting volume			120		1614	92
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			120		1614	92
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			52		40	27
cM capacity (veh/h)			1468		60	965

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	120	821	739
Volume Left	0	701	36
Volume Right	54	0	703
cSH	1700	1468	556
Volume to Capacity	0.07	0.48	1.33
Queue Length 95th (ft)	0	67	791
Control Delay (s)	0.0	9.0	182.3
Lane LOS		A	F
Approach Delay (s)	0.0	9.0	182.3
Approach LOS			F

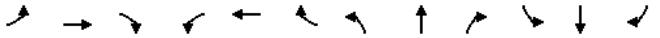
Intersection Summary				
Average Delay	84.6			
Intersection Capacity Utilization	96.7%	ICU Level of Service	F	
Analysis Period (min)	15			

APPENDIX I

PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS
EXISTING + PROJECT + CUMULATIVE PROJECTS

HCM Signalized Intersection Capacity Analysis
1: S Twin Oaks Valley Rd & Discovery St/E Barham Dr

2/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	341	311	60	240	794	330	70	1050	300	630	1440	674
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	0.91		1.00	1.00	1.00	1.00	0.91		0.97	0.91	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	4962		1770	1863	1583	1770	4916		3433	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	4962		1770	1863	1583	1770	4916		3433	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	371	338	65	261	863	359	76	1141	326	685	1565	733
RTOR Reduction (vph)	0	19	0	0	0	117	0	37	0	0	0	148
Lane Group Flow (vph)	371	384	0	261	863	242	76	1430	0	685	1565	585
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	11.0	38.8		25.2	53.0	53.0	8.0	39.0		21.0	52.0	52.0
Effective Green, g (s)	11.0	38.8		25.2	53.0	53.0	8.0	39.0		21.0	52.0	52.0
Actuated g/C Ratio	0.08	0.28		0.18	0.38	0.38	0.06	0.28		0.15	0.37	0.37
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)	269	1375		318	705	599	101	1369		514	1888	587
v/s Ratio Prot	c0.11	0.08		0.15	c0.46		0.04	c0.29		c0.20	0.31	
v/s Ratio Perm						0.15						0.37
v/c Ratio	1.38	0.28		0.82	1.22	0.40	0.75	1.04		1.33	0.83	1.00
Uniform Delay, d1	64.5	39.6		55.2	43.5	31.9	65.0	50.5		59.5	40.0	43.9
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	192.2	0.1		15.5	113.3	0.4	26.7	36.9		162.6	4.4	36.2
Delay (s)	256.7	39.8		70.7	156.8	32.3	91.7	87.4		222.1	44.3	80.1
Level of Service	F	D		E	F	C	F	F		F	D	F
Approach Delay (s)		143.8			111.5			87.6			93.9	
Approach LOS		F			F			F			F	

Intersection Summary					
HCM 2000 Control Delay	102.0	HCM 2000 Level of Service	F		
HCM 2000 Volume to Capacity ratio	1.20				
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0		
Intersection Capacity Utilization	109.8%	ICU Level of Service	H		
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
2: Barham Dr & Woodland Pkwy

2/27/2015

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	710	845	699	210	300	790
Ideal Flow (vphpl)	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	1.00	1.00	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	1863	1863	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	772	918	760	228	326	859
RTOR Reduction (vph)	0	0	0	0	0	28
Lane Group Flow (vph)	772	918	760	228	326	831
Turn Type	Prot	NA	NA	pm+ov	Prot	pm+ov
Protected Phases	7	4	8	6	6	7
Permitted Phases				8		6
Actuated Green, G (s)	49.0	99.0	46.0	69.0	23.0	72.0
Effective Green, g (s)	49.0	99.0	46.0	69.0	23.0	72.0
Actuated g/C Ratio	0.38	0.76	0.35	0.53	0.18	0.55
Clearance Time (s)	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
Lane Grp Cap (vph)	667	1418	659	888	313	925
v/s Ratio Prot	c0.44	0.49	c0.41	0.05	c0.18	0.34
v/s Ratio Perm				0.10		0.19
v/c Ratio	1.16	0.65	1.15	0.26	1.04	0.90
Uniform Delay, d1	40.5	7.3	42.0	16.6	53.5	25.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	87.0	1.0	85.5	0.2	62.1	11.4
Delay (s)	127.5	8.3	127.5	16.7	115.6	37.1
Level of Service	F	A	F	B	F	D
Approach Delay (s)		62.8	102.0		58.7	
Approach LOS		E	F		E	

Intersection Summary					
HCM 2000 Control Delay	71.6	HCM 2000 Level of Service	E		
HCM 2000 Volume to Capacity ratio	1.13				
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0		
Intersection Capacity Utilization	102.7%	ICU Level of Service	G		
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
3: Barham Dr/Driveway & Mission Rd

2/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	693	150	455	727	20	30	10	250	30	10	10
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	1.00	0.95			1.00	0.88		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.97	
Satd. Flow (prot)	1770	3539	1583	1770	3525			1795	2787		1760	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.79	
Satd. Flow (perm)	1770	3539	1583	1770	3525			1795	2787		1433	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	753	163	495	790	22	33	11	272	33	11	11
RTOR Reduction (vph)	0	0	123	0	2	0	0	0	216	0	10	0
Lane Group Flow (vph)	11	753	40	495	810	0	0	44	56	0	45	0
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8		2	2			6	
Permitted Phases			4						2	6		
Actuated Green, G (s)	0.7	22.8	22.8	28.5	50.6			19.2	19.2		6.9	
Effective Green, g (s)	0.7	22.8	22.8	28.5	50.6			19.2	19.2		6.9	
Actuated g/C Ratio	0.01	0.24	0.24	0.31	0.54			0.21	0.21		0.07	
Clearance Time (s)	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	
Lane Grp Cap (vph)	13	863	386	540	1909			368	572		105	
v/s Ratio Prot	0.01	c0.21		c0.28	0.23			c0.02				
v/s Ratio Perm			0.03						0.02		c0.03	
v/c Ratio	0.85	0.87	0.10	0.92	0.42			0.12	0.10		0.43	
Uniform Delay, d1	46.3	33.9	27.4	31.3	12.7			30.2	30.1		41.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	166.4	9.7	0.1	20.3	0.2			0.7	0.3		2.8	
Delay (s)	212.7	43.6	27.5	51.7	12.9			30.9	30.4		44.1	
Level of Service	F	D	C	D	B			C	C		D	
Approach Delay (s)		42.8			27.6			30.5			44.1	
Approach LOS		D			C			C			D	

Intersection Summary				
HCM 2000 Control Delay	33.7	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.66			
Actuated Cycle Length (s)	93.4	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	63.8%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
4: Nordahl Rd & SR-78 WB On Ramp/SR-78 WB Off Ramp

2/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	415	5	270	607	545	0	0	616	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Lane Util. Factor				0.95	0.91	0.95	0.97	0.95			0.91	1.00
Frt				1.00	0.97	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1578	1504	3433	3539			5085	1583
Flt Permitted				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1578	1504	3433	3539			5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	451	5	293	660	592	0	0	670	402
RTOR Reduction (vph)	0	0	0	0	13	180	0	0	0	0	0	242
Lane Group Flow (vph)	0	0	0	257	245	54	660	592	0	0	670	160
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				23.0	23.0	23.0	20.8	65.8			39.8	39.8
Effective Green, g (s)				23.0	23.0	23.0	20.8	65.8			39.8	39.8
Actuated g/C Ratio				0.23	0.23	0.23	0.21	0.66			0.40	0.40
Clearance Time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				386	362	345	714	2328			2023	630
v/s Ratio Prot				0.15	c0.16		c0.19	0.17			c0.13	
v/s Ratio Perm						0.04						0.10
v/c Ratio				0.67	0.68	0.16	0.92	0.25			0.33	0.25
Uniform Delay, d1				35.0	35.1	30.7	38.8	7.0			20.9	20.2
Progression Factor				1.00	1.00	1.00	0.71	1.14			1.00	1.00
Incremental Delay, d2				4.3	4.9	0.2	14.7	0.2			0.4	1.0
Delay (s)				39.3	40.1	31.0	42.2	8.2			21.3	21.1
Level of Service				D	D	C	D	A			C	C
Approach Delay (s)		0.0			37.0			26.1			21.2	
Approach LOS		A			D			C			C	

Intersection Summary				
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.57			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	68.3%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
4: SR 78 WB Ramps & Nordahl Rd

Existing+Project+Cumulatives AM
7/20/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	511	10	270	625	576	0	0	613	370
Future Volume (vph)	0	0	0	511	10	270	625	576	0	0	613	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Lane Util. Factor				0.95	0.91	0.95	0.97	0.95			0.91	1.00
Frt				1.00	0.99	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1601	1504	3433	3539			5085	1583
Flt Permitted				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1601	1504	3433	3539			5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	555	11	293	679	626	0	0	666	402
RTOR Reduction (vph)	0	0	0	0	4	163	0	0	0	0	0	252
Lane Group Flow (vph)	0	0	0	300	291	101	679	626	0	0	666	150
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				26.4	26.4	26.4	19.8	62.4			37.4	37.4
Effective Green, g (s)				26.4	26.4	26.4	19.8	62.4			37.4	37.4
Actuated g/C Ratio				0.26	0.26	0.26	0.20	0.62			0.37	0.37
Clearance Time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				443	422	397	679	2208			1901	592
v/s Ratio Prot				0.18	c0.18		c0.20	0.18			c0.13	
v/s Ratio Perm						0.07						0.09
v/c Ratio				0.68	0.69	0.25	1.00	0.28			0.35	0.25
Uniform Delay, d1				33.0	33.1	29.0	40.1	8.6			22.5	21.7
Progression Factor				1.00	1.00	1.00	0.63	0.38			1.00	1.00
Incremental Delay, d2				4.1	4.6	0.3	32.1	0.3			0.5	1.0
Delay (s)				37.1	37.7	29.4	57.5	3.6			23.1	22.7
Level of Service				D	D	C	E	A			C	C
Approach Delay (s)		0.0			34.9			31.6			22.9	
Approach LOS		A			C			C			C	

Intersection Summary				
HCM 2000 Control Delay	29.6	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	71.6%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Nordahl Rd & SR 78 EB Ramps

Existing+Project+Cumulatives AM
7/20/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	265	140	734	0	0	0	0	936	501	220	904	0
Future Volume (vph)	265	140	734	0	0	0	0	936	501	220	904	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.5	
Lane Util. Factor	0.95	0.91	0.95					0.91	1.00	0.97	0.95	
Frt	1.00	0.90	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1528	1504					5085	1583	3433	3539	
Flt Permitted	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1681	1528	1504					5085	1583	3433	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	288	152	798	0	0	0	0	1017	545	239	983	0
RTOR Reduction (vph)	0	41	54	0	0	0	0	0	350	0	0	0
Lane Group Flow (vph)	259	459	425	0	0	0	0	1017	195	239	983	0
Turn Type	Split	NA	Perm					NA	Perm	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	37.0	37.0	37.0					35.8	35.8	10.8	51.9	
Effective Green, g (s)	37.0	37.0	37.0					35.8	35.8	10.8	51.9	
Actuated g/C Ratio	0.37	0.37	0.37					0.36	0.36	0.11	0.52	
Clearance Time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.5	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	621	565	556					1820	566	370	1836	
v/s Ratio Prot	0.15	c0.30						0.20		0.07	c0.28	
v/s Ratio Perm			0.28						0.12			
v/c Ratio	0.42	0.81	0.77					0.56	0.34	0.65	0.54	
Uniform Delay, d1	23.5	28.4	27.7					25.8	23.5	42.8	16.0	
Progression Factor	1.00	1.00	1.00					0.55	1.58	1.07	0.38	
Incremental Delay, d2	0.5	8.7	6.2					1.0	1.3	3.6	1.0	
Delay (s)	23.9	37.1	33.9					15.1	38.5	49.3	7.1	
Level of Service	C	D	C					B	D	D	A	
Approach Delay (s)		33.1			0.0			23.3			15.4	
Approach LOS		C			A			C			B	

Intersection Summary				
HCM 2000 Control Delay	23.9	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.69			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	71.6%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Nordahl Rd & SR-78 EB Off Ramp/SR-78 EB On Ramp

2/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	0	742	0	0	0	0	962	452	220	811	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.6	
Lane Util. Factor	0.95	0.91	0.95					0.95	0.88	0.97	0.95	
Frt	1.00	0.86	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1450	1504					3539	2787	3433	3539	
Flt Permitted	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1681	1450	1504					3539	2787	3433	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	207	0	807	0	0	0	0	1046	491	239	882	0
RTOR Reduction (vph)	0	83	83	0	0	0	0	0	277	0	0	0
Lane Group Flow (vph)	186	323	329	0	0	0	0	1046	214	239	882	0
Turn Type	Split	NA	Perm					NA	Perm	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	29.3	29.3	29.3					43.6	43.6	10.7	59.5	
Effective Green, g (s)	29.3	29.3	29.3					43.6	43.6	10.7	59.5	
Actuated g/C Ratio	0.29	0.29	0.29					0.44	0.44	0.11	0.60	
Clearance Time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.6	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	492	424	440					1543	1215	367	2105	
v/s Ratio Prot	0.11	c0.23						c0.30		c0.07	0.25	
v/s Ratio Perm			0.22						0.08			
v/c Ratio	0.38	0.78	0.75					0.68	0.18	0.65	0.42	
Uniform Delay, d1	28.1	32.5	32.0					22.6	17.2	42.9	10.9	
Progression Factor	1.00	1.00	1.00					0.41	0.99	0.60	1.71	
Incremental Delay, d2	0.5	9.2	6.8					1.9	0.2	3.9	0.6	
Delay (s)	28.6	41.6	38.8					11.2	17.4	29.4	19.3	
Level of Service	C	D	D					B	B	C	B	
Approach Delay (s)		38.1			0.0			13.2			21.4	
Approach LOS		D			A			B			C	

Intersection Summary				
HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.71			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	68.3%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
6: Nordahl Rd & Mission Rd

2/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	340	420	213	104	640	190	452	874	59	350	904	290
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
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)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	4900	
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)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	4900	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	370	457	232	113	696	207	491	950	64	380	983	315
RTOR Reduction (vph)	0	0	0	0	0	153	0	0	0	0	58	0
Lane Group Flow (vph)	370	457	232	113	696	54	491	950	64	380	1240	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	12.8	34.0	34.0	5.0	26.2	26.2	12.0	30.0	30.0	11.0	29.0	
Effective Green, g (s)	12.8	34.0	34.0	5.0	26.2	26.2	12.0	30.0	30.0	11.0	29.0	
Actuated g/C Ratio	0.13	0.34	0.34	0.05	0.26	0.26	0.12	0.30	0.30	0.11	0.29	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	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)	439	1203	538	171	927	414	411	1525	474	377	1421	
v/s Ratio Prot	c0.11	0.13		0.03	c0.20		c0.14	0.19		0.11	c0.25	
v/s Ratio Perm			0.15			0.03			0.04			
v/c Ratio	0.84	0.38	0.43	0.66	0.75	0.13	1.19	0.62	0.14	1.01	0.87	
Uniform Delay, d1	42.6	25.0	25.5	46.7	33.9	28.2	44.0	30.1	25.5	44.5	33.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.06	0.72	
Incremental Delay, d2	13.7	0.2	0.6	9.2	3.5	0.1	109.2	1.9	0.6	44.7	6.6	
Delay (s)	56.3	25.2	26.1	55.9	37.4	28.3	153.2	32.1	26.1	91.9	31.1	
Level of Service	E	C	C	E	D	C	F	C	C	F	C	
Approach Delay (s)		36.3			37.6			71.3			44.8	
Approach LOS		D			D			E			D	

Intersection Summary				
HCM 2000 Control Delay	49.3	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.88			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	80.9%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
7: Auto Park Way & Country Club Dr/Driveway

2/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	410	5	57	5	5	5	183	855	5	50	1042	239
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	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1723		1770	3536		1770	3440	
Flt Permitted	0.75	1.00	1.00	0.75	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1399	1863	1583	1405	1723		1770	3536		1770	3440	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	446	5	62	5	5	5	199	929	5	54	1133	260
RTOR Reduction (vph)	0	0	48	0	4	0	0	0	0	0	21	0
Lane Group Flow (vph)	446	5	14	5	6	0	199	934	0	54	1372	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)	20.0	20.0	20.0	20.0	20.0		14.2	51.8		5.5	43.1	
Effective Green, g (s)	20.0	20.0	20.0	20.0	20.0		14.2	51.8		5.5	43.1	
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22		0.16	0.58		0.06	0.48	
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)	313	417	354	314	385		281	2051		109	1660	
v/s Ratio Prot		0.00			0.00		c0.11	0.26		0.03	c0.40	
v/s Ratio Perm	c0.32		0.01	0.00								
v/c Ratio	1.42	0.01	0.04	0.02	0.02		0.71	0.46		0.50	0.83	
Uniform Delay, d1	34.6	27.0	27.1	27.0	27.0		35.6	10.7		40.6	19.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	208.9	0.0	0.0	0.0	0.0		7.9	0.7		3.5	4.9	
Delay (s)	243.5	27.0	27.2	27.0	27.0		43.5	11.4		44.1	24.8	
Level of Service	F	C	C	C	C		D	B		D	C	
Approach Delay (s)		215.3			27.0			17.1			25.5	
Approach LOS		F			C			B			C	

Intersection Summary					
HCM 2000 Control Delay	53.7	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	0.96				
Actuated Cycle Length (s)	89.3	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	85.9%	ICU Level of Service		E	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
8: Valley Pkwy & W. 9th Ave

2/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	233	323	10	155	330	240	20	738	183	120	1075	264
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.91		1.00	0.91	
Frt	1.00	1.00		1.00	0.94		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3523		1770	3316		1770	4934		1770	4935	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3523		1770	3316		1770	4934		1770	4935	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	253	351	11	168	359	261	22	802	199	130	1168	287
RTOR Reduction (vph)	0	2	0	0	107	0	0	39	0	0	37	0
Lane Group Flow (vph)	253	360	0	168	513	0	22	962	0	130	1418	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	13.0	21.6		11.5	20.1		1.5	35.3		5.0	38.8	
Effective Green, g (s)	13.0	21.6		11.5	20.1		1.5	35.3		5.0	38.8	
Actuated g/C Ratio	0.14	0.23		0.12	0.22		0.02	0.38		0.05	0.42	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	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)	246	814		217	713		28	1864		94	2050	
v/s Ratio Prot	c0.14	0.10		0.09	c0.15		0.01	0.19		c0.07	c0.29	
v/s Ratio Perm												
v/c Ratio	1.03	0.44		0.77	0.72		0.79	0.52		1.38	0.69	
Uniform Delay, d1	40.2	30.7		39.7	34.0		45.8	22.4		44.2	22.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	64.9	0.4		15.7	3.5		82.7	1.0		225.2	1.9	
Delay (s)	105.1	31.1		55.4	37.5		128.5	23.5		269.4	24.3	
Level of Service	F	C		E	D		F	C		F	C	
Approach Delay (s)		61.6			41.3			25.7			44.4	
Approach LOS		E			D			C			D	

Intersection Summary					
HCM 2000 Control Delay	41.7	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	0.82				
Actuated Cycle Length (s)	93.4	Sum of lost time (s)		20.0	
Intersection Capacity Utilization	76.4%	ICU Level of Service		D	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
9: Auto Park Wy & Valley Pkwy

2/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	710	50	150	914	564	100	789	40	179	467	430
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	3.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3514		3433	3285	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3514		3433	3285	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	326	772	54	163	993	613	109	858	43	195	508	467
RTOR Reduction (vph)	0	0	38	0	0	67	0	4	0	0	166	0
Lane Group Flow (vph)	326	772	16	163	993	546	109	897	0	195	809	0
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	12.6	29.1	29.1	7.9	22.4	38.1	5.0	29.3		15.7	40.0	
Effective Green, g (s)	12.6	29.1	29.1	7.9	22.4	38.1	5.0	29.3		15.7	40.0	
Actuated g/C Ratio	0.13	0.29	0.29	0.08	0.22	0.38	0.05	0.29		0.16	0.40	
Clearance Time (s)	5.0	5.0	5.0	3.0	5.0	5.0	5.0	5.0		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)	432	1479	460	271	1139	682	171	1029		538	1314	
v/s Ratio Prot	c0.09	0.15		0.05	0.20	c0.13	0.03	c0.26		0.06	0.25	
v/s Ratio Perm			0.01			0.22						
v/c Ratio	0.75	0.52	0.03	0.60	0.87	0.80	0.64	0.87		0.36	0.62	
Uniform Delay, d1	42.2	29.6	25.4	44.5	37.4	27.6	46.6	33.6		37.7	23.9	
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	7.3	1.3	0.1	3.7	9.3	6.6	7.6	10.1		0.4	2.2	
Delay (s)	49.5	31.0	25.5	48.3	46.7	34.1	54.2	43.7		38.1	26.0	
Level of Service	D	C	C	D	D	C	D	D		D	C	
Approach Delay (s)		36.0			42.5			44.8			28.1	
Approach LOS		D			D			D			C	

Intersection Summary					
HCM 2000 Control Delay	38.2	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	0.87				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		20.0	
Intersection Capacity Utilization	79.1%	ICU Level of Service		D	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
10: Shopping Ctr Dwy/I-15 SB Ramps & Valley Pkwy

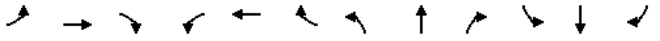
2/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	113	759	53	90	958	270	31	40	90	353	80	652
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.6	5.5	5.5	5.5	5.5	5.5		5.5	
Lane Util. Factor	0.97	0.91	1.00	0.97	0.81	0.81	1.00	1.00	1.00		0.95	
Frt	1.00	1.00	0.85	1.00	0.99	0.85	1.00	1.00	0.85		0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	3433	5085	1583	3433	5987	1282	1770	1863	1583		3169	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	
Satd. Flow (perm)	3433	5085	1583	3433	5987	1282	1770	1863	1583		3169	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	123	825	58	98	1041	293	34	43	98	384	87	709
RTOR Reduction (vph)	0	0	44	0	6	155	0	0	85	0	226	0
Lane Group Flow (vph)	123	825	14	98	1094	79	34	43	13	0	954	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6			3			
Actuated Green, G (s)	5.0	28.8	28.8	10.1	34.5	34.5	16.5	16.5	16.5		43.5	
Effective Green, g (s)	5.0	28.8	28.8	10.1	34.5	34.5	16.5	16.5	16.5		43.5	
Actuated g/C Ratio	0.04	0.24	0.24	0.08	0.29	0.29	0.14	0.14	0.14		0.36	
Clearance Time (s)	4.0	5.5	5.5	4.6	5.5	5.5	5.5	5.5	5.5		5.5	
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)	143	1220	379	288	1721	368	243	256	217		1148	
v/s Ratio Prot	c0.04	0.16		0.03	c0.18		0.02	c0.02			c0.30	
v/s Ratio Perm			0.01			0.06			0.01			
v/c Ratio	0.86	0.68	0.04	0.34	0.64	0.22	0.14	0.17	0.06		0.83	
Uniform Delay, d1	57.2	41.4	35.0	51.8	37.3	32.5	45.5	45.7	45.0		34.9	
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	37.6	3.0	0.2	0.7	1.8	1.3	1.2	1.4	0.5		7.0	
Delay (s)	94.8	44.4	35.1	52.5	39.1	33.8	46.7	47.1	45.6		41.9	
Level of Service	F	D	D	D	D	C	D	D	D		D	
Approach Delay (s)		50.0			39.1			46.2			41.9	
Approach LOS		D			D			D			D	

Intersection Summary					
HCM 2000 Control Delay	43.2	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	0.66				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		21.1	
Intersection Capacity Utilization	72.9%	ICU Level of Service		C	
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
11: I-15 NB Ramps & Valley Pkwy

2/27/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	335	867	0	0	1020	201	298	0	340	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	5.5			5.5	5.5		4.6	4.6			
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			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	364	942	0	0	1109	218	324	0	370	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	149	0	0	57	0	0	0
Lane Group Flow (vph)	364	942	0	0	1109	69	0	324	313	0	0	0
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases						6			8			
Actuated Green, G (s)	15.9	53.5			33.4	33.4		41.4	41.4			
Effective Green, g (s)	15.9	53.5			33.4	33.4		41.4	41.4			
Actuated g/C Ratio	0.15	0.51			0.32	0.32		0.39	0.39			
Clearance Time (s)	4.2	5.5			5.5	5.5		4.6	4.6			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	519	1803			1617	503		697	624			
v/s Ratio Prot	c0.11	0.27			c0.22			0.18				
v/s Ratio Perm						0.04			c0.20			
v/c Ratio	0.70	0.52			0.69	0.14		0.46	0.50			
Uniform Delay, d1	42.3	17.2			31.2	25.5		23.6	24.0			
Progression Factor	1.00	1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2	4.3	1.1			2.4	0.6		2.2	2.9			
Delay (s)	46.6	18.3			33.6	26.1		25.8	26.9			
Level of Service	D	B			C	C		C	C			
Approach Delay (s)		26.2			32.4			26.4			0.0	
Approach LOS		C			C			C			A	

Intersection Summary				
HCM 2000 Control Delay	28.7	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.60			
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	14.3	
Intersection Capacity Utilization	57.7%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
12: Country Club Dr & Eden Valley Ln

2/27/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	103	19	9	434	262	50
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	112	21	10	472	285	54
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	803	312	339			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	803	312	339			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	68	97	99			
cM capacity (veh/h)	350	728	1220			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	133	482	339
Volume Left	112	10	0
Volume Right	21	0	54
cSH	381	1220	1700
Volume to Capacity	0.35	0.01	0.20
Queue Length 95th (ft)	38	1	0
Control Delay (s)	19.4	0.2	0.0
Lane LOS	C	A	
Approach Delay (s)	19.4	0.2	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
13: Country Club Dr & Kauana Loa Dr

2/27/2015

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	23	99	288	64	88	180
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	108	313	70	96	196

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	133	383	291
Volume Left (vph)	25	0	96
Volume Right (vph)	108	70	0
Hadj (s)	-0.42	-0.08	0.10
Departure Headway (s)	5.0	4.5	4.8
Degree Utilization, x	0.18	0.48	0.39
Capacity (veh/h)	639	771	721
Control Delay (s)	9.2	11.7	10.8
Approach Delay (s)	9.2	11.7	10.8
Approach LOS	A	B	B

Intersection Summary			
Delay	10.9		
Level of Service	B		
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
14: Country Club Dr & Mt. Whitney Rd

2/27/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	82	17	9	270	166	40
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	89	18	10	293	180	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				917		
pX, platoon unblocked						
vC, conflicting volume	515	202	224			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	515	202	224			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	83	98	99			
cM capacity (veh/h)	516	839	1345			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	108	303	224
Volume Left	89	10	0
Volume Right	18	0	43
cSH	552	1345	1700
Volume to Capacity	0.19	0.01	0.13
Queue Length 95th (ft)	18	1	0
Control Delay (s)	13.1	0.3	0.0
Lane LOS	B	A	
Approach Delay (s)	13.1	0.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	33.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
15: Country Club Dr & New Access #1

2/27/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	22	2	1	257	174	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	2	1	279	189	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				507		
pX, platoon unblocked						
vC, conflicting volume	476	194	199			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	476	194	199			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	100	100			
cM capacity (veh/h)	547	847	1373			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	26	280	199
Volume Left	24	1	0
Volume Right	2	0	10
cSH	564	1373	1700
Volume to Capacity	0.05	0.00	0.12
Queue Length 95th (ft)	4	0	0
Control Delay (s)	11.7	0.0	0.0
Lane LOS	B	A	
Approach Delay (s)	11.7	0.0	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		0.6		
Intersection Capacity Utilization		24.3%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
16: Country Club Dr & New Access #2

2/27/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	22	4	1	236	167	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	4	1	257	182	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				307		
pX, platoon unblocked						
vC, conflicting volume	445	186	191			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	445	186	191			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	99	100			
cM capacity (veh/h)	570	856	1382			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	28	258	191
Volume Left	24	1	0
Volume Right	4	0	10
cSH	601	1382	1700
Volume to Capacity	0.05	0.00	0.11
Queue Length 95th (ft)	4	0	0
Control Delay (s)	11.3	0.0	0.0
Lane LOS	B	A	
Approach Delay (s)	11.3	0.0	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		0.7		
Intersection Capacity Utilization		23.2%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Signalized Intersection Capacity Analysis
17: Country Club Dr & Harmony Grove Rd

2/27/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	260	19	85	460	5	31	70	201	5	34	163
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	
Lane Util. Factor	0.95	0.95		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00			0.91		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1681	1748		1770	1860			1687		1770	1632	
Flt Permitted	0.95	0.98		0.95	1.00			0.87		0.24	1.00	
Satd. Flow (perm)	1681	1725		1770	1860			1483		447	1632	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	125	283	21	92	500	5	34	76	218	5	37	177
RTOR Reduction (vph)	0	1	0	0	0	0	0	77	0	0	141	0
Lane Group Flow (vph)	112	316	0	92	505	0	0	251	0	5	73	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	9.6	64.4		6.1	51.3			18.4		18.4	18.4	
Effective Green, g (s)	9.6	64.4		6.1	51.3			18.4		18.4	18.4	
Actuated g/C Ratio	0.11	0.71		0.07	0.56			0.20		0.20	0.20	
Clearance Time (s)	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	
Lane Grp Cap (vph)	176	1219		118	1045			298		90	328	
v/s Ratio Prot	c0.07	c0.03		0.05	c0.27						0.04	
v/s Ratio Perm		0.16						c0.17		0.01		
v/c Ratio	0.64	0.26		0.78	0.48			0.84		0.06	0.22	
Uniform Delay, d1	39.2	4.8		41.9	12.0			35.1		29.4	30.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	7.3	0.1		27.1	0.4			19.1		0.3	0.3	
Delay (s)	46.5	5.0		69.0	12.4			54.1		29.7	30.8	
Level of Service	D	A		E	B			D		C	C	
Approach Delay (s)		15.8			21.1			54.1			30.8	
Approach LOS		B			C			D			C	

Intersection Summary				
HCM 2000 Control Delay	27.9	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.58			
Actuated Cycle Length (s)	91.3	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	81.3%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
18: Harmony Grove Rd & Kauna Loa Dr

2/27/2015

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	139	23	529	95	37	528
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	151	25	575	103	40	574
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				268		
pX, platoon unblocked						
vC, conflicting volume			176		1417	164
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			176		1417	164
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			59		55	35
cM capacity (veh/h)			1400		89	881

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	176	678	614
Volume Left	0	575	40
Volume Right	25	0	574
cSH	1700	1400	557
Volume to Capacity	0.10	0.41	1.10
Queue Length 95th (ft)	0	51	480
Control Delay (s)	0.0	8.5	95.9
Lane LOS		A	F
Approach Delay (s)	0.0	8.5	95.9
Approach LOS			F

Intersection Summary				
Average Delay	44.1			
Intersection Capacity Utilization	87.7%	ICU Level of Service	E	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
1: S Twin Oaks Valley Rd & Discovery St/E Barham Dr

2/25/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	945	705	90	290	502	550	75	1660	460	440	1220	622
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	0.91		1.00	1.00	1.00	1.00	0.91		0.97	0.91	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	4999		1770	1863	1583	1770	4920		3433	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	4999		1770	1863	1583	1770	4920		3433	5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1027	766	98	315	546	598	82	1804	500	478	1326	676
RTOR Reduction (vph)	0	11	0	0	0	132	0	34	0	0	0	311
Lane Group Flow (vph)	1027	853	0	315	546	466	82	2270	0	478	1326	365
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	32.0	35.9		30.1	34.0	34.0	9.0	53.0		15.0	59.0	59.0
Effective Green, g (s)	32.0	35.9		30.1	34.0	34.0	9.0	53.0		15.0	59.0	59.0
Actuated g/C Ratio	0.21	0.24		0.20	0.23	0.23	0.06	0.35		0.10	0.39	0.39
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)	732	1196		355	422	358	106	1738		343	2000	622
v/s Ratio Prot	c0.30	0.17		0.18	0.29		0.05	c0.46		c0.14	0.26	
v/s Ratio Perm						c0.29						0.23
v/c Ratio	1.40	0.71		0.89	1.29	1.30	0.77	1.31		1.39	0.66	0.59
Uniform Delay, d1	59.0	52.3		58.3	58.0	58.0	69.5	48.5		67.5	37.3	35.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	189.5	2.0		22.4	148.9	154.5	28.8	142.1		194.1	1.8	4.0
Delay (s)	248.5	54.4		80.7	206.9	212.5	98.3	190.6		261.6	39.1	39.9
Level of Service	F	D		F	F	F	F	F		F	D	D
Approach Delay (s)		159.8			181.9			187.5			82.2	
Approach LOS		F			F			F			F	

Intersection Summary					
HCM 2000 Control Delay	148.3	HCM 2000 Level of Service	F		
HCM 2000 Volume to Capacity ratio	1.33				
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0		
Intersection Capacity Utilization	121.6%	ICU Level of Service	H		
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
2: Barham Dr & Woodland Pkwy

2/25/2015

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	820	1306	412	280	480	560
Ideal Flow (vphpl)	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	1.00	1.00	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	1863	1863	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	891	1420	448	304	522	609
RTOR Reduction (vph)	0	0	0	0	0	19
Lane Group Flow (vph)	891	1420	448	304	522	590
Turn Type	Prot	NA	NA	pm+ov	Prot	pm+ov
Protected Phases	7	4	8	6	6	7
Permitted Phases				8		6
Actuated Green, G (s)	66.0	102.0	32.0	72.0	40.0	106.0
Effective Green, g (s)	66.0	102.0	32.0	72.0	40.0	106.0
Actuated g/C Ratio	0.44	0.68	0.21	0.48	0.27	0.71
Clearance Time (s)	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
Lane Grp Cap (vph)	778	1266	397	802	472	1160
v/s Ratio Prot	0.50	c0.76	0.24	0.10	c0.29	0.22
v/s Ratio Perm				0.09		0.15
v/c Ratio	1.15	1.12	1.13	0.38	1.11	0.51
Uniform Delay, d1	42.0	24.0	59.0	24.8	55.0	10.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	80.2	65.7	84.9	0.3	73.5	0.4
Delay (s)	122.2	89.7	143.9	25.1	128.5	10.4
Level of Service	F	F	F	C	F	B
Approach Delay (s)		102.2	95.9		64.9	
Approach LOS		F	F		E	

Intersection Summary					
HCM 2000 Control Delay	91.0	HCM 2000 Level of Service	F		
HCM 2000 Volume to Capacity ratio	1.15				
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0		
Intersection Capacity Utilization	103.7%	ICU Level of Service	G		
Analysis Period (min)	15				
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
3: Barham Dr/Driveway & Mission Rd

2/25/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	1012	60	384	963	10	80	10	679	20	10	10
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	1.00	0.95			1.00	0.88		1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85		0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.98	
Satd. Flow (prot)	1770	3539	1583	1770	3534			1784	2787		1756	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.79	
Satd. Flow (perm)	1770	3539	1583	1770	3534			1784	2787		1425	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	1100	65	417	1047	11	87	11	738	22	11	11
RTOR Reduction (vph)	0	0	44	0	0	0	0	0	601	0	10	0
Lane Group Flow (vph)	11	1100	21	417	1058	0	0	98	137	0	34	0
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8		2	2			6	
Permitted Phases			4						2	6		
Actuated Green, G (s)	0.7	33.2	33.2	29.3	61.8			19.1	19.1		5.2	
Effective Green, g (s)	0.7	33.2	33.2	29.3	61.8			19.1	19.1		5.2	
Actuated g/C Ratio	0.01	0.32	0.32	0.29	0.60			0.19	0.19		0.05	
Clearance Time (s)	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	
Lane Grp Cap (vph)	12	1142	511	504	2124			331	517		72	
v/s Ratio Prot	0.01	c0.31		c0.24	0.30			c0.05				
v/s Ratio Perm			0.01						0.05		c0.02	
v/c Ratio	0.92	0.96	0.04	0.83	0.50			0.30	0.27		0.47	
Uniform Delay, d1	51.0	34.2	23.9	34.4	11.7			36.1	35.8		47.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	212.2	18.3	0.0	10.7	0.2			2.3	1.3		4.7	
Delay (s)	263.2	52.5	23.9	45.1	11.9			38.3	37.1		52.2	
Level of Service	F	D	C	D	B			D	D		D	
Approach Delay (s)		52.9			21.3			37.2			52.2	
Approach LOS		D			C			D			D	

Intersection Summary				
HCM 2000 Control Delay	36.0	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.74			
Actuated Cycle Length (s)	102.8	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	68.2%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
4: Nordahl Rd & SR-78 WB On Ramp/SR-78 WB Off Ramp

2/25/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	521	10	640	690	968	0	0	1058	550
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Lane Util. Factor				0.95	0.91	0.95	0.97	0.95			0.91	1.00
Frt				1.00	0.90	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1501	1504	3433	3539			5085	1583
Flt Permitted				0.95	0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1501	1504	3433	3539			5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	566	11	696	750	1052	0	0	1150	598
RTOR Reduction (vph)	0	0	0	0	65	68	0	0	0	0	0	410
Lane Group Flow (vph)	0	0	0	441	356	343	750	1052	0	0	1150	188
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				37.0	37.0	37.0	29.3	71.8			37.3	37.3
Effective Green, g (s)				37.0	37.0	37.0	29.3	71.8			37.3	37.3
Actuated g/C Ratio				0.31	0.31	0.31	0.24	0.60			0.31	0.31
Clearance Time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				518	462	463	838	2117			1580	492
v/s Ratio Prot				c0.26	0.24		c0.22	0.30			c0.23	
v/s Ratio Perm						0.23						0.12
v/c Ratio				0.85	0.77	0.74	0.89	0.50			0.73	0.38
Uniform Delay, d1				38.9	37.6	37.2	43.9	13.8			36.8	32.3
Progression Factor				1.00	1.00	1.00	1.47	0.58			1.00	1.00
Incremental Delay, d2				12.7	7.8	6.3	5.8	0.4			3.0	2.2
Delay (s)				51.6	45.4	43.5	70.4	8.4			39.8	34.6
Level of Service				D	D	D	E	A			D	C
Approach Delay (s)		0.0			47.0			34.2			38.0	
Approach LOS		A			D			C			D	

Intersection Summary				
HCM 2000 Control Delay	39.0	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.82			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	88.6%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
4: SR 78 WB Ramps & Nordahl Rd

7/20/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	578	10	640	679	965	0	0	982	550
Future Volume (vph)	0	0	0	578	10	640	679	965	0	0	982	550
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Lane Util. Factor				0.95	0.91	0.95	0.97	0.95			0.91	1.00
Frt				1.00	0.91	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.98	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1681	1513	1504	3433	3539			5085	1583
Flt Permitted				0.95	0.98	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1681	1513	1504	3433	3539			5085	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	628	11	696	738	1049	0	0	1067	598
RTOR Reduction (vph)	0	0	0	0	54	57	0	0	0	0	0	431
Lane Group Flow (vph)	0	0	0	465	391	368	738	1049	0	0	1067	167
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm
Protected Phases				8	8		5	2			6	
Permitted Phases						8						6
Actuated Green, G (s)				33.0	33.0	33.0	22.7	55.8			27.9	27.9
Effective Green, g (s)				33.0	33.0	33.0	22.7	55.8			27.9	27.9
Actuated g/C Ratio				0.33	0.33	0.33	0.23	0.56			0.28	0.28
Clearance Time (s)				5.6	5.6	5.6	5.2	5.6			5.6	5.6
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)				554	499	496	779	1974			1418	441
v/s Ratio Prot				c0.28	0.26		c0.21	0.30			c0.21	
v/s Ratio Perm						0.24						0.11
v/c Ratio				0.84	0.78	0.74	0.95	0.53			0.75	0.38
Uniform Delay, d1				31.0	30.3	29.7	38.1	13.9			32.9	29.1
Progression Factor				1.00	1.00	1.00	1.17	0.18			1.00	1.00
Incremental Delay, d2				10.8	7.9	5.9	16.0	0.7			3.7	2.5
Delay (s)				41.8	38.1	35.6	60.5	3.2			36.6	31.5
Level of Service				D	D	D	E	A			D	C
Approach Delay (s)		0.0			38.6			26.9			34.8	
Approach LOS		A			D			C			C	

Intersection Summary				
HCM 2000 Control Delay	32.9	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.84			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	127.1%	ICU Level of Service	H	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Nordahl Rd & SR 78 EB Ramps

7/20/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	375	60	525	0	0	0	0	1269	659	570	990	0
Future Volume (vph)	375	60	525	0	0	0	0	1269	659	570	990	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.6	
Lane Util. Factor	0.95	0.91	0.95					0.91	1.00	0.97	0.95	
Frt	1.00	0.90	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1511	1504					5085	1583	3433	3539	
Flt Permitted	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1681	1511	1504					5085	1583	3433	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	408	65	571	0	0	0	0	1379	716	620	1076	0
RTOR Reduction (vph)	0	60	64	0	0	0	0	0	351	0	0	0
Lane Group Flow (vph)	363	290	267	0	0	0	0	1379	365	620	1076	0
Turn Type	Split	NA	Perm					NA	Perm	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	28.3	28.3	28.3					38.5	38.5	16.8	60.5	
Effective Green, g (s)	28.3	28.3	28.3					38.5	38.5	16.8	60.5	
Actuated g/C Ratio	0.28	0.28	0.28					0.38	0.38	0.17	0.60	
Clearance Time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.6	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	475	427	425					1957	609	576	2141	
v/s Ratio Prot	c0.22	0.19						c0.27		c0.18	0.30	
v/s Ratio Perm			0.18						0.23			
v/c Ratio	0.76	0.68	0.63					0.70	0.60	1.08	0.50	
Uniform Delay, d1	32.8	31.8	31.3					26.0	24.6	41.6	11.2	
Progression Factor	1.00	1.00	1.00					0.49	0.41	0.81	0.84	
Incremental Delay, d2	7.2	4.3	2.9					1.2	2.4	52.4	0.5	
Delay (s)	40.0	36.1	34.2					14.0	12.4	86.3	9.9	
Level of Service	D	D	C					B	B	F	A	
Approach Delay (s)		36.8			0.0			13.5			37.8	
Approach LOS		D			A			B			D	

Intersection Summary				
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.80			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	127.1%	ICU Level of Service	H	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Nordahl Rd & SR-78 EB Off Ramp/SR-78 EB On Ramp

2/25/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	330	5	425	0	0	0	0	1328	665	570	1009	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.6	
Lane Util. Factor	0.95	0.91	0.95					0.95	0.88	0.97	0.95	
Frt	1.00	0.89	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1681	1492	1504					3539	2787	3433	3539	
Flt Permitted	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1681	1492	1504					3539	2787	3433	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	359	5	462	0	0	0	0	1443	723	620	1097	0
RTOR Reduction (vph)	0	83	84	0	0	0	0	0	314	0	0	0
Lane Group Flow (vph)	287	193	179	0	0	0	0	1443	409	620	1097	0
Turn Type	Split	NA	Perm					NA	Perm	Prot	NA	
Protected Phases	4	4						2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	27.1	27.1	27.1					50.9	50.9	25.6	81.7	
Effective Green, g (s)	27.1	27.1	27.1					50.9	50.9	25.6	81.7	
Actuated g/C Ratio	0.23	0.23	0.23					0.42	0.42	0.21	0.68	
Clearance Time (s)	5.6	5.6	5.6					5.6	5.6	5.2	5.6	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	379	336	339					1501	1182	732	2409	
v/s Ratio Prot	c0.17	0.13						c0.41		c0.18	0.31	
v/s Ratio Perm			0.12						0.15			
v/c Ratio	0.76	0.57	0.53					0.96	0.35	0.85	0.46	
Uniform Delay, d1	43.4	41.3	40.8					33.6	23.3	45.3	8.9	
Progression Factor	1.00	1.00	1.00					0.62	0.44	1.02	1.15	
Incremental Delay, d2	8.4	2.4	1.5					11.7	0.5	6.0	0.4	
Delay (s)	51.8	43.7	42.3					32.7	10.7	52.0	10.5	
Level of Service	D	D	D					C	B	D	B	
Approach Delay (s)		46.1			0.0			25.4			25.5	
Approach LOS		D			A			C			C	

Intersection Summary				
HCM 2000 Control Delay	29.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.88			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.4	
Intersection Capacity Utilization	88.6%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
6: Nordahl Rd & Mission Rd

2/25/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	450	800	461	40	430	430	497	1113	63	150	743	360
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
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)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	4837	
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)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	4837	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	489	870	501	43	467	467	540	1210	68	163	808	391
RTOR Reduction (vph)	0	0	0	0	0	166	0	0	0	0	70	0
Lane Group Flow (vph)	489	870	501	43	467	301	540	1210	68	163	1129	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	22.9	44.2	44.2	4.8	26.1	26.1	18.0	40.5	40.5	10.5	33.0	
Effective Green, g (s)	22.9	44.2	44.2	4.8	26.1	26.1	18.0	40.5	40.5	10.5	33.0	
Actuated g/C Ratio	0.19	0.37	0.37	0.04	0.22	0.22	0.15	0.34	0.34	0.09	0.28	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	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)	655	1303	583	137	769	344	514	1716	534	300	1330	
v/s Ratio Prot	0.14	0.25		0.01	0.13		c0.16	0.24		0.05	c0.23	
v/s Ratio Perm			c0.32			c0.19			0.04			
v/c Ratio	0.75	0.67	0.86	0.31	0.61	0.88	1.05	0.71	0.13	0.54	0.85	
Uniform Delay, d1	45.8	31.7	35.0	56.0	42.3	45.4	51.0	34.6	27.5	52.5	41.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.81	1.18	
Incremental Delay, d2	4.6	1.3	12.0	1.3	1.4	21.1	53.6	2.5	0.5	1.8	6.2	
Delay (s)	50.4	33.1	47.1	57.3	43.7	66.5	104.6	37.0	28.0	44.1	54.5	
Level of Service	D	C	D	E	D	E	F	D	C	D	D	
Approach Delay (s)		41.4			55.2			56.8			53.3	
Approach LOS		D			E			E			D	

Intersection Summary				
HCM 2000 Control Delay	51.0	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.92			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	78.7%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
7: Auto Park Way & Country Club Dr/Driveway

2/25/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	310	5	44	5	5	5	109	1003	5	80	886	458
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	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1723		1770	3537		1770	3358	
Flt Permitted	0.75	1.00	1.00	0.75	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1399	1863	1583	1405	1723		1770	3537		1770	3358	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	337	5	48	5	5	5	118	1090	5	87	963	498
RTOR Reduction (vph)	0	0	37	0	4	0	0	0	0	0	79	0
Lane Group Flow (vph)	337	5	11	5	6	0	118	1095	0	87	1382	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								
Actuated Green, G (s)	18.0	18.0	18.0	18.0	18.0		7.6	44.3		4.7	41.4	
Effective Green, g (s)	18.0	18.0	18.0	18.0	18.0		7.6	44.3		4.7	41.4	
Actuated g/C Ratio	0.23	0.23	0.23	0.23	0.23		0.10	0.56		0.06	0.52	
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)	318	424	360	320	392		170	1983		105	1759	
v/s Ratio Prot		0.00			0.00		c0.07	c0.31		0.05	c0.41	
v/s Ratio Perm	c0.24		0.01	0.00								
v/c Ratio	1.06	0.01	0.03	0.02	0.02		0.69	0.55		0.83	0.79	
Uniform Delay, d1	30.5	23.6	23.7	23.6	23.6		34.6	11.0		36.8	15.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	67.1	0.0	0.0	0.0	0.0		11.6	1.1		39.1	3.6	
Delay (s)	97.6	23.6	23.7	23.7	23.7		46.2	12.1		75.9	18.8	
Level of Service	F	C	C	C	C		D	B		E	B	
Approach Delay (s)		87.6			23.7			15.5			22.0	
Approach LOS		F			C			B			C	

Intersection Summary				
HCM 2000 Control Delay	27.6	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.84			
Actuated Cycle Length (s)	79.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	79.0%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
8: Valley Pkwy & W. 9th Ave

2/25/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	296	452	10	236	277	100	30	829	237	140	1004	206
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.91		1.00	0.91	
Frt	1.00	1.00		1.00	0.96		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3528		1770	3398		1770	4915		1770	4955	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3528		1770	3398		1770	4915		1770	4955	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	322	491	11	257	301	109	33	901	258	152	1091	224
RTOR Reduction (vph)	0	2	0	0	42	0	0	48	0	0	28	0
Lane Group Flow (vph)	322	500	0	257	368	0	33	1111	0	152	1287	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	15.1	19.2		14.1	18.2		2.3	33.3		5.0	36.0	
Effective Green, g (s)	15.1	19.2		14.1	18.2		2.3	33.3		5.0	36.0	
Actuated g/C Ratio	0.16	0.21		0.15	0.20		0.03	0.36		0.05	0.39	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	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)	291	739		272	675		44	1786		96	1947	
v/s Ratio Prot	c0.18	c0.14		0.15	0.11		0.02	0.23		c0.09	c0.26	
v/s Ratio Perm												
v/c Ratio	1.11	0.68		0.94	0.55		0.75	0.62		1.58	0.66	
Uniform Delay, d1	38.2	33.3		38.4	33.0		44.4	24.0		43.3	22.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	84.4	2.5		39.5	0.9		51.4	1.6		306.1	1.8	
Delay (s)	122.7	35.8		77.9	33.9		95.8	25.6		349.4	24.6	
Level of Service	F	D		E	C		F	C		F	C	
Approach Delay (s)		69.8			50.8			27.6			58.2	
Approach LOS		E			D			C			E	

Intersection Summary				
HCM 2000 Control Delay	50.5	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.85			
Actuated Cycle Length (s)	91.6	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	73.0%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
9: Auto Park Wy & Valley Pkwy

2/25/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	260	884	50	130	863	320	130	383	180	564	954	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3369		3433	3412	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3369		3433	3412	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	283	961	54	141	938	348	141	416	196	613	1037	326
RTOR Reduction (vph)	0	0	38	0	0	55	0	70	0	0	38	0
Lane Group Flow (vph)	283	961	16	141	938	293	141	542	0	613	1325	0
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	8.0	23.0	23.0	5.0	20.0	34.0	4.0	18.0		14.0	28.0	
Effective Green, g (s)	8.0	23.0	23.0	5.0	20.0	34.0	4.0	18.0		14.0	28.0	
Actuated g/C Ratio	0.10	0.29	0.29	0.06	0.25	0.42	0.05	0.22		0.18	0.35	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		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)	343	1461	455	214	1271	771	171	758		600	1194	
v/s Ratio Prot	c0.08	c0.19		0.04	0.18	0.07	0.04	0.16		c0.18	c0.39	
v/s Ratio Perm			0.01			0.12						
v/c Ratio	0.83	0.66	0.03	0.66	0.74	0.38	0.82	0.72		1.02	1.11	
Uniform Delay, d1	35.3	25.0	20.5	36.7	27.6	15.8	37.7	28.6		33.0	26.0	
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	14.8	2.3	0.1	7.1	3.9	0.3	26.4	5.7		42.3	61.7	
Delay (s)	50.1	27.4	20.6	43.8	31.5	16.1	64.1	34.3		75.3	87.7	
Level of Service	D	C	C	D	C	B	E	C		E	F	
Approach Delay (s)		32.1			28.9			39.9			83.9	
Approach LOS		C			C			D			F	

Intersection Summary				
HCM 2000 Control Delay	51.1	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.98			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	80.4%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
10: Shopping Ctr Dwy/I-15 SB Ramps & Valley Pkwy

2/25/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	102	1605	121	270	733	410	33	70	330	261	110	426
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.6	5.5	5.5	5.5	5.5	5.5		5.5	
Lane Util. Factor	0.97	0.91	1.00	0.97	0.81	0.81	1.00	1.00	1.00		0.95	
Frt	1.00	1.00	0.85	1.00	0.97	0.85	1.00	1.00	0.85		0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	3433	5085	1583	3433	5837	1282	1770	1863	1583		3203	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	
Satd. Flow (perm)	3433	5085	1583	3433	5837	1282	1770	1863	1583		3203	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	111	1745	132	293	797	446	36	76	359	284	120	463
RTOR Reduction (vph)	0	0	94	0	42	145	0	0	216	0	174	0
Lane Group Flow (vph)	111	1745	39	293	978	78	36	76	143	0	693	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2			6			3			
Actuated Green, G (s)	5.0	35.0	35.0	11.4	42.0	42.0	16.5	16.5	16.5		36.0	
Effective Green, g (s)	5.0	35.0	35.0	11.4	42.0	42.0	16.5	16.5	16.5		36.0	
Actuated g/C Ratio	0.04	0.29	0.29	0.10	0.35	0.35	0.14	0.14	0.14		0.30	
Clearance Time (s)	4.0	5.5	5.5	4.6	5.5	5.5	5.5	5.5	5.5		5.5	
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)	143	1483	461	326	2042	448	243	256	217		960	
v/s Ratio Prot	0.03	c0.34		c0.09	0.17		0.02	0.04			c0.22	
v/s Ratio Perm			0.02			0.06			c0.09			
v/c Ratio	0.78	1.18	0.08	0.90	0.48	0.17	0.15	0.30	0.66		0.72	
Uniform Delay, d1	56.9	42.5	30.9	53.7	30.5	27.0	45.6	46.5	49.1		37.5	
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	22.7	86.9	0.4	25.8	0.8	0.8	1.3	2.9	14.7		4.7	
Delay (s)	79.7	129.4	31.2	79.5	31.3	27.8	46.8	49.5	63.8		42.2	
Level of Service	E	F	C	E	C	C	D	D	E		D	
Approach Delay (s)		120.1			40.0			60.2			42.2	
Approach LOS		F			D			E			D	

Intersection Summary				
HCM 2000 Control Delay	75.1	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	0.89			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.1	
Intersection Capacity Utilization	89.5%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
11: I-15 NB Ramps & Valley Pkwy

2/25/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	813	1383	0	0	1170	373	243	0	430	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	5.5			5.5	5.5		4.6	4.6			
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			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	884	1503	0	0	1272	405	264	0	467	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	305	0	0	46	0	0	0
Lane Group Flow (vph)	884	1503	0	0	1272	100	0	264	421	0	0	0
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases						6			8			
Actuated Green, G (s)	28.5	58.5			25.8	25.8		36.4	36.4			
Effective Green, g (s)	28.5	58.5			25.8	25.8		36.4	36.4			
Actuated g/C Ratio	0.27	0.56			0.25	0.25		0.35	0.35			
Clearance Time (s)	4.2	5.5			5.5	5.5		4.6	4.6			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	931	1971			1249	388		613	548			
v/s Ratio Prot	c0.26	0.42			c0.25			0.15				
v/s Ratio Perm						0.06			c0.27			
v/c Ratio	0.95	0.76			1.02	0.26		0.43	0.77			
Uniform Delay, d1	37.5	17.9			39.6	31.9		26.3	30.6			
Progression Factor	1.00	1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2	18.2	2.9			30.2	1.6		2.2	10.0			
Delay (s)	55.8	20.8			69.8	33.5		28.5	40.5			
Level of Service	E	C			E	C		C	D			
Approach Delay (s)		33.7			61.0			36.2			0.0	
Approach LOS		C			E			D			A	

Intersection Summary				
HCM 2000 Control Delay	43.6	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.90			
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	14.3	
Intersection Capacity Utilization	73.3%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
12: Country Club Dr & Eden Valley Ln

2/25/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	59	15	22	301	444	114
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	64	16	24	327	483	124
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	920	545	607			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	920	545	607			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	78	97	98			
cM capacity (veh/h)	293	539	972			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	80	351	607
Volume Left	64	24	0
Volume Right	16	0	124
cSH	323	972	1700
Volume to Capacity	0.25	0.02	0.36
Queue Length 95th (ft)	24	2	0
Control Delay (s)	19.8	0.8	0.0
Lane LOS	C	A	
Approach Delay (s)	19.8	0.8	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	44.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
13: Country Club Dr & Kauana Loa Dr

2/25/2015

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	61	88	234	28	103	334
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	66	96	254	30	112	363

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	162	285	475
Volume Left (vph)	66	0	112
Volume Right (vph)	96	30	0
Hadj (s)	-0.24	-0.03	0.08
Departure Headway (s)	5.4	4.9	4.8
Degree Utilization, x	0.25	0.39	0.64
Capacity (veh/h)	591	699	727
Control Delay (s)	10.2	11.0	15.8
Approach Delay (s)	10.2	11.0	15.8
Approach LOS	B	B	C

Intersection Summary			
Delay	13.3		
Level of Service	B		
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
14: Country Club Dr & Mt. Whitney Rd

2/25/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	43	11	14	199	298	97
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	47	12	15	216	324	105
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				917		
pX, platoon unblocked						
vC, conflicting volume	623	377	429			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	623	377	429			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	98	99			
cM capacity (veh/h)	444	670	1130			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	59	232	429
Volume Left	47	15	0
Volume Right	12	0	105
cSH	476	1130	1700
Volume to Capacity	0.12	0.01	0.25
Queue Length 95th (ft)	10	1	0
Control Delay (s)	13.6	0.7	0.0
Lane LOS	B	A	
Approach Delay (s)	13.6	0.7	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	32.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
15: Country Club Dr & New Access #1

2/25/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	11	1	3	252	282	27
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	1	3	274	307	29
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				507		
pX, platoon unblocked						
vC, conflicting volume	602	321	336			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	602	321	336			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	100	100			
cM capacity (veh/h)	462	720	1223			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	13	277	336
Volume Left	12	3	0
Volume Right	1	0	29
cSH	476	1223	1700
Volume to Capacity	0.03	0.00	0.20
Queue Length 95th (ft)	2	0	0
Control Delay (s)	12.8	0.1	0.0
Lane LOS	B	A	
Approach Delay (s)	12.8	0.1	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		0.3		
Intersection Capacity Utilization		26.5%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
16: Country Club Dr & New Access #2

2/25/2015

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	11	2	5	244	257	26
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	2	5	265	279	28
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				327		
pX, platoon unblocked						
vC, conflicting volume	570	293	308			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	570	293	308			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	100	100			
cM capacity (veh/h)	481	746	1253			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	14	271	308
Volume Left	12	5	0
Volume Right	2	0	28
cSH	509	1253	1700
Volume to Capacity	0.03	0.00	0.18
Queue Length 95th (ft)	2	0	0
Control Delay (s)	12.3	0.2	0.0
Lane LOS	B	A	
Approach Delay (s)	12.3	0.2	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		0.4		
Intersection Capacity Utilization		26.9%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Signalized Intersection Capacity Analysis
17: Country Club Dr & Harmony Grove Rd

2/25/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	186	570	35	246	290	10	16	40	114	10	89	177
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	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99			0.91		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1770	1847		1770	1853			1685		1770	1677	
Flt Permitted	0.95	1.00		0.95	1.00			0.89		0.52	1.00	
Satd. Flow (perm)	1770	1847		1770	1853			1503		977	1677	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	202	620	38	267	315	11	17	43	124	11	97	192
RTOR Reduction (vph)	0	3	0	0	1	0	0	78	0	0	75	0
Lane Group Flow (vph)	202	655	0	267	325	0	0	106	0	11	214	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	13.0	30.6		11.7	29.3			14.3		14.3	14.3	
Effective Green, g (s)	13.0	30.6		11.7	29.3			14.3		14.3	14.3	
Actuated g/C Ratio	0.19	0.45		0.17	0.43			0.21		0.21	0.21	
Clearance Time (s)	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	
Lane Grp Cap (vph)	335	823		301	791			313		203	349	
v/s Ratio Prot	0.11	c0.35		c0.15	0.18						c0.13	
v/s Ratio Perm								0.07		0.01		
v/c Ratio	0.60	0.80		0.89	0.41			0.34		0.05	0.61	
Uniform Delay, d1	25.4	16.3		27.8	13.7			23.1		21.7	24.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	3.0	5.4		25.3	0.3			0.6		0.1	3.2	
Delay (s)	28.5	21.7		53.1	14.0			23.8		21.8	27.8	
Level of Service	C	C		D	B			C		C	C	
Approach Delay (s)		23.3			31.6			23.8			27.6	
Approach LOS		C			C			C			C	

Intersection Summary				
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.77			
Actuated Cycle Length (s)	68.6	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	79.6%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
18: Harmony Grove Rd & Kauna Loa Dr

2/25/2015

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	81	50	645	156	33	647
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	88	54	701	170	36	703
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				268		
pX, platoon unblocked						
vC, conflicting volume			142		1687	115
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			142		1687	115
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			51		32	25
cM capacity (veh/h)			1440		53	937

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	142	871	739
Volume Left	0	701	36
Volume Right	54	0	703
cSH	1700	1440	518
Volume to Capacity	0.08	0.49	1.43
Queue Length 95th (ft)	0	69	888
Control Delay (s)	0.0	9.0	225.5
Lane LOS		A	F
Approach Delay (s)	0.0	9.0	225.5
Approach LOS			F

Intersection Summary				
Average Delay	99.6			
Intersection Capacity Utilization	103.1%	ICU Level of Service	G	
Analysis Period (min)	15			

APPENDIX J

COUNTRY CLUB DRIVE
QUEUING ANALYSIS WORKSHEETS

Valiano
Access Analysis

Scenario Report

Scenario:	ex+cp+p am
Command:	ex+cp+p am
Volume:	ex+cp+p am
Geometry:	proposed
Impact Fee:	Default Impact Fee
Trip Generation:	Default Trip Generation
Trip Distribution:	Default Trip Distribution
Paths:	Default Path
Routes:	Default Route
Configuration:	Default Configuration

LT Queuing
Access Analysis

Base Queue Report (cars)

Node	Intersection	Northbound L	Northbound T	Northbound R	Southbound L	Southbound T	Southbound R	Eastbound L	Eastbound T	Eastbound R	Westbound L	Westbound T	Westbound R
#12	[2Way95thQ]:	0.0	xxxx	xxxx	xxxx	xxxx	xxxx	1.0	1.0	1.0	xxxx	xxxx	xxxx
#14	[2Way95thQ]:	0.0	xxxx	xxxx	xxxx	xxxx	xxxx	0.5	0.5	0.5	xxxx	xxxx	xxxx
#15	[2Way95thQ]:	0.0	xxxx	xxxx	xxxx	xxxx	xxxx	0.1	0.1	0.1	xxxx	xxxx	xxxx
#16	[2Way95thQ]:	0.0	xxxx	xxxx	xxxx	xxxx	xxxx	0.1	0.1	0.1	xxxx	xxxx	xxxx

Valiano
Access Analysis

Future Queue Report (cars)
Page 2

LT Queuing

Node	Intersection	Northbound L	Northbound T	Northbound R	Southbound L	Southbound T	Southbound R	Eastbound L	Eastbound T	Eastbound R	Westbound L	Westbound T	Westbound R
#12	[2Way95thQ]:	0.0	xxxx	xxxx	xxxx	xxxx	xxxx	1.0	1.0	1.0	xxxx	xxxx	xxxx
#14	[2Way95thQ]:	0.0	xxxx	xxxx	xxxx	xxxx	xxxx	0.5	0.5	0.5	xxxx	xxxx	xxxx
#15	[2Way95thQ]:	0.0	xxxx	xxxx	xxxx	xxxx	xxxx	0.1	0.1	0.1	xxxx	xxxx	xxxx
#16	[2Way95thQ]:	0.0	xxxx	xxxx	xxxx	xxxx	xxxx	0.1	0.1	0.1	xxxx	xxxx	xxxx

Scenario Report

Scenario: ex+cp+p pm

Command: cx+cp+p pm
Volume: ex+cp+p pm

LT Queuing

Geometry:	proposed
Impact Fee:	Default Impact Fee
Trip Generation:	Default Trip Generation
Trip Distribution:	Default Trip Distribution
Paths:	Default Path
Routes:	Default Route
Configuration:	Default Configuration

Base Queue Report (cars)

Node	Intersection	Northbound L -- T -- R	Southbound L -- T -- R	Eastbound L -- T -- R	Westbound L -- T -- R
#12	[2Way95thQ]:	0.1 xxxx xxxx	xxxx xxxx xxxx	0.6 0.6 0.6	xxxx xxxx xxxx
#14	[2Way95thQ]:	0.0 xxxx xxxx	xxxx xxxx xxxx	0.3 0.3 0.3	xxxx xxxx xxxx

		LT Queuing										
#15	[2Way95thQ]:	0.0	xxxx	xxxx	xxxx	xxxx	xxxx	0.0	0.0	0.0	xxxx	xxxx	xxxx
#16	[2Way95thQ]:	0.0	xxxx	xxxx	xxxx	xxxx	xxxx	0.1	0.1	0.1	xxxx	xxxx	xxxx

Future Queue Report (cars)

Node	Intersection	Northbound L	-- T	-- R	Southbound L	-- T	-- R	Eastbound L	-- T	-- R	Westbound L	-- T	-- R
#12	[2Way95thQ]:	0.1	xxxx	xxxx	xxxx	xxxx	xxxx	0.6	0.6	0.6	xxxx	xxxx	xxxx
#14	[2Way95thQ]:	0.0	xxxx	xxxx	xxxx	xxxx	xxxx	0.3	0.3	0.3	xxxx	xxxx	xxxx
#15	[2Way95thQ]:	0.0	xxxx	xxxx	xxxx	xxxx	xxxx	0.0	0.0	0.0	xxxx	xxxx	xxxx
#16	[2Way95thQ]:	0.0	xxxx	xxxx	xxxx	xxxx	xxxx	0.1	0.1	0.1	xxxx	xxxx	xxxx

APPENDIX K

ESCONDIDO CITY COUNCIL AGENDA: APPROVAL OF SIGNIFICANT AND UNAVOIDABLE IMPACTS FOR THE AUTO PARK WAY/ MISSION ROAD INTERSECTION – ESCONDIDO GENERAL PLAN UPDATE FEIR, MAY 2012

CORRELATION TO THE CITY COUNCIL ACTION PLAN:

This item relates to the Council's Action Plan regarding Community Outreach; Economic Development and Image and Appearance.

PLANNING COMMISSION ACTION:

Five members of the Planning Commission reviewed the General Plan and Final EIR on May 7, 2012 (See Attachment "B" Draft Planning Commission Minutes). Commissioner Spann was absent, and Commissioner Johns has not been officially sworn in. The Commission unanimously recommended approval of the General Plan chapters pertaining to Economic Prosperity, Growth Management, Resource Conservation, Community Protection, Community Health and Services, and Implementation Program without discussion. The Commission also unanimously recommended approval of two private General Plan land use amendments (refer to Planning Commission staff report pages 3, 17 – 23), as well as the deletion of Residential Clustering Policy 5.11 without discussion (refer to Planning Commission staff report page 4). Most of the discussion focused on the Land Use and Community Form Element involving several proposed General Plan amendments subject to voter approval:

Imperial Oakes Corporate Center SPA #13 (General Plan page II-59)
Areas along Iris Lane are established with single family residential homes, while portions to the west are less developed. The Specific Plan proposes retaining the residential development along the west side of Iris Lane and transitioning to employment land uses in the western portion of the site. The proposed SPA is encumbered by a SDGE utility easement that traverses the area in a north-south direction. Several members of the public opposed the proposed SPA. A majority of residents who spoke reside along Iris Lane and were concerned that the employment land uses would impact their neighborhood character. Other public concerns included potential loss of open space, traffic affecting emergency services, and the low demand for additional office uses given the current high vacancy rates.

Staff noted that the SPA text accommodates residential development along Iris Lane (see #3 on page II-60). The General Plan calls for future employment development to include trails that integrate with Rod McLeod Park, which would add recreational opportunities. Staff also noted that the General Plan is intended to address long-term community needs and that current employment land vacancy rates should not be used as an indicator of future conditions.

Commissioner Caster felt that the text and map should be further clarified to delineate residential and employment areas of the Specific Planning Area. Commission McQuead noted that such details could be established in the subsequent Specific Plan document that would implement the plan. Further discussion ensued regarding the merits of providing additional detail in the General Plan regarding the locations for residential and employment areas. Ultimately the Commission felt that providing such information in the General Plan would allow the residents to know the long term-plans for their area and recommended that the text and map be modified to further clarify the boundary between residential and employment land uses, specifically retaining residential uses along the west side of Iris Lane (4-0-1; Watson abstained due to an ownership conflict of interest).

However, The City Council may wish to consider eliminating this policy from the General Plan to avoid potential confusion in the future. Because the policy was readopted as part of the 1998 voter initiative, deleting the policy would require voter approval.

General Plan Ballot Measures

As the Council is aware, General Plan land use changes that intensify residential designations, or change residential designations to commercial and/or industrial land uses require a public vote. In addition, amendments to specified General Plan policies that were readopted in a 1998 voter-approved initiative also require voter approval. Because the General Plan Update includes both of the actions described, those portions of the Plan will require voter approval to be implemented. The General Plan is silent regarding the format for structuring General Plan ballot measures. Prior discussions at City Council meetings, and at the Planning Commission meeting on May 7, 2012, indicate a consensus for fewer (and possibly a single) ballot measure that groups land use and policy changes together in order to simplify the process and reduce confusion. Staff is seeking direction regarding the number and potential grouping of General Plan ballot amendments for voter consideration in order to commence developing ballot language for the Registrar of Voters to include in the November election.

STAFF RECOMMENDATION AND NEXT STEPS IN THE PROCESS:

Staff recommends that the City Council:

1) Adopt Resolution 2012-53 certifying the Final EIR, Findings, Statement of Overriding Considerations, and Mitigation Monitoring and Reporting Program;
2) Provide direction regarding the:
   a. Urban V land use designation;
   b. Population build out policy;
   c. Number and potential grouping of General Plan ballot amendments.
3) Adopt Resolution 2012-52 approving the General Plan Update with noted modifications;
4) Adopt Resolution 2012-54 approving General Plan amendments for voter consideration.

In light of the pending ballot measure(s), public outreach remains an important component. Based on City Council approval of the various General Plan update actions, staff proposes to schedule a follow-up briefing with the Council regarding educational and outreach programs recommended for informing voters about the General Plan in anticipation of the November election. Staff is developing recommended wording proposed for the ballot for consideration by the Council in June in order to meet the Registrar of Voter's timeframe for receiving the General Plan ballot measure language.

Respectfully submitted,

Barbara J. Redlitz
Director of Community Development

Jay Petrek
Principal Planner

The EIR concludes that implementing the project would result in *Less than Significant* Impacts for the following categories:

> Aesthetics, Agricultural Resources, Cultural Resources, Geology and Soils, Greenhouse Gas Emissions, Hazards and Hazardous Materials, Hydrology and Water Quality, Land Use, Mineral Resources, Public Services, and Recreation.

The EIR concludes that implementing the project would result in *Significant and Unavoidable* Impacts for the following categories:

1) Air Quality (Construction Dust)
2) Biological Resources (Special Status plant and animal species, Riparian Habitat, Wildlife Movement / Nursery Sites)
3) Noise (Ambient Noise, Construction Vibration)
4) Population and Housing (Population Displacement)
5) Transportation and Traffic (Level of Service for five roadway segments/six intersections):
   a. *Roadway Segments:*
      i. Mission Road between Barham Drive and Auto Park Way (LOS E)
      ii. Valley Parkway between Hickory Street and Fig Street (LOS F)
      iii. Valley Parkway between Fig Street and Date Street (LOS F)
      iv. Valley Parkway between Date Street and Ash Street (LOS F)
      v. Montiel Road between Nordahl Roand and Deodar Road (San Marcos) (LOS F)
   b. *Intersections:*
      i. Nordahl Road/Auto Park Way/Mission Road (LOS E, PM peak hour)
      ii. Centre City Parkway/Felicita Avenue (LOS F, PM peak hour)
      iii. Escondido Boulevard/Felicita Avenue (LOS E/F, AM/PM peak hours, respectively)
      iv. Ash Street/Valley Parkway (LOS E, both AM/PM peak hours)
      v. I-15 Southbound Ramps/Via Rancho Parkway (LOS E/F, AM/PM peak hours, respectively)
      vi. El Norte Parkway/Centre City Parkway (LOS E/F, AM/PM peak hours, respectively)
6) Utilities and Service Systems, (Water Supplies, Landfill Capacities)

Because adopting the General Plan Update involves Significant and Unavoidable Impacts, a Statement of Overriding Findings is included for adoption by the Planning Commission (Attachment C). This document concludes that the economic and social benefits of the project outweighs the impacts associated with implementation and is required as a component of the Final EIR's certification. The Final EIR includes a Mitigation and Monitoring Plan (Attachment D) where staff has assigned responsibility and tracking of the implementation of Mitigation Measures identified in the document.

Comments were received during the public review period that concluded on February 27, 2012 and incorporated into the Final EIR (refer to document). Late comments were received from the Escondido Elementary School District after the EIR public review period concluded expressing concern regarding school finances, continuity of educational programs, growth, and traffic/safety. The Department of Fish and Game (DFG) has requested clarification on General Plan policies related to open space preservation. The Chamber of Citizens submitted a follow-up letter expressing concern about General Plan population and compliance with an existing policy that limits Escondido's build-out population to 155,000 persons. Follow up responses have been prepared for the School District and DFG (Attachment E) for incorporation in the public record. The Chamber of Citizens concern is addressed below.

APPENDIX L

PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS
ALTERNATIVE ACCESS SCENARIO

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	22	6	1	83	70	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	7	1	90	76	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	174	82	88			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	174	82	88			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	100			
cM capacity (veh/h)	815	978	1508			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	30	91	88
Volume Left	24	1	0
Volume Right	7	0	12
cSH	845	1508	1700
Volume to Capacity	0.04	0.00	0.05
Queue Length 95th (ft)	3	0	0
Control Delay (s)	9.4	0.1	0.0
Lane LOS	A	A	
Approach Delay (s)	9.4	0.1	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	15.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	10	0	1	264	165	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	0	1	287	179	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					1284	
pX, platoon unblocked						
vC, conflicting volume	471	182	185			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	471	182	185			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	100	100			
cM capacity (veh/h)	551	860	1390			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	11	288	185
Volume Left	11	1	0
Volume Right	0	0	5
cSH	551	1390	1700
Volume to Capacity	0.02	0.00	0.11
Queue Length 95th (ft)	2	0	0
Control Delay (s)	11.7	0.0	0.0
Lane LOS	B	A	
Approach Delay (s)	11.7	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	24.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	16	2	6	105	72	17
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	2	7	114	78	18
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	215	88	97			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	215	88	97			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	100	100			
cM capacity (veh/h)	770	971	1497			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	20	121	97
Volume Left	17	7	0
Volume Right	2	0	18
cSH	788	1497	1700
Volume to Capacity	0.02	0.00	0.06
Queue Length 95th (ft)	2	0	0
Control Delay (s)	9.7	0.4	0.0
Lane LOS	A	A	
Approach Delay (s)	9.7	0.4	0.0
Approach LOS	A		

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	20.4%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	10	5	2	203	260	18
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	5	2	221	283	20
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					1203	
pX, platoon unblocked						
vC, conflicting volume	517	292	302			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	517	292	302			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	100			
cM capacity (veh/h)	517	747	1259			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	16	223	302
Volume Left	11	2	0
Volume Right	5	0	20
cSH	576	1259	1700
Volume to Capacity	0.03	0.00	0.18
Queue Length 95th (ft)	2	0	0
Control Delay (s)	11.4	0.1	0.0
Lane LOS	B	A	
Approach Delay (s)	11.4	0.1	0.0
Approach LOS	B		

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	24.8%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	51	10	3	137	110	23
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	55	11	3	149	120	25
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	288	132	145			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	288	132	145			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	99	100			
cM capacity (veh/h)	701	917	1438			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	66	152	145
Volume Left	55	3	0
Volume Right	11	0	25
cSH	729	1438	1700
Volume to Capacity	0.09	0.00	0.09
Queue Length 95th (ft)	7	0	0
Control Delay (s)	10.4	0.2	0.0
Lane LOS	B	A	
Approach Delay (s)	10.4	0.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	19.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	54	5	3	375	212	23
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	59	5	3	408	230	25
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					1278	
pX, platoon unblocked						
vC, conflicting volume	657	243	255			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	657	243	255			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	86	99	100			
cM capacity (veh/h)	429	796	1310			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	64	411	255
Volume Left	59	3	0
Volume Right	5	0	25
cSH	446	1310	1700
Volume to Capacity	0.14	0.00	0.15
Queue Length 95th (ft)	12	0	0
Control Delay (s)	14.4	0.1	0.0
Lane LOS	B	A	
Approach Delay (s)	14.4	0.1	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	32.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	32	4	11	154	174	53
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	35	4	12	167	189	58
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	409	218	247			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	409	218	247			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	99	99			
cM capacity (veh/h)	593	822	1319			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	39	179	247
Volume Left	35	12	0
Volume Right	4	0	58
cSH	612	1319	1700
Volume to Capacity	0.06	0.01	0.15
Queue Length 95th (ft)	5	1	0
Control Delay (s)	11.3	0.6	0.0
Lane LOS	B	A	
Approach Delay (s)	11.3	0.6	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		1.2		
Intersection Capacity Utilization		27.2%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	33	8	9	261	395	71
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	36	9	10	284	429	77
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					1301	
pX, platoon unblocked						
vC, conflicting volume	771	468	507			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	771	468	507			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	90	99	99			
cM capacity (veh/h)	365	595	1058			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	45	293	507
Volume Left	36	10	0
Volume Right	9	0	77
cSH	395	1058	1700
Volume to Capacity	0.11	0.01	0.30
Queue Length 95th (ft)	9	1	0
Control Delay (s)	15.3	0.4	0.0
Lane LOS	C	A	
Approach Delay (s)	15.3	0.4	0.0
Approach LOS	C		

Intersection Summary				
Average Delay		0.9		
Intersection Capacity Utilization		35.1%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	30	10	5	352	227	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	11	5	383	247	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	651	258	268			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	651	258	268			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	99	100			
cM capacity (veh/h)	431	781	1295			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	43	388	268
Volume Left	33	5	0
Volume Right	11	0	22
cSH	486	1295	1700
Volume to Capacity	0.09	0.00	0.16
Queue Length 95th (ft)	7	0	0
Control Delay (s)	13.1	0.2	0.0
Lane LOS	B	A	
Approach Delay (s)	13.1	0.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		0.9	
Intersection Capacity Utilization		32.5%	ICU Level of Service A
Analysis Period (min)		15	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	10	0	5	409	227	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	0	5	445	247	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					1203	
pX, platoon unblocked						
vC, conflicting volume	708	252	258			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	708	252	258			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	100	100			
cM capacity (veh/h)	400	786	1307			

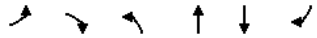
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	11	450	258
Volume Left	11	5	0
Volume Right	0	0	11
cSH	400	1307	1700
Volume to Capacity	0.03	0.00	0.15
Queue Length 95th (ft)	2	0	0
Control Delay (s)	14.3	0.1	0.0
Lane LOS	B	A	
Approach Delay (s)	14.3	0.1	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		0.3	
Intersection Capacity Utilization		35.5%	ICU Level of Service A
Analysis Period (min)		15	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	20	10	10	259	345	25
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	11	11	282	375	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	692	389	402			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	692	389	402			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	98	99			
cM capacity (veh/h)	406	660	1156			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	33	292	402
Volume Left	22	11	0
Volume Right	11	0	27
cSH	466	1156	1700
Volume to Capacity	0.07	0.01	0.24
Queue Length 95th (ft)	6	1	0
Control Delay (s)	13.3	0.4	0.0
Lane LOS	B	A	
Approach Delay (s)	13.3	0.4	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		0.8		
Intersection Capacity Utilization		31.7%	ICU Level of Service	A
Analysis Period (min)		15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	10	10	5	287	424	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	11	5	312	461	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					1203	
pX, platoon unblocked						
vC, conflicting volume	795	472	483			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	795	472	483			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	98	99			
cM capacity (veh/h)	355	592	1080			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	22	317	483
Volume Left	11	5	0
Volume Right	11	0	22
cSH	444	1080	1700
Volume to Capacity	0.05	0.01	0.28
Queue Length 95th (ft)	4	0	0
Control Delay (s)	13.5	0.2	0.0
Lane LOS	B	A	
Approach Delay (s)	13.5	0.2	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		0.4		
Intersection Capacity Utilization		33.5%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	59	14	7	406	267	32
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	64	15	8	441	290	35
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	764	308	325			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	764	308	325			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	83	98	99			
cM capacity (veh/h)	370	732	1235			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	79	449	325
Volume Left	64	8	0
Volume Right	15	0	35
cSH	408	1235	1700
Volume to Capacity	0.19	0.01	0.19
Queue Length 95th (ft)	18	0	0
Control Delay (s)	15.9	0.2	0.0
Lane LOS	C	A	
Approach Delay (s)	15.9	0.2	0.0
Approach LOS	C		

Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	37.8%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	54	5	7	520	274	28
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	59	5	8	565	298	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					1304	
pX, platoon unblocked						
vC, conflicting volume	893	313	328			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	893	313	328			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	81	99	99			
cM capacity (veh/h)	310	727	1231			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	64	573	328
Volume Left	59	8	0
Volume Right	5	0	30
cSH	326	1231	1700
Volume to Capacity	0.20	0.01	0.19
Queue Length 95th (ft)	18	0	0
Control Delay (s)	18.7	0.2	0.0
Lane LOS	C	A	
Approach Delay (s)	18.7	0.2	0.0
Approach LOS	C		

Intersection Summary				
Average Delay	1.4			
Intersection Capacity Utilization	43.0%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	59	12	15	308	447	61
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	64	13	16	335	486	66
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	886	519	552			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	886	519	552			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	79	98	98			
cM capacity (veh/h)	310	557	1018			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	77	351	552
Volume Left	64	16	0
Volume Right	13	0	66
cSH	335	1018	1700
Volume to Capacity	0.23	0.02	0.32
Queue Length 95th (ft)	22	1	0
Control Delay (s)	18.9	0.6	0.0
Lane LOS	C	A	
Approach Delay (s)	18.9	0.6	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	39.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	33	13	12	345	559	73
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	36	14	13	375	608	79
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					1311	
pX, platoon unblocked						
vC, conflicting volume	1048	647	687			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1048	647	687			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	86	97	99			
cM capacity (veh/h)	249	471	907			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	50	388	687
Volume Left	36	13	0
Volume Right	14	0	79
cSH	287	907	1700
Volume to Capacity	0.17	0.01	0.40
Queue Length 95th (ft)	16	1	0
Control Delay (s)	20.2	0.5	0.0
Lane LOS	C	A	
Approach Delay (s)	20.2	0.5	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX M

SANDAG SELECT ZONE ASSIGNMENT AND YEAR 2035 FORECAST TRAFFIC VOLUMES

SANDAG
Series 12 2035rc11
Select Zone Plot

TAZ 1086

Functional Classifications

- Freeway
- Prime
- Major
- Collector
- Light Collector
- Rural Collector
- Local
- Freeway Ramp
- Local Ramp
- Zone Connector

Traffic Analysis Zones

\# Selz Volumes & Percentage

\# Unadjusted ADT(x1000)

SAN DIEGO ASSOCIATION OF GOVERNMENTS
401 B STREET, SUITE 800
SAN DIEGO, CALIFORNIA 92101 USA
(619) 699-1900
E-mail: sandag@sandag.org
Web site: www.sandag.org

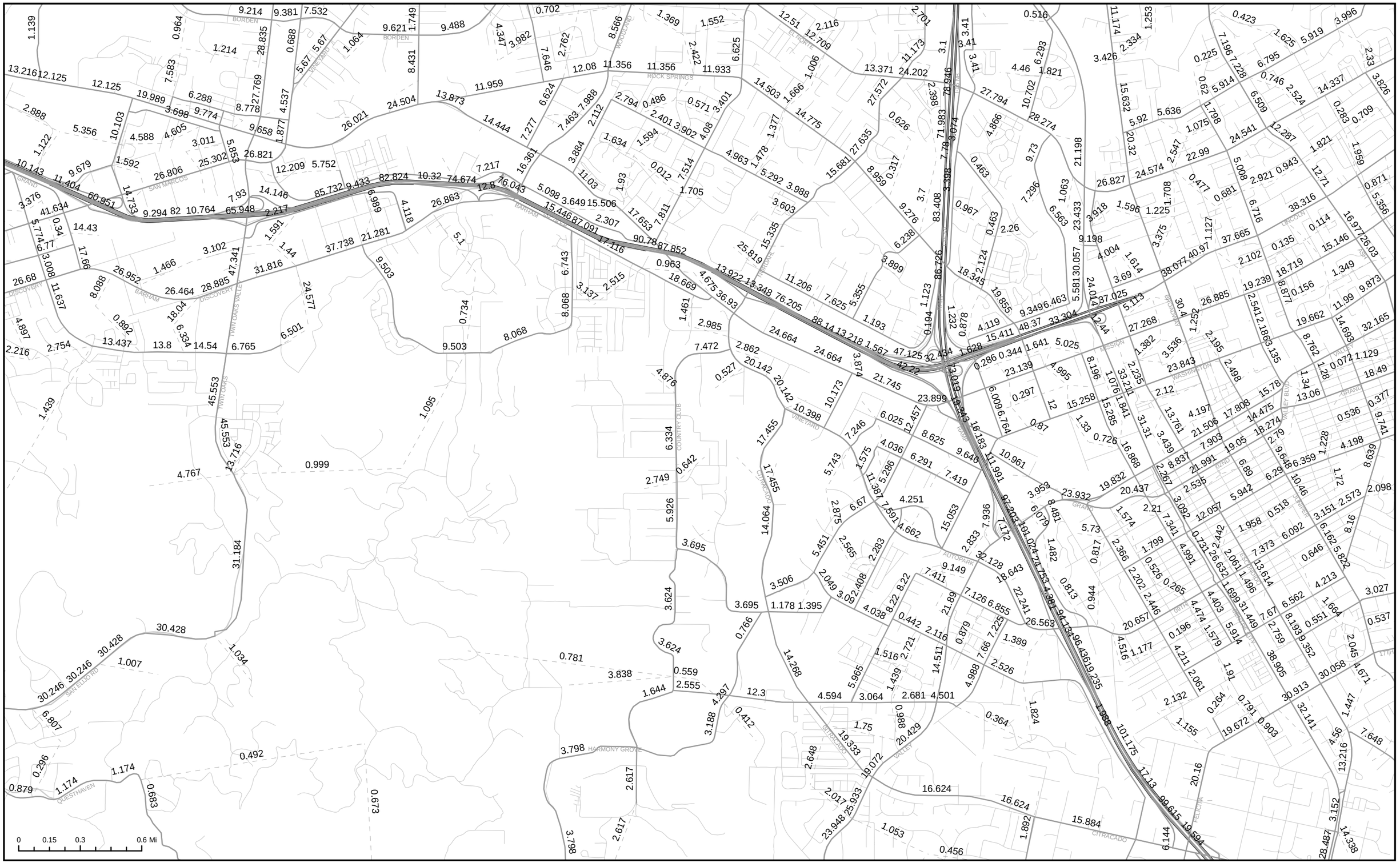
N

0 0.1 0.2 0.3
Miles

SANDAG

servicebureau

Date: August22, 2012


BORDEN
VINEYARD
WOODLAND
ROCK SPRINGS
EL NORTE
GRAND
SAN MARCOS
BARHAM
DISCOVERY
TWIN OAKS VALLEY
TWIN OAKS
COUNTRY CLUB
CITRACADO
AUTOPARK
LINCOLN
WASHINGTON
MISSION
FELICITA
QUESTHAVEN
SAN ELIDO RD
HARMONY GROVE
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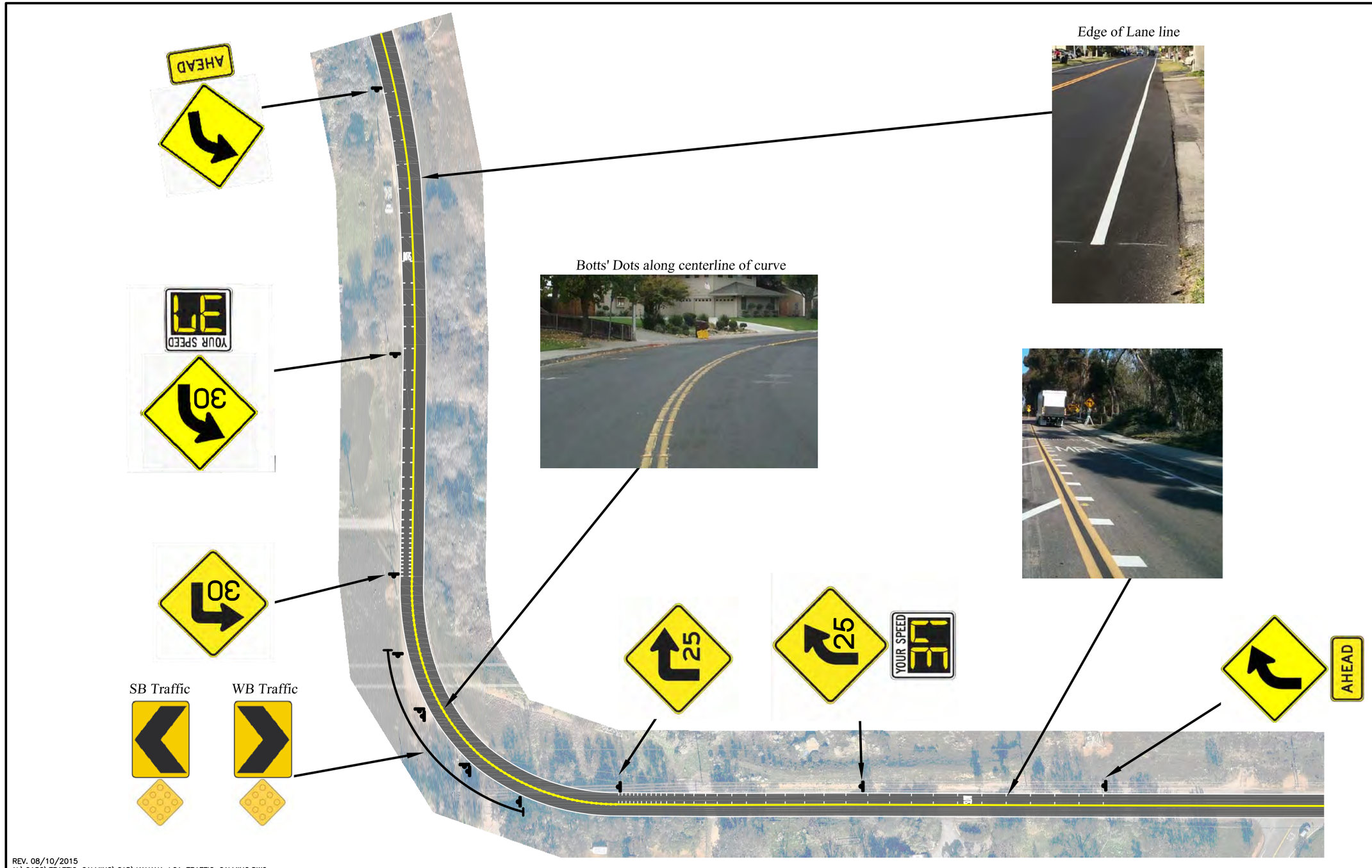
0.15
0.3
0.6 Mi

Eden Hills

APPENDIX N

KAUANA LOA DRIVE
PROPOSED TRAFFIC CALMING FEATURES



REV. 08/10/2015
N:\2152\TRAFFIC CALMING\CAD\KAUANA LOA TRAFFIC CALMING.DWG

LINSCOTT LAW & GREENSPAN engineers

Figure 1

Kauana Loa Dr- Proposed Traffic Calming Features

VALIANO

APPENDIX O

EXHIBIT B1; ESCONDIDO CITY COUNCIL APPROVED AGREEMENT FOR IMPROVEMENTS TO OFF-SITE ROADWAYS, DECEMBER 9, 2015

ESCONDIDO
City of Choice

CITY COUNCIL

For City Clerk's Use:
☐ APPROVED ☐ DENIED
Reso No. _____ File No. _____
Ord No. _____

Agenda Item No.: 17
Date: December 9, 2015

TO: Honorable Mayor and Members of the City Council

FROM: Graham Mitchell, Assistant City Manager

SUBJECT: Valiano Sewer Facilities Development Memorandum of Understanding and Traffic Mitigation Funding Agreement

RECOMMENDATION:

It is requested that the City Council adopt Resolution No. 2015-209 approving a Sewer Facilities Development Memorandum of Undestanding and a Traffic Mitigation Funding Agreement with Eden Hills Project Owner, LLC.

FISCAL ANALYSIS:

The approval of the Sewer Facilities Development Memorandum of Understanding will result in the construction of an upgraded sewer pump station, related facilities and wet weather storage resulting in operational savings, and a net of approximately $1.7 million in sewer connection fees. The approval of the Traffic Mitigation Funding Agreement will result in constructed roadway improvements and a deposit of $250,000 to apply to the future expansion of Citracado Parkway.

BACKGROUND:

The Valiano housing development project is planned to include 326 single family residential units. The project, located on 239 acres, is outside of the City's limits but within the City's sphere of influence—the project is not contiguous to the City's boundaries. The project will likely be considered by the San Diego County Board of Supervisors in Summer 2016. The City has no land use approval authority for this development project.

The project requires a method to treat the wastewater created by the development. Also, as part of the project's approval process, the County requires that the project's developer mitigate traffic impacts resulting in the City of Escondido.

Sewer Facilities Development Memorandum of Understanding

The Valiano project will require a means to treat wastewater generated by the development. The developer has identified several wastewater options. One of the sewer options benefits the City.

This option relies on the City's existing wastewater treatment system. In order to utilize the City's system, a Sewer Facilities Development Memorandum of Understanding (MOU) would be required.

Staff analyzed the impacts that the Valiano Project would have on the City's sewer system capacity. Currently, the City's Hale Avenue Resource Recovery Facility (HARRF) operates at 60 percent capacity during dry weather. Since reductions in water usage by the community, excess sewer capacity has increased over the past few years. Staff has determined that connecting 326 single family units will add approximately 82,000 gallons of wastewater to the system per day. Given the HARRF processes 11 million gallons per day, the addition of the Valiano Project wastewater is negligible and represents an increase of less than 1 percent.

The MOU requires the developer to reconstruct Sewer Pump Station No. 12, install new gravity and force mains, and provide a 5.5 million gallon wet weather storage facility that would principally serve the City. These upgrades to the sewer pump station, gravity and force mains, and the new wet weather storage facility are beneficial to the City.

In addition, the developer would pay $2,445,000 in sewer connection fees. The City would credit up to $750,000 to the developer for costs incurred in the development of the sewer facilities improvements, leaving the City with a minimum of nearly $1.7 million for future sewer capacity projects. The developer would also reimburse the City up to $25,000 for its review of plans and inspection of the various sewer projects.

The MOU would only become effective if the County approves the development project and if the City and County are able to enter into a sewer service agreement.

Traffic Mitigation Funding Agreement

The project's Environmental Impact Report determined mitigatable traffic impacts to the City. It was determined that there would be impacts on Country Club Drive, Kauana Loa Drive, and at the intersection of Country Club Drive/Auto Park Way. A Traffic Mitigation Funding Agreement identifies the developer's obligations to address the impacts. The mitigation measures identified in the Agreement include:

1) Restriping the intersection at Country Club Drive and Auto Park Way to improve functionality;
2) Widening portion of Country Club Drive near Auto Park Way (west of Auto Park Way);
3) Widening portion of Country Club Drive from Auto Park Way to near Hill Valley Drive to 36-feet wide (the widening project includes installing a section of sidewalk to connect a disconnected sidewalk system and relocating three utility poles);
4) Installing six-inch asphalt berm and a decomposed granite pathway along portions of Country Club Drive; and

5) Improving Kauana Loa Drive from 1,500 feet east of Country Club Drive to Harmony Grove Road (improvements include widening a section by two-feet, paving, and installation of traffic calming measures, such as signage, striping, radar speed signs, and "bott's dots").

The developer will also provide a one-time fair share contribution of $250,000 for eventual completion of Citracado Parkway. The payment and the improvements are contingent on the developer being approved to develop the project by the County of San Diego. If approved, the contribution and improvements will be completed before issuance of the first certificate of occupancy.

The public benefit to the City is the completion of needed improvements on Country Club Drive and Kauana Loa Drive, along with funding for Citracado Parkway's completion.

Respectfully submitted,

Graham Mitchell, Assistant City Manager

Agenda Item No.: 17
Date: December 9, 2015

RESOLUTION NO. 2015-209

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF ESCONDIDO, CALIFORNIA, AUTHORIZING THE MAYOR AND CITY CLERK, TO EXECUTE, ON BEHALF OF THE CITY, A SEWER FACILITIES DEVELOPMENT MEMORANDUM OF UNDERSTANDING AND A TRAFFIC MITIGATION FUNDING AGREEMENT WITH EDEN HILLS PROJECT OWNER, LLC

WHEREAS, Eden Hills Project Owner, LLC (the "Developer") is processing a 326 single family residential development project (the "Valiano Project") outside of the City of Escondido's limits; and

WHEREAS, the Valiano Project is within the City's sphere of influence; and

WHEREAS, the County Board of Supervisors has land use authority to consider the Valiano Project; and

WHEREAS, the Valiano Project requires a method to treat wastewater generated by the Developer and the Developer has identified several wastewater treatment options; and

WHEREAS, one of the Valiano wastewater treatment options that benefits the City and its sewer service rate payers is the City selling sewer capacity at its Hale Avenue Resource Recovery Facility in exchange for up to approximately $1.7 million in sewer connect fees, approximately $1.5 million in sewer system upgrades, and the development of a 5.5 million gallon wet weather storage facility that would serve the City; and

WHEREAS, a Sewer Facilities Development Memorandum of Understanding ("MOU") identities the requirements of the Developer regarding the sewer system upgrades and fees; and

WHEREAS, the Valiano Project's Environmental Impact Report determined mitigatable traffic impacts to the City; and

WHEREAS, a Traffic Mitigation Funding Agreement identifies the traffic mitigation measures required of the Developer and requires a one-time fair share contribution of $250,000 for the eventual completion of Citracado Parkway; and

WHEREAS, both the Sewer Facilities Development MOU and the Traffic Mitigation Funding Agreement would only become effective if the County of San Diego approves the Valiano Project; and

WHEREAS, it is the best interest of the City to enter into a Sewer Facilities Development MOU and a Traffic Mitigation Funding Agreement with Eden Hills Project Owner, LLC.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Escondido, California, as follows:

1. That the above recitations are true and correct.

2. That the City Council authorize the Mayor to executive a Sewer Facilities Development MOU with Eden Hills Project Owner, LLC which is attached and incorporated by this reference as Exhibit "A."

3. That the City Council authorize the Mayor to executive a Traffic Mitigation Funding Agreement with Eden Hills Project Owner, LLC which is attached and incorporated by this reference as Exhibit "B."

SEWER FACILITIES DEVELOPMENT MEMORANDUM OF UNDERSTANDING

THIS SEWER FACILITIES DEVELOPMENT MEMORANDUM OF UNDERSTANDING ("MOU") is made as of this _____ day of _____, 2015 between THE EDEN HILLS PROJECT OWNER, LLC, a Delaware limited liability company, (hereinafter referred to as "Developer") and the CITY OF ESCONDIDO, a California municipality (hereinafter referred to as "Escondido" or "the City."). Developer and the City may also at times be individually referred to as a "Party" and collectively as "Parties."

RECITALS

A. Developer is the developer of the Valiano residential project, located in the County of San Diego, consisting of 238 acres and 326 residential units, and any secondary dwelling units, if any, and park related facilities (the "Project"), generally depicted on Exhibit "1" attached hereto. While the Project is located in San Diego County, the majority of the Project site is located in the City's sphere of influence, and the Project site is not currently within any County of San Diego ("County") sanitation district.

B. The application associated with the Project, which includes a General Plan Amendment and enactment of a Specific Plan (the "Project Entitlements"), is currently undergoing review with the County. The Draft Environmental Impact Report ("DEIR") associated with the Project has been circulated and the public review period has concluded. The DEIR considers various sewer service options including the improvement and connection to the City's facilities as described in this document.

C. The City owns and operates a wastewater collection, treatment, and disposal system, including the Hale Avenue Resource Recovery Facility, a wastewater treatment and recycling plant located within the City (the "Plant" or "HARRF"). The Plant is located approximately 4,000 feet from the Project site, and currently has excess average dry weather wastewater capacity that can be made available for the Project.

D. It is anticipated that the City will allow the connection and acceptance of new sewer flows from a new County collection system from the Project, or a substantially similar project, to connect with the City's existing sewer system, subject to the terms and conditions of this MOU.

E. The Parties anticipate that the Developer will construct a new pump station, gravity main and force main which would replace and relocate the City's Sewer Pump Station No. 12 force main.

F. Developer desires to connect the Project to the Plant because the Project site is not currently serviced by the County, and Developer wishes to avoid constructing an onsite wastewater treatment plant and disposal facilities in conjunction with the Project. The Parties recognize that Developer enters into this MOU with the intention of satisfying any requirement the County may have as part of its review of the Project to show that the Project will have wastewater service.

G. If the County does not approve the Project Entitlements, or the City is not able to enter into a sewer service agreement with the County on terms acceptable to the City, then the Parties agree that neither Party is bound by this MOU.

NOW, THEREFORE, the parties agree as follows:

1. Incorporation of Recitals. The foregoing Recitals are fully incorporated into the MOU, as if they were fully repeated herein.

2. Duration. Unless otherwise agreed to in writing by the Parties, this MOU shall expire on December 31, 2030 if the Project Entitlements have not been approved by the County, or the City and the County have not entered into a sewer service agreement.

3. Replacement and Relocated Facilities. The City agrees Developer shall replace and relocate the City's Sewer Pump Station No. 12 and construct a new sewer pump station, gravity main, and force main (approximately 1,600 feet) in a different location, as shown in Exhibit "2", in accordance with City design standards at the time of installation. Developer shall ensure the construction is warrantied for a period of at least one year. Upon the completion of the construction of the Sewer Project, as described herein, Developer shall dedicate the new Sewer Pump Station No. 12 (Pump Station) and force main to the City. The Pump Station shall consist of submersible pumping units at an approximate capacity of 300 gallons per minute system with telemetry and backup generator. Attached as Exhibit "3" is a general description and preliminary budget for the Pump Station.

4. Planning Phase. Subject to City's reasonable prior approval, Developer shall designate and engage a qualified engineering firm (the "Engineer") to conduct preliminary design and engineering work for the purpose of constructing a new Sewer Pump Station No. 12, gravity main, and force main to convey both the Project flows, existing City flows, and other future flows as determined by the City, and installing and connecting the Developer's constructed onsite sewer system, to be accepted by the County, to the new City Sewer Pump Station No. 12. The new Developer sewer system will be designed to County and City standards and shall meet the City's requirements for flow. The Engineer shall report to City on the progress of its activities when requested by the City. As part of its scope of work for Developer, the Engineer shall identify all necessary permits and approvals from governmental and regulatory agencies and bodies other than City, as well as any rights of way which must be acquired in order to design, engineer, construct and operate the new Sewer Pump Station No. 12, force main, gravity main and sewer system (the "Sewer Project") to provide services to the Project.

5. Permitting, Construction and Approvals. Subject to City's reasonable prior approval of the design and engineering plans for the new Pump Station No. 12, force main, gravity main, and connection from the Project, Developer shall apply for any necessary permits and approvals from governmental agencies and bodies, in addition to those required by City which are referenced herein, to permit the construction and operation of the Project utilizing the services of the Engineer as may be selected by Developer with the reasonable prior approval of City. City agrees to cooperate with Developer in obtaining said permits and approvals and Developer shall pay any costs for such permits directly related to the Project.

Upon operational acceptance of the Sewer Project by the City and County, Developer shall pay to City the applicable fees, as set by resolution of the city council, at the time of acceptance. Those fees are set at $7500 per equivalent dwelling unit and will continue to be set at $7500, for the purposes of this MOU, for 36 months after the date this MOU is executed by both parties. The

City shall credit the fee paid by Developer for 25% of the design and construction cost of the improvements pursuant to this MOU. Such credit shall not exceed $750,000.

City shall be reimbursed by Developer for City's reasonable costs of overseeing and inspecting the construction work of the new Sewer Pump Station 12, gravity main, and force main being performed to connect the Developer sewer system within thirty (30) days of being sent a bill for such costs. City shall further be reimbursed by Developer for City's reasonable costs in coordinating planning or other time spent in relation to this MOU. Reimbursement shall be limited to a maximum of $25,000. All permits obtained by Developer shall be applicable to the new Pump Station, force main and the system connection only.

Developer shall comply with the requirements of the City's Wastewater Discharge Permit, and if required, any subsequent applicable requirements enforced by the County and/or the California Regional Water Quality Control Board. The City's charges for the Project's utilization of the Wastewater Treatment Plant and all other City facilities necessary for the collection, transmission, treatment and disposal of wastewater by the Project ("Plant Usage Fees") shall be fixed in the manner set forth in a sewer service agreement with the County.

6. City Sewer Service Agreement with County. As soon as reasonably possible after the County approves the Project Entitlements, the City will enter into a sewer service agreement with the County to provide sewer treatment and disposal for the Project (approximately 72,000 gallons per day ("gpd").

7. Maintenance after Construction. The County shall be responsible for all maintenance and repair of the Developer constructed sewer system within the Project up to the influent line to the Pump Station, and accordingly, Developer shall dedicate all such sewer facilities to the County. Except as set forth above, City shall be responsible for operating, maintaining and repairing the new Pump Station No. 12, gravity main, and force main and all related appurtenances within the Sewer Project and treatment system in accordance with prevailing industry standards for municipal wastewater collection, transmission, treatment and disposal facilities, and in compliance with all applicable federal, state and local laws. City shall be responsible for all costs associated with the operation and maintenance of City and services involved in the pumping, conveyance, treatment and disposal of wastewater discharged from the Project other than those that are part of the Project which are the sole responsibility of the County or Developer as provided above.

8. Wet Weather Storage and Peak Wet Weather Wastewater Flows. In consideration for the Project's impacts on the City's peak wet weather Plant capacity and its land outfall disposal system Developer shall provide the City with a wet weather storage facility site within the Project site for the temporary storage of Title 22 recycled water during peak wet weather storm events. The Project will dedicate up to 2 acres for a capacity of 5,500,000 gallons of said wet weather storage facility. The City shall be solely responsible for the maintenance of any wet weather storage facility constructed on the Project site pursuant to this Section.

9. Recycled Water. Developer will plan, design and construct a recycled water distribution system in accordance with the requirements of the City and the Rincon del Diablo Municipal Water District. Through the use of open space, the Project anticipates providing approximately 36 acres of permanent recycled water irrigation and 31 acres of continuing agricultural irrigation, which is planned to provide an opportunity for treated effluent disposal of wastewater on an average annual basis, and is programmed to reduce impacts on the City's

wastewater system occurring from land and ocean outfall on an average annual basis. Peak irrigation demands will be supplemented by the Plant.

10. Right of Cure. All agreements between Developer and the Engineer and any other professionals or contractors working on the Project shall include a provision entitling City to receive simultaneous notice of any breach and an opportunity to cure and assume such agreements directly to the extent that the agreements involve the lateral connections from the Project to the trunk sewer main.

11. No Third Party Beneficiaries. This MOU is solely for the benefit of the parties hereto and any successor-in-interest to the Project. Neither party shall have any authority to act in any way as a representative of the other, or to bind the other to any third party, except as specifically set forth herein, and the parties shall not be deemed to be partners, joint venturers or the like by virtue of the provisions hereof.

12. Force Majeure. Neither party shall be liable for any damages resulting from any failure or delay in the performance of any of their respective obligations (other than the payment of fees) if prevented from doing so by a cause or causes beyond its reasonable control (a "Force Majeure Event"). Without limiting the generality of the foregoing, Force Majeure Events include Acts of God, fires, floods, earthquakes, natural disasters, terrorism, strikes, blackouts, war, restraints of government (other than City), or other causes that are beyond a party's reasonable control, any one of which makes performance hereunder commercially impracticable.

13. Governing Law. This MOU, and all matters arising directly or indirectly from this MOU, shall be governed by and construed in accordance with the applicable laws and regulations of the City, the State, and Federal law and regulations. For all such matters, each party submits to the exclusive jurisdiction of the state and federal courts located in San Diego County in the State of California, and waives any jurisdictional, venue, or inconvenient forum objections.

14. Assignment. Developer shall not assign its rights or obligations under this MOU without the City's prior written consent, which consent may be withheld in the City's sole and absolute discretion, unless the Developer is assigns its rights or obligations under this agreement to an entity that is related to the Developer and has equal or greater financial wherewithal. Notwithstanding the foregoing, (a) Developer shall have the right to assign its interest under this MOU in connection with any financing of the Project so long as Developer remains responsible for the performance of its obligations under this MOU; and (b) Developer shall have the right to assign its rights and obligations under, and interest in, this MOU in connection with a sale of the Project subject to the City's prior written consent which may shall not be unreasonably withheld.

15. Entire Agreement. This MOU and the exhibits and schedules attached hereto constitute the entire agreement of the parties with respect to the subject matter hereof and supersedes any and all existing MOUs relating to the subject matter hereof. To the extent there is any conflict among the terms of this MOU and any attached exhibits or schedules, the terms of this MOU shall control.

16. No Waiver. Neither this MOU nor any provision hereof may be waived, modified, amended or terminated except by written agreement signed by both parties hereto. No failure on the part of any party to exercise and no delay in exercising any right, power or remedy under this MOU shall operate as a waiver thereof, nor shall any single or partial exercise of any right under this MOU preclude any other or further exercise thereof or the exercise of any other right.

17. Cumulative Remedies. No remedy conferred by any provision of this MOU is intended to be exclusive of any other remedy, and each and every remedy shall be cumulative and shall be in addition to every other remedy given in this MOU or existing at law or in equity, by statute or otherwise.

18. Severability. If any provision of this MOU shall be held to be illegal, invalid or unenforceable, such illegality, invalidity or unenforceability shall apply only to such provision and shall not in any manner affect or render illegal, invalid or unenforceable any other provision of this MOU, and that provision and this MOU generally shall be reformed, construed and enforced so as to most nearly give lawful effect to the intent of the parties as expressed in this MOU.

19. Authorization to Sign. Each person signing below hereby warrants that he/she has the authority to sign this MOU on behalf of the party for which he or she signs, and to bind the party for whom he/she is signing.

20. Assumption of Obligations of a Home Owner's Association. The Developer shall ensure that any obligations are included in the Home Owner Association's CC&Rs and any other necessary documents to obligate any subsequent HOA to perform any future obligations under this MOU.

21. Project Entitlements. In the event the County does not approve the Project Entitlements, neither Party will be bound by any provision in this MOU, other than for reimbursable and incurred costs by the City in coordinating and cooperating with Developer as stated above.

22. Out of Jurisdiction Approval. It is anticipated that Local Agency Formation Commission ("LAFCO") approval will be required for the City to extend sewer services beyond its jurisdiction. In addition, any extension of services must comply with applicable provisions of the City's Municipal Code.

23. Indemnification. The City shall have no liability to the Developer or any other person for, and the Developer shall indemnify, defend, and hold harmless the City from and against, any and all liabilities, claims, actions, causes of action, proceedings, suits, damages, judgments, liens, levies, costs and expenses of whatever nature, including reasonable attorneys' fees and disbursements (collectively "Claims"), which the City may suffer or incur or to which the City may become subject by as a result of or allegedly caused by Developer's activities, obligations, or otherwise occurring because of this MOU, except for the willful misconduct or gross negligence of the City. If any action or proceeding is brought against the City by reason of any of the matters against which the Developer has agreed to indemnify the City as provided above, the Developer, upon notice from the City, shall defend the City at the Developer's expense by counsel acceptable to City, such acceptance not to be unreasonably withheld. The City need not have first paid for any of the matters to which the City is entitled to indemnification in order to be so indemnified. The provisions of this section shall survive the expiration or earlier termination of this MOU.

IN WITNESS WHEREOF, the parties have executed this MOU as of the date first set forth above.

CITY OF ESCONDIDO	THE EDEN HILLS PROJECT OWNER, LLC
By:_____	By:_____
Dated:_____	Dated:_____

List of Exhibits to be Attached

Exhibit 1: Project Description

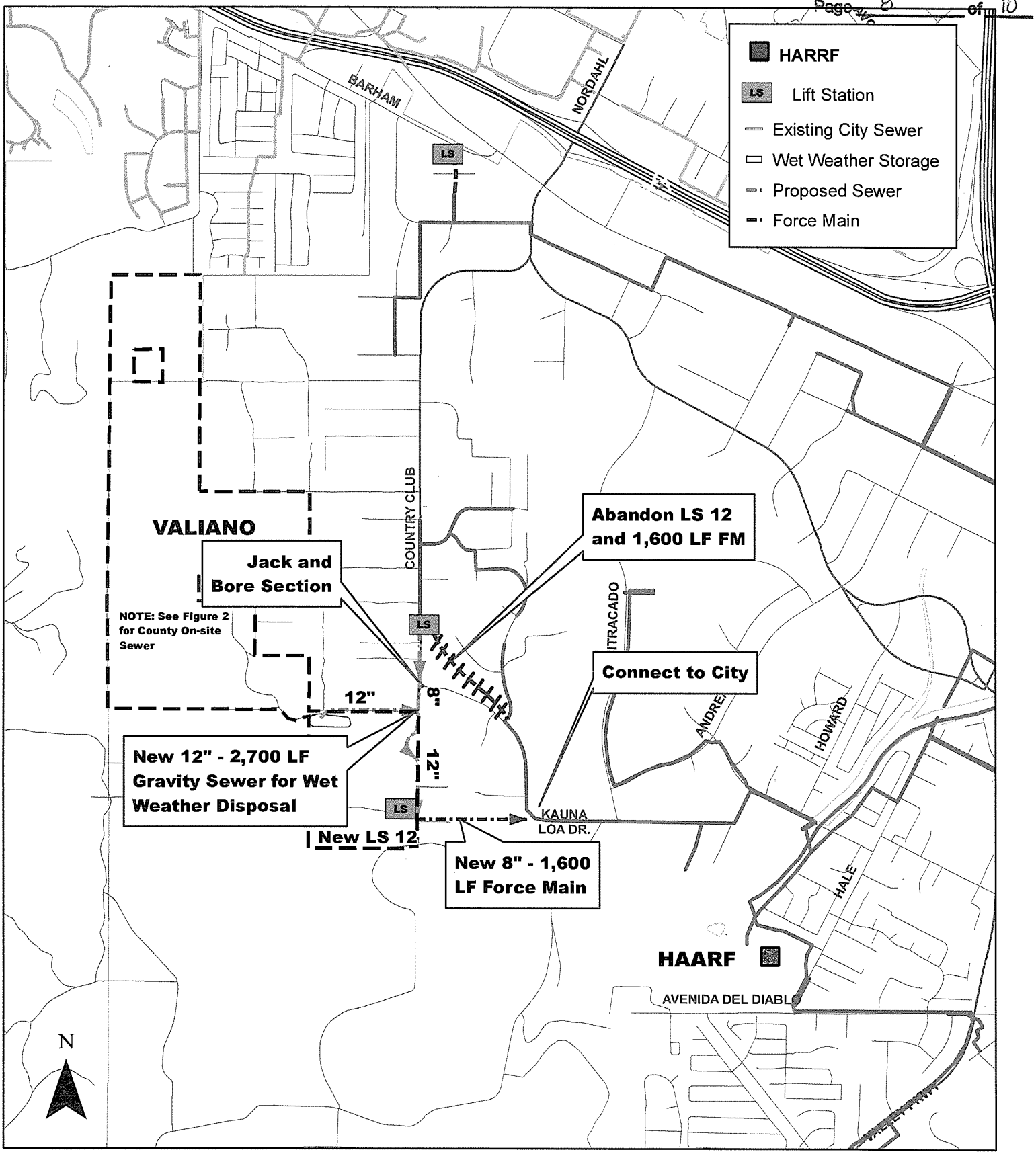
Exhibit 2: Diagram Showing Connection Points

Exhibit 3: Sewer Pump No. 12 Description and Cost Estimate

Exhibit 1

Project Description

The proposed Valiano Specific Plan encompasses 13 parcels totaling approximately 238.8 acres in the unincorporated County of San Diego. The Project includes the following APN's 228-313-13, 228-313-18, 232-013-01, 232-013-02, 232-013-03, 232-020-55, 232-492-01, 232-500-18 thru 23, and 235-031-41.



NOTE: On-site sewer system to be owned and operated by the County

ESCONDIDO SEWER SERVICE ALTERNATIVE
Figure 5

10/26/2015 MRG \\sdofs01\Data\Clients\Integral Communities\100033736_Valiano\GIS\mxd_082814\Fig5_EscondidoSewerPlan.mxd

EXHIBIT 3

ESCONDIDO SEWER PUMP STATION 12 IMPROVEMENTS
November 10, 2015

Pump 12 Project Description: Proposed SPS 12 will include pre-cast concrete PVC lined wet well and pre-cast concrete valve vault, and shall be duplex pump station equipped with explosion proof submersible pumps with capacity 300 gpm each, pump lifting assemblies, bar or channel screen with 300 gpm capacity, and all piping and valves. Pumps shall be non-clog capable to pass 3" solids. Pump motors will be supplied with the pump as an integral part of the pump assembly. Odor control system shall consist of carbon canister and forced ventilation rated for minimum 6 exchanges per hour. Lift station will have emergency underground storage with capacity of 50,000 gallons. The pump station site will be secured and include drivable access.

Pipeline(s) Project Description: Existing SPS 12 will be decommissioned and demolished. A new 8-inch gravity sewer will be constructed within Country Club Lane approximately 1,600 feet from the existing pump station to new SPS 12. Because of the topography approximately 500 feet of gravity main will need to be tunneled to avoid a high point through trenchless construction (jack and bore has been assumed). The new gravity sewer will then convey flows through a proposed Valiano gravity sewer to the new SPS 12. At the new Sewer PS 12, approximately 1,600 feet of 8-inch force main will be required to convey flows to an existing City sewer at Kauna Loa Drive.

Sewer Pump 12 Improvements

Item	Unit	Quantity	Cost/Unit	Total Cost
Sewer PS 12				
Pumps (2-300 gpm)	LS	1	$45,000	$45,000
Concrete Wet-well	LS	1	$45,000	$45,000
Installation mechanical equipment	LS	1	$100,000	$100,000
Piping, valve vault	LS	1	$30,000	$30,000
Odor Control	LS	1	$15,000	$15,000
Bar Screen (300 gpm)	LS	1	$15,000	$15,000
Site Improvements	LS	1	$20,000	$20,000
Gen Set (50 kW) w/enclosure, fuel tank	LS	1	$25,000	$25,000
Electrical/Telemetry	LS	1	$100,000	$100,000
Fiberglass Emergency Storage Tank	LS	1	$110,000	$110,000
Contingency	%	30		$152,000
Design, Admin., Legal, and CM	%	30		$152,000
PS 12 Subtotal				***$809,000***
Sewer PS 12 Force Main				
Force Main Pipeline (8-inch PVC C900)	LF	1,600	$60/LF	$96,000
Contingency	%	30		$29,000
Design, Admin., Legal, and CM	%	20		$19,000
PS 12 Force Main Subtotal				***$144,000***
Gravity Sewer and Demolition of Existing PS 12				
Gravity Sewer (8-inch PVC SDR 35)	LF	1,100	80	$88,000
Sewer Manholes	LS	4	$5,000	$20,000
Jack N Bore Gravity Sewer (8-inch PVC w/12-inch Steel Casing	LF	500	$400	$200,000
Demolition of LS 12	LS	1	$25,000	$25,000
Contingency	%	30		$100,000
Design, Admin., Legal, and CM	%	20		$67,000
Gravity Sewer/Demo of Existing PS 12 Subtotal				***$500,000***
Sewer Pump 12 Improvements Grand Total				**$1,453,000**

FIRST AMENDMENT TO TRAFFIC MITIGATION FUNDING AGREEMENT

This First Amendment to the Traffic Mitigation Funding Agreement ("**Amendment**") is made and entered into as of the 28 day of February, 2018 (the "**Amendment Date**"), by and between the CITY OF ESCONDIDO, a California municipal corporation (the "**City**"), and THE EDEN HILLS PROJECT OWNER, LLC, a Delaware limited liability company (the "**Developer**"). City and Developer may be referred to herein individually as a "**Party**" and collectively as the "**Parties**".

RECITALS

A. Developer is the owner and developer of property located in an unincorporated portion of the County of San Diego (the "**County**") subject to the proposed Valiano Specific Plan currently being considered for approval by the County (the "**Project**"). The Project site is located near the City of Escondido ("**City**").

B. The Parties entered into a Traffic Mitigation Funding Agreement ("**Agreement**") on December 28, 2015, where Developer agreed to provide the City with infrastructure improvements and a monetary payment in the event that the County approves the Project, in order to ensure that the Project's impacts relating to traffic within the City will not be significant.

C. The County has prepared a draft environmental impact report ("**EIR**") to analyze the Project's impacts, which has been recirculated for public review. Accordingly, the County has not yet made a decision on the Project.

D. The Parties now wish to reinstate and amend the Agreement to extend its term and add provisions relating to improvements to Hill Valley Drive, including the acceptance of dedication of real property to the City for public street/utility purposes in the event the Project is approved.

E. Any capitalized terms contained in this Amendment which are not defined herein shall have the meaning given in the Agreement, unless expressly provided to the contrary herein.

AMENDMENT

NOW, THEREFORE, based upon the foregoing Recitals, which are incorporated herein by this reference, the parties hereby amend the Agreement as follows:

1. The entire Agreement is amended such that all references to "Eden Hills Project Owner, LLC" are deemed amended to read "The Eden Hills Project Owner, LLC."

2. Section 1 of the Agreement is hereby deleted and replaced in its entirety with the following:

> "SECTION 1. TERM OF AGREEMENT
>
> This Agreement will commence on the Effective Date and shall continue in full force and effect until the Developer has made all the promised improvements and

monetary payments. Notwithstanding the foregoing, this Agreement will automatically terminate if the County Board of Supervisors does not approve the Project by January 1, 2022."

3. Section 2 of the Agreement is hereby amended to add subsections "C" and "D", to read as follows:

"C. As part of the City's acceptance and approval of the extension of Hill Valley Drive, as outlined in Exhibits B1 and B2 to this Agreement, the City agrees to accept dedication of an irrevocable offer of dedication ("IOD") for public street and public utility purposes, as depicted in recorded document "City of Escondido Offer of Dedication" recorded March 14, 1990 (90-135506) (attached hereto as Exhibit "C"), for the area approximately 407 feet from the existing public paved road terminus of Hill Valley Drive, as shown in Exhibit B2.

Before the City is obligated to accept the IOD, the Developer shall submit street improvements plans for the extension of Hill Valley Drive to the end of the IOD area, as well as signing and striping plans for the full length of the public street and the intersection of Country Club Drive and Hill Valley Drive (collectively, the "**Hill Valley Street Improvement Plans**"), for City approval. Upon Developer's execution of a public improvement agreement with the City, submittal of construction performance bonds, and payment of processing fees, the City will take action to accept all or portion of the IOD encumbered by the improvements followed by approval of improvement plans by the City Engineer.

D. Prior to the last Certificate of Occupancy, Developer and City Engineer will meet and confer to ascertain if Developer's construction traffic has caused damage to haul routes on City streets, taking into account existing non-project traffic, the beginning condition of City's streets, and the condition of similar streets within the City, and Developer shall reimburse City for the cost of repairs."

4. Exhibit B1 to the Agreement is amended to add Section 4, to read as follows:

"4. Improvements to Hill Valley Drive

a. Extend Hill Valley Drive with 24' of roadway with curb and gutter, sidewalk and street lighting on the north side and asphalt concrete berm on the south side. Roadway geometric design and structural section shall be in accordance with the City's Residential Street standard. The roadway improvement length shall be approximately 450'. The Developer shall rehabilitate the existing section of Hill Valley Drive (from Country Club Drive to the end of existing improvements) to the satisfaction of the City Engineer including but not limited to, (i) grind and overlay with asphalt concrete the western 200' of existing road, (ii) remove and replace areas of deficient pavement sections, and (iii) apply Type 2 slurry seal prior to filing a Notice of Completion on Hill Valley Drive.

b. A non-emergency/public traffic turn around shall be installed at the westerly end of the newly constructed roadway within the 49' of right-of-way. No sidewalk is required in the turnaround area.

c. Two street lights shall be installed at the crest and turnaround area.

d. Signing and striping together with improvements to improve sight distance to City standards shall be constructed at the intersection of Hill Valley Drive and Country Club Drive.

e. Signing and striping shall be installed to restrict parking on both sides of the entire length of Hill Valley Drive.

f. Roadway improvements will be subject to the City's storm water regulations and design."

5. Exhibit B2 to the Agreement is hereby deleted and replaced in its entirety with the new version of Exhibit B2, attached to this Amendment as Exhibit "1."

6. The Agreement is amended to add Exhibit C, which is attached as Exhibit "2" to this Amendment.

[Remainder of Page Left Intentionally Blank, Signature Page to Follow]

IN WITNESS WHEREOF, the Parties have executed this Amendment as of the Amendment Date hereinabove written.

CITY OF ESCONDIDO

Jeffrey Epp, City Manager

Approved as to form:

for Michael McGuiness, City Attorney

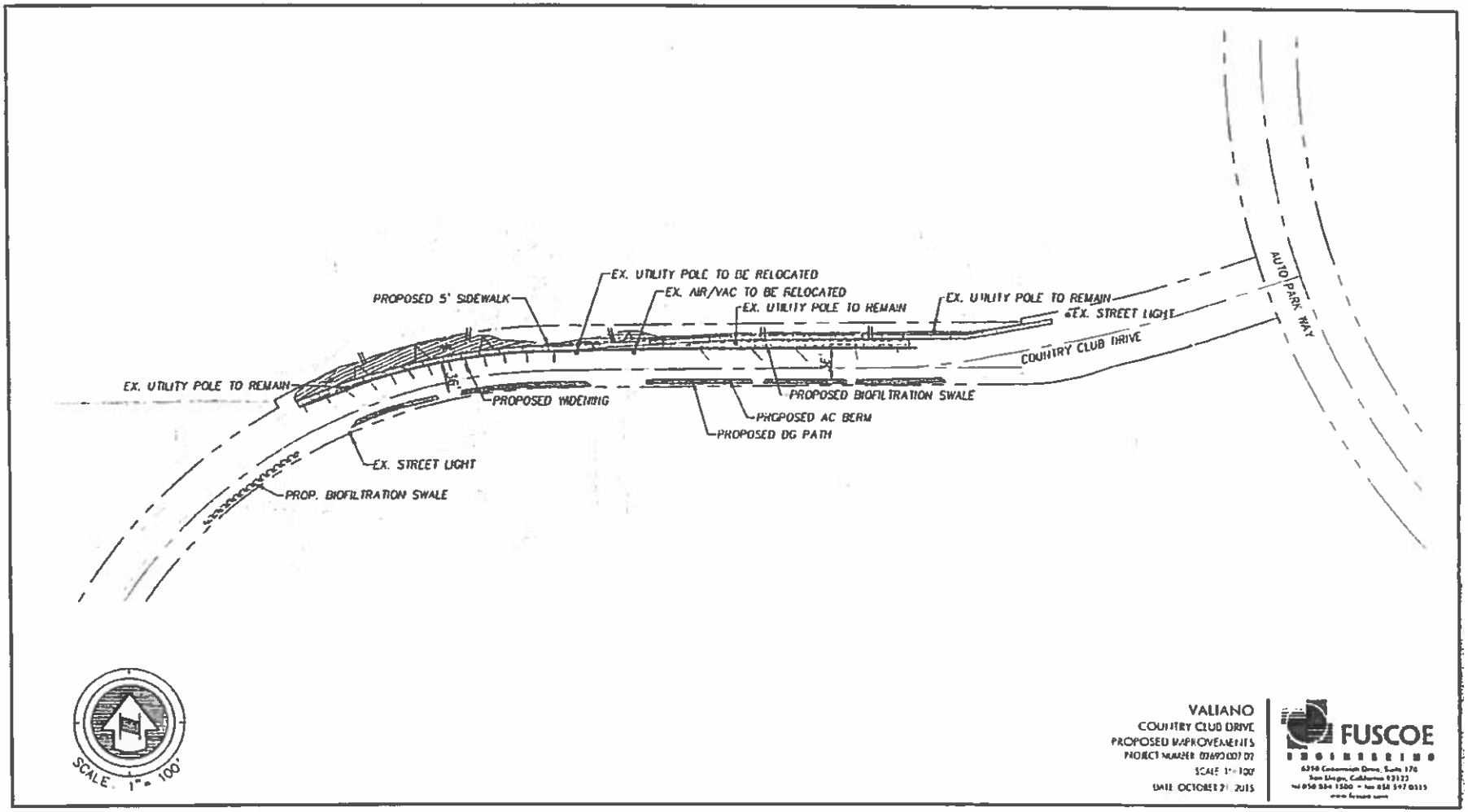
THE EDEN HILLS PROJECT OWNER, LLC,
a Delaware limited liability company,
By: The Eden Hills Operator, LLC,
a Delaware limited liability company,
its Manager
By: Eden Hills Communities Manager, LLC,
a California limited liability company,
its Manager
By: KPMW Integral, LLC,
a California limited liability company,
its Managing Member

By: _____
Name: Lance Wahe
Title: Auth Rep

Exhibit 1 (Replacement Exhibit B2)

See Attached Page(s)

Exhibit B2


EX. UTILITY POLE TO BE RELOCATED
PROPOSED 5' SIDEWALK
EX. AIR/VAC TO BE RELOCATED
EX. UTILITY POLE TO REMAIN
EX. UTILITY POLE TO REMAIN
EX. STREET LIGHT
AUTO PARK WAY
COUNTRY CLUB DRIVE
EX. UTILITY POLE TO REMAIN
PROPOSED WIDENING
PROPOSED BIOFILTRATION SWALE
PROPOSED AC BERM
PROPOSED DG PATH
EX. STREET LIGHT
PROP. BIOFILTRATION SWALE
SCALE 1" = 100'
VALIANO
COUNTRY CLUB DRIVE
PROPOSED IMPROVEMENTS
PROJECT NUMBER 07693.007.07
SCALE 1" = 100'
DATE OCTOBER 21, 2015
FUSCOE
ENGINEERING

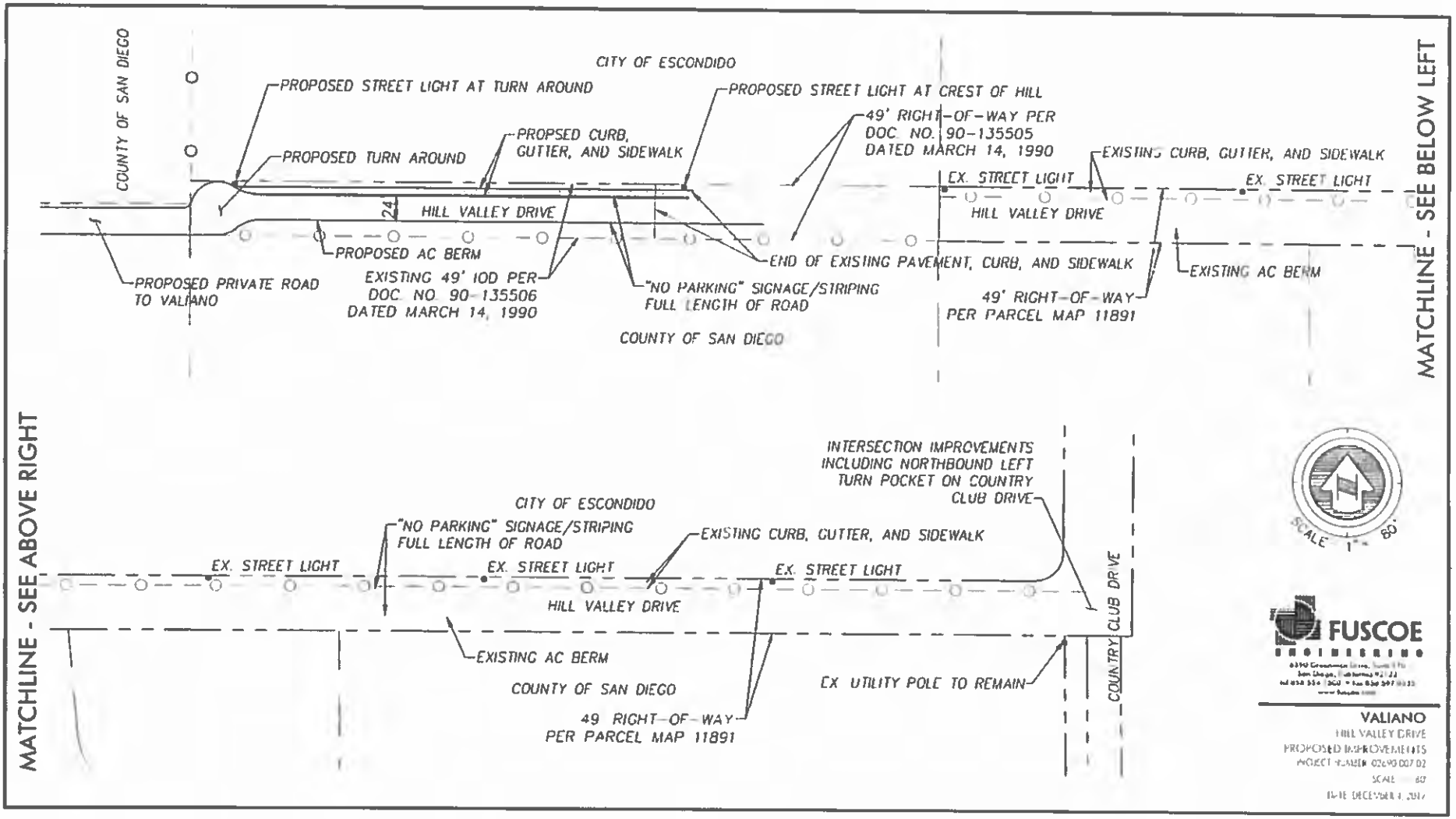

COUNTY OF SAN DIEGO
CITY OF ESCONDIDO
PROPOSED STREET LIGHT AT TURN AROUND
PROPOSED STREET LIGHT AT CREST OF HILL
PROPOSED TURN AROUND
PROPSED CURB, GUTTER, AND SIDEWALK
49' RIGHT-OF-WAY PER DOC. NO. 90-135505 DATED MARCH 14, 1990
EXISTING CURB, GUTTER, AND SIDEWALK
EX. STREET LIGHT
EX. STREET LIGHT
24
HILL VALLEY DRIVE
HILL VALLEY DRIVE
PROPOSED AC BERM
END OF EXISTING PAVEMENT, CURB, AND SIDEWALK
EXISTING AC BERM
PROPOSED PRIVATE ROAD TO VALIANO
EXISTING 49' IOD PER DOC. NO. 90-135506 DATED MARCH 14, 1990
"NO PARKING" SIGNAGE/STRIPING FULL LENGTH OF ROAD
49' RIGHT-OF-WAY PER PARCEL MAP 11891
COUNTY OF SAN DIEGO
MATCHLINE - SEE BELOW LEFT
MATCHLINE - SEE ABOVE RIGHT
INTERSECTION IMPROVEMENTS INCLUDING NORTHBOUND LEFT TURN POCKET ON COUNTRY CLUB DRIVE
CITY OF ESCONDIDO
"NO PARKING" SIGNAGE/STRIPING FULL LENGTH OF ROAD
EXISTING CURB, GUTTER, AND SIDEWALK
EX. STREET LIGHT
EX. STREET LIGHT
EX. STREET LIGHT
HILL VALLEY DRIVE
COUNTRY CLUB DRIVE
EXISTING AC BERM
COUNTY OF SAN DIEGO
EX UTILITY POLE TO REMAIN
49 RIGHT-OF-WAY PER PARCEL MAP 11891
SCALE 1" = 80'
FUSCOE ENGINEERING
VALIANO
HILL VALLEY DRIVE
PROPOSED IMPROVEMENTS
PROJECT NUMBER 02690.007.02
SCALE 1" = 80'
DATE DECEMBER 1, 2017

Exhibit 2 (Exhibit C)

See Attached Page(s)

90 135506

1519

90 MAR 16 AM 11:05

Recording Requested By:

City Clerk
City of Escondido

When Recorded Mail To:

City Clerk
City of Escondido
201 N. Broadway
Escondido, CA 92025

NO FEE

NO FEE

CITY OF ESCONDIDO
OFFER OF DEDICATION

A.P.N.: 228-311-25

City No. M11-90

LOUIE PAULETTO, a married man as his sole and separate property
(Type Name as Owned)

being the undersigned owner(s) of that certain real property located in the City of Escondido, County of San Diego, California, does/do hereby offer to dedicate to the public for street and public utility purposes, said land described as follows:

SEE ATTACHED EXHIBIT "A"

Said offer of dedication shall remain open and the City council of the City of Escondido may by resolution at any later date, and without further action by the undersigned or his heirs, successors and assigns, accept said offer and open the land so dedicated for public use.

IN WITNESS WHEREOF, the undersigned hereto sets his hand this 6th day of March, 1990 at Escondido, California.

Louie Pauletto

APPROVED AS TO FORM
BY Deputy CITY ATTORNEY

STATE OF CALIFORNIA)
:
COUNTY OF SAN DIEGO)

On March 6th, 1990, before me, the undersigned a Notary Public in and for said State, personally appeared Louie Pauletto, known to me to be the person whose name(s) is subscribed to the within instrument and acknowledged that he executed the same.

WITNESS my hand and official seal.

OFFICIAL SEAL
Connie J. Goehner
NOTARY PUBLIC CALIFORNIA
PRINCIPAL OFFICE IN
SAN DIEGO COUNTY
My Commission Expires OCT 2 1992

Notary Public in and for said County

offer.of.ded.M11-90

ACCEPTED:

1521

THIS IS TO CERTIFY that the interest in real property conveyed by the Deed or grant, as shown hereon and from the persons above named, to the City of Escondido, a municipal corporation, is hereby accepted pursuant to Resolution No. 89-516 of the City Council of the City of Escondido, dated December 6, 1989, and the grantee consents to recordation thereof by its duly authorized officer.

CITY OF ESCONDIDO

BY Douglas K Clark

CITY MANAGER

acceptance.certificate

OFFICIAL RECORDS, SAN DIEGO COUNTY, VERA L. LYLE, RECORDER

1522

EXHIBIT "A"

OFFER OF DEDICATION

That portion of the Easterly 660.00 feet of the South Half of Lot 6, Section 18, Township 12 South, Range 2 West, San Bernardino Meridian, in the City of Escondido, County of San Diego, State of California, described as follows:

Commencing at the Southeast corner of said described land, thence South 89°35'20" West, 253.00 feet to the point of beginning; thence South 89°35'20" West, 407.00 feet; thence North 00°00'50" East, 49.00 feet; thence North 89°35'20" East, 407.00 feet; thence South 00°00'50" West, 49.00 feet to the point of beginning.

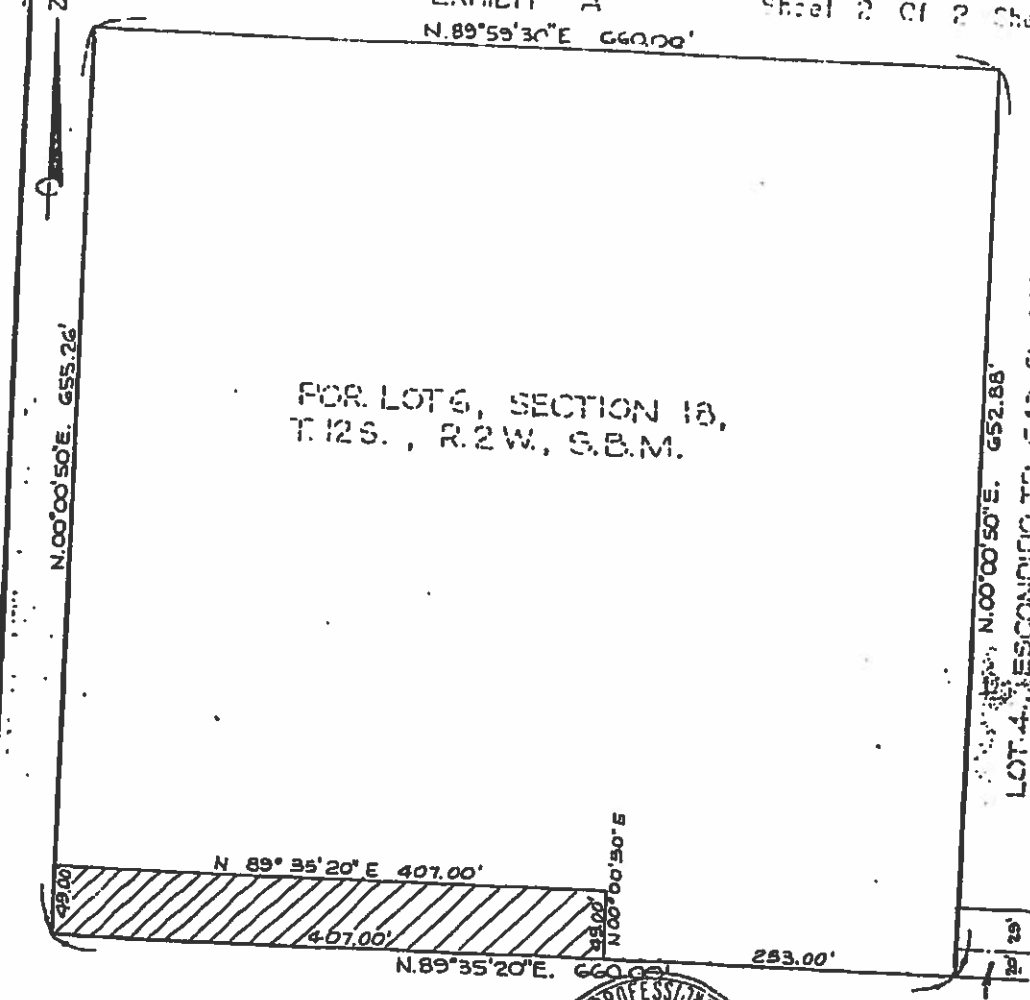
Arland M. Wiberg, R.C.E. 15382

ESCONDIDO DOC.
NO. M11-90

EXHIBIT "A"

1523

EXHIBIT "A" Sheet 2 Of 2 Sheets



ESCONDIDO ENGINEERING, INC.

BY: _____ 2/15/90
ARLAND M. WIBERG, R.C.E. 15382 DATE

REGISTERED PROFESSIONAL ENGINEER
ARLAND MORRIS WIBERG
No. 15382
Exp. 3/31/93
CIVIL
STATE OF CALIFORNIA

ESCONDIDO DOC. NO. M11-90

OFFER OF DEDICATION PLAT EXHIBIT "A"

SCALE 1"=100'	ESCONDIDO ENGINEERING, INC.	JOB NO. 87032
DATE 2/15/90	CIVIL ENGINEERS · SURVEYORS	
DRN M.S. CK D.F.	421 HALE AVE ESCONDIDO, CA. 92025	DWG NO
	(619) 745-3222	

OFFICIAL RECORDS, SAN DIEGO COUNTY, VERA L. LYLE, RECORDER