

Appendix 2 – Traffic Analysis Methodology

Memorandum



To: Patrick Angell, Beth Thompson
From: Kristin Maravilla and David Young
Date: October 7, 2004
Re: Traffic analysis methodology used in preparation of the General Plan Amendment Draft Supplemental EIR

General Plan Amendment SEIR Traffic Analysis: Methodology

The following describes the methodology used to forecast the traffic volumes under the adopted General Plan and to analyze traffic volumes and traffic operating conditions anticipated on roadways within the City limits at build out of the proposed General Plan Amendment project and the alternatives to the proposed project analyzed in the General Plan Amendment Draft Supplemental Environmental Impact Report (DSEIR). The DSEIR analyzes traffic impacts under the following four scenarios:

- 1) Adopted General Plan (Baseline condition and Alternative 1 – No Project),
- 2) Proposed General Plan Amendment project,
- 3) Alternative 2 – All Sites Except 21 and 29, and
- 4) Alternative 3 - Reduced Residential Density on Sites 21 and 29.

In order to quantify impacts under the proposed project and alternative scenarios identified above, traffic conditions from the proposed project and each alternative were compared to traffic conditions anticipated at build out (year 2025) of the Adopted General Plan. The methodology used to establish the Adopted General Plan condition (also called the Baseline condition) is described below. This discussion is followed by descriptions of the methodology used to establish traffic conditions under each of the scenarios analyzed in the General Plan Amendment DSEIR.

Adopted General Plan (Baseline) Methodology

Traffic conditions forecasted in the Elk Grove General Plan Draft EIR by the City of Elk Grove Traffic Model were updated to include proposed property owner alternatives approved at the November 19, 2003 City Council meeting to establish the Baseline condition for build out under the adopted General Plan. This Baseline was developed to serve as the existing conditions scenario to

accurately evaluate the impacts associated with the proposed General Plan Amendment project and alternatives to the project.

To establish this scenario, the traffic counts anticipated under the proposed property owner's alternatives which were approved at the November 19, 2003 City Council meeting were manually added to conditions established in the Elk Grove General Plan Draft EIR (SCH# 2002062082) certified in November 2003.

The approved property owner's alternative requests were applied to the adopted General Plan Land Use Map and the AM/PM Peak Hour Volume/Capacity Analysis Model Comparison, which was used in preparation of the Draft EIR. The trip generation rates presented in **Table 1** were used to develop the Baseline. These trip generation rates are consistent with the trip generation rates used in preparation of the certified General Plan EIR.

**Table 1
Trip Generation Rates**

| General Plan Designation | AM Peak Hour Trip Generation per Acre | PM Peak Hour Trip Generation per Acre |
|---------------------------------------|---------------------------------------|---------------------------------------|
| Public Open Space/Recreation (OS/REC) | 0.01 | 0.06 |
| Rural Residential (RR) | 0.23 | 0.30 |
| Estate Residential (ER) | 1.73 | 2.32 |
| Low Density Residential (LDR) | 4.16 | 5.61 |
| Medium Density Residential (MDR) | 5.19 | 6.41 |
| Multi-family (MF) | 10.60 | 13.08 |
| High Density Residential (HDR) | 15.3 | 18.6 |
| Commercial (COM) | 11.22 | 40.73 |
| Office (OF) | 16.99 | 16.23 |

Staff assumed sites with multiple designations would develop with varying percentages. For instance, staff assumed a site with a COM/OF/MF designation would develop with 20% commercial, 54% office, and 26% multi-family land uses. The development assumptions are presented in **Table 2**.

**Table 2
Designation Development Assumptions**

| General Plan Designation | % of Development per Designation |
|---------------------------------------|----------------------------------|
| Commercial/Office | 30%/70% |
| Commercial/Office/Multi-Family | 20%/54%/26% |
| Office/Multi-Family | 80%/20% |
| Commercial/Medium Density Residential | 80%/20% |

Table 3 illustrates the adopted General Plan designation and the total number of AM peak hour trips, PM peak hour trips, and Average Daily Traffic (ADT) associated with the adopted property owner's alternatives. The difference in trips from the adopted property owner's alternatives and trips anticipated under the existing land use designations for those sites were added to the General Plan trips from the Elk Grove General Plan Draft EIR.

**Table 3
2003 Adopted General Plan Alternatives AM/PM Peak Hour Trips and ADT**

| Site Name or Number | Site Acreage | Former GP Designation | Adopted General Plan Designation | AM Peak Hour Trips by Use | Total AM Peak Hour Trips for Adopted GP Designation | PM Peak Hour Trips by Use | Total PM Peak Hour Trips for Adopted GP Designation | ADT for Adopted GP Designation |
|---|--------------|-----------------------|----------------------------------|--|---|---|---|--------------------------------|
| Southwest corner of Bruceville and Big Horn | 1.6 | OF | COM/OF | COM (5.38) OF (19.02) | 24.4 | COM (19.55) OF (18.17) | 37.7 | 291.55 |
| Site #22 | 4.6 | RR | COM | - | 51.61 | - | 187.36 | 1,086.23 |
| Site #31 | 5.9 | LDR | COM/OF/MF | COM (13.23) OF (54.02) MF (16.21) | 83.46 | COM (48.06) OF (51.61) MF (20.01) | 119.68 | 924.82 |
| Site #35 | 7.5 | MDR | COM/OF/MF | COM (16.83) OF (68.80) MF (20.67) | 106.3 | COM (61.09) OF (65.73) MF (25.50) | 152.32 | 1,175.64 |
| Site #38 | 1.9 | RR | COM | - | 21.31 | - | 77.38 | 448.68 |
| Tegan Road | 28.2 | RR | LDR | - | 117.31 | - | 158.20 | 1,252.32 |
| Southwest Corner Laguna Boulevard/SR 99 | 21.7 | OF/MF | COM/OF/MF | COM (48.69) OF (198.95) MF (59.78) | 307.42 | COM (176.76) OF (198.95) MF (91.53) | 467.24 | 3,401.55 |
| Southwest quadrant of Sheldon Road/SR 99 | 15 | COM | COM/MDR | COM (134.64) MDR (15.57) | 150.21 | COM (488.76) MDR (19.23) | 507.99 | 2,991.82 |

Notes: Typically, 10% - 12% of the ADT equals the peak hour trips. Staff assumed 11% of the ADT = Peak Hour Trips.

Table 4 presents the adopted alternatives, the affected roadways and roadway segments, and the percentage of trips generated that was applied to each roadway segment.

Table 4
Characteristics of Alternative Sites Adopted with the Elk Grove General Plan

| Site Name or Number | Affected Roadways | Affected Roadway Segments | % Trip Distribution |
|---|-----------------------|------------------------------|---------------------|
| Southeast corner of Bruceville and Big Horn | Bruceville Road | (Sheldon-Laguna) | 50 |
| | Big Horn Boulevard | (Franklin-Laguna) | 50 |
| Site #22 | Grant Line Road | Bradshaw-Sheldon | 100 |
| Site #31 | Bond Road | East Stockton-EGF | 50 |
| | Elk Grove-Florin Road | Calvine-Bond | 50 |
| Site #35 | Sheldon Road | East Stockton-EGF | 100 |
| Site #38 | Grant Line Road | Bradshaw-Sheldon | 100 |
| Tegan Road | Laguna Boulevard | I-5 to Franklin | 50 |
| | Franklin Boulevard | Calvine-Laguna | 50 |
| Southwest Corner Laguna Boulevard/SR 99 | Laguna Boulevard | Bruceville-West Stockton | 50 |
| | Laguna Springs Road | EGB-Poppy Ridge | 50 |
| Southwest quadrant of Sheldon Road/SR 99 | Sheldon Road | Center Parkway-West Stockton | 100 |

Proposed General Plan Amendment Project Methodology

The proposed General Plan Amendment project (proposed project) scenario assumes that the eight General Plan Amendment sites (that is, Sites A, 4, 5, 21, 29, 24, 40, and 41) are approved and forecasts traffic conditions under build out of the General Plan with the proposed land use designations on those sites.

In order to create the proposed General Plan Amendment project scenario, the difference in traffic volumes resulting from development of with the land use designations of the proposed General Plan Amendment was compared to the Adopted General Plan (Baseline) scenario.

Table 5 shows the General Plan land use designations under the proposed project and identifies the total number of AM peak hour trips, PM peak hour trips, and ADT anticipated at build out of each site. The numbers below were calculated using the trip generation rates shown in **Table 1** above.

Table 5
Proposed General Plan Amendment Project AM/PM Peak Hour Trips, PM Peak Hour Trips, and ADT

| Site Number | Site Acreage | Proposed General Plan Designation | AM Peak Hour Trips | PM Peak Hour Trips | ADT |
|-------------|--------------|-----------------------------------|--------------------|--------------------|---------|
| 24 | 3.5 | Commercial | 39.3 | 142.6 | 826.5 |
| 40 | 6.4 | Commercial | 71.8 | 260.7 | 1,511.3 |
| 4 | 1.6 | Commercial | 17.9 | 65.2 | 377.8 |
| 5 | 6.4 | Commercial/Office/Multi-family | 90.7 | 130.0 | 1,003.2 |
| 41 | 7.5 | Commercial/Office/Multi-family | 106.3 | 152.3 | 1,175.7 |
| 21 | 160.4 | Low Density Residential | 667.3 | 899.8 | 7,123.2 |

| Site Number | Site Acreage | Proposed General Plan Designation | AM Peak Hour Trips | PM Peak Hour Trips | ADT |
|-------------|--------------|-----------------------------------|--------------------|--------------------|---------|
| 29 | 113.0 | Low Density Residential | 470.1 | 633.9 | 5,018.2 |
| A | 7.4 | High Density Residential | 113.2 | 137.6 | 1,140.3 |

Notes: Typically, 10% - 12% of the ADT equals the peak hour trips. Staff assumed 11% of the ADT = Peak Hour Trips.

Table 6 shows the adopted General Plan land use designations for the proposed project sites and identifies the total number of AM peak hour trips, PM peak hour trips, and ADT anticipated at build out of those sites under the existing General Plan designations.

**Table 6
Existing General Plan AM/PM Peak Hour Trips, PM Peak Hour Trips, and ADT**

| Site Number | Site Acreage | Existing General Plan Designation | AM Peak Hour Trips | PM Peak Hour Trips | ADT |
|-------------|--------------|-----------------------------------|--------------------|--------------------|---------|
| 24 | 3.5 | Estate Residential | 6.1 | 8.1 | 64.4 |
| 40 | 6.4 | Low Density Residential | 26.6 | 35.9 | 284.2 |
| 4 | 1.6 | Low Density Residential | 6.7 | 8.9 | 71.0 |
| 5 | 6.4 | Low Density Residential | 26.6 | 35.9 | 284.2 |
| 41 | 7.5 | Office/Multi-family | 117.8 | 117.0 | 1,067.5 |
| 21 | 160.4 | Rural Residential | 36.9 | 48.1 | 386.4 |
| 29 | 113.0 | Rural Residential | 25.9 | 33.9 | 272.2 |
| A | 7.4 | Public Open Space/Recreation | 0.07 | 0.4 | 2.4 |

The difference in A.M. peak hour trips, P.M. peak hour trips, and ADT between the trips generated under the adopted General Plan and the trips generated by the proposed project were added to the Baseline scenario using the corrections shown in **Tables 7** and **8** below. **Table 7** presents the roadway segments affected by the proposed project and the percentage of trip-generated traffic applied to each roadway segment during the AM peak hour. **Table 8** presents the percentage of trip-generated traffic applied to each roadway segment affected by the proposed project during the PM peak hour. These percentages reflect traffic volumes and direction splits projected by the City of Elk Grove Traffic Model.

**Table 7
AM Peak Hour Corrections for the General Plan Amendment SEIR Traffic Analysis**

| GP Alternative Site | Road Segment | Direction of Traffic | Percentage of Traffic Per Direction | Percentage of General Plan Amendment Generated Traffic by Traffic Direction Applied to Each Segment |
|--|--|----------------------|-------------------------------------|---|
| Site A | Big Horn Boulevard (Franklin Road-Laguna Boulevard) | EB | 60% | 60% plus Bruceville Sites trips |
| | | WB | 40% | 40% plus Bruceville Sites trips |
| Site 40 | Bond Road (E. Stockton Boulevard-Elk Grove Florin Road) | EB | 43% | 43% of total project trips |
| | | WB | 57% | 57% of total project trips |
| Site 24 | Bradshaw Road (Bond Road-Grant Line Road) | NB | 34% | 34% of 50% of total trips |
| | | SB | 66% | 66% of 50% of total trips |
| | Elk Grove Boulevard (Waterman Road to Grant Line Road) | EB | 37% | 37% of 50% of total trips |
| | | WB | 63% | 63% of 50% of total trips |
| | Grant Line Road (E. Stockton Boulevard-Bradshaw Road) | SB | 59% | 59% of 66% of total project trips |
| | | NB | 41% | 41% of 66% of total project trips |
| Sites 21 and 29 | Sheldon Road (Elk Grove Florin Road-Bradshaw Road) | EB | 34% | 34% of 50% of total project trips |
| | | WB | 66% | 66% of 50% of total project trips |
| | Sheldon Road (E. Stockton Boulevard-Elk Grove Florin Road) | EB | 34% | 75% of 34% of 50% of total project trips |
| | | WB | 66% | 75% of 66% of 50% of total project trips |
| | Waterman Road (Calvine Road-Bond Road) | NB | 35% | 35% of 50% of total project trips |
| | | SB | 65% | 65% of 50% of total project trips |
| Bradshaw Road (Calvine Road-Bond Road) | NB | 38% | 38% of 34% of 50% of project trips | |
| | SB | 62% | 62% of 34% of 50% of project trips | |
| Sites 4, 5, and 41 | Big Horn Boulevard (Franklin Road -Laguna Boulevard) | EB | 60% | 25% of 54% of total project trips plus Site A trips |
| | | WB | 40% | 25% of 54% of total project trips plus Site A trips |
| | Bruceville Road (Sheldon Road-Laguna Boulevard) | NB | 54% | 54% of total project trips |
| | | SB | 46% | 46% of total project trips |
| Laguna Boulevard (Franklin Road-Bruceville Road) | WB | N/A | 25% of 46% of total project trips | |
| | EB | N/A | 25% of 46% of total project trips | |

**Table 8
PM Peak Hour Corrections for the General Plan Amendment SEIR Traffic Analysis**

| GPA Site | Road Segment | Direction of Traffic | Percent of Traffic Per Direction | Percent of General Plan Amendment Generated Traffic by Traffic Direction Applied to Each Segment |
|--------------------|---|----------------------|----------------------------------|--|
| Site A | Big Horn Boulevard (Franklin Road-Laguna Boulevard) | EB | 46% | 46% plus Bruceville Sites trips |
| | | WB | 54% | 54% plus Bruceville Sites trips |
| Site 40 | Bond Road (E. Stockton Boulevard-Elk Grove Florin Road) | EB | 52% | 52% of total project trips |
| | | WB | 48% | 48% of total project trips |
| Site 24 | Bradshaw Road (Bond Road-Grant Line Road) | NB | 64% | 64% of 50% of total project trips |
| | | SB | 36% | 36% of 50% of total project trips |
| | | EB | 57% | 57% of 50% of total trips |
| | | WB | 43% | 43% of 50% of total trips |
| | | SB | 44% | 44% of 36% of total project trips |
| | | NB | 56% | 56% of 36% of total project trips |
| Sites 21 and 29 | Sheldon Road (Elk Grove Florin Road-Bradshaw Road) | EB | 54% | 54% of 50% of total project trips |
| | | WB | 46% | 46% of 50% of total project trips |
| | | EB | 54% | 75% of 54% of 50% of total project trips |
| | | WB | 46% | 75% of 46% of 50% of total project trips |
| | | NB | 52% | 52% of 50% of total project trips |
| | | SB | 48% | 48% of 50% of total project trips |
| Sites 4, 5, and 41 | Bradshaw Road (Calvine Road-Bond Road) | NB | 58% | 58% of 54% of 50% of project trips |
| | | SB | 42% | 42% of 54% of 50% of project trips |
| | | EB | 46% | 25% of 52% of total project trips plus Site A trips |
| | | WB | 54% | 25% of 52% of total project trips plus Site A trips |
| | | NB | 52% | 52% of total project trips |
| | | SB | 48% | 48% of total project trips |
| Sites 4, 5, and 41 | Big Horn Boulevard (Franklin Road-Laguna Boulevard) | WB | N/A | 25% of 48% of total project trips |
| | | EB | N/A | 25% of 48% of total project trips |
| | | WB | N/A | 25% of 48% of total project trips |
| | | EB | N/A | 25% of 48% of total project trips |

Alternative 2 - All Sites Except 21 and 29 Methodology

Under the Alternative 2 scenario, each of the sites is assumed to be approved with the proposed project General Plan land uses except for Sites 21 and 29 which are located near the Sheldon Road/Waterman Road intersection. These sites would retain the land use designation of Rural Residential established by the approved General Plan.

See **Table 5** for the AM peak hour trips, PM peak hour trips, and ADT anticipated at build out of the proposed General Plan Amendment sites.

Under this scenario, the difference in A.M. peak hour trips, P.M. peak hour trips, and ADT for only Sites A, 4, 5, 24, 40, and 41 under the Baseline and proposed project conditions were incorporated into the Baseline scenario using the corrections shown in **Tables 7 and 8** in order to forecast traffic impacts under Alternative 2. This alternative anticipates that trips generated for Sites 21 and 29 under the adopted General Plan (Baseline condition) would not change.

Alternative 3 - Reduced Density on Sites 21 and 29 Methodology

Alternative 3 assumes a combination of Estate and Rural Residential General Plan designations for Sites 21 and 29 only that would allow the development of 350 units. Under this scenario, the other six General Plan Amendment sites are assumed to be built out under the land use designations identified in the proposed project scenario.

In order to create the Alternative 3 scenario, the net increase in traffic volumes projected with the implementation of Alternative 3 were manually added to the Baseline Scenario traffic volumes for each affected roadway segment. This alternative anticipates that trips generated for Sites A, 4, 5, 24, 40, and 41 under the proposed project scenario would not change.

Table 9 shows the site designations for the Alternative 3 scenario and the total number of AM peak hour trips, PM peak hour trips, and ADT for Sites 21 and 29 anticipated at build out of this scenario.

**Table 9
General Plan Alternative – Reduced Density 21 and 29 AM/PM Peak Hour Trips, PM Peak Hour Trips, and ADT**

| Site Number | Acres | Proposed General Plan Designation | AM Peak Hour Trips | PM Peak Hour Trips | GPA ADT |
|-------------|-------|-----------------------------------|--------------------|--------------------|---------|
| 21 | 98.4 | Rural Residential | 88.9 | 118.7 | 1,378.4 |
| | 62 | Estate Residential | | | |
| 29 | 71 | Rural Residential | 113.22 | 137.6 | 944.2 |
| | 42 | Estate Residential | | | |

Notes: Typically, 10% - 12% of the ADT equals the peak hour trips. Staff assumed 11% of the ADT = Peak Hour Trips.

Table 6 shows the adopted General Plan designations for General Plan Amendment Sites 21 and 29 and the total number of AM peak hour trips, PM

peak hour trips, and ADT associated with the General Plan Amendment sites under the existing General Plan designations.

The difference in A.M. peak hour trips, P.M. peak hour trips, and ADT between the trips generated under the adopted General Plan and the trips generated by the Alternative 3 land uses for Sites 21 and 29 were added to the Baseline scenario using the corrections shown in **Tables 7** and **8**. Then, A.M. peak hour trips, P.M. peak hour trips, and ADT for Sites A, 4, 5, 24, 40, and 41 were also incorporated into the Baseline scenario using the corrections shown in **Tables 7** and **8** in order to forecast traffic impacts under Alternative 3.