Final Environmental Impact Report

VOLUME III -
Appendices G - K

BARTON PLACE

City of Cypress, California

SCH No. 2015031004

Prepared by

LSA

LSA ASSOCIATES, INC.

October 2015

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DRAFT

ENVIRONMENTAL IMPACT REPORT

BARTON PLACE PROJECT

CITY OF CYPRESS

Submitted to:

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APPENDIX G

PRELIMINARY HYDROLOGY STUDY

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PRELIMINARY HYDROLOGY STUDY

BARTON PLACE

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Job Number: 1334-001-01

full circle thinking®

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1.0 INTRODUCTION

1.1 LOCATION

The proposed ±33 acre project site is located on the northeasterly corner of Katella Ave and Enterprise Drive, in the City of Cypress. The project is bounded by Katella Ave on the South, Los Alamitos Race Course on the north and east, a hotel near the southeast corner and Enterprise Drive on the west.

VICINITY MAP

1.2 PROJECT DESCRIPTION

The existing site was previously a part of the Cypress Golf Club.

The proposed project consists of approximately 27.8 acres of residential use and approximately 5.1 acres of commercial uses adjacent to Katella Ave. The residential site will consist of 244 senior housing units of which 152 are detached and 92 are attached units. Private drives and auto courts will serve the residential portion of the project. The residential project main entry is from Enterprise Drive on the west. The commercial site will consist of approximately 47,876 square feet of retail and commercial consisting of five buildings. The commercial site will have two entries off of Katella Ave and one entry off of Enterprise Avenue. Pedestrian access is provided from Katella Ave and Enterprise Drive.

1.3 PURPOSE OF THIS REPORT

The purpose of this report is to accomplish the following objectives:

- To determine proposed preliminary storm water discharge generated within the proposed project area.
- To determine the detention sizing for the project based on City of Cypress requirement of a maximum of 0.308 cubic feet per second (cfs) per acre to be released to the existing storm drain line. A 100 year storm was used to size the detention basin.

2.0 METHODOLOGY

This study was prepared in conformance with the Orange County Hydrology Manual. A.E.S. Computer Software (Version 21) was utilized to compile the hydrologic data and to determine the peak discharges and unit hydrographs for the Detention Basin Basin Routing. A 2, 10 and 100 year Unit Hydrograph was used to analyze site and detention basin storage capacity by using HydroCAD 10.0-2013 HydroCAD Software Solutions LLC.

For reference – See Appendices 1-4

3.0 DRAINAGE FACILITIES

3.1 EXISTING ON-SITE DRAINAGE PATTERN AND FACILITIES

The site is generally flat and gently slopes from a high point at an average elevation of 33± feet in northeast area of the site, southwesterly to a low point near the southwest corner, at an average elevation of 22± feet. The site is generally clear with scattered weeds throughout. The storm water sheet flows from the northeast corner of the site to the southwest corner of the site. Based on the A.E.S. Computer Software – Rational method, the existing 100 year peak flow is 20.2 cubic feet per second (cfs). For Reference – See Existing 100 Year Hydrology and Map in Appendix 6

3.2 PROPOSED ON-SITE DRAINAGE PATTERN AND FACILITIES

The proposed development will maintain the historic drainage pattern and drain from the northeast to the southwest. Residential and commercial flows will be directed to the on-site private storm drain and StormTrap® detention systems. The residential site will have three storm drain systems. They will consist of a series of 12″ to 36″ storm drain pipes and a total of 30 catch basins. The storm water in the storm drain systems will drain to the proposed StormTrap® detention system located in the proposed commercial site. The proposed commercial site will have five Modular Wetland systems (MWS) with a by-pass storm drain at each low point. The storm water from the MWS and by-pass storm drain will drain directly into the StormTrap® detention system. The storm water from the StormTrap® detention system will discharge into the existing storm drain line located within Katella Ave. In the proposed commercial site there are three small areas totaling approximately 0.21 acres which surface drains to a trench drain with a filter at the property line. The storm water from the trench drains will drain directly to Katella Avenue and Enterprise Drive. In addition, both the proposed residential and commercial sites have been designed with secondary overflow directed towards Enterprise Drive and Katella Avenue.

3.3 PROPOSED STORMTRAP® DETENTION SYSTEM

The StormTrap® is a precast concrete modular storm water management system. The proposed StormTrap® system for the project is a reinforced, high strength concrete single trap unit. Each single trap modular unit has a height of 4′– 2″ (inside dimension). The width varies based on the type used, with a length of 15′– 4″ (inside dimension).

4.0 DRAINAGE AREAS

The proposed site has four main drainage areas directed to the StormTrap® detention system located at the commercial area. (See Exhibit A - next page). The first drainage area "A1 to A9" includes a total of 8.25 acres of the residential land use and drains in a southwesterly direction towards the proposed commercial site. The storm water collected in the proposed catch basins will outlet to a series of storm drain pipes varying in size from 18" to 30". The storm water from the storm drain system is directed to a splitter box located within the commercial site. The low flow will be directed to three Modular Wetland Systems (MWS) for treatment. The treated storm water will be discharged to the StormTrap® detention system. The storm water high flows will by-pass the MWS and will drain directly to the StormTrap® detention system. Both High and Low-Flows will pass through a pre-treatment chamber at the StormTrap® detention system.

The second drainage area "B1 to B4" includes a total of 3.44 acres of residential land use and drains in a southwesterly direction towards the proposed commercial site. The storm water is collected in proposed catch basins that outlet to 18" storm drain pipes and directed to a splitter box located within the commercial site. The storm water low flow will be directed to two Modular Wetland Systems (MWS) for treatment. The treated storm water will be discharged to the StormTrap® detention system. The high flows will by-pass through the splitter box and be directed to the StormTrap® detention system. High Flows will pass through a pre-treatment chamber at the StormTrap® detention system.

The third drainage area "C1 to C19" includes a total of 15.88 acres of residential land use and drains in a southwesterly direction towards the proposed commercial site. The storm water is collected in proposed catch basins that outlet to 18" to 36" storm drain pipes. Storm water is directed to a splitter box located within the commercial site. The storm water low flow will be directed to six Modular Wetland Systems (MWS) for treatment. The treated storm water will be discharged to the StormTrap® detention system. The high flows will by-pass through the splitter box and be directed to the StormTrap® detention system. High Flows will pass through a pre-treatment chamber at the StormTrap® detention system.

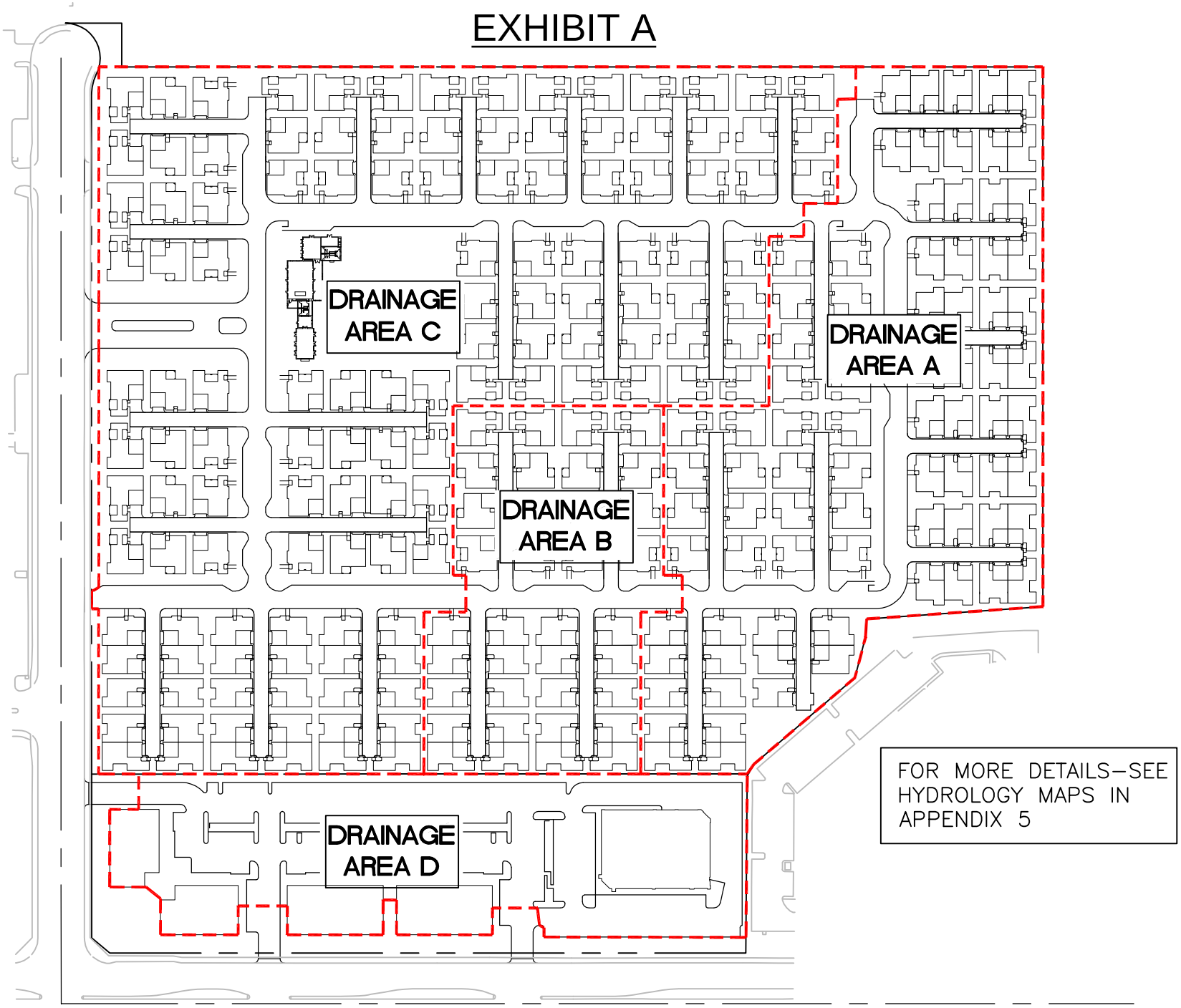
The fourth drainage area "D1 to D5" includes a total of 4.21 acres of commercial land use. Each commercial drainage area drains to a proposed Modular Wetland Unit for treatment with a by-pass system for high flows. The treated storm water and high flows will be discharge directly into the StormTrap® detention system.

There are three drainage areas at commercial site entrances, "E1-E3", that drain towards the street to a trench drain located along the right of way. The trench drain will contain a trench drain filter for storm water treatment. Storm water will outlet through the street curbs at Enterprise Drive and Katella Ave.

The remainder of the site, approximately 0.93 acres, consists of landscaped area along commercial and residential site edges.

For reference – See Proposed Hydrology Maps in Appendix 5

EXHIBIT A


DRAINAGE AREA C
DRAINAGE AREA A
DRAINAGE AREA B
DRAINAGE AREA D
FOR MORE DETAILS–SEE HYDROLOGY MAPS IN APPENDIX 5

5.0 RESULTS AND CONCLUSIONS

The City of Cypress flood control requirements for the project allows for a maximum of 0.308 cfs per acre to the existing Katella Ave storm drain line. Therefore, the approximately 32.92 acre site can release a maximum of 10.14 cfs to the existing Katella Ave storm drain line. The total 100 year storm flow for both the proposed residential and commercial project is 90.61 cfs. In order to reduce the storm water flowrate to below 10.14 cfs, a detention system will be required.

The proposed detention system will require a storm water volume of 5.0 acre-ft to be retained in order to reduce the outflow below 10.14 cfs. A 5.3 acre-ft StormTrap® detention system is being proposed allowing for 6% additional storage capacity over required storm water volume and a maximum outflow of 7.46 cfs. There is also additional storage space available in the storm drain pipes of approximately 0.25 acre-ft (10,980 CF). In addition, the proposed residential and commercial is graded to provide secondary overflow directed towards Enterprise Drive and Katella Avenue.

The following table summarizes the hydrologic findings:

Event	Peak Flow (cfs)	TC (min)	Detention Volume No Routing (ac-ft)	Required Detention Volume with Routing & Outflow (ac-ft)	Design Detention Volume (ac-ft)	Maximum Allowed Outflow (cfs)	Design Outflow Flow (cfs)
2 Year	29.44	12.77	2.60	1.04	5.3	N/A	3.42
10 Year	57.02	14.83	5.96	2.56	5.3	N/A	5.35
100 Year	90.61	14.19	11.40	5.00	5.3	10.14	7.46

Based on the hydrology, unit hydrograph, and flood routing calculations, the proposed project site meets the City of Cypress requirement of maximum outflow of 10.14 cfs for a 100 year storm event. The proposed project site also has incorporated a secondary overflow to Enterprise Drive and Katella Avenue. The proposed storm drain pipe and catch basin sizes provided in this report are based on preliminary engineering design and modeling. The final sizes will be determined during project construction document phase

For reference – See Appendices 1-5

6.0 APPENDICES

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Appendix 1

Soil Type Map

SOIL TYPE MAP

Appendix 2

Proposed 2, 10 & 100 Year Hydrology

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2014 Advanced Engineering Software (aes)
             Ver. 21.0  Release Date: 06/01/2014  License ID 1355

                           Analysis prepared by:

                          FUSCOE ENGINEERING, INC
                              16795 VON KARMAN
                                 SUITE 100
                              IRVINE, CA 92606

 ************************** DESCRIPTION OF STUDY **************************
* BARTON PLACE - C33                                                       *
* PROPOSED 2 YEAR HYDROLOGY                                                *
* JOB NO. 1334.01   FILE NAMES: PC3302.INP   PC3302.OUT                    *
 ***************************************************************************

  FILE NAME: PC3302.INP
  TIME/DATE OF STUDY: 09:39 02/03/2015
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   297.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.80  DOWNSTREAM(FEET) =     33.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.270
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.588
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.82      0.25     0.400    50    9.27
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      1.10
  TOTAL AREA(ACRES) =      0.82   PEAK FLOW RATE(CFS) =      1.10

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     30.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   33.00  DOWNSTREAM ELEVATION(FEET) =   32.20
  STREET LENGTH(FEET) =    76.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.24
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.17
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.96
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.53
  STREET FLOW TRAVEL TIME(MIN.) =   0.65   Tc(MIN.) =    9.92
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.528
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.22      0.25     0.400    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.22      SUBAREA RUNOFF(CFS) =    0.28
  EFFECTIVE AREA(ACRES) =      1.04    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       1.34

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.45
  FLOW VELOCITY(FEET/SEC.) =  1.98   DEPTH*VELOCITY(FT*FT/SEC.) =   0.55
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     30.00 =     373.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     40.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    28.00  DOWNSTREAM(FEET) =    27.80
  FLOW LENGTH(FEET) =    38.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.19
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.34
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   10.12
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     40.00 =     411.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.40  DOWNSTREAM(FEET) =     32.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.740
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.544
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.85      0.25     0.400    50    9.74
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.85   INITIAL SUBAREA RUNOFF(CFS) =    1.10

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   10.12
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.511
  SUBAREA AREA(ACRES) =    0.85      SUBAREA RUNOFF(CFS) =    1.08
  EFFECTIVE AREA(ACRES) =      1.89   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        1.9       PEAK FLOW RATE(CFS) =       2.40

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    27.80  DOWNSTREAM(FEET) =    27.00
  FLOW LENGTH(FEET) =   199.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.34
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.40
  PIPE TRAVEL TIME(MIN.) =   0.99    Tc(MIN.) =   11.11
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     50.00 =     610.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   360.00
```

```
  ELEVATION DATA: UPSTREAM(FEET) =     34.80  DOWNSTREAM(FEET) =     31.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.068
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.515
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.71      0.25     0.400    50   10.07
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.71   INITIAL SUBAREA RUNOFF(CFS) =    0.90

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   11.11
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.432
  SUBAREA AREA(ACRES) =    0.71      SUBAREA RUNOFF(CFS) =    0.85
  EFFECTIVE AREA(ACRES) =      2.60   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        2.6       PEAK FLOW RATE(CFS) =       3.12

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     60.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    27.00  DOWNSTREAM(FEET) =    26.20
  FLOW LENGTH(FEET) =   117.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.34
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.12
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =   11.56
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     60.00 =     727.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   327.00
  ELEVATION DATA: UPSTREAM(FEET) =     33.80  DOWNSTREAM(FEET) =     30.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.623
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.555
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.33      0.25     0.400    50    9.62
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.33   INITIAL SUBAREA RUNOFF(CFS) =    1.74

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   11.56
```

```
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.399
  SUBAREA AREA(ACRES) =    1.33      SUBAREA RUNOFF(CFS) =    1.56
  EFFECTIVE AREA(ACRES) =      3.93   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        3.9       PEAK FLOW RATE(CFS) =       4.60

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   265.00
  ELEVATION DATA: UPSTREAM(FEET) =     32.60  DOWNSTREAM(FEET) =     30.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.356
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.580
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.26      0.25     0.400    50    9.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.26   INITIAL SUBAREA RUNOFF(CFS) =    0.35

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   11.56
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.399
  SUBAREA AREA(ACRES) =    0.26      SUBAREA RUNOFF(CFS) =    0.30
  EFFECTIVE AREA(ACRES) =      4.19   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        4.2       PEAK FLOW RATE(CFS) =       4.90

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     70.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    26.20  DOWNSTREAM(FEET) =    25.44
  FLOW LENGTH(FEET) =   221.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.71
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.90
  PIPE TRAVEL TIME(MIN.) =   0.99    Tc(MIN.) =   12.55
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     70.00 =     948.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   264.00
  ELEVATION DATA: UPSTREAM(FEET) =     33.40  DOWNSTREAM(FEET) =     29.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.084
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.718
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.76      0.25     0.400    50    8.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.76   INITIAL SUBAREA RUNOFF(CFS) =    1.11

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   12.55
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.335
  SUBAREA AREA(ACRES) =    0.76      SUBAREA RUNOFF(CFS) =    0.84
  EFFECTIVE AREA(ACRES) =      4.95   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        4.9       PEAK FLOW RATE(CFS) =       5.50

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   162.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.00  DOWNSTREAM(FEET) =     29.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.301
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.822
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.18      0.25     0.400    50    7.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.18   INITIAL SUBAREA RUNOFF(CFS) =    0.28

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   12.55
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.335
  SUBAREA AREA(ACRES) =    0.18      SUBAREA RUNOFF(CFS) =    0.20
  EFFECTIVE AREA(ACRES) =      5.13   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        5.1       PEAK FLOW RATE(CFS) =       5.70

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     80.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    25.44  DOWNSTREAM(FEET) =    24.90
  FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.19
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.70
```

```
  PIPE TRAVEL TIME(MIN.) =   1.36    Tc(MIN.) =   13.91
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     80.00 =    1208.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   332.00
  ELEVATION DATA: UPSTREAM(FEET) =     32.25  DOWNSTREAM(FEET) =     29.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.808
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.538
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.39      0.25     0.400    50    9.81
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.39   INITIAL SUBAREA RUNOFF(CFS) =    1.80

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   13.91
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.258
  SUBAREA AREA(ACRES) =    1.39      SUBAREA RUNOFF(CFS) =    1.45
  EFFECTIVE AREA(ACRES) =      6.52   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        6.5       PEAK FLOW RATE(CFS) =       6.80

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   427.00
  ELEVATION DATA: UPSTREAM(FEET) =     34.40  DOWNSTREAM(FEET) =     29.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.224
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.501
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.73      0.25     0.400    50   10.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.73   INITIAL SUBAREA RUNOFF(CFS) =    2.18

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   13.91
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.258
  SUBAREA AREA(ACRES) =    1.73      SUBAREA RUNOFF(CFS) =    1.80
  EFFECTIVE AREA(ACRES) =      8.25   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        8.2       PEAK FLOW RATE(CFS) =       8.60
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     90.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.90  DOWNSTREAM(FEET) =    23.79
  FLOW LENGTH(FEET) =   271.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.52
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.60
  PIPE TRAVEL TIME(MIN.) =   1.00    Tc(MIN.) =   14.91
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     90.00 =    1479.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     90.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   173.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.18  DOWNSTREAM(FEET) =     30.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.868
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.887
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.42      0.25     0.100    50    6.87
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.42   INITIAL SUBAREA RUNOFF(CFS) =    0.70

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   14.91
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.209
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    0.45
  EFFECTIVE AREA(ACRES) =      8.67   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =        8.7       PEAK FLOW RATE(CFS) =       8.68

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE    100.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    23.79  DOWNSTREAM(FEET) =    23.75
  FLOW LENGTH(FEET) =   299.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   1.24
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.68
  PIPE TRAVEL TIME(MIN.) =   4.01    Tc(MIN.) =   18.92
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE    100.00 =    1778.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   211.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.18  DOWNSTREAM(FEET) =     29.28

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.633
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.925
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.51      0.25     0.100    50    6.63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.51   INITIAL SUBAREA RUNOFF(CFS) =    0.87

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   18.92
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.055
  SUBAREA AREA(ACRES) =    0.51      SUBAREA RUNOFF(CFS) =    0.47
  EFFECTIVE AREA(ACRES) =      9.18   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =        9.2       PEAK FLOW RATE(CFS) =       8.68
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   268.00
  ELEVATION DATA: UPSTREAM(FEET) =     32.12  DOWNSTREAM(FEET) =     29.90

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.421
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.805
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.70      0.25     0.100    50    7.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.70   INITIAL SUBAREA RUNOFF(CFS) =    1.12

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   18.92
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.055
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    0.65
  EFFECTIVE AREA(ACRES) =      9.88   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =        9.9       PEAK FLOW RATE(CFS) =       8.68
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =  10
----------------------------------------------------------------------------
```

```
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
==============================================================================

******************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    120.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   294.00
  ELEVATION DATA: UPSTREAM(FEET) =     33.80  DOWNSTREAM(FEET) =     29.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.580
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.660
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.78      0.25     0.400    50    8.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      1.10
  TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      1.10

******************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    130.00 IS CODE =  61
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =   29.80  DOWNSTREAM ELEVATION(FEET) =   28.60
  STREET LENGTH(FEET) =   131.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.21
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.36
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.83
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.50
  STREET FLOW TRAVEL TIME(MIN.) =   1.19   Tc(MIN.) =    9.77
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.541
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.17      0.25     0.400    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.17      SUBAREA RUNOFF(CFS) =    0.22
```

```
  EFFECTIVE AREA(ACRES) =      0.95    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       1.23

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.36
  FLOW VELOCITY(FEET/SEC.) =  1.87   DEPTH*VELOCITY(FT*FT/SEC.) =   0.51
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    130.00 =     425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   325.00
  ELEVATION DATA: UPSTREAM(FEET) =     33.00  DOWNSTREAM(FEET) =     28.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.939
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.622
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.84      0.25     0.400    50    8.94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.84   INITIAL SUBAREA RUNOFF(CFS) =    1.15

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =    9.77
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.541
  SUBAREA AREA(ACRES) =    0.84      SUBAREA RUNOFF(CFS) =    1.09
  EFFECTIVE AREA(ACRES) =      1.79   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        1.8       PEAK FLOW RATE(CFS) =       2.32

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    140.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.40  DOWNSTREAM(FEET) =    24.30
  FLOW LENGTH(FEET) =    18.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.64
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.32
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.86
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    140.00 =     443.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   369.00
```

```
  ELEVATION DATA: UPSTREAM(FEET) =     32.25  DOWNSTREAM(FEET) =     28.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.014
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.519
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.65      0.25     0.400    50   10.01
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.65   INITIAL SUBAREA RUNOFF(CFS) =    2.11

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =    9.86
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.533
  SUBAREA AREA(ACRES) =    1.65      SUBAREA RUNOFF(CFS) =    2.13
  EFFECTIVE AREA(ACRES) =      3.44   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        3.4       PEAK FLOW RATE(CFS) =       4.44

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    100.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.30  DOWNSTREAM(FEET) =    23.70
  FLOW LENGTH(FEET) =   280.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.97
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.44
  PIPE TRAVEL TIME(MIN.) =   1.57    Tc(MIN.) =   11.43
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    100.00 =     723.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.44   11.43    1.409  0.25( 0.10) 0.40       3.4     110.00
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    100.00 =     723.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.68   18.92    1.055  0.25( 0.09) 0.35       9.9      10.00
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE    100.00 =    1778.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.60   11.43    1.409  0.25( 0.09) 0.37       9.4     110.00
      2       11.92   18.92    1.055  0.25( 0.09) 0.36      13.3      10.00
```

```
    TOTAL AREA(ACRES) =        13.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       11.92  Tc(MIN.) =   18.918
  EFFECTIVE AREA(ACRES) =     13.32  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =       13.3
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE    100.00 =    1778.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    23.75  DOWNSTREAM(FEET) =    23.16
  FLOW LENGTH(FEET) =   299.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.72
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.92
  PIPE TRAVEL TIME(MIN.) =   1.34    Tc(MIN.) =   20.26
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE    150.00 =    2077.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   287.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.85  DOWNSTREAM(FEET) =     29.48

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.632
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.776
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        1.58      0.25     0.100    50    7.63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.58   INITIAL SUBAREA RUNOFF(CFS) =    2.49

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   20.26
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.014
  SUBAREA AREA(ACRES) =    1.58      SUBAREA RUNOFF(CFS) =    1.41
  EFFECTIVE AREA(ACRES) =     14.90   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.34
  TOTAL AREA(ACRES) =       14.9       PEAK FLOW RATE(CFS) =      12.47

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   209.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.99  DOWNSTREAM(FEET) =     29.66
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.331
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.977
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        1.00      0.25     0.100    50    6.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.00   INITIAL SUBAREA RUNOFF(CFS) =    1.76

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   20.26
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.014
  SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    0.89
  EFFECTIVE AREA(ACRES) =     15.90   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.32
  TOTAL AREA(ACRES) =       15.9       PEAK FLOW RATE(CFS) =      13.36

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.42   12.77    1.321  0.25( 0.08) 0.31      12.0     110.00
      2       13.36   20.26    1.014  0.25( 0.08) 0.32      15.9      10.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =      13.42  Tc(MIN.) =   12.77
  AREA-AVERAGED Fm(INCH/HR) =  0.08  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.31  EFFECTIVE AREA(ACRES) =      11.99

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    210.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   277.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.20  DOWNSTREAM(FEET) =     32.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.828
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.633
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.66      0.25     0.400    50    8.83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      0.91
  TOTAL AREA(ACRES) =      0.66   PEAK FLOW RATE(CFS) =      0.91

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    220.00 IS CODE =  61
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   32.30  DOWNSTREAM ELEVATION(FEET) =   31.40
  STREET LENGTH(FEET) =    97.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.93
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.42
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.75
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.45
  STREET FLOW TRAVEL TIME(MIN.) =   0.92   Tc(MIN.) =    9.75
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.543
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.03      0.25     0.400    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.03      SUBAREA RUNOFF(CFS) =    0.04
  EFFECTIVE AREA(ACRES) =      0.69    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       0.91
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.33
  FLOW VELOCITY(FEET/SEC.) =  1.76   DEPTH*VELOCITY(FT*FT/SEC.) =   0.44
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    220.00 =     374.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    220.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   268.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.20  DOWNSTREAM(FEET) =     31.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.200
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.704
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.65      0.25     0.400    50    8.20
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.65   INITIAL SUBAREA RUNOFF(CFS) =    0.94

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =    9.75
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.543
  SUBAREA AREA(ACRES) =    0.65      SUBAREA RUNOFF(CFS) =    0.84
  EFFECTIVE AREA(ACRES) =      1.34   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        1.3       PEAK FLOW RATE(CFS) =       1.74

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    27.30  DOWNSTREAM(FEET) =    27.20
  FLOW LENGTH(FEET) =    18.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.46
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.74
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    9.84
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    230.00 =     392.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   327.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.50  DOWNSTREAM(FEET) =     31.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.100
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.605
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.96      0.25     0.400    50    9.10
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.96   INITIAL SUBAREA RUNOFF(CFS) =    1.30

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =    9.84
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.535
  SUBAREA AREA(ACRES) =    0.96      SUBAREA RUNOFF(CFS) =    1.24
  EFFECTIVE AREA(ACRES) =      2.30   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       2.97

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    240.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    27.20  DOWNSTREAM(FEET) =    25.80
  FLOW LENGTH(FEET) =   292.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.74
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.97
  PIPE TRAVEL TIME(MIN.) =   1.30    Tc(MIN.) =   11.14
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    240.00 =     684.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   473.00
  ELEVATION DATA: UPSTREAM(FEET) =     34.80  DOWNSTREAM(FEET) =     30.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.197
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.425
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.74      0.25     0.400    50   11.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.74   INITIAL SUBAREA RUNOFF(CFS) =    2.08

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   11.14
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.429
  SUBAREA AREA(ACRES) =    1.74      SUBAREA RUNOFF(CFS) =    2.08
  EFFECTIVE AREA(ACRES) =      4.04   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        4.0       PEAK FLOW RATE(CFS) =       4.83

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   353.00
  ELEVATION DATA: UPSTREAM(FEET) =     34.50  DOWNSTREAM(FEET) =     30.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.528
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.563
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.32      0.25     0.400    50    9.53
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.32   INITIAL SUBAREA RUNOFF(CFS) =    1.74
```

```
  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   11.14
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.429
  SUBAREA AREA(ACRES) =    1.32      SUBAREA RUNOFF(CFS) =    1.58
  EFFECTIVE AREA(ACRES) =      5.36   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        5.4       PEAK FLOW RATE(CFS) =       6.41

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    250.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    25.80  DOWNSTREAM(FEET) =    24.80
  FLOW LENGTH(FEET) =   276.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.08
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.41
  PIPE TRAVEL TIME(MIN.) =   1.13    Tc(MIN.) =   12.27
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    250.00 =     960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    250.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   441.00
  ELEVATION DATA: UPSTREAM(FEET) =     33.10  DOWNSTREAM(FEET) =     28.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.595
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.471
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.94      0.25     0.400    50   10.60
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.94   INITIAL SUBAREA RUNOFF(CFS) =    1.16

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   12.27
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.352
  SUBAREA AREA(ACRES) =    0.94      SUBAREA RUNOFF(CFS) =    1.06
  EFFECTIVE AREA(ACRES) =      6.30   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        6.3       PEAK FLOW RATE(CFS) =       7.10

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    250.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   351.00
```

```
  ELEVATION DATA: UPSTREAM(FEET) =     33.00  DOWNSTREAM(FEET) =     28.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.279
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.587
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.03      0.25     0.400    50    9.28
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.03   INITIAL SUBAREA RUNOFF(CFS) =    1.38

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   12.27
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.352
  SUBAREA AREA(ACRES) =    1.03      SUBAREA RUNOFF(CFS) =    1.16
  EFFECTIVE AREA(ACRES) =      7.33   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        7.3       PEAK FLOW RATE(CFS) =       8.26

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    260.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.80  DOWNSTREAM(FEET) =    24.50
  FLOW LENGTH(FEET) =   138.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.56
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.26
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =   12.91
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    260.00 =    1098.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    260.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   473.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.80  DOWNSTREAM(FEET) =     28.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.860
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.379
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.58      0.25     0.400    50   11.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.58   INITIAL SUBAREA RUNOFF(CFS) =    1.82

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   12.91
```

```
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.313
  SUBAREA AREA(ACRES) =    1.58      SUBAREA RUNOFF(CFS) =    1.73
  EFFECTIVE AREA(ACRES) =      8.91   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        8.9       PEAK FLOW RATE(CFS) =       9.73

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    260.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   133.00
  ELEVATION DATA: UPSTREAM(FEET) =     30.20  DOWNSTREAM(FEET) =     28.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.325
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.978
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.25      0.25     0.400    50    6.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.25   INITIAL SUBAREA RUNOFF(CFS) =    0.42

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   12.91
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.313
  SUBAREA AREA(ACRES) =    0.25      SUBAREA RUNOFF(CFS) =    0.27
  EFFECTIVE AREA(ACRES) =      9.16   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        9.2       PEAK FLOW RATE(CFS) =      10.00

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    270.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.50  DOWNSTREAM(FEET) =    24.40
  FLOW LENGTH(FEET) =    58.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.42
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.00
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   13.19
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    270.00 =    1156.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.19
  RAINFALL INTENSITY(INCH/HR) =   1.30
  AREA-AVERAGED Fm(INCH/HR) =  0.10
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.40
  EFFECTIVE STREAM AREA(ACRES) =       9.16
  TOTAL STREAM AREA(ACRES) =       9.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.00

****************************************************************************
  FLOW PROCESS FROM NODE    280.00 TO NODE    290.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   185.00
  ELEVATION DATA: UPSTREAM(FEET) =     29.40  DOWNSTREAM(FEET) =     27.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.805
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.753
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.21      0.25     0.400    50    7.80
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      0.31
  TOTAL AREA(ACRES) =      0.21   PEAK FLOW RATE(CFS) =      0.31

****************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    300.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.90  DOWNSTREAM(FEET) =    24.80
  FLOW LENGTH(FEET) =    51.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   4.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   1.55
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.31
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =    8.35
  LONGEST FLOWPATH FROM NODE    280.00 TO NODE    300.00 =     236.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    300.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   185.00
  ELEVATION DATA: UPSTREAM(FEET) =     29.40  DOWNSTREAM(FEET) =     27.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.711
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.765
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.21      0.25     0.400    50    7.71
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.21   INITIAL SUBAREA RUNOFF(CFS) =    0.31

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =    8.35
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.686
  SUBAREA AREA(ACRES) =    0.21      SUBAREA RUNOFF(CFS) =    0.30
  EFFECTIVE AREA(ACRES) =      0.42   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        0.4       PEAK FLOW RATE(CFS) =       0.60

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    270.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.80  DOWNSTREAM(FEET) =    24.40
  FLOW LENGTH(FEET) =   187.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   6.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   1.84
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.60
  PIPE TRAVEL TIME(MIN.) =   1.69    Tc(MIN.) =   10.05
  LONGEST FLOWPATH FROM NODE    280.00 TO NODE    270.00 =     423.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.05
  RAINFALL INTENSITY(INCH/HR) =   1.52
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.40
  EFFECTIVE STREAM AREA(ACRES) =       0.42
  TOTAL STREAM AREA(ACRES) =       0.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.60

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       10.00   13.19    1.297  0.25( 0.10) 0.40       9.2     200.00
      2        0.60   10.05    1.516  0.25( 0.10) 0.40       0.4     280.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.61   10.05    1.516  0.25( 0.10) 0.40       7.4     280.00
      2       10.51   13.19    1.297  0.25( 0.10) 0.40       9.6     200.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      10.51    Tc(MIN.) =    13.19
  EFFECTIVE AREA(ACRES) =       9.58   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        9.6
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    270.00 =    1156.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    310.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.40  DOWNSTREAM(FEET) =    24.30
  FLOW LENGTH(FEET) =    49.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.70
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.51
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   13.41
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    310.00 =    1205.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   328.00
  ELEVATION DATA: UPSTREAM(FEET) =     30.50  DOWNSTREAM(FEET) =     28.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.524
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.477
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.75      0.25     0.400    50   10.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.75   INITIAL SUBAREA RUNOFF(CFS) =    0.93

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   13.41
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.285
  SUBAREA AREA(ACRES) =    0.75      SUBAREA RUNOFF(CFS) =    0.80
  EFFECTIVE AREA(ACRES) =     10.33   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       10.3       PEAK FLOW RATE(CFS) =      11.01

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   392.00
  ELEVATION DATA: UPSTREAM(FEET) =     33.00  DOWNSTREAM(FEET) =     28.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.959
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.524
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.99      0.25     0.400    50    9.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.99   INITIAL SUBAREA RUNOFF(CFS) =    1.27

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   13.41
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.285
  SUBAREA AREA(ACRES) =    0.99      SUBAREA RUNOFF(CFS) =    1.06
  EFFECTIVE AREA(ACRES) =     11.32   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       11.3       PEAK FLOW RATE(CFS) =      12.07

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    320.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.30  DOWNSTREAM(FEET) =    23.90
  FLOW LENGTH(FEET) =   199.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.76
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.07
  PIPE TRAVEL TIME(MIN.) =   0.88    Tc(MIN.) =   14.30
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    320.00 =    1404.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    320.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   271.00
  ELEVATION DATA: UPSTREAM(FEET) =     30.60  DOWNSTREAM(FEET) =     28.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.049
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.610
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.79      0.25     0.400    50    9.05
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.79   INITIAL SUBAREA RUNOFF(CFS) =    1.07

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   14.30
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.239
  SUBAREA AREA(ACRES) =    0.79      SUBAREA RUNOFF(CFS) =    0.81
  EFFECTIVE AREA(ACRES) =     12.11   AREA-AVERAGED Fm(INCH/HR) =  0.10
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       12.1       PEAK FLOW RATE(CFS) =      12.41

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    320.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   329.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.60  DOWNSTREAM(FEET) =     28.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.482
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.568
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.92      0.25     0.400    50    9.48
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.92   INITIAL SUBAREA RUNOFF(CFS) =    1.22

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   14.30
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.239
  SUBAREA AREA(ACRES) =    0.92      SUBAREA RUNOFF(CFS) =    0.94
  EFFECTIVE AREA(ACRES) =     13.03   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       13.0       PEAK FLOW RATE(CFS) =      13.35

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    330.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    23.90  DOWNSTREAM(FEET) =    23.70
  FLOW LENGTH(FEET) =   114.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.70
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.35
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   14.81
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    330.00 =    1518.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   248.00
  ELEVATION DATA: UPSTREAM(FEET) =     29.00  DOWNSTREAM(FEET) =     28.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.222
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.502
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
```

```
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
RESIDENTIAL
"8-10 DWELLINGS/ACRE"      C        0.22      0.25     0.400    50   10.22
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
SUBAREA AREA(ACRES) =    0.22   INITIAL SUBAREA RUNOFF(CFS) =    0.28

** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
MAINLINE Tc(MIN.) =   14.81
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.214
SUBAREA AREA(ACRES) =    0.22      SUBAREA RUNOFF(CFS) =    0.22
EFFECTIVE AREA(ACRES) =     13.25   AREA-AVERAGED Fm(INCH/HR) =  0.10
AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
TOTAL AREA(ACRES) =       13.2       PEAK FLOW RATE(CFS) =      13.35
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 IS CODE =  82
----------------------------------------------------------------------------
>>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
>>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =   381.00
ELEVATION DATA: UPSTREAM(FEET) =     31.95  DOWNSTREAM(FEET) =     28.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.049
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.516
SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
RESIDENTIAL
"8-10 DWELLINGS/ACRE"      C        1.66      0.25     0.400    50   10.05
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
SUBAREA AREA(ACRES) =    1.66   INITIAL SUBAREA RUNOFF(CFS) =    2.12

** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
MAINLINE Tc(MIN.) =   14.81
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.214
SUBAREA AREA(ACRES) =    1.66      SUBAREA RUNOFF(CFS) =    1.66
EFFECTIVE AREA(ACRES) =     14.91   AREA-AVERAGED Fm(INCH/HR) =  0.10
AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
TOTAL AREA(ACRES) =       14.9       PEAK FLOW RATE(CFS) =      14.94

****************************************************************************
FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =   14.81
RAINFALL INTENSITY(INCH/HR) =   1.21
AREA-AVERAGED Fm(INCH/HR) =  0.10
AREA-AVERAGED Fp(INCH/HR) =  0.25
AREA-AVERAGED Ap =  0.40
EFFECTIVE STREAM AREA(ACRES) =      14.91
TOTAL STREAM AREA(ACRES) =      14.91
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.94

****************************************************************************
  FLOW PROCESS FROM NODE    340.00 TO NODE    350.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   344.00
  ELEVATION DATA: UPSTREAM(FEET) =     30.85  DOWNSTREAM(FEET) =     27.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.889
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.530
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.84      0.25     0.400    50    9.89
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      1.08
  TOTAL AREA(ACRES) =      0.84   PEAK FLOW RATE(CFS) =      1.08

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    360.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.10  DOWNSTREAM(FEET) =    24.00
  FLOW LENGTH(FEET) =    18.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.01
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.08
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    9.99
  LONGEST FLOWPATH FROM NODE    340.00 TO NODE    360.00 =     362.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    360.00 TO NODE    360.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   173.00
  ELEVATION DATA: UPSTREAM(FEET) =     28.60  DOWNSTREAM(FEET) =     27.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.080
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.719
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.13      0.25     0.400    50    8.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.13   INITIAL SUBAREA RUNOFF(CFS) =    0.19
```

```
  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =    9.99
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.522
  SUBAREA AREA(ACRES) =    0.13      SUBAREA RUNOFF(CFS) =    0.17
  EFFECTIVE AREA(ACRES) =      0.97   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        1.0       PEAK FLOW RATE(CFS) =       1.24

****************************************************************************
  FLOW PROCESS FROM NODE    360.00 TO NODE    330.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.00  DOWNSTREAM(FEET) =    23.70
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   1.94
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.24
  PIPE TRAVEL TIME(MIN.) =   1.63    Tc(MIN.) =   11.62
  LONGEST FLOWPATH FROM NODE    340.00 TO NODE    330.00 =     552.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.62
  RAINFALL INTENSITY(INCH/HR) =   1.40
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.40
  EFFECTIVE STREAM AREA(ACRES) =       0.97
  TOTAL STREAM AREA(ACRES) =       0.97
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.24

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       14.78   11.68    1.391  0.25( 0.10) 0.40      12.7     280.00
      1       14.94   14.81    1.214  0.25( 0.10) 0.40      14.9     200.00
      2        1.24   11.62    1.395  0.25( 0.10) 0.40       1.0     340.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.99   11.62    1.395  0.25( 0.10) 0.40      13.6     340.00
      2       16.02   11.68    1.391  0.25( 0.10) 0.40      13.7     280.00
      3       16.01   14.81    1.214  0.25( 0.10) 0.40      15.9     200.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.02    Tc(MIN.) =    11.68
  EFFECTIVE AREA(ACRES) =      13.70   AREA-AVERAGED Fm(INCH/HR) =  0.10
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       15.9
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    330.00 =    1518.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    23.70  DOWNSTREAM(FEET) =    23.20
  FLOW LENGTH(FEET) =   244.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.07
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.02
  PIPE TRAVEL TIME(MIN.) =   1.00    Tc(MIN.) =   12.69
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    150.00 =    1762.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.99   12.62    1.331  0.25( 0.10) 0.40      13.6     340.00
      2       16.02   12.69    1.327  0.25( 0.10) 0.40      13.7     280.00
      3       16.01   15.81    1.169  0.25( 0.10) 0.40      15.9     200.00
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    150.00 =    1762.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.42   12.77    1.321  0.25( 0.08) 0.31      12.0     110.00
      2       13.36   20.26    1.014  0.25( 0.08) 0.32      15.9      10.00
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE    150.00 =    2077.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       29.35   12.62    1.331  0.25( 0.09) 0.36      25.5     340.00
      2       29.40   12.69    1.327  0.25( 0.09) 0.36      25.6     280.00
      3       29.44   12.77    1.321  0.25( 0.09) 0.36      25.7     110.00
      4       29.41   15.81    1.169  0.25( 0.09) 0.36      29.5     200.00
      5       27.05   20.26    1.014  0.25( 0.09) 0.36      31.8      10.00
    TOTAL AREA(ACRES) =        31.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       29.44  Tc(MIN.) =   12.771
  EFFECTIVE AREA(ACRES) =     25.74  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =       31.8
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE    150.00 =    2077.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       31.8  TC(MIN.) =     12.77
  EFFECTIVE AREA(ACRES) =     25.74  AREA-AVERAGED Fm(INCH/HR)=  0.09
```

AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.358
PEAK FLOW RATE(CFS) = 29.44

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	29.35	12.62	1.331	0.25(0.09)	0.36	25.5	340.00
2	29.40	12.69	1.327	0.25(0.09)	0.36	25.6	280.00
3	29.44	12.77	1.321	0.25(0.09)	0.36	25.7	110.00
4	29.41	15.81	1.169	0.25(0.09)	0.36	29.5	200.00
5	27.05	20.26	1.014	0.25(0.09)	0.36	31.8	10.00

==========
==========
END OF RATIONAL METHOD ANALYSIS

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 21.0  Release Date: 06/01/2014  License ID 1355

                           Analysis prepared by:

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 ************************** DESCRIPTION OF STUDY **************************
* BARTON PLACE - C33                                                       *
* PROPOSED 10 YEAR HYDROLOGY                                               *
* JOB NO. 1334.01   FILE NAMES:  PC3310.INP   PC3310.OUT                   *
 ***************************************************************************

  FILE NAME: PC3310.INP
  TIME/DATE OF STUDY: 10:39 02/03/2015
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   297.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.80  DOWNSTREAM(FEET) =     33.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.270
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.850
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.82      0.25     0.400    50    9.27
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      2.03
  TOTAL AREA(ACRES) =      0.82   PEAK FLOW RATE(CFS) =      2.03

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     30.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   33.00  DOWNSTREAM ELEVATION(FEET) =   32.20
  STREET LENGTH(FEET) =    76.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    9.52
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.24
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.71
  STREET FLOW TRAVEL TIME(MIN.) =   0.57   Tc(MIN.) =    9.84
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.755
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.22      0.25     0.400    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.22      SUBAREA RUNOFF(CFS) =    0.53
  EFFECTIVE AREA(ACRES) =      1.04    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.48

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.89
  FLOW VELOCITY(FEET/SEC.) =  2.27   DEPTH*VELOCITY(FT*FT/SEC.) =   0.73
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     30.00 =     373.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     40.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    28.00  DOWNSTREAM(FEET) =    27.80
  FLOW LENGTH(FEET) =    38.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.72
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.48
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   10.01
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     40.00 =     411.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.40  DOWNSTREAM(FEET) =     32.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.740
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.770
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.85      0.25     0.400    50    9.74
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.85   INITIAL SUBAREA RUNOFF(CFS) =    2.04

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   10.01
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.728
  SUBAREA AREA(ACRES) =    0.85      SUBAREA RUNOFF(CFS) =    2.01
  EFFECTIVE AREA(ACRES) =      1.89   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        1.9       PEAK FLOW RATE(CFS) =       4.47

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    27.80  DOWNSTREAM(FEET) =    27.00
  FLOW LENGTH(FEET) =   199.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.88
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.47
  PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =   10.86
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     50.00 =     610.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   360.00
```

```
  ELEVATION DATA: UPSTREAM(FEET) =     34.80  DOWNSTREAM(FEET) =     31.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.068
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.718
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.71      0.25     0.400    50   10.07
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.71   INITIAL SUBAREA RUNOFF(CFS) =    1.67

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   10.86
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.603
  SUBAREA AREA(ACRES) =    0.71      SUBAREA RUNOFF(CFS) =    1.60
  EFFECTIVE AREA(ACRES) =      2.60   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        2.6       PEAK FLOW RATE(CFS) =       5.86

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     60.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    27.00  DOWNSTREAM(FEET) =    26.20
  FLOW LENGTH(FEET) =   117.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.06
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.86
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   11.25
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     60.00 =     727.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   327.00
  ELEVATION DATA: UPSTREAM(FEET) =     33.80  DOWNSTREAM(FEET) =     30.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.623
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.790
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.33      0.25     0.400    50    9.62
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.33   INITIAL SUBAREA RUNOFF(CFS) =    3.22

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   11.25
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.551
  SUBAREA AREA(ACRES) =    1.33      SUBAREA RUNOFF(CFS) =    2.93
  EFFECTIVE AREA(ACRES) =      3.93   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        3.9       PEAK FLOW RATE(CFS) =       8.67

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   265.00
  ELEVATION DATA: UPSTREAM(FEET) =     32.60  DOWNSTREAM(FEET) =     30.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.356
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.835
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.26      0.25     0.400    50    9.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.26   INITIAL SUBAREA RUNOFF(CFS) =    0.64

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   11.25
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.551
  SUBAREA AREA(ACRES) =    0.26      SUBAREA RUNOFF(CFS) =    0.57
  EFFECTIVE AREA(ACRES) =      4.19   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        4.2       PEAK FLOW RATE(CFS) =       9.24

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     70.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    26.20  DOWNSTREAM(FEET) =    25.44
  FLOW LENGTH(FEET) =   221.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.38
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.24
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =   12.09
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     70.00 =     948.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   264.00
  ELEVATION DATA: UPSTREAM(FEET) =     33.40  DOWNSTREAM(FEET) =     29.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.084
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.083
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.76      0.25     0.400    50    8.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.76   INITIAL SUBAREA RUNOFF(CFS) =    2.04

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   12.09
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.448
  SUBAREA AREA(ACRES) =    0.76      SUBAREA RUNOFF(CFS) =    1.61
  EFFECTIVE AREA(ACRES) =      4.95   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        4.9       PEAK FLOW RATE(CFS) =      10.46

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   162.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.00  DOWNSTREAM(FEET) =     29.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.301
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.268
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.18      0.25     0.400    50    7.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.18   INITIAL SUBAREA RUNOFF(CFS) =    0.51

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   12.09
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.448
  SUBAREA AREA(ACRES) =    0.18      SUBAREA RUNOFF(CFS) =    0.38
  EFFECTIVE AREA(ACRES) =      5.13   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        5.1       PEAK FLOW RATE(CFS) =      10.84

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     80.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    25.44  DOWNSTREAM(FEET) =    24.90
  FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.75
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.84
```

```
  PIPE TRAVEL TIME(MIN.) =   1.16    Tc(MIN.) =   13.24
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     80.00 =    1208.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   332.00
  ELEVATION DATA: UPSTREAM(FEET) =     32.25  DOWNSTREAM(FEET) =     29.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.808
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.759
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.39      0.25     0.400    50    9.81
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.39   INITIAL SUBAREA RUNOFF(CFS) =    3.33

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   13.24
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.323
  SUBAREA AREA(ACRES) =    1.39      SUBAREA RUNOFF(CFS) =    2.78
  EFFECTIVE AREA(ACRES) =      6.52   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        6.5       PEAK FLOW RATE(CFS) =      13.04

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   427.00
  ELEVATION DATA: UPSTREAM(FEET) =     34.40  DOWNSTREAM(FEET) =     29.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.224
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.694
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.73      0.25     0.400    50   10.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.73   INITIAL SUBAREA RUNOFF(CFS) =    4.04

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   13.24
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.323
  SUBAREA AREA(ACRES) =    1.73      SUBAREA RUNOFF(CFS) =    3.46
  EFFECTIVE AREA(ACRES) =      8.25   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        8.2       PEAK FLOW RATE(CFS) =      16.51
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     90.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.90  DOWNSTREAM(FEET) =    23.79
  FLOW LENGTH(FEET) =   271.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.33
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.51
  PIPE TRAVEL TIME(MIN.) =   0.85    Tc(MIN.) =   14.09
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     90.00 =    1479.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     90.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   173.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.18  DOWNSTREAM(FEET) =     30.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.868
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.384
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.42      0.25     0.100    50    6.87
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.42   INITIAL SUBAREA RUNOFF(CFS) =    1.27

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   14.09
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.242
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    0.84
  EFFECTIVE AREA(ACRES) =      8.67   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =        8.7       PEAK FLOW RATE(CFS) =      16.74

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE    100.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    23.79  DOWNSTREAM(FEET) =    23.75
  FLOW LENGTH(FEET) =   299.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  37.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   1.48
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.74
  PIPE TRAVEL TIME(MIN.) =   3.37    Tc(MIN.) =   17.46
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE    100.00 =    1778.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   211.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.18  DOWNSTREAM(FEET) =     29.28

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.633
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.453
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.51      0.25     0.100    50    6.63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.51   INITIAL SUBAREA RUNOFF(CFS) =    1.57

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   17.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.983
  SUBAREA AREA(ACRES) =    0.51      SUBAREA RUNOFF(CFS) =    0.90
  EFFECTIVE AREA(ACRES) =      9.18   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =        9.2       PEAK FLOW RATE(CFS) =      16.74
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   268.00
  ELEVATION DATA: UPSTREAM(FEET) =     32.12  DOWNSTREAM(FEET) =     29.90

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.421
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.237
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.70      0.25     0.100    50    7.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.70   INITIAL SUBAREA RUNOFF(CFS) =    2.02

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   17.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.983
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    1.23
  EFFECTIVE AREA(ACRES) =      9.88   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =        9.9       PEAK FLOW RATE(CFS) =      16.85

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
```

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==============================================================================

******************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    120.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   294.00
  ELEVATION DATA: UPSTREAM(FEET) =     33.80  DOWNSTREAM(FEET) =     29.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.580
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.979
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.78      0.25     0.400    50    8.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      2.02
  TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      2.02

******************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    130.00 IS CODE =  61
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =   29.80  DOWNSTREAM ELEVATION(FEET) =   28.60
  STREET LENGTH(FEET) =   131.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.23
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    9.70
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
  STREET FLOW TRAVEL TIME(MIN.) =   1.04   Tc(MIN.) =    9.62
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.790
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.17      0.25     0.400    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.17      SUBAREA RUNOFF(CFS) =    0.41
  EFFECTIVE AREA(ACRES) =      0.95    AREA-AVERAGED Fm(INCH/HR) =  0.10
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       2.30

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.80
  FLOW VELOCITY(FEET/SEC.) =  2.13   DEPTH*VELOCITY(FT*FT/SEC.) =   0.69
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    130.00 =     425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   325.00
  ELEVATION DATA: UPSTREAM(FEET) =     33.00  DOWNSTREAM(FEET) =     28.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.939
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.910
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.84      0.25     0.400    50    8.94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.84   INITIAL SUBAREA RUNOFF(CFS) =    2.12

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =    9.62
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.790
  SUBAREA AREA(ACRES) =    0.84      SUBAREA RUNOFF(CFS) =    2.03
  EFFECTIVE AREA(ACRES) =      1.79   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        1.8       PEAK FLOW RATE(CFS) =       4.33

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    140.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.40  DOWNSTREAM(FEET) =    24.30
  FLOW LENGTH(FEET) =    18.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.24
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.33
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.69
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    140.00 =     443.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   369.00
  ELEVATION DATA: UPSTREAM(FEET) =     32.25  DOWNSTREAM(FEET) =     28.60
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.014
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.727
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.65      0.25     0.400    50   10.01
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.65   INITIAL SUBAREA RUNOFF(CFS) =    3.90

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =    9.69
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.779
  SUBAREA AREA(ACRES) =    1.65      SUBAREA RUNOFF(CFS) =    3.98
  EFFECTIVE AREA(ACRES) =      3.44   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        3.4       PEAK FLOW RATE(CFS) =       8.29

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    100.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.30  DOWNSTREAM(FEET) =    23.70
  FLOW LENGTH(FEET) =   280.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.54
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.29
  PIPE TRAVEL TIME(MIN.) =   1.32    Tc(MIN.) =   11.01
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    100.00 =     723.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.29   11.01    2.583  0.25( 0.10) 0.40       3.4     110.00
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    100.00 =     723.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       16.85   17.46    1.983  0.25( 0.09) 0.35       9.9      10.00
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE    100.00 =    1778.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       22.28   11.01    2.583  0.25( 0.09) 0.37       9.7     110.00
      2       23.14   17.46    1.983  0.25( 0.09) 0.36      13.3      10.00
    TOTAL AREA(ACRES) =        13.3
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       23.14  Tc(MIN.) =   17.460
  EFFECTIVE AREA(ACRES) =     13.32  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =       13.3
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE    100.00 =    1778.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    23.75  DOWNSTREAM(FEET) =    23.16
  FLOW LENGTH(FEET) =   299.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.44
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.14
  PIPE TRAVEL TIME(MIN.) =   1.12    Tc(MIN.) =   18.58
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE    150.00 =    2077.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   287.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.85  DOWNSTREAM(FEET) =     29.48

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.632
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.186
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        1.58      0.25     0.100    50    7.63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.58   INITIAL SUBAREA RUNOFF(CFS) =    4.49

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   18.58
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.913
  SUBAREA AREA(ACRES) =    1.58      SUBAREA RUNOFF(CFS) =    2.69
  EFFECTIVE AREA(ACRES) =     14.90   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.34
  TOTAL AREA(ACRES) =       14.9       PEAK FLOW RATE(CFS) =      24.53

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   209.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.99  DOWNSTREAM(FEET) =     29.66
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.331
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.546
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        1.00      0.25     0.100    50    6.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.00   INITIAL SUBAREA RUNOFF(CFS) =    3.17

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   18.58
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.913
  SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    1.70
  EFFECTIVE AREA(ACRES) =     15.90   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.32
  TOTAL AREA(ACRES) =       15.9       PEAK FLOW RATE(CFS) =      26.23

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    210.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   277.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.20  DOWNSTREAM(FEET) =     32.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.828
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.931
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.66      0.25     0.400    50    8.83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      1.68
  TOTAL AREA(ACRES) =      0.66   PEAK FLOW RATE(CFS) =      1.68

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    220.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   32.30  DOWNSTREAM ELEVATION(FEET) =   31.40
  STREET LENGTH(FEET) =    97.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.72
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.58
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.01
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.60
  STREET FLOW TRAVEL TIME(MIN.) =   0.80   Tc(MIN.) =    9.63
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.788
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.03      0.25     0.400    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.03      SUBAREA RUNOFF(CFS) =    0.07
  EFFECTIVE AREA(ACRES) =      0.69    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       1.68
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.48
  FLOW VELOCITY(FEET/SEC.) =  2.01   DEPTH*VELOCITY(FT*FT/SEC.) =   0.59
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    220.00 =     374.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    220.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   268.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.20  DOWNSTREAM(FEET) =     31.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.200
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.058
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.65      0.25     0.400    50    8.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.65   INITIAL SUBAREA RUNOFF(CFS) =    1.73

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =    9.63
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.788
  SUBAREA AREA(ACRES) =    0.65      SUBAREA RUNOFF(CFS) =    1.57
  EFFECTIVE AREA(ACRES) =      1.34   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        1.3       PEAK FLOW RATE(CFS) =       3.24
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    27.30  DOWNSTREAM(FEET) =    27.20
  FLOW LENGTH(FEET) =    18.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.04
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.24
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.71
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    230.00 =     392.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   327.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.50  DOWNSTREAM(FEET) =     31.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.100
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.880
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.96      0.25     0.400    50    9.10
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.96   INITIAL SUBAREA RUNOFF(CFS) =    2.40

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =    9.71
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.776
  SUBAREA AREA(ACRES) =    0.96      SUBAREA RUNOFF(CFS) =    2.31
  EFFECTIVE AREA(ACRES) =      2.30   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       5.54

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    240.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    27.20  DOWNSTREAM(FEET) =    25.80
  FLOW LENGTH(FEET) =   292.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.34
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.54
  PIPE TRAVEL TIME(MIN.) =   1.12    Tc(MIN.) =   10.83
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    240.00 =     684.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   473.00
  ELEVATION DATA: UPSTREAM(FEET) =     34.80  DOWNSTREAM(FEET) =     30.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.197
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.558
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.74      0.25     0.400    50   11.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.74   INITIAL SUBAREA RUNOFF(CFS) =    3.85

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   10.83
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.607
  SUBAREA AREA(ACRES) =    1.74      SUBAREA RUNOFF(CFS) =    3.93
  EFFECTIVE AREA(ACRES) =      4.04   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        4.0       PEAK FLOW RATE(CFS) =       9.12

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   353.00
  ELEVATION DATA: UPSTREAM(FEET) =     34.50  DOWNSTREAM(FEET) =     30.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.528
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.806
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.32      0.25     0.400    50    9.53
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.32   INITIAL SUBAREA RUNOFF(CFS) =    3.21

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   10.83
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.607
  SUBAREA AREA(ACRES) =    1.32      SUBAREA RUNOFF(CFS) =    2.98
  EFFECTIVE AREA(ACRES) =      5.36   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        5.4       PEAK FLOW RATE(CFS) =      12.10

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    250.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    25.80  DOWNSTREAM(FEET) =    24.80
  FLOW LENGTH(FEET) =   276.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.67
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.10
  PIPE TRAVEL TIME(MIN.) =   0.98    Tc(MIN.) =   11.81
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    250.00 =     960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    250.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   441.00
  ELEVATION DATA: UPSTREAM(FEET) =     33.10  DOWNSTREAM(FEET) =     28.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.595
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.640
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.94      0.25     0.400    50   10.60
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.94   INITIAL SUBAREA RUNOFF(CFS) =    2.15

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   11.81
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.481
  SUBAREA AREA(ACRES) =    0.94      SUBAREA RUNOFF(CFS) =    2.01
  EFFECTIVE AREA(ACRES) =      6.30   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        6.3       PEAK FLOW RATE(CFS) =      13.50

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    250.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   351.00
  ELEVATION DATA: UPSTREAM(FEET) =     33.00  DOWNSTREAM(FEET) =     28.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.279
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.848
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.03      0.25     0.400    50    9.28
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.03   INITIAL SUBAREA RUNOFF(CFS) =    2.55

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   11.81
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.481
  SUBAREA AREA(ACRES) =    1.03      SUBAREA RUNOFF(CFS) =    2.21
  EFFECTIVE AREA(ACRES) =      7.33   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        7.3       PEAK FLOW RATE(CFS) =      15.70

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    260.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.80  DOWNSTREAM(FEET) =    24.50
  FLOW LENGTH(FEET) =   138.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.16
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.70
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =   12.36
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    260.00 =    1098.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    260.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   473.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.80  DOWNSTREAM(FEET) =     28.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.860
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.475
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.58      0.25     0.400    50   11.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.58   INITIAL SUBAREA RUNOFF(CFS) =    3.38

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   12.36
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.416
  SUBAREA AREA(ACRES) =    1.58      SUBAREA RUNOFF(CFS) =    3.29
  EFFECTIVE AREA(ACRES) =      8.91   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        8.9       PEAK FLOW RATE(CFS) =      18.58

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    260.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
```

```
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   133.00
  ELEVATION DATA: UPSTREAM(FEET) =     30.20  DOWNSTREAM(FEET) =     28.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.325
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.548
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.25      0.25     0.400    50    6.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.25   INITIAL SUBAREA RUNOFF(CFS) =    0.78

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   12.36
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.416
  SUBAREA AREA(ACRES) =    0.25      SUBAREA RUNOFF(CFS) =    0.52
  EFFECTIVE AREA(ACRES) =      9.16   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        9.2       PEAK FLOW RATE(CFS) =      19.10

******************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    270.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.50  DOWNSTREAM(FEET) =    24.40
  FLOW LENGTH(FEET) =    58.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.98
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.10
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   12.61
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    270.00 =    1156.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.61
  RAINFALL INTENSITY(INCH/HR) =   2.39
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.40
  EFFECTIVE STREAM AREA(ACRES) =       9.16
  TOTAL STREAM AREA(ACRES) =       9.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      19.10

******************************************************************************
  FLOW PROCESS FROM NODE    280.00 TO NODE    290.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   185.00
  ELEVATION DATA: UPSTREAM(FEET) =     29.40  DOWNSTREAM(FEET) =     27.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.805
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.145
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.21      0.25     0.400    50    7.80
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      0.58
  TOTAL AREA(ACRES) =      0.21   PEAK FLOW RATE(CFS) =      0.58

******************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    300.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.90  DOWNSTREAM(FEET) =    24.80
  FLOW LENGTH(FEET) =    51.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   6.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   1.77
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.58
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =    8.29
  LONGEST FLOWPATH FROM NODE    280.00 TO NODE    300.00 =     236.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    300.00 IS CODE =  82
------------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   185.00
  ELEVATION DATA: UPSTREAM(FEET) =     29.40  DOWNSTREAM(FEET) =     27.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.711
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.167
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.21      0.25     0.400    50    7.71
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.21   INITIAL SUBAREA RUNOFF(CFS) =    0.58

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =    8.29
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.039
  SUBAREA AREA(ACRES) =    0.21      SUBAREA RUNOFF(CFS) =    0.56
  EFFECTIVE AREA(ACRES) =      0.42   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        0.4       PEAK FLOW RATE(CFS) =       1.11
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    270.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.80  DOWNSTREAM(FEET) =    24.40
  FLOW LENGTH(FEET) =   187.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.15
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.11
  PIPE TRAVEL TIME(MIN.) =   1.45    Tc(MIN.) =    9.73
  LONGEST FLOWPATH FROM NODE    280.00 TO NODE    270.00 =     423.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.73
  RAINFALL INTENSITY(INCH/HR) =   2.77
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.40
  EFFECTIVE STREAM AREA(ACRES) =       0.42
  TOTAL STREAM AREA(ACRES) =       0.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.11

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       19.10   12.61    2.390  0.25( 0.10) 0.40       9.2     200.00
      2        1.11    9.73    2.772  0.25( 0.10) 0.40       0.4     280.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       18.31    9.73    2.772  0.25( 0.10) 0.40       7.5     280.00
      2       20.05   12.61    2.390  0.25( 0.10) 0.40       9.6     200.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.05    Tc(MIN.) =    12.61
  EFFECTIVE AREA(ACRES) =       9.58   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        9.6
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    270.00 =    1156.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    310.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.40  DOWNSTREAM(FEET) =    24.30
  FLOW LENGTH(FEET) =    49.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.31
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.05
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   12.80
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    310.00 =    1205.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   328.00
  ELEVATION DATA: UPSTREAM(FEET) =     30.50  DOWNSTREAM(FEET) =     28.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.524
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.650
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.75      0.25     0.400    50   10.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.75   INITIAL SUBAREA RUNOFF(CFS) =    1.72

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   12.80
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.369
  SUBAREA AREA(ACRES) =    0.75      SUBAREA RUNOFF(CFS) =    1.53
  EFFECTIVE AREA(ACRES) =     10.33   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       10.3       PEAK FLOW RATE(CFS) =      21.10

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   392.00
  ELEVATION DATA: UPSTREAM(FEET) =     33.00  DOWNSTREAM(FEET) =     28.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.959
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.735
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.99      0.25     0.400    50    9.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.99   INITIAL SUBAREA RUNOFF(CFS) =    2.35
```

```
  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   12.80
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.369
  SUBAREA AREA(ACRES) =    0.99      SUBAREA RUNOFF(CFS) =    2.02
  EFFECTIVE AREA(ACRES) =     11.32   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       11.3       PEAK FLOW RATE(CFS) =      23.12

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    320.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.30  DOWNSTREAM(FEET) =    23.90
  FLOW LENGTH(FEET) =   199.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.47
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.12
  PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =   13.54
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    320.00 =    1404.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    320.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   271.00
  ELEVATION DATA: UPSTREAM(FEET) =     30.60  DOWNSTREAM(FEET) =     28.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.049
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.890
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.79      0.25     0.400    50    9.05
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.79   INITIAL SUBAREA RUNOFF(CFS) =    1.98

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   13.54
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.294
  SUBAREA AREA(ACRES) =    0.79      SUBAREA RUNOFF(CFS) =    1.56
  EFFECTIVE AREA(ACRES) =     12.11   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       12.1       PEAK FLOW RATE(CFS) =      23.91

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    320.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   329.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.60  DOWNSTREAM(FEET) =     28.20
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.482
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.813
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.92      0.25     0.400    50    9.48
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.92   INITIAL SUBAREA RUNOFF(CFS) =    2.25

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   13.54
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.294
  SUBAREA AREA(ACRES) =    0.92      SUBAREA RUNOFF(CFS) =    1.82
  EFFECTIVE AREA(ACRES) =     13.03   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       13.0       PEAK FLOW RATE(CFS) =      25.73

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    330.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    23.90  DOWNSTREAM(FEET) =    23.70
  FLOW LENGTH(FEET) =   114.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.27
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.73
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   13.98
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    330.00 =    1518.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   248.00
  ELEVATION DATA: UPSTREAM(FEET) =     29.00  DOWNSTREAM(FEET) =     28.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.222
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.695
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.22      0.25     0.400    50   10.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.22   INITIAL SUBAREA RUNOFF(CFS) =    0.51

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   13.98
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.252
```

```
  SUBAREA AREA(ACRES) =    0.22      SUBAREA RUNOFF(CFS) =    0.43
  EFFECTIVE AREA(ACRES) =     13.25   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       13.2       PEAK FLOW RATE(CFS) =      25.73
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   381.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.95  DOWNSTREAM(FEET) =     28.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.049
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.721
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.66      0.25     0.400    50   10.05
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.66   INITIAL SUBAREA RUNOFF(CFS) =    3.92

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   13.98
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.252
  SUBAREA AREA(ACRES) =    1.66      SUBAREA RUNOFF(CFS) =    3.21
  EFFECTIVE AREA(ACRES) =     14.91   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       14.9       PEAK FLOW RATE(CFS) =      28.88

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.98
  RAINFALL INTENSITY(INCH/HR) =   2.25
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.40
  EFFECTIVE STREAM AREA(ACRES) =      14.91
  TOTAL STREAM AREA(ACRES) =      14.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      28.88

****************************************************************************
  FLOW PROCESS FROM NODE    340.00 TO NODE    350.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   344.00
  ELEVATION DATA: UPSTREAM(FEET) =     30.85  DOWNSTREAM(FEET) =     27.70
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.889
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.746
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.84      0.25     0.400    50    9.89
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      2.00
  TOTAL AREA(ACRES) =      0.84   PEAK FLOW RATE(CFS) =      2.00

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    360.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.10  DOWNSTREAM(FEET) =    24.00
  FLOW LENGTH(FEET) =    18.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.56
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.00
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.97
  LONGEST FLOWPATH FROM NODE    340.00 TO NODE    360.00 =     362.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    360.00 TO NODE    360.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   173.00
  ELEVATION DATA: UPSTREAM(FEET) =     28.60  DOWNSTREAM(FEET) =     27.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.080
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.083
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.13      0.25     0.400    50    8.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.13   INITIAL SUBAREA RUNOFF(CFS) =    0.35

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =    9.97
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.733
  SUBAREA AREA(ACRES) =    0.13      SUBAREA RUNOFF(CFS) =    0.31
  EFFECTIVE AREA(ACRES) =      0.97   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        1.0       PEAK FLOW RATE(CFS) =       2.30

****************************************************************************
  FLOW PROCESS FROM NODE    360.00 TO NODE    330.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.00  DOWNSTREAM(FEET) =    23.70
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.26
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.30
  PIPE TRAVEL TIME(MIN.) =   1.40    Tc(MIN.) =   11.38
  LONGEST FLOWPATH FROM NODE    340.00 TO NODE    330.00 =     552.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.38
  RAINFALL INTENSITY(INCH/HR) =   2.53
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.40
  EFFECTIVE STREAM AREA(ACRES) =       0.97
  TOTAL STREAM AREA(ACRES) =       0.97
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.30

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       28.45   11.14    2.565  0.25( 0.10) 0.40      12.8     280.00
      1       28.88   13.98    2.252  0.25( 0.10) 0.40      14.9     200.00
      2        2.30   11.38    2.535  0.25( 0.10) 0.40       1.0     340.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       30.73   11.14    2.565  0.25( 0.10) 0.40      13.8     280.00
      2       30.78   11.38    2.535  0.25( 0.10) 0.40      14.0     340.00
      3       30.91   13.98    2.252  0.25( 0.10) 0.40      15.9     200.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.91    Tc(MIN.) =    13.98
  EFFECTIVE AREA(ACRES) =      15.88   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       15.9
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    330.00 =    1518.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    23.70  DOWNSTREAM(FEET) =    23.20
```

```
  FLOW LENGTH(FEET) =   244.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.82
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.91
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =   14.83
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    150.00 =    1762.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       30.73   11.98    2.460  0.25( 0.10) 0.40      13.8     280.00
      2       30.78   12.22    2.433  0.25( 0.10) 0.40      14.0     340.00
      3       30.91   14.83    2.178  0.25( 0.10) 0.40      15.9     200.00
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    150.00 =    1762.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       26.02   12.17    2.438  0.25( 0.08) 0.31      12.2     110.00
      2       26.23   18.58    1.913  0.25( 0.08) 0.32      15.9      10.00
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE    150.00 =    2077.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       56.58   11.98    2.460  0.25( 0.09) 0.36      25.8     280.00
      2       56.79   12.17    2.438  0.25( 0.09) 0.36      26.2     110.00
      3       56.80   12.22    2.433  0.25( 0.09) 0.36      26.2     340.00
      4       57.02   14.83    2.178  0.25( 0.09) 0.36      29.6     200.00
      5       53.21   18.58    1.913  0.25( 0.09) 0.36      31.8      10.00
    TOTAL AREA(ACRES) =        31.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       57.02  Tc(MIN.) =   14.828
  EFFECTIVE AREA(ACRES) =     29.64  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =       31.8
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE    150.00 =    2077.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       31.8  TC(MIN.) =     14.83
  EFFECTIVE AREA(ACRES) =     29.64  AREA-AVERAGED Fm(INCH/HR)=  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap = 0.361
  PEAK FLOW RATE(CFS)   =      57.02

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       56.58   11.98    2.460  0.25( 0.09) 0.36      25.8     280.00
      2       56.79   12.17    2.438  0.25( 0.09) 0.36      26.2     110.00
      3       56.80   12.22    2.433  0.25( 0.09) 0.36      26.2     340.00
      4       57.02   14.83    2.178  0.25( 0.09) 0.36      29.6     200.00
      5       53.21   18.58    1.913  0.25( 0.09) 0.36      31.8      10.00
```

==========
==========
END OF RATIONAL METHOD ANALYSIS

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                           Analysis prepared by:

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 ************************** DESCRIPTION OF STUDY **************************
* BARTON PLACE - C33                                                       *
* PROPOSED 100 YEAR HYDROLOGY                                              *
* JOB NO. 1334.01   FILE NAMES: PC33100.INP   PC33100.OUT                  *
 ***************************************************************************

  FILE NAME: PC33100.INP
  TIME/DATE OF STUDY: 11:09 02/03/2015
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   297.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.80  DOWNSTREAM(FEET) =     33.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.270
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.344
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.82      0.25     0.400    86    9.27
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      3.13
  TOTAL AREA(ACRES) =      0.82   PEAK FLOW RATE(CFS) =      3.13

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     30.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   33.00  DOWNSTREAM ELEVATION(FEET) =   32.20
  STREET LENGTH(FEET) =    76.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.54
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   11.48
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.46
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.88
  STREET FLOW TRAVEL TIME(MIN.) =   0.51   Tc(MIN.) =    9.78
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.211
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.22      0.25     0.400    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.22      SUBAREA RUNOFF(CFS) =    0.81
  EFFECTIVE AREA(ACRES) =      1.04    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       3.85

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.86
  FLOW VELOCITY(FEET/SEC.) =  2.52   DEPTH*VELOCITY(FT*FT/SEC.) =   0.92
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     30.00 =     373.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     40.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    28.00  DOWNSTREAM(FEET) =    27.80
  FLOW LENGTH(FEET) =    38.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.08
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.85
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    9.94
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     40.00 =     411.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   330.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.40  DOWNSTREAM(FEET) =     32.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.740
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.222
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.85      0.25     0.400    86    9.74
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.85   INITIAL SUBAREA RUNOFF(CFS) =    3.15

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =    9.94
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.174
  SUBAREA AREA(ACRES) =    0.85      SUBAREA RUNOFF(CFS) =    3.12
  EFFECTIVE AREA(ACRES) =      1.89   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        1.9       PEAK FLOW RATE(CFS) =       6.93

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    27.80  DOWNSTREAM(FEET) =    27.00
  FLOW LENGTH(FEET) =   199.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.32
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.93
  PIPE TRAVEL TIME(MIN.) =   0.77    Tc(MIN.) =   10.71
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     50.00 =     610.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   360.00
```

```
  ELEVATION DATA: UPSTREAM(FEET) =     34.80  DOWNSTREAM(FEET) =     31.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.068
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.143
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.71      0.25     0.400    86   10.07
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.71   INITIAL SUBAREA RUNOFF(CFS) =    2.58

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   10.71
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.999
  SUBAREA AREA(ACRES) =    0.71      SUBAREA RUNOFF(CFS) =    2.49
  EFFECTIVE AREA(ACRES) =      2.60   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        2.6       PEAK FLOW RATE(CFS) =       9.12

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     60.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    27.00  DOWNSTREAM(FEET) =    26.20
  FLOW LENGTH(FEET) =   117.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.65
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.12
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   11.05
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     60.00 =     727.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   327.00
  ELEVATION DATA: UPSTREAM(FEET) =     33.80  DOWNSTREAM(FEET) =     30.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.623
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.252
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.33      0.25     0.400    86    9.62
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.33   INITIAL SUBAREA RUNOFF(CFS) =    4.97

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   11.05
```

```
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.927
  SUBAREA AREA(ACRES) =    1.33      SUBAREA RUNOFF(CFS) =    4.58
  EFFECTIVE AREA(ACRES) =      3.93   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        3.9       PEAK FLOW RATE(CFS) =      13.54

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   265.00
  ELEVATION DATA: UPSTREAM(FEET) =     32.60  DOWNSTREAM(FEET) =     30.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.356
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.321
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.26      0.25     0.400    86    9.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.26   INITIAL SUBAREA RUNOFF(CFS) =    0.99

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   11.05
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.927
  SUBAREA AREA(ACRES) =    0.26      SUBAREA RUNOFF(CFS) =    0.90
  EFFECTIVE AREA(ACRES) =      4.19   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        4.2       PEAK FLOW RATE(CFS) =      14.43

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     70.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    26.20  DOWNSTREAM(FEET) =    25.44
  FLOW LENGTH(FEET) =   221.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.85
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.43
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =   11.81
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     70.00 =     948.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   264.00
  ELEVATION DATA: UPSTREAM(FEET) =     33.40  DOWNSTREAM(FEET) =     29.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.084
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.698
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.76      0.25     0.400    86    8.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.76   INITIAL SUBAREA RUNOFF(CFS) =    3.15

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   11.81
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.781
  SUBAREA AREA(ACRES) =    0.76      SUBAREA RUNOFF(CFS) =    2.52
  EFFECTIVE AREA(ACRES) =      4.95   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        4.9       PEAK FLOW RATE(CFS) =      16.40

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   162.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.00  DOWNSTREAM(FEET) =     29.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.301
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.981
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.18      0.25     0.400    86    7.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.18   INITIAL SUBAREA RUNOFF(CFS) =    0.79

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   11.81
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.781
  SUBAREA AREA(ACRES) =    0.18      SUBAREA RUNOFF(CFS) =    0.60
  EFFECTIVE AREA(ACRES) =      5.13   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        5.1       PEAK FLOW RATE(CFS) =      16.99

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     80.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    25.44  DOWNSTREAM(FEET) =    24.90
  FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.11
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.99
```

```
  PIPE TRAVEL TIME(MIN.) =   1.05    Tc(MIN.) =   12.87
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     80.00 =    1208.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   332.00
  ELEVATION DATA: UPSTREAM(FEET) =     32.25  DOWNSTREAM(FEET) =     29.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.808
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.206
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.39      0.25     0.400    86    9.81
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.39   INITIAL SUBAREA RUNOFF(CFS) =    5.14

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   12.87
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.600
  SUBAREA AREA(ACRES) =    1.39      SUBAREA RUNOFF(CFS) =    4.38
  EFFECTIVE AREA(ACRES) =      6.52   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        6.5       PEAK FLOW RATE(CFS) =      20.54

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   427.00
  ELEVATION DATA: UPSTREAM(FEET) =     34.40  DOWNSTREAM(FEET) =     29.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.224
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.107
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.73      0.25     0.400    86   10.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.73   INITIAL SUBAREA RUNOFF(CFS) =    6.24

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   12.87
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.600
  SUBAREA AREA(ACRES) =    1.73      SUBAREA RUNOFF(CFS) =    5.45
  EFFECTIVE AREA(ACRES) =      8.25   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        8.2       PEAK FLOW RATE(CFS) =      25.99
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     90.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.90  DOWNSTREAM(FEET) =    23.79
  FLOW LENGTH(FEET) =   271.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.02
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.99
  PIPE TRAVEL TIME(MIN.) =   0.75    Tc(MIN.) =   13.62
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     90.00 =    1479.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     90.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   173.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.18  DOWNSTREAM(FEET) =     30.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.868
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.158
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.42      0.25     0.100    86    6.87
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.42   INITIAL SUBAREA RUNOFF(CFS) =    1.94

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   13.62
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.485
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    1.31
  EFFECTIVE AREA(ACRES) =      8.67   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =        8.7       PEAK FLOW RATE(CFS) =      26.44

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE    100.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    23.79  DOWNSTREAM(FEET) =    23.75
  FLOW LENGTH(FEET) =   299.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  45.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   1.65
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.44
  PIPE TRAVEL TIME(MIN.) =   3.02    Tc(MIN.) =   16.63
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE    100.00 =    1778.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   211.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.18  DOWNSTREAM(FEET) =     29.28

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.633
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.262
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.51      0.25     0.100    86    6.63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.51   INITIAL SUBAREA RUNOFF(CFS) =    2.40

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   16.63
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.108
  SUBAREA AREA(ACRES) =    0.51      SUBAREA RUNOFF(CFS) =    1.41
  EFFECTIVE AREA(ACRES) =      9.18   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =        9.2       PEAK FLOW RATE(CFS) =      26.44
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   268.00
  ELEVATION DATA: UPSTREAM(FEET) =     32.12  DOWNSTREAM(FEET) =     29.90

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.421
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.934
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.70      0.25     0.100    86    7.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.70   INITIAL SUBAREA RUNOFF(CFS) =    3.09

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   16.63
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.108
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    1.94
  EFFECTIVE AREA(ACRES) =      9.88   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =        9.9       PEAK FLOW RATE(CFS) =      26.85

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
```

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==============================================================================

******************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    120.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   294.00
  ELEVATION DATA: UPSTREAM(FEET) =     33.80  DOWNSTREAM(FEET) =     29.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.580
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.541
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.78      0.25     0.400    86    8.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      3.12
  TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      3.12

******************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    130.00 IS CODE =  61
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =   29.80  DOWNSTREAM ELEVATION(FEET) =   28.60
  STREET LENGTH(FEET) =   131.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.44
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   11.67
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   0.94   Tc(MIN.) =    9.52
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.278
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.17      0.25     0.400    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.17      SUBAREA RUNOFF(CFS) =    0.64
  EFFECTIVE AREA(ACRES) =      0.95    AREA-AVERAGED Fm(INCH/HR) =  0.10
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       3.57

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.86
  FLOW VELOCITY(FEET/SEC.) =  2.34   DEPTH*VELOCITY(FT*FT/SEC.) =   0.85
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    130.00 =     425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   325.00
  ELEVATION DATA: UPSTREAM(FEET) =     33.00  DOWNSTREAM(FEET) =     28.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.939
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.435
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.84      0.25     0.400    86    8.94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.84   INITIAL SUBAREA RUNOFF(CFS) =    3.28

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =    9.52
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.278
  SUBAREA AREA(ACRES) =    0.84      SUBAREA RUNOFF(CFS) =    3.16
  EFFECTIVE AREA(ACRES) =      1.79   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        1.8       PEAK FLOW RATE(CFS) =       6.73

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    140.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.40  DOWNSTREAM(FEET) =    24.30
  FLOW LENGTH(FEET) =    18.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.76
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.73
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.58
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    140.00 =     443.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   369.00
  ELEVATION DATA: UPSTREAM(FEET) =     32.25  DOWNSTREAM(FEET) =     28.60
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.014
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.156
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.65      0.25     0.400    86   10.01
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.65   INITIAL SUBAREA RUNOFF(CFS) =    6.02

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =    9.58
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.262
  SUBAREA AREA(ACRES) =    1.65      SUBAREA RUNOFF(CFS) =    6.18
  EFFECTIVE AREA(ACRES) =      3.44   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        3.4       PEAK FLOW RATE(CFS) =      12.89

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    100.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.30  DOWNSTREAM(FEET) =    23.70
  FLOW LENGTH(FEET) =   280.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.89
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.89
  PIPE TRAVEL TIME(MIN.) =   1.20    Tc(MIN.) =   10.78
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    100.00 =     723.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.89   10.78    3.983  0.25( 0.10) 0.40       3.4     110.00
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    100.00 =     723.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       26.85   16.63    3.108  0.25( 0.09) 0.35       9.9      10.00
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE    100.00 =    1778.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       35.34   10.78    3.983  0.25( 0.09) 0.37       9.8     110.00
      2       36.83   16.63    3.108  0.25( 0.09) 0.36      13.3      10.00
    TOTAL AREA(ACRES) =        13.3
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       36.83  Tc(MIN.) =   16.632
  EFFECTIVE AREA(ACRES) =     13.32  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =       13.3
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE    100.00 =    1778.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    23.75  DOWNSTREAM(FEET) =    23.16
  FLOW LENGTH(FEET) =   299.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  30.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.96
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.83
  PIPE TRAVEL TIME(MIN.) =   1.00    Tc(MIN.) =   17.64
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE    150.00 =    2077.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   287.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.85  DOWNSTREAM(FEET) =     29.48

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.632
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.856
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        1.58      0.25     0.100    86    7.63
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.58   INITIAL SUBAREA RUNOFF(CFS) =    6.87

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   17.64
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.005
  SUBAREA AREA(ACRES) =    1.58      SUBAREA RUNOFF(CFS) =    4.24
  EFFECTIVE AREA(ACRES) =     14.90   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.34
  TOTAL AREA(ACRES) =       14.9       PEAK FLOW RATE(CFS) =      39.17

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   209.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.99  DOWNSTREAM(FEET) =     29.66
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.331
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.405
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        1.00      0.25     0.100    86    6.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.00   INITIAL SUBAREA RUNOFF(CFS) =    4.84

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   17.64
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.005
  SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    2.68
  EFFECTIVE AREA(ACRES) =     15.90   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.32
  TOTAL AREA(ACRES) =       15.9       PEAK FLOW RATE(CFS) =      41.85

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    210.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   277.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.20  DOWNSTREAM(FEET) =     32.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.828
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.467
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.66      0.25     0.400    86    8.83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      2.59
  TOTAL AREA(ACRES) =      0.66   PEAK FLOW RATE(CFS) =      2.59

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    220.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =   32.30  DOWNSTREAM ELEVATION(FEET) =   31.40
  STREET LENGTH(FEET) =    97.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 12.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   6.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.65
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   10.36
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.22
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.74
  STREET FLOW TRAVEL TIME(MIN.) =   0.73   Tc(MIN.) =    9.56
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.269
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.03      0.25     0.400    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.03      SUBAREA RUNOFF(CFS) =    0.11
  EFFECTIVE AREA(ACRES) =      0.69    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       2.59
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.27
  FLOW VELOCITY(FEET/SEC.) =  2.21   DEPTH*VELOCITY(FT*FT/SEC.) =   0.73
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    220.00 =     374.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    220.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   268.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.20  DOWNSTREAM(FEET) =     31.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.200
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.660
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.65      0.25     0.400    86    8.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.65   INITIAL SUBAREA RUNOFF(CFS) =    2.67

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =    9.56
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.269
  SUBAREA AREA(ACRES) =    0.65      SUBAREA RUNOFF(CFS) =    2.44
  EFFECTIVE AREA(ACRES) =      1.34   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        1.3       PEAK FLOW RATE(CFS) =       5.03
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    27.30  DOWNSTREAM(FEET) =    27.20
  FLOW LENGTH(FEET) =    18.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.52
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.03
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.62
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    230.00 =     392.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   327.00
  ELEVATION DATA: UPSTREAM(FEET) =     35.50  DOWNSTREAM(FEET) =     31.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.100
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.390
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.96      0.25     0.400    86    9.10
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.96   INITIAL SUBAREA RUNOFF(CFS) =    3.71

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =    9.62
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.252
  SUBAREA AREA(ACRES) =    0.96      SUBAREA RUNOFF(CFS) =    3.59
  EFFECTIVE AREA(ACRES) =      2.30   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       8.60

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    240.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    27.20  DOWNSTREAM(FEET) =    25.80
  FLOW LENGTH(FEET) =   292.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.84
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.60
  PIPE TRAVEL TIME(MIN.) =   1.01    Tc(MIN.) =   10.63
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    240.00 =     684.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   473.00
  ELEVATION DATA: UPSTREAM(FEET) =     34.80  DOWNSTREAM(FEET) =     30.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.197
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.898
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.74      0.25     0.400    86   11.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.74   INITIAL SUBAREA RUNOFF(CFS) =    5.95

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   10.63
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.017
  SUBAREA AREA(ACRES) =    1.74      SUBAREA RUNOFF(CFS) =    6.13
  EFFECTIVE AREA(ACRES) =      4.04   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        4.0       PEAK FLOW RATE(CFS) =      14.24

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   353.00
  ELEVATION DATA: UPSTREAM(FEET) =     34.50  DOWNSTREAM(FEET) =     30.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.528
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.276
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.32      0.25     0.400    86    9.53
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.32   INITIAL SUBAREA RUNOFF(CFS) =    4.96

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   10.63
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.017
  SUBAREA AREA(ACRES) =    1.32      SUBAREA RUNOFF(CFS) =    4.65
  EFFECTIVE AREA(ACRES) =      5.36   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        5.4       PEAK FLOW RATE(CFS) =      18.89

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    250.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    25.80  DOWNSTREAM(FEET) =    24.80
  FLOW LENGTH(FEET) =   276.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.31
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.89
  PIPE TRAVEL TIME(MIN.) =   0.87    Tc(MIN.) =   11.49
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    250.00 =     960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    250.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   441.00
  ELEVATION DATA: UPSTREAM(FEET) =     33.10  DOWNSTREAM(FEET) =     28.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.595
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.024
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.94      0.25     0.400    86   10.60
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.94   INITIAL SUBAREA RUNOFF(CFS) =    3.32

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   11.49
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.840
  SUBAREA AREA(ACRES) =    0.94      SUBAREA RUNOFF(CFS) =    3.16
  EFFECTIVE AREA(ACRES) =      6.30   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        6.3       PEAK FLOW RATE(CFS) =      21.21

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    250.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   351.00
  ELEVATION DATA: UPSTREAM(FEET) =     33.00  DOWNSTREAM(FEET) =     28.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.279
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.341
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.03      0.25     0.400    86    9.28
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.03   INITIAL SUBAREA RUNOFF(CFS) =    3.93

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   11.49
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.840
  SUBAREA AREA(ACRES) =    1.03      SUBAREA RUNOFF(CFS) =    3.47
  EFFECTIVE AREA(ACRES) =      7.33   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        7.3       PEAK FLOW RATE(CFS) =      24.67

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    260.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.80  DOWNSTREAM(FEET) =    24.50
  FLOW LENGTH(FEET) =   138.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.67
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.67
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   11.99
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    260.00 =    1098.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    260.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   473.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.80  DOWNSTREAM(FEET) =     28.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.860
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.772
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.58      0.25     0.400    86   11.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.58   INITIAL SUBAREA RUNOFF(CFS) =    5.22

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   11.99
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.749
  SUBAREA AREA(ACRES) =    1.58      SUBAREA RUNOFF(CFS) =    5.19
  EFFECTIVE AREA(ACRES) =      8.91   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        8.9       PEAK FLOW RATE(CFS) =      29.26

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    260.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
```

```
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   133.00
  ELEVATION DATA: UPSTREAM(FEET) =     30.20  DOWNSTREAM(FEET) =     28.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.325
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.407
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.25      0.25     0.400    86    6.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.25   INITIAL SUBAREA RUNOFF(CFS) =    1.19

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   11.99
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.749
  SUBAREA AREA(ACRES) =    0.25      SUBAREA RUNOFF(CFS) =    0.82
  EFFECTIVE AREA(ACRES) =      9.16   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        9.2       PEAK FLOW RATE(CFS) =      30.08

******************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    270.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.50  DOWNSTREAM(FEET) =    24.40
  FLOW LENGTH(FEET) =    58.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.45
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.08
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   12.20
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    270.00 =    1156.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.20
  RAINFALL INTENSITY(INCH/HR) =   3.71
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.40
  EFFECTIVE STREAM AREA(ACRES) =       9.16
  TOTAL STREAM AREA(ACRES) =       9.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      30.08

******************************************************************************
  FLOW PROCESS FROM NODE    280.00 TO NODE    290.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   185.00
  ELEVATION DATA: UPSTREAM(FEET) =     29.40  DOWNSTREAM(FEET) =     27.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.805
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.794
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.21      0.25     0.400    86    7.80
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      0.89
  TOTAL AREA(ACRES) =      0.21   PEAK FLOW RATE(CFS) =      0.89

******************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    300.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.90  DOWNSTREAM(FEET) =    24.80
  FLOW LENGTH(FEET) =    51.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   1.98
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.89
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =    8.23
  LONGEST FLOWPATH FROM NODE    280.00 TO NODE    300.00 =     236.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    300.00 IS CODE =  82
------------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   185.00
  ELEVATION DATA: UPSTREAM(FEET) =     29.40  DOWNSTREAM(FEET) =     27.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.711
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.827
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.21      0.25     0.400    86    7.71
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.21   INITIAL SUBAREA RUNOFF(CFS) =    0.89

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =    8.23
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.649
  SUBAREA AREA(ACRES) =    0.21      SUBAREA RUNOFF(CFS) =    0.86
  EFFECTIVE AREA(ACRES) =      0.42   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        0.4       PEAK FLOW RATE(CFS) =       1.72
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    270.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.80  DOWNSTREAM(FEET) =    24.40
  FLOW LENGTH(FEET) =   187.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.42
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.72
  PIPE TRAVEL TIME(MIN.) =   1.29    Tc(MIN.) =    9.52
  LONGEST FLOWPATH FROM NODE    280.00 TO NODE    270.00 =     423.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    270.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.52
  RAINFALL INTENSITY(INCH/HR) =   4.28
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.40
  EFFECTIVE STREAM AREA(ACRES) =       0.42
  TOTAL STREAM AREA(ACRES) =       0.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.72

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       30.08   12.20    3.711  0.25( 0.10) 0.40       9.2     200.00
      2        1.72    9.52    4.278  0.25( 0.10) 0.40       0.4     280.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       28.87    9.52    4.278  0.25( 0.10) 0.40       7.6     280.00
      2       31.57   12.20    3.711  0.25( 0.10) 0.40       9.6     200.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      31.57    Tc(MIN.) =    12.20
  EFFECTIVE AREA(ACRES) =       9.58   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        9.6
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    270.00 =    1156.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    310.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.40  DOWNSTREAM(FEET) =    24.30
  FLOW LENGTH(FEET) =    49.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.82
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.57
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   12.37
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    310.00 =    1205.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   328.00
  ELEVATION DATA: UPSTREAM(FEET) =     30.50  DOWNSTREAM(FEET) =     28.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.524
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.039
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.75      0.25     0.400    86   10.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.75   INITIAL SUBAREA RUNOFF(CFS) =    2.66

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   12.37
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.681
  SUBAREA AREA(ACRES) =    0.75      SUBAREA RUNOFF(CFS) =    2.42
  EFFECTIVE AREA(ACRES) =     10.33   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       10.3       PEAK FLOW RATE(CFS) =      33.30

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    310.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   392.00
  ELEVATION DATA: UPSTREAM(FEET) =     33.00  DOWNSTREAM(FEET) =     28.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.959
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.169
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.99      0.25     0.400    86    9.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.99   INITIAL SUBAREA RUNOFF(CFS) =    3.63
```

```
  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   12.37
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.681
  SUBAREA AREA(ACRES) =    0.99      SUBAREA RUNOFF(CFS) =    3.19
  EFFECTIVE AREA(ACRES) =     11.32   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       11.3       PEAK FLOW RATE(CFS) =      36.49

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    320.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.30  DOWNSTREAM(FEET) =    23.90
  FLOW LENGTH(FEET) =   199.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.99
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.49
  PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =   13.04
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    320.00 =    1404.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    320.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   271.00
  ELEVATION DATA: UPSTREAM(FEET) =     30.60  DOWNSTREAM(FEET) =     28.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.049
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.404
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.79      0.25     0.400    86    9.05
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.79   INITIAL SUBAREA RUNOFF(CFS) =    3.06

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   13.04
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.573
  SUBAREA AREA(ACRES) =    0.79      SUBAREA RUNOFF(CFS) =    2.47
  EFFECTIVE AREA(ACRES) =     12.11   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       12.1       PEAK FLOW RATE(CFS) =      37.85

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    320.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   329.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.60  DOWNSTREAM(FEET) =     28.20
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.482
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.288
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.92      0.25     0.400    86    9.48
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.92   INITIAL SUBAREA RUNOFF(CFS) =    3.47

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   13.04
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.573
  SUBAREA AREA(ACRES) =    0.92      SUBAREA RUNOFF(CFS) =    2.88
  EFFECTIVE AREA(ACRES) =     13.03   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       13.0       PEAK FLOW RATE(CFS) =      40.73

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    330.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    23.90  DOWNSTREAM(FEET) =    23.70
  FLOW LENGTH(FEET) =   114.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  31.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.88
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.73
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   13.43
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    330.00 =    1518.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   248.00
  ELEVATION DATA: UPSTREAM(FEET) =     29.00  DOWNSTREAM(FEET) =     28.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.222
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.107
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.22      0.25     0.400    86   10.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.22   INITIAL SUBAREA RUNOFF(CFS) =    0.79

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   13.43
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.513
```

```
  SUBAREA AREA(ACRES) =    0.22      SUBAREA RUNOFF(CFS) =    0.68
  EFFECTIVE AREA(ACRES) =     13.25   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       13.2       PEAK FLOW RATE(CFS) =      40.73
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   381.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.95  DOWNSTREAM(FEET) =     28.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.049
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.148
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        1.66      0.25     0.400    86   10.05
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.66   INITIAL SUBAREA RUNOFF(CFS) =    6.05

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   13.43
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.513
  SUBAREA AREA(ACRES) =    1.66      SUBAREA RUNOFF(CFS) =    5.10
  EFFECTIVE AREA(ACRES) =     14.91   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       14.9       PEAK FLOW RATE(CFS) =      45.80

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.43
  RAINFALL INTENSITY(INCH/HR) =   3.51
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.40
  EFFECTIVE STREAM AREA(ACRES) =      14.91
  TOTAL STREAM AREA(ACRES) =      14.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      45.80

****************************************************************************
  FLOW PROCESS FROM NODE    340.00 TO NODE    350.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   344.00
  ELEVATION DATA: UPSTREAM(FEET) =     30.85  DOWNSTREAM(FEET) =     27.70
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.889
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.186
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.84      0.25     0.400    86    9.89
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      3.09
  TOTAL AREA(ACRES) =      0.84   PEAK FLOW RATE(CFS) =      3.09

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    360.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.10  DOWNSTREAM(FEET) =    24.00
  FLOW LENGTH(FEET) =    18.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.00
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.09
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.96
  LONGEST FLOWPATH FROM NODE    340.00 TO NODE    360.00 =     362.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    360.00 TO NODE    360.00 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   173.00
  ELEVATION DATA: UPSTREAM(FEET) =     28.60  DOWNSTREAM(FEET) =     27.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.080
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.700
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      C        0.13      0.25     0.400    86    8.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.13   INITIAL SUBAREA RUNOFF(CFS) =    0.54

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =    9.96
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.168
  SUBAREA AREA(ACRES) =    0.13      SUBAREA RUNOFF(CFS) =    0.48
  EFFECTIVE AREA(ACRES) =      0.97   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        1.0       PEAK FLOW RATE(CFS) =       3.55

****************************************************************************
  FLOW PROCESS FROM NODE    360.00 TO NODE    330.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    24.00  DOWNSTREAM(FEET) =    23.70
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.54
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.55
  PIPE TRAVEL TIME(MIN.) =   1.25    Tc(MIN.) =   11.21
  LONGEST FLOWPATH FROM NODE    340.00 TO NODE    330.00 =     552.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    330.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.21
  RAINFALL INTENSITY(INCH/HR) =   3.90
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.40
  EFFECTIVE STREAM AREA(ACRES) =       0.97
  TOTAL STREAM AREA(ACRES) =       0.97
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.55

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       45.08   10.78    3.984  0.25( 0.10) 0.40      12.9     280.00
      1       45.80   13.43    3.513  0.25( 0.10) 0.40      14.9     200.00
      2        3.55   11.21    3.895  0.25( 0.10) 0.40       1.0     340.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       48.57   10.78    3.984  0.25( 0.10) 0.40      13.8     280.00
      2       48.75   11.21    3.895  0.25( 0.10) 0.40      14.2     340.00
      3       48.99   13.43    3.513  0.25( 0.10) 0.40      15.9     200.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      48.99    Tc(MIN.) =    13.43
  EFFECTIVE AREA(ACRES) =      15.88   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       15.9
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    330.00 =    1518.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    23.70  DOWNSTREAM(FEET) =    23.20
```

```
  FLOW LENGTH(FEET) =   244.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  34.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.35
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      48.99
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =   14.19
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    150.00 =    1762.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       48.57   11.54    3.832  0.25( 0.10) 0.40      13.8     280.00
      2       48.75   11.97    3.751  0.25( 0.10) 0.40      14.2     340.00
      3       48.99   14.19    3.404  0.25( 0.10) 0.40      15.9     200.00
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    150.00 =    1762.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       41.44   11.79    3.784  0.25( 0.08) 0.31      12.4     110.00
      2       41.85   17.64    3.005  0.25( 0.08) 0.32      15.9      10.00
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE    150.00 =    2077.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       89.64   11.54    3.832  0.25( 0.09) 0.36      26.0     280.00
      2       90.12   11.79    3.784  0.25( 0.09) 0.36      26.5     110.00
      3       90.20   11.97    3.751  0.25( 0.09) 0.36      26.7     340.00
      4       90.61   14.19    3.404  0.25( 0.09) 0.36      29.7     200.00
      5       84.93   17.64    3.005  0.25( 0.09) 0.36      31.8      10.00
    TOTAL AREA(ACRES) =        31.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       90.61  Tc(MIN.) =   14.187
  EFFECTIVE AREA(ACRES) =     29.73  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =       31.8
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE    150.00 =    2077.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       31.8  TC(MIN.) =     14.19
  EFFECTIVE AREA(ACRES) =     29.73  AREA-AVERAGED Fm(INCH/HR)=  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap = 0.361
  PEAK FLOW RATE(CFS)   =      90.61

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       89.64   11.54    3.832  0.25( 0.09) 0.36      26.0     280.00
      2       90.12   11.79    3.784  0.25( 0.09) 0.36      26.5     110.00
      3       90.20   11.97    3.751  0.25( 0.09) 0.36      26.7     340.00
      4       90.61   14.19    3.404  0.25( 0.09) 0.36      29.7     200.00
      5       84.93   17.64    3.005  0.25( 0.09) 0.36      31.8      10.00
```

==========
==========
END OF RATIONAL METHOD ANALYSIS

```
****************************************************************************
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                           Analysis prepared by:

                          FUSCOE ENGINEERING, INC
                              16795 VON KARMAN
                                 SUITE 100
                              IRVINE, CA 92606

 ************************** DESCRIPTION OF STUDY **************************
* BARTON PLACE - C33                                                       *
* PROPOSED 2 YEAR HYDROLOGY - AREAS E1 TO E3                               *
* JOB NO. 1334.01   FILE NAMES: PC33E02.INP   PC33E02.OUT                  *
 ***************************************************************************

  FILE NAME: PC33E02.INP
  TIME/DATE OF STUDY: 14:05 02/06/2015
===========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
===========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    410.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
===========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   107.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.20  DOWNSTREAM(FEET) =     27.89

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.264
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.07      0.25     0.100    50    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.14
  TOTAL AREA(ACRES) =      0.07   PEAK FLOW RATE(CFS) =      0.14

****************************************************************************
  FLOW PROCESS FROM NODE    420.00 TO NODE    430.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    92.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.85  DOWNSTREAM(FEET) =     27.95

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.264
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.08      0.25     0.100    50    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.16
  TOTAL AREA(ACRES) =      0.08   PEAK FLOW RATE(CFS) =      0.16

****************************************************************************
  FLOW PROCESS FROM NODE    440.00 TO NODE    450.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    88.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.85  DOWNSTREAM(FEET) =     28.62

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.264
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.06      0.25     0.100    50    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.12
  TOTAL AREA(ACRES) =      0.06   PEAK FLOW RATE(CFS) =      0.12
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.1  TC(MIN.) =      5.00
  EFFECTIVE AREA(ACRES) =      0.06  AREA-AVERAGED Fm(INCH/HR)=  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =       0.12
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
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                           Analysis prepared by:

                          FUSCOE ENGINEERING, INC
                              16795 VON KARMAN
                                 SUITE 100
                              IRVINE, CA 92606

 ************************** DESCRIPTION OF STUDY **************************
* BARTON PLACE - C33                                                       *
* PROPOSED 10 YEAR HYDROLOGY - AREAS E1 TO E3                              *
* JOB NO. 1334.01   FILE NAMES: PC33E10.INP   PC33E10.OUT                  *
 ***************************************************************************

  FILE NAME: PC33E10.INP
  TIME/DATE OF STUDY: 14:04 02/06/2015
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    410.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   107.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.20  DOWNSTREAM(FEET) =     27.89

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.07      0.25     0.100    50    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.25
  TOTAL AREA(ACRES) =      0.07   PEAK FLOW RATE(CFS) =      0.25

****************************************************************************
  FLOW PROCESS FROM NODE    420.00 TO NODE    430.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    92.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.85  DOWNSTREAM(FEET) =     27.95

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.08      0.25     0.100    50    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.29
  TOTAL AREA(ACRES) =      0.08   PEAK FLOW RATE(CFS) =      0.29

****************************************************************************
  FLOW PROCESS FROM NODE    440.00 TO NODE    450.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    88.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.85  DOWNSTREAM(FEET) =     28.62

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.06      0.25     0.100    50    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.06   PEAK FLOW RATE(CFS) =      0.22
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.1  TC(MIN.) =      5.00
  EFFECTIVE AREA(ACRES) =      0.06  AREA-AVERAGED Fm(INCH/HR)=  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =       0.22
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
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                           Analysis prepared by:

                          FUSCOE ENGINEERING, INC
                              16795 VON KARMAN
                                 SUITE 100
                              IRVINE, CA 92606

 ************************** DESCRIPTION OF STUDY **************************
* BARTON PLACE - C33                                                       *
* PROPOSED 100 YEAR HYDROLOGY - AREAS E1 TO E3                             *
* JOB NO. 1334.01   FILE NAMES: PC33E100.INP   PC33E100.OUT                *
 ***************************************************************************

  FILE NAME: PC33E100.INP
  TIME/DATE OF STUDY: 13:58 02/06/2015
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    410.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   107.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.20  DOWNSTREAM(FEET) =     27.89

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.07      0.25     0.100    86    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.39
  TOTAL AREA(ACRES) =      0.07   PEAK FLOW RATE(CFS) =      0.39

****************************************************************************
  FLOW PROCESS FROM NODE    420.00 TO NODE    430.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    92.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.85  DOWNSTREAM(FEET) =     27.95

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.08      0.25     0.100    86    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.44
  TOTAL AREA(ACRES) =      0.08   PEAK FLOW RATE(CFS) =      0.44

****************************************************************************
  FLOW PROCESS FROM NODE    440.00 TO NODE    450.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    88.00
  ELEVATION DATA: UPSTREAM(FEET) =     31.85  DOWNSTREAM(FEET) =     28.62

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.06      0.25     0.100    86    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.06   PEAK FLOW RATE(CFS) =      0.33
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.1  TC(MIN.) =      5.00
  EFFECTIVE AREA(ACRES) =      0.06  AREA-AVERAGED Fm(INCH/HR)=  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =       0.33
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Appendix 3

Proposed 2, 10 & 100 Year Unit Hydrology and Y-Bar Calculations

```
*****************************************************************************
                        SMALL AREA UNIT HYDROGRAPH MODEL
=============================================================================
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                            Analysis prepared by:

                           FUSCOE ENGINEERING, INC
                               16795 VON KARMAN
                                  SUITE 100
                               IRVINE, CA 92606

*****************************************************************************
-----------------------------------------------------------------------------

 Problem Descriptions:
  BARTON PLACE - C33
  PROPOSED 2 YEAR
  JOB NO. 1334.01
-----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.75
    TOTAL CATCHMENT AREA(ACRES) =   31.80
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.089
    LOW LOSS FRACTION = 0.429
    TIME OF CONCENTRATION(MIN.) = 12.77
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.19
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.53
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.89
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.22
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.05

-----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     2.60
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     2.83

*****************************************************************************
  TIME     VOLUME       Q    0.        7.5      15.0      22.5      30.0
 (HOURS)    (AF)      (CFS)
-----------------------------------------------------------------------------
  0.04      0.0000      0.00  Q         .         .         .         .
  0.25      0.0039      0.44  Q         .         .         .         .
  0.46      0.0116      0.44  Q         .         .         .         .
  0.68      0.0194      0.45  Q         .         .         .         .
```

0.89	0.0273	0.45	Q	.	.	.	.
1.10	0.0352	0.45	Q	.	.	.	.
1.31	0.0433	0.46	Q	.	.	.	.
1.53	0.0514	0.46	Q	.	.	.	.
1.74	0.0595	0.47	Q	.	.	.	.
1.95	0.0678	0.47	Q	.	.	.	.
2.17	0.0761	0.48	Q	.	.	.	.
2.38	0.0845	0.48	Q	.	.	.	.
2.59	0.0930	0.49	Q	.	.	.	.
2.80	0.1015	0.49	Q	.	.	.	.
3.02	0.1102	0.50	Q	.	.	.	.
3.23	0.1189	0.50	Q	.	.	.	.
3.44	0.1277	0.51	Q	.	.	.	.
3.66	0.1367	0.51	Q	.	.	.	.
3.87	0.1457	0.52	Q	.	.	.	.
4.08	0.1548	0.52	Q	.	.	.	.
4.29	0.1640	0.53	Q	.	.	.	.
4.51	0.1733	0.53	Q	.	.	.	.
4.72	0.1828	0.54	Q	.	.	.	.
4.93	0.1923	0.54	Q	.	.	.	.
5.15	0.2019	0.55	Q	.	.	.	.
5.36	0.2117	0.56	Q	.	.	.	.
5.57	0.2216	0.57	Q	.	.	.	.
5.78	0.2316	0.57	Q	.	.	.	.
6.00	0.2418	0.58	Q	.	.	.	.
6.21	0.2520	0.59	Q	.	.	.	.
6.42	0.2624	0.60	Q	.	.	.	.
6.64	0.2730	0.60	Q	.	.	.	.
6.85	0.2837	0.61	Q	.	.	.	.
7.06	0.2946	0.62	Q	.	.	.	.
7.27	0.3056	0.63	Q	.	.	.	.
7.49	0.3168	0.64	Q	.	.	.	.
7.70	0.3281	0.65	Q	.	.	.	.
7.91	0.3397	0.66	Q	.	.	.	.
8.13	0.3514	0.67	Q	.	.	.	.
8.34	0.3633	0.68	Q	.	.	.	.
8.55	0.3754	0.70	Q	.	.	.	.
8.76	0.3878	0.71	Q	.	.	.	.
8.98	0.4003	0.72	Q	.	.	.	.
9.19	0.4131	0.73	Q	.	.	.	.
9.40	0.4262	0.75	.Q	.	.	.	.
9.61	0.4395	0.76	.Q	.	.	.	.
9.83	0.4531	0.78	.Q	.	.	.	.
10.04	0.4669	0.79	.Q	.	.	.	.
10.25	0.4811	0.82	.Q	.	.	.	.
10.47	0.4956	0.83	.Q	.	.	.	.
10.68	0.5104	0.86	.Q	.	.	.	.
10.89	0.5256	0.87	.Q	.	.	.	.
11.10	0.5412	0.90	.Q	.	.	.	.
11.32	0.5572	0.92	.Q	.	.	.	.
11.53	0.5736	0.95	.Q	.	.	.	.
11.74	0.5905	0.97	.Q	.	.	.	.

11.96	0.6080	1.01	.Q . . . .
12.17	0.6264	1.08	.Q . . . .
12.38	0.6473	1.31	.Q . . . .
12.59	0.6706	1.34	.Q . . . .
12.81	0.6947	1.40	.Q . . . .
13.02	0.7195	1.43	.Q . . . .
13.23	0.7453	1.51	. Q . . . .
13.45	0.7722	1.55	. Q . . . .
13.66	0.8002	1.64	. Q . . . .
13.87	0.8296	1.69	. Q . . . .
14.08	0.8605	1.82	. Q . . . .
14.30	0.8938	1.96	. Q . . . .
14.51	0.9298	2.13	. Q . . . .
14.72	0.9682	2.24	. Q . . . .
14.94	1.0099	2.50	. Q . . . .
15.15	1.0554	2.67	. Q . . . .
15.36	1.1087	3.39	. Q . . . .
15.57	1.1685	3.42	. Q . . . .
15.79	1.2467	5.48	. Q . . . .
16.00	1.3688	8.40	. .Q . . .
16.21	1.7016	29.44	. . . . Q.
16.43	1.9959	4.03	. Q . . . .
16.64	2.0570	2.92	. Q . . . .
16.85	2.1034	2.36	. Q . . . .
17.06	2.1421	2.04	. Q . . . .
17.28	2.1755	1.75	. Q . . . .
17.49	2.2049	1.59	. Q . . . .
17.70	2.2318	1.47	.Q . . . .
17.92	2.2567	1.37	.Q . . . .
18.13	2.2800	1.28	.Q . . . .
18.34	2.3000	0.99	.Q . . . .
18.55	2.3169	0.93	.Q . . . .
18.77	2.3329	0.89	.Q . . . .
18.98	2.3481	0.84	.Q . . . .
19.19	2.3626	0.81	.Q . . . .
19.41	2.3765	0.77	.Q . . . .
19.62	2.3898	0.74	Q . . . .
19.83	2.4026	0.71	Q . . . .
20.04	2.4150	0.69	Q . . . .
20.26	2.4269	0.67	Q . . . .
20.47	2.4384	0.65	Q . . . .
20.68	2.4496	0.63	Q . . . .
20.90	2.4605	0.61	Q . . . .
21.11	2.4710	0.59	Q . . . .
21.32	2.4813	0.58	Q . . . .
21.53	2.4913	0.56	Q . . . .
21.75	2.5011	0.55	Q . . . .
21.96	2.5106	0.54	Q . . . .
22.17	2.5199	0.52	Q . . . .
22.39	2.5291	0.51	Q . . . .
22.60	2.5380	0.50	Q . . . .
22.81	2.5467	0.49	Q . . . .

23.02	2.5553	0.48	Q	.	.	.	.
23.24	2.5637	0.47	Q	.	.	.	.
23.45	2.5719	0.46	Q	.	.	.	.
23.66	2.5800	0.46	Q	.	.	.	.
23.87	2.5880	0.45	Q	.	.	.	.
24.09	2.5958	0.44	Q	.	.	.	.
24.30	2.5997	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1443.0
10%	76.6
20%	25.5
30%	12.8
40%	12.8
50%	12.8
60%	12.8
70%	12.8
80%	12.8
90%	12.8

```
*****************************************************************************
           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
=============================================================================
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                            Analysis prepared by:

                           FUSCOE ENGINEERING, INC
                               16795 VON KARMAN
                                  SUITE 100
                               IRVINE, CA 92606

*****************************************************************************
-----------------------------------------------------------------------------

 Problem Descriptions:
  BARTON PLACE - C33
  PROPOSED 2 YEAR
  JOB NO. 1334.01
=============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         31.80       35.80       69.(AMC II)     0.250       0.571

    TOTAL AREA (Acres) =     31.80

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.089

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.429
=============================================================================
```

```
*****************************************************************************
                        SMALL AREA UNIT HYDROGRAPH MODEL
=============================================================================
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                            Analysis prepared by:

                           FUSCOE ENGINEERING, INC
                               16795 VON KARMAN
                                  SUITE 100
                               IRVINE, CA 92606

*****************************************************************************
-----------------------------------------------------------------------------

 Problem Descriptions:
  BARTON PLACE - C33
  PROPOSED 10 YEAR
  JOB NO. 1334.01
-----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.86
    TOTAL CATCHMENT AREA(ACRES) =   31.80
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.090
    LOW LOSS FRACTION = 0.378
    TIME OF CONCENTRATION(MIN.) = 14.83
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  10
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.34
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.72
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.95
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.59
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.20
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  3.68

-----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     5.96
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     3.79

*****************************************************************************
  TIME     VOLUME       Q    0.       15.0      30.0      45.0      60.0
 (HOURS)    (AF)      (CFS)
-----------------------------------------------------------------------------
  0.18      0.0099      0.97  Q         .         .         .         .
  0.43      0.0299      0.98  Q         .         .         .         .
  0.68      0.0500      0.99  Q         .         .         .         .
  0.92      0.0703      1.00  Q         .         .         .         .
```

1.17	0.0908	1.01	Q	.	.	.	.
1.42	0.1115	1.02	Q	.	.	.	.
1.66	0.1325	1.03	Q	.	.	.	.
1.91	0.1536	1.04	Q	.	.	.	.
2.16	0.1750	1.05	Q	.	.	.	.
2.41	0.1967	1.07	Q	.	.	.	.
2.65	0.2186	1.08	Q	.	.	.	.
2.90	0.2407	1.09	Q	.	.	.	.
3.15	0.2631	1.10	Q	.	.	.	.
3.39	0.2858	1.12	Q	.	.	.	.
3.64	0.3087	1.13	Q	.	.	.	.
3.89	0.3319	1.15	Q	.	.	.	.
4.14	0.3555	1.16	Q	.	.	.	.
4.38	0.3793	1.18	Q	.	.	.	.
4.63	0.4034	1.19	Q	.	.	.	.
4.88	0.4279	1.21	Q	.	.	.	.
5.12	0.4527	1.22	Q	.	.	.	.
5.37	0.4779	1.24	Q	.	.	.	.
5.62	0.5034	1.26	Q	.	.	.	.
5.87	0.5293	1.28	Q	.	.	.	.
6.11	0.5556	1.29	Q	.	.	.	.
6.36	0.5823	1.32	Q	.	.	.	.
6.61	0.6094	1.34	Q	.	.	.	.
6.85	0.6370	1.36	Q	.	.	.	.
7.10	0.6650	1.38	Q	.	.	.	.
7.35	0.6936	1.41	Q	.	.	.	.
7.60	0.7226	1.43	Q	.	.	.	.
7.84	0.7521	1.46	Q	.	.	.	.
8.09	0.7822	1.48	Q	.	.	.	.
8.34	0.8129	1.52	.Q	.	.	.	.
8.59	0.8442	1.54	.Q	.	.	.	.
8.83	0.8762	1.59	.Q	.	.	.	.
9.08	0.9088	1.61	.Q	.	.	.	.
9.33	0.9422	1.66	.Q	.	.	.	.
9.57	0.9763	1.68	.Q	.	.	.	.
9.82	1.0112	1.74	.Q	.	.	.	.
10.07	1.0470	1.77	.Q	.	.	.	.
10.32	1.0837	1.83	.Q	.	.	.	.
10.56	1.1213	1.86	.Q	.	.	.	.
10.81	1.1601	1.93	.Q	.	.	.	.
11.06	1.2000	1.97	.Q	.	.	.	.
11.30	1.2411	2.05	.Q	.	.	.	.
11.55	1.2835	2.10	.Q	.	.	.	.
11.80	1.3273	2.20	.Q	.	.	.	.
12.05	1.3728	2.25	.Q	.	.	.	.
12.29	1.4262	2.98	.Q	.	.	.	.
12.54	1.4878	3.05	. Q	.	.	.	.
12.79	1.5517	3.21	. Q	.	.	.	.
13.03	1.6181	3.29	. Q	.	.	.	.
13.28	1.6874	3.49	. Q	.	.	.	.
13.53	1.7597	3.60	. Q	.	.	.	.
13.78	1.8359	3.85	. Q	.	.	.	.

```
 14.02      1.9161      4.00  . Q       .         .         .         .
 14.27      2.0034      4.55  .  Q      .         .         .         .
 14.52      2.0999      4.89  .  Q      .         .         .         .
 14.76      2.2088      5.77  .  Q      .         .         .         .
 15.01      2.3324      6.34  .   Q     .         .         .         .
 15.26      2.4780      7.92  .    Q    .         .         .         .
 15.51      2.6510      9.01  .     Q   .         .         .         .
 15.75      2.8610     11.55  .      Q  .         .         .         .
 16.00      3.1583     17.56  .         .Q        .         .         .
 16.25      3.9201     57.02  .         .         .         .       Q .
 16.49      4.5937      8.94  .    Q    .         .         .         .
 16.74      4.7568      7.03  .   Q     .         .         .         .
 16.99      4.8827      5.30  .  Q      .         .         .         .
 17.24      4.9801      4.24  . Q       .         .         .         .
 17.48      5.0614      3.72  . Q       .         .         .         .
 17.73      5.1340      3.39  . Q       .         .         .         .
 17.98      5.2005      3.13  . Q       .         .         .         .
 18.22      5.2577      2.48  .Q        .         .         .         .
 18.47      5.3049      2.15  .Q        .         .         .         .
 18.72      5.3474      2.01  .Q        .         .         .         .
 18.97      5.3873      1.90  .Q        .         .         .         .
 19.21      5.4250      1.80  .Q        .         .         .         .
 19.46      5.4608      1.71  .Q        .         .         .         .
 19.71      5.4949      1.63  .Q        .         .         .         .
 19.95      5.5275      1.56  .Q        .         .         .         .
 20.20      5.5589      1.50  .Q        .         .         .         .
 20.45      5.5890      1.45  Q         .         .         .         .
 20.70      5.6180      1.40  Q         .         .         .         .
 20.94      5.6460      1.35  Q         .         .         .         .
 21.19      5.6732      1.31  Q         .         .         .         .
 21.44      5.6995      1.27  Q         .         .         .         .
 21.68      5.7250      1.23  Q         .         .         .         .
 21.93      5.7498      1.20  Q         .         .         .         .
 22.18      5.7740      1.17  Q         .         .         .         .
 22.43      5.7975      1.14  Q         .         .         .         .
 22.67      5.8204      1.11  Q         .         .         .         .
 22.92      5.8429      1.08  Q         .         .         .         .
 23.17      5.8647      1.06  Q         .         .         .         .
 23.42      5.8861      1.04  Q         .         .         .         .
 23.66      5.9071      1.01  Q         .         .         .         .
 23.91      5.9276      0.99  Q         .         .         .         .
 24.16      5.9477      0.97  Q         .         .         .         .
 24.40      5.9577      0.00  Q         .         .         .         .
 ---------------------------------------------------------------------------
-------------------------------------------------------------------------------
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)

    Percentile of Estimated                 Duration
        Peak Flow Rate                      (minutes)
    ========================                =========
```

0%	1453.3
10%	133.5
20%	44.5
30%	29.7
40%	14.8
50%	14.8
60%	14.8
70%	14.8
80%	14.8
90%	14.8

```
******************************************************************************
           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
==============================================================================
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                            Analysis prepared by:

                           FUSCOE ENGINEERING, INC
                               16795 VON KARMAN
                                  SUITE 100
                               IRVINE, CA 92606

******************************************************************************
------------------------------------------------------------------------------

 Problem Descriptions:
  BARTON PLACE - C33
  PROPOSED 10 YEAR
  JOB NO. 1334.01
==============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     3.68 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         31.80       36.10       69.(AMC II)     0.250       0.622

    TOTAL AREA (Acres) =     31.80

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.090

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.378
==============================================================================
```

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******************************************************************************
                        SMALL AREA UNIT HYDROGRAPH MODEL
==============================================================================
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                            Analysis prepared by:

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                               16795 VON KARMAN
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 Problem Descriptions:
  BARTON PLACE - C33
  PROPOSED 100 YEAR
  JOB NO. 1334.01
------------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.87
    TOTAL CATCHMENT AREA(ACRES) =   31.80
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.090
    LOW LOSS FRACTION = 0.128
    TIME OF CONCENTRATION(MIN.) = 14.19
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) = 100
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.52
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  1.09
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.45
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  2.43
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  3.36
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  5.63

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    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    11.40
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     3.52

******************************************************************************
  TIME     VOLUME       Q    0.       25.0      50.0      75.0     100.0
 (HOURS)    (AF)      (CFS)
------------------------------------------------------------------------------
  0.15      0.0134      2.10  Q         .         .         .         .
  0.39      0.0545      2.11  Q         .         .         .         .
  0.63      0.0960      2.14  Q         .         .         .         .
  0.86      0.1379      2.15  Q         .         .         .         .
```

1.10	0.1801	2.18	Q	.	.	.	.
1.34	0.2228	2.19	Q	.	.	.	.
1.57	0.2660	2.22	Q	.	.	.	.
1.81	0.3095	2.24	Q	.	.	.	.
2.05	0.3535	2.27	Q	.	.	.	.
2.28	0.3980	2.28	Q	.	.	.	.
2.52	0.4430	2.32	Q	.	.	.	.
2.76	0.4884	2.33	Q	.	.	.	.
2.99	0.5344	2.37	Q	.	.	.	.
3.23	0.5809	2.39	Q	.	.	.	.
3.47	0.6279	2.42	Q	.	.	.	.
3.70	0.6754	2.44	Q	.	.	.	.
3.94	0.7236	2.48	Q	.	.	.	.
4.18	0.7723	2.50	.Q	.	.	.	.
4.41	0.8216	2.54	.Q	.	.	.	.
4.65	0.8715	2.57	.Q	.	.	.	.
4.88	0.9221	2.61	.Q	.	.	.	.
5.12	0.9734	2.63	.Q	.	.	.	.
5.36	1.0253	2.68	.Q	.	.	.	.
5.59	1.0780	2.71	.Q	.	.	.	.
5.83	1.1314	2.76	.Q	.	.	.	.
6.07	1.1856	2.79	.Q	.	.	.	.
6.30	1.2406	2.84	.Q	.	.	.	.
6.54	1.2964	2.87	.Q	.	.	.	.
6.78	1.3531	2.93	.Q	.	.	.	.
7.01	1.4107	2.96	.Q	.	.	.	.
7.25	1.4692	3.03	.Q	.	.	.	.
7.49	1.5287	3.06	.Q	.	.	.	.
7.72	1.5892	3.13	.Q	.	.	.	.
7.96	1.6508	3.17	.Q	.	.	.	.
8.20	1.7135	3.25	.Q	.	.	.	.
8.43	1.7774	3.29	.Q	.	.	.	.
8.67	1.8425	3.38	.Q	.	.	.	.
8.90	1.9089	3.42	.Q	.	.	.	.
9.14	1.9767	3.52	.Q	.	.	.	.
9.38	2.0459	3.57	.Q	.	.	.	.
9.61	2.1167	3.67	.Q	.	.	.	.
9.85	2.1890	3.73	.Q	.	.	.	.
10.09	2.2631	3.85	.Q	.	.	.	.
10.32	2.3390	3.91	.Q	.	.	.	.
10.56	2.4169	4.05	.Q	.	.	.	.
10.80	2.4968	4.13	.Q	.	.	.	.
11.03	2.5790	4.28	.Q	.	.	.	.
11.27	2.6635	4.37	.Q	.	.	.	.
11.51	2.7507	4.55	.Q	.	.	.	.
11.74	2.8406	4.65	.Q	.	.	.	.
11.98	2.9336	4.87	.Q	.	.	.	.
12.22	3.0346	5.46	. Q	.	.	.	.
12.45	3.1519	6.54	. Q	.	.	.	.
12.69	3.2813	6.70	. Q	.	.	.	.
12.93	3.4155	7.04	. Q	.	.	.	.
13.16	3.5549	7.23	. Q	.	.	.	.

```
 13.40      3.7004      7.66  .  Q      .         .         .         .
 13.63      3.8524      7.90  .  Q      .         .         .         .
 13.87      4.0123      8.46  .  Q      .         .         .         .
 14.11      4.1809      8.79  .  Q      .         .         .         .
 14.34      4.3609      9.62  .  Q      .         .         .         .
 14.58      4.5537     10.10  .   Q     .         .         .         .
 14.82      4.7628     11.30  .   Q     .         .         .         .
 15.05      4.9912     12.08  .   Q     .         .         .         .
 15.29      5.2484     14.24  .    Q    .         .         .         .
 15.53      5.5379     15.38  .     Q   .         .         .         .
 15.76      5.8842     20.05  .       Q .         .         .         .
 16.00      6.3576     28.38  .         .Q        .         .         .
 16.24      7.5204     90.61  .         .         .         .     Q   .
 16.47      8.5629     16.06  .     Q   .         .         .         .
 16.71      8.8472     13.03  .    Q    .         .         .         .
 16.95      9.0786     10.65  .   Q     .         .         .         .
 17.18      9.2725      9.19  .  Q      .         .         .         .
 17.42      9.4422      8.17  .  Q      .         .         .         .
 17.66      9.5947      7.43  . Q       .         .         .         .
 17.89      9.7344      6.86  . Q       .         .         .         .
 18.13      9.8640      6.40  . Q       .         .         .         .
 18.36      9.9730      4.76  .Q        .         .         .         .
 18.60     10.0630      4.46  .Q        .         .         .         .
 18.84     10.1477      4.20  .Q        .         .         .         .
 19.07     10.2276      3.98  .Q        .         .         .         .
 19.31     10.3036      3.79  .Q        .         .         .         .
 19.55     10.3760      3.62  .Q        .         .         .         .
 19.78     10.4452      3.47  .Q        .         .         .         .
 20.02     10.5117      3.33  .Q        .         .         .         .
 20.26     10.5756      3.21  .Q        .         .         .         .
 20.49     10.6372      3.10  .Q        .         .         .         .
 20.73     10.6967      2.99  .Q        .         .         .         .
 20.97     10.7543      2.90  .Q        .         .         .         .
 21.20     10.8101      2.81  .Q        .         .         .         .
 21.44     10.8643      2.73  .Q        .         .         .         .
 21.68     10.9170      2.66  .Q        .         .         .         .
 21.91     10.9683      2.59  .Q        .         .         .         .
 22.15     11.0182      2.52  .Q        .         .         .         .
 22.39     11.0669      2.46  Q         .         .         .         .
 22.62     11.1145      2.41  Q         .         .         .         .
 22.86     11.1610      2.35  Q         .         .         .         .
 23.09     11.2064      2.30  Q         .         .         .         .
 23.33     11.2509      2.25  Q         .         .         .         .
 23.57     11.2945      2.21  Q         .         .         .         .
 23.80     11.3372      2.16  Q         .         .         .         .
 24.04     11.3791      2.12  Q         .         .         .         .
 24.28     11.3998      0.00  Q         .         .         .         .
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-------------------------------------------------------------------------------
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)
```

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1447.4
10%	184.5
20%	42.6
30%	28.4
40%	14.2
50%	14.2
60%	14.2
70%	14.2
80%	14.2
90%	14.2

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           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
=============================================================================
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                            Analysis prepared by:

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                               IRVINE, CA 92606

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-----------------------------------------------------------------------------

 Problem Descriptions:
  BARTON PLACE - C33
  PROPOSED 100 YEAR
  JOB NO. 1334.01
=============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     5.63 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         31.80       36.10       69.(AMC II)     0.250       0.872

    TOTAL AREA (Acres) =     31.80

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.090

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.128
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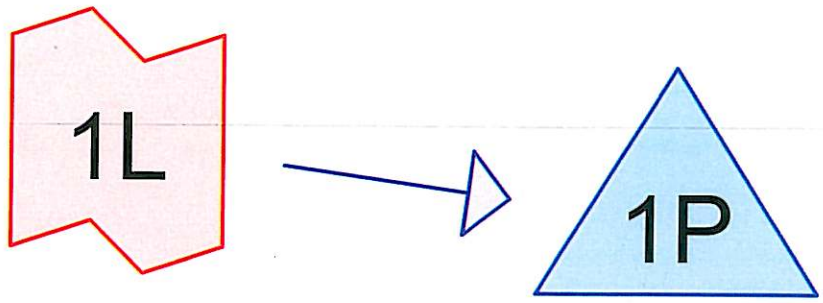
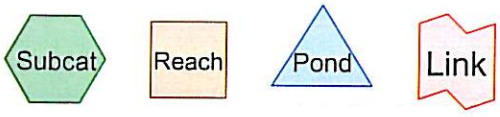
Appendix 4

Proposed 2, 10 & 100 Year Routing



2 Year Hydrology

Detention Basin



Routing Diagram for c332yr
Prepared by Fuscoe Engineering , Printed 2/4/2015
HydroCAD® 10.00 s/n 05904 © 2013 HydroCAD Software Solutions LLC

Time span=0.00-26.00 hrs, dt=0.20 hrs, 131 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 1P: Detention Basin Peak Elev=23.62' Storage=1.044 af Inflow=29.49 cfs 2.570 af
Outflow=3.42 cfs 2.428 af

Link 1L: 2 Year Hydrology Manual Hydrograph Inflow=29.49 cfs 2.570 af
Primary=29.49 cfs 2.570 af

$Q_{OUT} = 3.42$ CFS $< Q_{OUT\text{-}ALLOW} = 10.14$ CFS

STORAGE VOL = 1.044 AF $<$ STORAGE $VOL_{PROVIDED} = 5.3$ AF

Summary for Pond 1P: Detention Basin

Inflow	=	29.49 cfs @	16.19 hrs, Volume=	2.570 af	
Outflow	=	3.42 cfs @	16.56 hrs, Volume=	2.428 af,	Atten= 88%, Lag= 21.9 min
Primary	=	3.42 cfs @	16.56 hrs, Volume=	2.428 af	

Routing by Stor-Ind method, Time Span= 0.00-26.00 hrs, dt= 0.20 hrs
Peak Elev= 23.62' @ 16.56 hrs Surf.Area= 0.000 ac Storage= 1.044 af

Plug-Flow detention time= 186.0 min calculated for 2.428 af (94% of inflow)
Center-of-Mass det. time= 157.3 min (1,005.5 - 848.2)

Volume	Invert	Avail.Storage	Storage Description
#1	22.80'	5.320 af	**Custom Stage Data** Listed below

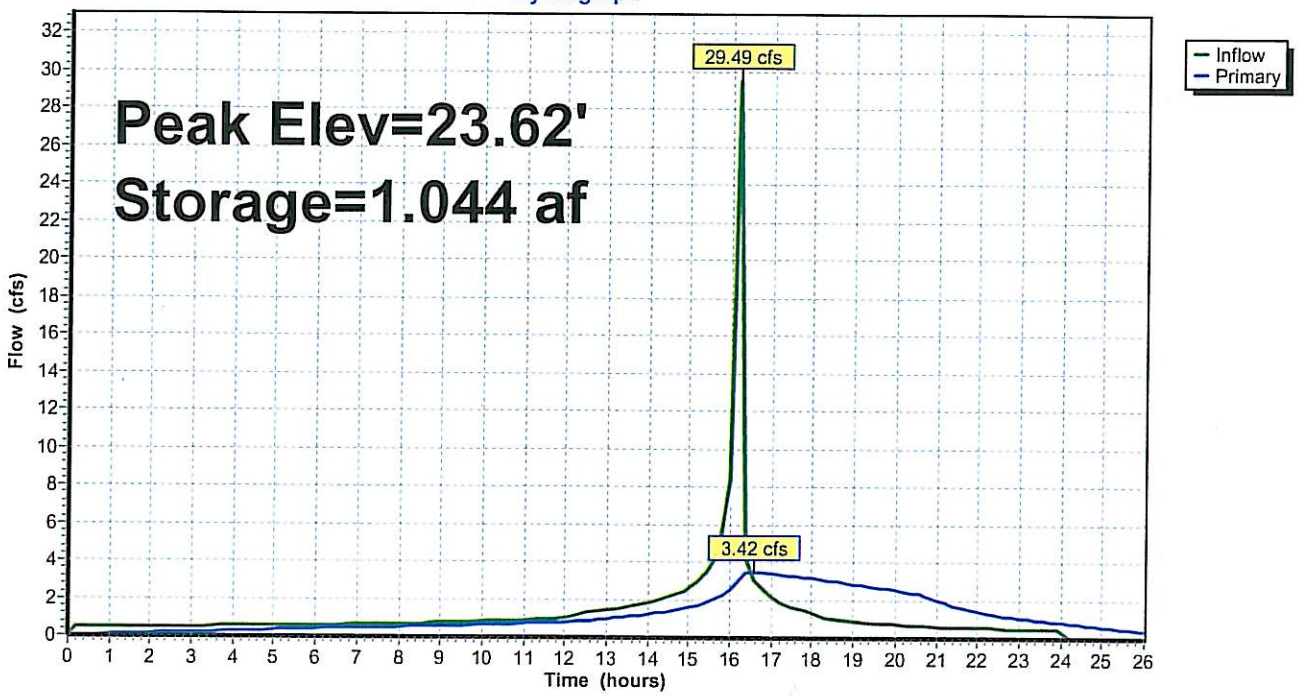
Elevation (feet)	Cum.Store (acre-feet)
22.80	0.000
23.80	1.280
24.80	2.560
25.80	3.840
26.80	5.120
26.96	5.320

Device	Routing	Invert	Outlet Devices
#1	Primary	22.80'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.41 cfs @ 16.56 hrs HW=23.62' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 3.41 cfs @ 4.35 fps)

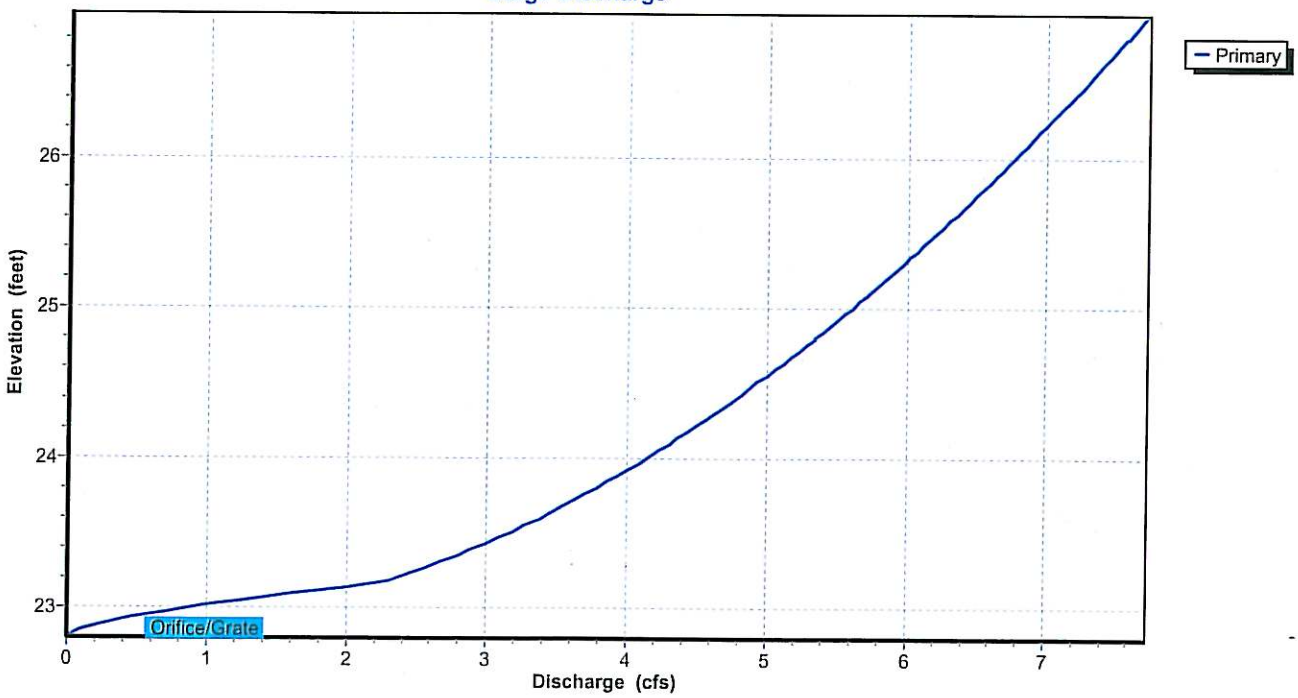
Pond 1P: Detention Basin

Hydrograph

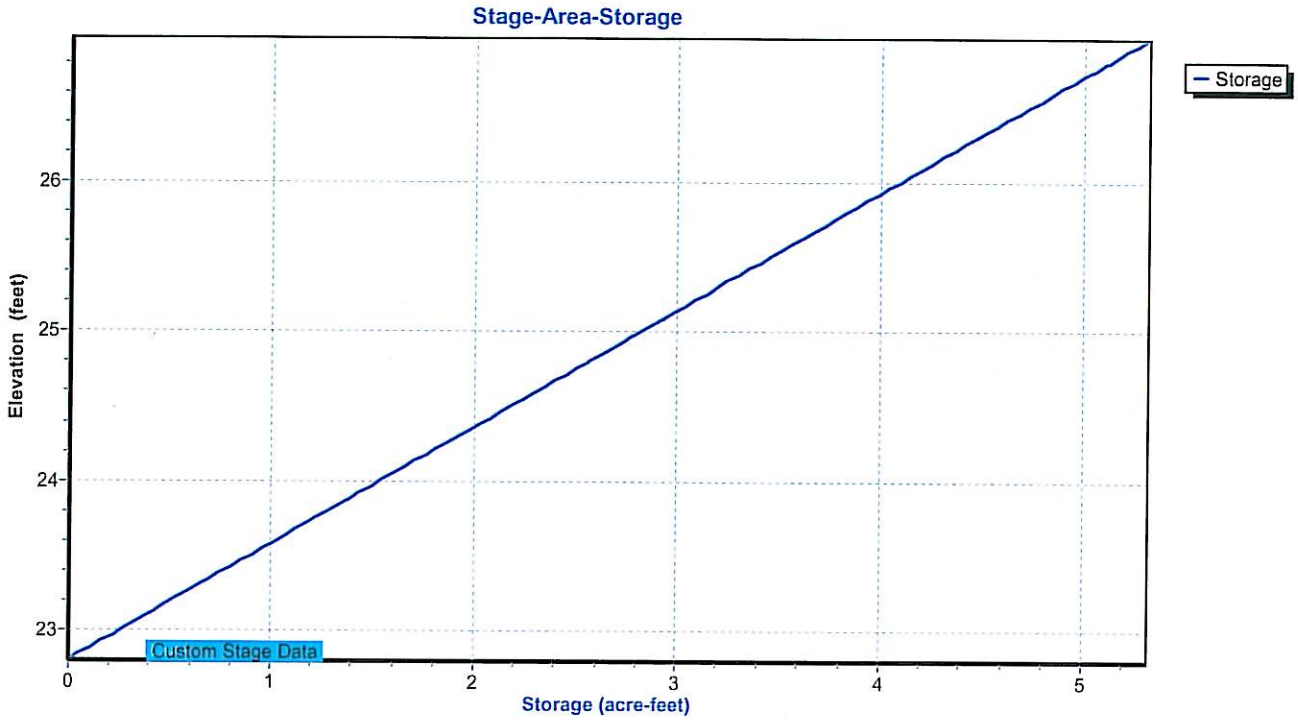


Pond 1P: Detention Basin

Stage-Discharge



Pond 1P: Detention Basin



Hydrograph for Pond 1P: Detention Basin

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	22.80	0.00
1.00	0.45	0.031	22.82	0.05
2.00	0.47	0.063	22.85	0.11
3.00	0.50	0.090	22.87	0.20
4.00	0.52	0.113	22.89	0.27
5.00	0.54	0.131	22.90	0.34
6.00	0.58	0.147	22.91	0.40
7.00	0.62	0.161	22.93	0.46
8.00	0.66	0.174	22.94	0.52
9.00	0.72	0.186	22.95	0.57
10.00	0.79	0.199	22.96	0.63
11.00	0.89	0.213	22.97	0.70
12.00	1.02	0.230	22.98	0.79
13.00	1.43	0.264	23.01	0.96
14.00	1.80	0.306	23.04	1.21
15.00	2.54	0.369	23.09	1.59
16.00	**8.40**	**0.548**	**23.23**	**2.47**
17.00	**2.17**	**1.017**	**23.59**	**3.37**
18.00	1.34	0.882	23.49	3.14
19.00	0.85	0.717	23.36	2.83
20.00	0.70	0.560	23.24	2.50
21.00	0.60	0.425	23.13	1.96
22.00	0.54	0.336	23.06	1.38
23.00	0.48	0.278	23.02	1.04
24.00	0.44	0.239	22.99	0.83
25.00	0.00	0.185	22.94	0.57
26.00	0.00	0.146	22.91	0.40

Stage-Discharge for Pond 1P: Detention Basin

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
22.80	0.00	25.40	6.10
22.85	0.11	25.45	6.16
22.90	0.32	25.50	6.21
22.95	0.60	25.55	6.27
23.00	0.92	25.60	6.33
23.05	1.28	25.65	6.38
23.10	1.69	25.70	6.44
23.15	2.13	25.75	6.50
23.20	2.39	25.80	6.55
23.25	2.54	25.85	6.60
23.30	2.67	25.90	6.66
23.35	2.80	25.95	6.71
23.40	2.93	26.00	6.76
23.45	3.05	26.05	6.82
23.50	3.16	26.10	6.87
23.55	3.28	26.15	6.92
23.60	3.38	26.20	6.97
23.65	3.49	26.25	7.02
23.70	3.59	26.30	7.07
23.75	3.69	26.35	7.13
23.80	3.78	26.40	7.18
23.85	3.88	26.45	7.22
23.90	3.97	26.50	7.27
23.95	4.06	26.55	7.32
24.00	4.14	26.60	7.37
24.05	4.23	26.65	7.42
24.10	4.31	26.70	7.47
24.15	4.39	26.75	7.52
24.20	4.47	26.80	7.56
24.25	4.55	26.85	7.61
24.30	4.63	26.90	7.66
24.35	4.71	26.95	**7.70**
24.40	4.78		
24.45	4.86		
24.50	4.93		
24.55	5.00		
24.60	5.07		
24.65	5.14		
24.70	5.21		
24.75	5.28		
24.80	5.35		
24.85	5.41		
24.90	5.48		
24.95	5.55		
25.00	5.61		
25.05	5.67		
25.10	5.74		
25.15	5.80		
25.20	5.86		
25.25	5.92		
25.30	5.98		
25.35	6.04		

Stage-Area-Storage for Pond 1P: Detention Basin

Elevation (feet)	Storage (acre-feet)
22.80	0.000
22.85	0.064
22.90	0.128
22.95	0.192
23.00	0.256
23.05	0.320
23.10	0.384
23.15	0.448
23.20	0.512
23.25	0.576
23.30	0.640
23.35	0.704
23.40	0.768
23.45	0.832
23.50	0.896
23.55	0.960
23.60	1.024
23.65	1.088
23.70	1.152
23.75	1.216
23.80	1.280
23.85	1.344
23.90	1.408
23.95	1.472
24.00	1.536
24.05	1.600
24.10	1.664
24.15	1.728
24.20	1.792
24.25	1.856
24.30	1.920
24.35	1.984
24.40	2.048
24.45	2.112
24.50	2.176
24.55	2.240
24.60	2.304
24.65	2.368
24.70	2.432
24.75	2.496
24.80	2.560
24.85	2.624
24.90	2.688
24.95	2.752
25.00	2.816
25.05	2.880
25.10	2.944
25.15	3.008
25.20	3.072
25.25	3.136
25.30	3.200
25.35	3.264
25.40	3.328
25.45	3.392
25.50	3.456
25.55	3.520
25.60	3.584
25.65	3.648
25.70	3.712
25.75	3.776
25.80	3.840
25.85	3.904
25.90	3.968
25.95	4.032
26.00	4.096
26.05	4.160
26.10	4.224
26.15	4.288
26.20	4.352
26.25	4.416
26.30	4.480
26.35	4.544
26.40	4.608
26.45	4.672
26.50	4.736
26.55	4.800
26.60	4.864
26.65	4.928
26.70	4.992
26.75	5.056
26.80	5.120
26.85	5.183
26.90	5.245
26.95	**5.307**

Summary for Link 1L: 2 Year Hydrology

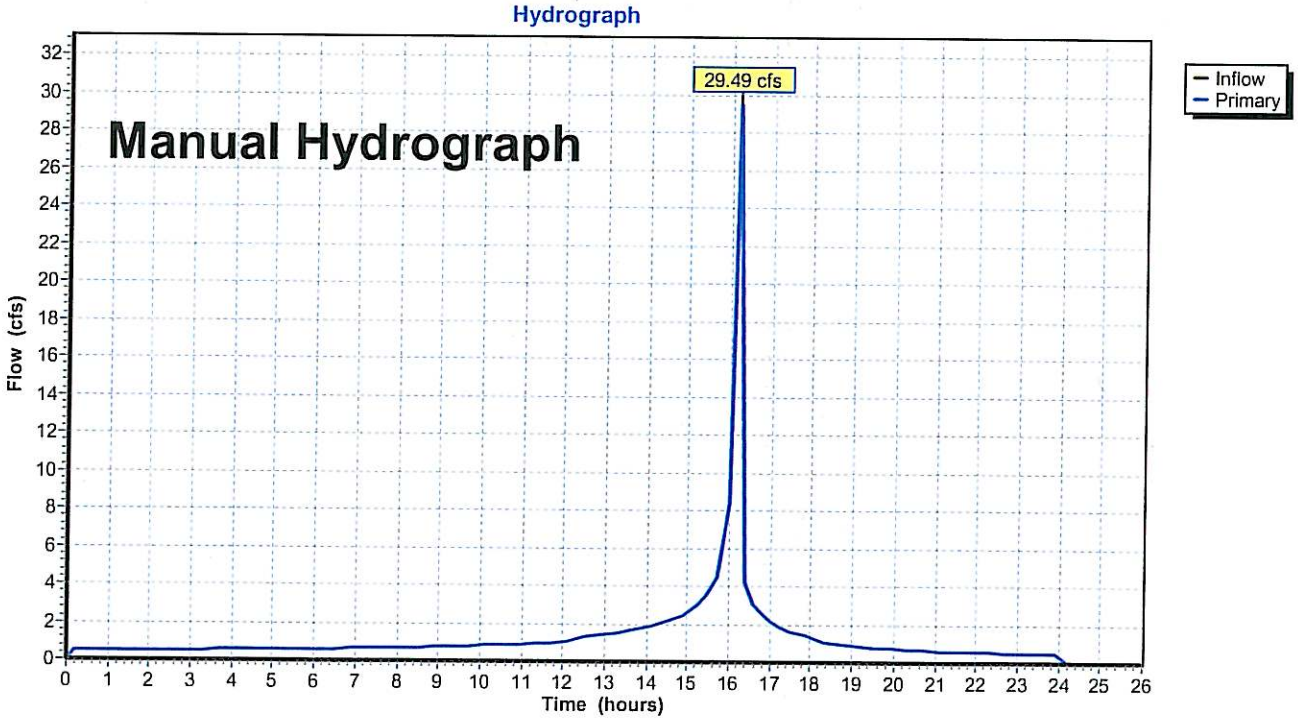
Inflow = 29.49 cfs @ 16.19 hrs, Volume= 2.570 af
Primary = 29.49 cfs @ 16.19 hrs, Volume= 2.570 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-26.00 hrs, dt= 0.20 hrs

121 Point manual hydrograph, To= 0.00 hrs, dt= 0.20 hrs, cfs =

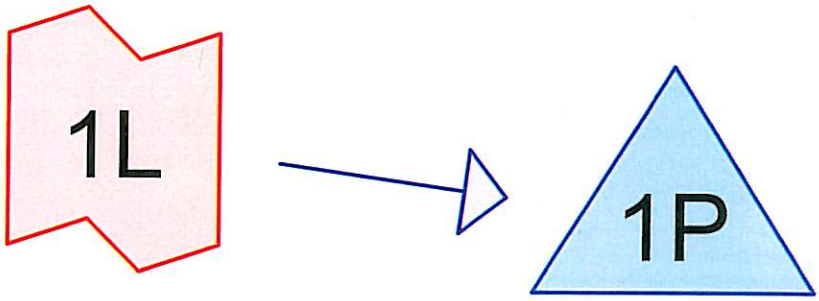
0.00	0.44	0.44	0.44	0.45	0.45	0.45	0.46	0.46	0.47
0.47	0.48	0.48	0.49	0.49	0.50	0.50	0.51	0.51	0.52
0.52	0.53	0.53	0.53	0.54	0.54	0.55	0.56	0.57	0.57
0.58	0.59	0.60	0.60	0.61	0.62	0.63	0.64	0.65	0.66
0.66	0.67	0.69	0.70	0.71	0.72	0.73	0.75	0.76	0.78
0.79	0.82	0.83	0.85	0.87	0.89	0.91	0.93	0.96	0.98
1.02	1.11	1.31	1.34	1.40	1.43	1.51	1.54	1.63	1.67
1.80	1.92	2.06	2.18	2.35	2.54	2.96	3.40	3.43	5.48
8.40	29.44	4.21	3.08	2.51	2.17	1.86	1.63	1.51	1.42
1.34	1.11	0.97	0.91	0.87	0.85	0.80	0.78	0.75	0.72
0.70	0.67	0.65	0.64	0.62	0.60	0.59	0.57	0.56	0.55
0.54	0.52	0.51	0.50	0.49	0.48	0.47	0.46	0.46	0.45
0.44									

Link 1L: 2 Year Hydrology



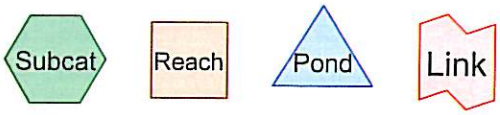
Hydrograph for Link 1L: 2 Year Hydrology

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00
0.40	0.44	0.00	0.44
0.80	0.45	0.00	0.45
1.20	0.45	0.00	0.45
1.60	0.46	0.00	0.46
2.00	0.47	0.00	0.47
2.40	0.48	0.00	0.48
2.80	0.49	0.00	0.49
3.20	0.50	0.00	0.50
3.60	0.51	0.00	0.51
4.00	0.52	0.00	0.52
4.40	0.53	0.00	0.53
4.80	0.54	0.00	0.54
5.20	0.55	0.00	0.55
5.60	0.57	0.00	0.57
6.00	0.58	0.00	0.58
6.40	0.60	0.00	0.60
6.80	0.61	0.00	0.61
7.20	0.63	0.00	0.63
7.60	0.65	0.00	0.65
8.00	0.66	0.00	0.66
8.40	0.69	0.00	0.69
8.80	0.71	0.00	0.71
9.20	0.73	0.00	0.73
9.60	0.76	0.00	0.76
10.00	0.79	0.00	0.79
10.40	0.83	0.00	0.83
10.80	0.87	0.00	0.87
11.20	0.91	0.00	0.91
11.60	0.96	0.00	0.96
12.00	1.02	0.00	1.02
12.40	1.31	0.00	1.31
12.80	1.40	0.00	1.40
13.20	1.51	0.00	1.51
13.60	1.63	0.00	1.63
14.00	1.80	0.00	1.80
14.40	2.06	0.00	2.06
14.80	2.35	0.00	2.35
15.20	2.96	0.00	2.96
15.60	3.43	0.00	3.43
16.00	**8.40**	0.00	**8.40**
16.40	**4.21**	0.00	**4.21**
16.80	2.51	0.00	2.51
17.20	1.86	0.00	1.86
17.60	1.51	0.00	1.51
18.00	1.34	0.00	1.34
18.40	0.97	0.00	0.97
18.80	0.87	0.00	0.87
19.20	0.80	0.00	0.80
19.60	0.75	0.00	0.75
20.00	0.70	0.00	0.70
20.40	0.65	0.00	0.65
20.80	0.62	0.00	0.62
21.20	0.59	0.00	0.59
21.60	0.56	0.00	0.56
22.00	0.54	0.00	0.54
22.40	0.51	0.00	0.51
22.80	0.49	0.00	0.49
23.20	0.47	0.00	0.47
23.60	0.46	0.00	0.46
24.00	0.44	0.00	0.44
24.40	0.00	0.00	0.00
24.80	0.00	0.00	0.00
25.20	0.00	0.00	0.00
25.60	0.00	0.00	0.00
26.00	0.00	0.00	0.00



10 Year Hydrology

Detention Basin



Routing Diagram for c3310yr
Prepared by Fuscoe Engineering , Printed 2/4/2015
HydroCAD® 10.00 s/n 05904 © 2013 HydroCAD Software Solutions LLC

Time span=0.00-26.00 hrs, dt=0.20 hrs, 131 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 1P: Detention Basin Peak Elev=24.80' Storage=2.562 af Inflow=57.03 cfs 5.863 af
Outflow=5.35 cfs 5.338 af

Link 1L: 10 Year Hydrology Manual Hydrograph Inflow=57.03 cfs 5.863 af
Primary=57.03 cfs 5.863 af

$Q_{OUT} = 5.35 CFS < Q_{OUT\text{-}ALLOW} = 10.14 CFS$

STORAGE STORAGE
$VOL = 2.562 AF < VOL_{PROVIDED} = 5.3 AF$

Summary for Pond 1P: Detention Basin

Inflow	=	57.03 cfs @	16.20 hrs,	Volume=	5.863 af
Outflow	=	5.35 cfs @	17.03 hrs,	Volume=	5.338 af, Atten= 91%, Lag= 50.1 min
Primary	=	5.35 cfs @	17.03 hrs,	Volume=	5.338 af

Routing by Stor-Ind method, Time Span= 0.00-26.00 hrs, dt= 0.20 hrs
Peak Elev= 24.80' @ 17.03 hrs Surf.Area= 0.000 ac Storage= 2.562 af

Plug-Flow detention time= 221.4 min calculated for 5.297 af (90% of inflow)
Center-of-Mass det. time= 180.6 min (1,031.2 - 850.5)

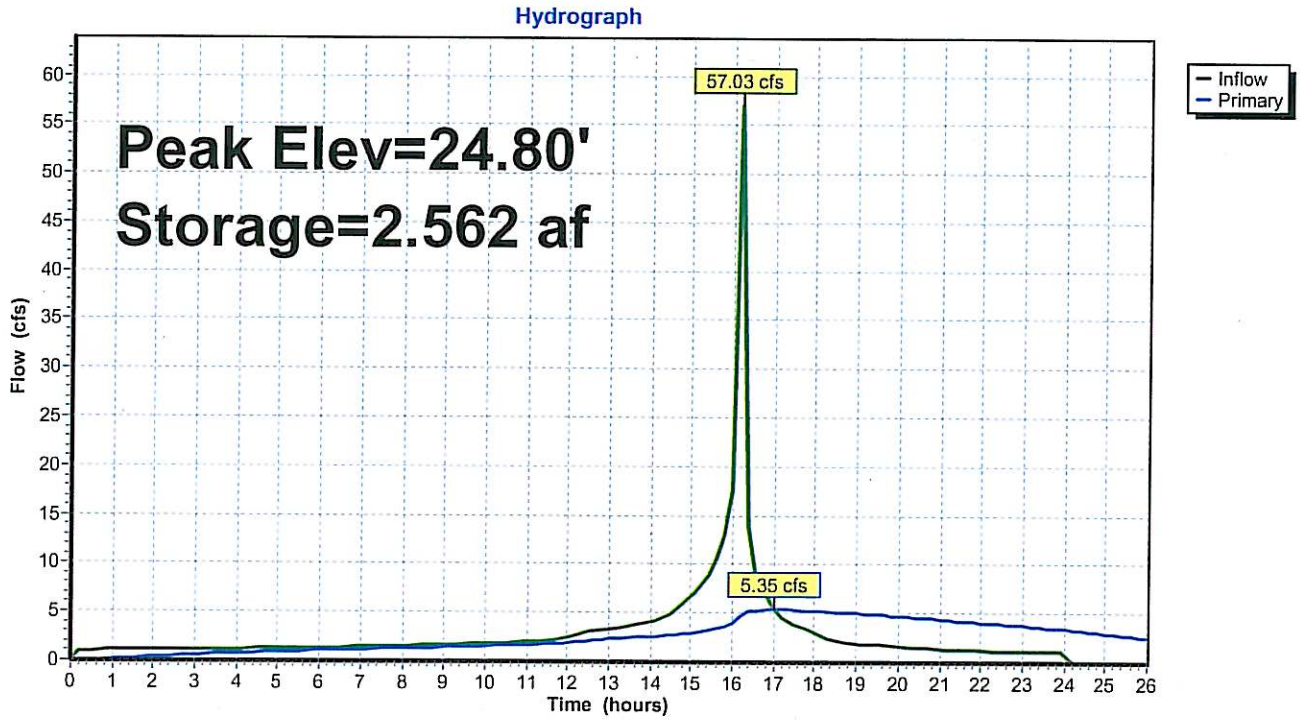
Volume	Invert	Avail.Storage	Storage Description
#1	22.80'	5.320 af	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (acre-feet)
22.80	0.000
23.80	1.280
24.80	2.560
25.80	3.840
26.80	5.120
26.96	5.320

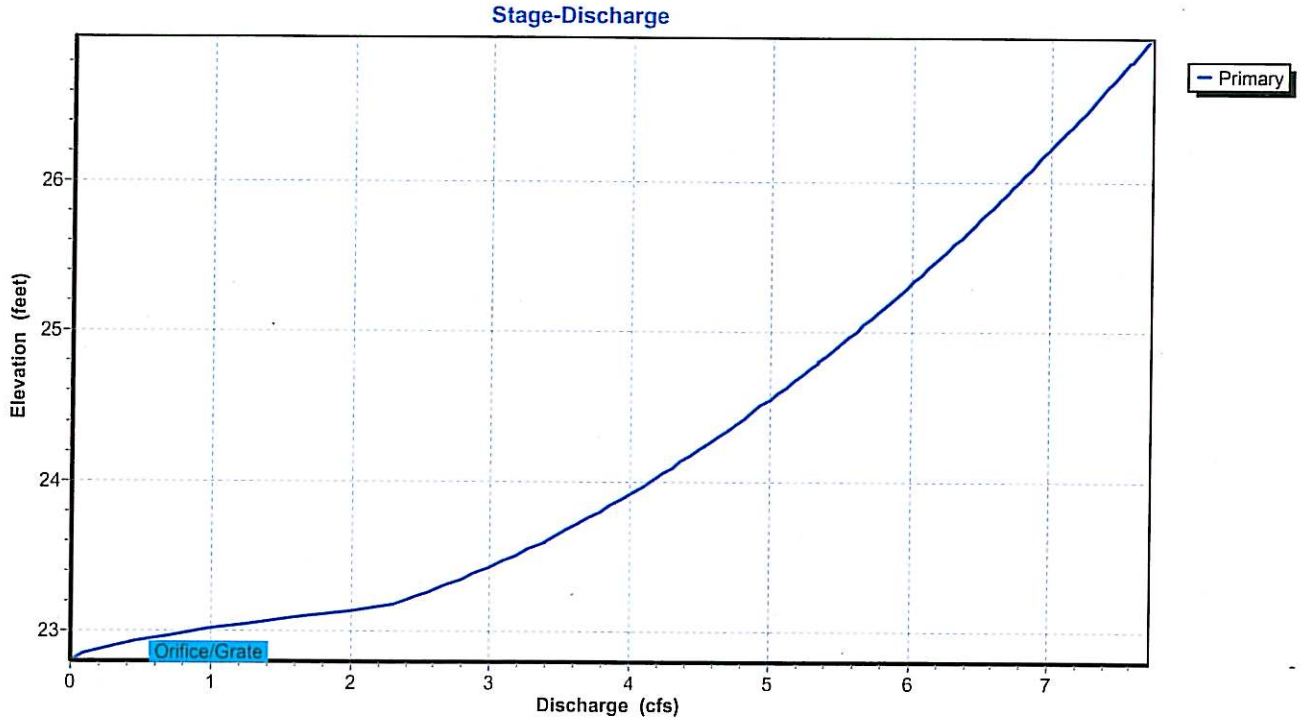
Device	Routing	Invert	Outlet Devices
#1	Primary	22.80'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=5.35 cfs @ 17.03 hrs HW=24.80' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 5.35 cfs @ 6.81 fps)

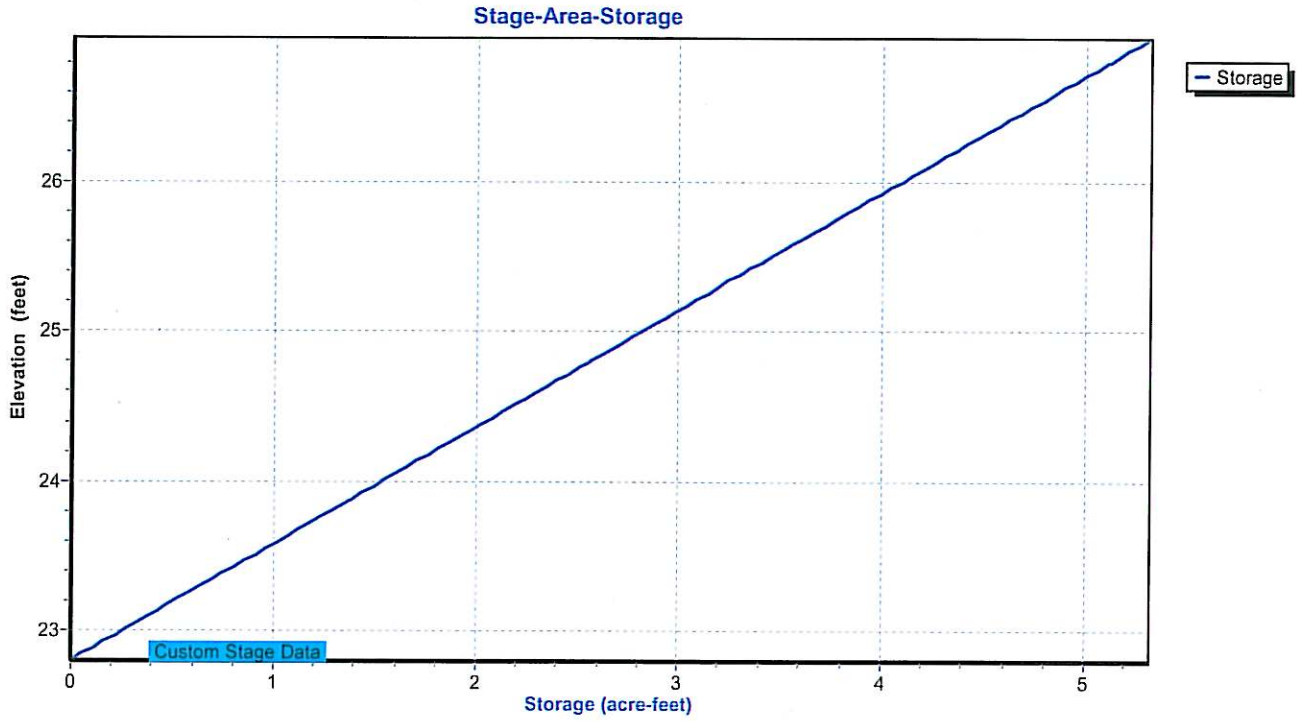
Pond 1P: Detention Basin



Pond 1P: Detention Basin



Pond 1P: Detention Basin



Hydrograph for Pond 1P: Detention Basin

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	22.80	0.00
1.00	1.01	0.069	22.85	0.13
2.00	1.05	0.134	22.90	0.35
3.00	1.09	0.184	22.94	0.57
4.00	1.15	0.223	22.97	0.75
5.00	1.22	0.252	23.00	0.90
6.00	1.29	0.276	23.02	1.03
7.00	1.38	0.296	23.03	1.15
8.00	1.47	0.315	23.05	1.25
9.00	1.60	0.333	23.06	1.37
10.00	1.76	0.354	23.08	1.50
11.00	1.96	0.378	23.10	1.65
12.00	2.24	0.407	23.12	1.85
13.00	3.27	0.483	23.18	2.32
14.00	3.95	0.582	23.25	2.55
15.00	6.33	0.774	23.40	2.94
16.00	**17.56**	1.364	23.87	3.90
17.00	**5.38**	**2.561**	**24.80**	**5.35**
18.00	3.07	2.444	24.71	5.23
19.00	1.87	2.208	24.53	4.97
20.00	1.55	1.951	24.32	4.67
21.00	1.33	1.697	24.13	4.35
22.00	1.19	1.455	23.94	4.03
23.00	1.08	1.229	23.76	3.70
24.00	0.98	1.021	23.60	3.38
25.00	0.00	0.768	23.40	2.93
26.00	0.00	0.545	23.23	2.47

Stage-Discharge for Pond 1P: Detention Basin

Elevation (feet)	Primary (cfs)
22.80	0.00
22.85	0.11
22.90	0.32
22.95	0.60
23.00	0.92
23.05	1.28
23.10	1.69
23.15	2.13
23.20	2.39
23.25	2.54
23.30	2.67
23.35	2.80
23.40	2.93
23.45	3.05
23.50	3.16
23.55	3.28
23.60	3.38
23.65	3.49
23.70	3.59
23.75	3.69
23.80	3.78
23.85	3.88
23.90	3.97
23.95	4.06
24.00	4.14
24.05	4.23
24.10	4.31
24.15	4.39
24.20	4.47
24.25	4.55
24.30	4.63
24.35	4.71
24.40	4.78
24.45	4.86
24.50	4.93
24.55	5.00
24.60	5.07
24.65	5.14
24.70	5.21
24.75	5.28
24.80	5.35
24.85	5.41
24.90	5.48
24.95	5.55
25.00	5.61
25.05	5.67
25.10	5.74
25.15	5.80
25.20	5.86
25.25	5.92
25.30	5.98
25.35	6.04
25.40	6.10
25.45	6.16
25.50	6.21
25.55	6.27
25.60	6.33
25.65	6.38
25.70	6.44
25.75	6.50
25.80	6.55
25.85	6.60
25.90	6.66
25.95	6.71
26.00	6.76
26.05	6.82
26.10	6.87
26.15	6.92
26.20	6.97
26.25	7.02
26.30	7.07
26.35	7.13
26.40	7.18
26.45	7.22
26.50	7.27
26.55	7.32
26.60	7.37
26.65	7.42
26.70	7.47
26.75	7.52
26.80	7.56
26.85	7.61
26.90	7.66
26.95	**7.70**

Stage-Area-Storage for Pond 1P: Detention Basin

Elevation (feet)	Storage (acre-feet)
22.80	0.000
22.85	0.064
22.90	0.128
22.95	0.192
23.00	0.256
23.05	0.320
23.10	0.384
23.15	0.448
23.20	0.512
23.25	0.576
23.30	0.640
23.35	0.704
23.40	0.768
23.45	0.832
23.50	0.896
23.55	0.960
23.60	1.024
23.65	1.088
23.70	1.152
23.75	1.216
23.80	1.280
23.85	1.344
23.90	1.408
23.95	1.472
24.00	1.536
24.05	1.600
24.10	1.664
24.15	1.728
24.20	1.792
24.25	1.856
24.30	1.920
24.35	1.984
24.40	2.048
24.45	2.112
24.50	2.176
24.55	2.240
24.60	2.304
24.65	2.368
24.70	2.432
24.75	2.496
24.80	2.560
24.85	2.624
24.90	2.688
24.95	2.752
25.00	2.816
25.05	2.880
25.10	2.944
25.15	3.008
25.20	3.072
25.25	3.136
25.30	3.200
25.35	3.264
25.40	3.328
25.45	3.392
25.50	3.456
25.55	3.520
25.60	3.584
25.65	3.648
25.70	3.712
25.75	3.776
25.80	3.840
25.85	3.904
25.90	3.968
25.95	4.032
26.00	4.096
26.05	4.160
26.10	4.224
26.15	4.288
26.20	4.352
26.25	4.416
26.30	4.480
26.35	4.544
26.40	4.608
26.45	4.672
26.50	4.736
26.55	4.800
26.60	4.864
26.65	4.928
26.70	4.992
26.75	5.056
26.80	5.120
26.85	5.183
26.90	5.245
26.95	**5.307**

Summary for Link 1L: 10 Year Hydrology

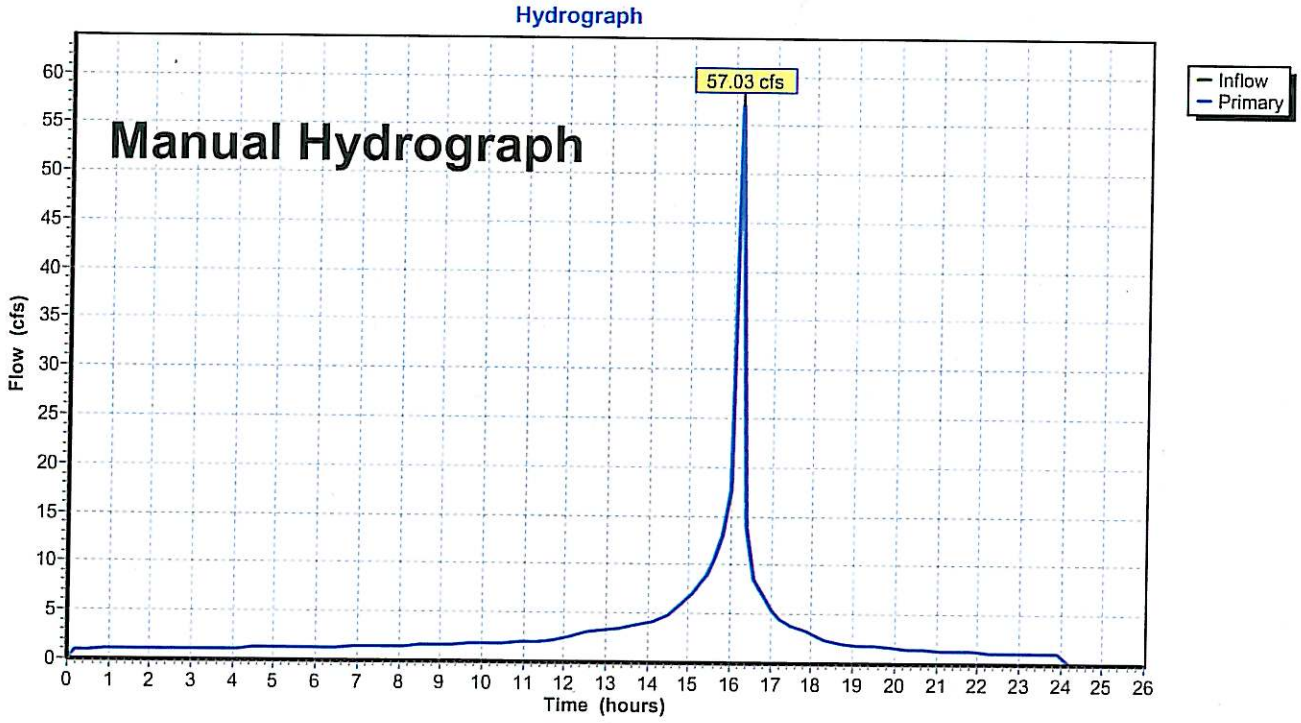
Inflow	=	57.03 cfs @	16.20 hrs,	Volume=	5.863 af
Primary	=	57.03 cfs @	16.20 hrs,	Volume=	5.863 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-26.00 hrs, dt= 0.20 hrs

121 Point manual hydrograph, To= 0.00 hrs, dt= 0.20 hrs, cfs =

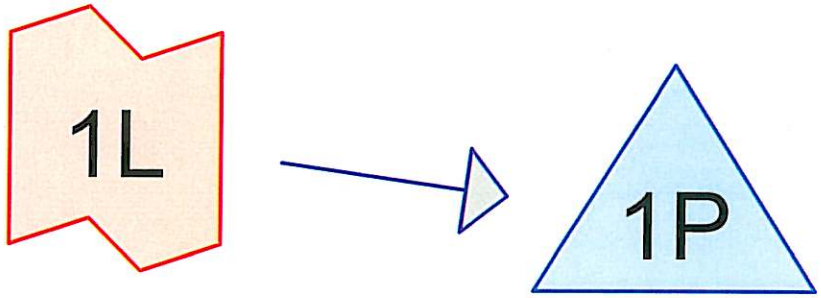
0.00	0.97	0.98	0.99	1.00	1.01	1.01	1.02	1.03	1.04
1.05	1.05	1.07	1.08	1.08	1.09	1.11	1.12	1.13	1.14
1.15	1.16	1.18	1.19	1.20	1.22	1.23	1.24	1.26	1.28
1.29	1.30	1.32	1.34	1.36	1.38	1.40	1.41	1.43	1.46
1.47	1.50	1.53	1.54	1.58	1.60	1.63	1.67	1.69	1.74
1.76	1.79	1.84	1.87	1.93	1.96	2.00	2.07	2.13	2.20
2.24	2.96	3.01	3.08	3.22	3.27	3.46	3.52	3.65	3.87
3.95	4.46	4.70	5.05	5.89	6.33	7.84	8.90	10.62	13.10
17.56	57.01	13.78	8.48	6.79	5.38	4.51	3.97	3.49	3.24
3.07	2.51	2.19	2.08	1.98	1.87	1.81	1.76	1.69	1.59
1.55	1.50	1.46	1.42	1.37	1.33	1.30	1.28	1.24	1.22
1.19	1.16	1.15	1.12	1.09	1.08	1.05	1.05	1.02	1.00
0.98									

Link 1L: 10 Year Hydrology



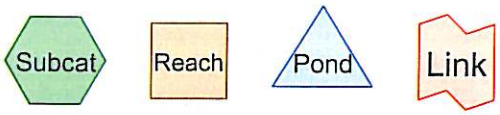
Hydrograph for Link 1L: 10 Year Hydrology

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00
0.40	0.98	0.00	0.98
0.80	1.00	0.00	1.00
1.20	1.01	0.00	1.01
1.60	1.03	0.00	1.03
2.00	1.05	0.00	1.05
2.40	1.07	0.00	1.07
2.80	1.08	0.00	1.08
3.20	1.11	0.00	1.11
3.60	1.13	0.00	1.13
4.00	1.15	0.00	1.15
4.40	1.18	0.00	1.18
4.80	1.20	0.00	1.20
5.20	1.23	0.00	1.23
5.60	1.26	0.00	1.26
6.00	1.29	0.00	1.29
6.40	1.32	0.00	1.32
6.80	1.36	0.00	1.36
7.20	1.40	0.00	1.40
7.60	1.43	0.00	1.43
8.00	1.47	0.00	1.47
8.40	1.53	0.00	1.53
8.80	1.58	0.00	1.58
9.20	1.63	0.00	1.63
9.60	1.69	0.00	1.69
10.00	1.76	0.00	1.76
10.40	1.84	0.00	1.84
10.80	1.93	0.00	1.93
11.20	2.00	0.00	2.00
11.60	2.13	0.00	2.13
12.00	2.24	0.00	2.24
12.40	3.01	0.00	3.01
12.80	3.22	0.00	3.22
13.20	3.46	0.00	3.46
13.60	3.65	0.00	3.65
14.00	3.95	0.00	3.95
14.40	4.70	0.00	4.70
14.80	5.89	0.00	5.89
15.20	7.84	0.00	7.84
15.60	10.62	0.00	10.62
16.00	**17.56**	0.00	**17.56**
16.40	**13.78**	0.00	**13.78**
16.80	6.79	0.00	6.79
17.20	4.51	0.00	4.51
17.60	3.49	0.00	3.49
18.00	3.07	0.00	3.07
18.40	2.19	0.00	2.19
18.80	1.98	0.00	1.98
19.20	1.81	0.00	1.81
19.60	1.69	0.00	1.69
20.00	1.55	0.00	1.55
20.40	1.46	0.00	1.46
20.80	1.37	0.00	1.37
21.20	1.30	0.00	1.30
21.60	1.24	0.00	1.24
22.00	1.19	0.00	1.19
22.40	1.15	0.00	1.15
22.80	1.09	0.00	1.09
23.20	1.05	0.00	1.05
23.60	1.02	0.00	1.02
24.00	0.98	0.00	0.98
24.40	0.00	0.00	0.00
24.80	0.00	0.00	0.00
25.20	0.00	0.00	0.00
25.60	0.00	0.00	0.00
26.00	0.00	0.00	0.00



100 Year Hydrology

Detention Basin



Routing Diagram for c33100yr
Prepared by Fuscoe Engineering , Printed 2/4/2015
HydroCAD® 10.00 s/n 05904 © 2013 HydroCAD Software Solutions LLC

Time span=0.00-26.00 hrs, dt=0.20 hrs, 131 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 1P: Detention Basin Peak Elev=26.69' Storage=4.982 af Inflow=90.75 cfs 11.148 af
Outflow=7.46 cfs 8.909 af

Link 1L: 100 Year Hydrology Manual Hydrograph Inflow=90.75 cfs 11.148 af
Primary=90.75 cfs 11.148 af

$Q_{OUT} = 7.46$ CFS $< Q_{OUT\text{-}ALLOW} = 10.14$ CFS

STORAGE VOL = 4.982 AF $<$ STORAGE $VOL_{PROVIDED} = 5.3$ AF

Summary for Pond 1P: Detention Basin

Inflow	=	90.75 cfs @	16.19 hrs,	Volume=	11.148 af
Outflow	=	7.46 cfs @	17.64 hrs,	Volume=	8.909 af, Atten= 92%, Lag= 87.0 min
Primary	=	7.46 cfs @	17.64 hrs,	Volume=	8.909 af

Routing by Stor-Ind method, Time Span= 0.00-26.00 hrs, dt= 0.20 hrs
Peak Elev= 26.69' @ 17.64 hrs Surf.Area= 0.000 ac Storage= 4.982 af

Plug-Flow detention time= 251.8 min calculated for 8.841 af (79% of inflow)
Center-of-Mass det. time= 167.6 min (1,003.1 - 835.5)

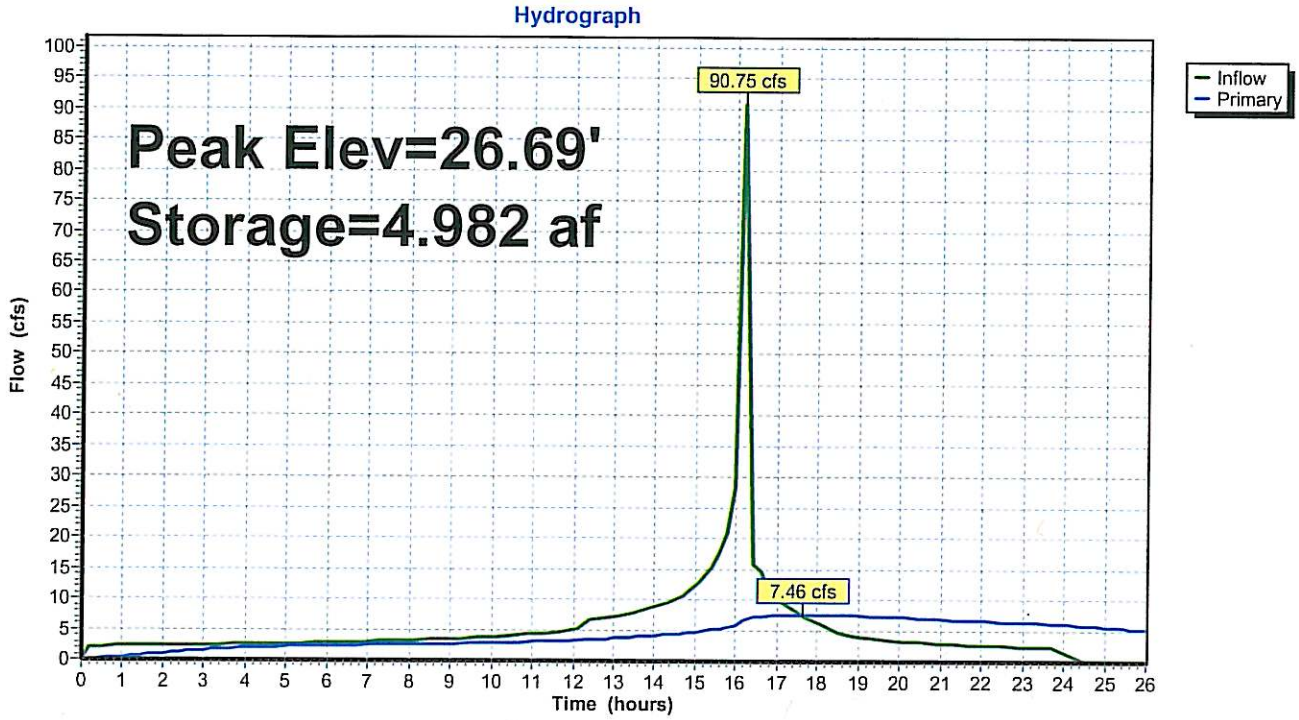
Volume	Invert	Avail.Storage	Storage Description
#1	22.80'	5.320 af	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (acre-feet)
22.80	0.000
23.80	1.280
24.80	2.560
25.80	3.840
26.80	5.120
26.96	5.320

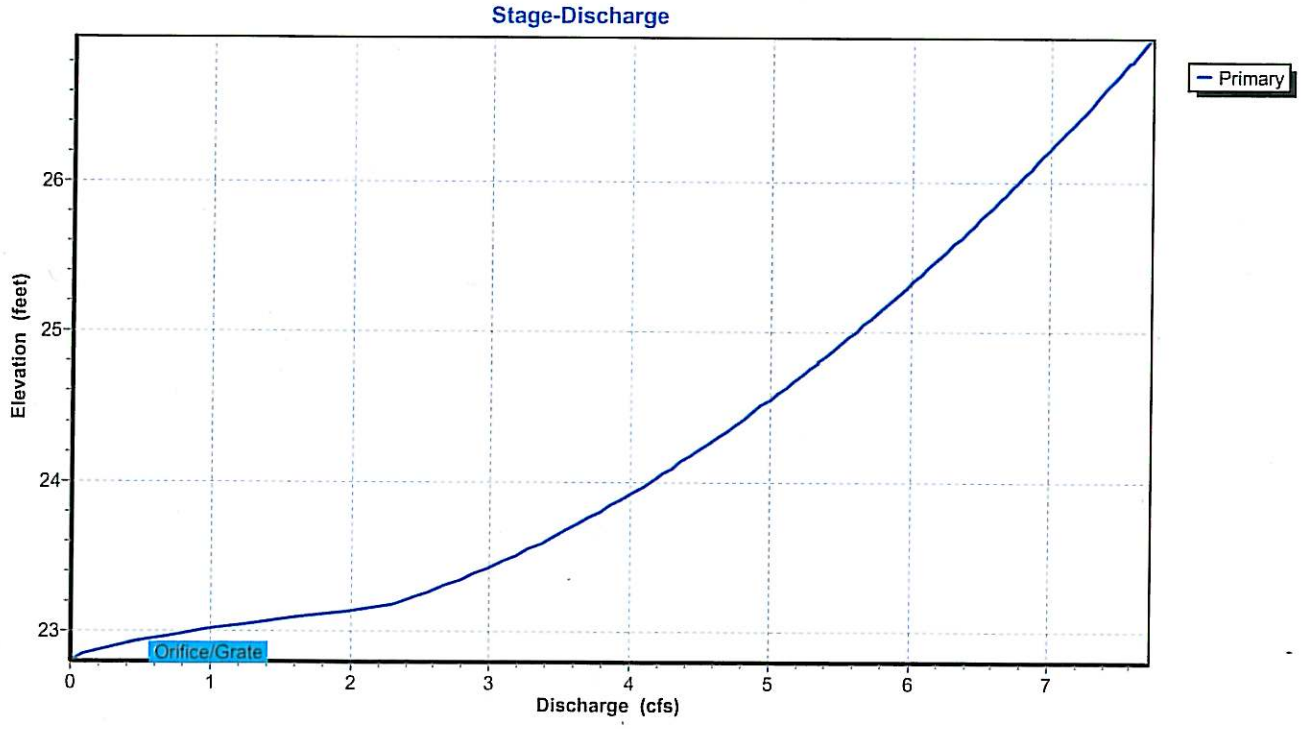
Device	Routing	Invert	Outlet Devices
#1	Primary	22.80'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=7.46 cfs @ 17.64 hrs HW=26.69' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 7.46 cfs @ 9.50 fps)

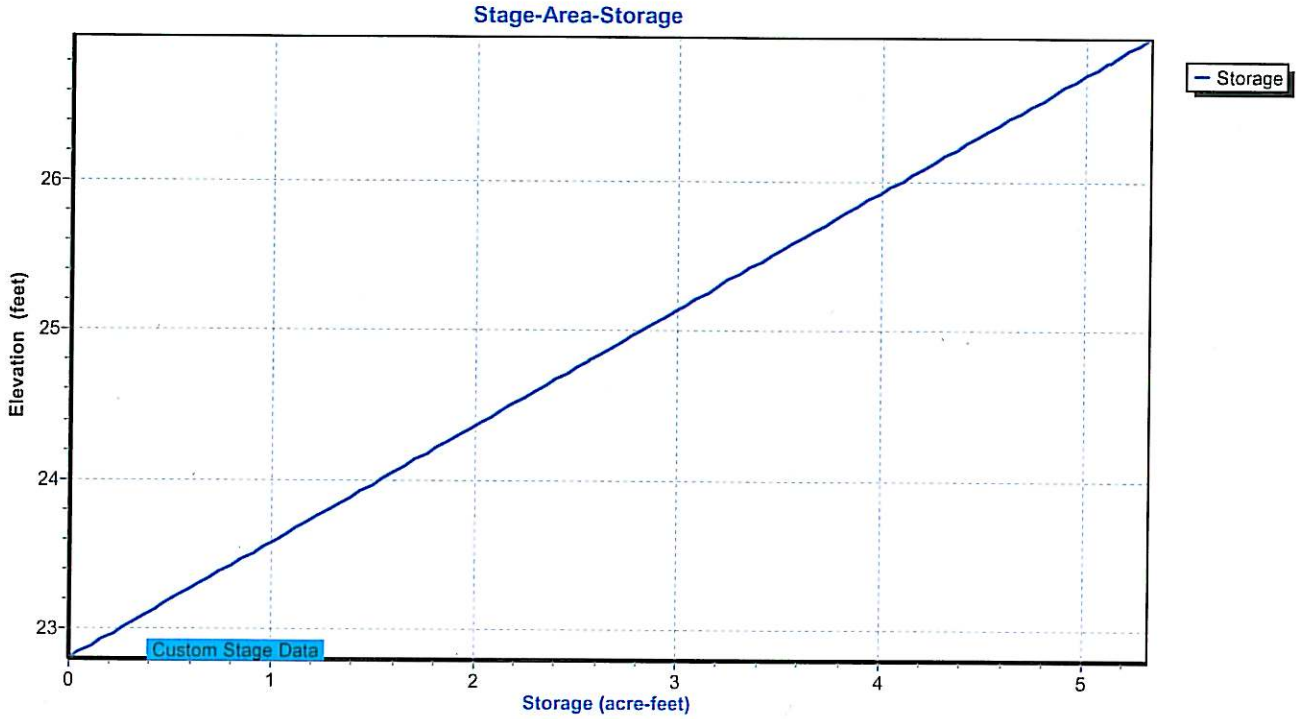
Pond 1P: Detention Basin



Pond 1P: Detention Basin



Pond 1P: Detention Basin



Hydrograph for Pond 1P: Detention Basin

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	22.80	0.00
1.00	2.17	0.146	22.91	0.40
2.00	2.27	0.271	23.01	1.00
3.00	2.37	0.357	23.08	1.51
4.00	2.49	0.415	23.12	1.90
5.00	2.61	0.457	23.16	2.17
6.00	2.78	0.493	23.18	2.35
7.00	2.96	0.532	23.22	2.44
8.00	3.18	0.581	23.25	2.55
9.00	3.46	0.640	23.30	2.67
10.00	3.83	0.713	23.36	2.82
11.00	4.28	0.805	23.43	3.00
12.00	4.89	0.924	23.52	3.21
13.00	7.12	1.163	23.71	3.61
14.00	8.70	1.493	23.97	4.08
15.00	12.06	1.965	24.34	4.69
16.00	**28.38**	2.989	25.14	5.78
17.00	**10.11**	**4.914**	**26.64**	**7.41**
18.00	6.63	**4.968**	**26.68**	**7.45**
19.00	4.04	4.756	26.52	7.29
20.00	3.35	4.466	26.29	7.06
21.00	2.88	4.148	26.04	6.81
22.00	2.56	3.822	25.79	6.53
23.00	2.32	3.495	25.53	6.25
24.00	2.12	3.173	25.28	5.95
25.00	0.00	2.717	24.92	5.51
26.00	0.00	2.280	24.58	5.05

Stage-Discharge for Pond 1P: Detention Basin

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
22.80	0.00	25.40	6.10
22.85	0.11	25.45	6.16
22.90	0.32	25.50	6.21
22.95	0.60	25.55	6.27
23.00	0.92	25.60	6.33
23.05	1.28	25.65	6.38
23.10	1.69	25.70	6.44
23.15	2.13	25.75	6.50
23.20	2.39	25.80	6.55
23.25	2.54	25.85	6.60
23.30	2.67	25.90	6.66
23.35	2.80	25.95	6.71
23.40	2.93	26.00	6.76
23.45	3.05	26.05	6.82
23.50	3.16	26.10	6.87
23.55	3.28	26.15	6.92
23.60	3.38	26.20	6.97
23.65	3.49	26.25	7.02
23.70	3.59	26.30	7.07
23.75	3.69	26.35	7.13
23.80	3.78	26.40	7.18
23.85	3.88	26.45	7.22
23.90	3.97	26.50	7.27
23.95	4.06	26.55	7.32
24.00	4.14	26.60	7.37
24.05	4.23	26.65	7.42
24.10	4.31	26.70	7.47
24.15	4.39	26.75	7.52
24.20	4.47	26.80	7.56
24.25	4.55	26.85	7.61
24.30	4.63	26.90	7.66
24.35	4.71	26.95	**7.70**
24.40	4.78		
24.45	4.86		
24.50	4.93		
24.55	5.00		
24.60	5.07		
24.65	5.14		
24.70	5.21		
24.75	5.28		
24.80	5.35		
24.85	5.41		
24.90	5.48		
24.95	5.55		
25.00	5.61		
25.05	5.67		
25.10	5.74		
25.15	5.80		
25.20	5.86		
25.25	5.92		
25.30	5.98		
25.35	6.04		

Stage-Area-Storage for Pond 1P: Detention Basin

Elevation (feet)	Storage (acre-feet)
22.80	0.000
22.85	0.064
22.90	0.128
22.95	0.192
23.00	0.256
23.05	0.320
23.10	0.384
23.15	0.448
23.20	0.512
23.25	0.576
23.30	0.640
23.35	0.704
23.40	0.768
23.45	0.832
23.50	0.896
23.55	0.960
23.60	1.024
23.65	1.088
23.70	1.152
23.75	1.216
23.80	1.280
23.85	1.344
23.90	1.408
23.95	1.472
24.00	1.536
24.05	1.600
24.10	1.664
24.15	1.728
24.20	1.792
24.25	1.856
24.30	1.920
24.35	1.984
24.40	2.048
24.45	2.112
24.50	2.176
24.55	2.240
24.60	2.304
24.65	2.368
24.70	2.432
24.75	2.496
24.80	2.560
24.85	2.624
24.90	2.688
24.95	2.752
25.00	2.816
25.05	2.880
25.10	2.944
25.15	3.008
25.20	3.072
25.25	3.136
25.30	3.200
25.35	3.264
25.40	3.328
25.45	3.392
25.50	3.456
25.55	3.520
25.60	3.584
25.65	3.648
25.70	3.712
25.75	3.776
25.80	3.840
25.85	3.904
25.90	3.968
25.95	4.032
26.00	4.096
26.05	4.160
26.10	4.224
26.15	4.288
26.20	4.352
26.25	4.416
26.30	4.480
26.35	4.544
26.40	4.608
26.45	4.672
26.50	4.736
26.55	4.800
26.60	4.864
26.65	4.928
26.70	4.992
26.75	5.056
26.80	5.120
26.85	5.183
26.90	5.245
26.95	**5.307**

Summary for Link 1L: 100 Year Hydrology

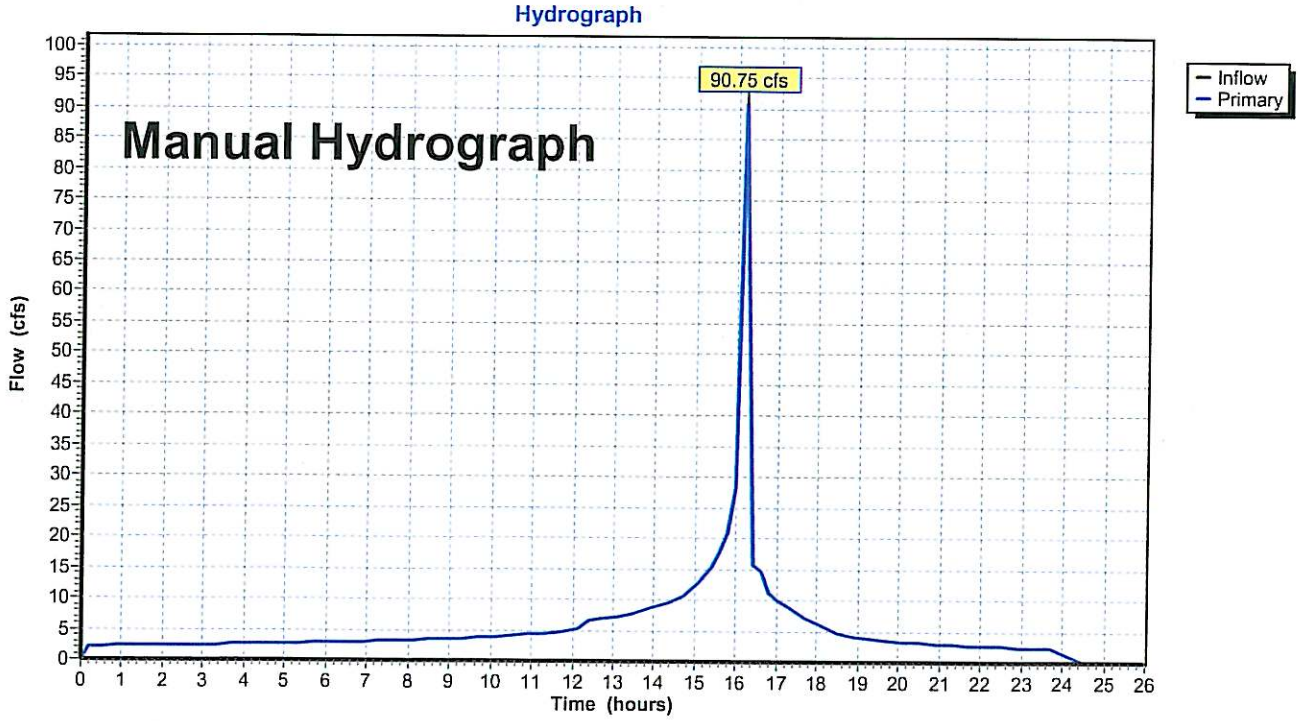
Inflow	=	90.75 cfs @	16.19 hrs,	Volume=	11.148 af
Primary	=	90.75 cfs @	16.19 hrs,	Volume=	11.148 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-26.00 hrs, dt= 0.20 hrs

121 Point manual hydrograph, To= 0.00 hrs, dt= 0.20 hrs, cfs =

0.00	2.10	2.11	2.14	2.15	2.17	2.18	2.20	2.22	2.24
2.27	2.28	2.31	2.32	2.33	2.37	2.39	2.42	2.43	2.45
2.49	2.50	2.54	2.57	2.60	2.61	2.66	2.69	2.71	2.76
2.78	2.81	2.85	2.89	2.93	2.96	3.02	3.05	3.11	3.15
3.18	3.25	3.28	3.37	3.40	3.46	3.53	3.58	3.67	3.72
3.83	3.88	3.97	4.06	4.13	4.28	4.35	4.47	4.60	4.72
4.89	5.44	6.51	6.67	6.82	7.12	7.28	7.66	7.88	8.40
8.70	8.91	9.73	10.14	11.26	12.06	13.90	15.07	17.64	20.88
28.38	90.61	15.84	14.62	11.16	10.11	9.40	8.21	7.60	6.94
6.63	5.38	4.71	4.46	4.23	4.04	3.92	3.72	3.58	3.44
3.35	3.22	3.12	3.04	2.95	2.88	2.81	2.75	2.70	2.62
2.56	2.49	2.45	2.43	2.37	2.32	2.28	2.22	2.19	2.16
2.12									

Link 1L: 100 Year Hydrology

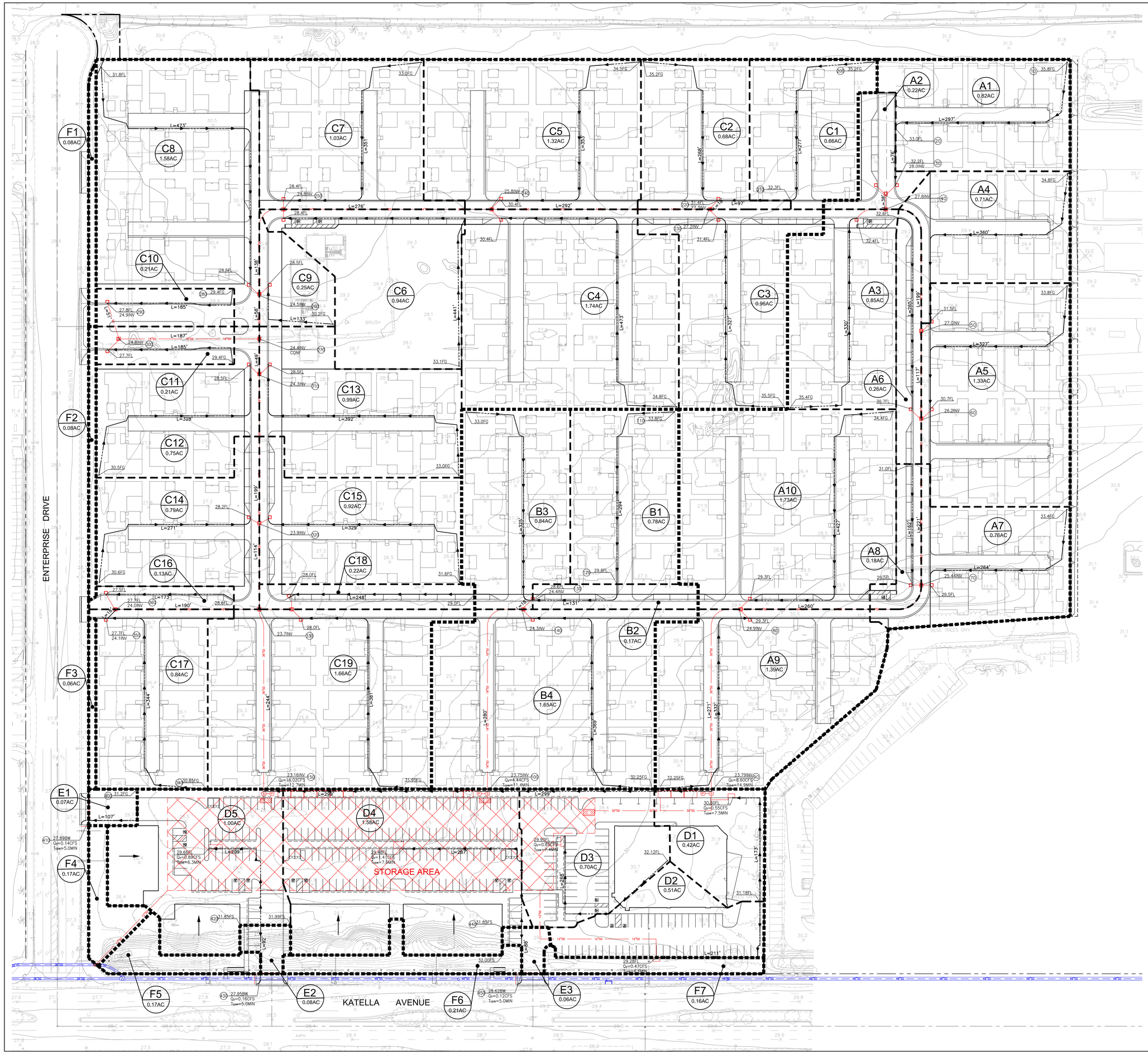


Hydrograph for Link 1L: 100 Year Hydrology

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00
0.40	2.11	0.00	2.11
0.80	2.15	0.00	2.15
1.20	2.18	0.00	2.18
1.60	2.22	0.00	2.22
2.00	2.27	0.00	2.27
2.40	2.31	0.00	2.31
2.80	2.33	0.00	2.33
3.20	2.39	0.00	2.39
3.60	2.43	0.00	2.43
4.00	2.49	0.00	2.49
4.40	2.54	0.00	2.54
4.80	2.60	0.00	2.60
5.20	2.66	0.00	2.66
5.60	2.71	0.00	2.71
6.00	2.78	0.00	2.78
6.40	2.85	0.00	2.85
6.80	2.93	0.00	2.93
7.20	3.02	0.00	3.02
7.60	3.11	0.00	3.11
8.00	3.18	0.00	3.18
8.40	3.28	0.00	3.28
8.80	3.40	0.00	3.40
9.20	3.53	0.00	3.53
9.60	3.67	0.00	3.67
10.00	3.83	0.00	3.83
10.40	3.97	0.00	3.97
10.80	4.13	0.00	4.13
11.20	4.35	0.00	4.35
11.60	4.60	0.00	4.60
12.00	4.89	0.00	4.89
12.40	6.51	0.00	6.51
12.80	6.82	0.00	6.82
13.20	7.28	0.00	7.28
13.60	7.88	0.00	7.88
14.00	8.70	0.00	8.70
14.40	9.73	0.00	9.73
14.80	11.26	0.00	11.26
15.20	13.90	0.00	13.90
15.60	17.64	0.00	17.64
16.00	**28.38**	0.00	**28.38**
16.40	**15.84**	0.00	**15.84**
16.80	11.16	0.00	11.16
17.20	9.40	0.00	9.40
17.60	7.60	0.00	7.60
18.00	6.63	0.00	6.63
18.40	4.71	0.00	4.71
18.80	4.23	0.00	4.23
19.20	3.92	0.00	3.92
19.60	3.58	0.00	3.58
20.00	3.35	0.00	3.35
20.40	3.12	0.00	3.12
20.80	2.95	0.00	2.95
21.20	2.81	0.00	2.81
21.60	2.70	0.00	2.70
22.00	2.56	0.00	2.56
22.40	2.45	0.00	2.45
22.80	2.37	0.00	2.37
23.20	2.28	0.00	2.28
23.60	2.19	0.00	2.19
24.00	2.12	0.00	2.12
24.40	0.00	0.00	0.00
24.80	0.00	0.00	0.00
25.20	0.00	0.00	0.00
25.60	0.00	0.00	0.00
26.00	0.00	0.00	0.00

Appendix 5

Proposed 2, 10 & 100 Year Hydrology Maps



2 YEAR FLOW SUMMARY

AREA DESIGNATION	AREA (ACRES)	Q2 (CFS)	TREATMENT	OUTLET LOCATION
A1 TO A9	8.25	8.60	MWS	DETENTION BASIN
B1 TO B4	3.44	4.44	MWS	DETENTION BASIN
C1 TO C19	15.88	16.02	MWS	DETENTION BASIN
D1	0.42	0.55	MWS	DETENTION BASIN
D2	0.51	0.47	MWS	DETENTION BASIN
D3	0.70	0.65	MWS	DETENTION BASIN
D4	1.58	1.41	MWS	DETENTION BASIN
D5	1.00	0.89	MWS	DETENTION BASIN
E1	0.07	0.14	TRENCH DRAIN FILTER	STREET CURB
E2	0.08	0.16	TRENCH DRAIN FILTER	STREET CURB
E3	0.06	0.12	TRENCH DRAIN FILTER	STREET CURB
LANDSCAPE AREA (F1 TO F7)	0.93	-	SELF TREATMENT	N/A
TOTAL	32.92	33.45		

SOIL CLASS = C

LEGEND

- MAJOR BOUNDARY
- MINOR BOUNDARY
- FLOW PATH
- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- A / 1.75AC — DRAINAGE AREA DESIGNATION / ACRES
- STORAGE AREA

N

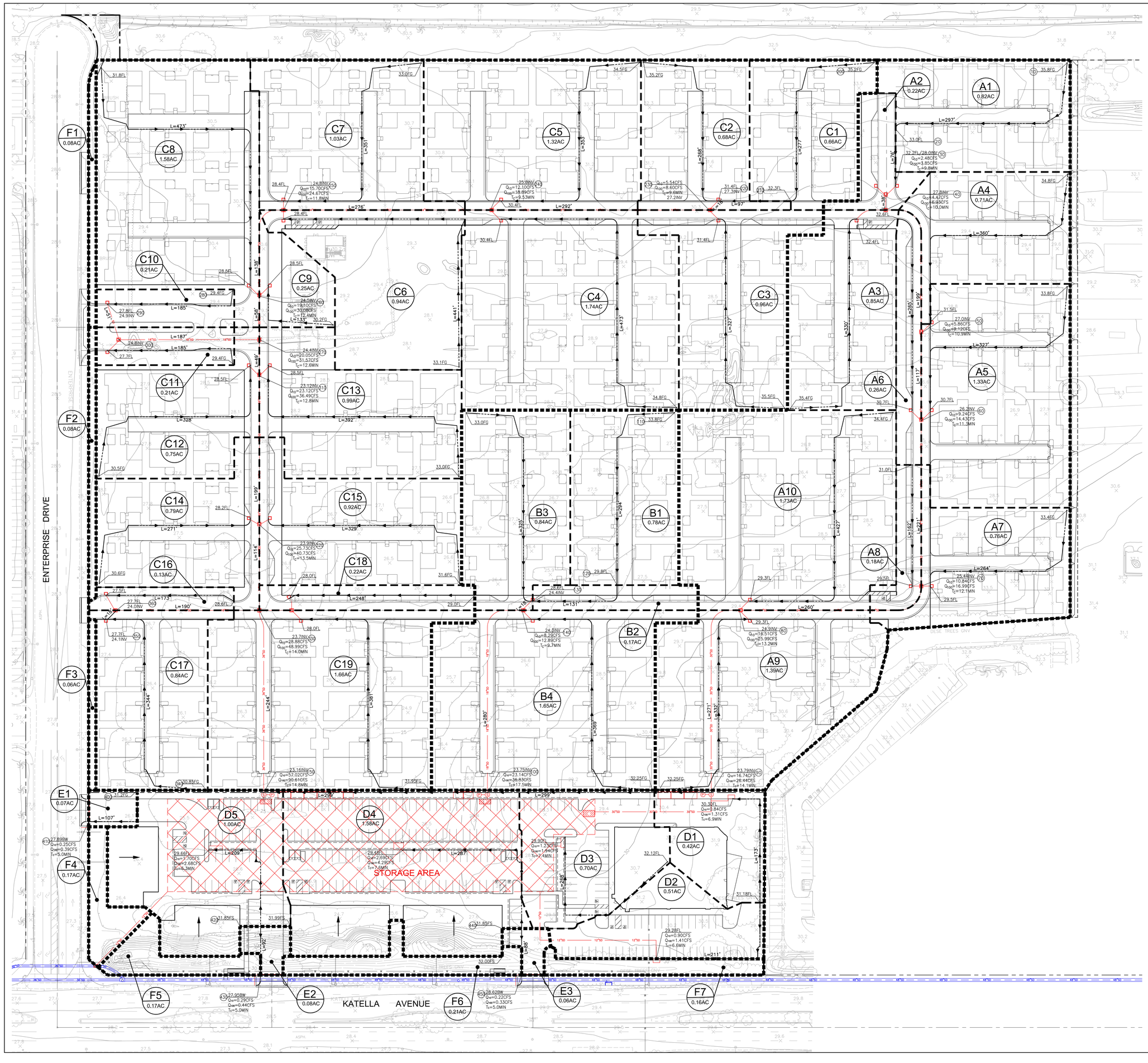
40' 0' 20' 40'
SCALE: 1" = 40'

PREPARED BY:
FUSCOE ENGINEERING
16795 Von Karman, Suite 100
Irvine, California 92606
tel 949.474.1960 • fax 949.474.5315
www.fuscoe.com

PROPOSED 2 YEAR HYDROLOGY MAP

BARTON PLACE
CYPRESS, CA

FEBRUARY 6, 2015



FLOW SUMMARY (TO DETENTION BASIN)

AREA DESIGNATION	AREA (ACRES)	Q10 (CFS)	Q100 (CFS)	OUTLET LOCATION
A1 TO A9	8.25	16.51	25.99	DETENTION BASIN
B1TO B4	3.44	8.29	12.89	DETENTION BASIN
C1 TO C19	15.88	30.91	48.99	DETENTION BASIN
D1TO D5	4.21	7.36	11.63	DETENTION BASIN
TOTAL*	31.8	57.02	90.61	

*TOTAL FROM HYDROLOGY CALCULATIONS – SEE HYDROLOGY REPORT APPENDIX 2

FLOW SUMMARY (TO OFFSITE)

AREA DESIGNATION	AREA (ACRES)	Q10 (CFS)	Q100 (CFS)	OUTLET LOCATION
E1 TO E3	0.21	0.76	1.16	STREET CURB
LANDSCAPE AREA (F1 TO F7)	0.93	-	-	N/A
TOTAL	1.14	0.76	1.16	

TOTAL SITE AREA = 32.92 ACRES

100 YEAR VOLUME SUMMARY - DETENTION BASIN

AREA DESIGNATION	AREA (ACRES)	VOLUME STORAGE WITH NO OUTFLOW (ACRE-FT)	MAX ALLOWABLE OUTFLOW (CFS)	DESIGN OUTFLOW (CFS)	STORAGE VOLUME WITH OUTFLOW (ACRE-FT)	PROVIDED STORAGE VOLUME (ACRE-FT)
A TO D	31.8	11.40	10.14	7.46	5.00	5.3

SOIL CLASS = C

LEGEND

- MAJOR BOUNDARY
- MINOR BOUNDARY
- FLOW PATH
- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- A / 1.75AC — DRAINAGE AREA DESIGNATION / ACRES
- STORAGE AREA

N

40' 0' 20' 40'
SCALE: 1" = 40'

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PROPOSED 10, 100 YEAR HYDROLOGY MAP

BARTON PLACE
CYPRESS, CA

FEBRUARY 6, 2015

Appendix 6

Existing 100 Year Hydrology and Map

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****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2011 Advanced Engineering Software (aes)
             Ver. 18.0  Release Date: 07/01/2011  License ID 1355

                           Analysis prepared by:

                          Fuscoe Engineering, Inc.
                      16795 Von Karman Ave. Suite 100
                          Irvine, California 92606
                    PH: 949-474-1960   Fax: 949-474-5315

 ************************** DESCRIPTION OF STUDY **************************
* Barton Place - C33                                                       *
* Existing 100 year Hydrology                                              *
* Job No. 1334.01  File:BPex100.inp   BPex100.out                          *
 ***************************************************************************

  FILE NAME: BPEX100.INP
  TIME/DATE OF STUDY: 14:59 05/20/2015
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =     33.50  DOWNSTREAM(FEET) =     28.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.438
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.851
```
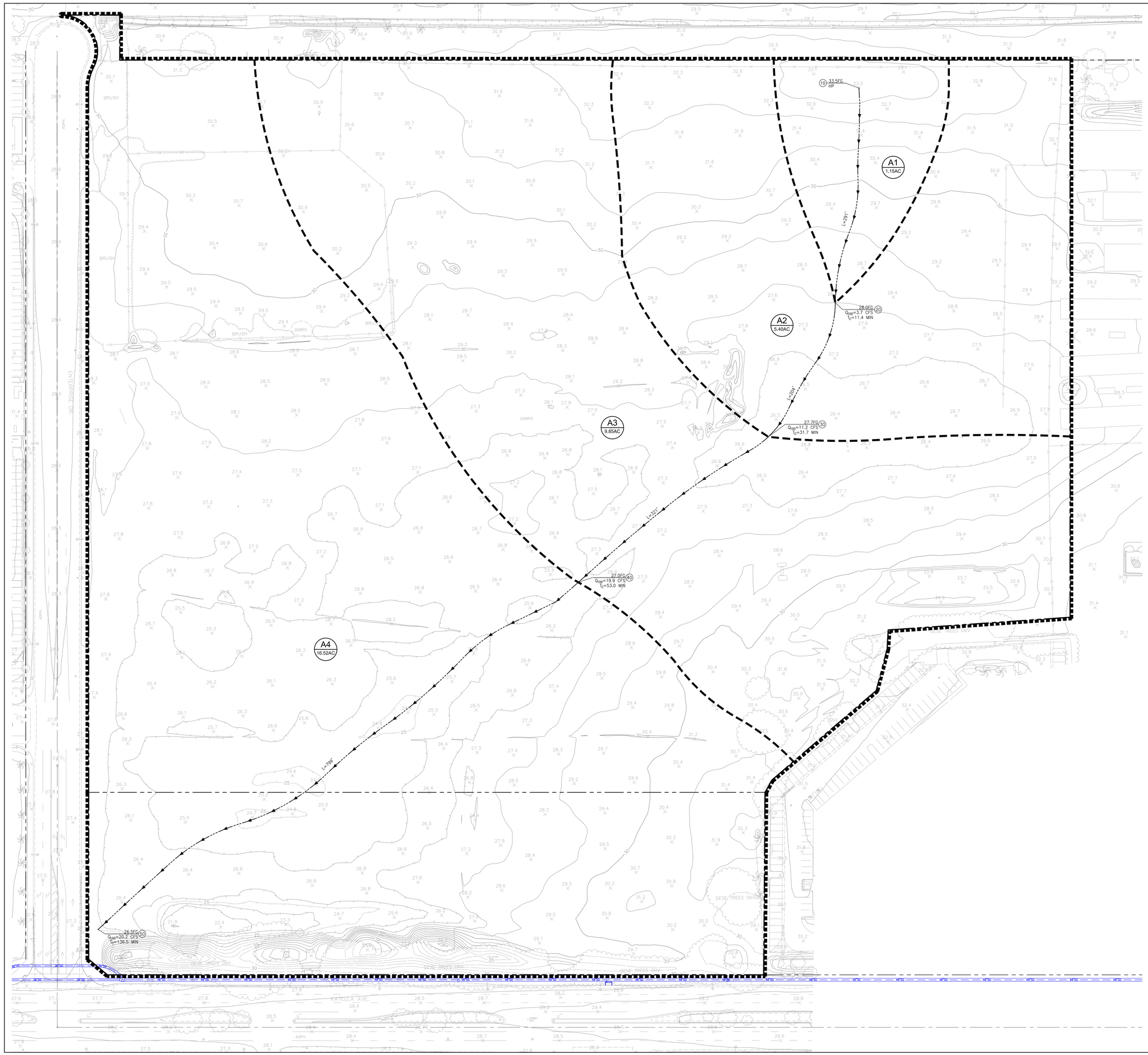

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "CHAPARRAL,BROADLEAF"      C        1.15      0.25     1.000    94   11.44
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.73
  TOTAL AREA(ACRES) =      1.15   PEAK FLOW RATE(CFS) =      3.73

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     30.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =     28.00
  DOWNSTREAM NODE ELEVATION(FEET) =     27.70
  CHANNEL LENGTH THRU SUBAREA(FEET) =   204.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.020   MANNING'S N = .2500
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.03000
  MAXIMUM DEPTH(FEET) =   1.50
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.146
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "CHAPARRAL,BROADLEAF"      C        5.40      0.25     1.000    94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      8.16
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.17
  AVERAGE FLOW DEPTH(FEET) =   1.20   FLOOD WIDTH(FEET) =   80.55
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =  20.29   Tc(MIN.) =   31.73
  SUBAREA AREA(ACRES) =    5.40       SUBAREA RUNOFF(CFS) =    9.22
  EFFECTIVE AREA(ACRES) =    6.55     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        6.6         PEAK FLOW RATE(CFS) =      11.18

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.36   FLOOD WIDTH(FEET) =   90.70
  FLOW VELOCITY(FEET/SEC.) =   0.18   DEPTH*VELOCITY(FT*FT/SEC) =   0.25
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     30.00 =     504.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     40.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =     27.70
  DOWNSTREAM NODE ELEVATION(FEET) =     27.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   321.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.020   MANNING'S N = .2500
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.04000
  MAXIMUM DEPTH(FEET) =   2.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  1.599
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  NATURAL POOR COVER
  "CHAPARRAL,BROADLEAF"      C        9.85      0.25     1.000    94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     17.13
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.25
  AVERAGE FLOW DEPTH(FEET) =   1.62   FLOOD WIDTH(FEET) =   82.61
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =  21.31   Tc(MIN.) =   53.03
  SUBAREA AREA(ACRES) =    9.85       SUBAREA RUNOFF(CFS) =   11.96
  EFFECTIVE AREA(ACRES) =   16.40     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       16.4         PEAK FLOW RATE(CFS) =      19.91

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.72   FLOOD WIDTH(FEET) =   87.51
  FLOW VELOCITY(FEET/SEC.) =   0.26   DEPTH*VELOCITY(FT*FT/SEC) =   0.45
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     40.00 =     825.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     50.00 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =     27.00
  DOWNSTREAM NODE ELEVATION(FEET) =     26.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   799.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.020   MANNING'S N = .2500
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.03000
  MAXIMUM DEPTH(FEET) =   2.50
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  0.930
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "CHAPARRAL,BROADLEAF"      C       16.52      0.25     1.000    94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     24.99
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.16
  AVERAGE FLOW DEPTH(FEET) =   2.16   FLOOD WIDTH(FEET) =  144.50
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =  83.47   Tc(MIN.) =  136.50
  SUBAREA AREA(ACRES) =   16.52       SUBAREA RUNOFF(CFS) =   10.11
  EFFECTIVE AREA(ACRES) =   32.92     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.25  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       32.9         PEAK FLOW RATE(CFS) =      20.15

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.99   FLOOD WIDTH(FEET) =  133.26
  FLOW VELOCITY(FEET/SEC.) =   0.15   DEPTH*VELOCITY(FT*FT/SEC) =   0.30
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     50.00 =    1624.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       32.9  TC(MIN.) =    136.50
  EFFECTIVE AREA(ACRES) =     32.92  AREA-AVERAGED Fm(INCH/HR)=  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      20.15
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```



SITE = BROAD LEAF-POOR COVER
SOIL CLASS = C

LEGEND

- MAJOR BOUNDARY
- MINOR BOUNDARY
- FLOW PATH
- EXISTING STORM DRAIN
- A / 1.75AC — DRAINAGE AREA DESIGNATION / ACRES

N

40' 0' 20' 40'
SCALE: 1" = 40'

PREPARED BY:

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EXISTING 100YR HYDROLOGY MAP

BARTON PLACE
CYPRESS, CA

MAY 19, 2015

APPENDIX H

NOISE IMPACT ANALYSIS

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Barton Place

NOISE IMPACT ANALYSIS

CITY OF CYPRESS

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APRIL 27, 2015

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
ANSI	American National Standards Institute
Calveno	California Vehicle Noise
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
I-405	Interstate 405 Freeway
I-605	Interstate 605 Freeway
INCE	Institute of Noise Control Engineering
JFTB	Joint Forces Training Base
Leq	Equivalent continuous (average) sound level
Lmax	Maximum level measured over the time interval
Lmin	Minimum level measured over the time interval
MM	Mitigation Measure
mph	Miles per hour
NLR	Noise Level Reduction
PDF	Project Design Features
Project	Barton Place
RCNM	Roadway Construction Noise Model
REMEL	Reference Energy Mean Emission Level
Specific Plan	Cypress Business & Professional Center Specific Plan
SR-22	State Route 22 Freeway
STC	Sound Transmission Class
VdB	Vibration Decibels

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EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this study to analyze potential noise impacts, determine noise exposure, and recommend noise mitigation measures, as needed, for the proposed Barton Place development ("Project"). The Project site is generally located north of Katella Avenue and east of Enterprise Drive in the City of Cypress. The mixed-use Project is proposed to consist of two components, a senior residential community with approximately 244 dwelling units and approximately 50,000 square feet of commercial/retail use along Katella Avenue. The purpose of this noise analysis is to ensure that the proposed development is compatible with the existing and future noise environment. This study has been prepared to demonstrate that the Project satisfies the City of Cypress noise standards for residential development and to support the Environmental Impact Report (EIR) for the Project.

OFF-SITE TRAFFIC NOISE ANALYSIS

Traffic generated by the proposed Project will influence the traffic noise levels in surrounding off-site areas. To quantify the off-site traffic noise increases on the surrounding off-site areas, the changes in traffic noise levels on 18 roadway segments surrounding the Project site were estimated based on the change in the average daily traffic (ADT) volumes. The traffic noise levels provided in this analysis are based on the traffic forecasts found in the *Barton Place Traffic Impact Analysis* prepared by Kimley-Horn and Associates, Inc. (1) To assess the off-site noise level impacts associated with the proposed Project, noise contour boundaries were developed for Existing and Year 2018 traffic conditions. The traffic noise analysis indicates that the Project's contributions to roadway noise levels at adjacent sensitive land uses will be less than significant for Existing and Year 2018 traffic conditions.

ON-SITE TRAFFIC NOISE ANALYSIS

The results of this analysis indicate that future vehicle noise from Katella Avenue is the principal source of traffic noise that will impact the Project site. The Project will also experience some background traffic noise impacts from Enterprise Drive and the Project's internal roads, however due to the distance, topography and low traffic volume/speeds, traffic noise from these roads will not make a significant contribution to the noise environment. The proposed Barton Place development was designed with traffic noise concerns in mind as made evident by Project Design Features (PDFs), such as the planned 8-foot high perimeter wall (Noise PDF-1) around the residential land use within the site, and the limited number of second floor living areas that are set back (Noise PDF-2) from potential traffic noise sources, such as Katella Avenue.

The following on-site PDFs reduce the exterior and interior noise levels to satisfy the City of Cypress transportation related CNEL noise criteria for residential development. With the PDFs shown on Exhibit ES-A, the on-site noise impacts will be less than significant.

EXTERIOR NOISE ABATEMENT PROJECT DESIGN FEATURES

To satisfy the City of Cypress 60 dBA CNEL exterior noise level standards for residential land use, the Project includes an 8-foot-high noise barrier (Noise PDF-1) that surrounds the residential lots. The noise barriers, shown on Exhibit ES-A, result in future exterior noise levels that range from 50.7 to 50.8 dBA CNEL. This noise analysis shows that the noise barriers will satisfy the City of Cypress 60 dBA CNEL exterior noise level standards for residential development. No exterior noise level standards are identified in the City of Cypress General Plan Noise Element for commercial/retail land use, but the analysis indicates that the commercial/retail land use within the Project site is considered *conditionally acceptable* with noise levels below 75 dBA CNEL. Therefore, no exterior noise mitigation is required.

The planned noise control barriers shall be constructed so that the top of each wall extends to the planned height above the pad elevation of the lot it is shielding. When the road is elevated above the pad elevation, the barrier shall extend to the planned height above the highest point between the residential home and the road. The barriers shall provide a weight of at least 4 pounds per square foot of face area with no decorative cutouts or line-of-sight openings between shielded areas and the roadways. The noise barrier may be constructed using one of the following materials:

- Masonry block
- Stucco veneer over wood framing (or foam core), or 1 inch thick tongue and groove wood of sufficient weight per square foot
- Glass (1/4 inch thick), or other transparent material with sufficient weight per square foot
- Earthen berm
- Any combination of these construction materials

The barrier must present a solid face from top to bottom. Unnecessary openings or decorative cutouts should not be made. All gaps (except for weep holes) should be filled with grout or caulking.

INTERIOR NOISE ABATEMENT PROJECT DESIGN FEATURES

To satisfy the City of Cypress 45 dBA CNEL interior noise level criteria for residential land use, lots facing Katella Avenue will require a Noise Level Reduction (NLR) of up to 15.7 dBA and a windows closed condition requiring a means of mechanical ventilation (e.g. air conditioning). In order to meet the City of Cypress 55 dBA CNEL interior noise standards for commercial/retail development, a NLR of up to 14.2 dBA and a windows closed condition requiring a means of mechanical ventilation (e.g. air conditioning) is needed. Therefore, the Project is designed with the following interior noise PDFs:

- <u>Windows</u>:
    - All windows and sliding glass doors shall be well fitted, well weather-stripped assemblies and shall have a minimum sound transmission class (STC) rating of 27.

  - Upgraded second floor windows and sliding glass doors with a minimum STC rating of 35 are included for the units along the northern site boundary adjacent to the Los Alamitos Race Course (Noise PDF-3).

- Doors: All exterior doors shall be well weather-stripped solid core assemblies at least one and three-fourths-inch thick.
- Roof: Roof sheathing of wood construction shall be well fitted or caulked plywood of at least one-half inch thick. Ceilings shall be well fitted, well-sealed gypsum board of at least one-half inch thick. Insulation with at least a rating of R-19 shall be used in the attic space.
- Attic: Attic vents should be oriented away from Katella Avenue. If such an orientation cannot be avoided, then an acoustical baffle shall be placed in the attic space behind the vents.
- Ventilation: Arrangements for any habitable room shall be such that any exterior door or window can be kept closed when the room is in use and still receive circulated air. A forced air circulation system (e.g. air conditioning) or active ventilation system (e.g. fresh air supply) shall be provided which satisfies the requirements of the Uniform Mechanical Code.

With the interior PDFs provided in this study, the Project will meet the City of Cypress 45 dBA CNEL interior noise level standards for residential and the 55 dBA CNEL interior noise level standards for commercial/retail development.

PROJECT RELATED OPERATIONAL NOISE ANALYSIS

The noise analysis assessed the potential stationary-source operational noise impacts at off-site receivers based on the Project's anticipated residential and commercial/retail stationary noise sources. The Project related noise sources are expected to include: parking lot vehicle movement, loading dock activities, and roof-top air conditioning units. The analysis shows that the operational noise levels associated with the Project's residential and commercial/retail land use will not exceed the daytime and nighttime exterior noise level standards for receivers in the City of Cypress or the City of Los Alamitos.

Further, the Project-related operational noise level increases at the sensitive receivers in the Project study area are considered less than significant for the daytime and nighttime conditions based on the combined ambient noise level measurements and Project-related operational noise levels. On this basis, Project operational stationary-source noise would not result in a substantial temporary/periodic, or permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project, and, therefore, impacts will be less-than-significant.

ON-SITE STATIONARY NOISE ANALYSIS

Stationary noise sources impacting the Project are expected to include parking lot vehicle movements, loading dock activities, roof-top air conditioning units and a trash compactor associated with the nearby churches, hotel, and retail center with Office Depot. Based on sample reference noise level measurements, taken by Urban Crossroads, Inc., of similar noise sources, this analysis estimates the operational stationary-source noise levels at the future on-site sensitive receivers within the Project site.

The analysis shows that the stationary-source noise levels impacting the Project will not exceed the City of Cypress Municipal Code noise level standards at the on-site sensitive receivers within the Project site. Therefore, the stationary-source noise level impacts associated with the existing stationary noise sources, such as the parking lot vehicle movements, loading dock activities, roof-top air conditioning units and trash compactor, will be less than significant.

CONSTRUCTION NOISE AND VIBRATION ANALYSIS

Construction noise represents a short-term increase in the ambient noise levels. Based on the phasing of Project construction and the abatement measures identified in this report, the temporary construction-related noise and vibration impacts will be less than significant.

CONSTRUCTION NOISE ABATEMENT MEASURES

Though construction noise is temporary, intermittent and of short duration, and will not present any long-term impacts, the following measures would reduce noise level increases produced by the construction equipment to the nearby land uses:

- Project plans shall include a note indicating that noise-generating Project construction activities shall only occur on weekdays and Saturdays between 7:00 a.m. and 8:00 p.m. (excluding holidays). The Project construction supervisor shall ensure compliance with the note and the City shall conduct periodic inspection at its discretion.
- Prioritize the construction of the 8-foot high planned wall around the residential homes within the Project site as soon as possible once construction has commenced. This would further reduce the noise impacts to nearby sensitive receivers during construction activity. The timing of constructing the wall is voluntary for the developer because impacts are less than significant during construction even without the wall.
- During all Project site construction, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the Project site.
- The construction contractor shall locate equipment staging in areas that will create a minimum distance of 100 feet between construction-related noise sources and noise-sensitive receivers nearest the Project site (i.e., toward the center) during Project construction.
- The construction contractor shall limit haul truck deliveries to the same hours specified for construction equipment (weekdays and Saturdays between 7:00 a.m. and 8:00 p.m.; excluding holidays). The contractor shall prepare a haul route exhibit and shall design delivery routes to minimize the exposure of sensitive land uses or residential dwellings to delivery truck-related noise.

LOS ALAMITOS RACE COURSE NOISE ANALYSIS

The noise analysis assessed the potential stationary-source noise impacts at the Project's on-site residential receivers due to peak activity at the Los Alamitos Horse Race Course located northeast of the Project site. The noise sources expected during peak race course activity include: public

address (P.A.) system speakerphones, horse-trailer trucks and cars operating adjacent to the Project site, and parking lot traffic movement.

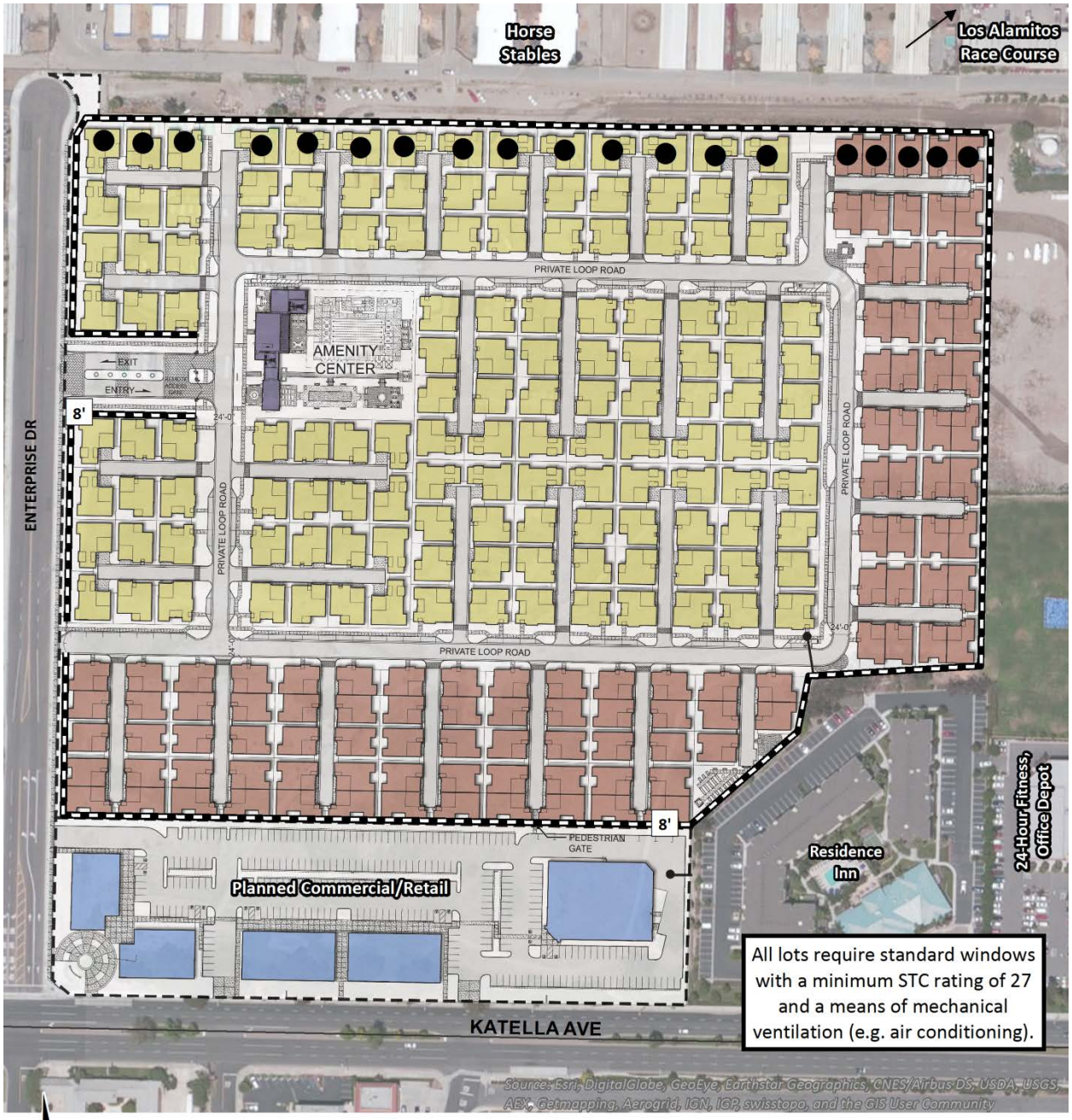
Based on long-term ambient noise level measurements taken at the Project site, without and with the Los Alamitos Race Course activity, the noise levels at the proposed single-family residential uses were calculated. The peak-hour noise level measurements showed an hourly noise level of 58.4 dBA Leq which includes noise from the public address (P.A.) system speakerphones, horse-trailer trucks and cars operating adjacent to the Project site, parking lot traffic movement, and an existing water pump adjacent to the northeast corner of the Project site. Based on the analysis including attenuation provided by the planned 8-foot high perimeter wall (Noise PDF-1) and the STC rating of 35 for second floor windows adjacent to the race course (Noise PDF-3), as shown on Exhibit ES-A, the noise levels due to peak race course activity will not exceed the City of Cypress exterior or interior noise level standards.

Due to the amount of noise sources adjacent to the Project site, including those associated with the regular race activity at the Los Alamitos Race Course, it is recommended that all future residents of the single-family land use within the Project be provided noise disclosure notices to inform them that there may be audible noise events due to race course activity.

LOS ALAMITOS JOINT FORCES TRAINING BASE NOISE ANALYSIS

The Joint Forces Training Base (JFTB) army airfield is located approximately one-half mile south of the Project site. The City of Los Alamitos General Plan Public Facilities and Safety Element, Figure 6, *JFTB Impact Zones*, (2) shows the 65 and 60 dBA CNEL noise contour boundaries of the JFTB airfield which are based on the Orange County Airport Land Use Commission *Airport Environs Land Use Plan (AELUP) for Joint Forces Training Base Los Alamitos.* (3) The Project site is located outside of the 60 dBA CNEL noise contour of the JFTB airfield, and therefore, impacts are clearly insignificant.

EXHIBIT ES-A: NOISE REDUCING PROJECT DESIGN FEATURES



LEGEND:

- Planned Barrier Location
- 8' Planned Barrier Height (in feet)
- ● Lots requiring upgraded second floor windows with a minimum STC rating of 35 and a means of mechanical ventilation (e.g. air conditioning).

NOISE REDUCING PROJECT DESIGN FEATURES

The proposed Project will include Project design features (PDFs), stated below, that will avoid or reduce environmental impacts. Since the PDFs are incorporated into the design of the Project, they are not considered to be mitigation measures.

NOISE PDF-1

The Project includes the construction of an 8-foot-high noise barrier (Noise PDF-1) that surrounds the residential lots. The noise barriers, shown on Exhibit ES-A, result in future exterior noise levels that range from 50.7 to 50.8 dBA CNEL. This noise analysis shows that Noise PDF-1 will satisfy the City of Cypress 60 dBA CNEL exterior noise level standards for residential development and no further exterior noise mitigation is required.

NOISE PDF-2

The second floor living areas within the residential lots of the Project are set back from potential traffic noise sources, such as Katella Avenue, and potential stationary sources, such as the Los Alamitos Race Course. By increasing the distance to the interior living areas on the second floor, the interior noise levels will be reduced.

NOISE PDF-3

Upgraded second floor windows and sliding glass doors with a minimum STC rating of 35 are included for the units along the northern site boundary adjacent to the Los Alamitos Race Course. The minimum calculated interior noise level reduction with the upgraded STC rating will be 30.7 dBA, as shown in Section 8.2 of this report.

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CEQA SIGNIFICANCE CRITERIA

The following section outlines the significance criteria found in the California Environmental Quality Act (CEQA) Guidelines (Appendix G) as they relate to the noise impacts associated with the Project. For the purposes of this analysis, the impacts associated with Project development are as follows:

A.) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

Off-Site Project Noise Impacts

The off-site traffic noise analysis indicates that the Project will not cause the generation of noise levels in excess of the standards established in the City of Cypress General Plan Noise Element above existing ambient noise levels along the study area roadway segments, and therefore, will be *less than significant*. To quantify the off-site traffic noise increases on the surrounding off-site areas, the changes in traffic noise levels on 18 roadway segments surrounding the Project site were estimated based on the change in the average daily traffic (ADT) volumes. To assess the off-site noise level impacts associated with the proposed Project, noise contour boundaries were developed for Existing and Year 2018 traffic conditions. The traffic noise analysis indicates that the Project's contributions to roadway noise levels at adjacent sensitive land uses will be *less than significant* for Existing and Year 2018 traffic conditions. See Sections 6.1 and 6.2 for the off-site traffic noise analysis methods, and Section 7 for the off-site traffic noise analysis findings.

The Project-related off-site operational noise analysis shows that the noise impacts due to noise sources within the planned commercial/retail portion of the site, such as parking lot vehicle movement, loading dock activities, and roof-top air conditioning units, will not generate noise levels in excess of the City of Cypress Municipal Code noise standards, and therefore, will be *less than significant.* See Section 6.4 for the reference stationary-source noise level measurements and Section 10 for the stationary noise analysis results. Tables C-1 and C-2 (Tables 10-3 and 10-4 of the report) below demonstrates the Project operational noise levels will be in compliance with local regulations at each receiver location identified in Section 9 of this report.

TABLE C-1: DAYTIME OFF-SITE OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	City	Land Use	Noise Level at Receiver Locations (dBA)[2]					Daytime Compliance[3]
			L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)	
R1	Cypress	Church	41.0	42.3	43.3	44.1	46.6	Yes
R2	Cypress	Church	34.9	36.4	37.7	39.1	47.1	Yes
R3	Cypress	Hotel	52.5	53.3	54.0	54.8	60.1	Yes
R4	Los Alamitos	Residential	47.7	48.8	49.8	50.7	56.5	Yes

[1] See Exhibit 10-A for the receiver and noise source locations.
[2] Estimated Project stationary source noise levels as shown on Table 10-1.
[3] Do the estimated Project stationary source noise levels meet the City of Cypress and Los Alamitos noise standards (shown on Table 3-1) on the affected land uses?
"Daytime" = 7:00 a.m. to 10:00 p.m.

TABLE C-2: NIGHTTIME OFF-SITE OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	City	Land Use	Noise Level at Receiver Locations (dBA)[2]					Nighttime Compliance[3]
			L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)	
R1	Cypress	Church	41.0	42.3	43.3	44.1	46.6	Yes
R2	Cypress	Church	34.9	36.4	37.7	39.1	47.1	Yes
R3	Cypress	Hotel	48.5	49.9	51.1	52.2	58.9	Yes
R4	Los Alamitos	Residential	46.2	47.6	48.8	49.8	56.1	Yes

[1] See Exhibit 10-B for the receiver and noise source locations.
[2] Estimated Project stationary source noise levels as shown on Table 10-2.
[3] Do the estimated Project stationary source noise levels meet the City of Cypress and Los Alamitos noise standards (shown on Table 3-1) on the affected land uses?
"Nighttime" = 10:00 p.m. to 7:00 a.m.

On-Site Project Noise Impacts

The on-site traffic noise analysis shows that with the planned 8-foot high noise barrier (Noise PDF-1), the exposure of persons to noise levels in excess of the standards will be *less than significant* based on the City of Cypress General Plan Noise Element 60 dBA CNEL standards. The noise barriers, shown on Exhibit ES-A, result in future exterior noise levels that range from 50.7 to 50.8 dBA CNEL. No exterior noise level standards are identified in the City of Cypress General Plan Noise Element for commercial/retail land use, but the analysis indicates that the commercial/retail land use within the Project site is considered *conditionally acceptable* with noise levels below 75 dBA CNEL. Therefore, no further exterior noise mitigation is required. See Section 6.3 for the on-site traffic noise analysis methods, and Section 8 for the on-site traffic noise analysis findings. Table C-3 (Table 8-1 of the report), from Section 8 of this report, shows the on-site traffic noise levels will satisfy the City of Cypress requirements for residential land use.

TABLE C-3: ON-SITE TRAFFIC EXTERIOR NOISE LEVELS (CNEL)

Lot	Roadway	Unmitigated Noise Level (dBA CNEL)	Mitigated Noise Level (dBA CNEL)	Barrier Height (Feet)	Top Of Barrier Elevation (Feet)
Commercial-West	Katella Av.	65.4	–[1]	–[1]	–[1]
Commercial-South	Katella Av.	69.2	–[1]	–[1]	–[1]
Residential-Southwest	Katella Av.	60.7	50.7	8.0'	37.9'
Residential-South	Katella Av.	60.7	50.8	8.0'	39.0'
Residential-Southeast	Katella Av.	60.7	50.8	8.0'	39.3'

[1] Commercial buildings do not include any outdoor environments requiring exterior noise mitigation based on the Interior and Exterior Noise Standards, Table N-3, of the City of Cypress General Plan Noise Element (Appendix 3.1).

The on-site stationary noise analysis shows that the stationary-source noise levels associated with the nearby churches, hotel, and retail center with Office Depot will not exceed the City of Cypress Municipal Code noise level standards at the on-site sensitive receivers within the Project site. Therefore, the stationary-source noise level impacts associated with the existing noise sources impacting the Project site, such as the parking lot vehicle movements, loading dock activities, roof-top air conditioning units and trash compactor, will be *less than significant*. See Section 6.4 for the reference stationary-source noise level measurements and Section 11 for the on-site stationary noise analysis findings. Table C-4 (Table 11-2 of the report) shows the on-site stationary noise levels due to the existing stationary noise sources in the Project study area will not exceed the City of Cypress noise standards.

TABLE C-4: ON-SITE STATIONARY SOURCE NOISE LEVEL COMPLIANCE

Receiver Location[1]	City	Land Use	Noise Level at Receiver Locations (dBA)[2]					Compliance[3]	
			L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)	Daytime	Nighttime
T1	Cypress	Residential	35.4	37.1	38.7	40.5	50.1	Yes	Yes
T4	Cypress	Residential	36.2	37.5	38.6	39.5	44.2	Yes	Yes
T5	Cypress	Residential	34.5	35.7	37.0	38.7	45.9	Yes	Yes
T6	Cypress	Residential	40.1	41.5	42.8	44.1	51.6	Yes	Yes
T8	Cypress	Residential	34.4	38.4	41.4	44.8	57.2	Yes	Yes

[1] See Exhibit 11-A for the receiver and noise source locations.
[2] Estimated Project stationary source noise levels as shown on Table 11-1.
[3] Do the estimated Project stationary source noise levels meet the City of Cypress noise standards (shown on Table 3-1) on the affected land uses?
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

Based on the long-term ambient noise level measurements taken at the Project site, the without and with Los Alamitos Race Course activity noise levels at the proposed single-family residential uses were calculated. The peak-hour noise level measurements showed an hourly noise level of 58.4 dBA Leq which includes noise from the public address (P.A.) system speakerphones, horse-trailer trucks and cars operating adjacent to the Project site, parking lot traffic movement, and an existing water pump adjacent to the northeast corner of the Project site. By including

attenuation provided by the planned 8-foot high perimeter wall (Noise PDF-1) and the STC rating of 35 for second floor windows adjacent to the race course (Noise PDF-3), as shown on Exhibit ES-A, the noise levels due to peak race course activity will not exceed the City of Cypress exterior or interior noise level standards. See Section 13 for the stationary noise analysis results due to Los Alamitos Race Course activity.

B.) Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels.

The noise analysis assessed the impacts from Project construction activity at the nearby receiver locations in the Project study area. Construction noise represents a short-term increase in the ambient noise levels at each receiver location. Based on the phasing of Project construction and the abatement measures identified in this report, the temporary construction-related noise and ground-borne vibration impacts will be *less than significant*. See Section 12 for the construction noise and vibration analysis findings. The noise levels due to Project construction are shown on Table C-5 (Table 12-5 of the report) below to be compliant with the significance thresholds of this analysis at all receiver locations.

TABLE C-5: CONSTRUCTION EQUIPMENT NOISE LEVEL COMPLIANCE

Noise Receiver[1]	City	Peak Const. Noise Level (dBA Lmax)[2]	Const. Noise Level Criteria (dBA Lmax)[3]	Compliance[4]
R1	Cypress	76.6	80.0	Yes
R2	Cypress	72.6	80.0	Yes
R3	Cypress	78.1	80.0	Yes
R4	Los Alamitos	74.9	75.0	Yes

[1] Noise receiver locations are shown on Exhibit 12-A.
[2] Estimated construction noise levels during peak operating conditions, as shown on Table 12-4.
[3] Based on the maximum exterior noise level standards of both the City of Cypress and City of Los Alamitos, as shown on Table 3-2.
[4] Do the estimated Project construction noise levels meet the threshold of 80 dBA Lmax for receivers within the City of Cypress and 75 dBA Lmax for receivers within the City of Los Alamitos?

C.) A substantial permanent increase in ambient noise levels in the Project vicinity above existing levels without the proposed Project.

The off-site traffic noise analysis shows that the Existing Project noise level contribution of up to 0.7 dBA CNEL is expected to decrease to 0.3 dBA CNEL by Year 2018 conditions. The 0.7 dBA CNEL increase attributable to traffic noise is well below even the most stringent significance threshold of 1.5 dBA or more. In addition, this analysis shows that the Project's incremental traffic-related noise level contributions at land uses adjacent to roadways conveying Project traffic will diminish over time. Therefore, the Project will not exceed a numerical threshold or represent a substantial permanent increase, as identified by CEQA, in the ambient noise levels above levels existing without the Project. The off-site traffic noise analysis indicates that the

Project's contributions to roadway noise levels will be *less than significant*. See Sections 7.2 to 7.4 regarding the Project traffic noise contributions to the ambient noise environment.

The Project-related operational noise level increases at the off-site sensitive receivers in the Project study area are considered l*ess than significant* for the daytime and nighttime conditions based on the combined ambient noise level measurements and Project-related operational noise levels, and the thresholds of significance identified in this report. On this basis, Project operational stationary-source noise would not result in a substantial permanent increase in ambient noise levels that impact sensitive receivers in the Project vicinity above levels existing without the Project, and, therefore, impacts will be *less than significant*. Section 10.2.2 shows the Project-related operational noise level contributions to the nearby receiver locations.

D.) A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above noise levels existing without the proposed Project.

The noise analysis assessed the impacts from temporary/periodic Project construction activity at the nearby receiver locations in the Project study area. Construction noise represents a short-term increase in the ambient noise levels at each receiver location. Based on the phasing of Project construction and the abatement measures identified in this report, the temporary/periodic construction-related noise impacts will be *less than significant*. See Section 12 for the construction noise analysis findings.

The Project-related operational noise level increases at the off-site sensitive receivers in the Project study area are considered less than significant for the daytime and nighttime conditions based on the combined ambient noise level measurements and Project-related operational noise levels. On this basis, Project operational stationary-source noise would not result in a substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project, and, therefore, impacts will be *less than significant*. Section 10.2.2 shows the Project-related operational noise level contributions to the nearby receiver locations.

E.) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the Project area to excessive noise levels.

The Project site is located approximately 0.27 miles north of the Joint Forces Training Base (JFTB) in the City of Los Alamitos. The Orange County Airport Environs Land Use Plan (AELUP) establishes Noise Impact Zones based on the location of land uses within the noise contours of the JFTB Los Alamitos airfield. Exhibit 14-A of this report shows the noise contour boundaries from the City of Los Alamitos General Plan and the boundary of the Project site, which is located outside the 60 dBA CNEL noise contour. Since the Project will be located outside of the 60 dBA CNEL noise contour boundary of the JFTB airfield, impacts due to aircraft noise are clearly insignificant. See Section 14 for the Los Alamitos Joint Forces Training Base discussion.

F.) For a project within the vicinity of a private airstrip, expose people residing or working in the Project area to excessive noise levels.

As previously discussed, the Project will be located outside of the 60 dBA CNEL noise contour boundary of the JFTB airfield. Impacts due to aircraft noise are clearly insignificant. See Section 14 for the Los Alamitos Joint Forces Training Base discussion.

1 INTRODUCTION

This noise analysis has been completed to determine the noise impacts associated with the development and operation of the proposed Barton Place mixed-use development ("Project"). This noise study briefly describes the proposed Project, provides information regarding noise fundamentals, describes the local regulatory setting, provides the study methods and procedures for traffic noise analysis, and evaluates the future exterior noise environment. In addition, this study includes an analysis of the potential Project-related and existing stationary-source long-term operational and short-term Project construction noise impacts.

1.1 SITE LOCATION, SETTING, AND SURROUNDING USES

The proposed Barton Place site is generally located north of Katella Avenue and east of Enterprise Drive in the City of Cypress, as shown on Exhibit 1-A. The Project site is located immediately north of the City of Los Alamitos boundary and approximately one mile northwest of the City of Garden Grove. The Interstate 605 (I-605) Freeway is located approximately two miles west of the Project site, and the State Route 22 (SR-22) and Interstate 405 (I-405) Freeways are located approximately three miles south. The Joint Forces Training Base (JFTB), Los Alamitos army airfield is located approximately 0.27 miles south of the Project site.

The Project site is currently vacant. Existing land uses in the Project study area include the former railroad property to the north which is currently vacant, and beyond that are one-story horse barns occupied by quarter horses and thoroughbred horses including equipment associated with the Los Alamitos Race Course. The Los Alamitos Race Course, located north of the Project site, conducts regular year-round quarter horse races Fridays through Sundays starting at 7:00 p.m. on Fridays, 6:00 p.m. on Saturdays, and 5:00 p.m. on Sundays. The final post times, or the last race of each night, are 10:30 p.m. on Fridays,9:45 p.m. on Saturdays, and 8:45 p.m. on Sundays. In addition, three annual thoroughbred events are scheduled to take place July 2nd to July 27th, September 10th through 27th, and December 3rd through 20th. Thoroughbred races take place on Thursdays to Sundays beginning around noon each day with races lasting approximately two to three hours each.

To the east of the Project site is an existing water pump, a surface parking area for the Los Alamitos Race Course, a small two-story church, and a four-story Residence Inn Hotel. To the south, on the far side of Katella Avenue, there is an existing Don's Turf motel, commercial and multi-family uses, behind which are single-family residences. To the west of the Project site is the Cottonwood Church campus across Enterprise Drive.

Noise sources in the area include, but are not limited to: traffic from Katella Avenue; activities at the Los Alamitos Race Course; operation of the water pump adjacent to the northeast corner of the Project site; parking lot vehicle movements, loading dock activities, roof-top air conditioning units and a trash compactor associated with the retail center with Office Depot located east of the Project site; and roof-top air conditioning units and parking lot vehicle movements from the nearby churches and hotel.

1.2 PROJECT DESCRIPTION

The mixed-use Barton Place Project is proposed to consist of two components, a senior residential community with approximately 244 dwelling units and approximately 50,000 square feet of commercial/retail use along Katella Avenue. The senior residential land use will include approximately 152 single-family detached homes and approximately 92 single-family attached homes, in one- and two-story configurations. An 8-foot high perimeter wall is planned as a Project design feature around the senior residential units, separating them from the proposed commercial/retail uses, the Los Alamitos Race Course, and other surrounding uses. The commercial/retail uses within the Project site include neighborhood-serving restaurants, retail stores, and other commercial uses in up to five building pads ranging in size from approximately 6,800 to 16,250 square feet each. Business operations would primarily be conducted within the enclosed commercial/retail buildings located on approximately five southern acres of the Project site along Katella Avenue. The on-site Project-related noise sources are expected to include: parking lot vehicle movement and loading dock activities at the retail center, and roof-top air conditioning units.

EXHIBIT 1-A: LOCATION MAP

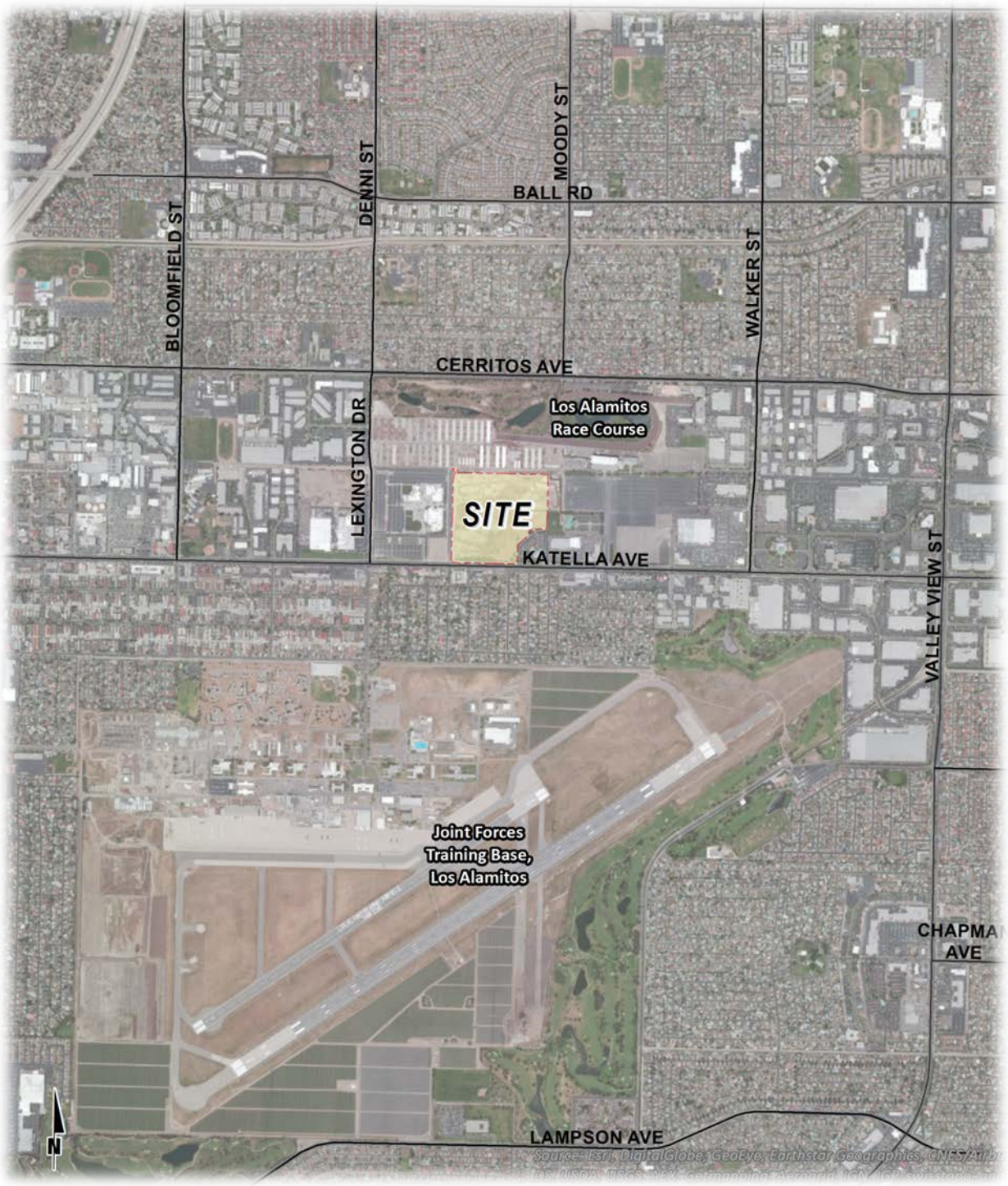


EXHIBIT 1-B: SITE PLAN

2 FUNDAMENTALS

Noise has been simply defined as "unwanted sound." Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Noise is measured on a logarithmic scale of sound pressure level known as a decibel (dB). A-weighted decibels (dBA) approximate the subjective response of the human ear to broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies which are audible to the human ear. Exhibit 2-A presents a summary of the typical noise levels and their subjective loudness and effects that are described in more detail below.

EXHIBIT 2-A: TYPICAL NOISE LEVELS

COMMON OUTDOOR ACTIVITIES	COMMON INDOOR ACTIVITIES	A - WEIGHTED SOUND LEVEL dBA	SUBJECTIVE LOUDNESS	EFFECTS OF NOISE
THRESHOLD OF PAIN		140	INTOLERABLE OR DEAFENING	HEARING LOSS
NEAR JET ENGINE		130		
		120		
JET FLY-OVER AT 300m (1000 ft)	ROCK BAND	110		
LOUD AUTO HORN		100	VERY NOISY	
GAS LAWN MOWER AT 1m (3 ft)		90		
DIESEL TRUCK AT 15m (50 ft), at 80 km/hr (50 mph)	FOOD BLENDER AT 1m (3 ft)	80		SPEECH INTERFERENCE
NOISY URBAN AREA, DAYTIME	VACUUM CLEANER AT 3m (10 ft)	70	LOUD	
HEAVY TRAFFIC AT 90m (300 ft)	NORMAL SPEECH AT 1m (3 ft)	60		
QUIET URBAN DAYTIME	LARGE BUSINESS OFFICE	50	MODERATE	
QUIET URBAN NIGHTTIME	THEATER, LARGE CONFERENCE ROOM (BACKGROUND)	40		SLEEP DISTURBANCE
QUIET SUBURBAN NIGHTTIME	LIBRARY	30	FAINT	NO EFFECT
QUIET RURAL NIGHTTIME	BEDROOM AT NIGHT, CONCERT HALL (BACKGROUND)	20		
	BROADCAST/RECORDING STUDIO	10	VERY FAINT	
LOWEST THRESHOLD OF HUMAN HEARING	LOWEST THRESHOLD OF HUMAN HEARING	0		

Source: Environmental Protection Agency Office of Noise Abatement and Control, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (EPA/ONAC 550/9-74-004) March 1974.

2.1 RANGE OF NOISE

Since the range of intensities that the human ear can detect is so large, the scale frequently used to measure intensity is a scale based on multiples of 10, the logarithmic scale. The scale for measuring intensity is the decibel scale. Each interval of 10 decibels indicates a sound energy ten times greater than before, which is perceived by the human ear as being roughly twice as loud. (4) The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at three feet is roughly at 60 dBA, while loud jet engine noises equate to 110 dBA

at approximately 100 feet, which can cause serious discomfort. (5) Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

2.2 NOISE DESCRIPTORS

Environmental noise descriptors are generally based on averages, rather than instantaneous, noise levels. The most commonly used figure is the equivalent level (Leq). Equivalent sound levels are not measured directly but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level (Leq) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period and is commonly used to describe the "average" noise levels within the environment.

To describe the time-varying character of environmental noise, the statistical or percentile noise descriptors L_{50}, L_{25}, L_8 and L_2, are commonly used. The percentile noise descriptors are the noise levels equaled or exceeded during 50 percent, 25 percent, 8 percent and 2 percent of a stated time. Sound levels associated with the L_2 and L_8 typically describe transient or short-term events, while levels associated with the L_{50} describe the steady state (or median) noise conditions. The City of Cypress Municipal Code relies on the percentile noise levels to describe the stationary source noise level limits. While the L_{50} describes the mean noise levels occurring 50 percent of the time, the Leq accounts for the total energy (average) observed for the entire hour. Therefore, the Leq noise descriptor is generally 1-2 dBA higher than the L_{50} noise level.

Peak hour or average noise levels, while useful, do not completely describe a given noise environment. Noise levels lower than peak hour may be disturbing if they occur during times when quiet is most desirable, namely evening and nighttime (sleeping) hours. To account for this, the Community Noise Equivalent Level (CNEL), representing a composite twenty-four hour noise level is utilized. The CNEL is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time of day corrections require the addition of 5 decibels to dBA Leq sound levels in the evening from 7:00 p.m. to 10:00 p.m., and the addition of 10 decibels to dBA Leq sound levels at night between 10:00 p.m. and 7:00 a.m. These additions are made to account for the noise sensitive time periods during the evening and night hours when sound appears louder. CNEL does not represent the actual sound level heard at any particular time, but rather represents the total sound exposure. The City of Cypress relies on the 24-hour CNEL level to assess land use compatibility with transportation related noise sources. (6)

2.3 SOUND PROPAGATION

When sound propagates over a distance, it changes in level and frequency content. The manner in which noise reduces with distance depends on the following factors.

2.3.1 GEOMETRIC SPREADING

Sound from a localized source (i.e., a stationary point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined

path and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source.

2.3.2 GROUND ABSORPTION

The propagation path of noise from a highway to a receptor is usually very close to the ground. Noise attenuation from ground absorption and reflective wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 ft. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receptor, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receptor such as soft dirt, grass, or scattered bushes and trees), an excess ground attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance from a line source.

2.3.3 ATMOSPHERIC EFFECTS

Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 ft) due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects.

2.3.4 SHIELDING

A large object or barrier in the path between a noise source and a receptor can substantially attenuate noise levels at the receptor location. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Shielding by trees and other such vegetation typically only has an “out of sight, out of mind” effect. That is, the perception of noise impact tends to decrease when vegetation blocks the line-of-sight to nearby resident. However, for vegetation to provide a substantial, or even noticeable, noise reduction, the vegetation area must be at least 15 feet in height, 100 feet wide and dense enough to completely obstruct the line-of sight between the source and the receiver. This size of vegetation may provide up to 5 dBA of noise reduction. The FHWA (as defined below) does not consider the planting of vegetation to be a noise abatement measure.

2.4 TRAFFIC NOISE PREDICTION

Vehicle noise is a combination of the noise produced by the engine, exhaust, and tires on the roadway. According to the *Highway Traffic Noise Analysis and Abatement Policy and Guidance,* provided by the Federal Highway Administration (FHWA), the level of traffic noise depends on three primary factors: the volume of the traffic, the speed of the traffic, and the vehicle mix

within the flow of traffic. Generally, the loudness of traffic noise is increased by heavier traffic volumes, higher speeds, and a greater number of trucks. (7) A doubling of the traffic volume, assuming that the speed and vehicle mix do not change, results in a noise level increase of 3 dBA. The vehicle mix on a given roadway may also have an effect on community noise levels. As the number of medium and heavy trucks increases and becomes a larger percentage of the vehicle mix, adjacent noise level impacts will increase.

2.5 NOISE CONTROL

Noise control is the process of obtaining an acceptable noise environment for a particular observation point or receptor by controlling the noise source, transmission path, receptor, or all three. This concept is known as the source-path-receptor concept.

2.6 NOISE BARRIER ATTENUATION

Effective noise barriers can reduce noise levels by 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or receptor. Noise barriers, however, do have limitations. For a noise barrier to work, it must be high enough and long enough to block the path of the noise source. (7)

2.7 LAND USE COMPATIBILITY WITH NOISE

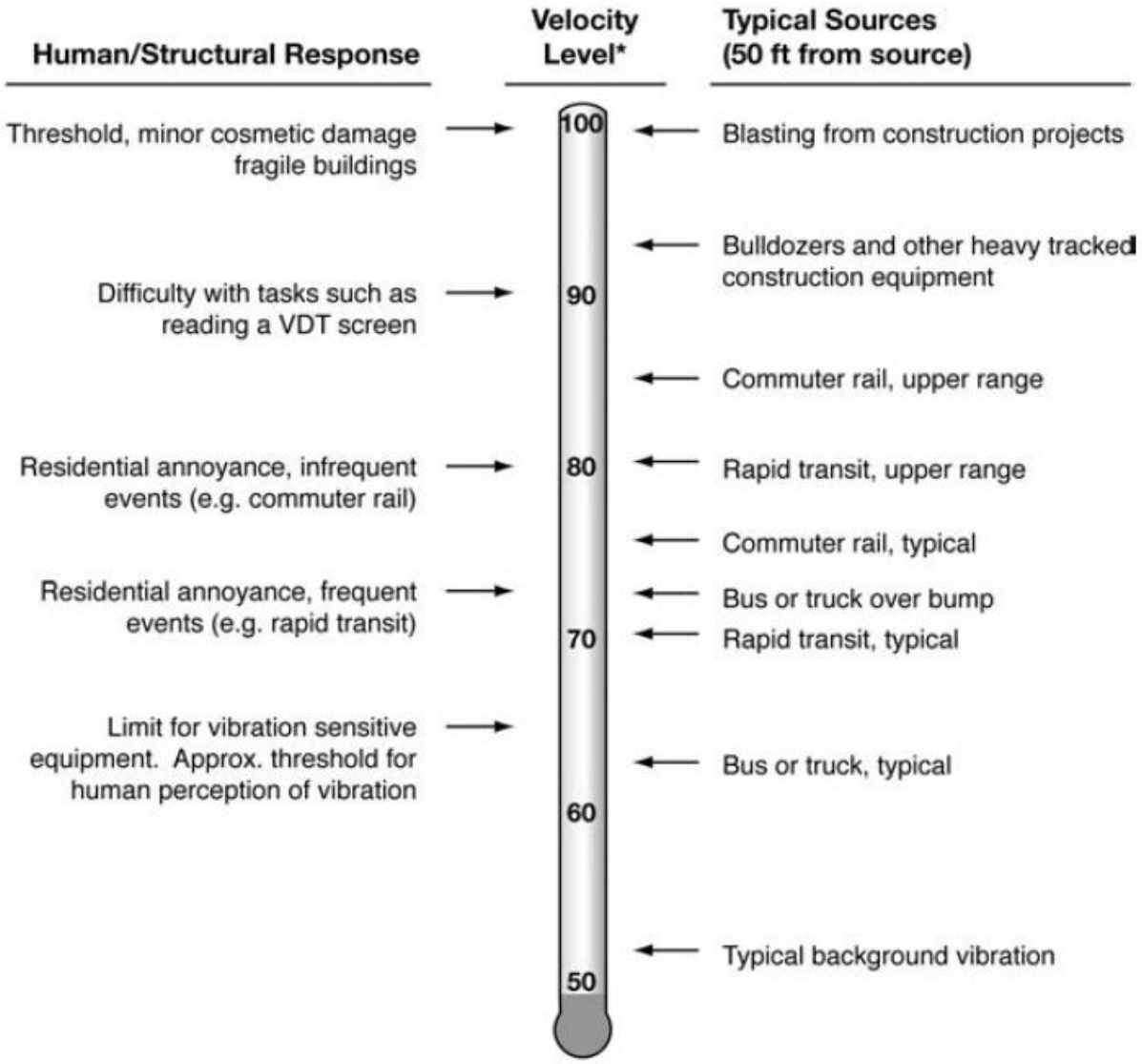
Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. As ambient noise levels affect the perceived amenity or livability of a development, so too can the mismanagement of noise impacts impair the economic health and growth potential of a community by reducing the area's desirability as a place to live, shop and work. For this reason, land use compatibility with the noise environment is an important consideration in the planning and design process. The FHWA encourages State and Local government to regulate land development in such a way that noise-sensitive land uses are either prohibited from being located adjacent to a highway, or that the developments are planned, designed, and constructed in such a way that noise impacts are minimized. (8)

2.8 VIBRATION

According to the Federal Transit Administration (FTA) Transit Noise Impact and Vibration Assessment (9), vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure borne noise. Sources of ground-borne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or human-made causes (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as factory machinery, or transient, such as explosions. As is the case with airborne sound, ground-borne vibrations may be described by amplitude and frequency. Vibration is often described in units of velocity (inches per second), and discussed in decibel (dB) units in order to compress the range of numbers required to describe vibration. Vibration impacts are generally associated with activities such as train operations, construction and heavy truck movements.

The background vibration-velocity level in residential areas is generally 50 VdB. Ground-borne vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground-borne vibration is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings. Exhibit 2-B illustrates common vibration sources and the human and structural response to ground-borne vibration.

EXHIBIT 2-B: TYPICAL LEVELS OF GROUND-BORNE VIBRATION



Source: Federal Transit Administration (FTA) Transit Noise Impact and Vibration Assessment

3 REGULATORY SETTING

To limit population exposure to physically and/or psychologically damaging as well as intrusive noise levels, the federal government, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise. In most areas, automobile and truck traffic is the major source of environmental noise. Traffic activity generally produces an average sound level that remains fairly constant with time. Air and rail traffic, and commercial and industrial activities are also major sources of noise in some areas. Federal, state, and local agencies regulate different aspects of environmental noise. Federal and state agencies generally set noise standards for mobile sources such as aircraft and motor vehicles, while regulation of stationary sources is left to local agencies.

3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared according to guidelines adopted by the Governor's Office of Planning and Research (OPR). (10) The purpose of the Noise Element as defined by the OPR guidelines is to *limit the exposure of the community to excessive noise levels*. In addition, the California Environmental Quality Act (CEQA) Guidelines include thresholds of significance for analyzing environmental noise impacts. (11)

3.2 STATE OF CALIFORNIA BUILDING CODE

The State of California's noise insulation standards are codified in the California Code of Regulations, Title 24, Building Standards Administrative Code, Part 2, and the California Building Code. These noise standards are applied to new construction in California for the purpose of controlling interior noise levels resulting from exterior noise sources. The regulations (Chapter 2-35, Part 2, Title 24) (10) specify that acoustical studies must be prepared when noise-sensitive structures, such as residential buildings, schools, or hospitals, are developed near major transportation noise sources, and where such noise sources create an exterior noise level of 60 dBA CNEL or higher. Acoustical studies that accompany building plans for noise-sensitive land uses must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new residential buildings, schools, and hospitals, the acceptable interior noise limit for new construction is 45 dBA CNEL.

3.3 CITY OF CYPRESS GENERAL PLAN NOISE ELEMENT

The City of Cypress has adopted a Noise Element of the General Plan (6) to control and abate environmental noise, and to protect the citizens of the City of Cypress from excessive exposure to noise. The City of Cypress General Plan Noise Element specifies the maximum allowable unmitigated exterior noise levels for new developments impacted by transportation noise sources such as arterial roads, freeways, airports and railroads. In addition, the City of Cypress General Plan Noise Element identifies several goals and policies to minimize the impacts of

excessive noise levels throughout the community, and establishes noise level requirements for all land uses. To limit the exposure of City residents to excessive noise, the City of Cypress General Plan Noise Element contains the following five goals:

N-1	*Reduce noise impacts from transportation noise sources.*
N-2	*Incorporate noise considerations into land use planning decisions.*
N-3	*Minimize noise spillover from commercial uses into nearby residential neighborhoods.*
N-4	*Minimize the noise impacts associated with the development of residential units above ground floor commercial uses in mixed use developments.*
N-5	*Develop measures to control non-transportation noise impacts.*

To satisfy these five overarching goals, the City of Cypress General Plan Noise Element identifies policies to reduce noise levels at sensitive land uses. For transportation noise sources (Goal N-1), the City of Cypress General Plan Noise Element requires the incorporation of mitigation measures, such as noise barriers, in the design of new developments. Further, the City has established criteria to determine the land use compatibility of new developments based on the noise level criteria defined in Table N-2, and the interior and exterior noise standards in Table N-3 of the City of Cypress General Plan Noise Element (Goal N-2). To minimize the noise spillover from commercial to residential land uses (Goal N-3), the City of Cypress General Plan Noise Element sets noise level limits for commercial properties and landscape buffer distance requirements, in addition to enforcing the City's Noise Ordinance. Additional policies are identified to reduce commercial noise in mixed-use developments where residential units are located above ground floor commercial uses (Goal N-4). Goal N-5 of the City of Cypress General Plan Noise Element requires compliance with the Noise Ordinance for noise-generating activities on land uses such as commercial and industrial. The City of Cypress General Plan Noise Element is included in Appendix 3.1.

3.3.1 LAND USE COMPATIBILITY

The *Noise and Land Use Compatibility Matrix* (Table N-2) in the City of Cypress General Plan Noise Element lists land use categories and the acceptable and unacceptable levels of community noise exposure. The compatibility criteria shown on Table N-2 (and Exhibit 3-A of this report) provides the City with a planning tool to gauge the compatibility of land uses relative to existing and future exterior noise levels.

The *Noise and Land Use Compatibility Matrix* describes categories of compatibility, but not specific noise standards. According to these categories of transportation-related noise compatibility, the Barton Place single-family detached and attached residential land uses are considered *normally acceptable* with unmitigated exterior noise levels below 60 dBA CNEL and *conditionally acceptable* with noise levels below 65 dBA CNEL. Business commercial land uses within the Project site are considered *normally acceptable* with exterior noise levels of between 50 to 67.5 dBA CNEL and *conditionally acceptable* with noise levels below 75 dBA CNEL. For *conditionally acceptable* land use, *"new construction or development should be undertaken only after a detailed analysis of noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh*

air supply systems or air conditioning, will normally suffice" (City of Cypress General Plan Noise Element, Table N-2).

EXHIBIT 3-A: NOISE AND LAND USE COMPATIBILITY MATRIX

Land Use Category	Community Noise Exposure			
	Ldn or CNEL, dB			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential-Low Density	50-60	60-65	65-75	75-85
Residential-Multiple Family	50-60	60-65	65-75	75-85
Transient Lodging-Motel, Hotels	50-65	65-70	70-80	80-85
Schools, Libraries, Churches, Hospitals, Nursing Homes	50-60	60-65	65-80	80-85
Auditoriums, Concert Halls, Amphitheaters	NA	50-65	NA	65-85
Sports Arenas, Outdoor Spectator Sports	NA	50-70	NA	70-85
Playgrounds, Neighborhood Parks	50-70	NA	70-75	75-85
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50-70	NA	70-80	80-85
Office Buildings, Business Commercial and Professional	50-67.5	67.5-75	75-85	NA
Industrial, Manufacturing, Utilities, Agriculture	50-70	70-75	75-85	NA

Source: Modified from U.S. Department of Housing and Urban Development Guidelines and State of California Standards.

NOTES: **NORMALLY ACCEPTABLE**
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
CONDITIONALLY ACCEPTABLE
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
NORMALLY UNACCEPTABLE
New Construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
CLEARLY UNACCEPTABLE
New construction or development should generally not be undertaken.
NA: Not Applicable

3.3.2 TRANSPORTATION NOISE STANDARDS

The City of Cypress General Plan Noise Element, Table N-3 *Interior and Exterior Noise Standards*, provides specific interior and exterior transportation-related noise level standards for various land use categories. For noise-sensitive residential uses, the City of Cypress General Plan Noise Element requires transportation-related exterior noise levels not to exceed 60 dBA CNEL. The City of Cypress General Plan Noise Element does not identify specific transportation-related exterior noise level standards for the commercial/retail land use within the Project site. The exterior transportation noise level standards apply to outdoor living areas such as private yards, and private patios or balconies that are greater than 6-feet deep. Exhibit 3-B shows the interior transportation-related noise levels for residential land use may not exceed 45 dBA CNEL, and the interior noise levels for commercial/retail land use shall not exceed 55 dBA CNEL.

Consistent with the land use compatibility guidelines and noise standards of the City of Cypress General Plan Noise Element, this noise study has been prepared to satisfy a transportation-related exterior noise level of less than 60 dBA CNEL and an interior noise level of less than 45 dBA CNEL for the noise-sensitive residential land uses within the Barton Place Project. For commercial/retail land uses within the Project site, an interior noise level of less than 55 dBA CNEL is required. This approach is consistent with Tables N-2 and N-3 of the City of Cypress General Plan Noise Element included in Appendix 3.1.

EXHIBIT 3-B: INTERIOR AND EXTERIOR NOISE STANDARDS

Land Use Categories		CNEL	
Categories	**Uses**	**Interior[1]**	**Exterior[2]**
Residential	Single family Duplex, Multiple Family	45[3] - 55	50 – 60
	Mobile Home	45	65[4]
Commercial Industrial Institutional	Hotel, Motel, Transient Lodging	45	--
	Commercial Retail, Bank, Restaurant	55	--
	Office Building, Research and Development, Professional Offices, City Office Building	50	--
	Amphitheater, Concert Hall, Auditorium, Meeting Hall	45	--
	Gymnasium (Multipurpose)	50	--
	Sports Club	55	--
	Manufacturing, Warehousing, Wholesale, Utilities	65	--
	Movie Theaters	45	--
Institutional	Hospital, Schools' Classrooms	45	65
	Church, Library	45	--
Open Space	Parks	--	65

NOTES:

1. Indoor environmental including: Bedrooms, living areas, bathrooms, toilets, closets, corridors.
2. Outdoor environment limited to: Private yard of single family
   Multi-family private patio or balcony which is served by a means of exit from inside the dwelling
   Balconies 6 feet deep or less are exempt
   Mobile home park
   Park's picnic area
   School's playground
3. Noise level requirement with closed windows. Mechanical ventilating system or other means of natural ventilation shall be provided as of Chapter 12, Section 1205 of UBC.
4. Exterior noise levels should be such that interior noise levels will not exceed 45 CNEL.

3.4 OPERATIONAL NOISE STANDARDS

To analyze noise impacts originating from a designated fixed location or private property such as the Project, stationary-source (operational) noise such as loading dock activities, roof-top air conditioning units, and parking lot traffic movement are typically evaluated against standards established under a City's Municipal Code. Although the Project site is located within the City of Cypress, sensitive receivers are located in the adjacent City of Los Alamitos. Therefore, this analysis presents both the City of Cypress and City of Los Alamitos operational noise standards.

3.4.1 CITY OF CYPRESS OPERATIONAL NOISE STANDARDS

The noise regulations included in the City of Cypress Municipal Code, Article VII *Noise Control*, provide standards for determining and mitigating non-transportation or stationary-source noise impacts from operations at private properties. The noise standards identified in the Municipal Code are based on noise zones specified in Section 13-67 *Designated noise zone* which establishes Noise Zone 1 for all residential properties zoned RS-15000 or RS-6000, and Noise Zone 2 for all other residential properties. Based on the Municipal Code and the Business & Professional Center Specific Plan ("Specific Plan"), the Project is designated as located within Noise Zone 2.

For noise-sensitive residential land uses in Noise Zone 2, Section 13-68, *Exterior Noise Standards*, identifies a daytime (7:00 a.m. to 10:00 p.m.) noise level standard of 60 dBA L_{50} and a nighttime (10:00 p.m. to 7:00 a.m.) noise level standard of 55 dBA L_{50}. (12) These standards shall apply for a cumulative period of 30 minutes in any hour, as well as plus 5 dBA cannot be exceeded for a cumulative period of more than 15 minutes in any hour, or the standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour, or the standard plus 15 dBA for a cumulative period of more than 1 minute in any hour, or the standard plus 20 dBA for any period of time.

The Municipal Code, Section 13-71 *Schools, hospitals and churches; special provisions*, further states that the Noise Zone designations of adjacent residential land uses shall also apply to schools, churches or hospitals when they are in use, and for the purposes of this analysis, the churches in the Project study area are considered to be within Noise Zone 2. The City of Cypress Municipal Code noise standards are shown on Table 3-1, and included in Appendix 3.2. The City of Cypress Municipal Code also identifies interior noise standards of 55 dBA L_8 (5 minutes) during the daytime hours and 45 dBA L_8 (5 minutes) during the nighttime hours for residential land use.

3.4.2 CITY OF LOS ALAMITOS OPERATIONAL NOISE STANDARDS

The Project is located within, and under the jurisdiction of, the City of Cypress. To present a conservative analysis, this report also applies the City of Los Alamitos noise standard to certain receptors located within that city. The City of Los Alamitos Municipal Code, Chapter 17.24 *Noise*, provides noise control guidelines for determining and mitigating non-transportation or stationary-source noise impacts from operations at private properties.

The City of Los Alamitos Municipal Code defines *Exterior Noise Standards* in Section 17.24.050 for land uses categorized in four different noise zones. As defined by the Municipal Code, Section 17.24.040, noise-sensitive residential properties are designated as Noise Zone 1, and the

operational noise level limits during the daytime (7:00 a.m. to 10:00 p.m.) hours of 55 dBA L_{50} and 50 dBA L_{50} during the nighttime (10:00 p.m. to 7:00 a.m.) hours shall apply to the nearby residential receivers in the City of Los Alamitos. (13) These standards shall apply for a cumulative period of 30 minutes in any hour, as well as plus 5 dBA cannot be exceeded for a cumulative period of more than 15 minutes in any hour, or the standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour, or the standard plus 15 dBA for a cumulative period of more than 1 minute in any hour, or the standard plus 20 dBA for any period of time. The City of Los Alamitos Municipal Code noise standards are shown on Table 3-1, and included in Appendix 3.3.

TABLE 3-1: OPERATIONAL EXTERIOR NOISE STANDARDS

Jurisdiction	Land Use	Time Period	Maximum Permissible Exterior Noise Levels (dBA)[5]					
			Leq (Average)	L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
City of Cypress[1]	Residential[3]	Daytime	60.0	60.0	65.0	70.0	75.0	80.0
		Nighttime	55.0	55.0	60.0	65.0	70.0	75.0
	Church[4]	Daytime	60.0	60.0	65.0	70.0	75.0	80.0
		Nighttime	55.0	55.0	60.0	65.0	70.0	75.0
City of Los Alamitos[2]	Residential	Daytime	55.0	55.0	60.0	65.0	70.0	75.0
		Nighttime	50.0	50.0	55.0	60.0	65.0	70.0

[1] Source: City of Cypress Municipal Code, Article VII Noise Control, Section 13-68 Exterior Noise Standards (Appendix 3.2).
[2] Source: City of Los Alamitos Municipal Code, Chapter 17.24 Noise, Section 17.24.050 Exterior Noise Standards (Appendix 3.3).
[3] Residential land use in Noise Zone 2 as defined by the City of Cypress Municipal Code as any residential property not zoned RS-15000 or RS-6000.
[4] Source: City of Cypress Municipal Code, Article VII Noise Control, Section 13-71 Schools, hospitals and churches; special provisions (Appendix 3.2).
[5] Leq represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. The percent noise level is the level exceeded "n" percent of the time during the measurement period. L25 is the noise level exceeded 25% of the time. "Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

3.5 CONSTRUCTION NOISE STANDARDS

Noise from construction activities are typically limited to the hours of operation established under a City's Municipal Code. The noise standards for construction are described below for the City of Cypress and the City of Los Alamitos to determine the potential noise impacts at receiver locations within each jurisdiction. The construction-related noise standards for each City are summarized in Table 3-2.

3.5.1 CITY OF CYPRESS CONSTRUCTION NOISE STANDARDS

The City of Cypress does not specify construction noise level limits because its Municipal Code, Section 13-70 (e), states that "[n]oise sources associated with construction, repair, remodeling or grading of any real property, provided said activities do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, and before 9:00 a.m. and after 8:00 p.m. on Saturdays, or at any time on Sundays or federal holiday" are exempt from the provisions of the noise ordinance. (12)

To provide a comprehensive and conservative analysis, the operational noise level limits discussed in Section 3.4 are used to evaluate the noise levels from construction activity on the Project site. The anytime maximum permitted exterior noise level of 80 dBA Lmax for the residential receivers in the City of Cypress shall be used as the acceptable threshold for determining the impacts due to Project construction for sensitive receivers in the City of Cypress. Since the City of Cypress has identified a maximum permitted exterior noise level to control operational noise levels, they represent a reasonable threshold of significance to evaluate potential construction noise level impacts.

The City of Cypress Municipal Code construction noise standards are shown on Table 3-2 and included in Appendix 3.2. Nearby sensitive receivers in the Project study area located within the City of Los Alamitos. Thus, this report also applies the City of Los Alamitos' construction noise level standards.

Since the Amended and Restated Cypress Business & Professional Center Specific Plan ("Specific Plan") supersedes the Municipal Code, the construction hours identified in Section 3.7 shall apply to Project construction, which permits construction activity on weekdays and Saturdays between 7:00 a.m. and 8:00 p.m. with no activity on holidays. (14)

3.5.2 CITY OF LOS ALAMITOS CONSTRUCTION NOISE STANDARDS

Since there are sensitive receivers located in the adjacent City of Los Alamitos, this report applies the City of Los Alamitos noise standards to determine potential impacts on those receivers. The City of Los Alamitos Municipal Code, Section 17.24.020 (D) states that construction activities are considered exempt if limited to the permitted hours between 7:00 a.m. to 8:00 p.m. on weekdays and Saturdays, with no activity on Sundays or federal holidays. (13) For the purposes of this analysis, the maximum permitted noise level limit of 75 dBA Lmax is used to assess the Project-related construction noise level impacts at receivers in the City of Los Alamitos. Since the City of Los Alamitos has identified a maximum permitted exterior noise level to control operational noise levels, they represent a reasonable threshold of significance to evaluate potential construction

noise level impacts. The City of Los Alamitos construction noise standards are shown on Table 3-2 and included in Appendix 3.3.

TABLE 3-2: CONSTRUCTION NOISE STANDARDS

City	Permitted Hours of Construction Activity	Construction Noise Level Standard	Acceptable Threshold For Significance[3]
City of Cypress[1]	7:00 a.m. to 8:00 p.m. weekdays; 9:00 a.m. to 8:00 p.m. Saturdays; no activity on Sundays or federal holidays.	n/a	80 dBA Lmax
City of Los Alamitos[2]	7:00 a.m. to 8:00 p.m. weekdays and Saturdays; no activity on Sundays or federal holidays.	n/a	75 dBA Lmax

[1] Source: City of Cypress Municipal Code, Section 13-70 (e) (Appendix 3.2).
[2] Source: City of Los Alamitos Municipal Code, Section 17.24.020 (D) (Appendix 3.3).
[3] Based on the maximum exterior noise level standards of both the City of Cypress and City of Los Alamitos, as shown on Table 3-1.

3.6 CONSTRUCTION VIBRATION STANDARDS

To analyze the vibration impacts originating from the construction of the Project, vibration from construction activities are typically evaluated against standards established under a City's Municipal Code. The City of Cypress and Los Alamitos Municipal Codes, however, do not identify specific vibration standards for construction. Therefore, the construction-related vibration standards provided by the United States Department of Transportation Federal Transit Administration (FTA) are used in this analysis to assess the potential vibration impacts due to Project construction.

3.6.1 FTA VIBRATION STANDARDS

The United States Department of Transportation Federal Transit Administration (FTA) identifies guidelines (9) for maximum-acceptable vibration criteria for different types of land uses. These guidelines allow 80 VdB as the human perception threshold for residential uses and buildings where people normally sleep. According to the FTA, "*ground vibrations from construction activities do not often reach the levels that can damage structures, but they can achieve the audible and feel-able ranges in buildings very close to the site. A possible exception is the case of fragile buildings, many of them old, where special care must be taken to avoid damage.*"

Construction activity can result in varying degrees of ground-borne vibration, depending on the equipment and methods used, distance to the affected structures and soil type. Construction vibration is generally associated with pile driving and rock blasting. Other construction equipment such as air compressors, light trucks, hydraulic loaders, etc., generates little or no ground vibration. Occasionally large bulldozers and loaded trucks can cause perceptible vibration levels at close proximity. With no enforceable regulations within the City of Cypress or Los

Alamitos, the FTA guidelines of 80 VdB for sensitive land uses provide the threshold for determining the significance of potential Project related vibration impacts.

3.6.2 HUMAN PERCEPTION OF VIBRATION

Typically, the human response at the perception threshold for vibration includes annoyance in residential areas, previously shown on Exhibit 2-B when vibration levels, expressed in vibration decibels (VdB), approach 75 VdB. As discussed in Section 2.9, ground-borne vibration is normally perceptible to humans at approximately 65 VdB and, for most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels. For this analysis, the FTA-provided 80 VdB vibration standard represents residential annoyance as perceived by the nearby sensitive receivers in the Project study area. The 80 VdB threshold for residential land use is identified for "*Infrequent Events"* by the FTA, such as the vibration due to commuter rail branch lines, which is defined as less than 30 vibration events of the same kind per day. Project construction is not expected to exceed this frequency of events since the majority of the equipment to be used in Project-construction will be those which generate little or no ground vibration, such as air compressors, light trucks, hydraulic loaders, etc. (9)

3.7 AMENDED AND RESTATED CYPRESS BUSINESS & PROFESSIONAL CENTER SPECIFIC PLAN

The City of Cypress has adopted the Amended and Restated Cypress Business & Professional Center Specific Plan ("Specific Plan") to establish guidance and regulations for the development of approximately 298.2 gross acres of land. (15) The Specific Plan area is bounded by Katella Avenue to the south, Cerritos Avenue to the north, Walker Street to the east, and Lexington Drive to the west. The Project is located within a portion of Planning Area 9 of the Specific Plan, which is designated as Mixed-Use Commercial / Senior Housing, and a portion of Planning Area 6 of the Specific Plan, which is designated as Professional Offices / Hotel and Support Commercial. Existing land uses within the Specific Plan include the Los Alamitos Race Course, Mixed-Use Business Park / General Retail Commercial, Professional Offices / Hotel and Support Commercial, and the Cottonwood Church. The Specific Plan, Appendix D *Inventory of Mitigation Measures*, contains mitigation measures that were considered while preparing this report.

3.7.1 AIRPORT NOISE

Exhibit 14-A of this report shows the noise contour boundaries from the City of Los Alamitos General Plan and the boundary of the Project site, which is located outside the 60 dBA CNEL noise contour of the JFTB Los Alamitos airfield. Exhibit 3-C shows the *Limitations on Land Use Due to Noise*, Residential and commercial/retail land uses outside of the 60 dBA CNEL noise contour boundary are considered *normally consistent*, and *no special noise reduction requirements* are required or recommended. (3) Since the Project will be located outside of the 60 dBA CNEL noise contour boundary of the JFTB airfield, the residential and commercial/retail land uses of the Project are considered *normally consistent*, and *no special noise reduction requirements* are recommended, the impacts due to aircraft noise are clearly insignificant.

EXHIBIT 3-C: LIMITATIONS ON LAND USE DUE TO NOISE

LAND USE CATEGORY	COMMUNITY NOISE EQUIVALENT LEVEL dB						
	55	60	65	70	75	80	
Residential (all types): Single and Multi-Family Residences							
Community Facilities: Churches, Libraries, Schools, Preschools, Day-Care Centers, Hospitals, Nursing/Convalescent Homes, & Other noise sensitive uses							
Commercial: Retail, Office							
Industrial:							

NORMALLY CONSISTENT

Conventional construction methods used. No special noise reduction requirements.

CONDITIONALLY CONSISTENT

Must use sound attenuation as required by the California Noise Insulation Standards, Title 25, California Code of Regulations. Residential use sound attenuation required to ensure that the interior CNEL does not exceed 45 dB. Commercial and industrial structures shall be sound attenuated to meet Noise Impact Zone "1" criteria (refer to Section 3.2.3).

NORMALLY INCONSISTENT

All residential units are inconsistent unless are sound attenuated to ensure that the interior CNEL does not exceed 45 dB, and that all units are indoor oriented so as to preclude noise impingement on outdoor living areas.

Source: Orange County Airport Environs Land Use Plan (AELUP), Limitations on Land Use Due to Noise*, Table 1.*

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4 SIGNIFICANCE CRITERIA

The following thresholds of significance are from Appendix G of the California Environmental Quality Act (CEQA) Guidelines. For the purposes of this report, impacts would be potentially significant if the Project is determined to result in or cause:

A. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
B. Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels.
C. A substantial permanent increase in ambient noise levels in the Project vicinity above existing levels without the proposed Project; or
D. A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above noise levels existing without the proposed Project.
E. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the Project area to excessive noise levels.
F. For a project within the vicinity of a private airstrip, expose people residing or working in the Project area to excessive noise levels.

While the CEQA Guidelines and the City of Cypress General Plan Guidelines provide direction on noise compatibility and establish noise standards by land use type that are sufficient to assess the significance of noise impacts under threshold A, they do not define the levels at which increases are considered substantial or excessive for use under threshold B, C and D.

Thus, this report compares new noise levels generated by the Project to the existing environment noise levels — the so-called *ambient* environment — and determines whether that level of change could be considered substantial. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will typically be judged. With this in mind, the Federal Interagency Committee on Noise (FICON) (16) developed guidance to be used for the assessment of project-generated increases in noise levels that take into account the ambient noise level. The FICON recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, these recommendations are often used in environmental noise impact assessments involving long-term community noise exposure metrics, such as the average-daily noise level (i.e., CNEL). The FICON recommendations apply to measurements of noise levels on sensitive land uses and receivers.

The FICON recommendations establishe that if the ambient noise environment is quiet (<60 dBA) and the new noise source greatly increases the noise levels, an impact may occur even though the noise criteria might not be exceeded. Therefore, for the purpose of this analysis, a *readily perceptible* 5 dBA or greater project related noise level increase is considered a significant impact when nearby noise-sensitive receivers are affected. According to the FICON, in areas where the "without project" noise levels range from 60 to 65 dBA a 3 dBA *barely perceptible* noise level

increase appears to be appropriate for most people. When the without project noise levels already exceed 65 dBA, an increase in community noise louder than 1.5 dBA or greater is considered a significant impact if noise-sensitive receivers are affected, since it likely contributes to an existing noise exposure exceedance. Table 4.1 below provides a summary of the noise impact significance criteria applied here, based on guidance from FICON.

TABLE 4-1: SIGNIFICANCE OF NOISE IMPACTS

Without Project Noise Level	Potential Significant Impact
< 60 dBA	5 dBA or more
60 - 65 dBA	3 dBA or more
> 65 dBA	1.5 dBA or more

Federal Interagency Committee on Noise (FICON), 1992. Thresholds of significance for impacts on sensitive receivers.

Based on the significance of noise impacts outlined on Table 4-2, noise impacts shall be considered significant if any of the following occur at a sensitive receiver as a direct result of the proposed development:

OFF-SITE TRAFFIC NOISE

- If the off-site traffic noise levels at nearby noise-sensitive receivers adjacent to roadways conveying Project traffic:
  - are less than 60 dBA CNEL and the Project creates a *readily perceptible* 5 dBA CNEL or greater Project related noise level increase; or
  - range from 60 to 65 dBA CNEL and the Project creates a *barely perceptible* 3 dBA CNEL or greater Project noise level increase; or
  - already exceed 65 dBA CNEL, and the Project creates a community noise level impact of greater than 1.5 dBA CNEL.

ON-SITE TRAFFIC NOISE

- If the on-site exterior noise levels exceed 60 dBA CNEL at the residential land uses within the Project site. Interior noise levels shall not exceed 45 dBA CNEL for residential land uses and 55 dBA CNEL for commercial/retail land uses located within the Project site (City of Cypress General Plan Noise Element, Table N-3).

OPERATIONAL NOISE

- If Project-related operational (stationary-source) noise levels:
  - in the City of Cypress exceed the exterior 60 dBA L_{50} daytime or 55 dBA L_{50} nighttime noise level standards for sensitive residential land uses. These standards shall not be exceeded for a cumulative period of 30 minutes (L_{50}), or plus 5 dBA cannot be exceeded for a cumulative period of more than 15 minutes (L_{25}) in any hour, or the standard plus 10 dBA for a cumulative period of more than 5 minutes (L_8) in any hour, or the standard plus 15 dBA for a cumulative period of more than 1 minute (L_2) in any hour, or the standard plus 20 dBA at any time (L_{max}) (City of Cypress Municipal Code, Section 13-68); or

- in the City of Cypress exceed the interior 55 dBA L_8 daytime or 45 dBA L_8 nighttime noise level standards for sensitive residential land uses. These standards cannot be exceeded for a cumulative period of more than 5 minutes (L_8) in any hour, or the standard plus 5 dBA for a cumulative period of more than 1 minute (L_2) in any hour, or the standard plus 10 dBA at any time (Lmax) (City of Cypress Municipal Code, Section 13-69); or
- in the City of Los Alamitos exceed the exterior 55 dBA L_{50} daytime or 50 dBA L_{50} nighttime noise level standards for sensitive residential land uses. These standards shall not be exceeded for a cumulative period of 30 minutes (L_{50}), or plus 5 dBA cannot be exceeded for a cumulative period of more than 15 minutes (L_{25}) in any hour, or the standard plus 10 dBA for a cumulative period of more than 5 minutes (L_8) in any hour, or the standard plus 15 dBA for a cumulative period of more than 1 minute (L_2) in any hour, or the standard plus 20 dBA at any time (Lmax) (City of Los Alamitos Municipal Code, Section 17.24.050).

CONSTRUCTION NOISE AND VIBRATION

- If Project-related construction activities:
  - occur anytime other than on weekdays and Saturdays between 7:00 a.m. and 8:00 p.m. or on holidays (Amended and Restated Cypress Business & Professional Center Specific Plan, Appendix D); or
  - create noise levels at sensitive residential receivers in the City of Cypress which exceed the maximum operational noise level limit of 80 dBA Lmax (City of Cypress Municipal Code, Section 13-68); or
  - create noise levels at sensitive residential receivers in the City of Los Alamitos which exceed the maximum operational noise level limit of 75 dBA Lmax (City of Los Alamitos Municipal Code, Section 17.24.050).
- If short-term Project generated construction source vibration levels could exceed the FTA maximum acceptable vibration standard of 80 vibration decibels (VdB) at noise-sensitive receiver locations.

TABLE 4-2: SUMMARY OF SIGNIFICANCE CRITERIA

Noise Analysis	Jurisdiction	Condition(s)	Significance Criteria	
			Daytime	Nighttime
Off-Site	Cypress & Los Alamitos	if ambient is < 60 dBA CNEL	≥ 5 dBA CNEL Project increase	
		if ambient is 60 - 65 dBA CNEL	≥ 3 dBA CNEL Project increase	
		if ambient is > 65 dBA CNEL	≥ 1.5 dBA CNEL Project increase	
On-Site	Cypress	Exterior residential land use	60 dBA CNEL exterior noise levels	
		Interior residential land use	45 dBA CNEL interior noise levels	
		Exterior commercial land use	55 dBA CNEL interior noise levels	
Operational	Cypress	Exterior residential land use	60 dBA L_{50}	55 dBA L_{50}
		≥ 30 minutes	60 dBA L_{50}	55 dBA L_{50}
		≥ 15 minutes	65 dBA L_{25}	60 dBA L_{25}
		≥ 5 minutes	70 dBA L_8	65 dBA L_8
		≥ 1 minute	75 dBA L_2	70 dBA L_2
		Anytime	80 dBA L_{max}	75 dBA L_{max}
		Interior residential land use	55 dBA L_8	45 dBA L_8
		≥ 5 minutes	55 dBA L_8	45 dBA L_8
		≥ 1 minute	60 dBA L_2	50 dBA L_2
		Anytime	65 dBA L_{max}	55 dBA L_{max}
	Los Alamitos	Exterior residential land use	55 dBA L_{50}	50 dBA L_{50}
		≥ 30 minutes	55 dBA L_{50}	50 dBA L_{50}
		≥ 15 minutes	60 dBA L_{25}	55 dBA L_{25}
		≥ 5 minutes	65 dBA L_8	60 dBA L_8
		≥ 1 minute	70 dBA L_2	65 dBA L_2
		Anytime	75 dBA L_{max}	70 dBA L_{max}
Construction	Cypress	Permitted hours of operation: weekdays and Saturdays between 7:00 a.m. and 8:00 p.m.; no activity on holidays		
		Noise level threshold	80 dBA L_{max}	n/a
	Los Alamitos	Noise level threshold	75 dBA L_{max}	n/a
	Cypress & Los Alamitos	Vibration level threshold	80 VdB	n/a

"Daytime" = 7:00 a.m. - 10:00 p.m.; "Nighttime" = 10:00 p.m. - 7:00 a.m.; "n/a" = No nighttime construction activity is permitted and therefore, no nighttime construction noise level threshold is identified.

5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, six long-term noise level measurements were taken at locations in the Project study area. The locations were selected to describe and document the existing noise environment within the Project study area without and with the noise associated with the activities at the Los Alamitos Race Course during evening races on Fridays through Sundays and with traffic on adjacent roadways. Exhibit 5-A provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing ambient noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Thursday, February 19th through Sunday, February 22nd, 2015. However, to focus the analysis on typical weekday ambient conditions, this section describes the 24-hour ambient noise levels without the race course activity on Thursday, February 19th, 2015. The additional noise level measurements, which include weekend race course activity, are discussed in Section 10. Appendix 5.1 includes study area photos.

5.1 MEASUREMENT PROCEDURE AND CRITERIA

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the daytime and nighttime hourly noise levels and calculate the 24-hour CNEL. The long-term noise level readings were recorded using Piccolo Type 2 integrating sound level meter and dataloggers. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150. All noise meters were programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment will satisfy American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (17)

5.2 NOISE MEASUREMENT LOCATIONS

The long-term noise level measurements were positioned at locations to assess the existing ambient hourly noise levels surrounding the Project site. To describe the existing noise environment, it is not necessary to collect measurements at each individual building, land use, or residence around the Project site, because each receiver measurement represents a group of buildings that share acoustical equivalence. In other words, the area represented by the receiver shares similar shielding, terrain, and geometric relationship to the reference noise source. Collecting reference ambient noise level measurements at receiver locations allows for a comparison of the before and after Project noise levels and is necessary to assess the potential long-term community noise impacts.

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS

LEGEND:

▲ Long-Term (LT) Noise Measurement Locations

5.3 NOISE MEASUREMENT RESULTS

To describe the existing ambient noise environment, the noise measurements presented below focus on the average or equivalent sound levels (L_{50}) based on the City of Cypress and City of Los Alamitos exterior noise standards, previously discussed in Section 3.4. The steady state (or median) noise conditions (L_{50}) represent the mean noise levels occurring 50 percent of the time. Table 5-1 identifies the hourly daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) noise levels at each noise level measurement location. Appendix 5.2 provides a summary of the existing hourly ambient noise levels described below:

- Located within the northwest corner of the Project site along Enterprise Drive, location LT1 represents the noise levels at future single-family detached homes within the Project. Based on the noise level measurements, the existing daytime hourly ambient noise levels ranged from 48.0 to 52.0 dBA L_{50} resulting in an energy (logarithmic) average daytime noise level of 50.5 dBA L_{50}. During the nighttime hours, the measured ambient noise levels ranged from 45.0 to 49.0 dBA L_{50} producing an energy (logarithmic) average nighttime noise level of 47.2 dBA L_{50}. A review of the 24-hour Community Noise Equivalent Level (CNEL) indicates that the overall unmitigated exterior noise level is 56.7 dBA CNEL.
- Location LT2 represents the noise levels at the northern Project site boundary adjacent to existing horse stables and a dirt road of the Los Alamitos Race Course. The noise level measurements collected show an overall 24-hour unmitigated exterior noise level of 57.6 dBA CNEL. The hourly noise levels measured at location LT2 ranged from 45.0 to 56.0 dBA L_{50} during the daytime hours and from 37.0 to 48.0 dBA L_{50} during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 50.5 dBA L_{50} with an average nighttime noise level of 43.8 dBA L_{50}.
- Location LT3 represents the noise levels at the northeast corner of the Project site, south of the existing horse stables and west of a water pump. The 24-hour CNEL indicates that the overall unmitigated exterior noise level is 59.7 dBA CNEL. At location LT3 the background ambient noise levels ranged from 46.0 to 53.0 dBA L_{50} during the daytime hours to levels of 40.0 to 54.0 dBA L_{50} during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 49.8 dBA L_{50} with an average nighttime noise level of 47.4 dBA L_{50}.
- Located along the eastern Project site boundary, location LT4 represents the noise levels at the western property line of an existing church. The noise level measurements collected show an overall 24-hour exterior noise level of 58.2 dBA CNEL. The hourly noise levels measured at location LT4 ranged from 45.0 to 51.0 dBA L_{50} during the daytime hours and from 44.0 to 56.0 dBA L_{50} during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 48.4 dBA L_{50} with an average nighttime noise level of 48.3 dBA L_{50}.
- Located along the western site boundary of the Project site, location LT5 represents the exterior noise levels along Enterprise Drive, east of the existing Cottonwood Church. Based on the noise level measurements, the existing daytime hourly ambient noise levels ranged from 49.0 to 54.0 dBA L_{50} resulting in an energy (logarithmic) average daytime noise level of 51.9 dBA L_{50}. During the nighttime hours, the measured ambient noise levels ranged from 44.0 to 52.0 dBA L_{50} producing an energy (logarithmic) average nighttime noise level of 49.1 dBA L_{50}. A review of the 24-hour CNEL indicates that the overall exterior noise level is 58.7 dBA CNEL.

- Location LT6 represents the noise levels at approximately the proposed boundary between the residential and commercial/retail land uses within the Project site. The noise level measurements collected show an overall 24-hour unmitigated exterior noise level of 56.8 dBA CNEL. The hourly noise levels measured at location LT6 ranged from 48.0 to 53.0 dBA L_{50} during the daytime hours and from 43.0 to 50.0 dBA L_{50} during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 50.9 dBA L_{50} with an average nighttime noise level of 47.2 dBA L_{50}.

Table 5-1 provides the (L_{50}) noise levels used to describe the daytime and nighttime ambient conditions. These daytime and nighttime energy average noise levels represent the steady state (or median) noise conditions during 50 percent of all hourly noise levels observed during these time periods expressed as a single number. Appendix 5.2 provides a summary of the hourly noise levels for each hour as well as the minimum and maximum noise level observed during the daytime and nighttime period.

The background ambient noise levels in the Project study area are dominated by the transportation related noise associated with the arterial roadway network and the stationary noise sources associated with the Los Alamitos Race Course. This includes the auto and truck activities near the noise level measurement locations as well as the stationary noise sources from Los Alamitos Race Course such as the public address (P.A.) system speakerphones, horse-trailer trucks and cars operating adjacent to the Project site, and parking lot vehicle movements. Additional stationary noise sources described by the noise level measurements include: the existing water pump adjacent to the northeast corner of the Project site, parking lot vehicle movements, loading dock activities, roof-top air conditioning units and trash compactors associated with the retail center with Office Depot located east of the Project site, and roof-top air conditioning units and parking lot vehicle movements from the nearby churches and hotel. Secondary background ambient noise is also included in the noise level measurements from the birds observed above the horse stables in the Project study area, however, these impacts are generally overshadowed by the nearby vehicular traffic noise levels. The 24-hour existing noise level measurements shown on Table 5-1 present the worst-case existing ambient noise conditions.

TABLE 5-1: 24-HOUR AMBIENT NOISE LEVEL MEASUREMENTS

Location[1]	City	Description	Hourly Noise Level (dBA L_{50})[2]		CNEL	Noise Level Compliance?[3]
			Daytime	Nighttime		
LT1	Cypress	Located within the northwest corner of the Project site along Enterprise Drive.	50.5	47.2	56.7	Yes
LT2		Located within the Project site along the northern property line, south of the existing horse stables of the Los Alamitos Race Course.	50.5	43.8	57.6	Yes
LT3		Located within the northeast corner of the Project site, south and west of Los Alamitos Race Course horse stables.	49.8	47.4	59.7	Yes
LT4		Located along the eastern Project site boundary, west of an existing church and north of an existing hotel.	48.4	48.3	58.2	Yes
LT5		Located within the Project site along the western property line across Enterprise Drive from an existing church.	51.9	49.1	58.7	Yes
LT6		Located within the Project site at the future separation between the residential and commercial land uses of the Project.	50.9	47.2	56.8	Yes

[1] See Exhibit 5-A for the noise level measurement locations.
[2] The long-term 24-hour measurement printouts are included in Appendix 5.2.
[3] Do the existing ambient noise levels satisfy the City of Cypress noise standards as discussed in Section 3?
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

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6 METHODS AND PROCEDURES

The following section outlines the methods and procedures used to model and analyze the future traffic noise environment, and the reference noise levels used to estimate the potential stationary noise source impacts.

6.1 FHWA TRAFFIC NOISE PREDICTION MODEL

The estimated roadway noise impacts from vehicular traffic were calculated using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108, which is the same methodology used to support the City of Los Alamitos General Plan Noise Element and represents standard industry practice for traffic noise contour modeling. (18) The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). In California the national REMELs are substituted with the California Vehicle Noise (Calveno) Emission Levels. (19) Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or arterial), the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT), the travel speed, the percentages of automobiles, medium trucks, and heavy trucks in the traffic volume, the roadway grade, the angle of view (e.g., whether the roadway view is blocked), the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping), and the percentage of total ADT which flows each hour throughout a 24-hour period.

6.2 OFF-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

Table 6-1 presents the roadway parameters used to assess the Project's off-site transportation noise impacts. Table 6-1 identifies the 18 study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications according to the City of Cypress and City of Los Alamitos General Plan Circulation Elements, and the vehicle speeds. For the purpose of the off-site analysis, soft site conditions were used to analyze the traffic noise impacts for the Project study area based on existing and future conditions in the Project study area. Soft site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation.

The Existing and Year 2018 average daily traffic volumes used for this study, presented in Table 6-2, were obtained from the *Barton Place Traffic Impact Analysis,* prepared by Kimley-Horn and Associates, Inc. (1) Table 6-3 presents the time of day vehicle splits and Table 6-4 presents the traffic flow distributions (vehicle mix) used for this analysis. The vehicle mix provides the hourly distribution percentages of automobile, medium trucks and heavy trucks for input into the FHWA noise prediction model.

TABLE 6-1: OFF-SITE ROADWAY PARAMETERS

ID	Roadway	Segment	Adjacent Land Use[1]	Distance from Centerline to Nearest Adjacent Land Use (Feet)[2]	Vehicle Speed (MPH)
1	Cerritos Av.	e/o Los Alamitos Bl.	Community & Institutional	60'	35
2	Cerritos Av.	e/o Bloomfield St.	Medium Density Residential	50'	40
3	Cerritos Av.	e/o Denni St.	Low Density Residential	50'	45
4	Cerritos Av.	e/o Moody St.	Low Density Residential	50'	45
5	Cerritos Av.	e/o Walker St.	Low Density Residential	50'	45
6	Katella Av.	e/o I-605 NB Ramps	Suburban Residential	60'	35
7	Katella Av.	e/o Los Alamitos Bl.	Professional Office	60'	35
8	Katella Av.	e/o Bloomfield St.	Community & Institutional	60'	35
9	Katella Av.	e/o Lexington Dr.	Single-Family Residential	60'	40
10	Katella Av.	e/o Enterprise Dr.	Single-Family Residential	60'	40
11	Katella Av.	e/o Siboney St.	Single-Family Residential	60'	40
12	Katella Av.	e/o Winners Cir.	Professional Office	60'	40
13	Katella Av.	e/o Walker St.	Specific Plan	60'	45
14	Bloomfield St.	s/o Cerritos Av.	Community & Institutional	42'	35
15	Lexington Dr.	s/o Cerritos Av.	Golf Course	42'	35
16	Walker St.	s/o Cerritos Av.	Specific Plan	42'	40
17	Valley View St.	s/o Cerritos Av.	Specific Plan	60'	45
18	Valley View St.	s/o Katella Av.	Low Density Residential	60'	45

[1] Sources: City of Cypress General Plan Land Use Policy Map and the City of Los Alamitos General Plan, Figure 3 Land Use Plan.
[2] Distance to adjacent land use is based upon the right-of-way distances for each functional roadway classification provided in the General Plan Circulation Elements.

TABLE 6-2: AVERAGE DAILY TRAFFIC VOLUMES

ID	Roadway	Segment	Average Daily Traffic (1,000's)[1]			
			Existing		Year 2018	
			Without Project	With Project	Without Project	With Project
1	Cerritos Av.	e/o Los Alamitos Bl.	26.9	26.9	29.2	29.2
2	Cerritos Av.	e/o Bloomfield St.	24.6	24.6	27.2	27.2
3	Cerritos Av.	e/o Denni St.	24.2	24.7	26.5	27.0
4	Cerritos Av.	e/o Moody St.	24.2	24.7	26.5	27.0
5	Cerritos Av.	e/o Walker St.	24.5	24.8	27.1	27.4
6	Katella Av.	e/o I-605 NB Ramps	70.7	71.1	75.6	75.9
7	Katella Av.	e/o Los Alamitos Bl.	50.5	51.0	55.7	56.3
8	Katella Av.	e/o Bloomfield St.	46.9	47.8	51.3	52.3
9	Katella Av.	e/o Lexington Dr.	46.6	48.5	51.7	53.6
10	Katella Av.	e/o Enterprise Dr.	46.6	48.7	51.7	53.8
11	Katella Av.	e/o Siboney St.	44.1	45.5	52.3	53.8
12	Katella Av.	e/o Winners Cir.	44.1	45.5	52.3	53.7
13	Katella Av.	e/o Walker St.	47.9	48.9	54.5	55.5
14	Bloomfield St.	s/o Cerritos Av.	11.8	12.0	12.0	12.2
15	Lexington Dr.	s/o Cerritos Av.	4.2	5.0	8.6	9.3
16	Walker St.	s/o Cerritos Av.	21.5	21.9	22.7	23.1
17	Valley View St.	s/o Cerritos Av.	40.0	40.4	42.3	42.7
18	Valley View St.	s/o Katella Av.	54.6	55.0	58.0	58.5

[1] Source: Barton Place Traffic Impact Analysis, Kimley-Horn and Associates, Inc., February 2015.

TABLE 6-3: TIME OF DAY VEHICLE SPLITS

Time Period	Vehicle Type		
	Autos	Medium Trucks	Heavy Trucks
Daytime (7am-7pm)	77.5%	84.8%	86.5%
Evening (7pm-10pm)	12.9%	4.9%	2.7%
Nighttime (10pm-7am)	9.6%	10.3%	10.8%
Total:	100.0%	100.0%	100.0%

Source: County of Orange Land Use/Noise Compatibility Manual, December 1993.

TABLE 6-4: DISTRIBUTION OF TRAFFIC FLOW BY VEHICLE TYPE (VEHICLE MIX)

Roadway Classification	Total % Traffic Flow			Total
	Autos	Medium Trucks	Heavy Trucks	
All Segments	97.42%	1.84%	0.74%	100.00%

Source: County of Orange Land Use/Noise Compatibility Manual, December 1993.

6.3 ON-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

The on-site roadway parameters including the average daily traffic (ADT) volumes used for this study are presented on Table 6-5. Based on the City of Cypress General Plan Circulation Element, Katella Avenue is classified as a 6-lane Major arterial. To predict the future on-site noise environment at the Project site, the General Plan Circulation Element, Table CIR-1, daily roadway capacity traffic volumes were used. (20) The traffic volumes shown on Table 6-5 reflect future long-range traffic conditions needed to assess the future on-site traffic noise environment and to identify potential mitigation measures (if any) that address the worst-case future conditions. For the purposes of this analysis, soft site conditions were used to analyze the on-site traffic noise impacts for the Project study area. Soft site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation, which are expected along Katella Avenue at the proposed property line of the Project's commercial/retail uses, and throughout the residential portion of the Project.

TABLE 6-5: ON-SITE ROADWAY PARAMETERS

Roadway	Lanes	Classification[1]	Daily Roadway Capacity Volume[2]	Posted Speed Limit (mph)[3]	Site Conditions
Katella Av.	6	Major	56,300	40	Soft

[1] Road classifications based upon the City of Cypress General Plan Circulation Element, 2000.
[2] Source: City of Cypress General Plan Circulation Element, Table CIR-1.
[3] Posted speed limit on Katella Avenue.

Table 6-3 presents the time of day vehicle splits by vehicle type, and Table 6-4 presents the total traffic flow distributions (vehicle mixes) used for this analysis. The vehicle mix provides the hourly distribution percentages of automobile, medium trucks and heavy trucks for input into the FHWA Model based on roadway types. To predict the future noise environment at buildings within the Project site, coordinate information was collected to identify the noise transmission path between the noise source and receiver. The coordinate information is based on the Project site plan showing the plotting of each building in relationship to Katella Avenue as shown in Appendix 6.1.

The site plan and grading plans, provided in Appendix 6.2, were used to identify the relationship between the roadway centerline elevation, the pad elevation and the centerline distance to the noise barrier, and the building façade. The exterior noise level impacts at the backyard receptors were placed five feet above the pad elevation and ten feet from the proposed barrier location or

at the proposed building façade, whichever is greater. First floor receptors were located five feet above the proposed finished floor elevation and second floor receptors were located fourteen feet above the proposed finished floor elevation.

6.4 STATIONARY-SOURCE REFERENCE NOISE LEVELS

To estimate the potential stationary-source noise impacts in the Project study area, sample reference noise level measurements were collected from similar types of activities. The sample reference noise level measurements are intended to represent the existing stationary noise sources potentially impacting the Project and the noise levels expected with the development of the Project. This section provides a detailed description of the reference noise level measurements shown on Table 6-6 used to estimate the stationary-source noise levels.

TABLE 6-6: STATIONARY SOURCE REFERENCE NOISE LEVEL MEASUREMENTS

Noise Source	Duration (mm:ss)	Distance From Source (Feet)	Noise Source Height (Feet)	Hourly Activity (Minutes)[5]	Hourly (dBA L_{50})
Loading Dock Activities[1]	1:00	20'	8'	6	77.2
Roof-Top Air Conditioning Units[2]	1:00	5'	25'	30	81.6
Parking Lot Vehicle Movement[3]	15:00	5'	4'	60	56.7
Trash Compactor[4]	2:22	5'	5'	20	70.5

[1] As measured at the Huntington Beach Walmart by Urban Crossroads, Inc. on 4/14/2011.
[2] As measured by Urban Crossroads, Inc. on 10/13/2010 at the Rancho Cordova Walmart #2457.
[3] As measured by Urban Crossroads, Inc. on 5/30/2012 at the Laguna Niguel Walmart located at 27470 Alicia Parkway.
[4] As measured at the Irvine Walmart Supercenter located on 16555 Von Karman Avenue by Urban Crossroads, Inc. on 1/23/2014.
[5] Duration (minutes within the hour) of noise activity during peak hourly conditions.

6.4.1 LOADING DOCK ACTIVITIES

As part of its commercial operations, the Project may include truck doors and loading facilities at the commercial/retail building in the eastern portion of the site. In addition, existing loading docks are located at the Office Depot east of the Project in an existing retail center. In order to evaluate the noise impacts associated with the delivery truck tractor trailer unloading/loading activities, reference noise level measurements were taken at the Huntington Beach Walmart located at the southwest corner of Goldenwest Street and Edinger Avenue by Urban Crossroads Inc. on April 14th, 2011.

The primary noise observed during the reference noise measurement was generated by tractor trailer unloading which includes the truck arriving, backing into the dock area, detaching the cab, attaching the cab to the empty trailer, and exiting the loading dock. Because the trailers seal to the loading dock, employees unload the tractor trailer from the inside of the store. The receiving crew placed a 20' long rolling conveyor assembly inside the trailer to roll merchandise (on pallets or in boxes) into the store. The unmitigated noise level was measured at 77.2 dBA L_{50} at a distance of 20 feet from the tractor trailer. Delivery truck activities lasted an average of 3–6 minutes per truck, depending on whether or not the loading bay was empty at the time of arrival.

The activities observed during the reference noise level measurement may overstate the actual loading dock activities at the commercial/retail land use within the Project site, and are used to present a conservative analysis.

In the event truck idling occurs, idling time would be limited to no more than 5 minutes under California State law (Cal Code Regs. 2485). Delivery trucks are generally equipped with an engine shutdown system that automatically turns off the engine after 5 minutes of idling. For the purpose of this analysis, it is assumed that there would be one delivery truck coming to the loading dock and completing delivery activities within a one hour period for the daytime hours at the Project's commercial land use. Nighttime loading dock activity within the Project site is not permitted between the hours of 10:00 p.m. to 7:00 a.m. Off-site existing loading docks at the retail plaza with Office Depot are anticipated to occur during both daytime and nighttime hours.

6.4.2 ROOF-TOP AIR CONDITIONING UNITS

In order to assess the impacts created by the roof-top air conditioning units at the planned commercial/retail uses within Project site, and existing units at the churches and retail center with Office Depot in the Project study area, reference noise levels measurements were taken at the Rancho Cordova Walmart on October 13th, 2010. Located at 10655 Folsom Boulevard in the City of Rancho Cordova, the noise level measurements describe a cluster of mechanical roof-top air conditioning units. The cluster consists of two Krack MXE-04 4-fan units and one MXE-02 2-fan unit. At a distance of 5 feet for the cluster of roof-top air conditioning units, the exterior noise levels were measured at 81.6 dBA L_{50}. For the purpose of this noise analysis, the air conditioning units were observed to be located on the roof at a noise elevation of 25 feet and are estimated to operate for approximately 30 minutes during typical daytime and nighttime conditions. The potential noise attenuation provided by a parapet wall was not included as part of this analysis.

6.4.3 PARKING LOT VEHICLE MOVEMENT

To determine the noise level impacts associated with parking lot vehicle movement, Urban Crossroads collected reference noise level measurements at the Laguna Niguel Walmart located at 27470 Alicia Parkway on May 30th, 2012. The fifteen minute noise level measurement indicates that the parking lot vehicle movement generates a noise level of 56.7 dBA L_{50} at a distance of 5 feet. The parking lot vehicle movement noise levels are mainly due to cars pulling in and out of spaces, car alarms sounding, and customers moving shopping carts. Noise associated with parking lot vehicle movement is expected during the typical daytime and nighttime conditions for the entire hour (60 minutes).

6.4.4 TRASH COMPACTORS

In order to assess the impacts created by the trash compactors within the Project study area, reference noise levels were gathered from the Irvine Walmart Supercenter located on 16555 Von Karman Avenue, by Urban Crossroads Inc. on Thursday, January 23rd, 2014. The unmitigated exterior noise levels were measured at 70.5 dBA L_{50} at a distance of 5 feet from the trash

compactor. It is expected the trash compactor will operate for a maximum of 20 minutes during typical hourly daytime and nighttime conditions.

6.5 VIBRATION ASSESSMENT

This analysis focuses on the potential ground-borne vibration associated with vehicular traffic and construction activities. Ground-borne vibration levels from automobile traffic are generally overshadowed by vibration generated by heavy trucks that roll over the same uneven roadway surfaces. However, due to the rapid drop-off rate of ground-borne vibration and the short duration of the associated events, vehicular traffic-induced ground-borne vibration is rarely perceptible beyond the roadway right-of-way, and rarely results in vibration levels that cause damage to buildings in the vicinity.

However, while vehicular traffic is rarely perceptible, construction has the potential to result in varying degrees of temporary ground vibration, depending on the specific construction activities and equipment used. Ground vibration levels associated with various types of construction equipment are summarized on Table 6-7. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the human response (annoyance) using the following vibration assessment methods defined by the FTA. To describe the human response (annoyance) associated with vibration impacts the FTA provides the following equation: $L_{VdB}(D) = L_{VdB}(25\text{ ft}) - 30\log(D/25)$

TABLE 6-7: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

Equipment	Vibration Decibels (VdB) at 25 feet[1]
Small bulldozer	58
Jackhammer	79
Loaded Trucks	86
Large bulldozer	87

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, May 2006.

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7 OFF-SITE TRANSPORTATION NOISE

To assess the off-site transportation CNEL noise level impacts associated with development of the Project, noise contours were developed based on the *Barton Place Traffic Impact Analysis*. (1) Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway. Noise contours were developed for the following traffic scenarios:

- Existing Without / With Project: This scenario refers to the existing present-day noise conditions, without the Project and with the construction of the proposed Project.
- Year 2018 Without / With Project: This scenario refers to the background noise conditions at future Year 2018 with and without the Project. This scenario corresponds to 2018 conditions, after Project completion, and includes all cumulative projects identified in the Traffic Impact Analysis.

7.1 OFF-SITE TRAFFIC NOISE CONTOURS

To quantify the Project's traffic noise impacts on the sensitive receivers in the surrounding areas, the changes in traffic noise levels on 18 roadway segments surrounding the Project were calculated based on the changes in the average daily traffic volumes. The noise contours were used to assess the Project's incremental traffic-related noise impacts at land uses adjacent to roadways conveying Project traffic. Based on the noise impact significance criteria described in Section 4, a significant off-site traffic noise level impact occurs if the without Project noise levels at nearby noise-sensitive receivers:

- are less than 60 dBA and the Project creates a *readily perceptible* 5 dBA or greater Project related noise level increase, or:
- range from 60 to 65 dBA and the Project creates a *barely perceptible* 3 dBA or greater Project noise level increase, or;
- already exceed 65 dBA, and the Project creates a community noise level impact of greater than 1.5 dBA.

Noise contours represent the distance to noise levels of a constant value and are measured from the center of the roadway for the 70, 65, and 60 dBA noise levels. The noise contours do not take into account the effect of any existing noise barriers or topography that may affect ambient noise levels. In addition, since the noise contours reflect modeling of vehicular noise along area roadways, they appropriately do not reflect noise contribution from the surrounding commercial uses within the Project study area. Tables 7-1 through 7-4 present a summary of the unmitigated exterior traffic noise levels for the 18 study area roadway segments analyzed from the without Project to the with Project conditions in each of the two timeframes: Existing and Year 2018. Appendix 7.1 includes a summary of the traffic noise level contours for each of the four traffic scenarios.

TABLE 7-1: EXISTING WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)	Distance to Contour from Centerline (Feet)[2]		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Cerritos Av.	e/o Los Alamitos Bl.	Community & Institutional	68.4	RW	102	219
2	Cerritos Av.	e/o Bloomfield St.	Medium Density Residential	69.5	RW	101	217
3	Cerritos Av.	e/o Denni St.	Low Density Residential	70.7	56	121	260
4	Cerritos Av.	e/o Moody St.	Low Density Residential	70.7	56	121	260
5	Cerritos Av.	e/o Walker St.	Low Density Residential	70.8	57	122	262
6	Katella Av.	e/o I-605 NB Ramps	Suburban Residential	72.6	90	194	417
7	Katella Av.	e/o Los Alamitos Bl.	Professional Office	71.2	72	155	333
8	Katella Av.	e/o Bloomfield St.	Community & Institutional	70.8	68	147	317
9	Katella Av.	e/o Lexington Dr.	Single-Family Residential	72.4	86	185	400
10	Katella Av.	e/o Enterprise Dr.	Single-Family Residential	72.4	86	185	400
11	Katella Av.	e/o Siboney St.	Single-Family Residential	72.1	83	179	385
12	Katella Av.	e/o Winners Cir.	Professional Office	72.1	83	179	385
13	Katella Av.	e/o Walker St.	Specific Plan	73.7	107	230	495
14	Bloomfield St.	s/o Cerritos Av.	Community & Institutional	66.3	RW	51	110
15	Lexington Dr.	s/o Cerritos Av.	Golf Course	61.8	RW	RW	55
16	Walker St.	s/o Cerritos Av.	Specific Plan	70.3	44	95	204
17	Valley View St.	s/o Cerritos Av.	Specific Plan	73.0	95	204	439
18	Valley View St.	s/o Katella Av.	Low Density Residential	74.3	116	251	540

[1] Sources: City of Cypress General Plan Land Use Policy Map and the City of Los Alamitos General Plan, Figure 3 Land Use Plan.
[2] "RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-2: EXISTING WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)	Distance to Contour from Centerline (Feet)[2]		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Cerritos Av.	e/o Los Alamitos Bl.	Community & Institutional	68.4	RW	102	219
2	Cerritos Av.	e/o Bloomfield St.	Medium Density Residential	69.5	RW	101	217
3	Cerritos Av.	e/o Denni St.	Low Density Residential	70.8	57	122	264
4	Cerritos Av.	e/o Moody St.	Low Density Residential	70.8	57	122	264
5	Cerritos Av.	e/o Walker St.	Low Density Residential	70.9	57	123	265
6	Katella Av.	e/o I-605 NB Ramps	Suburban Residential	72.7	90	194	419
7	Katella Av.	e/o Los Alamitos Bl.	Professional Office	71.2	72	156	336
8	Katella Av.	e/o Bloomfield St.	Community & Institutional	70.9	69	149	321
9	Katella Av.	e/o Lexington Dr.	Single-Family Residential	72.5	88	191	410
10	Katella Av.	e/o Enterprise Dr.	Single-Family Residential	72.5	89	191	412
11	Katella Av.	e/o Siboney St.	Single-Family Residential	72.2	85	183	393
12	Katella Av.	e/o Winners Cir.	Professional Office	72.2	85	183	393
13	Katella Av.	e/o Walker St.	Specific Plan	73.8	108	233	502
14	Bloomfield St.	s/o Cerritos Av.	Community & Institutional	66.3	RW	52	111
15	Lexington Dr.	s/o Cerritos Av.	Golf Course	62.5	RW	RW	62
16	Walker St.	s/o Cerritos Av.	Specific Plan	70.4	45	96	207
17	Valley View St.	s/o Cerritos Av.	Specific Plan	73.0	95	205	442
18	Valley View St.	s/o Katella Av.	Low Density Residential	74.3	117	252	542

[1] Sources: City of Cypress General Plan Land Use Policy Map and the City of Los Alamitos General Plan, Figure 3 Land Use Plan.
[2] "RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-3: YEAR 2018 WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)	Distance to Contour from Centerline (Feet)[2]		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Cerritos Av.	e/o Los Alamitos Bl.	Community & Institutional	68.8	RW	107	231
2	Cerritos Av.	e/o Bloomfield St.	Medium Density Residential	70.0	50	107	232
3	Cerritos Av.	e/o Denni St.	Low Density Residential	71.1	60	128	277
4	Cerritos Av.	e/o Moody St.	Low Density Residential	71.1	60	128	277
5	Cerritos Av.	e/o Walker St.	Low Density Residential	71.2	60	130	281
6	Katella Av.	e/o I-605 NB Ramps	Suburban Residential	72.9	94	202	436
7	Katella Av.	e/o Los Alamitos Bl.	Professional Office	71.6	77	165	356
8	Katella Av.	e/o Bloomfield St.	Community & Institutional	71.2	73	156	337
9	Katella Av.	e/o Lexington Dr.	Single-Family Residential	72.8	92	199	428
10	Katella Av.	e/o Enterprise Dr.	Single-Family Residential	72.8	92	199	428
11	Katella Av.	e/o Siboney St.	Single-Family Residential	72.9	93	200	432
12	Katella Av.	e/o Winners Cir.	Professional Office	72.9	93	200	432
13	Katella Av.	e/o Walker St.	Specific Plan	74.3	116	250	539
14	Bloomfield St.	s/o Cerritos Av.	Community & Institutional	66.3	RW	52	111
15	Lexington Dr.	s/o Cerritos Av.	Golf Course	64.9	RW	RW	89
16	Walker St.	s/o Cerritos Av.	Specific Plan	70.5	46	98	212
17	Valley View St.	s/o Cerritos Av.	Specific Plan	73.2	98	211	455
18	Valley View St.	s/o Katella Av.	Low Density Residential	74.6	121	261	562

[1] Sources: City of Cypress General Plan Land Use Policy Map and the City of Los Alamitos General Plan, Figure 3 Land Use Plan.
[2] "RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-4: YEAR 2018 WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)	Distance to Contour from Centerline (Feet)[2]		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Cerritos Av.	e/o Los Alamitos Bl.	Community & Institutional	68.8	RW	107	231
2	Cerritos Av.	e/o Bloomfield St.	Medium Density Residential	70.0	50	107	232
3	Cerritos Av.	e/o Denni St.	Low Density Residential	71.2	60	130	280
4	Cerritos Av.	e/o Moody St.	Low Density Residential	71.2	60	130	280
5	Cerritos Av.	e/o Walker St.	Low Density Residential	71.3	61	131	283
6	Katella Av.	e/o I-605 NB Ramps	Suburban Residential	72.9	94	203	437
7	Katella Av.	e/o Los Alamitos Bl.	Professional Office	71.6	77	166	358
8	Katella Av.	e/o Bloomfield St.	Community & Institutional	71.3	74	158	341
9	Katella Av.	e/o Lexington Dr.	Single-Family Residential	73.0	95	204	439
10	Katella Av.	e/o Enterprise Dr.	Single-Family Residential	73.0	95	204	440
11	Katella Av.	e/o Siboney St.	Single-Family Residential	73.0	95	204	440
12	Katella Av.	e/o Winners Cir.	Professional Office	73.0	95	204	439
13	Katella Av.	e/o Walker St.	Specific Plan	74.4	118	253	546
14	Bloomfield St.	s/o Cerritos Av.	Community & Institutional	66.4	RW	52	113
15	Lexington Dr.	s/o Cerritos Av.	Golf Course	65.2	RW	44	94
16	Walker St.	s/o Cerritos Av.	Specific Plan	70.6	46	99	214
17	Valley View St.	s/o Cerritos Av.	Specific Plan	73.2	99	213	458
18	Valley View St.	s/o Katella Av.	Low Density Residential	74.6	122	262	565

[1] Sources: City of Cypress General Plan Land Use Policy Map and the City of Los Alamitos General Plan, Figure 3 Land Use Plan.
[2] "RW" = Location of the respective noise contour falls within the right-of-way of the road.

7.2 EXISTING PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-5 presents a comparison of the Existing without and with Project conditions CNEL noise levels. The unmitigated without Project exterior noise levels are expected to range from 61.8 to 74.3 dBA CNEL. Existing with Project noise level contours are expected to range from 62.5 to 74.3 dBA CNEL. Overall the Project is expected to generate an unmitigated exterior noise level increase of up to 0.7 dBA CNEL. A review of the data in Table 7-5 demonstrates that the Project's contribution to the existing noise level is less than significant for all of the study area roadway segments. Based on the criteria in Section 4, the Project will create a less than significant off-site traffic noise level impact on the study area roadway segments for Existing conditions.

7.3 YEAR 2018 PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-6 presents a comparison of the Year 2018 without and with Project conditions CNEL noise levels. Table 7-3 shows that the unmitigated exterior noise levels without the Project are expected to range from 64.9 to 74.6 dBA CNEL. Table 7-4 presents the Year 2018 with Project conditions noise level contours that are expected to range from 65.2 to 74.6 dBA CNEL. As shown on Table 7-6 the Project is expected to generate an unmitigated exterior noise level increase of up to 0.3 dBA CNEL. Based on the criteria described in Section 4, for Year 2018 conditions, the Project will create a less than significant impact on the study area roadway segments.

7.4 PROJECT TRAFFIC NOISE CONTRIBUTIONS

The off-site traffic noise analysis shows that the Existing Project noise level contribution of up to 0.7 dBA CNEL is expected to decrease to 0.3 dBA CNEL by Year 2018 conditions. This shows that the Project's incremental traffic-related noise level contributions at land uses adjacent to roadways conveying Project traffic will diminish over time. In addition, the minor increases in noise levels are well below even the most stringent significance threshold of 1.5 dBA or more. Therefore, the Project will not create a substantial permanent increase in the ambient noise levels above levels existing without the Project. The background traffic on the study area roadway segments increases and, over time, the Project represents a smaller percentage of the overall traffic volume. The off-site traffic noise analysis indicates that the Project's contributions to roadway noise levels will be less than significant.

TABLE 7-5: EXISTING OFF-SITE PROJECT RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	Adjacent Land Use[1]	CNEL at Adjacent Land Use (dBA)			Potential Significant Impact?[2]
				No Project	With Project	Project Addition	
1	Cerritos Av.	e/o Los Alamitos Bl.	Community & Institutional	68.4	68.4	0.0	No
2	Cerritos Av.	e/o Bloomfield St.	Medium Density Residential	69.5	69.5	0.0	No
3	Cerritos Av.	e/o Denni St.	Low Density Residential	70.7	70.8	0.1	No
4	Cerritos Av.	e/o Moody St.	Low Density Residential	70.7	70.8	0.1	No
5	Cerritos Av.	e/o Walker St.	Low Density Residential	70.8	70.9	0.1	No
6	Katella Av.	e/o I-605 NB Ramps	Suburban Residential	72.6	72.7	0.1	No
7	Katella Av.	e/o Los Alamitos Bl.	Professional Office	71.2	71.2	0.0	No
8	Katella Av.	e/o Bloomfield St.	Community & Institutional	70.8	70.9	0.1	No
9	Katella Av.	e/o Lexington Dr.	Single-Family Residential	72.4	72.5	0.1	No
10	Katella Av.	e/o Enterprise Dr.	Single-Family Residential	72.4	72.5	0.1	No
11	Katella Av.	e/o Siboney St.	Single-Family Residential	72.1	72.2	0.1	No
12	Katella Av.	e/o Winners Cir.	Professional Office	72.1	72.2	0.1	No
13	Katella Av.	e/o Walker St.	Specific Plan	73.7	73.8	0.1	No
14	Bloomfield St.	s/o Cerritos Av.	Community & Institutional	66.3	66.3	0.0	No
15	Lexington Dr.	s/o Cerritos Av.	Golf Course	61.8	62.5	0.7	No
16	Walker St.	s/o Cerritos Av.	Specific Plan	70.3	70.4	0.1	No
17	Valley View St.	s/o Cerritos Av.	Specific Plan	73.0	73.0	0.0	No
18	Valley View St.	s/o Katella Av.	Low Density Residential	74.3	74.3	0.0	No

[1] Sources: City of Cypress General Plan Land Use Policy Map and the City of Los Alamitos General Plan, Figure 3 Land Use Plan.
[2] Significance of Cumulative Impacts (Table 4-1): if Project increases of 5 dBA, 3 dBA, or 1.5 dBA CNEL occur when ambient noise levels are less than 60 dBA, between 60 to 65 dBA, or greater than 65 dBA CNEL, respectively.

TABLE 7-6: YEAR 2018 OFF-SITE PROJECT RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	Adjacent Land Use[1]	CNEL at Adjacent Land Use (dBA)			Potential Significant Impact?[2]
				No Project	With Project	Project Addition	
1	Cerritos Av.	e/o Los Alamitos Bl.	Community & Institutional	68.8	68.8	0.0	No
2	Cerritos Av.	e/o Bloomfield St.	Medium Density Residential	70.0	70.0	0.0	No
3	Cerritos Av.	e/o Denni St.	Low Density Residential	71.1	71.2	0.1	No
4	Cerritos Av.	e/o Moody St.	Low Density Residential	71.1	71.2	0.1	No
5	Cerritos Av.	e/o Walker St.	Low Density Residential	71.2	71.3	0.1	No
6	Katella Av.	e/o I-605 NB Ramps	Suburban Residential	72.9	72.9	0.0	No
7	Katella Av.	e/o Los Alamitos Bl.	Professional Office	71.6	71.6	0.0	No
8	Katella Av.	e/o Bloomfield St.	Community & Institutional	71.2	71.3	0.1	No
9	Katella Av.	e/o Lexington Dr.	Single-Family Residential	72.8	73.0	0.2	No
10	Katella Av.	e/o Enterprise Dr.	Single-Family Residential	72.8	73.0	0.2	No
11	Katella Av.	e/o Siboney St.	Single-Family Residential	72.9	73.0	0.1	No
12	Katella Av.	e/o Winners Cir.	Professional Office	72.9	73.0	0.1	No
13	Katella Av.	e/o Walker St.	Specific Plan	74.3	74.4	0.1	No
14	Bloomfield St.	s/o Cerritos Av.	Community & Institutional	66.3	66.4	0.1	No
15	Lexington Dr.	s/o Cerritos Av.	Golf Course	64.9	65.2	0.3	No
16	Walker St.	s/o Cerritos Av.	Specific Plan	70.5	70.6	0.1	No
17	Valley View St.	s/o Cerritos Av.	Specific Plan	73.2	73.2	0.0	No
18	Valley View St.	s/o Katella Av.	Low Density Residential	74.6	74.6	0.0	No

[1] Sources: City of Cypress General Plan Land Use Policy Map and the City of Los Alamitos General Plan, Figure 3 Land Use Plan.
[2] Significance of Cumulative Impacts (Table 4-1): if Project increases of 5 dBA, 3 dBA, or 1.5 dBA CNEL occur when ambient noise levels are less than 60 dBA, between 60 to 65 dBA, or greater than 65 dBA CNEL, respectively.

8 ON-SITE TRAFFIC NOISE

An on-site exterior noise impact analysis has been completed to determine the traffic noise exposure (to future uses on the site) and to identify potential necessary noise abatement measures. It is expected that the primary source of traffic noise impacts to the Project site will be from Katella Avenue. The uses on the site will also experience some background traffic noise impacts from Enterprise Drive and the Project's internal streets, however, due to the distance, topography and low traffic volume/speed, traffic noise from these roads will not make a significant contribution to the noise environment.

8.1 ON-SITE EXTERIOR NOISE ANALYSIS

Using the FHWA traffic noise prediction model and the parameters outlined in Tables 6-3 to 6-5, the expected future exterior noise levels for individual lots were calculated. Table 8-1 presents a summary of future exterior noise level impacts in the outdoor living areas (backyards) of the residential land use, and at the façade of buildings within the commercial land use of the Project site. The on-site traffic noise level impacts indicate that the lots facing Katella Avenue will experience unmitigated exterior noise levels ranging from 60.7 to 69.2 dBA CNEL. The on-site traffic noise analysis calculations are provided in Appendix 8.1.

To satisfy the City of Cypress 60 dBA CNEL exterior noise level standards for residential land use, the Project includes an 8-foot-high noise barrier (Noise PDF-1) that surrounds the residential lots. The residential lots are also set back from Katella Avenue by approximately 250 linear feet. The noise barriers, shown on Exhibit ES-A, result in future exterior noise levels that range from 50.7 to 50.8 dBA CNEL. This noise analysis shows that the noise barriers will satisfy the City of Cypress 60 dBA CNEL exterior noise level standards for residential development. No exterior noise level standards are identified in the City of Cypress General Plan Noise Element for commercial/retail land use, but the analysis indicates that the on-site traffic noise impacts at the commercial/retail land use within the Project site is considered *conditionally acceptable* with noise levels below 75 dBA CNEL. Therefore, no further exterior noise mitigation is required for the planned commercial/retail land uses.

TABLE 8-1: ON-SITE TRAFFIC EXTERIOR NOISE LEVELS (CNEL)

Lot	Roadway	Unmitigated Noise Level (dBA CNEL)	Mitigated Noise Level (dBA CNEL)	Barrier Height (Feet)	Top Of Barrier Elevation (Feet)
Commercial-West	Katella Av.	65.4	–[1]	–[1]	–[1]
Commercial-South	Katella Av.	69.2	–[1]	–[1]	–[1]
Residential-Southwest	Katella Av.	60.7	50.7	8.0'	37.9'
Residential-South	Katella Av.	60.7	50.8	8.0'	39.0'
Residential-Southeast	Katella Av.	60.7	50.8	8.0'	39.3'

[1] Commercial buildings do not include any outdoor environments requiring exterior noise mitigation based on the Interior and Exterior Noise Standards, Table N-3, of the City of Cypress General Plan Noise Element (Appendix 3.1).

8.2 ON-SITE INTERIOR NOISE ANALYSIS

To ensure that the interior noise levels (in future uses on the site) comply with the City of Cypress 45 dBA CNEL residential and 55 dBA CNEL commercial/retail interior noise standards, future noise levels were calculated at the first and second floor building facades.

8.2.1 NOISE LEVEL REDUCTION METHODOLOGY

The interior noise level is the difference between the predicted exterior noise level at the building facade and the noise reduction of the structure. Typical building construction will provide a Noise Level Reduction (NLR) of approximately 12 dBA with "windows open" and a minimum 25 dBA noise reduction with "windows closed." However, sound leaks, cracks and openings within the window assembly can greatly diminish its effectiveness in reducing noise. Several methods are typically used to improve interior noise reduction, including: (1) weather-stripped solid core exterior doors; (2) upgraded dual glazed windows; (3) mechanical ventilation/air conditioning; and (4) exterior wall/roof assembles free of cut outs or openings.

8.2.2 NOISE LEVEL REDUCTION CALCULATIONS

The noise reduction characteristics of a building are determined by combining the transmission loss of each of the building components that make up the building. Each unique component has a transmission loss value. For residential homes, the critical building components include the roof, walls, windows, doors, and attic configuration and insulation characteristics. The total noise reduction is dependent upon the transmission loss of each element and the surface area of that element in relation to the total surface area of the room. To account for the acoustic energy absorbed within a room, the absorption coefficients for individual surface areas such as drywall and carpet are used to calculate the interior room effects. The calculated building noise reduction includes both the transmission loss associated with the exterior wall assembly and the room absorption characteristics.

The interior noise level estimates are based on typical residential construction that includes exterior walls with a minimum Sound Transmission Class (STC) rating of 46. Typical walls with this rating will have 2x4 studs or greater, 16” o.c. with R-13 insulation, a minimum 7/8” exterior

surface of cement plaster and a minimum interior surface of 1/2" gypsum board. Interior wall finish shall be at least 1/2-inch thick gypsum wallboard or plaster. Ceilings shall be finished with gypsum board or plaster that is at least 1/2 inch thick. The roof system should have minimum 1/2" plywood sheathing which is well sealed to form a continuous traffic noise barrier with a minimum insulation of R-19 for all attic spaces. Compliance with California Building code achieves the required noise level reduction.

The NLR calculations were completed for the second floor living areas of the single-family detached and attached floor plans. Noise level reduction calculations are based on architectural floor plans prepared by Robert Hidey Architects. The floor plans were used to estimate the "windows closed" interior noise levels expected at each lot. To satisfy the City of Cypress interior noise level requirements based on the calculated exterior noise levels at the Project site, the calculations for interior NLRs were completed using standard windows with a minimum STC rating of 27 and upgraded windows with an STC rating of 35. As shown on Table 8-2, the calculated interior noise level reductions will range from 25.5 to 28.8 dBA CNEL with standard windows, and from 30.7 to 33.3 dBA CNEL with upgraded windows. The interior noise reduction calculations are included in Appendix 8.2.

TABLE 8-2: NOISE LEVEL REDUCTION CALCULATIONS (CNEL)

Layout	Floor Plan	Room	Floor	Calculated Noise Level Reduction (STC 27)[1]	Calculated Noise Level Reduction (STC 35)[1]
Single-Family Detached	4	Master / Bedroom 3	2	27.8	30.8
	4	Bath 3	2	28.8	32.9
	4	Media Room	2	27.3	31.5
	5	Bedroom 3	2	27.3	31.9
	5	Study	2	28.7	33.3
Single-Family Attached	3	Bonus Room	2	28.3	31.3
	4	Bedroom 2	2	27.0	31.8
	4	Bonus Room	2	25.5	30.7

[1] Interior noise reduction calculations are included in Appendix 8.2.

8.2.3 INTERIOR NOISE LEVEL ASSESSMENT

To provide the necessary interior noise level reduction, Tables 8-3 and 8-4 indicate that the residential lots and first floor of commercial buildings facing Katella Avenue will require a windows closed condition and a means of mechanical ventilation (e.g. air conditioning). Table 8-3 shows that the future unmitigated noise levels at the first floor building façade are expected to range from 50.7 to 69.2 dBA CNEL. The first floor interior noise level analysis shows that the City of Cypress 45 dBA CNEL interior noise level standards can be satisfied using standard windows with a minimum STC rating of 27. First floor residential lots will benefit from the attenuation provided by the planned 8-foot high perimeter wall (Noise PDF-1). Table 8-4 shows that the future noise levels at the second floor building façade are expected to approach 60.7 dBA CNEL,

and windows with a minimum STC rating of 27 will satisfy the City of Cypress's 45 dBA CNEL interior noise level standards for lots facing Katella Avenue.

TABLE 8-3: ON-SITE TRAFFIC FIRST FLOOR INTERIOR NOISE IMPACTS (CNEL)

Lot	Noise Level at Façade[1]	Required Interior Noise Reduction[2]	Estimated Interior Noise Reduction[3]	Upgraded Windows[4]	Interior Noise Level[5]
Commercial-West	65.4	10.4	25.0	No	40.4
Commercial-South	69.2	14.2	25.0	No	44.2
Residential-Southwest	50.7	5.7	25.0	No	25.7
Residential-South	50.8	5.8	25.0	No	25.8
Residential-Southeast	50.8	5.8	25.0	No	25.8

[1] Exterior noise level at the facade with a windows closed condition requiring a means of mechanical ventilation (e.g. air conditioning).
[2] Noise reduction required to satisfy the 45 dBA CNEL interior noise standards for residential development, and 55 dBA CNEL for commercial/retail land use.
[3] A minimum of 25 dBA with windows closed and 12 dBA with windows open noise reduction is assumed with standard building construction.
[4] Does the required interior noise reduction trigger upgraded windows with a minimum STC rating of greater than 27?
[5] Estimated interior noise level with minimum STC rating for all windows.

TABLE 8-4: ON-SITE TRAFFIC SECOND FLOOR INTERIOR NOISE IMPACTS (CNEL)

Lot	Noise Level at Façade[1]	Required Interior Noise Reduction[2]	Calculated Interior Noise Reduction[3]	Upgraded Windows[4]	Interior Noise Level[5]
Commercial-West	–[6]	–[6]	–[6]	–[6]	–[6]
Commercial-South	–[6]	–[6]	–[6]	–[6]	–[6]
Residential-Southwest	60.7	15.7	25.5	No	35.2
Residential-South	60.7	15.7	25.5	No	35.2
Residential-Southeast	60.7	15.7	25.5	No	35.2

[1] Exterior noise level at the facade with a windows closed condition requiring a means of mechanical ventilation (e.g. air conditioning).
[2] Noise reduction required to satisfy the 45 dBA CNEL interior noise standards for residential development, and 55 dBA CNEL for commercial/retail land use.
[3] Lowest calculated interior noise level reduction as shown on Table 8-2.
[4] Does the required interior noise reduction trigger upgraded windows with a minimum STC rating of greater than 27?
[5] Estimated interior noise level with minimum STC rating for all windows.
[6] First floor building only.

9 OFF-SITE RECEIVER LOCATIONS

To assess the potential for long-term operational and short-term construction noise impacts, the following four receiver locations shown on Exhibit 9-A were identified. The City of Cypress defines the most predominant sensitive receivers as housing locations where considerable time is spent by individuals, significant activities occur outdoors, and where sleep disturbances are most likely to occur in a residential area. The City of Cypress General Plan Noise Element also considers educational facilities, churches, libraries, senior housing, and park and recreation facilities as noise sensitive uses. (6) Similarly, the City of Los Alamitos General Plan Noise Element defines sensitive receptors as residences, schools, childcare facilities, religious institutions, hospitals, libraries, parks and recreational facilities, health care facilities, convalescent centers, and retirement homes.

Representative sensitive receivers in the vicinity of the Project site include residential land uses located at receiver location R4, and churches located at receiver locations R1 and R2. Receiver location R3 represents the existing Residence Inn hotel (which is not defined as a sensitive receiver but is included for informational purposes) in the Project study area, and is used to determine the operational noise level compliance due to Project noise sources. The closest sensitive residential land uses are represented by location R4 at a distance of approximately 163 feet south of the Project site.

R1: Location R1 represents the existing Cottonwood Church along Enterprise Drive located approximately 117 feet west of the Project site boundary. A 24-hour noise level measurement, LT5, was taken near this location to describe the existing ambient noise environment.

R2: Location R2 represents the existing church located roughly 242 feet east of the Project site boundary. A 24-hour noise level measurement, LT4, was taken near this location to describe the existing ambient noise environment.

R3: Location R3 represents the existing Residence Inn hotel located approximately 83 feet southeast of the Project site boundary.

R4: At a distance of approximately 163 feet south of the Project site, location R4 represents the residential community south of Katella Avenue, in the City of Los Alamitos.

EXHIBIT 9-A: OFF-SITE RECEIVER LOCATIONS

LEGEND:

- Off-Site Receiver Locations
- Distance from receiver to Project site boundary (in feet)

10 PROJECT-RELATED OPERATIONAL NOISE

This section analyzes the potential stationary-source noise impacts due to Project operational activities. Exhibit 10-A identifies the Project-related operational stationary noise sources, and receiver locations.

10.1 OPERATIONAL NOISE STANDARDS

Although the Project site is located within the City of Cypress, there are some residential sensitive receivers located directly across Katella Avenue in the City of Los Alamitos. Therefore, to accurately describe the potential operational noise level impacts, this analysis presents the operational noise standards for the City of Cypress and the City of Los Alamitos.

10.1.1 CITY OF CYPRESS OPERATIONAL NOISE STANDARDS

The noise regulations included in the City of Cypress Municipal Code, Article VII *Noise Control*, provide standards for determining and mitigating non-transportation or stationary-source noise impacts from operations at private properties. The noise standards identified in the Municipal Code are based on noise zones specified in Section 13-67 *Designated noise zone* which establishes Noise Zone 1 for all residential properties zoned RS-15000 or RS-6000, and Noise Zone 2 for all other residential properties. Based on the Municipal Code, the proposed Project development is designated as located within Noise Zone 2. Further, the Amended and Restated Cypress Business & Professional Center Specific Plan ("Specific Plan") also indicates that the Project site is within Noise Zone 2, (12)

For noise-sensitive residential land uses in Noise Zone 2, Section 13-68, *Exterior Noise Standards*, identifies a daytime (7:00 a.m. to 10:00 p.m.) noise level standard of 60 dBA L_{50} and a nighttime (10:00 p.m. to 7:00 a.m.) noise level standard of 55 dBA L_{50}. (12) These standards shall apply for a cumulative period of 30 minutes in any hour, as well as plus 5 dBA cannot be exceeded for a cumulative period of more than 15 minutes in any hour, or the standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour, or the standard plus 15 dBA for a cumulative period of more than 1 minute in any hour, or the standard plus 20 dBA for any period of time.

The Municipal Code, Section 13-71 *Schools, hospitals and churches; special provisions*, further states that the noise limits in Section 13-68 shall also apply to schools, churches or hospitals when they are in use, and for the purposes of this analysis, the churches in the Project study area are considered to be within Noise Zone 2. The City of Cypress Municipal Code noise standards are shown on Table 3-1, and included in Appendix 3.2. The City of Cypress Municipal Code also identifies interior noise standards of 55 dBA L_8 (5 minutes) during the daytime hours and 45 dBA L_8 (5 minutes) during the nighttime hours for residential land use.

10.1.2 CITY OF LOS ALAMITOS OPERATIONAL NOISE STANDARDS

The nearby residential land uses located south of the Project site, and south of Katella Avenue, are generally located in the City of Los Alamitos. The City of Los Alamitos Municipal Code, Chapter 17.24 *Noise*, provides noise standards.

The City of Los Alamitos Municipal Code defines *Exterior Noise Standards* in Section 17.24.050 for land uses categorized in four different noise zones. As defined by the Municipal Code, Section 17.24.040, residential properties are designated as Noise Zone 1, and the operational noise level limits during the daytime (7:00 a.m. to 10:00 p.m.) hours of 55 dBA L_{50} and 50 dBA L_{50} during the nighttime (10:00 p.m. to 7:00 a.m.) hours shall apply to the nearby residential receivers in the City of Los Alamitos. (13) These standards shall apply for a cumulative period of 30 minutes in any hour, as well as plus 5 dBA cannot be exceeded for a cumulative period of more than 15 minutes in any hour, or the standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour, or the standard plus 15 dBA for a cumulative period of more than 1 minute in any hour, or the standard plus 20 dBA for any period of time. The City of Los Alamitos Municipal Code noise standards are shown on Table 3-1, and included in Appendix 3.3.

10.2 OFF-SITE PROJECT RELATED OPERATIONAL NOISE LEVELS

The Project commercial/retail-related noise sources are expected to include: parking lot vehicle movement, loading dock activities, and roof-top air conditioning units. The loading dock activities at the commercial/retail land use will only occur during the daytime hours of 7:00 a.m. to 10:00 p.m. The residential development is not expected to include any specific type of operational noise levels beyond the typical noise sources associated with residential land use. Based upon the reference noise levels presented in Section 6.4, it is possible to estimate the Project related operational stationary-source noise levels at the off-site receiver locations, as shown on Exhibit 10-A for the daytime conditions, and Exhibit 10-B for the nighttime conditions. The operational noise level calculations shown on Tables 10-1 and 10-2 account for the distance attenuation provided due to geometric spreading, when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. With geometric spreading, sound levels attenuate (or decrease) at a rate of 6 dB for each doubling of distance from a point source (e.g. loading dock activity and roof-top air conditioning units) and 4.5 dB for each doubling of distance from a line source (e.g. parking lot vehicle movement). Table 10-1 indicates that the daytime hourly noise levels due to Project noise sources at the off-site receivers are expected to range from 34.9 to 52.5 dBA L_{50}; 36.4 to 53.3 dBA L_{25}; 37.7 to 54.0 dBA L_8; 39.1 to 54.8 dBA L_2; and 46.6 to 60.1 dBA Lmax. Table 10-2 indicates that the nighttime hourly noise levels due to Project noise sources, without the loading dock activity, at the off-site receivers are expected to range from 34.9 to 48.5 dBA L_{50}; 36.4 to 49.9 dBA L_{25}; 37.7 to 51.1 dBA L_8; 39.1 to 52.2 dBA L_2; and 46.6 to 58.9 dBA Lmax. The operational noise level calculations are included in Appendix 10.1.

EXHIBIT 10-A: PROJECT RELATED DAYTIME OPERATIONAL NOISE ANALYSIS

N

LEGEND:

- 8' Barrier Height (in feet)
- Planned Barrier
- Distance from receivers to center of noise sources (in feet)
- Off-Site Receiver Locations
- On-Site Receiver Locations
- Roof-Top Air Conditioning Units
- Loading Dock Activity
- Parking Lot Vehicle Movement

EXHIBIT 10-B: PROJECT RELATED NIGHTTIME OPERATIONAL NOISE ANALYSIS

LEGEND:

- 8' Barrier Height (in feet)
- Planned Barrier
- Distance from receivers to center of noise sources (in feet)
- Off-Site Receiver Locations
- On-Site Receiver Locations
- Roof-Top Air Conditioning Units
- Parking Lot Vehicle Movement

TABLE 10-1: OFF-SITE PROJECT RELATED DAYTIME OPERATIONAL NOISE LEVEL PROJECTIONS

Receiver Location[1]	Land Use[2]	Noise Source[3]	Operational Noise Levels (dBA)[4]				
			L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
R1	Church	Loading Dock Activity	-[5]	-[5]	-[5]	-[5]	-[5]
		Roof-Top Air Conditioning Units	41.0	42.2	43.2	43.8	43.0
		Parking Lot Vehicle Movement	21.3	25.3	28.3	31.7	44.1
		Combined Noise Level:	41.0	42.3	43.3	44.1	46.6
R2	Church	Loading Dock Activity	-[5]	-[5]	-[5]	-[5]	-[5]
		Roof-Top Air Conditioning Units	34.5	35.7	36.7	37.3	36.5
		Parking Lot Vehicle Movement	23.9	27.9	30.9	34.3	46.7
		Combined Noise Level:	34.9	36.4	37.7	39.1	47.1
R3	Hotel	Loading Dock Activity	50.2	50.6	50.9	51.2	53.6
		Roof-Top Air Conditioning Units	48.3	49.5	50.5	51.1	50.3
		Parking Lot Vehicle Movement	35.5	39.5	42.5	45.9	58.3
		Combined Noise Level:	52.5	53.3	54.0	54.8	60.1
R4	Residential	Loading Dock Activity	42.4	42.8	43.1	43.4	45.8
		Roof-Top Air Conditioning Units	46.0	47.2	48.2	48.8	48.0
		Parking Lot Vehicle Movement	32.6	36.6	39.6	43.0	55.4
		Combined Noise Level:	47.7	48.8	49.8	50.7	56.5
		Peak Hour Noise Level:	52.5	53.3	54.0	54.8	60.1

[1] See Exhibit 10-A for the receiver and Project noise source locations.
[2] Source: City of Cerritos General Plan Land Use Element, Land Use Policy Map and the City of Los Alamitos General Plan Land Use Element, Figure 3.
[3] Reference noise sources as shown on Table 6-6.
[4] Stationary source noise level calculations are provided in Appendix 10.1.
[5] Noise source is not located near the receiver location. No direct line of sight to the noise source.

TABLE 10-2: OFF-SITE PROJECT RELATED NIGHTTIME OPERATIONAL NOISE LEVEL PROJECTIONS

Receiver Location[1]	Land Use[2]	Noise Source[3]	Operational Noise Levels (dBA)[4]				
			L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
R1	Church	Loading Dock Activity	-[5]	-[5]	-[5]	-[5]	-[5]
		Roof-Top Air Conditioning Units	41.0	42.2	43.2	43.8	43.0
		Parking Lot Vehicle Movement	21.3	25.3	28.3	31.7	44.1
		Combined Noise Level:	41.0	42.3	43.3	44.1	46.6
R2	Church	Loading Dock Activity	-[5]	-[5]	-[5]	-[5]	-[5]
		Roof-Top Air Conditioning Units	34.5	35.7	36.7	37.3	36.5
		Parking Lot Vehicle Movement	23.9	27.9	30.9	34.3	46.7
		Combined Noise Level:	34.9	36.4	37.7	39.1	47.1
R3	Hotel	Loading Dock Activity	-[5]	-[5]	-[5]	-[5]	-[5]
		Roof-Top Air Conditioning Units	48.3	49.5	50.5	51.1	50.3
		Parking Lot Vehicle Movement	35.5	39.5	42.5	45.9	58.3
		Combined Noise Level:	48.5	49.9	51.1	52.2	58.9
R4	Residential	Loading Dock Activity	-[5]	-[5]	-[5]	-[5]	-[5]
		Roof-Top Air Conditioning Units	46.0	47.2	48.2	48.8	48.0
		Parking Lot Vehicle Movement	32.6	36.6	39.6	43.0	55.4
		Combined Noise Level:	46.2	47.6	48.8	49.8	56.1
		Peak Hour Noise Level:	48.5	49.9	51.1	52.2	58.9

[1] See Exhibit 10-B for the receiver and Project noise source locations.
[2] Source: City of Cerritos General Plan Land Use Element, Land Use Policy Map and the City of Los Alamitos General Plan Land Use Element, Figure 3.
[3] Reference noise sources as shown on Table 6-6.
[4] Stationary source noise level calculations are provided in Appendix 10.1.
[5] Loading dock activity is not permitted during the nighttime hours (10:00 p.m. to 7:00 a.m.).

10.2.1 OFF-SITE PROJECT RELATED OPERATIONAL NOISE LEVEL COMPLIANCE

Tables 10-3 and 10-4 show the operational noise levels associated with the Project will not exceed the daytime and nighttime exterior noise level standards, respectively, for off-site sensitive receivers in the City of Cypress or the City of Los Alamitos.

TABLE 10-3: DAYTIME OFF-SITE OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	City	Land Use	Noise Level at Receiver Locations (dBA)[2]					Daytime Compliance[3]
			L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)	
R1	Cypress	Church	41.0	42.3	43.3	44.1	46.6	Yes
R2	Cypress	Church	34.9	36.4	37.7	39.1	47.1	Yes
R3	Cypress	Hotel	52.5	53.3	54.0	54.8	60.1	Yes
R4	Los Alamitos	Residential	47.7	48.8	49.8	50.7	56.5	Yes

[1] See Exhibit 10-A for the receiver and noise source locations.
[2] Estimated Project stationary source noise levels as shown on Table 10-1.
[3] Do the estimated Project stationary source noise levels meet the City of Cypress and Los Alamitos noise standards (shown on Table 3-1) on the affected land uses?
"Daytime" = 7:00 a.m. to 10:00 p.m.

TABLE 10-4: NIGHTTIME OFF-SITE OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	City	Land Use	Noise Level at Receiver Locations (dBA)[2]					Nighttime Compliance[3]
			L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)	
R1	Cypress	Church	41.0	42.3	43.3	44.1	46.6	Yes
R2	Cypress	Church	34.9	36.4	37.7	39.1	47.1	Yes
R3	Cypress	Hotel	48.5	49.9	51.1	52.2	58.9	Yes
R4	Los Alamitos	Residential	46.2	47.6	48.8	49.8	56.1	Yes

[1] See Exhibit 10-B for the receiver and noise source locations.
[2] Estimated Project stationary source noise levels as shown on Table 10-2.
[3] Do the estimated Project stationary source noise levels meet the City of Cypress and Los Alamitos noise standards (shown on Table 3-1) on the affected land uses?
"Nighttime" = 10:00 p.m. to 7:00 a.m.

10.2.2 OFF-SITE PROJECT RELATED OPERATIONAL NOISE CONTRIBUTION

To describe the Project operational noise level contributions, the Project operational noise levels were combined with the existing ambient noise level measurements at the off-site receiver locations potentially impacted by Project noise sources. The difference between the combined Project and ambient noise levels describes the Project noise level contributions at each of the receiver locations. Noise levels that would be experienced at receiver locations when Project-source noise is added to the ambient daytime and nighttime conditions are presented on Tables 10-5 and 10-6, respectively, and include the attenuation provided by the planned 8-foot high noise barrier (Noise PDF-1) shown on Exhibit 10-A.

By subtracting the ambient noise levels from the combined Project and ambient noise levels, the Project-only noise level contributions are calculated, as shown on Tables 10-5 and 10-6. Based on these calculations, the Project would contribute operational stationary-source noise level increases of up to 3.9 dBA L_{50} (daytime) and 3.7 dBA L_{50} (nighttime) at nearby off-site receiver locations. The noise level contributions of 3.9 dBA L_{50} and 3.7 dBA L_{50} at off-site receiver locations would not exceed the significance criteria discussed in Section 4 when the existing ambient noise levels are below 60 dBA L_{50}. The Project-related operational noise level increases at the off-site sensitive receivers in the Project study area are considered less than significant for the daytime and nighttime conditions. On this basis, Project operational stationary-source noise would not result in a substantial temporary/periodic, or permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project, and, therefore, impacts will be less-than-significant.

TABLE 10-5: OFF-SITE PROJECT RELATED DAYTIME OPERATIONAL NOISE LEVEL CONTRIBUTIONS

Location		Type of Noise	Noise Levels (dBA)					Potential Significant Impact?[6]
Receiver[1]	Meas.		L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)	
R1	LT5	Project Noise Level[2]	41.0	42.3	43.3	44.1	46.6	No
		Ambient Noise Level[3]	51.9	54.1	56.7	61.1	75.3	
		Combined[4]	52.2	54.4	56.9	61.2	75.3	
		Project Contribution[5]	0.3	0.3	0.2	0.1	0.0	
R2	LT4	Project Noise Level[2]	34.9	36.4	37.7	39.1	47.1	No
		Ambient Noise Level[3]	48.4	50.2	54.7	60.5	71.5	
		Combined[4]	48.6	50.4	54.8	60.5	71.5	
		Project Contribution[5]	0.2	0.2	0.1	0.0	0.0	
R3[7]	LT6	Project Noise Level[2]	52.5	53.3	54.0	54.8	60.1	No
		Ambient Noise Level[3]	50.9	52.6	55.0	58.9	70.3	
		Combined[4]	54.8	56.0	57.6	60.3	70.7	
		Project Contribution[5]	3.9	3.4	2.6	1.4	0.4	
R4	LT6	Project Noise Level[2]	47.7	48.8	49.8	50.7	56.5	No
		Ambient Noise Level[3]	50.9	52.6	55.0	58.9	70.3	
		Combined[4]	52.6	54.1	56.1	59.5	70.5	
		Project Contribution[5]	1.7	1.5	1.1	0.6	0.2	

[1] See Exhibit 10-A for the receiver and noise source locations.
[2] Total operational noise levels as shown on Table 10-3.
[3] Existing ambient noise level measurement locations as shown on Exhibit 5-A.
[4] Represents the combined ambient conditions plus the Project activities.
[5] The noise level increase expected with the addition of the proposed Project activities.
[6] Significance of Cumulative Impacts (Section 4, Table 4-1).
[7] Receiver location is not considered noise-sensitive by the City of Cypress General Plan Noise Element.

TABLE 10-6: OFF-SITE PROJECT RELATED NIGHTTIME OPERATION NOISE LEVEL CONTRIBUTIONS

Location		Type of Noise	Noise Levels (dBA)					Potential Significant Impact?[6]
Receiver[1]	Meas.		L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)	
R1	LT5	Project Noise Level[2]	41.0	42.3	43.3	44.1	46.6	No
		Ambient Noise Level[3]	49.1	51.1	53.6	55.8	68.5	
		Combined[4]	49.7	51.6	54.0	56.1	68.5	
		Project Contribution[5]	0.6	0.5	0.4	0.3	0.0	
R2	LT4	Project Noise Level[2]	34.9	36.4	37.7	39.1	47.1	No
		Ambient Noise Level[3]	49.8	51.3	53.0	55.9	68.7	
		Combined[4]	49.9	51.4	53.1	56.0	68.7	
		Project Contribution[5]	0.1	0.1	0.1	0.1	0.0	
R3[7]	LT6	Project Noise Level[2]	48.5	49.9	51.1	52.2	58.9	No
		Ambient Noise Level[3]	47.2	48.9	51.1	53.4	60.9	
		Combined[4]	50.9	52.4	54.1	55.9	63.0	
		Project Contribution[5]	3.7	3.5	3.0	2.5	2.1	
R4	LT6	Project Noise Level[2]	46.2	47.6	48.8	49.8	56.1	No
		Ambient Noise Level[3]	47.2	48.9	51.1	53.4	60.9	
		Combined[4]	49.7	51.3	53.1	55.0	62.1	
		Project Contribution[5]	2.5	2.4	2.0	1.6	1.2	

[1] See Exhibit 10-B for the receiver and noise source locations.
[2] Total operational noise levels as shown on Table 10-4.
[3] Existing ambient noise level measurement locations as shown on Exhibit 5-A.
[4] Represents the combined ambient conditions plus the Project activities.
[5] The noise level increase expected with the addition of the proposed Project activities.
[6] Significance of Cumulative Impacts (Section 4, Table 4-1).
[7] Receiver location is not considered noise-sensitive by the City of Cypress General Plan Noise Element.

10.3 ON-SITE PROJECT RELATED OPERATIONAL NOISE LEVELS

Based upon the reference noise levels presented in Section 6.4, it is possible to estimate the Project related operational stationary-source noise levels at the on-site receiver locations, as shown on Exhibit 10-A for the daytime hours, and Exhibit 10-B for the nighttime hours. The operational noise level calculations shown on Tables 10-7 and 10-8 account for the distance attenuation provided due to geometric spreading, when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. With geometric spreading, sound levels attenuate (or decrease) at a rate of 6 dB for each doubling of distance from a point source (e.g. loading dock activity and roof-top air conditioning units) and 4.5 dB for each doubling of distance from a line source (e.g. parking lot vehicle movement). Table 10-7 indicates that the daytime hourly noise levels at the on-site receivers within the Project site are expected to range from 41.4 to 49.8 dBA L_{50}; 43.5 to 50.9 dBA L_{25}; 45.4 to 51.9 dBA L_8; 47.6 to 52.8 dBA L_2; and 58.2 to 58.5 dBA Lmax. Table 10-8 indicates that the nighttime hourly noise levels at the on-site receivers within the Project site are expected to range from 41.4 to 48.3 dBA L_{50}; 43.5 to 49.7 dBA L_{25}; 45.4 to 50.8 dBA L_8; 47.6 to 51.9 dBA L_2; and 58.1 to 58.2 dBA Lmax.

TABLE 10-7: ON-SITE PROJECT RELATED DAYTIME OPERATIONAL NOISE LEVEL PROJECTIONS

Receiver Location[1]	Land Use[2]	Noise Source[3]	Operational Noise Levels (dBA)[4]				
			L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
T7	Residential	Loading Dock Activity	-[5]	-[5]	-[5]	-[5]	-[5]
		Roof-Top Air Conditioning Units	40.2	41.4	42.4	43.0	42.2
		Parking Lot Vehicle Movement	35.3	39.3	42.3	45.7	58.1
		Combined Noise Level:	41.4	43.5	45.4	47.6	58.2
T8	Residential	Loading Dock Activity	44.5	44.9	45.2	45.5	47.9
		Roof-Top Air Conditioning Units	48.1	49.3	50.3	50.9	50.1
		Parking Lot Vehicle Movement	34.6	38.6	41.6	45.0	57.4
		Combined Noise Level:	49.8	50.9	51.9	52.8	58.5
		Peak Hour Noise Level:	49.8	50.9	51.9	52.8	58.5

[1] See Exhibit 10-A for the receiver and Project noise source locations.
[2] Source: City of Cerritos General Plan Land Use Element, Land Use Policy Map and the City of Los Alamitos General Plan Land Use Element, Figure 3.
[3] Reference noise sources as shown on Table 6-6.
[4] Stationary source noise level calculations are provided in Appendix 10.1.
[5] Noise source is not located near the receiver location. No direct line of sight to the noise source.

TABLE 10-8: ON-SITE PROJECT RELATED NIGHTTIME OPERATIONAL NOISE LEVEL PROJECTIONS

Receiver Location[1]	Land Use[2]	Noise Source[3]	Operational Noise Levels (dBA)[4]				
			L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
T7	Residential	Loading Dock Activity	-[5]	-[5]	-[5]	-[5]	-[5]
		Roof-Top Air Conditioning Units	40.2	41.4	42.4	43.0	42.2
		Parking Lot Vehicle Movement	35.3	39.3	42.3	45.7	58.1
		Combined Noise Level:	41.4	43.5	45.4	47.6	58.2
T8	Residential	Loading Dock Activity	-[5]	-[5]	-[5]	-[5]	-[5]
		Roof-Top Air Conditioning Units	48.1	49.3	50.3	50.9	50.1
		Parking Lot Vehicle Movement	34.6	38.6	41.6	45.0	57.4
		Combined Noise Level:	48.3	49.7	50.8	51.9	58.1
		Peak Hour Noise Level:	48.3	49.7	50.8	51.9	58.2

[1] See Exhibit 10-B for the receiver and Project noise source locations.
[2] Source: City of Cerritos General Plan Land Use Element, Land Use Policy Map and the City of Los Alamitos General Plan Land Use Element, Figure 3.
[3] Reference noise sources as shown on Table 6-6.
[4] Stationary source noise level calculations are provided in Appendix 10.1.
[5] Loading dock activity is not permitted during the nighttime hours (10:00 p.m. to 7:00 a.m.).

10.3.1 On-Site Project Related Operational Noise Level Compliance

Tables 10-9 and 10-10 show the operational noise levels associated with the Project's commercial land use will not exceed the daytime and nighttime exterior noise level standards, respectively, for the on-site residential receivers within the Project site.

TABLE 10-9: DAYTIME ON-SITE OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	City	Land Use	Noise Level at Receiver Locations (dBA)[2]					Daytime Compliance[3]
			L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)	
T7	Cypress	Residential	41.4	43.5	45.4	47.6	58.2	Yes
T8	Cypress	Residential	49.8	50.9	51.9	52.8	58.5	Yes

[1] See Exhibit 10-A for the receiver and noise source locations.
[2] Estimated Project stationary source noise levels as shown on Table 10-7.
[3] Do the estimated Project stationary source noise levels meet the City of Cypress noise standards (shown on Table 3-1) on the affected land uses? "Daytime" = 7:00 a.m. to 10:00 p.m.

TABLE 10-10: NIGHTTIME ON-SITE OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	City	Land Use	Noise Level at Receiver Locations (dBA)[2]					Nighttime Compliance[3]
			L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)	
T7	Cypress	Residential	41.4	43.5	45.4	47.6	58.2	Yes
T8	Cypress	Residential	48.3	49.7	50.8	51.9	58.1	Yes

[1] See Exhibit 10-A for the receiver and noise source locations.
[2] Estimated Project stationary source noise levels as shown on Table 10-8.
[3] Do the estimated Project stationary source noise levels meet the City of Cypress noise standards (shown on Table 3-1) on the affected land uses?
"Nighttime" = 10:00 p.m. to 7:00 a.m.

11 ON-SITE STATIONARY NOISE

This section analyzes the potential stationary-source operational noise impacts at the future sensitive receivers/residential units within the Project site from the off-site stationary noise sources associated with surrounding land uses including the existing churches, hotel, and retail plaza with Office Depot. Exhibit 11-A identifies the on-site receiver locations and off-site noise source locations used to assess the stationary-source noise levels without the race activity.

11.1 STATIONARY NOISE SOURCES

This noise study analyzes the potential impacts to on-site sensitive receivers during the typical weekday conditions. Existing off-site stationary noise sources include: parking lot vehicle movements, loading dock activities, roof-top air conditioning units and trash compactors associated with the retail center with Office Depot located east of the Project site; and roof-top air conditioning units and parking lot vehicle movements from the nearby churches and hotel.

Additional background stationary-source noise due to an existing water pump located adjacent to the northeast corner of the Project site may also be experienced by the on-site receivers, however, the noise from the water pump will be overshadowed by the existing parking lot vehicle movements, daytime loading dock activities, roof-top air conditioning units and trash compactors in the Project study area. To account for the potential noise impacts due to the water pump, reference noise level measurements were taken during peak race course activity at the Los Alamitos Race Course which include noise from water pump activity. The Los Alamitos Race Course peak hour noise analysis is presented in Section 13.

11.2 ON-SITE STATIONARY-SOURCE NOISE LEVELS

Based upon the reference noise levels described in Section 6.4, it is possible to estimate the stationary-source noise levels at the on-site receiver locations, as shown on Exhibit 11-A. The operational noise level calculations shown on Table 11-1 account for the distance attenuation provided due to geometric spreading, when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. With geometric spreading, sound levels attenuate (or decrease) at a rate of 6 dB for each doubling of distance from a point source (e.g. loading dock activity, roof-top air conditioning units, trash compactors) and 4.5 dB for each doubling of distance from a line source (e.g. parking lot vehicle movement). Table 11-1 indicates that the unmitigated hourly noise levels at the on-site receivers are expected to range from 34.4 to 40.1 dBA L_{50}; 35.7 to 41.5 dBA L_{25}; 37.0 to 42.8 dBA L_8; 38.7 to 44.8 dBA L_2; and 44.2 to 57.2 dBA Lmax. The off-site stationary-source noise calculations are included in Appendix 11.1.

EXHIBIT 11-A: STATIONARY NOISE SOURCE AND RECEIVER LOCATIONS

LEGEND:

- 8' Barrier Height (in feet)
- Planned Barrier
- Distance from receivers to center of noise sources (in feet)
- On-Site Receiver Locations
- Roof-Top Air Conditioning Units
- Trash Compactor
- Loading Dock Activity
- Parking Lot Vehicle Movement

TABLE 11-1: ON-SITE STATIONARY NOISE LEVEL PROJECTIONS

Receiver Location[1]	Land Use[2]	Noise Source[3]	Operational Noise Levels (dBA)[4]				
			L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
T1	Residential	Loading Dock Activity	-[5]	-[5]	-[5]	-[5]	-[5]
		Roof-Top Air Conditioning Units	34.7	35.9	36.9	37.5	36.7
		Parking Lot Vehicle Movement	27.1	31.1	34.1	37.5	49.9
		Combined Noise Level:	35.4	37.1	38.7	40.5	50.1
T4	Residential	Loading Dock Activity	-[5]	-[5]	-[5]	-[5]	-[5]
		Roof-Top Air Conditioning Units	36.1	37.3	38.3	38.9	38.1
		Parking Lot Vehicle Movement	20.2	24.2	27.2	30.6	43.0
		Combined Noise Level:	36.2	37.5	38.6	39.5	44.2
T5	Residential	Loading Dock Activity	30.3	30.7	31.0	31.3	33.7
		Roof-Top Air Conditioning Units	31.9	33.1	34.1	34.7	33.9
		Parking Lot Vehicle Movement	22.3	26.3	29.3	32.7	45.1
		Trash Compactor	16.0	17.3	25.6	30.8	31.8
		Combined Noise Level:	34.5	35.7	37.0	38.7	45.9
T6	Residential	Loading Dock Activity	-[5]	-[5]	-[5]	-[5]	-[5]
		Roof-Top Air Conditioning Units	39.8	41.0	42.0	42.6	41.8
		Parking Lot Vehicle Movement	28.3	32.3	35.3	38.7	51.1
		Combined Noise Level:	40.1	41.5	42.8	44.1	51.6
T8	Residential	Loading Dock Activity	-[5]	-[5]	-[5]	-[5]	-[5]
		Roof-Top Air Conditioning Units	-[5]	-[5]	-[5]	-[5]	-[5]
		Parking Lot Vehicle Movement	34.4	38.4	41.4	44.8	57.2
		Combined Noise Level:	34.4	38.4	41.4	44.8	57.2
		Peak Hour Noise Level:	40.1	41.5	42.8	44.8	57.2

[1] See Exhibit 11-A for the receiver and Project noise source locations.
[2] Source: City of Cerritos General Plan Land Use Element, Land Use Policy Map and the City of Los Alamitos General Plan Land Use Element, Figure 3.
[3] Reference noise sources as shown on Table 6-6.
[4] Stationary source noise level calculations are provided in Appendix 11.1.
[5] Noise source is not located near the receiver location. No direct line of sight to the noise source.

11.2.1 ON-SITE STATIONARY SOURCE NOISE LEVEL COMPLIANCE

Table 11-2 shows the noise levels associated with the existing stationary sources including parking lot vehicle movements, loading dock activities, roof-top air conditioning units and trash compactors associated with the retail center with Office Depot located east of the Project site; and roof-top air conditioning units and parking lot vehicle movements from the nearby churches and hotel will not exceed the City of Cypress daytime and nighttime exterior noise level standards for on-site sensitive residential receivers within the Project site.

TABLE 11-2: ON-SITE STATIONARY SOURCE NOISE LEVEL COMPLIANCE

Receiver Location[1]	City	Land Use	Noise Level at Receiver Locations (dBA)[2]					Compliance[3]	
			L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)	Daytime	Nighttime
T1	Cypress	Residential	35.4	37.1	38.7	40.5	50.1	Yes	Yes
T4	Cypress	Residential	36.2	37.5	38.6	39.5	44.2	Yes	Yes
T5	Cypress	Residential	34.5	35.7	37.0	38.7	45.9	Yes	Yes
T6	Cypress	Residential	40.1	41.5	42.8	44.1	51.6	Yes	Yes
T8	Cypress	Residential	34.4	38.4	41.4	44.8	57.2	Yes	Yes

[1] See Exhibit 11-A for the receiver and noise source locations.
[2] Estimated Project stationary source noise levels as shown on Table 11-1.
[3] Do the estimated Project stationary source noise levels meet the City of Cypress noise standards (shown on Table 3-1) on the affected land uses?
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

12 CONSTRUCTION

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project.

12.1 CONSTRUCTION NOISE STANDARDS

The City of Cypress does not specify construction noise level limits because its Municipal Code, Section 13-70 (e), states that "[n]oise sources associated with construction, repair, remodeling or grading of any real property, provided said activities do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays and before 9:00 a.m. and after 8:00 p.m. on Saturdays, or at any time on Sundays or federal holiday" are exempt from the provisions of the noise ordinance. (12)

However, to provide a comprehensive and conservative analysis, the operational noise level limits discussed in Section 3.4 are used to evaluate the noise levels from construction activity on the Project site. The anytime maximum permitted exterior noise level of 80 dBA Lmax for the residential receivers in the City of Cypress shall be used as the acceptable threshold for determining the impacts due to Project construction for sensitive receivers in the City of Cypress. Since the City of Cypress has identified a maximum permitted exterior noise level to control operational noise levels, they represent a reasonable threshold of significance to evaluate potential construction noise level impacts. The City of Cypress Municipal Code construction noise standards are shown on Table 3-2 and included in Appendix 3.2.

Sensitive receivers in the Project study area are also located within the City of Los Alamitos. Similar to the method above, and to provide a conservative analysis, the City of Los Alamitos' noise level standards are analyzed. The City of Los Alamitos Municipal Code, Section 17.24.020 (D) states that construction activities are considered exempt if limited to the permitted hours between 7:00 a.m. to 8:00 p.m. on weekdays and Saturdays, with no activity on Sundays or federal holidays. (13) While the City of Los Alamitos Municipal Code does not identify specific noise level limits, the stationary-source noise level standards discussed in Section 3.4 are used to analyze impacts. For the purposes of this analysis, the maximum permitted noise level limit of 75 dBA Lmax shall be used to assess the Project-related construction noise level impacts at receivers in the City of Los Alamitos. Since the City of Los Alamitos has identified a maximum permitted exterior noise level to control operational noise levels, they represent a reasonable threshold of significance to evaluate potential construction noise level impacts. The City of Los Alamitos noise standards are shown on Table 3-2 and included in Appendix 3.3.

12.2 CONSTRUCTION NOISE LEVELS

Noise generated by the Project construction equipment will include a combination of earth moving equipment, trucks, power tools, concrete mixers and portable generators that when combined can reach high levels. The number and mix of construction equipment is expected to occur in the following stages:

- Site Preparation

- Grading & Paving
- Building Construction & Architectural Coatings

This construction noise analysis was prepared using the Federal Highway Administration (FHWA) published Roadway Construction Noise Model (RCNM) that includes a national database of construction equipment reference noise emission levels. (21) The RCNM equipment database, as shown in Appendix 12.1, provides a comprehensive list of the noise generating characteristics for specific types of construction equipment. In addition, the database provides an acoustical usage factor to estimate the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation. The usage factor is a key input variable of the RCNM noise prediction model that is used to calculate the average Leq noise levels using the Lmax noise levels measured at a distance of 50 feet.

Noise levels generated by heavy construction equipment can range from approximately 70 dBA to in excess of 100 dBA when measured at 50 feet. However, these noise levels diminish with distance from the construction site at a rate of 6 dBA per doubling of distance. For example, a noise level of 78 dBA measured at 50 feet from the noise source to the receiver would be reduced to 72 dBA at 100 feet from the source to the receiver, and would be further reduced to 66 dBA at 200 feet from the source to the receiver. The construction noise levels including the number and mix of construction equipment by construction phase are consistent with the data used to support the construction emissions in the *Barton Place Air Quality Impact Analysis* provided by C33, LLC. (22)

12.3 CONSTRUCTION NOISE ANALYSIS

Using the stationary-source RCNM noise prediction model, calculations of the Project construction noise level impacts at the four off-site noise receiver locations were completed. Tables 12-1 to 12-3 present the short-term construction noise levels for each phase of construction. Table 12-4 provides a summary of the construction noise levels by phase at the four noise receiver locations. Based on the stages of construction, the noise impacts associated with the Project are expected to create temporary noise impacts at receiver locations surrounding the Project site when all equipment is operating at the center of construction activity within Project site.

To assess the construction noise levels at each receiver location, this analysis shows the noise impacts when each piece of heavy equipment is operating simultaneously at a distance of roughly 100 feet from the Project site boundary. This analysis represents a conservative approach since it assumes all heavy equipment is operating at the same time and distance from each receiver, which is unlikely to occur during actual construction activities, and therefore, represents a worst-case noise analysis. The distance from each receiver location to the center of Project construction activity is shown on Exhibit 12-A.

EXHIBIT 12-A: CONSTRUCTION ACTIVITY AND RECEIVER LOCATIONS

N

LEGEND:

- Off-Site Receiver Locations
- Distance from receivers to center of construction activity (in feet)
- Center of Construction Activity
- Project Site Boundary

TABLE 12-1: SITE PREPARATION EQUIPMENT NOISE LEVELS

Equipment Type[1]	Quantity	Usage Factor[2]	Hours Of Operation[3]	Reference Noise Level @ 50 Feet (dBA Lmax)	Cumulative Level @ 100 Feet (dBA Lmax)
Rubber Tired Dozers	1	40%	3.2	79.0	73.0
Tractor/Loader/Backhoes	1	40%	3.2	78.0	72.0
Water Trucks	1	40%	3.2	76.0	70.0
Cumulative Hourly Noise Levels 100 Feet (dBA Lmax)					76.6

Construction Noise Reference Distance	Distance To Property Line (In Feet)[4]	Distance Attenuation (dBA Lmax)[5]	Estimated Noise Barrier Attenuation (dBA Lmax)	Construction Noise Level (dBA Lmax)
R1	217'	-6.7	0.0	69.9
R2	342'	-10.7	0.0	65.9
R3	183'	-5.2	0.0	71.3
R4	263'	-8.4	0.0	68.2

[1] Source: FHWA's Roadway Construction Noise Model, January 2006.
[2] Estimates the fraction of time each piece of equipment is operating at full power during a construction operation.
[3] Represents the actual hours of peak construction equipment activity out of a typical 8 hour workday.
[4] Distance from the center of construction activity to the nearest receiver, shown on Exhibit 10-A.
[5] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.

TABLE 12-2: GRADING & PAVING EQUIPMENT NOISE LEVELS

Equipment Type[1]	Quantity	Usage Factor[2]	Hours Of Operation[3]	Reference Noise Level @ 50 Feet (dBA Lmax)	Cumulative Level @ 100 Feet (dBA Lmax)
Water Trucks	4	40%	3.2	76.0	70.0
Scrapers	7	40%	3.2	84.0	78.0
Tractor/Loader/Backhoes	6	40%	3.2	78.0	72.0
Other Equipment	2	50%	4.0	85.0	79.0
Pavers	2	50%	4.0	77.0	71.0
Paving Equipment	2	40%	3.2	76.0	70.0
Rollers	2	20%	1.6	80.0	74.0
Cumulative Hourly Noise Levels 100 Feet (dBA Lmax)					83.3

Construction Noise Reference Distance	Distance To Property Line (In Feet)[4]	Distance Attenuation (dBA Lmax)[5]	Estimated Noise Barrier Attenuation (dBA Lmax)	Construction Noise Level (dBA Lmax)
R1	217'	-6.7	0.0	76.6
R2	342'	-10.7	0.0	72.6
R3	183'	-5.2	0.0	78.1
R4	263'	-8.4	0.0	74.9

[1] Source: FHWA's Roadway Construction Noise Model, January 2006.
[2] Estimates the fraction of time each piece of equipment is operating at full power during a construction operation.
[3] Represents the actual hours of peak construction equipment activity out of a typical 8 hour workday.
[4] Distance from the center of construction activity to the nearest receiver, shown on Exhibit 10-A.
[5] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.

TABLE 12-3: BUILDING CONSTRUCTION & ARCHITECTURAL COATING EQUIPMENT NOISE LEVELS

Equipment Type[1]	Quantity	Usage Factor[2]	Hours Of Operation[3]	Reference Noise Level @ 50 Feet (dBA Lmax)	Cumulative Level @ 100 Feet (dBA Lmax)
Concrete Pump Trucks	1	20%	1.6	81.0	75.0
Forklifts	1	20%	1.6	75.0	69.0
Tractor/Loader/Backhoes	2	40%	3.2	78.0	72.0
Cement/Mortar Mixer	1	50%	4.0	80.0	74.0
Air Compressors	2	40%	3.2	78.0	72.0
Cumulative Hourly Noise Levels 100 Feet (dBA Lmax)					79.8

Construction Noise Reference Distance	Distance To Property Line (In Feet)[4]	Distance Attenuation (dBA Lmax)[5]	Estimated Noise Barrier Attenuation (dBA Lmax)	Construction Noise Level (dBA Lmax)
R1	217'	-6.7	0.0	73.1
R2	342'	-10.7	0.0	69.1
R3	183'	-5.2	0.0	74.6
R4	263'	-8.4	0.0	71.4

[1] Source: FHWA's Roadway Construction Noise Model, January 2006.
[2] Estimates the fraction of time each piece of equipment is operating at full power during a construction operation.
[3] Represents the actual hours of peak construction equipment activity out of a typical 8 hour workday.
[4] Distance from the center of construction activity to the nearest receiver, shown on Exhibit 10-A.
[5] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.

12.4 CONSTRUCTION NOISE THRESHOLDS OF SIGNIFICANCE

The construction noise analysis shows that the highest construction noise levels will occur during the grading and paving phases. As shown on Table 12-4, the unmitigated peak construction noise levels are expected to range from 72.6 to 78.1 dBA Lmax. Construction activities are considered exempt from the provisions of the City of Cypress Municipal Code noise standards if they occur during the permitted hours of 7:00 a.m. to 8:00 p.m. on weekdays and 9:00 a.m. to 8:00 p.m. on Saturdays, with no activities allowed on Sundays or federal holidays. (12) Since the Amended and Restated Cypress Business & Professional Center Specific Plan ("Specific Plan") supersedes the Municipal Code noise standards, the construction hours identified in Section 3.7 shall apply to Project construction, which limits construction activity to weekdays and Saturdays between 7:00 a.m. and 8:00 p.m. with no activity on holidays. (15)

TABLE 12-4: CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY

Noise Receiver[1]	Distance To Property Line (Feet)	Construction Phase Hourly Noise Level (dBA Lmax)			
		Site Preparation	Grading & Paving	Building Const. & Arch. Coating	Peak[2]
R1	217'	69.9	76.6	73.1	76.6
R2	342'	65.9	72.6	69.1	72.6
R3	183'	71.3	78.1	74.6	78.1
R4	263'	68.2	74.9	71.4	74.9

[1] Noise receiver locations are shown on Exhibit 12-A.
[2] Estimated construction noise levels during peak operating conditions.

Based on the construction noise standards described in Section 3.5, the potential short-term unmitigated construction noise level impacts are not expected to exceed the noise level threshold of 80 dBA Lmax at receiver locations in the City of Cypress, and 75 dBA Lmax at receivers in the City of Los Alamitos during the permitted hours of construction activity when all equipment is operating simultaneously at a distance of 100 feet from the Project site boundary, as shown on Table 12-5.

TABLE 12-5: CONSTRUCTION EQUIPMENT NOISE LEVEL COMPLIANCE

Noise Receiver[1]	City	Peak Const. Noise Level (dBA Lmax)[2]	Const. Noise Level Criteria (dBA Lmax)[3]	Compliance[4]
R1	Cypress	76.6	80.0	Yes
R2	Cypress	72.6	80.0	Yes
R3	Cypress	78.1	80.0	Yes
R4	Los Alamitos	74.9	75.0	Yes

[1] Noise receiver locations are shown on Exhibit 12-A.
[2] Estimated construction noise levels during peak operating conditions, as shown on Table 12-4.
[3] Based on the maximum exterior noise level standards of both the City of Cypress and City of Los Alamitos, as shown on Table 3-2.
[4] Do the estimated Project construction noise levels meet the threshold of 80 dBA Lmax for receivers within the City of Cypress and 75 dBA Lmax for receivers within the City of Los Alamitos?

12.5 CONSTRUCTION NOISE ABATEMENT MEASURES

Construction noise is temporary, intermittent and of short duration, and will not present any long-term impacts. Noise from construction is also considered exempt in the City of Cypress and the City of Los Alamitos if it occurs during permitted hours. In addition, the impact analysis above demonstrates that the Project will not exceed the quantitative thresholds applied. The Project would either integrate or comply with the following measures to reduce noise levels produced by the construction equipment to the nearby land uses:

- Prior to approval of grading plans and/or issuance of building permits, plans shall include a note indicating that noise-generating Project construction activities shall only occur on weekdays and Saturdays between 7:00 a.m. and 8:00 p.m. (excluding holidays). The Project construction supervisor shall ensure compliance with the note and the City shall conduct periodic inspection at its discretion.
- Prioritize the construction of the 8-foot high planned wall around the residential homes within the Project site as soon as possible once construction has commenced. This would further reduce the noise impacts to nearby sensitive receivers during construction activity. The timing of constructing the wall is voluntary for the developer because impacts are less than significant during construction even without the wall.
- During all Project site construction, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the Project site.
- The construction contractor shall locate equipment staging in areas that will create a minimum distance of 100 feet between construction-related noise sources and noise-sensitive receivers nearest the Project site (i.e., in the center) during Project construction.

- The construction contractor shall limit haul truck deliveries to the same hours specified for construction equipment (weekdays and Saturdays between 7:00 a.m. and 8:00 p.m.; excluding holidays). The contractor shall prepare a haul route exhibit and shall design delivery routes to minimize the exposure of sensitive land uses or residential dwellings to delivery truck-related noise.

12.6 CONSTRUCTION VIBRATION IMPACTS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. The proposed Project's construction activities most likely to cause vibration impacts are:

- Heavy Construction Equipment: Although all heavy mobile construction equipment has the potential of causing at least some perceptible vibration while operating close to buildings, the vibration is usually short-term and is not of sufficient magnitude to cause building damage. It is not expected that heavy equipment such as large bulldozers would operate close enough to any residences or buildings to cause a vibration impact.
- Trucks: Trucks hauling building materials to construction sites can be sources of vibration intrusion if the haul routes pass through residential neighborhoods on streets with bumps or potholes. Repairing the bumps and potholes generally eliminates the problem.

Ground-borne vibration levels resulting from construction activities occurring within the Project site were estimated by data published by the Federal Transit Administration. Construction activities that would have the potential to generate low levels of ground-borne vibration within the Project site include grading and paving. Using the vibration source level of construction equipment provided on Table 6-7 and the construction vibration assessment methodology published by the FTA, it is possible to estimate the Project vibration impacts. Table 12-6 presents the expected Project related vibration levels at four receiver locations.

TABLE 12-6: CONSTRUCTION EQUIPMENT VIBRATION LEVELS

Noise Receiver[1]	Distance To Property Line (In Feet)	Receiver Vibration Levels (VdB)[2]					Potential Significant Impact?[3]
		Small Bulldozer	Jackhammer	Loaded Trucks	Large Bulldozer	Peak Vibration	
R1	217'	29.8	50.8	57.8	58.8	58.8	No
R2	342'	23.9	44.9	51.9	52.9	52.9	No
R3	183'	32.1	53.1	60.1	61.1	61.1	No
R4	263'	27.3	48.3	55.3	56.3	56.3	No

[1] Receiver locations are shown on Exhibit 12-A.
[2] Based on the Vibration Source Levels of Construction Equipment included on Table 6-7.
[3] Does the Peak Vibration exceed the FTA maximum acceptable vibration standard of 80 (VdB)?

Based on the reference vibration levels provided by the FTA, a large bulldozer represents the peak source of vibration with a reference level of 87 VdB at a distance of 25 feet. At distances

ranging from 183 to 342 feet from the center of Project construction activity, construction vibration levels are expected to range from 23.9 to 61.1 VdB. Using the construction vibration assessment methods provided by the Federal Transit Administration (FTA) the proposed Project site will not include or require equipment, facilities, or activities that would result in a perceptible human response (annoyance).

The Project construction would not generate vibration levels exceeding the FTA maximum acceptable vibration standard of 80 (VdB). Further, Project construction-related vibration levels at the site of the closest receiver would not occur during the entire construction period, but will occur rather only during the times that heavy construction equipment is operating at the center of construction activity. Moreover, construction at the Project site will be restricted to daytime hours consistent with City requirements thereby eliminating potential vibration impacts during the sensitive nighttime hours. Therefore, the potential for the Project to result in exposure of persons to, or generation of, excessive ground-borne vibration is determined to be less than significant.

12.6.1 Truck Haul Route Vibration Impacts

Although the human threshold of perception of vibration is around 65 VdB, human response to vibration is not usually significant unless the vibration exceeds 70 VdB. Truck vibration levels are dependent on vehicle characteristics, load, speed, and pavement condition. Typical vibration levels for heavy trucks on normal traffic speeds will not exceed 65 VdB. Truck deliveries transiting on site will be travelling at very low speeds so it is expected that delivery truck vibration impacts at nearby homes will not exceed the vibration threshold identified by the FTA of 80 VdB, and therefore, will be less than significant.

13 LOS ALAMITOS RACE COURSE

This section analyzed the on-site stationary noise impacts (to future uses on the Project site) during peak race course activity at the Los Alamitos Race Course, located northeast of the Project site. Exhibit 13-A identifies the on-site receiver locations and noise source locations used to assess the operational noise levels due to peak activity at the Los Alamitos Race Course.

13.1 PEAK-HOUR RACE COURSE NOISE ANALYSIS

The Los Alamitos Race Course is located northeast of the Project site and represents a potential stationary-source noise impact during race course activity. The Los Alamitos Race Course conducts year-round quarter horse races Fridays through Sundays starting at 7:00 p.m. on Fridays, 6:00 p.m. on Saturdays, and 5:00 p.m. on Sundays. The final post times, or the last race of each night, are 10:30 p.m. on Fridays, 9:45 p.m. on Saturdays, and 8:45 p.m. on Sundays. In addition, three annual thoroughbred events are scheduled to take place July 2nd to July 27th, September 10th through 27th, and December 3rd through 20th. Thoroughbred races will take place on Thursdays to Sundays beginning around noon each day with races lasting approximately 2 to 3 hours each. Therefore, to fully describe the existing noise conditions with and without the race course activity, noise level measurements were collected by Urban Crossroads, Inc. on Thursday, February 19th through Sunday, February 22nd, 2015. Based on the noise level measurements taken during race course activities on Friday, Saturday, and Sunday nights, the peak hour of activity, or highest energy average hourly noise level (dBA Leq), was observed on Friday, February 20th, between 6:00 p.m. and 7:00 p.m. While races are scheduled to begin at 7:00 p.m. on Fridays, the preparation for the races, including public address (P.A.) announcements, horse-trailer trucks and cars operating adjacent to the Project site, and parking lot vehicle movement, in addition to noise from an existing water pump adjacent to the northeast corner of the Project site, were observed to operate during the peak-hour conditions.

13.2 PEAK-HOUR LOS ALAMITOS RACE COURSE NOISE SOURCES

To evaluate the impacts at the planned residential land use within the Project site during peak race course activity, the following noise sources were observed at measurement location LT2, adjacent to the Project's northern site boundary: the Los Alamitos Race Course public address (P.A.) system speakerphones, horse-trailer trucks and cars operating adjacent to the Project site, parking lot vehicle movement, and an existing water pump adjacent to the northeast corner of the Project site. For the purposes of this analysis, the noise sources associated with the Los Alamitos Race Course are assessed under the observed peak hour of operation (6:00 p.m. to 7:00 p.m.) conditions during the noise level measurements described in Section 5 on Friday, February 20th, 2015. The peak-hour race activity noise level measurement data at location LT2 is provided in Appendix 13.1. Exhibit 13-A shows the noise sources included in the peak-hour race course activity analysis, and the on-site receiver locations.

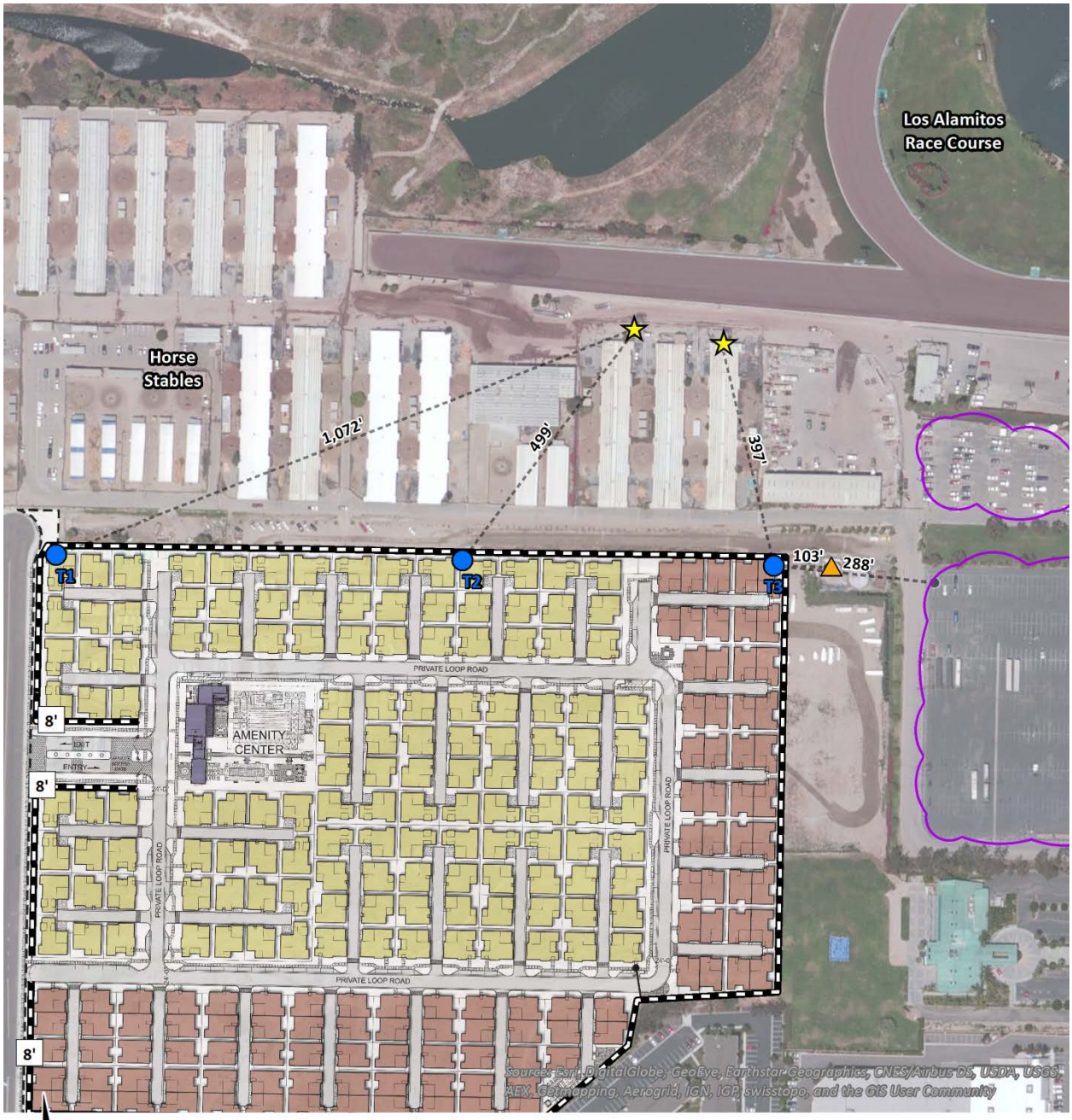
13.3 PEAK-HOUR RACE COURSE EXTERIOR NOISE LEVELS

The noise levels presented on Table 13-1 show the ambient noise level without race course activity noise levels at measurement location LT2 between 6:00 p.m. to 7:00 p.m. on Thursday, February 19th, in addition to the peak-hour with race course activity noise levels on Friday, February 20th, 2015. The measurements show that the unmitigated with race course activity hourly dBA Leq noise levels will approach 58.4 dBA Leq during peak hour conditions. However, since the City of Cypress exterior noise standards are in dBA L_{50}, L_{25}, L_8, L_2, and Lmax the noise levels due to peak race course activity are presented for comparison purposes in the equivalent noise descriptors on Table 13-1.

The exterior noise levels include the barrier attenuation provided by the planned 8-foot high wall (Noise PDF-1), as shown on Exhibit 13-A. The mitigated noise levels with the 8-foot high barrier, shown on Table 13-1, represent the expected noise levels at the first floor outdoor living areas for the single-family residential units adjacent to the northern site boundary. With the attenuation from the Project design features, the noise levels will approach 39.8 dBA L_{50}, 42.8 dBA L_{25}, 46.8 dBA L_8, 56.8 dBA L_2, and 73.4 dBA Lmax during peak-hour race course activity. Table 13-2 shows the mitigated exterior noise levels during peak race course activity will not exceed the City of Cypress exterior noise standards for residential development at the first floor of the single-family units.

Due to the amount of noise sources adjacent to the Project site, including those associated with the regular race activity at the Los Alamitos Race Course, it is recommended that all future residents of the single-family land use within the Project are provided with a noise disclosure notices to inform them that there may be audible noise events due to race course activity.

EXHIBIT 13-A: RACE COURSE NOISE SOURCES AND RECEIVER LOCATIONS



LEGEND:

- 8' Barrier Height (in feet)
- Planned Barrier
- On-Site Receiver Locations
- Distance from on-site receivers to center of peak race course activity noise sources (in feet)
- Water Pump Location
- P.A. Speakerphone Location
- Parking Lot Vehicle Movement

TABLE 13-1: PEAK RACE COURSE EXTERIOR NOISE LEVELS

Meas. Location[1]	Description	Noise Levels (dBA)[2]				
		L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
LT2	Ambient Noise Level Without Race Activity[3]	49.0	51.0	56.0	60.0	75.9
	Unmitigated Noise Level With Peak Race Activity[4]	48.0	51.0	55.0	65.0	81.6
	Barrier Attenuation[5]	-8.2	-8.2	-8.2	-8.2	-8.2
	Mitigated Noise Level With Race Activity	39.8	42.8	46.8	56.8	73.4

[1] See Exhibit 5-A for the noise level measurement locations.
[2] Percent noise level is the level exceeded "n" percent of the time during the measurement period. L25 is the noise level exceeded 25% of the time.
[3] Ambient noise level measurement data at location LT2 collected by Urban Crossroads, Inc. from 6:00 p.m. to 7:00 p.m. on Thursday, February 19, 2015 (Appendix 5.2).
[4] Peak hour of activity observed at location LT2 on Friday, February 20, 2015 from 6:00 p.m. to 7:00 p.m., associated with the Los Alamitos Race Course (Appendix 13.1). The ambient noise levels during peak activity include the public address (P.A.) system speakerphones, horse-trailer trucks and cars operating adjacent to the Project site, parking lot vehicle movement, and an existing water pump.
[5] Estimated attenuation provided by the planned 8-foot high noise barrier at the perimeter of the Project site, as shown on Exhibit 13-A, when a receiver is located 10 feet from the planned barrier location.

TABLE 13-2: PEAK RACE COURSE EXTERIOR NOISE LEVEL COMPLIANCE

Meas. Location[1]	Description	Noise Levels (dBA)[2]				
		L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
LT2	Mitigated Noise Level With Race Activity[3]	39.8	42.8	46.8	56.8	73.4
	Daytime Noise Level Standard[4]	60.0	65.0	70.0	75.0	80.0
	Compliance[5]	Yes	Yes	Yes	Yes	Yes
	Nighttime Noise Level Standard[4]	55.0	60.0	65.0	70.0	75.0
	Compliance[5]	Yes	Yes	Yes	Yes	Yes

[1] See Exhibit 5-A for the noise level measurement locations.
[2] Percent noise level is the level exceeded "n" percent of the time during the measurement period. L25 is the noise level exceeded 25% of the time.
[3] Peak hour race course activity with the attenuation provided by the planned 8-foot high barrier, as shown on Table 13-1.
[4] The City of Cypress exterior noise level standards are shown on Table 3-1.
[5] Does the peak race course activity noise level satisfy the City of Cypress exterior noise standards at the Project site?
"Daytime" = 7:00 a.m. - 10:00 p.m.; "Nighttime" = 10:00 p.m. - 7:00 a.m.

13.4 PEAK-HOUR RACE COURSE INTERIOR NOISE LEVELS

The first and second floor interior noise levels during peak race course activity are presented on Table 13-3. The first floor interior noise levels shown on Table 13-3 include the attenuation provided by the planned 8-foot high perimeter wall (Noise PDF-1) and standard windows with a minimum STC rating of 27. The second floor interior noise levels include the attenuation provided by upgraded windows with a minimum STC rating of 35 (Noise PDF-3). Table 13-4 shows that with the recommended STC 27 rated first floor windows, and STC 35 rated second floor windows at the northern property line, the interior noise levels at the Project site will satisfy the

City of Cypress interior noise level standards for residential development at the first and second floor receivers at all residential locations. Due to noise considerations included in the design features of the Barton Place development, second floor interior living areas are set back (Noise PDF-2) from the northern property line and the race course noise sources. The calculations shown on Table 13-4 include the lowest calculated interior noise level reduction (NLR) of 30.7 dBA with upgraded windows, previously shown on Table 8-2, for the second floor windows with an STC rating of 35. Based on this analysis, the interior noise levels during the peak Los Alamitos Race Course activity at the second floor living areas will be less than significant with upgraded windows with a minimum STC rating of 35 along the northern property line as shown on Exhibit ES-A.

TABLE 13-3: PEAK RACE ACTIVITY INTERIOR NOISE LEVELS

Floor	Description	Noise Levels (dBA)[1]		
		L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
1st	Mitigated Noise Level With Race Activity[2]	46.8	56.8	73.4
	Estimated Interior Noise Reduction[3]	-25.0	-25.0	-25.0
	Interior Noise Level With Race Activity[4]	21.8	31.8	48.4
2nd	Unmitigated Noise Level With Race Activity[5]	55.0	65.0	81.6
	Calculated Interior Noise Reduction[6]	-30.7	-30.7	-30.7
	Interior Noise Level With Race Activity[4]	24.3	34.3	50.9

[1] Percent noise level is the level exceeded "n" percent of the time during the measurement period. L25 is the noise level exceeded 25% of the time.
[2] First floor noise levels include the attenuation provided by the planned 8-foot high barrier as shown on Table 13-1.
[3] A minimum interior noise level reduction of 25 dBA is assumed with standard building construction and a windows closed condition.
[4] Estimated interior noise level with the recommended STC rating for all windows.
[5] Peak hour of activity observed at location LT2 on Friday, February 20, 2015 from 6:00 p.m. to 7:00 p.m., associated with the Los Alamitos Race Course (Appendix 13.1).
[6] Calculated noise level reduction based on the Project floor plans, as shown on Table 8-2 and in Appendix 8.2.

TABLE 13-4: PEAK RACE ACTIVITY INTERIOR NOISE LEVEL COMPLIANCE

Floor	Description	Noise Levels (dBA)[1]		
		L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
1st	Interior Noise Level With Race Activity[2]	21.8	31.8	48.4
	Daytime Noise Level Standard[3]	55.0	60.0	65.0
	Compliance[4]	Yes	Yes	Yes
	Nighttime Noise Level Standard[3]	45.0	50.0	55.0
	Compliance[4]	Yes	Yes	Yes
2nd	Interior Noise Level With Race Activity[5]	24.3	34.3	50.9
	Daytime Noise Level Standard[3]	55.0	60.0	65.0
	Compliance[4]	Yes	Yes	Yes
	Nighttime Noise Level Standard[3]	45.0	50.0	55.0
	Compliance[4]	Yes	Yes	Yes

[1] Percent noise level is the level exceeded "n" percent of the time during the measurement period. L25 is the noise level exceeded 25% of the time.
[2] First floor interior noise levels as shown on Table 13-3.
[3] Source: City of Cypress Municipal Code, Article VII Noise Control, Section 13-69 Interior Noise Standards (Appendix 3.2).
[4] Does the peak race course activity noise level satisfy the City of Cypress interior noise standards at the Project site?
[5] Second floor interior noise levels as shown on Table 13-3.
"Daytime" = 7:00 a.m. - 10:00 p.m.; "Nighttime" = 10:00 p.m. - 7:00 a.m.

14 LOS ALAMITOS JOINT FORCES TRAINING BASE

The Project site is located approximately 0.27 miles north of the Los Alamitos Joint Forces Training Base (JFTB), Los Alamitos airfield. The base contains two runways and is the only remaining military airfield in Los Angeles and Orange Counties. The majority of the JFTB operations consist of helicopter training with some light twin engine fixed aircraft and occasional operations by transient military and civil support aircraft.

The City of Los Alamitos General Plan Public Facilities and Safety Element, Figure 6, *JFTB Impact Zones*, (2) shows the 65 and 60 dBA CNEL noise contour boundaries of the JFTB Los Alamitos airfield which are based on the Orange County Airport Land Use Commission *Airport Environs Land Use Plan for Joint Forces Training Base Los Alamitos.* (3) Exhibit 14-A shows the noise contour boundaries from the City of Los Alamitos General Plan and the boundary of the Barton Place site, which is located outside the 60 dBA CNEL noise contour. Since the Project will be located outside of the 60 dBA CNEL noise contour boundary of the JFTB airfield impacts due to aircraft noise are clearly insignificant. (3)

EXHIBIT 14-A: JFTB AIRFIELD NOISE CONTOUR BOUNDARIES

LEGEND:

Joint Forces Training Base Noise Contours, Los Alamitos General Plan Public Facilities and Safety Element

Unmitigated 65 dBA CNEL Noise Level Contour Boundary

Unmitigated 60 dBA CNEL Noise Level Contour Boundary

15 REFERENCES

1. **Kimley-Horn and Associates, Inc.** *Barton Place Traffic Impact Analysis.* April 2015.
2. **City of Los Alamitos.** *General Plan Public Facilities and Safety Element.* March 2014.
3. **Orange County Airport Land Use Commission.** *Airport Environs Land Use Plan for Joint Forces Training Base Los Alamitos.* December 2002.
4. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.
5. **Environmental Protection Agency Office of Noise Abatement and Control.** *Information on Levels of Environmental Noise Requiste to Protect Public Health and Welfare with an Adequate Margin of Safety.* March, 1974. EPA/ONAC 550/9/74-004.
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10. **Office of Planning and Research.** *State of California General Plan Guidlines 2003.* October 2003.
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13. **City of Los Alamitos.** *Municipal Code, Chapter 7.24 Noise.*
14. **City of Cypress.** *Cypress Business & Professional Center Specific Plan.* June 2012.
15. —. *Amended and Restated Cypress Business & Professional Center Specific Plan ("Specific Plan").* June 2012.
16. **Federal Interagency Committee on Noise.** *Federal Agency Review of Selected Airport Noise Analysis Issues.* August 1992.
17. **American National Standards Institute (ANSI).** *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013.*
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20. **City of Cypress.** *General Plan Circulation Element.* 2000.
21. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning.** *FHWA Roadway Construction Noise Model.* January, 2006.
22. **C33, LLC.** *Barton Place Air Quality Impact Analysis.* 2015.

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16 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed Barton Place Project. The information contained in this noise study report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 660-1994 ext. 203.

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EDUCATION

Master of Science in Civil and Environmental Engineering
California Polytechnic State University, San Luis Obispo • December, 1993

Bachelor of Science in City and Regional Planning
California Polytechnic State University, San Luis Obispo • June, 1992

PROFESSIONAL REGISTRATIONS

PE – Registered Professional Traffic Engineer – TR 2537 • January, 2009
AICP – American Institute of Certified Planners – 013011 • June, 1997–January 1, 2012
PTP – Professional Transportation Planner • May, 2007 – May, 2013
INCE – Institute of Noise Control Engineering • March, 2004

PROFESSIONAL AFFILIATIONS

ASA – Acoustical Society of America
ITE – Institute of Transportation Engineers

PROFESSIONAL CERTIFICATIONS

Certified Acoustical Consultant – County of Orange • February, 2011
FHWA-NHI-142051 Highway Traffic Noise Certificate of Training • February, 2013

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APPENDIX 3.1:

CITY OF CYPRESS GENERAL PLAN NOISE ELEMENT

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VI. NOISE ELEMENT

INTRODUCTION TO THE NOISE ELEMENT

The control of noise is an important part of preserving the quality of a community. The development of effective strategies to reduce excessive noise is essential to creating a safe and compatible living and working environment. Since 1971, the Noise Element has been one of the seven mandatory elements of a general plan.

PURPOSE

The Noise Element of a general plan is a comprehensive program for including noise control in the planning process. It is a tool for achieving and maintaining environmental noise levels compatible with land use. The Noise Element identifies noise-sensitive land uses and noise sources, and defines areas of noise impact. This Noise Element establishes goals, policies, and programs to ensure that Cypress residents will be protected from excessive noise. The adopted noise element serves as a guideline for compliance with the state's noise insulation standards.

The Noise Element follows guidelines in the State Government Code Section 65302(f) and Section 46050.1 of the Health and Safety Code. It quantifies the community noise environment by establishing noise exposure contours for both near- and long-term levels of growth and noise-generating activity. The information will become a guideline for the development of goals and policies to achieve noise compatible land uses. This information also identifies baseline noise levels and sources for the identification of local noise ordinance enforcement.

RELATIONSHIP WITH OTHER GENERAL PLAN ELEMENTS

The Noise Element's relationship to other elements of the General Plan depends upon the nature of the other Elements. In the case of the Land Use Element, the relationship arises from the need to locate incompatible uses away from one another when possible. The relationship to the Safety Element works to protect residents, workers, and visitors within the City from being exposed to harmful noise levels. The relationship to the Circulation Element encourages roadways and other transportation systems that efficiently move people and goods, but also transportation systems which do not create serious noise impacts to surrounding land uses. The Housing Element and the Noise Elements work together to assure a housing stock that is well maintained and meets all current noise standards. Finally, the Conservation/Open Space Element and the Noise Element work together to assure that the City is a pleasant place to live and work.

NOISE SCALES

Decibels (dB) are based on the logarithmic scale. The logarithmic scale compresses the wide range in sound pressure levels to a more usable range of numbers in a manner similar to the Richter scale used to measure earthquakes. In terms of human response to noise, a sound 10 dB higher than another is judged to be twice as loud; and 20 dB higher four times as loud; and so forth. Everyday sounds normally range from 30 dBA (very quiet) to 100 dBA (very loud). The A-weighted sound pressure level is the sound pressure level, in decibels, as measured on a sound level meter using the A-weighted filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound, placing greater emphasis on those frequencies within the sensitivity range of the human ear. Examples, of various sound levels in different environments are shown in Table N-1, *Sound Levels and Human Response.*

Many methods have been developed for evaluating community noise to account for, among other things:

- The variation of noise levels over time;
- The influence of periodic individual loud events; and
- The community response to changes in the community noise environment.

Numerous methods have been developed to measure sound over a period of time. These methods include: 1) the Community Noise Equivalent Level (CNEL); 2) the Equivalent Sound Level (Leq); and 3) the Day/Night Average Sound Level (Ldn). These methods are described below.

Community Noise Equivalent Level (CNEL) . The predominant community noise rating scale used in California for land use compatibility assessment is the Community Noise Equivalent Level (CNEL). The CNEL reading represents the average of 24 hourly readings of equivalent levels, known as Leq's, based on an A-weighted decibel with upward adjustments added to account for increased noise sensitivity in the evening and night periods. These adjustments are +5 dBA for the evening, 7:00 p.m. to 10:00 p.m., and +10 dBA for the night, 10:00 p.m. to 7:00 a.m. CNEL may be indicated by "dBA CNEL" or just "CNEL".

Leq. The Leq is the sound level containing the same total energy over a given sample time period. The Leq can be thought of as the steady sound level which, in a stated period of time, would contain the same acoustic energy as the time-varying sound level during the same period. Leq is typically computed over 1, 8 and 24-hour sample periods.

Day Night Average (Ldn). Another commonly used method is the day/night average level or Ldn. The Ldn is a measure of the 24-hour average noise level at a given location. It was adopted by the U.S. Environmental Protection Agency (EPA) for developing criteria for the evaluation of community noise exposure. It is based on a measure of the average noise level over a given time period called the Leq. The Ldn is calculated by averaging the Leq's for each hour of the day at a given location after penalizing the "sleeping hours" (defined as 10:00 p.m. to 7:00 a.m.), by 10 dBA to account for the increased sensitivity of people to noises that occur at night. The maximum noise level recorded during a noise event is typically expressed as Lmax. The sound level exceeded over a specified time frame can be expressed as L_n (i.e., L_{90}, L_{50}, L_{10}, etc.). L_{50} equals the level exceeded 50 percent of the time, L_{10} ten percent of the time, etc.

Table N-1
SOUND LEVELS AND HUMAN RESPONSE

Noise Source	dB(A) Noise Level	Response
	150	
Carrier Jet Operation	140	Harmfully Loud
	130	Pain Threshold
Jet Takeoff *(200 feet; thence.)* Discotheque	120	
Unmuffled Motorcycle Auto Horn *(3 feet; thence.)* Rock'n Roll Band Riveting Machine	110	Maximum Vocal Effort Physical Discomfort
Loud Power Mower Jet Takeoff *(2000 feet; thence.)* Garbage Truck	100	Very Annoying Hearing Damage (Steady 8-Hour Exposure)
Heavy Truck *(50 feet; thence.)* Pneumatic Drill *(50 feet; thence.)*	90	
Alarm Clock Freight Train *(50 feet; thence.)* Vacuum Cleaner *(10 feet; thence.)*	80	Annoying
Freeway Traffic *(50 feet; thence.)*	70	Telephone Use Difficult
Dishwashers Air Conditioning Unit *(20 feet; thence.)*	60	Intrusive
Light Auto Traffic *(100 feet; thence.)*	50	Quiet
Living Room Bedroom	40	
Library Soft Whisper *(15 feet; thence.)*	30	Very Quiet
Broadcasting Studio	20	
	10	Just Audible
	0	Threshold of Hearing

Source: Melville C. Branch and R. Dale Beland, *Outdoor Noise in the Metropolitan Environment*, 1970, Page 2.

FEDERAL NOISE STANDARDS

The United States Noise Control Act of 1972 (NCA) recognized the role of the Federal government in dealing with major commercial noise sources in order to provide for uniform treatment of such sources. As Congress has the authority to regulate interstate and foreign commerce, regulation of noise generated by such commerce also falls under congressional authority. The Federal government specifically preempts local control of noise emissions from aircraft, railroad and interstate highways.

The U.S. EPA has identified acceptable noise levels for various land uses, in order to protect public welfare, allowing for an adequate margin of safety, in addition to establishing noise emission standards for interstate commerce activities.

STATE NOISE STANDARDS

The Office of Noise Control in the State Department of Health Services has developed criteria and guidelines for local governments to use when setting standards for human exposure to noise and preparing noise elements for General Plans. These guidelines include noise exposure levels for both exterior and interior environments. In addition, Title 25, Section 1092 of the California Code of Regulations sets forth requirements for the insulation of multiple-family residential dwelling units from excessive and potentially harmful noise. The State indicates that locating units in areas where exterior ambient noise levels exceed 65 dBA is undesirable. Whenever such units are to be located in such areas, the developer must incorporate into building design construction features which reduce interior noise levels to 45 dBA CNEL. Tables N-2 and N-3, below, summarize standards adopted by various State and Federal agencies. Table N-2, *Noise and Land Use Compatibility Matrix*, presents criteria used to assess the compatibility of proposed land uses with the noise environment. Table N-3, *Interior and Exterior Noise Standards*, indicates standards and criteria that specify acceptable limits of noise for various land uses throughout Cypress. These standards and criteria will be incorporated into the land use planning process to reduce future noise and land use incompatibilities. These tables are the primary tools which allow the City to ensure integrated planning for compatibility between land uses and outdoor noise.

CITY NOISE STANDARDS

The City of Cypress adopted a comprehensive noise ordinance into its City Code which sets standards for noise levels citywide and provides the means to enforce the reduction of obnoxious or offensive noises (refer to Table N-4, *Noise Ordinance Standards*). Sections 13-64 through 13-78 of the City Code establish noise standards and enforcement procedures.

Noise Ordinance. The City Noise Ordinance is designed to protect people from non-transportation noise sources such as music, construction activity, machinery and pumps, and air conditioners. Enforcement of the ordinance ensures that adjacent properties are not exposed to excessive noise from stationary sources. Enforcing the Noise Ordinance includes requiring proposed development projects to show compliance with the ordinance, and requiring construction activity to comply with established schedule limits. The ordinance will be reviewed periodically for adequacy and amended as needed to address community needs and development patterns.

Table N-2
NOISE AND LAND USE COMPATIBILITY MATRIX

Land Use Category	Community Noise Exposure			
	Ldn or CNEL, dB			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential-Low Density	50-60	60-65	65-75	75-85
Residential-Multiple Family	50-60	60-65	65-75	75-85
Transient Lodging-Motel, Hotels	50-65	65-70	70-80	80-85
Schools, Libraries, Churches, Hospitals, Nursing Homes	50-60	60-65	65-80	80-85
Auditoriums, Concert Halls, Amphitheaters	NA	50-65	NA	65-85
Sports Arenas, Outdoor Spectator Sports	NA	50-70	NA	70-85
Playgrounds, Neighborhood Parks	50-70	NA	70-75	75-85
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50-70	NA	70-80	80-85
Office Buildings, Business Commercial and Professional	50-67.5	67.5-75	75-85	NA
Industrial, Manufacturing, Utilities, Agriculture	50-70	70-75	75-85	NA

Source: Modified from U.S. Department of Housing and Urban Development Guidelines and State of California Standards.

NOTES: **NORMALLY ACCEPTABLE**
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
CONDITIONALLY ACCEPTABLE
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
NORMALLY UNACCEPTABLE
New Construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
CLEARLY UNACCEPTABLE
New construction or development should generally not be undertaken.
NA: Not Applicable

Table N-3
INTERIOR AND EXTERIOR NOISE STANDARDS

Land Use Categories		CNEL	
Categories	**Uses**	**Interior[1]**	**Exterior[2]**
Residential	Single family Duplex, Multiple Family	45[3] - 55	50 – 60
	Mobile Home	45	65[4]
Commercial Industrial Institutional	Hotel, Motel, Transient Lodging	45	--
	Commercial Retail, Bank, Restaurant	55	--
	Office Building, Research and Development, Professional Offices, City Office Building	50	--
	Amphitheater, Concert Hall, Auditorium, Meeting Hall	45	--
	Gymnasium (Multipurpose)	50	--
	Sports Club	55	--
	Manufacturing, Warehousing, Wholesale, Utilities	65	--
	Movie Theaters	45	--
Institutional	Hospital, Schools' Classrooms	45	65
	Church, Library	45	--
Open Space	Parks	--	65

NOTES:

1. Indoor environmental including: Bedrooms, living areas, bathrooms, toilets, closets, corridors.

2. Outdoor environment limited to: Private yard of single family
Multi-family private patio or balcony which is served by a means of exit from inside the dwelling
Balconies 6 feet deep or less are exempt
Mobile home park
Park's picnic area
School's playground

3. Noise level requirement with closed windows. Mechanical ventilating system or other means of natural ventilation shall be provided as of Chapter 12, Section 1205 of UBC.

4. Exterior noise levels should be such that interior noise levels will not exceed 45 CNEL.

Table N-4
NOISE ORDINANCE STANDARDS

Noise Zone	Exterior Standard	Interior Standard
1	55dB(A) 7am-10pm 50dB(A) 10pm-7am	55dB(A) 7am-10pm 45dB(A) 10pm-7am
2	60dB(A) 7am-10pm 55dB(A) 10am-7pm	55dB(A) 7am-10pm 45dB(A) 10am-7pm
Noise Zone 1: RS-15000 and RS-6000 zoned residential. Noise Zone 2: All other residential properties.		

SUMMARY OF EXISTING CONDITIONS

The sources of noise in Cypress fall into four basic categories. These are:

- Major and minor arterial roadways;
- Aircraft overflights (from the Joint Forces Training Center (JFTC) Los Alamitos);
- Stationary sources (including industrial and commercial centers); and
- Trains (from the Southern Pacific rail line).

Major and Minor Arterial Roadways. Traffic noise on surface streets is a significant source of noise within the community. The major roadways in the City include: Crescent Avenue, Lincoln Avenue, Orange Avenue, Ball Road, Cerritos Avenue, Katella Avenue, Orangewood Avenue, Bloomfield Street, Denni Street, Moody Street, Walker Street, Valley View, Holder Street, and Knott Street.

Noise levels along roadways are determined by a number of traffic characteristics. Most important is the average daily traffic (ADT). Additional factors include the percentage of trucks, vehicle speed, the time distribution of this traffic, and gradient of the roadway. In general, most of the land uses along the major roadways are commercial, open space, and light industrial. However, single and multi-family areas, as well as public facilities, are situated along many of the major roadways indicated above.

Aircraft Operations. The Joint Forces Training Center (JFTC) Los Alamitos is situated along the southern boundary of the City and is the only airport within the vicinity of Cypress. The Center is primarily a helicopter training base. Approximately 91 percent of total operations are by helicopters with the remainder being light twin-engine fixed-wing aircraft and occasional operations by transient military and civil support aircraft.

Land uses within the Airport Environs Land Use Plan (AELUP) include residential, vacant, agricultural, and business park uses. Exhibit N-2 shows the existing noise contours which form the boundary of AELUP.

Stationary Sources. Commercial and industrial land uses located near residential areas currently generate occasional noise impacts. The primary noise sources associated with these facilities is caused by delivery trucks, air compressors, generators, outdoor loudspeakers, and gas venting. Other significant stationary noise sources in the City include noise from construction activity, street sweepers, and gas powered leaf blowers.

Train Operations. The City is traversed by one Southern Pacific Rail Road (SPRR) freight train line. Train traffic on this rail line which run along the northeastern edge of the City is considered to contribute to a relatively minor source of noise within the community due to the low frequency of operation (approximately two trains per day unless freight activity requires an increase in frequency in which 3 trips per day occurs).

The railroad lines traverse both commercial and residential property. Any residential developments and other sensitive uses located along the two railroad lines will require sound insulation to mitigate noise to an acceptable level.

NOISE SENSITIVE RECEPTORS

Housing is the most predominant and noise-sensitive land use in Cypress. This land use is considered especially noise-sensitive because (1) considerable time is spent by individuals at home, (2) significant activities occur outdoors, and (3) sleep disturbance is most likely to occur in a residential area. Mixed use developments which include residential uses along major arterials are particularly sensitive uses since they are located in areas where higher noise levels are generated.

Additionally, the City of Cypress has a number of educational facilities, churches, a library, senior housing, and park and recreation facilities that are considered noise-sensitive. The location of noise sensitive receptors are shown on Exhibit N-1, *Noise Sensitive Receptors*. Noise levels measured at schools, day care centers, churches (with day care centers), the library and community centers are reported in Table N-4, *Field Noise Measurements*.

COMMUNITY NOISE CONTOURS

The noise environment for Cypress can be described using noise contours developed for the major noise sources within the City. These contours represent lines of equal noise exposure, just as the contour lines on a topographic map are lines of equal elevation. The contours shown are the 60 and 65 dB(A) CNEL (Community Noise Equivalency Level) contours. As previously stated, CNEL is a 24-hour time-weighted average noise level where noise which occurs during sensitive time periods is weighted more heavily.

Noise contours for Cypress were developed based on existing and future traffic levels, and other sources of noise in the community. Cypress noise contours are presented in Exhibits N-2 and N-3. Exhibit N-2 shows the noise environment as estimated in 1999 for existing land uses and traffic on major streets in the City. Exhibit N-3 shows the future noise environment as it would exist at full implementation of the General Plan.

The inclusion of an area within a 60 or 65 CNEL contour on Exhibit N-2, *Existing Noise Contours (1999)*, or N-3, *Future Noise Contours (2020)*, indicates that noise levels are high enough to be of potential concern, but does not imply that excessive noise levels are present uniformly on all sites within the area. Buildings, walls, berms, and changes in topography affect noise levels. Some locations may be screened from noise impact by the presence of one or more of these features.

INSERT EXHIBIT N-1
"Noise Sensitive Receptors"

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INSERT EXHIBIT N-2
"Existing Noise Contours (1999)"

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INSERT EXHIBIT N-3
"Future Noise Contours (2020)"

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Table N-5
FIELD NOISE MEASUREMENTS

Site #	Sensitive Receptor	Leq dBA	Lmax dBA	L10 dBA	L50 dBA	L90 dBA
1	Cypress Montessori School	50.6	68.8	49.8	40.0	37.7
2	King Elementary School	51.2	63.4	55.0	48.0	40.9
3	ABC Development Pre-School (8710 Moody Street.)	51.3	60.4	54.4	49.7	43.0
4	Calvary Chapel Christian School	50.2	61.9	53.5	47.5	41.0
5	Cypress Head Start	47.3	54.3	47.7	47.2	46.8
6	Cypress College	52.0	69.5	54.8	45.8	41.8
7	Cypress High School	49.2	57.8	53.7	45.5	41.7
8	ABC Development Pre-School (9952 Graham Street)	51.8	61.8	55.4	48.9	41.7
9	Morris Elementary School	43.8	61.3	43.2	35.4	32.8
10	Swain Elementary School	36.6	45.9	39.7	34.2	32.5
11	Children's World Learning Center	37.5	53.9	40.2	32.9	31.2
12	Cypress Learning Tree	50.2	59.7	51.5	46.7	42.2
13	Cypress Senior Center	49.7	66.6	52.7	43.4	36.9
14	St. Irenaeus Catholic School	46.1	60.5	50.4	40.0	34.7
15	Oxford Academy	48.7	61.9	51.3	45.5	40.0
16	Cypress Library	47.7	57.3	51.2	46.3	37.8
17	Cypress Community Center	41.3	47.6	44.0	40.5	37.4
18	Lexington Junior High School	45.5.	53.7	49.0	43.8	37.2
19	Arnold Elementary School	46.7	60.4	50.4	43.5	38.2
20	ABC Development Pre-School (9281 Denni Street)	38.3	53.4	38.7	36.8	35.2
21	Landell Elementary	43.8	52.7	47.8	40.8	35.0
22	A Child's Adventure (9739 Denni Street)	43.3	56.1	46.4	41.3	36.5
23	Cawthon Elementary School	42.4	58.5	45.7	35.3	33.3
24	A Child's Adventure (4545 Myra Avenue)	45.2	59.6	49.8	37.9	33.3
25	Damron Elementary School	45.1	63.7	48.0	38.3	35.3
26	A Child's Adventure (5400 Myra Avenue)	37.8	48.0	40.4	36.5	33.7
27	Vessels Elementary School	42.8	56.6	46.5	38.2	36.2
28	Carousel Pre-School and Day Care	42.0	54.3	43.5	41.8	39.3
29	Cypress Park Community Church and Day Care	47.2	60.5	49.4	44.7	40.4
30	Grace Christian School	49.3	59.2	53.0	47.3	40.4
31	Cypress Early Learning Center	55.4	69.3	58.7	53.0	47.3

Source: Noise monitoring survey conducted by Robert Bein, William Frost & Associates on August 26, and August 27, 1999.

1. Noise measurements based on 15 minute recording period.
2. Measurements recorded adjacent to abutting roadway.

Exhibit N-3 shows projected 60 dB contours ranging between approximately 110 feet and 520 feet from the roadway centerlines. The 65 dB contour ranges between 51 feet and 240 feet along roadways modeled. This impacts existing residential neighborhoods. However, Lincoln Avenue's 60 dB noise contour impacts land uses within approximately 280 feet and Valley View Street and Katella Avenue between 360 feet and 520 feet, respectively. Future residential units constructed along Lincoln Avenue will therefore require noise mitigation. Exhibit N-3 also shows the noise contours for the Los Alamitos Army Airfield which extend over the Cypress Business Park and a residential neighborhood on the City's eastern border.

60 CNEL. The 60 CNEL contour defines the Noise Study Zone. The noise environment for any proposed noise-sensitive land use (for example, single- or multi-family residences, hospitals, schools, or churches) within this zone should be evaluated on a project specific basis. The project may require mitigation to meet City and/or State (Title 24) standards. A site- and project-specific study will be necessary to determine what kinds of mitigation will make the interior building environment acceptable for the given type of land use. Some sites may already be sufficiently protected by existing walls or berms that no further mitigation measures are required.

65 CNEL. The 65 CNEL contour defines the Noise Mitigation Zone. Within this contour, new or expanded noise-sensitive developments should be permitted only if appropriate mitigation measures, such as barriers or additional sound insulation, are included and City and/or State noise standards are achieved. In some instances it may be possible to show that existing walls, berms, or screening may exist such that required mitigation is already in place.

KEY NOISE ISSUES

Several factors contribute to create noise issues within the City. These issues are summarized below.

TRANSPORTATION NOISE CONTROL

The City of Cypress contains several transportation-related noise sources, including Joint Forces Training Center, major arterials, and collector roadways. These sources are the major contributors of noise in Cypress. Cost-effective strategies to reduce their influence on the community noise environment are an essential part of the Noise Element.

NOISE AND LAND USE PLANNING INTEGRATION

Information relative to the existing and future noise environment within Cypress should be integrated into future land use planning decisions. The Element presents the noise environment in order that the City may include noise impact considerations in development programs. Noise and land use compatibility guidelines are presented, as well as noise standards for new developments.

COMMUNITY NOISE CONTROL FOR NON-TRANSPORTATION NOISE SOURCES

Residential land uses and areas identified as noise-sensitive must be protected from excessive noise from non-transportation sources including commercial and industrial centers. These impacts are best controlled through effective land use planning and the application of the City Noise Ordinance.

DESCRIPTION OF THE NOISE PLAN

NOISE CONTROL

Transportation noise is the most serious noise problem in Cypress. However, local government has little direct control of transportation noise at the source. State and federal agencies have the responsibility to control vehicle noise emission levels. The most effective method the City has to mitigate transportation noise is by reducing noise impact on the community. Mitigation through site planning and the design and construction of a noise barrier (generally a wall or berm) are the most common ways of alleviating traffic noise impacts in existing urban environments.

TRANSPORTATION NOISE CONTROL

The most efficient and effective means of controlling noise from transportation systems is to reduce noise at the source. However, since the City has little direct control over source noise levels because of State and federal preemption (for example, State motor vehicle noise standards and federal air regulations), policies should be focused on reducing the impact of the noise on the community.

The following methods can be utilized to assist in the reduction of transportation related noise levels:

- Ensure the employment of noise mitigation measures in the design of roadway improvement projects consistent with funding capability. Support efforts by the California Department of Transportation and other agencies to provide for acoustical protection of existing noise-sensitive land uses affected by these projects.

- Require the use of walls and landscape berms in the design of residential and other noise-sensitive land uses that are adjacent to major roads, railroads, Joint Forces Training Center (JFTC) Los Alamitos, commercial uses, or industrial areas.

- Provide for continued evaluation of truck movements and routes in the City to provide effective separation from residential and other noise-sensitive land uses.

- Enforce the State motor vehicle noise standards for cars, trucks, and motorcycles.

NOISE AND LAND USE PLANNING INTEGRATION

Information relative to the existing and future noise environments within Cypress should be integrated into future land use planning decisions. The Element presents the existing and future noise environments so that the City will include noise impact considerations in development programs. Noise and land use compatibility guidelines are presented, as well as noise standards for new developments. Community noise considerations are to be incorporated into land use planning to the maximum extent feasible.

The following methods are intended to prevent future noise and land use incompatibilities:

- Enforce standards that specify acceptable noise limits for various land uses throughout the City. Table N-1 shows criteria used to assess the compatibility of proposed land uses with the noise environment. These criteria are the basis of specific noise standards.

These standards, presented in Table N-2, define City policy related to land uses and acceptable noise levels.

- Incorporate noise-reduction features during site planning to mitigate anticipated noise impacts on affected noise-sensitive land uses. The noise referral zones identified by 60 and 65 decibel CNELs in Exhibits N-2 and N-3 can be used to identify locations of potential conflict. New developments will be permitted only if appropriate mitigation measures are included such that the standards contained in this Element are met in accord with Table N-3.

- Enforce the provisions of the current State of California Uniform Building Code, which specifies that the indoor noise levels for multi-family residential living spaces not exceed 45 dB CNEL due to the combined effect of all noise sources. The State requires special construction features to be incorporated within project design to attain this interior noise standard when the outdoor noise levels exceed 65 dB CNEL.

  The Noise Referral Zones (the 65 dB CNEL contour) can be used to determine when this standard needs to be addressed. The Uniform Building Code requires that "interior" CNEL/L_{dn} with windows closed, attributable to exterior sources shall not exceed an annual CNEL or L_{dn} of 45 dB in any habitable room. The code requires that this standard be applied to all new hotels, motels, apartment houses, and dwellings other than detached single-family dwellings. The City will also apply this standard to single-family dwellings.

- Coordinate all land use planning and design efforts in the environs of Joint Forces Training Center (JFTC) Los Alamitos to be consistent with noise levels for the airport. Noise sensitive land uses should be prohibited inside the 65 CNEL contour projected for the airport and all noise sensitive land uses inside the 60 CNEL contour should be designed to mitigate airport noise.

NON-TRANSPORTATION NOISE CONTROL

People must be protected from excessive noise from non-transportation sources, including commercial and industrial centers. These impacts are most effectively controlled through the application of the City's Noise Ordinance. Refer to *City Noise Standards* discussion, above, for basic standards of the City's noise ordinance.

- Enforce the comprehensive City Noise Ordinance. The ordinance will protect people from non-transportation related noise sources such as music, machinery, pumps, and air conditioners.

- Require that any proposed development and building projects demonstrate compliance with the City Noise Element and Ordinance prior to project approval. Notify applicants for building permits that include mechanical equipment that this requirement exists.

- Require construction activity to comply with limits established in the City Noise Ordinance. Ensure adequate noise control measures at all construction sites through provision of mufflers and the physical separation of machinery maintenance areas from adjacent residential uses.

- Continue the noise enforcement efforts of the City.

- Limit delivery hours for commercial and industrial uses with loading areas or docks fronting, siding, bordering, or gaining access on driveways adjacent to noise-sensitive areas. Exemption from this restriction shall be based solely on attaining full compliance with the nighttime noise limits of the noise ordinance.

STANDARD NOISE ATTENUATION TECHNIQUES

Noise reduction can be accomplished by placement of walls, landscaped berms, or a combination of the two, between the noise source and the receiver. Generally, effective noise shielding requires a solid barrier with a mass of at least four pounds per square foot of surface area which is large enough to block the line of sight between source and receiver. Variations may be appropriate in individual cases based on distance, nature and orientation of buildings behind the barrier, and a number of other factors. Garages or other buildings may be used to shield dwelling units and outdoor living areas from traffic noise.

In addition to site design techniques, noise insulation can be accomplished through proper design of buildings. Nearby noise generators should be recognized in determining the location of doors, windows and vent openings. Sound-rated windows (extra thick or multi-paned) and wall insulation are also effective. None of these measures, however, can realize their full potential unless care is taken in actual construction: doors and windows fitted properly; openings sealed; joints caulked; plumbing adequately insulated from structural members. And, of course, sound-rated doors and windows will have little effect if left open. This may require installation of air conditioning for adequate ventilation. The chain of design, construction and operation is only as effective as its weakest link.

Noise impacts can be reduced by insulating noise sensitive uses, such as residences, schools, libraries, hospitals, nursing and carehomes and some types of commercial activities. But perhaps a more efficient approach involves limiting the level of noise generation at the source. State and Federal statutes have largely preempted local control over vehicular noise emissions but commercial and industrial operations and certain residential activities provide opportunities for local government to assist in noise abatement. Local ordinances may establish maximum levels for noise generated on-site. This usually takes the form of limiting the level of noise permitted to leave the property where it may impact other uses.

Although vehicular noise emissions standards are established at the State and Federal levels, local agencies can play a significant part in reducing traffic noise by controlling traffic volume and congestion. Traffic noise is greatest at intersections due to acceleration, deceleration and gear shifting. Measures such as signal synchronization can help to minimize this problem. Likewise, reduction of congestion aids in reduction of noise. This can be accomplished through the application of traffic engineering techniques such as channelization of turning movements, parking restrictions, separation of modes (bus, auto, bicycle, pedestrian) and restrictions on truck traffic.

GOALS AND POLICIES

TRANSPORTATION NOISE CONTROL

N-1: Reduce noise impacts from transportation noise sources.

N-1.1: Require construction of barriers to shield noise-sensitive uses from excessive noise.

N-1.2: Ensure the inclusion of noise mitigation measures in the design of new roadway projects in Cypress.

N-1.3: Reduce transportation noise through proper design and coordination of new or remodeled transportation and circulation facilities.

N-1.4: Enforce City, State, and federal noise standards, especially those for automobile mufflers and modified exhaust systems.

N-1.5: Ensure that the Zoning Ordinance, Circulation Element, and Land Use Element fully integrate the policies adopted as part of the Noise Element.

N-1.6: Monitor noise from buses and other heavy vehicles in residential areas. If necessary, consider alternate circulation routes for those types of vehicles.

N-1.7: Discourage through-traffic in residential neighborhoods by use of one-way streets.

N-1.8: Require that new equipment purchased by the City of Cypress comply with noise performance standards.

NOISE AND LAND USE PLANNING INTEGRATION

NOISE AND LAND USE PLANNING INTEGRATION

N-2: Incorporate noise considerations into land use planning decisions.

N-2.1: Establish targeted limits of noise for various land uses throughout the community, in accordance with Table N-2.

N-2.2: Ensure acceptable noise levels near schools, hospitals, convalescent homes, churches, and other noise-sensitive areas, in accordance with Table N-1.

N-2.3: Establish standards for all types of noise not already governed by local ordinances or preempted by State or federal law.

N-2.4: Require noise-reduction techniques in site planning, architectural design, and construction where noise reduction is necessary.

N-2.5: Discourage and, if necessary, prohibit the exposure of noise-sensitive land uses to noisy environments.

N-3: Minimize noise spillover from commercial uses into nearby residential neighborhoods.

N-3.1: Enforce the 65 dB(A) State standard for exterior noise levels for all commercial uses.

N-3.2: Require that a minimum of 15 feet be landscaped as a buffer between a commercial or mixed use structure and an adjoining residential parcel.

N-3.3: Require that automobile and truck access to commercial properties located adjacent to residential parcels be located at the maximum practical distance from the residential parcel.

N-3.4: Truck deliveries within the City to commercial and industrial properties abutting residential uses shall fully comply with the City's Noise Ordinance.

N-4: Minimize the noise impacts associated with the development of residential units above ground floor commercial uses in mixed use developments.

N-4.1: Require that commercial uses developed as part of a mixed use project (with residential uses) not be noise-intensive.

N-4.2: Require that mixed use structures be designed to prevent transfer of noise and vibration from the commercial to the residential use.

N-4.3: Orient mixed use residential units away from major noise sources.

N-4.4: Locate balconies and openable windows of residential units in mixed use projects away from the primary street and other major noise sources.

NON-TRANSPORTATION NOISE CONTROL

N-5.0: Develop measures to control non-transportation noise impacts.

N-5.1: Review the City's existing noise ordinance and revise as necessary to better regulate noise-generating uses.

N-5.2: Continue to enforce the Noise Ordinance and make the public more aware of its utility.

N-5.3: Where possible, resolve existing and potential conflicts between various noise sources and other human activities.

N-5.4: Reduce noise generated by building activities by requiring sound attenuation devices on construction equipment.

N-5.5: Establish and maintain coordination among the agencies involved in noise abatement.

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APPENDIX 3.2:

CITY OF CYPRESS MUNICIPAL CODE

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Cypress Municipal Code

Chapter 13 HEALTH AND SANITATION

ARTICLE VII. NOISE CONTROL

Note

* **Editor's note:** Ord. No. 563, § 1, adopted Feb. 23, 1976, specifically amended the Code by adding Art. VII, §§ 13-64—13-78 as herein set out.

Cross references: Advertising vehicles with sound-amplifying devices, § 16-82.

Sec. 13-64. Declaration of policy.

(a) In order to control unnecessary, excessive and annoying sounds emanating from incorporated areas of the city, it is hereby declared to be the policy of the city to prohibit such sounds generated from all sources as specified in this chapter.

(b) It is determined that certain noise levels are detrimental to the public health, welfare and safety and contrary to public interest; therefore, the city council does ordain and declare that creating, maintaining, causing or allowing to create, maintain or cause any noise in a manner prohibited by or not in conformity with the provisions of this chapter, is a public nuisance and shall be punishable as such.

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-65. Definitions.

The following words, phrases and terms as used in this chapter shall have the meaning as indicated below:

Ambient noise level shall mean the all-encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding the alleged offensive noise, at the location and approximate time at which a comparison with the alleged offensive noise is to be made.

Cumulative period shall mean an additive period of time composed of individual time segments which may be continuous or interrupted.

Decibel (dB) shall mean a unit which denotes the ratio between two (2) quantities which are proportional to power: The number of decibels corresponding to the ratio of two (2) amounts of power is ten (10) times the logarithm to the base ten (10) of this ratio.

Dwelling unit shall mean a single unit providing complete, independent living facilities for one or more persons including permanent provisions for living, sleeping, eating, cooking and sanitation.

Emergency machinery, vehicle or work shall mean any machinery, vehicle or work used, employed or performed in an effort to protect, provide or restore safe conditions in the community or for the citizenry, or work by private or public utilities when restoring utility service.

Fixed noise source shall mean a stationary device which creates sounds while fixed or motionless including but not limited to industrial and commercial machinery and equipment, pumps, fans, compressors, generators, air conditioners and refrigeration equipment.

Grading shall mean any excavating or filling of earth material, or any combination thereof, conducted at a site to prepare said site for construction or other improvements thereon.

Impact noise shall mean the noise produced by the collision of one mass in motion with a second mass which may be either in motion or at rest.

Mobile noise source shall mean any noise source other than a fixed noise source.

Noise level shall mean the "A" weighted sound pressure level in decibels obtained by using a sound level meter at slow response with a reference pressure of twenty (20) microNewtons per square meter. The unit of measurement shall be designated at dB(A).

Noise variance board shall mean an administrative board of five (5) members appointed by the board of supervisors of the County of Orange, per Title 4, Division 6, Article 1 of the Codified Ordinances of the County of Orange.

Person shall mean a person, firm, association, copartnership, joint venture, corporation or any entity, public or private in nature.

Residential property shall mean a parcel of real property which is developed and used either in part or in whole for residential purposes, other than transient uses such as hotels and motels.

Simple tone noise shall mean a noise characterized by a predominant frequency or frequencies so that other frequencies cannot be readily distinguished.

Sound level meter shall mean an instrument meeting American National Standard Institute's Standard S1.4-1971 for Type 1 or Type 2 sound level meters or an instrument and the associated recording and analyzing equipment which will provide equivalent data.

Sound pressure level of a sound, in decibels, shall mean twenty (20) times the logarithm to the base ten (10) of the ratio of the pressure of the sound to a reference pressure, which reference pressure shall be explicitly stated.

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-66. Noise level measurement criteria.

Any noise level measurements made pursuant to the provisions of this chapter shall be performed using a sound level meter as defined in section 13-65.

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-67. Designated noise zone.

The residential properties hereinafter described are hereby assigned to the following noise zones:

Noise Zone 1: All residential properties zoned RS-15000 or RS-6000.

Noise Zone 2: All residential property not in Noise Zone 1.

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-68. Exterior noise standards.

(a) The following noise standards, unless otherwise specifically indicated, shall apply to all residential property within a designated noise zone.

NOISE STANDARDS

Noise Zone	Noise Level	Time Period
1	55 dB(A)	7:00 a.m.—10:00 p.m.
	50 dB(A)	10:00 p.m.—7:00 a.m.
2	60 dB(A)	7:00 a.m.—10:00 p.m.
	55 dB(A)	10:00 p.m.—7:00 a.m.

In the event the alleged offensive noise consists of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by five (5) dB(A).

(b) It shall be unlawful for any person at any location within the incorporated area of the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, when the foregoing causes the noise level, when measured on any other residential property, either incorporated or unincorporated, to exceed:

(1) The noise standard for a cumulative period of more than thirty (30) minutes in any hour; or

(2) The noise standard plus five (5) dB(A) for a cumulative period of more than fifteen (15) minutes in any hour; or

(3) The noise standard plus ten (10) dB(A) for a cumulative period of more than five (5) minutes in any hour; or

(4) The noise standard plus fifteen (15) dB(A) for a cumulative period of more than one minute in any hour; or

(5) The noise standard plus twenty (20) dB(A) for any period of time.

(c) In the event the ambient noise level exceeds any of the first four (4) noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-69. Interior noise standards.

(a) The following interior noise standards, unless otherwise specifically indicated, shall apply to all residential property within a designated noise zone:

INTERIOR NOISE STANDARDS

Noise Zone	Noise Level	Time Period
1 and 2	55 dB(A)	7:00 a.m.—10:00 p.m.
	45 dB(A)	10:00 p.m.—7:00 a.m.

In the event the alleged offensive noise consists of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by five (5) dB(A).

(b) It shall be unlawful for any person at any location within the incorporated area of the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, when the foregoing causes the noise level when measured within any other dwelling unit on any residential property, either incorporated or unincorporated, to exceed:

(1) The interior noise standard for a cumulative period of more than five (5) minutes in any hour; or

(2) The interior noise standard plus five (5) dB(A) for a cumulative period of more than one minute in any hour; or

(3) The interior noise standard plus ten (10) dB(A) for any period of time.

(c) In the event the ambient noise level exceeds either of the first two (2) noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the third noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-70. Special provisions.

The following activities shall be exempted from the provisions of this chapter:

(a) Authorized activities conducted on the grounds of any public or private nursery, elementary, intermediate or secondary school or college.

(b) Reserved.

(c) Activities conducted on any park, playground, or street, provided such park, playground, or street, is owned and operated by a public entity.

(d) Any mechanical device, apparatus or equipment used, related to or connected with emergency machinery, vehicle or work.

(e) Noise sources associated with construction, repair, remodeling or grading of any real property, provided said activities do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, before 9:00 a.m. and after 8:00 p.m. on Saturday, or at any time on Sunday or a federal

holiday.

(f) All mechanical devices, apparatus or equipment which are utilized for the protection or salvage of agricultural crops during periods of potential or actual frost damage or other adverse weather conditions.

(g) Mobile noise sources associated with agricultural operations provided such operations do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday.

(h) Mobile noise sources associated with agricultural pest control through pesticide application provided that the application is made in accordance with restricted material permits issued by or regulations enforced by the agricultural commissioner.

(i) Noise sources, excepting leaf blowers as defined in section 13-72.1(a) of this Code, associated with the maintenance of real property provided said activities take place between the hours of 7:00 a.m. and 8:00 p.m. on any day except Saturday, Sunday or federal holiday, or between the hours of 8:00 a.m. and 8:00 p.m. on Saturday, Sunday or federal holiday.

(j) Any activity to the extent regulation thereof has been preempted by state or federal law.

(Ord. No. 563, § 1, 2-23-76; Ord. No. 854, § 4, 8-27-90; Ord. No. 856, § 2, 10-29-90; Ord. No. 994, §§ 1, 2, 9-27-99; Ord. No. 1137, § 1, 10-28-13.)

Sec. 13-71. Schools, hospitals and churches; special provisions.

It shall be unlawful for any person to create any noise which causes the noise level at any school, hospital or church while the same is in use, to exceed the noise limits as specified in section 13-68 prescribed for the assigned noise zone in which the school, hospital or church is located, or which noise level unreasonably interferes with the use of such institutions or which unreasonably disturbs or annoys patients in the hospital, provided conspicuous signs are displayed in three (3) separate locations within one-tenth (0.1) of a mile of the institution indicating the presence of a school, church or hospital.

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-72. Air conditioning and refrigeration; special provisions.

Until September 15, 1978, the noise standards enumerated in sections 13-68 and 13-69 shall be increased eight (8) dB(A) where the alleged offensive noise source is an air conditioning or refrigeration system or associated equipment which was installed prior to the effective date of this article.

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-72.1. Leaf blower operation; definitions.

As used in this section, the following terms shall have meanings as set forth below:

Leaf blower means any machine however powered used to blow leaves, dirt and other debris off sidewalks, driveways, lawns and other surfaces.

Parcel means an area of real property with a separate or distinct number or other designation shown on a plat recorded in the office of the county recorder. Contiguous parcels owned by the same individual or entity shall be considered one (1) parcel for purposes of this section.

(Ord. No. 856, § 1, 10-29-90.)

Sec. 13-72.2. Restrictions on operation of leaf blowers.

It shall be unlawful for any person within a residential zone or within two hundred (200) feet of a residential zone to operate any type of leaf blower within the city except under the following restrictions:

(a) Time restriction: Notwithstanding section 13-70(i), leaf blowers shall not be operated except between the hours of 8:00 a.m. and 6:00 p.m. Monday through Friday and 9:00 a.m. to 6:00 p.m. on Saturday;

(b) Distance restriction: Leaf blowers shall not be operated within a horizontal distance of ten (10) feet of any operable window, door, or mechanical air intake opening or duct;

(c) Duration of use restriction: Leaf blowers shall not be operated for more than fifteen (15) minutes per hour on parcels less than one-half acre and no more than thirty (30) minutes per hour on parcels greater than one-half acre.

(d) Number restriction: No person shall operate more than one (1) leaf blower per parcel.

(Ord. No. 856, § 1, 10-29-90.)

Sec. 13-72.3. Unlawful to propel debris beyond parcel boundary.

It shall be unlawful for any person to use or operate any leaf blower in such a manner as to blow, dispel, or make airborne, dust, leaves, grass cuttings, paper, trash, or any other type of unattached debris or material which by its use will cause said dust, leaves, grass cuttings, paper, trash, or any other type of unattached debris or material to become airborne or travel beyond the parcel boundaries in which it is being used to adjoining properties. It shall be unlawful for any person to use or operate any leaf blower within the city in such a way as to blow leaves, dirt, and other debris onto the public rights-of-way and to allow the material to remain there for more than fifteen (15) minutes.

(Ord. No. 856, § 1, 10-29-90.)

Sec. 13-72.4. Exemptions regarding leaf blower operation.

The following are exempted from the operation of this section.

(a) Any publicly owned properties, including but not limited to public schools, parks, fire stations, etc.

(b) Privately owned schools.

(Ord. No. 856, § 1, 10-29-90.)

Sec. 13-72.5. Violations: infractions.

Any person violating any of the provisions of sections 13-72.1 through 13-72.4 is deemed an infraction and upon conviction thereof, shall be fined in an amount not exceeding fifty dollars ($50.00). Each day such violation is committed or permitted to continue shall constitute a separate offense and shall be punishable as such.

(Ord. No. 856, § 1, 10-29-90.)

Sec. 13-72.6. Violations; additional remedies; injunctions.

As an additional remedy, the operation of any leaf blower in violation of any provision of sections 13-72.1 through 13-72.4 which operation causes discomfort or annoyance to reasonable persons of normal sensitiveness or which endangers the comfort, repose, health or peace of residents in the area, shall be deemed and is declared to be a public nuisance and may be subject to abatement summarily by a restraining order or injunction issued by a court of competent jurisdiction.

Any violation of sections 13-72.1 through 72.4 is declared to be a public nuisance and may be abated in accordance with law. The expense of such abatement may be by resolution of the city council declared to be a lien against the property in which such nuisances are maintained, and such lien shall be made a personal obligation of the property owner.

(Ord. No. 856, § 1, 10-29-90.)

Sec. 13-73. Noise level measurement.

The location selected for measuring exterior noise levels shall be at any point on the affected property. Interior noise measurements shall be made within the affected dwelling unit. The measurement shall be made at a point at least four (4) feet from the wall, ceiling or floor nearest the alleged offensive noise source and may be made with the windows of the affected unit open.

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-74. Manner of enforcement.

(a) The Orange County Health Officer and his duly authorized representatives are directed to enforce the provisions of this chapter. The Orange County Health Officer and his duly authorized representatives are authorized, pursuant to Penal Code Section 836.5, to arrest any person without a warrant when they have reasonable cause to believe that such person has committed a misdemeanor in their presence.

(b) No person shall interfere with, oppose or resist any authorized person charged with enforcement of this chapter while such person is engaged in the performance of his duty.

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-75. Variance procedure.

(a) The owner or operator of a noise source which violates any of the provisions of this chapter may file an application with the community development department for a variance from the provisions thereof wherein said owner or operator shall set forth all actions taken to comply with said provisions, the reasons why immediate compliance cannot be achieved, a proposed method of

achieving compliance, and a proposed time schedule for its accomplishment. Said application shall be accompanied by a fee in the amount prescribed by the master fee schedule, which may be updated by resolution from time to time. A separate application shall be filed for each noise source; provided, however, that several mobile sources under common ownership, or several fixed sources on a single property may be combined into one application. Upon receipt of said application and fee, the community development department shall refer it with his recommendation thereon within thirty (30) days to the noise variance board for action thereon in accordance with the provisions of this chapter.

(b) An applicant for a variance shall remain subject to prosecution under the terms of this article until a variance is granted.

(Ord. No. 563, § 1, 2-23-76; Ord. No. 1103, § 11, 10-27-08.)

Sec. 13-76. Noise variance board.

The noise variance board shall evaluate all applications for variance from the requirements of this chapter and may grant said variances with respect to time for compliance, subject to such terms, conditions and requirements as it may deem reasonable to achieve maximum compliance with the provisions of this chapter. Said terms, conditions and requirements may include, but shall not be limited to limitations on noise levels and operating hours. Each such variance shall set forth in detail the approved method of achieving maximum compliance and a time schedule for its accomplishment. In its determinations, said board shall consider the magnitude of nuisance caused by the offensive noise; the uses of property within the area of impingement by the noise; the time factors related to study, design, financing and construction of remedial work; the economic factors related to age and useful life of equipment; and the general public interest and welfare. Any variance granted by said board shall be by resolution and shall be transmitted to the health officer for enforcement. Any violation of the terms of said variance shall be unlawful.

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-77. Appeals.

(a) Within fifteen (15) days following the decision of the variance board on an application, the applicant, the health officer, or any member of the city council, may appeal the decision to the city council by filing a notice of appeal with the secretary of the variance board. In the case of an appeal by the applicant for a variance, the notice of appeal shall be accompanied by a fee to be computed by the secretary on the basis of the estimated cost of preparing the materials required to be forwarded to the city council as discussed hereafter. If the actual cost of such preparation differs from the estimated cost, appropriate payments shall be made either to or by the secretary.

(b) Within fifteen (15) days following receipt of a notice of appeal and the appeal fee, the secretary of the variance board shall forward to the city council copies of the application for variance; the recommendation of the health officer; the notice of appeal; all evidence concerning said application received by the variance board and its decision thereon. In addition, any person may file with the city council written arguments supporting or attacking said decision and the city council may in its discretion hear oral arguments thereon. The city clerk shall mail to the applicant a notice of the date set for hearing of the appeal. The notice shall be mailed at least ten (10) days prior to the hearing date.

(c) Within sixty (60) days following its receipt of the notice of the appeal, the city council shall either affirm, modify or reverse the decision of the variance board. Such decision shall be based upon the city council's evaluation of the matters submitted to the city council in light of the powers conferred on the variance board and the factors to be considered, both as enumerated in sections 13-75 and 13-76.

(d) As part of its decision, the council may direct the variance board to conduct further proceedings on said application. Failure of the city council to affirm, modify or reverse the decision of the variance board within said sixty (60) day period shall constitute an affirmance of the decision.

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-78. Violations: Misdemeanors.

Any person violating any of the provisions of this chapter shall be deemed guilty of a misdemeanor. Each day such violation is committed or permitted to continue shall constitute a separate offense and shall be punishable as such. The provisions of this chapter shall not be construed as permitting conduct not prescribed herein and shall not affect the enforceability of any other applicable provisions of law.

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-79. Reserved.

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APPENDIX 3.3:

CITY OF LOS ALAMITOS MUNICIPAL CODE

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Los Alamitos Municipal Code

Title 17 ZONING

Division 3. Site Planning and General Development Standards

Chapter 17.24 NOISE

17.24.010 Purpose.

A. In order to control unnecessary, excessive and annoying sounds emanating from incorporated areas of the city, it is declared to be the policy of the city to prohibit these sounds generated from all sources as specified in this chapter.

B. It is determined that certain noise levels are detrimental to the public health, welfare and safety and contrary to public interest; therefore, the council does ordain and declare that creating, maintaining, causing or allowing to create, maintain or cause any noise in a manner prohibited by, or not in conformity with the provisions of this chapter, is a public nuisance and shall be punishable. (Ord. 688 § 1, 2006)

17.24.020 Exemptions.

The following activities shall be exempt from the provisions of this chapter.

A. School bands, school athletic and school entertainment events, provided these events are conducted on school property or authorized by special permit from the city;

B. Activities lawfully conducted in public parks, public playgrounds, and public or private school grounds;

C. A mechanical device, apparatus, or equipment used, related to or connected with emergency machinery, vehicle or work;

D. Noise sources associated with construction, repair, remodeling or grading of any real property; provided a permit has been obtained from the city; and provided the activities do not take place between the hours of eight p.m. and seven a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday;

E. Mechanical devices, apparatus or equipment which are utilized for the protection or harvest of agricultural crops during periods of potential or actual frost damage or other adverse weather conditions;

F. Mobile noise sources associated with agricultural operations provided the operations do not take place between the hours of eight p.m. and seven a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday;

G. Mobile noise sources associated with agricultural pest control through pesticide application; provided, that the application is made in compliance with restricted material permits issued by or regulations enforced by the State Agricultural Commissioner;

H. Noise sources associated with the maintenance of real property, provided the activities take place between the hours of eight a.m. and eight p.m. on any day except Sunday or between the hours of nine a.m. and six p.m. on Sunday or a federal holiday;

I. An activity, or equipment, to the extent that design regulation of it has been preempted by state or federal laws. (Ord. 688 § 1, 2006)

17.24.030 Noise level measurement criteria.

Noise level measurements made in compliance with the provisions of this chapter shall be performed using a sound level meter as defined in Chapter 17.76 (Definitions). The location selected for measuring exterior noise levels shall be at any point on the property line of the offender or anywhere on the affected property. Interior noise measurements shall be made within the affected unit. The measurement shall be made at a point in the affected unit at least four feet from the wall, ceiling, or floor nearest the noise source. (Ord. 688 § 1, 2006)

17.24.040 Designated noise zoning districts.

The properties described below are assigned to the following noise zoning districts:

A. Noise Zone 1: all residential properties;

B. Noise Zone 2: all professional office and public institutional properties;

C. Noise Zone 3: all commercial properties with the exception of professional office properties; and

D. Noise Zone 4: all industrial properties. (Ord. 688 § 1, 2006)

17.24.050 Exterior noise standards.

The following noise standards, unless otherwise specifically indicated, shall apply to property used for residential purposes within a designated noise zone:

EXTERIOR NOISE STANDARDS

Noise Zone	Noise Level	Time Period
1 day	55 dB(A)	7 a.m. — 10 p.m.
1 night	50 dB(A)	10 p.m. — 7 a.m.
2	55 dB(A)	Anytime
3	60 dB(A)	Anytime
4	70 dB(A)	Anytime

(Ord. 688 § 1, 2006)

17.24.060 Prohibited exterior noise levels.

A. It is unlawful for a person to create noise, or to allow the creation of noise on property owned, leased, occupied, or otherwise controlled by a person, that causes the noise level when measured on a residential, public institutional, professional, commercial, or industrial property, either within or without the city, to exceed the applicable noise standard:

1. For a cumulative period of more than thirty (30) minutes in any hour;
2. Plus five dB(A) for a cumulative period of more than fifteen (15) minutes in any hour;
3. Plus ten (10) dB(A) for a cumulative period of more than five minutes in any hour;
4. Plus fifteen (15) dB(A) for a cumulative period of more than one minute in any hour; or
5. Plus twenty (20) dB(A) for any period of time.

B. Maximum Allowable Noise Levels. In the event the ambient noise level exceeds the noise limit categories described in subsections (A)(1) through (5) of this section above, the cumulative period applicable to the category shall be increased to reflect the ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under that category shall be increased to reflect the maximum ambient noise level. (Ord. 688 § 1, 2006)

17.24.070 Interior noise standards.

The following noise standards, unless otherwise specifically indicated, shall apply to all real property within a designated noise zone:

INTERIOR NOISE STANDARDS

Noise Zone	Noise Level	Time Period
1	55 dB(A)	7 a.m. — 10 p.m.
	45 dB(A)	10 p.m. — 7 a.m.
2, 3, 4	55 dB(A)	anytime

(Ord. 688 § 1, 2006)

17.24.080 Prohibited interior noise levels.

A. Noise Limit Categories. It is unlawful for a person to create noise, or to allow the creation of noise on property owned, leased, occupied or otherwise controlled by a person, that causes the noise level when measured within other structures on residential, public institutional, commercial, or industrial property to exceed:

1. The noise standard for a cumulative period of more than five minutes in an hour;
2. The noise standard plus five dB(A) for a cumulative period of more than one minute in an hour; or
3. The noise standard plus ten (10) dB(A) for a period of time.

B. Maximum Allowable Noise Levels. In the event the ambient noise level exceeds either of the first two noise limit categories described in subsections (A)(1) and (2) of this section, the cumulative period applicable to the category shall be increased to reflect the ambient noise level. In the event the ambient noise level exceeds the third noise limit category, the maximum allowable noise level under that category shall be increased to reflect the maximum ambient noise level.

C. Reductions. Each of the noise limits specified above shall be reduced by five dB(A) for impact or predominant tone noises, or for noises consisting of speech or music.

D. Different Zoning Districts. In the event that the noise source and the affected property are within different noise zoning districts, the noise standards of the affected property shall apply. (Ord. 688 § 1, 2006)

17.24.090 Special provisions—Schools, hospitals and religious institutions.

It is unlawful for a person to create noise that causes the noise level at a school, hospital, or religious institution while the facility is in use, to exceed the noise limits specified for exterior noise in this chapter, or which noise level unreasonably interferes with the use of the facility or which unreasonably disturbs or annoys patients in a hospital, provided conspicuous signs are displayed in three separate locations within one-tenth of a mile of the institution indicating the presence of a school, hospital, or religious institution. (Ord. 688 § 1, 2006)

17.24.100 Manner of enforcement.

A. The director and his or her duly authorized representatives are directed to enforce the provisions of this title. The police chief and his or her duly authorized representatives are authorized in compliance with Penal Code Section 836.5, to arrest any person without a warrant when they have reasonable cause to believe that a person has committed a misdemeanor in their presence.

B. Persons shall not interfere with, oppose, or resist an authorized person charged with enforcement of this title while any person is engaged in the performance of their duty. (Ord. 688 § 1, 2006)

17.24.110 Variance application procedure.

A. Application Requirements. The owner or operator of a noise source that violates any of the provisions of this chapter may file an application with the director for a variance from the provisions, and the owner or operator shall detail all actions taken to comply with the provisions, the reasons why immediate compliance cannot be achieved, a proposed method of achieving compliance, and a proposed time schedule for its accomplishment. The application shall be accompanied by a fee as established by resolution of the council.

B. Separate Applications. A separate application shall be filed for each noise source; provided, however, that several mobile sources under common ownership, or several fixed sources on a single property may be combined into one application. Upon receipt of the application and fee, the director shall refer it with his recommendation in compliance with the provisions of this chapter.

C. Compliance Required Until Variance Granted. An applicant for a variance shall remain subject to prosecution under the terms of this title until a variance is granted.

D. Review Authority. The planning commission shall evaluate all applications for variance from the requirements of this title and may grant variances with respect to time for compliance, subject to the terms, conditions, and requirements, as it may deem reasonable to achieve maximum compliance with the provisions of this title. These terms, conditions, and requirements may include, but shall not be limited to, limitations on noise levels and operating hours. Each variance shall identify in detail the approved method of achieving maximum compliance and a time schedule for its accomplishment.

E. Factors to be Considered. In its determinations the planning commission shall consider the magnitude of nuisance caused by the offensive noise; the uses of property within the area of impingement by the noise; the time factors related to study, design, financing and construction of remedial work; the economic factors related to age and useful life of equipment; and the general public interest and welfare.

F. Violations. A variance granted shall be by resolution and shall be transmitted to the director for enforcement. A violation of the terms of the variance is unlawful. (Ord. 688 § 1, 2006)

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APPENDIX 5.1:

STUDY AREA PHOTOS

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LT1
33, 48' 23.494200", 118, 3' 1.878600"

LT1_E
33, 48' 22.299500", 118, 3' 2.482900"

LT1_N
33, 48' 23.494200", 118, 3' 1.878600"

LT1_NE
33, 48' 23.494200", 118, 3' 1.878600"

LT1_S
33, 48' 23.494200", 118, 3' 1.878600"

LT1_W
33, 48' 23.494200", 118, 3' 1.878600"

LT2
33, 48' 23.576600", 118, 2' 53.886100"

LT2_E
33, 48' 23.576600", 118, 2' 53.886100"

LT2_N
33, 48' 23.576600", 118, 2' 53.886100"

LT2_NE
33, 48' 23.576600", 118, 2' 53.886100"

LT2_S
33, 48' 23.892500", 118, 2' 53.995900"

LT2_SW
33, 48' 23.892500", 118, 2' 53.995900"

LT3
33, 48' 23.507900", 118, 2' 47.047100"

LT3_N_Stables
33, 48' 23.507900", 118, 2' 47.047100"

LT3_NE
33, 48' 23.507900", 118, 2' 47.047100"

LT3_SE
33, 48' 23.507900", 118, 2' 47.047100"

LT3_SW
33, 48' 23.507900", 118, 2' 47.047100"

LT3_W
33, 48' 23.507900", 118, 2' 47.047100"

LT4
33, 48' 18.907400", 118, 2' 46.470300"

LT4_E_Church
33, 48' 18.248200", 118, 2' 47.651300"

LT4_E2_Church
33, 48' 18.248200", 118, 2' 47.651300"

LT4_N
33, 48' 18.907400", 118, 2' 46.470300"

LT4_N2
33, 48' 18.907400", 118, 2' 46.470300"

LT4_NE_Stables
33, 48' 18.550400", 118, 2' 47.294300"

LT4_NW
33, 48' 18.907400", 118, 2' 46.470300"

LT4_S
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LT4_W
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LT5
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LT5_E
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LT5_N
33, 48' 17.177100", 118, 3' 2.400500"

LT5_NE
33, 48' 17.177100", 118, 3' 2.400500"

LT5_S
33, 48' 17.177100", 118, 3' 2.400500"

LT5_W
33, 48' 17.177100", 118, 3' 2.400500"

LT6
33, 48' 14.636500", 118, 2' 56.248100"

LT6_2
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LT6_E
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LT6_N
33, 48' 14.636500", 118, 2' 56.248100"

LT6_N2
33, 48' 14.636500", 118, 2' 56.248100"

LT6_S
33, 48' 14.636500", 118, 2' 56.248100"

LT6_S2
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LT6_SE
33, 48' 14.636500", 118, 2' 56.248100"

LT6_SW
33, 48' 14.636500", 118, 2' 56.248100"

LT6_W
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Site_Center_Looking_E
33, 48' 17.039700", 118, 2' 53.336700"

Site_Center_Looking_E2
33, 48' 17.822500", 118, 2' 56.412900"

Site_Center_Looking_N
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Site_Center_Looking_NE
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Site_Center_Looking_NW
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Site_Center_Looking_S
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Site_Center_Looking_SE
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Site_Center_Looking_W
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Site_E_Looking_E_Church
33, 48' 16.160800", 118, 2' 48.447800"

Site_E_Looking_NE
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Site_E_Looking_NE_RaceTrack
33, 48' 16.160800", 118, 2' 48.447800"

Site_E_Looking_S_ResidenceInn
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Site_E_Looking_S2_ResidenceInn
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Site_E_Looking_SE_ResidenceInn
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Site_E_Looking_SW
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Site_N_Looking_E_Stables
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Site_N_Looking_N_ConstFence
33, 48' 23.851300", 118, 2' 51.441600"

Site_N_Looking_N_ConstFence2
33, 48' 23.851300", 118, 2' 51.441600"

Site_N_Looking_N_Stables
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Site_N_Looking_NE_RaceTrack
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Site_N_Looking_NE2_RaceTrack
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Site_N_Looking_NW
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Site_N_Looking_S
33, 48' 23.617800", 118, 2' 47.623900"

Site_N_Looking_S_EntryGate
33, 48' 23.645300", 118, 2' 47.898500"

Site_N_Looking_SE_Stables
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Site_N_Looking_SW
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Site_N_Looking_W
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Site_N_Looking_W3
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Site_NW_Looking_NW
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Site_NW_Looking_W
33, 48' 19.951100", 118, 2' 57.841100"

Site_W_Looking_N
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Site_W_Looking_NW
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Site_W_Looking_S
33, 48' 19.594100", 118, 3' 1.549000"

Site_W_Looking_SW
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StudyArea_Church_EofSite
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StudyArea_CommercialLU_OfficeDepot
33, 48' 15.529100", 118, 2' 39.082000"

StudyArea_CommercialLU_OfficeDepot_LoadingDock
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StudyArea_CommercialLU_OfficeDepot_TrashCompactor
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StudyArea_Costco_LoadingDocks1
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StudyArea_Costco_LoadingDocks2
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StudyArea_Costco_LoadingDocks3
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StudyArea_Costco_Looking_NW
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StudyArea_Costco_Looking_W
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StudyArea_RaceTrack_CerritosAvenue1
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StudyArea_RaceTrack_CerritosAvenue2
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StudyArea_RaceTrack_CerritosAvenue3
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StudyArea_RaceTrack_Entrance1
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StudyArea_RaceTrack_Entrance3
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StudyArea_RaceTrack_Parking1
33, 48' 23.192100", 118, 2' 42.405300"

StudyArea_RaceTrack_Parking2
33, 48' 23.192100", 118, 2' 42.405300"

StudyArea_RaceTrack_Parking3
33, 48' 23.192100", 118, 2' 42.405300"

StudyArea_RaceTrack_Parking4
33, 48' 23.631500", 118, 2' 40.592600"

StudyArea_RaceTrack_Parking5
33, 48' 23.604100", 118, 2' 42.542700"

StudyArea_RaceTrack_Parking6
33, 48' 23.604100", 118, 2' 42.542700"

Site_Center_Panoramic1
33, 48' 17.000000", 118, 2' 56.000000"

Site_Center_Panoramic2
33, 48' 17.000000", 118, 2' 56.000000"

APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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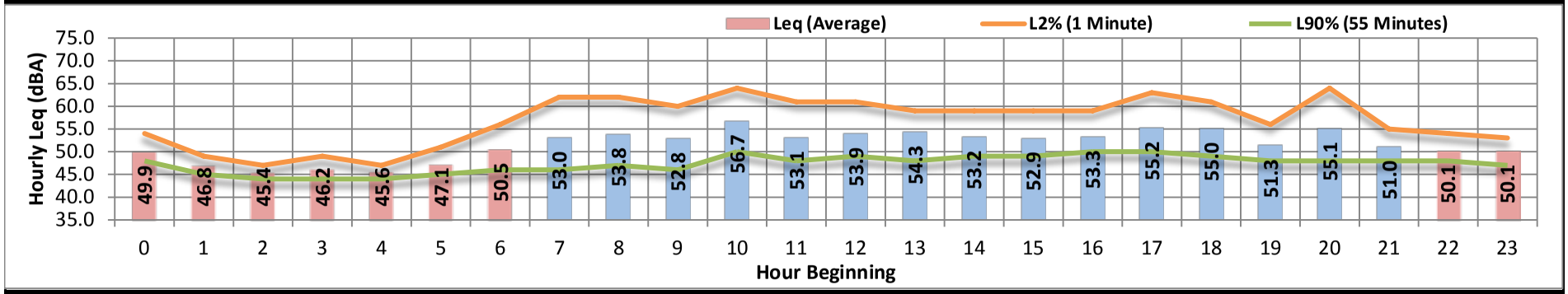
24-Hour Noise Level Measurement Summary

Project Name:	Barton Place	*JN:* 9555	*Energy Average Leq*		*24-Hour*
Location:	LT1 - Located in the northwest corner of the Project site adjacent to Enterprise Drive, northeast of the existing Cottonwood Church.	*Analyst:* A. Wolfe	*Day*	*Night*	*CNEL*
		Date: 2/19/2015	53.9	48.4	56.7

Hourly Leq dBA Readings (unadjusted)



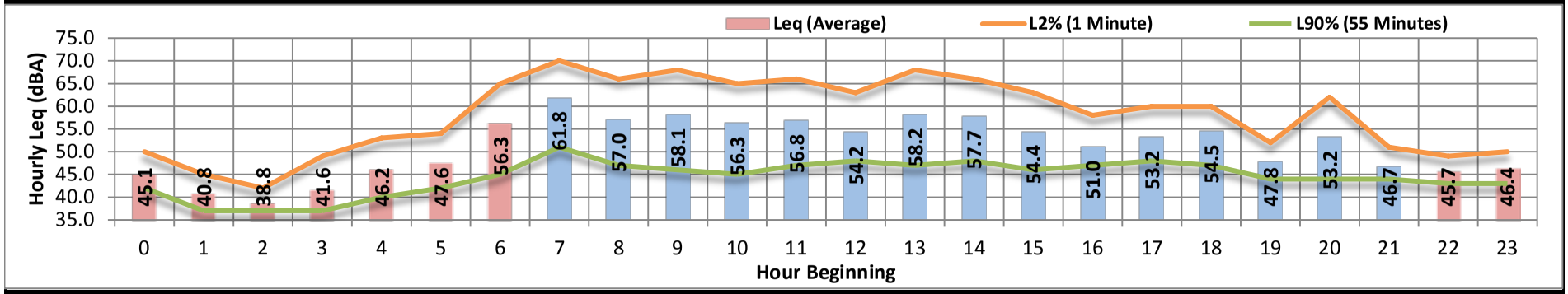
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	51.0	65.7	44.5	56.0	55.0	53.0	52.0	50.0	48.0	46.0	46.0	45.0
	Max	56.7	77.2	48.3	68.0	64.0	60.0	57.0	54.0	52.0	50.0	49.0	49.0
Energy Average		53.9	71.8	47.0	63.6	61.0	57.4	55.5	52.3	50.5	48.5	48.0	47.4
Night	Min	45.4	52.6	43.9	48.0	47.0	46.0	46.0	45.0	45.0	44.0	44.0	44.0
	Max	50.5	71.4	46.9	59.0	56.0	53.0	51.0	50.0	49.0	48.0	48.0	47.0
Energy Average		48.4	65.5	45.3	54.0	52.2	50.3	49.2	48.1	47.2	46.0	45.8	45.4
Hourly Summary													
Night	0	49.9	65.7	46.9	55.0	54.0	52.0	51.0	50.0	49.0	48.0	47.0	47.0
	1	46.8	58.0	44.2	49.0	49.0	49.0	48.0	47.0	45.0	45.0	45.0	44.0
	2	45.4	53.5	43.9	48.0	47.0	46.0	46.0	45.0	45.0	44.0	44.0	44.0
	3	46.2	64.2	44.4	53.0	49.0	47.0	46.0	45.0	45.0	44.0	44.0	44.0
	4	45.6	52.6	44.2	48.0	47.0	46.0	46.0	45.0	45.0	44.0	44.0	44.0
	5	47.1	62.6	44.8	51.0	51.0	49.0	48.0	47.0	46.0	45.0	45.0	45.0
	6	50.5	71.4	45.4	59.0	56.0	53.0	51.0	49.0	48.0	46.0	46.0	46.0
Day	7	53.0	71.6	45.4	65.0	62.0	56.0	54.0	50.0	48.0	46.0	46.0	45.0
	8	53.8	70.2	45.6	64.0	62.0	58.0	56.0	52.0	50.0	47.0	47.0	46.0
	9	52.8	72.2	44.5	62.0	60.0	57.0	55.0	52.0	50.0	46.0	46.0	45.0
	10	56.7	77.2	47.6	67.0	64.0	59.0	57.0	53.0	51.0	50.0	49.0	48.0
	11	53.1	69.6	46.6	63.0	61.0	58.0	56.0	52.0	50.0	48.0	47.0	47.0
	12	53.9	69.8	46.3	63.0	61.0	58.0	56.0	53.0	51.0	49.0	48.0	47.0
	13	54.3	72.6	47.0	62.0	59.0	57.0	56.0	54.0	51.0	48.0	48.0	47.0
	14	53.2	67.8	47.5	62.0	59.0	56.0	55.0	52.0	51.0	49.0	49.0	48.0
	15	52.9	65.7	48.2	61.0	59.0	56.0	55.0	52.0	51.0	49.0	49.0	48.0
	16	53.3	69.0	48.3	61.0	59.0	56.0	55.0	53.0	51.0	50.0	49.0	49.0
	17	55.2	72.6	48.3	65.0	63.0	60.0	57.0	54.0	52.0	50.0	49.0	49.0
	18	55.0	74.1	47.2	63.0	61.0	58.0	56.0	53.0	51.0	49.0	48.0	48.0
	19	51.3	66.8	47.3	59.0	56.0	54.0	53.0	51.0	50.0	48.0	48.0	47.0
	20	55.1	73.5	47.0	68.0	64.0	59.0	56.0	51.0	50.0	48.0	48.0	47.0
	21	51.0	70.0	47.1	56.0	55.0	53.0	52.0	50.0	49.0	48.0	48.0	47.0
Night	22	50.1	62.5	46.8	55.0	54.0	52.0	51.0	50.0	49.0	48.0	48.0	47.0
	23	50.1	68.5	45.9	55.0	53.0	52.0	51.0	50.0	49.0	47.0	47.0	46.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Project Name:	Barton Place	*JN:* 9555	*Energy Average Leq*		*24-Hour*
Location:	LT2 - Located along the northern Project site boundary, south of the existing horse stables of the Los Alamitos Race Course.	*Analyst:* A. Wolfe	*Day*	*Night*	*CNEL*
		Date: 2/19/2015	56.2	48.7	57.6

Hourly Leq dBA Readings (unadjusted)



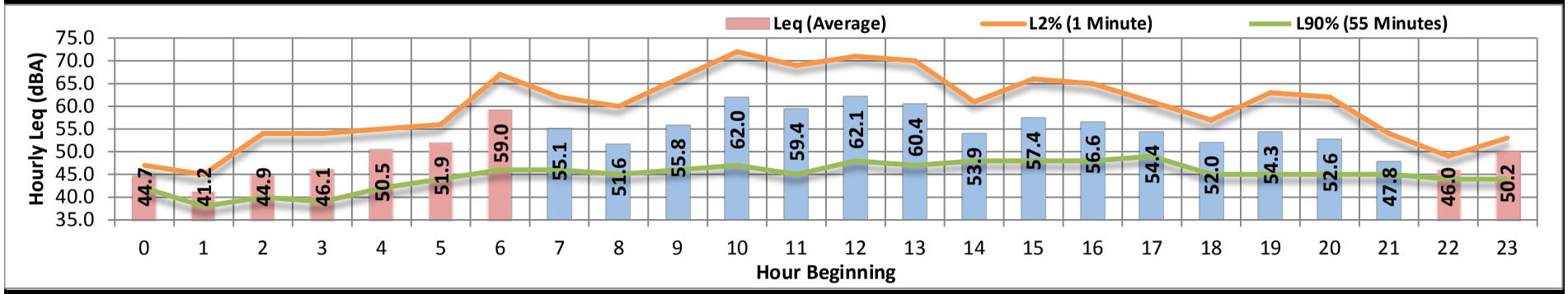
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	46.7	61.8	42.4	52.0	51.0	50.0	48.0	46.0	45.0	44.0	43.0	43.0
	Max	61.8	79.6	46.2	71.0	70.0	67.0	65.0	62.0	56.0	51.0	49.0	47.0
Energy Average		56.2	75.0	44.4	66.9	64.9	61.2	59.2	54.1	50.5	47.0	46.1	45.3
Night	Min	38.8	50.5	35.9	43.0	42.0	41.0	40.0	39.0	37.0	37.0	36.0	36.0
	Max	56.3	77.4	43.2	67.0	65.0	61.0	58.0	53.0	48.0	45.0	44.0	44.0
Energy Average		48.7	68.8	39.7	58.5	56.5	52.9	50.6	46.5	43.8	41.5	40.8	40.3
Hourly Summary													
Night	0	45.1	58.7	40.4	52.0	50.0	48.0	47.0	45.0	43.0	42.0	41.0	41.0
	1	40.8	56.0	36.0	47.0	45.0	43.0	43.0	40.0	39.0	37.0	37.0	36.0
	2	38.8	50.5	35.9	43.0	42.0	41.0	40.0	39.0	37.0	37.0	36.0	36.0
	3	41.6	59.0	36.0	51.0	49.0	46.0	44.0	40.0	39.0	37.0	37.0	37.0
	4	46.2	66.1	37.7	55.0	53.0	50.0	49.0	44.0	42.0	40.0	39.0	38.0
	5	47.6	67.4	40.6	57.0	54.0	51.0	50.0	46.0	44.0	42.0	41.0	41.0
	6	56.3	77.4	43.2	67.0	65.0	61.0	58.0	53.0	48.0	45.0	44.0	44.0
Day	7	61.8	79.6	45.8	71.0	70.0	67.0	65.0	62.0	56.0	51.0	49.0	47.0
	8	57.0	76.6	43.3	68.0	66.0	62.0	60.0	55.0	52.0	47.0	46.0	45.0
	9	58.1	75.1	43.7	69.0	68.0	65.0	63.0	54.0	50.0	46.0	46.0	45.0
	10	56.3	77.2	43.6	68.0	65.0	59.0	57.0	52.0	49.0	45.0	45.0	44.0
	11	56.8	74.4	43.9	69.0	66.0	62.0	60.0	54.0	51.0	47.0	46.0	45.0
	12	54.2	72.7	45.6	64.0	63.0	59.0	57.0	52.0	50.0	48.0	47.0	46.0
	13	58.2	78.1	44.8	70.0	68.0	64.0	61.0	53.0	50.0	47.0	46.0	45.0
	14	57.7	76.9	45.0	68.0	66.0	62.0	61.0	55.0	52.0	48.0	47.0	46.0
	15	54.4	74.0	44.0	67.0	63.0	58.0	55.0	50.0	48.0	46.0	46.0	45.0
	16	51.0	68.2	45.2	60.0	58.0	54.0	52.0	50.0	49.0	47.0	46.0	46.0
	17	53.2	66.8	46.2	63.0	60.0	57.0	56.0	52.0	51.0	48.0	47.0	47.0
	18	54.5	75.9	44.6	63.0	60.0	57.0	56.0	51.0	49.0	47.0	47.0	46.0
	19	47.8	61.8	42.8	56.0	52.0	50.0	49.0	47.0	46.0	44.0	44.0	43.0
	20	53.2	72.3	42.5	64.0	62.0	59.0	55.0	48.0	46.0	44.0	43.0	43.0
	21	46.7	62.2	42.4	52.0	51.0	50.0	48.0	46.0	45.0	44.0	43.0	43.0
Night	22	45.7	62.6	41.9	52.0	49.0	47.0	47.0	45.0	45.0	43.0	43.0	42.0
	23	46.4	55.4	38.9	50.0	50.0	49.0	48.0	47.0	46.0	43.0	42.0	40.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Project Name:	Barton Place	*JN:* 9555	*Energy Average Leq*		*24-Hour*
Location:	LT3 - Located in the northeast corner of the Project site. Existing horse stables are located north and east of this location. An existing well pump is also adjacent to the eastern Project site boundary at LT3.	*Analyst:* A. Wolfe	*Day*	*Night*	*CNEL*
		Date: 2/19/2015	57.4	51.7	59.7

Hourly Leq dBA Readings (unadjusted)



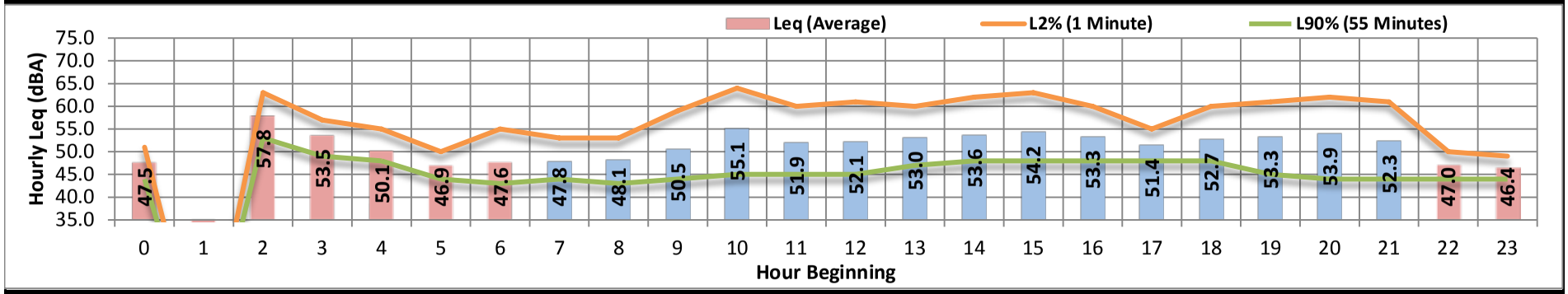
Time Period	Hour	Leq	Lmax	Lmin	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	47.8	59.4	43.0	56.0	54.0	51.0	49.0	47.0	46.0	45.0	44.0	44.0
	Max	62.1	81.8	46.3	73.0	72.0	69.0	67.0	61.0	53.0	49.0	48.0	47.0
Energy Average		57.4	75.5	44.7	68.2	66.5	63.5	61.2	54.7	49.8	46.7	46.2	45.4
Night	Min	41.2	56.7	38.2	48.0	45.0	43.0	42.0	41.0	40.0	38.0	38.0	38.0
	Max	59.0	83.4	44.1	68.0	67.0	62.0	61.0	56.0	54.0	46.0	46.0	45.0
Energy Average		51.7	75.3	41.3	59.8	58.6	54.9	54.1	50.1	47.4	42.8	42.3	41.8
Hourly Summary													
Night	0	44.7	56.7	40.0	48.0	47.0	46.0	46.0	45.0	44.0	42.0	42.0	41.0
	1	41.2	56.9	38.2	49.0	45.0	43.0	42.0	41.0	40.0	38.0	38.0	38.0
	2	44.9	57.8	38.2	54.0	54.0	53.0	51.0	41.0	40.0	40.0	39.0	38.0
	3	46.1	57.6	38.2	54.0	54.0	53.0	53.0	42.0	40.0	39.0	38.0	38.0
	4	50.5	67.1	40.4	57.0	55.0	54.0	54.0	52.0	46.0	42.0	42.0	41.0
	5	51.9	70.4	42.2	58.0	56.0	55.0	55.0	53.0	49.0	44.0	43.0	43.0
	6	59.0	83.4	44.1	68.0	67.0	62.0	61.0	56.0	54.0	46.0	46.0	45.0
Day	7	55.1	80.1	43.9	64.0	62.0	59.0	58.0	54.0	49.0	46.0	45.0	44.0
	8	51.6	71.6	43.2	63.0	60.0	56.0	53.0	49.0	47.0	45.0	44.0	44.0
	9	55.8	72.9	44.6	68.0	66.0	61.0	58.0	51.0	48.0	46.0	45.0	45.0
	10	62.0	75.4	44.2	73.0	72.0	69.0	67.0	59.0	51.0	47.0	46.0	45.0
	11	59.4	74.2	44.1	71.0	69.0	66.0	63.0	55.0	50.0	45.0	45.0	44.0
	12	62.1	81.8	46.1	72.0	71.0	69.0	67.0	61.0	53.0	48.0	48.0	47.0
	13	60.4	74.0	45.5	71.0	70.0	68.0	65.0	57.0	50.0	47.0	47.0	46.0
	14	53.9	73.1	45.2	63.0	61.0	55.0	54.0	51.0	50.0	48.0	48.0	47.0
	15	57.4	75.3	46.3	68.0	66.0	62.0	59.0	54.0	52.0	48.0	48.0	47.0
	16	56.6	75.3	45.5	70.0	65.0	58.0	56.0	53.0	50.0	48.0	47.0	46.0
	17	54.4	67.5	46.0	62.0	61.0	59.0	58.0	54.0	52.0	49.0	48.0	47.0
	18	52.0	72.4	44.2	61.0	57.0	54.0	53.0	50.0	48.0	45.0	45.0	44.0
	19	54.3	75.9	43.6	66.0	63.0	57.0	55.0	49.0	46.0	45.0	44.0	44.0
	20	52.6	68.3	43.0	64.0	62.0	58.0	56.0	49.0	47.0	45.0	44.0	44.0
	21	47.8	59.4	43.9	56.0	54.0	51.0	49.0	47.0	46.0	45.0	44.0	44.0
Night	22	46.0	58.8	42.6	50.0	49.0	48.0	47.0	46.0	45.0	44.0	43.0	43.0
	23	50.2	78.3	42.8	56.0	53.0	49.0	48.0	47.0	46.0	44.0	43.0	43.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Project Name:	Barton Place	*JN:* 9555	*Energy Average Leq*		*24-Hour*
Location:	LT4 - Located along the eastern Project site boundary adjacent to the western property line of an existing Seventh Day Adventist Church.	*Analyst:* A. Wolfe	*Day*	*Night*	*CNEL*
		Date: 2/19/2015	52.6	51.2	58.2

Hourly Leq dBA Readings (unadjusted)



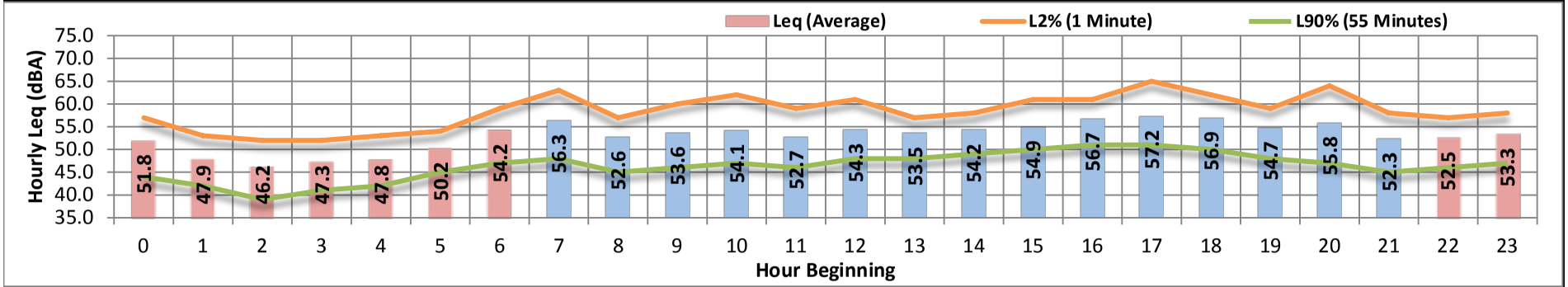
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	47.8	63.2	41.1	56.0	53.0	49.0	48.0	46.0	45.0	43.0	43.0	42.0
	Max	55.1	75.0	46.6	68.0	64.0	60.0	58.0	53.0	51.0	48.0	48.0	47.0
Energy Average		52.6	71.5	44.3	63.5	60.5	56.8	54.7	50.2	48.4	46.1	45.5	44.9
Night	Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Max	57.8	74.4	51.8	64.0	63.0	61.0	60.0	58.0	56.0	53.0	52.0	52.0
Energy Average		51.2	68.7	45.9	57.4	55.9	53.8	53.0	51.3	48.3	47.1	46.4	46.1
Hourly Summary													
Night	0	47.5	67.2	41.0	53.0	51.0	50.0	49.0	47.0	46.0	44.0	43.0	42.0
	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2	57.8	74.4	51.8	64.0	63.0	61.0	60.0	58.0	56.0	53.0	52.0	52.0
	3	53.5	73.5	48.4	59.0	57.0	55.0	55.0	54.0	53.0	49.0	49.0	48.0
	4	50.1	66.2	47.0	56.0	55.0	52.0	51.0	49.0	49.0	48.0	47.0	47.0
	5	46.9	63.9	42.1	52.0	50.0	49.0	48.0	47.0	46.0	44.0	43.0	43.0
	6	47.6	65.8	41.4	58.0	55.0	51.0	49.0	46.0	44.0	43.0	42.0	42.0
Day	7	47.8	63.2	42.4	56.0	53.0	51.0	49.0	47.0	46.0	44.0	44.0	43.0
	8	48.1	66.9	41.1	58.0	53.0	49.0	48.0	46.0	45.0	43.0	43.0	42.0
	9	50.5	73.1	42.4	61.0	59.0	55.0	53.0	48.0	46.0	44.0	44.0	43.0
	10	55.1	75.0	43.2	66.0	64.0	60.0	57.0	49.0	47.0	45.0	44.0	44.0
	11	51.9	66.6	43.4	61.0	60.0	58.0	58.0	49.0	47.0	45.0	44.0	44.0
	12	52.1	74.1	43.5	63.0	61.0	57.0	55.0	49.0	48.0	45.0	45.0	44.0
	13	53.0	69.5	44.4	63.0	60.0	57.0	55.0	52.0	50.0	47.0	46.0	45.0
	14	53.6	72.4	45.5	64.0	62.0	57.0	55.0	52.0	50.0	48.0	47.0	46.0
	15	54.2	70.8	46.6	65.0	63.0	60.0	57.0	52.0	50.0	48.0	47.0	47.0
	16	53.3	69.6	46.6	63.0	60.0	56.0	55.0	53.0	51.0	48.0	48.0	47.0
	17	51.4	68.6	46.6	57.0	55.0	54.0	53.0	51.0	50.0	48.0	47.0	47.0
	18	52.7	66.7	45.2	62.0	60.0	57.0	55.0	52.0	50.0	48.0	47.0	46.0
	19	53.3	74.6	44.0	65.0	61.0	57.0	54.0	49.0	48.0	45.0	45.0	44.0
	20	53.9	74.0	42.7	68.0	62.0	55.0	51.0	48.0	46.0	44.0	44.0	44.0
	21	52.3	70.0	42.5	64.0	61.0	58.0	55.0	48.0	46.0	44.0	44.0	43.0
Night	22	47.0	58.7	42.4	51.0	50.0	49.0	48.0	47.0	46.0	44.0	44.0	43.0
	23	46.4	55.5	42.7	50.0	49.0	48.0	48.0	47.0	46.0	44.0	44.0	43.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Project Name:	Barton Place	*JN:* 9555	*Energy Average Leq*		*24-Hour*
Location:	LT5 - Located along the western Project site boundary across Enterprise Drive from the existing Cottonwood Church.	*Analyst:* A. Wolfe	*Day*	*Night*	*CNEL*
		Date: 2/19/2015	54.9	51.0	58.7

Hourly Leq dBA Readings (unadjusted)



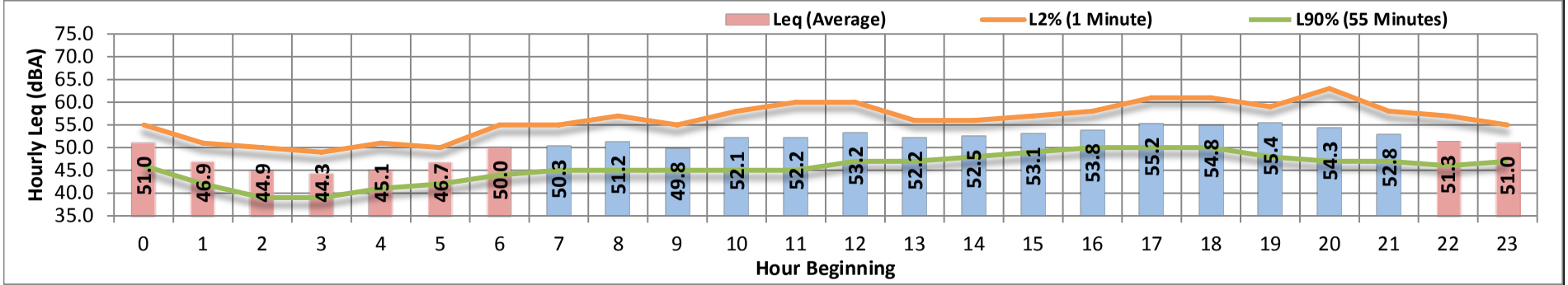
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	52.3	69.9	42.0	59.0	57.0	56.0	54.0	51.0	49.0	45.0	44.0	43.0
	Max	57.2	80.8	47.4	67.0	65.0	61.0	59.0	56.0	54.0	51.0	50.0	49.0
Energy Average		54.9	75.3	44.6	63.8	61.1	58.1	56.7	54.1	51.9	48.4	47.3	46.0
Night	Min	46.2	59.6	37.7	53.0	52.0	51.0	50.0	47.0	44.0	39.0	39.0	39.0
	Max	54.2	73.5	42.4	62.0	59.0	57.0	56.0	54.0	52.0	47.0	46.0	44.0
Energy Average		51.0	68.5	40.7	57.6	55.8	54.3	53.6	51.1	49.1	44.4	43.5	42.0
Hourly Summary													
Night	0	51.8	70.4	41.2	58.0	57.0	56.0	55.0	52.0	50.0	44.0	43.0	42.0
	1	47.9	59.8	39.4	54.0	53.0	52.0	51.0	48.0	46.0	42.0	41.0	40.0
	2	46.2	60.9	37.7	53.0	52.0	51.0	50.0	47.0	44.0	39.0	39.0	39.0
	3	47.3	67.2	39.3	53.0	52.0	51.0	50.0	47.0	45.0	41.0	40.0	39.0
	4	47.8	59.6	39.4	54.0	53.0	51.0	51.0	48.0	46.0	42.0	42.0	40.0
	5	50.2	66.0	41.0	55.0	54.0	53.0	53.0	51.0	49.0	45.0	44.0	42.0
	6	54.2	73.5	42.4	62.0	59.0	57.0	56.0	54.0	52.0	47.0	46.0	44.0
Day	7	56.3	78.7	43.3	67.0	63.0	59.0	57.0	54.0	52.0	48.0	47.0	45.0
	8	52.6	71.7	42.0	59.0	57.0	56.0	55.0	53.0	51.0	45.0	44.0	43.0
	9	53.6	75.2	43.4	62.0	60.0	57.0	56.0	53.0	50.0	46.0	45.0	45.0
	10	54.1	73.3	43.9	66.0	62.0	57.0	54.0	51.0	49.0	47.0	46.0	45.0
	11	52.7	73.8	43.5	62.0	59.0	56.0	55.0	52.0	49.0	46.0	46.0	45.0
	12	54.3	70.1	45.4	64.0	61.0	57.0	56.0	53.0	52.0	48.0	47.0	46.0
	13	53.5	72.2	45.0	62.0	57.0	56.0	55.0	53.0	51.0	48.0	47.0	45.0
	14	54.2	75.5	43.7	60.0	58.0	57.0	56.0	54.0	52.0	49.0	48.0	47.0
	15	54.9	69.9	46.0	62.0	61.0	58.0	57.0	55.0	53.0	50.0	49.0	47.0
	16	56.7	80.8	47.0	64.0	61.0	59.0	58.0	56.0	54.0	51.0	50.0	49.0
	17	57.2	72.7	47.4	67.0	65.0	61.0	59.0	56.0	54.0	51.0	50.0	48.0
	18	56.9	76.4	45.3	64.0	62.0	60.0	59.0	56.0	54.0	50.0	48.0	47.0
	19	54.7	75.2	43.7	62.0	59.0	58.0	57.0	55.0	52.0	48.0	46.0	45.0
	20	55.8	75.9	42.4	66.0	64.0	60.0	58.0	54.0	52.0	47.0	46.0	45.0
	21	52.3	71.9	42.3	59.0	58.0	56.0	55.0	52.0	49.0	45.0	44.0	43.0
Night	22	52.5	68.8	42.3	59.0	57.0	56.0	55.0	53.0	50.0	46.0	45.0	44.0
	23	53.3	70.0	41.5	60.0	58.0	56.0	56.0	53.0	52.0	47.0	46.0	44.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Project Name:	Barton Place	*JN:* 9555	*Energy Average Leq*		*24-Hour*
Location:	LT6 - Located within the Project site at the future location of the barrier between the residential and commercial land uses of the Project.	*Analyst:* A. Wolfe	*Day*	*Night*	*CNEL*
		Date: 2/19/2015	53.2	48.7	56.8

Hourly Leq dBA Readings (unadjusted)



Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	49.8	58.3	41.1	55.0	55.0	53.0	52.0	50.0	48.0	45.0	43.0	42.0
	Max	55.4	76.7	47.7	65.0	63.0	59.0	58.0	55.0	53.0	50.0	49.0	49.0
Energy Average		53.2	70.3	44.3	61.5	58.9	56.1	55.0	52.6	50.9	47.6	46.7	45.4
Night	Min	44.3	54.3	37.2	50.0	49.0	48.0	47.0	44.0	43.0	39.0	39.0	38.0
	Max	51.3	67.6	43.6	60.0	57.0	54.0	53.0	52.0	50.0	47.0	46.0	45.0
Energy Average		48.7	60.9	40.6	55.0	53.4	51.9	51.1	48.9	47.2	43.8	43.1	41.8
Hourly Summary													
Night	0	51.0	59.7	42.6	56.0	55.0	54.0	53.0	52.0	50.0	46.0	45.0	43.0
	1	46.9	54.9	38.9	53.0	51.0	50.0	50.0	47.0	45.0	42.0	41.0	40.0
	2	44.9	57.0	37.2	51.0	50.0	49.0	48.0	45.0	43.0	39.0	39.0	38.0
	3	44.3	54.3	37.2	50.0	49.0	48.0	47.0	44.0	43.0	39.0	39.0	38.0
	4	45.1	57.1	38.8	52.0	51.0	49.0	48.0	45.0	43.0	41.0	40.0	39.0
	5	46.7	55.6	38.9	51.0	50.0	49.0	49.0	47.0	46.0	42.0	42.0	41.0
	6	50.0	60.7	40.1	56.0	55.0	54.0	53.0	50.0	48.0	44.0	43.0	42.0
Day	7	50.3	58.3	41.9	55.0	55.0	53.0	53.0	51.0	49.0	45.0	44.0	43.0
	8	51.2	66.1	41.1	59.0	57.0	54.0	53.0	51.0	49.0	45.0	43.0	42.0
	9	49.8	63.3	42.5	56.0	55.0	53.0	52.0	50.0	48.0	45.0	44.0	43.0
	10	52.1	72.0	42.5	62.0	58.0	53.0	52.0	50.0	48.0	45.0	44.0	43.0
	11	52.2	70.5	43.0	62.0	60.0	57.0	54.0	50.0	48.0	45.0	45.0	44.0
	12	53.2	71.4	42.3	64.0	60.0	56.0	55.0	51.0	50.0	47.0	46.0	44.0
	13	52.2	71.8	44.2	59.0	56.0	54.0	53.0	51.0	50.0	47.0	46.0	45.0
	14	52.5	65.7	43.7	58.0	56.0	55.0	54.0	53.0	51.0	48.0	47.0	46.0
	15	53.1	64.0	45.3	59.0	57.0	56.0	55.0	53.0	52.0	49.0	48.0	46.0
	16	53.8	64.1	46.5	59.0	58.0	56.0	56.0	54.0	53.0	50.0	49.0	48.0
	17	55.2	73.3	47.7	64.0	61.0	58.0	57.0	55.0	53.0	50.0	49.0	49.0
	18	54.8	65.3	46.0	62.0	61.0	59.0	58.0	55.0	53.0	50.0	49.0	47.0
	19	55.4	76.7	44.5	64.0	59.0	57.0	56.0	54.0	52.0	48.0	47.0	45.0
	20	54.3	70.0	43.9	65.0	63.0	58.0	56.0	53.0	51.0	47.0	46.0	45.0
	21	52.8	68.1	44.1	61.0	58.0	56.0	55.0	53.0	51.0	47.0	47.0	45.0
Night	22	51.3	67.6	43.6	60.0	57.0	54.0	53.0	51.0	49.0	46.0	46.0	45.0
	23	51.0	60.6	42.7	55.0	55.0	54.0	53.0	51.0	50.0	47.0	46.0	44.0

URBAN CROSSROADS

APPENDIX 6.1:

SITE PLAN

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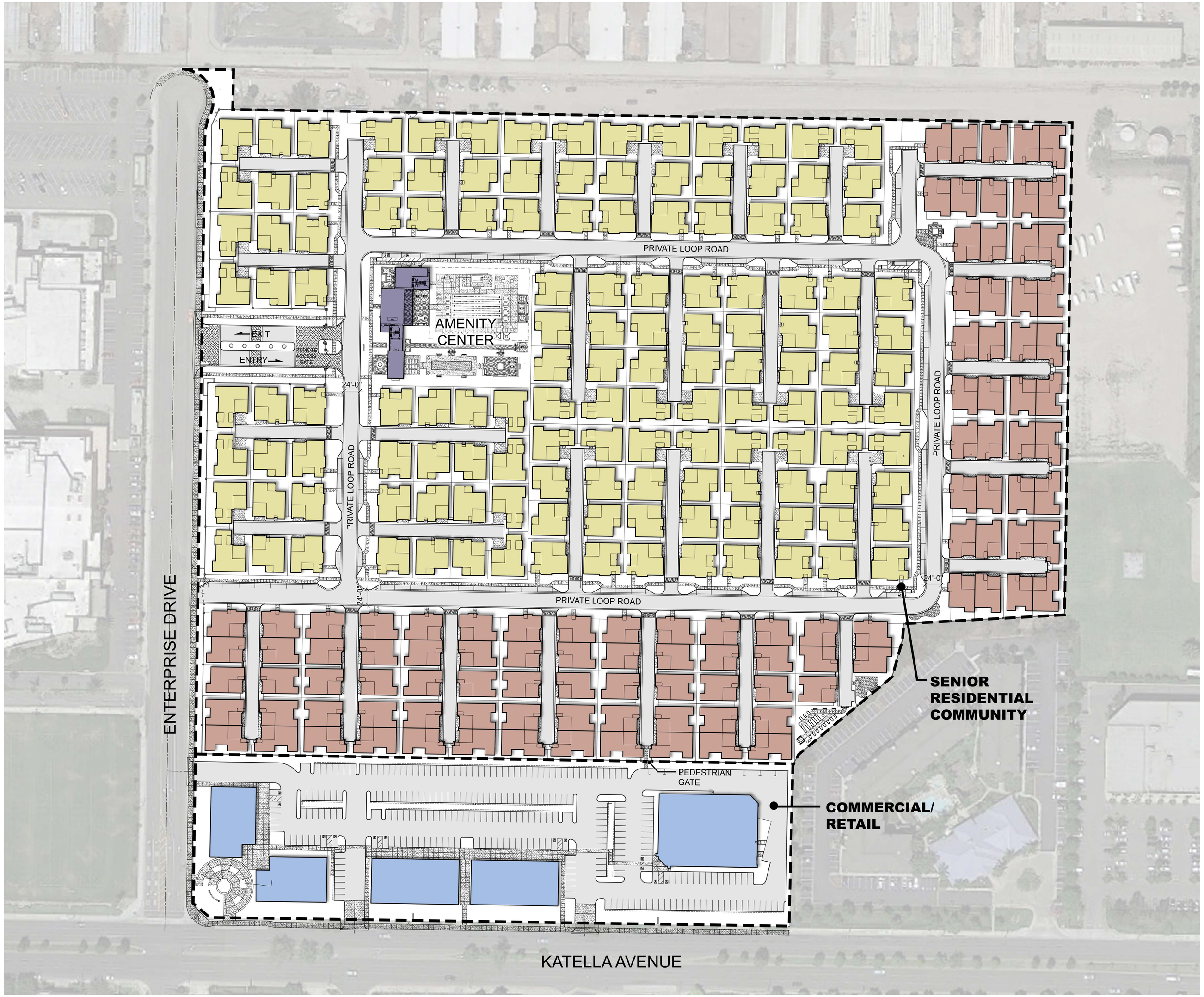

CONCEPTUAL SITE PLAN

N

0 30' 60' 120'

SCALE: 1"=60'

Robert Hidey **Architects**

BARTON PLACE

C33, LLC

3337 Michelson Drive, Suite 170, Irvine, CA 92612 Telephone 949.655.1550
4301 Hacienda Drive, Suite 560, Pleasanton, CA 94588 Telephone 925.824.0440
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CYPRESS, CALIFORNIA

PROJECT NUMBER: 14047 01/30/2015

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APPENDIX 6.2:

GRADING PLANS

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LEGEND:

BW	BACK OF WALK
CO	CLEANOUT
FF	FINISHED FLOOR
FG	FINISHED GRADE
FL	FLOWLINE
GB	GRADE BREAK
H	HEIGHT OF RETAINING
HP	HIGH POINT
SDMH	STORM DRAIN MANHOLE
SSMH	SANITARY SEWER MANHOLE
TC	TOP OF CURB

EXISTING CENTER LINE
EXISTING EASEMENT
PROPERTY LINE
PROPOSED EASEMENT
SANITARY SEWER MANHOLE
STORM DRAIN MANHOLE

N

40' 0' 20' 40'
SCALE: 1" = 40'

NO.	DATE	REVISIONS	APP'D.	DATE

PREPARED BY:
FUSCOE ENGINEERING
16795 Von Karman, Suite 100, Irvine, California 92606
tel 949.474.1960 • fax 949.474.5315 • www.fuscoe.com
DEBRA V. SCHALES RCE#43101 02/06/2015 DATE

REGISTERED PROFESSIONAL ENGINEER DEBRA VALLE SCHALES No. 43101 CIVIL STATE OF CALIFORNIA 02/06/2015

CONCEPTUAL GRADING PLAN

4921 KATELLA AVE
CYPRESS, CA 90720

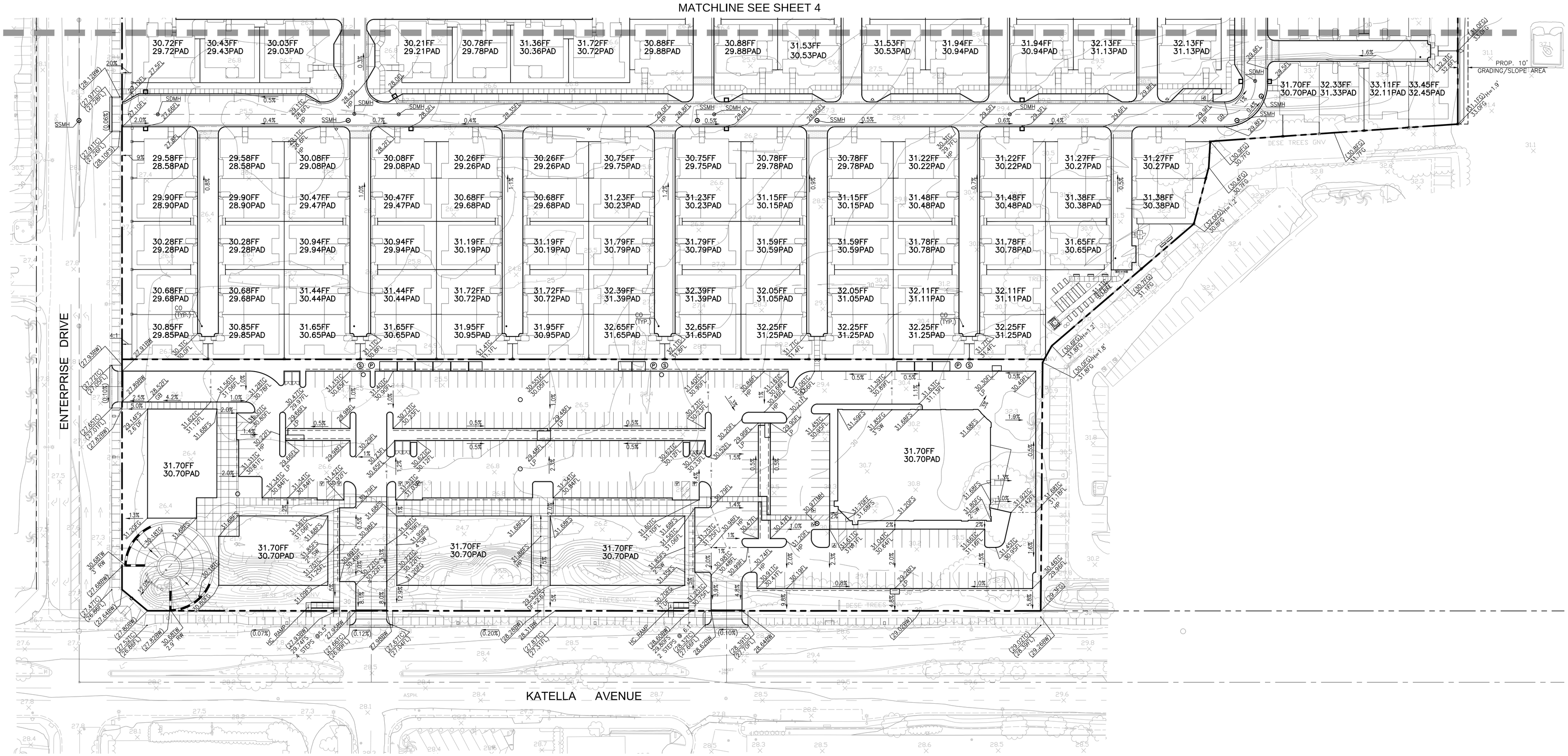
VESTING TENTATIVE TRACT MAP 17830

DRAWN:	KC
DESIGN:	DVS
CHECKED:	DVS
SCALE:	AS SHOWN
JOB NO.:	1334-001
DATE:	02/17/2015
SHEET	4 OF 8

BARTON PLACE
VESTING TENTATIVE TRACT MAP

PLAN SET: B 02/17/2015

F:\PROJECTS\1334\001\PLANS\ENTITLEMENTS\TENTATIVE TRACT MAP\1334-001MGH.DWG (02-17-15 4:44:53PM) Plotted by: Nate Stone



LEGEND:

BW	BACK OF WALK
CO	CLEANOUT
FF	FINISHED FLOOR
FG	FINISHED GRADE
FL	FLOWLINE
FS	FINISHED SURFACE
GB	GRADE BREAK
H	HEIGHT OF RETAINING
HC	HANDICAP
HP	HIGH POINT
LP	LOW POINT
RW	RETAINING WALL
SDMH	STORM DRAIN MANHOLE
SSMH	SANITARY SEWER MANHOLE
SW	STEM WALL
TC	TOP OF CURB
TMH	TOP OF MANHOLE
TW	TOP OF WALL

EXISTING CENTER LINE
PROPERTY LINE
PROPOSED EASEMENT
PROPOSED SANITARY SEWER MANHOLE
PROPOSED STORM DRAIN MANHOLE
PROPOSED STORM DRAIN PUMP (LOW FLOW ONLY)
PROPOSED STORM DRAIN SPLITTER BOX

N

40' 0' 20' 40'
SCALE: 1" = 40'

NO.	DATE	REVISIONS	APP'D.	DATE

PREPARED BY:
FUSCOE ENGINEERING
16795 Von Karman, Suite 100, Irvine, California 92606
tel 949.474.1960 • fax 949.474.5315 • www.fuscoe.com
DEBRA V. SCHALES RCE#43101 DATE 02/06/2015

REGISTERED PROFESSIONAL ENGINEER DEBRA VALLE SCHALES No. 43101 CIVIL STATE OF CALIFORNIA 02/06/2015

CONCEPTUAL GRADING PLAN

4921 KATELLA AVE
CYPRESS, CA 90720

VESTING TENTATIVE TRACT MAP 17830

DRAWN:	KC
DESIGN:	DVS
CHECKED:	DVS
SCALE:	AS SHOWN
JOB NO.:	1334-001
DATE:	02/17/2015
SHEET	5 OF 8

BARTON PLACE
VESTING TENTATIVE TRACT MAP

PLAN SET: B 02/17/2015

F:\PROJECTS\1334\001\PLANS\ENTITLEMENTS\TENTATIVE TRACT MAP\1334-001TMDISC.DWG (02-17-15 5:18:12PM) Plotted by: Nate Steve

APPENDIX 7.1:

OFF-SITE TRAFFIC NOISE CONTOURS

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Cerritos Av.
Road Segment: e/o Los Alamitos Bl.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,900 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,690 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	47.329
Medium Trucks:	47.244
Heavy Trucks:	47.329

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	3.44	0.25	-1.20	-4.85	0.000	0.000
Medium Trucks:	75.75	-13.80	0.27	-1.20	-5.01	0.000	0.000
Heavy Trucks:	81.57	-17.76	0.25	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.8	64.9	63.1	57.1	65.7	66.3
Medium Trucks:	61.0	59.5	53.1	51.6	60.1	60.3
Heavy Trucks:	62.9	61.4	52.4	53.7	62.0	62.1
Vehicle Noise:	69.0	67.3	63.9	59.5	68.0	68.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	44	95	205	442
CNEL:	47	102	219	472

Monday, February 09, 2015

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Cerritos Av.
Road Segment: e/o Bloomfield St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,600 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,460 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.744
Medium Trucks:	46.658
Heavy Trucks:	46.744

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	2.47	0.34	-1.20	-4.84	0.000	0.000
Medium Trucks:	77.72	-14.77	0.35	-1.20	-5.04	0.000	0.000
Heavy Trucks:	82.99	-18.72	0.34	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.1	66.2	64.5	58.4	67.0	67.6
Medium Trucks:	62.1	60.6	54.2	52.7	61.1	61.4
Heavy Trucks:	63.4	62.0	52.9	54.2	62.6	62.7
Vehicle Noise:	70.1	68.4	65.1	60.6	69.1	69.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	44	94	202	436
CNEL:	47	101	217	467

Monday, February 09, 2015

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Cerritos Av.
Road Segment: e/o Denni St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,420 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.744
Medium Trucks:	46.658
Heavy Trucks:	46.744

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	1.89	0.34	-1.20	-4.84	0.000	0.000
Medium Trucks:	79.45	-15.35	0.35	-1.20	-5.04	0.000	0.000
Heavy Trucks:	84.25	-19.31	0.34	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.5	67.6	65.8	59.8	68.4	69.0
Medium Trucks:	63.2	61.7	55.4	53.8	62.3	62.5
Heavy Trucks:	64.1	62.7	53.6	54.9	63.2	63.4
Vehicle Noise:	71.3	69.6	66.4	61.7	70.3	70.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	52	113	243	523
CNEL:	56	121	260	561

Monday, February 09, 2015

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Cerritos Av.
Road Segment: e/o Moody St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,420 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.744
Medium Trucks:	46.658
Heavy Trucks:	46.744

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	1.89	0.34	-1.20	-4.84	0.000	0.000
Medium Trucks:	79.45	-15.35	0.35	-1.20	-5.04	0.000	0.000
Heavy Trucks:	84.25	-19.31	0.34	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.5	67.6	65.8	59.8	68.4	69.0
Medium Trucks:	63.2	61.7	55.4	53.8	62.3	62.5
Heavy Trucks:	64.1	62.7	53.6	54.9	63.2	63.4
Vehicle Noise:	71.3	69.6	66.4	61.7	70.3	70.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	52	113	243	523
CNEL:	56	121	260	561

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Cerritos Av.
Road Segment: e/o Walker St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,500	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,450	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	36	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	50.0	feet
Centerline Dist. to Observer:	50.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.744
Medium Trucks:	46.658
Heavy Trucks:	46.744

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	1.94	0.34	-1.20	-4.84	0.000	0.000
Medium Trucks:	79.45	-15.30	0.35	-1.20	-5.04	0.000	0.000
Heavy Trucks:	84.25	-19.25	0.34	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.5	67.6	65.9	59.8	68.4	69.0
Medium Trucks:	63.3	61.8	55.4	53.9	62.3	62.6
Heavy Trucks:	64.1	62.7	53.7	54.9	63.3	63.4
Vehicle Noise:	71.4	69.6	66.5	61.8	70.3	70.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	53	114	245	527
CNEL:	57	122	262	565

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Katella Av.
Road Segment: e/o I-605 NB Ramps
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	70,700	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	7,070	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	74	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	47.329
Medium Trucks:	47.244
Heavy Trucks:	47.329

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	7.63	0.25	-1.20	-4.85	0.000	0.000
Medium Trucks:	75.75	-9.60	0.27	-1.20	-5.01	0.000	0.000
Heavy Trucks:	81.57	-13.56	0.25	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.0	69.1	67.3	61.3	69.9	70.5
Medium Trucks:	65.2	63.7	57.3	55.8	64.3	64.5
Heavy Trucks:	67.1	65.6	56.6	57.9	66.2	66.3
Vehicle Noise:	73.2	71.5	68.1	63.7	72.2	72.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	84	181	390	841
CNEL:	90	194	417	899

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Katella Av.
Road Segment: e/o Los Alamitos Bl.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	50,500	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	5,050	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	74	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	47.329
Medium Trucks:	47.244
Heavy Trucks:	47.329

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	6.17	0.25	-1.20	-4.85	0.000	0.000
Medium Trucks:	75.75	-11.06	0.27	-1.20	-5.01	0.000	0.000
Heavy Trucks:	81.57	-15.02	0.25	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.5	67.6	65.9	59.8	68.4	69.0
Medium Trucks:	63.8	62.2	55.9	54.3	62.8	63.0
Heavy Trucks:	65.6	64.2	55.1	56.4	64.7	64.9
Vehicle Noise:	71.8	70.0	66.6	62.2	70.7	71.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	67	145	312	672
CNEL:	72	155	333	718

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Katella Av.
Road Segment: e/o Bloomfield St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	46,900	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,690	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	74	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	47.329
Medium Trucks:	47.244
Heavy Trucks:	47.329

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	5.85	0.25	-1.20	-4.85	0.000	0.000
Medium Trucks:	75.75	-11.39	0.27	-1.20	-5.01	0.000	0.000
Heavy Trucks:	81.57	-15.34	0.25	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.2	67.3	65.5	59.5	68.1	68.7
Medium Trucks:	63.4	61.9	55.6	54.0	62.5	62.7
Heavy Trucks:	65.3	63.9	54.8	56.1	64.4	64.6
Vehicle Noise:	71.4	69.7	66.3	61.9	70.4	70.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	64	138	297	640
CNEL:	68	147	317	684

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Katella Av.
Road Segment: e/o Lexington Dr.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	46,600	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,660	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	76	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	5.24	0.37	-1.20	*-4.85*	0.000	0.000
Medium Trucks:	77.72	-11.99	0.38	-1.20	*-5.01*	0.000	0.000
Heavy Trucks:	82.99	-15.95	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.9	69.0	67.3	61.2	69.8	70.4
Medium Trucks:	64.9	63.4	57.0	55.5	63.9	64.2
Heavy Trucks:	66.2	64.8	55.8	57.0	65.4	65.5
Vehicle Noise:	72.9	71.2	67.9	63.4	71.9	72.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	80	173	373	804
CNEL:	86	185	400	861

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Katella Av.
Road Segment: e/o Enterprise Dr.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	46,600	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,660	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	76	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	5.24	0.37	-1.20	*-4.85*	0.000	0.000
Medium Trucks:	77.72	-11.99	0.38	-1.20	*-5.01*	0.000	0.000
Heavy Trucks:	82.99	-15.95	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.9	69.0	67.3	61.2	69.8	70.4
Medium Trucks:	64.9	63.4	57.0	55.5	63.9	64.2
Heavy Trucks:	66.2	64.8	55.8	57.0	65.4	65.5
Vehicle Noise:	72.9	71.2	67.9	63.4	71.9	72.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	80	173	373	804
CNEL:	86	185	400	861

Monday, February 09, 2015

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Katella Av.
Road Segment: e/o Siboney St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	44,100	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,410	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	76	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	5.00	0.37	-1.20	*-4.85*	0.000	0.000
Medium Trucks:	77.72	-12.23	0.38	-1.20	*-5.01*	0.000	0.000
Heavy Trucks:	82.99	-16.19	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.7	68.8	67.0	61.0	69.6	70.2
Medium Trucks:	64.7	63.2	56.8	55.2	63.7	63.9
Heavy Trucks:	66.0	64.5	55.5	56.8	65.1	65.2
Vehicle Noise:	72.7	71.0	67.7	63.1	71.7	72.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	78	167	360	775
CNEL:	83	179	385	830

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Katella Av.
Road Segment: e/o Winners Cir.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	44,100	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,410	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	76	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	5.00	0.37	-1.20	*-4.85*	0.000	0.000
Medium Trucks:	77.72	-12.23	0.38	-1.20	*-5.01*	0.000	0.000
Heavy Trucks:	82.99	-16.19	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.7	68.8	67.0	61.0	69.6	70.2
Medium Trucks:	64.7	63.2	56.8	55.2	63.7	63.9
Heavy Trucks:	66.0	64.5	55.5	56.8	65.1	65.2
Vehicle Noise:	72.7	71.0	67.7	63.1	71.7	72.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	78	167	360	775
CNEL:	83	179	385	830

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Katella Av.
Road Segment: e/o Walker St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	47,900 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,790 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	4.85	0.37	-1.20	-4.85	0.000	0.000
Medium Trucks:	79.45	-12.39	0.38	-1.20	-5.01	0.000	0.000
Heavy Trucks:	84.25	-16.34	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.5	70.6	68.8	62.8	71.4	72.0
Medium Trucks:	66.2	64.7	58.4	56.8	65.3	65.5
Heavy Trucks:	67.1	65.7	56.6	57.9	66.2	66.3
Vehicle Noise:	74.3	72.6	69.4	64.7	73.3	73.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	99	214	461	994
CNEL:	107	230	495	1,066

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Bloomfield St.
Road Segment: s/o Cerritos Av.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,180 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	38.066
Medium Trucks:	37.961
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	-0.14	1.67	-1.20	-4.83	0.000	0.000
Medium Trucks:	75.75	-17.38	1.69	-1.20	-5.07	0.000	0.000
Heavy Trucks:	81.57	-21.33	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.6	62.7	61.0	54.9	63.5	64.1
Medium Trucks:	58.9	57.4	51.0	49.4	57.9	58.1
Heavy Trucks:	60.7	59.3	50.2	51.5	59.9	60.0
Vehicle Noise:	66.9	65.1	61.7	57.3	65.8	66.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	22	48	103	222
CNEL:	24	51	110	237

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Lexington Dr.
Road Segment: s/o Cerritos Av.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	420 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	38.066
Medium Trucks:	37.961
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	-4.63	1.67	-1.20	-4.83	0.000	0.000
Medium Trucks:	75.75	-21.87	1.69	-1.20	-5.07	0.000	0.000
Heavy Trucks:	81.57	-25.82	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	60.1	58.2	56.5	50.4	59.1	59.7
Medium Trucks:	54.4	52.9	46.5	45.0	53.4	53.7
Heavy Trucks:	56.2	54.8	45.8	47.0	55.4	55.5
Vehicle Noise:	62.4	60.7	57.2	52.8	61.4	61.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	11	24	52	111
CNEL:	12	26	55	119

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Walker St.
Road Segment: s/o Cerritos Av.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	21,500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,150 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	38.066
Medium Trucks:	37.961
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	1.88	1.67	-1.20	-4.83	0.000	0.000
Medium Trucks:	77.72	-15.35	1.69	-1.20	-5.07	0.000	0.000
Heavy Trucks:	82.99	-19.31	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.9	67.0	65.2	59.2	67.8	68.4
Medium Trucks:	62.9	61.3	55.0	53.4	61.9	62.1
Heavy Trucks:	64.2	62.7	53.7	54.9	63.3	63.4
Vehicle Noise:	70.9	69.1	65.9	61.3	69.9	70.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	41	89	191	411
CNEL:	44	95	204	440

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Valley View St.
Road Segment: s/o Cerritos Av.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	40,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,000 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	4.07	0.37	-1.20	*-4.85*	0.000	0.000
Medium Trucks:	79.45	-13.17	0.38	-1.20	*-5.01*	0.000	0.000
Heavy Trucks:	84.25	-17.12	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.7	69.8	68.0	62.0	70.6	71.2
Medium Trucks:	65.5	63.9	57.6	56.0	64.5	64.7
Heavy Trucks:	66.3	64.9	55.8	57.1	65.4	65.6
Vehicle Noise:	73.5	71.8	68.6	64.0	72.5	73.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	88	190	409	881
CNEL:	95	204	439	945

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Valley View St.
Road Segment: s/o Katella Av.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	54,600 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,460 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	5.42	0.37	-1.20	*-4.85*	0.000	0.000
Medium Trucks:	79.45	-11.82	0.38	-1.20	*-5.01*	0.000	0.000
Heavy Trucks:	84.25	-15.77	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	73.0	71.1	69.4	63.3	71.9	72.6
Medium Trucks:	66.8	65.3	58.9	57.4	65.9	66.1
Heavy Trucks:	67.6	66.2	57.2	58.4	66.8	66.9
Vehicle Noise:	74.9	73.1	70.0	65.3	73.9	74.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	108	234	503	1,084
CNEL:	116	251	540	1,163

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Cerritos Av.
Road Segment: e/o Los Alamitos Bl.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,900 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,690 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	47.329
Medium Trucks:	47.244
Heavy Trucks:	47.329

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	3.44	0.25	-1.20	*-4.85*	0.000	0.000
Medium Trucks:	75.75	-13.80	0.27	-1.20	*-5.01*	0.000	0.000
Heavy Trucks:	81.57	-17.76	0.25	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.8	64.9	63.1	57.1	65.7	66.3
Medium Trucks:	61.0	59.5	53.1	51.6	60.1	60.3
Heavy Trucks:	62.9	61.4	52.4	53.7	62.0	62.1
Vehicle Noise:	69.0	67.3	63.9	59.5	68.0	68.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	44	95	205	442
CNEL:	47	102	219	472

Monday, February 09, 2015

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Cerritos Av.
Road Segment: e/o Bloomfield St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,600 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,460 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	46.744
Medium Trucks:	46.658
Heavy Trucks:	46.744

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	2.47	0.34	-1.20	*-4.84*	0.000	0.000
Medium Trucks:	77.72	-14.77	0.35	-1.20	*-5.04*	0.000	0.000
Heavy Trucks:	82.99	-18.72	0.34	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.1	66.2	64.5	58.4	67.0	67.6
Medium Trucks:	62.1	60.6	54.2	52.7	61.1	61.4
Heavy Trucks:	63.4	62.0	52.9	54.2	62.6	62.7
Vehicle Noise:	70.1	68.4	65.1	60.6	69.1	69.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	44	94	202	436
CNEL:	47	101	217	467

Monday, February 09, 2015

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Cerritos Av.
Road Segment: e/o Denni St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,700	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,470	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	36	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	50.0	feet
Centerline Dist. to Observer:	50.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.744
Medium Trucks:	46.658
Heavy Trucks:	46.744

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	1.98	0.34	-1.20	-4.84	0.000	0.000
Medium Trucks:	79.45	-15.26	0.35	-1.20	-5.04	0.000	0.000
Heavy Trucks:	84.25	-19.22	0.34	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.6	67.7	65.9	59.9	68.5	69.1
Medium Trucks:	63.3	61.8	55.5	53.9	62.4	62.6
Heavy Trucks:	64.2	62.7	53.7	55.0	63.3	63.4
Vehicle Noise:	71.4	69.7	66.5	61.8	70.4	70.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	53	114	246	530
CNEL:	57	122	264	569

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Cerritos Av.
Road Segment: e/o Moody St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,700	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,470	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	36	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	50.0	feet
Centerline Dist. to Observer:	50.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.744
Medium Trucks:	46.658
Heavy Trucks:	46.744

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	1.98	0.34	-1.20	-4.84	0.000	0.000
Medium Trucks:	79.45	-15.26	0.35	-1.20	-5.04	0.000	0.000
Heavy Trucks:	84.25	-19.22	0.34	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.6	67.7	65.9	59.9	68.5	69.1
Medium Trucks:	63.3	61.8	55.5	53.9	62.4	62.6
Heavy Trucks:	64.2	62.7	53.7	55.0	63.3	63.4
Vehicle Noise:	71.4	69.7	66.5	61.8	70.4	70.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	53	114	246	530
CNEL:	57	122	264	569

Monday, February 09, 2015

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Cerritos Av.
Road Segment: e/o Walker St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,480	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	36	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	50.0	feet
Centerline Dist. to Observer:	50.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.744
Medium Trucks:	46.658
Heavy Trucks:	46.744

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	1.99	0.34	-1.20	-4.84	0.000	0.000
Medium Trucks:	79.45	-15.24	0.35	-1.20	-5.04	0.000	0.000
Heavy Trucks:	84.25	-19.20	0.34	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.6	67.7	65.9	59.9	68.5	69.1
Medium Trucks:	63.4	61.8	55.5	53.9	62.4	62.6
Heavy Trucks:	64.2	62.8	53.7	55.0	63.3	63.5
Vehicle Noise:	71.4	69.7	66.5	61.9	70.4	70.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	53	114	247	531
CNEL:	57	123	265	570

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Katella Av.
Road Segment: e/o I-605 NB Ramps
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	71,100	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	7,110	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	74	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	47.329
Medium Trucks:	47.244
Heavy Trucks:	47.329

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	7.66	0.25	-1.20	-4.85	0.000	0.000
Medium Trucks:	75.75	-9.58	0.27	-1.20	-5.01	0.000	0.000
Heavy Trucks:	81.57	-13.54	0.25	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.0	69.1	67.4	61.3	69.9	70.5
Medium Trucks:	65.2	63.7	57.4	55.8	64.3	64.5
Heavy Trucks:	67.1	65.7	56.6	57.9	66.2	66.4
Vehicle Noise:	73.2	71.5	68.1	63.7	72.2	72.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	84	182	392	844
CNEL:	90	194	419	902

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Katella Av.
Road Segment: e/o Los Alamitos Bl.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	51,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,100 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	47.329
Medium Trucks:	47.244
Heavy Trucks:	47.329

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	6.22	0.25	-1.20	-4.85	0.000	0.000
Medium Trucks:	75.75	-11.02	0.27	-1.20	-5.01	0.000	0.000
Heavy Trucks:	81.57	-14.98	0.25	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.6	67.7	65.9	59.9	68.5	69.1
Medium Trucks:	63.8	62.3	55.9	54.4	62.8	63.1
Heavy Trucks:	65.6	64.2	55.2	56.4	64.8	64.9
Vehicle Noise:	71.8	70.1	66.6	62.3	70.8	71.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	68	146	314	677
CNEL:	72	156	336	723

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Katella Av.
Road Segment: e/o Bloomfield St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	47,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,780 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	47.329
Medium Trucks:	47.244
Heavy Trucks:	47.329

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	5.93	0.25	-1.20	-4.85	0.000	0.000
Medium Trucks:	75.75	-11.30	0.27	-1.20	-5.01	0.000	0.000
Heavy Trucks:	81.57	-15.26	0.25	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.3	67.4	65.6	59.6	68.2	68.8
Medium Trucks:	63.5	62.0	55.6	54.1	62.6	62.8
Heavy Trucks:	65.4	63.9	54.9	56.2	64.5	64.6
Vehicle Noise:	71.5	69.8	66.4	62.0	70.5	70.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	65	140	301	648
CNEL:	69	149	321	692

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Katella Av.
Road Segment: e/o Lexington Dr.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	48,500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,850 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	5.42	0.37	-1.20	-4.85	0.000	0.000
Medium Trucks:	77.72	-11.82	0.38	-1.20	-5.01	0.000	0.000
Heavy Trucks:	82.99	-15.78	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.1	69.2	67.4	61.4	70.0	70.6
Medium Trucks:	65.1	63.6	57.2	55.7	64.1	64.4
Heavy Trucks:	66.4	65.0	55.9	57.2	65.5	65.7
Vehicle Noise:	73.1	71.4	68.1	63.5	72.1	72.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	83	178	383	826
CNEL:	88	191	410	884

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Katella Av.
Road Segment: e/o Enterprise Dr.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	48,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,870 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	5.44	0.37	-1.20	-4.85	0.000	0.000
Medium Trucks:	77.72	-11.80	0.38	-1.20	-5.01	0.000	0.000
Heavy Trucks:	82.99	-15.76	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.1	69.2	67.4	61.4	70.0	70.6
Medium Trucks:	65.1	63.6	57.2	55.7	64.1	64.4
Heavy Trucks:	66.4	65.0	55.9	57.2	65.5	65.7
Vehicle Noise:	73.1	71.4	68.1	63.6	72.1	72.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	83	178	384	828
CNEL:	89	191	412	887

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Katella Av.
Road Segment: e/o Siboney St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	45,500	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,550	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	76	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	5.14	0.37	-1.20	-4.85	0.000	0.000
Medium Trucks:	77.72	-12.10	0.38	-1.20	-5.01	0.000	0.000
Heavy Trucks:	82.99	-16.05	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.8	68.9	67.2	61.1	69.7	70.3
Medium Trucks:	64.8	63.3	56.9	55.4	63.8	64.1
Heavy Trucks:	66.1	64.7	55.6	56.9	65.3	65.4
Vehicle Noise:	72.8	71.1	67.8	63.3	71.8	72.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	79	171	367	791
CNEL:	85	183	393	847

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Katella Av.
Road Segment: e/o Winners Cir.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	45,500	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,550	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	76	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	5.14	0.37	-1.20	-4.85	0.000	0.000
Medium Trucks:	77.72	-12.10	0.38	-1.20	-5.01	0.000	0.000
Heavy Trucks:	82.99	-16.05	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.8	68.9	67.2	61.1	69.7	70.3
Medium Trucks:	64.8	63.3	56.9	55.4	63.8	64.1
Heavy Trucks:	66.1	64.7	55.6	56.9	65.3	65.4
Vehicle Noise:	72.8	71.1	67.8	63.3	71.8	72.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	79	171	367	791
CNEL:	85	183	393	847

Monday, February 09, 2015

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Katella Av.
Road Segment: e/o Walker St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	48,900	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,890	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	76	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	4.94	0.37	-1.20	-4.85	0.000	0.000
Medium Trucks:	79.45	-12.30	0.38	-1.20	-5.01	0.000	0.000
Heavy Trucks:	84.25	-16.25	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.6	70.7	68.9	62.8	71.5	72.1
Medium Trucks:	66.3	64.8	58.5	56.9	65.4	65.6
Heavy Trucks:	67.2	65.7	56.7	58.0	66.3	66.4
Vehicle Noise:	74.4	72.7	69.5	64.8	73.4	73.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	101	217	468	1,007
CNEL:	108	233	502	1,081

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Bloomfield St.
Road Segment: s/o Cerritos Av.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	12,000	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,200	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	36	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	42.0	feet
Centerline Dist. to Observer:	42.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	38.066
Medium Trucks:	37.961
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	-0.07	1.67	-1.20	-4.83	0.000	0.000
Medium Trucks:	75.75	-17.31	1.69	-1.20	-5.07	0.000	0.000
Heavy Trucks:	81.57	-21.26	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.7	62.8	61.0	55.0	63.6	64.2
Medium Trucks:	58.9	57.4	51.1	49.5	58.0	58.2
Heavy Trucks:	60.8	59.4	50.3	51.6	59.9	60.1
Vehicle Noise:	66.9	65.2	61.8	57.4	65.9	66.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	22	48	104	224
CNEL:	24	52	111	240

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Lexington Dr.
Road Segment: s/o Cerritos Av.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	500 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	38.066
Medium Trucks:	37.961
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	-3.87	1.67	-1.20	-4.83	0.000	0.000
Medium Trucks:	75.75	-21.11	1.69	-1.20	-5.07	0.000	0.000
Heavy Trucks:	81.57	-25.06	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	60.9	59.0	57.2	51.2	59.8	60.4
Medium Trucks:	55.1	53.6	47.3	45.7	54.2	54.4
Heavy Trucks:	57.0	55.6	46.5	47.8	56.1	56.3
Vehicle Noise:	63.1	61.4	58.0	53.6	62.1	62.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	13	27	58	125
CNEL:	13	29	62	134

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Walker St.
Road Segment: s/o Cerritos Av.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	21,900 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,190 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	38.066
Medium Trucks:	37.961
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	1.96	1.67	-1.20	-4.83	0.000	0.000
Medium Trucks:	77.72	-15.27	1.69	-1.20	-5.07	0.000	0.000
Heavy Trucks:	82.99	-19.23	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.9	67.1	65.3	59.2	67.9	68.5
Medium Trucks:	62.9	61.4	55.1	53.5	62.0	62.2
Heavy Trucks:	64.2	62.8	53.8	55.0	63.4	63.5
Vehicle Noise:	71.0	69.2	66.0	61.4	69.9	70.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	42	90	193	416
CNEL:	45	96	207	445

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Valley View St.
Road Segment: s/o Cerritos Av.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	40,400 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,040 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	4.11	0.37	-1.20	-4.85	0.000	0.000
Medium Trucks:	79.45	-13.13	0.38	-1.20	-5.01	0.000	0.000
Heavy Trucks:	84.25	-17.08	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.7	69.8	68.1	62.0	70.6	71.2
Medium Trucks:	65.5	64.0	57.6	56.1	64.5	64.8
Heavy Trucks:	66.3	64.9	55.9	57.1	65.5	65.6
Vehicle Noise:	73.6	71.8	68.7	64.0	72.5	73.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	89	191	412	887
CNEL:	95	205	442	952

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Valley View St.
Road Segment: s/o Katella Av.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	55,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,500 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	5.45	0.37	-1.20	-4.85	0.000	0.000
Medium Trucks:	79.45	-11.79	0.38	-1.20	-5.01	0.000	0.000
Heavy Trucks:	84.25	-15.74	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.1	71.2	69.4	63.4	72.0	72.6
Medium Trucks:	66.8	65.3	59.0	57.4	65.9	66.1
Heavy Trucks:	67.7	66.3	57.2	58.5	66.8	66.9
Vehicle Noise:	74.9	73.2	70.0	65.3	73.9	74.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	109	235	506	1,090
CNEL:	117	252	542	1,169

Monday, February 09, 2015

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 Without Project
Road Name: Cerritos Av.
Road Segment: e/o Los Alamitos Bl.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,920	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	74	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	47.329
Medium Trucks:	47.244
Heavy Trucks:	47.329

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	3.79	0.25	-1.20	-4.85	0.000	0.000
Medium Trucks:	75.75	-13.44	0.27	-1.20	-5.01	0.000	0.000
Heavy Trucks:	81.57	-17.40	0.25	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.2	65.3	63.5	57.4	66.1	66.7
Medium Trucks:	61.4	59.9	53.5	52.0	60.4	60.7
Heavy Trucks:	63.2	61.8	52.8	54.0	62.4	62.5
Vehicle Noise:	69.4	67.7	64.2	59.8	68.4	68.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	47	101	217	467
CNEL:	50	107	231	498

Monday, February 09, 2015

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 Without Project
Road Name: Cerritos Av.
Road Segment: e/o Bloomfield St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,720	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	36	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	50.0	feet
Centerline Dist. to Observer:	50.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.744
Medium Trucks:	46.658
Heavy Trucks:	46.744

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	2.91	0.34	-1.20	-4.84	0.000	0.000
Medium Trucks:	77.72	-14.33	0.35	-1.20	-5.04	0.000	0.000
Heavy Trucks:	82.99	-18.29	0.34	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.6	66.7	64.9	58.8	67.5	68.1
Medium Trucks:	62.5	61.0	54.7	53.1	61.6	61.8
Heavy Trucks:	63.8	62.4	53.4	54.6	63.0	63.1
Vehicle Noise:	70.6	68.8	65.6	61.0	69.5	70.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	47	100	216	466
CNEL:	50	107	232	499

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 Without Project
Road Name: Cerritos Av.
Road Segment: e/o Denni St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,500	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,650	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	36	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	50.0	feet
Centerline Dist. to Observer:	50.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.744
Medium Trucks:	46.658
Heavy Trucks:	46.744

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.28	0.34	-1.20	-4.84	0.000	0.000
Medium Trucks:	79.45	-14.96	0.35	-1.20	-5.04	0.000	0.000
Heavy Trucks:	84.25	-18.91	0.34	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.9	68.0	66.2	60.2	68.8	69.4
Medium Trucks:	63.6	62.1	55.8	54.2	62.7	62.9
Heavy Trucks:	64.5	63.1	54.0	55.3	63.6	63.7
Vehicle Noise:	71.7	70.0	66.8	62.1	70.7	71.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	56	120	258	555
CNEL:	60	128	277	596

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 Without Project
Road Name: Cerritos Av.
Road Segment: e/o Moody St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,500	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,650	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	36	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	50.0	feet
Centerline Dist. to Observer:	50.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.744
Medium Trucks:	46.658
Heavy Trucks:	46.744

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.28	0.34	-1.20	-4.84	0.000	0.000
Medium Trucks:	79.45	-14.96	0.35	-1.20	-5.04	0.000	0.000
Heavy Trucks:	84.25	-18.91	0.34	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.9	68.0	66.2	60.2	68.8	69.4
Medium Trucks:	63.6	62.1	55.8	54.2	62.7	62.9
Heavy Trucks:	64.5	63.1	54.0	55.3	63.6	63.7
Vehicle Noise:	71.7	70.0	66.8	62.1	70.7	71.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	56	120	258	555
CNEL:	60	128	277	596

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 Without Project
Road Name: Cerritos Av.
Road Segment: e/o Walker St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,100 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,710 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.744
Medium Trucks:	46.658
Heavy Trucks:	46.744

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.38	0.34	-1.20	-4.84	0.000	0.000
Medium Trucks:	79.45	-14.86	0.35	-1.20	-5.04	0.000	0.000
Heavy Trucks:	84.25	-18.82	0.34	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.0	68.1	66.3	60.3	68.9	69.5
Medium Trucks:	63.7	62.2	55.9	54.3	62.8	63.0
Heavy Trucks:	64.6	63.2	54.1	55.4	63.7	63.8
Vehicle Noise:	71.8	70.1	66.9	62.2	70.8	71.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	56	121	262	564
CNEL:	60	130	281	605

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 Without Project
Road Name: Katella Av.
Road Segment: e/o I-605 NB Ramps
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	75,600 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	7,560 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	47.329
Medium Trucks:	47.244
Heavy Trucks:	47.329

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	7.93	0.25	-1.20	-4.85	0.000	0.000
Medium Trucks:	75.75	-9.31	0.27	-1.20	-5.01	0.000	0.000
Heavy Trucks:	81.57	-13.27	0.25	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.3	69.4	67.6	61.6	70.2	70.8
Medium Trucks:	65.5	64.0	57.6	56.1	64.5	64.8
Heavy Trucks:	67.4	65.9	56.9	58.1	66.5	66.6
Vehicle Noise:	73.5	71.8	68.4	64.0	72.5	72.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	88	190	408	880
CNEL:	94	202	436	940

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 Without Project
Road Name: Katella Av.
Road Segment: e/o Los Alamitos Bl.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	55,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,570 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	47.329
Medium Trucks:	47.244
Heavy Trucks:	47.329

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	6.60	0.25	-1.20	-4.85	0.000	0.000
Medium Trucks:	75.75	-10.64	0.27	-1.20	-5.01	0.000	0.000
Heavy Trucks:	81.57	-14.60	0.25	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.0	68.1	66.3	60.2	68.9	69.5
Medium Trucks:	64.2	62.7	56.3	54.8	63.2	63.5
Heavy Trucks:	66.0	64.6	55.6	56.8	65.2	65.3
Vehicle Noise:	72.2	70.5	67.0	62.6	71.2	71.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	72	155	333	718
CNEL:	77	165	356	767

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 Without Project
Road Name: Katella Av.
Road Segment: e/o Bloomfield St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	51,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,130 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	47.329
Medium Trucks:	47.244
Heavy Trucks:	47.329

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	6.24	0.25	-1.20	-4.85	0.000	0.000
Medium Trucks:	75.75	-11.00	0.27	-1.20	-5.01	0.000	0.000
Heavy Trucks:	81.57	-14.95	0.25	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.6	67.7	65.9	59.9	68.5	69.1
Medium Trucks:	63.8	62.3	55.9	54.4	62.9	63.1
Heavy Trucks:	65.7	64.2	55.2	56.5	64.8	64.9
Vehicle Noise:	71.8	70.1	66.7	62.3	70.8	71.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	68	146	315	679
CNEL:	73	156	337	726

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 Without Project
Road Name: Katella Av.
Road Segment: e/o Lexington Dr.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	51,700	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	5,170	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	76	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	5.70	0.37	-1.20	*-4.85*	0.000	0.000
Medium Trucks:	77.72	-11.54	0.38	-1.20	*-5.01*	0.000	0.000
Heavy Trucks:	82.99	-15.50	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.4	69.5	67.7	61.7	70.3	70.9
Medium Trucks:	65.3	63.8	57.5	55.9	64.4	64.6
Heavy Trucks:	66.7	65.2	56.2	57.5	65.8	65.9
Vehicle Noise:	73.4	71.6	68.4	63.8	72.4	72.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	86	186	400	862
CNEL:	92	199	428	923

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 Without Project
Road Name: Katella Av.
Road Segment: e/o Enterprise Dr.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	51,700	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	5,170	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	76	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	5.70	0.37	-1.20	*-4.85*	0.000	0.000
Medium Trucks:	77.72	-11.54	0.38	-1.20	*-5.01*	0.000	0.000
Heavy Trucks:	82.99	-15.50	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.4	69.5	67.7	61.7	70.3	70.9
Medium Trucks:	65.3	63.8	57.5	55.9	64.4	64.6
Heavy Trucks:	66.7	65.2	56.2	57.5	65.8	65.9
Vehicle Noise:	73.4	71.6	68.4	63.8	72.4	72.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	86	186	400	862
CNEL:	92	199	428	923

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 Without Project
Road Name: Katella Av.
Road Segment: e/o Siboney St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	52,300	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	5,230	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	76	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	5.75	0.37	-1.20	*-4.85*	0.000	0.000
Medium Trucks:	77.72	-11.49	0.38	-1.20	*-5.01*	0.000	0.000
Heavy Trucks:	82.99	-15.45	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.4	69.5	67.8	61.7	70.3	70.9
Medium Trucks:	65.4	63.9	57.5	56.0	64.4	64.7
Heavy Trucks:	66.7	65.3	56.3	57.5	65.9	66.0
Vehicle Noise:	73.4	71.7	68.4	63.9	72.4	72.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	87	187	403	868
CNEL:	93	200	432	930

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 Without Project
Road Name: Katella Av.
Road Segment: e/o Winners Cir.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	52,300	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	5,230	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	76	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	5.75	0.37	-1.20	*-4.85*	0.000	0.000
Medium Trucks:	77.72	-11.49	0.38	-1.20	*-5.01*	0.000	0.000
Heavy Trucks:	82.99	-15.45	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.4	69.5	67.8	61.7	70.3	70.9
Medium Trucks:	65.4	63.9	57.5	56.0	64.4	64.7
Heavy Trucks:	66.7	65.3	56.3	57.5	65.9	66.0
Vehicle Noise:	73.4	71.7	68.4	63.9	72.4	72.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	87	187	403	868
CNEL:	93	200	432	930

Monday, February 09, 2015

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 Without Project
Road Name: Katella Av.
Road Segment: e/o Walker St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	54,500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,450 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	5.41	0.37	-1.20	-4.85	0.000	0.000
Medium Trucks:	79.45	-11.83	0.38	-1.20	-5.01	0.000	0.000
Heavy Trucks:	84.25	-15.78	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.0	71.1	69.4	63.3	71.9	72.5
Medium Trucks:	66.8	65.3	58.9	57.4	65.8	66.1
Heavy Trucks:	67.6	66.2	57.2	58.4	66.8	66.9
Vehicle Noise:	74.9	73.1	70.0	65.3	73.8	74.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	108	233	503	1,083
CNEL:	116	250	539	1,162

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 Without Project
Road Name: Bloomfield St.
Road Segment: s/o Cerritos Av.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	12,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,200 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	38.066
Medium Trucks:	37.961
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	-0.07	1.67	-1.20	-4.83	0.000	0.000
Medium Trucks:	75.75	-17.31	1.69	-1.20	-5.07	0.000	0.000
Heavy Trucks:	81.57	-21.26	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.7	62.8	61.0	55.0	63.6	64.2
Medium Trucks:	58.9	57.4	51.1	49.5	58.0	58.2
Heavy Trucks:	60.8	59.4	50.3	51.6	59.9	60.1
Vehicle Noise:	66.9	65.2	61.8	57.4	65.9	66.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	22	48	104	224
CNEL:	24	52	111	240

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 Without Project
Road Name: Lexington Dr.
Road Segment: s/o Cerritos Av.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,600 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	860 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	38.066
Medium Trucks:	37.961
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	-1.51	1.67	-1.20	-4.83	0.000	0.000
Medium Trucks:	75.75	-18.75	1.69	-1.20	-5.07	0.000	0.000
Heavy Trucks:	81.57	-22.71	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.3	61.4	59.6	53.5	62.2	62.8
Medium Trucks:	57.5	56.0	49.6	48.1	56.5	56.8
Heavy Trucks:	59.3	57.9	48.9	50.1	58.5	58.6
Vehicle Noise:	65.5	63.8	60.3	55.9	64.5	64.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	18	39	83	180
CNEL:	19	41	89	192

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 Without Project
Road Name: Walker St.
Road Segment: s/o Cerritos Av.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,270 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	38.066
Medium Trucks:	37.961
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	2.12	1.67	-1.20	-4.83	0.000	0.000
Medium Trucks:	77.72	-15.12	1.69	-1.20	-5.07	0.000	0.000
Heavy Trucks:	82.99	-19.07	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.1	67.2	65.4	59.4	68.0	68.6
Medium Trucks:	63.1	61.6	55.2	53.7	62.1	62.4
Heavy Trucks:	64.4	63.0	53.9	55.2	63.5	63.7
Vehicle Noise:	71.1	69.4	66.1	61.6	70.1	70.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	43	92	198	426
CNEL:	46	98	212	456

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 Without Project
Road Name: Valley View St.
Road Segment: s/o Cerritos Av.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	42,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,230 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	4.31	0.37	-1.20	-4.85	0.000	0.000
Medium Trucks:	79.45	-12.93	0.38	-1.20	-5.01	0.000	0.000
Heavy Trucks:	84.25	-16.88	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.9	70.0	68.3	62.2	70.8	71.4
Medium Trucks:	65.7	64.2	57.8	56.3	64.7	65.0
Heavy Trucks:	66.5	65.1	56.1	57.3	65.7	65.8
Vehicle Noise:	73.8	72.0	68.9	64.2	72.7	73.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	91	197	425	915
CNEL:	98	211	455	981

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 Without Project
Road Name: Valley View St.
Road Segment: s/o Katella Av.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	58,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,800 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	5.68	0.37	-1.20	-4.85	0.000	0.000
Medium Trucks:	79.45	-11.56	0.38	-1.20	-5.01	0.000	0.000
Heavy Trucks:	84.25	-15.51	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.3	71.4	69.6	63.6	72.2	72.8
Medium Trucks:	67.1	65.6	59.2	57.7	66.1	66.4
Heavy Trucks:	67.9	66.5	57.4	58.7	67.1	67.2
Vehicle Noise:	75.1	73.4	70.3	65.6	74.1	74.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	113	243	524	1,129
CNEL:	121	261	562	1,211

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 With Project
Road Name: Cerritos Av.
Road Segment: e/o Los Alamitos Bl.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,920 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	47.329
Medium Trucks:	47.244
Heavy Trucks:	47.329

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	3.79	0.25	-1.20	-4.85	0.000	0.000
Medium Trucks:	75.75	-13.44	0.27	-1.20	-5.01	0.000	0.000
Heavy Trucks:	81.57	-17.40	0.25	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.2	65.3	63.5	57.4	66.1	66.7
Medium Trucks:	61.4	59.9	53.5	52.0	60.4	60.7
Heavy Trucks:	63.2	61.8	52.8	54.0	62.4	62.5
Vehicle Noise:	69.4	67.7	64.2	59.8	68.4	68.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	47	101	217	467
CNEL:	50	107	231	498

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 With Project
Road Name: Cerritos Av.
Road Segment: e/o Bloomfield St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,720 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.744
Medium Trucks:	46.658
Heavy Trucks:	46.744

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	2.91	0.34	-1.20	-4.84	0.000	0.000
Medium Trucks:	77.72	-14.33	0.35	-1.20	-5.04	0.000	0.000
Heavy Trucks:	82.99	-18.29	0.34	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.6	66.7	64.9	58.8	67.5	68.1
Medium Trucks:	62.5	61.0	54.7	53.1	61.6	61.8
Heavy Trucks:	63.8	62.4	53.4	54.6	63.0	63.1
Vehicle Noise:	70.6	68.8	65.6	61.0	69.5	70.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	47	100	216	466
CNEL:	50	107	232	499

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 With Project
Road Name: Cerritos Av.
Road Segment: e/o Denni St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,000	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,700	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	36	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	50.0	feet
Centerline Dist. to Observer:	50.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	46.744
Medium Trucks:	46.658
Heavy Trucks:	46.744

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.36	0.34	-1.20	*-4.84*	0.000	0.000
Medium Trucks:	79.45	-14.88	0.35	-1.20	*-5.04*	0.000	0.000
Heavy Trucks:	84.25	-18.83	0.34	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.0	68.1	66.3	60.2	68.9	69.5
Medium Trucks:	63.7	62.2	55.9	54.3	62.8	63.0
Heavy Trucks:	64.6	63.1	54.1	55.3	63.7	63.8
Vehicle Noise:	71.8	70.1	66.9	62.2	70.8	71.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	56	121	261	562
CNEL:	60	130	280	603

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 With Project
Road Name: Cerritos Av.
Road Segment: e/o Moody St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,000	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,700	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	36	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	50.0	feet
Centerline Dist. to Observer:	50.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	46.744
Medium Trucks:	46.658
Heavy Trucks:	46.744

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.36	0.34	-1.20	*-4.84*	0.000	0.000
Medium Trucks:	79.45	-14.88	0.35	-1.20	*-5.04*	0.000	0.000
Heavy Trucks:	84.25	-18.83	0.34	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.0	68.1	66.3	60.2	68.9	69.5
Medium Trucks:	63.7	62.2	55.9	54.3	62.8	63.0
Heavy Trucks:	64.6	63.1	54.1	55.3	63.7	63.8
Vehicle Noise:	71.8	70.1	66.9	62.2	70.8	71.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	56	121	261	562
CNEL:	60	130	280	603

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 With Project
Road Name: Cerritos Av.
Road Segment: e/o Walker St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,400	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,740	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	36	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	50.0	feet
Centerline Dist. to Observer:	50.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	46.744
Medium Trucks:	46.658
Heavy Trucks:	46.744

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.43	0.34	-1.20	*-4.84*	0.000	0.000
Medium Trucks:	79.45	-14.81	0.35	-1.20	*-5.04*	0.000	0.000
Heavy Trucks:	84.25	-18.77	0.34	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.0	68.1	66.4	60.3	68.9	69.5
Medium Trucks:	63.8	62.3	55.9	54.4	62.8	63.1
Heavy Trucks:	64.6	63.2	54.2	55.4	63.8	63.9
Vehicle Noise:	71.9	70.1	67.0	62.3	70.8	71.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	57	122	264	568
CNEL:	61	131	283	609

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 With Project
Road Name: Katella Av.
Road Segment: e/o I-605 NB Ramps
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	75,900	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	7,590	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	74	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	47.329
Medium Trucks:	47.244
Heavy Trucks:	47.329

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	7.94	0.25	-1.20	*-4.85*	0.000	0.000
Medium Trucks:	75.75	-9.30	0.27	-1.20	*-5.01*	0.000	0.000
Heavy Trucks:	81.57	-13.25	0.25	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.3	69.4	67.6	61.6	70.2	70.8
Medium Trucks:	65.5	64.0	57.7	56.1	64.6	64.8
Heavy Trucks:	67.4	65.9	56.9	58.2	66.5	66.6
Vehicle Noise:	73.5	71.8	68.4	64.0	72.5	72.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	88	190	409	882
CNEL:	94	203	437	942

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 With Project
Road Name: Katella Av.
Road Segment: e/o Los Alamitos Bl.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	56,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,630 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	47.329
Medium Trucks:	47.244
Heavy Trucks:	47.329

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	6.65	0.25	-1.20	-4.85	0.000	0.000
Medium Trucks:	75.75	-10.59	0.27	-1.20	-5.01	0.000	0.000
Heavy Trucks:	81.57	-14.55	0.25	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.0	68.1	66.3	60.3	68.9	69.5
Medium Trucks:	64.2	62.7	56.4	54.8	63.3	63.5
Heavy Trucks:	66.1	64.7	55.6	56.9	65.2	65.3
Vehicle Noise:	72.2	70.5	67.1	62.7	71.2	71.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	72	156	335	723
CNEL:	77	166	358	772

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 With Project
Road Name: Katella Av.
Road Segment: e/o Bloomfield St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	52,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,230 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	47.329
Medium Trucks:	47.244
Heavy Trucks:	47.329

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	6.33	0.25	-1.20	-4.85	0.000	0.000
Medium Trucks:	75.75	-10.91	0.27	-1.20	-5.01	0.000	0.000
Heavy Trucks:	81.57	-14.87	0.25	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.7	67.8	66.0	60.0	68.6	69.2
Medium Trucks:	63.9	62.4	56.0	54.5	62.9	63.2
Heavy Trucks:	65.8	64.3	55.3	56.5	64.9	65.0
Vehicle Noise:	71.9	70.2	66.8	62.4	70.9	71.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	69	148	319	688
CNEL:	74	158	341	735

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 With Project
Road Name: Katella Av.
Road Segment: e/o Lexington Dr.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	53,600 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,360 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	5.85	0.37	-1.20	-4.85	0.000	0.000
Medium Trucks:	77.72	-11.39	0.38	-1.20	-5.01	0.000	0.000
Heavy Trucks:	82.99	-15.34	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.5	69.6	67.9	61.8	70.4	71.0
Medium Trucks:	65.5	64.0	57.6	56.1	64.6	64.8
Heavy Trucks:	66.8	65.4	56.4	57.6	66.0	66.1
Vehicle Noise:	73.5	71.8	68.5	64.0	72.5	73.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	88	190	410	883
CNEL:	95	204	439	945

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 With Project
Road Name: Katella Av.
Road Segment: e/o Enterprise Dr.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	53,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,380 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	5.87	0.37	-1.20	-4.85	0.000	0.000
Medium Trucks:	77.72	-11.37	0.38	-1.20	-5.01	0.000	0.000
Heavy Trucks:	82.99	-15.33	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.5	69.6	67.9	61.8	70.4	71.1
Medium Trucks:	65.5	64.0	57.7	56.1	64.6	64.8
Heavy Trucks:	66.8	65.4	56.4	57.6	66.0	66.1
Vehicle Noise:	73.6	71.8	68.5	64.0	72.5	73.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	88	191	411	885
CNEL:	95	204	440	948

Monday, February 09, 2015

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 With Project
Road Name: Katella Av.
Road Segment: e/o Siboney St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	53,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,380 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	5.87	0.37	-1.20	-4.85	0.000	0.000
Medium Trucks:	77.72	-11.37	0.38	-1.20	-5.01	0.000	0.000
Heavy Trucks:	82.99	-15.33	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.5	69.6	67.9	61.8	70.4	71.1
Medium Trucks:	65.5	64.0	57.7	56.1	64.6	64.8
Heavy Trucks:	66.8	65.4	56.4	57.6	66.0	66.1
Vehicle Noise:	73.6	71.8	68.5	64.0	72.5	73.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	88	191	411	885
CNEL:	95	204	440	948

Monday, February 09, 2015

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 With Project
Road Name: Katella Av.
Road Segment: e/o Winners Cir.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	53,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,370 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	5.86	0.37	-1.20	-4.85	0.000	0.000
Medium Trucks:	77.72	-11.38	0.38	-1.20	-5.01	0.000	0.000
Heavy Trucks:	82.99	-15.33	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.5	69.6	67.9	61.8	70.4	71.0
Medium Trucks:	65.5	64.0	57.6	56.1	64.6	64.8
Heavy Trucks:	66.8	65.4	56.4	57.6	66.0	66.1
Vehicle Noise:	73.5	71.8	68.5	64.0	72.5	73.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	88	190	410	884
CNEL:	95	204	439	946

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 With Project
Road Name: Katella Av.
Road Segment: e/o Walker St.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	55,500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,550 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	5.49	0.37	-1.20	-4.85	0.000	0.000
Medium Trucks:	79.45	-11.75	0.38	-1.20	-5.01	0.000	0.000
Heavy Trucks:	84.25	-15.70	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.1	71.2	69.5	63.4	72.0	72.6
Medium Trucks:	66.9	65.4	59.0	57.5	65.9	66.2
Heavy Trucks:	67.7	66.3	57.3	58.5	66.9	67.0
Vehicle Noise:	75.0	73.2	70.1	65.4	73.9	74.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	110	236	509	1,096
CNEL:	118	253	546	1,176

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 With Project
Road Name: Bloomfield St.
Road Segment: s/o Cerritos Av.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	12,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,220 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	38.066
Medium Trucks:	37.961
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	0.00	1.67	-1.20	-4.83	0.000	0.000
Medium Trucks:	75.75	-17.23	1.69	-1.20	-5.07	0.000	0.000
Heavy Trucks:	81.57	-21.19	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.8	62.9	61.1	55.1	63.7	64.3
Medium Trucks:	59.0	57.5	51.1	49.6	58.1	58.3
Heavy Trucks:	60.9	59.4	50.4	51.6	60.0	60.1
Vehicle Noise:	67.0	65.3	61.9	57.5	66.0	66.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	23	49	105	227
CNEL:	24	52	113	242

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 With Project
Road Name: Lexington Dr.
Road Segment: s/o Cerritos Av.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	9,300	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	930	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	36	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	42.0	feet
Centerline Dist. to Observer:	42.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	38.066
Medium Trucks:	37.961
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	-1.17	1.67	-1.20	-4.83	0.000	0.000
Medium Trucks:	75.75	-18.41	1.69	-1.20	-5.07	0.000	0.000
Heavy Trucks:	81.57	-22.37	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.6	61.7	59.9	53.9	62.5	63.1
Medium Trucks:	57.8	56.3	50.0	48.4	56.9	57.1
Heavy Trucks:	59.7	58.3	49.2	50.5	58.8	58.9
Vehicle Noise:	65.8	64.1	60.7	56.3	64.8	65.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	19	41	88	189
CNEL:	20	44	94	202

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 With Project
Road Name: Walker St.
Road Segment: s/o Cerritos Av.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,100	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,310	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	36	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	42.0	feet
Centerline Dist. to Observer:	42.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	38.066
Medium Trucks:	37.961
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	2.20	1.67	-1.20	-4.83	0.000	0.000
Medium Trucks:	77.72	-15.04	1.69	-1.20	-5.07	0.000	0.000
Heavy Trucks:	82.99	-19.00	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.2	67.3	65.5	59.5	68.1	68.7
Medium Trucks:	63.2	61.7	55.3	53.8	62.2	62.4
Heavy Trucks:	64.5	63.0	54.0	55.3	63.6	63.7
Vehicle Noise:	71.2	69.5	66.2	61.6	70.2	70.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	43	93	200	431
CNEL:	46	99	214	462

Monday, February 09, 2015

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 With Project
Road Name: Valley View St.
Road Segment: s/o Cerritos Av.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	42,700	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,270	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	76	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	4.35	0.37	-1.20	-4.85	0.000	0.000
Medium Trucks:	79.45	-12.89	0.38	-1.20	-5.01	0.000	0.000
Heavy Trucks:	84.25	-16.84	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.0	70.1	68.3	62.3	70.9	71.5
Medium Trucks:	65.7	64.2	57.9	56.3	64.8	65.0
Heavy Trucks:	66.6	65.2	56.1	57.4	65.7	65.9
Vehicle Noise:	73.8	72.1	68.9	64.2	72.8	73.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	92	198	427	920
CNEL:	99	213	458	987

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2018 With Project
Road Name: Valley View St.
Road Segment: s/o Katella Av.
Project Name: Barton Place
Job Number: 9555

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	58,500	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	5,850	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	76	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	2.000		
Medium Trucks:	4.000		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	46.530
Medium Trucks:	46.444
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	5.72	0.37	-1.20	-4.85	0.000	0.000
Medium Trucks:	79.45	-11.52	0.38	-1.20	-5.01	0.000	0.000
Heavy Trucks:	84.25	-15.47	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.3	71.4	69.7	63.6	72.2	72.9
Medium Trucks:	67.1	65.6	59.2	57.7	66.2	66.4
Heavy Trucks:	67.9	66.5	57.5	58.7	67.1	67.2
Vehicle Noise:	75.2	73.4	70.3	65.6	74.2	74.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	114	245	527	1,135
CNEL:	122	262	565	1,218

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APPENDIX 8.1:

ON-SITE TRAFFIC NOISE CALCULATIONS

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Backyard With Wall
Road Name: Katella Av.
Lot No: Residential-Southwest

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	56,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,630 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**8.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	317.0 feet
Centerline Dist. to Observer:	322.0 feet
Barrier Distance to Observer:	5.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	29.9 feet
Road Elevation:	28.2 feet
Barrier Elevation:	29.9 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	30.200		
Medium Trucks:	32.200		
Heavy Trucks:	36.206	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	320.665
Medium Trucks:	320.623
Heavy Trucks:	320.576

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	67.36	6.07	-12.21	-1.20	*0.90*	-10.000	-13.000
Medium Trucks:	76.31	-11.17	-12.21	-1.20	*0.88*	-9.940	-12.940
Heavy Trucks:	81.16	-15.13	-12.21	-1.20	*0.84*	-9.820	-12.820

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	60.0	58.1	56.4	50.3	58.9	59.5
Medium Trucks:	51.7	50.2	43.9	42.3	50.8	51.0
Heavy Trucks:	52.6	51.2	42.2	43.4	51.8	51.9
Vehicle Noise:	61.3	59.5	56.7	51.6	60.2	60.7

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	50.0	48.1	46.4	40.3	48.9	49.5
Medium Trucks:	41.8	40.3	33.9	32.4	40.8	41.1
Heavy Trucks:	42.8	41.4	32.3	33.6	42.0	42.1
Vehicle Noise:	51.3	49.5	46.8	41.7	50.2	50.7

Centerline Distance to Noise Contour (in feet)	70 dBA	65 dBA	60 dBA	55 dBA
CNEL:	77	167	359	773

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Backyard With Wall
Road Name: Katella Av.
Lot No: Residential-South

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	56,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,630 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**8.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	317.0 feet
Centerline Dist. to Observer:	322.0 feet
Barrier Distance to Observer:	5.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	31.0 feet
Road Elevation:	28.4 feet
Barrier Elevation:	31.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	30.400		
Medium Trucks:	32.400		
Heavy Trucks:	36.406	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	320.661
Medium Trucks:	320.613
Heavy Trucks:	320.555

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	67.36	6.07	-12.21	-1.20	*0.88*	-9.940	-12.940
Medium Trucks:	76.31	-11.17	-12.21	-1.20	*0.86*	-9.880	-12.880
Heavy Trucks:	81.16	-15.13	-12.21	-1.20	*0.82*	-9.760	-12.760

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	60.0	58.1	56.4	50.3	58.9	59.5
Medium Trucks:	51.7	50.2	43.9	42.3	50.8	51.0
Heavy Trucks:	52.6	51.2	42.2	43.4	51.8	51.9
Vehicle Noise:	61.3	59.5	56.7	51.6	60.2	60.7

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	50.1	48.2	46.4	40.4	49.0	49.6
Medium Trucks:	41.9	40.3	34.0	32.4	40.9	41.1
Heavy Trucks:	42.9	41.4	32.4	33.7	42.0	42.1
Vehicle Noise:	51.3	49.6	46.8	41.7	50.3	50.8

Centerline Distance to Noise Contour (in feet)	70 dBA	65 dBA	60 dBA	55 dBA
CNEL:	77	167	359	773

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Backyard With Wall
Road Name: Katella Av.
Lot No: Residential-Southeast

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	56,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,630 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**8.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	317.0 feet
Centerline Dist. to Observer:	322.0 feet
Barrier Distance to Observer:	5.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	31.3 feet
Road Elevation:	29.6 feet
Barrier Elevation:	31.3 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	31.600		
Medium Trucks:	33.600		
Heavy Trucks:	37.606	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	320.638
Medium Trucks:	320.596
Heavy Trucks:	320.549

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	67.36	6.07	-12.21	-1.20	*0.87*	-9.910	-12.910
Medium Trucks:	76.31	-11.17	-12.21	-1.20	*0.85*	-9.850	-12.850
Heavy Trucks:	81.16	-15.13	-12.21	-1.20	*0.81*	-9.730	-12.730

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	60.0	58.1	56.4	50.3	58.9	59.5
Medium Trucks:	51.7	50.2	43.9	42.3	50.8	51.0
Heavy Trucks:	52.6	51.2	42.2	43.4	51.8	51.9
Vehicle Noise:	61.3	59.5	56.7	51.6	60.2	60.7

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	50.1	48.2	46.4	40.4	49.0	49.6
Medium Trucks:	41.9	40.4	34.0	32.5	40.9	41.2
Heavy Trucks:	42.9	41.5	32.4	33.7	42.0	42.2
Vehicle Noise:	51.4	49.6	46.8	41.8	50.3	50.8

Centerline Distance to Noise Contour (in feet)	70 dBA	65 dBA	60 dBA	55 dBA
CNEL:	77	167	359	773

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: First Floor With Wall
Road Name: Katella Av.
Lot No: Commercial-West

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	56,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,630 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	160.0 feet
Centerline Dist. to Observer:	160.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	30.7 feet
Road Elevation:	28.2 feet
Barrier Elevation:	30.7 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	30.200		
Medium Trucks:	32.200		
Heavy Trucks:	36.206	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	155.519
Medium Trucks:	155.461
Heavy Trucks:	155.423

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	67.36	6.07	-7.50	-1.20	*-4.80*	0.000	0.000
Medium Trucks:	76.31	-11.17	-7.49	-1.20	*-4.86*	0.000	0.000
Heavy Trucks:	81.16	-15.13	-7.49	-1.20	*-4.98*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.7	62.8	61.1	55.0	63.6	64.2
Medium Trucks:	56.4	54.9	48.6	47.0	55.5	55.7
Heavy Trucks:	57.3	55.9	46.9	48.1	56.5	56.6
Vehicle Noise:	66.0	64.2	61.5	56.4	64.9	65.4

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.7	62.8	61.1	55.0	63.6	64.2
Medium Trucks:	56.4	54.9	48.6	47.0	55.5	55.7
Heavy Trucks:	57.3	55.9	46.9	48.1	56.5	56.6
Vehicle Noise:	66.0	64.2	61.5	56.4	64.9	65.4

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: First Floor With Wall
Road Name: Katella Av.
Lot No: Commercial-South

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	56,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,630 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	95.0 feet
Centerline Dist. to Observer:	95.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	30.7 feet
Road Elevation:	28.4 feet
Barrier Elevation:	30.7 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	30.400		
Medium Trucks:	32.400		
Heavy Trucks:	36.406	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	87.230
Medium Trucks:	87.131
Heavy Trucks:	87.072

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	6.07	-3.73	-1.20	*-4.75*	0.000	0.000
Medium Trucks:	76.31	-11.17	-3.72	-1.20	*-4.85*	0.000	0.000
Heavy Trucks:	81.16	-15.13	-3.72	-1.20	*-5.06*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.5	66.6	64.8	58.8	67.4	68.0
Medium Trucks:	60.2	58.7	52.3	50.8	59.3	59.5
Heavy Trucks:	61.1	59.7	50.7	51.9	60.3	60.4
Vehicle Noise:	69.7	68.0	65.2	60.1	68.7	69.2

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.5	66.6	64.8	58.8	67.4	68.0
Medium Trucks:	60.2	58.7	52.3	50.8	59.3	59.5
Heavy Trucks:	61.1	59.7	50.7	51.9	60.3	60.4
Vehicle Noise:	69.7	68.0	65.2	60.1	68.7	69.2

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: First Floor With Wall
Road Name: Katella Av.
Lot No: Residential-Southwest

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	56,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,630 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**8.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	317.0 feet
Centerline Dist. to Observer:	322.0 feet
Barrier Distance to Observer:	5.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	29.9 feet
Road Elevation:	28.2 feet
Barrier Elevation:	29.9 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	30.200		
Medium Trucks:	32.200		
Heavy Trucks:	36.206	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	320.665
Medium Trucks:	320.623
Heavy Trucks:	320.576

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	6.07	-12.21	-1.20	*0.90*	-10.000	-13.000
Medium Trucks:	76.31	-11.17	-12.21	-1.20	*0.88*	-9.940	-12.940
Heavy Trucks:	81.16	-15.13	-12.21	-1.20	*0.84*	-9.820	-12.820

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	60.0	58.1	56.4	50.3	58.9	59.5
Medium Trucks:	51.7	50.2	43.9	42.3	50.8	51.0
Heavy Trucks:	52.6	51.2	42.2	43.4	51.8	51.9
Vehicle Noise:	61.3	59.5	56.7	51.6	60.2	60.7

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	50.0	48.1	46.4	40.3	48.9	49.5
Medium Trucks:	41.8	40.3	33.9	32.4	40.8	41.1
Heavy Trucks:	42.8	41.4	32.3	33.6	42.0	42.1
Vehicle Noise:	51.3	49.5	46.8	41.7	50.2	50.7

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: First Floor With Wall
Road Name: Katella Av.
Lot No: Residential-South

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	56,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,630 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**8.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	317.0 feet
Centerline Dist. to Observer:	322.0 feet
Barrier Distance to Observer:	5.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	31.0 feet
Road Elevation:	28.4 feet
Barrier Elevation:	31.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	30.400		
Medium Trucks:	32.400		
Heavy Trucks:	36.406	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	320.661
Medium Trucks:	320.613
Heavy Trucks:	320.555

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	6.07	-12.21	-1.20	*0.88*	-9.940	-12.940
Medium Trucks:	76.31	-11.17	-12.21	-1.20	*0.86*	-9.880	-12.880
Heavy Trucks:	81.16	-15.13	-12.21	-1.20	*0.82*	-9.760	-12.760

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	60.0	58.1	56.4	50.3	58.9	59.5
Medium Trucks:	51.7	50.2	43.9	42.3	50.8	51.0
Heavy Trucks:	52.6	51.2	42.2	43.4	51.8	51.9
Vehicle Noise:	61.3	59.5	56.7	51.6	60.2	60.7

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	50.1	48.2	46.4	40.4	49.0	49.6
Medium Trucks:	41.9	40.3	34.0	32.4	40.9	41.1
Heavy Trucks:	42.9	41.4	32.4	33.7	42.0	42.1
Vehicle Noise:	51.3	49.6	46.8	41.7	50.3	50.8

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: First Floor With Wall
Road Name: Katella Av.
Lot No: Residential-Southeast

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	56,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,630 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**8.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	317.0 feet
Centerline Dist. to Observer:	322.0 feet
Barrier Distance to Observer:	5.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	31.3 feet
Road Elevation:	29.6 feet
Barrier Elevation:	31.3 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	31.600		
Medium Trucks:	33.600		
Heavy Trucks:	37.606	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	320.638
Medium Trucks:	320.596
Heavy Trucks:	320.549

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	6.07	-12.21	-1.20	*0.87*	-9.910	-12.910
Medium Trucks:	76.31	-11.17	-12.21	-1.20	*0.85*	-9.850	-12.850
Heavy Trucks:	81.16	-15.13	-12.21	-1.20	*0.81*	-9.730	-12.730

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	60.0	58.1	56.4	50.3	58.9	59.5
Medium Trucks:	51.7	50.2	43.9	42.3	50.8	51.0
Heavy Trucks:	52.6	51.2	42.2	43.4	51.8	51.9
Vehicle Noise:	61.3	59.5	56.7	51.6	60.2	60.7

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	50.1	48.2	46.4	40.4	49.0	49.6
Medium Trucks:	41.9	40.4	34.0	32.5	40.9	41.2
Heavy Trucks:	42.9	41.5	32.4	33.7	42.0	42.2
Vehicle Noise:	51.4	49.6	46.8	41.8	50.3	50.8

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Second Floor With Wall
Road Name: Katella Av.
Lot No: Residential-Southwest

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	56,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,630 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**8.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	317.0 feet
Centerline Dist. to Observer:	322.0 feet
Barrier Distance to Observer:	5.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	29.9 feet
Road Elevation:	28.2 feet
Barrier Elevation:	29.9 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	30.200		
Medium Trucks:	32.200		
Heavy Trucks:	36.206	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	320.041
Medium Trucks:	319.962
Heavy Trucks:	319.841

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	6.07	-12.20	-1.20	*-2.52*	0.000	0.000
Medium Trucks:	76.31	-11.17	-12.20	-1.20	*-2.56*	0.000	0.000
Heavy Trucks:	81.16	-15.13	-12.19	-1.20	*-2.63*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	60.0	58.1	56.4	50.3	58.9	59.5
Medium Trucks:	51.7	50.2	43.9	42.3	50.8	51.0
Heavy Trucks:	52.6	51.2	42.2	43.4	51.8	51.9
Vehicle Noise:	61.3	59.5	56.8	51.7	60.2	60.7

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	60.0	58.1	56.4	50.3	58.9	59.5
Medium Trucks:	51.7	50.2	43.9	42.3	50.8	51.0
Heavy Trucks:	52.6	51.2	42.2	43.4	51.8	51.9
Vehicle Noise:	61.3	59.5	56.8	51.7	60.2	60.7

Friday, February 27, 2015

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Second Floor With Wall
Road Name: Katella Av.
Lot No: Residential-South

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	56,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,630 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**8.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	317.0 feet
Centerline Dist. to Observer:	322.0 feet
Barrier Distance to Observer:	5.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	31.0 feet
Road Elevation:	28.4 feet
Barrier Elevation:	31.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	30.400		
Medium Trucks:	32.400		
Heavy Trucks:	36.406	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	320.081
Medium Trucks:	319.996
Heavy Trucks:	319.864

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	6.07	-12.20	-1.20	*-2.54*	0.000	0.000
Medium Trucks:	76.31	-11.17	-12.20	-1.20	*-2.58*	0.000	0.000
Heavy Trucks:	81.16	-15.13	-12.19	-1.20	*-2.65*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	60.0	58.1	56.4	50.3	58.9	59.5
Medium Trucks:	51.7	50.2	43.9	42.3	50.8	51.0
Heavy Trucks:	52.6	51.2	42.2	43.4	51.8	51.9
Vehicle Noise:	61.3	59.5	56.8	51.7	60.2	60.7

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	60.0	58.1	56.4	50.3	58.9	59.5
Medium Trucks:	51.7	50.2	43.9	42.3	50.8	51.0
Heavy Trucks:	52.6	51.2	42.2	43.4	51.8	51.9
Vehicle Noise:	61.3	59.5	56.8	51.7	60.2	60.7

Friday, February 27, 2015

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Second Floor With Wall
Road Name: Katella Av.
Lot No: Residential-Southeast

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	56,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,630 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**8.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	317.0 feet
Centerline Dist. to Observer:	322.0 feet
Barrier Distance to Observer:	5.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	31.3 feet
Road Elevation:	29.6 feet
Barrier Elevation:	31.3 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	31.600		
Medium Trucks:	33.600		
Heavy Trucks:	37.606	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	320.041
Medium Trucks:	319.962
Heavy Trucks:	319.841

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	6.07	-12.20	-1.20	*-2.56*	0.000	0.000
Medium Trucks:	76.31	-11.17	-12.20	-1.20	*-2.59*	0.000	0.000
Heavy Trucks:	81.16	-15.13	-12.19	-1.20	*-2.66*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	60.0	58.1	56.4	50.3	58.9	59.5
Medium Trucks:	51.7	50.2	43.9	42.3	50.8	51.0
Heavy Trucks:	52.6	51.2	42.2	43.4	51.8	51.9
Vehicle Noise:	61.3	59.5	56.8	51.7	60.2	60.7

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	60.0	58.1	56.4	50.3	58.9	59.5
Medium Trucks:	51.7	50.2	43.9	42.3	50.8	51.0
Heavy Trucks:	52.6	51.2	42.2	43.4	51.8	51.9
Vehicle Noise:	61.3	59.5	56.8	51.7	60.2	60.7

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APPENDIX 8.2:

NOISE LEVEL REDUCTION CALCULATIONS

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INTERIOR NOISE REDUCTIONS

Project Name: Barton Place — *Job Number:* 9555

Floor Plan: SF Detached Plan 4 — *Analyst:* A. Wolfe

Room: Master / Bedroom 3

(1) Transmission Loss Calculations (Exterior Wall)

Exterior Wall Assembly	Source	Wall Area	STC	Transmission Loss (dB) by Frequency (Hz) 125	250	500	1000	2000	4000	Fractional Area S/(10^(TL/10)) 125	250	500	1000	2000	4000	dB
Stucco	David Harris p. 371	194.0	46	27	42	44	46	49	54	0.3871	0.0122	0.0077	0.0049	0.0024	0.0008	
Windows/Doors		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
	ABC	45.0	26	21	17	25	32	37	38	0.3574	0.8979	0.1423	0.0284	0.0090	0.0071	
	Milgard	40.0	29	19	17	26	33	39	29	0.5036	0.7981	0.1005	0.0200	0.0050	0.0504	
		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
										0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Totals		279								0.0045	0.0061	0.0009	0.0002	0.0001	0.0002	
Composite Exterior Wall Sound Transmission Loss		10*LOG(1/t)								23.49	22.13	30.47	37.19	42.29	36.80	36.76

(2) Room Effects (Absorption)

Room Surface/ Material	Source	Area	NRC	Absorption Coefficients by Frequency (Hz) 125	250	500	1000	2000	4000	Absorption (Sabins) 125	250	500	1000	2000	4000	
Floor - Carpet	David Harris p. 347	240.0	0.30	0.15	0.17	0.12	0.32	0.52	0.30	36.00	40.80	28.80	76.80	124.80	72.00	
Floor - Vinyl	David Harris p. 347	0.0	0.05	0.02	0.03	0.05	0.03	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	
Ceiling - Drywall	David Harris p. 348	240.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	24.00	19.20	12.00	7.20	7.20	7.20	
Walls - Drywall	David Harris p. 348	558.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	55.80	44.64	27.90	16.74	16.74	16.74	
Totals		1038								115.8	104.64	68.7	100.74	148.74	95.94	140.96
Room Effect	10*log (Room Absorption in Sabins)/(Exterior Wall Area)									-3.82	-4.26	-6.09	-4.42	-2.73	-4.64	-2.97

(3) Adjustment Factor

Sound Source Adjustment Factor										-6.00	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00

(4) Calculated Interior Noise Reduction (dBA)

	125	250	500	1000	2000	4000	dBA
(Transmission Loss + Room Effects + Adjustment Factor)	13.67	11.87	18.38	26.76	33.56	26.17	
Octave Band Frequency Correction Factors for A-Weighted Sound Levels	16.10	8.60	3.20	0.00	-1.20	-1.00	
A-Weighted Sound Levels	29.77	20.47	21.58	26.76	32.36	25.17	
Noise Reduction (dBA)	29.65	20.35	21.46	26.64	32.24	25.04	**27.8**

INTERIOR NOISE REDUCTIONS

Project Name: Barton Place — *Job Number:* 9555

Floor Plan: SF Detached Plan 4 — *Analyst:* A. Wolfe

Room: Bath 3

(1) Transmission Loss Calculations (Exterior Wall)

Exterior Wall Assembly	Source	Wall Area	STC	Transmission Loss (dB) by Frequency (Hz) 125	250	500	1000	2000	4000	Fractional Area S/(10^(TL/10)) 125	250	500	1000	2000	4000	dB
Stucco	David Harris p. 371	196.0	46	27	42	44	46	49	54	0.3911	0.0124	0.0078	0.0049	0.0025	0.0008	
Windows/Doors	ABC	20.0	27	17	20	23	31	31	29	0.3991	0.2000	0.1002	0.0159	0.0159	0.0252	
		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
	Milgard	0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
										0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Totals		216								0.0037	0.0010	0.0005	0.0001	0.0001	0.0001	
Composite Exterior Wall Sound Transmission Loss		10*LOG(1/t)								24.37	30.07	33.01	40.16	40.71	39.20	37.50

(2) Room Effects (Absorption)

Room Surface/ Material	Source	Area	NRC	Absorption Coefficients by Frequency (Hz) 125	250	500	1000	2000	4000	Absorption (Sabins) 125	250	500	1000	2000	4000	
Floor - Carpet	David Harris p. 347	140.0	0.30	0.15	0.17	0.12	0.32	0.52	0.30	21.00	23.80	16.80	44.80	72.80	42.00	
Floor - Vinyl	David Harris p. 347	0.0	0.05	0.02	0.03	0.05	0.03	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	
Ceiling - Drywall	David Harris p. 348	140.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	14.00	11.20	7.00	4.20	4.20	4.20	
Walls - Drywall	David Harris p. 348	432.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	43.20	34.56	21.60	12.96	12.96	12.96	
Totals		712								78.2	69.56	45.4	61.96	89.96	59.16	82.51
Room Effect	10*log (Room Absorption in Sabins)/(Exterior Wall Area)									-4.41	-4.92	-6.77	-5.42	-3.80	-5.62	-4.18

(3) Adjustment Factor

	125	250	500	1000	2000	4000	
Sound Source Adjustment Factor	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00

(4) Calculated Interior Noise Reduction (dBA)

	125	250	500	1000	2000	4000	dBA
(Transmission Loss + Room Effects + Adjustment Factor)	13.96	19.15	20.23	28.74	30.90	27.58	
Octave Band Frequency Correction Factors for A-Weighted Sound Levels	16.10	8.60	3.20	0.00	-1.20	-1.00	
A-Weighted Sound Levels	30.06	27.75	23.43	28.74	29.70	26.58	
Noise Reduction (dBA)	29.93	27.63	23.31	28.61	29.58	26.45	**28.1**

INTERIOR NOISE REDUCTIONS

Project Name: Barton Place — *Job Number:* 9555

Floor Plan: SF Detached Plan 4 — *Analyst:* A. Wolfe

Room: Media Room

(1) Transmission Loss Calculations (Exterior Wall)

Exterior Wall Assembly	Source	Wall Area	STC	Transmission Loss (dB) by Frequency (Hz) 125	250	500	1000	2000	4000	Fractional Area S/(10^(TL/10)) 125	250	500	1000	2000	4000	dB
Stucco	David Harris p. 371	243.0	46	27	42	44	46	49	54	0.4848	0.0153	0.0097	0.0061	0.0031	0.0010	
Windows/Doors	ABC	20.0	27	17	20	23	31	31	29	0.3991	0.2000	0.1002	0.0159	0.0159	0.0252	
	ABC	30.0	26	21	17	25	32	37	38	0.2383	0.5986	0.0949	0.0189	0.0060	0.0048	
	Milgard	40.0	29	19	17	26	33	39	29	0.5036	0.7981	0.1005	0.0200	0.0050	0.0504	
		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
										0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Totals		333								0.0049	0.0048	0.0009	0.0002	0.0001	0.0002	
Composite Exterior Wall Sound Transmission Loss		10*LOG(1/t)								23.11	23.15	30.38	37.37	40.46	36.13	35.68

(2) Room Effects (Absorption)

Room Surface/ Material	Source	Area	NRC	Absorption Coefficients by Frequency (Hz) 125	250	500	1000	2000	4000	Absorption (Sabins) 125	250	500	1000	2000	4000	
Floor - Carpet	David Harris p. 347	322.0	0.30	0.15	0.17	0.12	0.32	0.52	0.30	48.30	54.74	38.64	103.04	167.44	96.60	
Floor - Vinyl	David Harris p. 347	0.0	0.05	0.02	0.03	0.05	0.03	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	
Ceiling - Drywall	David Harris p. 348	322.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	32.20	25.76	16.10	9.66	9.66	9.66	
Walls - Drywall	David Harris p. 348	666.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	66.60	53.28	33.30	19.98	19.98	19.98	
Totals		1310								147.1	133.78	88.04	132.68	197.08	126.24	189.30
Room Effect	10*log (Room Absorption in Sabins)/(Exterior Wall Area)									-3.55	-3.96	-5.78	-4.00	-2.28	-4.21	-2.45

(3) Adjustment Factor

Sound Source Adjustment Factor	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00

(4) Calculated Interior Noise Reduction (dBA)

	125	250	500	1000	2000	4000	dBA
(Transmission Loss + Room Effects + Adjustment Factor)	13.57	13.19	18.60	27.38	32.18	25.91	
Octave Band Frequency Correction Factors for A-Weighted Sound Levels	16.10	8.60	3.20	0.00	-1.20	-1.00	
A-Weighted Sound Levels	29.67	21.79	21.80	27.38	30.98	24.91	
Noise Reduction (dBA)	29.54	21.67	21.68	27.25	30.85	24.79	**27.3**

INTERIOR NOISE REDUCTIONS

Project Name: Barton Place — *Job Number:* 9555

Floor Plan: SF Detached Plan 5 — *Analyst:* A. Wolfe

Room: Bedroom 3

(1) Transmission Loss Calculations (Exterior Wall)

Exterior Wall Assembly	Source	Wall Area	STC	Transmission Loss (dB) by Frequency (Hz) 125	250	500	1000	2000	4000	Fractional Area S/(10^(TL/10)) 125	250	500	1000	2000	4000	dB
Stucco	David Harris p. 371	186.0	46	27	42	44	46	49	54	0.3711	0.0117	0.0074	0.0047	0.0023	0.0007	
Windows/Doors	ABC	20.0	27	17	20	23	31	31	29	0.3991	0.2000	0.1002	0.0159	0.0159	0.0252	
	ABC	10.0	26	21	17	25	32	37	38	0.0794	0.1995	0.0316	0.0063	0.0020	0.0016	
	Milgard	0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
										0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Totals		216								0.0039	0.0019	0.0006	0.0001	0.0001	0.0001	
Composite Exterior Wall Sound Transmission Loss		10*LOG(1/t)								24.05	27.20	31.91	39.05	40.29	38.95	36.83

(2) Room Effects (Absorption)

Room Surface/ Material	Source	Area	NRC	Absorption Coefficients by Frequency (Hz) 125	250	500	1000	2000	4000	Absorption (Sabins) 125	250	500	1000	2000	4000	
Floor - Carpet	David Harris p. 347	143.0	0.30	0.15	0.17	0.12	0.32	0.52	0.30	21.45	24.31	17.16	45.76	74.36	42.90	
Floor - Vinyl	David Harris p. 347	0.0	0.05	0.02	0.03	0.05	0.03	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	
Ceiling - Drywall	David Harris p. 348	143.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	14.30	11.44	7.15	4.29	4.29	4.29	
Walls - Drywall	David Harris p. 348	432.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	43.20	34.56	21.60	12.96	12.96	12.96	
Totals		718								78.95	70.31	45.91	63.01	91.61	60.15	84.10
Room Effect	10*log (Room Absorption in Sabins)/(Exterior Wall Area)									-4.37	-4.87	-6.73	-5.35	-3.73	-5.55	-4.10

(3) Adjustment Factor

Sound Source Adjustment Factor	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00

(4) Calculated Interior Noise Reduction (dBA)

	125	250	500	1000	2000	4000	dBA
(Transmission Loss + Room Effects + Adjustment Factor)	13.68	16.33	19.18	27.70	30.56	27.40	
Octave Band Frequency Correction Factors for A-Weighted Sound Levels	16.10	8.60	3.20	0.00	-1.20	-1.00	
A-Weighted Sound Levels	29.78	24.93	22.38	27.70	29.36	26.40	
Noise Reduction (dBA)	29.66	24.80	22.26	27.58	29.24	26.27	**27.3**

INTERIOR NOISE REDUCTIONS

Project Name: Barton Place — *Job Number:* 9555

Floor Plan: SF Detached Plan 5 — *Analyst:* A. Wolfe

Room: Study

(1) Transmission Loss Calculations (Exterior Wall)

Exterior Wall Assembly	Source	Wall Area	STC	Transmission Loss (dB) by Frequency (Hz) 125	250	500	1000	2000	4000	Fractional Area S/(10^(TL/10)) 125	250	500	1000	2000	4000	dB
Stucco	David Harris p. 371	314.0	46	27	42	44	46	49	54	0.6265	0.0198	0.0125	0.0079	0.0040	0.0013	
Windows/Doors	ABC	35.0	27	17	20	23	31	31	29	0.6983	0.3500	0.1754	0.0278	0.0278	0.0441	
	ABC	20.0	26	21	17	25	32	37	38	0.1589	0.3991	0.0632	0.0126	0.0040	0.0032	
		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
										0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Totals		369								0.0040	0.0021	0.0007	0.0001	0.0001	0.0001	
Composite Exterior Wall Sound Transmission Loss		10*LOG(1/t)								23.96	26.81	31.67	38.83	40.14	38.81	36.65

(2) Room Effects (Absorption)

Room Surface/ Material	Source	Area	NRC	Absorption Coefficients by Frequency (Hz) 125	250	500	1000	2000	4000	Absorption (Sabins) 125	250	500	1000	2000	4000	
Floor - Carpet	David Harris p. 347	400.0	0.30	0.15	0.17	0.12	0.32	0.52	0.30	60.00	68.00	48.00	128.00	208.00	120.00	
Floor - Vinyl	David Harris p. 347	0.0	0.05	0.02	0.03	0.05	0.03	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	
Ceiling - Drywall	David Harris p. 348	400.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	40.00	32.00	20.00	12.00	12.00	12.00	
Walls - Drywall	David Harris p. 348	738.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	73.80	59.04	36.90	22.14	22.14	22.14	
Totals		1538								173.8	159.04	104.9	162.14	242.14	154.14	234.36
Room Effect	10*log (Room Absorption in Sabins)/(Exterior Wall Area)									-3.27	-3.66	-5.46	-3.57	-1.83	-3.79	-1.97

(3) Adjustment Factor

Sound Source Adjustment Factor	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00

(4) Calculated Interior Noise Reduction (dBA)

	125	250	500	1000	2000	4000	dBA
(Transmission Loss + Room Effects + Adjustment Factor)	14.69	17.16	20.21	29.26	32.31	29.02	
Octave Band Frequency Correction Factors for A-Weighted Sound Levels	16.10	8.60	3.20	0.00	-1.20	-1.00	
A-Weighted Sound Levels	30.79	25.76	23.41	29.26	31.11	28.02	
Noise Reduction (dBA)	30.66	25.63	23.28	29.13	30.98	27.90	**28.7**

INTERIOR NOISE REDUCTIONS

Project Name: Barton Place — *Job Number:* 9555

Floor Plan: SF Attached Plan 3 — *Analyst:* A. Wolfe

Room: Bonus Room

(1) Transmission Loss Calculations (Exterior Wall)

Exterior Wall Assembly	Source	Wall Area	STC	Transmission Loss (dB) by Frequency (Hz) 125	250	500	1000	2000	4000	Fractional Area S/(10^(TL/10)) 125	250	500	1000	2000	4000	dB
Stucco	David Harris p. 371	200.0	46	27	42	44	46	49	54	0.3991	0.0126	0.0080	0.0050	0.0025	0.0008	
Windows/Doors		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
	ABC	40.0	26	21	17	25	32	37	38	0.3177	0.7981	0.1265	0.0252	0.0080	0.0063	
	Milgard	48.0	29	19	17	26	33	39	29	0.6043	0.9577	0.1206	0.0241	0.0060	0.0604	
		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
										0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Totals		288								0.0046	0.0061	0.0009	0.0002	0.0001	0.0002	
Composite Exterior Wall Sound Transmission Loss		10*LOG(1/t)								23.38	22.12	30.53	37.24	42.41	36.30	36.76

(2) Room Effects (Absorption)

Room Surface/ Material	Source	Area	NRC	Absorption Coefficients by Frequency (Hz) 125	250	500	1000	2000	4000	Absorption (Sabins) 125	250	500	1000	2000	4000	
Floor - Carpet	David Harris p. 347	252.0	0.30	0.15	0.17	0.12	0.32	0.52	0.30	37.80	42.84	30.24	80.64	131.04	75.60	
Floor - Vinyl	David Harris p. 347	154.0	0.05	0.02	0.03	0.05	0.03	0.03	0.02	3.08	4.62	7.70	4.62	4.62	3.08	
Ceiling - Drywall	David Harris p. 348	406.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	40.60	32.48	20.30	12.18	12.18	12.18	
Walls - Drywall	David Harris p. 348	576.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	57.60	46.08	28.80	17.28	17.28	17.28	
Totals		1388								139.08	126.02	87.04	114.72	165.12	108.14	157.35
Room Effect	10*log (Room Absorption in Sabins)/(Exterior Wall Area)									-3.16	-3.59	-5.20	-4.00	-2.42	-4.25	-2.63

(3) Adjustment Factor

Sound Source Adjustment Factor	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00

(4) Calculated Interior Noise Reduction (dBA)

	125	250	500	1000	2000	4000	dBA
(Transmission Loss + Room Effects + Adjustment Factor)	14.22	12.53	19.33	27.25	33.99	26.04	
Octave Band Frequency Correction Factors for A-Weighted Sound Levels	16.10	8.60	3.20	0.00	-1.20	-1.00	
A-Weighted Sound Levels	30.32	21.13	22.53	27.25	32.79	25.04	
Noise Reduction (dBA)	30.20	21.00	22.41	27.12	32.67	24.92	**28.3**

INTERIOR NOISE REDUCTIONS

Project Name: Barton Place — *Job Number:* 9555

Floor Plan: SF Attached Plan 3 — *Analyst:* A. Wolfe

Room: Bedroom 2

(1) Transmission Loss Calculations (Exterior Wall)

Exterior Wall Assembly	Source	Wall Area	STC	Transmission Loss (dB) by Frequency (Hz) 125	250	500	1000	2000	4000	Fractional Area S/(10^(TL/10)) 125	250	500	1000	2000	4000	dB
Stucco	David Harris p. 371	190.0	46	27	42	44	46	49	54	0.3791	0.0120	0.0076	0.0048	0.0024	0.0008	
Windows/Doors	ABC	25.0	27	17	20	23	31	31	29	0.4988	0.2500	0.1253	0.0199	0.0199	0.0315	
	ABC	10.0	26	21	17	25	32	37	38	0.0794	0.1995	0.0316	0.0063	0.0020	0.0016	
		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
										0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Totals		225								0.0043	0.0021	0.0007	0.0001	0.0001	0.0002	
Composite Exterior Wall Sound Transmission Loss		10*LOG(1/t)								23.71	26.88	31.36	38.62	39.68	38.23	36.25

(2) Room Effects (Absorption)

Room Surface/ Material	Source	Area	NRC	Absorption Coefficients by Frequency (Hz) 125	250	500	1000	2000	4000	Absorption (Sabins) 125	250	500	1000	2000	4000	
Floor - Carpet	David Harris p. 347	156.0	0.30	0.15	0.17	0.12	0.32	0.52	0.30	23.40	26.52	18.72	49.92	81.12	46.80	
Floor - Vinyl	David Harris p. 347	0.0	0.05	0.02	0.03	0.05	0.03	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	
Ceiling - Drywall	David Harris p. 348	156.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	15.60	12.48	7.80	4.68	4.68	4.68	
Walls - Drywall	David Harris p. 348	450.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	45.00	36.00	22.50	13.50	13.50	13.50	
Totals		762								84	75	49.02	68.1	99.3	64.98	91.67
Room Effect	10*log (Room Absorption in Sabins)/(Exterior Wall Area)									-4.28	-4.77	-6.62	-5.19	-3.55	-5.39	-3.90

(3) Adjustment Factor

Sound Source Adjustment Factor	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00

(4) Calculated Interior Noise Reduction (dBA)

	125	250	500	1000	2000	4000	dBA
(Transmission Loss + Room Effects + Adjustment Factor)	13.43	16.11	18.74	27.43	30.12	26.84	
Octave Band Frequency Correction Factors for A-Weighted Sound Levels	16.10	8.60	3.20	0.00	-1.20	-1.00	
A-Weighted Sound Levels	29.53	24.71	21.94	27.43	28.92	25.84	
Noise Reduction (dBA)	29.41	24.58	21.82	27.30	28.80	25.71	**27.0**

INTERIOR NOISE REDUCTIONS

Project Name: Barton Place — *Job Number:* 9555

Floor Plan: SF Attached Plan 4 — *Analyst:* A. Wolfe

Room: Bonus Room

(1) Transmission Loss Calculations (Exterior Wall)

Exterior Wall Assembly	Source	Wall Area	STC	Transmission Loss (dB) by Frequency (Hz) 125	250	500	1000	2000	4000	Fractional Area S/(10^(TL/10)) 125	250	500	1000	2000	4000	dB
Stucco	David Harris p. 371	193.0	46	27	42	44	46	49	54	0.3851	0.0122	0.0077	0.0048	0.0024	0.0008	
Windows/Doors	ABC	50.0	27	17	20	23	31	31	29	0.9976	0.5000	0.2506	0.0397	0.0397	0.0629	
	ABC	30.0	26	21	17	25	32	37	38	0.2383	0.5986	0.0949	0.0189	0.0060	0.0048	
		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
	Milgard	15.0	28	21	15	25	35	41	28	0.1191	0.4743	0.0474	0.0047	0.0012	0.0012	
										0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Totals		288								0.0060	0.0055	0.0014	0.0002	0.0002	0.0002	
Composite Exterior Wall Sound Transmission Loss		10*LOG(1/t)								22.19	22.59	28.57	36.25	37.66	36.16	34.05

(2) Room Effects (Absorption)

Room Surface/ Material	Source	Area	NRC	Absorption Coefficients by Frequency (Hz) 125	250	500	1000	2000	4000	Absorption (Sabins) 125	250	500	1000	2000	4000	
Floor - Carpet	David Harris p. 347	247.0	0.30	0.15	0.17	0.12	0.32	0.52	0.30	37.05	41.99	29.64	79.04	128.44	74.10	
Floor - Vinyl	David Harris p. 347	0.0	0.05	0.02	0.03	0.05	0.03	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	
Ceiling - Drywall	David Harris p. 348	247.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	24.70	19.76	12.35	7.41	7.41	7.41	
Walls - Drywall	David Harris p. 348	576.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	57.60	46.08	28.80	17.28	17.28	17.28	
Totals		1070								119.35	107.83	70.79	103.73	153.13	98.79	145.35
Room Effect	10*log (Room Absorption in Sabins)/(Exterior Wall Area)									-3.83	-4.27	-6.09	-4.43	-2.74	-4.65	-2.97

(3) Adjustment Factor

Sound Source Adjustment Factor	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00

(4) Calculated Interior Noise Reduction (dBA)

	125	250	500	1000	2000	4000	dBA
(Transmission Loss + Room Effects + Adjustment Factor)	12.36	12.33	16.47	25.82	28.92	25.52	
Octave Band Frequency Correction Factors for A-Weighted Sound Levels	16.10	8.60	3.20	0.00	-1.20	-1.00	
A-Weighted Sound Levels	28.46	20.93	19.67	25.82	27.72	24.52	
Noise Reduction (dBA)	28.34	20.80	19.55	25.69	27.59	24.39	**25.5**

INTERIOR NOISE REDUCTIONS

Project Name: Barton Place — *Job Number:* 9555

Floor Plan: SF Detached Plan 4 — *Analyst:* A. Wolfe

Room: Master / Bedroom 3

(1) Transmission Loss Calculations (Exterior Wall)

Exterior Wall Assembly	Source	Wall Area	STC	Transmission Loss (dB) by Frequency (Hz) 125	250	500	1000	2000	4000	Fractional Area S/(10^(TL/10)) 125	250	500	1000	2000	4000	dB
Stucco	David Harris p. 371	194.0	46	27	42	44	46	49	54	0.3871	0.0122	0.0077	0.0049	0.0024	0.0008	
Windows/Doors		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
	Anlin	45.0	35	23	22	34	38	39	35	0.2255	0.2839	0.0179	0.0071	0.0057	0.0142	
	Starline	40.0	35	24	23	34	37	40	39	0.1592	0.2005	0.0159	0.0080	0.0040	0.0050	
		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
										0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Totals		279								0.0028	0.0018	0.0001	0.0001	0.0000	0.0001	
Composite Exterior Wall Sound Transmission Loss		10*LOG(1/t)								25.58	27.50	38.27	41.45	43.63	41.44	39.89

(2) Room Effects (Absorption)

Room Surface/ Material	Source	Area	NRC	Absorption Coefficients by Frequency (Hz) 125	250	500	1000	2000	4000	Absorption (Sabins) 125	250	500	1000	2000	4000	
Floor - Carpet	David Harris p. 347	240.0	0.30	0.15	0.17	0.12	0.32	0.52	0.30	36.00	40.80	28.80	76.80	124.80	72.00	
Floor - Vinyl	David Harris p. 347	0.0	0.05	0.02	0.03	0.05	0.03	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	
Ceiling - Drywall	David Harris p. 348	240.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	24.00	19.20	12.00	7.20	7.20	7.20	
Walls - Drywall	David Harris p. 348	558.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	55.80	44.64	27.90	16.74	16.74	16.74	
Totals		1038								115.8	104.64	68.7	100.74	148.74	95.94	140.96
Room Effect	10*log (Room Absorption in Sabins)/(Exterior Wall Area)									-3.82	-4.26	-6.09	-4.42	-2.73	-4.64	-2.97

(3) Adjustment Factor

Sound Source Adjustment Factor										-6.00	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00

(4) Calculated Interior Noise Reduction (dBA)

	125	250	500	1000	2000	4000	dBA
(Transmission Loss + Room Effects + Adjustment Factor)	15.76	17.24	26.18	31.02	34.89	30.80	
Octave Band Frequency Correction Factors for A-Weighted Sound Levels	16.10	8.60	3.20	0.00	-1.20	-1.00	
A-Weighted Sound Levels	31.86	25.84	29.38	31.02	33.69	29.80	
Noise Reduction (dBA)	31.74	25.71	29.26	30.90	33.57	29.68	**30.8**

INTERIOR NOISE REDUCTIONS

Project Name: Barton Place — *Job Number:* 9555

Floor Plan: SF Detached Plan 4 — *Analyst:* A. Wolfe

Room: Bath 3

(1) Transmission Loss Calculations (Exterior Wall)

Exterior Wall Assembly	Source	Wall Area	STC	Transmission Loss (dB) by Frequency (Hz) 125	250	500	1000	2000	4000	Fractional Area S/(10^(TL/10)) 125	250	500	1000	2000	4000	dB
Stucco	David Harris p. 371	196.0	46	27	42	44	46	49	54	0.3911	0.0124	0.0078	0.0049	0.0025	0.0008	
Windows/Doors	Anlin	20.0	35	25	23	32	39	39	37	0.0632	0.1002	0.0126	0.0025	0.0025	0.0040	
		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
	Starline	0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
										0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Totals		216								0.0021	0.0005	0.0001	0.0000	0.0000	0.0000	
Composite Exterior Wall Sound Transmission Loss		10*LOG(1/t)								26.77	32.83	40.24	44.63	46.37	46.56	43.38

(2) Room Effects (Absorption)

Room Surface/ Material	Source	Area	NRC	Absorption Coefficients by Frequency (Hz) 125	250	500	1000	2000	4000	Absorption (Sabins) 125	250	500	1000	2000	4000	
Floor - Carpet	David Harris p. 347	140.0	0.30	0.15	0.17	0.12	0.32	0.52	0.30	21.00	23.80	16.80	44.80	72.80	42.00	
Floor - Vinyl	David Harris p. 347	0.0	0.05	0.02	0.03	0.05	0.03	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	
Ceiling - Drywall	David Harris p. 348	140.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	14.00	11.20	7.00	4.20	4.20	4.20	
Walls - Drywall	David Harris p. 348	432.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	43.20	34.56	21.60	12.96	12.96	12.96	
Totals		712								78.2	69.56	45.4	61.96	89.96	59.16	82.51
Room Effect	10*log (Room Absorption in Sabins)/(Exterior Wall Area)									-4.41	-4.92	-6.77	-5.42	-3.80	-5.62	-4.18

(3) Adjustment Factor

Sound Source Adjustment Factor	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00

(4) Calculated Interior Noise Reduction (dBA)

	125	250	500	1000	2000	4000	dBA
(Transmission Loss + Room Effects + Adjustment Factor)	16.36	21.91	27.47	33.20	36.56	34.93	
Octave Band Frequency Correction Factors for A-Weighted Sound Levels	16.10	8.60	3.20	0.00	-1.20	-1.00	
A-Weighted Sound Levels	32.46	30.51	30.67	33.20	35.36	33.93	
Noise Reduction (dBA)	32.33	30.38	30.54	33.08	35.24	33.81	**32.9**

INTERIOR NOISE REDUCTIONS

Project Name: Barton Place — *Job Number:* 9555

Floor Plan: SF Detached Plan 4 — *Analyst:* A. Wolfe

Room: Media Room

(1) Transmission Loss Calculations (Exterior Wall)

Exterior Wall Assembly	Source	Wall Area	STC	Transmission Loss (dB) by Frequency (Hz) 125	250	500	1000	2000	4000	Fractional Area S/(10^(TL/10)) 125	250	500	1000	2000	4000	dB
Stucco	David Harris p. 371	243.0	46	27	42	44	46	49	54	0.4848	0.0153	0.0097	0.0061	0.0031	0.0010	
Windows/Doors	Anlin	20.0	35	25	23	32	39	39	37	0.0632	0.1002	0.0126	0.0025	0.0025	0.0040	
	Anlin	30.0	35	23	22	34	38	39	35	0.1504	0.1893	0.0119	0.0048	0.0038	0.0095	
	Anlin	40.0	35	24	23	34	37	40	39	0.1592	0.2005	0.0159	0.0080	0.0040	0.0050	
		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
										0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Totals		333								0.0026	0.0015	0.0002	0.0001	0.0000	0.0001	
Composite Exterior Wall Sound Transmission Loss		10*LOG(1/t)								25.89	28.19	38.22	41.93	43.97	42.33	40.37

(2) Room Effects (Absorption)

Room Surface/ Material	Source	Area	NRC	Absorption Coefficients by Frequency (Hz) 125	250	500	1000	2000	4000	Absorption (Sabins) 125	250	500	1000	2000	4000	
Floor - Carpet	David Harris p. 347	322.0	0.30	0.15	0.17	0.12	0.32	0.52	0.30	48.30	54.74	38.64	103.04	167.44	96.60	
Floor - Vinyl	David Harris p. 347	0.0	0.05	0.02	0.03	0.05	0.03	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	
Ceiling - Drywall	David Harris p. 348	322.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	32.20	25.76	16.10	9.66	9.66	9.66	
Walls - Drywall	David Harris p. 348	666.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	66.60	53.28	33.30	19.98	19.98	19.98	
Totals		1310								147.1	133.78	88.04	132.68	197.08	126.24	189.30
Room Effect	10*log (Room Absorption in Sabins)/(Exterior Wall Area)									-3.55	-3.96	-5.78	-4.00	-2.28	-4.21	-2.45

(3) Adjustment Factor

Sound Source Adjustment Factor	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00

(4) Calculated Interior Noise Reduction (dBA)

	125	250	500	1000	2000	4000	dBA
(Transmission Loss + Room Effects + Adjustment Factor)	16.34	18.23	26.44	31.93	35.69	32.12	
Octave Band Frequency Correction Factors for A-Weighted Sound Levels	16.10	8.60	3.20	0.00	-1.20	-1.00	
A-Weighted Sound Levels	32.44	26.83	29.64	31.93	34.49	31.12	
Noise Reduction (dBA)	32.32	26.70	29.52	31.81	34.37	30.99	**31.5**

INTERIOR NOISE REDUCTIONS

Project Name: Barton Place — *Job Number:* 9555

Floor Plan: SF Detached Plan 5 — *Analyst:* A. Wolfe

Room: Bedroom 3

(1) Transmission Loss Calculations (Exterior Wall)

Exterior Wall Assembly	Source	Wall Area	STC	Transmission Loss (dB) by Frequency (Hz) 125	250	500	1000	2000	4000	Fractional Area S/(10^(TL/10)) 125	250	500	1000	2000	4000	dB
Stucco	David Harris p. 371	186.0	46	27	42	44	46	49	54	0.3711	0.0117	0.0074	0.0047	0.0023	0.0007	
Windows/Doors	Anlin	20.0	35	25	23	32	39	39	37	0.0632	0.1002	0.0126	0.0025	0.0025	0.0040	
	Anlin	10.0	35	23	22	34	38	39	35	0.0501	0.0631	0.0040	0.0016	0.0013	0.0032	
	Starline	0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
										0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Totals		216								0.0022	0.0008	0.0001	0.0000	0.0000	0.0000	
Composite Exterior Wall Sound Transmission Loss		10*LOG(1/t)								26.49	30.91	39.54	43.91	45.48	44.37	42.13

(2) Room Effects (Absorption)

Room Surface/ Material	Source	Area	NRC	Absorption Coefficients by Frequency (Hz) 125	250	500	1000	2000	4000	Absorption (Sabins) 125	250	500	1000	2000	4000	
Floor - Carpet	David Harris p. 347	143.0	0.30	0.15	0.17	0.12	0.32	0.52	0.30	21.45	24.31	17.16	45.76	74.36	42.90	
Floor - Vinyl	David Harris p. 347	0.0	0.05	0.02	0.03	0.05	0.03	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	
Ceiling - Drywall	David Harris p. 348	143.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	14.30	11.44	7.15	4.29	4.29	4.29	
Walls - Drywall	David Harris p. 348	432.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	43.20	34.56	21.60	12.96	12.96	12.96	
Totals		718								78.95	70.31	45.91	63.01	91.61	60.15	84.10
Room Effect	10*log (Room Absorption in Sabins)/(Exterior Wall Area)									-4.37	-4.87	-6.73	-5.35	-3.73	-5.55	-4.10

(3) Adjustment Factor

Sound Source Adjustment Factor	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00

(4) Calculated Interior Noise Reduction (dBA)

	125	250	500	1000	2000	4000	dBA
(Transmission Loss + Room Effects + Adjustment Factor)	16.12	20.04	26.82	32.56	35.75	32.82	
Octave Band Frequency Correction Factors for A-Weighted Sound Levels	16.10	8.60	3.20	0.00	-1.20	-1.00	
A-Weighted Sound Levels	32.22	28.64	30.02	32.56	34.55	31.82	
Noise Reduction (dBA)	32.10	28.51	29.89	32.44	34.43	31.69	**31.9**

INTERIOR NOISE REDUCTIONS

Project Name: Barton Place — *Job Number:* 9555

Floor Plan: SF Detached Plan 5 — *Analyst:* A. Wolfe

Room: Study

(1) Transmission Loss Calculations (Exterior Wall)

Exterior Wall Assembly	Source	Wall Area	STC	Transmission Loss (dB) by Frequency (Hz) 125	250	500	1000	2000	4000	Fractional Area S/(10^(TL/10)) 125	250	500	1000	2000	4000	dB
Stucco	David Harris p. 371	314.0	46	27	42	44	46	49	54	0.6265	0.0198	0.0125	0.0079	0.0040	0.0013	
Windows/Doors	Anlin	35.0	35	25	23	32	39	39	37	0.1107	0.1754	0.0221	0.0044	0.0044	0.0070	
	Anlin	20.0	35	23	22	34	38	39	35	0.1002	0.1262	0.0080	0.0032	0.0025	0.0063	
		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
										0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Totals		369								0.0023	0.0009	0.0001	0.0000	0.0000	0.0000	
Composite Exterior Wall Sound Transmission Loss		10*LOG(1/t)								26.44	30.60	39.38	43.78	45.31	44.04	41.92

(2) Room Effects (Absorption)

Room Surface/ Material	Source	Area	NRC	Absorption Coefficients by Frequency (Hz) 125	250	500	1000	2000	4000	Absorption (Sabins) 125	250	500	1000	2000	4000	
Floor - Carpet	David Harris p. 347	400.0	0.30	0.15	0.17	0.12	0.32	0.52	0.30	60.00	68.00	48.00	128.00	208.00	120.00	
Floor - Vinyl	David Harris p. 347	0.0	0.05	0.02	0.03	0.05	0.03	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	
Ceiling - Drywall	David Harris p. 348	400.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	40.00	32.00	20.00	12.00	12.00	12.00	
Walls - Drywall	David Harris p. 348	738.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	73.80	59.04	36.90	22.14	22.14	22.14	
Totals		1538								173.8	159.04	104.9	162.14	242.14	154.14	234.36
Room Effect	10*log (Room Absorption in Sabins)/(Exterior Wall Area)									-3.27	-3.66	-5.46	-3.57	-1.83	-3.79	-1.97

(3) Adjustment Factor

Sound Source Adjustment Factor	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00

(4) Calculated Interior Noise Reduction (dBA)

	125	250	500	1000	2000	4000	dBA
(Transmission Loss + Room Effects + Adjustment Factor)	17.17	20.94	27.92	34.21	37.48	34.25	
Octave Band Frequency Correction Factors for A-Weighted Sound Levels	16.10	8.60	3.20	0.00	-1.20	-1.00	
A-Weighted Sound Levels	33.27	29.54	31.12	34.21	36.28	33.25	
Noise Reduction (dBA)	33.15	29.42	30.99	34.08	36.15	33.12	**33.3**

INTERIOR NOISE REDUCTIONS

Project Name: Barton Place — *Job Number:* 9555

Floor Plan: SF Attached Plan 3 — *Analyst:* A. Wolfe

Room: Bonus Room

(1) Transmission Loss Calculations (Exterior Wall)

Exterior Wall Assembly	Source	Wall Area	STC	Transmission Loss (dB) by Frequency (Hz) 125	250	500	1000	2000	4000	Fractional Area S/(10^(TL/10)) 125	250	500	1000	2000	4000	dB
Stucco	David Harris p. 371	200.0	46	27	42	44	46	49	54	0.3991	0.0126	0.0080	0.0050	0.0025	0.0008	
Windows/Doors		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
	Anlin	40.0	35	23	22	34	38	39	35	0.2005	0.2524	0.0159	0.0063	0.0050	0.0126	
	Anlin	48.0	35	24	23	34	37	40	39	0.1911	0.2406	0.0191	0.0096	0.0048	0.0060	
		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
										0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Totals		288								0.0027	0.0018	0.0001	0.0001	0.0000	0.0001	
Composite Exterior Wall Sound Transmission Loss		10*LOG(1/t)								25.61	27.56	38.26	41.38	43.68	41.70	39.96

(2) Room Effects (Absorption)

Room Surface/ Material	Source	Area	NRC	Absorption Coefficients by Frequency (Hz) 125	250	500	1000	2000	4000	Absorption (Sabins) 125	250	500	1000	2000	4000	
Floor - Carpet	David Harris p. 347	252.0	0.30	0.15	0.17	0.12	0.32	0.52	0.30	37.80	42.84	30.24	80.64	131.04	75.60	
Floor - Vinyl	David Harris p. 347	154.0	0.05	0.02	0.03	0.05	0.03	0.03	0.02	3.08	4.62	7.70	4.62	4.62	3.08	
Ceiling - Drywall	David Harris p. 348	406.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	40.60	32.48	20.30	12.18	12.18	12.18	
Walls - Drywall	David Harris p. 348	576.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	57.60	46.08	28.80	17.28	17.28	17.28	
Totals		1388								139.08	126.02	87.04	114.72	165.12	108.14	157.35
Room Effect	10*log (Room Absorption in Sabins)/(Exterior Wall Area)									-3.16	-3.59	-5.20	-4.00	-2.42	-4.25	-2.63

(3) Adjustment Factor

Sound Source Adjustment Factor										-6.00	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00

(4) Calculated Interior Noise Reduction (dBA)

	125	250	500	1000	2000	4000	dBA
(Transmission Loss + Room Effects + Adjustment Factor)	16.45	17.97	27.06	31.39	35.26	31.44	
Octave Band Frequency Correction Factors for A-Weighted Sound Levels	16.10	8.60	3.20	0.00	-1.20	-1.00	
A-Weighted Sound Levels	32.55	26.57	30.26	31.39	34.06	30.44	
Noise Reduction (dBA)	32.43	26.44	30.14	31.26	33.93	30.32	**31.3**

INTERIOR NOISE REDUCTIONS

Project Name: Barton Place — *Job Number:* 9555

Floor Plan: SF Attached Plan 3 — *Analyst:* A. Wolfe

Room: Bedroom 2

(1) Transmission Loss Calculations (Exterior Wall)

Exterior Wall Assembly	Source	Wall Area	STC	Transmission Loss (dB) by Frequency (Hz) 125	250	500	1000	2000	4000	Fractional Area S/(10^(TL/10)) 125	250	500	1000	2000	4000	dB
Stucco	David Harris p. 371	190.0	46	27	42	44	46	49	54	0.3791	0.0120	0.0076	0.0048	0.0024	0.0008	
Windows/Doors	Anlin	25.0	35	25	23	32	39	39	37	0.0791	0.1253	0.0158	0.0031	0.0031	0.0050	
	Anlin	10.0	35	23	22	34	38	39	35	0.0501	0.0631	0.0040	0.0016	0.0013	0.0032	
		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
										0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Totals		225								0.0023	0.0009	0.0001	0.0000	0.0000	0.0000	
Composite Exterior Wall Sound Transmission Loss		10*LOG(1/t)								26.46	30.50	39.16	43.74	45.20	44.02	41.85

(2) Room Effects (Absorption)

Room Surface/ Material	Source	Area	NRC	Absorption Coefficients by Frequency (Hz) 125	250	500	1000	2000	4000	Absorption (Sabins) 125	250	500	1000	2000	4000	
Floor - Carpet	David Harris p. 347	156.0	0.30	0.15	0.17	0.12	0.32	0.52	0.30	23.40	26.52	18.72	49.92	81.12	46.80	
Floor - Vinyl	David Harris p. 347	0.0	0.05	0.02	0.03	0.05	0.03	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	
Ceiling - Drywall	David Harris p. 348	156.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	15.60	12.48	7.80	4.68	4.68	4.68	
Walls - Drywall	David Harris p. 348	450.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	45.00	36.00	22.50	13.50	13.50	13.50	
Totals		762								84	75	49.02	68.1	99.3	64.98	91.67
Room Effect	10*log (Room Absorption in Sabins)/(Exterior Wall Area)									-4.28	-4.77	-6.62	-5.19	-3.55	-5.39	-3.90

(3) Adjustment Factor

Sound Source Adjustment Factor										-6.00	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00

(4) Calculated Interior Noise Reduction (dBA)

	125	250	500	1000	2000	4000	dBA
(Transmission Loss + Room Effects + Adjustment Factor)	16.18	19.73	26.54	32.55	35.65	32.63	
Octave Band Frequency Correction Factors for A-Weighted Sound Levels	16.10	8.60	3.20	0.00	-1.20	-1.00	
A-Weighted Sound Levels	32.28	28.33	29.74	32.55	34.45	31.63	
Noise Reduction (dBA)	32.16	28.21	29.61	32.43	34.32	31.51	**31.8**

INTERIOR NOISE REDUCTIONS

Project Name: Barton Place — *Job Number:* 9555

Floor Plan: SF Attached Plan 4 — *Analyst:* A. Wolfe

Room: Bonus Room

(1) Transmission Loss Calculations (Exterior Wall)

Exterior Wall Assembly	Source	Wall Area	STC	Transmission Loss (dB) by Frequency (Hz) 125	250	500	1000	2000	4000	Fractional Area S/(10^(TL/10)) 125	250	500	1000	2000	4000	dB
Stucco	David Harris p. 371	193.0	46	27	42	44	46	49	54	0.3851	0.0122	0.0077	0.0048	0.0024	0.0008	
Windows/Doors	Anlin	50.0	35	25	23	32	39	39	37	0.1581	0.2506	0.0315	0.0063	0.0063	0.0100	
	Anlin	30.0	35	23	22	34	38	39	35	0.1504	0.1893	0.0119	0.0048	0.0038	0.0095	
		0.0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
	Anlin	15.0	35	25	22	30	40	43	40	0.0474	0.0946	0.0150	0.0015	0.0008	0.0008	
										0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Totals		288								0.0026	0.0019	0.0002	0.0001	0.0000	0.0001	
Composite Exterior Wall Sound Transmission Loss		10*LOG(1/t)								25.90	27.22	36.39	42.19	43.37	41.38	39.80

(2) Room Effects (Absorption)

Room Surface/ Material	Source	Area	NRC	Absorption Coefficients by Frequency (Hz) 125	250	500	1000	2000	4000	Absorption (Sabins) 125	250	500	1000	2000	4000	
Floor - Carpet	David Harris p. 347	247.0	0.30	0.15	0.17	0.12	0.32	0.52	0.30	37.05	41.99	29.64	79.04	128.44	74.10	
Floor - Vinyl	David Harris p. 347	0.0	0.05	0.02	0.03	0.05	0.03	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	
Ceiling - Drywall	David Harris p. 348	247.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	24.70	19.76	12.35	7.41	7.41	7.41	
Walls - Drywall	David Harris p. 348	576.0	0.50	0.10	0.08	0.05	0.03	0.03	0.03	57.60	46.08	28.80	17.28	17.28	17.28	
Totals		1070								119.35	107.83	70.79	103.73	153.13	98.79	145.35
Room Effect	10*log (Room Absorption in Sabins)/(Exterior Wall Area)									-3.83	-4.27	-6.09	-4.43	-2.74	-4.65	-2.97

(3) Adjustment Factor

Sound Source Adjustment Factor	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00	-6.00

(4) Calculated Interior Noise Reduction (dBA)

	125	250	500	1000	2000	4000	dBA
(Transmission Loss + Room Effects + Adjustment Factor)	16.07	16.95	24.29	31.75	34.63	30.73	
Octave Band Frequency Correction Factors for A-Weighted Sound Levels	16.10	8.60	3.20	0.00	-1.20	-1.00	
A-Weighted Sound Levels	32.17	25.55	27.49	31.75	33.43	29.73	
Noise Reduction (dBA)	32.05	25.42	27.37	31.63	33.30	29.60	**30.7**

APPENDIX 10.1:

PROJECT OPERATIONAL STATIONARY-SOURCE NOISE CALCULATIONS

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STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Air Conditioning Units
Observer Location: R1

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	380.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	380.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	0.0 feet		
Noise Height:	25.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	No
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 20.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	81.9	81.6	82.8	83.8	84.4	83.6
Distance Attenuation	380.0	-37.6	-37.6	-37.6	-37.6	-37.6	-37.6
Shielding (Barrier Attenuation)	380.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		44.3	44.0	45.2	46.2	46.8	46.0
30 Minute Hourly Adjustment		**41.3**	**41.0**	**42.2**	**43.2**	**43.8**	**43.0**

Friday, April 24, 2015

STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Parking Lot Activity
Observer Location: R1

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	418.0 feet	***Barrier Height:***	**8.0 feet**
Noise Distance to Barrier:	45.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	373.0 feet		
Noise Height:	4.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	Yes
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 15.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	418.0	-28.8	-28.8	-28.8	-28.8	-28.8	-28.8
Shielding (Barrier Attenuation)	418.0	-6.6	-6.6	-6.6	-6.6	-6.6	-6.6
Raw (Distance + Barrier)		24.7	21.3	25.3	28.3	31.7	44.1
60 Minute Hourly Adjustment		**24.7**	**21.3**	**25.3**	**28.3**	**31.7**	**44.1**

Friday, April 24, 2015

STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Air Conditioning Units
Observer Location: R2

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	806.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	806.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	0.0 feet		
Noise Height:	25.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	No
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 20.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	81.9	81.6	82.8	83.8	84.4	83.6
Distance Attenuation	806.0	-44.1	-44.1	-44.1	-44.1	-44.1	-44.1
Shielding (Barrier Attenuation)	806.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		37.8	37.5	38.7	39.7	40.3	39.5
30 Minute Hourly Adjustment		**34.8**	**34.5**	**35.7**	**36.7**	**37.3**	**36.5**

Friday, April 24, 2015

STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Parking Lot Activity
Observer Location: R2

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	769.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	769.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	0.0 feet		
Noise Height:	4.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	No
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 15.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	769.0	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8
Shielding (Barrier Attenuation)	769.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		27.3	23.9	27.9	30.9	34.3	46.7
60 Minute Hourly Adjustment		**27.3**	**23.9**	**27.9**	**30.9**	**34.3**	**46.7**

Friday, April 24, 2015

STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Loading Dock Activities
Observer Location: R3

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	142.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	142.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	0.0 feet		
Noise Height:	8.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	No
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 20.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	20.0	77.3	77.2	77.6	77.9	78.2	80.6
Distance Attenuation	142.0	-17.0	-17.0	-17.0	-17.0	-17.0	-17.0
Shielding (Barrier Attenuation)	142.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		60.3	60.2	60.6	60.9	61.2	63.6
6 Minute Hourly Adjustment		**50.3**	**50.2**	**50.6**	**50.9**	**51.2**	**53.6**

Friday, April 24, 2015

STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Air Conditioning Units
Observer Location: R3

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	164.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	164.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	0.0 feet		
Noise Height:	25.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	No
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 20.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	81.9	81.6	82.8	83.8	84.4	83.6
Distance Attenuation	164.0	-30.3	-30.3	-30.3	-30.3	-30.3	-30.3
Shielding (Barrier Attenuation)	164.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		51.6	51.3	52.5	53.5	54.1	53.3
30 Minute Hourly Adjustment		**48.6**	**48.3**	**49.5**	**50.5**	**51.1**	**50.3**

Friday, April 24, 2015

STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Parking Lot Activity
Observer Location: R3

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	129.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	129.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	0.0 feet		
Noise Height:	4.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	No
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 15.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	129.0	-21.2	-21.2	-21.2	-21.2	-21.2	-21.2
Shielding (Barrier Attenuation)	129.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		38.9	35.5	39.5	42.5	45.9	58.3
60 Minute Hourly Adjustment		**38.9**	**35.5**	**39.5**	**42.5**	**45.9**	**58.3**

Friday, April 24, 2015

STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Loading Dock Activities
Observer Location: R4

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	349.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	349.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	0.0 feet		
Noise Height:	8.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	No
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 20.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	20.0	77.3	77.2	77.6	77.9	78.2	80.6
Distance Attenuation	349.0	-24.8	-24.8	-24.8	-24.8	-24.8	-24.8
Shielding (Barrier Attenuation)	349.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		52.5	52.4	52.8	53.1	53.4	55.8
6 Minute Hourly Adjustment		**42.5**	**42.4**	**42.8**	**43.1**	**43.4**	**45.8**

Friday, April 24, 2015

STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Air Conditioning Units
Observer Location: R4

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	213.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	213.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	0.0 feet		
Noise Height:	25.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	No
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 20.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	81.9	81.6	82.8	83.8	84.4	83.6
Distance Attenuation	213.0	-32.6	-32.6	-32.6	-32.6	-32.6	-32.6
Shielding (Barrier Attenuation)	213.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		49.3	49.0	50.2	51.2	51.8	51.0
30 Minute Hourly Adjustment		**46.3**	**46.0**	**47.2**	**48.2**	**48.8**	**48.0**

Friday, April 24, 2015

STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Parking Lot Activity
Observer Location: R4

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	202.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	202.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	0.0 feet		
Noise Height:	4.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	No
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 15.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	202.0	-24.1	-24.1	-24.1	-24.1	-24.1	-24.1
Shielding (Barrier Attenuation)	202.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		36.0	32.6	36.6	39.6	43.0	55.4
60 Minute Hourly Adjustment		**36.0**	**32.6**	**36.6**	**39.6**	**43.0**	**55.4**

Friday, April 24, 2015

STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Air Conditioning Units
Observer Location: T7

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	192.0 feet	***Barrier Height:***	**8.0 feet**
Noise Distance to Barrier:	182.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	10.0 feet		
Noise Height:	25.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	Yes
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 20.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	81.9	81.6	82.8	83.8	84.4	83.6
Distance Attenuation	192.0	-31.7	-31.7	-31.7	-31.7	-31.7	-31.7
Shielding (Barrier Attenuation)	192.0	-6.7	-6.7	-6.7	-6.7	-6.7	-6.7
Raw (Distance + Barrier)		43.5	43.2	44.4	45.4	46.0	45.2
30 Minute Hourly Adjustment		**40.5**	**40.2**	**41.4**	**42.4**	**43.0**	**42.2**

Friday, April 24, 2015

STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Parking Lot Activity
Observer Location: T7

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	30.0 feet	***Barrier Height:***	**8.0 feet**
Noise Distance to Barrier:	20.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	10.0 feet		
Noise Height:	4.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	Yes
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 15.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	30.0	-11.7	-11.7	-11.7	-11.7	-11.7	-11.7
Shielding (Barrier Attenuation)	30.0	-9.7	-9.7	-9.7	-9.7	-9.7	-9.7
Raw (Distance + Barrier)		38.7	35.3	39.3	42.3	45.7	58.1
60 Minute Hourly Adjustment		**38.7**	**35.3**	**39.3**	**42.3**	**45.7**	**58.1**

Friday, April 24, 2015

STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Loading Dock Activities
Observer Location: T8

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	110.0 feet	***Barrier Height:***	**8.0 feet**
Noise Distance to Barrier:	100.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	10.0 feet		
Noise Height:	8.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	Yes
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 20.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	20.0	77.3	77.2	77.6	77.9	78.2	80.6
Distance Attenuation	110.0	-14.8	-14.8	-14.8	-14.8	-14.8	-14.8
Shielding (Barrier Attenuation)	110.0	-7.9	-7.9	-7.9	-7.9	-7.9	-7.9
Raw (Distance + Barrier)		54.6	54.5	54.9	55.2	55.5	57.9
6 Minute Hourly Adjustment		**44.6**	**44.5**	**44.9**	**45.2**	**45.5**	**47.9**

Friday, April 24, 2015

STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Air Conditioning Units
Observer Location: T8

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	91.0 feet	***Barrier Height:***	**8.0 feet**
Noise Distance to Barrier:	81.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	10.0 feet		
Noise Height:	25.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	Yes
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 20.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	81.9	81.6	82.8	83.8	84.4	83.6
Distance Attenuation	91.0	-25.2	-25.2	-25.2	-25.2	-25.2	-25.2
Shielding (Barrier Attenuation)	91.0	-5.3	-5.3	-5.3	-5.3	-5.3	-5.3
Raw (Distance + Barrier)		51.4	51.1	52.3	53.3	53.9	53.1
30 Minute Hourly Adjustment		**48.4**	**48.1**	**49.3**	**50.3**	**50.9**	**50.1**

Friday, April 24, 2015

STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Parking Lot Activity
Observer Location: T8

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	35.0 feet	***Barrier Height:***	**8.0 feet**
Noise Distance to Barrier:	25.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	10.0 feet		
Noise Height:	4.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	Yes
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 15.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	35.0	-12.7	-12.7	-12.7	-12.7	-12.7	-12.7
Shielding (Barrier Attenuation)	35.0	-9.4	-9.4	-9.4	-9.4	-9.4	-9.4
Raw (Distance + Barrier)		38.0	34.6	38.6	41.6	45.0	57.4
60 Minute Hourly Adjustment		**38.0**	**34.6**	**38.6**	**41.6**	**45.0**	**57.4**

Friday, April 24, 2015

APPENDIX 11.1:

ON-SITE STATIONARY-SOURCE NOISE CALCULATIONS

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STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Air Conditioning Units
Observer Location: T1

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	334.0 feet	***Barrier Height:***	**8.0 feet**
Noise Distance to Barrier:	324.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	10.0 feet		
Noise Height:	25.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	Yes
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 20.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	81.9	81.6	82.8	83.8	84.4	83.6
Distance Attenuation	334.0	-36.5	-36.5	-36.5	-36.5	-36.5	-36.5
Shielding (Barrier Attenuation)	334.0	-7.4	-7.4	-7.4	-7.4	-7.4	-7.4
Raw (Distance + Barrier)		38.0	37.7	38.9	39.9	40.5	39.7
30 Minute Hourly Adjustment		**35.0**	**34.7**	**35.9**	**36.9**	**37.5**	**36.7**

Friday, April 24, 2015

STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Parking Lot Activity
Observer Location: T1

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	129.0 feet	***Barrier Height:***	**8.0 feet**
Noise Distance to Barrier:	119.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	10.0 feet		
Noise Height:	4.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	Yes
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 15.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	129.0	-21.2	-21.2	-21.2	-21.2	-21.2	-21.2
Shielding (Barrier Attenuation)	129.0	-8.4	-8.4	-8.4	-8.4	-8.4	-8.4
Raw (Distance + Barrier)		30.5	27.1	31.1	34.1	37.5	49.9
60 Minute Hourly Adjustment		**30.5**	**27.1**	**31.1**	**34.1**	**37.5**	**49.9**

Friday, April 24, 2015

STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Air Conditioning Units
Observer Location: T4

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	626.0 feet	***Barrier Height:***	**8.0 feet**
Noise Distance to Barrier:	177.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	449.0 feet		
Noise Height:	25.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	No
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 20.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	81.9	81.6	82.8	83.8	84.4	83.6
Distance Attenuation	626.0	-42.0	-42.0	-42.0	-42.0	-42.0	-42.0
Shielding (Barrier Attenuation)	626.0	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Raw (Distance + Barrier)		39.4	39.1	40.3	41.3	41.9	41.1
30 Minute Hourly Adjustment		**36.4**	**36.1**	**37.3**	**38.3**	**38.9**	**38.1**

Friday, April 24, 2015

STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Parking Lot Activity
Observer Location: T4

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	552.0 feet	***Barrier Height:***	**8.0 feet**
Noise Distance to Barrier:	91.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	461.0 feet		
Noise Height:	4.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	Yes
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 15.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	552.0	-30.6	-30.6	-30.6	-30.6	-30.6	-30.6
Shielding (Barrier Attenuation)	552.0	-5.9	-5.9	-5.9	-5.9	-5.9	-5.9
Raw (Distance + Barrier)		23.6	20.2	24.2	27.2	30.6	43.0
60 Minute Hourly Adjustment		**23.6**	**20.2**	**24.2**	**27.2**	**30.6**	**43.0**

Friday, April 24, 2015

STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Loading Dock Activities
Observer Location: T5

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	548.0 feet	***Barrier Height:***	**8.0 feet**
Noise Distance to Barrier:	538.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	10.0 feet		
Noise Height:	8.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	Yes
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 20.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	20.0	77.3	77.2	77.6	77.9	78.2	80.6
Distance Attenuation	548.0	-28.8	-28.8	-28.8	-28.8	-28.8	-28.8
Shielding (Barrier Attenuation)	548.0	-8.1	-8.1	-8.1	-8.1	-8.1	-8.1
Raw (Distance + Barrier)		40.4	40.3	40.7	41.0	41.3	43.7
6 Minute Hourly Adjustment		**30.4**	**30.3**	**30.7**	**31.0**	**31.3**	**33.7**

Friday, April 24, 2015

STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Air Conditioning Units
Observer Location: T5

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	451.0 feet	***Barrier Height:***	**8.0 feet**
Noise Distance to Barrier:	441.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	10.0 feet		
Noise Height:	25.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	Yes
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 20.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	81.9	81.6	82.8	83.8	84.4	83.6
Distance Attenuation	451.0	-39.1	-39.1	-39.1	-39.1	-39.1	-39.1
Shielding (Barrier Attenuation)	451.0	-7.6	-7.6	-7.6	-7.6	-7.6	-7.6
Raw (Distance + Barrier)		35.2	34.9	36.1	37.1	37.7	36.9
30 Minute Hourly Adjustment		**32.2**	**31.9**	**33.1**	**34.1**	**34.7**	**33.9**

Friday, April 24, 2015

STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Parking Lot Activity
Observer Location: T5

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	276.0 feet	***Barrier Height:***	**8.0 feet**
Noise Distance to Barrier:	266.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	10.0 feet		
Noise Height:	4.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	Yes
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 15.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	276.0	-26.1	-26.1	-26.1	-26.1	-26.1	-26.1
Shielding (Barrier Attenuation)	276.0	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3
Raw (Distance + Barrier)		25.7	22.3	26.3	29.3	32.7	45.1
60 Minute Hourly Adjustment		**25.7**	**22.3**	**26.3**	**29.3**	**32.7**	**45.1**

Friday, April 24, 2015

STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Trash Compactor
Observer Location: T5

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	592.0 feet	***Barrier Height:***	**8.0 feet**
Noise Distance to Barrier:	582.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	10.0 feet		
Noise Height:	5.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	Yes
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 20.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	75.5	70.5	71.8	80.1	85.3	86.3
Distance Attenuation	592.0	-41.5	-41.5	-41.5	-41.5	-41.5	-41.5
Shielding (Barrier Attenuation)	592.0	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2
Raw (Distance + Barrier)		25.8	20.8	22.1	30.4	35.6	36.6
20 Minute Hourly Adjustment		**21.0**	**16.0**	**17.3**	**25.6**	**30.8**	**31.8**

Friday, April 24, 2015

STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Air Conditioning Units
Observer Location: T6

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	198.0 feet	***Barrier Height:***	**8.0 feet**
Noise Distance to Barrier:	188.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	10.0 feet		
Noise Height:	25.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	Yes
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 20.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	81.9	81.6	82.8	83.8	84.4	83.6
Distance Attenuation	198.0	-32.0	-32.0	-32.0	-32.0	-32.0	-32.0
Shielding (Barrier Attenuation)	198.0	-6.8	-6.8	-6.8	-6.8	-6.8	-6.8
Raw (Distance + Barrier)		43.1	42.8	44.0	45.0	45.6	44.8
30 Minute Hourly Adjustment		**40.1**	**39.8**	**41.0**	**42.0**	**42.6**	**41.8**

Friday, April 24, 2015

STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Parking Lot Activity
Observer Location: T6

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	106.0 feet	***Barrier Height:***	**8.0 feet**
Noise Distance to Barrier:	96.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	10.0 feet		
Noise Height:	4.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	Yes
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 15.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	106.0	-19.9	-19.9	-19.9	-19.9	-19.9	-19.9
Shielding (Barrier Attenuation)	106.0	-8.5	-8.5	-8.5	-8.5	-8.5	-8.5
Raw (Distance + Barrier)		31.7	28.3	32.3	35.3	38.7	51.1
60 Minute Hourly Adjustment		**31.7**	**28.3**	**32.3**	**35.3**	**38.7**	**51.1**

Friday, April 24, 2015

STATIONARY SOURCE NOISE PREDICTION MODEL

Source: Parking Lot Activity
Observer Location: T8

Project Name: Barton Place
Job Number: 9555
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	36.0 feet	***Barrier Height:***	**8.0 feet**
Noise Distance to Barrier:	26.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0.0
Barrier Distance to Observer:	10.0 feet		
Noise Height:	4.0 feet		
Observer Height (Above Pad):	5.0 feet	*Barrier Breaks Line of Sight:*	Yes
Observer Elevation:	0.0 feet	*Wall Located at Noise Source Elevation:*	No
Noise Source Elevation:	0.0 feet		

Drop Off Coefficient: 15.0 (20 = 6 dBA per doubling of distance, 15 = 4.5 dBA per doubling of distance)

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	36.0	-12.9	-12.9	-12.9	-12.9	-12.9	-12.9
Shielding (Barrier Attenuation)	36.0	-9.4	-9.4	-9.4	-9.4	-9.4	-9.4
Raw (Distance + Barrier)		37.8	34.4	38.4	41.4	44.8	57.2
60 Minute Hourly Adjustment		**37.8**	**34.4**	**38.4**	**41.4**	**44.8**	**57.2**

Friday, April 24, 2015

APPENDIX 12.1:

RCNM EQUIPMENT DATABASE

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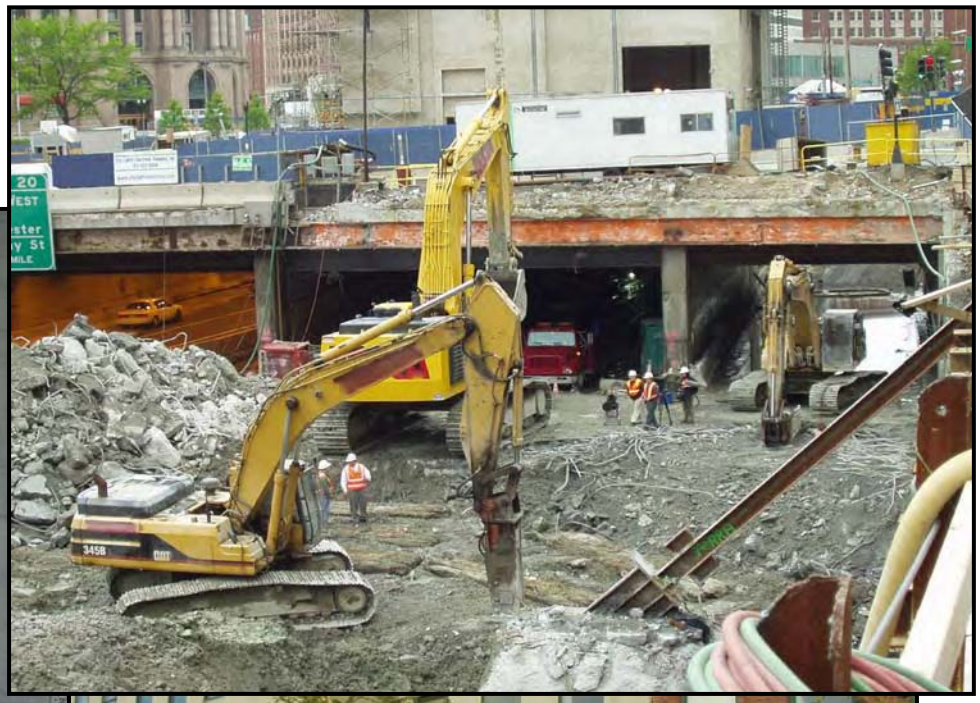
U.S. Department
of Transportation

**Federal Highway
Administration**

FHWA
Roadway Construction Noise Model
User's Guide

FHWA-HEP-05-054
DOT-VNTSC-FHWA-05-01

Final Report
January 2006



Prepared for
U.S. Department of Transportation
Federal Highway Administration
Office of Natural and Human Environment
Washington, DC 20590

Prepared by
U.S. Department of Transportation
Research and Innovative Technology Administration
John A. Volpe National Transportation Systems Center
Acoustics Facility
Cambridge, MA 02142

Table 1. CA/T equipment noise emissions and acoustical usage factors database.

CA/T Noise Emission Reference Levels and Usage Factors					
filename: EQUIPLST.xls					
revised: 7/26/05		Acoustical	Spec 721.560	Actual Measured	No. of Actual
	Impact	Use Factor	Lmax @ 50ft	Lmax @ 50ft	Data Samples
Equipment Description	Device ?	(%)	(dBA, slow)	(dBA, slow)	(Count)
				(samples averaged)	
All Other Equipment > 5 HP	No	50	85	-- N/A --	0
Auger Drill Rig	No	20	85	84	36
Backhoe	No	40	80	78	372
Bar Bender	No	20	80	-- N/A --	0
Blasting	Yes	-- N/A --	94	-- N/A --	0
Boring Jack Power Unit	No	50	80	83	1
Chain Saw	No	20	85	84	46
Clam Shovel (dropping)	Yes	20	93	87	4
Compactor (ground)	No	20	80	83	57
Compressor (air)	No	40	80	78	18
Concrete Batch Plant	No	15	83	-- N/A --	0
Concrete Mixer Truck	No	40	85	79	40
Concrete Pump Truck	No	20	82	81	30
Concrete Saw	No	20	90	90	55
Crane	No	16	85	81	405
Dozer	No	40	85	82	55
Drill Rig Truck	No	20	84	79	22
Drum Mixer	No	50	80	80	1
Dump Truck	No	40	84	76	31
Excavator	No	40	85	81	170
Flat Bed Truck	No	40	84	74	4
Front End Loader	No	40	80	79	96
Generator	No	50	82	81	19
Generator (<25KVA, VMS signs)	No	50	70	73	74
Gradall	No	40	85	83	70
Grader	No	40	85	-- N/A --	0
Grapple (on backhoe)	No	40	85	87	1
Horizontal Boring Hydr. Jack	No	25	80	82	6
Hydra Break Ram	Yes	10	90	-- N/A --	0
Impact Pile Driver	Yes	20	95	101	11
Jackhammer	Yes	20	85	89	133
Man Lift	No	20	85	75	23
Mounted Impact Hammer (hoe ram)	Yes	20	90	90	212
Pavement Scarafier	No	20	85	90	2
Paver	No	50	85	77	9
Pickup Truck	No	40	55	75	1
Pneumatic Tools	No	50	85	85	90
Pumps	No	50	77	81	17
Refrigerator Unit	No	100	82	73	3
Rivit Buster/chipping gun	Yes	20	85	79	19
Rock Drill	No	20	85	81	3
Roller	No	20	85	80	16
Sand Blasting (Single Nozzle)	No	20	85	96	9
Scraper	No	40	85	84	12
Shears (on backhoe)	No	40	85	96	5
Slurry Plant	No	100	78	78	1
Slurry Trenching Machine	No	50	82	80	75
Soil Mix Drill Rig	No	50	80	-- N/A --	0
Tractor	No	40	84	-- N/A --	0
Vacuum Excavator (Vac-truck)	No	40	85	85	149
Vacuum Street Sweeper	No	10	80	82	19
Ventilation Fan	No	100	85	79	13
Vibrating Hopper	No	50	85	87	1
Vibratory Concrete Mixer	No	20	80	80	1
Vibratory Pile Driver	No	20	95	101	44
Warning Horn	No	5	85	83	12
Welder / Torch	No	40	73	74	5

APPENDIX 13.1:

PEAK RACE COURSE ACTIVITY NOISE LEVEL MEASUREMENT WORKSHEET

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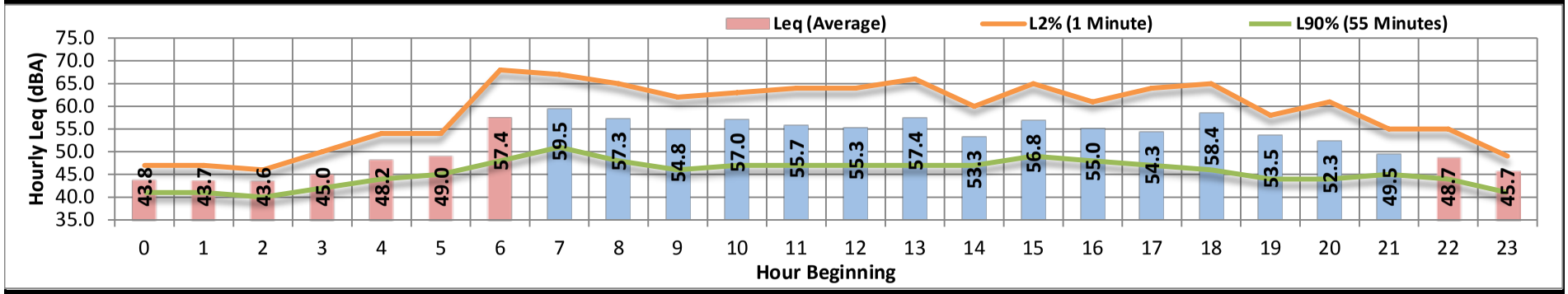
24-Hour Noise Level Measurement Summary

Project Name:	Barton Place	*JN:* 9555	*Energy Average Leq*		*24-Hour*
Location:	LT2 - Located along the northern Project site boundary, south of the existing horse stables of the Los Alamitos Race Course.	*Analyst:* A. Wolfe	*Day*	*Night*	*CNEL*
		Date: 2/20/2015	56.0	50.0	58.3

Hourly Leq dBA Readings (unadjusted)



Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	49.5	63.9	41.9	57.0	55.0	53.0	51.0	49.0	47.0	44.0	43.0	42.0
	Max	59.5	81.6	46.4	72.0	67.0	64.0	62.0	58.0	56.0	51.0	50.0	48.0
Energy Average		56.0	76.0	44.1	67.3	63.6	59.3	57.4	53.4	51.0	47.2	46.5	45.2
Night	Min	43.6	52.3	38.9	47.0	46.0	45.0	45.0	43.0	42.0	40.0	40.0	39.0
	Max	57.4	74.7	46.3	70.0	68.0	63.0	59.0	53.0	51.0	48.0	47.0	46.0
Energy Average		50.0	67.7	42.1	61.1	59.2	54.8	51.8	47.5	46.0	43.7	43.3	42.4
Hourly Summary													
Night	0	43.8	63.7	39.0	48.0	47.0	46.0	45.0	44.0	43.0	41.0	41.0	40.0
	1	43.7	57.3	39.0	49.0	47.0	46.0	45.0	44.0	43.0	41.0	40.0	40.0
	2	43.6	65.7	38.9	47.0	46.0	45.0	45.0	43.0	42.0	40.0	40.0	39.0
	3	45.0	56.3	40.9	51.0	50.0	48.0	47.0	45.0	44.0	42.0	42.0	41.0
	4	48.2	66.9	42.6	56.0	54.0	52.0	50.0	47.0	45.0	44.0	44.0	43.0
	5	49.0	70.3	43.3	57.0	54.0	51.0	50.0	47.0	46.0	45.0	45.0	44.0
	6	57.4	74.7	46.3	70.0	68.0	63.0	59.0	53.0	51.0	48.0	47.0	46.0
Day	7	59.5	78.4	46.4	70.0	67.0	64.0	62.0	58.0	56.0	51.0	50.0	48.0
	8	57.3	74.1	44.4	68.0	65.0	61.0	59.0	56.0	53.0	48.0	48.0	46.0
	9	54.8	75.5	43.3	64.0	62.0	59.0	58.0	52.0	49.0	46.0	45.0	44.0
	10	57.0	77.8	44.4	65.0	63.0	59.0	58.0	56.0	53.0	47.0	46.0	45.0
	11	55.7	74.8	43.5	68.0	64.0	60.0	57.0	52.0	50.0	47.0	46.0	45.0
	12	55.3	72.2	44.7	66.0	64.0	60.0	58.0	52.0	50.0	47.0	46.0	45.0
	13	57.4	77.6	44.7	69.0	66.0	61.0	59.0	53.0	50.0	47.0	47.0	46.0
	14	53.3	70.5	43.0	63.0	60.0	57.0	55.0	52.0	50.0	47.0	47.0	45.0
	15	56.8	77.6	45.7	68.0	65.0	59.0	57.0	53.0	51.0	49.0	48.0	47.0
	16	55.0	74.5	43.3	64.0	61.0	58.0	57.0	55.0	52.0	48.0	47.0	45.0
	17	54.3	72.8	44.9	67.0	64.0	58.0	55.0	51.0	49.0	47.0	46.0	45.0
	18	58.4	81.6	43.9	72.0	65.0	58.0	55.0	51.0	48.0	46.0	45.0	44.0
	19	53.5	74.1	42.3	68.0	58.0	54.0	53.0	49.0	47.0	44.0	44.0	43.0
	20	52.3	69.2	41.9	63.0	61.0	57.0	55.0	51.0	48.0	44.0	43.0	42.0
	21	49.5	63.9	43.3	57.0	55.0	53.0	51.0	49.0	48.0	45.0	45.0	44.0
Night	22	48.7	60.8	42.5	56.0	55.0	53.0	52.0	48.0	47.0	44.0	44.0	43.0
	23	45.7	52.3	39.9	50.0	49.0	48.0	48.0	46.0	45.0	41.0	41.0	40.0

URBAN CROSSROADS

APPENDIX I

ENERGY RESOURCE WORKSHEETS

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The Barton Place Project
4921 Katella Avenue, Cypress, California

Table 1. Summary of Energy Use During Construction

Source	Resource Use	
Electricity		
Water Consumption[1]	12,003	kWh
Lighting during construction, electronic equipment, other construction activities necessitating electrical power	-	kWh
Electricity Total	**12,003**	**kWh**
Diesel		
On-Road Construction Trips[2]	92,331	Gallons
Off-Road Construction Equipment[3]	70,918	Gallons
Diesel Total	**163,249**	**Gallons**
Gasoline		
On-Road Construction Trips[2]	144,954	Gallons
Off-Road Construction Equipment[4]	-	Gallons
Gasoline Total	**144,954**	**Gallons**

Notes

1. Construction water use estimated based on acres disturbed per day per construction phase, construction days per phase, and estimated water use per acre (AWMA 1992).
2. On-road mobile source fuel use based on vehicle miles traveled (VMT) from CalEEMod for all years of construction and fleet-average fuel consumption in gallons per mile from EMFAC2011 for each of the construction years in the SCAQMD.
3. Off-road mobile source fuel usage based on a fuel usage rate of 0.05 gallons of diesel per horsepower (HP)-hour, based on SCAQMD CEQA Air Quality Handbook, Table A9-3E.
4. All emissions from off-road construction equipment were assumed to be diesel.

Abbreviations

CalEEMod: California Emission Estimation Model
EMFAC2011: California Air Resources Board EMission FACtor model.
kWh: kilowatt-hour
SCAQMD: South Coast Air Quality Management District

Sources

Air & Waste Management Association. 1992. Air Pollution Engineering Manual.
SCAQMD CEQA Air Quality Handbook, Table A9-3E.

The Barton Place Project
4921 Katella Avenue, Cypress, California

Table 2. Summary of Operational Annual Energy Resource Use

Source	2020 BAU Annual Resource Use[1]	2020 Project Annual Resource Use[1]	Units	Percent Reduction
Electricity				
Building[2]	2,624,889	1,823,146	kWh/year	31%
Water[2]	386,359	350,507	kWh/year	9%
Total Electricity	**3,011,248**	**2,173,653**	**kWh/year**	**28%**
Natural Gas				
Building[2]	9,525,689	8,580,659	kBTU/year	10%
Mobile[3]				
Gasoline	328,984	328,984	gallons/year	0%
Diesel	47,620	47,620	gallons/year	0%

Notes

1. The Project annual resource use incorporates the energy saving benefits from project design features (e.g., Energy Star appliances and high efficiency lighting) and regulatory requirements (i.e., CalGreen Building Standard).

2. Water use, related electricity use, and natural gas use from CalEEMod for operational year 2020.
3. Mobile source fuel use based on vehicle miles traveled (VMT) from CalEEMod for operational year 2020 and fleet-average fuel consumption in gallons per mile from EMFAC2011 for operational year 2020 in the South Coast Air Quality Management District.

Abbreviations

EMFAC2011: California Air Resources Board EMission FACtor model.
kWh: kilowatt-hour
BTU: British Thermal Unit

The Barton Place Project
4921 Katella Avenue, Cypress, California

Supplemental Table A. On-Road Construction Trips by Year and Trip Type

Year	Trip Type	Annual Trips	Trip Length	Vehicle Miles Traveled (VMT)	Fuel Efficiency	Annual Fuel Usage[1]	
		(trips/year)	(miles)	(miles/year)	(mpg)	(Fuel)	(gallon/year)
2016	Worker[1,2]	58,520	14.7	860,244	20.46	Gasoline	42,052
	Vendor[4]	15,576	6.9	107,474	7.31	Diesel	14,711
	Haul[5]	11,674	20.0	233,480	5.71	Diesel	40,898
2017	Worker[1,2]	85,266	14.7	1,253,410	20.47	Gasoline	61,228
	Vendor[4]	23,364	6.9	161,212	7.31	Diesel	22,043
	Haul[5]	0	20.0	0	5.71	Diesel	0
2018	Worker[1,2]	58,074	14.7	853,688	20.48	Gasoline	41,675
	Vendor[4]	15,576	6.9	107,474	7.32	Diesel	14,679
	Haul[5]	0	20.0	0	5.72	Diesel	0
Total						**Gasoline**	**144,954**
						Diesel	**92,331**

Notes

1. On-road mobile source fuel use based on vehicle miles traveled (VMT) from CalEEMod for all years of construction and fleet-average fuel consumption in gallons per mile from EMFAC2011 for each of the construction years in the South Coast Air Quality Management District (SCAQMD).
2. Worker trips are 99.7% gasoline, based on EMFAC2011, and consequently were assumed to be 100%
3. Worker Trips were assumed to be 50% LDA, 25% LDT1, and 25% LDT2, consistent with CalEEMod.
4. Vendor trips were assumed to be 50% MHDT and 50% HHDT, split evenly between the MHDT and HHDT construction categories.
5. Haul trips were assumed to be split evenly between the two HHDT construction categories.

Abbreviations

HHDT: Heavy-Heavy Duty Truck
LDA: Light-Duty Autos (Passenger Cars)
LDT1: Light-Duty Trucks (GVWR <=6000 lbs. and ETW <= 3750 lbs)
LDT2: Light-Duty Trucks (GVWR <=6000 lbs. and ETW > 3750 lbs)
MHDT: Medium-Heavy Duty Trucks
mpg: miles per gallon

The Barton Place Project
4921 Katella Avenue, Cypress, California

Supplemental Table B. Water Used for Construction Dust Mitigation

Phase Type	Off-Road Equipment Type[1]	Average Number of Units per Day[2]	Hours Per Day	Acres Disturbed per Day[3]	Water Usage per Day[4] (Gallons)	Electicity Consumption Day[5] (kWh/day)	Number of Days	Total Water Usage[5] (Gallons)	Total Electricy Consumption[6] (kWh)
Grading	Graders	0.1	6	0.05	150	2	242	36,240	403
Grading	Rubber Tired Loaders	0.9	6	0.32	973	11	242	235,560	2,617
Grading	Scrapers	1.2	6	0.87	2,639	29	242	638,730	7,096
Grading	Tractors/Loaders/Backhoes	0.5	6	0.20	608	7	242	147,225	1,636
Site Preparation	Rubber Tired Dozers	1	6	0.375	1,133	13	10	11,325	126
Site Preparation	Tractors/Loaders/Backhoes	1	6	0.375	1,133	13	10	11,325	126
Total								**1,080,405**	**12,003**

Notes

1. Construction off-road equipment use, hours per day, and days per phase from project specific construction equipment list. Only the equipment types here are assumed to have associated water control.
2. Weighted average calculated based on the equpment usage and number of days in each grading sub-phases.
3. Acres disturbed per day calculated from CalEEMod Appendix D Table 3.7.
4. Gallons per year of water usage for dust control is calculated based on a minimum control efficiency of 66% (three times daily) with an application rate of 3,020 gal/acre/day (AWMA 1992) and average of 26 construction days per month.
5. Calculated based on the CalEEMod SCAQMD energy intensity of 0.0111 kWhr per gallon for supply, distribution, and treatment of water.
6. The total water and associated electricity throughout the entire construction duration.

Abbreviations

kWh: kilowatt-hour

Reference

Air & Waste Management Association. 1992. Air Pollution Engineering Manual.

The Barton Place Project
4921 Katella Avenue, Cypress, California

Supplemental Table C. Operational Energy Resource Use by Land Use

	Annual VMT	Natural Gas (kBTU/yr)		Electricity (kWh/yr)		Water (Mgal/yr)	
Land Uses		**2020 BAU**	**2020 Project**	**2020 BAU**	**2020 Project**	**2020 BAU**	**2020 Project**
Parking Lot	0	0	0	124,960	31,240	0.0	0.0
Health Club	0	115,274	99,939	50,334	32,574	0.5	0.5
High Turnover (Sit Down Restaurant)	1,764,217	3,008,500	2,838,770	461,638	347,821	3.7	3.3
Recreational Swimming Pool	0	0	0	0	0	0.3	0.3
Condo/Townhouse	872,623	1,545,070	1,410,910	402,317	311,169	9.8	8.9
Single Family Housing	1,495,150	4,779,830	4,162,420	1,095,080	837,359	16.1	14.7
Regional Shopping Center	2,800,588	77,015	68,620	490,560	262,983	4.4	4.0
Total	**6,932,578**	**9,525,689**	**8,580,659**	**2,624,889**	**1,823,146**	**34.8**	**31.5**

Notes

1. Mobile source vehicle miles traveled (VMT) from CalEEMod for operational year 2020.
2. Operational building electricity and natural gas use from CalEEMod for operational year 2020.
3. Water use and related electricity use from CalEEMod for operational year 2020.

Abbreviations

kWh: kilowatt-hour
BTU: British Thermo Unit

APPENDIX J

CORRESPONDENCE WITH PUBLIC SERVICE AND UTILITY PROVIDERS

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POLICE PROTECTION

For your convenience, we have provided space below for your answers. If you choose to answer these questions in the form of a letter, please number your responses to correspond to the questions. We would very much appreciate a response at your earliest convenience. Please return the completed questionnaire via email to mario.scalzo@lsa-assoc.com.

1. **Please evaluate the following statement for accuracy. If any of the information contained in the text below is incorrect or should be updated, please indicate the needed revisions below.**

   Police services for the City of Cypress (city) are provided by the Cypress Police Department (department). The department includes the Office of the Chief of Police, and is divided into three divisions which include Operations, Investigations, and Administration. The department serves the city's population of approximately 50,000 and covers an area just under seven square miles. The department includes 55 officers, of which 37 are dedicated to the delivery of patrol services, 22 civilian employees, and numerous volunteers. The services provided by the department include a detective bureau, canine teams, special investigations team, motorcycle officers, Personnel & Training, Positive Actions thru Character Education (P.A.C.E.) program, S.W.A.T. and a Lead Police Officer program. In addition, the Department has established Community Policing, or Cypress Policing, as the philosophy for providing public safety services.[1]

   Police dispatch services for the City of Cypress are provided by the West Cities Police Communications Center, also known as West-Comm. West-Comm is a consolidated police dispatch center, formed by a Joint Powers Authority between the cities of Cypress, Los Alamitos and Seal Beach. Located at the Seal Beach Police Department, West-Comm serves a combined population of approximately 90,000 and handles approximately 100,000 calls for service each year.

2. **Are there any current plans for expansion of Police Department facilities, services, or staff or to construct a new facility? If yes, please explain.**

   City staff is in the process of conducting a space utilization study of the police department facility. Several projects related to space have been evaluated and the greater need to determining if our existing facility can even meet our expansion plans is a first priority. There is no plan for a new facility however there is a plan to add a police management analyst for fiscal year 2015/2016.

3. **Would the project substantially increase response times or create a substantial increase in demand for staff, facilities, equipment, or police or other emergency services (e.g., as a result of potential increase call volume)?**

   Statistically speaking, there will be a general increase in calls for service with the anticipated increase in overall population and the addition of a shopping complex. This population growth and anticipated shopping complex activity would not be considered substantial.

[1] City of Cypress Police. The Community we Serve: http://www.ci.cypress.ca.us/police/community_we_serve.htm#overview (accessed March 16, 2015)

4. Are there any specific crime prevention design features that the Police Department recommends for incorporation into the proposed project?

Housing area:

Staff recommends the use of the Click-2-Enter device for any remote controlled access control devices (vehicle, pedestrian gates, bollards, doors, etc…) leading into the proposed housing area where public safety personnel would need immediately access (www.click2enter.net). This would be in addition to the Knox Box rapid entry system.

The Click-2-Enter device provides public safety agencies with a quick and easy was to activate an access control device (remote entry-point), utilizing existing public safety radios. Consideration for not only installation, but programming of the Click-2-Enter device(s) should also be accounted for.

Shopping complex:

- Proper lighting extending the rear of the businesses (back of building and parking area), for the safety of customers, employees and businesses.
- Recorded video surveillance monitoring the perimeter and parking area of the complex, to include the vehicle and pedestrian entry-points.
- If rear doors are for employee/delivery access only, they should be solid doors. If rear doors are to be a secondary entrance/exit, we recommend security glass to prevent or deter window smash burglaries.
- The front doors and windows to the shopping complex need to be free of posters and artwork that can obscure a street view into the business.
- If a common patio will be presented for food establishments and a tenant will be applying for an ABC license for alcohol use, the ideal situation would be that each tenant have their own sectioned off patio. ABC does allow common patios to be licensed, however upon application for an ABC license and subsequent investigation for issuing the license, additional conditions may be required.

5. Based on the proposed project description, will the Police Department be able to adequately serve the proposed project? If not, can you recommend any measures for mitigating project impacts that might be incorporated into the project?

Staff believes the police department will be able to adequately serve the proposed project.

6. Please provide any additional comments or questions you would like to see addressed in the environmental analysis for this project.

None

Prepared by: Tom Bruce

Title: Commander

Date: 5-18-15

Phone: (714) 229-6628

Ryan Bensley

From: Doug Hawkins <dhawkins@ci.cypress.ca.us>
Sent: Wednesday, July 15, 2015 8:57 AM
To: Ryan Bensley
Subject: Open Space and Recreational Facilities on School Sites

Hello Ryan,

Table COSR-4 of the Cypress General Plan indicates that approximately 119 acres of open space and recreation resources are located on school sites within the City. Since the adoption of the General Plan in 2001, the Mackay school site has been sold for a residential development and several other school sites have expanded their classroom facilities thereby reducing the amount of available open space on school sites. Therefore, staff estimates that approximately 100 acres of open space currently remains on school sites located in the City.

Please let me know if you need any additional information.

Thank you,

Douglas Hawkins
City Planner
DHawkins@ci.cypress.ca.us
(714) 229-6727
(714) 229-0154 FAX

Hilary Haskell

From: Richardson, Helen <Helen.Richardson@occr.ocgov.com>
Sent: Monday, April 13, 2015 11:46 AM
To: Hilary Haskell
Subject: Cypress Library

The catalog reports that CYP has 87802 volumes!

Helen Richardson
Senior Branch Manager
OC Public Libraries | Cypress Library
5331 Orange Ave, Cypress, CA 90630
714-826-0354
Helen.richardson@occr.ocgov.com

Mario Scalzo

From: Gary Hewitt <ghewitt@octa.net>
Sent: Friday, May 15, 2015 2:25 PM
To: Maryanne Cronin
Subject: RE: OCTA Bus Ridership and Projections on Route 50
Attachments: Route 50 EB WD.pdf; Route 50 WB WD.pdf

Maryanne-

I received your voicemail and I apologize for not getting back to you sooner.

Attached is the most recent weekday Route 50 ridership (eastbound and westbound). I have highlighted the stops closest to the proposed development. The "on" column is daily boardings and the "off' column is daily alightings.

We have no immediate plans for changes to Route 50. In our unconstrained Long-Range Transit Plan, we have a limited stop bus service proposed for Katella in this area. Though it will pass by the site, the closest stops would probably be at Valley View and Los Alamitos. Since the stops are not immediately adjacent to the development, we would probably not have any comments during the EIR review, but it would be a good idea to circulate it to us in case circumstances change.

Let me know if you have any additional questions.

Gary Hewitt
Section Manager- Transit & Non-Motorized Planning
Orange County Transportation Authority
714.560.5715

From: Maryanne Cronin [mailto:Maryanne.Cronin@lsa-assoc.com]
Sent: Friday, May 01, 2015 11:00 AM
To: Gary Hewitt
Subject: RE: OCTA Bus Ridership and Projections on Route 50

Good Morning Mr. Hewitt,

This email is to follow up with you about the ridership information request for Route 50 along Katella Avenue. I have re-attached the project vicinity map to this email.

Please let me know if you have any questions.

Thank you.

Maryanne Cronin
Assistant Environmental Planner
LSA Associates, Inc.
20 Executive Park, Suite 200
Irvine, CA 92614
p. 949-553-0666

From: Maryanne Cronin
Sent: Wednesday, April 22, 2015 11:24 AM
To: 'Gary Hewitt'

Cc: Ryan Bensley
Subject: RE: OCTA Bus Ridership and Projections on Route 50

Good Morning Mr. Hewitt,

Thank you for your reply. We are requesting current ridership and future ridership projections for Route 50 along Katella Avenue. We are preparing an Environmental Impact Report (EIR) for a project proposed on Katella Avenue in the City of Cypress and are assessing OCTA's ability to serve the proposed project. A map of the project site is attached to this email and you will find a description of the proposed project below.

The approximately 33-acre project site is located at 4921 Katella Avenue, at the northeast corner of Katella Avenue and Enterprise Drive The project site is directly bordered on the north by a portion of the Los Alamitos Race Course that includes one-story horse barns currently occupied by quarter and thoroughbred horses, associated equipment, and other portions of the Los Alamitos Race Course. A surface parking area for the Los Alamitos Race Course, a small two-story church, and a four-story Residence Inn Hotel are located to the east of the project site, with commercial uses, including a 24 Hour Fitness and Office Depot, located to the east beyond the hotel. Refer to Figure 1 (attached) for the location of the project site. The existing project site is currently vacant.

The proposed project includes a senior residential community and a commercial/retail component. The senior residential community would be comprised of 244 homes on approximately 28 acres on the northern portion of the project site. The commercial/retail component of the proposed project would be approximately 50,000 square feet of commercial/retail space divided into approximately five buildings, and would include neighborhood-serving restaurants, retail stores, and other commercial uses. Each of the senior residential units would include an attached two car garage. In addition approximately 74 guest parking spaces would be provided for the residential community. The surface parking lot supporting the commercial/retail area would include 277 parking spaces.

LSA is seeking information on how the proposed project would affect OCTA's ability to provide services and whether the project would require new or expanded facilities.

If you have any questions or comments on the questionnaire, please contact me at (949) 553-0666. Thank you for your time and assistance.

Maryanne Cronin
Assistant Environmental Planner
LSA Associates, Inc.
20 Executive Park, Suite 200
Irvine, CA 92614
p. 949-553-0666

From: Gary Hewitt [mailto:ghewitt@octa.net]
Sent: Wednesday, April 22, 2015 10:52 AM
To: Maryanne Cronin
Subject: FW: OCTA Bus Ridership and Projections on Route 50

Maryanne-

You email was forwarded to me by our outreach group. Let me know what specific ridership info you need.

Gary Hewitt
Section Manager- Transit & Non-Motorized Planning
Orange County Transportation Authority
714.560.5715

From: Maryanne Cronin [mailto:Maryanne.Cronin@lsa-assoc.com]
Sent: Thursday, April 16, 2015 11:13 AM
To: Jessica Lopez; Lauren Thompson
Subject: OCTA Bus Ridership and Projections on Route 50

Good Morning,

I found your contact information on the bus transit fact sheet on the OCTA website. I am preparing an EIR for a development project in the City of Cypress, and I was hoping to get in touch with someone who can provide me with ridership information for OCTA Route 50. I would greatly appreciate it if you could please forward this email to someone who can provide information regarding my request.

Thank you in advance for your time in this request.

Maryanne Cronin
Assistant Environmental Planner
LSA Associates, Inc.
20 Executive Park, Suite 200
Irvine, CA 92614
p. 949-553-0666

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ON/OFF SUMMARY REPORT

Line: 50 East **Service:** Weekday

From: 02/08/15 **To:** 06/13/15

Total Trips: 33

Seq.	Stop	Stop Location	Distance	WC	Bike	On	Off	On Board	Kill Time
1	4022	7TH-CHANNEL	239	4	14	283	0	283	0
2	4023	7TH-WEST CAMPUS	239	0	1	39	0	322	0
3	4089	STUDEBAKER-ANAHEIM	239	0	0	9	0	331	0
4	4090	STUDEBAKER-MANTOVA	239	0	0	2	0	333	0
5	4091	STUDEBAKER-DRISCOLL	239	0	0	1	0	334	0
6	4092	STUDEBAKER-ATHERTON	239	1	1	33	1	366	0
7	4093	STUDEBAKER-LOS SANTOS	239	0	0	6	0	372	0
8	4094	STUDEBAKER-STEARNS	239	0	0	5	1	376	0
9	4095	STUDEBAKER-EL SALVADOR	239	0	0	4	0	380	0
10	4096	STUDEBAKER-LOS ARCOS	239	0	0	2	0	382	0
11	4097	STUDEBAKER-WILLOW	239	0	2	34	0	416	0
12	4573	KATELLA-CIVIC CENTER	239	0	0	2	2	416	0
13	8064	KATELLA-WALLINGSFORD	239	1	1	16	15	417	0
14	4574	KATELLA-LOS ALIMITOS	239	2	3	53	41	429	3
15	4576	KATELLA-MAPLE	239	0	1	20	8	441	0
16	4577	KATELLA-BLOOMFIELD	239	0	0	9	7	443	0
17	4578	KATELLA-NOEL	239	0	0	14	12	445	0
18	4579	KATELLA-SARATOGA	239	0	1	7	8	444	0
19	4580	KATELLA-TICONDEROGA	239	0	0	1	3	442	0
20	4581	KATELLA-SIBONEY	239	0	0	20	21	441	0
21	4582	KATELLA-WINNERS CIRCLE	239	0	1	8	12	437	0
22	4583	KATELLA-WALKER	239	0	0	7	17	427	0
23	1412	KATELLA-WARLAND	239	0	0	9	13	423	0
24	1413	KATELLA-VALLEY VIEW	239	0	2	54	31	446	0
25	1414	KATELLA-HOPE	239	0	0	4	4	446	0
26	1415	KATELLA-HOLDER	239	0	0	9	3	452	0
27	1416	KATELLA-MERIDIAN	239	0	0	18	14	456	0
28	7122	KATELLA-KNOTT	239	0	2	69	30	495	0
29	7123	KATELLA-BRADFORD	239	0	0	2	1	496	0
30	7124	KATELLA-WESTERN	239	1	0	53	18	531	0
31	7126	KATELLA-CEDAR	239	1	0	18	9	540	0
32	7127	KATELLA-BEACH	239	1	0	130	81	589	1
33	7128	KATELLA-BOATMAN	239	0	1	4	1	592	0
34	2399	KATELLA-DALE	239	0	3	78	16	654	0
35	2400	KATELLA-MACMURRAY	239	0	1	9	4	659	0
36	2401	KATELLA-MAGNOLIA	239	0	0	107	45	721	0
37	2402	KATELLA-GARZA	239	0	0	13	6	728	0
38	2403	KATELLA-GILBERT	239	1	1	43	31	740	0
39	2404	KATELLA-BARCLAY	239	0	0	11	10	741	0
40	2405	KATELLA-BROOKHURST	239	1	3	87	47	781	0
41	2406	KATELLA-DALLAS	239	0	0	12	4	789	0
42	2407	KATELLA-NUTWOOD	239	1	0	40	23	806	0
43	2408	KATELLA-DINO	239	0	0	58	48	816	0
44	262	KATELLA-EUCLID	239	1	2	107	84	839	0
45	263	KATELLA-CARNELIAN	239	0	0	43	10	872	0
46	264	KATELLA-9TH	239	0	0	15	13	874	0
47	265	KATELLA-CASA VISTA	239	0	1	39	32	881	0
48	266	KATELLA-WEST	239	0	1	22	35	868	0
49	267	KATELLA-CONVENTION CENTER	239	0	0	13	22	859	0
50	268	KATELLA-HARBOR	239	1	4	148	269	738	2
51	269	KATELLA-CLEMENTINE	239	0	0	13	44	707	0
52	270	KATELLA-HASTER	239	0	1	84	174	617	0
53	271	KATELLA-LEWIS	239	0	0	9	18	608	0
54	272		239	0	0	0	0	0	0
55	273	KATELLA-STATE COLLEGE	239	1	1	74	160	522	0
56	274	KATELLA-HOWELL	239	0	0	1	17	506	0
57	8366	ARTIC - DOCK 6	239	1	0	21	76	451	0

Requested by: ghewitt

ON/OFF SUMMARY REPORT

Line: 50 East **Service:** Weekday

From: 02/08/15 **To:** 06/13/15

Total Trips: 33

Seq.	Stop	Stop Location	Distance	WC	Bike	On	Off	On Board	Kill Time
58	275	KATELLA-DOUGLASS	239	0	0	4	15	440	0
59	5439	KATELLA-STRUCK	239	0	0	1	26	415	0
60	5440	KATELLA-MAIN	239	0	0	72	62	425	0
61	5441	KATELLA-BATAVIA	239	0	0	9	56	378	0
62	5442	KATELLA-MANZANITA	239	0	0	3	29	352	0
63	5443	KATELLA-GLASSELL	239	1	0	32	63	321	1
64	5444	KATELLA-SHAFFER	239	0	1	3	12	312	0
65	5445	KATELLA-CAMBRIDGE	239	0	0	0	9	303	0
66	5446	KATELLA-CALIFORNIA	239	0	0	3	20	286	0
67	5623	TUSTIN-KATELLA	239	0	0	16	105	197	0
68	5624	TUSTIN-VANOWEN	239	1	0	7	8	196	0
69	5625	TUSTIN-TAFT	239	0	0	1	4	193	0
70	5626	TUSTIN-GROVE	239	0	0	0	11	182	0
71	5536	MEATS-TUSTIN	239	0	0	0	99	83	0
72	5308	CANAL-MEATS	239	0	0	0	15	68	0
73	5311	CANAL-HEIM	239	0	0	0	5	63	0
74	5636	TUSTIN-HEIM	239	0	0	0	22	41	0
75	5638	TUSTIN-EAST VILLAGE WAY (ZONE2)	239	0	0	0	41	0	0
				20	**49**	**2,143**	**2,143**		**7**

ON/OFF SUMMARY REPORT

Line: 50 West **Service:** Weekday

From: 02/08/15 **To:** 06/13/15

Total Trips: 34

Seq.	Stop	Stop Location	Distance	WC	Bike	On	Off	On Board	Kill Time
1	5638	TUSTIN-EAST VILLAGE WAY (ZONE2)	239	0	0	74	0	74	0
2	5640	TUSTIN-EAST VILLAGE WAY (ZONE4)	239	0	0	42	0	116	0
3	5642	TUSTIN-MEATS	239	0	1	63	1	178	0
4	5643	TUSTIN-GROVE	239	0	0	22	1	199	0
5	5644	TUSTIN-BRIARDALE	239	0	0	7	2	204	0
6	5645	TUSTIN-TAFT	239	1	0	6	0	210	0
7	5646	TUSTIN-CHESTNUT	239	0	0	9	1	218	0
8	5448	KATELLA-TUSTIN	239	0	2	149	15	352	0
9	5449	KATELLA-CALIFORNIA	239	0	1	4	2	354	0
10	5450	KATELLA-CAMBRIDGE	239	0	0	15	3	366	0
11	5451	KATELLA-SHAFFER	239	0	1	16	6	376	0
12	5452	KATELLA-GLASSELL	239	1	3	65	36	405	4
13	5454	KATELLA-MANZANITA	239	1	0	17	7	415	0
14	5455	KATELLA-BATAVIA	239	0	0	42	5	452	0
15	5456	KATELLA-MAIN	239	1	0	67	86	433	1
16	5457	KATELLA-STRUCK	239	0	0	7	2	438	1
17	8365	ARTIC - DOCK 5	239	1	4	89	21	506	22
18	277	KATELLA-HOWELL	239	0	0	21	8	519	0
19	278	KATELLA-STATE COLLEGE	239	2	4	146	71	594	0
20	279	KATELLA-AUBURN	239	0	1	6	1	599	0
21	280	KATELLA-LEWIS	239	0	0	10	14	595	0
22	281	KATELLA-ANAHEIM	239	1	2	211	74	732	0
23	282	KATELLA-CLEMENTINE	239	0	0	18	13	737	0
24	283	KATELLA-HARBOR	239	3	2	224	146	815	0
25	284	KATELLA-CONVENTION CENTER	239	0	0	18	7	826	0
26	285	KATELLA-DISNEYLAND	239	0	1	43	24	845	0
27	286	KATELLA-WALNUT	239	0	0	23	19	849	0
28	287	KATELLA-9TH	239	0	0	13	17	845	0
29	8326	KATELLA-TIARA	239	0	0	2	74	773	0
30	288	KATELLA-EUCLID	239	1	1	113	133	753	0
31	289	KATELLA-HUMOR	239	0	0	11	23	741	0
32	290	KATELLA-NUTWOOD	239	1	1	18	29	730	0
33	291	KATELLA-DALLAS	239	0	1	3	12	721	0
34	292	KATELLA-BROOKHURST	239	0	2	59	96	684	2
35	5122	KATELLA-JEAN	239	0	1	7	18	673	0
36	5183	KATELLA-GILBERT	239	0	1	33	38	668	0
37	5184	KATELLA-GARZA	239	0	0	2	8	662	0
38	7129	KATELLA-MAGNOLIA	239	0	0	45	84	623	0
39	7130	KATELLA-MACK	239	0	0	7	12	618	0
40	7131	KATELLA-DALE	239	0	0	19	57	580	0
41	7132	KATELLA-BOATMAN	239	0	0	1	10	571	0
42	7133	KATELLA-BEACH	239	1	1	59	127	503	2
43	7134	KATELLA-CEDAR	239	0	0	12	20	495	0
44	7136	KATELLA-WESTERN	239	2	1	30	41	484	0
45	7137	KATELLA-BRADFORD	239	0	0	3	6	481	0
46	1417	KATELLA-KNOTT	239	0	0	44	79	446	0
47	1418	KATELLA-MERIDIAN	239	0	0	1	6	441	0
48	1419	KATELLA-HOLDER	239	0	0	8	15	434	0
49	1420	KATELLA-HOPE	239	0	0	2	5	431	1
50	1421	KATELLA-VALLEY VIEW	239	0	0	27	39	419	0
51	1422	KATELLA-DOUGLAS	239	0	2	14	13	420	0
52	1423	KATELLA-WALKER	239	0	1	14	18	416	0
53	1424	KATELLA-WINNERS CIRCLE	239	0	0	10	12	414	0
54	1425	KATELLA-SIBONEY	239	0	0	14	20	408	1
55	1426	KATELLA-ENTERPRISE	239	0	0	2	1	409	0
56	4584	KATELLA-LEXINGTON	239	0	2	10	25	394	0
57	4585	KATELLA-PORTAL	239	0	0	4	4	394	0

Requested by: ghewitt

ON/OFF SUMMARY REPORT

Line: 50 West **Service:** Weekday

From: 02/08/15 **To:** 06/13/15

Total Trips: 34

Seq.	Stop	Stop Location	Distance	WC	Bike	On	Off	On Board	Kill Time
58	4586	KATELLA-BLOOMFIELD	239	0	0	17	20	391	1
59	4587	KATELLA-KAYLOR	239	0	0	17	14	394	0
60	4589	KATELLA-LOS ALAMITOS	239	0	0	31	51	374	2
61	4590	KATELLA-WALNUT	239	0	0	16	10	380	0
62	4591	KATELLA-CIVIC CENTER	239	0	0	0	0	380	0
63	4098	STUDEBAKER-WILLOW	239	0	0	1	56	325	0
64	4099	STUDEBAKER-LOS ARCOS	239	0	0	0	5	320	0
65	4100	STUDEBAKER-LA MARIMBA	239	0	0	0	2	318	0
66	4101	STUDEBAKER-STEARNS	239	0	0	0	0	318	0
67	4102	STUDEBAKER-LOS SANTOS	239	0	0	0	1	317	0
68	4103	STUDEBAKER-ATHERTON	239	0	0	0	10	307	0
69	4104	STUDEBAKER-DRISCOLL	239	0	0	1	1	307	0
70	4105	STUDEBAKER-VUELTA GRANDE	239	0	0	0	1	306	0
71	4106	STUDEBAKER-ANAHEIM	239	0	0	2	11	297	0
72	4024	7TH-EAST CAMPUS	239	0	0	1	60	238	1
73	4056	CHANNEL-7TH	239	0	0	0	227	11	0
74	4022	7TH-CHANNEL	239	0	0	0	11	0	0
				16	**36**	**2,087**	**2,087**		**38**

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

DATE : March 25, 2014

COMPANY: Newport Equities, LLC

SUBJECT: 4921 Katella Ave, Cypress CA 90720

Your project is located in Southern California Edison (SCE) service territory. SCE will serve the above subject project's electrical requirements per the California Public Utilities Commission and Federal Energy Regulatory Commission tariffs.

SCE may need to conduct utility studies, where applicable, to assess whether additions or modifications to the existing electric infrastructure are required to serve this project. Where applicable, SCE has attached Appendix (B) which not only describes the study, and permitting, but includes a Project Information Sheet that will need to be completed by you and submitted to SCE if your project is at a point where SCE has to determine the required electrical utility work. This Will-Serve letter does not imply that either: (i) these studies have been completed, or (ii) that any required California Environmental Quality Act (CEQA) analysis of project-related electric utility impacts has been conducted.

I am the SCE Design Representative currently assigned to this project. SCE or Applicant will design and construct all required electrical infrastructure to serve this project provided you enter into the applicable contractual agreements with SCE identify scope of electrical utility work required, and supply the following information:

- Site plans as required
- Required contracts and agreements (fully executed)
- Applicable fees
- Local permits
- Required easement documents

Your project will be scheduled for construction once SCE has all the necessary information for your project and you have submitted or agreed to the applicable requirements as stated above, and paid any necessary fees.

If your project will not require SCE services, please notify us so that we can update our records.

SCE appreciates your business. If you have any questions, please feel free to call me at (714) 512-0978.

Sincerely,

SCE Design Representative

Enclosure: Appendix B, where applicable

Appendix B

SOUTHERN CALIFORNIA EDISON

An EDISON INTERNATIONAL Company

DATE : March 25, 2014

COMPANY: Newport Equities, LLC

SUBJECT: 4921 Katella Ave, Cypress CA 90720

As your Southern California Edison (SCE) Design Representative for this project, I am committed to providing you with excellent customer service. The following information is intended to help explain SCE's planning and permitting process for the electric infrastructure needed to serve your Project.

Depending on the scope of work necessary to serve your project (electric facility installation, removal, relocation, rearrangement and/or replacement), it may be necessary for you to submit an Advanced Engineering Fee. This Fee will be applied to certain expenses associated with preliminary design and engineering work required to estimate the cost for SCE to perform the electric work associated with your project. Please note: Depending on factors such as resource constraints, construction or relocation of SCE facilities requirements, the need for environmental review, and so forth, delays in meeting your projected completion date may occur. To help minimize the potential for delays it is imperative that you provide all requested information as early as possible.

If the project results in the need for SCE to perform work on SCE electrical facilities that operate at between 50 and 200 kilovolts (kV), please be advised these facilities are subject to the California Public Utilities Commission's (CPUC's) General Order 131-D (GO 131-D) Permit to Construct (PTC) requirements. For the CPUC PTC review, the CPUC acts as the lead agency under the California Environmental Quality Act (CEQA). Depending on the scope of SCE's work, certain exemptions to the PTC requirements may be available. If no exemptions are available, the PTC application preparation and environmental approval process could take a minimum of 24 - 48 months.

If you anticipate that your project will require work to be performed on SCE electrical facilities operated at between 50 kV and 200 kV, please inform me at your earliest possible convenience for further assistance to determine the potential G.O.131-D permitting requirements and/or permitting exemption(s).

In order for SCE to determine the required electrical utility work necessary to support your project, and to determine any permitting requirements and costs associated with constructing these facilities, project plans and a completed Customer Project Information Sheet will need to be submitted.

If you have any additional questions, please feel free to call me at (714) 512-0978.

Sincerely,

SCE Design Representative

SOUTHERN CALIFORNIA EDISON®

An EDISON INTERNATIONAL® Company

Customer/Project Information Sheet

Date Received by SCE: _____

Individual or Business Name: (Customer / Developer – Tract DBA or LLC)		
Address:	Email Address:	
City:	State:	Zip Code:
Attn:	Phone No:	
Legal Contact: (Individual responsible for signing contracts, paying fees and receiving potential refunds)	Phone No:	
Address:	Email Address:	
City:	State:	Zip Code:
Primary Field / Site Superintendent / Job Contact:		
Relationship to Project:	Phone No:	
E-mail Address:	FAX No:	
Project Address:		
City:	State:	Zip Code:
TG Map # or GPS	Major Cross Street:	

Detailed Project Information

Residential: ☐	**Commercial:** ☐	**Industrial:** ☐	**Agricultural:** ☐
Overhead: ☐	Underground: ☐	Tract:	Lot(s):
Temporary Service Required: Yes ☐ No ☐		Federal Funding Source for Project: ☐ FHWA ☐ FTA ☐ FRA ☐ N/A	
Approximate start work date for SCE crews:		Your Construction Start Date:	
Approximate date you would like the job completed and energized:			
Scope of Project:			
Solar or Generation Equipment to be installed (If yes, please attach additional descriptions/specifications): ☐ Yes ☐ No			
Electric Vehicle: ☐ Charge Station ☐ Plug-In Electric Vehicle (PEV)			
Panel Size (amps):		Service Voltage/Phase:	
Total Tons of A/C:	Total # of A/C Units:	Largest A/C Unit (tons):	
Total HP of Pumps:	Total # of Pump Units:	Largest Pump (HP):	
Installing Gas or Electric:	Heater:	Water Heater:	Range:
Square Footage of Buildings (if multiple buildings give all footages): *Homes over 5000 sq ft require a Load Schedule. Please contact your electrician for assistance.*			

The Gas Company
A Sempra Energy utility℠

1919 S. State College Blvd.
Anaheim, CA 92806-6114

July 21, 2014

Newport Equities, LLC
26 Corporate Plaza, Ste. 260
Newport Beach, CA 92660

Attn: Bryce Bunker

Subject: Will Serve Request for Residential Development of 4921 Katella Ave, Cypress; Orange Co. APN# 241-231-16, -18, -23, -51, -52, -53, -54, -55, -56, -57

Thank you for inquiring about the availability of natural gas service for your project. We are pleased to inform you that Southern California Gas Company (SoCalGas) has facilities in the area where the above named project is being proposed. The service would be in accordance with SoCalGas' policies and extension rules on file with the California Public Utilities Commission (Commission) at the time contractual arrangements are made.

This letter should not be considered a contractual commitment to serve the proposed project, and is only provided for informational purposes only. The availability of natural gas service is based upon natural gas supply conditions and is subject to changes in law or regulation. As a public utility, SoCalGas is under the jurisdiction of the Commission and certain federal regulatory agencies, and gas service will be provided in accordance with the rules and regulations in effect at the time service is provided. Natural gas service is also subject to environmental regulations, which could affect the construction of a main or service line extension (for example, if hazardous wastes were encountered in the process of installing the line). Applicable regulations will be determined once a contract with SoCalGas is executed.

If you need assistance choosing the appropriate gas equipment for your project, or would like to discuss the most effective applications of energy efficiency techniques, please contact our area Service Center at 800-427-2200.

Thank you again for choosing clean, reliable, and safe natural gas, your best energy value.

Armando Torrez
Planning Supervisor
SouthEast Region - Anaheim Planning & Engineering

AT/ps
wilserv.doc

Valley Vista Services
Waste Disposal and Recycling Division
17445 East Railroad Street • City of Industry, California 91748 • (626) 961-6291 • Fax (626) 961-1105

Recovering the Earth's Resources

Bryce Bunker
Province Group/Newport Equities LLC
26 Corporate Plaza, Suite 260
Newport Beach, CA 92660

Re: **Tentative Tract Number 17830, Barton Place, Cypress**

Dear Mr. Bunker:

Thank you for your call and description of the proposed residential projects waste and recycling requirements. Based on this as well as the site layout and adherence to Orange County Fire Authority's access and roadway design elements we will have no issue providing service to its future residents.

I would also like to take this opportunity to let you know about our drop box services for all of your construction needs. We can offer debris boxes of all sizes and will process all material to provide maximum landfill diversion. If your project has LEED requirements we have certified staff that can provide reporting and assistance for your LEED scoresheet and check list.

We look forward to your project and wish you success.

Sincerely,

David Perez
Valley Vista Services of Orange County
626-855-5555 ofc
626-855-5557 fax

Printed on Recycled Paper

ORANGE COUNTY FIRE AUTHORITY QUESTIONNAIRE

For your convenience, we have provided space below for your answers. If you choose to answer these questions in the form of a letter, please number your responses to correspond to the questions. We would very much appreciate a response by **April 15, 2015**. Please return the completed questionnaire via email to mario.scalzo@lsa-assoc.com.

1. **Please evaluate the following statement for accuracy. If any of the information contained in the text below is incorrect or should be updated, please indicate the needed revisions below.**

The Orange County Fire Authority (OCFA) is a Joint Powers Authority responsible for reducing loss of life and property from fire, medical, and environmental emergencies. The OCFA provides service to 23 partner cities and the unincorporated areas of Orange County in a service area of approximately 575 square miles. The OCFA serves approximately 1,750,000 residents from its 71 fire stations located throughout Orange County.

In addition to providing fire suppression, emergency medical services, hazardous materials response, wildland firefighting, technical rescue, and airport rescue firefighting services, OCFA provides a variety of public services, including the following:

- Receives and dispatches emergency calls.
- Provides public education programs to schools, businesses, community associations, childcare providers and other members of the community.
- Administers a Reserve Firefighter Program.
- Sponsors Fire Explorer posts. The Explorers are young individuals, ages 14 to 21, interested in a career in fire and emergency medical services.
- Adopts and enforces codes and ordinances relative to fire and life safety issues associated with commercial, industrial, and residential development.
- Maintains irefighting helicopters used for emergency responses throughout the year.
- Coordinates the inspection of all commercial buildings, investigates all fires, and enforces hazardous materials regulations.
- Works with developers and jurisdictional planning departments on development projects impacting fire protection services, from conception through planning process approval.
- Conducts new construction inspections, fire safety inspections, and State Fire Marshal-required inspections (including high rise, jail, board and care, and day care inspections), and enforces applicable fire codes and ordinances.
- Interacts with developers, architects, and engineers to meet the fire protection requirements for buildings and developments by reviewing all architectural blue prints, development plans, and proposals submitted in OCFA's jurisdiction.
- Conducts Uniform Fire Code inspections, assists in reducing risks associated with the use of hazardous materials in the community, and administers the State-mandated Risk Management and Prevention program.

- Investigates fires to determine their cause, prepares arson and hazardous materials cases for the district attorney, and initiates actions to recover costs for negligently caused fires
- Develops and maintains a fire-safe corridor between the wildland and community developments through fuel modifications and inspections.

The City of Cypress is located in Division VII, which includes Battalions 8, and serves the cities of Buena Park, Cypress, La Palma, , Stanton,
There is one fire station located within the City to provide prompt assistance to area residents. Station No. 17 serves and would continue to serve the existing project site. This station is located at 4991 Cerritos Avenue, approximately 0.51 miles from the project site, and is staffed by six captains, six engineers, and 15 firefighters. In 2014, Station No. 17 responded to 5,513 calls.[1]

OCFA's goal is to have the first responding company for a fire call to reach the emergency scene within 7 minutes 20 seconds from receipt of call to on scene of call 80% of the time. The paramedics response goal is to reach the emergency scene within 10 minutes from receipt of call to on scene of call 80% of the time..In 2013, the OCFA responded to 41 fires, 1,845 Emergency Service calls, and 780 other incidents within the City of Cypress.[3]

[1] Orange County Fire Authority, Station Statistics: per Michele Hernandez 5/18/2015
[3] Orange County Fire Authority, 2013 Statistical Annual Report: http://www.ocfa.org/_uploads/pdf/2013_Statistical_Data_Annual_Report.pdf (accessed March 14, 2015)

2. Are there any current plans for expansion of Fire Department facilities, services, or staff or to construct a new facility? If yes, please explain.

Fire Station 17 has recently been built with added capacity. This project is required to participate in fair share funding of the new fire station and infrastructure to support the project area. Changes in staffing or equipment is evaluated annually and subject to change**.**

3. It is LSA's understanding that fire flow requirements are based on building types and floor area and range from 1,250 to 8,000 gallons per minute at 20 pounds per square inch. Can you provide an estimate of the fire flow requirements for the proposed project?

Not without floor plans, size per unit and construction type.

4. Would the project substantially increase response times or create a substantial increase in demand for staff, facilities, equipment, or Fire or other emergency services (e.g., as a result of a potential increased call volume)?

The project causes cumulative impacts in response time and call work load.

5. Can you please provide current (2014, if possible) incident information for Fire Station 17, including basic life support calls, advanced life support calls, and fire services?

In 2014, Station No. 17 responded to 5,513 calls.

Jurisdiction	Fires	EMS	Other	Total
Cypress	45	1,981	623	2,649

6. Will the OCFA be able to adequately serve the existing community and the proposed project? If not, can you recommend any measures for mitigating project impacts that might be incorporated into the project?

Mitigation or Condition: Prior to approval of any building permit for the project, the designated site developer shall enter into a Secured Fire Protection Agreement with the Orange County Fire Authority.

This Agreement shall specify the developer's pro-rata fair share funding of capital improvements necessary to establish adequate fire protection facilities and equipment, and/or personnel. Said agreement shall be reached as early as possible in the planning process, preferably for each phase or land use sector of the project, rather than on a parcel by parcel basis.

This agreement is typically entered into with developers on a project specific basis to contribute a pro rata share towards funding capital improvements necessary to establish adequate fire protection facilities and equipment. The Secured Fire Protection Agreement is not related to the provision of an "*adequate tax base directed to the Structural Fire Fund to offset short and long range costs*", but rather to mitigating the impact of a project on OCFA as it impacts capital and infrastructure needs.

7. Please provide any additional comments or questions you would like to see addressed in the environmental analysis for this project.

Mitigation

In order to insure a fire safe project, the following items should be considered.

- Structures should have automatic fire sprinkler systems.
- A supervised fire alarm system per the requirements of the California Fire Code in an accessible location with annunciator.
- Access to and around structures to meet OCFA and California Fire Code requirements
- A water supply system to supply fire hydrants and automatic fire sprinkler systems. Fire hydrant spacing is 300 feet between fire hydrants.
- Turning radius and access in and around the project site and buildings shall be designed to accommodate large fire department vehicles and their weight.
- Please ensure all roadways that have medians do not exceed 1000' without a turnaround. If medians are planned greater than 1000', please provide emergency turnaround access for heavy fire equipment.
- All traffic signals on public access ways should include the installation of optical preemption devices.
- All electrically operated gates within the Project shall install emergency opening devices as approved by the Orange County Fire Authority.

In addition, we would like to point out that all standard conditions with regard to development, including water supply, built in fire protection systems, road grades

and width, access, building materials, and the like will be applied to this project at the time of plan submittal.

Prepared by: Michele Hernandez

Title: Management Analyst

Date: 5/18/2015

Phone: 714-573-6199

Maryanne Cronin

From: Covarrubias, Daisy <DCOVARRUBIAS@OCSD.COM>
Sent: Thursday, April 16, 2015 10:16 AM
To: Maryanne Cronin
Cc: Ryan Bensley
Subject: RE: OCSD questionnaire for Barton Place Project

Categories: Cypress

Our address is

Orange County Sanitation District
10844 Ellis Avenue
Fountain Valley, CA 92708

Please address it to my attention.

Thanks.

-----Original Message-----
From: Maryanne Cronin [mailto:Maryanne.Cronin@lsa-assoc.com]
Sent: Thursday, April 16, 2015 9:14 AM
To: Covarrubias, Daisy
Cc: Ryan Bensley
Subject: RE: OCSD questionnaire for Barton Place Project

Good Morning,

Thank you for your reply. The Draft EIR should be available for public review in late June. Can you please provide me your mailing address for inclusion in our distribution list?

Thank you,
Maryanne

-----Original Message-----
From: Covarrubias, Daisy [mailto:DCOVARRUBIAS@OCSD.COM]
Sent: Thursday, April 16, 2015 7:15 AM
To: Maryanne Cronin
Subject: RE: OCSD questionnaire for Barton Place Project

Hi Maryanne,

Based on initial assessment, OCSD should be able to handle the flow. We will verify numbers once our project to rehabilitee the Western Regional Sewers is underway.

When do you expect to have the Draft EIR completed and released for public comment?

Thanks,
Daisy

-----Original Message-----
From: Maryanne Cronin [mailto:Maryanne.Cronin@lsa-assoc.com]
Sent: Wednesday, April 15, 2015 2:53 PM
To: Covarrubias, Daisy
Cc: Ryan Bensley
Subject: RE: OCSD questionnaire for Barton Place Project

Good Afternoon Ms. Covarrubias,

We have used the flow factors provided in your email below for the proposed Barton Place project. The calculated flows are slightly higher than your estimate in the email below. We wanted to follow up with you to assess whether OCSD would be able to serve the proposed project.

Medium Density Residential (8-16 du/ac) (3451gpd/acre)
28 acres = 96,628gpd

Commercial/Office(2262gpd/acre)
5 acres = 11,310

Total Project = 107,938 gpd

Thank you for your time.

Maryanne Cronin
Assistant Environmental Planner
LSA Associates, Inc.
20 Executive Park, Suite 200
Irvine, CA 92614
p. 949-553-0666

-----Original Message-----
From: Covarrubias, Daisy [mailto:DCOVARRUBIAS@OCSD.COM]
Sent: Mon 3/30/2015 3:54 PM
To: Mario Scalzo
Subject: RE: OCSD questionnaire for Barton Place Project

I forgot to include the referenced map. Sorry.

From: Covarrubias, Daisy
Sent: Monday, March 30, 2015 3:49 PM
To: 'mario.scalzo@lsa-assoc.com'
Subject: OCSD questionnaire for Barton Place Project

Hello Mr. Scalzo, below please find answers to your questions for the Barton Place Project.

1. Please use the following flow factors to determine the estimated wastewater quantity for the proposed project:
1488 gpd/acre for low density residential (4-7d.u. /acre)
3451 gpd/acre for medium density residential (8-16 d.u./acre)

5474 gpd/acre for medium-high density residential (17-25 d.u./acre)
7516 gpd/acre for high density residential (26-35 d.u./acre)
2262 gpd/acre for commercial/office
3167 gpd/acre for industrial
2715 gpd/acre for institutional

2. OCSD is currently in the planning phase of a construction project that intents to rehabilitate and replace sewer lines in the City of Cypress. The project is the Rehabilitation of the Western Regional Sewers, please see attached map for exact project location. As can be noted, a portion of the sewer project is to take place in close proximity to your proposed project. Our project is scheduled to start construction in 2018, however, since the project is still in the early phases of planning, we are unsure which area would be done first (project will be phased).

3. Our sewer project was developed using General Land Use Plans from the surrounding cities, the plans reviewed are as late as 2006, if the City amended its plan since then, those additions/corrections have not been incorporated into this project. During design of our sewer project this information will be verified to include the latest numbers and figures available, however, any changes that are known today should be communicated to OCSD to make sure that the projected flow for the Barton Place project can be properly handled without further improvements. With this being said, please confirm date of amendment to specific plan as well as project's proposed flow to provide a more definitive answer.

4. This information would need to be provided by proposed project developer or consultant, not OCSD.

5. As mentioned in answer #3, OCSD's initial flow calculations for our Rehabilitation of Western Regional Sewers project was based on general land use plans from 2006, if the City has updated that information since then, we have not made those modifications. Based on quick calculations it appears the projected wastewater flow would approximately be 97,000 gpd (please confirm using the flow factors listed above). If the numbers have not changed or have been reduced since the last time we checked, it is anticipated that OCSD would be able to serve the project. Once the calculations and analyzes have been done for the Draft EIR, OCSD will be able to provide a more conclusive answer.

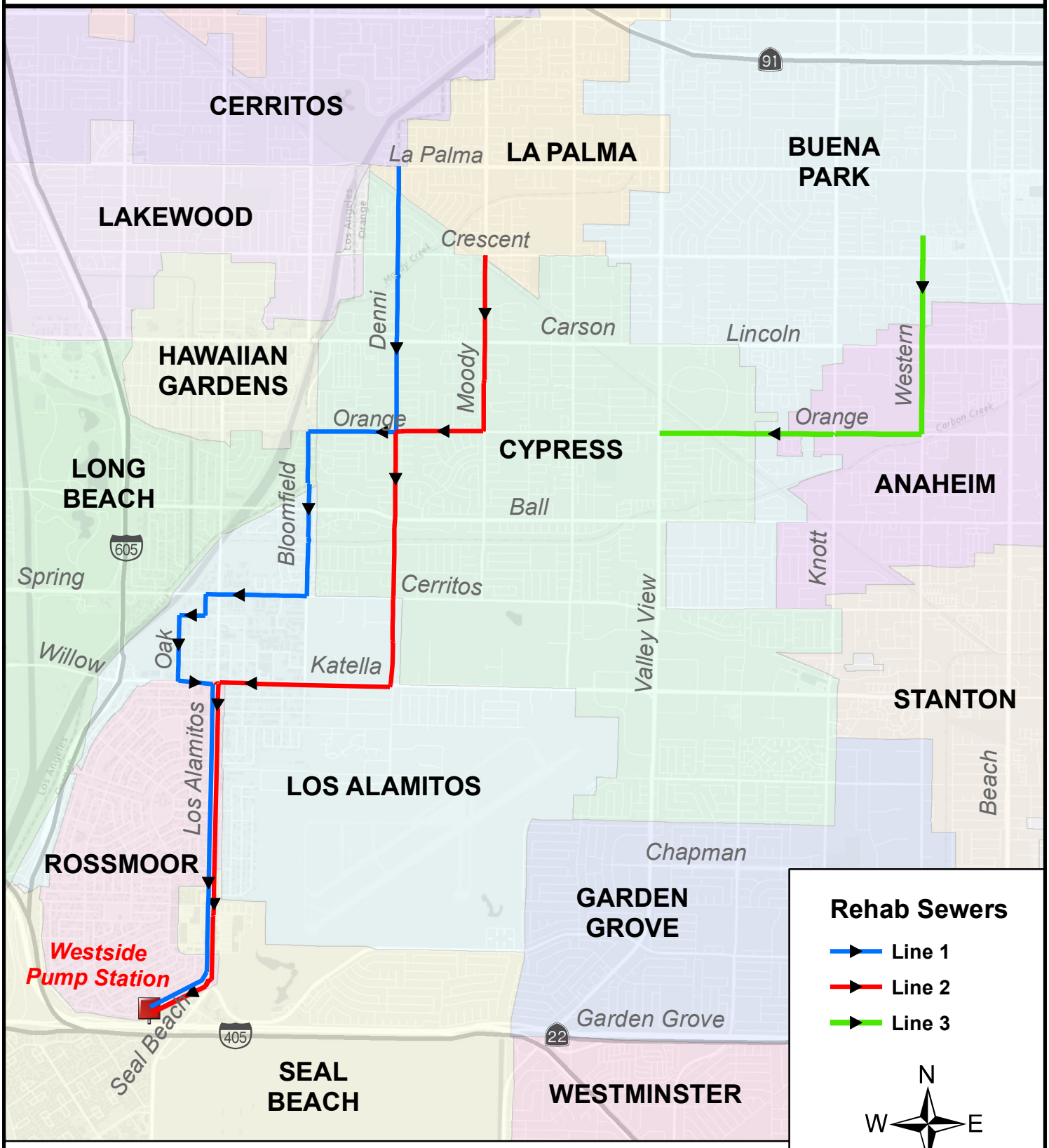
Please let me know if there is anything else we can help you with.

Regards,

[cid:image002.jpg@01D06B01.C7532A40]<http://www.ocsewers.com/>Daisy
Covarrubias, MPA Orange County Sanitation District Planning | Senior Staff Analyst
Office: 714.593.7119 | Cell: 714.478.5763 www.ocsewers.com<http://www.ocsewers.com/>

Orange County Sanitation District Project No. 3-64

Rehabilitation of Western Regional Sewers



ORANGE COUNTY SANITATION DISTRICT (OCSD)
Geographical Information Systems, Information Technology

Disclaimer: This map is intended for graphical representation only. No level of accuracy is claimed for the base mapping shown hereon and graphics should not be used to obtain coordinate values, bearings or distances.

Golden State
Water Company
A Subsidiary of American States Water Company

July 2, 2015

Mr. Bryce Bunker
Province Group/Newport Equities LLC
26 Corporate Plaza, Suite 260
Newport Beach, Ca. 92660

Re: Will Serve Letter
4921 Katella Avenue
Cypress, California

Dear Mr. Bunker:

This letter is to inform you that water service is available to the above referenced address from Golden State Water Company's (GSWC) Orange County District water system located in Cypress. Service to the address may be provided from our existing water facilities within Enterprise Drive and Katella Avenue. Please note this proposed development may be subject to SB 610 or SB 221 requirements.

Upon completion and execution of an agreement between GSWC and owner, that contains satisfactory financial arrangements and other provisions governing the extension of water service under the Water Service Agreement, GSWC will begin providing water service for the referenced address once all owner obligations have been satisfied. Analysis of more detailed development plans may require the owner to participate in the construction of special facilities prior to the Company providing water service.

GSWC is committed to providing water service to all customers within its service area consistent with the company's obligations under rules, statutes and regulations of both the California Department of Public Health and the California Public Utilities Commission.

Unless modified or extended by GSWC, this Will Serve Letter shall terminate and be of no further force and effect one year from the date indicated above.

If you have any questions concerning the issues addressed in this letter, please call me at 714-535-8010 Extension 320.

Sincerely,

Stan Yarbrough

Stan Yarbrough, PE
Operations Engineer
Orange County District

1920 West Corporate Way, Anaheim, CA 92801
Tel: (714) 535-7711 Fax: (714) 535-8616

APPENDIX K

TRAFFIC IMPACT STUDY REPORT

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TRAFFIC IMPACT STUDY
FOR THE
BARTON PLACE
MIXED-USE PROJECT

IN THE CITY OF CYPRESS

Prepared for:

The City of Cypress

Prepared by:

Kimley-Horn and Associates, Inc.
765 The City Drive, Suite 200
Orange, California 92868

April 2015

TRAFFIC IMPACT STUDY
FOR BARTON PLACE

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TRAFFIC IMPACT STUDY
FOR BARTON PLACE
AT KATELLA AVENUE AND ENTERPRISE DRIVE
IN THE CITY OF CYPRESS

INTRODUCTION

This traffic impact study has been prepared to evaluate the traffic impacts associated with the proposed Barton Place mixed-use development project, consisting of senior housing, commercial/ retail and restaurant uses. The project site is located on the northeast corner of Katella Avenue and Enterprise Drive in the City of Cypress. The project site location is shown in its regional setting on **Figure 1.**

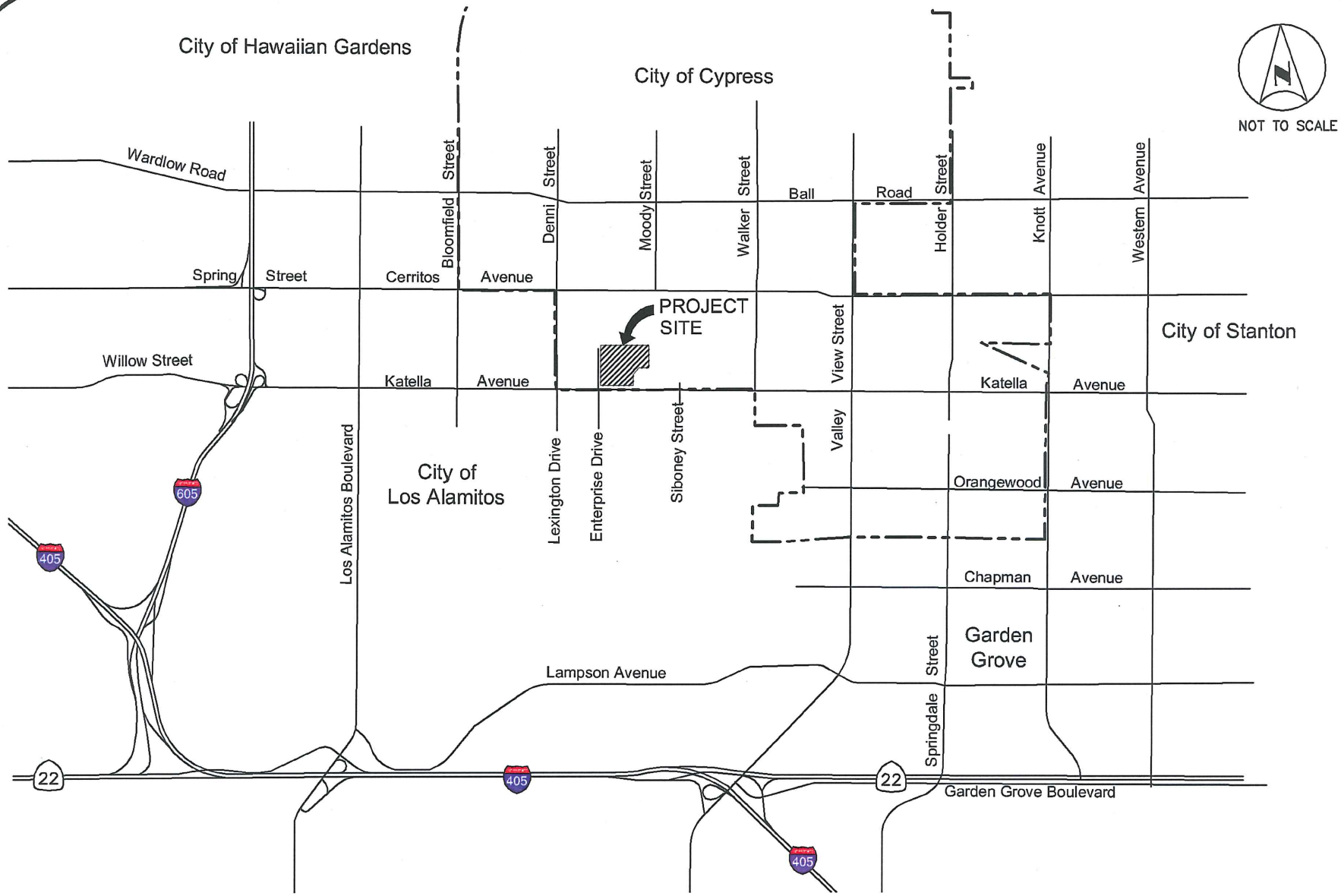
The project consists of 244 senior residential units, 36,500 square feet of commercial/retail use, and 11,376 square feet of restaurant use. This report satisfies the traffic impact study requirements established by the City of Cypress, the City of Los Alamitos, and the County of Orange Congestion Management Program (CMP).

PROJECT DESCRIPTION

The project is located within the boundaries of the area governed by the Amended and Restated Cypress Business and Professional Center Specific Plan (Specific Plan). The project site plan is shown on **Figure 2**. The project is a mixed-use development consisting of senior residential housing, commercial/retail and restaurant uses on the north side of Katella Avenue, directly east of the Cottonwood Church complex. The project site is immediately north of the City of Los Alamitos boundary at Katella Avenue. The project includes the following four land uses:

- 152 dwelling units of detached senior housing
- 92 dwelling units of attached senior housing
- 36,500 square feet of commercial/retail
- 11,376 square feet of restaurant.

Access to the commercial/retail and restaurant area will be provided via two driveways on Katella Avenue and one on Enterprise Drive. Access to the senior housing community will be provided via one gated entry on Enterprise Drive. There is an additional emergency access driveway on Enterprise Drive for the senior residential community. On-site circulation for the senior residential community will include the construction of a new private loop road, which is 24 feet in width, with a series of short motor courts that provide direct access to the dwelling units.

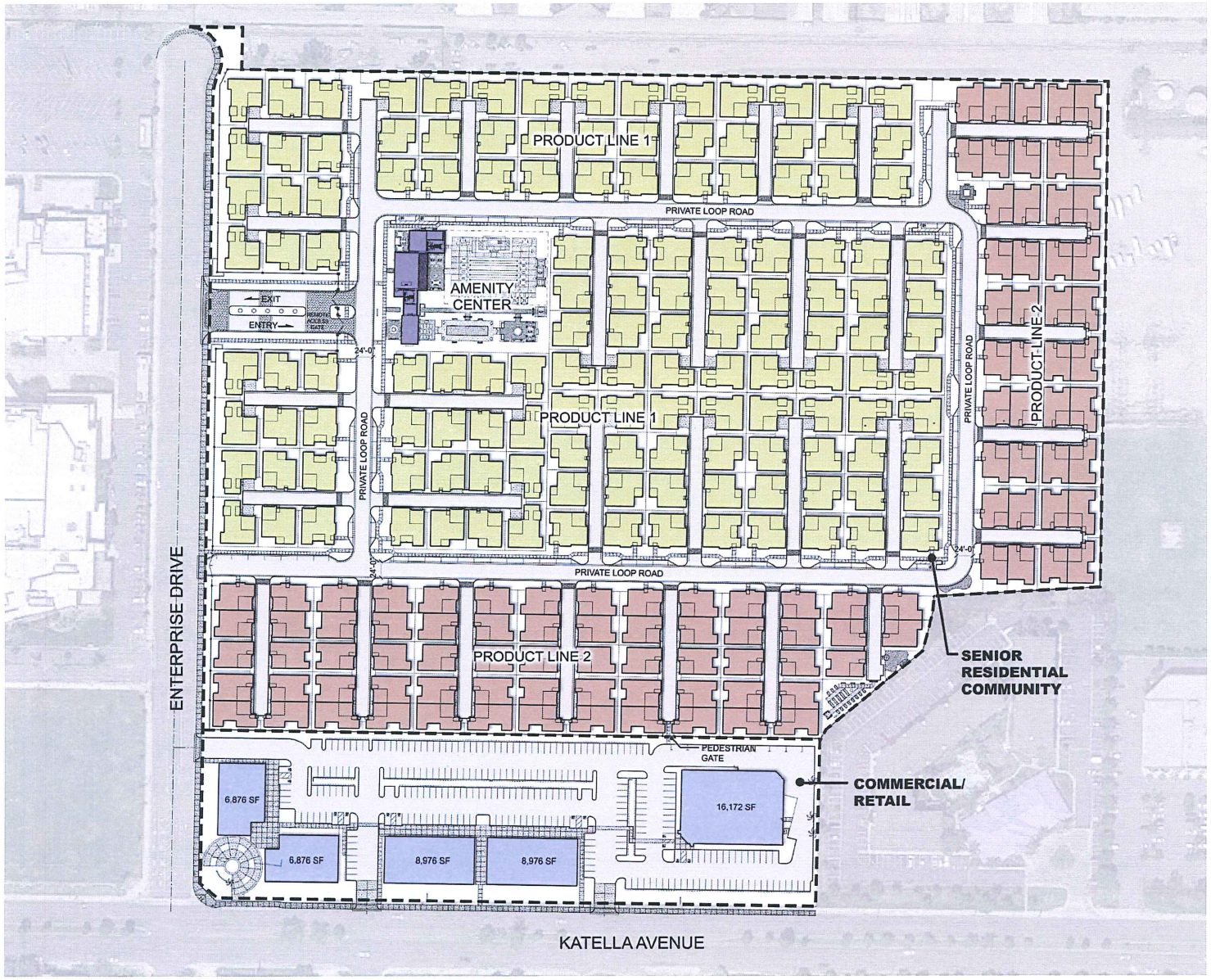


LEGEND:

City Boundary

FIGURE 1
VICINITY MAP

Kimley»Horn



NOT TO SCALE

FIGURE 2
PROJECT SITE PLAN

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Appendix A to this report shows the planning areas established in the Specific Plan. The project site occupies portions of Planning Areas 6 and 9 within the Specific Plan area.

Proposed Traffic Improvements and Project Access

As shown on the project site plan, the project includes the following improvements to the public street system to provide access to the project site:

- The project will take primary access from Enterprise Drive, north of Katella Avenue. The intersection of Enterprise Drive and Katella Avenue is currently unsignalized and is signed and striped to restrict movements to right-in/right-out turns only. This intersection would be maintained as an unsignalized intersection with right-in/right-out only movements.

- A new private street extending in an east-west direction from Enterprise Drive would connect with a new private loop road providing access to the senior residential community. The entrance to the community would be gated. A second private drive off Enterprise Drive would provide access only for emergency vehicles.

- Two unsignalized right-in/right-out/left-out only driveways on Katella Avenue, and one unsignalized full-movement driveway on Enterprise Drive, would be provided for the commercial/retail area.

ANALYSIS SCENARIOS AND METHODOLOGY

Analysis Scenarios

This traffic analysis will provide an evaluation of weekday morning and evening peak hour operations for the following scenarios:

- Existing Conditions
- Existing Plus Project Conditions
- Opening Year 2018 (Cumulative Conditions) without Project
- Opening Year 2018 (Cumulative Conditions) with Project

Analysis Methodology

Signalized Intersections – Intersection Capacity Utilization (ICU) Methodology

The analysis will focus on the project's off-site traffic-related impacts and will address the project's peak hour impacts at nineteen existing study intersections, seventeen of which are signalized and two of which are unsignalized.

In accordance with the City of Cypress and the County of Orange Congestion Management Plan (CMP), signalized intersection operation is evaluated using the Intersection Capacity Utilization (ICU) methodology, which provides a comparison of the theoretical hourly vehicular capacity of an intersection to the number of vehicles actually passing through that intersection during a given hour. The ICU calculations assume a per-lane capacity of 1,700 vehicles per hour (vph) with a clearance interval of 0.05.

The results of the evaluation are reported in terms of Level of Service, which is represented by letter grades "A" (uncongested, free-flow conditions) through "F" (congested, over-capacity conditions). A summary description of each Level of Service and the corresponding volume/capacity (v/c) ratio for signalized intersections is provided on the following page.

Unsignalized Intersections – Highway Capacity Manual (HCM) Methodology

Unsignalized intersections are evaluated using the Highway Capacity Manual (HCM) methodology. The HCM methodology analysis determines the average total delay for each vehicle making any movement from the stop-controlled minor street, as well as left turns from the major street. Delay values are calculated based on the relationship between traffic on the major street and the availability of acceptable gaps in the traffic stream through which conflicting traffic movements can be made. A summary description of each Level of Service for unsignalized intersections, and the corresponding delay, expressed in seconds per vehicle, is provided on the following page.

LEVEL OF SERVICE DESCRIPTIONS SIGNALIZED INTERSECTIONS		
Level of Service	**ICU Value**	**Description**
A	0.00 - 0.60	EXCELLENT – No vehicle waits longer than one red light and no approach phase is fully used.
B	0.61 - 0.70	VERY GOOD – An occasional approach phase is fully utilized; drivers may begin to feel somewhat restricted within groups of vehicles.
C	0.71 - 0.80	GOOD – Occasionally drivers may have to wait through more than one red light; back-ups may develop behind turning vehicles
D	0.81 - 0.90	FAIR – Delays may be substantial during portions of the rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive back-ups.
E	0.91 - 1.00	POOR – Represents the most vehicles that the intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	> 1.00	FAILURE – Back-ups from nearby locations or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches. Delays occur, with increasing queue lengths.

HIGHWAY CAPACITY MANUAL LEVEL OF SERVICE DESCRIPTIONS UNSIGNALIZED INTERSECTIONS			
Delay (seconds/vehicle)	**Level of Service**		**Description**
	V/C ≤ 1.0	**V/C > 1.0**	
≤ 10.0	A	F	Little or no delay
> 10.0 – 15.0	B	F	Short traffic delays
> 15.0 – 25.0	C	F	Average traffic delays
> 25.0 – 35.0	D	F	Long traffic delays
> 35.0 – 50.0	E	F	Very long traffic delays
> 50.0	F	F	Severe congestion

Performance Criteria

The City of Cypress Level of Service standard for intersection operation is Level of Service D, except at intersections along Valley View Street, Lincoln Avenue, and Katella Avenue. These arterials carry a significant amount of regional through traffic, and as such, the City has adopted Level of Service E as the standard for intersections along these three arterials.

The City of Los Alamitos standard for intersection operation is Level of Service D, except at intersections along Katella Avenue, where the Level of Service standard is LOS E, consistent with the CMP.

The following chart shows the study intersections, the jurisdiction in which the intersection is located, traffic control, and the Level of Service standard for each intersection.

Int. #	Intersection	Jurisdiction	Traffic Control	LOS Standard
1	Cerritos Avenue at Los Alamitos Boulevard	Los Alamitos	S	D
2	Cerritos Avenue at Bloomfield Street	Los Alamitos	S	D
3	Cerritos Avenue at Lexington Drive / Denni	Cypress/Los Alamitos	S	D
4	Cerritos Avenue at Moody Street	Cypress	S	D
5	Cerritos Avenue at Walker Street	Cypress	S	D
6	Cerritos Avenue at Valley View Street	Cypress	S	E
7	Katella Avenue at I-605 Northbound ramp	Caltrans	S	C
8	Katella Avenue at Los Alamitos Boulevard	Los Alamitos	S	E
9	Katella Avenue at Bloomfield Street	Los Alamitos	S	E
10	Katella Avenue at Lexington Drive	Cypress/Los Alamitos	S	E
11	Katella Avenue at Cottonwood Way	Cypress/Los Alamitos	S	E
12	Katella Avenue at Enterprise Drive	Cypress/Los Alamitos	U	E
13	Katella Avenue at Siboney Street	Cypress/Los Alamitos	S	E
14	Katella Avenue at Winners Circle	Cypress/Los Alamitos	S	E
15	Katella Avenue at Walker Street	Cypress/Los Alamitos	S	E
16	Katella Avenue at Valley View Street	Cypress	S	E
17	Farquhar Avenue at Los Alamitos Boulevard	Los Alamitos	S	D
18	Farquhar Avenue at Lexington Drive	Los Alamitos	U	D
19	Orangewood Avenue at Valley View Street	Cypress	S	E
S = Signalized U = Unsignalized				

Significance Thresholds

Based on City of Cypress and City of Los Alamitos standards, a project traffic impact would be considered to be significant if it:

- causes an intersection operating at an acceptable Level of Service to deteriorate to an unacceptable Level of Service; or
- is already operating at an unacceptable Level of Service and adds 0.01 or more to the peak hour ICU.

EXISTING CONDITIONS

Existing Roadway System

Regional access to the project site is provided by the I-605, I-405, SR-22 and SR-91 freeways. The I-605 Freeway is located approximately two miles west of the project site, while the I-405 and SR-22 Freeways are located approximately 3.5 miles to the south. The SR-91 Freeway is located approximately five miles north of the project site, and provides access to the Inland Empire.

Local access to the project vicinity is provided by several arterial and commuter roadways.

Cerritos Avenue is classified as an east-west Primary Roadway in both cities' Circulation Elements. Cerritos Avenue provides access from the City of Long Beach in the west, where is it named Spring Street, and to the City of Anaheim in the east, where it terminates at Walnut Street, near Disneyland. Cerritos Avenue has a partial interchange with the I-605 freeway approximately 1.5 miles west of the project site. This roadway provides two travel lanes in each direction, separated by a painted median. On-street parking is prohibited and the speed limit varies between 40 and 45 miles per hour (mph).

Katella Avenue is a six-lane roadway through the Cities of Cypress and Los Alamitos, with a center median and turn lanes at major intersections. Katella Avenue is designated as a Smart Street through the Cities of Cypress and Los Alamitos, and is designated on the Orange County Congestion Management Program (CMP) as a CMP facility. The posted speed limit varies between 35 and 45 mph through the study area.

Los Alamitos Boulevard varies from a four- to six-lane divided roadway, traversing the City of Los Alamitos in a north-south direction. The posted speed limit on Los Alamitos Boulevard is 35 mph north of Katella Avenue and 40 mph south of Katella Avenue. On-street parking is permitted along some segments of the roadway. The street name changes to Norwalk Boulevard to the north of the City, and to Seal Beach Boulevard to the south.

Bloomfield Street is a four-lane roadway with a center two-way turn lane divider along some segments of the roadway. The posted speed limit on Bloomfield Street is 40 mph north of Cerritos Avenue and 35 mph south of Cerritos Avenue. On-street parking is generally permitted along Bloomfield Street.

Denni Street/Lexington Drive is a north-south roadway. Denni Street/Lexington Drive begins at Lincoln Avenue in Cypress, and ends at the Joint Forces Training Base in Los Alamitos. The name changes from Denni Street to Lexington Drive at Cerritos Avenue. For most of its length, Denni Street is a four-lane undivided roadway with a posted speed limit varying between 35 and 40 mph. Lexington Drive is generally a two-lane undivided roadway. On-street parking is mostly prohibited. Along some segment, Class II bike lanes are provided, while other segments are designated Class III bike routes.

Moody Street is a north-south Primary Roadway stretching from Cerritos Avenue on the south, northward through the Cities of La Palma, Cerritos, and others. Moody Street changes name to Carmenita Road north of the SR-91 Freeway. Moody Street is a four-lane roadway with Class II bike lanes on both sides, divided by a painted median. On-street parking is prohibited on both sides and the posted speed limit is 40 mph.

Walker Street is a north-south Secondary Roadway which begins at Katella Avenue and ends at the I-5 freeway. Walker Street is a four-lane roadway divided by a painted median. For a short segment south of Cerritos Avenue, Walker Street has three northbound lanes. Class II bike lanes are generally provided on Walker Street throughout the project vicinity. The posted speed limit is 45 mph.

Valley View Street is a north-south Major Roadway providing regional access between several cities in Orange and Los Angeles Counties. Valley View Street is a six-lane roadway, divided by a raised landscaped median, with Class II bike lanes on both sides. On-street parking is prohibited for its entire length and the posted speed limit is 45 mph.

Existing Peak Hour Traffic Volumes

Existing peak hour turning movement counts were collected on a typical (non-holiday) Thursday in November of 2014 at nineteen existing study intersections. Existing lane configurations and traffic control at each of the study intersections are shown on **Figure 3**. Existing morning and evening peak hour traffic turning movement volumes for the study intersections are shown on **Figure 4**. Copies of the traffic count data forms are provided in ***Appendix B*** to this report.

Existing Peak Hour Traffic Conditions

Existing peak hour operations were evaluated using the Intersection Capacity Utilization (ICU) methodology for signalized study intersections, and the Highway Capacity Manual (HCM) delay methodology for unsignalized intersections. The results of the analysis are summarized on **Table 1.** Review of this table shows that all signalized study intersections are currently operating at Level of Service D or better during both peak hours. The average vehicle delay results for the unsignalized intersections of Katella Avenue and Enterprise Drive (#12) and Farquhar Avenue at Lexington Drive (#18) indicate that both intersections are currently operating at LOS A during both weekday morning and evening peak hours on an overall intersection basis. Intersection analysis worksheets are provided in ***Appendix C*** to this report.

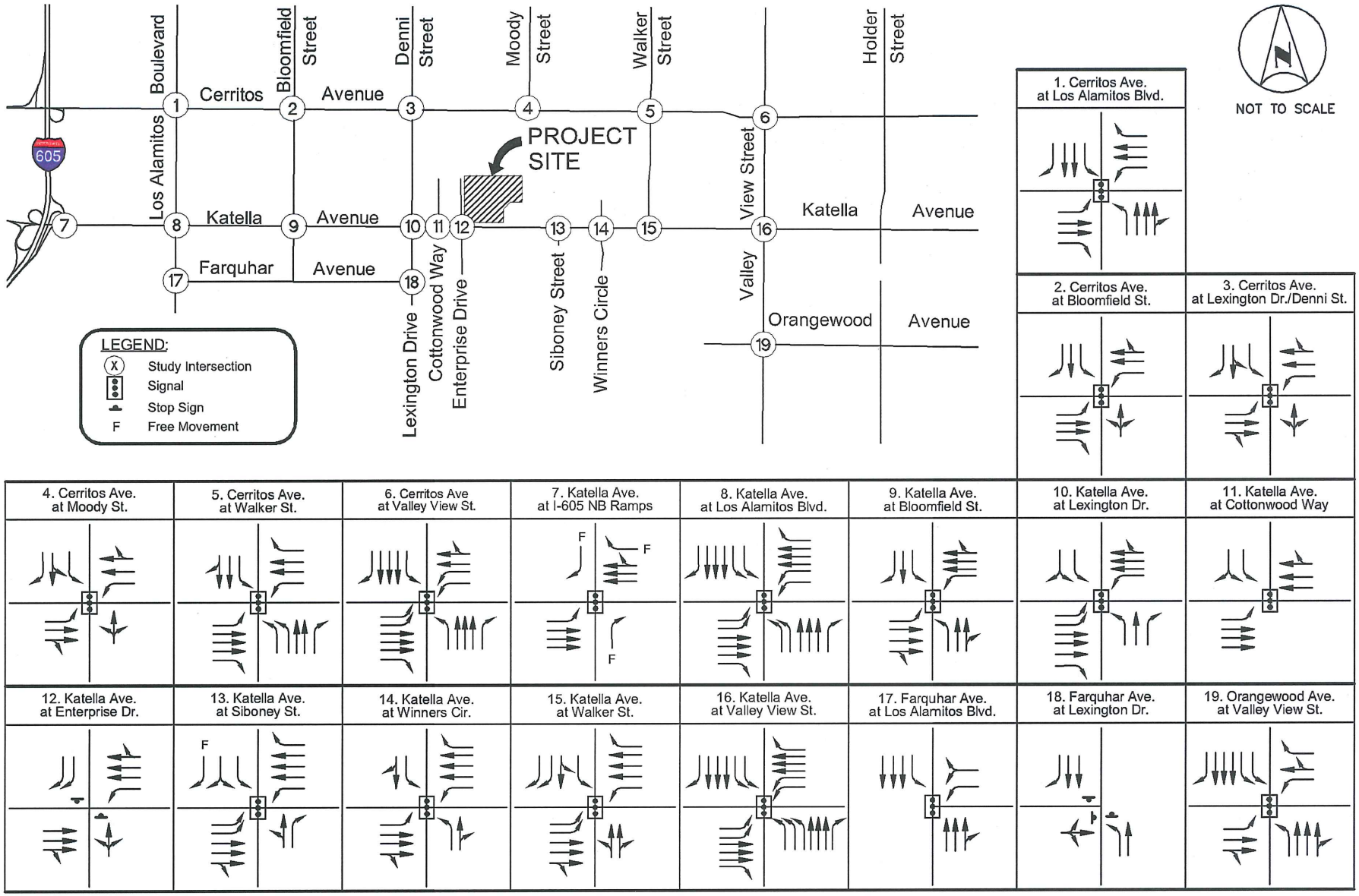

FIGURE 3
EXISTING LANE CONFIGURATION AND TRAFFIC CONTROL

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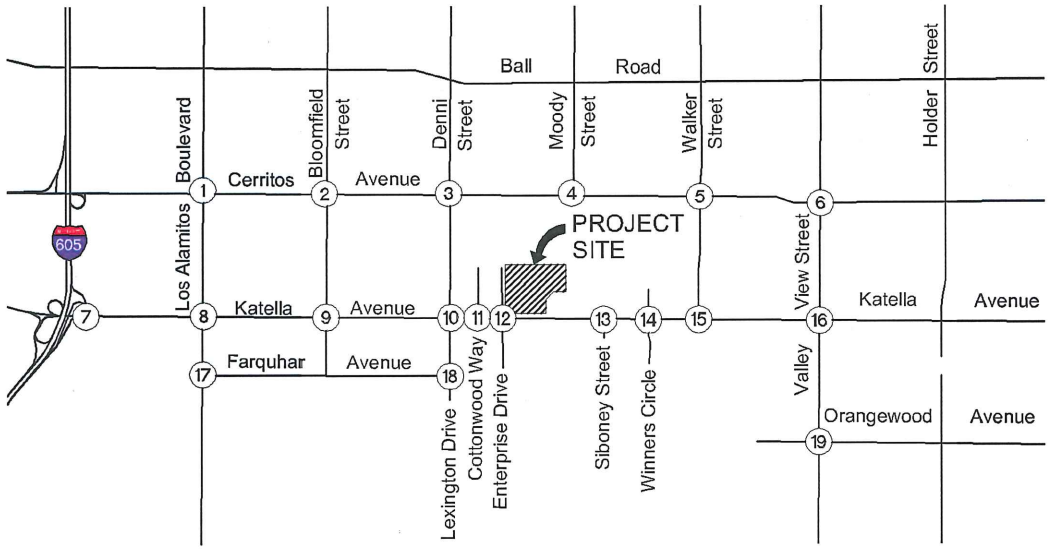

1. Cerritos Ave. at Los Alamitos Blvd.	2. Cerritos Ave. at Bloomfield St.	3. Cerritos Ave. at Lexington Dr./Denni St.	4. Cerritos Ave. at Moody St.
99/48, 729/617, 104/89	229/100, 538/283, 139/59	148/91, 161/53, 215/92	218/134, 1/1, 599/246
140/148, 791/999, 315/379	59/126, 899/1140, 177/99	142/145, 923/1076, 100/46	109/332, 897/1199, 0/3
125/143, 938/875, 174/234	53/147, 968/1048, 161/96	56/135, 999/1120, 100/35	65/214, 1128/1076, 2/0
170/254, 664/840, 319/348	211/133, 276/435, 174/135	60/80, 71/135, 37/73	0/3, 1/1

5. Cerritos Ave. at Walker St.	6. Cerritos Ave at Valley View St.	7. Katella Ave. at I-605 NB Ramps	8. Katella Ave. at Los Alamitos Blvd.	9. Katella Ave. at Bloomfield St.	10. Katella Ave. at Lexington Dr.	11. Katella Ave. at Cottonwood Way
57/48, 695/413, 177/113	287/186, 1350/1132, 124/125	73/74	151/208, 965/1066, 167/177	333/169, 203/180, 180/225	103/120, 7/12, 121/130	3/1, 0/6
101/144, 901/898, 98/78	115/134, 657/534, 184/95	776/893, 1435/1628	77/94, 1198/1514, 329/310	248/311, 1206/1704, 54/76	84/109, 1385/1697, 101/118	5/4, 1555/1939
24/68, 1180/992, 562/263	128/325, 675/772, 505/265	82/340, 1475/1910	199/307, 1692/1391, 256/442	276/242, 1828/1569, 38/65	65/86, 1657/1667, 116/72	4/11, 1859/1894, 4/1
97/505, 179/688, 52/206	183/318, 1086/1815, 39/184	805/758	395/464, 947/847, 377/344	80/54, 350/109, 15/29	93/76, 49/46, 92/108	0/3

12. Katella Ave. at Enterprise Dr.	13. Katella Ave. at Siboney St.	14. Katella Ave. at Winners Circle	15. Katella Ave. at Walker St.	16. Katella Ave. at Valley View St.	17. Farquhar Ave. at Los Alamitos Blvd.	18. Farquhar Ave. at Lexington Dr.	19. Orangewood Ave. at Valley View St.
1/2	20/71, 3/5, 31/75	5/47, 7/33	195/200, 9/1, 839/551	243/222, 1159/1385, 207/264	1378/1686, 125/116	75/80, 218/70	43/101, 1739/2242, 233/549
18/2, 1556/1951, 10/19	43/53, 1458/1902, 36/61	3/8, 1566/1898, 54/53	301/539, 1461/1739, 8/2	157/272, 980/1009, 170/353	119/168, 346/427		644/442, 30/16, 75/75
1857/1875, 4/13	130/100, 1728/1926, 25/39	18/144, 1771/1839, 25/15	166/265, 1560/1661, 2/2	250/271, 1011/1086, 792/1291		81/69, 83/28	143/104, 60/49, 13/25
3/2, 10/7	42/62, 5/2, 34/67	5/42, 1/4, 4/52	6/27, 2/16, 0/4	783/603, 1441/1401, 270/163	1725/1542, 182/169	3/106, 41/232	20/17, 1899/1477, 65/68

LEGEND:

(X) Study Intersection

XX/YY AM/PM Turning Movement Volume

FIGURE 4
EXISTING PEAK HOUR TRAFFIC VOLUMES

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TABLE 1
SUMMARY OF PEAK HOUR INTERSECTION OPERATION
EXISTING CONDITIONS

Int. #	Intersection	Traffic Control	AM Peak Hour		PM Peak Hour	
			ICU/Delay	LOS	ICU/Delay	LOS
1	Cerritos Ave at Los Alamitos Blvd	S	0.826	D	0.861	D
2	Cerritos Ave at Bloomfield St	S	0.836	D	0.711	C
3	Cerritos Ave at Lexington Dr/ Denni St	S	0.628	B	0.712	C
4	Cerritos Ave at Moody St	S	0.561	A	0.707	C
5	Cerritos Ave at Walker St	S	0.688	B	0.638	B
6	Cerritos Ave at Valley View St	S	0.774	C	0.771	C
7	Katella Ave at I-605 NB Ramp	S	0.380	A	0.569	A
8	Katella Ave at Los Alamitos Blvd	S	0.784	C	0.783	C
9	Katella Ave at Bloomfield St	S	0.740	C	0.760	C
10	Katella Ave at Lexington Dr	S	0.557	A	0.596	A
11	Katella Ave at Cottonwood Way	S	0.417	A	0.445	A
12	Katella Ave at Enterprise Dr	U	0.30	A	0.30	A
13	Katella Ave at Siboney St	S	0.453	A	0.540	A
14	Katella Ave at Winners Cir	S	0.437	A	0.559	A
15	Katella Ave at Walker St	S	0.638	B	0.647	B
16	Katella Ave at Valley View St	S	0.696	B	0.757	C
17	Farquhar Ave at Los Alamitos Blvd	S	0.634	B	0.629	B
18	Farquhar Ave at Lexington Dr	U	8.3	A	8.9	A
19	Orangewood Ave at Valley View St	S	0.786	C	0.710	C

S = Signalized intersection; U = Unsignalized intersection
ICU = Intersection Capacity Utilization; LOS = Level of Service
ICU value is expressed in volume-to-capacity (v/c) ratio.
Average delay is expressed in seconds of delay per peak hour vehicle.
LOS shown in **Bold** indicates unacceptable level of service.

PROJECT TRAFFIC

Project Trip Generation

Daily and peak hour trip generation estimates have been prepared for the project. Trip generation estimates are based on the Institute of Transportation Engineers (ITE) Trip Generation Manual (9th Edition) trip rates for:

- Senior Adult Housing – Detached (Land Use 251)
- Senior Adult Housing – Attached (Land Use 252)
- Shopping Center (Land Use 820)
- High-Turnover (Sit-Down) Restaurant (Land Use 932).

The trip generation estimates for the proposed project were developed by adding together the trips generated by the residential, commercial/retail, and restaurant uses. A characteristic of multi-use developments is the potential for interaction among the uses in terms of walk trips or vehicular trips between land uses. For example, a pedestrian connection between the residential and commercial/ retail components of the project will be provided. Residents may make trips to the restaurant and shops by walking there from their homes. As a result, the total inbound and outbound vehicular trips to and from the project site may be reduced. The resulting reduction in off-site vehicular trips is known as internal capture.

In addition, it is recognized that not all trips into and out of the project will be "new" trips on the roadway system serving the project site. Some trips to the commercial/retail and restaurant uses will consist of "pass-by" trips -- motorists who are already traveling on the surrounding roadways from one place to another. Common pass-by trips for a commercial center would be individuals who stop to eat, shop, or run errands on their way to or from work or school.

The trip generation estimates for the project include trip adjustments for internal trip capture between the site uses, and pass-by trips for the commercial/retail and restaurant uses, based on the ITE Trip Generation Manual Vol. 1: User's Guide and Handbook. The trip rates and the resulting project trip generation estimates are shown on **Table 2**. The project would generate approximately 3,256 vehicle trips on a daily basis, with 209 trips in the morning peak hour and 181 trips in the evening peak hour.

Project Trip Distribution and Assignment

Trip distribution assumptions for the project were developed based on the likely origins and destinations of residents, patrons, and employees. Residents of the senior residential portion of the project are assumed to distribute primarily to local businesses and commercial centers, with a small percentage of trips distributed to the freeways. Patrons of the commercial and restaurant uses are assumed to come primarily from nearby residential neighborhoods. Trip distribution assumptions during the morning and afternoon peak hours for the residential and retail portions of the project are shown on **Figure 5** and **Figure 6**, respectively.

Project traffic entering and exiting the project site using Enterprise Drive will be restricted to right-in/right-out only movements. The existing southbound restriction, which prohibits traffic on southbound Enterprise Drive from turning left or crossing Katella Avenue and entering the residential neighborhood to the south, will be maintained. In addition, the existing eastbound restriction at the Katella Avenue/Enterprise Drive intersection, which prohibits left turns from Katella Avenue onto Enterprise Drive to access the project site, will be maintained. These existing turn restrictions could be reinforced by installing a physical barrier on Enterprise Drive just north of Katella Avenue.

As a result, traffic approaching the project site from the west on Katella Avenue will pass Enterprise Drive and make a U-turn at Siboney Street. Likewise, traffic leaving the project site and destined to travel east on Katella Avenue will make a U-turn at Lexington Drive.

Based on these trip distribution assumptions, the project trips that would be added to the street system were calculated, and are shown on **Figure 7**.

EXISTING PLUS PROJECT CONDITIONS

This section addresses the traffic-related impacts associated with adding project-related trips to Existing Conditions traffic volumes. The Existing Plus Project scenario is a hypothetical scenario which assumes that the Project would be fully operational at the present time, with no other changes to area traffic volumes or to the street network serving the project site. This analysis assumes full development of the project and full absorption of project traffic on the circulation system at the present time.

Existing Plus Project Peak Hour Analysis

Project-related trips were added to existing traffic volumes to forecast Existing Plus Project Conditions. Morning and evening peak hour traffic volumes for this scenario are shown on **Figure 8**. A summary of the resulting intersection Level of Service is provided on **Table 3**. As review of this table shows, all signalized study intersections would continue to operate at LOS D or better under Existing Plus Project Conditions, and the two unsignalized intersections would continue to operate at LOS A on an overall intersection basis during both peak hours. Intersection analysis worksheets are provided in ***Appendix C*** to this report.

TABLE 2
SUMMARY OF PROJECT TRIP GENERATION

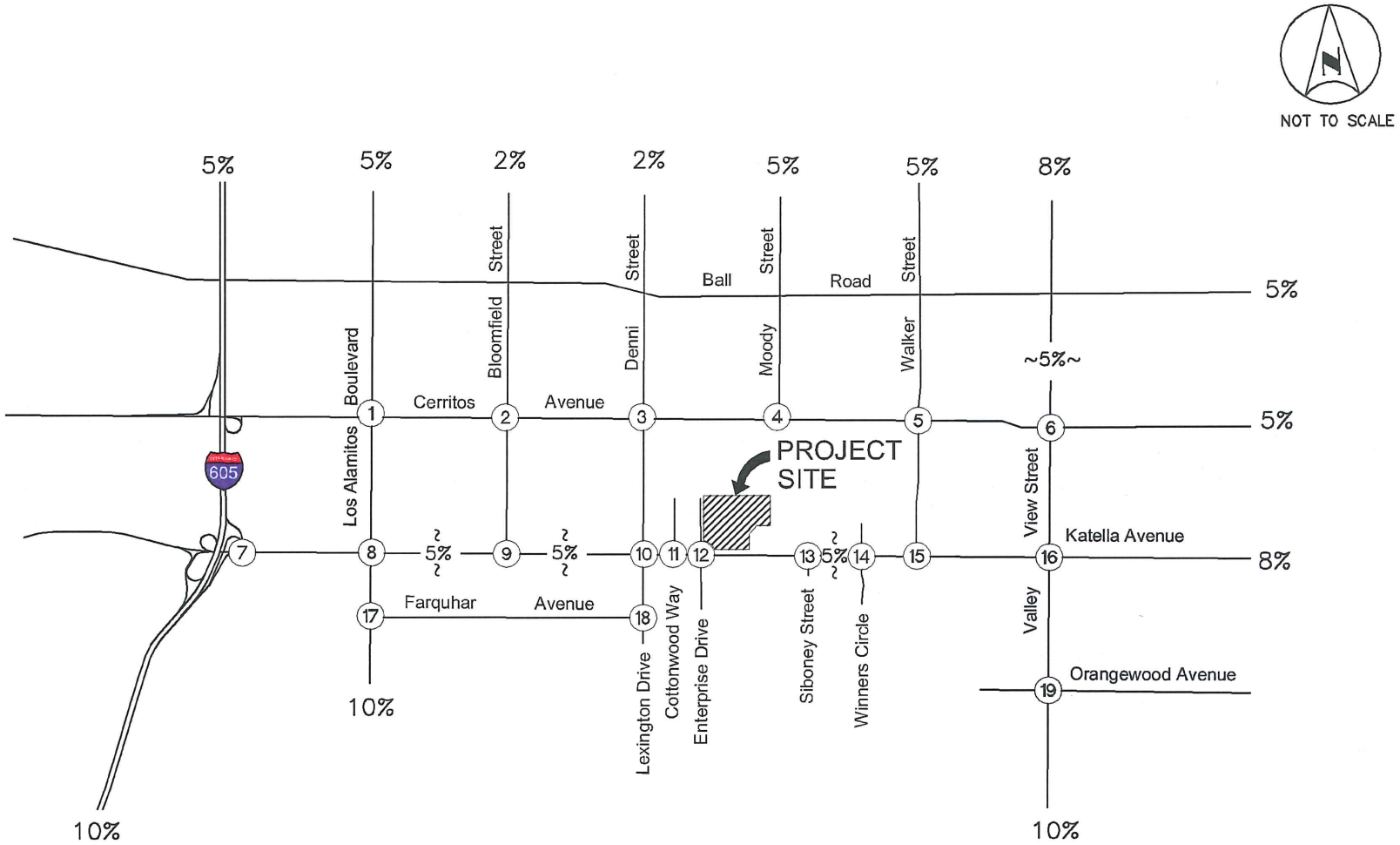
Land Use	ITE Code	Unit	Trip Generation Rates [1]						
			Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Senior Adult Housing-Detached	251	DU	3.680	0.077	0.143	0.220	0.165	0.105	0.270
Senior Adult Housing-Attached	252	DU	3.440	0.067	0.124	0.190	0.138	0.092	0.230
Shopping Center	820	KSF	42.700	0.595	0.365	0.960	1.781	1.929	3.710
High-Turnover (Sit-Down) Restaurant	932	KSF	127.150	5.946	4.865	10.810	5.910	3.940	9.850

Land Use	Quantity	Unit	Trip Generation Estimates						
			Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Senior Adult Housing-Detached	152	DU	559	12	22	34	25	16	41
Senior Adult Housing-Attached	92	DU	316	6	11	17	13	8	21
Sub-Total Residential Trips			***875***	***18***	***33***	***51***	***38***	***24***	***62***
- Internal Capture [2]			***-123***	***0***	***0***	***0***	***-6***	***-4***	***-10***
Total Residential Trips			***752***	***18***	***33***	***51***	***32***	***20***	***52***
Shopping Center	36.500	KSF	1,559	22	13	35	65	70	135
High-Turnover (Sit-Down) Restaurant	11.378	KSF	1,447	68	55	123	67	45	112
Sub-Total Retail / Restaurant Trips			***3,006***	***90***	***68***	***158***	***132***	***115***	***247***
- Internal Capture [2]			***-421***	***0***	***0***	***0***	***-20***	***-17***	***-37***
- Pass-by Trips [3]			***-81***	***0***	***0***	***0***	***-43***	***-38***	***-81***
Total Retail / Restaurant Trips			**2,504**	**90**	**68**	**158**	**69**	**60**	**129**
Total Project Trips			**3,256**	**108**	**101**	**209**	**101**	**80**	**181**

[1] Source: Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition

[2] Source: ITE Trip Generation Manual - Volume 1: User's Guide and Handbook. The Handbook does not provide internal capture rates for AM Peak Hour. Daily internal capture is 14%. PM Peak Hour internal capture is 15%.

[3] Source: ITE Trip Generation Manual - Volume 1: User's Guide and Handbook. The Handbook only provides pass-by rates for the PM Peak Hour. The Daily pass-by is the total of the PM Peak Hour inbound and outbound pass-by trips. The pass-by rate is 34% for retail and 43% for restaurants. The pass-by reduction is applied to the net retail and restaurant trips after the internal capture reduction is applied.



LEGEND:

(X) = Study Intersection

X% = Trip Distribution Percentage

~X%~ = Local Distribution

FIGURE 5
PROJECT TRIP DISTRIBUTION - RESIDENTIAL

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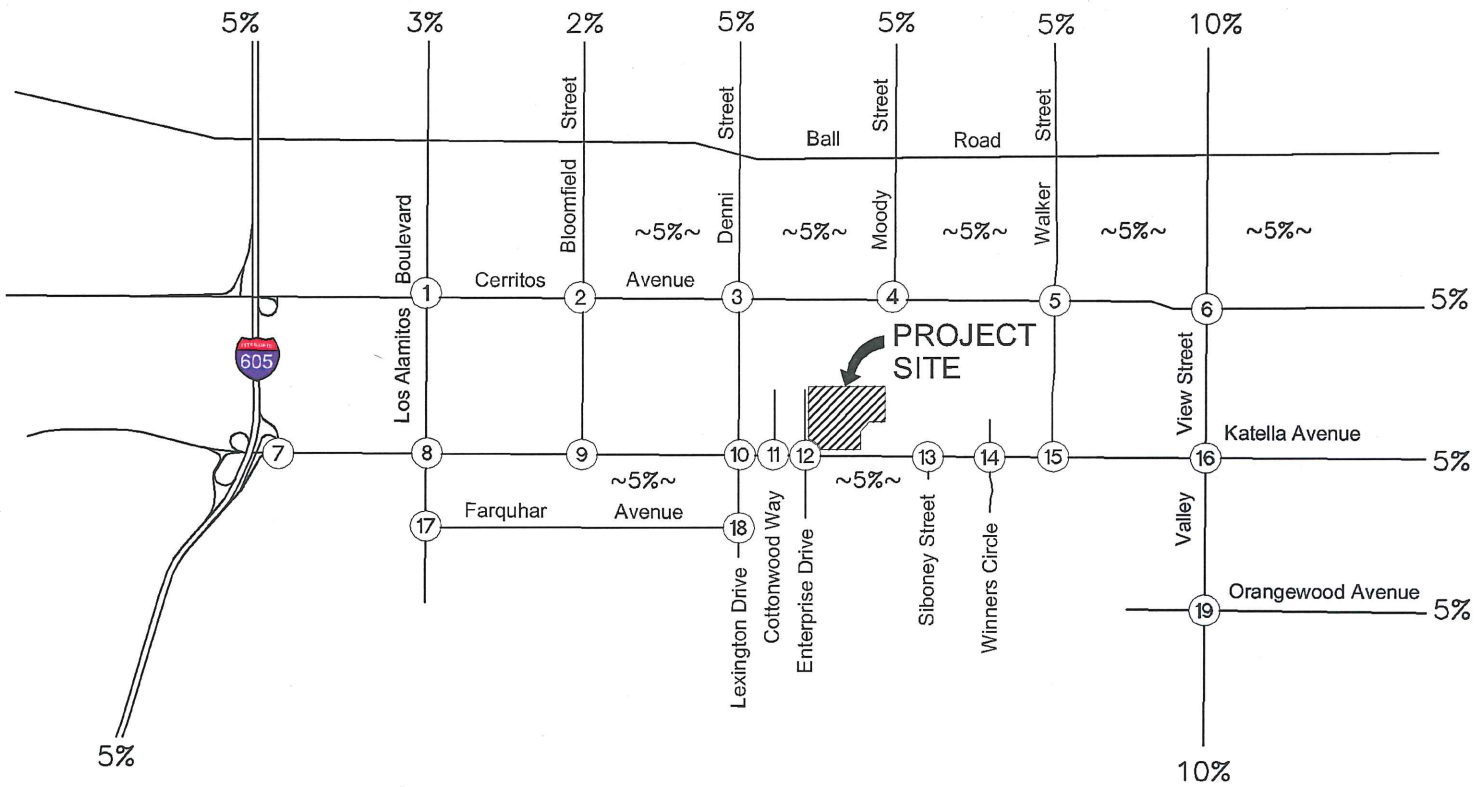


LEGEND:

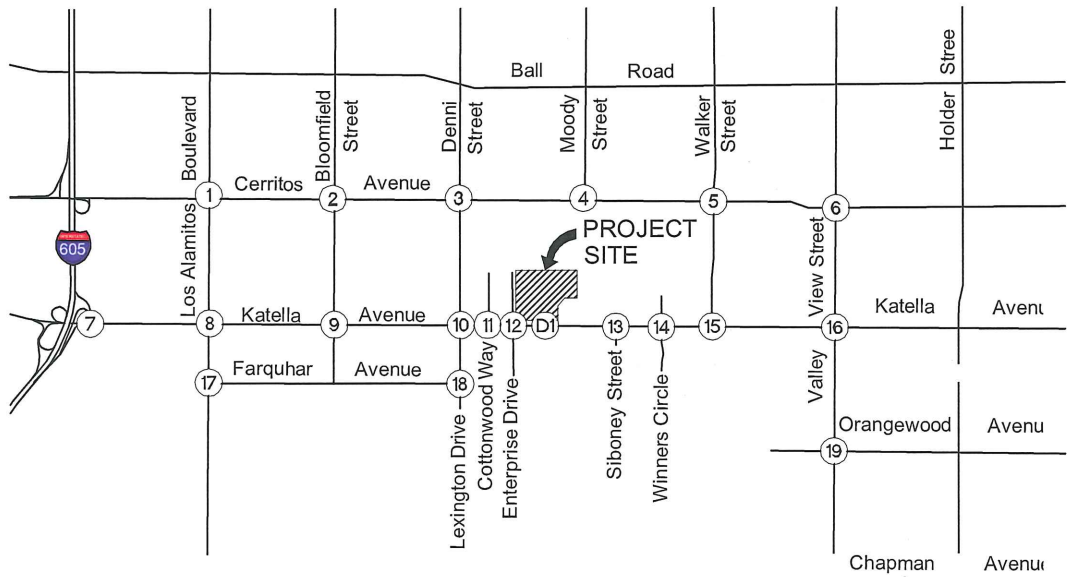
(X) = Study Intersection

X% = Trip Distribution Percentage

~X%~ = Local Distribution

FIGURE 6
PROJECT TRIP DISTRIBUTION - RETAIL/RESTAURANT

Kimley»Horn



D1. Katella Ave. at Retail Driveways	
38/58 ← 24/34 ← 81/105 ← 27/39	
50/44 →	

1. Cerritos Ave. at Los Alamitos Blvd.	
4/4 ←	
	4/3 →

2. Cerritos Ave. at Bloomfield St.	
7/5 ←	
	5/5 →

3. Cerritos Ave. at Lexington Dr./Denni St.	
9/8 ←	
	7/6 → 29/23 →

4. Cerritos Ave. at Moody St.	
10/9 ↙	
8/7 ↘ 20/16 →	

5. Cerritos Ave. at Walker St.	
11/10 ←	7/6 ←
8/7 ↗ 12/9 → 10/9 ↘	

6. Cerritos Ave. at Valley View St.	
1/1 ← 14/13 ←	5/5 ←
7/5 ↗ 5/4 →	9/8 →

7. Katella Ave. at I-605 NB Ramps	
	5/4 ← 7/5 ←
5/5 →	6/7 ↗

8. Katella Ave. at Los Alamitos Blvd.	
4/4 ↙	4/3 ← 12/9 ← 3/2 ↗
12/12 →	2/3 ↗

9. Katella Ave. at Bloomfield St.	
7/5 ↙	5/5 ← 20/15 ↗
18/20 →	

10. Katella Ave. at Lexington Dr.	
9/8 ↙	36/29 ← 31/23 ← 10/6 ↺
30/31 →	

11. Katella Ave. at Cottonwood Way	
	77/59 ←
50/44 →	

12. Katella Ave. at Enterprise Dr.	
40/26 ↙	27/39 ← 38/33 ↗
50/44 →	

13. Katella Ave. at Siboney St.	
	64/59 ←
39/38 ↺ 31/24 →	

14. Katella Ave. at Winners Circle	
	63/58 ←
29/23 →	

15. Katella Ave. at Walker St.	
27/25 ↙	36/33 ←
29/23 →	

16. Katella Ave. at Valley View St.	
14/13 ↙	6/6 ←
9/8 ↗ 6/5 → 14/11 ↘	15/14 ↗

17. Farquhar Ave. at Los Alamitos Blvd.	
3/2 ←	
	2/3 →

18. Farquhar Ave. at Lexington Dr.	

19. Orangewood Ave. at Valley View St.	
10/8 ← 3/3 ↙	5/3 ↗
	11/10 →

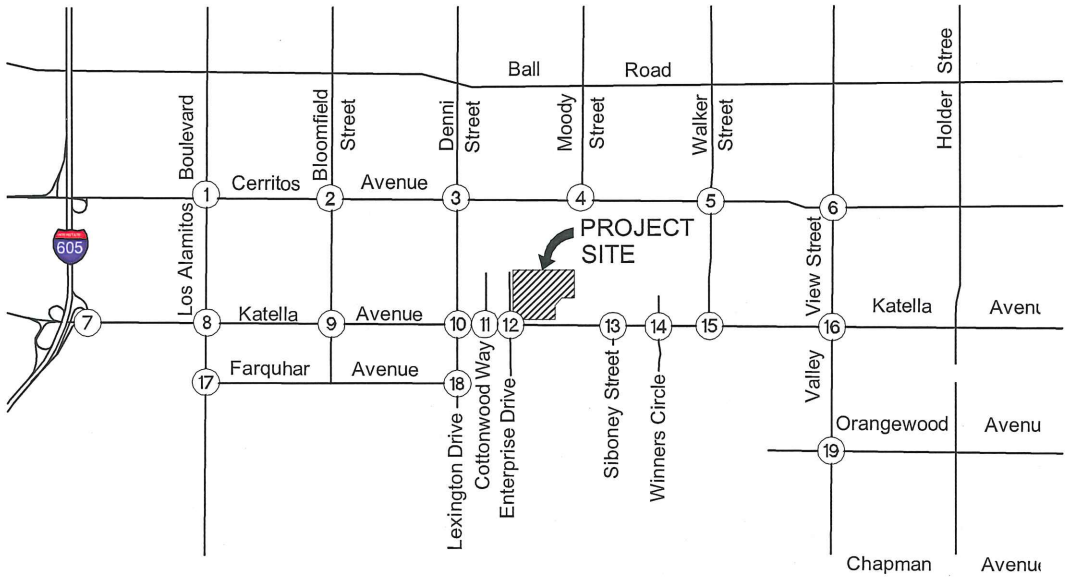
LEGEND:

(X) Study Intersection

XX/YY AM/PM Turning Movement Volume

FIGURE 7
PROJECT-RELATED PEAK HOUR TRAFFIC

Kimley»Horn



1. Cerritos Ave. at Los Alamitos Blvd.	2. Cerritos Ave. at Bloomfield St.
99/48, 733/621, 104/89, 140/148, 791/999, 315/379	229/100, 545/288, 139/59, 59/126, 899/1140, 177/99
125/143, 938/875, 174/234, 170/254, 688/843, 319/348	53/147, 968/1048, 161/96, 211/133, 281/440, 174/135

3. Cerritos Ave. at Lexington Dr./Denni St.	4. Cerritos Ave. at Moody St.
148/91, 170/61, 215/92, 142/145, 923/1076, 100/46	218/134, 1/1, 609/255, 109/332, 897/1199, 0/3
56/135, 999/1120, 100/35, 60/80, 78/141, 66/96	73/221, 1148/1092, 2/0, 0/3, 1/1

5. Cerritos Ave. at Walker St.	6. Cerritos Ave at Valley View St.	7. Katella Ave. at I-605 NB Ramps	8. Katella Ave. at Los Alamitos Blvd.	9. Katella Ave. at Bloomfield St.	10. Katella Ave. at Lexington Dr.	11. Katella Ave. at Cottonwood Way
57/48, 706/423, 177/113, 101/144, 901/898, 105/84	288/187, 1364/1145, 124/125, 115/134, 662/539, 184/95	73/74, 781/897, 1442/1633	151/208, 965/1066, 171/181, 81/97, 1210/1523, 332/312	333/169, 203/180, 187/230, 253/316, 1226/1719, 54/76	103/120, 7/12, 130/138, 120/138, 1416/1720, 111/124	3/1, 0/6, 5/4, 1632/1998
32/75, 1192/1001, 572/272, 97/505, 179/688, 52/206	135/330, 680/776, 505/265, 183/318, 1095/1823, 39/184	82/340, 1480/1915, 811/765	199/307, 1704/1403, 256/442, 395/464, 947/847, 379/347	276/242, 1846/1589, 38/65, 80/54, 350/109, 15/29	65/86, 1687/1698, 116/72, 93/76, 49/46, 92/108	4/11, 1909/1938, 4/1, 0/3

12. Katella Ave. at Enterprise Dr.	13. Katella Ave. at Siboney St.	14. Katella Ave. at Winners Circle	15. Katella Ave. at Walker St.	16. Katella Ave. at Valley View St.	17. Farquhar Ave. at Los Alamitos Blvd.	18. Farquhar Ave. at Lexington Dr.	19. Orangewood Ave. at Valley View St.
41/28, 45/41, 1594/1984, 10/19	20/71, 3/5, 31/75, 43/53, 1522/1961, 36/61	5/47, 7/33, 3/8, 1629/1956, 54/53	222/225, 9/1, 839/551, 301/539, 1497/1772, 8/2	257/235, 1159/1385, 207/264, 157/272, 986/1015, 170/353	1381/1688, 125/116, 119/168, 346/427	75/80, 218/70	43/101, 1749/2250, 236/552, 649/445, 30/16, 75/75
1907/1919, 4/13, 3/2, 10/7	169/153, 1759/1948, 25/39, 42/62, 5/2, 34/67	18/144, 1800/1862, 25/15, 5/42, 1/4, 4/52	166/265, 1589/1684, 2/2, 6/27, 2/16, 0/4	259/279, 1017/1091, 806/1302, 798/617, 1441/1401, 270/163	1727/1545, 182/169	81/69, 83/28, 3/106, 41/232	143/104, 60/49, 13/25, 20/17, 1910/1487, 65/68

LEGEND:

(X) Study Intersection

XX/YY AM/PM Turning Movement Volume

FIGURE 8
EXISTING PLUS PROJECT PEAK HOUR TRAFFIC VOLUMES

Kimley»Horn

TABLE 3
SUMMARY OF PEAK HOUR INTERSECTION OPERATION
EXISTING PLUS PROJECT CONDITIONS

			AM Peak Hour						PM Peak Hour					
			Without Project		With Project		Project	Impact	Without Project		With Project		Project	Impact
Int. #	Intersection	Traffic Conrol	ICU/Delay	LOS	ICU/Delay	LOS	Impact	Sig?	ICU/Delay	LOS	ICU/Delay	LOS	Impact	Sig?
1	Cerritos Ave at Los Alamitos Blvd	S	0.826	D	0.827	D	0.001	No	0.861	D	0.862	D	0.001	No
2	Cerritos Ave at Bloomfield St	S	0.836	D	0.838	D	0.002	No	0.711	C	0.713	C	0.002	No
3	Cerritos Ave at Lexington Dr/ Denni St	S	0.628	B	0.649	B	0.021	No	0.712	C	0.729	C	0.017	No
4	Cerritos Ave at Moody St	S	0.561	A	0.568	A	0.007	No	0.707	C	0.711	C	0.004	No
5	Cerritos Ave at Walker St	S	0.688	B	0.701	B	0.013	No	0.638	B	0.645	B	0.007	No
6	Cerritos Ave at Valley View St	S	0.774	C	0.776	C	0.002	No	0.771	C	0.776	C	0.005	No
7	Katella Ave at I-605 NB Ramp	S	0.380	A	0.381	A	0.001	No	0.569	A	0.570	A	0.001	No
8	Katella Ave at Los Alamitos Blvd	S	0.784	C	0.787	C	0.003	No	0.783	C	0.784	C	0.001	No
9	Katella Ave at Bloomfield St	S	0.740	C	0.745	C	0.005	No	0.760	C	0.767	C	0.007	No
10	Katella Ave at Lexington Dr	S	0.557	A	0.571	A	0.014	No	0.596	A	0.599	A	0.003	No
11	Katella Ave at Cottonwood Way	S	0.417	A	0.427	A	0.010	No	0.445	A	0.454	A	0.009	No
12	Katella Ave at Enterprise Dr	U	0.30	A	0.50	A	0.20	No	0.30	A	0.40	A	0.10	No
13	Katella Ave at Siboney St	S	0.453	A	0.459	A	0.006	No	0.540	A	0.549	A	0.009	No
14	Katella Ave at Winners Cir	S	0.437	A	0.443	A	0.006	No	0.559	A	0.571	A	0.012	No
15	Katella Ave at Walker St	S	0.638	B	0.645	B	0.007	No	0.647	B	0.654	B	0.007	No
16	Katella Ave at Valley View St	S	0.696	B	0.703	B	0.007	No	0.757	C	0.760	C	0.003	No
17	Farquhar Ave at Los Alamitos Blvd	S	0.634	B	0.635	B	0.001	No	0.629	B	0.629	B	0.000	No
18	Farquhar Ave at Lexington Dr	U	8.3	A	8.3	A	0.000	No	8.9	A	8.9	A	0.000	No
19	Orangewood Ave at Valley View St	S	0.786	C	0.790	C	0.004	No	0.710	C	0.714	C	0.004	No

S = Signalized intersection; U = Unsignalized intersection
ICU = Intersection Capacity Utilization; LOS = Level of Service
ICU value is expressed in volume-to-capacity (v/c) ratio.
Average delay is expressed in seconds of delay per peak hour vehicle.
LOS shown in **Bold** indicates unacceptable level of service.

FUTURE CONDITIONS

Future traffic forecasts have been developed to evaluate Opening Year (Cumulative Conditions) for the anticipated project opening year, which is estimated to occur in 2018. Opening Year 2018 traffic forecast volumes were developed using the following approach.

Opening Year 2018 Traffic Forecasts

Ambient Growth

The cumulative forecasts for Opening Year 2018 were developed using the "build-up" process, starting with adding a background, or ambient, growth factor to existing peak hour volumes at the study intersections. While the ambient growth rate for the Cypress area typically has been assumed to be one-half percent per year (due to the relatively limited amount of development in the surrounding area), for purposes of this study, an ambient growth rate of 1 percent per year (compounded) was applied to conservatively account for growth in surrounding areas.

Cumulative Projects

In addition to ambient growth, Cumulative Project traffic volumes from reasonably foreseeable projects in the vicinity of the project site were included in the Opening Year baseline traffic volumes. Reasonably foreseeable projects consist of projects that are approved but not yet built, as well as projects that are in various stages of the application and approval process, but have not yet been approved.

Information regarding Cumulative Projects was requested from the Cities of Cypress and Los Alamitos and other surrounding cities, including Hawaiian Gardens, La Palma, Stanton, Buena Park, Garden Grove, and Rossmoor. The Cumulative Projects located in the project vicinity were considered in the Cumulative Conditions analysis, including projects in Cypress, Los Alamitos, Hawaiian Gardens, La Palma, Stanton, Buena Park, and a project on the Joint Forces Training Base (JFTB). A summary of Cumulative Projects is provided on **Table 4.** The location of each of the Cumulative Projects relative to the project site is shown on **Figure 9**.

Project trip generation estimates for each of the Cumulative Projects were derived from approved traffic studies, to the extent available, or from calculations based on the ITE Trip Generation rates where approved studies were unavailable. A summary of the estimated Cumulative Projects trip generation is provided on **Table 5**. The distribution of Cumulative Project trips at the study intersections was based on approved traffic studies, to the extent available, or was estimated by Kimley-Horn where approved studies were unavailable. Cumulative Project trips at the study intersections are shown on **Figure 10**.

TABLE 4
SUMMARY OF CUMULATIVE PROJECTS

Project No.	Project Name	Location	Status	Project Description
City of Cypress				
1	13-Acre Retail/Commercial Project	NW Corner of Katella Avenue and Winners Circle	Approved, Not Built	122,556 SF Major Retail 21,000 SF Retail / Restaurant 9,353 SF Sit Down Restaurant
2	Cottonwood Church	NW Corner of Katella Avenue and Lexington Drive	Approved, Portion of project not built	245,843 SF Church 28,000 SF Specialty Retail 33,600 SF Community College 1,750 Students
3	Mackay Elementary School Redevelopment	8721 Cypress Avenue	Approved, Not Built	47 Single-Family Dwelling Units
4	Habitat for Humanity	6122 Lincoln Avenue	Approved, Portion of project not built	10 Condominiums
5	Bonanni Development	6178 & 6182 Lincoln Avenue	Approved, Under Construction	19 Condominiums
6	Bonanni Development	4861-4891 Camp Street	Approved, Under Construction	16 Condominiums
7	Bonanni Development	4604 Lincoln Avenue	Approved, Not Built	57 Condominiums
8	Restaurant Development	NWC Katella Avenue and Valley View Street	Application	17,391 SF Restaurants
City of Los Alamitos				
9	Los Alamitos Medical Center Specific Plan - Phase 2 and Phase 3	Katella Avenue on the south, Cherry Street on the west, Catalina and Florista Streets on the north, Bloomfield Street on the east	Approved, Not Built	164 Hospital Beds, 14,100 SF Light Industrial (Central Plant)
City of Hawaiian Gardens				
10	Hawaiian Gardens Casino Redevelopment	11871 Carson Street	Approved, Not Built	102,425 SF of Gaming Floor area, Demolition of 45,858 SF of Gaming Table area
Joint Forces Training Base (JFTB) Los Alamitos				
11	New Headquarters Facilities at JFTB Los Alamitos, California	JFTB Airforce Base	Approved, Not Built	229,833 GSF General Office 124 Employees
City of Stanton				
12	Harmony I	7102-7142 Kermore Lane	Approved, Under Construction	20 Single-Family Detached Housing Units
13	Harmony II	7171-7232 Kermore Lane	Approved, Under Construction	22 Single-Family Detached Housing Units
City of Buena Park				
14	Residential Project	Bernadette Avenue (Dickerson School Site)	Approved, Not Built	67 Single-Family Detached Housing Units
City of La Palma				
15	Residential Project	7601 and 7621 Walker Street	Application	7 Single-Family Detached Housing Units
City of Garden Grove				
16	Gas Station Remodel / Expansion	11971 Valley View Street	Approved, Not Built	2,140 SF Convenience Store 690 SF Automatic Car Wash, Demolition of 384 SF of Existing Convenience Store
17	Expansion of Industrial Building	7191 Acacia Ave	Approved, Not Built	3,760 SF Industrial

DU = Dwelling Units, GSF = Gross Square Feet, SF = Square Feet

TABLE 5
SUMMARY OF CUMULATIVE PROJECTS TRIP GENERATION

Project No.	Trip Generation Estimates						
		AM Peak Hour			PM Peak Hour		
	Daily	In	Out	Total	In	Out	Total
City of Cypress							
1	6,786	96	59	155	194	195	389
2	6,128	375	163	538	309	198	507
3	447	9	26	35	30	17	47
4	88	1	6	7	5	3	8
5	112	1	7	8	7	3	10
6	94	1	6	7	5	3	8
7	331	4	21	25	20	10	30
8	1,889	14	3	17	105	52	157
Sub-Total	**13,986**	**487**	**288**	**775**	**570**	**429**	**999**
City of Los Alamitos							
9	1,168	100	44	144	57	146	203
Sub-Total	**1,168**	**100**	**44**	**144**	**57**	**146**	**203**
City of Hawaiian Gardens							
10	9,499	140	83	223	319	231	550
Sub-Total	**9,499**	**140**	**83**	**223**	**319**	**231**	**550**
Joint Forces Training Base (JFTB) Los Alamitos							
11	442	52	7	59	10	47	57
Sub-Total	**442**	**52**	**7**	**59**	**10**	**47**	**57**
City of Stanton							
12	192	4	11	15	13	7	20
13	210	4	13	17	14	8	22
Sub-Total	**402**	**8**	**24**	**32**	**27**	**15**	**42**
City of Buena Park							
14	638	13	38	51	42	25	67
Sub-Total	**638**	**13**	**38**	**51**	**42**	**25**	**67**
City of La Palma							
15	67	1	4	5	4	3	7
Sub-Total	**67**	**1**	**4**	**5**	**4**	**3**	**7**
City of Garden Grove							
16	26	3	0	3	3	0	3
17	123	7	6	13	5	5	10
Sub-Total	**149**	**10**	**6**	**16**	**8**	**5**	**13**
Total	**26,351**	**811**	**494**	**1,305**	**1,037**	**901**	**1,938**

Source : Project Traffic Impact Studies, where available;
Institute of Transportation Engineers (ITE) Trip Generation Manual (9th Edition) trip estimates if traffic studies were not available.
Note : Trip estimates represent net new trips for Cumulative Projects, or the portions of Cumulative Projects that are not yet completed.

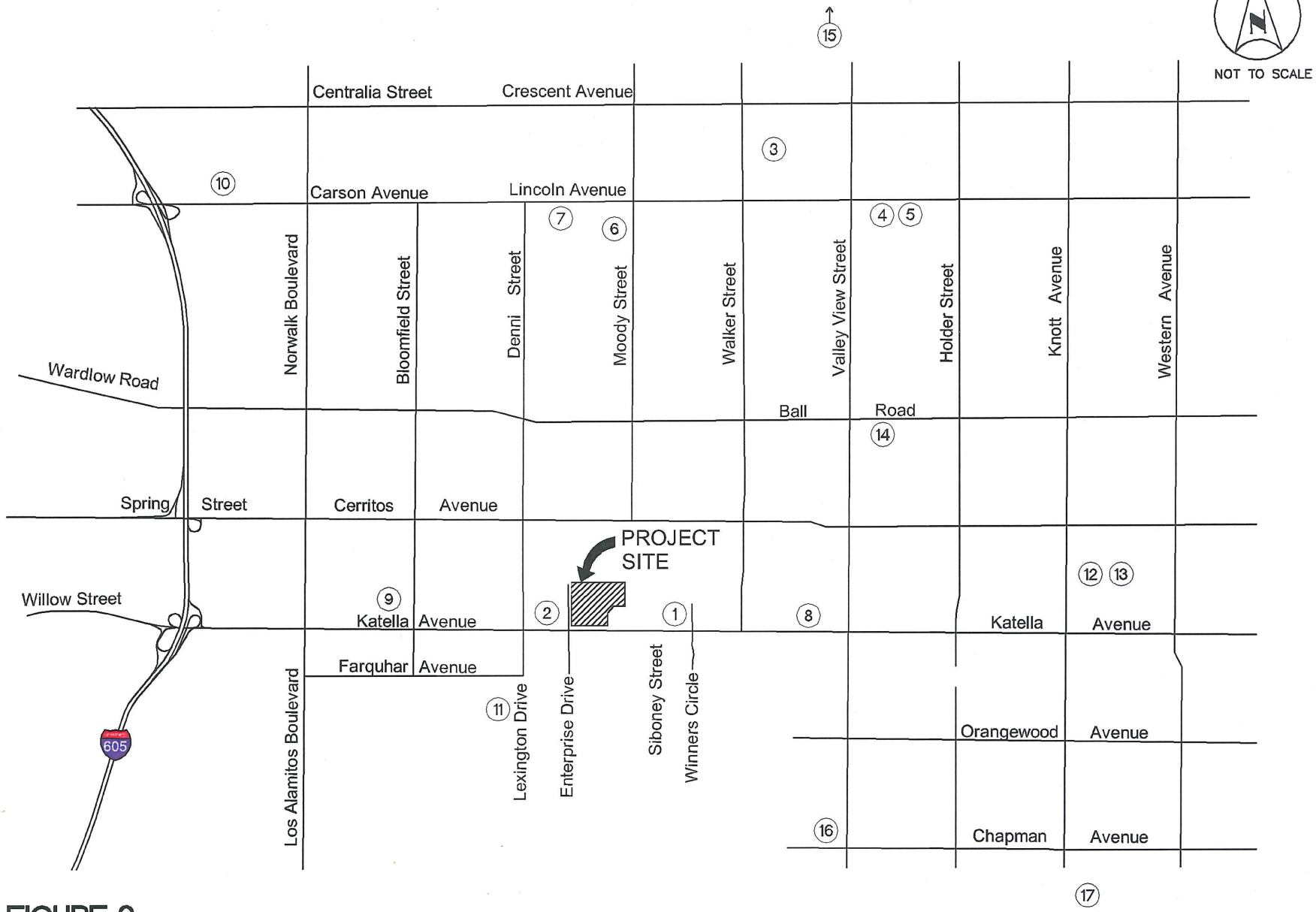


FIGURE 9
LOCATION OF CUMULATIVE PROJECTS

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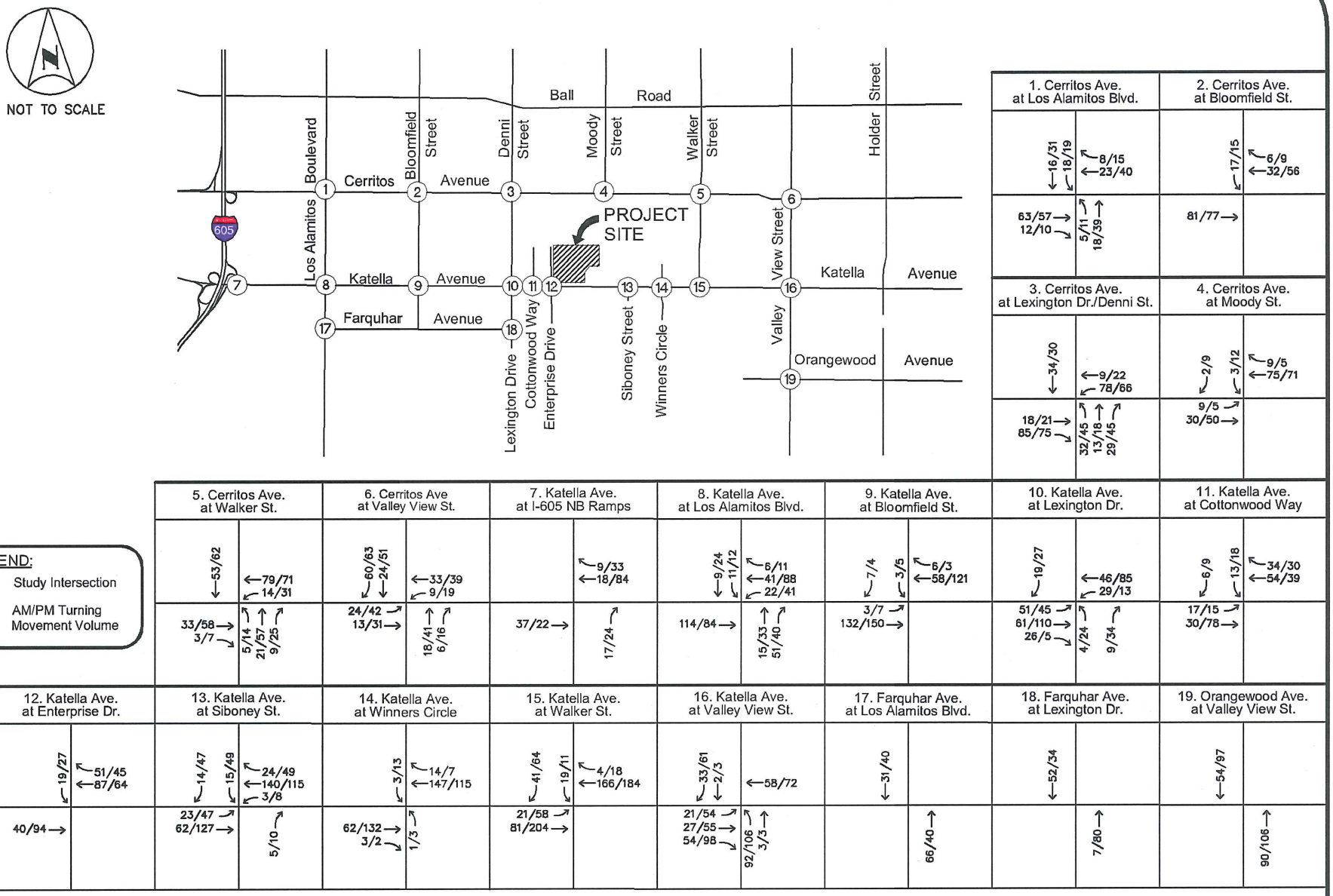


FIGURE 10
CUMULATIVE PROJECTS PEAK HOUR TRAFFIC VOLUMES

Kimley»Horn

Opening Year 2018 without Project Conditions

The ambient growth and the project-related traffic volumes from the Cumulative Projects were added to the existing peak hour volumes, to develop Opening Year 2018 Without Project peak hour forecasts. The resulting peak hour volumes are shown on **Figure 11.**

The results of the Opening Year 2018 Without Project intersection analysis are summarized on **Table 6**. Review of this table shows that, with the addition of ambient growth and the traffic from Cumulative Projects, each of the study intersections would continue to operate within their respective target Levels of Service, with the exception of:

1. Cerritos Avenue at Los Alamitos Boulevard (PM LOS E)

The addition of background growth and Cumulative Project traffic would cause this intersection to worsen from LOS D to LOS E during the evening peak hour. All other signalized intersections would continue to operate at LOS D or better, and the two unsignalized intersections would continue to operate at LOS A on an overall intersection basis during both peak hours.

Opening Year 2018 with Project Conditions

Project-related peak hour traffic volumes for the project were added to the Opening Year 2018 Without Project traffic volumes to develop Opening Year 2018 With Project traffic forecast volumes. The resulting peak hour traffic volumes are shown on **Figure 12**.

The intersection analysis was conducted with the addition of project trips, and the results are summarized on **Table 7**. As review of this table shows, all study intersections would continue to operate within their target Levels of Service with the addition of project traffic, with the exception of:

1. Cerritos Avenue at Los Alamitos Boulevard (PM LOS E)

The intersection of Cerritos Avenue at Los Alamitos Boulevard was forecasted to operate at LOS E during the evening peak hour in the Opening Year 2018 Without Project scenario, and would continue to do so with the addition of project traffic. The project contribution to this intersection would be nominal (0.001 increase in ICU) and would not result in a significant impact to this intersection. The two unsignalized intersections would continue to operate at LOS A on an overall intersection basis during both peak hours.

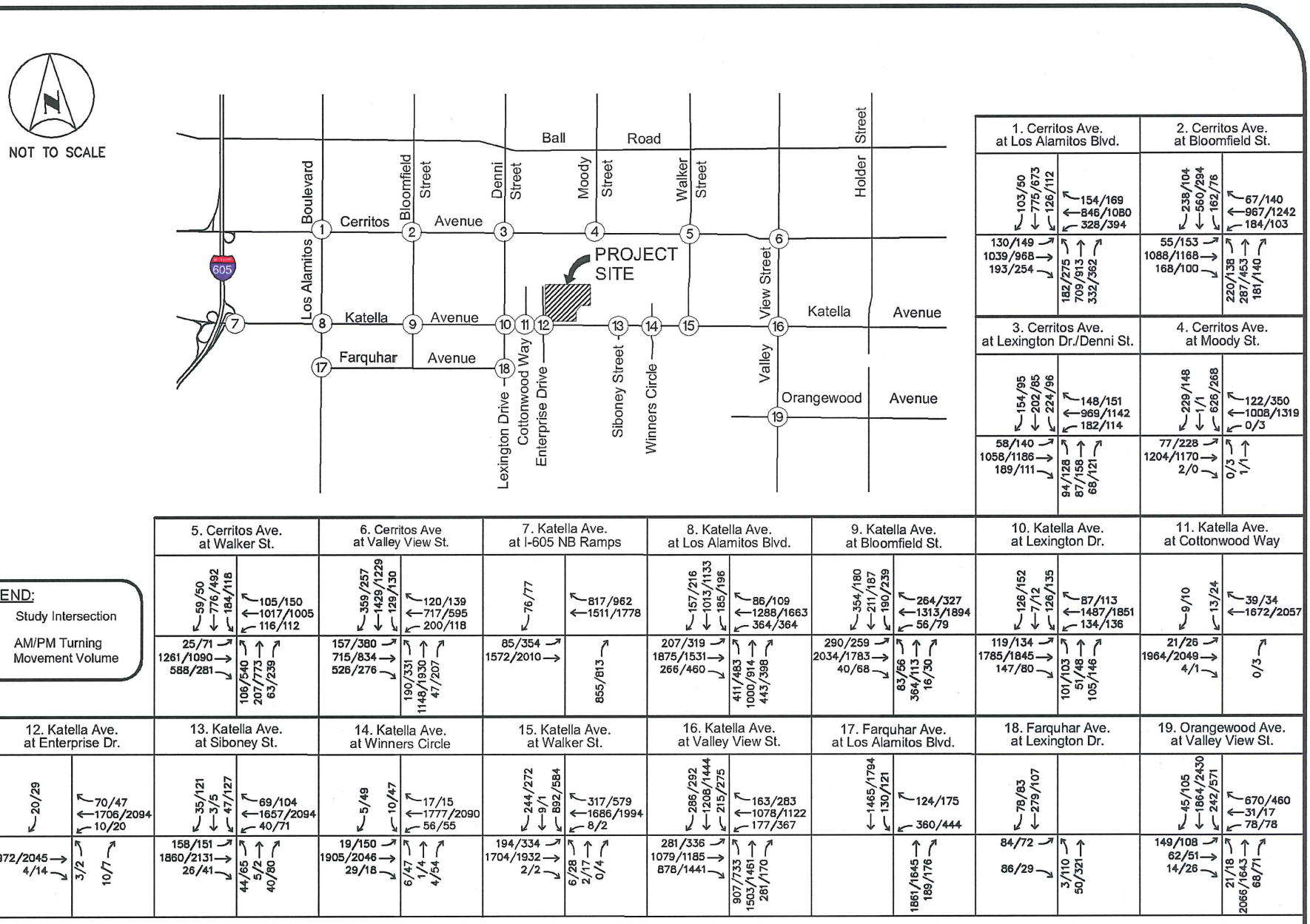


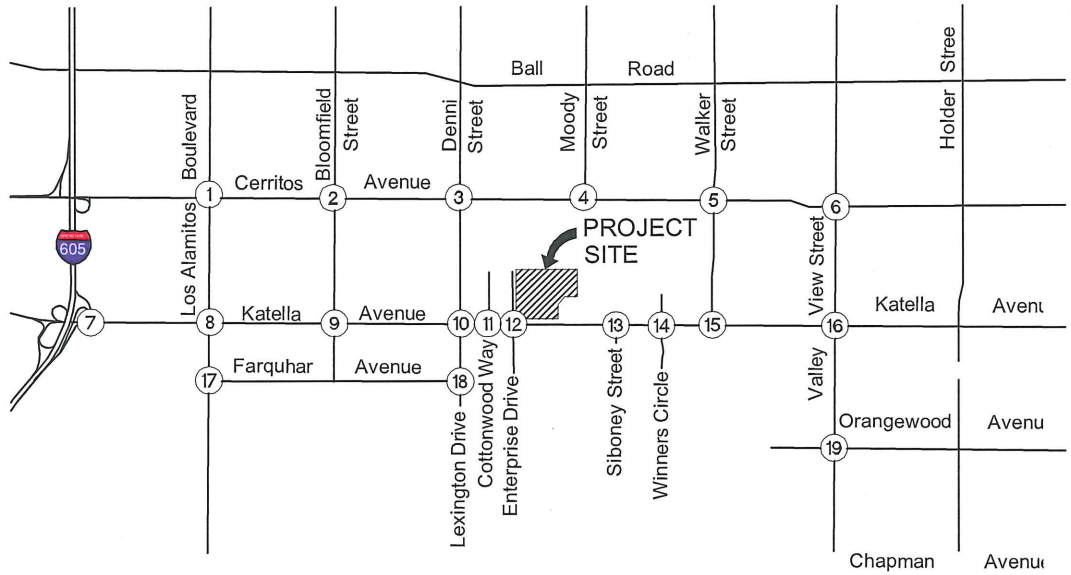
FIGURE 11
OPENING YEAR 2018 WITHOUT PROJECT PEAK HOUR TRAFFIC VOLUMES

Kimley»Horn

TABLE 6
SUMMARY OF PEAK HOUR INTERSECTION OPERATION
OPENING YEAR 2018 WITHOUT PROJECT

Int. #	Intersection	Traffic Control	AM Peak Hour		PM Peak Hour	
			ICU/Delay	LOS	ICU/Delay	LOS
1	Cerritos Ave at Los Alamitos Blvd	S	0.883	D	0.926	**E**
2	Cerritos Ave at Bloomfield St	S	0.892	D	0.766	C
3	Cerritos Ave at Lexington Dr/ Denni St	S	0.746	C	0.809	D
4	Cerritos Ave at Moody St	S	0.613	B	0.765	C
5	Cerritos Ave at Walker St	S	0.741	C	0.705	C
6	Cerritos Ave at Valley View St	S	0.810	D	0.833	D
7	Katella Ave at I-605 NB Ramp	S	0.397	A	0.607	B
8	Katella Ave at Los Alamitos Blvd	S	0.844	D	0.834	D
9	Katella Ave at Bloomfield St	S	0.787	C	0.821	D
10	Katella Ave at Lexington Dr	S	0.619	B	0.674	B
11	Katella Ave at Cottonwood Way	S	0.444	A	0.492	A
12	Katella Ave at Enterprise Dr	U	0.50	A	0.50	A
13	Katella Ave at Siboney St	S	0.489	A	0.614	B
14	Katella Ave at Winners Cir	S	0.471	A	0.610	B
15	Katella Ave at Walker St	S	0.706	C	0.728	C
16	Katella Ave at Valley View St	S	0.759	C	0.817	D
17	Farquhar Ave at Los Alamitos Blvd	S	0.671	B	0.660	B
18	Farquhar Ave at Lexington Dr	U	8.6	A	9.9	A
19	Orangewood Ave at Valley View St	S	0.834	D	0.758	C

S = Signalized intersection; U = Unsignalized intersection
ICU = Intersection Capacity Utilization; LOS = Level of Service
Intersection operation is expressed in volume-to-capacity (v/c) ratio.
LOS shown in **Bold** indicates unacceptable level of service.



1. Cerritos Ave. at Los Alamitos Blvd.

103/50 ↙ 779/677 ← 126/112 ↙	↖ 154/169 ← 846/1080 ↙ 328/394
130/149 → 1039/968 → 193/254 ↘	↗ 182/275 ↑ 713/916 ↑ 332/362

2. Cerritos Ave. at Bloomfield St.

238/104 ↙ 567/299 ↓ 162/76 ↙	↖ 67/140 ← 967/1242 ↙ 184/103
55/153 → 1088/1168 → 168/100 ↘	↗ 220/138 ↑ 292/458 ↑ 181/140

3. Cerritos Ave. at Lexington Dr./Denni St.

154/95 ↙ 211/93 ← 224/96 ↙	↖ 148/151 ← 969/1142 ↙ 182/114
58/140 → 1058/1186 → 189/111 ↘	↗ 94/128 ↑ 94/164 ↑ 97/144

4. Cerritos Ave. at Moody St.

229/148 ↙ 1/1 ↓ 636/277 ↙	↖ 122/350 ← 1008/1319 ↙ 0/3
85/235 → 1224/1186 → 2/0 ↘	↗ 0/3 ↑ 1/1 ↑

5. Cerritos Ave. at Walker St.

59/50 ↙ 787/502 ← 184/118 ↙	↖ 105/150 ← 1017/1005 ↙ 123/118
33/78 → 1273/1099 → 598/290 ↘	↗ 106/540 ↑ 207/773 ↑ 63/239

6. Cerritos Ave at Valley View St.

360/258 ↙ 1443/1242 ↓ 129/130 ↙	↖ 120/139 ← 722/600 ↙ 200/118
164/385 → 720/838 → 526/276 ↘	↗ 190/331 ↑ 1157/1938 ↑ 47/207

7. Katella Ave. at I-605 NB Ramps

76/77 ↙	↖ 822/966 ← 1518/1783
85/354 → 1577/2015 →	↗ 861/820

8. Katella Ave. at Los Alamitos Blvd.

157/216 ↙ 1013/1133 ↓ 189/200 ↙	↖ 90/112 ← 1300/1672 ↙ 367/366
207/319 → 1887/1543 → 266/460 ↘	↗ 411/483 ↑ 1000/914 ↑ 445/401

9. Katella Ave. at Bloomfield St.

354/180 ↙ 211/187 ← 197/244 ↙	↖ 269/332 ← 1333/1909 ↙ 56/79
290/259 → 2052/1803 → 40/68 ↘	↗ 83/56 ↑ 364/113 ↑ 16/30

10. Katella Ave. at Lexington Dr.

126/152 ↙ 7/12 ← 135/143 ↙	↖ 123/142 ← 1518/1874 ↙ 144/142
119/134 → 1815/1876 → 147/80 ↘	↗ 101/103 ↑ 51/48 ↑ 105/146

11. Katella Ave. at Cottonwood Way

9/10 ↙ 13/24 ↙	↖ 39/34 ← 1749/2116
21/26 → 2014/2093 → 4/1 ↘	↗ 0/3

12. Katella Ave. at Enterprise Dr.

60/55 ↙	↖ 97/86 ← 1744/2127 ↙ 10/20
2022/2089 → 4/14 ↘	↗ 3/2 ↑ 10/7

13. Katella Ave. at Siboney St.

35/121 ↙ 3/5 ↓ 47/127 ↙	↖ 69/104 ← 1721/2153 ↙ 40/71
197/204 → 1891/2153 → 26/41 ↘	↗ 44/65 ↑ 5/2 ↑ 40/80

14. Katella Ave. at Winners Circle

5/49 ↙ 10/47 ↙	↖ 17/15 ← 1840/2148 ↙ 56/55
19/150 → 1934/2069 → 29/18 ↘	↗ 6/47 ↑ 1/4 ↑ 4/54

15. Katella Ave. at Walker St.

271/297 ↙ 9/1 ↓ 892/584 ↙	↖ 317/579 ← 1722/2027 ↙ 8/2
194/334 → 1733/1955 → 2/2 ↘	↗ 6/28 ↑ 2/17 ↑ 0/4

16. Katella Ave. at Valley View St.

300/305 ↙ 1208/1444 ↓ 215/275 ↙	↖ 163/283 ← 1084/1128 ↙ 177/367
290/344 → 1085/1190 → 892/1452 ↘	↗ 922/747 ↑ 1503/1461 ↑ 281/170

17. Farquhar Ave. at Los Alamitos Blvd.

1468/1796 ↙ 130/121 ↙	↖ 124/175 ← 360/444
	↗ 1863/1648 ↑ 189/176

18. Farquhar Ave. at Lexington Dr.

78/83 ↙ 279/107 ↙	
84/72 → 86/29 ↘	↗ 3/110 ↑ 50/321

19. Orangewood Ave. at Valley View St.

45/105 ↙ 1874/2438 ↓ 245/574 ↙	↖ 675/463 ← 31/17 ↙ 78/78
149/108 → 62/51 → 14/26 ↘	↗ 21/18 ↑ 2077/1653 ↑ 68/71

LEGEND:

(X) Study Intersection

XX/YY AM/PM Turning Movement Volume

FIGURE 12
OPENING YEAR 2018 WITH PROJECT PEAK HOUR TRAFFIC VOLUMES

Kimley»Horn

TABLE 7
SUMMARY OF PEAK HOUR INTERSECTION OPERATION
OPENING YEAR 2018 WITH PROJECT

Int. #	Intersection	Traffic Conrol	AM Peak Hour						PM Peak Hour					
			Without Project		With Project		Project	Impact	Without Project		With Project		Project	Impact
			ICU/Delay	LOS	ICU/Delay	LOS	Impact	Sig?	ICU/Delay	LOS	ICU/Delay	LOS	Impact	Sig?
1	Cerritos Ave at Los Alamitos Blvd	S	0.883	D	0.884	D	0.001	No	0.926	**E**	0.928	**E**	0.002	No
2	Cerritos Ave at Bloomfield St	S	0.892	D	0.894	D	0.002	No	0.766	C	0.767	C	0.001	No
3	Cerritos Ave at Lexington Dr/ Denni St	S	0.746	C	0.767	C	0.021	No	0.809	D	0.826	D	0.017	No
4	Cerritos Ave at Moody St	S	0.613	B	0.620	B	0.007	No	0.765	C	0.769	C	0.004	No
5	Cerritos Ave at Walker St	S	0.741	C	0.754	C	0.013	No	0.705	C	0.712	C	0.007	No
6	Cerritos Ave at Valley View St	S	0.810	D	0.813	D	0.003	No	0.833	D	0.837	D	0.004	No
7	Katella Ave at I-605 NB Ramp	S	0.397	A	0.398	A	0.001	No	0.607	B	0.608	B	0.001	No
8	Katella Ave at Los Alamitos Blvd	S	0.844	D	0.848	D	0.004	No	0.834	D	0.836	D	0.002	No
9	Katella Ave at Bloomfield St	S	0.787	C	0.792	C	0.005	No	0.821	D	0.827	D	0.006	No
10	Katella Ave at Lexington Dr	S	0.619	B	0.631	B	0.012	No	0.674	B	0.684	B	0.010	No
11	Katella Ave at Cottonwood Way	S	0.444	A	0.453	A	0.009	No	0.492	A	0.503	A	0.011	No
12	Katella Ave at Enterprise Dr	U	0.50	A	0.70	A	0.20	No	0.50	A	0.70	A	0.20	No
13	Katella Ave at Siboney St	S	0.489	A	0.491	A	0.002	No	0.614	B	0.629	B	0.015	No
14	Katella Ave at Winners Cir	S	0.471	A	0.477	A	0.006	No	0.610	B	0.621	B	0.011	No
15	Katella Ave at Walker St	S	0.706	C	0.713	C	0.007	No	0.728	C	0.734	C	0.006	No
16	Katella Ave at Valley View St	S	0.759	C	0.765	C	0.006	No	0.817	D	0.821	D	0.004	No
17	Farquhar Ave at Los Alamitos Blvd	S	0.671	B	0.671	B	0.000	No	0.660	B	0.661	B	0.001	No
18	Farquhar Ave at Lexington Dr	U	8.6	A	8.6	A	0.0	No	9.9	A	9.9	A	0.0	No
19	Orangewood Ave at Valley View St	S	0.834	D	0.838	D	0.004	No	0.758	C	0.762	C	0.004	No

S = Signalized intersection; U = Unsignalized intersection
ICU = Intersection Capacity Utilization; LOS = Level of Service
ICU value is expressed in volume-to-capacity (v/c) ratio.
Average delay is expressed in seconds of delay per peak hour vehicle.
LOS shown in **Bold** indicates unacceptable level of service.

CONSTRUCTION TRAFFIC

The construction of the project will generate construction-phase traffic with respect to the grading of the project site and construction of the proposed facilities. The duration of construction is expected to be approximately eight months for the site work and 29 months for building construction, with approximately three months of overlapping grading and construction activities.

Large construction equipment such as bulldozers, loaders, scrapers, backhoes, water trucks, and pavers will be required during various construction phases. Such equipment is generally brought to the site at the start of the construction phase and kept on site until its term of use ends. A staging area will be designated onsite toward the center of the project site for construction equipment and supplies to be stored during construction.

Throughout the construction, the size of the work crew reporting to the project site each day will vary from approximately 20 to 75 workers, depending on the different phases of the project. Parking for construction workers will be provided onsite during all phases of construction. Workers will not be allowed to park on local streets.

Earthwork for the project will require approximately 93,390 cubic yards of fill, which would require the import of approximately 5,836 truckloads of dirt during the grading phase. The haul route for construction traffic will be along the designated truck routes (Katella Avenue and Valley View Street) to either the I-605 or the I-405 Freeway.

Temporary delays in traffic may occur due to oversized vehicles traveling at lower speeds on Katella Avenue, turning into the project site. Such delays will be occasional, and of short duration. The traffic generated by construction activity will be limited in duration and will not materially impact the Level of Service at any study intersections.

ANALYSIS OF STATE HIGHWAY FACILITIES

Intersection Analysis

Intersections on State highway facilities, which are controlled by Caltrans, are also analyzed using the Highway Capacity Manual (HCM) methodology, as required by the *Caltrans Guide for the Preparation of Traffic Impact Studies* (State of California Department of Transportation, December 2002) (Caltrans Guide). For this study, one intersection is located on a State highway facility:

- Katella Avenue at the I-605 Northbound Ramps.

The HCM methodology measures average seconds of delay per vehicle based on a number of technical parameters, such as peak hourly traffic volumes, number of lanes, type of signal operation, signal timing, and signal phasing in the calculations.

A description of each Level of Service, based on delay parameters, per the Highway Capacity Manual (HCM) is provided in the following chart.

LEVEL OF SERVICE DESCRIPTIONS		
Level of Service	**Signalized Intersection Delay (sec)**	**Description**
A	≤10	EXCELLENT – No vehicle waits longer than one red light and no approach phase is fully used.
B	> 10 – 20	VERY GOOD – An occasional approach phase is fully utilized; drivers begin to feel somewhat restricted within groups of vehicles.
C	> 20 – 35	GOOD – Occasionally drivers may have to wait through more than one red light; back-ups may develop behind turning vehicles
D	> 35 – 55	FAIR – Delays may be substantial during portions of the rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive back-ups.
E	> 55 – 80	POOR – Represents the most vehicles that the intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	> 80	FAILURE – Back-ups from nearby locations or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches. Delays occur, with increasing queue lengths.
Source: Highway Capacity Manual 2010		

For State-controlled intersections, Level of Service standards and impact criteria specified by Caltrans will apply. The Caltrans Guide states that "Caltrans endeavors to maintain a target Level of Service at the transition between LOS C and LOS D on State highway facilities. If an existing State highway facility is operating at less than the target LOS, the existing Level of Service is to be maintained."

Intersection Significance Threshold

The Caltrans Guide does not establish a threshold of significance for State highway intersections, but consistent with custom and practice, this traffic analysis uses the following traffic thresholds of significance:

- A significant project impact would occur at a State Highway study intersection where the addition of project-generated trips (1) causes the peak hour level of service of the study intersection to change from acceptable operation (LOS A, B, or C) to deficient operation (LOS D, E, or F) or (2) causes an intersection already operating at a deficient Level of Service to deteriorate to a worse Level of Service.

Analysis of Peak Hour Operations on State Highway Facilities

The intersection of Katella Avenue at the I-605 northbound ramps was analyzed for each of the study scenarios using the HCM delay methodology. The results of the analysis are summarized on **Table 8**. The intersection of Katella Avenue at the I-605 northbound ramps currently operates at Level of Service A during the morning and evening peak hours, and would continue to do so with the addition of project traffic under both the Existing Plus Project and the Opening Year 2018 with Project conditions.

Freeway Mainline Analysis

Methodology and Trip Generation/Significance Thresholds

Analysis of freeway mainline segments is conducted in accordance with the Caltrans Guide, which specifies application of the HCM operational methodology for freeway analysis. The Caltrans Guide includes trip generation thresholds, which function as screening criteria to determine whether a full traffic impact study (TIS) or some lesser analysis is required with respect to a project's impact on freeway mainline segments. Pursuant to those thresholds, a TIS is required if a project:

- generates over 100 peak hour trips assigned to a State highway facility; or
- generates 50 to 100 peak hour trips assigned to a State highway facility and the affected State highway facility is experiencing noticeable delay, approaching unstable traffic flow conditions (LOS C or D).
- generates 1 to 49 peak hour trips assigned to a State highway facility and the affected State highway facility is experiencing significant delay with unstable or forced traffic flow conditions (LOS E or F).

If a proposed project meets one of the foregoing thresholds, a TIS or other additional traffic analysis is required. Freeway mainline analysis results are expressed in terms of density, which measures the number of passenger cars per lane mile (pc/mi/ln) on the freeway mainline. In accordance with the Caltrans Guide, the target LOS for freeway mainline segments is the transition between LOS C and D, which is a density of 35.0 pc/mi/ln. If the existing density exceeds the target LOS, the existing Level of Service is to be maintained.

Scope of Analysis

In relation to the area freeways in the project vicinity, the project site is located as follows:

- 1.9 miles east of the I-605 Freeway (the San Gabriel River Freeway)
- 3.5 miles north of the SR-22 Freeway (the Garden Grove Freeway)
- 3.6 miles north of the I-405 Freeway (the San Diego Freeway)
- 5.0 miles south of the SR-91 Freeway (the Riverside Freeway).

TABLE 8
SUMMARY OF INTERSECTION OPERATION
KATELLA AVENUE AT I-605 NB RAMPS
HCM METHODOLOGY

Scenario	AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS
Existing Conditions	2.3	A	7.6	A
Existing Plus Project	2.3	A	7.5	A
Opening Year 2018 Without Project	2.3	A	7.7	A
Opening Year 2018 With Project	2.3	A	7.7	A

LOS = Level of Service

Intersection operation is expressed in seconds of delay per peak hour vehicle.

LOS shown in **Bold** indicates unacceptable level of service.

The proposed project consists of 244 senior housing units and approximately 48,000 square feet of neighborhood-serving commercial/retail uses. With respect to senior housing trip demand on nearby freeways, many senior residents will no longer be employed, so that freeway commuting is less likely. In addition, senior drivers tend to avoid the rush hours, so their freeway trips are less likely to occur during the AM or PM peak hours.

With respect to the commercial/retail component of the project, it will be neighborhood-serving rather than destination retail (such as a Costco or Walmart). Therefore, the commercial/retail component will generate very few freeway trips.

For these reasons, and given the distance of the proposed project from the nearest freeway facilities, the analysis of the project's freeway mainline impact is limited to the evaluation of the project's impact on the I-605, which is the closest freeway to the project site, less than two miles away. The two segments of the I-605 selected for analysis are the Jct. 405 to Katella Avenue segment and the Katella Avenue to Spring Street segment.

Annual average daily traffic (AADT) freeway volumes were obtained from the *2013 Traffic Volumes on California State Highways* traffic volumes book, which is the most recent traffic volumes book posted on the Caltrans website (www.dot.ca.gov). Daily traffic volumes are converted to peak hour directional volumes using the HCM methodology. The results of the analysis are expressed in terms of vehicular density in each peak hour, in each direction, in accordance with HCM methodology. The freeway analysis worksheets are provided in ***Appendix D***. A summary of the results of the freeway mainline analysis is presented below.

Existing with Project Conditions

Peak hour freeway volumes and analysis results, by segment, and by direction, are summarized on **Table 9** for Existing Conditions, without and with the project. As shown on Table 9, with the addition of project traffic, both the Jct. 405 to Katella Avenue and the Katella Avenue to Spring Street segments on the I-605 would operate at LOS B or C during the morning and evening peak hours in both the northbound and southbound directions. Table 9 also shows that the project would only add 4 to 7 peak hour trips to each segment.

Based on the analysis reflected in Table 9, the third trip generation threshold (1-49 peak hour trips) applies here because the project only adds 4 to 7 peak hour trips to the Jct. 405 to Katella Avenue and Katella Avenue to Spring Street segments in both the northbound and southbound directions. However, that trip generation threshold does not require any further traffic analysis because none of the segments would operate at LOS E or F with project traffic. Specifically, the northbound Jct. 405 to Katella segment currently operates at LOS B, and would continue to do so with project traffic during the AM peak hour. The remaining segments would otherwise operate, or continue to operate, at LOS C with project traffic.

TABLE 9
SUMMARY OF FREEWAY MAINLINE OPERATIONS
EXISTING PLUS PROJECT CONDITIONS

Freeway: I-605

Freeway Segment	Lanes	Existing Conditions						Existing With Project						Project Impact			
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour		PM Peak Hour	
		Volume	Density (pc/mi/ln)	LOS	Volume	Density (pc/mi/ln)	LOS	Volume	Density (pc/mi/ln)	LOS	Volume	Density (pc/mi/ln)	LOS	Vol	Density (pc/mi/ln)	Vol	Density (pc/mi/ln)
Northbound																	
JCT. 405 to Katella Ave.	5	5,267	16.8	B	6,593	21.1	C	5,273	16.9	B	6,600	21.1	C	6	0.1	7	0.0
Katella Ave. to Spring St.	5	5,746	18.4	C	7,192	23.0	C	5,751	18.4	C	7,196	23.0	C	5	0.0	4	0.0
Southbound																	
Spring St. to Katella Ave.	5	7,066	22.6	C	6,340	20.3	C	7,071	22.6	C	6,345	20.3	C	5	0.0	5	0.0
Katella Ave. to JCT. 405	5	6,477	20.7	C	5,812	18.6	C	6,484	20.7	C	5,817	18.6	C	7	0.0	5	0.0

In addition, even if further traffic analysis was required pursuant to the Caltrans Guide, the project would not have a significant impact on freeway mainline traffic. As shown on Table 9, the study freeway segments would all operate at LOS C or better during both peak hours, with densities ranging from 16.9 to 23.0 pc/mi/ln under Existing with Project Conditions. This is well within the Caltrans target Level of Service for freeway mainline operation (transition between LOS C and D/density of 35.0 pc/mi/ln). Table 9 further demonstrates that the addition of project traffic in the peak hours would have a minimal effect on the freeway segment operation, with no changes in Levels of Service, and a project-related increase in density of 0.0 to 0.1 pc/mi/ln.

Opening Year 2018 with Project Conditions

Peak hour freeway volumes and analysis results for Opening Year 2018 Conditions, without and with the project, are summarized on **Table 10**. As shown on Table 10, with the addition of project traffic, both the Jct. 405 to Katella Avenue and Katella Avenue to Spring Street segments on the I-605 would operate at LOS B or C during the peak hours in both the northbound and southbound directions. Table 10 also shows that the project would only add 4 to 7 peak hour trips to each segment.

Based on the analysis reflected in Table 10, the third trip generation threshold (1-49 peak hour trips) applies here because the project only adds 4 to 7 peak hour trips to the Jct. 405 to Katella Avenue and Katella Avenue to Spring Street segments in both the northbound and southbound directions. However, that trip generation threshold does not require any further traffic analysis because none of the segments would operate at LOS E or F with project traffic. Specifically, the northbound Jct. 405 to Katella segment would continue to operate at LOS B with project traffic during the AM peak hour. The remaining segments would otherwise operate, or continue to operate, at LOS C with project traffic.

In addition, even if further traffic analysis was required pursuant to the Caltrans Guide, the project would not have a significant impact on freeway mainline traffic. As shown on Table 10, the study freeway segments would all operate at LOS C or better during both peak hours, with densities ranging from 17.1 to 23.3 pc/mi/ln under Opening Year 2018 with Project Conditions. This is well within the Caltrans target Level of Service for freeway mainline operation (transition between LOS C and D/density of 35.0 pc/mi/ln). Table 10 further demonstrates that the addition of project traffic in the peak hours would have a minimal effect on the freeway segment operation, with no changes in Levels of Service, and a project-related increase in density of less than 0.1 pc/mi/ln.

For these reasons, the project would not have any significant freeway impacts.

TABLE 10
SUMMARY OF FREEWAY MAINLINE OPERATIONS
OPENING YEAR 2018 WITH PROJECT CONDITIONS

Freeway: I-605

Freeway Segment	Lanes	Opening Year 2018 without Project						Opening Year 2018 With Project						Project Impact			
		AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour		PM Peak Hour	
		Volume	Density (pc/mi/ln)	LOS	Volume	Density (pc/mi/ln)	LOS	Volume	Density (pc/mi/ln)	LOS	Volume	Density (pc/mi/ln)	LOS	Vol	Density (pc/mi/ln)	Vol	Density (pc/mi/ln)
Northbound																	
JCT. 405 to Katella Ave.	5	5,347	17.1	B	6,693	21.4	C	5,353	17.1	B	6,700	21.4	C	6	0.0	7	0.0
Katella Ave. to Spring St.	5	5,833	18.7	C	7,301	23.3	C	5,838	18.7	C	7,305	23.3	C	5	0.0	4	0.0
Southbound																	
Spring St. to Katella Ave.	5	7,172	22.9	C	6,435	20.6	C	7,177	22.9	C	6,440	20.6	C	5	0.0	5	0.0
Katella Ave. to JCT. 405	5	6,574	21.0	C	5,899	18.9	C	6,581	21.0	C	5,904	18.9	C	7	0.0	5	0.0

SITE ACCESS AND CIRCULATION

The project site will have a total of five driveways for access to and from the public street system. Access to the commercial/retail and restaurant area will be provided by two driveways on Katella Avenue and one on Enterprise Drive. The Katella Avenue driveways will be unsignalized, and will allow right-in/right-out and left-out movements only. The access on Enterprise Drive will also be unsignalized, and will allow all movements.

Access to the senior residential community will be provided by one gated entry on Enterprise Drive. In addition, there will be an emergency access driveway on Enterprise Drive for the senior residential community.

On-site circulation within the senior residential community will be provided by a private loop road, which will be 24 feet in width, with one travel lane in each direction. The individual residential units will not take direct access onto the loop road; a series of short motor courts will intersect with the main loop road and provide direct access to the individual residential lots. The loop road configuration with the short motor courts disperses turning and backing movements throughout the site, reducing turning conflicts on the main road, and providing efficient circulation for vehicles entering and exiting the site.

The intersection of Katella Avenue at Enterprise Drive, which is located south of the access points on Enterprise Drive to the proposed commercial/retail area and senior residential community, has the following physical and operational features that would be maintained:

- The intersection is unsignalized.
- Katella Avenue has a raised median, with a median break at Enterprise Drive.
- The westbound approach has a left-turn pocket, which allows drivers to turn left from Katella Avenue into the neighborhood to the south.
- There is no left-turn pocket in the eastbound direction, and there is a sign stating that left turns and U-turns are prohibited (Manual on Uniform Traffic Control Devices (MUTCD) sign R3-18). Therefore, eastbound left turns from Katella Avenue to northbound Enterprise Drive are prohibited.
- The southbound approach on Enterprise Drive is stop-controlled, and is signed and striped to indicate that only right turns are allowed. Therefore, southbound through and left-turn movements from Enterprise Drive are prohibited.
- The northbound approach on Enterprise Drive is stop-controlled, and allows right-turn, through, and left-turn movements.

Given these features, (1) project traffic that enters and exits the project site using Enterprise Drive would be restricted to right-in/right-out-only movements at the Katella Avenue/Enterprise Drive intersection and (2) project traffic heading eastbound on Katella Avenue would not be able to turn left onto Enterprise Drive to access the project site. The existing southbound restrictions, which prohibit traffic on southbound Enterprise Drive from making a through or left-turn movement, as well as the eastbound left-turn restriction, would be maintained.

SIGNAL WARRANT ANALYSIS AT KATELLA AVENUE AND ENTERPRISE DRIVE

A signal warrant analysis was conducted for Opening Year 2018 with Project conditions for the intersection of Katella Avenue at Enterprise Drive. Traffic signal warrants are used to determine whether or not the volume of traffic on the side street is great enough to warrant signalizing that intersection, in order to facilitate the movement of traffic from the side street to and from the major street. The signal warrant analysis is based on the 2014 California MUTCD, Chapter 4C, Warrant 2 (Four-Hour Warrant), and Warrant 3 (Peak Hour Warrant), and evaluates the intersection with the Opening Year 2018 with Project peak hour forecasts.

The results of the signal warrant analysis indicate that the intersection would not warrant signalization in either the morning or evening peak hour. The signal warrant analysis worksheets are provided in ***Appendix E***.

PROJECT PARKING

The parking requirements for the project are defined in Section IV.E of the Specific Plan, which provides required parking ratios for each land use allowed in the Specific Plan. The parking requirements for the proposed site uses are as follows:

Shopping Center

- 1 space per 225 square feet

Restaurant

- 1 space per 100 square feet

Senior Housing

- 1 garage space per dwelling unit, plus
- 1 uncovered guest space per 20 dwelling units

The chart below provides a summary of the project parking requirements based on these parking ratios, and the parking provided, as shown on the project site plan. The parking requirement for the commercial center is 277 spaces, and the surface parking lot for the commercial center would include 277 spaces and thereby would satisfy the parking requirement. The parking requirement for the senior housing community is 257 parking spaces, including 244 garage spaces and 13 open guest spaces, while the project includes 566 parking spaces for that use, including 488 garage spaces and 78 open guest spaces, which results in a surplus of 309 parking spaces.

Summary of Project Parking				
Use	**Unit**	**Quantity**	**1 Space Per**	**Required Parking**
Commercial/Retail	SF	36,500	225 SF	163
Restaurant	SF	11,376	100 SF	114
Total Required				***277***
Total Provided				***277***
Senior Housing Garage Parking	DU	244	1 DU	244
Senior Housing Guest Parking	DU	244	20 DU	13
Total Required				***257***
Garage Parking Provided				***488***
Guest Parking Provided				***78***
Total Provided				***566***
Notes: SF = Square Feet DU = Dwelling Unit				

Based on this summary, the project satisfies the parking requirement for the commercial/retail and restaurant site, and substantially exceeds the parking requirement for the senior residential portion of the project, and would be in compliance with the applicable parking requirements in the Specific Plan and, to the extent applicable, the Cypress Zoning Ordinance.

Location of Residential Guest Parking

As previously discussed, the proposed senior residential community includes a 24-foot-wide private loop road for on-site circulation. As shown on the project site plan (see Figure 2), the guest parking spaces, which are eight feet in width, would be located adjacent to one side of the loop road, but would be physically separated from the loop road by concrete V-gutters and bulb-outs at each street corner. The proposed residential guest parking areas are not located on the private loop road and constitute off-street parking in compliance with the Specific Plan.

In addition, Section IV.E.3 of the Specific Plan permits alternatives to its parking requirements. For several reasons, the placement of the guest parking areas adjacent to the loop road throughout the community is necessary and appropriate. Off-street parking adjacent to a private street is customary and appropriate for a residential development. By spreading the guest parking areas throughout the residential community, rather than placing all of them in one or two centralized locations, the distance that guests have to walk to and from their vehicles would be minimized, making it safer and more convenient.

Moreover, the distribution of the guest parking spaces throughout the residential area creates a far more pleasing aesthetic than congregating guest vehicles in one or more off-street parking lots. The most logical way to distribute guest parking is to place it adjacent to the loop road and throughout the community.

The location of the guest parking areas would not adversely affect the circulation, function, or use of the private loop road. Parallel parking spaces are safer and more convenient than perpendicular off-street parking spaces because drivers would not have to back their vehicles onto the loop road to exit their spaces.

In addition, the Specific Plan requires 13 guest parking spaces for the 244-unit senior residential community, based on the required ratio of one guest parking space for each 20 dwelling units. The project includes 78 guest parking spaces located throughout the community. This would ensure that all residential guests will be able to find parking within the residential area and would not be tempted to park on adjacent commercial parcels.

Finally, the project complies with all applicable parking requirements in the Specific Plan and, to the extent applicable, the Cypress Zoning Ordinance.

ORANGE COUNTY CONGESTION MANAGEMENT PROGRAM (CMP)

The Orange County Congestion Management Program (CMP) was established in 1991 to reduce traffic congestion and to provide a mechanism for coordinating land use and development decisions. Compliance with the CMP requirements ensures a city's eligibility to compete for State gas tax funds for local transportation projects.

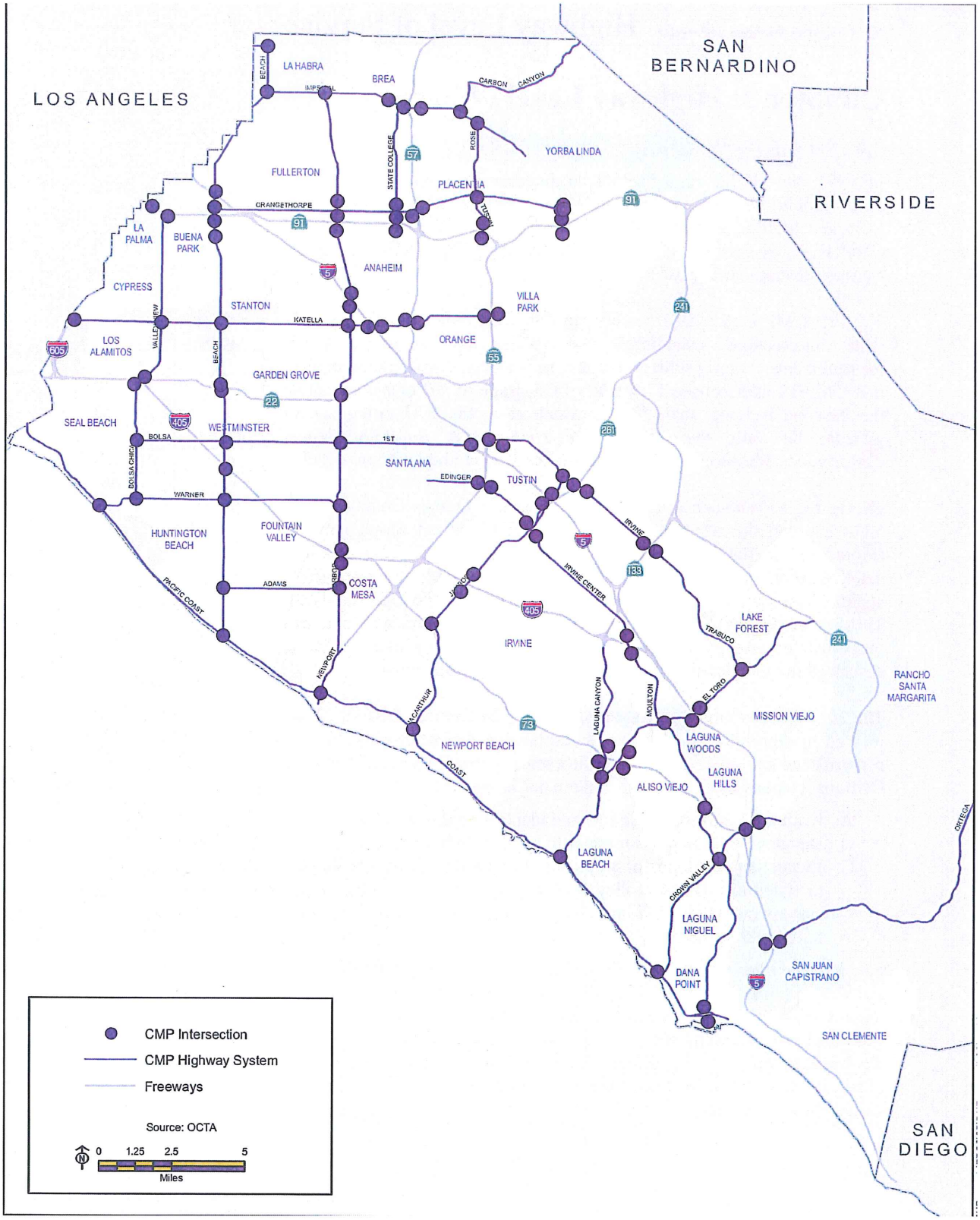
The County of Orange CMP Highway System is shown on **Figure 13**. Within the Cities of Cypress and Los Alamitos, the CMP Highway System includes two arterials: Valley View Street and Katella Avenue. The intersections of Katella Avenue at Valley View and Katella Avenue at the I-605 Northbound Ramps are the only CMP intersections in the study area. Both intersections are study intersections in this report.

Based on CMP requirements, a Traffic Impact Analysis (TIA) is required for CMP purposes for any proposed development generating 2,400 or more daily trips, except that for developments which will directly access a CMP Highway System roadway segment, the threshold for requiring a TIA is reduced to 1,600 or more trips per day. The Barton Place project is estimated to generate a total of 3,458 daily trips, and would take access directly from Katella Avenue, which is a CMP facility. As such, a TIA is required for CMP purposes.

Based on CMP requirements, the extent of the study area for a TIA is determined by comparing the project's daily trips on a CMP roadway segment to the daily LOS E capacity of that segment. The CMP requires that the study area for the project extend far enough to cover any CMP roadway segment on which the project traffic would represent 3 percent or more of the roadway segment LOS E capacity.

This section of the report has been prepared to demonstrate that the analysis for the project in the preceding sections of this report also satisfies the CMP study area requirements. The LOS E capacities of Katella Avenue and Valley View Street, the two CMP roadways near the project site, and the forecasted daily project traffic volumes on those segments, are shown on **Figure 14** [1]. This figure demonstrates that the project daily traffic volumes exceed the 3% threshold only on Katella Avenue directly east of the project site. The project daily traffic volumes on all other roadway segments are less than 3% of the daily roadway LOS E capacities at the study area boundaries, and therefore the traffic analysis has been carried out sufficiently far enough to satisfy CMP requirements. In other words, the prior traffic analysis analyzed intersection impacts beyond the point where the project-related daily traffic represented 3% or more of the road segment LOS E capacity. Moreover, the project would not result in a significant traffic impact at any CMP intersection in the project vicinity. This traffic study, therefore, complies with CMP requirements.

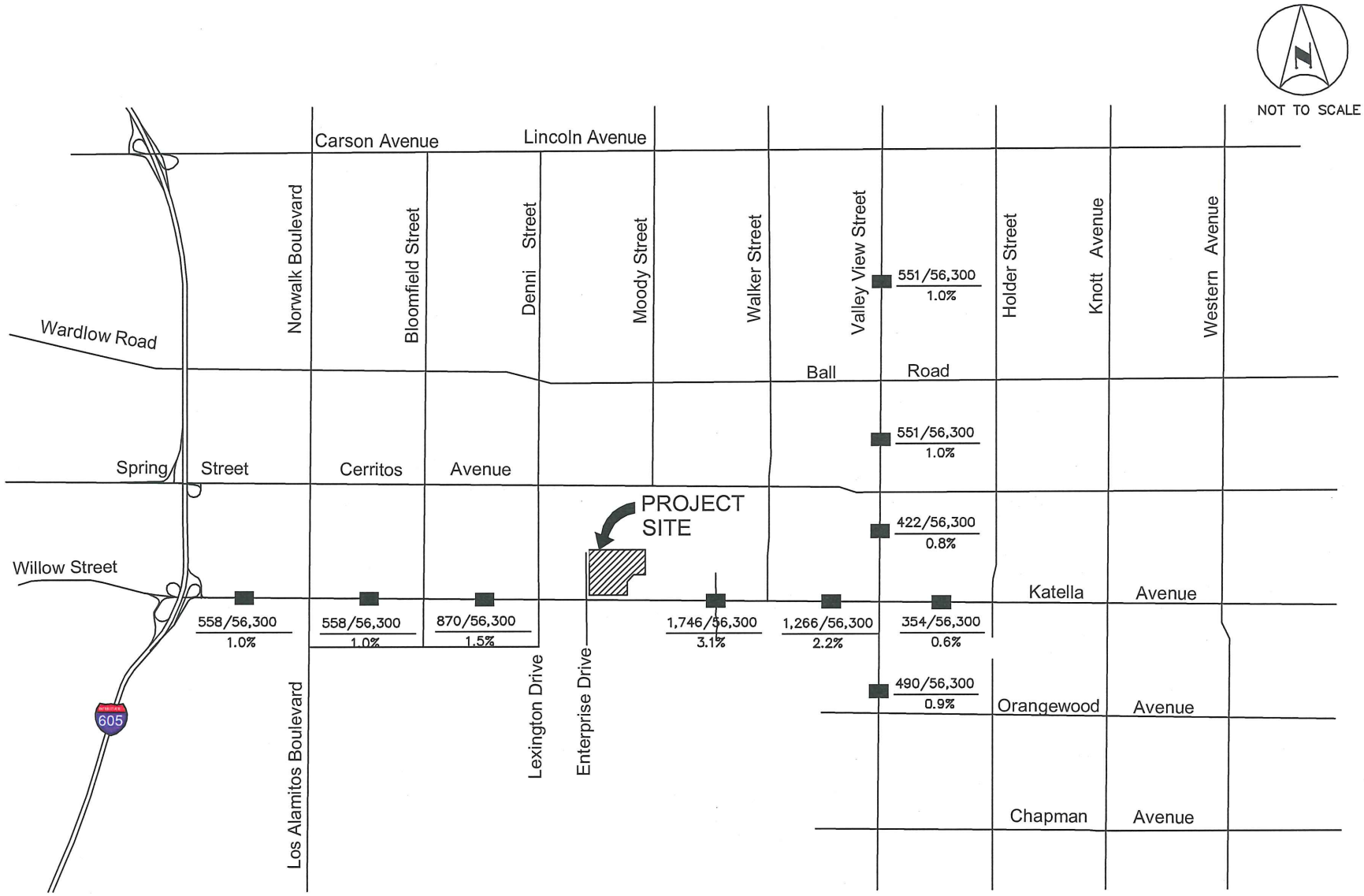
[1] Based on the *Guidance for Administration of the Orange County Master Plan of Arterial Highways* (OCTA, October, 2012), the LOS E capacity for 6-lane major roadways (Katella Avenue and Valley View Street) is 56,300 vehicles per day.



NOT TO SCALE

FIGURE 13
COUNTY OF ORANGE CMP HIGHWAY SYSTEM

Kimley»Horn



LEGEND:

$$\frac{\text{XXX / YYY}}{\text{Z\%}} = \frac{\text{Project Traffic / LOS "E" Capacity}}{\text{Project Percentage of LOS "E" Capacity}}$$

FIGURE 14
CMP STUDY AREA DETERMINATION

Kimley»Horn

SUMMARY OF FINDINGS AND CONCLUSIONS

- The project, known as Barton Place, would consist of 244 senior housing residential units, 36,500 square feet of commercial/retail use, and 11,376 square feet of restaurant use. The project is located in the City of Cypress at the northeast corner of Katella Avenue and Enterprise Drive, within the area governed by the Amended and Restated Cypress Business and Professional Center Specific Plan.

- Morning and evening peak hour operating conditions were evaluated at nineteen study intersections for the following study scenarios:

    - Existing Conditions
    - Existing Plus Project
    - Opening Year 2018 Without Project
    - Opening Year 2018 With Project

- Under Existing Conditions, all study intersections currently operate at Level of Service D or better.

- At build-out, the project would generate approximately 3,256 weekday vehicle trips on a daily basis, with 209 trips during the morning peak hour and 181 trips during the evening peak hour.

- Project traffic was added to Existing Conditions to establish Existing Plus Project forecasts. Under Existing Plus Project Conditions, all study intersections will continue to operate at LOS D or better.

- Ambient traffic growth at a conservative rate of 1.0 percent per year and traffic from Cumulative Projects were added to Existing Conditions to establish Opening Year 2018 Without Project forecasts.

- Under Opening Year 2018 Without Project Conditions, all study intersections would operate at their respective target Levels of Service, with the exception of the intersection of Cerritos Avenue at Los Alamitos Boulevard (PM LOS E).

- Project traffic was added to Opening Year 2018 Without Project Conditions to establish Opening Year 2018 With Project forecasts.

- Under Opening Year 2018 With Project Conditions, the project would not have a significant impact on any of the study intersections.

- Based on HCM delay methodology, the intersection of Katella Avenue at the I-605 northbound ramps, which is a State highway facility, would continue to operate at Level of Service A during the morning and evening peak hours under both the Existing Plus Project and the Opening Year 2018 with Project conditions.

- Based on HCM freeway mainline density methodology, the project would not exceed any of the trip generation thresholds with respect to the I-605 and, in any event, would not have a significant impact on freeway mainlines.

- Access to the commercial/retail and restaurant area would be provided by two unsignalized driveways on Katella Avenue and one unsignalized driveway on Enterprise Drive.

- Access to the senior residential community would be provided by one gated entry on Enterprise Drive. In addition, there will be an emergency access driveway on Enterprise Drive for the senior residential community.

- The project includes an efficient and adequate on-site circulation system.

- The existing turn restrictions at the intersection of Katella Avenue at Enterprise Drive, which prohibit southbound through and left-turn movements and eastbound left turns, would be maintained.

- Signal warrant analysis was conducted for the intersection of Katella Avenue at Enterprise Drive. Using the Opening Year 2018 with Project forecasts, the intersection would not satisfy the signal warrants in either the morning or the evening peak hour.

- The project parking supply will meet and exceed the applicable parking requirements in the Specific Plan and the City of Cypress Zoning Ordinance.

- The location of the guest parking spaces for the senior residential community, which are distributed throughout the community adjacent to the private loop road, constitute off-street parking in compliance with the Specific Plan and are otherwise necessary and appropriate.

- The project would not result in a significant impact at any CMP intersection and the traffic study complies with all applicable CMP requirements.

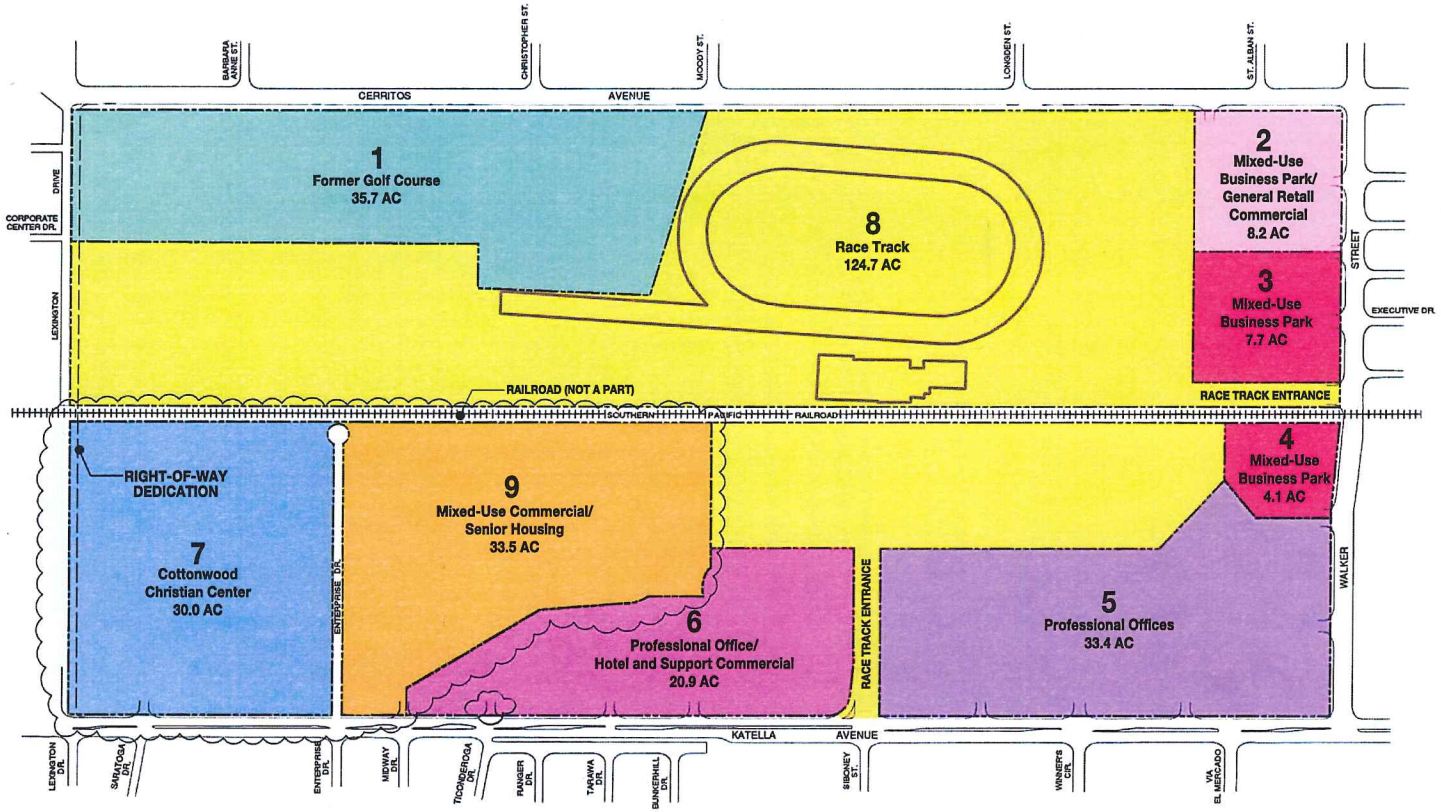
- Traffic generated by construction activity would be limited in duration and would not materially impact the level of service at any of the study intersections.

APPENDIX A

CYPRESS BUSINESS AND PROFESSIONAL CENTER SPECIFIC PLAN MAP

Cypress Business & Professional Center

City of Cypress



PLANNING AREA LAND USE DESIGNATION	ACRES	BUILDING S.F.
Mixed-Use Business Park and/or General Retail Commercial	8.2	160,736
Mixed-Use Business Park	11.8	239,935
Professional Offices & Hotel and Support Commercial	20.9	546,242
Professional Offices	33.4	873,000
Mixed-Use Commercial/ Senior Housing	33.5	875,556
TOTAL	**107.8**	**2,695,469**

STATISTICAL SUMMARY

AREA	ACRES	BUILDING S.F.	AVERAGE DENSITY
1	35.7	Former Golf Course	-
2	8.2	160,736	0.45
3	7.7	150,935	0.45
4	4.1	89,000	0.50
5	33.4	873,000	0.60
6	20.9	546,242	0.60
7	30.0	-	-
8	124.7	Race Track	-
9	33.5	875,556	0.60/ 20 du/ac
TOTAL	**298.2**	**2,695,469**	

Denotes Revision to Graphic in Amended and Restated Specific Plan

0 500'

Robert Bein, William Frost & Associates
11/11 JN 10-108347

Land Use Plan
Exhibit 1 (Part A)

APPENDIX B

EXISTING PEAK HOUR
TRAFFIC DATA COLLECTION SHEETS

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Los Alamitos Blvd and Cerritos Ave , Cypress

Date: 11/20/2014

Day: Thursday

Project #: 14-1311-001

City: Cypress

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	430 PM

Peak Hour Summary

Southbound Approach

Los Alamitos Blvd

Lanes	1	2	1		
AM	99	729	104	929	AM
NOON	0	0	0	0	NOON
PM	48	617	89	1131	PM

Eastbound Approach

Cerritos Ave

	AM	NOON	PM
	1060	0	1301
1	125	0	143
2	938	0	875
1	174	0	234
Lanes	AM	NOON	PM

Westbound Approach

AM	NOON	PM	Lanes
140	0	148	1
791	0	999	2
315	0	379	1
1361	0	1312	
AM	NOON	PM	

CONTROL
Signalzied

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Northbound Approach

AM	1218	170	664	319	AM
NOON	0	0	0	0	NOON
PM	1230	254	840	348	PM
		1	3	0	Lanes

Total Ins & Outs

North Leg		
932	929	AM
0	0	NOON
754	1131	PM

West Leg			East Leg		
AM	NOON	PM			
1060	0	1301	1246	0	1526
1237	0	1252	1361	0	1312
			AM	NOON	PM

South Leg		
1218	1153	AM
0	0	NOON
1230	1442	PM

Total Volume Per Leg

North Leg	
1861	AM
0	NOON
1885	PM

West Leg			East Leg		
AM	NOON	PM			
2297	0	2553	2607	0	2838
			AM	NOON	PM

South Leg	
2371	AM
0	NOON
2672	PM

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Bloomfield St and Cerritos Ave , Cypress

Date: 11/20/2014

Day: Thursday

Project #: 14-1311-002

City: Cypress

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	500 PM

Peak Hour Summary

Southbound Approach (Bloomfield St)

	Lanes 0	2	1	
AM	229	538	139	388
NOON	0	0	0	0
PM	100	283	59	708

Eastbound Approach (Cerritos Ave)

Lanes	AM	NOON	PM
	1339	0	1373
1	53	0	147
2	968	0	1048
0	161	0	96

Westbound Approach

Lanes	AM	NOON	PM
0	59	0	126
2	899	0	1140
1	177	0	99
	1281	0	1242

Northbound Approach

				Lanes
AM	876	211	276	174
NOON	0	0	0	0
PM	478	133	435	135
Lanes		1	2	0

CONTROL

Signalzied

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

	North Leg		East Leg			West Leg		
						AM	NOON	PM
AM	906	388	1135	0	1365	1339	0	1373
NOON	0	0	1281	0	1242	1182	0	1291
PM	442	708	AM	NOON	PM			
	South Leg							
AM	876	661						
NOON	0	0						
PM	478	703						

Total Volume Per Leg

	North Leg		East Leg			West Leg		
						AM	NOON	PM
AM	1294		2416	0	2607	2521	0	2664
NOON	0							
PM	1150		AM	NOON	PM			
	South Leg							
AM	1537							
NOON	0							
PM	1181							

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Lexington Dr and Cerritos Ave , Cypress

Date: 11/20/2014

Day: Thursday

Project #: 14-1311-003

City: Cypress

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	430 PM

Peak Hour Summary

Southbound Approach

Lexington Dr

Lanes	1	1	1		
AM	148	161	215	269	AM
NOON	0	0	0	0	NOON
PM	91	53	92	415	PM

Eastbound Approach

Cerritos Ave

	AM	NOON	PM
	1131	0	1247
1	56	0	135
2	999	0	1120
1	100	0	35
Lanes	AM	NOON	PM

Westbound Approach

AM	NOON	PM	Lanes
142	0	145	0
923	0	1076	2
100	0	46	1
1251	0	1285	
AM	NOON	PM	

CONTROL

Signalzied

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Northbound Approach

AM	361	60	71	37	AM
NOON	0	0	0	0	NOON
PM	134	80	135	73	PM
		0	1	0	Lanes

Total Ins & Outs

North Leg		
524	269	AM
0	0	NOON
236	415	PM

West Leg			East Leg		
AM	NOON	PM			
1131	0	1247	1165	0	1267
1155	0	1290	1251	0	1285
			AM	NOON	PM

South Leg		
361	168	AM
0	0	NOON
134	288	PM

Total Volume Per Leg

North Leg		
793		AM
0		NOON
651		PM

West Leg			East Leg		
AM	NOON	PM			
2286	0	2537	2416	0	2552
			AM	NOON	PM

South Leg		
529		AM
0		NOON
422		PM

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Moody St and Cerritos Ave , Cypress

Date:	11/20/2014
Day:	Thursday

Project #:	14-1311-004
City:	Cypress

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	500 PM

Peak Hour Summary

Southbound Approach

Moody St

Lanes	1	0.5	1.5		
AM	218	1	599	175	AM
NOON	0	0	0	0	NOON
PM	134	1	246	547	PM

Eastbound Approach

Cerritos Ave

	AM	NOON	PM
	1115	0	1336
1	65	0	214
2	1128	0	1076
0	2	0	0
Lanes	AM	NOON	PM

Westbound Approach

AM	NOON	PM	Lanes
109	0	332	0
897	0	1199	2
0	0	3	1
1727	0	1322	
AM	NOON	PM	

CONTROL
Signalzied

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Northbound Approach

AM	3	0	1	0
NOON	0	0	0	0
PM	4	3	1	0
		0	1	0 Lanes

Total Ins & Outs

North Leg		
818	175	AM
0	0	NOON
381	547	PM

West Leg			East Leg		
AM	NOON	PM			
1115	0	1336	1006	0	1534
1195	0	1290	1727	0	1322
			AM	NOON	PM

South Leg		
3	1	AM
0	0	NOON
4	4	PM

Total Volume Per Leg

North Leg
993 AM
0 NOON
928 PM

West Leg			East Leg		
AM	NOON	PM			
2310	0	2626	2733	0	2856
			AM	NOON	PM

South Leg
4 AM
0 NOON
8 PM

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Walker St and Cerritos Ave , Cypress

Date: 11/20/2014

Day: Thursday

Project #: 14-1311-005

City: Cypress

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	430 PM

Peak Hour Summary

Southbound Approach

Walker St

Lanes	0	2	1		
AM	57	695	177	304	AM
NOON	0	0	0	0	NOON
PM	48	413	113	900	PM

Eastbound Approach

Cerritos Ave

Lanes	AM	NOON	PM
	1055	0	1451
1	24	0	68
2	1180	0	992
1	562	0	263

Westbound Approach

Lanes	AM	NOON	PM
1	101	0	144
2	901	0	898
1	98	0	78
	1409	0	1311

CONTROL

Signalzied

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Northbound Approach

AM	1355	97	179	52
NOON	0	0	0	0
PM	754	505	688	206
Lanes		2	2	1

Total Ins & Outs

	North Leg		
AM	929	304	
NOON	0	0	
PM	574	900	

West Leg			East Leg		
AM	NOON	PM	AM	NOON	PM
1055	0	1451	1100	0	1120
1766	0	1323	1409	0	1311

	South Leg	
AM	1355	328
NOON	0	0
PM	754	1399

Total Volume Per Leg

	North Leg
AM	1233
NOON	0
PM	1474

West Leg			East Leg		
AM	NOON	PM	AM	NOON	PM
2821	0	2774	2509	0	2431

	South Leg
AM	1683
NOON	0
PM	2153

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Valley View St and Cerritos Ave , Cypress

Date: 11/20/2014

Day: Thursday

Project #: 14-1311-006

City: Cypress

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	445 PM

Peak Hour Summary

Southbound Approach

Valley View St

Lanes	1	3	1		
AM	287	1350	124	1329	AM
NOON	0	0	0	0	NOON
PM	186	1132	125	2274	PM

Eastbound Approach

Cerritos Ave

	AM	NOON	PM
	1127	0	1038
2	128	0	325
3	675	0	772
1	505	0	265
Lanes	AM	NOON	PM

Westbound Approach

AM	NOON	PM	Lanes
115	0	134	0
657	0	534	2
184	0	95	2
838	0	1081	
AM	NOON	PM	

CONTROL

Signalzied

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Northbound Approach

AM	2039	183	1086	39	AM
NOON	0	0	0	0	NOON
PM	1492	318	1815	184	PM
		1	3	1	Lanes

Total Ins & Outs

	North Leg		
	1761	1329	AM
	0	0	NOON
	1443	2274	PM

West Leg			East Leg		
AM	NOON	PM	AM	NOON	PM
1127	0	1038	956	0	763
1308	0	1362	838	0	1081

	South Leg	
AM	2039	1308
NOON	0	0
PM	1492	2317

Total Volume Per Leg

	North Leg
AM	3090
NOON	0
PM	3717

West Leg			East Leg		
AM	NOON	PM	AM	NOON	PM
2435	0	2400	1794	0	1844

	South Leg
AM	3347
NOON	0
PM	3809

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

I-605 NB Ramp and Katella Ave , Cypress

Date:	11/20/2014
Day:	Thursday

Project #:	14-1311-007
City:	Cypress

AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	445 PM

Peak Hour Summary

Southbound Approach

I-605 NB Ramp

Lanes	1	0	0		
AM	73	0	0	858	AM
NOON	0	0	0	0	NOON
PM	74	0	0	1233	PM

Eastbound Approach

Katella Ave

Lanes	AM	NOON	PM
	1508	0	1702
1	82	0	340
2	1475	0	1910
0	0	0	0

Westbound Approach

Lanes	AM	NOON	PM
2	776	0	893
3	1435	0	1628
0	0	0	0
	2280	0	2668

CONTROL

Signalzied

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Northbound Approach

AM	0	0	0	805	AM
NOON	0	0	0	0	NOON
PM	0	0	0	758	PM
Lanes		0	0	1	Lanes

Total Ins & Outs

	North Leg		
	73	858	AM
	0	0	NOON
	74	1233	PM

	AM	NOON	PM		East Leg		
	1508	0	1702		2211	0	2521
	1557	0	2250		2280	0	2668
	West Leg				AM	NOON	PM

AM	0	805
NOON	0	0
PM	0	758
	South Leg	

Total Volume Per Leg

	North Leg		
	931		AM
	0		NOON
	1307		PM

AM	NOON	PM		East Leg		
3065	0	3952		4491	0	5189
West Leg				AM	NOON	PM

AM	805
NOON	0
PM	758
South Leg	

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Los Alamitos Blvd and Katella Ave , Cypress

Date: 11/20/2014

Day: Thursday

Project #: 14-1311-008

City: Cypress

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	400 PM

Peak Hour Summary

Southbound Approach

Los Alamitos Blvd

Lanes	1	3	2		
AM	151	965	167	1223	AM
NOON	0	0	0	0	NOON
PM	208	1066	177	1248	PM

Eastbound Approach

Katella Ave

Lanes	AM	NOON	PM
	1744	0	2186
2	199	0	307
3	1692	0	1391
1	256	0	442

Westbound Approach

Lanes	AM	NOON	PM
1	77	0	94
3	1198	0	1514
2	329	0	310
	2236	0	1912

CONTROL

Signalzied

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Northbound Approach

AM	1550	395	947	377
NOON	0	0	0	0
PM	1818	464	847	344
Lanes		2	3	1

Total Ins & Outs

	North Leg		
AM	1283	1223	
NOON	0	0	
PM	1451	1248	

West Leg			East Leg		
AM	NOON	PM	AM	NOON	PM
1744	0	2186	1604	0	1918
2147	0	2140	2236	0	1912

	South Leg	
AM	1550	1719
NOON	0	0
PM	1818	1655

Total Volume Per Leg

	North Leg
AM	2506
NOON	0
PM	2699

West Leg			East Leg		
AM	NOON	PM	AM	NOON	PM
3891	0	4326	3840	0	3830

	South Leg
AM	3269
NOON	0
PM	3473

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Bloomfield St and Katella Ave , Cypress

Date:	11/20/2014
Day:	Thursday

Project #:	14-1311-009
City:	Cypress

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	430 PM

Peak Hour Summary

Southbound Approach

Bloomfield St

Lanes	1	1	1		
AM	333	203	180	874	AM
NOON	0	0	0	0	NOON
PM	169	180	225	662	PM

Katella Ave

Eastbound Approach

	AM	NOON	PM
	1619	0	1927
1	276	0	242
3	1828	0	1569
0	38	0	65
Lanes	AM	NOON	PM

CONTROL

Signalzied

Westbound Approach

AM	NOON	PM	Lanes
248	0	311	0
1206	0	1704	3
54	0	76	1
2023	0	1823	
AM	NOON	PM	

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Northbound Approach

AM	295	80	350	15	AM
NOON	0	0	0	0	NOON
PM	321	54	109	29	PM
		1	1.5	0.5	Lanes

Total Ins & Outs

	AM	NOON	PM
North Leg	716	0	574
	874	0	662
West Leg	1619	0	1927
	2142	0	1876
East Leg	1508	0	2091
	2023	0	1823
South Leg	295	0	321
	445	0	192

Total Volume Per Leg

	AM	NOON	PM
North Leg	1590	0	1236
West Leg	3761	0	3803
East Leg	3531	0	3914
South Leg	740	0	513

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Lexington Dr and Katella Ave , Cypress

Date:	11/20/2014
Day:	Thursday

Project #:	14-1311-010
City:	Cypress

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	500 PM

Peak Hour Summary

Southbound Approach

Lexington Dr

Lanes	0.5	0	1.5		
AM	103	7	121	198	AM
NOON	0	0	0	0	NOON
PM	120	12	130	241	PM

Eastbound Approach

Katella Ave

Lanes	AM	NOON	PM
	1581	0	1893
2	65	0	86
3	1657	0	1667
1	116	0	72

Westbound Approach

Lanes	AM	NOON	PM
0	84	0	109
3	1385	0	1697
1	101	0	118
	1870	0	1905

CONTROL

Signalzied

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Northbound Approach

AM	224	93	49	92
NOON	0	0	0	0
PM	202	76	46	108
Lanes		1	1	1

Total Ins & Outs

	North Leg		
AM	231	198	AM
NOON	0	0	NOON
PM	262	241	PM

West Leg AM	NOON	PM	East Leg AM	NOON	PM
1581	0	1893	1570	0	1924
1838	0	1825	1870	0	1905

	South Leg	
AM	224	234
NOON	0	0
PM	202	230

Total Volume Per Leg

	North Leg
AM	429
NOON	0
PM	503

West Leg AM	NOON	PM	East Leg AM	NOON	PM
3419	0	3718	3440	0	3829

	South Leg
AM	458
NOON	0
PM	432

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Cottonwood Way and Katella Ave , Cypress

Date:	11/20/2014
Day:	Thursday

Project #:	14-1311-011
City:	Cypress

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	430 PM

Peak Hour Summary

Southbound Approach

Cottonwood Way

Lanes	0.5	0	1.5		
AM	3	0	0	9	AM
NOON	0	0	0	0	NOON
PM	1	0	6	15	PM

Eastbound Approach

Katella Ave

	AM	NOON	PM
	1558	0	1940
1	4	0	11
3	1859	0	1894
0	4	0	1
Lanes	AM	NOON	PM

Westbound Approach

AM	NOON	PM	Lanes
5	0	4	0
1555	0	1939	3
0	0	0	0
1859	0	1903	
AM	NOON	PM	

CONTROL
Signalzied

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Northbound Approach

AM	4	0	0	0	AM
NOON	0	0	0	0	NOON
PM	1	0	0	3	PM
		0	1	0	Lanes

Total Ins & Outs

North Leg		
3	9	AM
0	0	NOON
7	15	PM

West Leg			East Leg		
AM	NOON	PM			
1558	0	1940	1560	0	1943
1867	0	1906	1859	0	1903
			AM	NOON	PM

South Leg		
4	0	AM
0	0	NOON
1	3	PM

Total Volume Per Leg

North Leg		
12		AM
0		NOON
22		PM

West Leg			East Leg		
AM	NOON	PM			
3425	0	3846	3419	0	3846
			AM	NOON	PM

South Leg	
4	AM
0	NOON
4	PM

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Enterprise Dr and Katella Ave , Cypress

Date:	11/20/2014
Day:	Thursday

Project #:	14-1311-012
City:	Cypress

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	415 PM

Peak Hour Summary

Southbound Approach

Enterprise Dr

Lanes	2	0	0		
AM	1	0	0	18	AM
NOON	0	0	0	0	NOON
PM	2	0	0	2	PM

Eastbound Approach

Katella Ave

	AM	NOON	PM
	1560	0	1955
0	0	0	0
3	1857	0	1875
0	4	0	13
Lanes	AM	NOON	PM

Westbound Approach

AM	NOON	PM	Lanes
18	0	2	0
1556	0	1951	3
10	0	19	1
1867	0	1882	
AM	NOON	PM	

CONTROL

2 Way Stop (NB & SB)

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Northbound Approach

AM	14	3	0	10	AM
NOON	0	0	0	0	NOON
PM	32	2	0	7	PM
		0	1	0	Lanes

Total Ins & Outs

	North Leg		
	1	18	AM
	0	0	NOON
	2	2	PM

West Leg				East Leg		
AM	NOON	PM		AM	NOON	PM
1560	0	1955		1584	0	1972
1861	0	1888		1867	0	1882

	South Leg	
AM	14	13
NOON	0	0
PM	32	9

Total Volume Per Leg

	North Leg
AM	19
NOON	0
PM	4

West Leg				East Leg		
AM	NOON	PM		AM	NOON	PM
3421	0	3843		3451	0	3854

	South Leg
AM	27
NOON	0
PM	41

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Siboney St and Katella Ave , Cypress

Date: 11/20/2014

Day: Thursday

Project #: 14-1311-013

City: Cypress

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	430 PM

Peak Hour Summary

Southbound Approach

Siboney St

Lanes	1	1	0		
AM	20	3	31	178	AM
NOON	0	0	0	0	NOON
PM	71	5	75	155	PM

Eastbound Approach

Katella Ave

	AM	NOON	PM
	1520	0	2035
2	130	0	100
3	1728	0	1926
0	25	0	39
Lanes	AM	NOON	PM

Westbound Approach

	AM	NOON	PM	Lanes
	43	0	53	1
	1458	0	1902	3
	36	0	61	1
	1793	0	2068	
	AM	NOON	PM	

CONTROL

Signalzied

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Northbound Approach

AM	64	42	5	34	AM
NOON	0	0	0	0	NOON
PM	105	62	2	67	PM
		0.5	0.5	1	Lanes

Total Ins & Outs

	North Leg		
	54	178	AM
	0	0	NOON
	151	155	PM

West Leg			East Leg		
AM	NOON	PM			
1520	0	2035	1537	0	2016
1883	0	2065	1793	0	2068
			AM	NOON	PM

	South Leg	
AM	64	81
NOON	0	0
PM	105	131

Total Volume Per Leg

	North Leg
AM	232
NOON	0
PM	306

West Leg			East Leg		
AM	NOON	PM			
3403	0	4100	3330	0	4084
			AM	NOON	PM

	South Leg
AM	145
NOON	0
PM	236

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Winners Circle and Katella Ave , Cypress

Date:	11/20/2014
Day:	Thursday

Project #:	14-1311-014
City:	Cypress

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	430 PM

Peak Hour Summary

Southbound Approach (Winners Circle)

Lanes	0	1	1		
AM	5	0	7	22	AM
NOON	0	0	0	0	NOON
PM	47	0	33	156	PM

Eastbound Approach (Katella Ave)

Lanes	AM	NOON	PM
	1576	0	1987
1	18	0	144
3	1771	0	1839
0	25	0	15

Westbound Approach

Lanes	AM	NOON	PM
0	3	0	8
3	1566	0	1898
1	54	0	53
	1782	0	1924

Northbound Approach

AM	79	5	1	4
NOON	0	0	0	0
PM	68	42	4	52
Lanes		1	1	0

CONTROL

Signalzied

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

	North Leg		
AM	12	22	AM
NOON	0	0	NOON
PM	80	156	PM

West Leg AM	NOON	PM	East Leg AM	NOON	PM
1576	0	1987	1623	0	1959
1814	0	1998	1782	0	1924

	South Leg
AM	79	10
NOON	0	0
PM	68	98

Total Volume Per Leg

	North Leg
AM	34
NOON	0
PM	236

West Leg AM	NOON	PM	East Leg AM	NOON	PM
3390	0	3985	3405	0	3883

	South Leg
AM	89
NOON	0
PM	166

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Walker St and Katella Ave , Cypress

Date: 11/20/2014

Day: Thursday

Project #: 14-1311-015

City: Cypress

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	430 PM

Peak Hour Summary

Southbound Approach

Walker St

Lanes	2	0.5	1.5		
AM	195	9	839	469	AM
NOON	0	0	0	0	NOON
PM	200	1	551	820	PM

Eastbound Approach

Katella Ave

	AM	NOON	PM
	1662	0	1966
2	166	0	265
3	1560	0	1661
0	2	0	2
Lanes	AM	NOON	PM

Westbound Approach

AM	NOON	PM	Lanes
301	0	539	1
1461	0	1739	3
8	0	2	1
2399	0	2216	
AM	NOON	PM	

CONTROL

Signalzied

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Northbound Approach

AM	19	6	2	0	AM
NOON	0	0	0	0	NOON
PM	5	27	16	4	PM
		0.5	1	0.5	Lanes

Total Ins & Outs

	North Leg		
	1043	469	AM
	0	0	NOON
	752	820	PM

West Leg			East Leg		
AM	NOON	PM			
1662	0	1966	1770	0	2280
1728	0	1928	2399	0	2216
			AM	NOON	PM

	South Leg	
AM	19	8
NOON	0	0
PM	5	47

Total Volume Per Leg

	North Leg
AM	1512
NOON	0
PM	1572

West Leg			East Leg		
AM	NOON	PM			
3390	0	3894	4169	0	4496
			AM	NOON	PM

	South Leg
AM	27
NOON	0
PM	52

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Valley View St and Katella Ave , Cypress

Date: 11/20/2014

Day: Thursday

Project #: 14-1311-016

City: Cypress

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	445 PM

Peak Hour Summary

Southbound Approach

Valley View St

Lanes	1	3	2		
AM	243	1159	207	1848	AM
NOON	0	0	0	0	NOON
PM	222	1385	264	1944	PM

Eastbound Approach

Katella Ave

Lanes	AM	NOON	PM
	2006	0	1834
2	250	0	271
3	1011	0	1086
1	792	0	1291

Westbound Approach

Lanes	AM	NOON	PM
1	157	0	272
3	980	0	1009
2	170	0	353
	1488	0	1513

CONTROL

Signalzied

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Northbound Approach

AM	2121	783	1441	270
NOON	0	0	0	0
PM	3029	603	1401	163
Lanes		3	3	1

Total Ins & Outs

	North Leg		
AM	1609	1848	
NOON	0	0	
PM	1871	1944	

West Leg	AM	NOON	PM
	2006	0	1834
	2053	0	2648

East Leg	AM	NOON	PM
	1307	0	1634
	1488	0	1513

	South Leg	
AM	2121	2494
NOON	0	0
PM	3029	2167

Total Volume Per Leg

	North Leg
AM	3457
NOON	0
PM	3815

West Leg	AM	NOON	PM
	4059	0	4482

East Leg	AM	NOON	PM
	2795	0	3147

	South Leg
AM	4615
NOON	0
PM	5196

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Los Alamitos Blvd and Farquhar Ave , Cypress

Date:	11/20/2014
Day:	Thursday

Project #:	14-1311-017
City:	Cypress

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	415 PM

Peak Hour Summary

Southbound Approach

Los Alamitos Blvd

Lanes	0	3	1		
AM	0	1378	125	1844	AM
NOON	0	0	0	0	NOON
PM	0	1686	116	1710	PM

Eastbound Approach

Farquhar Ave

	AM	NOON	PM
	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
Lanes	AM	NOON	PM

Westbound Approach

AM	NOON	PM	Lanes
119	0	168	0.5
0	0	0	0
346	0	427	1.5
307	0	285	
AM	NOON	PM	

CONTROL
Signalzied

Northbound Approach

AM	1724	0	1725	182	AM
NOON	0	0	0	0	NOON
PM	2113	0	1542	169	PM
		0	3	0	Lanes

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg		
1503	1844	AM
0	0	NOON
1802	1710	PM

West Leg				East Leg		
AM	NOON	PM				
0	0	0		465	0	595
0	0	0		307	0	285
				AM	NOON	PM

South Leg		
1724	1907	AM
0	0	NOON
2113	1711	PM

Total Volume Per Leg

North Leg	
3347	AM
0	NOON
3512	PM

West Leg				East Leg		
AM	NOON	PM				
0	0	0		772	0	880
				AM	NOON	PM

South Leg	
3631	AM
0	NOON
3824	PM

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Valley View St and Orangewood Ave , Cypress

Date:	11/20/2014
Day:	Thursday

Project #:	14-1311-018
City:	Cypress

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	445 PM

Peak Hour Summary

Southbound Approach

Valley View St

Lanes	1	3	2		
AM	43	1739	233	2686	AM
NOON	0	0	0	0	NOON
PM	101	2242	549	2023	PM

Eastbound Approach

Orangewood Ave

	AM	NOON	PM
	93	0	134
1	143	0	104
2	60	0	49
0	13	0	25
Lanes	AM	NOON	PM

Westbound Approach

AM	NOON	PM	Lanes
644	0	442	1
30	0	16	0.5
75	0	75	1.5
358	0	666	
AM	NOON	PM	

CONTROL
Signalzied

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Northbound Approach

AM	1827	20	1899	65	AM
NOON	0	0	0	0	NOON
PM	2342	17	1477	68	PM
		1	3	0	Lanes

Total Ins & Outs

			North Leg					
			2015	2686	AM			
			0	0	NOON			
			2892	2023	PM			
AM	NOON	PM				East Leg		
93	0	134				749	0	533
216	0	178				358	0	666
West Leg						AM	NOON	PM
			1827	1984	AM			
			0	0	NOON			
			2342	1562	PM			
			South Leg					

Total Volume Per Leg

			North Leg					
			4701		AM			
			0		NOON			
			4915		PM			
AM	NOON	PM				East Leg		
309	0	312				1107	0	1199
West Leg						AM	NOON	PM
			3811		AM			
			0		NOON			
			3904		PM			
			South Leg					

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Lexington Dr and Farquhar Ave , Cypress

Date:	11/20/2014
Day:	Thursday

Project #:	14-1311-019
City:	Cypress

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	400 PM

Peak Hour Summary

Southbound Approach

Lexington Dr

Lanes	1	2	0		
AM	75	218	0	122	AM
NOON	0	0	0	0	NOON
PM	80	70	0	301	PM

Eastbound Approach

Farquhar Ave

	AM	NOON	PM
	78	0	186
0	81	0	69
1	0	0	0
0	83	0	28
Lanes	AM	NOON	PM

Westbound Approach

AM	NOON	PM	Lanes
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	
AM	NOON	PM	

CONTROL

3 Way Stop (NB , SB & EB)

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Northbound Approach

AM	301	3	41	0	AM
NOON	0	0	0	0	NOON
PM	98	106	232	0	PM
		1	1	0	Lanes

Total Ins & Outs

	North Leg		
	293	122	AM
	0	0	NOON
	150	301	PM

West Leg AM	West Leg NOON	West Leg PM		East Leg AM	East Leg NOON	East Leg PM
78	0	186		0	0	0
164	0	97		0	0	0

	South Leg	
AM	301	44
NOON	0	0
PM	98	338

Total Volume Per Leg

	North Leg
AM	415
NOON	0
PM	451

West Leg AM	West Leg NOON	West Leg PM		East Leg AM	East Leg NOON	East Leg PM
242	0	283		0	0	0

	South Leg
AM	345
NOON	0
PM	436

APPENDIX C

INTERSECTION ANALYSIS WORKSHEETS

Appendix C-1

Existing Conditions

Cypress Barton Place
Existing Conditions
AM Peak Hour

Scenario Report

Scenario:	Existing AM ICU
Command:	Existing AM
Volume:	AM EXISTING
Geometry:	Existing
Impact Fee:	Default Impact Fee
Trip Generation:	none
Trip Distribution:	none
Paths:	none
Routes:	Default Route
Configuration:	ICU

Cypress Barton Place
Existing Conditions
AM Peak Hour

Turning Movement Report
Daily

Volume	Northbound			Southbound			Eastbound			Westbound			Total
Type	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
#1 Cerritos Ave. / Los Alamitos Blvd													
Base	170	664	319	104	729	99	125	938	174	315	791	140	4568
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	170	664	319	104	729	99	125	938	174	315	791	140	4568
#2 Cerritos Ave / Bloomfield St													
Base	211	276	174	139	538	229	53	968	161	177	899	59	3884
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	211	276	174	139	538	229	53	968	161	177	899	59	3884
#3 Cerritos Ave / Denni St													
Base	60	71	37	215	161	148	56	999	100	100	923	142	3012
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	60	71	37	215	161	148	56	999	100	100	923	142	3012
#4 Cerritos Ave / Moody St													
Base	0	1	0	599	1	218	65	1128	2	0	897	109	3020
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	599	1	218	65	1128	2	0	897	109	3020
#5 Cerritos Ave / Walker St													
Base	97	179	52	177	695	57	24	1180	562	98	901	101	4123
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	97	179	52	177	695	57	24	1180	562	98	901	101	4123
#6 Cerritos Avenue / Valley View Street													
Base	183	1086	39	124	1350	287	128	675	505	184	657	115	5333
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	183	1086	39	124	1350	287	128	675	505	184	657	115	5333
#7 Katella Ave. / I-605 NB Ramps													
Base	0	0	805	0	0	73	82	1475	0	0	1435	776	4646
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	805	0	0	73	82	1475	0	0	1435	776	4646
#8 Katella Ave. / Los Alamitos Blvd.													
Base	395	947	377	167	965	151	199	1692	256	329	1198	77	6753
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	395	947	377	167	965	151	199	1692	256	329	1198	77	6753
#9 Katella Avenue / Bloomfield Street													
Base	80	350	15	180	203	333	276	1828	38	54	1206	248	4811
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	80	350	15	180	203	333	276	1828	38	54	1206	248	4811

Cypress Barton Place
Existing Conditions
AM Peak Hour

Volume Type	Northbound Left	Thru	Right	Southbound Left	Thru	Right	Eastbound Left	Thru	Right	Westbound Left	Thru	Right	Total Volume
#10 Katella Ave / Lexington Dr													
Base	93	49	92	121	7	103	65	1657	116	101	1385	84	3873
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	93	49	92	121	7	103	65	1657	116	101	1385	84	3873
#11 Katella Ave / Cottonwood Way													
Base	0	0	0	0	0	3	4	1859	4	0	1555	5	3430
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	3	4	1859	4	0	1555	5	3430
#12 Katella Ave. / Enterprise Dr.													
Base	3	0	10	0	0	1	0	1857	4	10	1556	18	3459
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	3	0	10	0	0	1	0	1857	4	10	1556	18	3459
#13 Katella Avenue / Siboney Street													
Base	42	5	34	31	3	20	130	1728	25	36	1458	43	3555
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	42	5	34	31	3	20	130	1728	25	36	1458	43	3555
#14 Katella Avenue / Winner Circle													
Base	5	1	4	7	0	5	18	1771	25	54	1566	3	3459
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	5	1	4	7	0	5	18	1771	25	54	1566	3	3459
#15 Katella Avenue / Walker Street													
Base	6	2	0	839	9	195	166	1560	2	8	1461	301	4549
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	6	2	0	839	9	195	166	1560	2	8	1461	301	4549
#16 Katella Avenue / Valley View Street													
Base	783	1441	270	207	1159	243	250	1011	792	170	980	157	7463
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	783	1441	270	207	1159	243	250	1011	792	170	980	157	7463
#17 Farquhar Ave / Los Alamitos Blvd													
Base	0	1725	182	125	1378	0	0	0	0	346	0	119	3875
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1725	182	125	1378	0	0	0	0	346	0	119	3875
#18 Farquhar Ave / Lexington Dr													
Base	3	41	0	0	218	75	81	0	83	0	0	0	501
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	3	41	0	0	218	75	81	0	83	0	0	0	501

Cypress Barton Place
Existing Conditions
AM Peak Hour

Volume Type	Northbound Left	Thru	Right	Southbound Left	Thru	Right	Eastbound Left	Thru	Right	Westbound Left	Thru	Right	Total Volume
#19 Orangewood Avenue / Valley View Street													
Base	20	1899	65	233	1739	43	143	60	13	75	30	644	4964
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	20	1899	65	233	1739	43	143	60	13	75	30	644	4964

Cypress Barton Place
Existing Conditions
AM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
# 1 Cerritos Ave. / Los Alamitos B	D	xxxxx	0.826	D	xxxxx	0.826	+ 0.000 V/C
# 2 Cerritos Ave / Bloomfield St	D	xxxxx	0.836	D	xxxxx	0.836	+ 0.000 V/C
# 3 Cerritos Ave / Denni St	B	xxxxx	0.628	B	xxxxx	0.628	+ 0.000 V/C
# 4 Cerritos Ave / Moody St	A	xxxxx	0.561	A	xxxxx	0.561	+ 0.000 V/C
# 5 Cerritos Ave / Walker St	B	xxxxx	0.688	B	xxxxx	0.688	+ 0.000 V/C
# 6 Cerritos Avenue / Valley View	C	xxxxx	0.774	C	xxxxx	0.774	+ 0.000 V/C
# 7 Katella Ave. / I-605 NB Ramps	A	xxxxx	0.380	A	xxxxx	0.380	+ 0.000 V/C
# 8 Katella Ave. / Los Alamitos Bl	C	xxxxx	0.784	C	xxxxx	0.784	+ 0.000 V/C
# 9 Katella Avenue / Bloomfield S	C	xxxxx	0.740	C	xxxxx	0.740	+ 0.000 V/C
# 10 Katella Ave / Lexington Dr	A	xxxxx	0.557	A	xxxxx	0.557	+ 0.000 V/C
# 11 Katella Ave / Cottonwood Way	A	xxxxx	0.417	A	xxxxx	0.417	+ 0.000 V/C
# 12 Katella Ave. / Enterprise Dr.	F	71.3	0.171	F	71.3	0.171	+ 0.000 D/V
# 13 Katella Avenue / Siboney Stree	A	xxxxx	0.453	A	xxxxx	0.453	+ 0.000 V/C
# 14 Katella Avenue / Winner Circle	A	xxxxx	0.437	A	xxxxx	0.437	+ 0.000 V/C
# 15 Katella Avenue / Walker Street	B	xxxxx	0.638	B	xxxxx	0.638	+ 0.000 V/C
# 16 Katella Avenue / Valley View S	B	xxxxx	0.696	B	xxxxx	0.696	+ 0.000 V/C
# 17 Farquhar Ave / Los Alamitos Bl	B	xxxxx	0.634	B	xxxxx	0.634	+ 0.000 V/C
# 18 Farquhar Ave / Lexington Dr	A	8.3	0.209	A	8.3	0.209	+ 0.000 V/C
# 19 Orangewood Avenue / Valley Vie	C	xxxxx	0.786	C	xxxxx	0.786	+ 0.000 V/C

Cypress Barton Place
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #1 Cerritos Ave. / Los Alamitos Blvd

Cycle (sec):	100	Critical Vol./Cap.(X):	0.826
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	58	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 1	0	1 0	2 0	1	1 0	2 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	170	664	319	104	729	99	125	938	174	315	791	140
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	170	664	319	104	729	99	125	938	174	315	791	140
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	170	664	319	104	729	99	125	938	174	315	791	140
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	170	664	319	104	729	99	125	938	174	315	791	140
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	170	664	319	104	729	99	125	938	174	315	791	140
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.03	0.97	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1700	3445	1655	1700	3400	1700	1700	3400	1700	1700	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.10	0.19	0.19	0.06	0.21	0.06	0.07	0.28	0.10	0.19	0.23	0.08
Crit Moves:	****				****			****		****		

Cypress Barton Place
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #2 Cerritos Ave / Bloomfield St

Cycle (sec):	100	Critical Vol./Cap.(X):	0.836
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	61	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1 1	0	1 0	1 1	0	1 0	1 1	0	1 0	1 1	0
Volume Module: >> Count Date: 17 Nov 2011 << Existing AM Peak Hour												
Base Vol:	211	276	174	139	538	229	53	968	161	177	899	59
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	211	276	174	139	538	229	53	968	161	177	899	59
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	211	276	174	139	538	229	53	968	161	177	899	59
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	211	276	174	139	538	229	53	968	161	177	899	59
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	211	276	174	139	538	229	53	968	161	177	899	59
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.23	0.77	1.00	1.40	0.60	1.00	1.71	0.29	1.00	1.88	0.12
Final Sat.:	1700	2085	1315	1700	2385	1015	1700	2915	485	1700	3191	209
Capacity Analysis Module:												
Vol/Sat:	0.12	0.13	0.13	0.08	0.23	0.23	0.03	0.33	0.33	0.10	0.28	0.28
Crit Moves:	****				****			****		****		

Cypress Barton Place
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #3 Cerritos Ave / Denni St

Cycle (sec):	100	Critical Vol./Cap.(X):	0.628
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	31	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Prot+Permit			Prot+Permit		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	1! 0	0	1 0	1 0	1	1 0	2 0	1	1 0	1 1	0
Volume Module: >> Count Date: 17 Nov 2011 << Existing AM Peak Hour												
Base Vol:	60	71	37	215	161	148	56	999	100	100	923	142
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	60	71	37	215	161	148	56	999	100	100	923	142
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	60	71	37	215	161	148	56	999	100	100	923	142
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	60	71	37	215	161	148	56	999	100	100	923	142
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	60	71	37	215	161	148	56	999	100	100	923	142
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.36	0.42	0.22	1.00	1.00	1.00	1.00	2.00	1.00	1.00	1.73	0.27
Final Sat.:	607	718	374	1700	1700	1700	1700	3400	1700	1700	2947	453
Capacity Analysis Module:												
Vol/Sat:	0.10	0.10	0.10	0.13	0.09	0.09	0.03	0.29	0.06	0.06	0.31	0.31
Crit Moves:			****	****				****		****		

Cypress Barton Place
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #4 Cerritos Ave / Moody St

Cycle (sec):	100	Critical Vol./Cap.(X):	0.561
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	27	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Prot+Permit			Prot+Permit		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	1	0 0	1 1	0	0 1	1 0	1	1 0	1 0	1	1 0
Volume Module: >> Count Date: 1 Feb 2012 << Existing AM Peak Hour												
Base Vol:	0	1	0	599	1	218	65	1128	2	0	897	109
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1	0	599	1	218	65	1128	2	0	897	109
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1	0	599	1	218	65	1128	2	0	897	109
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	1	0	599	1	218	65	1128	2	0	897	109
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	1	0	599	1	218	65	1128	2	0	897	109
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	0.00	1.99	0.01	1.00	1.00	1.99	0.01	1.00	1.78	0.22
Final Sat.:	0	1700	0	3394	6	1700	1700	3394	6	1700	3032	368
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.18	0.18	0.13	0.04	0.33	0.33	0.00	0.30	0.30
Crit Moves:		****		****			****				****	

Cypress Barton Place
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #5 Cerritos Ave / Walker St

Cycle (sec):	100	Critical Vol./Cap.(X):	0.688
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	36	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2 0	2	0 1	1 0	1	1 0	1 0	3	0 1	1 0	2	0 1
Volume Module: >> Count Date: 1 Feb 2012 << Existing AM Peak Hour												
Base Vol:	97	179	52	177	695	57	24	1180	562	98	901	101
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	97	179	52	177	695	57	24	1180	562	98	901	101
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	97	179	52	177	695	57	24	1180	562	98	901	101
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	97	179	52	177	695	57	24	1180	562	98	901	101
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	97	179	52	177	695	57	24	1180	562	98	901	101
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	1.00	1.85	0.15	1.00	3.00	1.00	1.00	2.00	1.00
Final Sat.:	3400	3400	1700	1700	3142	258	1700	5100	1700	1700	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.03	0.05	0.03	0.10	0.22	0.22	0.01	0.23	0.33	0.06	0.27	0.06
Crit Moves:	****				****				****	****		

Cypress Barton Place
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #6 Cerritos Avenue / Valley View Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.774
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	47	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	3 0	1	1 0	3 0	1	2 0	3 0	1	2 0	1 1	0
Volume Module:												
Base Vol:	183	1086	39	124	1350	287	128	675	505	184	657	115
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	183	1086	39	124	1350	287	128	675	505	184	657	115
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	183	1086	39	124	1350	287	128	675	505	184	657	115
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	183	1086	39	124	1350	287	128	675	505	184	657	115
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	183	1086	39	124	1350	287	128	675	505	184	657	115
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	3.00	1.00	1.00	3.00	1.00	2.00	3.00	1.00	2.00	1.70	0.30
Final Sat.:	1700	5100	1700	1700	5100	1700	3400	5100	1700	3400	2894	506
Capacity Analysis Module:												
Vol/Sat:	0.11	0.21	0.02	0.07	0.26	0.17	0.04	0.13	0.30	0.05	0.23	0.23
Crit Moves:	****				****				****	****		

Cypress Barton Place
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #7 Katella Ave. / I-605 NB Ramps

Cycle (sec):	100	Critical Vol./Cap.(X):	0.380
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	19	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Ignore			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	0 0	1	0 0	0 0	1	1 0	3 0	0	0 0	2 1	1
Volume Module:												
Base Vol:	0	0	805	0	0	73	82	1475	0	0	1435	776
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	805	0	0	73	82	1475	0	0	1435	776
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Volume:	0	0	0	0	0	0	82	1475	0	0	1435	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	0	0	0	82	1475	0	0	1435	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
FinalVolume:	0	0	0	0	0	0	82	1475	0	0	1435	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	1.00	0.00	0.00	1.00	1.00	3.00	0.00	0.00	3.00	1.00
Final Sat.:	0	0	1700	0	0	1700	1700	5100	0	0	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.29	0.00	0.00	0.28	0.00
Crit Moves:							****				****	

Cypress Barton Place
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #8 Katella Ave. / Los Alamitos Blvd.

Cycle (sec):	100	Critical Vol./Cap.(X):	0.784
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	49	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:		Ovl			Ovl			Ovl			Ovl	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2 0	3 0	1	2 0	3 0	1	2 0	3 0	1	2 0	3 0	1
Volume Module:												
Base Vol:	395	947	377	167	965	151	199	1692	256	329	1198	77
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	395	947	377	167	965	151	199	1692	256	329	1198	77
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	395	947	377	167	965	151	199	1692	256	329	1198	77
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	395	947	377	167	965	151	199	1692	256	329	1198	77
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	395	947	377	167	965	151	199	1692	256	329	1198	77
OvlAdjVol:			213			51			58			0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.12	0.19	0.22	0.05	0.19	0.09	0.06	0.33	0.15	0.10	0.23	0.05
OvlAdjV/S:			0.13			0.03			0.03			0.00
Crit Moves:	****				****			****		****		

Cypress Barton Place
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #9 Katella Avenue / Bloomfield Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.740
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	42	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Prot+Permit			Prot+Permit			Protected			Protected		
Rights:		Include			Include			Include			Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1 1	0	1 0	1 0	1	1 0	2 1	0	1 0	2 1	0
Volume Module:												
Base Vol:	80	350	15	180	203	333	276	1828	38	54	1206	248
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	80	350	15	180	203	333	276	1828	38	54	1206	248
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	80	350	15	180	203	333	276	1828	38	54	1206	248
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	80	350	15	180	203	333	276	1828	38	54	1206	248
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	80	350	15	180	203	333	276	1828	38	54	1206	248
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.92	0.08	1.00	1.00	1.00	1.00	2.94	0.06	1.00	2.49	0.51
Final Sat.:	1700	3260	140	1700	1700	1700	1700	4996	104	1700	4230	870
Capacity Analysis Module:												
Vol/Sat:	0.05	0.11	0.11	0.11	0.12	0.20	0.16	0.37	0.37	0.03	0.29	0.29
Crit Moves:	****					****	****				****	

Cypress Barton Place
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #10 Katella Ave / Lexington Dr

Cycle (sec):	100	Critical Vol./Cap.(X):	0.557
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	26	Level Of Service:	A

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Split Phase						Split Phase						Protected						Protected					
Rights:	Include						Include						Include						Include					
Min. Green:	0	0	0				0	0	0				0	0	0				0	0	0			
Y+R:	4.0	4.0	4.0				4.0	4.0	4.0				4.0	4.0	4.0				4.0	4.0	4.0			
Lanes:	1	0	1	0	1		1	0	1!	0	0		2	0	3	0	1		1	0	2	1	0	
Volume Module: >> Count Date: 17 Nov 2011 << Existing AM Peak Hour																								
Base Vol:	93	49	92				121	7	103				65	1657	116				101	1385	84			
Growth Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
Initial Bse:	93	49	92				121	7	103				65	1657	116				101	1385	84			
User Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Volume:	93	49	92				121	7	103				65	1657	116				101	1385	84			
Reduct Vol:	0	0	0				0	0	0				0	0	0				0	0	0			
Reduced Vol:	93	49	92				121	7	103				65	1657	116				101	1385	84			
PCE Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
MLF Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
FinalVolume:	93	49	92				121	7	103				65	1657	116				101	1385	84			
Saturation Flow Module:																								
Sat/Lane:	1700	1700	1700				1700	1700	1700				1700	1700	1700				1700	1700	1700			
Adjustment:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
Lanes:	1.00	1.00	1.00				1.05	0.06	0.89				2.00	3.00	1.00				1.00	2.83	0.17			
Final Sat.:	1700	1700	1700				1781	103	1516				3400	5100	1700				1700	4808	292			
Capacity Analysis Module:																								
Vol/Sat:	0.05	0.03	0.05				0.07	0.07	0.07				0.02	0.32	0.07				0.06	0.29	0.29			
Crit Moves:	****						****							****					****					

Cypress Barton Place
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #11 Katella Ave / Cottonwood Way

Cycle (sec):	100	Critical Vol./Cap.(X):	0.417
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	21	Level Of Service:	A

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Split Phase						Split Phase						Protected						Protected					
Rights:	Include						Include						Include						Include					
Min. Green:	0	0	0				0	0	0				0	0	0				0	0	0			
Y+R:	4.0	4.0	4.0				4.0	4.0	4.0				4.0	4.0	4.0				4.0	4.0	4.0			
Lanes:	0	0	0	0	0		1	0	0	0	1		1	0	2	1	0		0	0	2	1	0	
Volume Module:																								
Base Vol:	0	0	0				0	0	3				4	1859	4				0	1555	5			
Growth Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
Initial Bse:	0	0	0				0	0	3				4	1859	4				0	1555	5			
User Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Volume:	0	0	0				0	0	3				4	1859	4				0	1555	5			
Reduct Vol:	0	0	0				0	0	0				0	0	0				0	0	0			
Reduced Vol:	0	0	0				0	0	3				4	1859	4				0	1555	5			
PCE Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
MLF Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
FinalVolume:	0	0	0				0	0	3				4	1859	4				0	1555	5			
Saturation Flow Module:																								
Sat/Lane:	1700	1700	1700				1700	1700	1700				1700	1700	1700				1700	1700	1700			
Adjustment:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
Lanes:	0.00	0.00	0.00				1.00	0.00	1.00				1.00	2.99	0.01				0.00	2.99	0.01			
Final Sat.:	0	0	0				1700	0	1700				1700	5089	11				0	5084	16			
Capacity Analysis Module:																								
Vol/Sat:	0.00	0.00	0.00				0.00	0.00	0.00				0.00	0.37	0.37				0.00	0.31	0.31			
Crit Moves:													****		****				****					

Cypress Barton Place
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #12 Katella Ave. / Enterprise Dr.

Average Delay (sec/veh): 0.3 Worst Case Level Of Service: F[71.3]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Stop Sign						Stop Sign						Uncontrolled						Uncontrolled					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	1!	0	0		0	0	0	0	2		0	0	2	1	0		1	0	2	1	0	
Volume Module:																								
Base Vol:	3		0		10		0		0		1		0	1857		4			10	1556		18		
Growth Adj:	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00
Initial Bse:	3		0		10		0		0		1		0	1857		4			10	1556		18		
User Adj:	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00
PHF Adj:	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00
PHF Volume:	3		0		10		0		0		1		0	1857		4			10	1556		18		
Reduct Vol:	0		0		0		0		0		0		0	0		0			0	0		0		
FinalVolume:	3		0		10		0		0		1		0	1857		4			10	1556		18		
Critical Gap Module:																								
Critical Gp:	7.5	6.5		6.9	xxxxx	xxxx		6.9	xxxxx	xxxx	xxxxx		4.1	xxxx	xxxxx									
FollowUpTim:	3.5	4.0		3.3	xxxxx	xxxx		3.3	xxxxx	xxxx	xxxxx		2.2	xxxx	xxxxx									
Capacity Module:																								
Cnflict Vol:	2398	3453		621	xxxx	xxxx		528	xxxx	xxxx	xxxxx		1861	xxxx	xxxxx									
Potent Cap.:	18	7		435	xxxx	xxxx		500	xxxx	xxxx	xxxxx		329	xxxx	xxxxx									
Move Cap.:	18	7		435	xxxx	xxxx		500	xxxx	xxxx	xxxxx		329	xxxx	xxxxx									
Volume/Cap:	0.17	0.00		0.02	xxxx	xxxx		0.00	xxxx	xxxx	xxxx		0.03	xxxx	xxxx									
Level Of Service Module:																								
2Way95thQ:	xxxx	xxxx	xxxxx		xxxx	xxxx		0.0	xxxx	xxxx	xxxxx		0.1	xxxx	xxxxx									
Control Del:	xxxxx	xxxx	xxxxx		xxxxx	xxxx		12.2	xxxxx	xxxx	xxxxx		16.3	xxxx	xxxxx									
LOS by Move:	*	*	*		*	*		B	*	*	*		C	*	*									
Movement:	LT -	LTR -	RT		LT -	LTR -	RT		LT -	LTR -	RT		LT -	LTR -	RT									
Shared Cap.:	xxxx	67	xxxxx		xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx									
SharedQueue:	xxxxx	0.7	xxxxx		xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx									
Shrd ConDel:	xxxxx	71.3	xxxxx		xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx									
Shared LOS:	*	F	*		*	*	*		*	*	*		*	*	*									
ApproachDel:		71.3				12.2				xxxxxx				xxxxxx										
ApproachLOS:		F				B				*				*										

Note: Queue reported is the number of cars per lane.

Cypress Barton Place
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #13 Katella Avenue / Siboney Street

Cycle (sec): 100 Critical Vol./Cap.(X): 0.453
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 22 Level Of Service: A

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Split Phase						Split Phase						Protected						Protected					
Rights:	Include						Include						Include						Include					
Min. Green:	0		0		0		0		0		0		0		0		0		0		0		0	
Y+R:	4.0	4.0		4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0		4.0		4.0
Lanes:	0	1	0	0	1		1	0	1!	0	1		2	0	2	1	0		1	0	3	0	1	
Volume Module:																								
Base Vol:	42		5		34		31		3		20		130	1728		25			36	1458		43		
Growth Adj:	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00
Initial Bse:	42		5		34		31		3		20		130	1728		25			36	1458		43		
User Adj:	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00
PHF Adj:	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00
PHF Volume:	42		5		34		31		3		20		130	1728		25			36	1458		43		
Reduct Vol:	0		0		0		0		0		0		0	0		0			0	0		0		
Reduced Vol:	42		5		34		31		3		20		130	1728		25			36	1458		43		
PCE Adj:	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00
MLF Adj:	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00
FinalVolume:	42		5		34		31		3		20		130	1728		25			36	1458		43		
Saturation Flow Module:																								
Sat/Lane:	1700	1700		1700		1700	1700	1700		1700		1700	1700	1700		1700		1700	1700	1700		1700		1700
Adjustment:	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00
Lanes:	0.89	0.11		1.00		1.72	0.17	1.11		2.00		2.96	0.04	1.00		3.00		1.00						
Final Sat.:	1519	181		1700		2928	283	1889		3400		5027	73	1700		5100		1700						
Capacity Analysis Module:																								
Vol/Sat:	0.03	0.03		0.02		0.01	0.01	0.01		0.04		0.34	0.34	0.02		0.29		0.03						
Crit Moves:		****					****					****		****										

Cypress Barton Place
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #14 Katella Avenue / Winner Circle

Cycle (sec):	100	Critical Vol./Cap.(X):	0.437
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	21	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0 1	0	1 0	0 1	0	1 0	2 1	0	1 0	3 0	1
Volume Module:												
Base Vol:	5	1	4	7	0	5	18	1771	25	54	1566	3
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	5	1	4	7	0	5	18	1771	25	54	1566	3
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	5	1	4	7	0	5	18	1771	25	54	1566	3
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	5	1	4	7	0	5	18	1771	25	54	1566	3
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	5	1	4	7	0	5	18	1771	25	54	1566	3
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.20	0.80	1.00	0.00	1.00	1.00	2.96	0.04	1.00	3.00	1.00
Final Sat.:	1700	340	1360	1700	0	1700	1700	5029	71	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.35	0.35	0.03	0.31	0.00
Crit Moves:	****				****			****		****		

Cypress Barton Place
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #15 Katella Avenue / Walker Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.638
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	32	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 1	0 1	0	1 1	0 0	2	2 0	2 1	0	1 0	3 0	1
Volume Module:												
Base Vol:	6	2	0	839	9	195	166	1560	2	8	1461	301
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	6	2	0	839	9	195	166	1560	2	8	1461	301
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	6	2	0	839	9	195	166	1560	2	8	1461	301
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	6	2	0	839	9	195	166	1560	2	8	1461	301
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	6	2	0	839	9	195	166	1560	2	8	1461	301
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	0.00	1.98	0.02	2.00	2.00	2.99	0.01	1.00	3.00	1.00
Final Sat.:	1700	1700	0	3364	36	3400	3400	5093	7	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.25	0.25	0.06	0.05	0.31	0.31	0.00	0.29	0.18
Crit Moves:	****			****			****				****	

Cypress Barton Place
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #18 Farquhar Ave / Lexington Dr

Cycle (sec):	100	Critical Vol./Cap.(X):	0.209
Loss Time (sec):	0	Average Delay (sec/veh):	8.3
Optimal Cycle:	0	Level Of Service:	A

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	T	R		L	T	R		L	T	R		L	T	R	
Control:	Stop Sign				Stop Sign				Stop Sign				Stop Sign			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0	
Lanes:	1 0	1 0	0		0 0	2 0	1		0 0	1! 0	0		0 0	0 0	0	
Volume Module:																
Base Vol:	3	41	0		0	218	75		81	0	83		0	0	0	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	3	41	0		0	218	75		81	0	83		0	0	0	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	3	41	0		0	218	75		81	0	83		0	0	0	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	3	41	0		0	218	75		81	0	83		0	0	0	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	3	41	0		0	218	75		81	0	83		0	0	0	
Saturation Flow Module:																
Adjustment:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Lanes:	1.00	1.00	0.00		0.00	2.00	1.00		0.49	0.00	0.51		0.00	0.00	0.00	
Final Sat.:	620	680	0		0	1435	834		387	0	397		0	0	0	
Capacity Analysis Module:																
Vol/Sat:	0.00	0.06	xxxx		xxxx	0.15	0.09		0.21	xxxx	0.21		xxxx	xxxx	xxxx	
Crit Moves:		****				****			****							
Delay/Veh:	8.3	8.1	0.0		0.0	8.5	7.3		8.5	0.0	8.5		0.0	0.0	0.0	
Delay Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
AdjDel/Veh:	8.3	8.1	0.0		0.0	8.5	7.3		8.5	0.0	8.5		0.0	0.0	0.0	
LOS by Move:	A	A	*		*	A	A		A	*	A		*	*	*	
ApproachDel:		8.2				8.2				8.5				xxxxxx		
Delay Adj:		1.00				1.00				1.00				xxxxx		
ApprAdjDel:		8.2				8.2				8.5				xxxxxx		
LOS by Appr:		A				A				A				*		
AllWayAvgQ:	0.0	0.1	0.0		0.0	0.2	0.1		0.2	0.2	0.2		0.0	0.0	0.0	

Note: Queue reported is the number of cars per lane.

Cypress Barton Place
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #19 Orangewood Avenue / Valley View Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.786
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	49	Level Of Service:	C

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	T	R		L	T	R		L	T	R		L	T	R	
Control:	Protected				Protected				Split Phase				Split Phase			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	1 0	2 1	0		2 0	3 0	1		1 0	1 1	0		1 0	0 1	1	
Volume Module:																
Base Vol:	20	1899	65		233	1739	43		143	60	13		75	30	644	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	20	1899	65		233	1739	43		143	60	13		75	30	644	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	20	1899	65		233	1739	43		143	60	13		75	30	644	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	20	1899	65		233	1739	43		143	60	13		75	30	644	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	20	1899	65		233	1739	43		143	60	13		75	30	644	
Saturation Flow Module:																
Sat/Lane:	1700	1700	1700		1700	1700	1700		1700	1700	1700		1700	1700	1700	
Adjustment:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Lanes:	1.00	2.90	0.10		2.00	3.00	1.00		1.00	1.64	0.36		1.00	0.09	1.91	
Final Sat.:	1700	4931	169		3400	5100	1700		1700	2795	605		1700	151	3249	
Capacity Analysis Module:																
Vol/Sat:	0.01	0.39	0.39		0.07	0.34	0.03		0.08	0.02	0.02		0.04	0.20	0.20	
Crit Moves:		****			****				****					****		

Cypress Barton Place
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #16 Katella Avenue / Valley View Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.696
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	37	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	3 0	3 0	1	2 0	3 0	1	2 0	3 0	1	2 0	3 0	1
Volume Module:												
Base Vol:	783	1441	270	207	1159	243	250	1011	792	170	980	157
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	783	1441	270	207	1159	243	250	1011	792	170	980	157
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	783	1441	270	207	1159	243	250	1011	0	170	980	157
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	783	1441	270	207	1159	243	250	1011	0	170	980	157
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
FinalVolume:	783	1441	270	207	1159	243	250	1011	0	170	980	157
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	3.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	5100	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.15	0.28	0.16	0.06	0.23	0.14	0.07	0.20	0.00	0.05	0.19	0.09
Crit Moves:	****				****		****				****	

Cypress Barton Place
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #17 Farquhar Ave / Los Alamitos Blvd

Cycle (sec):	100	Critical Vol./Cap.(X):	0.634
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	31	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	2 1	0	1 0	3 0	0	0 0	0 0	0	1 0	1! 0	0
Volume Module:												
Base Vol:	0	1725	182	125	1378	0	0	0	0	346	0	119
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1725	182	125	1378	0	0	0	0	346	0	119
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1725	182	125	1378	0	0	0	0	346	0	119
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	1725	182	125	1378	0	0	0	0	346	0	119
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	1725	182	125	1378	0	0	0	0	346	0	119
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	2.71	0.29	1.00	3.00	0.00	0.00	0.00	0.00	1.49	0.00	0.51
Final Sat.:	0	4613	487	1700	5100	0	0	0	0	2530	0	870
Capacity Analysis Module:												
Vol/Sat:	0.00	0.37	0.37	0.07	0.27	0.00	0.00	0.00	0.00	0.14	0.00	0.14
Crit Moves:		****		****						****		

Cypress Barton Place
Existing Conditions
PM Peak Hour

Scenario Report

Scenario:	Existing PM ICU
Command:	Existing PM
Volume:	PM EXISTING
Geometry:	Existing
Impact Fee:	Default Impact Fee
Trip Generation:	none
Trip Distribution:	none
Paths:	none
Routes:	Default Route
Configuration:	ICU

Cypress Barton Place
Existing Conditions
PM Peak Hour

Turning Movement Report
Daily

Volume	Northbound			Southbound			Eastbound			Westbound			Total
Type	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume
#1 Cerritos Ave. / Los Alamitos Blvd													
Base	254	840	348	89	617	48	143	875	234	379	999	148	4974
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	254	840	348	89	617	48	143	875	234	379	999	148	4974
#2 Cerritos Ave / Bloomfield St													
Base	133	435	135	59	283	100	147	1048	96	99	1140	126	3801
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	133	435	135	59	283	100	147	1048	96	99	1140	126	3801
#3 Cerritos Ave / Denni St													
Base	80	135	73	92	53	91	135	1120	35	46	1076	145	3081
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	80	135	73	92	53	91	135	1120	35	46	1076	145	3081
#4 Cerritos Ave / Moody St													
Base	3	1	0	246	1	134	214	1076	0	3	1199	332	3209
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	3	1	0	246	1	134	214	1076	0	3	1199	332	3209
#5 Cerritos Ave / Walker St													
Base	505	688	206	113	413	48	68	992	263	78	898	144	4416
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	505	688	206	113	413	48	68	992	263	78	898	144	4416
#6 Cerritos Avenue / Valley View Street													
Base	318	1815	184	125	1132	186	325	772	265	95	534	134	5885
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	318	1815	184	125	1132	186	325	772	265	95	534	134	5885
#7 Katella Ave. / I-605 NB Ramps													
Base	0	0	758	0	0	74	340	1910	0	0	1628	893	5603
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	758	0	0	74	340	1910	0	0	1628	893	5603
#8 Katella Ave. / Los Alamitos Blvd.													
Base	464	847	344	177	1066	208	307	1391	442	310	1514	94	7164
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	464	847	344	177	1066	208	307	1391	442	310	1514	94	7164
#9 Katella Avenue / Bloomfield Street													
Base	54	109	29	225	180	169	242	1569	65	76	1704	311	4733
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	54	109	29	225	180	169	242	1569	65	76	1704	311	4733

Cypress Barton Place
Existing Conditions
PM Peak Hour

Volume Type	Northbound Left	Thru	Right	Southbound Left	Thru	Right	Eastbound Left	Thru	Right	Westbound Left	Thru	Right	Total Volume
#10 Katella Ave / Lexington Dr													
Base	76	46	108	130	12	120	86	1667	72	118	1697	109	4241
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
PassBy	0	0	0	0	0	0	0	0	0	14	0	0	14
Total	76	46	108	130	12	120	86	1667	72	132	1697	109	4255
#11 Katella Ave / Cottonwood Way													
Base	0	0	3	6	0	1	11	1894	1	0	1939	4	3859
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
PassBy	0	0	0	0	0	0	0	14	0	0	14	0	28
Total	0	0	3	6	0	1	11	1908	1	0	1953	4	3887
#12 Katella Ave. / Enterprise Dr.													
Base	2	0	7	0	0	2	0	1875	13	19	1951	2	3871
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
PassBy	0	0	0	0	0	4	0	14	0	0	10	0	28
Total	2	0	7	0	0	6	0	1889	13	19	1961	2	3899
#13 Katella Avenue / Siboney Street													
Base	62	2	67	75	5	71	100	1926	39	61	1902	53	4363
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
PassBy	0	0	0	0	0	0	16	-2	0	0	0	0	14
Total	62	2	67	75	5	71	116	1924	39	61	1902	53	4377
#14 Katella Avenue / Winner Circle													
Base	42	4	52	33	0	47	144	1839	15	53	1898	8	4135
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	42	4	52	33	0	47	144	1839	15	53	1898	8	4135
#15 Katella Avenue / Walker Street													
Base	27	16	4	551	1	200	265	1661	2	2	1739	539	5007
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	27	16	4	551	1	200	265	1661	2	2	1739	539	5007
#16 Katella Avenue / Valley View Street													
Base	603	1401	163	264	1385	222	271	1086	1291	353	1009	272	8320
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	603	1401	163	264	1385	222	271	1086	1291	353	1009	272	8320
#17 Farquhar Ave / Los Alamitos Blvd													
Base	0	1542	169	116	1686	0	0	0	0	427	0	168	4108
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1542	169	116	1686	0	0	0	0	427	0	168	4108
#18 Farquhar Ave / Lexington Dr													
Base	106	232	0	0	70	80	69	0	28	0	0	0	585
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	106	232	0	0	70	80	69	0	28	0	0	0	585

Cypress Barton Place
Existing Conditions
PM Peak Hour

Volume Type	Northbound Left	Thru	Right	Southbound Left	Thru	Right	Eastbound Left	Thru	Right	Westbound Left	Thru	Right	Total Volume
#19 Orangewood Avenue / Valley View Street													
Base	17	1477	68	549	2242	101	104	49	25	75	16	442	5165
Added	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	17	1477	68	549	2242	101	104	49	25	75	16	442	5165

Cypress Barton Place
Existing Conditions
PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
# 1 Cerritos Ave. / Los Alamitos B	D	xxxxx	0.861	D	xxxxx	0.861	+ 0.000 V/C
# 2 Cerritos Ave / Bloomfield St	C	xxxxx	0.711	C	xxxxx	0.711	+ 0.000 V/C
# 3 Cerritos Ave / Denni St	C	xxxxx	0.712	C	xxxxx	0.712	+ 0.000 V/C
# 4 Cerritos Ave / Moody St	C	xxxxx	0.707	C	xxxxx	0.707	+ 0.000 V/C
# 5 Cerritos Ave / Walker St	B	xxxxx	0.638	B	xxxxx	0.638	+ 0.000 V/C
# 6 Cerritos Avenue / Valley View	C	xxxxx	0.771	C	xxxxx	0.771	+ 0.000 V/C
# 7 Katella Ave. / I-605 NB Ramps	A	xxxxx	0.569	A	xxxxx	0.569	+ 0.000 V/C
# 8 Katella Ave. / Los Alamitos Bl	C	xxxxx	0.783	C	xxxxx	0.783	+ 0.000 V/C
# 9 Katella Avenue / Bloomfield S	C	xxxxx	0.760	C	xxxxx	0.760	+ 0.000 V/C
# 10 Katella Ave / Lexington Dr	A	xxxxx	0.587	A	xxxxx	0.596	+ 0.008 V/C
# 11 Katella Ave / Cottonwood Way	A	xxxxx	0.443	A	xxxxx	0.445	+ 0.003 V/C
# 12 Katella Ave. / Enterprise Dr.	F	89.5	0.159	F	93.4	0.166	+ 3.936 D/V
# 13 Katella Avenue / Siboney Stree	A	xxxxx	0.540	A	xxxxx	0.540	-0.000 V/C
# 14 Katella Avenue / Winner Circle	A	xxxxx	0.559	A	xxxxx	0.559	+ 0.000 V/C
# 15 Katella Avenue / Walker Street	B	xxxxx	0.647	B	xxxxx	0.647	+ 0.000 V/C
# 16 Katella Avenue / Valley View S	C	xxxxx	0.757	C	xxxxx	0.757	+ 0.000 V/C
# 17 Farquhar Ave / Los Alamitos Bl	B	xxxxx	0.629	B	xxxxx	0.629	+ 0.000 V/C
# 18 Farquhar Ave / Lexington Dr	A	8.9	0.317	A	8.9	0.317	+ 0.000 V/C
# 19 Orangewood Avenue / Valley Vie	C	xxxxx	0.710	C	xxxxx	0.710	+ 0.000 V/C

Cypress Barton Place
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #1 Cerritos Ave. / Los Alamitos Blvd

Cycle (sec):	100	Critical Vol./Cap.(X):	0.861
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	69	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 1	0	1 0	2 0	1	1 0	2 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	254	840	348	89	617	48	143	875	234	379	999	148
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	254	840	348	89	617	48	143	875	234	379	999	148
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	254	840	348	89	617	48	143	875	234	379	999	148
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	254	840	348	89	617	48	143	875	234	379	999	148
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	254	840	348	89	617	48	143	875	234	379	999	148
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.12	0.88	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1700	3606	1494	1700	3400	1700	1700	3400	1700	1700	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.15	0.23	0.23	0.05	0.18	0.03	0.08	0.26	0.14	0.22	0.29	0.09
Crit Moves:	****				****			****		****		

Cypress Barton Place
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #2 Cerritos Ave / Bloomfield St

Cycle (sec):	100	Critical Vol./Cap.(X):	0.711
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	38	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1	1 0	1 0	1	1 0	1 0	1	1 0	1 0	1	1 0
Volume Module:	Existing PM Peak Hour											
Base Vol:	133	435	135	59	283	100	147	1048	96	99	1140	126
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	133	435	135	59	283	100	147	1048	96	99	1140	126
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	133	435	135	59	283	100	147	1048	96	99	1140	126
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	133	435	135	59	283	100	147	1048	96	99	1140	126
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	133	435	135	59	283	100	147	1048	96	99	1140	126
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.53	0.47	1.00	1.48	0.52	1.00	1.83	0.17	1.00	1.80	0.20
Final Sat.:	1700	2595	805	1700	2512	888	1700	3115	285	1700	3062	338
Capacity Analysis Module:												
Vol/Sat:	0.08	0.17	0.17	0.03	0.11	0.11	0.09	0.34	0.34	0.06	0.37	0.37
Crit Moves:		****		****			****				****	

Cypress Barton Place
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #3 Cerritos Ave / Denni St

Cycle (sec):	100	Critical Vol./Cap.(X):	0.712
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	38	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Prot+Permit			Prot+Permit		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	1!	0 0	1 0	1	0 1	1 0	2	0 1	1 0	1	1 0
Volume Module:	Existing PM Peak Hour											
Base Vol:	80	135	73	92	53	91	135	1120	35	46	1076	145
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	80	135	73	92	53	91	135	1120	35	46	1076	145
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	80	135	73	92	53	91	135	1120	35	46	1076	145
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	80	135	73	92	53	91	135	1120	35	46	1076	145
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	80	135	73	92	53	91	135	1120	35	46	1076	145
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.28	0.47	0.25	1.00	1.00	1.00	1.00	2.00	1.00	1.00	1.76	0.24
Final Sat.:	472	797	431	1700	1700	1700	1700	3400	1700	1700	2996	404
Capacity Analysis Module:												
Vol/Sat:	0.17	0.17	0.17	0.05	0.03	0.05	0.08	0.33	0.02	0.03	0.36	0.36
Crit Moves:	****			****			****				****	

Cypress Barton Place
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #4 Cerritos Ave / Moody St

Cycle (sec):	100	Critical Vol./Cap.(X):	0.707
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	38	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Prot+Permit			Prot+Permit		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 1	0	0 0	1 1	0	0 1	1 0	1	1 0	1 0	1	1 0
Volume Module:	Existing PM Peak Hour											
Base Vol:	3	1	0	246	1	134	214	1076	0	3	1199	332
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	3	1	0	246	1	134	214	1076	0	3	1199	332
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	3	1	0	246	1	134	214	1076	0	3	1199	332
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	3	1	0	246	1	134	214	1076	0	3	1199	332
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	3	1	0	246	1	134	214	1076	0	3	1199	332
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.75	0.25	0.00	1.99	0.01	1.00	1.00	2.00	0.00	1.00	1.57	0.43
Final Sat.:	1275	425	0	3386	14	1700	1700	3400	0	1700	2663	737
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.07	0.07	0.08	0.13	0.32	0.00	0.00	0.45	0.45
Crit Moves:		****				****	****				****	

Cypress Barton Place
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #5 Cerritos Ave / Walker St

Cycle (sec):	100	Critical Vol./Cap.(X):	0.638
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	32	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2 0	2	0 1	1 0	1	1 0	1 0	3	0 1	1 0	2	0 1
Volume Module:	Existing PM Peak Hour											
Base Vol:	505	688	206	113	413	48	68	992	263	78	898	144
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	505	688	206	113	413	48	68	992	263	78	898	144
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	505	688	206	113	413	48	68	992	263	78	898	144
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	505	688	206	113	413	48	68	992	263	78	898	144
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	505	688	206	113	413	48	68	992	263	78	898	144
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	1.00	1.79	0.21	1.00	3.00	1.00	1.00	2.00	1.00
Final Sat.:	3400	3400	1700	1700	3046	354	1700	5100	1700	1700	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.15	0.20	0.12	0.07	0.14	0.14	0.04	0.19	0.15	0.05	0.26	0.08
Crit Moves:	****				****		****				****	

Cypress Barton Place
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #6 Cerritos Avenue / Valley View Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.771
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	47	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	3 0	1	1 0	3 0	1	2 0	3 0	1	2 0	1 1	0
Volume Module:												
Base Vol:	318	1815	184	125	1132	186	325	772	265	95	534	134
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	318	1815	184	125	1132	186	325	772	265	95	534	134
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	318	1815	184	125	1132	186	325	772	265	95	534	134
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	318	1815	184	125	1132	186	325	772	265	95	534	134
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	318	1815	184	125	1132	186	325	772	265	95	534	134
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	3.00	1.00	1.00	3.00	1.00	2.00	3.00	1.00	2.00	1.60	0.40
Final Sat.:	1700	5100	1700	1700	5100	1700	3400	5100	1700	3400	2718	682
Capacity Analysis Module:												
Vol/Sat:	0.19	0.36	0.11	0.07	0.22	0.11	0.10	0.15	0.16	0.03	0.20	0.20
Crit Moves:		****		****			****				****	

Cypress Barton Place
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #7 Katella Ave. / I-605 NB Ramps

Cycle (sec):	100	Critical Vol./Cap.(X):	0.569
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	27	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Ignore			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	0 0	1	0 0	0 0	1	1 0	3 0	0	0 0	2 1	1
Volume Module:												
Base Vol:	0	0	758	0	0	74	340	1910	0	0	1628	893
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	758	0	0	74	340	1910	0	0	1628	893
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Volume:	0	0	0	0	0	0	340	1910	0	0	1628	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	0	0	0	340	1910	0	0	1628	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
FinalVolume:	0	0	0	0	0	0	340	1910	0	0	1628	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	1.00	0.00	0.00	1.00	1.00	3.00	0.00	0.00	3.00	1.00
Final Sat.:	0	0	1700	0	0	1700	1700	5100	0	0	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.37	0.00	0.00	0.32	0.00
Crit Moves:							****				****	

Cypress Barton Place
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #8 Katella Ave. / Los Alamitos Blvd.

Cycle (sec):	100	Critical Vol./Cap.(X):	0.783
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	49	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:		Ovl			Ovl			Ovl			Ovl	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2 0	3 0	1	2 0	3 0	1	2 0	3 0	1	2 0	3 0	1
Volume Module:												
Base Vol:	464	847	344	177	1066	208	307	1391	442	310	1514	94
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	464	847	344	177	1066	208	307	1391	442	310	1514	94
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	464	847	344	177	1066	208	307	1391	442	310	1514	94
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	464	847	344	177	1066	208	307	1391	442	310	1514	94
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	464	847	344	177	1066	208	307	1391	442	310	1514	94
OvlAdjVol:			189			55			210			6
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.14	0.17	0.20	0.05	0.21	0.12	0.09	0.27	0.26	0.09	0.30	0.06
OvlAdjV/S:			0.11			0.03			0.12			0.00
Crit Moves:	****				****		****				****	

Cypress Barton Place
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #9 Katella Avenue / Bloomfield Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.760
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	45	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Prot+Permit			Prot+Permit			Protected			Protected		
Rights:		Include			Include			Include			Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1 1	0	1 0	1 0	1	1 0	2 1	0	1 0	2 1	0
Volume Module:												
Base Vol:	54	109	29	225	180	169	242	1569	65	76	1704	311
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	54	109	29	225	180	169	242	1569	65	76	1704	311
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	54	109	29	225	180	169	242	1569	65	76	1704	311
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	54	109	29	225	180	169	242	1569	65	76	1704	311
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	54	109	29	225	180	169	242	1569	65	76	1704	311
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.58	0.42	1.00	1.00	1.00	1.00	2.88	0.12	1.00	2.54	0.46
Final Sat.:	1700	2686	714	1700	1700	1700	1700	4897	203	1700	4313	787
Capacity Analysis Module:												
Vol/Sat:	0.03	0.04	0.04	0.13	0.11	0.10	0.14	0.32	0.32	0.04	0.40	0.40
Crit Moves:		****		****			****				****	

Cypress Barton Place
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #10 Katella Ave / Lexington Dr

Cycle (sec):	100	Critical Vol./Cap.(X):	0.587
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	28	Level Of Service:	A

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Split Phase						Split Phase						Protected						Protected					
Rights:	Include						Include						Include						Include					
Min. Green:	0		0		0		0		0		0		0		0		0		0		0		0	
Y+R:	4.0		4.0		4.0		4.0		4.0		4.0		4.0		4.0		4.0		4.0		4.0		4.0	
Lanes:	1	0	1	0	1		1	0	1!	0	0		2	0	3	0	1		1	0	2	1	0	
Volume Module:	Existing PM Peak Hour																							
Base Vol:	76		46		108		130		12		120		86		1667		72		118		1697		109	
Growth Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Initial Bse:	76		46		108		130		12		120		86		1667		72		118		1697		109	
User Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
PHF Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
PHF Volume:	76		46		108		130		12		120		86		1667		72		118		1697		109	
Reduct Vol:	0		0		0		0		0		0		0		0		0		0		0		0	
Reduced Vol:	76		46		108		130		12		120		86		1667		72		118		1697		109	
PCE Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
MLF Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
FinalVolume:	76		46		108		130		12		120		86		1667		72		118		1697		109	
Saturation Flow Module:																								
Sat/Lane:	1700		1700		1700		1700		1700		1700		1700		1700		1700		1700		1700		1700	
Adjustment:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Lanes:	1.00		1.00		1.00		1.00		0.09		0.91		2.00		3.00		1.00		1.00		2.82		0.18	
Final Sat.:	1700		1700		1700		1700		155		1545		3400		5100		1700		1700		4792		308	
Capacity Analysis Module:																								
Vol/Sat:	0.04		0.03		0.06		0.08		0.08		0.08		0.03		0.33		0.04		0.07		0.35		0.35	
Crit Moves:					****				****						****				****					

Cypress Barton Place
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #11 Katella Ave / Cottonwood Way

Cycle (sec):	100	Critical Vol./Cap.(X):	0.443
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	21	Level Of Service:	A

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Split Phase						Split Phase						Protected						Protected					
Rights:	Include						Include						Include						Include					
Min. Green:	0		0		0		0		0		0		0		0		0		0		0		0	
Y+R:	4.0		4.0		4.0		4.0		4.0		4.0		4.0		4.0		4.0		4.0		4.0		4.0	
Lanes:	0	0	0	0	1		1	0	0	0	1		1	0	2	1	0		0	0	2	1	0	
Volume Module:																								
Base Vol:	0		0		3		6		0		1		11		1894		1		0		1939		4	
Growth Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Initial Bse:	0		0		3		6		0		1		11		1894		1		0		1939		4	
User Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
PHF Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
PHF Volume:	0		0		3		6		0		1		11		1894		1		0		1939		4	
Reduct Vol:	0		0		0		0		0		0		0		0		0		0		0		0	
Reduced Vol:	0		0		3		6		0		1		11		1894		1		0		1939		4	
PCE Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
MLF Adj:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
FinalVolume:	0		0		3		6		0		1		11		1894		1		0		1939		4	
Saturation Flow Module:																								
Sat/Lane:	1700		1700		1700		1700		1700		1700		1700		1700		1700		1700		1700		1700	
Adjustment:	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Lanes:	0.00		0.00		1.00		1.00		0.00		1.00		1.00		2.99		0.01		0.00		2.99		0.01	
Final Sat.:	0		0		1700		1700		0		1700		1700		5097		3		0		5090		10	
Capacity Analysis Module:																								
Vol/Sat:	0.00		0.00		0.00		0.00		0.00		0.00		0.01		0.37		0.37		0.00		0.38		0.38	
Crit Moves:					****		****						****								****			

Cypress Barton Place
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #12 Katella Ave. / Enterprise Dr.

Average Delay (sec/veh): 0.3 Worst Case Level Of Service: F[89.5]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1!	0	0	0 0	0	2	0 0	2	1 0	1 0	2	1 0
Volume Module:												
Base Vol:	2	0	7	0	0	2	0	1875	13	19	1951	2
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	2	0	7	0	0	2	0	1875	13	19	1951	2
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	2	0	7	0	0	2	0	1875	13	19	1951	2
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	2	0	7	0	0	2	0	1875	13	19	1951	2
Critical Gap Module:												
Critical Gp:	7.5	6.5	6.9	xxxxx	xxxx	6.9	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	xxxxx	xxxx	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2570	3873	632	xxxx	xxxx	651	xxxx	xxxx	xxxxx	1888	xxxx	xxxxx
Potent Cap.:	13	4	428	xxxx	xxxx	416	xxxx	xxxx	xxxxx	321	xxxx	xxxxx
Move Cap.:	13	3	428	xxxx	xxxx	416	xxxx	xxxx	xxxxx	321	xxxx	xxxxx
Volume/Cap:	0.16	0.00	0.02	xxxx	xxxx	0.00	xxxx	xxxx	xxxx	0.06	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	0.0	xxxx	xxxx	xxxxx	0.2	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	13.7	xxxxx	xxxx	xxxxx	16.9	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	B	*	*	*	C	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	51	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	0.6	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	89.5	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	F	*	*	*	*	*	*	*	*	*	*
ApproachDel:		89.5			13.7			xxxxxx			xxxxxx	
ApproachLOS:		F			B			*			*	

Note: Queue reported is the number of cars per lane.

Cypress Barton Place
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #13 Katella Avenue / Siboney Street

Cycle (sec): 100 Critical Vol./Cap.(X): 0.540
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 26 Level Of Service: A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 1	0	0 1	1 0	1!	0 1	2 0	2	1 0	1 0	3	0 1
Volume Module:												
Base Vol:	62	2	67	75	5	71	100	1926	39	61	1902	53
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	62	2	67	75	5	71	100	1926	39	61	1902	53
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	62	2	67	75	5	71	100	1926	39	61	1902	53
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	62	2	67	75	5	71	100	1926	39	61	1902	53
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	62	2	67	75	5	71	100	1926	39	61	1902	53
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.97	0.03	1.00	1.49	0.10	1.41	2.00	2.94	0.06	1.00	3.00	1.00
Final Sat.:	1647	53	1700	2533	169	2398	3400	4999	101	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.39	0.39	0.04	0.37	0.03
Crit Moves:			****		****			****		****		

Cypress Barton Place
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #14 Katella Avenue / Winner Circle

Cycle (sec):	100	Critical Vol./Cap.(X):	0.559
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	26	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0 1	0	1 0	0 1	0	1 0	2 1	0	1 0	3 0	1
Volume Module:												
Base Vol:	42	4	52	33	0	47	144	1839	15	53	1898	8
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	42	4	52	33	0	47	144	1839	15	53	1898	8
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	42	4	52	33	0	47	144	1839	15	53	1898	8
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	42	4	52	33	0	47	144	1839	15	53	1898	8
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	42	4	52	33	0	47	144	1839	15	53	1898	8
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.07	0.93	1.00	0.00	1.00	1.00	2.98	0.02	1.00	3.00	1.00
Final Sat.:	1700	121	1579	1700	0	1700	1700	5059	41	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.03	0.03	0.02	0.00	0.03	0.08	0.36	0.36	0.03	0.37	0.00
Crit Moves:		****		****			****				****	

Cypress Barton Place
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #15 Katella Avenue / Walker Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.647
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	32	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 1	0 1	0	1 1	0 0	2	2 0	2 1	0	1 0	3 0	1
Volume Module:												
Base Vol:	27	16	4	551	1	200	265	1661	2	2	1739	539
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	27	16	4	551	1	200	265	1661	2	2	1739	539
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	27	16	4	551	1	200	265	1661	2	2	1739	539
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	27	16	4	551	1	200	265	1661	2	2	1739	539
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	27	16	4	551	1	200	265	1661	2	2	1739	539
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.83	0.17	1.99	0.01	2.00	2.00	2.99	0.01	1.00	3.00	1.00
Final Sat.:	1700	1411	289	3394	6	3400	3400	5094	6	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.01	0.01	0.16	0.16	0.06	0.08	0.33	0.33	0.00	0.34	0.32
Crit Moves:	****				****		****				****	

Cypress Barton Place
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #16 Katella Avenue / Valley View Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.757
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	44	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	3 0	3 0	1	2 0	3 0	1	2 0	3 0	1	2 0	3 0	1
Volume Module:												
Base Vol:	603	1401	163	264	1385	222	271	1086	1291	353	1009	272
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	603	1401	163	264	1385	222	271	1086	1291	353	1009	272
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	603	1401	163	264	1385	222	271	1086	0	353	1009	272
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	603	1401	163	264	1385	222	271	1086	0	353	1009	272
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
FinalVolume:	603	1401	163	264	1385	222	271	1086	0	353	1009	272
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	3.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	5100	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.12	0.27	0.10	0.08	0.27	0.13	0.08	0.21	0.00	0.10	0.20	0.16
Crit Moves:	****				****			****		****		

Cypress Barton Place
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #17 Farquhar Ave / Los Alamitos Blvd

Cycle (sec):	100	Critical Vol./Cap.(X):	0.629
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	31	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	2 1	0	1 0	3 0	0	0 0	0 0	0	1 0	1! 0	0
Volume Module:												
Base Vol:	0	1542	169	116	1686	0	0	0	0	427	0	168
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1542	169	116	1686	0	0	0	0	427	0	168
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1542	169	116	1686	0	0	0	0	427	0	168
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	1542	169	116	1686	0	0	0	0	427	0	168
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	1542	169	116	1686	0	0	0	0	427	0	168
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	2.70	0.30	1.00	3.00	0.00	0.00	0.00	0.00	1.44	0.00	0.56
Final Sat.:	0	4596	504	1700	5100	0	0	0	0	2440	0	960
Capacity Analysis Module:												
Vol/Sat:	0.00	0.34	0.34	0.07	0.33	0.00	0.00	0.00	0.00	0.17	0.00	0.17
Crit Moves:		****		****						****		

Cypress Barton Place
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #18 Farquhar Ave / Lexington Dr

Cycle (sec): 100 Critical Vol./Cap.(X): 0.317
Loss Time (sec): 0 Average Delay (sec/veh): 8.9
Optimal Cycle: 0 Level Of Service: A

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	T		R	L	T		R	L	T		R	L	T		R
Control:	Stop Sign				Stop Sign				Stop Sign				Stop Sign			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0	
Lanes:	1 0	1	0	0	0 0	2	0	1	0 0	1!	0	0	0 0	0	0	0
Volume Module:																
Base Vol:	106	232	0		0	70	80		69	0	28		0	0	0	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	106	232	0		0	70	80		69	0	28		0	0	0	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	106	232	0		0	70	80		69	0	28		0	0	0	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	106	232	0		0	70	80		69	0	28		0	0	0	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	106	232	0		0	70	80		69	0	28		0	0	0	
Saturation Flow Module:																
Adjustment:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Lanes:	1.00	1.00	0.00		0.00	2.00	1.00		0.71	0.00	0.29		0.00	0.00	0.00	
Final Sat.:	663	731	0		0	1397	809		491	0	199		0	0	0	
Capacity Analysis Module:																
Vol/Sat:	0.16	0.32	xxxx		xxxx	0.05	0.10		0.14	xxxx	0.14		xxxx	xxxx	xxxx	
Crit Moves:		****					****		****							
Delay/Veh:	9.1	9.8	0.0		0.0	8.0	7.5		8.6	0.0	8.6		0.0	0.0	0.0	
Delay Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
AdjDel/Veh:	9.1	9.8	0.0		0.0	8.0	7.5		8.6	0.0	8.6		0.0	0.0	0.0	
LOS by Move:	A	A	*		*	A	A		A	*	A		*	*	*	
ApproachDel:	9.5				7.7				8.6				xxxxxx			
Delay Adj:	1.00				1.00				1.00				xxxxx			
ApprAdjDel:	9.5				7.7				8.6				xxxxxx			
LOS by Appr:	A				A				A				*			
AllWayAvgQ:	0.2	0.4	0.0		0.0	0.1	0.1		0.1	0.1	0.1		0.0	0.0	0.0	

Note: Queue reported is the number of cars per lane.

Cypress Barton Place
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #19 Orangewood Avenue / Valley View Street

Cycle (sec): 100 Critical Vol./Cap.(X): 0.710
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 38 Level Of Service: C

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	T		R	L	T		R	L	T		R	L	T		R
Control:	Protected				Protected				Split Phase				Split Phase			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	1 0	2	1	0	2 0	3	0	1	1 0	1	1	0	1 0	0	1	1
Volume Module:																
Base Vol:	17	1477	68		549	2242	101		104	49	25		75	16	442	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	17	1477	68		549	2242	101		104	49	25		75	16	442	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	17	1477	68		549	2242	101		104	49	25		75	16	442	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	17	1477	68		549	2242	101		104	49	25		75	16	442	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	17	1477	68		549	2242	101		104	49	25		75	16	442	
Saturation Flow Module:																
Sat/Lane:	1700	1700	1700		1700	1700	1700		1700	1700	1700		1700	1700	1700	
Adjustment:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Lanes:	1.00	2.87	0.13		2.00	3.00	1.00		1.00	1.32	0.68		1.00	0.07	1.93	
Final Sat.:	1700	4876	224		3400	5100	1700		1700	2251	1149		1700	119	3281	
Capacity Analysis Module:																
Vol/Sat:	0.01	0.30	0.30		0.16	0.44	0.06		0.06	0.02	0.02		0.04	0.13	0.13	
Crit Moves:		****			****				****					****		

Appendix C-2

Existing Plus Project

Cypress Barton Place
Existing Plus Project
AM Peak Hour

Scenario Report

Scenario:	Ex Plus Proj AM ICU
Command:	Existing Plus Proj AM
Volume:	AM EXISTING
Geometry:	Existing
Impact Fee:	Default Impact Fee
Trip Generation:	Project AM
Trip Distribution:	Existing Plus Project
Paths:	Project NO EBL
Routes:	Default Route
Configuration:	ICU

Cypress Barton Place
Existing Plus Project
AM Peak Hour

Trip Generation Report

Forecast for AM Project

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
401	Cypress Bart	1.00	Residential	18.00	33.00	18	33	51	24.4
	Zone 401 Subtotal					18	33	51	24.4
504	Cypress Bart	1.00	Retail	90.00	68.00	90	68	158	75.6
	Zone 504 Subtotal					90	68	158	75.6
TOTAL						108	101	209	100.0

Cypress Barton Place
Existing Plus Project
AM Peak Hour

Trip Distribution Report

Percent Of Trips Project Trips

Zone	To Gates 1	2	3	4	10	14	15	16	17	18	21
401	2.0	5.0	5.0	8.0	0.0	5.0	5.0	8.0	0.0	10.0	2.0
504	2.0	5.0	5.0	10.0	0.0	0.0	5.0	5.0	5.0	10.0	5.0

Zone	To Gates 39	40	42	44	68	69	70	71	72	73	74
401	0.0	0.0	0.0	0.0	10.0	5.0	0.0	5.0	10.0	5.0	5.0
504	5.0	5.0	5.0	5.0	5.0	5.0	0.0	3.0	0.0	5.0	5.0

Zone	To Gates 75	76	77
401	0.0	5.0	5.0
504	5.0	0.0	0.0

Cypress Barton Place
Existing Plus Project
AM Peak Hour

Intersection Volume Report
Base Volume Alternative

Node	Intersection	Northbound L	T	R	Southbound L	T	R	Eastbound L	T	R	Westbound L	T	R
1	Cerritos Ave.	170	664	319	104	729	99	125	938	174	315	791	140
2	Cerritos Ave	211	276	174	139	538	229	53	968	161	177	899	59
3	Cerritos Ave	60	71	37	215	161	148	56	999	100	100	923	142
4	Cerritos Ave	0	1	0	599	1	218	65	1128	2	0	897	109
5	Cerritos Ave	97	179	52	177	695	57	24	1180	562	98	901	101
6	Cerritos Aven	183	1086	39	124	1350	287	128	675	505	184	657	115
7	Katella Ave.	0	0	805	0	0	73	82	1475	0	0	1435	776
8	Katella Ave.	395	947	377	167	965	151	199	1692	256	329	1198	77
9	Katella Avenu	80	350	15	180	203	333	276	1828	38	54	1206	248
10	Katella Ave /	93	49	92	121	7	103	65	1657	116	101	1385	84
11	Katella Ave /	0	0	0	0	0	3	4	1859	4	0	1555	5
12	Katella Ave.	3	0	10	0	0	1	0	1857	4	10	1556	18
13	Katella Avenu	42	5	34	31	3	20	130	1728	25	36	1458	43
14	Katella Avenu	5	1	4	7	0	5	18	1771	25	54	1566	3
15	Katella Avenu	6	2	0	839	9	195	166	1560	2	8	1461	301
16	Katella Avenu	783	1441	270	207	1159	243	250	1011	792	170	980	157
17	Farquhar Ave	0	1725	182	125	1378	0	0	0	0	346	0	119
18	Farquhar Ave	3	41	0	0	218	75	81	0	83	0	0	0
19	Orangewood Av	20	1899	65	233	1739	43	143	60	13	75	30	644

Cypress Barton Place
Existing Plus Project
AM Peak Hour

Intersection Volume Report
Future Volume Alternative

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
1	Cerritos Ave.	170	668	319	104	733	99	125	938	174	315	791	140
2	Cerritos Ave	211	281	174	139	545	229	53	968	161	177	899	59
3	Cerritos Ave	60	78	66	215	170	148	56	999	100	100	923	142
4	Cerritos Ave	0	1	0	609	1	218	73	1148	2	0	897	109
5	Cerritos Ave	97	179	52	177	706	57	32	1192	572	105	901	101
6	Cerritos Aven	183	1095	39	124	1364	288	135	680	505	184	662	115
7	Katella Ave.	0	0	811	0	0	73	82	1480	0	0	1442	781
8	Katella Ave.	395	947	379	171	965	151	199	1704	256	332	1210	81
9	Katella Avenu	80	350	15	187	203	333	276	1846	38	54	1226	253
10	Katella Ave /	93	49	92	130	7	103	65	1687	116	111	1416	120
11	Katella Ave /	0	0	0	0	0	3	4	1909	4	0	1632	5
12	Katella Ave.	3	0	10	0	0	41	0	1907	4	10	1594	45
13	Katella Avenu	42	5	34	31	3	20	169	1759	25	36	1522	43
14	Katella Avenu	5	1	4	7	0	5	18	1800	25	54	1629	3
15	Katella Avenu	6	2	0	839	9	222	166	1589	2	8	1497	301
16	Katella Avenu	798	1441	270	207	1159	257	259	1017	806	170	986	157
17	Farquhar Ave	0	1727	182	125	1381	0	0	0	0	346	0	119
18	Farquhar Ave	3	41	0	0	218	75	81	0	83	0	0	0
19	Orangewood Av	20	1910	65	236	1749	43	143	60	13	75	30	649

Cypress Barton Place
Existing Plus Project
AM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
# 1 Cerritos Ave. / Los Alamitos B	D	xxxxx	0.826	D	xxxxx	0.827	+ 0.001 V/C
# 2 Cerritos Ave / Bloomfield St	D	xxxxx	0.836	D	xxxxx	0.838	+ 0.002 V/C
# 3 Cerritos Ave / Denni St	B	xxxxx	0.628	B	xxxxx	0.649	+ 0.021 V/C
# 4 Cerritos Ave / Moody St	A	xxxxx	0.561	A	xxxxx	0.568	+ 0.007 V/C
# 5 Cerritos Ave / Walker St	B	xxxxx	0.688	C	xxxxx	0.701	+ 0.013 V/C
# 6 Cerritos Avenue / Valley View	C	xxxxx	0.774	C	xxxxx	0.776	+ 0.003 V/C
# 7 Katella Ave. / I-605 NB Ramps	A	xxxxx	0.380	A	xxxxx	0.381	+ 0.001 V/C
# 8 Katella Ave. / Los Alamitos Bl	C	xxxxx	0.784	C	xxxxx	0.787	+ 0.003 V/C
# 9 Katella Avenue / Bloomfield S	C	xxxxx	0.740	C	xxxxx	0.745	+ 0.005 V/C
# 10 Katella Ave / Lexington Dr	A	xxxxx	0.557	A	xxxxx	0.571	+ 0.014 V/C
# 11 Katella Ave / Cottonwood Way	A	xxxxx	0.417	A	xxxxx	0.427	+ 0.010 V/C
# 12 Katella Ave. / Enterprise Dr.	F	71.3	0.171	F	87.9	0.209	+16.593 D/V
# 13 Katella Avenue / Siboney Stree	A	xxxxx	0.453	A	xxxxx	0.459	+ 0.006 V/C
# 14 Katella Avenue / Winner Circle	A	xxxxx	0.437	A	xxxxx	0.443	+ 0.006 V/C
# 15 Katella Avenue / Walker Street	B	xxxxx	0.638	B	xxxxx	0.645	+ 0.007 V/C
# 16 Katella Avenue / Valley View S	B	xxxxx	0.696	C	xxxxx	0.703	+ 0.007 V/C
# 17 Farquhar Ave / Los Alamitos Bl	B	xxxxx	0.634	B	xxxxx	0.635	+ 0.000 V/C
# 18 Farquhar Ave / Lexington Dr	A	8.3	0.209	A	8.3	0.209	+ 0.000 V/C
# 19 Orangewood Avenue / Valley Vie	C	xxxxx	0.786	C	xxxxx	0.790	+ 0.005 V/C

Cypress Barton Place
Existing Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Cerritos Ave. / Los Alamitos Blvd

Cycle (sec):	100	Critical Vol./Cap.(X):	0.827
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	58	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2	1 0	1 0	2	0 1	1 0	2	0 1	1 0	2	0 1
Volume Module:												
Base Vol:	170	664	319	104	729	99	125	938	174	315	791	140
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	170	664	319	104	729	99	125	938	174	315	791	140
Added Vol:	0	4	0	0	4	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	170	668	319	104	733	99	125	938	174	315	791	140
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	170	668	319	104	733	99	125	938	174	315	791	140
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	170	668	319	104	733	99	125	938	174	315	791	140
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	170	668	319	104	733	99	125	938	174	315	791	140
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.03	0.97	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1700	3452	1648	1700	3400	1700	1700	3400	1700	1700	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.10	0.19	0.19	0.06	0.22	0.06	0.07	0.28	0.10	0.19	0.23	0.08
Crit Moves:	****				****			****		****		

Cypress Barton Place
Existing Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #2 Cerritos Ave / Bloomfield St

Cycle (sec):	100	Critical Vol./Cap.(X):	0.838
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	61	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1	1 0	1 0	1	1 0	1 0	1	1 0	1 0	1	1 0
Volume Module: >> Count Date: 17 Nov 2011 << Existing AM Peak Hour												
Base Vol:	211	276	174	139	538	229	53	968	161	177	899	59
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	211	276	174	139	538	229	53	968	161	177	899	59
Added Vol:	0	5	0	0	7	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	211	281	174	139	545	229	53	968	161	177	899	59
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	211	281	174	139	545	229	53	968	161	177	899	59
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	211	281	174	139	545	229	53	968	161	177	899	59
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	211	281	174	139	545	229	53	968	161	177	899	59
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.24	0.76	1.00	1.41	0.59	1.00	1.71	0.29	1.00	1.88	0.12
Final Sat.:	1700	2100	1300	1700	2394	1006	1700	2915	485	1700	3191	209
Capacity Analysis Module:												
Vol/Sat:	0.12	0.13	0.13	0.08	0.23	0.23	0.03	0.33	0.33	0.10	0.28	0.28
Crit Moves:	****				****			****		****		

Cypress Barton Place
Existing Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #3 Cerritos Ave / Denni St

Cycle (sec):	100	Critical Vol./Cap.(X):	0.649
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	32	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Prot+Permit			Prot+Permit		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	1! 0	0	1 0	1 0	1	1 0	2 0	1	1 0	1 1	0
Volume Module: >> Count Date: 17 Nov 2011 << Existing AM Peak Hour												
Base Vol:	60	71	37	215	161	148	56	999	100	100	923	142
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	60	71	37	215	161	148	56	999	100	100	923	142
Added Vol:	0	7	29	0	9	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	60	78	66	215	170	148	56	999	100	100	923	142
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	60	78	66	215	170	148	56	999	100	100	923	142
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	60	78	66	215	170	148	56	999	100	100	923	142
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	60	78	66	215	170	148	56	999	100	100	923	142
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.29	0.39	0.32	1.00	1.00	1.00	1.00	2.00	1.00	1.00	1.73	0.27
Final Sat.:	500	650	550	1700	1700	1700	1700	3400	1700	1700	2947	453
Capacity Analysis Module:												
Vol/Sat:	0.12	0.12	0.12	0.13	0.10	0.09	0.03	0.29	0.06	0.06	0.31	0.31
Crit Moves:		****		****				****		****		

Cypress Barton Place
Existing Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #4 Cerritos Ave / Moody St

Cycle (sec):	100	Critical Vol./Cap.(X):	0.568
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	27	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Prot+Permit			Prot+Permit		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	1 0	0	1 1	0 0	1	1 0	1 1	0	1 0	1 1	0
Volume Module: >> Count Date: 1 Feb 2012 << Existing AM Peak Hour												
Base Vol:	0	1	0	599	1	218	65	1128	2	0	897	109
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1	0	599	1	218	65	1128	2	0	897	109
Added Vol:	0	0	0	10	0	0	8	20	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	1	0	609	1	218	73	1148	2	0	897	109
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1	0	609	1	218	73	1148	2	0	897	109
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	1	0	609	1	218	73	1148	2	0	897	109
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	1	0	609	1	218	73	1148	2	0	897	109
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	0.00	1.99	0.01	1.00	1.00	1.99	0.01	1.00	1.78	0.22
Final Sat.:	0	1700	0	3394	6	1700	1700	3394	6	1700	3032	368
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.18	0.18	0.13	0.04	0.34	0.34	0.00	0.30	0.30
Crit Moves:		****			****			****		****		

Cypress Barton Place
Existing Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #5 Cerritos Ave / Walker St

Cycle (sec):	100	Critical Vol./Cap.(X):	0.701
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	37	Level Of Service:	C

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	- T	- R		L	- T	- R		L	- T	- R		L	- T	- R	
Control:	Protected				Protected				Protected				Protected			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	2	0	2	0	1	1	0	1	1	0	1	0	3	0	1	1	0	2	0	1
Volume Module: >> Count Date: 1 Feb 2012 << Existing AM Peak Hour																				
Base Vol:	97	179	52		177	695	57		24	1180	562		98	901	101	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	97	179	52		177	695	57		24	1180	562		98	901	101	
Added Vol:	0	0	0		0	11	0		8	12	10		7	0	0	
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0	
Initial Fut:	97	179	52		177	706	57		32	1192	572		105	901	101	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	97	179	52		177	706	57		32	1192	572		105	901	101	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	97	179	52		177	706	57		32	1192	572		105	901	101	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	97	179	52		177	706	57		32	1192	572		105	901	101	
Saturation Flow Module:																
Sat/Lane:	1700	1700	1700		1700	1700	1700		1700	1700	1700		1700	1700	1700	
Adjustment:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Lanes:	2.00	2.00	1.00		1.00	1.85	0.15		1.00	3.00	1.00		1.00	2.00	1.00	
Final Sat.:	3400	3400	1700		1700	3146	254		1700	5100	1700		1700	3400	1700	
Capacity Analysis Module:																
Vol/Sat:	0.03	0.05	0.03		0.10	0.22	0.22		0.02	0.23	0.34		0.06	0.27	0.06	
Crit Moves:	****					****					****		****			

Cypress Barton Place
Existing Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #6 Cerritos Avenue / Valley View Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.776
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	47	Level Of Service:	C

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	- T	- R		L	- T	- R		L	- T	- R		L	- T	- R	
Control:	Protected				Protected				Protected				Protected			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	1	0	3	0	1	1	0	3	0	1	2	0	3	0	1	2	0	1	1	0
Volume Module:																				
Base Vol:	183	1086	39		124	1350	287		128	675	505		184	657	115	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	183	1086	39		124	1350	287		128	675	505		184	657	115	
Added Vol:	0	9	0		0	14	1		7	5	0		0	5	0	
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0	
Initial Fut:	183	1095	39		124	1364	288		135	680	505		184	662	115	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	183	1095	39		124	1364	288		135	680	505		184	662	115	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	183	1095	39		124	1364	288		135	680	505		184	662	115	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	183	1095	39		124	1364	288		135	680	505		184	662	115	
Saturation Flow Module:																
Sat/Lane:	1700	1700	1700		1700	1700	1700		1700	1700	1700		1700	1700	1700	
Adjustment:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Lanes:	1.00	3.00	1.00		1.00	3.00	1.00		2.00	3.00	1.00		2.00	1.70	0.30	
Final Sat.:	1700	5100	1700		1700	5100	1700		3400	5100	1700		3400	2897	503	
Capacity Analysis Module:																
Vol/Sat:	0.11	0.21	0.02		0.07	0.27	0.17		0.04	0.13	0.30		0.05	0.23	0.23	
Crit Moves:	****					****					****		****			

Cypress Barton Place
Existing Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #7 Katella Ave. / I-605 NB Ramps

Cycle (sec):	100	Critical Vol./Cap.(X):	0.381
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	19	Level Of Service:	A

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Protected					Protected					Protected					Protected				
Rights:	Ignore					Ignore					Include					Ignore				
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0	0	0	0	1	0	0	0	0	1	1	0	3	0	0	0	0	2	1	1
Volume Module:																				
Base Vol:	0	0	805	0	0	73	82	1475	0	0	1435	776								
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00								
Initial Bse:	0	0	805	0	0	73	82	1475	0	0	1435	776								
Added Vol:	0	0	6	0	0	0	0	5	0	0	7	5								
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0								
Initial Fut:	0	0	811	0	0	73	82	1480	0	0	1442	781								
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00								
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00								
PHF Volume:	0	0	0	0	0	0	82	1480	0	0	1442	0								
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0								
Reduced Vol:	0	0	0	0	0	0	82	1480	0	0	1442	0								
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00								
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00								
FinalVolume:	0	0	0	0	0	0	82	1480	0	0	1442	0								
Saturation Flow Module:																				
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700								
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00								
Lanes:	0.00	0.00	1.00	0.00	0.00	1.00	1.00	3.00	0.00	0.00	3.00	1.00								
Final Sat.:	0	0	1700	0	0	1700	1700	5100	0	0	5100	1700								
Capacity Analysis Module:																				
Vol/Sat:	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.29	0.00	0.00	0.28	0.00								
Crit Moves:							****				****									

Cypress Barton Place
Existing Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #8 Katella Ave. / Los Alamitos Blvd.

Cycle (sec):	100	Critical Vol./Cap.(X):	0.787
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	49	Level Of Service:	C

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Protected					Protected					Protected					Protected				
Rights:	Ovl					Ovl					Ovl					Ovl				
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2	0	3	0	1	2	0	3	0	1	2	0	3	0	1	2	0	3	0	1
Volume Module:																				
Base Vol:	395	947	377	167	965	151	199	1692	256	329	1198	77								
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00								
Initial Bse:	395	947	377	167	965	151	199	1692	256	329	1198	77								
Added Vol:	0	0	2	4	0	0	0	12	0	3	12	4								
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0								
Initial Fut:	395	947	379	171	965	151	199	1704	256	332	1210	81								
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00								
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00								
PHF Volume:	395	947	379	171	965	151	199	1704	256	332	1210	81								
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0								
Reduced Vol:	395	947	379	171	965	151	199	1704	256	332	1210	81								
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00								
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00								
FinalVolume:	395	947	379	171	965	151	199	1704	256	332	1210	81								
OvlAdjVol:			213			51			58			0								
Saturation Flow Module:																				
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700								
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00								
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00								
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700								
Capacity Analysis Module:																				
Vol/Sat:	0.12	0.19	0.22	0.05	0.19	0.09	0.06	0.33	0.15	0.10	0.24	0.05								
OvlAdjV/S:			0.13			0.03			0.03			0.00								
Crit Moves:	****				****			****			****									

Cypress Barton Place
Existing Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #9 Katella Avenue / Bloomfield Street

Cycle (sec): 100 Critical Vol./Cap.(X): 0.745
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 43 Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Prot+Permit			Prot+Permit			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1	1 0	1 0	1	1	1 0	2	1 0	1 0	2	1 0
Volume Module:												
Base Vol:	80	350	15	180	203	333	276	1828	38	54	1206	248
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	80	350	15	180	203	333	276	1828	38	54	1206	248
Added Vol:	0	0	0	7	0	0	0	18	0	0	20	5
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	80	350	15	187	203	333	276	1846	38	54	1226	253
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	80	350	15	187	203	333	276	1846	38	54	1226	253
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	80	350	15	187	203	333	276	1846	38	54	1226	253
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	80	350	15	187	203	333	276	1846	38	54	1226	253
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.92	0.08	1.00	1.00	1.00	1.00	2.94	0.06	1.00	2.49	0.51
Final Sat.:	1700	3260	140	1700	1700	1700	1700	4997	103	1700	4228	872
Capacity Analysis Module:												
Vol/Sat:	0.05	0.11	0.11	0.11	0.12	0.20	0.16	0.37	0.37	0.03	0.29	0.29
Crit Moves:	****					****	****				****	

Cypress Barton Place
Existing Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #10 Katella Ave / Lexington Dr

Cycle (sec): 100 Critical Vol./Cap.(X): 0.571
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 27 Level Of Service: A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1	0 1	1 0	1	1 0	2 0	3	0 1	1 0	2	1 0
Volume Module: >> Count Date: 17 Nov 2011 << Existing AM Peak Hour												
Base Vol:	93	49	92	121	7	103	65	1657	116	101	1385	84
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	93	49	92	121	7	103	65	1657	116	101	1385	84
Added Vol:	0	0	0	9	0	0	0	30	0	10	31	36
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	93	49	92	130	7	103	65	1687	116	111	1416	120
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	93	49	92	130	7	103	65	1687	116	111	1416	120
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	93	49	92	130	7	103	65	1687	116	111	1416	120
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	93	49	92	130	7	103	65	1687	116	111	1416	120
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	1.08	0.06	0.86	2.00	3.00	1.00	1.00	2.77	0.23
Final Sat.:	1700	1700	1700	1842	99	1459	3400	5100	1700	1700	4702	398
Capacity Analysis Module:												
Vol/Sat:	0.05	0.03	0.05	0.07	0.07	0.07	0.02	0.33	0.07	0.07	0.30	0.30
Crit Moves:	****			****				****		****		

Cypress Barton Place
Existing Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #11 Katella Ave / Cottonwood Way

Cycle (sec): 100 Critical Vol./Cap.(X): 0.427
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 21 Level Of Service: A

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	- T	- R		L	- T	- R		L	- T	- R		L	- T	- R	
Control:	Split Phase				Split Phase				Protected				Protected			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	0	0	0	0	0	1	0	0	0	1	1	0	2	1	0	0	0	2	1	0
Volume Module:																				
Base Vol:	0	0	0		0	0	3		4	1859	4		0	1555	5	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	0	0	0		0	0	3		4	1859	4		0	1555	5	
Added Vol:	0	0	0		0	0	0		0	50	0		0	77	0	
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0	
Initial Fut:	0	0	0		0	0	3		4	1909	4		0	1632	5	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	0	0	0		0	0	3		4	1909	4		0	1632	5	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	0	0	0		0	0	3		4	1909	4		0	1632	5	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	0	0	0		0	0	3		4	1909	4		0	1632	5	
Saturation Flow Module:																
Sat/Lane:	1700	1700	1700		1700	1700	1700		1700	1700	1700		1700	1700	1700	
Adjustment:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Lanes:	0.00	0.00	0.00		1.00	0.00	1.00		1.00	2.99	0.01		0.00	2.99	0.01	
Final Sat.:	0	0	0		1700	0	1700		1700	5089	11		0	5084	16	
Capacity Analysis Module:																
Vol/Sat:	0.00	0.00	0.00		0.00	0.00	0.00		0.00	0.38	0.38		0.00	0.32	0.32	
Crit Moves:							****			****			****			

Cypress Barton Place
Existing Plus Project
AM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #12 Katella Ave. / Enterprise Dr.

Average Delay (sec/veh): 0.5 Worst Case Level Of Service: F[87.9]

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	- T	- R			L	- T	- R			L	- T	- R			L	- T	- R		
Control:	Stop Sign					Stop Sign					Uncontrolled					Uncontrolled				
Rights:	Include					Include					Include					Include				
Lanes:	0	0	1!	0	0	0	0	0	0	2	0	0	2	1	0	1	0	2	1	0
Volume Module:																				
Base Vol:	3	0	10		0	0	1		0	1857	4		10	1556	18					
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00					
Initial Bse:	3	0	10		0	0	1		0	1857	4		10	1556	18					
Added Vol:	0	0	0		0	0	40		0	50	0		0	38	27					
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0					
Initial Fut:	3	0	10		0	0	41		0	1907	4		10	1594	45					
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00					
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00					
PHF Volume:	3	0	10		0	0	41		0	1907	4		10	1594	45					
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0					
FinalVolume:	3	0	10		0	0	41		0	1907	4		10	1594	45					
Critical Gap Module:																				
Critical Gp:	7.5	6.5	6.9	xxxxx	xxxx		6.9	xxxxx	xxxx	xxxxx		4.1	xxxx	xxxxx						
FollowUpTim:	3.5	4.0	3.3	xxxxx	xxxx		3.3	xxxxx	xxxx	xxxxx		2.2	xxxx	xxxxx						
Capacity Module:																				
Cnflict Vol:	2460	3568	638	xxxx	xxxx		554	xxxx	xxxx	xxxxx		1911	xxxx	xxxxx						
Potent Cap.:	16	6	424	xxxx	xxxx		481	xxxx	xxxx	xxxxx		315	xxxx	xxxxx						
Move Cap.:	14	6	424	xxxx	xxxx		481	xxxx	xxxx	xxxxx		315	xxxx	xxxxx						
Volume/Cap:	0.21	0.00	0.02	xxxx	xxxx		0.09	xxxx	xxxx	xxxx		0.03	xxxx	xxxx						
Level Of Service Module:																				
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx		0.3	xxxx	xxxx	xxxxx		0.1	xxxx	xxxxx						
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx		13.2	xxxxx	xxxx	xxxxx		16.8	xxxx	xxxxx						
LOS by Move:	*	*	*	*	*		B	*	*	*		C	*	*						
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT					
Shared Cap.:	xxxx	56	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx								
SharedQueue:	xxxxx	0.8	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx								
Shrd ConDel:	xxxxx	87.9	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx								
Shared LOS:	*	F	*	*	*	*	*	*	*	*	*	*								
ApproachDel:	87.9			13.2			xxxxxx			xxxxxx										
ApproachLOS:	F			B			*			*										

Note: Queue reported is the number of cars per lane.

Cypress Barton Place
Existing Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #13 Katella Avenue / Siboney Street

Cycle (sec): 100 Critical Vol./Cap.(X): 0.459
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 22 Level Of Service: A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 1	0	0 1	1 0	1! 0	1	2 0	2 1	0	1 0	3 0	1
Volume Module:												
Base Vol:	42	5	34	31	3	20	130	1728	25	36	1458	43
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	42	5	34	31	3	20	130	1728	25	36	1458	43
Added Vol:	0	0	0	0	0	0	39	31	0	0	64	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	42	5	34	31	3	20	169	1759	25	36	1522	43
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	42	5	34	31	3	20	169	1759	25	36	1522	43
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	42	5	34	31	3	20	169	1759	25	36	1522	43
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	42	5	34	31	3	20	169	1759	25	36	1522	43
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.89	0.11	1.00	1.72	0.17	1.11	2.00	2.96	0.04	1.00	3.00	1.00
Final Sat.:	1519	181	1700	2928	283	1889	3400	5029	71	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.03	0.03	0.02	0.01	0.01	0.01	0.05	0.35	0.35	0.02	0.30	0.03
Crit Moves:		****			****			****			****	

Cypress Barton Place
Existing Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #14 Katella Avenue / Winner Circle

Cycle (sec): 100 Critical Vol./Cap.(X): 0.443
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 21 Level Of Service: A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0	1 0	1 0	0	1 0	1 0	2 1	0	1 0	3 0	1
Volume Module:												
Base Vol:	5	1	4	7	0	5	18	1771	25	54	1566	3
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	5	1	4	7	0	5	18	1771	25	54	1566	3
Added Vol:	0	0	0	0	0	0	0	29	0	0	63	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	5	1	4	7	0	5	18	1800	25	54	1629	3
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	5	1	4	7	0	5	18	1800	25	54	1629	3
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	5	1	4	7	0	5	18	1800	25	54	1629	3
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	5	1	4	7	0	5	18	1800	25	54	1629	3
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.20	0.80	1.00	0.00	1.00	1.00	2.96	0.04	1.00	3.00	1.00
Final Sat.:	1700	340	1360	1700	0	1700	1700	5030	70	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.36	0.36	0.03	0.32	0.00
Crit Moves:	****				****			****			****	

Cypress Barton Place
Existing Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #15 Katella Avenue / Walker Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.645
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	32	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 1	0 1	0	1 1	0 0	2	2 0	2 1	0	1 0	3 0	1
Volume Module:												
Base Vol:	6	2	0	839	9	195	166	1560	2	8	1461	301
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	6	2	0	839	9	195	166	1560	2	8	1461	301
Added Vol:	0	0	0	0	0	27	0	29	0	0	36	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	6	2	0	839	9	222	166	1589	2	8	1497	301
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	6	2	0	839	9	222	166	1589	2	8	1497	301
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	6	2	0	839	9	222	166	1589	2	8	1497	301
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	6	2	0	839	9	222	166	1589	2	8	1497	301
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	0.00	1.98	0.02	2.00	2.00	2.99	0.01	1.00	3.00	1.00
Final Sat.:	1700	1700	0	3364	36	3400	3400	5094	6	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.25	0.25	0.07	0.05	0.31	0.31	0.00	0.29	0.18
Crit Moves:	****			****			****				****	

Cypress Barton Place
Existing Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #16 Katella Avenue / Valley View Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.703
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	37	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	3 0	3 0	1	2 0	3 0	1	2 0	3 0	1	2 0	3 0	1
Volume Module:												
Base Vol:	783	1441	270	207	1159	243	250	1011	792	170	980	157
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	783	1441	270	207	1159	243	250	1011	792	170	980	157
Added Vol:	15	0	0	0	0	14	9	6	14	0	6	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	798	1441	270	207	1159	257	259	1017	806	170	986	157
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	798	1441	270	207	1159	257	259	1017	0	170	986	157
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	798	1441	270	207	1159	257	259	1017	0	170	986	157
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
FinalVolume:	798	1441	270	207	1159	257	259	1017	0	170	986	157
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	3.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	5100	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.16	0.28	0.16	0.06	0.23	0.15	0.08	0.20	0.00	0.05	0.19	0.09
Crit Moves:	****				****		****				****	

Cypress Barton Place
Existing Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #17 Farquhar Ave / Los Alamitos Blvd

Cycle (sec):	100	Critical Vol./Cap.(X):	0.635
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	31	Level Of Service:	B

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	- T	-	R	L	- T	-	R	L	- T	-	R	L	- T	-	R
Control:	Protected				Protected				Permitted				Permitted			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0		0	0	0		0	0	0		0	0	0		0
Y+R:	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0
Lanes:	0	0	2	1 0	1	0	3	0 0	0	0	0	0 0	1	0	1!	0 0
Volume Module:																
Base Vol:	0	1725	182		125	1378	0		0	0	0		346	0	119	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	0	1725	182		125	1378	0		0	0	0		346	0	119	
Added Vol:	0	2	0		0	3	0		0	0	0		0	0	0	
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0	
Initial Fut:	0	1727	182		125	1381	0		0	0	0		346	0	119	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	0	1727	182		125	1381	0		0	0	0		346	0	119	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	0	1727	182		125	1381	0		0	0	0		346	0	119	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	0	1727	182		125	1381	0		0	0	0		346	0	119	
Saturation Flow Module:																
Sat/Lane:	1700	1700	1700		1700	1700	1700		1700	1700	1700		1700	1700	1700	
Adjustment:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Lanes:	0.00	2.71	0.29		1.00	3.00	0.00		0.00	0.00	0.00		1.49	0.00	0.51	
Final Sat.:	0	4614	486		1700	5100	0		0	0	0		2530	0	870	
Capacity Analysis Module:																
Vol/Sat:	0.00	0.37	0.37		0.07	0.27	0.00		0.00	0.00	0.00		0.14	0.00	0.14	
Crit Moves:		****			****								****			

Cypress Barton Place
Existing Plus Project
AM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #18 Farquhar Ave / Lexington Dr

Cycle (sec):	100	Critical Vol./Cap.(X):	0.209
Loss Time (sec):	0	Average Delay (sec/veh):	8.3
Optimal Cycle:	0	Level Of Service:	A

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	- T	-	R	L	- T	-	R	L	- T	-	R	L	- T	-	R
Control:	Stop Sign				Stop Sign				Stop Sign				Stop Sign			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0		0	0	0		0	0	0		0	0	0		0
Lanes:	1	0	1	0 0	0	0	2	0 1	0	0	1!	0 0	0	0	0	0 0
Volume Module:																
Base Vol:	3	41	0		0	218	75		81	0	83		0	0	0	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	3	41	0		0	218	75		81	0	83		0	0	0	
Added Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0	
Initial Fut:	3	41	0		0	218	75		81	0	83		0	0	0	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	3	41	0		0	218	75		81	0	83		0	0	0	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	3	41	0		0	218	75		81	0	83		0	0	0	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	3	41	0		0	218	75		81	0	83		0	0	0	
Saturation Flow Module:																
Adjustment:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Lanes:	1.00	1.00	0.00		0.00	2.00	1.00		0.49	0.00	0.51		0.00	0.00	0.00	
Final Sat.:	620	680	0		0	1435	834		387	0	397		0	0	0	
Capacity Analysis Module:																
Vol/Sat:	0.00	0.06	xxxx		xxxx	0.15	0.09		0.21	xxxx	0.21		xxxx	xxxx	xxxx	
Crit Moves:		****				****			****							
Delay/Veh:	8.3	8.1	0.0		0.0	8.5	7.3		8.5	0.0	8.5		0.0	0.0	0.0	
Delay Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
AdjDel/Veh:	8.3	8.1	0.0		0.0	8.5	7.3		8.5	0.0	8.5		0.0	0.0	0.0	
LOS by Move:	A	A	*		*	A	A		A	*	A		*	*	*	
ApproachDel:		8.2				8.2				8.5				xxxxxx		
Delay Adj:		1.00				1.00				1.00				xxxxx		
ApprAdjDel:		8.2				8.2				8.5				xxxxxx		
LOS by Appr:		A				A				A				*		
AllWayAvgQ:	0.0	0.1	0.0		0.0	0.2	0.1		0.2	0.2	0.2		0.0	0.0	0.0	

Note: Queue reported is the number of cars per lane.

Cypress Barton Place
Existing Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #19 Orangewood Avenue / Valley View Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.790
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	50	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 1	0	2 0	3 0	1	1 0	1 1	0	1 0	0 1	1
Volume Module:												
Base Vol:	20	1899	65	233	1739	43	143	60	13	75	30	644
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	20	1899	65	233	1739	43	143	60	13	75	30	644
Added Vol:	0	11	0	3	10	0	0	0	0	0	0	5
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	20	1910	65	236	1749	43	143	60	13	75	30	649
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	20	1910	65	236	1749	43	143	60	13	75	30	649
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	20	1910	65	236	1749	43	143	60	13	75	30	649
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	20	1910	65	236	1749	43	143	60	13	75	30	649
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.90	0.10	2.00	3.00	1.00	1.00	1.64	0.36	1.00	0.09	1.91
Final Sat.:	1700	4932	168	3400	5100	1700	1700	2795	605	1700	150	3250
Capacity Analysis Module:												
Vol/Sat:	0.01	0.39	0.39	0.07	0.34	0.03	0.08	0.02	0.02	0.04	0.20	0.20
Crit Moves:		****		****			****				****	

Cypress Barton Place
Existing Plus Project
PM Peak Hour

Scenario Report

Scenario:	Ex Plus Proj PM ICU
Command:	Existing Plus Proj PM
Volume:	PM EXISTING
Geometry:	Existing
Impact Fee:	Default Impact Fee
Trip Generation:	Project PM
Trip Distribution:	Existing Plus Project
Paths:	Project NO EBL
Routes:	Default Route
Configuration:	ICU

Cypress Barton Place
Existing Plus Project
PM Peak Hour

Trip Generation Report

Forecast for PM Project

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
401	Cypress Bart	1.00	Residential	32.00	20.00	32	20	52	28.7
	Zone 401 Subtotal					32	20	52	28.7
504	Cypress Bart	1.00	Retail	69.00	60.00	69	60	129	71.3
	Zone 504 Subtotal					69	60	129	71.3
TOTAL						101	80	181	100.0

Cypress Barton Place
Existing Plus Project
PM Peak Hour

Trip Distribution Report

Percent Of Trips Project Trips

Zone	To Gates 1	2	3	4	10	14	15	16	17	18	21
401	2.0	5.0	5.0	8.0	0.0	5.0	5.0	8.0	0.0	10.0	2.0
504	2.0	5.0	5.0	10.0	0.0	0.0	5.0	5.0	5.0	10.0	5.0

Zone	To Gates 39	40	42	44	68	69	70	71	72	73	74
401	0.0	0.0	0.0	0.0	10.0	5.0	0.0	5.0	10.0	5.0	5.0
504	5.0	5.0	5.0	5.0	5.0	5.0	0.0	3.0	0.0	5.0	5.0

Zone	To Gates 75	76	77
401	0.0	5.0	5.0
504	5.0	0.0	0.0

Cypress Barton Place
Existing Plus Project
PM Peak Hour

Intersection Volume Report
Base Volume Alternative

Node	Intersection	Northbound L	T	R	Southbound L	T	R	Eastbound L	T	R	Westbound L	T	R
1	Cerritos Ave.	254	840	348	89	617	48	143	875	234	379	999	148
2	Cerritos Ave	133	435	135	59	283	100	147	1048	96	99	1140	126
3	Cerritos Ave	80	135	73	92	53	91	135	1120	35	46	1076	145
4	Cerritos Ave	3	1	0	246	1	134	214	1076	0	3	1199	332
5	Cerritos Ave	505	688	206	113	413	48	68	992	263	78	898	144
6	Cerritos Aven	318	1815	184	125	1132	186	325	772	265	95	534	134
7	Katella Ave.	0	0	758	0	0	74	340	1910	0	0	1628	893
8	Katella Ave.	464	847	344	177	1066	208	307	1391	442	310	1514	94
9	Katella Avenu	54	109	29	225	180	169	242	1569	65	76	1704	311
10	Katella Ave /	76	46	108	130	12	120	86	1667	72	118	1697	109
11	Katella Ave /	0	0	3	6	0	1	11	1894	1	0	1939	4
12	Katella Ave.	2	0	7	0	0	2	0	1875	13	19	1951	2
13	Katella Avenu	62	2	67	75	5	71	100	1926	39	61	1902	53
14	Katella Avenu	42	4	52	33	0	47	144	1839	15	53	1898	8
15	Katella Avenu	27	16	4	551	1	200	265	1661	2	2	1739	539
16	Katella Avenu	603	1401	163	264	1385	222	271	1086	1291	353	1009	272
17	Farquhar Ave	0	1542	169	116	1686	0	0	0	0	427	0	168
18	Farquhar Ave	106	232	0	0	70	80	69	0	28	0	0	0
19	Orangewood Av	17	1477	68	549	2242	101	104	49	25	75	16	442

Cypress Barton Place
Existing Plus Project
PM Peak Hour

Intersection Volume Report
Future Volume Alternative

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
1	Cerritos Ave.	254	843	348	89	621	48	143	875	234	379	999	148
2	Cerritos Ave	133	440	135	59	288	100	147	1048	96	99	1140	126
3	Cerritos Ave	80	141	96	92	61	91	135	1120	35	46	1076	145
4	Cerritos Ave	3	1	0	255	1	134	221	1092	0	3	1199	332
5	Cerritos Ave	505	688	206	113	423	48	75	1001	272	84	898	144
6	Cerritos Aven	318	1823	184	125	1145	187	330	776	265	95	539	134
7	Katella Ave.	0	0	765	0	0	74	340	1915	0	0	1633	897
8	Katella Ave.	464	847	347	181	1066	208	307	1403	442	312	1523	97
9	Katella Avenu	54	109	29	230	180	169	242	1589	65	76	1719	316
10	Katella Ave /	76	46	108	138	12	120	86	1698	72	124	1720	138
11	Katella Ave /	0	0	3	6	0	1	11	1938	1	0	1998	4
12	Katella Ave.	2	0	7	0	0	28	0	1919	13	19	1984	41
13	Katella Avenu	62	2	67	75	5	71	153	1948	39	61	1961	53
14	Katella Avenu	42	4	52	33	0	47	144	1862	15	53	1956	8
15	Katella Avenu	27	16	4	551	1	225	265	1684	2	2	1772	539
16	Katella Avenu	617	1401	163	264	1385	235	279	1091	1302	353	1015	272
17	Farquhar Ave	0	1545	169	116	1688	0	0	0	0	427	0	168
18	Farquhar Ave	106	232	0	0	70	80	69	0	28	0	0	0
19	Orangewood Av	17	1487	68	552	2250	101	104	49	25	75	16	445

Cypress Barton Place
Existing Plus Project
PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
# 1 Cerritos Ave. / Los Alamitos B	D	xxxxx	0.861	D	xxxxx	0.862	+ 0.001 V/C
# 2 Cerritos Ave / Bloomfield St	C	xxxxx	0.711	C	xxxxx	0.713	+ 0.001 V/C
# 3 Cerritos Ave / Denni St	C	xxxxx	0.712	C	xxxxx	0.729	+ 0.017 V/C
# 4 Cerritos Ave / Moody St	C	xxxxx	0.707	C	xxxxx	0.711	+ 0.004 V/C
# 5 Cerritos Ave / Walker St	B	xxxxx	0.638	B	xxxxx	0.645	+ 0.007 V/C
# 6 Cerritos Avenue / Valley View	C	xxxxx	0.771	C	xxxxx	0.776	+ 0.005 V/C
# 7 Katella Ave. / I-605 NB Ramps	A	xxxxx	0.569	A	xxxxx	0.570	+ 0.001 V/C
# 8 Katella Ave. / Los Alamitos Bl	C	xxxxx	0.783	C	xxxxx	0.784	+ 0.002 V/C
# 9 Katella Avenue / Bloomfield S	C	xxxxx	0.760	C	xxxxx	0.767	+ 0.007 V/C
# 10 Katella Ave / Lexington Dr	A	xxxxx	0.587	A	xxxxx	0.599	+ 0.011 V/C
# 11 Katella Ave / Cottonwood Way	A	xxxxx	0.443	A	xxxxx	0.454	+ 0.012 V/C
# 12 Katella Ave. / Enterprise Dr.	F	89.5	0.159	F	106.9	0.188	+17.422 D/V
# 13 Katella Avenue / Siboney Stree	A	xxxxx	0.540	A	xxxxx	0.545	+ 0.004 V/C
# 14 Katella Avenue / Winner Circle	A	xxxxx	0.559	A	xxxxx	0.571	+ 0.011 V/C
# 15 Katella Avenue / Walker Street	B	xxxxx	0.647	B	xxxxx	0.654	+ 0.006 V/C
# 16 Katella Avenue / Valley View S	C	xxxxx	0.757	C	xxxxx	0.760	+ 0.004 V/C
# 17 Farquhar Ave / Los Alamitos Bl	B	xxxxx	0.629	B	xxxxx	0.629	+ 0.001 V/C
# 18 Farquhar Ave / Lexington Dr	A	8.9	0.317	A	8.9	0.317	+ 0.000 V/C
# 19 Orangewood Avenue / Valley Vie	C	xxxxx	0.710	C	xxxxx	0.714	+ 0.004 V/C

Cypress Barton Place
Existing Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Cerritos Ave. / Los Alamitos Blvd

Cycle (sec):	100	Critical Vol./Cap.(X):	0.862
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	69	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2	1 0	1 0	2	0 1	1 0	2	0 1	1 0	2	0 1
Volume Module:												
Base Vol:	254	840	348	89	617	48	143	875	234	379	999	148
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	254	840	348	89	617	48	143	875	234	379	999	148
Added Vol:	0	3	0	0	4	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	254	843	348	89	621	48	143	875	234	379	999	148
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	254	843	348	89	621	48	143	875	234	379	999	148
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	254	843	348	89	621	48	143	875	234	379	999	148
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	254	843	348	89	621	48	143	875	234	379	999	148
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.12	0.88	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1700	3610	1490	1700	3400	1700	1700	3400	1700	1700	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.15	0.23	0.23	0.05	0.18	0.03	0.08	0.26	0.14	0.22	0.29	0.09
Crit Moves:	****				****			****		****		

Cypress Barton Place
Existing Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #2 Cerritos Ave / Bloomfield St

Cycle (sec):	100	Critical Vol./Cap.(X):	0.713
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	39	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1	1 0	1 0	1	1 0	1 0	1	1 0	1 0	1	1 0
Volume Module:	Existing PM Peak Hour											
Base Vol:	133	435	135	59	283	100	147	1048	96	99	1140	126
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	133	435	135	59	283	100	147	1048	96	99	1140	126
Added Vol:	0	5	0	0	5	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	133	440	135	59	288	100	147	1048	96	99	1140	126
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	133	440	135	59	288	100	147	1048	96	99	1140	126
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	133	440	135	59	288	100	147	1048	96	99	1140	126
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	133	440	135	59	288	100	147	1048	96	99	1140	126
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.53	0.47	1.00	1.48	0.52	1.00	1.83	0.17	1.00	1.80	0.20
Final Sat.:	1700	2602	798	1700	2524	876	1700	3115	285	1700	3062	338
Capacity Analysis Module:												
Vol/Sat:	0.08	0.17	0.17	0.03	0.11	0.11	0.09	0.34	0.34	0.06	0.37	0.37
Crit Moves:		****		****			****				****	

Cypress Barton Place
Existing Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #3 Cerritos Ave / Denni St

Cycle (sec): 100 Critical Vol./Cap.(X): 0.729
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 41 Level Of Service: C

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	- T	- R		L	- T	- R		L	- T	- R		L	- T	- R	
Control:	Split Phase				Split Phase				Prot+Permit				Prot+Permit			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	0	0	1!	0	0	1	0	1	0	1	1	0	2	0	1	1	0	1	0
Volume Module: Existing PM Peak Hour																			
Base Vol:	80	135	73		92	53	91		135	1120	35		46	1076	145				
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00				
Initial Bse:	80	135	73		92	53	91		135	1120	35		46	1076	145				
Added Vol:	0	6	23		0	8	0		0	0	0		0	0	0				
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0				
Initial Fut:	80	141	96		92	61	91		135	1120	35		46	1076	145				
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00				
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00				
PHF Volume:	80	141	96		92	61	91		135	1120	35		46	1076	145				
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0				
Reduced Vol:	80	141	96		92	61	91		135	1120	35		46	1076	145				
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00				
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00				
FinalVolume:	80	141	96		92	61	91		135	1120	35		46	1076	145				
Saturation Flow Module:																			
Sat/Lane:	1700	1700	1700		1700	1700	1700		1700	1700	1700		1700	1700	1700				
Adjustment:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00				
Lanes:	0.25	0.45	0.30		1.00	1.00	1.00		1.00	2.00	1.00		1.00	1.76	0.24				
Final Sat.:	429	756	515		1700	1700	1700		1700	3400	1700		1700	2996	404				
Capacity Analysis Module:																			
Vol/Sat:	0.19	0.19	0.19		0.05	0.04	0.05		0.08	0.33	0.02		0.03	0.36	0.36				
Crit Moves:	****				****				****					****					

Cypress Barton Place
Existing Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #4 Cerritos Ave / Moody St

Cycle (sec): 100 Critical Vol./Cap.(X): 0.711
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 38 Level Of Service: C

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	- T	- R		L	- T	- R		L	- T	- R		L	- T	- R	
Control:	Split Phase				Split Phase				Prot+Permit				Prot+Permit			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	0	1	0	0	0	1	1	0	0	1	1	0	1	0	1	1	0	1	0
Volume Module: Existing PM Peak Hour																			
Base Vol:	3	1	0		246	1	134		214	1076	0		3	1199	332				
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00				
Initial Bse:	3	1	0		246	1	134		214	1076	0		3	1199	332				
Added Vol:	0	0	0		9	0	0		7	16	0		0	0	0				
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0				
Initial Fut:	3	1	0		255	1	134		221	1092	0		3	1199	332				
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00				
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00				
PHF Volume:	3	1	0		255	1	134		221	1092	0		3	1199	332				
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0				
Reduced Vol:	3	1	0		255	1	134		221	1092	0		3	1199	332				
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00				
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00				
FinalVolume:	3	1	0		255	1	134		221	1092	0		3	1199	332				
Saturation Flow Module:																			
Sat/Lane:	1700	1700	1700		1700	1700	1700		1700	1700	1700		1700	1700	1700				
Adjustment:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00				
Lanes:	0.75	0.25	0.00		1.99	0.01	1.00		1.00	2.00	0.00		1.00	1.57	0.43				
Final Sat.:	1275	425	0		3387	13	1700		1700	3400	0		1700	2663	737				
Capacity Analysis Module:																			
Vol/Sat:	0.00	0.00	0.00		0.08	0.08	0.08		0.13	0.32	0.00		0.00	0.45	0.45				
Crit Moves:		****					****		****					****					

Cypress Barton Place
Existing Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #5 Cerritos Ave / Walker St

Cycle (sec):	100	Critical Vol./Cap.(X):	0.645
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	32	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2 0	2 0	1	1 0	1 1	0	1 0	3 0	1	1 0	2 0	1
Volume Module:	Existing PM Peak Hour											
Base Vol:	505	688	206	113	413	48	68	992	263	78	898	144
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	505	688	206	113	413	48	68	992	263	78	898	144
Added Vol:	0	0	0	0	10	0	7	9	9	6	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	505	688	206	113	423	48	75	1001	272	84	898	144
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	505	688	206	113	423	48	75	1001	272	84	898	144
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	505	688	206	113	423	48	75	1001	272	84	898	144
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	505	688	206	113	423	48	75	1001	272	84	898	144
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	1.00	1.80	0.20	1.00	3.00	1.00	1.00	2.00	1.00
Final Sat.:	3400	3400	1700	1700	3054	346	1700	5100	1700	1700	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.15	0.20	0.12	0.07	0.14	0.14	0.04	0.20	0.16	0.05	0.26	0.08
Crit Moves:	****				****		****				****	

Cypress Barton Place
Existing Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #6 Cerritos Avenue / Valley View Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.776
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	47	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	3 0	1	1 0	3 0	1	2 0	3 0	1	2 0	1 1	0
Volume Module:												
Base Vol:	318	1815	184	125	1132	186	325	772	265	95	534	134
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	318	1815	184	125	1132	186	325	772	265	95	534	134
Added Vol:	0	8	0	0	13	1	5	4	0	0	5	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	318	1823	184	125	1145	187	330	776	265	95	539	134
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	318	1823	184	125	1145	187	330	776	265	95	539	134
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	318	1823	184	125	1145	187	330	776	265	95	539	134
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	318	1823	184	125	1145	187	330	776	265	95	539	134
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	3.00	1.00	1.00	3.00	1.00	2.00	3.00	1.00	2.00	1.60	0.40
Final Sat.:	1700	5100	1700	1700	5100	1700	3400	5100	1700	3400	2723	677
Capacity Analysis Module:												
Vol/Sat:	0.19	0.36	0.11	0.07	0.22	0.11	0.10	0.15	0.16	0.03	0.20	0.20
Crit Moves:		****		****			****				****	

Cypress Barton Place
Existing Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #7 Katella Ave. / I-605 NB Ramps

Cycle (sec):	100	Critical Vol./Cap.(X):	0.570
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	27	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Ignore			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	0 0	1	0 0	0 0	1	1 0	3 0	0	0 0	2 1	1
Volume Module:												
Base Vol:	0	0	758	0	0	74	340	1910	0	0	1628	893
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	758	0	0	74	340	1910	0	0	1628	893
Added Vol:	0	0	7	0	0	0	0	5	0	0	5	4
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	765	0	0	74	340	1915	0	0	1633	897
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Volume:	0	0	0	0	0	0	340	1915	0	0	1633	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	0	0	0	340	1915	0	0	1633	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
FinalVolume:	0	0	0	0	0	0	340	1915	0	0	1633	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	1.00	0.00	0.00	1.00	1.00	3.00	0.00	0.00	3.00	1.00
Final Sat.:	0	0	1700	0	0	1700	1700	5100	0	0	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.38	0.00	0.00	0.32	0.00
Crit Moves:							****				****	

Cypress Barton Place
Existing Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #8 Katella Ave. / Los Alamitos Blvd.

Cycle (sec):	100	Critical Vol./Cap.(X):	0.784
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	49	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Ovl			Ovl			Ovl		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2 0	3 0	1	2 0	3 0	1	2 0	3 0	1	2 0	3 0	1
Volume Module:												
Base Vol:	464	847	344	177	1066	208	307	1391	442	310	1514	94
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	464	847	344	177	1066	208	307	1391	442	310	1514	94
Added Vol:	0	0	3	4	0	0	0	12	0	2	9	3
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	464	847	347	181	1066	208	307	1403	442	312	1523	97
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	464	847	347	181	1066	208	307	1403	442	312	1523	97
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	464	847	347	181	1066	208	307	1403	442	312	1523	97
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	464	847	347	181	1066	208	307	1403	442	312	1523	97
OvlAdjVol:			191			55			210			6
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.14	0.17	0.20	0.05	0.21	0.12	0.09	0.28	0.26	0.09	0.30	0.06
OvlAdjV/S:			0.11			0.03			0.12			0.00
Crit Moves:	****				****		****				****	

Cypress Barton Place
Existing Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #9 Katella Avenue / Bloomfield Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.767
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	46	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Prot+Permit			Prot+Permit			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1 1	0	1 0	1 0	1	1 0	2 1	0	1 0	2 1	0
Volume Module:												
Base Vol:	54	109	29	225	180	169	242	1569	65	76	1704	311
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	54	109	29	225	180	169	242	1569	65	76	1704	311
Added Vol:	0	0	0	5	0	0	0	20	0	0	15	5
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	54	109	29	230	180	169	242	1589	65	76	1719	316
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	54	109	29	230	180	169	242	1589	65	76	1719	316
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	54	109	29	230	180	169	242	1589	65	76	1719	316
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	54	109	29	230	180	169	242	1589	65	76	1719	316
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.58	0.42	1.00	1.00	1.00	1.00	2.88	0.12	1.00	2.53	0.47
Final Sat.:	1700	2686	714	1700	1700	1700	1700	4900	200	1700	4308	792
Capacity Analysis Module:												
Vol/Sat:	0.03	0.04	0.04	0.14	0.11	0.10	0.14	0.32	0.32	0.04	0.40	0.40
Crit Moves:		****		****			****				****	

Cypress Barton Place
Existing Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #10 Katella Ave / Lexington Dr

Cycle (sec):	100	Critical Vol./Cap.(X):	0.599
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	29	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1 0	1	1 0	1 1	0 0	2 0	3 0	1	1 0	2 1	0
Volume Module:	Existing PM Peak Hour											
Base Vol:	76	46	108	130	12	120	86	1667	72	118	1697	109
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	76	46	108	130	12	120	86	1667	72	118	1697	109
Added Vol:	0	0	0	8	0	0	0	31	0	6	23	29
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	76	46	108	138	12	120	86	1698	72	124	1720	138
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	76	46	108	138	12	120	86	1698	72	124	1720	138
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	76	46	108	138	12	120	86	1698	72	124	1720	138
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	76	46	108	138	12	120	86	1698	72	124	1720	138
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	1.02	0.09	0.89	2.00	3.00	1.00	1.00	2.78	0.22
Final Sat.:	1700	1700	1700	1738	151	1511	3400	5100	1700	1700	4721	379
Capacity Analysis Module:												
Vol/Sat:	0.04	0.03	0.06	0.08	0.08	0.08	0.03	0.33	0.04	0.07	0.36	0.36
Crit Moves:			****		****			****		****		

Cypress Barton Place
Existing Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #11 Katella Ave / Cottonwood Way

Cycle (sec): 100 Critical Vol./Cap.(X): 0.454
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 22 Level Of Service: A

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	T	R		L	T	R		L	T	R		L	T	R	
Control:	Split Phase				Split Phase				Protected				Protected			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	0	0	0	0	1	1	0	0	0	1	1	0	2	1	0	0	0	2	1	0
Volume Module:																				
Base Vol:	0	0	3		6	0	1		11	1894	1		0	1939	4	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	0	0	3		6	0	1		11	1894	1		0	1939	4	
Added Vol:	0	0	0		0	0	0		0	44	0		0	59	0	
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0	
Initial Fut:	0	0	3		6	0	1		11	1938	1		0	1998	4	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	0	0	3		6	0	1		11	1938	1		0	1998	4	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	0	0	3		6	0	1		11	1938	1		0	1998	4	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	0	0	3		6	0	1		11	1938	1		0	1998	4	
Saturation Flow Module:																
Sat/Lane:	1700	1700	1700		1700	1700	1700		1700	1700	1700		1700	1700	1700	
Adjustment:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Lanes:	0.00	0.00	1.00		1.00	0.00	1.00		1.00	2.99	0.01		0.00	2.99	0.01	
Final Sat.:	0	0	1700		1700	0	1700		1700	5097	3		0	5090	10	
Capacity Analysis Module:																
Vol/Sat:	0.00	0.00	0.00		0.00	0.00	0.00		0.01	0.38	0.38		0.00	0.39	0.39	
Crit Moves:			****		****				****					****		

Cypress Barton Place
Existing Plus Project
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #12 Katella Ave. / Enterprise Dr.

Average Delay (sec/veh): 0.4 Worst Case Level Of Service: F[106.9]

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	T	R		L	T	R		L	T	R		L	T	R	
Control:	Stop Sign				Stop Sign				Uncontrolled				Uncontrolled			
Rights:	Include				Include				Include				Include			
Lanes:	0	0	1!	0	0	0	0	0	0	2	0	0	2	1	0	1	0	2	1	0
Volume Module:																				
Base Vol:	2	0	7		0	0	2		0	1875	13		19	1951	2	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	2	0	7		0	0	2		0	1875	13		19	1951	2	
Added Vol:	0	0	0		0	0	26		0	44	0		0	33	39	
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0	
Initial Fut:	2	0	7		0	0	28		0	1919	13		19	1984	41	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	2	0	7		0	0	28		0	1919	13		19	1984	41	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
FinalVolume:	2	0	7		0	0	28		0	1919	13		19	1984	41	
Critical Gap Module:																
Critical Gp:	7.5	6.5	6.9	xxxxx	xxxx	6.9	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx				
FollowUpTim:	3.5	4.0	3.3	xxxxx	xxxx	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx				
Capacity Module:																
Cnflict Vol:	2625	3989	646	xxxx	xxxx	682	xxxx	xxxx	xxxxx	1932	xxxx	xxxxx				
Potent Cap.:	12	3	419	xxxx	xxxx	397	xxxx	xxxx	xxxxx	309	xxxx	xxxxx				
Move Cap.:	11	3	419	xxxx	xxxx	397	xxxx	xxxx	xxxxx	309	xxxx	xxxxx				
Volume/Cap:	0.19	0.00	0.02	xxxx	xxxx	0.07	xxxx	xxxx	xxxx	0.06	xxxx	xxxx				
Level Of Service Module:																
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	0.2	xxxx	xxxx	xxxxx	0.2	xxxx	xxxxx				
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	14.8	xxxxx	xxxx	xxxxx	17.4	xxxx	xxxxx				
LOS by Move:	*	*	*	*	*	B	*	*	*	C	*	*				
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT				
Shared Cap.:	xxxx	44	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx				
SharedQueue:	xxxxx	0.7	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx				
Shrd ConDel:	xxxxx	107	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx				
Shared LOS:	*	F	*	*	*	*	*	*	*	*	*	*				
ApproachDel:	106.9				14.8		xxxxxx			xxxxxx						
ApproachLOS:	F				B		*			*						

Note: Queue reported is the number of cars per lane.

Cypress Barton Place
Existing Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #13 Katella Avenue / Siboney Street

Cycle (sec): 100 Critical Vol./Cap.(X): 0.545
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 26 Level Of Service: A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 1	0	0 1	1 0	1! 0	1	2 0	2 1	0	1 0	3 0	1
Volume Module:												
Base Vol:	62	2	67	75	5	71	100	1926	39	61	1902	53
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	62	2	67	75	5	71	100	1926	39	61	1902	53
Added Vol:	0	0	0	0	0	0	38	24	0	0	59	0
PasserByVol:	0	0	0	0	0	0	15	-2	0	0	0	0
Initial Fut:	62	2	67	75	5	71	153	1948	39	61	1961	53
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	62	2	67	75	5	71	153	1948	39	61	1961	53
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	62	2	67	75	5	71	153	1948	39	61	1961	53
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	62	2	67	75	5	71	153	1948	39	61	1961	53
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.97	0.03	1.00	1.49	0.10	1.41	2.00	2.94	0.06	1.00	3.00	1.00
Final Sat.:	1647	53	1700	2533	169	2398	3400	5000	100	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.04	0.04	0.04	0.03	0.03	0.03	0.05	0.39	0.39	0.04	0.38	0.03
Crit Moves:			****		****			****		****		

Cypress Barton Place
Existing Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #14 Katella Avenue / Winner Circle

Cycle (sec): 100 Critical Vol./Cap.(X): 0.571
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 27 Level Of Service: A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0 1	0	1 0	0 1	0	1 0	2 1	0	1 0	3 0	1
Volume Module:												
Base Vol:	42	4	52	33	0	47	144	1839	15	53	1898	8
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	42	4	52	33	0	47	144	1839	15	53	1898	8
Added Vol:	0	0	0	0	0	0	0	23	0	0	58	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	42	4	52	33	0	47	144	1862	15	53	1956	8
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	42	4	52	33	0	47	144	1862	15	53	1956	8
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	42	4	52	33	0	47	144	1862	15	53	1956	8
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	42	4	52	33	0	47	144	1862	15	53	1956	8
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.07	0.93	1.00	0.00	1.00	1.00	2.98	0.02	1.00	3.00	1.00
Final Sat.:	1700	121	1579	1700	0	1700	1700	5059	41	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.03	0.03	0.02	0.00	0.03	0.08	0.37	0.37	0.03	0.38	0.00
Crit Moves:		****		****			****				****	

Cypress Barton Place
Existing Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #15 Katella Avenue / Walker Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.654
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	33	Level Of Service:	B

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	- T	-	R	L	- T	-	R	L	- T	-	R	L	- T	-	R
Control:	Split Phase				Split Phase				Protected				Protected			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	0	1	0	1	0	1	1	0	0	2	2	0	2	1	0	1
Volume Module:																
Base Vol:	27	16	4		551	1	200		265	1661	2		2	1739	539	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	27	16	4		551	1	200		265	1661	2		2	1739	539	
Added Vol:	0	0	0		0	0	25		0	23	0		0	33	0	
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0	
Initial Fut:	27	16	4		551	1	225		265	1684	2		2	1772	539	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	27	16	4		551	1	225		265	1684	2		2	1772	539	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	27	16	4		551	1	225		265	1684	2		2	1772	539	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	27	16	4		551	1	225		265	1684	2		2	1772	539	
Saturation Flow Module:																
Sat/Lane:	1700	1700	1700		1700	1700	1700		1700	1700	1700		1700	1700	1700	
Adjustment:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Lanes:	1.00	0.83	0.17		1.99	0.01	2.00		2.00	2.99	0.01		1.00	3.00	1.00	
Final Sat.:	1700	1411	289		3394	6	3400		3400	5094	6		1700	5100	1700	
Capacity Analysis Module:																
Vol/Sat:	0.02	0.01	0.01		0.16	0.16	0.07		0.08	0.33	0.33		0.00	0.35	0.32	
Crit Moves:	****					****			****					****		

Cypress Barton Place
Existing Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #16 Katella Avenue / Valley View Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.760
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	45	Level Of Service:	C

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	- T	-	R	L	- T	-	R	L	- T	-	R	L	- T	-	R
Control:	Protected				Protected				Protected				Protected			
Rights:	Include				Include				Ignore				Include			
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	3	0	3	0	1	2	0	3	0	1	2	0	3	0	1	
Volume Module:																
Base Vol:	603	1401	163		264	1385	222		271	1086	1291		353	1009	272	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	603	1401	163		264	1385	222		271	1086	1291		353	1009	272	
Added Vol:	14	0	0		0	0	13		8	5	11		0	6	0	
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0	
Initial Fut:	617	1401	163		264	1385	235		279	1091	1302		353	1015	272	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	0.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	0.00		1.00	1.00	1.00	
PHF Volume:	617	1401	163		264	1385	235		279	1091	0		353	1015	272	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	617	1401	163		264	1385	235		279	1091	0		353	1015	272	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	0.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	0.00		1.00	1.00	1.00	
FinalVolume:	617	1401	163		264	1385	235		279	1091	0		353	1015	272	
Saturation Flow Module:																
Sat/Lane:	1700	1700	1700		1700	1700	1700		1700	1700	1700		1700	1700	1700	
Adjustment:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Lanes:	3.00	3.00	1.00		2.00	3.00	1.00		2.00	3.00	1.00		2.00	3.00	1.00	
Final Sat.:	5100	5100	1700		3400	5100	1700		3400	5100	1700		3400	5100	1700	
Capacity Analysis Module:																
Vol/Sat:	0.12	0.27	0.10		0.08	0.27	0.14		0.08	0.21	0.00		0.10	0.20	0.16	
Crit Moves:	****					****				****			****			

Cypress Barton Place
Existing Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #17 Farquhar Ave / Los Alamitos Blvd

Cycle (sec):	100	Critical Vol./Cap.(X):	0.629
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	31	Level Of Service:	B

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	-	T	- R	L	-	T	- R	L	-	T	- R	L	-	T	- R
Control:	Protected				Protected				Permitted				Permitted			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	0	0	2	1 0	1	0	3	0 0	0	0	0	0 0	1	0	1!	0 0
Volume Module:																
Base Vol:	0	1542	169		116	1686	0		0	0	0		427	0	168	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	0	1542	169		116	1686	0		0	0	0		427	0	168	
Added Vol:	0	3	0		0	2	0		0	0	0		0	0	0	
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0	
Initial Fut:	0	1545	169		116	1688	0		0	0	0		427	0	168	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	0	1545	169		116	1688	0		0	0	0		427	0	168	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	0	1545	169		116	1688	0		0	0	0		427	0	168	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	0	1545	169		116	1688	0		0	0	0		427	0	168	
Saturation Flow Module:																
Sat/Lane:	1700	1700	1700		1700	1700	1700		1700	1700	1700		1700	1700	1700	
Adjustment:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Lanes:	0.00	2.70	0.30		1.00	3.00	0.00		0.00	0.00	0.00		1.44	0.00	0.56	
Final Sat.:	0	4597	503		1700	5100	0		0	0	0		2440	0	960	
Capacity Analysis Module:																
Vol/Sat:	0.00	0.34	0.34		0.07	0.33	0.00		0.00	0.00	0.00		0.17	0.00	0.17	
Crit Moves:		****			****								****			

Cypress Barton Place
Existing Plus Project
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #18 Farquhar Ave / Lexington Dr

Cycle (sec):	100	Critical Vol./Cap.(X):	0.317
Loss Time (sec):	0	Average Delay (sec/veh):	8.9
Optimal Cycle:	0	Level Of Service:	A

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	-	T	- R	L	-	T	- R	L	-	T	- R	L	-	T	- R
Control:	Stop Sign				Stop Sign				Stop Sign				Stop Sign			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0	
Lanes:	1	0	1	0 0	0	0	2	0 1	0	0	1!	0 0	0	0	0	0 0
Volume Module:																
Base Vol:	106	232	0		0	70	80		69	0	28		0	0	0	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	106	232	0		0	70	80		69	0	28		0	0	0	
Added Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
PasserByVol:	0	0	0		0	0	0		0	0	0		0	0	0	
Initial Fut:	106	232	0		0	70	80		69	0	28		0	0	0	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	106	232	0		0	70	80		69	0	28		0	0	0	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	106	232	0		0	70	80		69	0	28		0	0	0	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	106	232	0		0	70	80		69	0	28		0	0	0	
Saturation Flow Module:																
Adjustment:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Lanes:	1.00	1.00	0.00		0.00	2.00	1.00		0.71	0.00	0.29		0.00	0.00	0.00	
Final Sat.:	663	731	0		0	1397	809		491	0	199		0	0	0	
Capacity Analysis Module:																
Vol/Sat:	0.16	0.32	xxxx		xxxx	0.05	0.10		0.14	xxxx	0.14		xxxx	xxxx	xxxx	
Crit Moves:		****					****		****							
Delay/Veh:	9.1	9.8	0.0		0.0	8.0	7.5		8.6	0.0	8.6		0.0	0.0	0.0	
Delay Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
AdjDel/Veh:	9.1	9.8	0.0		0.0	8.0	7.5		8.6	0.0	8.6		0.0	0.0	0.0	
LOS by Move:	A	A	*		*	A	A		A	*	A		*	*	*	
ApproachDel:		9.5				7.7				8.6				xxxxxx		
Delay Adj:		1.00				1.00				1.00				xxxxx		
ApprAdjDel:		9.5				7.7				8.6				xxxxxx		
LOS by Appr:		A				A				A				*		
AllWayAvgQ:	0.2	0.4	0.0		0.0	0.1	0.1		0.1	0.1	0.1		0.0	0.0	0.0	

Note: Queue reported is the number of cars per lane.

Cypress Barton Place
Existing Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #19 Orangewood Avenue / Valley View Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.714
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	39	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 1	0	2 0	3 0	1	1 0	1 1	0	1 0	0 1	1
Volume Module:												
Base Vol:	17	1477	68	549	2242	101	104	49	25	75	16	442
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	17	1477	68	549	2242	101	104	49	25	75	16	442
Added Vol:	0	10	0	3	8	0	0	0	0	0	0	3
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	17	1487	68	552	2250	101	104	49	25	75	16	445
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	17	1487	68	552	2250	101	104	49	25	75	16	445
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	17	1487	68	552	2250	101	104	49	25	75	16	445
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	17	1487	68	552	2250	101	104	49	25	75	16	445
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.87	0.13	2.00	3.00	1.00	1.00	1.32	0.68	1.00	0.07	1.93
Final Sat.:	1700	4877	223	3400	5100	1700	1700	2251	1149	1700	118	3282
Capacity Analysis Module:												
Vol/Sat:	0.01	0.30	0.30	0.16	0.44	0.06	0.06	0.02	0.02	0.04	0.14	0.14
Crit Moves:		****		****			****					****

Appendix C-3

Opening Year 2018
Without Project Conditions

Cypress Barton Place
Cumulative Without Project
AM Peak Hour

Scenario Report

Scenario:	Cumulative AM ICU
Command:	Cumulative AM
Volume:	Existing plus cum AM
Geometry:	Existing
Impact Fee:	Default Impact Fee
Trip Generation:	none
Trip Distribution:	none
Paths:	none
Routes:	Default Route
Configuration:	ICU + GROWTH

Cypress Barton Place
Cumulative Without Project
AM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
# 1 Cerritos Ave. / Los Alamitos B	D	xxxxx	0.857	D	xxxxx	0.883	+ 0.026 V/C
# 2 Cerritos Ave / Bloomfield St	D	xxxxx	0.868	D	xxxxx	0.892	+ 0.024 V/C
# 3 Cerritos Ave / Denni St	B	xxxxx	0.651	C	xxxxx	0.746	+ 0.095 V/C
# 4 Cerritos Ave / Moody St	A	xxxxx	0.582	B	xxxxx	0.613	+ 0.031 V/C
# 5 Cerritos Ave / Walker St	C	xxxxx	0.714	C	xxxxx	0.741	+ 0.027 V/C
# 6 Cerritos Avenue / Valley View	D	xxxxx	0.803	D	xxxxx	0.810	+ 0.007 V/C
# 7 Katella Ave. / I-605 NB Ramps	A	xxxxx	0.393	A	xxxxx	0.397	+ 0.004 V/C
# 8 Katella Ave. / Los Alamitos Bl	D	xxxxx	0.814	D	xxxxx	0.844	+ 0.031 V/C
# 9 Katella Avenue / Bloomfield S	C	xxxxx	0.768	C	xxxxx	0.787	+ 0.018 V/C
# 10 Katella Ave / Lexington Dr	A	xxxxx	0.578	B	xxxxx	0.619	+ 0.042 V/C
# 11 Katella Ave / Cottonwood Way	A	xxxxx	0.432	A	xxxxx	0.444	+ 0.012 V/C
# 12 Katella Ave. / Enterprise Dr.	F	86.7	0.212	F	104.5	0.251	+17.826 D/V
# 13 Katella Avenue / Siboney Stree	A	xxxxx	0.470	A	xxxxx	0.489	+ 0.020 V/C
# 14 Katella Avenue / Winner Circle	A	xxxxx	0.453	A	xxxxx	0.471	+ 0.019 V/C
# 15 Katella Avenue / Walker Street	B	xxxxx	0.662	C	xxxxx	0.706	+ 0.044 V/C
# 16 Katella Avenue / Valley View S	C	xxxxx	0.723	C	xxxxx	0.759	+ 0.036 V/C
# 17 Farquhar Ave / Los Alamitos Bl	B	xxxxx	0.658	B	xxxxx	0.671	+ 0.013 V/C
# 18 Farquhar Ave / Lexington Dr	A	8.4	0.219	A	8.6	0.225	+ 0.006 V/C
# 19 Orangewood Avenue / Valley Vie	D	xxxxx	0.816	D	xxxxx	0.834	+ 0.018 V/C

Cypress Barton Place
Cumulative Without Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Cerritos Ave. / Los Alamitos Blvd

Cycle (sec):	100	Critical Vol./Cap.(X):	0.883
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	78	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2	1 0	1 0	2	0 1	1 0	2	0 1	1 0	2	0 1
Volume Module:												
Base Vol:	170	664	319	104	729	99	125	938	174	315	791	140
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	177	691	332	108	759	103	130	976	181	328	823	146
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj:	5	18	0	18	16	0	0	63	12	0	23	8
Initial Fut:	182	709	332	126	775	103	130	1039	193	328	846	154
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	182	709	332	126	775	103	130	1039	193	328	846	154
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	182	709	332	126	775	103	130	1039	193	328	846	154
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	182	709	332	126	775	103	130	1039	193	328	846	154
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.04	0.96	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1700	3474	1626	1700	3400	1700	1700	3400	1700	1700	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.11	0.20	0.20	0.07	0.23	0.06	0.08	0.31	0.11	0.19	0.25	0.09
Crit Moves:	****				****			****		****		

Cypress Barton Place
Cumulative Without Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #2 Cerritos Ave / Bloomfield St

Cycle (sec):	100	Critical Vol./Cap.(X):	0.892
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	82	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1	1 0	1 0	1	1 0	1 0	1	1 0	1 0	1	1 0
Volume Module:												
Base Vol:	211	276	174	139	538	229	53	968	161	177	899	59
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	220	287	181	145	560	238	55	1007	168	184	935	61
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj:	0	0	0	17	0	0	0	81	0	0	32	6
Initial Fut:	220	287	181	162	560	238	55	1088	168	184	967	67
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	220	287	181	162	560	238	55	1088	168	184	967	67
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	220	287	181	162	560	238	55	1088	168	184	967	67
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	220	287	181	162	560	238	55	1088	168	184	967	67
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.23	0.77	1.00	1.40	0.60	1.00	1.73	0.27	1.00	1.87	0.13
Final Sat.:	1700	2085	1315	1700	2385	1015	1700	2946	454	1700	3179	221
Capacity Analysis Module:												
Vol/Sat:	0.13	0.14	0.14	0.10	0.23	0.23	0.03	0.37	0.37	0.11	0.30	0.30
Crit Moves:	****				****			****		****		

Cypress Barton Place
Cumulative Without Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #3 Cerritos Ave / Denni St

Cycle (sec): 100 Critical Vol./Cap.(X): 0.746
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 43 Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Split Phase			Split Phase			Prot+Permit			Prot+Permit		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	1! 0	0	1 0	1 0	1	1 0	2 0	1	1 0	1 1	0
Volume Module:												
Base Vol:	60	71	37	215	161	148	56	999	100	100	923	142
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	62	74	39	224	168	154	58	1040	104	104	960	148
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj:	32	13	29	0	34	0	0	18	85	78	9	0
Initial Fut:	94	87	68	224	202	154	58	1058	189	182	969	148
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	94	87	68	224	202	154	58	1058	189	182	969	148
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	94	87	68	224	202	154	58	1058	189	182	969	148
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	94	87	68	224	202	154	58	1058	189	182	969	148
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.38	0.35	0.27	1.00	1.00	1.00	1.00	2.00	1.00	1.00	1.74	0.26
Final Sat.:	645	594	461	1700	1700	1700	1700	3400	1700	1700	2950	450
Capacity Analysis Module:												
Vol/Sat:	0.15	0.15	0.15	0.13	0.12	0.09	0.03	0.31	0.11	0.11	0.33	0.33
Crit Moves:			****	****				****		****		

Cypress Barton Place
Cumulative Without Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #4 Cerritos Ave / Moody St

Cycle (sec): 100 Critical Vol./Cap.(X): 0.613
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 30 Level Of Service: B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Split Phase			Split Phase			Prot+Permit			Prot+Permit		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	1 0	0	1 1	0 0	1	1 0	1 1	0	1 0	1 1	0
Volume Module:												
Base Vol:	0	1	0	599	1	218	65	1128	2	0	897	109
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	0	1	0	623	1	227	68	1174	2	0	933	113
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj:	0	0	0	3	0	2	9	30	0	0	75	9
Initial Fut:	0	1	0	626	1	229	77	1204	2	0	1008	122
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1	0	626	1	229	77	1204	2	0	1008	122
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	1	0	626	1	229	77	1204	2	0	1008	122
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	1	0	626	1	229	77	1204	2	0	1008	122
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	0.00	1.99	0.01	1.00	1.00	1.99	0.01	1.00	1.78	0.22
Final Sat.:	0	1700	0	3394	6	1700	1700	3394	6	1700	3032	368
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.18	0.18	0.13	0.05	0.35	0.35	0.00	0.33	0.33
Crit Moves:		****		****			****				****	

Cypress Barton Place
Cumulative Without Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #5 Cerritos Ave / Walker St

Cycle (sec):	100	Critical Vol./Cap.(X):	0.741
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	42	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2 0	2 0	1	1 0	1 1	0	1 0	3 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	97	179	52	177	695	57	24	1180	562	98	901	101
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	101	186	54	184	723	59	25	1228	585	102	938	105
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj:	5	21	9	0	53	0	0	33	3	14	79	0
Initial Fut:	106	207	63	184	776	59	25	1261	588	116	1017	105
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	106	207	63	184	776	59	25	1261	588	116	1017	105
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	106	207	63	184	776	59	25	1261	588	116	1017	105
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	106	207	63	184	776	59	25	1261	588	116	1017	105
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	1.00	1.86	0.14	1.00	3.00	1.00	1.00	2.00	1.00
Final Sat.:	3400	3400	1700	1700	3159	241	1700	5100	1700	1700	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.03	0.06	0.04	0.11	0.25	0.25	0.01	0.25	0.35	0.07	0.30	0.06
Crit Moves:	****				****				****	****		

Cypress Barton Place
Cumulative Without Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #6 Cerritos Avenue / Valley View Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.810
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	54	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	3 0	1	1 0	3 0	1	2 0	3 0	1	2 0	1 1	0
Volume Module:												
Base Vol:	183	1086	39	124	1350	287	128	675	505	184	657	115
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	190	1130	41	129	1405	299	133	702	526	191	684	120
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj:	0	18	6	0	24	60	24	13	0	9	33	0
Initial Fut:	190	1148	47	129	1429	359	157	715	526	200	717	120
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	190	1148	47	129	1429	359	157	715	526	200	717	120
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	190	1148	47	129	1429	359	157	715	526	200	717	120
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	190	1148	47	129	1429	359	157	715	526	200	717	120
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	3.00	1.00	1.00	3.00	1.00	2.00	3.00	1.00	2.00	1.71	0.29
Final Sat.:	1700	5100	1700	1700	5100	1700	3400	5100	1700	3400	2914	486
Capacity Analysis Module:												
Vol/Sat:	0.11	0.23	0.03	0.08	0.28	0.21	0.05	0.14	0.31	0.06	0.25	0.25
Crit Moves:	****				****				****	****		

Cypress Barton Place
Cumulative Without Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #7 Katella Ave. / I-605 NB Ramps

Cycle (sec):	100	Critical Vol./Cap.(X):	0.397
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	20	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Ignore			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	0	0 1	0 0	0	0 1	1 0	3	0 0	0 0	2	1 1
Volume Module:												
Base Vol:	0	0	805	0	0	73	82	1475	0	0	1435	776
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	0	0	838	0	0	76	85	1535	0	0	1493	808
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj:	0	0	17	0	0	0	0	37	0	0	18	9
Initial Fut:	0	0	855	0	0	76	85	1572	0	0	1511	817
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Volume:	0	0	0	0	0	0	85	1572	0	0	1511	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	0	0	0	85	1572	0	0	1511	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
FinalVolume:	0	0	0	0	0	0	85	1572	0	0	1511	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	1.00	0.00	0.00	1.00	1.00	3.00	0.00	0.00	3.00	1.00
Final Sat.:	0	0	1700	0	0	1700	1700	5100	0	0	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.31	0.00	0.00	0.30	0.00
Crit Moves:							****				****	

Cypress Barton Place
Cumulative Without Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #8 Katella Ave. / Los Alamitos Blvd.

Cycle (sec):	100	Critical Vol./Cap.(X):	0.844
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	63	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Ovl			Ovl			Ovl		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2 0	3	0 1	2 0	3	0 1	2 0	3	0 1	2 0	3	0 1
Volume Module:												
Base Vol:	395	947	377	167	965	151	199	1692	256	329	1198	77
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	411	985	392	174	1004	157	207	1761	266	342	1247	80
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj:	0	15	51	11	9	0	0	114	0	22	41	6
Initial Fut:	411	1000	443	185	1013	157	207	1875	266	364	1288	86
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	411	1000	443	185	1013	157	207	1875	266	364	1288	86
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	411	1000	443	185	1013	157	207	1875	266	364	1288	86
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	411	1000	443	185	1013	157	207	1875	266	364	1288	86
OvlAdjVol:			261			54			61			0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.12	0.20	0.26	0.05	0.20	0.09	0.06	0.37	0.16	0.11	0.25	0.05
OvlAdjV/S:			0.15			0.03			0.04			0.00
Crit Moves:	****				****			****		****		

Cypress Barton Place
Cumulative Without Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #9 Katella Avenue / Bloomfield Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.787
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	49	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Prot+Permit			Prot+Permit			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1	1 0	1 0	1	0 1	1 0	2	1 0	1 0	2	1 0
Volume Module:												
Base Vol:	80	350	15	180	203	333	276	1828	38	54	1206	248
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	83	364	16	187	211	347	287	1902	40	56	1255	258
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj:	0	0	0	3	0	7	3	132	0	0	58	6
Initial Fut:	83	364	16	190	211	354	290	2034	40	56	1313	264
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	83	364	16	190	211	354	290	2034	40	56	1313	264
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	83	364	16	190	211	354	290	2034	40	56	1313	264
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	83	364	16	190	211	354	290	2034	40	56	1313	264
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.92	0.08	1.00	1.00	1.00	1.00	2.94	0.06	1.00	2.50	0.50
Final Sat.:	1700	3260	140	1700	1700	1700	1700	5003	97	1700	4246	854
Capacity Analysis Module:												
Vol/Sat:	0.05	0.11	0.11	0.11	0.12	0.21	0.17	0.41	0.41	0.03	0.31	0.31
Crit Moves:	****					****	****				****	

Cypress Barton Place
Cumulative Without Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #10 Katella Ave / Lexington Dr

Cycle (sec):	100	Critical Vol./Cap.(X):	0.619
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	30	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1	0 1	1 0	1	1! 0 0	2 0	3	0 1	1 0	2	1 0
Volume Module:												
Base Vol:	93	49	92	121	7	103	65	1657	116	101	1385	84
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	97	51	96	126	7	107	68	1724	121	105	1441	87
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj:	4	0	9	0	0	19	51	61	26	29	46	0
Initial Fut:	101	51	105	126	7	126	119	1785	147	134	1487	87
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	101	51	105	126	7	126	119	1785	147	134	1487	87
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	101	51	105	126	7	126	119	1785	147	134	1487	87
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	101	51	105	126	7	126	119	1785	147	134	1487	87
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	1.00	0.05	0.95	2.00	3.00	1.00	1.00	2.83	0.17
Final Sat.:	1700	1700	1700	1700	93	1607	3400	5100	1700	1700	4817	283
Capacity Analysis Module:												
Vol/Sat:	0.06	0.03	0.06	0.07	0.08	0.08	0.03	0.35	0.09	0.08	0.31	0.31
Crit Moves:			****		****			****		****		

Cypress Barton Place
Cumulative Without Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #11 Katella Ave / Cottonwood Way

Cycle (sec): 100 Critical Vol./Cap.(X): 0.444
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 21 Level Of Service: A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	0	0 0	1 0	0	0 1	1 0	2	1 0	0 0	2	1 0
Volume Module:												
Base Vol:	0	0	0	0	0	3	4	1859	4	0	1555	5
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	0	0	0	0	0	3	4	1934	4	0	1618	5
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj:	0	0	0	13	0	6	17	30	0	0	54	34
Initial Fut:	0	0	0	13	0	9	21	1964	4	0	1672	39
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	13	0	9	21	1964	4	0	1672	39
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	13	0	9	21	1964	4	0	1672	39
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	13	0	9	21	1964	4	0	1672	39
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	2.99	0.01	0.00	2.93	0.07
Final Sat.:	0	0	0	1700	0	1700	1700	5089	11	0	4983	117
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.39	0.39	0.00	0.34	0.34
Crit Moves:				****				****		****		

Cypress Barton Place
Cumulative Without Project
AM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #12 Katella Ave. / Enterprise Dr.

Average Delay (sec/veh): 0.5 Worst Case Level Of Service: F[104.5]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1! 0	0	0 0	0 0	2	0 0	2 1	0	1 0	2 1	0
Volume Module:												
Base Vol:	3	0	10	0	0	1	0	1857	4	10	1556	18
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	3	0	10	0	0	1	0	1932	4	10	1619	19
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj:	0	0	0	0	0	19	0	40	0	0	87	51
Initial Fut:	3	0	10	0	0	20	0	1972	4	10	1706	70
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	3	0	10	0	0	20	0	1972	4	10	1706	70
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	3	0	10	0	0	20	0	1972	4	10	1706	70
Critical Gap Module:												
Critical Gp:	7.5	6.5	6.9	xxxxx	xxxx	6.9	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	xxxxx	xxxx	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2564	3771	660	xxxx	xxxx	604	xxxx	xxxx	xxxxx	1977	xxxx	xxxxx
Potent Cap.:	13	4	411	xxxx	xxxx	447	xxxx	xxxx	xxxxx	297	xxxx	xxxxx
Move Cap.:	12	4	411	xxxx	xxxx	447	xxxx	xxxx	xxxxx	297	xxxx	xxxxx
Volume/Cap:	0.25	0.00	0.03	xxxx	xxxx	0.04	xxxx	xxxx	xxxx	0.04	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	0.1	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	13.4	xxxxx	xxxx	xxxxx	17.6	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	B	*	*	*	C	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	49	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	0.9	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	105	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	F	*	*	*	*	*	*	*	*	*	*
ApproachDel:	104.5			13.4			xxxxxx			xxxxxx		
ApproachLOS:	F			B			*			*		

Note: Queue reported is the number of cars per lane.

Cypress Barton Place
Cumulative Without Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #13 Katella Avenue / Siboney Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.489
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	23	Level Of Service:	A

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	- T	-	R	L	- T	-	R	L	- T	-	R	L	- T	-	R
Control:	Split Phase				Split Phase				Protected				Protected			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0		0	0	0		0	0	0		0	0	0		0
Y+R:	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0
Lanes:	0	1	0	0 1	1	0	1!	0 1	2	0	2	1 0	1	0	3	0 1
Volume Module:																
Base Vol:	42	5		34	31	3		20	130	1728		25	36	1458		43
Growth Adj:	1.04	1.04		1.04	1.04	1.04		1.04	1.04	1.04		1.04	1.04	1.04		1.04
Initial Bse:	44	5		35	32	3		21	135	1798		26	37	1517		45
Added Vol:	0	0		0	0	0		0	0	0		0	0	0		0
Cum. Proj:	0	0		5	15	0		14	23	62		0	3	140		24
Initial Fut:	44	5		40	47	3		35	158	1860		26	40	1657		69
User Adj:	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00
PHF Adj:	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00
PHF Volume:	44	5		40	47	3		35	158	1860		26	40	1657		69
Reduct Vol:	0	0		0	0	0		0	0	0		0	0	0		0
Reduced Vol:	44	5		40	47	3		35	158	1860		26	40	1657		69
PCE Adj:	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00
MLF Adj:	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00
FinalVolume:	44	5		40	47	3		35	158	1860		26	40	1657		69
Saturation Flow Module:																
Sat/Lane:	1700	1700		1700	1700	1700		1700	1700	1700		1700	1700	1700		1700
Adjustment:	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00
Lanes:	0.89	0.11		1.00	1.66	0.11		1.23	2.00	2.96		0.04	1.00	3.00		1.00
Final Sat.:	1519	181		1700	2829	187		2084	3400	5030		70	1700	5100		1700
Capacity Analysis Module:																
Vol/Sat:	0.03	0.03		0.02	0.02	0.02		0.02	0.05	0.37		0.37	0.02	0.32		0.04
Crit Moves:		****				****				****				****		

Cypress Barton Place
Cumulative Without Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #14 Katella Avenue / Winner Circle

Cycle (sec):	100	Critical Vol./Cap.(X):	0.471
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	22	Level Of Service:	A

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	- T	-	R	L	- T	-	R	L	- T	-	R	L	- T	-	R
Control:	Permitted				Permitted				Protected				Protected			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0		0	0	0		0	0	0		0	0	0		0
Y+R:	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0
Lanes:	1	0	0	1 0	1	0	0	1 0	1	0	2	1 0	1	0	3	0 1
Volume Module:																
Base Vol:	5	1		4	7	0		5	18	1771		25	54	1566		3
Growth Adj:	1.04	1.04		1.04	1.04	1.04		1.04	1.04	1.04		1.04	1.04	1.04		1.04
Initial Bse:	5	1		4	7	0		5	19	1843		26	56	1630		3
Added Vol:	0	0		0	0	0		0	0	0		0	0	0		0
Cum. Proj:	1	0		0	3	0		0	0	62		3	0	147		14
Initial Fut:	6	1		4	10	0		5	19	1905		29	56	1777		17
User Adj:	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00
PHF Adj:	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00
PHF Volume:	6	1		4	10	0		5	19	1905		29	56	1777		17
Reduct Vol:	0	0		0	0	0		0	0	0		0	0	0		0
Reduced Vol:	6	1		4	10	0		5	19	1905		29	56	1777		17
PCE Adj:	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00
MLF Adj:	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00
FinalVolume:	6	1		4	10	0		5	19	1905		29	56	1777		17
Saturation Flow Module:																
Sat/Lane:	1700	1700		1700	1700	1700		1700	1700	1700		1700	1700	1700		1700
Adjustment:	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00
Lanes:	1.00	0.20		0.80	1.00	0.00		1.00	1.00	2.95		0.05	1.00	3.00		1.00
Final Sat.:	1700	340		1360	1700	0		1700	1700	5023		77	1700	5100		1700
Capacity Analysis Module:																
Vol/Sat:	0.00	0.00		0.00	0.01	0.00		0.00	0.01	0.38		0.38	0.03	0.35		0.01
Crit Moves:		****			****					****				****		

Cypress Barton Place
Cumulative Without Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #15 Katella Avenue / Walker Street

Cycle (sec): 100 Critical Vol./Cap.(X): 0.706
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 38 Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 1	0	1 0	1 1	0	0 2	2 0	2	1 0	1 0	3 0	1
Volume Module:												
Base Vol:	6	2	0	839	9	195	166	1560	2	8	1461	301
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	6	2	0	873	9	203	173	1623	2	8	1520	313
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj:	0	0	0	19	0	41	21	81	0	0	166	4
Initial Fut:	6	2	0	892	9	244	194	1704	2	8	1686	317
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	6	2	0	892	9	244	194	1704	2	8	1686	317
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	6	2	0	892	9	244	194	1704	2	8	1686	317
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	6	2	0	892	9	244	194	1704	2	8	1686	317
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	0.00	1.98	0.02	2.00	2.00	2.99	0.01	1.00	3.00	1.00
Final Sat.:	1700	1700	0	3365	35	3400	3400	5094	6	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.27	0.27	0.07	0.06	0.33	0.33	0.00	0.33	0.19
Crit Moves:	****				****		****				****	

Cypress Barton Place
Cumulative Without Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #16 Katella Avenue / Valley View Street

Cycle (sec): 100 Critical Vol./Cap.(X): 0.759
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 45 Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	3 0	3	0 1	2 0	3	0 1	2 0	3	0 1	2 0	3	0 1
Volume Module:												
Base Vol:	783	1441	270	207	1159	243	250	1011	792	170	980	157
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	815	1500	281	215	1206	253	260	1052	824	177	1020	163
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj:	92	3	0	0	2	33	21	27	54	0	58	0
Initial Fut:	907	1503	281	215	1208	286	281	1079	878	177	1078	163
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	907	1503	281	215	1208	286	281	1079	0	177	1078	163
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	907	1503	281	215	1208	286	281	1079	0	177	1078	163
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
FinalVolume:	907	1503	281	215	1208	286	281	1079	0	177	1078	163
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	3.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	5100	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.18	0.29	0.17	0.06	0.24	0.17	0.08	0.21	0.00	0.05	0.21	0.10
Crit Moves:	****				****		****				****	

Cypress Barton Place
Cumulative Without Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #17 Farquhar Ave / Los Alamitos Blvd

Cycle (sec):	100	Critical Vol./Cap.(X):	0.671
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	34	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	2	1 0	1 0	3	0 0	0 0	0	0 0	1 0	1!	0 0
Volume Module:												
Base Vol:	0	1725	182	125	1378	0	0	0	0	346	0	119
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	0	1795	189	130	1434	0	0	0	0	360	0	124
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj:	0	66	0	0	31	0	0	0	0	0	0	0
Initial Fut:	0	1861	189	130	1465	0	0	0	0	360	0	124
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1861	189	130	1465	0	0	0	0	360	0	124
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	1861	189	130	1465	0	0	0	0	360	0	124
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	1861	189	130	1465	0	0	0	0	360	0	124
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	2.72	0.28	1.00	3.00	0.00	0.00	0.00	0.00	1.48	0.01	0.51
Final Sat.:	0	4629	471	1700	5100	0	0	0	0	2530	0	870
Capacity Analysis Module:												
Vol/Sat:	0.00	0.40	0.40	0.08	0.29	0.00	0.00	0.00	0.00	0.14	0.00	0.14
Crit Moves:		****		****						****		

Cypress Barton Place
Cumulative Without Project
AM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #18 Farquhar Ave / Lexington Dr

Cycle (sec):	100	Critical Vol./Cap.(X):	0.225
Loss Time (sec):	0	Average Delay (sec/veh):	8.6
Optimal Cycle:	0	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	1	0 0	0 0	2	0 1	0 0	1!	0 0	0 0	0	0 0
Volume Module:												
Base Vol:	3	41	0	0	218	75	81	0	83	0	0	0
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	3	43	0	0	227	78	84	0	86	0	0	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj:	0	7	0	0	52	0	0	0	0	0	0	0
Initial Fut:	3	50	0	0	279	78	84	0	86	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	3	50	0	0	279	78	84	0	86	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	3	50	0	0	279	78	84	0	86	0	0	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	3	50	0	0	279	78	84	0	86	0	0	0
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	0.00	0.00	2.00	1.00	0.49	0.00	0.51	0.00	0.00	0.00
Final Sat.:	609	665	0	0	1426	828	374	0	383	0	0	0
Capacity Analysis Module:												
Vol/Sat:	0.01	0.07	xxxx	xxxx	0.20	0.09	0.23	xxxx	0.23	xxxx	xxxx	xxxx
Crit Moves:		****			****		****					
Delay/Veh:	8.4	8.3	0.0	0.0	8.8	7.4	8.8	0.0	8.8	0.0	0.0	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	8.4	8.3	0.0	0.0	8.8	7.4	8.8	0.0	8.8	0.0	0.0	0.0
LOS by Move:	A	A	*	*	A	A	A	*	A	*	*	*
ApproachDel:		8.3			8.5			8.8			xxxxxx	
Delay Adj:		1.00			1.00			1.00			xxxxx	
ApprAdjDel:		8.3			8.5			8.8			xxxxxx	
LOS by Appr:		A			A			A			*	
AllWayAvgQ:	0.0	0.1	0.0	0.0	0.2	0.1	0.3	0.3	0.3	0.0	0.0	0.0

Note: Queue reported is the number of cars per lane.

Cypress Barton Place
Cumulative Without Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #19 Orangewood Avenue / Valley View Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.834
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	60	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 1	0	2 0	3 0	1	1 0	1 1	0	1 0	0 1	1
Volume Module:												
Base Vol:	20	1899	65	233	1739	43	143	60	13	75	30	644
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	21	1976	68	242	1810	45	149	62	14	78	31	670
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj:	0	90	0	0	54	0	0	0	0	0	0	0
Initial Fut:	21	2066	68	242	1864	45	149	62	14	78	31	670
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	21	2066	68	242	1864	45	149	62	14	78	31	670
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	21	2066	68	242	1864	45	149	62	14	78	31	670
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	21	2066	68	242	1864	45	149	62	14	78	31	670
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.90	0.10	2.00	3.00	1.00	1.00	1.64	0.36	1.00	0.09	1.91
Final Sat.:	1700	4938	162	3400	5100	1700	1700	2795	605	1700	151	3249
Capacity Analysis Module:												
Vol/Sat:	0.01	0.42	0.42	0.07	0.37	0.03	0.09	0.02	0.02	0.05	0.21	0.21
Crit Moves:		****		****			****				****	

Cypress Barton Place
Cumulative Without Project
PM Peak Hour

Scenario Report

Scenario:	Cumulative PM ICU
Command:	Cumulative PM
Volume:	Existing plus cum PM
Geometry:	Existing
Impact Fee:	Default Impact Fee
Trip Generation:	none
Trip Distribution:	none
Paths:	none
Routes:	Default Route
Configuration:	ICU + GROWTH

Cypress Barton Place
Cumulative Without Project
PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
# 1 Cerritos Ave. / Los Alamitos B	D	xxxxx	0.894	E	xxxxx	0.926	+ 0.032 V/C
# 2 Cerritos Ave / Bloomfield St	C	xxxxx	0.738	C	xxxxx	0.766	+ 0.028 V/C
# 3 Cerritos Ave / Denni St	C	xxxxx	0.739	D	xxxxx	0.809	+ 0.070 V/C
# 4 Cerritos Ave / Moody St	C	xxxxx	0.734	C	xxxxx	0.765	+ 0.031 V/C
# 5 Cerritos Ave / Walker St	B	xxxxx	0.662	C	xxxxx	0.705	+ 0.043 V/C
# 6 Cerritos Avenue / Valley View	D	xxxxx	0.801	D	xxxxx	0.833	+ 0.032 V/C
# 7 Katella Ave. / I-605 NB Ramps	A	xxxxx	0.590	B	xxxxx	0.607	+ 0.016 V/C
# 8 Katella Ave. / Los Alamitos Bl	D	xxxxx	0.812	D	xxxxx	0.834	+ 0.022 V/C
# 9 Katella Avenue / Bloomfield S	C	xxxxx	0.789	D	xxxxx	0.821	+ 0.031 V/C
# 10 Katella Ave / Lexington Dr	B	xxxxx	0.609	B	xxxxx	0.674	+ 0.065 V/C
# 11 Katella Ave / Cottonwood Way	A	xxxxx	0.459	A	xxxxx	0.492	+ 0.033 V/C
# 12 Katella Ave. / Enterprise Dr.	F	110.8	0.200	F	153.8	0.267	+43.026 D/V
# 13 Katella Avenue / Siboney Stree	A	xxxxx	0.560	B	xxxxx	0.614	+ 0.054 V/C
# 14 Katella Avenue / Winner Circle	A	xxxxx	0.580	B	xxxxx	0.610	+ 0.030 V/C
# 15 Katella Avenue / Walker Street	B	xxxxx	0.671	C	xxxxx	0.728	+ 0.056 V/C
# 16 Katella Avenue / Valley View S	C	xxxxx	0.785	D	xxxxx	0.817	+ 0.032 V/C
# 17 Farquhar Ave / Los Alamitos Bl	B	xxxxx	0.652	B	xxxxx	0.660	+ 0.008 V/C
# 18 Farquhar Ave / Lexington Dr	A	9.0	0.332	A	9.9	0.445	+ 0.113 V/C
# 19 Orangewood Avenue / Valley Vie	C	xxxxx	0.737	C	xxxxx	0.758	+ 0.021 V/C

Cypress Barton Place
Cumulative Without Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Cerritos Ave. / Los Alamitos Blvd

Cycle (sec):	100	Critical Vol./Cap.(X):	0.926
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	105	Level Of Service:	E

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2	1 0	1 0	2	0 1	1 0	2	0 1	1 0	2	0 1
Volume Module:												
Base Vol:	254	840	348	89	617	48	143	875	234	379	999	148
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	264	874	362	93	642	50	149	911	244	394	1040	154
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj.:	11	39	0	19	31	0	0	57	10	0	40	15
Initial Fut:	275	913	362	112	673	50	149	968	254	394	1080	169
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	275	913	362	112	673	50	149	968	254	394	1080	169
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	275	913	362	112	673	50	149	968	254	394	1080	169
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	275	913	362	112	673	50	149	968	254	394	1080	169
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.15	0.85	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1700	3652	1448	1700	3400	1700	1700	3400	1700	1700	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.16	0.25	0.25	0.07	0.20	0.03	0.09	0.28	0.15	0.23	0.32	0.10
Crit Moves:	****				****			****		****		

Cypress Barton Place
Cumulative Without Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #2 Cerritos Ave / Bloomfield St

Cycle (sec):	100	Critical Vol./Cap.(X):	0.766
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	46	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1	1 0	1 0	1	1 0	1 0	1	1 0	1 0	1	1 0
Volume Module:												
Base Vol:	133	435	135	59	283	100	147	1048	96	99	1140	126
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	138	453	140	61	294	104	153	1091	100	103	1186	131
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj.:	0	0	0	15	0	0	0	77	0	0	56	9
Initial Fut:	138	453	140	76	294	104	153	1168	100	103	1242	140
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	138	453	140	76	294	104	153	1168	100	103	1242	140
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	138	453	140	76	294	104	153	1168	100	103	1242	140
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	138	453	140	76	294	104	153	1168	100	103	1242	140
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.53	0.47	1.00	1.48	0.52	1.00	1.84	0.16	1.00	1.80	0.20
Final Sat.:	1700	2595	805	1700	2512	888	1700	3132	268	1700	3055	345
Capacity Analysis Module:												
Vol/Sat:	0.08	0.17	0.17	0.04	0.12	0.12	0.09	0.37	0.37	0.06	0.41	0.41
Crit Moves:		****		****			****				****	

Cypress Barton Place
Cumulative Without Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #3 Cerritos Ave / Denni St

Cycle (sec): 100 Critical Vol./Cap.(X): 0.809
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 54 Level Of Service: D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Split Phase			Split Phase			Prot+Permit			Prot+Permit		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	1! 0	0	1 0	1 0	1	1 0	2 0	1	1 0	1 1	0
Volume Module:												
Base Vol:	80	135	73	92	53	91	135	1120	35	46	1076	145
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	83	140	76	96	55	95	140	1165	36	48	1120	151
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj.:	45	18	45	0	30	0	0	21	75	66	22	0
Initial Fut:	128	158	121	96	85	95	140	1186	111	114	1142	151
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	128	158	121	96	85	95	140	1186	111	114	1142	151
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	128	158	121	96	85	95	140	1186	111	114	1142	151
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	128	158	121	96	85	95	140	1186	111	114	1142	151
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.31	0.39	0.30	1.00	1.00	1.00	1.00	2.00	1.00	1.00	1.77	0.23
Final Sat.:	535	661	504	1700	1700	1700	1700	3400	1700	1700	3003	397
Capacity Analysis Module:												
Vol/Sat:	0.24	0.24	0.24	0.06	0.05	0.06	0.08	0.35	0.07	0.07	0.38	0.38
Crit Moves:			****	****			****				****	

Cypress Barton Place
Cumulative Without Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #4 Cerritos Ave / Moody St

Cycle (sec): 100 Critical Vol./Cap.(X): 0.765
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 46 Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Split Phase			Split Phase			Prot+Permit			Prot+Permit		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 1	0 0	0	1 1	0 0	1	1 0	1 1	0	1 0	1 1	0
Volume Module:												
Base Vol:	3	1	0	246	1	134	214	1076	0	3	1199	332
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	3	1	0	256	1	139	223	1120	0	3	1248	345
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj.:	0	0	0	12	0	9	5	50	0	0	71	5
Initial Fut:	3	1	0	268	1	148	228	1170	0	3	1319	350
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	3	1	0	268	1	148	228	1170	0	3	1319	350
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	3	1	0	268	1	148	228	1170	0	3	1319	350
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	3	1	0	268	1	148	228	1170	0	3	1319	350
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.75	0.25	0.00	1.99	0.01	1.00	1.00	2.00	0.00	1.00	1.58	0.42
Final Sat.:	1275	425	0	3387	13	1700	1700	3400	0	1700	2686	714
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.08	0.08	0.09	0.13	0.34	0.00	0.00	0.49	0.49
Crit Moves:		****				****	****				****	

Cypress Barton Place
Cumulative Without Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #5 Cerritos Ave / Walker St

Cycle (sec):	100	Critical Vol./Cap.(X):	0.705
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	38	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2 0	2 0	1	1 0	1 1	0	1 0	3 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	505	688	206	113	413	48	68	992	263	78	898	144
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	526	716	214	118	430	50	71	1032	274	81	934	150
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj.:	14	57	25	0	62	0	0	58	7	31	71	0
Initial Fut:	540	773	239	118	492	50	71	1090	281	112	1005	150
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	540	773	239	118	492	50	71	1090	281	112	1005	150
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	540	773	239	118	492	50	71	1090	281	112	1005	150
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	540	773	239	118	492	50	71	1090	281	112	1005	150
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	1.00	1.82	0.18	1.00	3.00	1.00	1.00	2.00	1.00
Final Sat.:	3400	3400	1700	1700	3087	313	1700	5100	1700	1700	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.16	0.23	0.14	0.07	0.16	0.16	0.04	0.21	0.17	0.07	0.30	0.09
Crit Moves:	****				****		****				****	

Cypress Barton Place
Cumulative Without Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #6 Cerritos Avenue / Valley View Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.833
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	60	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	3 0	1	1 0	3 0	1	2 0	3 0	1	2 0	1 1	0
Volume Module:												
Base Vol:	318	1815	184	125	1132	186	325	772	265	95	534	134
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	331	1889	191	130	1178	194	338	803	276	99	556	139
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj.:	0	41	16	0	51	63	42	31	0	19	39	0
Initial Fut:	331	1930	207	130	1229	257	380	834	276	118	595	139
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	331	1930	207	130	1229	257	380	834	276	118	595	139
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	331	1930	207	130	1229	257	380	834	276	118	595	139
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	331	1930	207	130	1229	257	380	834	276	118	595	139
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	3.00	1.00	1.00	3.00	1.00	2.00	3.00	1.00	2.00	1.62	0.38
Final Sat.:	1700	5100	1700	1700	5100	1700	3400	5100	1700	3400	2754	646
Capacity Analysis Module:												
Vol/Sat:	0.19	0.38	0.12	0.08	0.24	0.15	0.11	0.16	0.16	0.03	0.22	0.22
Crit Moves:		****		****			****				****	

Cypress Barton Place
Cumulative Without Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #7 Katella Ave. / I-605 NB Ramps

Cycle (sec): 100 Critical Vol./Cap.(X): 0.607
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 29 Level Of Service: B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Ignore			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	0	0 1	0 0	0	0 1	1 0	3	0 0	0 0	2	1 1
Volume Module:												
Base Vol:	0	0	758	0	0	74	340	1910	0	0	1628	893
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	0	0	789	0	0	77	354	1988	0	0	1694	929
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj.:	0	0	24	0	0	0	0	22	0	0	84	33
Initial Fut:	0	0	813	0	0	77	354	2010	0	0	1778	962
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Volume:	0	0	0	0	0	0	354	2010	0	0	1778	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	0	0	0	354	2010	0	0	1778	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
FinalVolume:	0	0	0	0	0	0	354	2010	0	0	1778	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	1.00	0.00	0.00	1.00	1.00	3.00	0.00	0.00	3.00	1.00
Final Sat.:	0	0	1700	0	0	1700	1700	5100	0	0	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.39	0.00	0.00	0.35	0.00
Crit Moves:							****				****	

Cypress Barton Place
Cumulative Without Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #8 Katella Ave. / Los Alamitos Blvd.

Cycle (sec): 100 Critical Vol./Cap.(X): 0.834
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 60 Level Of Service: D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Ovl			Ovl			Ovl		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2 0	3	0 1	2 0	3	0 1	2 0	3	0 1	2 0	3	0 1
Volume Module:												
Base Vol:	464	847	344	177	1066	208	307	1391	442	310	1514	94
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	483	881	358	184	1109	216	319	1447	460	323	1575	98
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj.:	0	33	40	12	24	0	0	84	0	41	88	11
Initial Fut:	483	914	398	196	1133	216	319	1531	460	364	1663	109
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	483	914	398	196	1133	216	319	1531	460	364	1663	109
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	483	914	398	196	1133	216	319	1531	460	364	1663	109
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	483	914	398	196	1133	216	319	1531	460	364	1663	109
OvlAdjVol:			216			57			219			11
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.14	0.18	0.23	0.06	0.22	0.13	0.09	0.30	0.27	0.11	0.33	0.06
OvlAdjV/S:			0.13			0.03			0.13			0.01
Crit Moves:	****				****		****				****	

Cypress Barton Place
Cumulative Without Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #9 Katella Avenue / Bloomfield Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.821
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	57	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Prot+Permit			Prot+Permit			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1	1 0	1 0	1	0 1	1 0	2	1 0	1 0	2	1 0
Volume Module:												
Base Vol:	54	109	29	225	180	169	242	1569	65	76	1704	311
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	56	113	30	234	187	176	252	1633	68	79	1773	324
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj.:	0	0	0	5	0	4	7	150	0	0	121	3
Initial Fut:	56	113	30	239	187	180	259	1783	68	79	1894	327
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	56	113	30	239	187	180	259	1783	68	79	1894	327
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	56	113	30	239	187	180	259	1783	68	79	1894	327
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	56	113	30	239	187	180	259	1783	68	79	1894	327
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.58	0.42	1.00	1.00	1.00	1.00	2.89	0.11	1.00	2.56	0.44
Final Sat.:	1700	2686	714	1700	1700	1700	1700	4914	186	1700	4350	750
Capacity Analysis Module:												
Vol/Sat:	0.03	0.04	0.04	0.14	0.11	0.11	0.15	0.36	0.36	0.05	0.44	0.44
Crit Moves:		****		****			****				****	

Cypress Barton Place
Cumulative Without Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #10 Katella Ave / Lexington Dr

Cycle (sec):	100	Critical Vol./Cap.(X):	0.674
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	35	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1	0 1	1 0	1!	0 0	2 0	3	0 1	1 0	2	1 0
Volume Module:												
Base Vol:	76	46	108	130	12	120	86	1667	72	118	1697	109
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	79	48	112	135	12	125	89	1735	75	123	1766	113
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj.:	24	0	34	0	0	27	45	110	5	13	85	0
Initial Fut:	103	48	146	135	12	152	134	1845	80	136	1851	113
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	103	48	146	135	12	152	134	1845	80	136	1851	113
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	103	48	146	135	12	152	134	1845	80	136	1851	113
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	103	48	146	135	12	152	134	1845	80	136	1851	113
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	1.00	0.08	0.92	2.00	3.00	1.00	1.00	2.83	0.17
Final Sat.:	1700	1700	1700	1700	129	1571	3400	5100	1700	1700	4806	294
Capacity Analysis Module:												
Vol/Sat:	0.06	0.03	0.09	0.08	0.10	0.10	0.04	0.36	0.05	0.08	0.39	0.39
Crit Moves:			****		****			****		****		

Cypress Barton Place
Cumulative Without Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #11 Katella Ave / Cottonwood Way

Cycle (sec): 100 Critical Vol./Cap.(X): 0.492
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 23 Level Of Service: A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	0	1	1 0	0	1	1 0	2	1 0	0 0	2	1 0
Volume Module:												
Base Vol:	0	0	3	6	0	1	11	1894	1	0	1939	4
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	0	0	3	6	0	1	11	1971	1	0	2018	4
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj.:	0	0	0	18	0	9	15	78	0	0	39	30
Initial Fut:	0	0	3	24	0	10	26	2049	1	0	2057	34
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	3	24	0	10	26	2049	1	0	2057	34
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	3	24	0	10	26	2049	1	0	2057	34
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	3	24	0	10	26	2049	1	0	2057	34
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	1.00	1.00	0.00	1.00	1.00	2.99	0.01	0.00	2.95	0.05
Final Sat.:	0	0	1700	1700	0	1700	1700	5097	3	0	5017	83
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.01	0.00	0.01	0.02	0.40	0.40	0.00	0.41	0.41
Crit Moves:			****	****			****				****	

Cypress Barton Place
Cumulative Without Project
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #12 Katella Ave. / Enterprise Dr.

Average Delay (sec/veh): 0.5 Worst Case Level Of Service: F[153.8]

Approach:	North Bound				South Bound					East Bound					West Bound				
Movement:	L -	T -	R		L -	T -	R			L -	T -	R			L -	T -	R		
Control:	Stop Sign				Stop Sign					Uncontrolled					Uncontrolled				
Rights:	Include				Include					Include					Include				
Lanes:	0	0	1!	0	0	0	0	0	0	2	0	0	2	1	0	1	0	2	1	0
Volume Module:																				
Base Vol:	2	0	7		0	0	2		0	1875	13		19	1951	2					
Growth Adj:	1.04	1.04	1.04		1.04	1.04	1.04		1.04	1.04	1.04		1.04	1.04	1.04					
Initial Bse:	2	0	7		0	0	2		0	1951	14		20	2030	2					
Added Vol:	0	0	0		0	0	0		0	0	0		0	0	0					
Cum. Proj.:	0	0	0		0	0	27		0	94	0		0	64	45					
Initial Fut:	2	0	7		0	0	29		0	2045	14		20	2094	47					
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00					
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00					
PHF Volume:	2	0	7		0	0	29		0	2045	14		20	2094	47					
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0					
FinalVolume:	2	0	7		0	0	29		0	2045	14		20	2094	47					
Critical Gap Module:																				
Critical Gp:	7.5	6.5	6.9	xxxxx	xxxx		6.9	xxxxx	xxxx	xxxxx			4.1	xxxx	xxxxx					
FollowUpTim:	3.5	4.0	3.3	xxxxx	xxxx		3.3	xxxxx	xxxx	xxxxx			2.2	xxxx	xxxxx					
Capacity Module:																				
Cnflict Vol:	2790	4233	688	xxxx	xxxx		722	xxxx	xxxx	xxxxx			2059	xxxx	xxxxx					
Potent Cap.:	9	2	393	xxxx	xxxx		374	xxxx	xxxx	xxxxx			276	xxxx	xxxxx					
Move Cap.:	8	2	393	xxxx	xxxx		374	xxxx	xxxx	xxxxx			276	xxxx	xxxxx					
Volume/Cap:	0.27	0.00	0.02	xxxx	xxxx		0.08	xxxx	xxxx	xxxx			0.07	xxxx	xxxx					
Level Of Service Module:																				
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx		0.3	xxxx	xxxx	xxxxx			0.2	xxxx	xxxxx					
Control Del:	xxxxx	xxxxx	xxxxx	xxxxx	xxxx		15.4	xxxxx	xxxx	xxxxx			19.1	xxxx	xxxxx					
LOS by Move:	*	*	*	*	*		C	*	*	*			C	*	*					
Movement:	LT -	LTR -	RT	LT -	LTR -	RT		LT -	LTR -	RT			LT -	LTR -	RT					
Shared Cap.:	xxxx	33	xxxxx	xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx			xxxx	xxxx	xxxxx					
SharedQueue:	xxxxx	0.9	xxxxx	xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx					
Shrd ConDel:	xxxxx	154	xxxxx	xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx					
Shared LOS:	*	F	*	*	*	*		*	*	*			*	*	*					
ApproachDel:	153.8			15.4				xxxxxx					xxxxxx							
ApproachLOS:	F			C				*					*							

Note: Queue reported is the number of cars per lane.

Cypress Barton Place
Cumulative Without Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #13 Katella Avenue / Siboney Street

Cycle (sec): 100 Critical Vol./Cap.(X): 0.614
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 30 Level Of Service: B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 1	0	0 1	1 0	1! 0	1	2 0	2 1	0	1 0	3 0	1
Volume Module:												
Base Vol:	62	2	67	75	5	71	100	1926	39	61	1902	53
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	65	2	70	78	5	74	104	2004	41	63	1979	55
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj.:	0	0	10	49	0	47	47	127	0	8	115	49
Initial Fut:	65	2	80	127	5	121	151	2131	41	71	2094	104
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	65	2	80	127	5	121	151	2131	41	71	2094	104
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	65	2	80	127	5	121	151	2131	41	71	2094	104
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	65	2	80	127	5	121	151	2131	41	71	2094	104
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.97	0.03	1.00	1.51	0.06	1.43	2.00	2.94	0.06	1.00	3.00	1.00
Final Sat.:	1647	53	1700	2560	105	2436	3400	5005	95	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.04	0.04	0.05	0.05	0.05	0.05	0.04	0.43	0.43	0.04	0.41	0.06
Crit Moves:			****	****				****		****		

Cypress Barton Place
Cumulative Without Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #14 Katella Avenue / Winner Circle

Cycle (sec): 100 Critical Vol./Cap.(X): 0.610
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 30 Level Of Service: B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0 1	0	1 0	0 1	0	1 0	2 1	0	1 0	3 0	1
Volume Module:												
Base Vol:	42	4	52	33	0	47	144	1839	15	53	1898	8
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	44	4	54	34	0	49	150	1914	16	55	1975	8
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj.:	3	0	0	13	0	0	0	132	2	0	115	7
Initial Fut:	47	4	54	47	0	49	150	2046	18	55	2090	15
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	47	4	54	47	0	49	150	2046	18	55	2090	15
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	47	4	54	47	0	49	150	2046	18	55	2090	15
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	47	4	54	47	0	49	150	2046	18	55	2090	15
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.07	0.93	1.00	0.00	1.00	1.00	2.97	0.03	1.00	3.00	1.00
Final Sat.:	1700	121	1579	1700	0	1700	1700	5056	44	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.03	0.03	0.03	0.03	0.00	0.03	0.09	0.40	0.40	0.03	0.41	0.01
Crit Moves:		****		****			****				****	

Cypress Barton Place
Cumulative Without Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #15 Katella Avenue / Walker Street

Cycle (sec): 100 Critical Vol./Cap.(X): 0.728
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 40 Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 1	0 1	0	1 1	0 0	2	2 0	2 1	0	1 0	3 0	1
Volume Module:												
Base Vol:	27	16	4	551	1	200	265	1661	2	2	1739	539
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	28	17	4	573	1	208	276	1728	2	2	1810	561
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj.:	0	0	0	11	0	64	58	204	0	0	184	18
Initial Fut:	28	17	4	584	1	272	334	1932	2	2	1994	579
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	28	17	4	584	1	272	334	1932	2	2	1994	579
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	28	17	4	584	1	272	334	1932	2	2	1994	579
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	28	17	4	584	1	272	334	1932	2	2	1994	579
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.83	0.17	1.99	0.01	2.00	2.00	2.99	0.01	1.00	3.00	1.00
Final Sat.:	1700	1411	289	3394	6	3400	3400	5095	5	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.01	0.01	0.17	0.17	0.08	0.10	0.38	0.38	0.00	0.39	0.34
Crit Moves:	****				****		****				****	

Cypress Barton Place
Cumulative Without Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #16 Katella Avenue / Valley View Street

Cycle (sec): 100 Critical Vol./Cap.(X): 0.817
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 56 Level Of Service: D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	3 0	3 0	1	2 0	3 0	1	2 0	3 0	1	2 0	3 0	1
Volume Module:												
Base Vol:	603	1401	163	264	1385	222	271	1086	1291	353	1009	272
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	627	1458	170	275	1441	231	282	1130	1343	367	1050	283
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj.:	106	3	0	0	3	61	54	55	98	0	72	0
Initial Fut:	733	1461	170	275	1444	292	336	1185	1441	367	1122	283
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	733	1461	170	275	1444	292	336	1185	0	367	1122	283
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	733	1461	170	275	1444	292	336	1185	0	367	1122	283
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
FinalVolume:	733	1461	170	275	1444	292	336	1185	0	367	1122	283
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	3.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	5100	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.14	0.29	0.10	0.08	0.28	0.17	0.10	0.23	0.00	0.11	0.22	0.17
Crit Moves:	****				****			****		****		

Cypress Barton Place
Cumulative Without Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #17 Farquhar Ave / Los Alamitos Blvd

Cycle (sec):	100	Critical Vol./Cap.(X):	0.660
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	33	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	2	1 0	1 0	3	0 0	0 0	0	0 0	1 0	1!	0 0
Volume Module:												
Base Vol:	0	1542	169	116	1686	0	0	0	0	427	0	168
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	0	1605	176	121	1754	0	0	0	0	444	0	175
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj.:	0	40	0	0	40	0	0	0	0	0	0	0
Initial Fut:	0	1645	176	121	1794	0	0	0	0	444	0	175
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1645	176	121	1794	0	0	0	0	444	0	175
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	1645	176	121	1794	0	0	0	0	444	0	175
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	1645	176	121	1794	0	0	0	0	444	0	175
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	2.71	0.29	1.00	3.00	0.00	0.00	0.00	0.00	1.43	0.01	0.56
Final Sat.:	0	4607	493	1700	5100	0	0	0	0	2440	0	960
Capacity Analysis Module:												
Vol/Sat:	0.00	0.36	0.36	0.07	0.35	0.00	0.00	0.00	0.00	0.18	0.00	0.18
Crit Moves:		****		****						****		

Cypress Barton Place
Cumulative Without Project
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #18 Farquhar Ave / Lexington Dr

Cycle (sec):	100	Critical Vol./Cap.(X):	0.445
Loss Time (sec):	0	Average Delay (sec/veh):	9.9
Optimal Cycle:	0	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	1	0 0	0 0	2	0 1	0 0	1!	0 0	0 0	0	0 0
Volume Module:												
Base Vol:	106	232	0	0	70	80	69	0	28	0	0	0
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	110	241	0	0	73	83	72	0	29	0	0	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj.:	0	80	0	0	34	0	0	0	0	0	0	0
Initial Fut:	110	321	0	0	107	83	72	0	29	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	110	321	0	0	107	83	72	0	29	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	110	321	0	0	107	83	72	0	29	0	0	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	110	321	0	0	107	83	72	0	29	0	0	0
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	0.00	0.00	2.00	1.00	0.71	0.00	0.29	0.00	0.00	0.00
Final Sat.:	655	723	0	0	1365	787	464	0	188	0	0	0
Capacity Analysis Module:												
Vol/Sat:	0.17	0.44	xxxx	xxxx	0.08	0.11	0.15	xxxx	0.15	xxxx	xxxx	xxxx
Crit Moves:		****				****	****					
Delay/Veh:	9.2	11.4	0.0	0.0	8.3	7.7	9.0	0.0	9.0	0.0	0.0	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	9.2	11.4	0.0	0.0	8.3	7.7	9.0	0.0	9.0	0.0	0.0	0.0
LOS by Move:	A	B	*	*	A	A	A	*	A	*	*	*
ApproachDel:		10.9			8.0			9.0			xxxxxx	
Delay Adj:		1.00			1.00			1.00			xxxxx	
ApprAdjDel:		10.9			8.0			9.0			xxxxxx	
LOS by Appr:		B			A			A			*	
AllWayAvgQ:	0.2	0.8	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.0	0.0	0.0

Note: Queue reported is the number of cars per lane.

Cypress Barton Place
Cumulative Without Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #19 Orangewood Avenue / Valley View Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.758
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	45	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 1	0	2 0	3 0	1	1 0	1 1	0	1 0	0 1	1
Volume Module:												
Base Vol:	17	1477	68	549	2242	101	104	49	25	75	16	442
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	18	1537	71	571	2333	105	108	51	26	78	17	460
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj.:	0	106	0	0	97	0	0	0	0	0	0	0
Initial Fut:	18	1643	71	571	2430	105	108	51	26	78	17	460
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	18	1643	71	571	2430	105	108	51	26	78	17	460
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	18	1643	71	571	2430	105	108	51	26	78	17	460
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	18	1643	71	571	2430	105	108	51	26	78	17	460
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.88	0.12	2.00	3.00	1.00	1.00	1.32	0.68	1.00	0.07	1.93
Final Sat.:	1700	4889	211	3400	5100	1700	1700	2251	1149	1700	119	3281
Capacity Analysis Module:												
Vol/Sat:	0.01	0.34	0.34	0.17	0.48	0.06	0.06	0.02	0.02	0.05	0.14	0.14
Crit Moves:		****		****			****				****	

Appendix C-4

Opening Year 2018
With Project Conditions

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Scenario Report

Scenario:	Cum + Proj AM ICU
Command:	Cum + Proj AM
Volume:	Existing plus cum AM
Geometry:	Existing
Impact Fee:	Default Impact Fee
Trip Generation:	Project AM
Trip Distribution:	Existing Plus Project
Paths:	Project NO EBL
Routes:	Default Route
Configuration:	ICU + GROWTH

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Trip Generation Report

Forecast for AM Project

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
401	Cypress Bart	1.00	Residential	18.00	33.00	18	33	51	24.4
	Zone 401 Subtotal					18	33	51	24.4
504	Cypress Bart	1.00	Retail	90.00	68.00	90	68	158	75.6
	Zone 504 Subtotal					90	68	158	75.6
TOTAL						108	101	209	100.0

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Trip Distribution Report

Percent Of Trips Project Trips

Zone	To Gates 1	2	3	4	10	14	15	16	17	18	21
401	2.0	5.0	5.0	8.0	0.0	5.0	5.0	8.0	0.0	10.0	2.0
504	2.0	5.0	5.0	10.0	0.0	0.0	5.0	5.0	5.0	10.0	5.0

Zone	To Gates 39	40	42	44	68	69	70	71	72	73	74
401	0.0	0.0	0.0	0.0	10.0	5.0	0.0	5.0	10.0	5.0	5.0
504	5.0	5.0	5.0	5.0	5.0	5.0	0.0	3.0	0.0	5.0	5.0

Zone	To Gates 75	76	77
401	0.0	5.0	5.0
504	5.0	0.0	0.0

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Intersection Volume Report
Base Volume Alternative

Node	Intersection	Northbound L	T	R	Southbound L	T	R	Eastbound L	T	R	Westbound L	T	R
1	Cerritos Ave.	177	691	332	108	759	103	130	976	181	328	823	146
2	Cerritos Ave	220	287	181	145	560	238	55	1007	168	184	935	61
3	Cerritos Ave	62	74	39	224	168	154	58	1040	104	104	960	148
4	Cerritos Ave	0	1	0	623	1	227	68	1174	2	0	933	113
5	Cerritos Ave	101	186	54	184	723	59	25	1228	585	102	938	105
6	Cerritos Aven	190	1130	41	129	1405	299	133	702	526	191	684	120
7	Katella Ave.	0	0	838	0	0	76	85	1535	0	0	1493	808
8	Katella Ave.	411	985	392	174	1004	157	207	1761	266	342	1247	80
9	Katella Avenu	83	364	16	187	211	347	287	1902	40	56	1255	258
10	Katella Ave /	97	51	96	126	7	107	68	1724	121	105	1441	87
11	Katella Ave /	0	0	0	0	0	3	4	1934	4	0	1618	5
12	Katella Ave.	3	0	10	0	0	1	0	1932	4	10	1619	19
13	Katella Avenu	44	5	35	32	3	21	135	1798	26	37	1517	45
14	Katella Avenu	5	1	4	7	0	5	19	1843	26	56	1630	3
15	Katella Avenu	6	2	0	873	9	203	173	1623	2	8	1520	313
16	Katella Avenu	815	1500	281	215	1206	253	260	1052	824	177	1020	163
17	Farquhar Ave	0	1795	189	130	1434	0	0	0	0	360	0	124
18	Farquhar Ave	3	43	0	0	227	78	84	0	86	0	0	0
19	Orangewood Av	21	1976	68	242	1810	45	149	62	14	78	31	670

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Intersection Volume Report
Future Volume Alternative

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
1	Cerritos Ave.	182	713	332	126	779	103	130	1039	193	328	846	154
2	Cerritos Ave	220	292	181	162	567	238	55	1088	168	184	967	67
3	Cerritos Ave	94	94	97	224	211	154	58	1058	189	182	969	148
4	Cerritos Ave	0	1	0	636	1	229	85	1224	2	0	1008	122
5	Cerritos Ave	106	207	63	184	787	59	33	1273	598	123	1017	105
6	Cerritos Aven	190	1157	47	129	1443	360	164	720	526	200	722	120
7	Katella Ave.	0	0	861	0	0	76	85	1577	0	0	1518	822
8	Katella Ave.	411	1000	445	189	1013	157	207	1887	266	367	1300	90
9	Katella Avenu	83	364	16	197	211	354	290	2052	40	56	1333	269
10	Katella Ave /	101	51	105	135	7	126	119	1815	147	144	1518	123
11	Katella Ave /	0	0	0	13	0	9	21	2014	4	0	1749	39
12	Katella Ave.	3	0	10	0	0	60	0	2022	4	10	1744	97
13	Katella Avenu	44	5	40	47	3	35	197	1891	26	40	1721	69
14	Katella Avenu	6	1	4	10	0	5	19	1934	29	56	1840	17
15	Katella Avenu	6	2	0	892	9	271	194	1733	2	8	1722	317
16	Katella Avenu	922	1503	281	215	1208	300	290	1085	892	177	1084	163
17	Farquhar Ave	0	1863	189	130	1468	0	0	0	0	360	0	124
18	Farquhar Ave	3	50	0	0	279	78	84	0	86	0	0	0
19	Orangewood Av	21	2077	68	245	1874	45	149	62	14	78	31	675

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
# 1 Cerritos Ave. / Los Alamitos B	D	xxxxx	0.857	D	xxxxx	0.884	+ 0.027 V/C
# 2 Cerritos Ave / Bloomfield St	D	xxxxx	0.868	D	xxxxx	0.894	+ 0.026 V/C
# 3 Cerritos Ave / Denni St	B	xxxxx	0.651	C	xxxxx	0.767	+ 0.116 V/C
# 4 Cerritos Ave / Moody St	A	xxxxx	0.582	B	xxxxx	0.620	+ 0.039 V/C
# 5 Cerritos Ave / Walker St	C	xxxxx	0.714	C	xxxxx	0.754	+ 0.040 V/C
# 6 Cerritos Avenue / Valley View	D	xxxxx	0.803	D	xxxxx	0.813	+ 0.010 V/C
# 7 Katella Ave. / I-605 NB Ramps	A	xxxxx	0.393	A	xxxxx	0.398	+ 0.005 V/C
# 8 Katella Ave. / Los Alamitos Bl	D	xxxxx	0.814	D	xxxxx	0.848	+ 0.034 V/C
# 9 Katella Avenue / Bloomfield S	C	xxxxx	0.768	C	xxxxx	0.792	+ 0.023 V/C
# 10 Katella Ave / Lexington Dr	A	xxxxx	0.578	B	xxxxx	0.631	+ 0.054 V/C
# 11 Katella Ave / Cottonwood Way	A	xxxxx	0.432	A	xxxxx	0.453	+ 0.021 V/C
# 12 Katella Ave. / Enterprise Dr.	F	86.7	0.212	F	135.4	0.312	+48.670 D/V
# 13 Katella Avenue / Siboney Stree	A	xxxxx	0.470	A	xxxxx	0.491	+ 0.021 V/C
# 14 Katella Avenue / Winner Circle	A	xxxxx	0.453	A	xxxxx	0.477	+ 0.024 V/C
# 15 Katella Avenue / Walker Street	B	xxxxx	0.662	C	xxxxx	0.713	+ 0.051 V/C
# 16 Katella Avenue / Valley View S	C	xxxxx	0.723	C	xxxxx	0.765	+ 0.043 V/C
# 17 Farquhar Ave / Los Alamitos Bl	B	xxxxx	0.658	B	xxxxx	0.671	+ 0.013 V/C
# 18 Farquhar Ave / Lexington Dr	A	8.4	0.219	A	8.6	0.225	+ 0.006 V/C
# 19 Orangewood Avenue / Valley Vie	D	xxxxx	0.816	D	xxxxx	0.838	+ 0.022 V/C

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Cerritos Ave. / Los Alamitos Blvd

Cycle (sec):	100	Critical Vol./Cap.(X):	0.884
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	79	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2	1 0	1 0	2	0 1	1 0	2	0 1	1 0	2	0 1
Volume Module:												
Base Vol:	170	664	319	104	729	99	125	938	174	315	791	140
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	177	691	332	108	759	103	130	976	181	328	823	146
Added Vol:	0	4	0	0	4	0	0	0	0	0	0	0
PasserByVol:	5	18	0	18	16	0	0	63	12	0	23	8
Initial Fut:	182	713	332	126	779	103	130	1039	193	328	846	154
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	182	713	332	126	779	103	130	1039	193	328	846	154
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	182	713	332	126	779	103	130	1039	193	328	846	154
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	182	713	332	126	779	103	130	1039	193	328	846	154
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.05	0.95	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1700	3480	1620	1700	3400	1700	1700	3400	1700	1700	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.11	0.20	0.20	0.07	0.23	0.06	0.08	0.31	0.11	0.19	0.25	0.09
Crit Moves:	****				****			****		****		

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #2 Cerritos Ave / Bloomfield St

Cycle (sec):	100	Critical Vol./Cap.(X):	0.894
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	83	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1	1 0	1 0	1	1 0	1 0	1	1 0	1 0	1	1 0
Volume Module:												
Base Vol:	211	276	174	139	538	229	53	968	161	177	899	59
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	220	287	181	145	560	238	55	1007	168	184	935	61
Added Vol:	0	5	0	0	7	0	0	0	0	0	0	0
PasserByVol:	0	0	0	17	0	0	0	81	0	0	32	6
Initial Fut:	220	292	181	162	567	238	55	1088	168	184	967	67
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	220	292	181	162	567	238	55	1088	168	184	967	67
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	220	292	181	162	567	238	55	1088	168	184	967	67
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	220	292	181	162	567	238	55	1088	168	184	967	67
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.23	0.77	1.00	1.41	0.59	1.00	1.73	0.27	1.00	1.87	0.13
Final Sat.:	1700	2099	1301	1700	2394	1006	1700	2946	454	1700	3179	221
Capacity Analysis Module:												
Vol/Sat:	0.13	0.14	0.14	0.10	0.24	0.24	0.03	0.37	0.37	0.11	0.30	0.30
Crit Moves:	****				****			****		****		

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #3 Cerritos Ave / Denni St

Cycle (sec): 100 Critical Vol./Cap.(X): 0.767
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 46 Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Split Phase			Split Phase			Prot+Permit			Prot+Permit		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	1! 0	0	1 0	1 0	1	1 0	2 0	1	1 0	1 1	0
Volume Module:												
Base Vol:	60	71	37	215	161	148	56	999	100	100	923	142
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	62	74	39	224	168	154	58	1040	104	104	960	148
Added Vol:	0	7	29	0	9	0	0	0	0	0	0	0
PasserByVol:	32	13	29	0	34	0	0	18	85	78	9	0
Initial Fut:	94	94	97	224	211	154	58	1058	189	182	969	148
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	94	94	97	224	211	154	58	1058	189	182	969	148
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	94	94	97	224	211	154	58	1058	189	182	969	148
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	94	94	97	224	211	154	58	1058	189	182	969	148
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.33	0.33	0.34	1.00	1.00	1.00	1.00	2.00	1.00	1.00	1.74	0.26
Final Sat.:	564	560	576	1700	1700	1700	1700	3400	1700	1700	2950	450
Capacity Analysis Module:												
Vol/Sat:	0.17	0.17	0.17	0.13	0.12	0.09	0.03	0.31	0.11	0.11	0.33	0.33
Crit Moves:			****	****				****		****		

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #4 Cerritos Ave / Moody St

Cycle (sec): 100 Critical Vol./Cap.(X): 0.620
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 30 Level Of Service: B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Split Phase			Split Phase			Prot+Permit			Prot+Permit		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	1 0	0	1 1	0 0	1	1 0	1 1	0	1 0	1 1	0
Volume Module:												
Base Vol:	0	1	0	599	1	218	65	1128	2	0	897	109
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	0	1	0	623	1	227	68	1174	2	0	933	113
Added Vol:	0	0	0	10	0	0	8	20	0	0	0	0
PasserByVol:	0	0	0	3	0	2	9	30	0	0	75	9
Initial Fut:	0	1	0	636	1	229	85	1224	2	0	1008	122
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1	0	636	1	229	85	1224	2	0	1008	122
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	1	0	636	1	229	85	1224	2	0	1008	122
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	1	0	636	1	229	85	1224	2	0	1008	122
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	0.00	1.99	0.01	1.00	1.00	1.99	0.01	1.00	1.78	0.22
Final Sat.:	0	1700	0	3394	6	1700	1700	3394	6	1700	3032	368
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.19	0.19	0.13	0.05	0.36	0.36	0.00	0.33	0.33
Crit Moves:		****		****			****				****	

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #5 Cerritos Ave / Walker St

Cycle (sec):	100	Critical Vol./Cap.(X):	0.754
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	44	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2 0	2 0	1	1 0	1 1	0	1 0	3 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	97	179	52	177	695	57	24	1180	562	98	901	101
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	101	186	54	184	723	59	25	1228	585	102	938	105
Added Vol:	0	0	0	0	11	0	8	12	10	7	0	0
PasserByVol:	5	21	9	0	53	0	0	33	3	14	79	0
Initial Fut:	106	207	63	184	787	59	33	1273	598	123	1017	105
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	106	207	63	184	787	59	33	1273	598	123	1017	105
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	106	207	63	184	787	59	33	1273	598	123	1017	105
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	106	207	63	184	787	59	33	1273	598	123	1017	105
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	1.00	1.86	0.14	1.00	3.00	1.00	1.00	2.00	1.00
Final Sat.:	3400	3400	1700	1700	3162	238	1700	5100	1700	1700	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.03	0.06	0.04	0.11	0.25	0.25	0.02	0.25	0.35	0.07	0.30	0.06
Crit Moves:	****				****				****	****		

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #6 Cerritos Avenue / Valley View Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.813
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	55	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	3 0	1	1 0	3 0	1	2 0	3 0	1	2 0	1 1	0
Volume Module:												
Base Vol:	183	1086	39	124	1350	287	128	675	505	184	657	115
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	190	1130	41	129	1405	299	133	702	526	191	684	120
Added Vol:	0	9	0	0	14	1	7	5	0	0	5	0
PasserByVol:	0	18	6	0	24	60	24	13	0	9	33	0
Initial Fut:	190	1157	47	129	1443	360	164	720	526	200	722	120
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	190	1157	47	129	1443	360	164	720	526	200	722	120
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	190	1157	47	129	1443	360	164	720	526	200	722	120
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	190	1157	47	129	1443	360	164	720	526	200	722	120
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	3.00	1.00	1.00	3.00	1.00	2.00	3.00	1.00	2.00	1.72	0.28
Final Sat.:	1700	5100	1700	1700	5100	1700	3400	5100	1700	3400	2916	484
Capacity Analysis Module:												
Vol/Sat:	0.11	0.23	0.03	0.08	0.28	0.21	0.05	0.14	0.31	0.06	0.25	0.25
Crit Moves:	****				****				****	****		

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #7 Katella Ave. / I-605 NB Ramps

Cycle (sec):	100	Critical Vol./Cap.(X):	0.398
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	20	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Ignore			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	0	0 1	0 0	0	0 1	1 0	3	0 0	0 0	2	1 1
Volume Module:												
Base Vol:	0	0	805	0	0	73	82	1475	0	0	1435	776
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	0	0	838	0	0	76	85	1535	0	0	1493	808
Added Vol:	0	0	6	0	0	0	0	5	0	0	7	5
PasserByVol:	0	0	17	0	0	0	0	37	0	0	18	9
Initial Fut:	0	0	861	0	0	76	85	1577	0	0	1518	822
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Volume:	0	0	0	0	0	0	85	1577	0	0	1518	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	0	0	0	85	1577	0	0	1518	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
FinalVolume:	0	0	0	0	0	0	85	1577	0	0	1518	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	1.00	0.00	0.00	1.00	1.00	3.00	0.00	0.00	3.00	1.00
Final Sat.:	0	0	1700	0	0	1700	1700	5100	0	0	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.31	0.00	0.00	0.30	0.00
Crit Moves:							****				****	

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #8 Katella Ave. / Los Alamitos Blvd.

Cycle (sec):	100	Critical Vol./Cap.(X):	0.848
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	64	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Ovl			Ovl			Ovl		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2 0	3	0 1	2 0	3	0 1	2 0	3	0 1	2 0	3	0 1
Volume Module:												
Base Vol:	395	947	377	167	965	151	199	1692	256	329	1198	77
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	411	985	392	174	1004	157	207	1761	266	342	1247	80
Added Vol:	0	0	2	4	0	0	0	12	0	3	12	4
PasserByVol:	0	15	51	11	9	0	0	114	0	22	41	6
Initial Fut:	411	1000	445	189	1013	157	207	1887	266	367	1300	90
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	411	1000	445	189	1013	157	207	1887	266	367	1300	90
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	411	1000	445	189	1013	157	207	1887	266	367	1300	90
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	411	1000	445	189	1013	157	207	1887	266	367	1300	90
OvlAdjVol:			262			54			61			0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.12	0.20	0.26	0.06	0.20	0.09	0.06	0.37	0.16	0.11	0.25	0.05
OvlAdjV/S:			0.15			0.03			0.04			0.00
Crit Moves:	****				****			****		****		

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #9 Katella Avenue / Bloomfield Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.792
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	50	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Prot+Permit			Prot+Permit			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1	1 0	1 0	1 0	1	1 0	2	1 0	1 0	2	1 0
Volume Module:												
Base Vol:	80	350	15	180	203	333	276	1828	38	54	1206	248
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	83	364	16	187	211	347	287	1902	40	56	1255	258
Added Vol:	0	0	0	7	0	0	0	18	0	0	20	5
PasserByVol:	0	0	0	3	0	7	3	132	0	0	58	6
Initial Fut:	83	364	16	197	211	354	290	2052	40	56	1333	269
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	83	364	16	197	211	354	290	2052	40	56	1333	269
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	83	364	16	197	211	354	290	2052	40	56	1333	269
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	83	364	16	197	211	354	290	2052	40	56	1333	269
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.92	0.08	1.00	1.00	1.00	1.00	2.94	0.06	1.00	2.50	0.50
Final Sat.:	1700	3260	140	1700	1700	1700	1700	5004	96	1700	4243	857
Capacity Analysis Module:												
Vol/Sat:	0.05	0.11	0.11	0.12	0.12	0.21	0.17	0.41	0.41	0.03	0.31	0.31
Crit Moves:	****					****	****				****	

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #10 Katella Ave / Lexington Dr

Cycle (sec):	100	Critical Vol./Cap.(X):	0.631
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	31	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1	0 1	1 0	1	0 0	2 0	3	0 1	1 0	2	1 0
Volume Module:												
Base Vol:	93	49	92	121	7	103	65	1657	116	101	1385	84
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	97	51	96	126	7	107	68	1724	121	105	1441	87
Added Vol:	0	0	0	9	0	0	0	30	0	10	31	36
PasserByVol:	4	0	9	0	0	19	51	61	26	29	46	0
Initial Fut:	101	51	105	135	7	126	119	1815	147	144	1518	123
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	101	51	105	135	7	126	119	1815	147	144	1518	123
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	101	51	105	135	7	126	119	1815	147	144	1518	123
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	101	51	105	135	7	126	119	1815	147	144	1518	123
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	1.01	0.05	0.94	2.00	3.00	1.00	1.00	2.77	0.23
Final Sat.:	1700	1700	1700	1709	92	1599	3400	5100	1700	1700	4717	383
Capacity Analysis Module:												
Vol/Sat:	0.06	0.03	0.06	0.08	0.08	0.08	0.03	0.36	0.09	0.08	0.32	0.32
Crit Moves:			****			****		****		****		

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #11 Katella Ave / Cottonwood Way

Cycle (sec): 100 Critical Vol./Cap.(X): 0.453
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 22 Level Of Service: A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	0	0 0	1 0	0	0 1	1 0	2	1 0	0 0	2	1 0
Volume Module:												
Base Vol:	0	0	0	0	0	3	4	1859	4	0	1555	5
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	0	0	0	0	0	3	4	1934	4	0	1618	5
Added Vol:	0	0	0	0	0	0	0	50	0	0	77	0
PasserByVol:	0	0	0	13	0	6	17	30	0	0	54	34
Initial Fut:	0	0	0	13	0	9	21	2014	4	0	1749	39
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	13	0	9	21	2014	4	0	1749	39
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	13	0	9	21	2014	4	0	1749	39
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	13	0	9	21	2014	4	0	1749	39
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	2.99	0.01	0.00	2.93	0.07
Final Sat.:	0	0	0	1700	0	1700	1700	5089	11	0	4988	112
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.40	0.40	0.00	0.35	0.35
Crit Moves:				****				****		****		

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #12 Katella Ave. / Enterprise Dr.

Average Delay (sec/veh): 0.7 Worst Case Level Of Service: F[135.4]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1!	0 0	0 0	0	0 2	0 0	2	1 0	1 0	2	1 0
Volume Module:												
Base Vol:	3	0	10	0	0	1	0	1857	4	10	1556	18
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	3	0	10	0	0	1	0	1932	4	10	1619	19
Added Vol:	0	0	0	0	0	40	0	50	0	0	38	27
PasserByVol:	0	0	0	0	0	19	0	40	0	0	87	51
Initial Fut:	3	0	10	0	0	60	0	2022	4	10	1744	97
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	3	0	10	0	0	60	0	2022	4	10	1744	97
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	3	0	10	0	0	60	0	2022	4	10	1744	97
Critical Gap Module:												
Critical Gp:	7.5	6.5	6.9	xxxxx	xxxx	6.9	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	xxxxx	xxxx	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2627	3886	676	xxxx	xxxx	630	xxxx	xxxx	xxxxx	2027	xxxx	xxxxx
Potent Cap.:	12	4	400	xxxx	xxxx	429	xxxx	xxxx	xxxxx	284	xxxx	xxxxx
Move Cap.:	10	3	400	xxxx	xxxx	429	xxxx	xxxx	xxxxx	284	xxxx	xxxxx
Volume/Cap:	0.31	0.00	0.03	xxxx	xxxx	0.14	xxxx	xxxx	xxxx	0.04	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	0.5	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	14.7	xxxxx	xxxx	xxxxx	18.2	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	B	*	*	*	C	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	40	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	1.1	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	135	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	F	*	*	*	*	*	*	*	*	*	*
ApproachDel:	135.4			14.7			xxxxxx			xxxxxx		
ApproachLOS:	F			B			*			*		

Note: Queue reported is the number of cars per lane.

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #13 Katella Avenue / Siboney Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.491
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	23	Level Of Service:	A

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	- T	-	R	L	- T	-	R	L	- T	-	R	L	- T	-	R
Control:	Split Phase				Split Phase				Protected				Protected			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	0	1	0	0	1	1	0	1!	0	1	2	0	2	1	0	
Volume Module:																
Base Vol:	42	5	34		31	3	20		130	1728	25		36	1458	43	
Growth Adj:	1.04	1.04	1.04		1.04	1.04	1.04		1.04	1.04	1.04		1.04	1.04	1.04	
Initial Bse:	44	5	35		32	3	21		135	1798	26		37	1517	45	
Added Vol:	0	0	0		0	0	0		39	31	0		0	64	0	
PasserByVol:	0	0	5		15	0	14		23	62	0		3	140	24	
Initial Fut:	44	5	40		47	3	35		197	1891	26		40	1721	69	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	44	5	40		47	3	35		197	1891	26		40	1721	69	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	44	5	40		47	3	35		197	1891	26		40	1721	69	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	44	5	40		47	3	35		197	1891	26		40	1721	69	
Saturation Flow Module:																
Sat/Lane:	1700	1700	1700		1700	1700	1700		1700	1700	1700		1700	1700	1700	
Adjustment:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Lanes:	0.89	0.11	1.00		1.66	0.11	1.23		2.00	2.96	0.04		1.00	3.00	1.00	
Final Sat.:	1519	181	1700		2829	187	2084		3400	5031	69		1700	5100	1700	
Capacity Analysis Module:																
Vol/Sat:	0.03	0.03	0.02		0.02	0.02	0.02		0.06	0.38	0.38		0.02	0.34	0.04	
Crit Moves:		****				****			****					****		

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #14 Katella Avenue / Winner Circle

Cycle (sec):	100	Critical Vol./Cap.(X):	0.477
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	23	Level Of Service:	A

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	- T	-	R	L	- T	-	R	L	- T	-	R	L	- T	-	R
Control:	Permitted				Permitted				Protected				Protected			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	1	0	0	1	0	1	0	0	1	0	1	0	2	1	0	
Volume Module:																
Base Vol:	5	1	4		7	0	5		18	1771	25		54	1566	3	
Growth Adj:	1.04	1.04	1.04		1.04	1.04	1.04		1.04	1.04	1.04		1.04	1.04	1.04	
Initial Bse:	5	1	4		7	0	5		19	1843	26		56	1630	3	
Added Vol:	0	0	0		0	0	0		0	29	0		0	63	0	
PasserByVol:	1	0	0		3	0	0		0	62	3		0	147	14	
Initial Fut:	6	1	4		10	0	5		19	1934	29		56	1840	17	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	6	1	4		10	0	5		19	1934	29		56	1840	17	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	6	1	4		10	0	5		19	1934	29		56	1840	17	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	6	1	4		10	0	5		19	1934	29		56	1840	17	
Saturation Flow Module:																
Sat/Lane:	1700	1700	1700		1700	1700	1700		1700	1700	1700		1700	1700	1700	
Adjustment:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Lanes:	1.00	0.20	0.80		1.00	0.00	1.00		1.00	2.96	0.04		1.00	3.00	1.00	
Final Sat.:	1700	340	1360		1700	0	1700		1700	5025	75		1700	5100	1700	
Capacity Analysis Module:																
Vol/Sat:	0.00	0.00	0.00		0.01	0.00	0.00		0.01	0.38	0.38		0.03	0.36	0.01	
Crit Moves:		****				****					****			****		

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #15 Katella Avenue / Walker Street

Cycle (sec): 100 Critical Vol./Cap.(X): 0.713
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 39 Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 1	0 1	0	1 1	0 0	2	2 0	2 1	0	1 0	3 0	1
Volume Module:												
Base Vol:	6	2	0	839	9	195	166	1560	2	8	1461	301
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	6	2	0	873	9	203	173	1623	2	8	1520	313
Added Vol:	0	0	0	0	0	27	0	29	0	0	36	0
PasserByVol:	0	0	0	19	0	41	21	81	0	0	166	4
Initial Fut:	6	2	0	892	9	271	194	1733	2	8	1722	317
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	6	2	0	892	9	271	194	1733	2	8	1722	317
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	6	2	0	892	9	271	194	1733	2	8	1722	317
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	6	2	0	892	9	271	194	1733	2	8	1722	317
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	0.00	1.98	0.02	2.00	2.00	2.99	0.01	1.00	3.00	1.00
Final Sat.:	1700	1700	0	3365	35	3400	3400	5094	6	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.27	0.27	0.08	0.06	0.34	0.34	0.00	0.34	0.19
Crit Moves:	****				****		****				****	

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #16 Katella Avenue / Valley View Street

Cycle (sec): 100 Critical Vol./Cap.(X): 0.765
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 46 Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	3 0	3 0	1	2 0	3 0	1	2 0	3 0	1	2 0	3 0	1
Volume Module:												
Base Vol:	783	1441	270	207	1159	243	250	1011	792	170	980	157
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	815	1500	281	215	1206	253	260	1052	824	177	1020	163
Added Vol:	15	0	0	0	0	14	9	6	14	0	6	0
PasserByVol:	92	3	0	0	2	33	21	27	54	0	58	0
Initial Fut:	922	1503	281	215	1208	300	290	1085	892	177	1084	163
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	922	1503	281	215	1208	300	290	1085	0	177	1084	163
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	922	1503	281	215	1208	300	290	1085	0	177	1084	163
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
FinalVolume:	922	1503	281	215	1208	300	290	1085	0	177	1084	163
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	3.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	5100	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.18	0.29	0.17	0.06	0.24	0.18	0.09	0.21	0.00	0.05	0.21	0.10
Crit Moves:	****				****		****				****	

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #17 Farquhar Ave / Los Alamitos Blvd

Cycle (sec):	100	Critical Vol./Cap.(X):	0.671
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	34	Level Of Service:	B

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	-	T	- R	L	-	T	- R	L	-	T	- R	L	-	T	- R
Control:	Protected				Protected				Permitted				Permitted			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0	
Y+R:	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	
Lanes:	0	0	2	1 0	1	0	3	0 0	0	0	0	0 0	1	0	1!	0 0
Volume Module:																
Base Vol:	0	1725	182		125	1378	0		0	0	0		346	0	119	
Growth Adj:	1.04	1.04	1.04		1.04	1.04	1.04		1.04	1.04	1.04		1.04	1.04	1.04	
Initial Bse:	0	1795	189		130	1434	0		0	0	0		360	0	124	
Added Vol:	0	2	0		0	3	0		0	0	0		0	0	0	
PasserByVol:	0	66	0		0	31	0		0	0	0		0	0	0	
Initial Fut:	0	1863	189		130	1468	0		0	0	0		360	0	124	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	0	1863	189		130	1468	0		0	0	0		360	0	124	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	0	1863	189		130	1468	0		0	0	0		360	0	124	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	0	1863	189		130	1468	0		0	0	0		360	0	124	
Saturation Flow Module:																
Sat/Lane:	1700	1700	1700		1700	1700	1700		1700	1700	1700		1700	1700	1700	
Adjustment:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Lanes:	0.00	2.72	0.28		1.00	3.00	0.00		0.00	0.00	0.00		1.48	0.01	0.51	
Final Sat.:	0	4629	471		1700	5100	0		0	0	0		2530	0	870	
Capacity Analysis Module:																
Vol/Sat:	0.00	0.40	0.40		0.08	0.29	0.00		0.00	0.00	0.00		0.14	0.00	0.14	
Crit Moves:		****			****								****			

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #18 Farquhar Ave / Lexington Dr

Cycle (sec):	100	Critical Vol./Cap.(X):	0.225
Loss Time (sec):	0	Average Delay (sec/veh):	8.6
Optimal Cycle:	0	Level Of Service:	A

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	-	T	- R	L	-	T	- R	L	-	T	- R	L	-	T	- R
Control:	Stop Sign				Stop Sign				Stop Sign				Stop Sign			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0	
Lanes:	1	0	1	0 0	0	0	2	0 1	0	0	1!	0 0	0	0	0	0 0
Volume Module:																
Base Vol:	3	41	0		0	218	75		81	0	83		0	0	0	
Growth Adj:	1.04	1.04	1.04		1.04	1.04	1.04		1.04	1.04	1.04		1.04	1.04	1.04	
Initial Bse:	3	43	0		0	227	78		84	0	86		0	0	0	
Added Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
PasserByVol:	0	7	0		0	52	0		0	0	0		0	0	0	
Initial Fut:	3	50	0		0	279	78		84	0	86		0	0	0	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Volume:	3	50	0		0	279	78		84	0	86		0	0	0	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	3	50	0		0	279	78		84	0	86		0	0	0	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	3	50	0		0	279	78		84	0	86		0	0	0	
Saturation Flow Module:																
Adjustment:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Lanes:	1.00	1.00	0.00		0.00	2.00	1.00		0.49	0.00	0.51		0.00	0.00	0.00	
Final Sat.:	609	665	0		0	1426	828		374	0	383		0	0	0	
Capacity Analysis Module:																
Vol/Sat:	0.01	0.07	xxxx		xxxx	0.20	0.09		0.23	xxxx	0.23		xxxx	xxxx	xxxx	
Crit Moves:		****				****			****							
Delay/Veh:	8.4	8.3	0.0		0.0	8.8	7.4		8.8	0.0	8.8		0.0	0.0	0.0	
Delay Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
AdjDel/Veh:	8.4	8.3	0.0		0.0	8.8	7.4		8.8	0.0	8.8		0.0	0.0	0.0	
LOS by Move:	A	A	*		*	A	A		A	*	A		*	*	*	
ApproachDel:		8.3				8.5				8.8				xxxxxx		
Delay Adj:		1.00				1.00				1.00				xxxxx		
ApprAdjDel:		8.3				8.5				8.8				xxxxxx		
LOS by Appr:		A				A				A				*		
AllWayAvgQ:	0.0	0.1	0.0		0.0	0.2	0.1		0.3	0.3	0.3		0.0	0.0	0.0	

Note: Queue reported is the number of cars per lane.

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #19 Orangewood Avenue / Valley View Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.838
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	61	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 1	0	2 0	3 0	1	1 0	1 1	0	1 0	0 1	1
Volume Module:												
Base Vol:	20	1899	65	233	1739	43	143	60	13	75	30	644
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	21	1976	68	242	1810	45	149	62	14	78	31	670
Added Vol:	0	11	0	3	10	0	0	0	0	0	0	5
PasserByVol:	0	90	0	0	54	0	0	0	0	0	0	0
Initial Fut:	21	2077	68	245	1874	45	149	62	14	78	31	675
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	21	2077	68	245	1874	45	149	62	14	78	31	675
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	21	2077	68	245	1874	45	149	62	14	78	31	675
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	21	2077	68	245	1874	45	149	62	14	78	31	675
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.91	0.09	2.00	3.00	1.00	1.00	1.64	0.36	1.00	0.09	1.91
Final Sat.:	1700	4939	161	3400	5100	1700	1700	2795	605	1700	150	3250
Capacity Analysis Module:												
Vol/Sat:	0.01	0.42	0.42	0.07	0.37	0.03	0.09	0.02	0.02	0.05	0.21	0.21
Crit Moves:		****		****			****				****	

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Scenario Report

Scenario:	Cum + Proj PM ICU
Command:	Cum + Proj PM
Volume:	Existing plus cum PM With Pass-By
Geometry:	Existing
Impact Fee:	Default Impact Fee
Trip Generation:	Project PM
Trip Distribution:	Existing Plus Project
Paths:	Project NO EBL
Routes:	Default Route
Configuration:	ICU + GROWTH

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Trip Generation Report

Forecast for PM Project

Zone #	Subzone	Amount	Units	Rate In	Rate Out	Trips In	Trips Out	Total Trips	% Of Total
401	Cypress Bart	1.00	Residential	32.00	20.00	32	20	52	28.7
	Zone 401 Subtotal					32	20	52	28.7
504	Cypress Bart	1.00	Retail	69.00	60.00	69	60	129	71.3
	Zone 504 Subtotal					69	60	129	71.3
TOTAL						101	80	181	100.0

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Trip Distribution Report

Percent Of Trips Project Trips

Zone	To Gates 1	2	3	4	10	14	15	16	17	18	21
401	2.0	5.0	5.0	8.0	0.0	5.0	5.0	8.0	0.0	10.0	2.0
504	2.0	5.0	5.0	10.0	0.0	0.0	5.0	5.0	5.0	10.0	5.0

Zone	To Gates 39	40	42	44	68	69	70	71	72	73	74
401	0.0	0.0	0.0	0.0	10.0	5.0	0.0	5.0	10.0	5.0	5.0
504	5.0	5.0	5.0	5.0	5.0	5.0	0.0	3.0	0.0	5.0	5.0

Zone	To Gates 75	76	77
401	0.0	5.0	5.0
504	5.0	0.0	0.0

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Intersection Volume Report
Base Volume Alternative

Node	Intersection	Northbound L	T	R	Southbound L	T	R	Eastbound L	T	R	Westbound L	T	R
1	Cerritos Ave.	264	874	362	93	642	50	149	911	244	394	1040	154
2	Cerritos Ave	138	453	140	61	294	104	153	1091	100	103	1186	131
3	Cerritos Ave	83	140	76	96	55	95	140	1165	36	48	1120	151
4	Cerritos Ave	3	1	0	256	1	139	223	1120	0	3	1248	345
5	Cerritos Ave	526	716	214	118	430	50	71	1032	274	81	934	150
6	Cerritos Aven	331	1889	191	130	1178	194	338	803	276	99	556	139
7	Katella Ave.	0	0	789	0	0	77	354	1988	0	0	1694	929
8	Katella Ave.	483	881	358	184	1109	216	319	1447	460	323	1575	98
9	Katella Avenu	56	113	30	234	187	176	252	1633	68	79	1773	324
10	Katella Ave /	79	48	112	135	12	125	89	1735	75	123	1766	113
11	Katella Ave /	0	0	3	6	0	1	11	1971	1	0	2018	4
12	Katella Ave.	2	0	7	0	0	2	0	1951	14	20	2030	2
13	Katella Avenu	65	2	70	78	5	74	104	2004	41	63	1979	55
14	Katella Avenu	44	4	54	34	0	49	150	1914	16	55	1975	8
15	Katella Avenu	28	17	4	573	1	208	276	1728	2	2	1810	561
16	Katella Avenu	627	1458	170	275	1441	231	282	1130	1343	367	1050	283
17	Farquhar Ave	0	1605	176	121	1754	0	0	0	0	444	0	175
18	Farquhar Ave	110	241	0	0	73	83	72	0	29	0	0	0
19	Orangewood Av	18	1537	71	571	2333	105	108	51	26	78	17	460

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Intersection Volume Report
Future Volume Alternative

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
1	Cerritos Ave.	275	916	362	112	677	50	149	968	254	394	1080	169
2	Cerritos Ave	138	458	140	76	299	104	153	1168	100	103	1242	140
3	Cerritos Ave	128	164	144	96	93	95	140	1186	111	114	1142	151
4	Cerritos Ave	3	1	0	277	1	148	235	1186	0	3	1319	350
5	Cerritos Ave	540	773	239	118	502	50	78	1099	290	118	1005	150
6	Cerritos Aven	331	1938	207	130	1242	258	385	838	276	118	600	139
7	Katella Ave.	0	0	820	0	0	77	354	2015	0	0	1783	966
8	Katella Ave.	483	914	401	200	1133	216	319	1543	460	366	1672	112
9	Katella Avenu	56	113	30	244	187	180	259	1803	68	79	1909	332
10	Katella Ave /	103	48	146	143	12	152	134	1876	80	142	1874	142
11	Katella Ave /	0	0	3	24	0	10	26	2093	1	0	2116	34
12	Katella Ave.	2	0	7	0	0	55	0	2089	14	20	2127	86
13	Katella Avenu	65	2	80	127	5	121	204	2153	41	71	2153	104
14	Katella Avenu	47	4	54	47	0	49	150	2069	18	55	2148	15
15	Katella Avenu	28	17	4	584	1	297	334	1955	2	2	2027	579
16	Katella Avenu	747	1461	170	275	1444	305	344	1190	1452	367	1128	283
17	Farquhar Ave	0	1648	176	121	1796	0	0	0	0	444	0	175
18	Farquhar Ave	110	321	0	0	107	83	72	0	29	0	0	0
19	Orangewood Av	18	1653	71	574	2438	105	108	51	26	78	17	463

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
# 1 Cerritos Ave. / Los Alamitos B	D	xxxxx	0.894	E	xxxxx	0.928	+ 0.034 V/C
# 2 Cerritos Ave / Bloomfield St	C	xxxxx	0.738	C	xxxxx	0.767	+ 0.029 V/C
# 3 Cerritos Ave / Denni St	C	xxxxx	0.739	D	xxxxx	0.826	+ 0.087 V/C
# 4 Cerritos Ave / Moody St	C	xxxxx	0.734	C	xxxxx	0.769	+ 0.035 V/C
# 5 Cerritos Ave / Walker St	B	xxxxx	0.662	C	xxxxx	0.712	+ 0.050 V/C
# 6 Cerritos Avenue / Valley View	D	xxxxx	0.801	D	xxxxx	0.837	+ 0.036 V/C
# 7 Katella Ave. / I-605 NB Ramps	A	xxxxx	0.590	B	xxxxx	0.608	+ 0.017 V/C
# 8 Katella Ave. / Los Alamitos Bl	D	xxxxx	0.812	D	xxxxx	0.836	+ 0.024 V/C
# 9 Katella Avenue / Bloomfield S	C	xxxxx	0.789	D	xxxxx	0.827	+ 0.038 V/C
# 10 Katella Ave / Lexington Dr	B	xxxxx	0.609	B	xxxxx	0.684	+ 0.075 V/C
# 11 Katella Ave / Cottonwood Way	A	xxxxx	0.459	A	xxxxx	0.503	+ 0.045 V/C
# 12 Katella Ave. / Enterprise Dr.	F	110.8	0.200	F	193.0	0.322	+82.183 D/V
# 13 Katella Avenue / Siboney Stree	A	xxxxx	0.560	B	xxxxx	0.629	+ 0.069 V/C
# 14 Katella Avenue / Winner Circle	A	xxxxx	0.580	B	xxxxx	0.621	+ 0.042 V/C
# 15 Katella Avenue / Walker Street	B	xxxxx	0.671	C	xxxxx	0.734	+ 0.063 V/C
# 16 Katella Avenue / Valley View S	C	xxxxx	0.785	D	xxxxx	0.821	+ 0.036 V/C
# 17 Farquhar Ave / Los Alamitos Bl	B	xxxxx	0.652	B	xxxxx	0.661	+ 0.008 V/C
# 18 Farquhar Ave / Lexington Dr	A	9.0	0.332	A	9.9	0.445	+ 0.113 V/C
# 19 Orangewood Avenue / Valley Vie	C	xxxxx	0.737	C	xxxxx	0.762	+ 0.025 V/C

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Cerritos Ave. / Los Alamitos Blvd

Cycle (sec):	100	Critical Vol./Cap.(X):	0.928
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	106	Level Of Service:	E

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2	1 0	1 0	2	0 1	1 0	2	0 1	1 0	2	0 1
Volume Module:												
Base Vol:	254	840	348	89	617	48	143	875	234	379	999	148
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	264	874	362	93	642	50	149	911	244	394	1040	154
Added Vol:	0	3	0	0	4	0	0	0	0	0	0	0
PasserByVol:	11	39	0	19	31	0	0	57	10	0	40	15
Initial Fut:	275	916	362	112	677	50	149	968	254	394	1080	169
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	275	916	362	112	677	50	149	968	254	394	1080	169
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	275	916	362	112	677	50	149	968	254	394	1080	169
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	275	916	362	112	677	50	149	968	254	394	1080	169
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.15	0.85	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1700	3655	1445	1700	3400	1700	1700	3400	1700	1700	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.16	0.25	0.25	0.07	0.20	0.03	0.09	0.28	0.15	0.23	0.32	0.10
Crit Moves:	****				****			****		****		

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #2 Cerritos Ave / Bloomfield St

Cycle (sec):	100	Critical Vol./Cap.(X):	0.767
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	46	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1	1 0	1 0	1	1 0	1 0	1	1 0	1 0	1	1 0
Volume Module:												
Base Vol:	133	435	135	59	283	100	147	1048	96	99	1140	126
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	138	453	140	61	294	104	153	1091	100	103	1186	131
Added Vol:	0	5	0	0	5	0	0	0	0	0	0	0
PasserByVol:	0	0	0	15	0	0	0	77	0	0	56	9
Initial Fut:	138	458	140	76	299	104	153	1168	100	103	1242	140
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	138	458	140	76	299	104	153	1168	100	103	1242	140
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	138	458	140	76	299	104	153	1168	100	103	1242	140
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	138	458	140	76	299	104	153	1168	100	103	1242	140
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.53	0.47	1.00	1.48	0.52	1.00	1.84	0.16	1.00	1.80	0.20
Final Sat.:	1700	2601	799	1700	2523	877	1700	3132	268	1700	3055	345
Capacity Analysis Module:												
Vol/Sat:	0.08	0.18	0.18	0.04	0.12	0.12	0.09	0.37	0.37	0.06	0.41	0.41
Crit Moves:		****		****			****				****	

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #3 Cerritos Ave / Denni St

Cycle (sec): 100 Critical Vol./Cap.(X): 0.826
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 58 Level Of Service: D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Split Phase			Split Phase			Prot+Permit			Prot+Permit		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	1! 0	0	1 0	1 0	1	1 0	2 0	1	1 0	1 1	0
Volume Module:												
Base Vol:	80	135	73	92	53	91	135	1120	35	46	1076	145
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	83	140	76	96	55	95	140	1165	36	48	1120	151
Added Vol:	0	6	23	0	8	0	0	0	0	0	0	0
PasserByVol:	45	18	45	0	30	0	0	21	75	66	22	0
Initial Fut:	128	164	144	96	93	95	140	1186	111	114	1142	151
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	128	164	144	96	93	95	140	1186	111	114	1142	151
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	128	164	144	96	93	95	140	1186	111	114	1142	151
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	128	164	144	96	93	95	140	1186	111	114	1142	151
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.29	0.38	0.33	1.00	1.00	1.00	1.00	2.00	1.00	1.00	1.77	0.23
Final Sat.:	499	640	560	1700	1700	1700	1700	3400	1700	1700	3003	397
Capacity Analysis Module:												
Vol/Sat:	0.26	0.26	0.26	0.06	0.05	0.06	0.08	0.35	0.07	0.07	0.38	0.38
Crit Moves:		****		****			****				****	

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #4 Cerritos Ave / Moody St

Cycle (sec): 100 Critical Vol./Cap.(X): 0.769
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 46 Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Split Phase			Split Phase			Prot+Permit			Prot+Permit		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 1	0 0	0	1 1	0 0	1	1 0	1 1	0	1 0	1 1	0
Volume Module:												
Base Vol:	3	1	0	246	1	134	214	1076	0	3	1199	332
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	3	1	0	256	1	139	223	1120	0	3	1248	345
Added Vol:	0	0	0	9	0	0	7	16	0	0	0	0
PasserByVol:	0	0	0	12	0	9	5	50	0	0	71	5
Initial Fut:	3	1	0	277	1	148	235	1186	0	3	1319	350
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	3	1	0	277	1	148	235	1186	0	3	1319	350
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	3	1	0	277	1	148	235	1186	0	3	1319	350
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	3	1	0	277	1	148	235	1186	0	3	1319	350
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.75	0.25	0.00	1.99	0.01	1.00	1.00	2.00	0.00	1.00	1.58	0.42
Final Sat.:	1275	425	0	3387	13	1700	1700	3400	0	1700	2686	714
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.08	0.08	0.09	0.14	0.35	0.00	0.00	0.49	0.49
Crit Moves:		****				****	****				****	

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #5 Cerritos Ave / Walker St

Cycle (sec):	100	Critical Vol./Cap.(X):	0.712
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	39	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2 0	2 0	1	1 0	1 1	0	1 0	3 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	505	688	206	113	413	48	68	992	263	78	898	144
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	526	716	214	118	430	50	71	1032	274	81	934	150
Added Vol:	0	0	0	0	10	0	7	9	9	6	0	0
PasserByVol:	14	57	25	0	62	0	0	58	7	31	71	0
Initial Fut:	540	773	239	118	502	50	78	1099	290	118	1005	150
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	540	773	239	118	502	50	78	1099	290	118	1005	150
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	540	773	239	118	502	50	78	1099	290	118	1005	150
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	540	773	239	118	502	50	78	1099	290	118	1005	150
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	1.00	1.82	0.18	1.00	3.00	1.00	1.00	2.00	1.00
Final Sat.:	3400	3400	1700	1700	3092	308	1700	5100	1700	1700	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.16	0.23	0.14	0.07	0.16	0.16	0.05	0.22	0.17	0.07	0.30	0.09
Crit Moves:	****				****		****				****	

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #6 Cerritos Avenue / Valley View Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.837
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	61	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	3 0	1	1 0	3 0	1	2 0	3 0	1	2 0	1 1	0
Volume Module:												
Base Vol:	318	1815	184	125	1132	186	325	772	265	95	534	134
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	331	1889	191	130	1178	194	338	803	276	99	556	139
Added Vol:	0	8	0	0	13	1	5	4	0	0	5	0
PasserByVol:	0	41	16	0	51	63	42	31	0	19	39	0
Initial Fut:	331	1938	207	130	1242	258	385	838	276	118	600	139
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	331	1938	207	130	1242	258	385	838	276	118	600	139
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	331	1938	207	130	1242	258	385	838	276	118	600	139
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	331	1938	207	130	1242	258	385	838	276	118	600	139
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	3.00	1.00	1.00	3.00	1.00	2.00	3.00	1.00	2.00	1.62	0.38
Final Sat.:	1700	5100	1700	1700	5100	1700	3400	5100	1700	3400	2759	641
Capacity Analysis Module:												
Vol/Sat:	0.19	0.38	0.12	0.08	0.24	0.15	0.11	0.16	0.16	0.03	0.22	0.22
Crit Moves:		****		****			****				****	

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #7 Katella Ave. / I-605 NB Ramps

Cycle (sec): 100 Critical Vol./Cap.(X): 0.608
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 29 Level Of Service: B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Ignore			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	0	0 1	0 0	0	0 1	1 0	3	0 0	0 0	2	1 1
Volume Module:												
Base Vol:	0	0	758	0	0	74	340	1910	0	0	1628	893
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	0	0	789	0	0	77	354	1988	0	0	1694	929
Added Vol:	0	0	7	0	0	0	0	5	0	0	5	4
PasserByVol:	0	0	24	0	0	0	0	22	0	0	84	33
Initial Fut:	0	0	820	0	0	77	354	2015	0	0	1783	966
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Volume:	0	0	0	0	0	0	354	2015	0	0	1783	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	0	0	0	354	2015	0	0	1783	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
FinalVolume:	0	0	0	0	0	0	354	2015	0	0	1783	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	1.00	0.00	0.00	1.00	1.00	3.00	0.00	0.00	3.00	1.00
Final Sat.:	0	0	1700	0	0	1700	1700	5100	0	0	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.40	0.00	0.00	0.35	0.00
Crit Moves:							****				****	

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #8 Katella Ave. / Los Alamitos Blvd.

Cycle (sec): 100 Critical Vol./Cap.(X): 0.836
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 61 Level Of Service: D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Ovl			Ovl			Ovl		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2 0	3	0 1	2 0	3	0 1	2 0	3	0 1	2 0	3	0 1
Volume Module:												
Base Vol:	464	847	344	177	1066	208	307	1391	442	310	1514	94
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	483	881	358	184	1109	216	319	1447	460	323	1575	98
Added Vol:	0	0	3	4	0	0	0	12	0	2	9	3
PasserByVol:	0	33	40	12	24	0	0	84	0	41	88	11
Initial Fut:	483	914	401	200	1133	216	319	1543	460	366	1672	112
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	483	914	401	200	1133	216	319	1543	460	366	1672	112
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	483	914	401	200	1133	216	319	1543	460	366	1672	112
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	483	914	401	200	1133	216	319	1543	460	366	1672	112
OvlAdjVol:			218			57			219			12
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.14	0.18	0.24	0.06	0.22	0.13	0.09	0.30	0.27	0.11	0.33	0.07
OvlAdjV/S:			0.13			0.03			0.13			0.01
Crit Moves:	****				****		****				****	

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #9 Katella Avenue / Bloomfield Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.827
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	58	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Prot+Permit			Prot+Permit			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1	1 0	1 0	1	0 1	1 0	2	1 0	1 0	2	1 0
Volume Module:												
Base Vol:	54	109	29	225	180	169	242	1569	65	76	1704	311
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	56	113	30	234	187	176	252	1633	68	79	1773	324
Added Vol:	0	0	0	5	0	0	0	20	0	0	15	5
PasserByVol:	0	0	0	5	0	4	7	150	0	0	121	3
Initial Fut:	56	113	30	244	187	180	259	1803	68	79	1909	332
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	56	113	30	244	187	180	259	1803	68	79	1909	332
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	56	113	30	244	187	180	259	1803	68	79	1909	332
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	56	113	30	244	187	180	259	1803	68	79	1909	332
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.58	0.42	1.00	1.00	1.00	1.00	2.89	0.11	1.00	2.56	0.44
Final Sat.:	1700	2686	714	1700	1700	1700	1700	4916	184	1700	4345	755
Capacity Analysis Module:												
Vol/Sat:	0.03	0.04	0.04	0.14	0.11	0.11	0.15	0.37	0.37	0.05	0.44	0.44
Crit Moves:		****		****			****				****	

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #10 Katella Ave / Lexington Dr

Cycle (sec):	100	Critical Vol./Cap.(X):	0.684
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	36	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1	0 1	1 0	1	0 0	2 0	3	0 1	1 0	2	1 0
Volume Module:												
Base Vol:	76	46	108	130	12	120	86	1667	72	118	1697	109
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	79	48	112	135	12	125	89	1735	75	123	1766	113
Added Vol:	0	0	0	8	0	0	0	31	0	6	23	29
PasserByVol:	24	0	34	0	0	27	45	110	5	13	85	0
Initial Fut:	103	48	146	143	12	152	134	1876	80	142	1874	142
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	103	48	146	143	12	152	134	1876	80	142	1874	142
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	103	48	146	143	12	152	134	1876	80	142	1874	142
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	103	48	146	143	12	152	134	1876	80	142	1874	142
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	1.00	0.08	0.92	2.00	3.00	1.00	1.00	2.79	0.21
Final Sat.:	1700	1700	1700	1700	129	1571	3400	5100	1700	1700	4740	360
Capacity Analysis Module:												
Vol/Sat:	0.06	0.03	0.09	0.08	0.10	0.10	0.04	0.37	0.05	0.08	0.40	0.40
Crit Moves:			****		****			****		****		

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #11 Katella Ave / Cottonwood Way

Cycle (sec): 100 Critical Vol./Cap.(X): 0.503
Loss Time (sec): 5 Average Delay (sec/veh): xxxxxx
Optimal Cycle: 24 Level Of Service: A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	0 0	1	1 0	0 0	1	1 0	2 1	0	0 0	2 1	0
Volume Module:												
Base Vol:	0	0	3	6	0	1	11	1894	1	0	1939	4
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	0	0	3	6	0	1	11	1971	1	0	2018	4
Added Vol:	0	0	0	0	0	0	0	44	0	0	59	0
PasserByVol:	0	0	0	18	0	9	15	78	0	0	39	30
Initial Fut:	0	0	3	24	0	10	26	2093	1	0	2116	34
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	3	24	0	10	26	2093	1	0	2116	34
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	3	24	0	10	26	2093	1	0	2116	34
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	3	24	0	10	26	2093	1	0	2116	34
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	1.00	1.00	0.00	1.00	1.00	2.99	0.01	0.00	2.95	0.05
Final Sat.:	0	0	1700	1700	0	1700	1700	5097	3	0	5019	81
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.01	0.00	0.01	0.02	0.41	0.41	0.00	0.42	0.42
Crit Moves:			****	****			****				****	

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #12 Katella Ave. / Enterprise Dr.

Average Delay (sec/veh): 0.7 Worst Case Level Of Service: F[193.0]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1! 0	0	0 0	0 0	2	0 0	2 1	0	1 0	2 1	0
Volume Module:												
Base Vol:	2	0	7	0	0	2	0	1875	13	19	1951	2
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	2	0	7	0	0	2	0	1951	14	20	2030	2
Added Vol:	0	0	0	0	0	26	0	44	0	0	33	39
PasserByVol:	0	0	0	0	0	27	0	94	0	0	64	45
Initial Fut:	2	0	7	0	0	55	0	2089	14	20	2127	86
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	2	0	7	0	0	55	0	2089	14	20	2127	86
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	2	0	7	0	0	55	0	2089	14	20	2127	86
Critical Gap Module:												
Critical Gp:	7.5	6.5	6.9	xxxxx	xxxx	6.9	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	xxxxx	xxxx	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2845	4349	703	xxxx	xxxx	752	xxxx	xxxx	xxxxx	2103	xxxx	xxxxx
Potent Cap.:	8	2	385	xxxx	xxxx	357	xxxx	xxxx	xxxxx	265	xxxx	xxxxx
Move Cap.:	6	2	385	xxxx	xxxx	357	xxxx	xxxx	xxxxx	265	xxxx	xxxxx
Volume/Cap:	0.32	0.00	0.02	xxxx	xxxx	0.15	xxxx	xxxx	xxxx	0.07	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	0.5	xxxx	xxxx	xxxxx	0.2	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	16.9	xxxxx	xxxx	xxxxx	19.7	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	C	*	*	*	C	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	27	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	1.1	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	193	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	F	*	*	*	*	*	*	*	*	*	*
ApproachDel:	193.0			16.9			xxxxxx			xxxxxx		
ApproachLOS:	F			C			*			*		

Note: Queue reported is the number of cars per lane.

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #13 Katella Avenue / Siboney Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.629
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	31	Level Of Service:	B

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Split Phase						Split Phase						Protected						Protected					
Rights:		Include						Include						Include						Include				
Min. Green:	0	0	0				0	0	0				0	0	0				0	0	0			
Y+R:	4.0	4.0	4.0				4.0	4.0	4.0				4.0	4.0	4.0				4.0	4.0	4.0			
Lanes:	0	1	0	0	1		1	0	1!	0	1		2	0	2	1	0		1	0	3	0	1	
Volume Module:																								
Base Vol:	62	2	67				75	5	71				100	1926	39				61	1902	53			
Growth Adj:	1.04	1.04	1.04				1.04	1.04	1.04				1.04	1.04	1.04				1.04	1.04	1.04			
Initial Bse:	65	2	70				78	5	74				104	2004	41				63	1979	55			
Added Vol:	0	0	0				0	0	0				38	24	0				0	59	0			
PasserByVol:	0	0	10				49	0	47				62	125	0				8	115	49			
Initial Fut:	65	2	80				127	5	121				204	2153	41				71	2153	104			
User Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Volume:	65	2	80				127	5	121				204	2153	41				71	2153	104			
Reduct Vol:	0	0	0				0	0	0				0	0	0				0	0	0			
Reduced Vol:	65	2	80				127	5	121				204	2153	41				71	2153	104			
PCE Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
MLF Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
FinalVolume:	65	2	80				127	5	121				204	2153	41				71	2153	104			
Saturation Flow Module:																								
Sat/Lane:	1700	1700	1700				1700	1700	1700				1700	1700	1700				1700	1700	1700			
Adjustment:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
Lanes:	0.97	0.03	1.00				1.51	0.06	1.43				2.00	2.94	0.06				1.00	3.00	1.00			
Final Sat.:	1647	53	1700				2560	105	2436				3400	5006	94				1700	5100	1700			
Capacity Analysis Module:																								
Vol/Sat:	0.04	0.04	0.05				0.05	0.05	0.05				0.06	0.43	0.43				0.04	0.42	0.06			
Crit Moves:			****				****						****							****				

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #14 Katella Avenue / Winner Circle

Cycle (sec):	100	Critical Vol./Cap.(X):	0.621
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	30	Level Of Service:	B

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Permitted						Permitted						Protected						Protected					
Rights:		Include						Include						Include						Include				
Min. Green:	0	0	0				0	0	0				0	0	0				0	0	0			
Y+R:	4.0	4.0	4.0				4.0	4.0	4.0				4.0	4.0	4.0				4.0	4.0	4.0			
Lanes:	1	0	0	1	0		1	0	0	1	0		1	0	2	1	0		1	0	3	0	1	
Volume Module:																								
Base Vol:	42	4	52				33	0	47				144	1839	15				53	1898	8			
Growth Adj:	1.04	1.04	1.04				1.04	1.04	1.04				1.04	1.04	1.04				1.04	1.04	1.04			
Initial Bse:	44	4	54				34	0	49				150	1914	16				55	1975	8			
Added Vol:	0	0	0				0	0	0				0	23	0				0	58	0			
PasserByVol:	3	0	0				13	0	0				0	132	2				0	115	7			
Initial Fut:	47	4	54				47	0	49				150	2069	18				55	2148	15			
User Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Volume:	47	4	54				47	0	49				150	2069	18				55	2148	15			
Reduct Vol:	0	0	0				0	0	0				0	0	0				0	0	0			
Reduced Vol:	47	4	54				47	0	49				150	2069	18				55	2148	15			
PCE Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
MLF Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
FinalVolume:	47	4	54				47	0	49				150	2069	18				55	2148	15			
Saturation Flow Module:																								
Sat/Lane:	1700	1700	1700				1700	1700	1700				1700	1700	1700				1700	1700	1700			
Adjustment:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
Lanes:	1.00	0.07	0.93				1.00	0.00	1.00				1.00	2.97	0.03				1.00	3.00	1.00			
Final Sat.:	1700	121	1579				1700	0	1700				1700	5057	43				1700	5100	1700			
Capacity Analysis Module:																								
Vol/Sat:	0.03	0.03	0.03				0.03	0.00	0.03				0.09	0.41	0.41				0.03	0.42	0.01			
Crit Moves:		****					****						****							****				

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #15 Katella Avenue / Walker Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.734
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	41	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 1	0 1	0	1 1	0 0	2	2 0	2 1	0	1 0	3 0	1
Volume Module:												
Base Vol:	27	16	4	551	1	200	265	1661	2	2	1739	539
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	28	17	4	573	1	208	276	1728	2	2	1810	561
Added Vol:	0	0	0	0	0	25	0	23	0	0	33	0
PasserByVol:	0	0	0	11	0	64	58	204	0	0	184	18
Initial Fut:	28	17	4	584	1	297	334	1955	2	2	2027	579
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	28	17	4	584	1	297	334	1955	2	2	2027	579
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	28	17	4	584	1	297	334	1955	2	2	2027	579
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	28	17	4	584	1	297	334	1955	2	2	2027	579
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.83	0.17	1.99	0.01	2.00	2.00	2.99	0.01	1.00	3.00	1.00
Final Sat.:	1700	1411	289	3394	6	3400	3400	5095	5	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.01	0.01	0.17	0.17	0.09	0.10	0.38	0.38	0.00	0.40	0.34
Crit Moves:	****				****		****				****	

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #16 Katella Avenue / Valley View Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.821
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	57	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	3 0	3 0	1	2 0	3 0	1	2 0	3 0	1	2 0	3 0	1
Volume Module:												
Base Vol:	603	1401	163	264	1385	222	271	1086	1291	353	1009	272
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	627	1458	170	275	1441	231	282	1130	1343	367	1050	283
Added Vol:	14	0	0	0	0	13	8	5	11	0	6	0
PasserByVol:	106	3	0	0	3	61	54	55	98	0	72	0
Initial Fut:	747	1461	170	275	1444	305	344	1190	1452	367	1128	283
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	747	1461	170	275	1444	305	344	1190	0	367	1128	283
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	747	1461	170	275	1444	305	344	1190	0	367	1128	283
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
FinalVolume:	747	1461	170	275	1444	305	344	1190	0	367	1128	283
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	3.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	5100	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.15	0.29	0.10	0.08	0.28	0.18	0.10	0.23	0.00	0.11	0.22	0.17
Crit Moves:	****				****			****		****		

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #17 Farquhar Ave / Los Alamitos Blvd

Cycle (sec):	100	Critical Vol./Cap.(X):	0.661
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	33	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	2	1 0	1 0	3	0 0	0 0	0	0 0	1 0	1!	0 0
Volume Module:												
Base Vol:	0	1542	169	116	1686	0	0	0	0	427	0	168
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	0	1605	176	121	1754	0	0	0	0	444	0	175
Added Vol:	0	3	0	0	2	0	0	0	0	0	0	0
PasserByVol:	0	40	0	0	40	0	0	0	0	0	0	0
Initial Fut:	0	1648	176	121	1796	0	0	0	0	444	0	175
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1648	176	121	1796	0	0	0	0	444	0	175
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	1648	176	121	1796	0	0	0	0	444	0	175
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	1648	176	121	1796	0	0	0	0	444	0	175
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	2.71	0.29	1.00	3.00	0.00	0.00	0.00	0.00	1.43	0.01	0.56
Final Sat.:	0	4608	492	1700	5100	0	0	0	0	2440	0	960
Capacity Analysis Module:												
Vol/Sat:	0.00	0.36	0.36	0.07	0.35	0.00	0.00	0.00	0.00	0.18	0.00	0.18
Crit Moves:		****		****						****		

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #18 Farquhar Ave / Lexington Dr

Cycle (sec):	100	Critical Vol./Cap.(X):	0.445
Loss Time (sec):	0	Average Delay (sec/veh):	9.9
Optimal Cycle:	0	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	1	0 0	0 0	2	0 1	0 0	1!	0 0	0 0	0	0 0
Volume Module:												
Base Vol:	106	232	0	0	70	80	69	0	28	0	0	0
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	110	241	0	0	73	83	72	0	29	0	0	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	80	0	0	34	0	0	0	0	0	0	0
Initial Fut:	110	321	0	0	107	83	72	0	29	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	110	321	0	0	107	83	72	0	29	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	110	321	0	0	107	83	72	0	29	0	0	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	110	321	0	0	107	83	72	0	29	0	0	0
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	0.00	0.00	2.00	1.00	0.71	0.00	0.29	0.00	0.00	0.00
Final Sat.:	655	723	0	0	1365	787	464	0	188	0	0	0
Capacity Analysis Module:												
Vol/Sat:	0.17	0.44	xxxx	xxxx	0.08	0.11	0.15	xxxx	0.15	xxxx	xxxx	xxxx
Crit Moves:		****				****	****					
Delay/Veh:	9.2	11.4	0.0	0.0	8.3	7.7	9.0	0.0	9.0	0.0	0.0	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	9.2	11.4	0.0	0.0	8.3	7.7	9.0	0.0	9.0	0.0	0.0	0.0
LOS by Move:	A	B	*	*	A	A	A	*	A	*	*	*
ApproachDel:		10.9			8.0			9.0			xxxxxx	
Delay Adj:		1.00			1.00			1.00			xxxxx	
ApprAdjDel:		10.9			8.0			9.0			xxxxxx	
LOS by Appr:		B			A			A			*	
AllWayAvgQ:	0.2	0.8	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.0	0.0	0.0

Note: Queue reported is the number of cars per lane.

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #19 Orangewood Avenue / Valley View Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.762
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	45	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 1	0	2 0	3 0	1	1 0	1 1	0	1 0	0 1	1
Volume Module:												
Base Vol:	17	1477	68	549	2242	101	104	49	25	75	16	442
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	18	1537	71	571	2333	105	108	51	26	78	17	460
Added Vol:	0	10	0	3	8	0	0	0	0	0	0	3
PasserByVol:	0	106	0	0	97	0	0	0	0	0	0	0
Initial Fut:	18	1653	71	574	2438	105	108	51	26	78	17	463
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	18	1653	71	574	2438	105	108	51	26	78	17	463
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	18	1653	71	574	2438	105	108	51	26	78	17	463
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	18	1653	71	574	2438	105	108	51	26	78	17	463
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.88	0.12	2.00	3.00	1.00	1.00	1.32	0.68	1.00	0.07	1.93
Final Sat.:	1700	4891	209	3400	5100	1700	1700	2251	1149	1700	118	3282
Capacity Analysis Module:												
Vol/Sat:	0.01	0.34	0.34	0.17	0.48	0.06	0.06	0.02	0.02	0.05	0.14	0.14
Crit Moves:		****		****			****					****

Appendix C-5

HCM Analysis for
State Highway Intersection

Cypress Barton Place
Existing Conditions
AM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

****

Intersection #7 Katella Ave. / I-605 NB Ramps

****

Cycle (sec):	100	Critical Vol./Cap.(X):	0.339
Loss Time (sec):	5	Average Delay (sec/veh):	2.3
Optimal Cycle:	19	Level Of Service:	A

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Ignore			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	0 0	1	0 0	0 0	1	1 0	3 0	0	0 0	2 1	1
Volume Module:												
Base Vol:	0	0	805	0	0	73	82	1475	0	0	1435	776
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	805	0	0	73	82	1475	0	0	1435	776
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	805	0	0	73	82	1475	0	0	1435	776
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Volume:	0	0	0	0	0	0	82	1475	0	0	1435	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	0	0	0	82	1475	0	0	1435	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
FinalVolume:	0	0	0	0	0	0	82	1475	0	0	1435	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.91	1.00	1.00	0.91	0.91
Lanes:	0.00	0.00	1.00	0.00	0.00	1.00	1.00	3.00	0.00	0.00	3.00	1.00
Final Sat.:	0	0	1900	0	0	1900	1805	5187	0	0	5187	1729
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.28	0.00	0.00	0.28	0.00
Crit Moves:							****				****	
Green/Cycle:	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.95	0.00	0.00	0.82	0.00
Volume/Cap:	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.30	0.00	0.00	0.34	0.00
Delay/Veh:	0.0	0.0	0.0	0.0	0.0	0.0	40.1	0.2	0.0	0.0	2.4	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	0.0	0.0	0.0	40.1	0.2	0.0	0.0	2.4	0.0
LOS by Move:	A	A	A	A	A	A	D	A	A	A	A	A
HCM2k85thQ:	0	0	0	0	0	0	4	2	0	0	6	0

****

Note: Queue reported is the number of cars per lane.

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Cypress Barton Place
Existing Conditions
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

****

Intersection #7 Katella Ave. / I-605 NB Ramps

****

Cycle (sec):	100	Critical Vol./Cap.(X):	0.529
Loss Time (sec):	5	Average Delay (sec/veh):	7.6
Optimal Cycle:	26	Level Of Service:	A

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Ignore			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	0 0	1	0 0	0 0	1	1 0	3 0	0	0 0	2 1	1
Volume Module:												
Base Vol:	0	0	758	0	0	74	340	1910	0	0	1628	893
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	758	0	0	74	340	1910	0	0	1628	893
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	758	0	0	74	340	1910	0	0	1628	893
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Volume:	0	0	0	0	0	0	340	1910	0	0	1628	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	0	0	0	340	1910	0	0	1628	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
FinalVolume:	0	0	0	0	0	0	340	1910	0	0	1628	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.91	1.00	1.00	0.91	0.91
Lanes:	0.00	0.00	1.00	0.00	0.00	1.00	1.00	3.00	0.00	0.00	3.00	1.00
Final Sat.:	0	0	1900	0	0	1900	1805	5187	0	0	5187	1729
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.37	0.00	0.00	0.31	0.00
Crit Moves:							****				****	
Green/Cycle:	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.95	0.00	0.00	0.59	0.00
Volume/Cap:	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.39	0.00	0.00	0.53	0.00
Delay/Veh:	0.0	0.0	0.0	0.0	0.0	0.0	26.4	0.2	0.0	0.0	12.2	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	0.0	0.0	0.0	26.4	0.2	0.0	0.0	12.2	0.0
LOS by Move:	A	A	A	A	A	A	C	A	A	A	B	A
HCM2k85thQ:	0	0	0	0	0	0	12	3	0	0	16	0

****

Note: Queue reported is the number of cars per lane.

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Cypress Barton Place
Existing Plus Project
AM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

****

Intersection #7 Katella Ave. / I-605 NB Ramps

****

Cycle (sec):	100	Critical Vol./Cap.(X):	0.340
Loss Time (sec):	5	Average Delay (sec/veh):	2.3
Optimal Cycle:	19	Level Of Service:	A

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Ignore			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	0 0	1	0 0	0 0	1	1 0	3 0	0	0 0	2 1	1
Volume Module:												
Base Vol:	0	0	805	0	0	73	82	1475	0	0	1435	776
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	805	0	0	73	82	1475	0	0	1435	776
Added Vol:	0	0	6	0	0	0	0	5	0	0	7	5
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	811	0	0	73	82	1480	0	0	1442	781
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Volume:	0	0	0	0	0	0	82	1480	0	0	1442	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	0	0	0	82	1480	0	0	1442	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
FinalVolume:	0	0	0	0	0	0	82	1480	0	0	1442	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.91	1.00	1.00	0.91	0.91
Lanes:	0.00	0.00	1.00	0.00	0.00	1.00	1.00	3.00	0.00	0.00	3.00	1.00
Final Sat.:	0	0	1900	0	0	1900	1805	5187	0	0	5187	1729
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.29	0.00	0.00	0.28	0.00
Crit Moves:							****				****	
Green/Cycle:	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.95	0.00	0.00	0.82	0.00
Volume/Cap:	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.30	0.00	0.00	0.34	0.00
Delay/Veh:	0.0	0.0	0.0	0.0	0.0	0.0	40.2	0.2	0.0	0.0	2.4	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	0.0	0.0	0.0	40.2	0.2	0.0	0.0	2.4	0.0
LOS by Move:	A	A	A	A	A	A	D	A	A	A	A	A
HCM2k85thQ:	0	0	0	0	0	0	4	2	0	0	6	0

****

Note: Queue reported is the number of cars per lane.

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Cypress Barton Place
Existing Plus Project
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

****

Intersection #7 Katella Ave. / I-605 NB Ramps

****

Cycle (sec):	100	Critical Vol./Cap.(X):	0.530
Loss Time (sec):	5	Average Delay (sec/veh):	7.5
Optimal Cycle:	26	Level Of Service:	A

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Ignore			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	0 0	1	0 0	0 0	1	1 0	3 0	0	0 0	2 1	1
Volume Module:												
Base Vol:	0	0	758	0	0	74	340	1910	0	0	1628	893
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	758	0	0	74	340	1910	0	0	1628	893
Added Vol:	0	0	7	0	0	0	0	5	0	0	5	4
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	765	0	0	74	340	1915	0	0	1633	897
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Volume:	0	0	0	0	0	0	340	1915	0	0	1633	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	0	0	0	340	1915	0	0	1633	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
FinalVolume:	0	0	0	0	0	0	340	1915	0	0	1633	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.91	1.00	1.00	0.91	0.91
Lanes:	0.00	0.00	1.00	0.00	0.00	1.00	1.00	3.00	0.00	0.00	3.00	1.00
Final Sat.:	0	0	1900	0	0	1900	1805	5187	0	0	5187	1729
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.37	0.00	0.00	0.31	0.00
Crit Moves:							****				****	
Green/Cycle:	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.95	0.00	0.00	0.59	0.00
Volume/Cap:	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.39	0.00	0.00	0.53	0.00
Delay/Veh:	0.0	0.0	0.0	0.0	0.0	0.0	26.4	0.2	0.0	0.0	12.2	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	0.0	0.0	0.0	26.4	0.2	0.0	0.0	12.2	0.0
LOS by Move:	A	A	A	A	A	A	C	A	A	A	B	A
HCM2k85thQ:	0	0	0	0	0	0	12	3	0	0	16	0

****

Note: Queue reported is the number of cars per lane.

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Cypress Barton Place
Cumulative Without Project
AM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

****

Intersection #7 Katella Ave. / I-605 NB Ramps

****

Cycle (sec):	100	Critical Vol./Cap.(X):	0.356
Loss Time (sec):	5	Average Delay (sec/veh):	2.3
Optimal Cycle:	20	Level Of Service:	A

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Ignore			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	0	0 1	0 0	0	0 1	1 0	3	0 0	0 0	2	1 1
Volume Module:												
Base Vol:	0	0	805	0	0	73	82	1475	0	0	1435	776
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	0	0	838	0	0	76	85	1535	0	0	1493	808
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj:	0	0	17	0	0	0	0	37	0	0	18	9
Initial Fut:	0	0	855	0	0	76	85	1572	0	0	1511	817
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Volume:	0	0	0	0	0	0	85	1572	0	0	1511	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	0	0	0	85	1572	0	0	1511	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
FinalVolume:	0	0	0	0	0	0	85	1572	0	0	1511	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.91	1.00	1.00	0.91	0.91
Lanes:	0.00	0.00	1.00	0.00	0.00	1.00	1.00	3.00	0.00	0.00	3.00	1.00
Final Sat.:	0	0	1900	0	0	1900	1805	5187	0	0	5187	1729
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.30	0.00	0.00	0.29	0.00
Crit Moves:							****				****	
Green/Cycle:	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.95	0.00	0.00	0.82	0.00
Volume/Cap:	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.32	0.00	0.00	0.36	0.00
Delay/Veh:	0.0	0.0	0.0	0.0	0.0	0.0	40.4	0.2	0.0	0.0	2.4	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	0.0	0.0	0.0	40.4	0.2	0.0	0.0	2.4	0.0
LOS by Move:	A	A	A	A	A	A	D	A	A	A	A	A
HCM2k85thQ:	0	0	0	0	0	0	4	3	0	0	7	0

****

Note: Queue reported is the number of cars per lane.

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Cypress Barton Place
Cumulative Without Project
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

****

Intersection #7 Katella Ave. / I-605 NB Ramps

****

Cycle (sec):	100	Critical Vol./Cap.(X):	0.567
Loss Time (sec):	5	Average Delay (sec/veh):	7.7
Optimal Cycle:	28	Level Of Service:	A

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Ignore			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	0 0	1	0 0	0 0	1	1 0	3 0	0	0 0	2 1	1
Volume Module:												
Base Vol:	0	0	758	0	0	74	340	1910	0	0	1628	893
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	0	0	789	0	0	77	354	1988	0	0	1694	929
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Cum. Proj.:	0	0	24	0	0	0	0	22	0	0	84	33
Initial Fut:	0	0	813	0	0	77	354	2010	0	0	1778	962
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Volume:	0	0	0	0	0	0	354	2010	0	0	1778	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	0	0	0	354	2010	0	0	1778	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
FinalVolume:	0	0	0	0	0	0	354	2010	0	0	1778	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.91	1.00	1.00	0.91	0.91
Lanes:	0.00	0.00	1.00	0.00	0.00	1.00	1.00	3.00	0.00	0.00	3.00	1.00
Final Sat.:	0	0	1900	0	0	1900	1805	5187	0	0	5187	1729
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.39	0.00	0.00	0.34	0.00
Crit Moves:							****				****	
Green/Cycle:	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.95	0.00	0.00	0.60	0.00
Volume/Cap:	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.41	0.00	0.00	0.57	0.00
Delay/Veh:	0.0	0.0	0.0	0.0	0.0	0.0	27.9	0.3	0.0	0.0	12.2	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	0.0	0.0	0.0	27.9	0.3	0.0	0.0	12.2	0.0
LOS by Move:	A	A	A	A	A	A	C	A	A	A	B	A
HCM2k85thQ:	0	0	0	0	0	0	13	4	0	0	17	0

****

Note: Queue reported is the number of cars per lane.

Traffix 8.0.0715 (c) 2008 Dowling Assoc. Licensed to K-H, PHOENIX, AZ

Cypress Barton Place
Cumulative Plus Project
AM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

****

Intersection #7 Katella Ave. / I-605 NB Ramps

****

Cycle (sec):	100	Critical Vol./Cap.(X):	0.358
Loss Time (sec):	5	Average Delay (sec/veh):	2.3
Optimal Cycle:	20	Level Of Service:	A

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Ignore			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	0 0	1	0 0	0 0	1	1 0	3 0	0	0 0	2 1	1
Volume Module:												
Base Vol:	0	0	805	0	0	73	82	1475	0	0	1435	776
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	0	0	838	0	0	76	85	1535	0	0	1493	808
Added Vol:	0	0	6	0	0	0	0	5	0	0	7	5
PasserByVol:	0	0	17	0	0	0	0	37	0	0	18	9
Initial Fut:	0	0	861	0	0	76	85	1577	0	0	1518	822
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Volume:	0	0	0	0	0	0	85	1577	0	0	1518	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	0	0	0	85	1577	0	0	1518	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
FinalVolume:	0	0	0	0	0	0	85	1577	0	0	1518	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.91	1.00	1.00	0.91	0.91
Lanes:	0.00	0.00	1.00	0.00	0.00	1.00	1.00	3.00	0.00	0.00	3.00	1.00
Final Sat.:	0	0	1900	0	0	1900	1805	5187	0	0	5187	1729
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.30	0.00	0.00	0.29	0.00
Crit Moves:							****				****	
Green/Cycle:	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.95	0.00	0.00	0.82	0.00
Volume/Cap:	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.32	0.00	0.00	0.36	0.00
Delay/Veh:	0.0	0.0	0.0	0.0	0.0	0.0	40.5	0.2	0.0	0.0	2.4	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	0.0	0.0	0.0	40.5	0.2	0.0	0.0	2.4	0.0
LOS by Move:	A	A	A	A	A	A	D	A	A	A	A	A
HCM2k85thQ:	0	0	0	0	0	0	4	3	0	0	7	0

****

Note: Queue reported is the number of cars per lane.

Traffix 8.0.0715 (c) 2008 Dowling Assoc. Licensed to K-H, PHOENIX, AZ

Cypress Barton Place
Cumulative Plus Project
PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

****

Intersection #7 Katella Ave. / I-605 NB Ramps

****

Cycle (sec):	100	Critical Vol./Cap.(X):	0.568
Loss Time (sec):	5	Average Delay (sec/veh):	7.7
Optimal Cycle:	28	Level Of Service:	A

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Ignore			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	0 0	1	0 0	0 0	1	1 0	3 0	0	0 0	2 1	1
Volume Module:												
Base Vol:	0	0	758	0	0	74	340	1910	0	0	1628	893
Growth Adj:	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
Initial Bse:	0	0	789	0	0	77	354	1988	0	0	1694	929
Added Vol:	0	0	7	0	0	0	0	5	0	0	5	4
PasserByVol:	0	0	24	0	0	0	0	22	0	0	84	33
Initial Fut:	0	0	820	0	0	77	354	2015	0	0	1783	966
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Volume:	0	0	0	0	0	0	354	2015	0	0	1783	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	0	0	0	354	2015	0	0	1783	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
FinalVolume:	0	0	0	0	0	0	354	2015	0	0	1783	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.91	1.00	1.00	0.91	0.91
Lanes:	0.00	0.00	1.00	0.00	0.00	1.00	1.00	3.00	0.00	0.00	3.00	1.00
Final Sat.:	0	0	1900	0	0	1900	1805	5187	0	0	5187	1729
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.39	0.00	0.00	0.34	0.00
Crit Moves:							****				****	
Green/Cycle:	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.95	0.00	0.00	0.61	0.00
Volume/Cap:	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.41	0.00	0.00	0.57	0.00
Delay/Veh:	0.0	0.0	0.0	0.0	0.0	0.0	27.9	0.3	0.0	0.0	12.1	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	0.0	0.0	0.0	27.9	0.3	0.0	0.0	12.1	0.0
LOS by Move:	A	A	A	A	A	A	C	A	A	A	B	A
HCM2k95thQ:	0	0	0	0	0	0	16	5	0	0	21	0

****

Note: Queue reported is the number of cars per lane.

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APPENDIX D

SIGNAL WARRANT WORKSHEETS

TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS (2000 MUTCD)

MAJOR STREET: Katella Avenue | EB | WB | # OF APPROACH LANES: 3

MINOR STREET: Enterprise Drive | NB | SB | # OF APPROACH LANES: 1

CITY, STATE: Cypress / Los Alamitos, CA

COMMENTS:

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): N

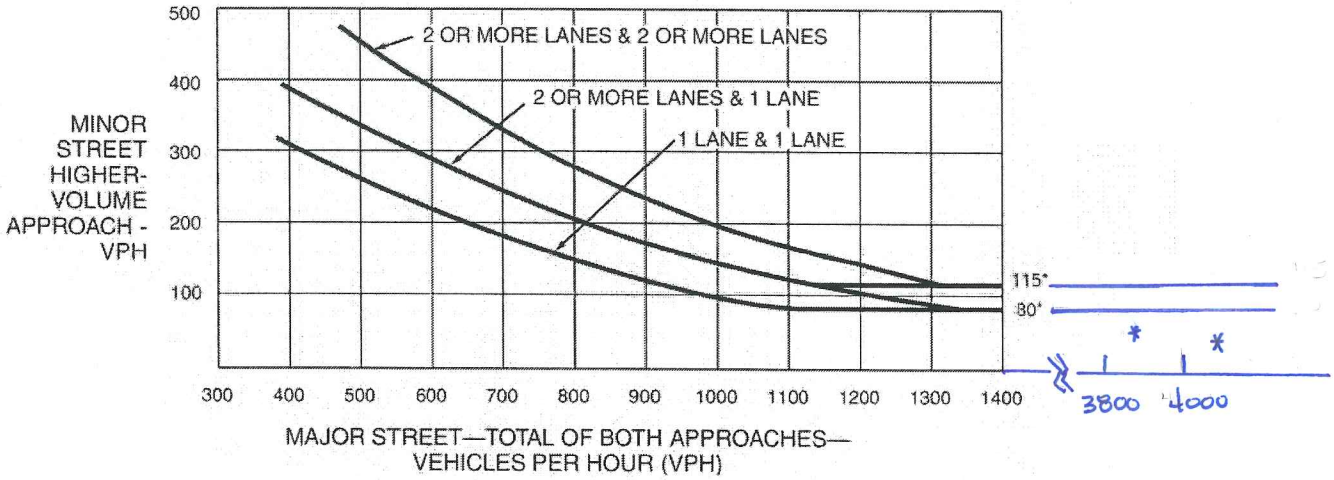
85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): N

			Katella Avenue			Enterprise Drive		
			EB Approach	WB Approach	Total	NB Approach	SB Approach	Minor Street Heavy Leg
06:00 AM	TO	07:00 AM			0			0
07:00 AM	TO	08:00 AM	2018	1857	3875	13	66	66
08:00 AM	TO	09:00 AM			0			0
09:00 AM	TO	10:00 AM			0			0
10:00 AM	TO	11:00 AM			0			0
11:00 AM	TO	12:00 PM			0			0
12:00 PM	TO	01:00 PM			0			0
01:00 PM	TO	02:00 PM			0			0
02:00 PM	TO	03:00 PM			0			0
03:00 PM	TO	04:00 PM			0			0
04:00 PM	TO	05:00 PM			0			0
05:00 PM	TO	06:00 PM	2070	2216	4286	9	58	58
06:00 PM	TO	07:00 PM			0			0
07:00 PM	TO	08:00 PM			0			0
08:00 PM	TO	09:00 PM			0			0
09:00 PM	TO	10:00 PM			0			0

02/03/15

Kimley-Horn and Associates

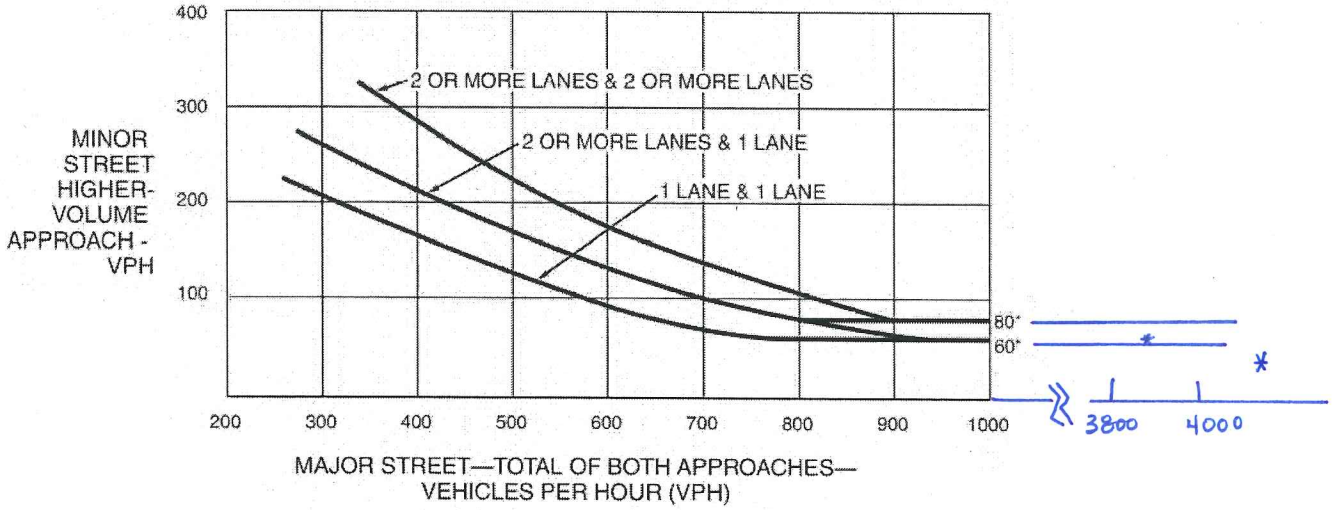
Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



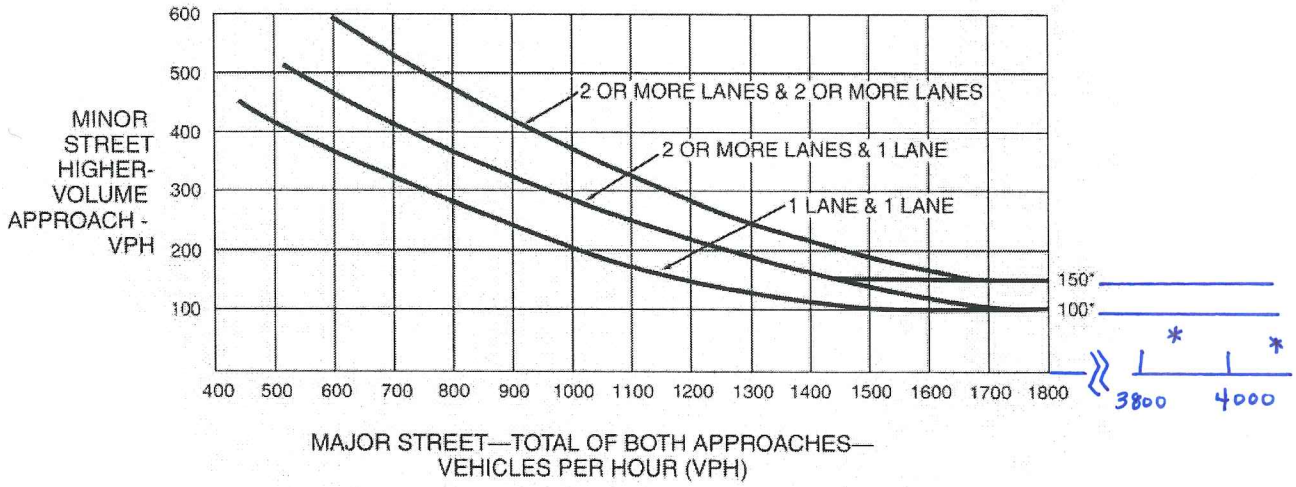
*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

MINOR STREET: Enterprise Drive

MAJOR STREET: Katella Avenue

SCENARIO: Opening Year 2018 with Project

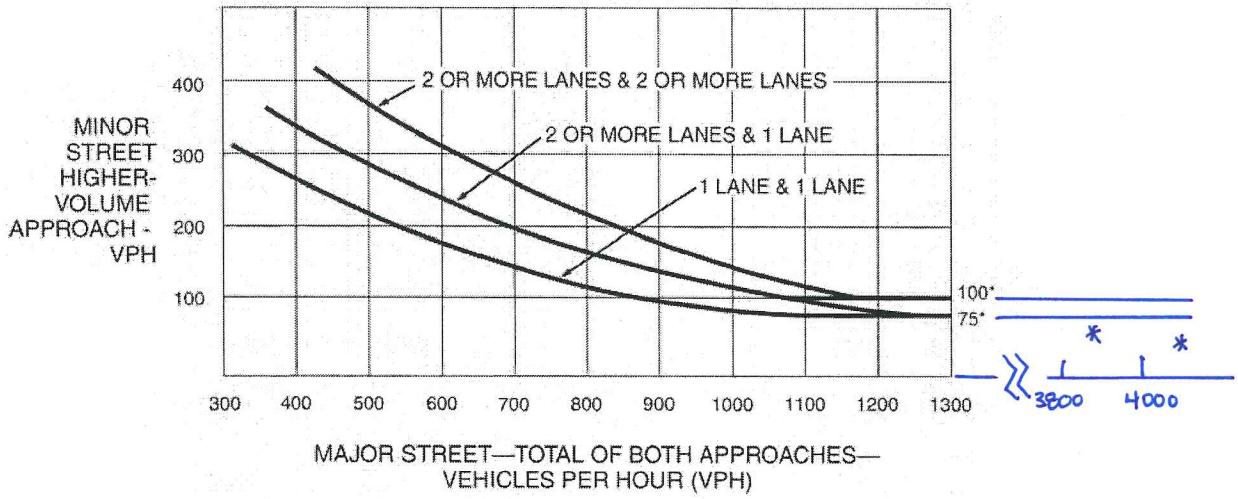
Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

MINOR STREET: Enterprise Drive

MAJOR STREET: Katella Avenue

SCENARIO: Opening Year 2018 with Project

APPENDIX E

FREEWAY MAINLINE WORKSHEETS

Appendix E-1

Existing Conditions

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Northbound
Date Performed	-	To / From	Katella Ave. to JCT. 405
Analysis Time Period	AM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Ex 2015

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	5267	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	1.0

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV PHF * N * f_{HV} * f_p	1137	pc/h/ln
S	67.5	mi/h
D = V_p / S	16.8	pc/mi/ln
LOS	B	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV PHF * N * f_{HV} * f_p		pc/h/ln
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV PHF * N * fHV * fp		pc/h/ln
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Northbound
Date Performed	-	To / From	Spring St. to Katella Ave.
Analysis Time Period	AM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Ex 2015

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	5746	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	175,744	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	7.29%		% RV, P_R	0%
Peak Hour direction proportion, D	44.85%		General Terrain	Level
DDHV = AADT * K * D	5746	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	1.0

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV / PHF * N * f_{HV} * f_p	1240	pc/h/ln
S	67.5	mi/h
D = V_p / S	18.4	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV / PHF * N * f_{HV} * f_p		pc/h/ln
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV / PHF * N * fHV * fp		pc/h/ln
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Southbound
Date Performed	-	To / From	Spring St. to Katella Ave.
Analysis Time Period	AM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Ex 2015

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	7066	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h

FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N

67.5 mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV / PHF * N * f_{HV} * f_p	1525	pc/h/ln
S	67.5	mi/h
D = V_p / S	22.6	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV / PHF * N * f_{HV} * f_p		pc/h/ln
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV / PHF * N * fHV * fp		pc/h/ln
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Southbound
Date Performed	-	To / From	Katella Ave. to JCT. 405
Analysis Time Period	AM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Ex 2015

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	6477	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV	1398	pc/h/ln
PHF * N * f_{HV} * f_p		
S	67.5	mi/h
D = V_p / S	20.7	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV		pc/h/ln
PHF * N * f_{HV} * f_p		
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV		pc/h/ln
PHF * N * fHV * fp		
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Northbound
Date Performed	-	To / From	Katella Ave. to JCT. 405
Analysis Time Period	PM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Ex 2015

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	6593	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h

FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N

67.5 mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV	1423	pc/h/ln
PHF * N * f_{HV} * f_p		
S	67.5	mi/h
D = V_p / S	21.1	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV		pc/h/ln
PHF * N * f_{HV} * f_p		
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV		pc/h/ln
PHF * N * fHV * fp		
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Northbound
Date Performed	-	To / From	Spring St. to Katella Ave.
Analysis Time Period	PM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Ex 2015

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	7192	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h

FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N

67.5 mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV	1552	pc/h/ln
PHF * N * f_{HV} * f_p		
S	67.5	mi/h
D = V_p / S	23.0	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV		pc/h/ln
PHF * N * f_{HV} * f_p		
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV		pc/h/ln
PHF * N * fHV * fp		
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Southbound
Date Performed	-	To / From	Spring St. to Katella Ave.
Analysis Time Period	PM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Ex 2015

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	6340	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV	1368	pc/h/ln
PHF * N * f_{HV} * f_p		
S	67.5	mi/h
D = V_p / S	20.3	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV		pc/h/ln
PHF * N * f_{HV} * f_p		
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV		pc/h/ln
PHF * N * fHV * fp		
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Southbound
Date Performed	-	To / From	Katella Ave. to JCT. 405
Analysis Time Period	PM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Ex 2015

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	5812	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV	1254	pc/h/ln
PHF * N * f_{HV} * f_p		
S	67.5	mi/h
D = V_p / S	18.6	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV		pc/h/ln
PHF * N * f_{HV} * f_p		
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV		pc/h/ln
PHF * N * fHV * fp		
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

Appendix E-2

Existing Plus Project

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Northbound
Date Performed	-	To / From	Katella Ave. to JCT. 405
Analysis Time Period	AM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Ex Plus Project

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	5273	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV / PHF * N * f_{HV} * f_p	1138	pc/h/ln
S	67.5	mi/h
D = V_p / S	16.9	pc/mi/ln
LOS	B	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV / PHF * N * f_{HV} * f_p		pc/h/ln
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV / PHF * N * fHV * fp		pc/h/ln
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Northbound
Date Performed	-	To / From	Spring St. to Katella Ave.
Analysis Time Period	AM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Ex Plus Project

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	5751	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	1.0

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h

FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N

67.5 mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV	1241	pc/h/ln
PHF * N * f_{HV} * f_p		
S	67.5	mi/h
D = V_p / S	18.4	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV		pc/h/ln
PHF * N * f_{HV} * f_p		
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV		pc/h/ln
PHF * N * fHV * fp		
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Southbound
Date Performed	-	To / From	Spring St. to Katella Ave.
Analysis Time Period	AM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Ex Plus Project

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	7071	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV	1526	pc/h/ln
PHF * N * f_{HV} * f_p		
S	67.5	mi/h
D = V_p / S	22.6	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV		pc/h/ln
PHF * N * f_{HV} * f_p		
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV		pc/h/ln
PHF * N * fHV * fp		
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Southbound
Date Performed	-	To / From	Katella Ave. to JCT. 405
Analysis Time Period	AM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Ex Plus Project

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	6484	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV / PHF * N * f_{HV} * f_p	1399	pc/h/ln
S	67.5	mi/h
D = V_p / S	20.7	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV / PHF * N * f_{HV} * f_p		pc/h/ln
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV / PHF * N * fHV * fp		pc/h/ln
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Northbound
Date Performed	-	To / From	Katella Ave. to JCT. 405
Analysis Time Period	PM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Ex Plus Project

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	6600	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV	1424	pc/h/ln
PHF * N * f_{HV} * f_p		
S	67.5	mi/h
D = V_p / S	21.1	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV		pc/h/ln
PHF * N * f_{HV} * f_p		
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV		pc/h/ln
PHF * N * fHV * fp		
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Northbound
Date Performed	-	To / From	Spring St. to Katella Ave.
Analysis Time Period	PM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Ex Plus Project

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	7196	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV / PHF * N * f_{HV} * f_p	1553	pc/h/ln
S	67.5	mi/h
D = V_p / S	23.0	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV / PHF * N * f_{HV} * f_p		pc/h/ln
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV / PHF * N * fHV * fp		pc/h/ln
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Southbound
Date Performed	-	To / From	Spring St. to Katella Ave.
Analysis Time Period	PM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Ex Plus Project

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	6345	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV	1369	pc/h/ln
PHF * N * f_{HV} * f_p		
S	67.5	mi/h
D = V_p / S	20.3	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV		pc/h/ln
PHF * N * f_{HV} * f_p		
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV		pc/h/ln
PHF * N * fHV * fp		
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Southbound
Date Performed	-	To / From	Katella Ave. to JCT. 405
Analysis Time Period	PM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Ex Plus Project

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	5817	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h

FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N

67.5 mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV	1255	pc/h/ln
PHF * N * f_{HV} * f_p		
S	67.5	mi/h
D = V_p / S	18.6	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV		pc/h/ln
PHF * N * f_{HV} * f_p		
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV		pc/h/ln
PHF * N * fHV * fp		
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

Appendix E-3

Opening Year 2018
Without Project Conditions

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Northbound
Date Performed	-	To / From	Katella Ave. to JCT. 405
Analysis Time Period	AM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Future 2018

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	5347	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV	1154	pc/h/ln
PHF * N * f_{HV} * f_p		
S	67.5	mi/h
D = V_p / S	17.1	pc/mi/ln
LOS	B	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV		pc/h/ln
PHF * N * f_{HV} * f_p		
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV		pc/h/ln
PHF * N * fHV * fp		
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Northbound
Date Performed	-	To / From	Spring St. to Katella Ave.
Analysis Time Period	AM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Future 2018

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	5833	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h

FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N

67.5 mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV	1259	pc/h/ln
PHF * N * f_{HV} * f_p		
S	67.5	mi/h
D = V_p / S	18.7	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV		pc/h/ln
PHF * N * f_{HV} * f_p		
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV		pc/h/ln
PHF * N * fHV * fp		
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Southbound
Date Performed	-	To / From	Spring St. to Katella Ave.
Analysis Time Period	AM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Future 2018

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	7172	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV / PHF * N * f_{HV} * f_p	1548	pc/h/ln
S	67.5	mi/h
D = V_p / S	22.9	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV / PHF * N * f_{HV} * f_p		pc/h/ln
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV / PHF * N * fHV * fp		pc/h/ln
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Southbound
Date Performed	-	To / From	Katella Ave. to JCT. 405
Analysis Time Period	AM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Future 2018

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	6574	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV	1419	pc/h/ln
PHF * N * f_{HV} * f_p		
S	67.5	mi/h
D = V_p / S	21.0	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV		pc/h/ln
PHF * N * f_{HV} * f_p		
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV		pc/h/ln
PHF * N * fHV * fp		
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Northbound
Date Performed	-	To / From	Katella Ave. to JCT. 405
Analysis Time Period	PM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Future 2018

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	6693	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV / PHF * N * f_{HV} * f_p	1444	pc/h/ln
S	67.5	mi/h
D = V_p / S	21.4	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV / PHF * N * f_{HV} * f_p		pc/h/ln
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV / PHF * N * fHV * fp		pc/h/ln
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Northbound
Date Performed	-	To / From	Spring St. to Katella Ave.
Analysis Time Period	PM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Future 2018

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	7301	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV / PHF * N * f_{HV} * f_p	1575	pc/h/ln
S	67.5	mi/h
D = V_p / S	23.3	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV / PHF * N * f_{HV} * f_p		pc/h/ln
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV / PHF * N * fHV * fp		pc/h/ln
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Southbound
Date Performed	-	To / From	Spring St. to Katella Ave.
Analysis Time Period	PM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Future 2018

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	6435	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV / PHF * N * f_{HV} * f_p	1389	pc/h/ln
S	67.5	mi/h
D = V_p / S	20.6	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV / PHF * N * f_{HV} * f_p		pc/h/ln
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV / PHF * N * fHV * fp		pc/h/ln
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information

Analyst	-
Agency or Company	Kimley-Horn
Date Performed	-
Analysis Time Period	PM Peak Hour
Project Name	Barton Place

Site Information

Highway	I-605
Direction of Travel	Southbound
To / From	Katella Ave. to JCT. 405
Jurisdiction	Caltrans
Analysis Year	Future 2018

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	5899	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h

FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N

67.5 mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV / PHF * N * f_{HV} * f_p	1273	pc/h/ln
S	67.5	mi/h
D = V_p / S	18.9	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV / PHF * N * f_{HV} * f_p		pc/h/ln
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV / PHF * N * fHV * fp		pc/h/ln
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

Appendix E-4

Opening Year 2018
With Project Conditions

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Northbound
Date Performed	-	To / From	Katella Ave. to JCT. 405
Analysis Time Period	AM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Future With Project

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	5353	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV / PHF * N * f_{HV} * f_p	1155	pc/h/ln
S	67.5	mi/h
D = V_p / S	17.1	pc/mi/ln
LOS	B	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV / PHF * N * f_{HV} * f_p		pc/h/ln
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV / PHF * N * fHV * fp		pc/h/ln
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Northbound
Date Performed	-	To / From	Spring St. to Katella Ave.
Analysis Time Period	AM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Future With Project

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	5838	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV / PHF * N * f_{HV} * f_p	1260	pc/h/ln
S	67.5	mi/h
D = V_p / S	18.7	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV / PHF * N * f_{HV} * f_p		pc/h/ln
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV / PHF * N * fHV * fp		pc/h/ln
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Southbound
Date Performed	-	To / From	Spring St. to Katella Ave.
Analysis Time Period	AM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Future With Project

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	7177	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV / PHF * N * f_{HV} * f_p	1549	pc/h/ln
S	67.5	mi/h
D = V_p / S	22.9	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV / PHF * N * f_{HV} * f_p		pc/h/ln
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV / PHF * N * fHV * fp		pc/h/ln
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Southbound
Date Performed	-	To / From	Katella Ave. to JCT. 405
Analysis Time Period	AM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Future With Project

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	6581	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV / PHF * N * f_{HV} * f_p	1420	pc/h/ln
S	67.5	mi/h
D = V_p / S	21.0	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV / PHF * N * f_{HV} * f_p		pc/h/ln
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV / PHF * N * fHV * fp		pc/h/ln
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Northbound
Date Performed	-	To / From	Katella Ave. to JCT. 405
Analysis Time Period	PM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Future With Project

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	6700	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV / PHF * N * f_{HV} * f_p	1446	pc/h/ln
S	67.5	mi/h
D = V_p / S	21.4	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV / PHF * N * f_{HV} * f_p		pc/h/ln
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV / PHF * N * fHV * fp		pc/h/ln
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Northbound
Date Performed	-	To / From	Spring St. to Katella Ave.
Analysis Time Period	PM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Future With Project

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	7305	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV / PHF * N * f_{HV} * f_p	1576	pc/h/ln
S	67.5	mi/h
D = V_p / S	23.3	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV / PHF * N * f_{HV} * f_p		pc/h/ln
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV / PHF * N * fHV * fp		pc/h/ln
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Southbound
Date Performed	-	To / From	Spring St. to Katella Ave.
Analysis Time Period	PM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Future With Project

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	6440	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV / PHF * N * f_{HV} * f_p	1390	pc/h/ln
S	67.5	mi/h
D = V_p / S	20.6	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV / PHF * N * f_{HV} * f_p		pc/h/ln
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV / PHF * N * fHV * fp		pc/h/ln
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7

BASIC FREEWAY SEGMENTS OPERATIONAL ANALYSIS

General Information		Site Information	
Analyst	-	Highway	I-605
Agency or Company	Kimley-Horn	Direction of Travel	Southbound
Date Performed	-	To / From	Katella Ave. to JCT. 405
Analysis Time Period	PM Peak Hour	Jurisdiction	Caltrans
Project Name	Barton Place	Analysis Year	Future With Project

Operational (LOS) [X] Design [ ] Planning Data [ ]

Flow Inputs

Volume, V	5904	veh/h	Peak Hour Factor, PHF	0.95
Annual Avg. Daily Traffic, AADT	0	veh/day	% Trucks and buses, P_T	5%
Peak Hour Proportion of AADT, K	0		% RV, P_R	0%
Peak Hour direction proportion, D	0		General Terrain	Level
DDHV = AADT * K * D	0	veh/h		
Driver Type	Commuter/Weekday			

Calculate Flow Adjustments

f_p	1	E_R	1.2
E_T	1.5	f_{HV}	0.975609756

Speed Inputs

Free-flow Speed	Base free-flow speed, BFFS	
Speed	70	mi/h
Lane Width	12	ft
Rt.-shoulder lateral clearance	>=6	ft
Interchange Density	1	I/mi
Number of Lanes, N	>=5	

Calculate Speed Adjustments and FFS

f_{LW}	0.0	mi/h
f_{LC}	0	mi/h
f_{ID}	2.5	mi/h
f_N	0	mi/h
FFS = BFFS - f_{LW} - f_{LC} - f_{ID} - f_N	67.5	mi/h

LOS and Performance Measures

Operational (LOS) or Planning (LOS)

V_p = V or DDHV / PHF * N * f_{HV} * f_p	1274	pc/h/ln
S	67.5	mi/h
D = V_p / S	18.9	pc/mi/ln
LOS	C	

Design (N) or Planning (N) 1st Iteration

N		assumed
V_p = V or DDHV / PHF * N * f_{HV} * f_p		pc/h/ln
LOS		

Design (Vp) or Planning (Vp)

LOS		
Vp		pc/h/ln
V = V_p * PHF * N * f_{HV} * f_p		veh/h
S		mi/h
D = V_p / S		pc/mi/ln

Design (N) or Planning (N) 2nd Iteration

N		assumed
Vp = V or DDHV / PHF * N * fHV * fp		pc/h/ln
S		mi/h
D = Vp / S		pc/mi/ln
LOS		

Glossary

N	- Number of lanes	S	- Speed
V	- Hourly volume	D	- Density
Vp	- Flow rate	FFS	- Free-flow speed
LOS	- Level of service	BFFS	- Base FFS
DDHV	- Directional design-hour volume		

Factor Location

E_R - Exh. 23-8, 23-10	f_{LW} - Exh. 23-4
E_T - Exh. 23-8, 23-9, 23-11	f_{LC} - Exh. 23-5
f_p - Page 23-12	f_N - Exh. 23-6
LOS,S,FFS,V_p - Exh. 23-2, 23-3	f_{ID} - Exh. 23-7