

VEHICLES MILES TRAVELED (VMT) TRAFFIC IMPACT METRIC

A project-specific quantified analysis of the MGA Campus has been undertaken to compare BAU to the project including the project's VMT reduction program (including shuttles and TDM).

Introduction

Greenhouse Gas Emissions (GHG) have been identified as a major cause of global warming. The California Global Solutions Act of 2006 (AB32) establishes a comprehensive strategy to reduce GHG to 1990 levels by 2020. In its AB 32 Scoping Plan, originally adopted in 2008, and updated in May 2014, the California Air Resources Board (CARB) forecast the GHG emissions that would occur in 2020 if reduction actions are not taken. The no-action scenario is known as "Business-as-Usual" or BAU. This BAU forecast is necessary to assess the scope of reductions California must achieve to return to 1990 statewide GHG emissions levels by 2020.

The estimated 1990 emissions are 431 million metric tons of CO₂e. The updated 2020 BAU estimate is 509 million metric tons CO₂e, which includes credit for certain GHG emission reduction measures already in place (e.g., the Renewables Portfolio Standard). Using this updated estimate, achieving AB 32's mandate would require a reduction of 78 million metric tons CO₂e or approximately 15.3 percent from BAU.

The availability of, and low cost of, land away from the urban center, has created less dense and more dispersed development resulting in increases in vehicle miles traveled. The transportation sector is the largest emitter of GHG necessitating a reduction in VMT to obtain the 1990 statewide target. The States Climate Change Scoping Plan calls for transportation emissions to be addressed by a combination of more stringent standards, one being a greater consideration in reducing vehicle miles traveled (VMT) and trip generation through land use planning.

Significance Threshold

One approach for determining the significance of GHG and VMT is to require a project to meet a percent reduction target to satisfy the AB32 requirement to return to 1990 levels. For purposes of the analysis of the MGA Campus Project, this target is based on a VMT reduction from BAU of 15.7% . The project is considered to result in a significant impact or potential significant impact if it would impede the state's ability to achieve the reduction to 1990 levels in GHG emission required by AB32. An impediment to the achievement of the AB32 reduction goal would occur if the project would not achieve the 15.7% reduction in VMT.

The following steps were taken to assess the project's reduction in VMT: 1) identify and quantify the level of VMT with no measures to reduce VMT (BAU), 2) identify features that would reduce VMT impacts, and 3) assess the significance of the VMT impact.

MGA Mixed – Use VMT Analysis

For purposes of assessing VMT impacts of the MGA project, project VMT were estimated for two scenarios: 1) Business as Usual (no – action); and 2) Mitigated Project Scenario including all project design features that would serve to reduce vehicle trips and trip lengths.

A trip - based VMT calculation has been prepared which counts the number of miles traveled by motor vehicles that are generated by or attracted to the project site. Assessing a trip-based VMT is a two-step process that requires the estimate of project trip generation and average trip length.

MGA trip generation has been calculated in the project's traffic impact study using trip rates developed by the Institute of Transportation Engineers (ITE), the daily trips by land use are summarized below in Table 1 as determined from the MGA traffic impact study for the project.. The average trip lengths for the MGA project's land uses have been calculated by Crain & Associates using the City of Los Angeles' version of the SCAG Regional Travel Demand Model, see attached letter dated June 19, 2014 for a brief discussion on the traffic model and methodology. The total BAU VMT was then calculated by multiplying the number of trips by the average trip length for each land use.

1. Business As Usual VMT

The BAU scenario consists of the VMT that would occur if the proposed project were built without any project design features towards VMT reduction. The results of the project specific VMT trip based calculation shows a daily project VMT of 69,031 vehicle miles traveled under BAU conditions, as shown in Table 1 below.

Table 1
MGA Mixed - Use project Specific VMT BAU calculation

Daily	ITE Trips	Average Trip Length (Crain Model)	MGA VMT
Zone 1228 (Retail)	681	5.30	3,609
Zone 1319 (Residential)	4,655	8.20	38,171
Zone 1061 (Office)	2,821	9.66	27,251
	8,157		69,031

2. MGA VMT Reduction using URBEMIS Mitigation Measures Module

The California Air Resources Board Urban Emissions Model (URBEMIS) was used to estimate the potential trip reductions realized from the MGA project design features and traffic demand management measures (TDM).

The URBEMIS model is widely used to estimate VMT and GHG from new development. The mitigation measures module was developed by Nelson/Nygaard Consulting Associates specifically for the URBEMIS module software to estimate the effectiveness of measures to reduce trip generation and VMT. While the reductions ideally should be expressed as a range in order to account for uncertainty, a single value is needed to measure the percent reduction relative to AB32 requirements. The URBEMIS2007 Mobile Source Mitigation Measures module was used to document the basis of the project specific VMT percent reduction.

The applicable percent reduction attributed to the project design features and mitigation measures was determined based on the difference between the URBEMIS BAU model run and the mitigated (i.e. the project including Project Design Features) model run. The inputs for the URBEMIS BAU model included setting the MGA mixed – use land use, trip generation and trip length characteristics previously determined for the project. URBEMIS BAU model was then

calibrated to closely match the project specific VMT value of 69,031 as shown in Table 1.

The resulting URBEMIS calibrated model shows a BAU of 69,942 VMT for the MGA project. Inserting the project design features including TDM program elements into the URBEMIS model produced a mitigated VMT value of 56,261 VMT as shown in Table 2 below.

For each factor that reduces VMT there is a range of how much VMT may be reduced depending on individual project conditions including whether other VMT reduction factors apply to a given project. Therefore in the discussion below, while a conservative project-specific estimate of VMT reduction is provided for each factor, the model combines the factors to produce the total VMT reduction. Because some factors overlap the individual VMT reductions from each factor do not add to 19.6%. A reduction of 19.6 % was realized by this application of the URBEMIS model software.

Table 2
MGA Mixed - Use VMT BAU calculation

Use	Average Trip Length	Unmitigated Trips	Mitigated Trips	% Reduction	Unmitigated VMT	Mitigated VMT	% Reduction
Retail	5.3	851	634	25.5%	4,510	3,360	25.5%
Residential	8.2	4,655	3,981	14.5%	38,171	32,644	14.5%
Office	9.66	2,822	2,097	25.7%	27,261	20,257	25.7%
Total		8,328	6,712		69,942	56,261	19.6%

3. Model Inputs

Project design features include a variety of smart growth measures that show a reduction in the number of vehicle trips in the URBEMIS MGA project model. The following operational mitigation measures and resulting trip reduction percentages were realized in the model:

1. Mix of Uses – 0.23 % trip reduction
2. Local serving retail – 2.0 % trip reduction
3. Transit use (private shuttle) – 2.02 % trip reduction
4. Bike and Pedestrian programs – 4.05 % trip reduction
5. Parking Cash Out – 10.42 % non-residential trip reduction
6. Free Transit passes – 0.5 % trip reduction
7. Telecommuting – 1.4 % non-residential trip reduction
8. Other Transportation Demand Management - 2.61% non-residential trip reduction

Each of these URBEMIS Mitigation models is briefly described below. A much more detailed description is included in URBEMIS user's guide Appendix D. MGA model inputs are attached as part of the model output.

Mix of Uses Mitigation – 0.23 % Trip Reduction

The following procedure is used to adjust trip generation rates as a function of the mix of land uses for any particular project.

$$\begin{aligned} \text{Trip reduction} &= (1 - (\text{ABS} (1.5 * h - e) / (1.5 * h + e)) - 0.25) / 0.25 * 0.03 \\ 0.0023 &= (1 - (\text{ABS} (1.5 * 700 - 6760) / (1.5 * 700 + 6760)) - 0.25) / 0.25 * 0.03 \\ \text{Where: } h &= \text{study area households (or 700 housing units)} \\ e &= \text{study area employment two thirds of 18779 census tract 113303 employment 2020.} \end{aligned}$$

This formula assumes an “ideal” housing balance of 1.5 jobs per household and a baseline diversity of 0.25. This reduction takes into account overall jobs-population balance. The number of households or housing units and employment should be based on the area located within a 1/2 mile radius of the project's center.

Operational Local Serving Retail Mitigation – 2% Trip Reduction

The presence of local serving retail can be expected to bring further trip reduction benefits, and an additional reduction of 2% is assumed. This is towards the lower end of the values presented in the research, in order to avoid double counting with the diversity indicator.

Operational Transit Mitigation – 2.02 % Trip Reduction

The Transit Service Index emphasizes frequency but with greater weighting given to rail services. Greater weight is also given to dedicated shuttles, in recognition of the fact that these are likely to be more closely targeted to the needs of the development. Information on transit availability and frequency can be obtained from transit agency maps and schedules.

The Transit Service Index is determined as follows:

- Number of average daily weekday buses stopping within 1/4 mile of the site (87) ; plus
 - Twice the number of daily rail or bus rapid transit trips stopping within 1/2 mile of the site (0); plus
 - Twice the number of dedicated daily shuttle trips (40);
 - Divided by 900, the point at which the maximum benefits are assumed.
- $$\text{Service Index scores} = (87 + (2*40))/900 = 0.186$$

Transit Service Score Assumptions:

To account for non-motorized access to transit, half the reduction is dependent on the pedestrian/bicycle friendliness score. This ensures that places with good pedestrian and bicycle access to transit are rewarded.

$$\begin{aligned} \text{Trip reduction} &= t * 0.075 + t * \text{ped/bike score} * 0.075 \\ \text{Where: } t &= \text{transit service index} \\ \text{Trip reduction} &= 0.186 * 0.075 + 0.186 * \text{ped/bike score} * 0.075 \end{aligned}$$

Operational Bike and Pedestrian Mitigation – 4.05 % Trip Reduction

Many street design factors have been shown to promote walking and cycling. The trip reduction is calculated as:

$$\begin{aligned}\text{Trip reduction} &= 9\% * \text{ped/bike factor} \\ \text{Trip reduction} &= 9\% * 0.45 = 0.0405\end{aligned}$$

The model inputs are as follows: project's number of intersections per square mile, the percent of streets with sidewalks on one or both sides, and the percent of arterials/collectors with bike lanes. The pedestrian/bicycle factor is calculated as follows:

$$\begin{aligned}\text{Ped/bike factor} &= (\text{network density} + \text{sidewalk completeness} + \text{bike lane completeness}) / 3 \\ \text{Where: Network density} &= \text{intersections per square mile} / 1300 \text{ (or } 1.0, \text{ whichever is less)}\end{aligned}$$

$$\text{Ped/bike factor} = (0.019 + 1 + 0.33) / 3 = 0.45$$

A value of 1,300 roughly equates to a dense grid with four-way intersections every 300 feet. Intersections with dedicated routes for pedestrians and/or bicyclists should be included in this calculation. Sidewalk completeness = % streets with sidewalks on both sides + 0.5 * % streets with sidewalk on one side. Bike lane completeness = % arterials and collectors with bicycle lanes, or where suitable, direct parallel routes exist

Daily Parking Management – 10.42% Non-residential Trip Reduction

The model recommends that parking cash-out programs should be eligible for 50% of the reduction for direct parking charges. The MGA project proposes a transportation benefits package equivalent to a free monthly transit pass, currently valued at \$100 per month or approximately \$5 / day. The daily parking charge set in the model is \$2.50. The trip reduction will therefore be as follows:

$$\begin{aligned}\text{Trip reduction} &= \text{daily parking charge} / 6 * 0.25 \\ \text{Trip reduction} &= 2.5 / 6 * 0.25 = 0.1042\end{aligned}$$

Operational Transportation Demand Management

Include transit demand management parking and transit passes, telecommuting, and other transportation demand measures.

Free Transit Passes - 0.5% Trip Reduction

Thus, the credit is more valuable in places that have good transit service. This reduction only applies to the portion of trips generated by those granted the free transit passes (e.g. residents and/or employees, but excluding shoppers and other visitors).

Telecommuting – 1.4% Non-residential Trip Reduction

The percentage reduction is not additive (in contrast to most other trip reduction measures). For example, if 20% of employees telecommute, and other trip reduction measures are estimated to reduce vehicle trips from 1,000 to 800 per day, the 20% reduction is applied to the 800 trips, not the original 1,000.

Other TDMs - 2.61 % Non-residential Trip Reduction

Other TDM program elements that do not include financial incentives tend to have a smaller impact on travel behavior. Trip and associated emission reductions for other TDMs selected within URBEMIS are based on the following elements incorporated into the program as appropriate.

- Secure bicycle parking (at least one space per 20 vehicle parking spaces)
- Showers/changing facilities
- Guaranteed Ride Home
- Information on transportation alternatives, such as bus schedules and bike maps
- Dedicated employee transportation coordinator
- Carpool matching programs
- Preferential carpool/vanpool parking

Recommended TDM Program Reductions based on level number of elements trip reduction:

Major At least 5 elements = 2%, plus 10% of the credit for transit and pedestrian/bike friendliness

$$\text{TDM Trip Reduction} = 0.02 + (0.10 * (0.0405 + 0.0202)) = 0.0261$$

URBEMIS BAU Output

Urbemis 2007 Version 9.2.4

Detail Report for Annual Operational Unmitigated

Project Name: mga

Project Location: California State-wide

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Analysis Year: 2016 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

<u>Land Use Type</u>	<u>Trip Rate</u>	<u>Unit Type</u>	<u>No. Units</u>	<u>Total Trips</u>
Apartments mid rise	6.65	dwelling units	700.00	4,655.00
High turnover (sit-down) rest.	127.15	1000 sq ft	3.00	381.45
Strip mall	42.70	1000 sq ft	11.00	469.70
General office building	11.03	1000 sq ft	255.82	2,821.69
				8,327.84

URBEMIS Mitigated Output Detail Report for Annual Operational Mitigated

Includes correction for pass-by trips

Includes the following double counting adjustment for internal trips:

Analysis Year: 2016 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

<u>Land Use Type</u>	<u>Trip Rate</u>	<u>Unit Type</u>	<u>No. Units</u>	<u>Total Trips</u>
Apartments mid rise	5.69	dwelling units	700.00	3,980.59
High turnover (sit-down) rest.	94.51	1000 sq ft	3.00	283.53
Strip mall	31.74	1000 sq ft	11.00	349.13
General office building	8.20	1000 sq ft	255.82	2,097.38
				6,710.63



VIA EMAIL

June 19, 2014

Mr. Jerry Overland
Overland Traffic Consultants, Inc.
24325 Main Street, Suite 202
Santa Clarita, California 91321

RE: Trip Lengths for the Winnetka Avenue and Prairie Street Mixed-Use Project

Dear Jerry,

As requested, we have conducted a modeling analysis of the trip length for trips generated by the mixed-use project to be constructed at the southeast corner of Winnetka Avenue and Prairie Street in the Chatsworth Community of the City of Los Angeles. Attached is a table showing the anticipated trip lengths for the vehicle trips with one end at the Project site. The trip lengths are based on output from a refined version of the City of Los Angeles Department of Transportation (LADOT) version of the Southern California Association of Governments (SCAG) Regional Travel Demand Model. The refinements made to the LADOT version of the model included adding three zones at the project site location – each containing the individual demographic variables representing the retail, residential or office components of the project. The trips have been assigned to each zone based on the demographics associated with three land use categories using the output from the LADOT model. The data for different times of day were developed separately in order to determine trip lengths that should be applied to trips from those individual time periods. Thus, the output data presented in the attached table are the average trip lengths anticipated for each land use by time of day. Specifically, the separate trip length factors have been developed to be applied to the trip generation estimates in a standard traffic study trip generation table.

It should be noted that retail pass-by trips are allowed to be excluded from the trip calculations used at all intersections not immediately adjacent to the project site, per the latest LADOT

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June 19, 2014

Traffic Study Policies and Procedures (June 2013). It should also be noted that differences in trip purpose result in different trip lengths by use and time of day. For example, a higher proportion of the office trips in the AM and PM peak periods are home-based work trips, while the off-peak retail trips largely consist of home-based shopping and other shopping trips. This results in different lengths for the project trips depending on land use and time of day.

Please contact me with any questions.

Sincerely,

A handwritten signature in blue ink that reads "George Rhyner". The signature is written in a cursive style and is positioned above a vertical line.

George Rhyner, PE
Senior Transportation Engineer
TE 2143, CE 47763

GR/lc
C21235
enclosure

Winnetka and Prairie Mixed-Use Project Trip Length Estimation Modeling Procedures

The modeling procedures for the Winnetka Avenue and Prairie Mixed-Use Project (the Project) in the Chatsworth Community of the City of Los Angeles were based on a refinement of the standard transportation model for the Southern California region. The City of Los Angeles Department of Transportation (LADOT) added details to the Southern California Association of Governments (SCAG) model which projected the year 2035 conditions for the five Counties in the Southern California region. The refinements were to better reflect the traffic conditions within the City of Los Angeles. That refined model, in turn, was used as the start point for the Project specific trip estimation procedure.

Three traffic analysis zones (TAZs) were added to the LADOT model to reflect the land-use components for the Project. One TAZ reflected the residential uses, another TAZ reflected the office uses and the third TAZ reflected the other commercial uses. Each TAZ was represented by a specific centroid node, and then linked to the roadway network corresponding to the project site location by centroid connectors.

Next, the standard modeling procedures were conducted with the updated Project model. As part of the standard modeling procedures, a trip assignment was performed based on the constrained network. For a constrained model assignment, the model considered the operating speed on each of the roadway segments for the various periods of the day. The SCAG time periods are: AM peak - 6am-9am; Mid-day - 9am-3pm; PM peak - 3 pm-7pm; and Nighttime- 7 pm-6 am. The model proceeds iteratively to reflect drivers' choices of routes, which may vary based on the time of day and the operating speed of each roadway segment.

As a next step, a select link analysis was then conducted for each of the three TAZs, which shows volumes on the roadway system for each TAZ. Select Link analysis for the commercial uses was for all non-pass-by trips only.

As a final step, matrices with the number of trips and distance between each TAZS were prepared. This data was then analyzed to determine the weighted average trip length for each Project TAZ, with each TAZ representing a different land-use category.

**Winnetka And Prairie Mixed-Use
Project
Trip Length Adjustment
By Year**

	Adjustment Factor				Trip Length		
	Retail	Residential	Office		Retail	Residential	Office
2035	1.00	1.00	1.00		5.79	7.25	8.77
2034	0.99	1.01	1.01		5.76	7.31	8.83
2033	0.99	1.02	1.01		5.73	7.37	8.88
2032	0.98	1.02	1.02		5.70	7.43	8.94
2031	0.98	1.03	1.03		5.67	7.49	8.99
2030	0.97	1.04	1.03		5.64	7.55	9.05
2029	0.97	1.05	1.04		5.61	7.61	9.10
2028	0.96	1.06	1.04		5.58	7.66	9.16
2027	0.96	1.07	1.05		5.55	7.72	9.21
2026	0.95	1.07	1.06		5.52	7.78	9.27
2025	0.95	1.08	1.06		5.49	7.84	9.32
2024	0.94	1.09	1.07		5.46	7.90	9.38
2023	0.94	1.10	1.08		5.43	7.96	9.44
2022	0.93	1.11	1.08		5.40	8.02	9.49
2021	0.93	1.12	1.09		5.37	8.08	9.55
2020	0.92	1.12	1.09		5.33	8.14	9.60
2019	0.92	1.13	1.10		5.30	8.20	9.66
2018	0.91	1.14	1.11		5.27	8.26	9.71
2017	0.91	1.15	1.11		5.24	8.32	9.77
2016	0.90	1.16	1.12		5.21	8.38	9.82
2015	0.89	1.16	1.13		5.18	8.44	9.88
2014	0.89	1.17	1.13		5.15	8.50	9.93
2013	0.88	1.18	1.14		5.12	8.56	9.99
2012	0.88	1.19	1.15		5.09	8.62	10.04
2011	0.87	1.20	1.15		5.06	8.68	10.10
2010	0.87	1.21	1.16		5.03	8.74	10.15
2009	0.86	1.21	1.16		5.00	8.80	10.21
2008	0.86	1.22	1.17		4.97	8.86	10.27