

## Urbemis: A New Era in Traffic Modeling

Traffic models are urban planners' crystal balls. They provide a glimpse into the future and predict how much traffic will result from new development. There is currently one national standard for predicting traffic, but it is very simplistic. The Urbemis traffic model is an emerging new standard for predicting traffic that is more sophisticated, but builds on the conventional method.

### Adding depth to “*Trip Generation*”

The conventional method for predicting traffic impacts is to look up a trip rate in a volume of reference books created by the Institute for Traffic Engineers called “*Trip Generation*”. This method only requires two variables for predicting the amount of traffic that is projected from new development: **1) The type of development (homes, shops, offices) and 2) The amount of new building (# of homes, # of square feet)**. The primary weakness in this method is that it lacks any information that describes where the new development will be built.

Predicting traffic from development that is proposed for an auto-oriented suburb should be very different than development that will go into a walkable, transit district. However the data reported in ITE's Trip Generation references were gathered from conventional, auto-oriented, single use suburban locations and are therefore best suited for predicting traffic in this type of development. For mixed used, higher density neighborhoods, with good pedestrian and bicycle connections or main-street districts with frequent and extensive public transit, ITE advises traffic engineers to adjust the trip generation rate to account for the reduced auto use. However far too often this advice is ignored and the simplistic model is applied to the wrong locations. Using the wrong model means engineers grossly over-predict traffic that will result from transit oriented, mixed use development. With these inflated traffic volumes good infill development can be required to widen streets to accommodate traffic. Thus making it harder for people to walk around the neighborhood and defeating the purpose.

### The Ins and Outs of Urbemis

The Urbemis model is the solution for objectively predicting traffic in a way that factors in the effect of the surrounding neighborhood. The air quality management districts of California, along with the California Department of Transportation, worked together in 2004 to examine all the key variables that influence automobile trip generation. The result was Urbemis, a simple yet powerful tool that employs standard traffic engineering methodologies, but provides the opportunity to adjust ITE average rates to quantify the impact of a development's location, physical characteristics, and any traffic demand management programs.

The following is a list of **inputs** Urbemis needs to calculate the amount of traffic to come from new development:

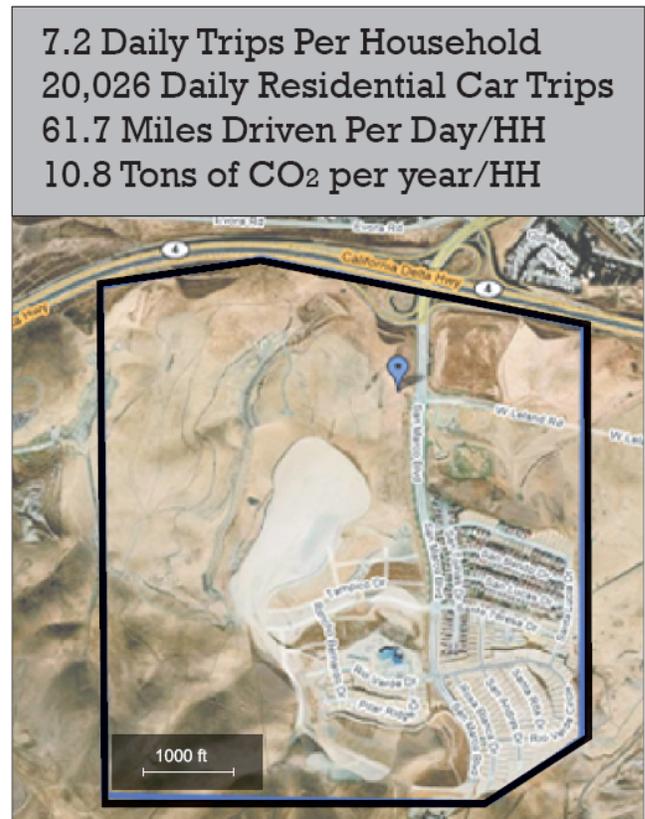
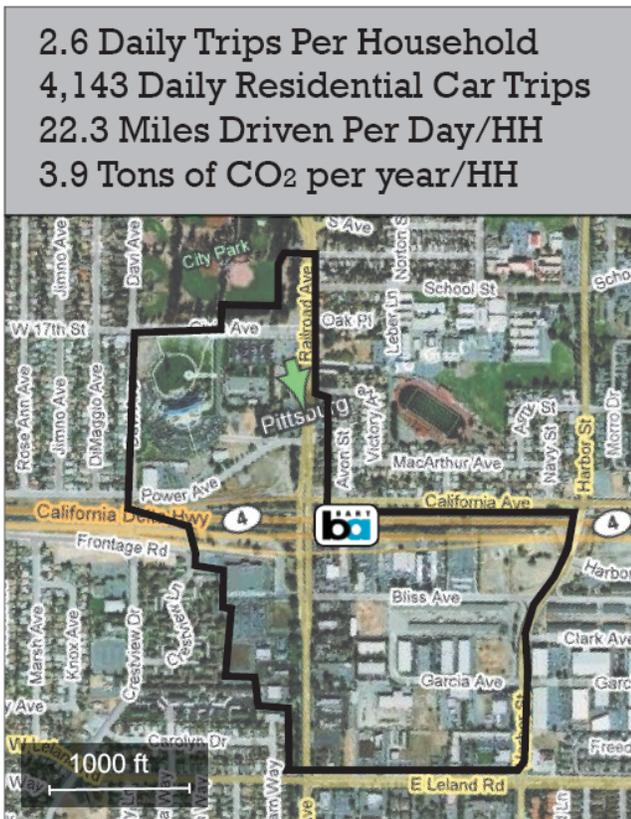
- **Land Uses** – The type and amount of development such as: Residential, Commercial, or Industrial
- **Mix of uses** – The number of homes & jobs within ½ mile of the site.
- **Locally Serving Retail** – The presence of local services within ½ mile.
- **Transit Service** – Total buses within ¼ mile of the site and total trains within ½ mile of the site.
- **Bicycle and Pedestrian Infrastructure** – Intersections per square mile; Percent of streets with sidewalks; Percent of streets with a bike route.
- **Percent of Below Market Rate units**
- **Transportation Demand Management Programs and Strategies** – Daily Parking Charges; Free Transit Passes; Telecommuting; Bike Parking, Showers for Bike Commuters; Guaranteed Ride Home Program; Car Sharing; Providing information on transportation alternatives; Dedicated transportation coordinator; carpool match; preferred carpool parking; Reduced Parking Supply.
- If there is no site specific information about reduced parking supply or exact acreage of residential land then the model will default to standard ITE assumptions about parking provided and trip rates.

The **outputs** of the Urbemis model include:

- Total Trips, Total Vehicle Miles Traveled (VMT) both the standard ITE prediction and the prediction including the full spectrum of inputs described above.
- Annual Tons/Year of ROG, NO<sub>x</sub>, CO, SO<sub>2</sub>, CO<sub>2</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>
- A summary of which traffic reducing discounts were applied, summarized by % reduction by each variable.

### Urbemis Applied to a TOD Site and a Typical Suburban Master Plan Pittsburg, CA

On the left is the future Railroad Ave. eBART Station Area and on the right is the San Marcos Master Development Plan. Both are in Pittsburg but because of differences in what is surrounding the site, there is a big difference in the residential traffic generated. **The eBART Station Area will have 64% fewer trips per household than the San Marcos project.**



The table below summarizes the key differences between the project areas that generated the Urbemis results above the maps.

Plan	# of Homes	1,590
	Floors	1 to 6
	# of acres	45
Existing Condition	Transit Service: Daily Buses within a 1/4 mile	1,559
	Daily BART Trains	78
	Households within a 1/2 mile	1,865
	Employees within a 1/2 mile	3,154

Plan	# of Homes	2,771
	Floors	1 to 3
	# of acres	512
Existing Condition	Transit Service: Daily Buses within a 1/4 mile	22
	Daily BART Trains	0
	Households within a 1/2 mile	1,628
	Employees within a 1/2 mile	398

Sources: Draft Railroad Ave. Station Area Specific Plan (January 2008), U.S. Census Bureau - Longitudinal Employer-Household Dynamics 2007, URBEMIS 2002 Version 9.2 developed by Nelson/Nygaard in association with Jones & Stokes for the San Joaquin Air Pollution Control District, and ITE Trip Generation, 7th Edition 2003.

<http://www.urbemis.com/>