

I-680 Corridor System Management Plan  
Smart Mobility Framework (SMF)  
Place Type Analysis Methodology

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## Introduction

System Metrics Group, Inc. (SMG) performed a place type assessment for the Contra Costa I-680 Corridor System Management Plan (CSMP). This analysis was done at the Traffic Analysis Zone (TAZ) level using the Smart Mobility Framework (SMF) Place Types. This document summarizes the findings of this analysis and describes the methodology used to label the place types.

These place type results should be reviewed by members of the I-680 CSMP Staff Working Group and Technical Advisory Committee (TAC) before being finalized. This will ensure that local expertise and knowledge of the communities is applied to the analysis.

## Place Type Analysis Results Summary

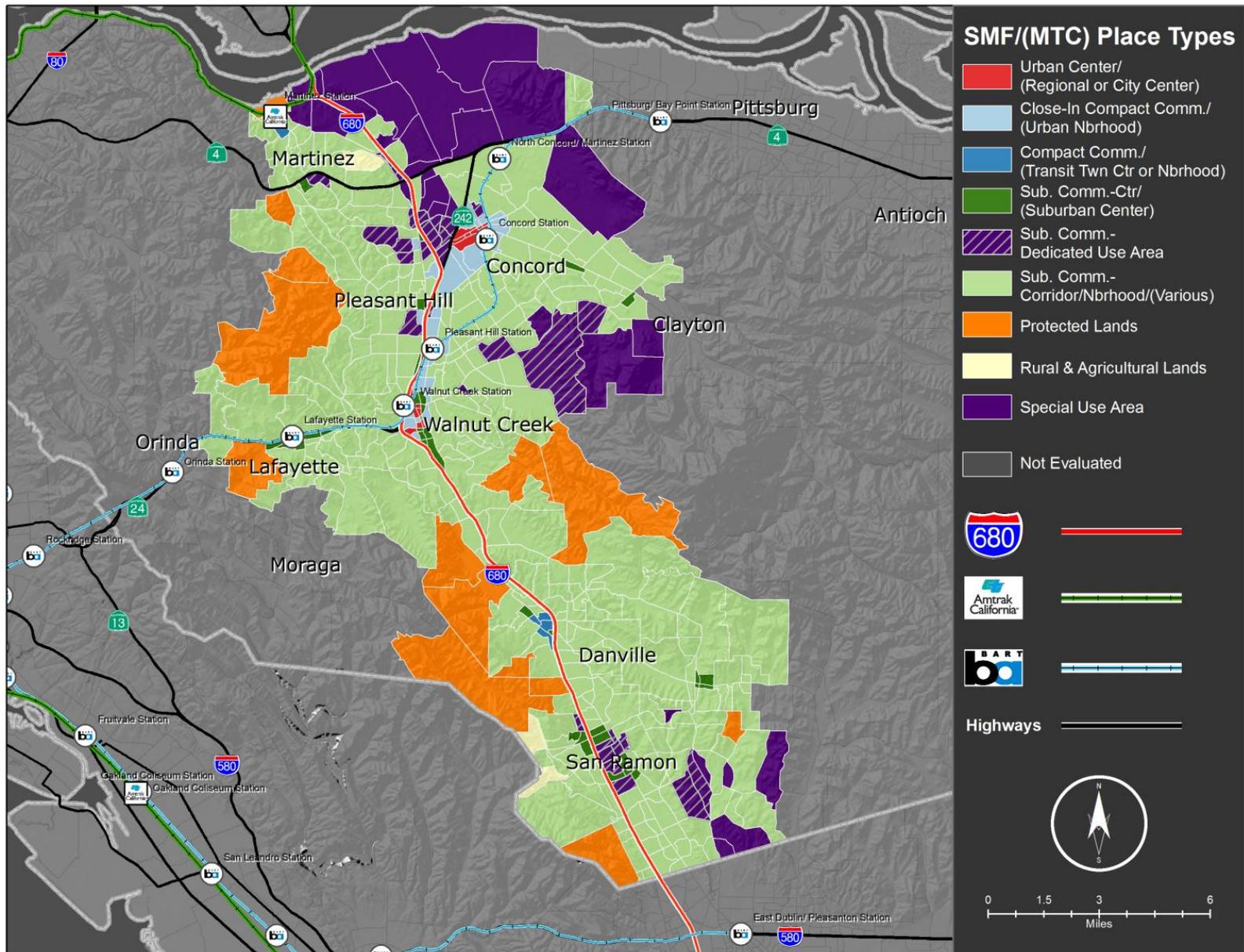
Figure 1 is a map showing the results of the analysis for the I-680 corridor. Descriptions of the SMF Place Types are summarized in Figure 2. The table in Figure 2 also provides examples of areas related to the I-680 CSMP that were labeled as belonging to each SMF Place Type.

Based on the analysis, most of the I-680 CSMP corridor may be best described as the *Suburban Community* place type. Other predominant types include *Special Use Areas* such as the oil refineries near Martinez and the Concord Naval Weapons Station, and protected open space such as Mount Diablo State Park. *Suburban Centers* can be found in San Ramon in other areas.

Areas near the Walnut Creek and Concord BART rail transit stations were labeled as *Urban Centers* surrounded by a mix of *Suburban Centers* and *Close-In Compact Communities* all lying adjacent to I-680 and SR-242. Though the SMF Place Types have several sub-categories for the *Close-In* label, the SMG analysis did not attempt to distinguish between *Close-In Centers*, *Close-In Corridors*, or *Close-In Neighborhoods*. These were labeled with the more general *Close-In Compact Communities* designation.

Some *Suburban Community Dedicated Use Areas* along the corridor include Bishop Ranch in San Ramon, the California State University East Bay campus in Concord, and Waterworld Theme Park in Pleasant Hill.

Figure 1: SMF Place Types





## Analysis Methodology Overview

This section describes the methodology used by SMG to label the TAZes by SMF Place Type. Most of the SMF Place Types describe areas at jurisdictional levels below the city or town level. Three of the 18 place types (Suburban Communities, Compact Communities and Rural and Agricultural Lands) can be applicable to a town or city level, but the remaining (e.g., “corridor-level”) require a greater level of detail. This required the study team to perform an analysis smaller than the city or town level in order to capture the differentiation among the communities along the I-680 corridor. The study team attempted to label TAZes as given place types based on general criteria from the Smart Mobility Framework that include:

- Completeness in relation to land use and activities
- Connectivity of Transportation Networks
- Accessibility to a range of destinations throughout the area
- Local transit service
- Safe and convenient bicycling and walking.<sup>1</sup>

The process for developing the place types was iterative as illustrated in Figure 3. The process began by using 2010 land use and socio-economic data at the TAZ level.<sup>2</sup>

The TAZ-level data is used to develop the CCTA countywide travel demand model and is linked to Geographic Information System (GIS) spatial coverages for visualization. Key data from this dataset included households and employment data including manufacturing and agricultural employment.

This data was supplemented by other data from Walk Score®, an internet-based site that rates street addresses based on the walkability to nearby utilitarian amenities (e.g., grocery, restaurants, entertainment)<sup>3</sup>. Transit schedules were also used to attempt to label place types.

Finally, TAZes were labeled based on a visual inspection of land use parcel and transit station and route GIS coverages provided by CCTA as well as maps showing Metropolitan Transportation Commission (MTC) Place Types. One of the most important tools used by the study team was Google Earth®, a geo-spatial satellite imagery viewing software that also has a “Street View” feature that allows one to view images at street level.

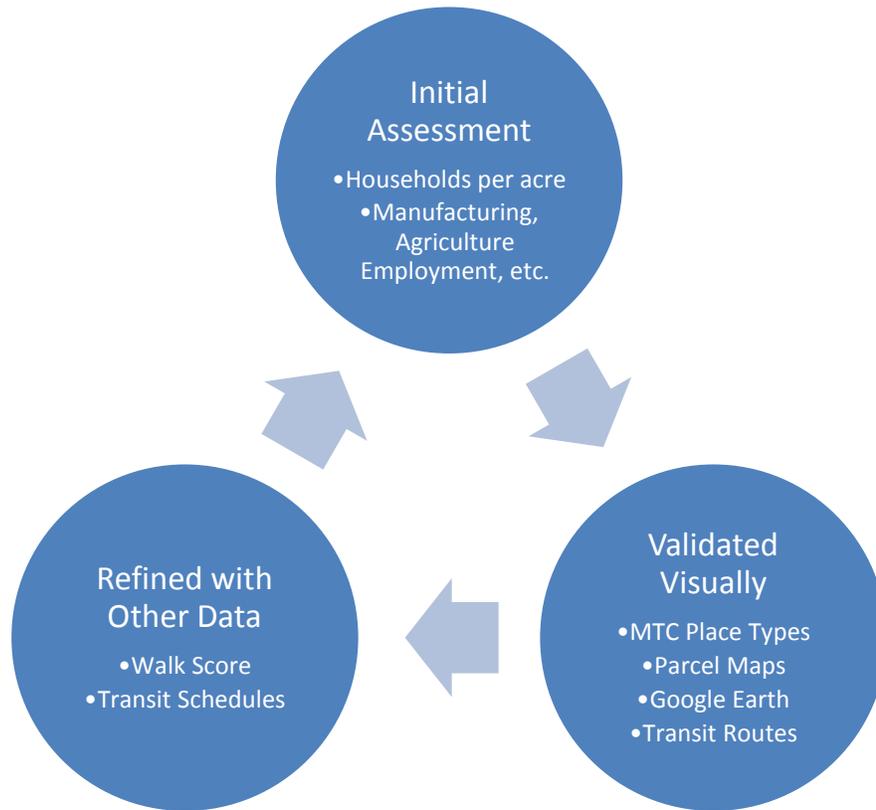
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<sup>1</sup> California Department of Transportation. (2010). *Smart Mobility 2010: A Call to Action for the New Decade*. [http://www.dot.ca.gov/hq/tpp/offices/ocp/documents/smf\\_files/SMF\\_handbook\\_062210.pdf](http://www.dot.ca.gov/hq/tpp/offices/ocp/documents/smf_files/SMF_handbook_062210.pdf)

<sup>2</sup> Contra Costa Transportation Authority (2010). CCTA Countywide Model Master Land Use Data.

<sup>3</sup> [www.walkscore.com](http://www.walkscore.com)

Figure 3: General Place Type Evaluation Methodology



Labeling TAZes with SMF Place types was an iterative process using all of the data sources and tools described above. There were also challenges in that there are no firm guidelines to apply quantitative measures to place types. For example, one of the key features of a highly compact place is residential density, but there are no thresholds to use for what constitutes a *Close-In Compact Neighborhood* versus a *Suburban Neighborhood*. The same holds true for other quantitative measures.

However, in combination with a visual validation, it may be possible to develop a “first cut” at identifying place types pending a thorough review by community representatives with extensive local experience and knowledge.

The following sections discuss in more detail each of the data sources and tools used for this analysis, including:

- CCTA Traffic Analysis Zone (TAZ) Data
- MTC Place Types
- CCTA Parcel Maps
- Google Earth®
- Walk Score®
- Transit Schedules.

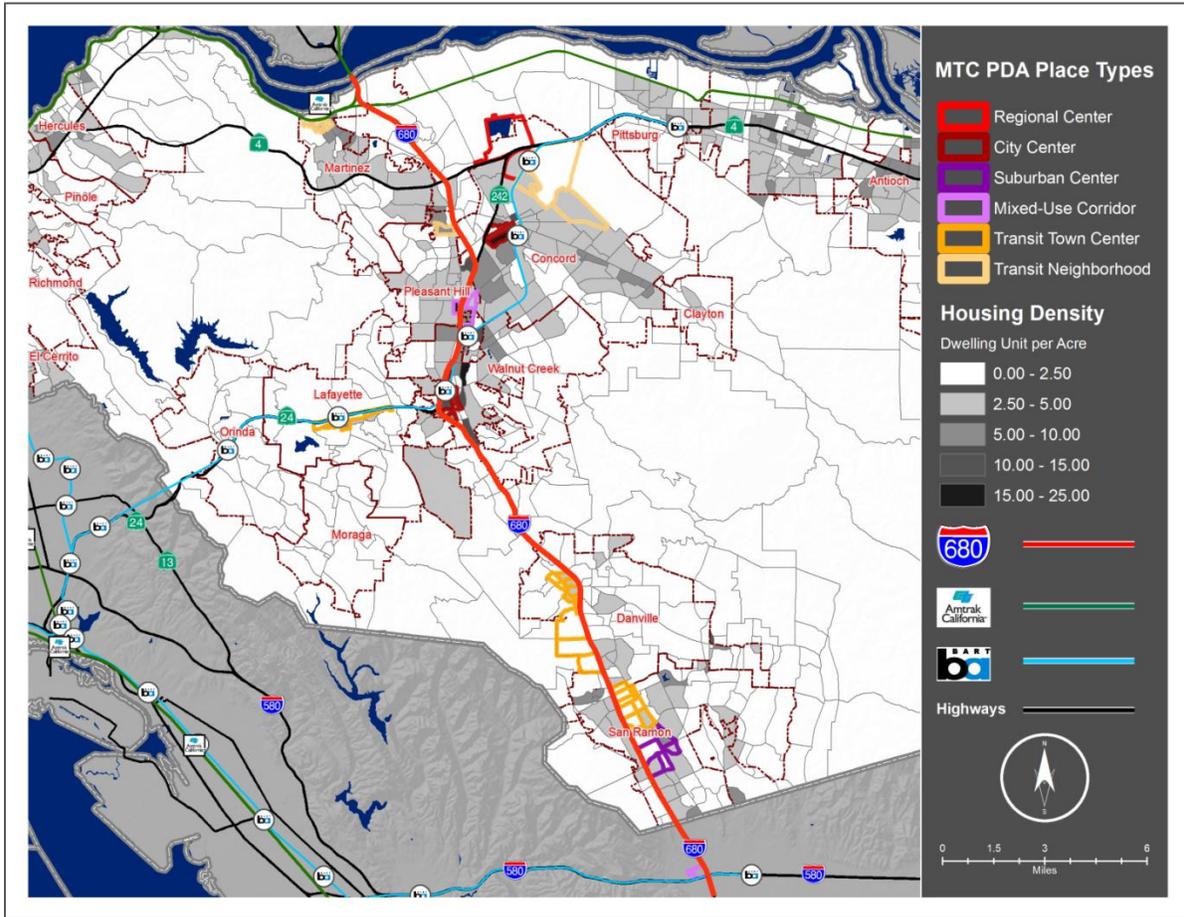
## CCTA Traffic Analysis Zone (TAZ) Data

The first step in the place type analysis was to obtain 2010 Land Use data by TAZ from the CCTA travel demand model. This extensive data includes several key variables that were used at least for the initial screening of TAZes including:

- Acres
- Households
- Total Employment
- Retail Employment
- Service Employment
- Other Employment
- Agricultural Employment
- Manufacturing Employment
- Wholesale Employment.

The TAZ household and acreage data were used to develop the Households per Acre statistic used to gauge residential housing density. Though it is preferable to use housing units per acre instead of households per acre as a measure of density, this data was not readily available for the analysis. The reason that housing units is a better measure is that it accounts for empty units that may be available. Because the foreclosure crisis hit some areas of Contra Costa County particularly hard, using households may not represent the true residential density of a particular TAZ. Figure 4 illustrates how household density data was used as part of the evaluation and combined visually with MTC Place Types (discussed below).

Figure 4: Household Density and MTC Place Types



The CCTA data also has several employment statistics that were used to identify the mix of employment in a TAZ. For this analysis SMG grouped retail and service employment into a category called “Local Serving” commercial employment, which may be an indicator of commercial retail businesses that residents may be able to readily access. For example, a TAZ with high number of retail stores and services and high residential densities may be a TAZ that is a compact community if verified by visual inspection.

Manufacturing and Wholesale employment were added together into a single category because this type of employment may be indicative of a special use area. A TAZ with high total manufacturing and wholesale employment, high relative employment as a percentage of other types of employment, and with low residential densities is likely a TAZ that is a *Special Use Area* place type.

Agricultural employment was used to identify “Rural and Agricultural Lands” place types. If a TAZ has high total agricultural employment and as a percentage of other employment types in conjunction with residential densities, then that place type was flagged as rural and agricultural pending a visual inspection.

The CCTA data was sorted first by the Manufacturing+Wholesale employment category. TAZes with high absolute and relative levels of employment were reviewed in Google Earth®. If the analyst concluded that they appeared to be a *Special Use Area* they were labeled accordingly. Once the analyst was unable to determine the place type visually, this analysis was stopped and other methods were used to evaluate the TAZes. The same approach was used for Agricultural land uses.

Initially, the household density metric was analyzed in a similar manner to the employment data. Once sorted, the analyst would flag the highest density TAZes and flag them as being *Close-In*. This *Close-In* classification was further scrutinized by using the Walk Score®, “Local Serving” employment, and visually to qualitatively label the TAZ was *Close-In* or a “Center” (e.g., Urban or Suburban) or one of the *Suburban Community* classifications.

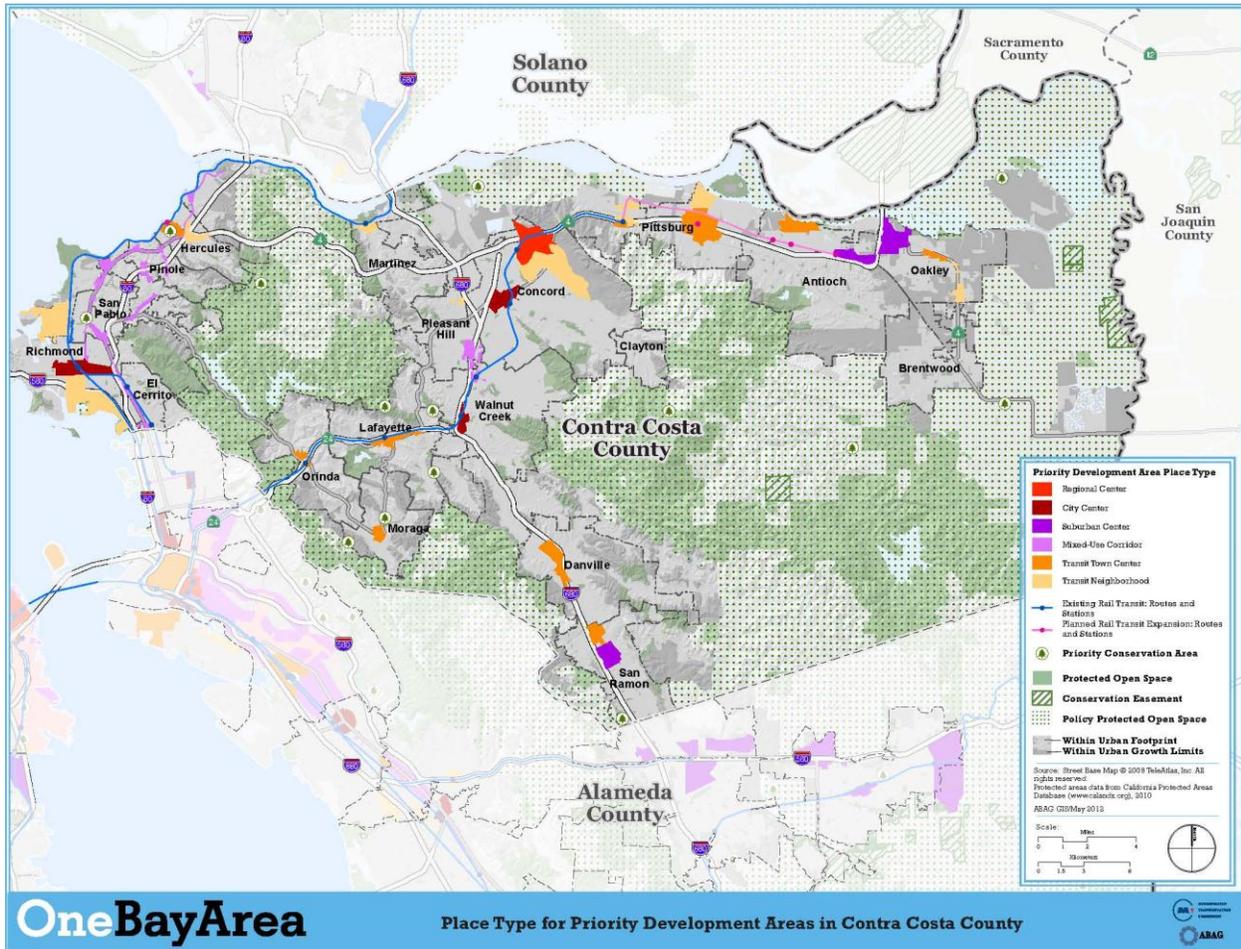
As one of the final review steps in the analysis, these socio-economic data items were used to identify TAZes that may have a place type label applied incorrectly during the process. The data were re-sorted by assigned place type and a review of the extreme values was performed. For example, if a TAZ was labeled as a *Close-In* place type, yet had a very low household density, that TAZ was reviewed visually a final time for classification.

## MTC Place Types

SMG mapped the MTC Place Types to the CCTA TAZ coverage (Shown in Figure 4 above). The MTC Place Types were developed in coordination with local jurisdictions to help communities to identify Priority Development Areas (PDAs) where there exist opportunities for future infill development as shown in Figure 5.

The MTC Place Type classifications may be more prescriptive of what can be done to benefit a community rather than descriptive of an existing condition where the SMF Place Types are more descriptive in labeling of existing land uses within an area that may be candidates for transition to another place type.

Figure 5: MTC Contra Costa County Place Types



Source: Association of Bay Area Governments (ABAG) Jobs-Housing Connection Strategy. May 2012.

The MTC Place Types were used in this analysis to validate the SMF Place Type labeling. For example, downtown Danville is a *Transit Town Center* PDA with local commitment to increase housing and amenities in a pedestrian-friendly environment served by transit.<sup>1</sup>

Since downtown Danville currently has housing densities, relatively high Walk Scores® to existing amenities, and relatively accessible transit services it was labeled by the study team as a “Compact Community” SMF Place Type to be consistent with the community defined *Transit Town Center* Place Type.

SMG attempted to label TAZes with an MTC/SMF correspondence. However, the existing condition of the location did not correspond to the future-looking MTC Place Type. For example, TAZes adjacent to the North Concord/Martinez BART Station are designated as a *Regional Center* MTC Place Type. But when these were reviewed by the study team, these locations were deemed to be closer to the

<sup>1</sup> Eligibility to be classified as a PDA, a community has to be near existing or planned fixed transit or served by comparable bus service, and planned for more housing according to MTC guidelines.

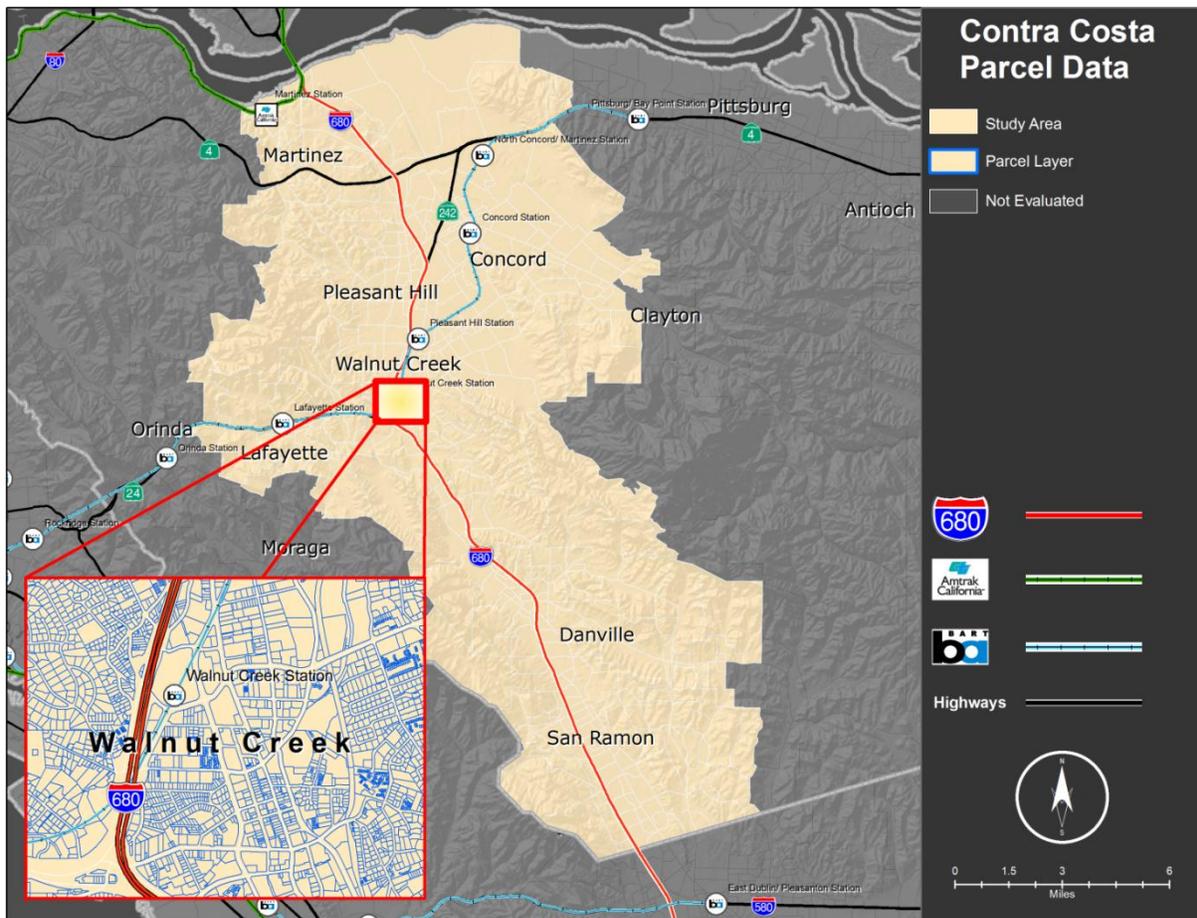
Suburban Community or Special Use Area SMF Place Type even though much of that area has been designated by the community to transition to a *Regional Center* PDA. The SMG analysis indicated relatively low existing residential densities as well as few people-oriented land uses and amenities near the BART Station.

### CCTA Parcel Maps

The parcel maps by CCTA proved extremely useful to identify *Suburban Community* Place Types. The parcel maps show each parcel of land along with street layouts for Contra Costa County as illustrated in Figure 6. Since much of the I-680 study corridor may be considered suburban residential in nature, the majority of TAZes were labeled *Suburban Community* by overlaying the TAZ GIS coverage on top of the parcel maps and manually selecting TAZes that “looked” suburban due to the street layout (e.g., having cul-de-sacs).

Follow-up analyses using other metrics were used to ultimately label TAZes, but this tool allowed the study team to quickly identify the majority of place types.

Figure 6: Contra Costa County Parcel Data

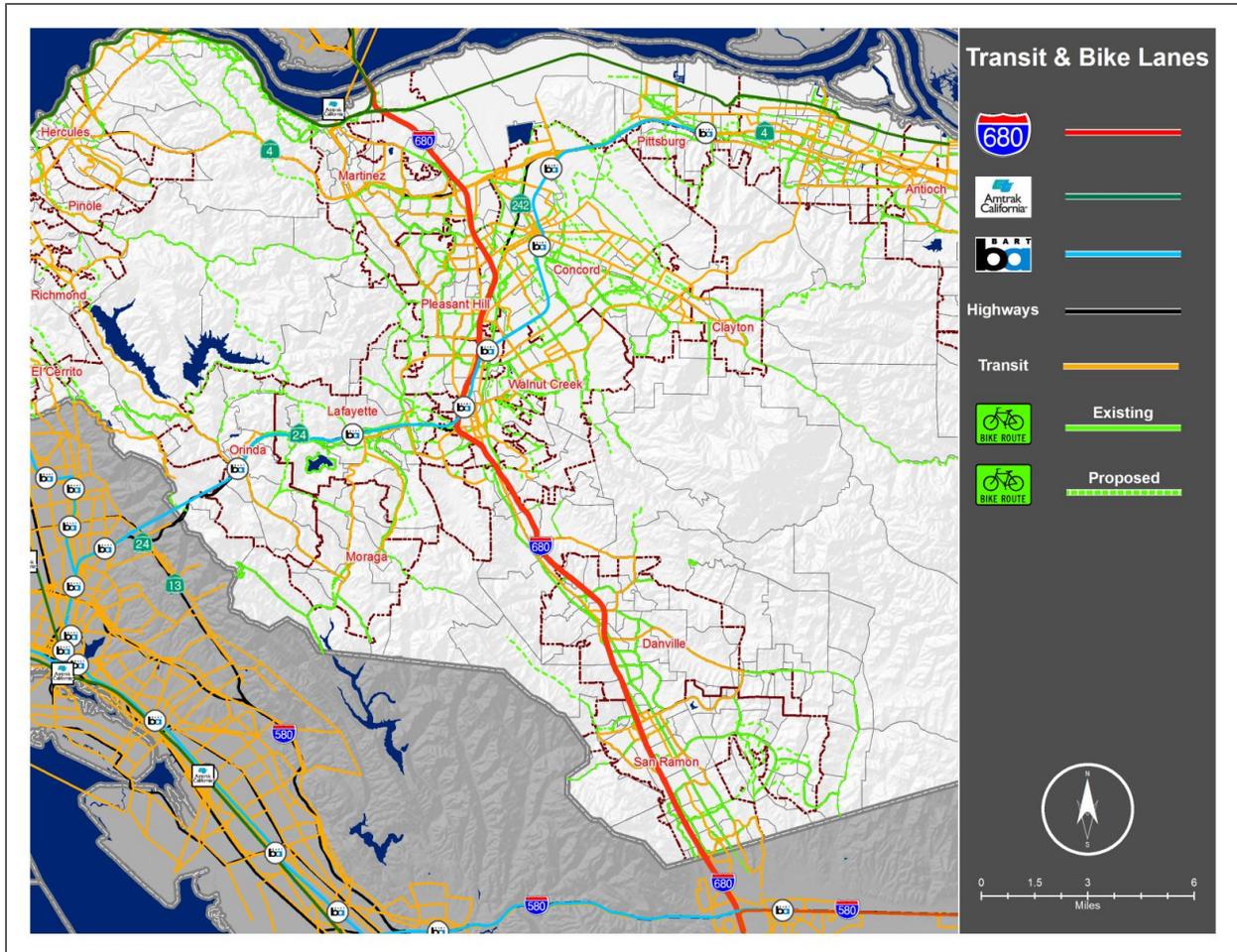


Source: CCTA Parcel GIS Coverages 2012.

## CCTA Transit, Bicycle and Pedestrian GIS Coverages

These GIS coverages illustrated in Figure 7 were useful to visually identify TAZes with high concentrations of transit and non-motorized access. These coverages were used primarily to qualitatively review TAZes. For example, TAZes within a quarter mile of BART stations were flagged for identification as an Urban or Suburban Center, or *Close-In* place types unless other criteria suggested that another place type classification was more important.

Figure 7: Contra Costa County Transit and Bike Lanes



Source: CCTA Transit and Bicycle GIS Coverages 2012.

## Google Earth®

Google Earth is a well-known virtual globe mapping software package used by Caltrans and other regional agencies for planning purposes.

Google Earth was the primary tool used to visually validate SMF Place Types in conjunction with CCTA Parcel Maps. All TAZes labeled *Special Use Area* were validated using Google Earth, and it was instrumental in reviewing all TAZes where questions existed about the Place Type label.

Uses of Google Earth include cases where a TAZ was labeled as *Close-In*, but had a low Walk Score® or was labeled as a *Suburban Community*, but had a high Walk Score. As mentioned earlier, TAZes with high manufacturing or agricultural employment were verified using Google Earth before labeling them as *Special Use Area*.

## Walk Score®

Walk Score®<sup>1</sup> is a system to rate, from a score of 0 to 100, the walkability of a location based on an algorithm that evaluates the distance to utilitarian amenities in various categories. (Walk Score, 2011) The patent pending methodology calculates the most likely route and distance to one of nine amenity categories and penalizes locations that have long blocks or low intersection density. In addition it weights the categories according to their importance. The nine categories and the respective weightings are shown below:

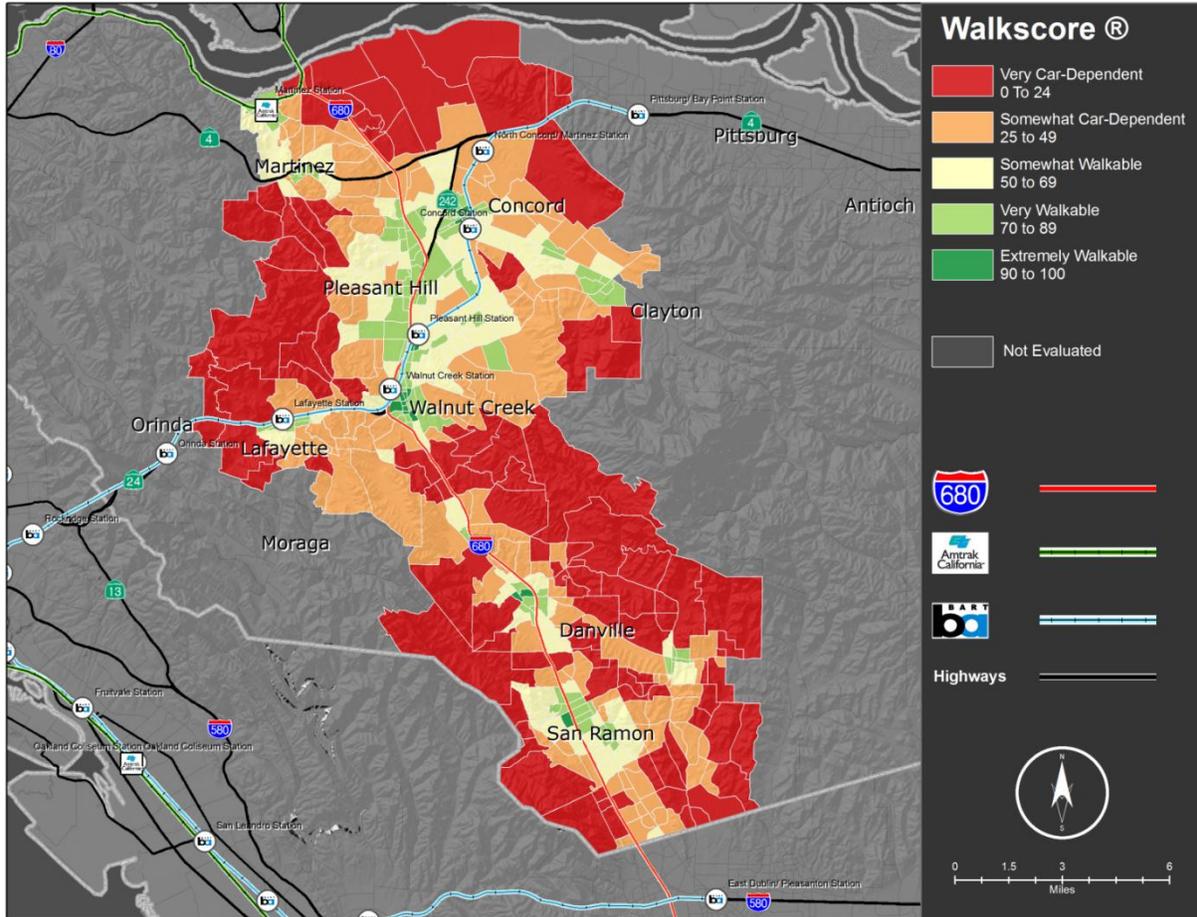
- Grocery
- Coffee
- Banks
- Books
- Entertainment
- Parks
- Schools
- Restaurants
- Shopping.

SMG recognizes that Walk Score® may not be fully tested as a metric for pedestrian-oriented neighborhoods as it is not currently used by Caltrans, CCTA, or other regional entities for planning. Moreover, there may be very walkable neighborhoods that are not quantified as such by Walk Score. The study team, therefore, used it as one metric among many in evaluating place types.

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<sup>1</sup> <http://www.walkscore.com/>

Figure 8: I-680 Corridor Walk Scores



Source: SMG analysis of Walk Score. 2012

To analyze the TAZs, SMG took the centroid of each TAZ near the corridor or belonging to a city or town that touches the corridor and used the Walk Score® website to produce the associated score for the TAZ. The results of this analysis are shown in Exhibit x below. For very large TAZs, this may not accurately capture the walkability of that TAZ if, say, the TAZ is largely vacant, but with a walkable neighborhood on edge of the TAZ. The team used the Walk Score® recommended ranges for walkability as follows:

- 0-24 Very Car Dependent
- 25-49 Somewhat Car Dependent
- 50-69 Somewhat Walkable
- 70-89 Very Walkable
- 90-100 Extremely Walkable.

If a TAZ was near an *Urban Center* Place Type such as in Walnut Creek, had relatively high household densities, and a high Walk Score, it would be labeled as an *In-Close Compact* TAZ. If the same TAZ was instead not adjacent to an Urban Center, it would be labeled as a *Suburban Center*.

One result of using the Walk Score® methodology, was that the team labeled some TAZes in the Blackhawk-Camino Tassajara community as a *Suburban Center* based on the Walk Score® in addition to the residential densities and the access transit in that area. One of the objectives of the SMF is to be able to identify areas with potentially high “latent” location efficiency where land use, urban design patterns, and demographic characteristics could improve Smart Mobility outcomes if a fuller range of transportation facilities and services were present. (California Department of Transportation, 2010)

It is also important to note that Walk Score® was correlated with TAZ size. This is to be expected since TAZes are sized based on the demographics in an area. Cities or towns with higher population or employment densities have smaller TAZes.

## Transit Schedules

In some cases, transit schedules were reviewed to assess the frequency of service. This was done if there was a question about whether to label a TAZ as a *Suburban Community* or a *Close-In Community*. A TAZ with a transit access with a high frequency of peak period service may be designated a *Close-In Community* if adjacent to other TAZes with a similar label or if it lay near an *Urban Center*.

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California Department of Transportation. (2010). *Smart Mobility 2010: A Call to Action for the New Decade*. Sacramento: California Department of Transportation.

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