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SB 375 Regional Greenhouse Gas Emission Reduction Target-Setting Report for the San Luis Obispo Region

Preliminary Analysis

(for submittal to California Air Resources Board)

DRAFT

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Executive Summary

In September 2008 the Governor signed Senate Bill 375 (SB 375), which encourages coordinated land use and transportation planning at the regional level to reduce greenhouse gas emissions from passenger and light duty vehicles. SB 375 requires all 18 MPOs in California to develop a Sustainable Communities Strategy (SCS) as an additional element of the regional transportation plan. The California Air Resources Board (ARB) is required to adopt regional greenhouse gas targets for each region for years 2020 and 2035. The SCS is meant to include a set of land use and transportation strategies that will, if implemented, reduce greenhouse gas emissions from passenger vehicles and meet the regional targets. If the SCS is unable to meet the regional target, then an Alternative Planning Strategy (APS) is to be prepared by the MPO that shows that it will meet the regional target.

The ARB-appointed Regional Targets Advisory Committee (RTAC) recommended a process for MPOs to work with ARB staff to allow MPOs to provide their own target methodology and modeling results for ARB to consider in the target-setting process.

In the process of preparing the *SLOCOG 2010 Regional Transportation Plan* (RTP), the agency undertook a preliminary analysis of several planning scenarios based on the *Community 2050* Regional Blueprint's *Regional Growth Strategy* with guidance from its SB 375/Sustainable Communities Strategy Joint Policy Committee and Working Team comprised of representatives from SLOCOG, LAFCO, APCD, the County of San Luis Obispo and several cities. During that process, land use and transportation scenarios for 2035 were examined to coincide with the planning horizon of the RTP. The outcome of that effort was the development of a *Preliminary Sustainable Communities Strategy (PSCS) to* (a) continue to build upon interagency coordination on issues of regional concern established in the *Community 2050* regional blueprint planning process, (b) develop land use and travel modeling tools integral to the implementation of SB 375, (c) identify current and future data needs, and (d) develop staff capacity with modeling tools.

A 2008 existing conditions land use scenario and four 2035 land use scenarios were examined as part of that process. A "business-as-usual" scenario identified a likely future development pattern based on trends of the recent past, which would be a continuation of a low density development pattern throughout the region. Three alternative land use scenarios were compared against the "business-as-usual" scenario. Each alternative scenario assumed progressive intensification in the target development areas – the existing commercial corridors, downtowns, and villages throughout the region – and progressively less rural residential development. The Working Team and Joint Policy Committee recommended the 2035 Scenario 2 as the "Preferred Growth Scenario", as it best fit the test of being 'reasonably anticipated' and a scenario that was both ambitious and achievable.

Over the past several months, SLOCOG has participated in the target-setting process in coordination with planning staff from member jurisdictions, ARB staff, and planning and technical staff from other MPOs. In partnership with planning staff from member jurisdictions, SLOCOG staff developed two 2020 land use scenarios for purposes of the target-setting process. The assumptions for these scenarios is that they are consistent with the policy basis of both the 2035 Scenario 1

("Business-As-Usual") and 2035 Scenario 2 ("Preferred Growth Scenario") but the rate of growth will be slower during the earlier years.

This report outlines the assumptions and technical analysis used by SLOCOG in planning scenarios for three time periods: 2008 base year, 2020 interim and 2035 horizon years. Three models are used in this analysis: I-PLACE^{3}S (a regional land use model), TransCAD (a regional traffic model), and EMFAC (a regional greenhouse gas emissions model). The final output of this three-model system is an estimated greenhouse gas emission figure for each of the scenarios tested. The primary metric used to evaluate the planning scenarios is greenhouse gas emission reduction per capita of a given land use and transportation scenario alternative when measured against the base case ("business-as-usual") planning scenario.

Summary of Traffic Model Results

Table ES-1 summarizes the overall change in vehicle miles of travel and greenhouse gas emissions (both total and per capita figures) for the 2035 horizon year as compared to the 2008 base year results.

Table ES-1. Baseline comparison of VMT and GHG figures between 2008 and 2035

Evaluation Criteria (2008 base year vs. 2035 horizon year)	2008 Base Year	2035 Scenario 1 "Business-As-Usual"	2035 Scenario 2 "Preferred Growth Scenario"	% Increase / % Reduction		
				2008 BY vs. 2035 S1	2008 BY vs. 2035 S2	2035 S2 vs. 2035 S1
Population	269,300	330,800	330,800	22.8%	22.8%	0.0%
Daily VMT (land use and 4-D improvements only)	8,016,501	9,293,131	9,068,851	15.9%	13.1%	-2.4%
Daily VMT per capita (land use and 4-D improvements only)	29.8	28.1	27.4	-5.6%	-7.9%	-2.4%
Quick Response Tool reduction rate (applied to Daily VMT to account for transit and TDM improvements)	--	-3.38%	-3.46%	--	--	--
Daily VMT (land use, 4-D and transit and TDM improvements)	8,016,501	8,979,023	8,755,069	12.0%	9.2%	-2.5%
Daily VMT per capita (land use, 4-D and transit and TDM improvements)	29.8	27.1	26.5	-8.8%	-11.1%	-2.5%
Daily CO_2 emissions per capita (kg per capita)	12.2	11.4	11.2	-6.6%	-8.2%	-1.8%

Note: The Pavley II and Low Carbon Fuel Standard adjustments are not applied in this planning scenario process.

When accounting for land use and 4-D improvements only, 2035 Scenario 2 produces a 7.9% reduction in VMT per capita over the 2008 base year (29.8 to 27.4 VMT per capita), while 2035 Scenario 1 produces a 5.6% reduction in VMT per capita over the 2008 base year (29.8 to 28.1 VMT per capita). When also accounting for transit and TDM improvements using the VMT Quick Response Tool, 2035 Scenario 2 produces an 11.1% reduction in VMT per capita over the 2008 base year (29.8 to 26.5 VMT per capita), while 2035 Scenario 1 produces an 8.8% reduction in VMT per capita over the 2008 base year (29.8 to 27.1 VMT per capita). When comparing 2035 Scenario 2 to 2035 Scenario 1, Scenario 2 produces a 2.4% reduction in VMT per capita for land use and 4-D improvements only, and a 2.5% reduction in VMT per capita when accounting for transit and TDM improvements.

Table ES-2 summarizes the overall change in vehicle miles of travel and greenhouse gas emissions (both total and per capita figures) for the 2020 interim year as compared to the 2008 base year results.

Table ES-2. Baseline comparison of VMT and GHG figures for 2008 and 2020

Evaluation Criteria (2008 base year vs. 2020 interim year)	2008 Base Year	2020 Scenario 1 "Business-As-Usual"	2020 Scenario 2 "Preferred Growth Scenario"	% Increase / % Reduction		
				2008 BY vs. 2020 S1	2008 BY vs. 2020 S2	2020 S2 vs. 2020 S1
Population	269,300	288,000	288,000	6.9%	6.9%	0.0%
Daily VMT (land use and 4-D improvements only)	8,016,501	8,070,899	8,013,341	0.7%	-0.04%	-0.7%
Daily VMT per capita (land use and 4-D improvements only)	29.8	28.0	27.8	-5.9%	-6.5%	-0.7%
Quick Response Tool reduction rate (applied to Daily VMT to account for transit and TDM improvements)	--	-1.00%	-1.68%	--	--	--
Daily VMT (land use, 4-D and transit and TDM improvements)	8,016,501	7,990,190	7,878,717	-0.3%	-1.7%	-1.4%
Daily VMT per capita (land use, 4-D and transit and TDM improvements)	29.8	27.7	27.4	-6.8%	-8.1%	-1.4%
Daily CO_2 emissions per capita (kg per capita)	12.2	11.4	11.3	-6.6%	-7.4%	-0.9%

Note: The Pavley II and Low Carbon Fuel Standard adjustments are not applied in this planning scenario process.

When accounting for land use and 4-D improvements only, 2020 Scenario 2 produces a 6.5% reduction in VMT per capita over the 2008 base year (29.8 to 27.8 VMT per capita), while 2020 Scenario 1 produces a 5.9% reduction in VMT per capita over the 2008 base year (29.8 to 28.0 VMT per capita). When also accounting for transit and TDM improvements using the VMT Quick Response Tool, 2020 Scenario 2 produces an 8.1% reduction in VMT per capita over the 2008 base year (29.8 to 27.4 VMT per capita), while 2020 Scenario 1 produces an 6.8% reduction in VMT per capita over the 2008 base year (29.8 to 27.7 VMT per capita). When comparing 2020 Scenario 2 to 2020 Scenario 1, Scenario 2 produces a 0.7% reduction in VMT per capita for land use and 4-D improvements only, and a 1.4% reduction in VMT per capita when accounting for transit and TDM improvements.

Summary of Findings and Conclusions

The following are key findings and conclusions that can be drawn at the completion of this preliminary analysis several planning scenarios:

1. No single variable can generate a significant shift in VMT alone. Noticeable shifts can be achieved through coordinated efforts effect change in: land use patterns, application of 4-D elements, transit, and TDM.
2. Land use shifts (and 4-D improvements) that resulted in a slight reduction in total daily VMT in the 2020 Scenario 2 (from the 2008 base year) may in part be attributable to an improved balance of jobs and housing in the Central County subregion for that time period (as compared to the overall time period of 2008 to 2035). This may warrant a closer examination of the relationship of jobs-housing balance in the region and total daily VMT in the scenario planning process of the Sustainable Communities Strategy in the next two years.
3. Population growth from 2008 to 2035 (22.8% increase) in the San Luis Obispo region outpaces growth in VMT in the region for both 2035 scenarios (15.9% increase for Scenario 1 and 13.1% increase for Scenario 2), resulting in a reduction in daily VMT per capita for both 2035 scenarios. Historically, growth in VMT has outpaced population growth. From 1970 to 2005, growth in vehicle miles of travel has outpaced growth in population by nearly three-fold in the United States.

4. Pricing adjustments are expected to have noticeable impacts on VMT, but are not easily adjusted by SLOCOG (including adjustments to parking costs, fuel cost or lane-pricing). An additional benefit would be the resulting revenues to further fund VMT-reducing improvements or incentives.
5. The SLOCOG VMT Quick Response Tool provides a low-cost approach to ascertain the affect of TDM and transit improvements on VMT without the very costly investment (potentially $1 million or more) to build a sophisticated, mode-choice, travel demand model.
6. The process requires directions for consistency, especially for: handling of IX, XI, and XX trip, use of statewide projections at MPO boundaries, application of post-processor results, and a list of specific metrics expected from MPOs.
7. The smaller variation between 2020 Scenario 2 and 2020 Scenario 1 for daily VMT per capita results (a 0.7% difference) may reflect the slow pace of growth anticipated in the next decade. A modest variation in results between 2035 Scenario 2 and 2035 Scenario 1 for daily VMT per capita (a 2.4% difference) may reflect the assumption that many of the smart growth investments in existing corridors, downtowns and villages will take a longer time to realize; likewise, the VMT reduction expected from such projects may not show up until the later years in the planning horizon.
8. The modeling tools used in this scenario planning effort allow SLOCOG staff to reflect future housing and employment growth at the parcel-level, which allows for a relatively detailed reflection of a potential future land use scenario. However, there may be over-riding considerations made for SLOCOG's staff ability to accurately reflect the timing of future growth in the region relative to the 2020 interim year. This may impact the ability to present a likely reflection of a future growth in the region for the interim year, which could overstate reductions in total VMT and VMT per capita.

Organization of Report

The regional greenhouse gas target-setting report contains seven sections. Section 1 provides an overview of the work SLOCOG has completed to date as it relates to implementation of SB 375 including the preparation of a *Preliminary Sustainable Communities Strategy* as part of the concurrent preparation of the 2010 RTP.

Section 2 provides an overview of the modeling tools and data inputs, including a discussion of the development of the regional land use information system (an outcome of the *Community 2050* regional blueprint plan) that has facilitated a parcel-based and rule-based regional land use modeling process.

Section 3 provides an overview of the land use scenario development process, including a discussion of the growth allocation approach used in the development of the land use scenarios.

Section 4 provides a summary of the land use scenario results, including a comparison of the 2008 base year to the 2020 interim and 2035 horizon years for the following geographic levels: regional, four subregional areas, and six subregional "urbanized" or "future urbanized" areas.

Section 5 provides a summary of the assumptions and process used in the development and application of the regional traffic model, including the network improvements made for years 2020 and 2035 and the integration of 4-D variables to the modeling process.

Section 6 provides a summary of the results from the regional traffic model, including per capita results and a discussion of the application of the VMT Quick Response Tool to reflect the effect improvements in transit and TDM can have on VMT in the region.

Section 7 provides a summary of the key findings and conclusions drawn from this scenario planning effort.

Section 1. Introduction

Background and Purpose

Senate Bill 375 (Steinberg, 2008) encourages coordinated planning on a regional scale, in a manner designed to reduce vehicle miles traveled and associated greenhouse gas emissions. It requires the California Air Resources Board (ARB) to provide regional greenhouse gas emissions targets for passenger vehicles and light trucks for all 18 MPOs in the state. Each MPO must then adopt a Sustainable Communities Strategy (SCS). The MPO must adopt a regional land use and transportation that, when adopted, would achieve the regional greenhouse gas target established for 2020 and 2035. If the MPO can not show that its SCS can meet the regional greenhouse gas reduction target, an Alternate Planning Strategy (APS) that *would* achieve the targets must be developed and adopted.

The following are some of the important changes in land use and transportation planning that would occur under SB 375:

1) ***Regional Emissions Targets***. By September 30, 2010, ARB must establish greenhouse gas emission reduction targets for all 18 MPOs in the state. The regional targets are to focus on automobiles and light trucks, and must be established for the years 2020 and 2035. SB 375 does not set a numeric target, but rather establishes a coordinated inter-agency process to adopt the targets.

2) ***Traffic Models to Account for Land Use-Transportation Relationships***. SB 375 will require the California Transportation Commission (CTC) to update its guidelines for the development and use of travel demand models. These models are to assess the relationship between vehicle miles traveled (VMT), regional jobs/housing balance, and proximity between complementary land uses, proximity to transit, and development density. This is in contrast to models that simply assume every trip associated with a development project is new or that all development generates trips at the same rate or length. These models will shape regional and local planning, as well as CEQA compliance.

3) ***Regional Transportation Plan requirement for new land use component, the Sustainable Communities Strategy (SCS), and Alternative Planning Strategy (APS)***. SB 375 requires RTPs to include an SCS. The SCS must include a development pattern, which, when integrated with the transportation network and other transportation policies, will reduce the greenhouse gas emissions from automobiles and light trucks to achieve the regional emissions targets. If it is not feasible to achieve the targets, the MPO must prepare an Alternative Planning Strategy (APS) identifying the impediments to achieving the targets, and how the targets would be achieved through alternate development patterns, infrastructure or additional transportation measures or policies. SB 375 *does not* require cities or counties to conform their general plans to the SCS or the APS.

SLOCOG 2010 Regional Transportation Plan

The Regional Transportation Plan (RTP) is a blueprint to guide decisions on making the San Luis Obispo region's transportation system accessible, safe, and reliable. It is a necessary activity to meet the federal and state requirements to fund transportation projects in the region. SLOCOG is in the process of developing the *SLOCOG 2010 RTP* to update the 2005 RTP. The *SLOCOG 2010 RTP* contains an integrated set of public policies, strategies and investments to maintain, manage, and improve the transportation system in the San Luis Obispo region over the next 25 years.

SLOCOG's 2005 RTP ("*Vision 2025*") identified three basic system improvement "scenarios" to address the mobility needs for the San Luis Obispo region. These scenarios have been assessed using updated financial projections through 2025. These same three scenarios (*Highway and Streets Emphasis*, *Transit and Rail Emphasis*, and an *Intermodal Emphasis*) were

evaluated in the 2001 RTP. The Intermodal System Emphasis Scenario was chosen and remains as the basis of the current Plan.

Relationship of SCS to Regional Transportation Plan

In December 2008, the SLOCOG Board provided direction regarding the implementation of the *Community 2050* Regional Blueprint. The Board instructed that the 2010 RTP update:

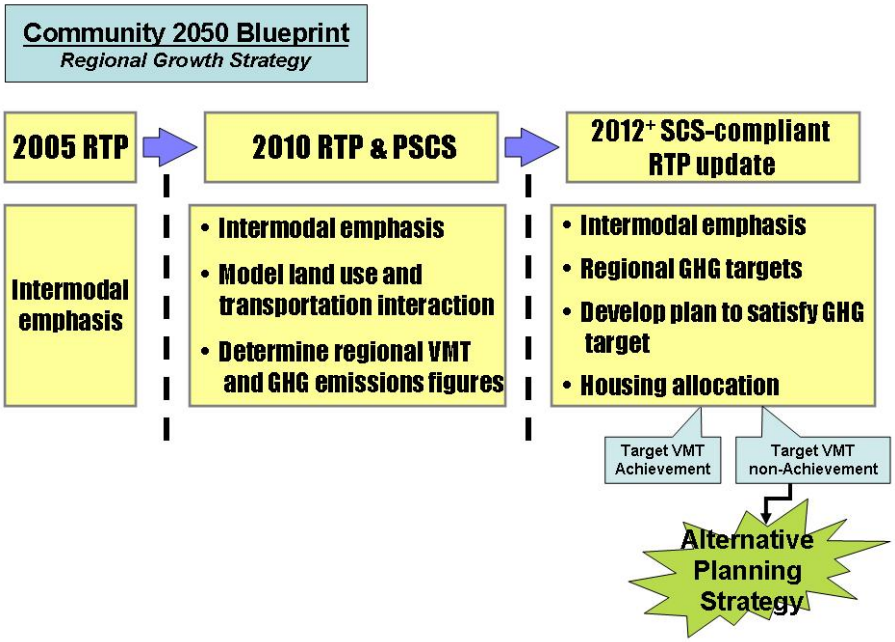
- Integrate the *Community 2050 Regional Growth Strategy* into the 2010 RTP and the Sustainable Communities Strategy
- Refine the targeted development corridors and centers
- Work with member jurisdictions, APCD, and LAFCO to refine urban expansion areas and areas not to grow
- Refine policies and identify incentives and/or programs to implement these efforts

SB 375 assigns responsibilities to SLOCOG to implement the bill's provisions for the San Luis Obispo region. The requirements for the development and adoption of a SCS are extensive and particular. The procedures demand a participatory approach that could not be accommodated under the schedule for updating the current RTP and would be evolving over the next year considering new guidelines and targets. The bill mandates the development of the SCS using an integrated regional land use and transportation planning approach to reduce greenhouse gas emissions from passenger vehicles and light trucks, and coordinate the regional housing needs allocation process with the regional transportation planning process. Extensive public and member agency engagement in the development of the regional greenhouse gas reduction targets and public participation delineating the SCS is required in advance of integrating it into the RTP update. This process will occur after the state establishes regional targets in late 2010.

As part of the concurrent update of the 2010 RTP and SB 375 implementation, SLOCOG has undertaken a preliminary analysis of several planning scenarios over the past year. As the 2010 RTP is not required to address all the requirements of SB 375, it is treated as an interim plan in preparation for the full implementation of SB 375 in its update of the RTP in the next two years. Having noted that, SLOCOG has developed a *Preliminary Sustainable Communities Strategy (PSCS)* to (a) continue to build upon interagency coordination on issues of regional concern established in the *Community 2050* regional blueprint planning process, (b) develop land use and travel modeling tools integral to the implementation of SB 375, (c) identify current and future data needs, and (d) develop staff capacity with modeling tools.

Figure 1 shows the progression from the 2005 RTP through the adoption of the 2010 RTP and the 2012 SCS-compliant RTP update.

Figure 1. Schematic flow from 2005 RTP to SCS-compliant 2012 RTP



The work effort toward developing the 2012 SCS-compliant RTP is depicted in two phases.

The first phase (the 2010 RTP update) builds upon the Intermodal Transportation & Smart Growth Scenario included in the 2005 RTP consistent with the framework of the Regional Growth Strategy outlined in the *Community 2050* regional blueprint. The four major elements (Policy, Action, Financial, and Environmental) are currently being revisited and refined to address some of the requirements in SB 375. Several land use and intermodal transportation scenarios have been developed and evaluated with the objective to create a preliminary SCS for integration into the 2010 RTP.

The second phased (the 2012 RTP) will build upon and further refine the efforts of the Joint Policy Committee and the Working Team to adjust alternatives to satisfy State requirements of SB 375.

In April 2009 the SLOCOG Board established a Joint Policy Committee to oversee and guide the process for the development of the *PSCS* as part of the 2010 RTP update. The Joint Policy Committee was comprised of six elected officials representing cities, San Luis Obispo County, the San Luis Obispo County Local Agency Formation Commission (LAFCO), and the San Luis Obispo County Air Pollution Control District (APCD). Primary responsibilities include:

- Provide direction to the Working Team by reviewing/setting the interim regional targets, as well as goals and performance measures for the *PSCS*.
- Review and provide direction on land use alternatives, associated performance measures and other recommendations from the Working Team; and
- Provide direction on alternatives to be analyzed in the Environmental Impact Report for the 2010 RTP and final recommendations to SLOCOG.

A Working Team comprised of staff from SLOCOG, APCD, LAFCO and member jurisdictions was established in April 2009 to evaluate technical aspects of the process and provide feedback on the *PSCS*. SLOCOG developed four 2035 land use scenarios for review by the Joint Policy Committee and Working Team. The 2035 Scenario 2 was identified as the "Preferred Growth Scenario" for the planning horizon year of 2035. Two 2020 land use scenarios were developed more recently as part of the early implementation of SB 375. The two 2020 land use scenarios were meant to reflect the interim year for two of the 2035 land use scenarios. A full discussion of the land use scenario development process and results can be found in Sections 3 and 4.

Section 2. Modeling Tools and Inputs

Overview of Modeling Tools

Three modeling tools are to be used in order to compare regional land use alternatives:

- I-PLACE3S: A regional land use model
- TransCAD: A regional traffic model
- EMFAC 2007: A regional air quality model

Regional Land Use Model

I-PLACE3S is a regional land use model that allows the operator to allocate future anticipated growth at the parcel level and produces a set of land use performance measures such as dwelling units per acre and total developed acres for each land use scenario created. The output file from I-PLACE3S for each regional land use scenario is to be inputted into and tested with the Regional Traffic Model.

Regional Traffic Model

TransCAD is a regional traffic model that uses land use alternatives as an input and, using its inherent road network, estimates transportation performance measures such as vehicle miles of travel, vehicle speeds, congestion, and delay through trip assignments to meet the demands of those land uses. The output file from TransCAD for each regional land use scenario is to be inputted into and tested with the Regional Air Quality Model.

Regional Air Quality Model

EMFAC 2007 is a regional air quality model that produces performance measures for greenhouse gas emissions and criteria air pollutants for all vehicle types based on vehicle miles traveled, vehicle type, fuel type and vehicle speed. The primary output from EMFAC 2007 is metric tons of carbon dioxide equivalents ($MTCO_2e$) which includes carbon dioxide, nitrous oxide and methane emissions calculated in terms of carbon dioxide emissions.

Long-Range Socio-Economic Projections

The regional land use model is developed in a manner that is consistent with the *Long-Range Socio-Economic Projections* report (ERA, 2009 update) developed for San Luis Obispo County to project countywide population and employment growth through 2035.

In June 2009, the SLOCOG Board adopted revised population and employment projections for San Luis Obispo County through 2035. The SLOCOG Board supported the "Medium Scenario" for population and employment projections. Table 1 summarizes the Medium Scenario projections.

Table 1. 2035 Population and Employment Growth Estimates (Medium Scenario)

Year	Population	Employment[1]
2008	269,300	103,000
2010	273,500	100,600
2015	284,900	106,100
2020	295,400	113,400
2025	305,500	121,100
2030	318,100	129,100
2035	330,800	138,100
Compoud Annual Growth Rate	0.76%	1.09%
Numeric Growth	61,500	35,100
Annual Average	2,300	1,300

Source: Update to Long-Range Socio-Economic Projections (ERA, 2009)

[1] The employment projections are for non-farm employment. Countywide agriculture-based employment is estimated to be 4,500 employees in 2008.

Land Use Data & Land Use Information System

The first step in the regional land use modeling process is to understand the existing conditions. Therefore, the first I-PLACE3S regional land use model output represents existing land use conditions in 2008. The set of performance measures associated with 2008 Existing Conditions may serve as a baseline against which future 2020 and 2035 land use scenarios can be measured.

The regional land use model software requires the following spatial layers and information:

- Countywide parcel base layer
- Generalized land use designation (assigned to all parcels)
- Existing land use classification (assigned to all parcels)
- Countywide traffic analysis zone (TAZ) layer (assigned to all parcels)

Additional spatial information has been collected, aggregated, updated or developed to capture the following information:

- Number of units per parcel
- Number of employees per parcel (estimated)
- Residential building permit information and location (2000 to 2006 for all jurisdictions)
- Commercial square footage information
- Location of antiquated subdivisions
- City limit boundaries
- Unincorporated community boundaries (urban and village reserve lines)
- County rural planning area boundaries
- Spheres of influence boundaries

Figure 2 provides a map of the San Luis Obispo region and its communities and the region's relation to neighboring counties and communities in northern Santa Barbara County

Figure 2. Map of San Luis Obispo region and its communities

Model Land Use Designations

The I-PLACE^{3}S modeling software requires the development of "Generalized Land Use Classifications", or GLUCs, which are meant to reflect standardized general plan land use designations. The term "Model Land Use Designations" was used to clarify the distinction between a city's general plan designation and the generalized land use designation that has been used for modeling purposes.

The general plans and zoning ordinances were examined to develop consistent land use categories between the eight general plans in the region (the County and the seven cities). Once Model Land Use Designations were developed for all residential, commercial and mixed-use designations, all parcels in the county were assigned a MLUD based on the designation that most closely reflects the actual general plan designation.

A list of the Model Land Use Designations used in this land use modeling effort is included in Appendix C.

Regional Place Types

The I-PLACE3S software uses development types, or land use categories, to assign to parcels with similar characteristics. This development types are referred to as Place Types in the context of the software. Included in these Place Types are a set of assumptions that define what the Place Type is, what its physical form is, and ultimately, the development yield[1] of the use. Place Types have similar function as general plan or zoning designations; in I-PLACE^{3}S you are able to specify the physical parameters of each designation and then apply them to a growth scenario. Place Types are created and managed from the "Place Type Manager". The "Place Type Manager" lists all of the Place Types available within the given project. It also lists summary information for each Place Type including:

- Dwelling units per acre;
- Employees per acre;
- Percentage of use in each general sector (residential, retail, office, industrial, public, other); and
- Floor Area Ratio

A list of the Regional Place Types used in this land use modeling effort is included in Appendix D.

[1] The development yield of a given Place Type is housing units per acre in the case of residential Place Types, employees per acre in the case of employment Place Types, or a combination of housing units per acre and employees per acre in the case of mixed-use Place Types.

Section 3. 2020 and 2035 Land Use Scenario Development

Scenario Descriptions

This section briefly describes the two 2020 land use scenarios and the four 2035 land use scenarios that were analyzed over the past year as part of the *Preliminary Sustainable Communities Strategy*.

2035 Scenario 1 (2035 "Business-As-Usual" / Base Case)
2035 Scenario 1 assumes a future development pattern that follows development trends of the recent past, which is a low density development pattern throughout the region. Generally, new development occurs in an outward growth pattern, with limited reinvestment in existing commercial corridors. This scenario also assumes development in the rural unincorporated area continues at its present pace.

2020 Scenario 1 (2020 "Business-As-Usual" / Base Case)
2020 Scenario 1 assumes a future development pattern that follows development trends of the recent past, which is a low density development pattern throughout the region. Generally, new development occurs in an outward growth pattern, with limited reinvestment in existing commercial corridors. This scenario also assumes development in the rural unincorporated area continues at its present pace. This scenario is meant to reflect the interim year of 2020 for 2035 Scenario 1.

2035 Scenario 2 (2035 "Preferred Growth Scenario")
2035 Scenario 2 assumes intensification in the Target Development Areas, which are the existing commercial corridors throughout the county. Twenty percent (20%) of new residential units are accommodated in mixed-use development along these commercial corridors. The scenario also assumes some reduction in the scale of proposed land use projects that are outside county communities and city spheres of influence. This scenario assumes development continues to occur in the rural unincorporated area to a lesser degree than in Scenario 1.

2020 Scenario 2 (2020 "Preferred Growth Scenario")
2020 Scenario 2 assumes intensification in the Target Development Areas, which are the existing commercial corridors throughout the county. Twenty percent (20%) of new residential units are accommodated in mixed-use development along these commercial corridors. The scenario also assumes some reduction in the scale of proposed land use projects that are outside county communities and city spheres of influence. This scenario assumes development continues to occur in the rural unincorporated area to a lesser degree than in Scenario 1. This scenario is meant to reflect the interim year of 2020 for 2035 Scenario 2.

2035 Scenario 3
2035 Scenario 3 assumes additional intensification in the Target Development Areas than what occurs in Scenario 2. Twenty-five percent (25%) of new residential units are accommodated in mixed-use development along these commercial corridors. The scenario also assumes further reduction in the scale of proposed land use projects that are outside county communities and spheres of influence of the seven cities. This scenario also assumes limited development occurs in the rural unincorporated area. An interim year scenario for 2020 was not developed for 2035 Scenario 3.

2035 Scenario 4
2035 Scenario 4 assumes additional intensification in the Target Development Areas than what occurs in Scenario 3. About thirty percent (30%) of new residential units are accommodated in mixed-use development along these commercial corridors. The scenario also assumes no growth is allocated to proposed land use projects that are outside county communities and the spheres of influence of the seven cities. This scenario also assumes no new development occurs on land zoned for agriculture in the rural unincorporated area. This scenario also assumes intensification occurs in medium- and high- density residential areas where additional residential capacity exists under the general plan. An interim year scenario for 2020 was not developed for 2035 Scenario 4.

Growth Allocation Approach

The land use allocation model is a parcel-based and rule-based model. The two 2020 land use scenarios and four 2035 land use scenarios described above were developed to be consistent with the population and employment projections. Each of the scenarios adheres to the control totals for projected housing units (8,500 and 26,000 projected new housing units for 2020 and 2035, respectively) and projected employment growth (10,400 and 35,100 projected new jobs for 2020 and 2035, respectively).

Residential and non-residential growth was allocated to five different types of growth areas: proposed land use projects, target development areas, vacant land in cities and communities, rural unincorporated areas, and medium- and high-density residentially-zoned land with additional capacity under the general plan.

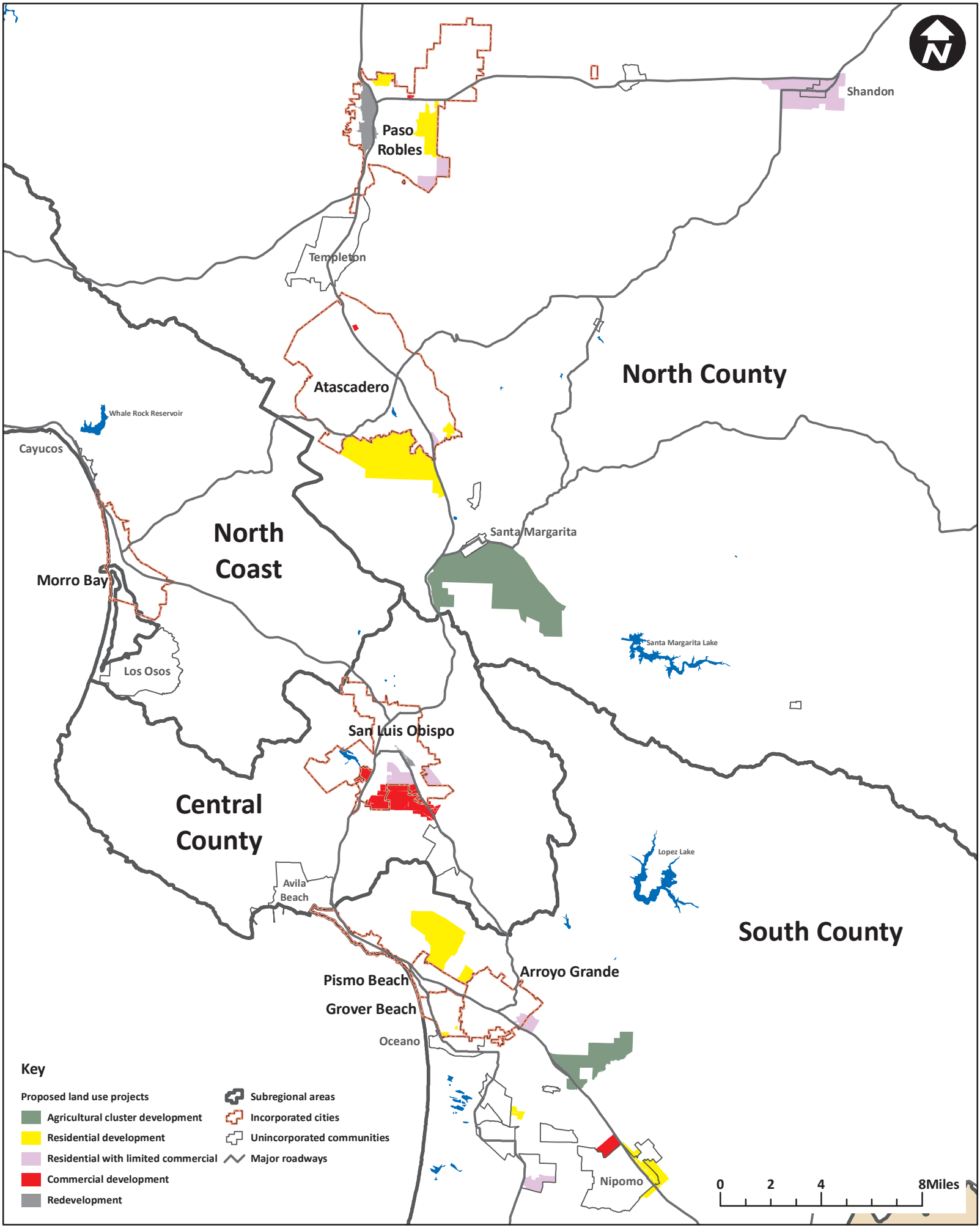
Proposed Land Use Projects

Table 2 provides a summary list of the proposed land use projects included in the scenario development with estimated total acreage and estimated number housing units planned for development. Large or significant new employment centers are also included in this list. Figure 3 shows the location of the proposed land use projects in relation to the existing communities in the region.

Table 2. Proposed land use projects included in land use scenario development

Proposed Land Use Project or Specific Plan	Jurisdiction / Location	Estimated acreage	Estimated number of housing units
Arroyo Linda Crossroads	Arroyo Grande SOI	286	175
Eagle Ranch Specific Plan (less OS)	Atascadero SOI	2,189	600
Chandler Ranch Area Specific Plan	Paso Robles	783	1,439
Cuesta College North expansion (employment only)	Paso Robles	22	0
Olsen-Beechwood SP (Beechwood)	Paso Robles	234	674
Olsen-Beechwood SP (Olsen)	Paso Robles	238	673
N Paso Robles expansion area (College Area)	Paso Robles	21	295
N Paso Robles expansion area	Paso Robles	249	1,055
Uptown/Town Centre Specific Plan	Paso Robles	redevelopment	636
Golden Hill Shopping Center (employment only)	Paso Robles	25	0
Los Robles Del Mar	Pismo Beach SOI	181	312
Price Canyon Master Plan	PB SOI/SLO County	1,488	634
Margarita Area Specific Plan	San Luis Obispo	416	868
South Broad Street Corridor Plan	San Luis Obispo	redevelopment	475
Village at Broad Street	San Luis Obispo	6	123
Airport Area Specific Plan	San Luis Obispo SOI	400	28
Los Osos Valley Road / West Foothill area	San Luis Obispo SOI	875	250
Orcutt Area Specific Plan	San Luis Obispo SOI	231	979
Prefumo Creek Commons (employment only)	San Luis Obispo SOI	17	0
Canada Ranch property (employment only)	SLO County	100	0
Laetitia Agricultural Cluster development	SLO County	1,910	102
Oak Glen Specific Plan (Nipomo)	SLO County	466	240
Oak Glen Specific Plan (Study Area)	SLO County	126	75
Santa Margarita Ranch	SLO County	6,084	514
Shandon Community Plan	SLO County	936	1,847
Woodlands Specific Plan (Phase II)	SLO County	383	650
Dalidio property (mostly employment, limited res.)	SLO SOI/SLO County	130	60
All land use projects		17,794	12,704

Figure 3. Location of proposed land use projects in region



Target Development Areas

As part of the framework of its regional growth strategy, the Community 2050 Regional Blueprint identified Target Development Areas throughout the county. The target development areas are defined around existing commercial corridors and adjacent medium- and high-density residential areas. In many cases, existing regional and local transit routes serves these corridors. Planning staff at local jurisdictions provided feedback on the target development areas in their respective communities and changes were incorporated into the process.

During the *PSCS* planning process a total of 50 Target Development Areas were identified throughout the region using the *Community 2050 Regional Growth Strategy*. Most of the region's existing employment centers are contained within the target development areas. After a review of zoning ordinances for each of the jurisdictions, all but 15 of the target development areas allow mixed-use development. Existing development on commercially-zoned land (that also allows mixed-use development) within the target development areas is largely characterized as single-use commercial properties. The parcel-based land use inventory found that a limited number of mixed-use development projects are in place throughout the county in the target development areas. Figure 4 provides a map of the location of the target development areas in the region.

Vacant Land in Cities and County Communities

Vacant properties exist throughout many of the cities and county communities in the region. Some of these are vacant lots that are part of new residential neighborhoods that have streets, sidewalks and other infrastructure already in place. Some of these properties are larger vacant parcels that are adjacent to existing development that are zoned for either residential or commercial development.

Rural Unincorporated Areas

These areas include properties zoned for Rural Residential (which generally allow for the development of 1 dwelling unit for 5-, 10-, or 20-acre minimum lot size), properties zoned for Agriculture (which require 20-acre to 320-acre minimum lot size), and properties within antiquated subdivisions (where each lot could potentially allow the development of 1 dwelling unit).

Medium- and High-Density Residential Land with Additional Capacity

These areas include properties zoned for medium- or high-density residential development that are not developed to the allowable capacity under the general plan.

Figure 4. Location of target development areas in region

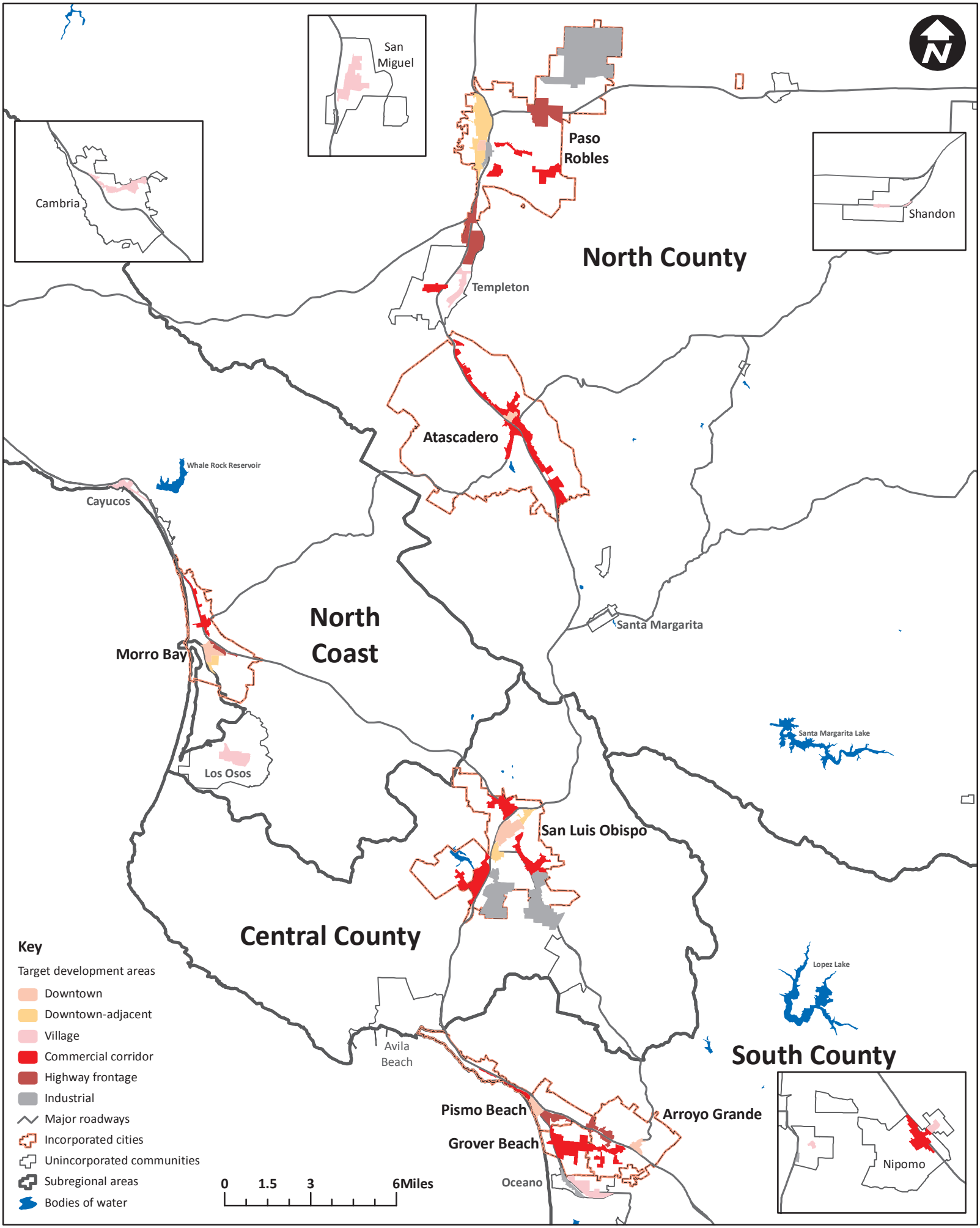


Table 3 provides a summary of how the 2035 land use scenarios were developed and how they differ in the way future residential and non-residential development was allocated throughout the region.

Table 3.
2035 land use scenario descriptions matrix

Planning Theme	**2008 Existing Conditions**	**2035 Scenario 1 "Business-As-Usual"**	**2035 Scenario 2**	**2035 Scenario 3**	**2035 Scenario 4**
	Reflects existing conditions in 2008.	Future development same as recent past (fairly low density). Outward growth pattern, limited reinvestment in existing commercial corridors	Some intensification through reinvestment in existing commercial corridors. Some new development follows historical development pattern.	Additional intensification in existing commercial corridors. Less new development in rural unincorporated area.	Limits development that requires rezoning of agricultural land. Additional intensification in high density residential areas not reaching development capacity.
Land use modeling component	Characterization of each component of land use modeling process for each scenario				
Proposed major land use projects	A number of land use projects are proposed throughout the county.	All projects assumed to be built as proposed.	Reduction in scale of projects for those outside of SOI and outside county communities.	Further reduction in scale of projects for those outside SOI and outside county communities. Reduction in scale of projects for those in SOI.	No growth allocated to projects outside SOI and outside county communities which are not consistent with general plan.
Target development areas	Very limited residential development exists in commercial corridors where zoning allows for mixed-use development.	Limited residential growth in target development areas; assumes some intensification as a result of specific plans for infill.	About 20% of projected residential units.	About 25% of projected residential units.	About 30% of projected residential units.
Vacant residential and commercial land in cities and county communities	Vacant land and vacant developable lots exist throughout county.	Developed to capacity of general plan. Commercial development assigned to vacant non-residential land.	Developed to capacity of general plan. Commercial development assigned to vacant non-residential land.	Developed to capacity of general plan. Commercial development assigned to vacant non-residential land.	Developed to capacity of general plan. Commercial development assigned to vacant non-residential land.
Rural unincorporated land	Extensive rural residential growth in unincorporated area.	Continued growth on land zoned for agriculture. Land zoned for rural residential assumed to build out.	Limited residential growth on land zoned for agriculture. Land zoned for rural residential assumed for build out.	Little to no residential growth on land zoned for agriculture. Land zoned for rural residential assumed to build out.	No residential growth on land zoned for agriculture. Limited residential growth for land zoned for rural residential.
Medium- and high-density residential with additional capacity under general plan.	Additional capacity exists in land zoned for medium- and high-density residential throughout the county.	No intensification.	Limited intensification of medium- and high-density residential with additional capacity under the existing general plan.	More intensification of medium- and high-density residential with additional capacity under the existing general plan than in Scenario 2.	Additional intensification of medium- and high-density residential with additional capacity under the existing general plan than in Scenario 3.

Section 4. 2035 Land Use Scenario Results

This section describes components of the following: 2008 Existing Conditions, 2035 Scenario 1 ("Business-As-Usual"), and three alternative land use scenarios (2035 Scenarios 2, 3 and 4). The SLOCOG Board identified the 2035 Scenario 2 as the "Preferred Growth Scenario" following review from the Joint Policy Committee, the Technical and the Citizens' Transportation Advisory Committees.

Comparison of 2008 Existing Conditions and 2035 scenarios: Regional Analysis

This section provides a comparison of the four 2035 land use scenarios that have been developed: 2035 Scenario 1 ("Business-As-Usual"), and 2035 Scenario 2, 3 and 4. In the following performance measures for employment figures and acres developed, only non-farm employment was considered. This was done to more accurately reflect the current and future "footprint" of employment centers in existing urbanized areas.

The following two tables provide a comparison of the four 2035 land use scenarios based on key performance measures, including *total dwelling units*, *total employees*, *acres with dwelling units*, *acres with employment*, *total developed acres*, *dwelling units per acre*, *non-farm employees per acre*, and *non-farm employment per dwelling unit.* Table 4 provides a comparison of the 2008 Existing Conditions and the four 2035 scenarios based on the above set of performance measures. Table 5 provides a comparison of the 2008 Existing Conditions to the two 2020 and 2035 scenarios based on the above set of performance measures. The Place Type "Agriculture – Residential" (typically characterized as residential development on land zoned for agriculture with 20-acre minimum lot size) is not included in these calculations.

Table 4. [2]

Performance Measures at Regional-Level

Comparison of 2008 Existing Conditions to 2035 Scenarios (excluding residential agriculture properties)

Scenario	2008 Existing Conditions	2035 Scenario 1 "Business-As-Usual"	2035 Scenario 2 "Preferred Growth Scenario"	2035 Scenario 3	2035 Scenario 4
Total residents[a]	258,213	320,121	320,267	319,603	320,183
Total dwelling units [b]	106,605	130,139	131,917	132,167	133,190
Total employees (non-farm)	101,543	141,769	141,625	142,696	143,329
Acres with dwelling units[b]	43,433	56,389	49,961	51,591	46,958
percent change from 2008 EC		29.8%	15.0%	18.8%	8.1%
percent change from 2035 BAU		--	-11.4%	-8.5%	-16.7%
Acres with employees (non-farm)	11,370	13,046	13,038	12,367	12,182
percent change from 2008 EC		14.7%	14.7%	8.8%	7.1%
percent change from 2035 BAU		--	-0.1%	-5.2%	-6.6%
Total developed acres (non-farm)	54,803	69,435	62,999	63,958	59,140
percent change from 2008 EC		26.7%	15.0%	16.7%	7.9%
percent change from 2035 BAU		--	-9.3%	-7.9%	-14.8%
Dwelling units per acre[b]	2.45	2.31	2.64	2.56	2.84
percent change from 2008 EC		-6.0%	7.6%	4.4%	15.6%
percent change from 2035 BAU		--	14.4%	11.0%	22.9%
Employees per acre (non-farm)	8.93	10.87	10.86	11.54	11.77
percent change from 2008 EC		21.7%	21.6%	29.2%	31.7%
percent change from 2035 BAU		--	0.0%	6.2%	8.3%
Non-farm employment per d.u.	0.95	1.09	1.07	1.08	1.08

Notes:

(a) Total residents does not account for the estimated group quarters population of 16,064.

(b) Place Types "Agriculture - Residential", "Agriculture" and "Grazing and Ranch Lands" not included in this calculation.

[2] Table 4 and Table 5 reflect land use statistics that exclude Place Type "Agriculture - Residential", which is meant to be representative of residential development on 20-acre minimum parcels with agriculture zoning.

Table 5.
Performance Measures at Regional Level
Comparison of 2008 Existing Conditions to 2020 and 2035 Scenarios (excluding residential agriculture properties)

Scenario	2008 Existing Conditions	2020 Scenario 1 "Business-As-Usual"	2020 Scenario 2 "Preferred Growth Scenario"	2035 Scenario 1 "Business-As-Usual"	2035 Scenario 2 "Preferred Growth Scenario"
Total residents[a]	258,213	278,135	278,157	320,121	320,267
Total dwelling units [b]	106,605	114,871	114,997	130,139	131,917
Total employees (non-farm)	101,543	110,876	110,872	141,769	141,625
Acres with dwelling units[b]	43,433	46,737	45,813	56,389	49,961
percent change from 2008 EC		7.6%	5.5%	29.8%	15.0%
percent change from 2035 BAU		--	-2.0%	20.7%	6.9%
Acres with employees (non-farm)	11,370	11,884	11,817	13,046	13,038
percent change from 2008 EC		4.5%	3.9%	14.7%	14.7%
percent change from 2035 BAU		--	-0.6%	9.8%	9.7%
Total developed acres (non-farm)	54,803	58,621	57,630	69,435	62,999
percent change from 2008 EC		7.0%	5.2%	26.7%	15.0%
percent change from 2035 BAU		--	-1.7%	18.4%	7.5%
Dwelling units per acre[b]	2.45	2.46	2.51	2.31	2.64
percent change from 2008 EC		0.1%	2.3%	-6.0%	7.6%
percent change from 2035 BAU		--	2.1%	-6.1%	7.4%
Employees per acre (non-farm)	8.93	9.33	9.38	10.87	10.86
percent change from 2008 EC		4.5%	5.1%	21.7%	21.6%
percent change from 2035 BAU		--	0.6%	16.5%	16.4%
Non-farm employment per d.u.	0.95	0.97	0.96	1.09	1.07

Notes:
(a) Total residents does not account for the estimated group quarters population of 16,064.
(b) Place Types "Agriculture - Residential", “Agriculture” and “Grazing and Ranch Lands” not included in this calculation.

Number of New Housing Units by Type

The housing development types used in this analysis are defined in the following way:

- Rural Residential: 1 dwelling unit on 5-, 10-, or 20-acre minimum lot size.
- Single Family, Large-Lot: Detached single family homes on lots larger than 5,500 square feet and generally smaller than 2.5 acres.
- Single Family, Small-Lot: Detached single family homes on lots smaller than 5,500 square feet.
- Attached Single Family: Attached single family home or condo, generally found in planned-unit developments or condominium development.
- Apartment / Rental Housing: Includes all apartments and rental housing, such as duplexes, triplexes, fourplexes, and large apartment complexes. Also includes senior living facilities.
- Mobile Home Park: Includes all mobile homes in mobile home parks.
- Mixed-Use: Includes all mixed-use units in mixed-use developments.

Table 6 provides a comparison of housing types for *new* housing units for the 2035 scenarios. Table 7 provides a comparison of housing types for *new* housing units for the 2020 and 2035 scenarios.

Table 6.
Number of New Housing Units by Type
Comparison of the 2035 scenarios

Scenario	2008 Existing Conditions	2035 Scenario 1 "Business-As-Usual"	2035 Scenario 2 "Preferred Growth Scenario"	2035 Scenario 3	2035 Scenario 4
Housing Type	**Existing Dwelling Units**	**New Dwelling Units**			
Rural Residential	10,958	5,290	1,964	2,032	206
Single Family, Large-Lot	49,729	13,344	10,624	9,178	7,120
Single Family, Small-Lot	13,142	749	1,208	724	558
Attached Single Family	8,616	2,669	3,705	2,634	2,272
Apartment / Rental Housing	20,035	2,206	2,649	2,427	4,409
Mobile Home Park	7,325	-30	0	0	0
Mixed-Use	175	2,043	6,358	9,208	12,083
Total	109,980	26,271	26,508	26,203	26,648

Table 7.
Number of New Housing Units by Type
Comparison of the 2020 and 2035 scenarios

Scenario	2008 Existing Conditions	2020 Scenario 1 "Business-As-Usual"	2020 Scenario 2 "Preferred Growth Scenario"	2035 Scenario 1 "Business-As-Usual"	2035 Scenario 2 "Preferred Growth Scenario"
Housing Type	**Existing Dwelling Units**	**New Dwelling Units**			
Rural Residential	10,958	872	471	5,290	1,964
Single Family, Large-Lot	49,729	3,628	3,367	13,344	10,624
Single Family, Small-Lot	13,142	589	542	749	1,208
Attached Single Family	8,616	1,675	1,613	2,669	3,705
Apartment / Rental Housing	20,035	875	689	2,206	2,649
Mobile Home Park	7,325	0	0	-30	0
Mixed-Use	175	912	1,856	2,043	6,358
Total	109,980	8,551	8,538	26,271	26,508

Housing Mix of New Housing Units

Figure 5 shows the housing type distribution of the new housing units allocated in the four 2035 scenarios. Figure 6 shows housing type distribution of the new housing units allocated in the 2020 and 2035 Scenarios 1 and 2.

Figure 5. Housing Mix of New Housing Units
Comparison of 2035 Scenarios

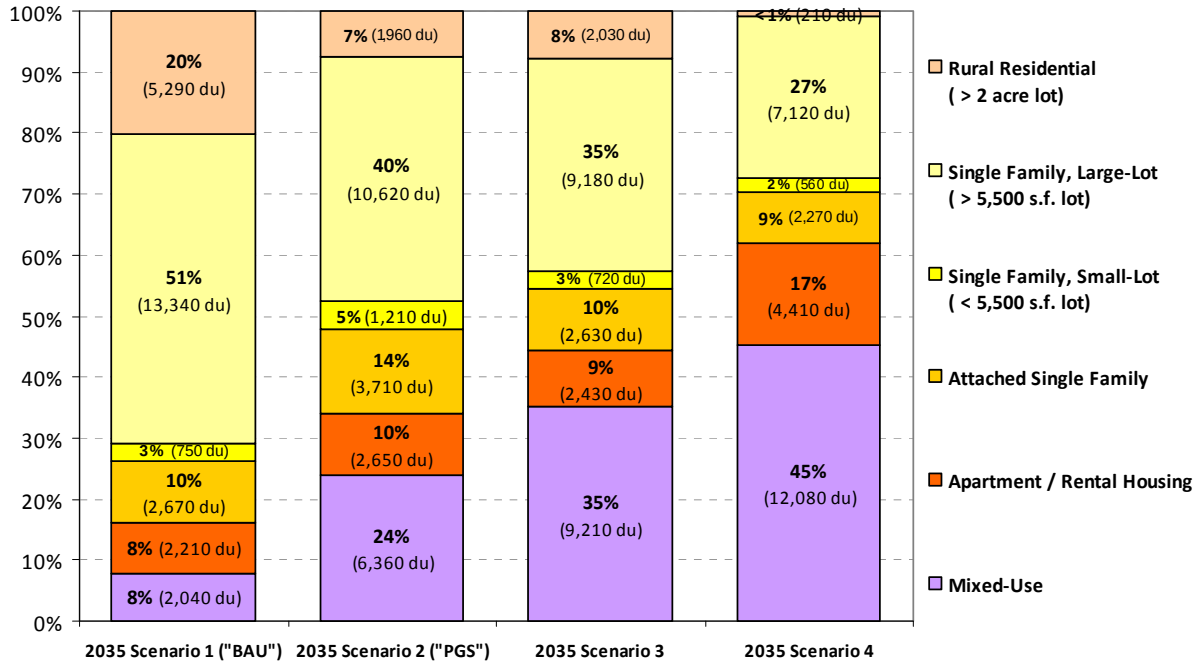
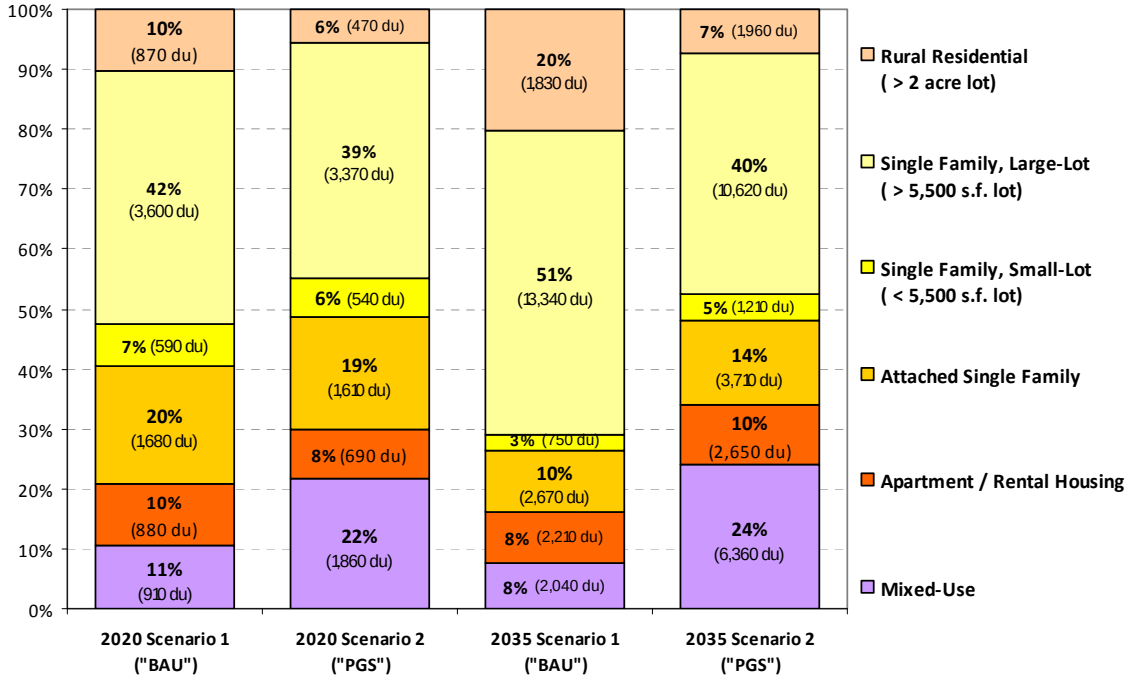


Figure 6. Housing Mix of New Housing Units
Comparison of 2020 Scenarios 1 & 2 and 2035 Scenarios 1 & 2



Note: These two sets of stacked bar charts represent the difference in allocation of housing units by type for the four 2035 scenarios and the two 2020 scenarios. The projected housing need between 2008 and 2035 is estimated to be 26,000 dwelling units. The projected housing need between 2008 and 2020 is estimated to be 8,500 dwelling units.

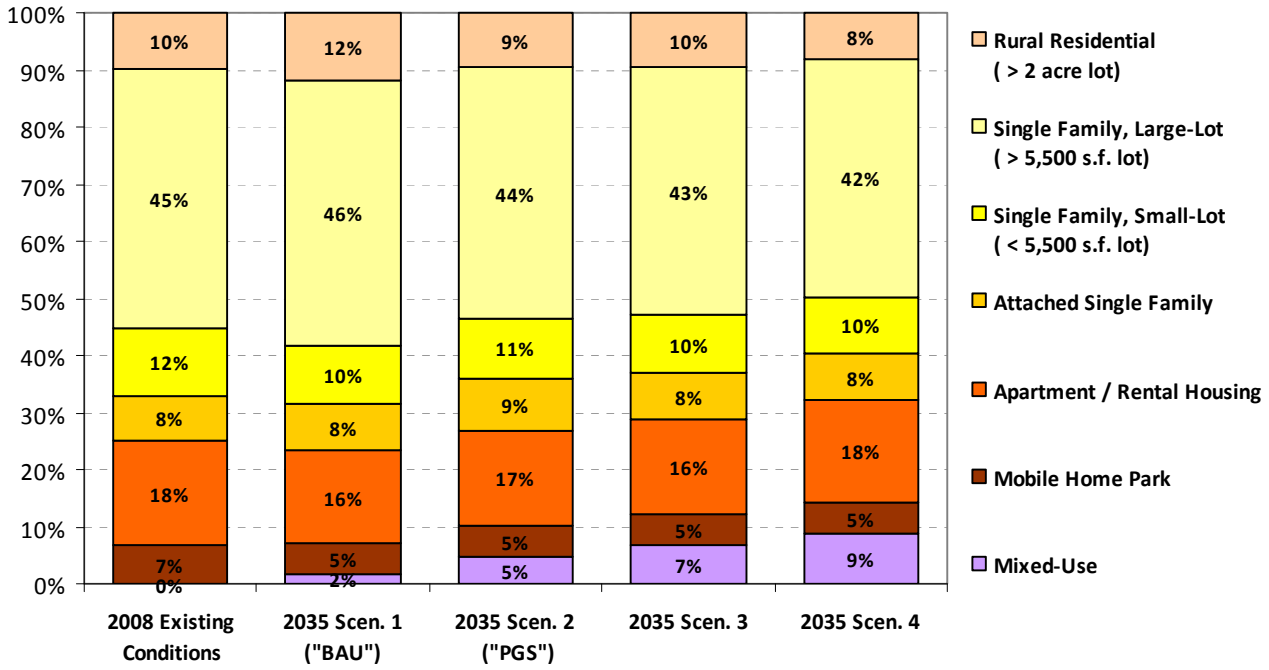
Total Housing Type Distribution

Table 8 provides a comparison of housing types for the *total* housing stock for 2008 Existing Conditions and the projected *total* housing stock for the 2035 scenarios. Figure 7 provides a similar comparison in graphic form.

Table 8.
Total Number of Housing Units by Type
Comparison of 2008 Existing Conditions to 2035 scenarios

Scenario	2008 Existing Conditions	2035 Scenario 1 "Business-As-Usual"	2035 Scenario 2 "Preferred Growth Scenario"	2035 Scenario 3	2035 Scenario 4
Housing Type	**Number of Dwelling Units**				
Rural Residential	10,958	16,248	12,922	12,990	11,164
Single Family, Large-Lot	49,729	63,073	60,353	58,907	56,849
Single Family, Small-Lot	13,142	13,891	14,350	13,866	13,700
Attached Single Family	8,616	11,285	12,321	11,250	10,888
Apartment / Rental Housing	20,035	22,241	22,684	22,462	24,444
Mobile Home Park	7,325	7,295	7,325	7,325	7,325
Mixed-Use	175	2,218	6,533	9,383	12,258
Total	109,980	136,251	136,488	136,183	136,628

Figure 7. Total Housing Type Distribution
Comparison of 2035 Scenarios



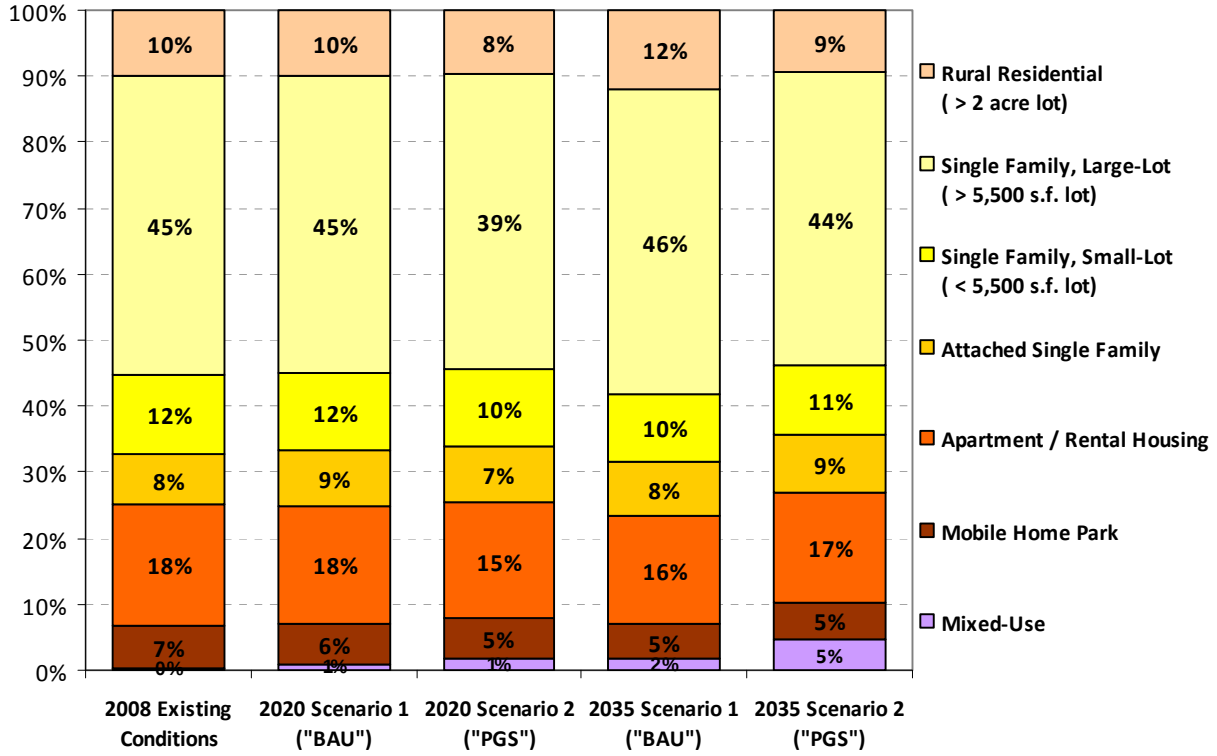
Note: The first stacked bar chart represents the existing housing stock in 2008 (an estimated 110,000 housing units) while the other four stacked bar charts represents the estimated housing stock in 2035 (an estimated 136,300 housing units).

Table 9 provides a comparison of housing types for the *total* housing stock for 2008 Existing Conditions and the projected *total* housing stock for the 2020 and 2035 scenarios. Figure 8 provides a similar comparison in graphic form.

Table 9.
Total Number of Housing Units by Type
Comparison of 2008 Existing Conditions to 2020 and 2035 scenarios

Scenario	2008 Existing Conditions	2020 Scenario 1 "Business-As-Usual"	2020 Scenario 2 "Preferred Growth Scenario"	2035 Scenario 1 "Business-As-Usual"	2035 Scenario 2 "Preferred Growth Scenario"
Housing Type	**Number of Dwelling Units**				
Rural Residential	10,958	11,830	11,429	16,248	12,922
Single Family, Large-Lot	49,729	53,357	53,096	63,073	60,353
Single Family, Small-Lot	13,142	13,731	13,684	13,891	14,350
Attached Single Family	8,616	10,291	10,229	11,285	12,321
Apartment / Rental Housing	20,035	20,910	20,724	22,241	22,684
Mobile Home Park	7,325	7,325	7,325	7,295	7,325
Mixed-Use	175	1,087	2,031	2,218	6,533
Total	109,980	118,531	118,518	136,251	136,488

Figure 8. Total Housing Type Distribution
Comparison of 2008 Existing Conditions with 2020 Scenarios 1 & 2 and 2035 Scenarios 1 & 2



Note: The first stacked bar chart represents the existing housing stock in 2008 (an estimated 110,000 housing units); the next two stacked bars represent the estimated housing stock in 2020 (an estimated 118,500 housing units), while the final two stacked bar charts represent the estimated housing stock in 2035 (an estimated 136,300 housing units).

Number of Employees by Sector

Table 10 is a comparison table of employees by general employment types for the 2008 Existing Conditions and the 2035 scenarios. The differences between the land use scenarios is dependent upon what employment land use types (i.e., place types such as commercial, light industrial or office) that were allocated to land zoned for non-residential development in each scenario. Table 11 is a similar comparison table for the 2008 Existing Conditions and the 2020 and 2035 scenarios.

Table 10.
Number of Employees by Sector
Comparison of 2008 Existing Conditions to 2035 scenarios

Scenario	2008 Existing Conditions	2035 Scenario 1 "Business-As-Usual"	2035 Scenario 2 "Preferred Growth Scenario"	2035 Scenario 3	2035 Scenario 4
Employment Sector	**Number of Employees**				
Retail	38,569	56,132	52,996	55,023	56,606
Office	31,032	47,663	49,148	51,061	52,356
Industrial	9,289	14,560	16,044	14,186	11,917
Public	21,121	21,918	21,939	20,937	20,950
Other	2,888	2,838	2,841	2,833	2,844
Total	102,899	143,111	142,968	144,040	144,673

Table 11.
Number of Employees by Sector
Comparison of 2008 Existing Conditions to 2020 and 2035 scenarios

Scenario	2008 Existing Conditions	2020 Scenario 1 "Business-As-Usual"	2020 Scenario 2 "Preferred Growth Scenario"	2035 Scenario 1 "Business-As-Usual"	2035 Scenario 2 "Preferred Growth Scenario"
Employment Sector	**Number of Employees**				
Retail	38,569	42,864	42,820	56,132	52,996
Office	31,032	34,438	34,825	47,663	49,148
Industrial	9,289	10,508	10,128	14,560	16,044
Public	21,121	21,524	21,558	21,918	21,939
Other	2,888	2,888	2,885	2,838	2,841
Total	102,899	112,222	112,216	143,111	142,968

Comparison of 2008 Existing Conditions, 2020 and 2035: Subregional Analysis

This section provides an analysis of the differences between the two scenarios for 2020 and 2035 at the subregional level.

Subregional Areas: Definitions

The four subregions of the county, as delineated in *Community 2050* based on watershed boundaries are the North Coast, North County, Central County and South County. Figure 9 shows the boundaries of the four subregions in the region.

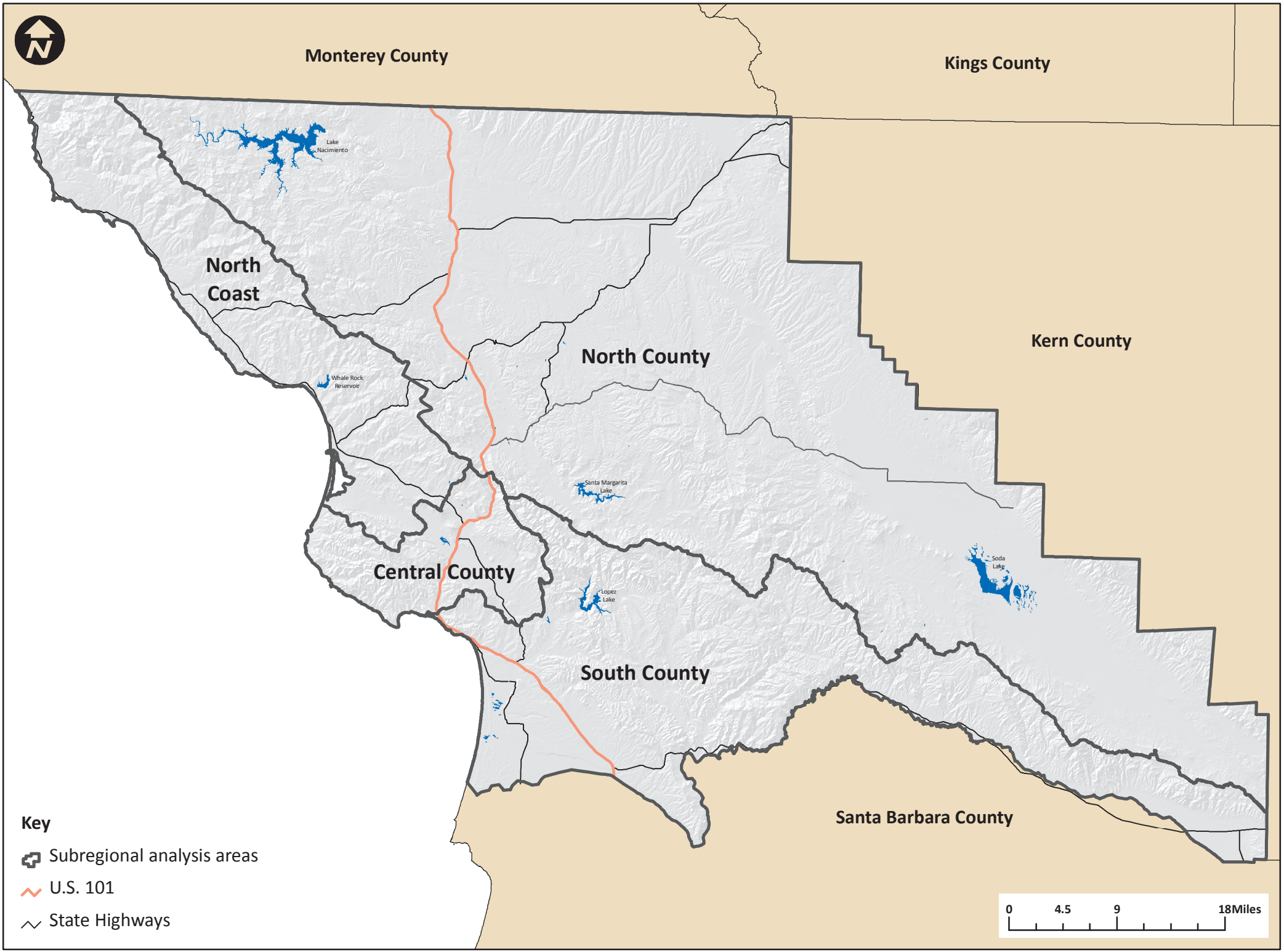
- North Coast: This subregion includes the incorporated city of **Morro Bay**, and the unincorporated county communities of **Los Osos**, **Cayucos**, **Cambria**, and **San Simeon**.

- North County: This subregion includes the incorporated cities of **Paso Robles** and **Atascadero**, and the unincorporated county communities of **Shandon**, **San Miguel**, **Templeton**, **Santa Margarita**, **Garden Farms**, **Heritage Ranch**, **Oak Shores**, **Creston**, **Garden Farms**, **Pozo**, **Whitley Gardens**, **California Valley**, and a number of antiquated subdivisions.

- Central County: This subregion includes the incorporated city of **San Luis Obispo** and the unincorporated county communities of **Avila Beach** and **Los Ranchos-Edna**.

- South County: This subregion includes the incorporated cities of **Arroyo Grande**, **Grover Beach**, and **Pismo Beach**, and the unincorporated communities of **Nipomo**, **Oceano**; as well as other communities on the Nipomo Mesa, including **Blacklake**, **Callender-Garrett**, **Los Berros**, **Palo Mesa**, and the **Woodlands** planned community.

Figure 9. Subregional areas in San Luis Obispo region



Subregional Areas: Land Use Performance Measures

This section contains a list of land use performance measures that allow a comparison of the projected growth in population, households and employment in each of the four subregional areas. The following is an exhaustive list of land use performance measures that can be produced by (or derived from) the I-PLACE^{3}S modeling software for any geographic analysis area:

Estimated Population
Change in Population (estimated)
Percentage Change in Population (estimated)
Total Developed Acres
Change in Developed Acres
Percentage Change in Developed Acres
Acres with Dwelling Units
Acres with Employment
Total Dwelling Units
Change in Dwelling Units
Percentage Change in Dwelling Units
Percentage Share of Region's Housing Growth
Dwelling Units per Acre
Total Non-Farm Jobs
Change in Non-Farm Jobs
Percentage Share of Region's Job Growth
Non-Farm Jobs per Acre
Jobs per Dwelling Unit

For the purposes of this report, only selected performance measures are included in this comparative analysis of the four subregional areas for the two land use scenarios for 2020 and 2035: *percentage change in population, change in dwelling units, share of region's new dwelling units, dwelling units per acre, change in non-farm jobs, share of region's job growth, and jobs per dwelling unit.*

These figures are included in Appendix B of this report.

Subregional "Urbanized" and "Future Urbanizing" Areas: Definitions

In order to provide a more accurate and realistic land use analysis of the contiguous urbanized areas within each of these subregions, the four subregions were grouped into the following six subregional areas: Estero Bay (North Coast), North County Urbanized, Central County Urbanized, San Luis Bay (Five Cities), Nipomo Mesa, and Other Areas. Figure 10 shows the boundaries of the six subregional "urbanized" and "future urbanizing" areas in the region.

- Estero Bay (North Coast): Includes the developed, urbanized or future urbanizing areas of **Morro Bay**, **Los Osos**, and **Cayucos**. Includes the potential expansion area at the southeastern edge of Morro Bay. Cambria is included in "Other Areas" as it is not contiguous to the other three communities.

- North County Urbanized: Includes the developed, urbanized or future urbanizing areas of **Paso Robles**, **Templeton**, **Atascadero**, **Carmel Ranchos**, and **Garden Farms**. Includes the proposed Eagle Ranch Specific Plan, Chandler Ranch Areas Specific Plan, Olson-Beechwood Specific Plan, and potential expansion area in northern Paso Robles. San Miguel, Shandon, Santa Margarita, Creston, Heritage Ranch, Oak Shores, Pozo, Whitley Gardens, and all antiquated subdivisions are included in "Other Areas" as they are not contiguous to the other North County communities.

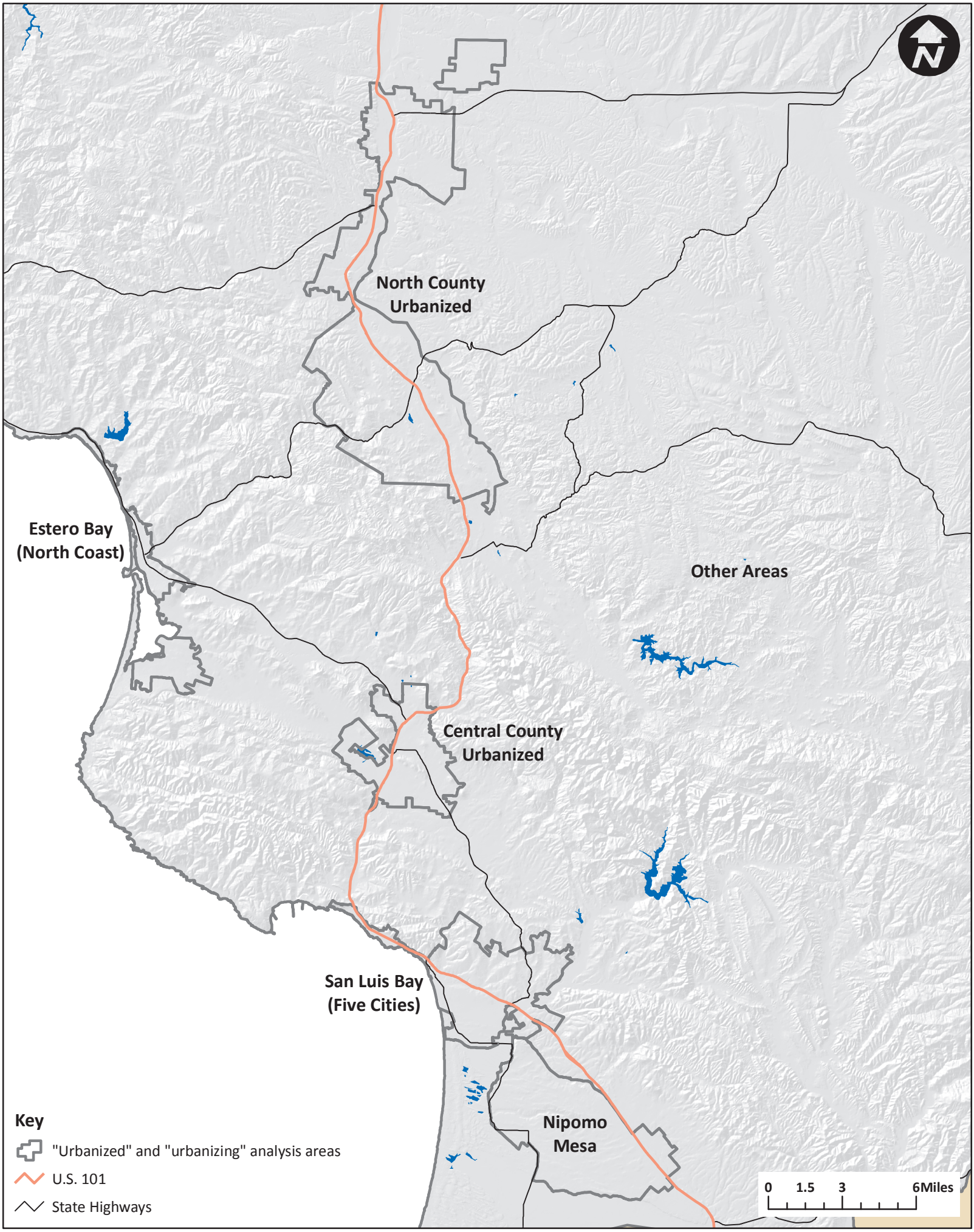
- Central County Urbanized: Includes the developed, urbanized or future urbanizing areas of **San Luis Obispo** and **Los Ranchos-Edna**. The potential expansion area west of San Luis Obispo is included in this subregion, as well as Orcutt Areas Specific Plan and all areas contained within the sphere of influence of San Luis Obispo. Properties over five acres in size in Los Ranchos-Edna are not included. All other outlying areas are included in "Other Areas".

- San Luis Bay (Five Cities): Includes the developed, urbanized or future urbanizing areas of **Arroyo Grande**, **Avila Beach**, **Grover Beach**, **Oceano**, and **Pismo Beach**. Includes the proposed Arroyo Linda Crossroads, Los Robles Del Mar, and Price Canyon Master Plan in this subregion. Also includes properties in the foothill area above Arroyo Grande up to about five acres. All other areas are included in "Other Areas".

- Nipomo Mesa: Includes the developed, urbanized or future urbanizing areas of **Nipomo**, **Blacklake**, **Callender-Garrett**, **Los Berros**, **Palo Mesa**, and **Woodlands**. Includes the proposed Oak Glen Specific Plan and the build-out of the Trilogy Central Coast development. This area follows the general boundary the Nipomo Mesa as outlined in the County's Land Use Ordinance (Title 22).

- Other Areas: Includes **Cambria**, **San Miguel**, **Santa Margarita**, **Shandon**, **California Valley**, **Creston**, **Heritage Ranch**, **Oak Shores**, **Pozo**, **Whitley Gardens**, antiquated subdivisions throughout the unincorporated area, and all other rural unincorporated areas of the county.

Figure 10. Subregional "urbanized" and "future urbanizing"areas in San Luis Obispo region



Subregional "Urbanized" and "Future Urbanizing" Areas: Land Use Performance Measures

This section contains a list of land use performance measures that allow a comparison of the projected growth in population, households and employment in each of the six subregional "urbanized" or "future urbanizing" areas described above. The same land use performance measures listed above can be produced by (or derived from) the I-PLACE^{3}S modeling software for these geographic analysis areas.

For the purposes of this report, only selected performance measures are included in this comparative analysis of the six geographic analysis areas for the two land use scenarios for 2020 and 2035: *percentage change in population, change in dwelling units, share of region's new dwelling units, dwelling units per acre, change in non-farm jobs, share of region's job growth, and jobs per dwelling unit.*

These figures are included in Appendix B of this report.

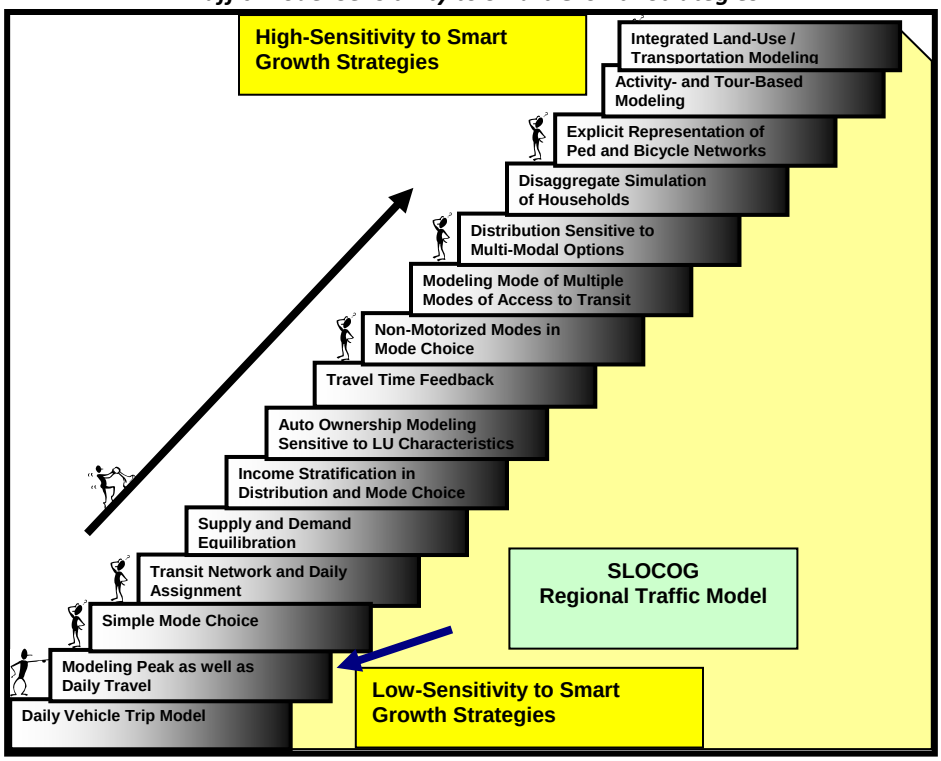
Section 5. Regional Traffic Model: Assumptions, Process, and Issues

Overview of Regional Traffic Model

TransCAD is a traffic modeling software that SLOCOG uses to operate the Regional Traffic Model. Once a land use alternative is generated and an I-PLACE^{3}S output is produced, TransCAD can be used to test various land use scenarios with the Regional Traffic Model. A traffic model uses land use (alternatives) as an input and, using its road network, estimates the miles of travel, speeds, congestion, and delay through trip assignments to meet the demands of those land uses.

The ideal traffic model would be an integrated land use-transportation model. The SLOCOG Regional Traffic Model functions to "model peak as well as daily travel", which signifies that it is not a very sophisticated regional traffic model (see Figure 11). However, through the parcel-based land use modeling used the I-PLACE^{3}S modeling software, SLOCOG is able to develop detailed land use alternatives and export a file to test each alternative in the traffic model. Our traffic model uses 1,207 traffic analysis zones (TAZs) instead of parcels through aggregation of residential and employment uses from the underlying parcels. While I-PLACE^{3}S uses up to 55 land use categories, only 25 land use categories are used in the regional traffic model. An intermediate step is used to aggregate and translate the land use types from I-PLACE^{3}S into a functional TransCAD input. The SLOCOG Regional Traffic Model uses dwelling units (with 5 different types) and non-residential square feet for employment instead of jobs. TransCAD is able to generate different performance measures (VMT, VHT, delay, travel time) than I-PLACE^{3}S to compare against all alternatives. An export from TransCAD is critical to provide an input into EMFAC, the air quality model.

Figure 11. Logical Progression of Steps to Improve Traffic Model Sensitivity to Smart Growth Strategies



Improvements to the 2035 Regional Traffic Model

Roadway Improvements

The SLOCOG Regional Traffic Model is based on a master network of roadways as well as demographic data as generated from the I-PLACE^{3}S land use model.

The master roadway network is coded with existing facility features for all existing roadways, including sidewalks. For scenario testing, both 2020 and 2035 scenarios assumed the following capacity or connection improvements identified in Table 12 (no guarantees of funding is made for projects on this list). This list represents a draft project listing of the 2010 RTP within financial constraints.

Table 12.
Basic Roadway Network Improvements

Community	Model Year	Capacity Increasing Transportation Improvement
Recently constructed or nearing completion		
Avila Beach	2009	101: San Luis Creek to Avila Rd sb aux lane
SLO	2009	South street Road diet (2lanes to 1)
SLO	2009	Santa Barbara Rd added center turn lane
SLO	2009	Orcutt Rd widening - Broad to Laurel
Templeton	2009	101: Vineyard overcrossing widening
Arroyo Grande	2010	101: Halcyon to Grand sb aux lane
Arroyo Grande	2010	101: Oak Park to 4th nb aux lane
Atascadero	2010	101: new nb onramp at Rt41, and underxing
Pismo Beach	2010	101: Bello to Mattie nb aux lane
Construction fully funded and programmed		
Nipomo	2015	Willow IC and new road connections
Paso Robles	2015	101: Dual lefts & sb aux lane from 46E; 17th St. ramp adj.
SLO	2015	101: LOVR widen overxing/ramp imp
2010 RTP Mid and Long Candidate Projects ($ Constrained)		
Arroyo Grande	2020	101: Brisco/Grand Ramp and nb aux lane improvements
Atascadero	2020	101: Rosario nb onramp closure
Atascadero	2020	101: Curbaril IC improvements
N. County	2020	46E widening: east to McMillan
Paso Robles	2020	Wisteria: 46E parallel route connection/extension
Paso Robles	2020	Chandler Ranch Arterials
Paso Robles	2020	46W alignment: new Theatre Drive alignment
Paso Robles	2020	Union Road: 46E parallel route connections/extension
S. County	2020	101: Santa Maria River Bridge widening
SLO	2020	Dalidio arterials (no IC or Overcrossing)
SLO	2020	S. Higuera widening - Elks to Prado
SLO	2020	101: Prado to Marsh nb aux lane
Atascadero	2035	101: Traffic Way IC reconstruct
N. County	2035	46E widening: McMillan to Rest Stop
Paso Robles	2035	Dry Creek Rd: 46E parallel route connection/extension
SLO	2035	Prado Rd Extension - Higuera to Broad
SLO	2035	Buckley Rd extension: Extend to S. Higuera
SLO	2035	227 widening: El Capitan to Fuller
2010 RTP Unconstrained Projects		
Arroyo Grande	Uncon	Fair Oaks widening - Elm to Woodland
Arroyo Grande	Uncon	101: Oak Park to Halcyon sb aux lane
Atascadero	Uncon	El Camino Real widening - Santa Barbara to Santa Rosa
Atascadero	Uncon	El Camino Real widening - Del Rio to San Anselmo
Atascadero	Uncon	41 widening: 101 to Portola (study)
Atascadero	Uncon	101: Atascadero Interchange improvements
Central Co.	Uncon	227 widening: Buckley to Price Canyon
N. County	Uncon	Monterey Rd Extension - Spring St to Exline Rd
N. County	Uncon	New Frontage Road - Rt 58 to Tassajara
N. County	Uncon	46E widening: east of Rest Stop
Nipomo	Uncon	101: Nipomo ramp improvements
Paso Robles	Uncon	46W alignment: new Vine St. alignment
Paso Robles	Uncon	46E / Union Road interchange improvements
Paso Robles	Uncon	101: 46w to Spring nb aux lane
Pismo Beach	Uncon	101: Pismo Creek to Bello nb aux lane
Pismo Beach	Uncon	101: 4th St to Price nb aux lane
S. County	Uncon	101: Spyglass to Avila Beach Rd nb aux lane
SLO	Uncon	Prado Overcrossing
SLO	Uncon	Mid Higuera widening - South St to Marsh
SLO	Uncon	101: Madonna to Prado sb aux lane
SLO	Uncon	101: Broad to Marsh sb aux lane
SLO	Uncon	101: Marsh to Broad nb aux lane
SLO	Uncon	101: LOVR to Prado nb aux lane
SLO	Uncon	101: Prado Rd Overcrossing/IC/sb ramps
Templeton	Uncon	101: Main to Las Tablas sb aux lane
Templeton	Uncon	101: Las Tablas to Vineyard sb aux lane
Templeton	Uncon	101: Vineyard to Las Tablas nb aux lane
Templeton	Uncon	101: Las Tablas to Main nb aux lane

Sidewalk Improvements

Within the TDAs of the 2008 model network, 71 miles of streets were classified as having 'partial sidewalks' (meaning the presence of a sidewalk on one side of the street), 90 miles of streets were classified with 'full sidewalks' (180 linear miles), and 28 miles of streets were not reviewed.

- 2035 Scenario 1 and 2020 Scenario 2 add nearly 60 miles of new sidewalks by improving any street within a Target Development Area (TDA) with 'no sidewalks' in 2008 to a 'partial sidewalk'. This indicates the construction of a sidewalk on one side of the street.

- 2035 Scenario 2 adds over 120 linear miles (over 2008) of sidewalk by improving any street, within all TDAs, with 'no sidewalks' in 2008 to a 'partial sidewalk' AND any street within a TDA with 'partial sidewalk' in 2008 to a 'full sidewalk'. This indicates a sidewalk on both sides of the street.

Integration of 4-D Variables

Prior to running the traffic model or even converting the I-PLACE^{3}S export, the following 'D' variable inputs were generated:

Design: The 2035 street network (with RTP capacity-increasing improvements), node network, and TAZ structure are processed to generate such information as route directness, length of streets and sidewalks, intersection densities, TAZ size, and a pedestrian design score. The information is then used by the land use conversion file to generate inputs for the Regional Traffic Model.

Density: The land use conversion file calculates employees per acre and dwelling units per acre based on each land use scenario.

Diversity: The land use conversion file calculates employment per population based on each land use scenario.

Destinations: The distribution of trips to and from home, work, school or other.

With the conversion complete and the above 'D' variables generated, the traffic model is run. The traffic model outputs are influenced by and adjusted by the 'D' variables. The TAZs in the Regional Traffic Model that have higher indices for any or all of the 'D' variables will result in a downward adjustment to VMT for street and roadways segments located in those TAZs.

Section 6. Regional Traffic Model Results

Regional Traffic Model Results

All land use scenarios, including 2008 Existing Conditions, were processed similarly through conversion tools to create the traffic model inputs and calculate 4D adjustments. As the 2008 base year was calibrated to existing counts, no 4-D adjustment is used, and future scenario adjustments are compared with the 2008 base year. The 2008, 2020, and 2035 scenarios were run in the traffic model and similarly adjusted using the post-processor to adjust for transit and TDM measures.

County-wide Projected Traffic Results

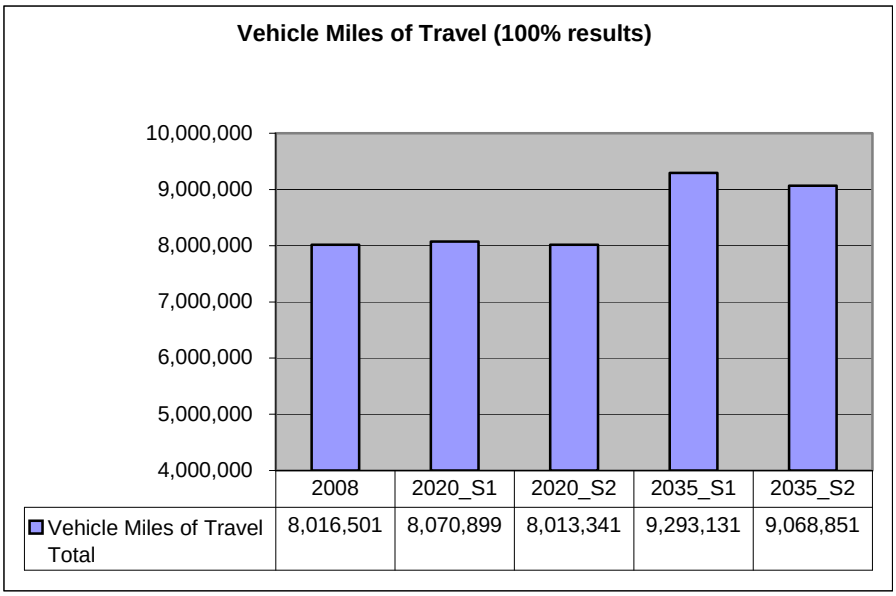
The 'Average-Daily' Traffic Model generated Vehicle Miles of Travel (VMT) results. While AM and PM peak hour results were also generated, the following tables focus on the Daily summaries. VMT results include all the roadway segments (not centroid connectors) in the regional model. The SLOCOG Regional Traffic Model includes roadway segments outside of the county for external purposes as well (e.g., U.S. 101 extends into Santa Maria in northern Santa Barbara County, and Broadway and Main Street – both primary arterials in Santa Maria – exist in the model).

Internal-Internal, Internal-External, External-Internal, and External-External results were developed, and discussions to halve IX and XI trips and eliminate the burden of XX trips were discussed in the many MPO/SB 375 meetings, but a clear resolution was not determined. The SLOCOG Regional Traffic Model results will benefit from both clear direction in handling of these trip types as well as from the Statewide Travel model that is to provide current year and, staff hopes, future year IX, XI, and XX inputs. Table titles with "100% results" include all VMT whether II, IX, XI, or XX trips. One identifiable limitation of the Regional Traffic model is the handling of external trips. These currently represent a share of the overall trips, rather than growing or shrinking based on statewide factors and information.

Land use scenarios were tested using the list of draft capacity transportation improvements (identified above in Table 12) as developed for the 2010 RTP. Figure 12, below, compares results for the five tested land use scenarios. The minimal change in total VMT in the 2020 scenarios compared to the 2008 base year may be a reflection of the low population and employment growth rate in the next decade. Notably, total VMT decreased in 2020 Scenario 2 over the 2008 base year. Several factors were identified as potential explanation for this result:

1. An over-allocation of new housing in the Central County subregion for 2020 Scenario 2 when compared to the 2035 scenarios (Figure B-3 in Appendix B shows that 21.3% percent of the region's housing growth occurs in the Central County subregion in 2020 Scenario 2, whereas about 13 percent of the region's housing growth from 2008 to 2035 occurs in the Central County subregion);
2. Improvements to 'Design' (sidewalk improvements, improved walkability, and improved connectivity);
3. Land use changes in 'Diversity' and 'Design' (mixed-use projects);
4. Relatively centralized employment centers (in San Luis Obispo, Paso Robles and the Five Cities area); or
5. Jobs-housing balance factors (Figure B-7 in Appendix shows that while the ratio of jobs per housing unit in the North Coast, North County and South County remain relatively stable from 2008 to the 2020 and 2035 scenarios, the ratio of jobs per housing unit in the Central County subregion (1.93 jobs per housing unit in the 2008 base year) fluctuates from a high of 2.31 jobs per housing unit in 2035 Scenario 1 to a low of 1.87 jobs per housing unit in 2020 Scenario 2).

Figure 12. Daily VMT and VHT (in minutes) (not post-processed)



Per Capita Results

When comparing the 11 to 14% rise in VMT with the 22.8% increase in population it is easy to understand the results of the following table of Daily VMT and CO_2 per capita. Compared with the 2008 traffic model results, all of the 2020 and 2035 scenarios resulted in fewer VMT per capita and CO_2 per capita.

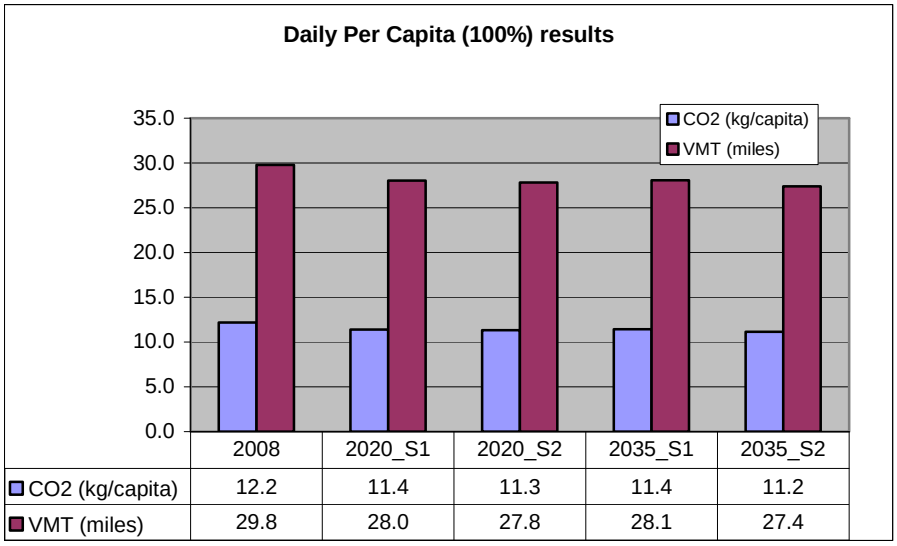
It is worth noting that EMFAC was not used in generating these preliminary results for CO_2. A spreadsheet tool is utilized to generate VMT, VMT per capita, and CO_2 per capita. This tool pulls data from model run results for AM, PM, and Daily models into speed bins and calculates CO_2 based on a single multiplier for each speed bin. It is anticipated that EMFAC will provide more accurate greenhouse gas results, invoking a higher level of sophistication as well as varying vehicle classifications for multipliers for each speed bin.

While a significant shift is not observed in overall traffic results between the future scenarios of Figure 14, a 5.6% reduction in VMT per capita is found from 2008 Existing Conditions to 2020 Scenario 2. However, only a 7.9% reduction is observed in 2035 Scenario 2.

Figure 13: CO_2 (kg) Single Multiplier by Speed Bin & Year

Avg Speed	2008	2020	2035
7.5	1.1914	1.1938	1.1938
12.5	0.9057	0.9066	0.9066
17.5	0.7157	0.7152	0.7152
22.5	0.5878	0.5866	0.5866
27.5	0.5038	0.5021	0.5021
32.5	0.4473	0.4454	0.4454
37.5	0.4110	0.4089	0.4089
42.5	0.3904	0.3883	0.3883
47.5	0.3832	0.3810	0.3810
52.5	0.3886	0.3865	0.3865
57.5	0.4073	0.4054	0.4054
62.5	0.4415	0.4400	0.4400
67.5	0.4958	0.4947	0.4947
72.5	0.5040	0.5034	0.5034
77.5	0.5170	0.5172	0.5172

Figure 14. Daily VMT and CO2 per capita (not post-processed)

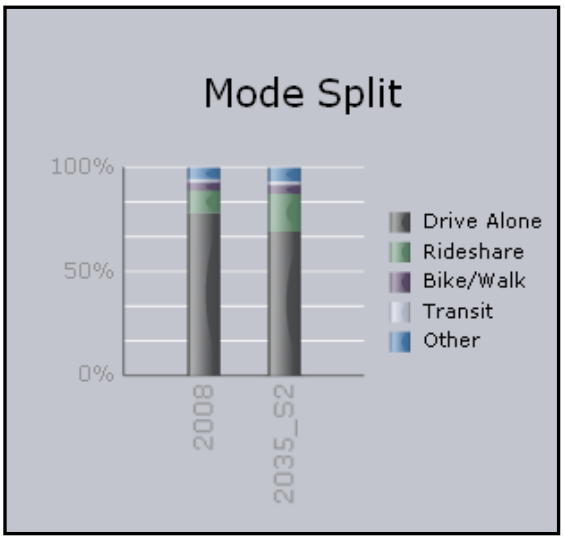


	2008	2020_S1	2020_S2	2035_S1	2035_S2
CO2 (kg/capita)	12.2	11.4	11.3	11.4	11.2
VMT (miles)	29.8	28.0	27.8	28.1	27.4

SLOCOG VMT Quick-Response Tool

SLOCOG must use a post-processor tool to adjust for alternative modes (Transit, Ridesharing, Biking) after the Regional Traffic Model is run. Up to four land use scenarios may be examined with similar, or differing, levels of investments or modifications to nine variables. These variables are based on current (2008) local conditions and established elasticities. Each variable change results in a shift (up or down) in the mode split percentage. The travel mode split for 2008 Existing Conditions and for 2035 Scenario 2 was identified as:

Mode	2008 EC	2035 S2
• Drive Alone	78.1%	69.1%
• Rideshare	10.7%	18.2%
• Bike/Walk	3.9%	4.2%
• Transit	1.8%	1.9%
• Other	5.5%	6.6%



Without changes from the current conditions, the tool maintains the mode split percentages for the added population. Each variable affects the mode split of travel.

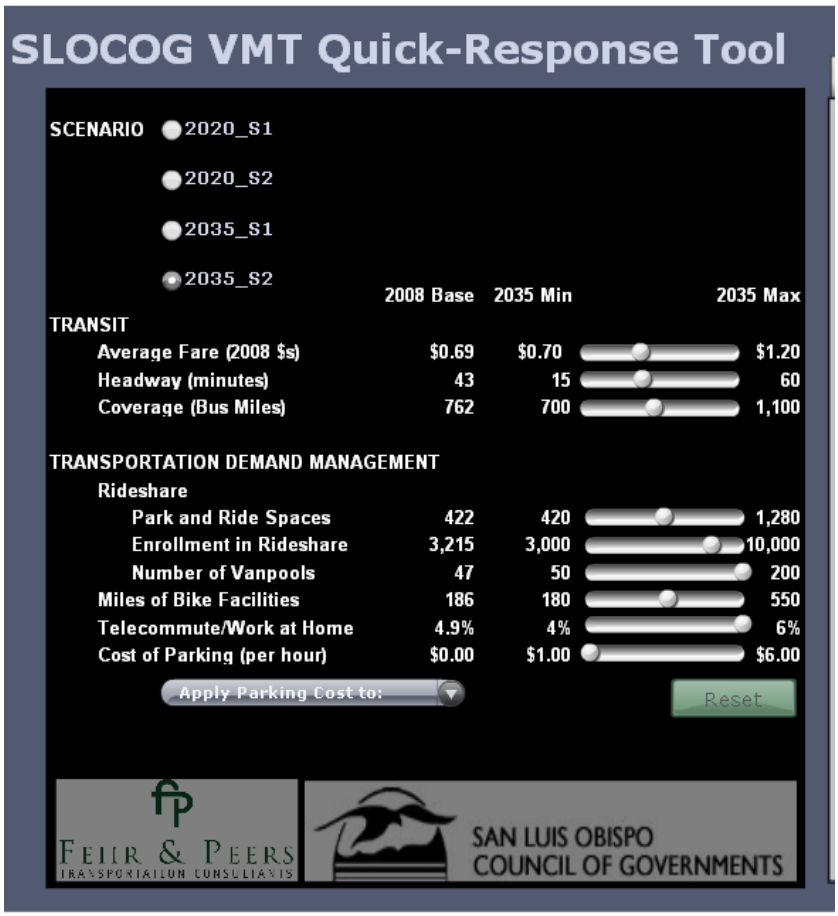
The Quick-Response Tool (QRT) reports changes from the 2008 Base Year to a future year scenarios in vehicle miles of travel (VMT) per day. The 2008 base year traffic model and its VMT is calculated and calibrated to 2008 traffic counts. Results for transit and transportation demand management are inherent to the 2008 model results. With the existing transit and transportation demand management measures, the 2008 VMT was calculated at 8.0 million VMT per day.

Inputs for the VMT Quick-Response Tool

<u>All Transit Variables</u>

For Transit, adjustments that affect vehicle miles of travel and transit ridership include: *Average Fares*, *Headways*, and *Bus Coverage*. In this category, using the maximum benefits to increase transit ridership and decrease VMT (and fares would keep pace with inflation), the end result could be as high as a 0.54% (or 49,000 VMT) reduction. Using the 2035 Scenario 2 expected improvements, the end result is a 0.09% (or 8,000 VMT) reduction.

2035_S2 results:
- 0.09%
(- 8,000 VMT)



Average Fare: A base level of $0.69 was identified using all fixed route services in the area, fares collected, and ridership. This figure accounts for subsidized fare passengers as well as full-price passengers. Recent fare adjustments (2008 to 2010) have outpaced inflation as a result of recent transit funding reductions (STA). Future fare adjustments are assumed to continue at only the pace of inflation. An increase to $0.90 (in 2008 dollars) for 2035 Scenario 2 is expected and will result in an 11% reduction of ridership and a 0.12% increase in VMT (or 11,000 VMT).

Headway (minutes): Using all fixed route services in the region, 43 minutes was identified as the average headway (*headway* refers to the frequency of bus routes weighted by runs per day). A shift of headway to 60 minutes would increase the average headway by 140% and would result in a 15% reduction in ridership. Conversely, an improved change in headway time – leading to more frequent bus service – to 15 minutes would decrease the average headway by 65% and result in a 24% increase in ridership and a 0.16% reduction in VMT (or 23,000 VMT). For 2035 Scenario 2, headway is expected to improve by - 45% to 25 minutes (weighted average), resulting in a 0.1% reduction in VMT (or 8,100 VMT). A 9.0% increase in ridership is subsequently observed.

Bus coverage: Using all of the fixed route services and calculating the total miles of routes (including overlapping routes), the bus coverage was calculated at 762 miles in 2008. An increase of coverage of 338 miles (144%) would result in a 27% increase in ridership and a 0.28% reduction in VMT (or 26,000 VMT). For 2035 Scenario 2, 135 miles of new coverage is assumed, resulting in an increase in bus coverage of 18%. An 11% increase in ridership and a 0.12% reduction in VMT (or 10,500 VMT) is expected.

<u>All Transportation Demand Management Variables</u>

2035_S2 results:
- 3.3%
(- 300,000 VMT)

For Transportation Demand Management (TDM) variables, adjustments that affect mode split and VMT include: *Park and Ride Spaces*, *Rideshare enrollment*, *Number of vanpools*, *Bike facilities*, and *Telecommuting*. In this category, using the maximum benefits to increase ridesharing, biking, and telecommuting (and not using parking costs) to decrease VMT, the end result could be as high as 4.0% reduction in VMT (or 368,000 VMT). Using the 2035 Scenario 2 expected improvements, the end result is 3.8% reduction in VMT (or 370,000 VMT).

Park and Ride Spaces: Currently, 422 spaces exist in formal Park and Ride lots throughout the region. Most of these lots are running at 100% capacity, and some lots exceed their capacity. A 300% increase in spaces - an additional 844 spaces - (and corresponding usage) would result in a 0.59% reduction in VMT (or 54,000 VMT). The Draft 2010 RTP identifies funding for over 450 new spaces, more than doubling the current number of spaces. In 2035 Scenario 2, this emphasis results in a 0.32% reduction in VMT (or 29,000 VMT).

Enrollment in Rideshare: The current enrollment in Rideshare is 3,215 persons. The Draft 2010 RTP places an emphasis of both policy and effort in this area and a goal of 9,000 members is attainable. That enrollment level is expected to achieve a 1.37% reduction in VMT (or nearly 124,000 VMT).

Vanpool: Established elasticities for VMT reductions per added vanpools were unavailable. Using local data (such as average travel distance, number of vans, and number of riders) gathered from Rideshare and Ride-On, the average VMT reduction per van was calculated. Currently, 47 vanpools are operating in the region. Based on the anticipated growth in vanpools over the next 25 years as outlined in the Draft 2010 RTP, adjusting the vanpool variable to the QRT's maximum of 200 would result in a 1.1% reduction in VMT (or 100,000 VMT).

Miles of Bike Facilities: There are currently 186 miles of Class I and Class II bikeways (centerline miles) throughout the region. The Non-Motorized project listing in the Draft 2010 RTP identifies over four dozen bikeway (Class I or II) improvements. These projects, added to policy and expectations of local road rehabilitations and road diet improvements re-striping for Class II facilities, leads to the expectation of doubling the amount of Class I and II routes in the region. Adding 370 new miles (for a total of 550 miles) of Class I and II bikeways would result in a 0.16% reduction in VMT (or 14,500 VMT). In 2035 Scenario 2, adding 189 new miles (for a total of 375 miles) of Class I and Class II bikeways would result in a 0.08% reduction in VMT (or 7,500 VMT).

While the quantifiable VMT reduction benefits are minimal, expanding bikeways provides qualified benefits for commuters and other travelers in the county through improved air quality for the region, health benefits to the user, tourism draw to the region, and can instill a lifelong awareness for cycling and cyclists.

Telecommuting: Nearly 5% of work trips are currently comprised of telecommuting or working from home. An increase to 6% is expected (based on advancements in technology and work-place policy). This shift results in a 0.36% reduction in VMT (or 32,000 VMT).

Cost of Parking: The single variable with the potential for the greatest VMT reduction is a user cost. It is believed that increased fuel prices (whether additional taxes or increased oil prices) has significant impacts on VMT, however, quality and quantifiable data to develop established elasticities is still being gathered. Established elasticities have been identified for parking costs. The SLOCOG VMT Quick-Response Tool allows analysis for parking pricing in three geographies: Downtown San Luis Obispo, All Downtowns, and All Urban Areas. Table 13 summarizes the impact on VMT using the three geographies and three levels of parking costs.

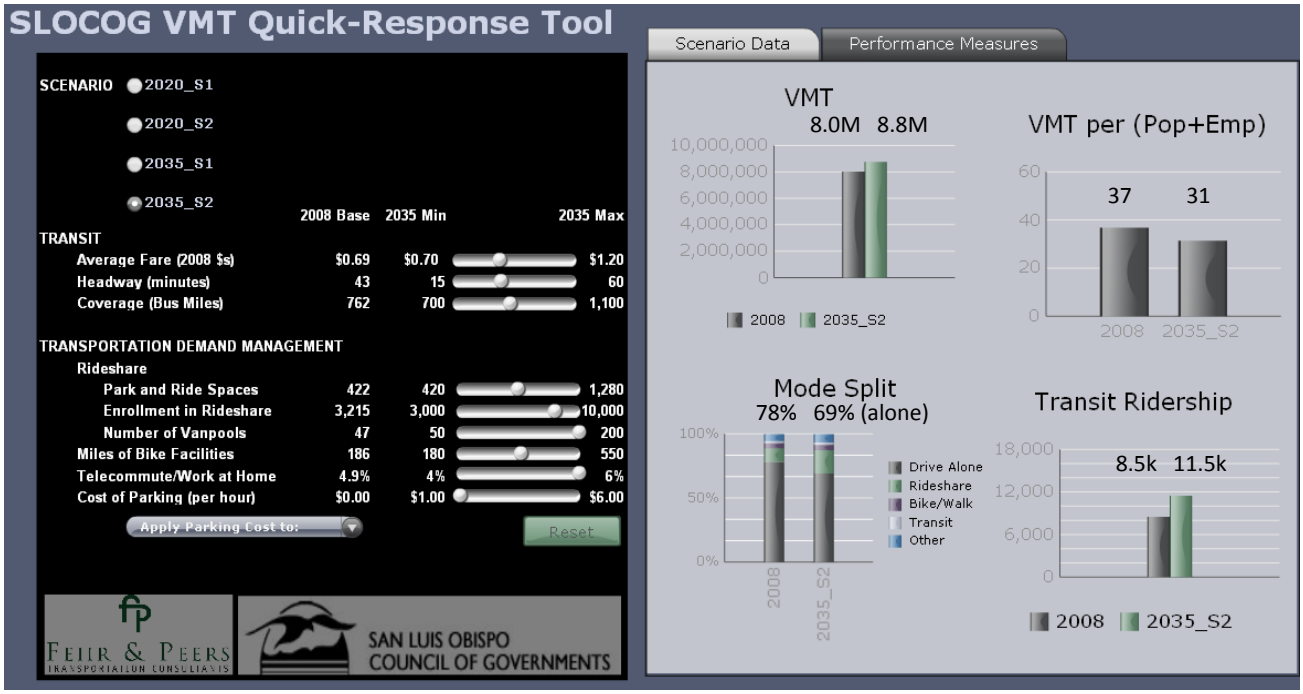
Table 13. VMT reduction resulting from increases in cost of parking in various geographic areas

VMT reduction	$2 / hour	$4 / hour	$6 / hour
Downtown San Luis Obispo	6,000	29,000	70,000
All downtowns	43,000	132,000	279,000
All urban areas	76,000	263,000	556,000

While the cost of parking could have significant VMT impacts and some level of regional funding could be tied to implementation, it is a political decision at the jurisdictional level. In generating the most realistic results for 2035 Scenario 2, no change to this variable was applied.

Outputs for the VMT Quick-Response Tool

Applied funding can directly and immediately generate impacts in the variables of Transit, Ridesharing, and Miles of Bike Facilities. By adjusting each variable of the QRT to match the expectations of the Draft 2010 RTP, an overall 3.4% reduction in VMT (or nearly 310,000 VMT) is observed. The following exhibit displays the results of applying the QRT to the 2035 Scenario 2.



SLOCOG VMT Quick-Response Tool Adjustments

A recommended consensus on the application of the results of the QRT to adjust VMT has not yet been reached. Three methods of applying the QRT results are identified below. Depending on the applied method, the results will vary to some degree.

Method 1: With a 3.4% reduction of VMT, the simplest method would be to reduce the 2035 Scenario 2 (9M VMT) by 3.4%. The 'adjusted' VMT would then be 8.7M VMT. New calculations for VMT per capita and CO_2 could then be based on this result.

Method 2: Applying the 3.4% reduction to <u>each</u> of the speed bin results, should provide a similar outcome for total VMT and CO_2.

Method 3: A more in-depth analysis to determine the best application of reductions could occur. This analysis would consider varying the reductions to: AM, PM, or off-peak travel; IX, XI, XX, or II trips; or to specific speed bins.

Summary of Land Use and Traffic Model Results

Table 14 summarizes the overall change in vehicle miles of travel and greenhouse gas emissions (both total and per capita figures) for the 2035 horizon year as compared to the 2008 base year results.

In 2035 Scenario 1, daily VMT increases by 15.9% over the 2008 base year, based on land use and 4-D improvements only. However, since the region's population increases by 22.8% by 2035, daily VMT per capita decreases by 5.6% (from 29.8 to 28.1 VMT per capita) when compared to the 2008 base year, again based on land use and 4-D improvements only. When accounting for the potential reduction in daily VMT realized from transit and TDM improvements through the Quick Response Tool (estimated to be a 3.38% reduction in VMT), daily VMT per capita may decrease by up to 8.8% (from 29.8 to 27.4 VMT per capita) when compared to the 2008 base year. Daily CO2 emissions per capita are reduced by 6.6% (12.2 to 11.4 kg CO2 per capita) in 2035 Scenario 1 compared to 2008 base year.

In 2035 Scenario 2, daily VMT increases by 13.1% over the 2008 base year, based on land use and 4-D improvements only. However, since the region's population increases by 22.8% by 2035, daily VMT per capita decreases by 7.9% (from 29.8 to 28.1 VMT per capita) when compared to the 2008 base year, again based on land use and 4-D improvements only. When accounting for the potential reduction in daily VMT realized from transit and TDM improvement through the Quick Response Tool (estimated to be a 3.46% reduction in VMT), daily VMT per capita may decrease by up to 11.1% (from 29.8 to 26.5 VMT per capita) when compared to the 2008 base year. Daily CO2 emissions per capita are reduced by 8.2% (12.2 to 11.2 kg CO2 per capita) in 2035 Scenario 2 when compared to the 2008 base year.

The 2035 Scenario 2 produces a 2.4% reduction in daily VMT per capita when compared to 2035 Scenario 1 (from 28.1 to 27.4 VMT per capita) based on land use and 4-D improvements only. When accounting for transit and TDM improvements using the Quick Response Tool, 2035 Scenario 2 produces a 2.5% reduction in daily VMT per capita from 2035 Scenario 1 (from 27.1 to 26.5 VMT per capita). Daily CO2 emissions per capita are 1.8% lower (11.4 to 11.2 kg CO2 per capita) in 2035 Scenario 2 than in 2035 Scenario 1.

Table 14. Baseline comparison of VMT and GHG figures between 2008 and 2035

Evaluation Criteria (2008 base year vs. 2035 horizon year)	2008 Base Year	2035 Scenario 1 "Business-As-Usual"	2035 Scenario 2 "Preferred Growth Scenario"	% Increase / % Reduction		
				2008 BY vs. 2035 S1	2008 BY vs. 2035 S2	2035 S2 vs. 2035 S1
Population	269,300	330,800	330,800	22.8%	22.8%	0.0%
Daily VMT (land use and 4-D improvements only)	8,016,501	9,293,131	9,068,851	15.9%	13.1%	-2.4%
Daily VMT per capita (land use and 4-D improvements only)	29.8	28.1	27.4	-5.6%	-7.9%	-2.4%
Quick Response Tool reduction rate (applied to Daily VMT to account for transit and TDM improvements)	--	-3.38%	-3.46%	--	--	--
Daily VMT (land use, 4-D and transit and TDM improvements)	8,016,501	8,979,023	8,755,069	12.0%	9.2%	-2.5%
Daily VMT per capita (land use, 4-D and transit and TDM improvements)	29.8	27.1	26.5	-8.8%	-11.1%	-2.5%
Daily CO_2 emissions per capita (kg per capita)	12.2	11.4	11.2	-6.6%	-8.2%	-1.8%

Note: The Pavley II and Low Carbon Fuel Standard adjustments are not applied in this planning scenario process.

Table 15 summarizes the overall change in vehicle miles of travel and greenhouse gas emissions (both total and per capita figures) for the 2020 interim year as compared to the 2008 base year results.

In 2020 Scenario 1, daily VMT increases by 0.7% when compared to the 2008 base year, based on land use and 4-D improvements only. Since the region's population increases by 6.9% by 2020, daily VMT per capita decreases by 5.9% (from 29.8 to 28.0 VMT per capita) compared to the 2008 base year, again based on land use and 4-D improvements only. When accounting for the potential reduction in daily VMT realized from transit and TDM improvements through the Quick Response Tool (estimated to be a 1.00% reduction in VMT), daily VMT per capita may decrease by up to 6.8% (from 29.8 to 27.7 VMT per capita) compared to the 2008 base year. Daily CO2 emissions per capita are reduced by 6.6% (12.2 to 11.4 kg CO2 per capita) in 2020 Scenario 1 compared to the 2008 base year.

In 2020 Scenario 2, daily VMT is reduced by 0.04% compared to the 2008 base year, based on land use and 4-D improvements only. However, since the region's population increases by 6.9% by 2020, daily VMT per capita decreases by 6.5% (from 29.8 to 27.8 VMT per capita) compared to the 2008 base year, again based on land use and 4-D improvements only. When accounting for the potential reduction in daily VMT realized from transit and TDM improvement through the Quick Response Tool (estimated to be a 1.68% reduction in VMT), daily VMT per capita may decrease by up to 8.1% (from 29.8 to 27.4 VMT per capita) compared to the 2008 base year. Daily CO2 emissions per capita are reduced by 7.4% (12.2 to 11.3 kg CO2 per capita) in 2020 Scenario 2 compared to the 2008 base year.

The 2020 Scenario 2 produces a 0.7% reduction in daily VMT per capita from the 2020 Scenario 1 (from 28.0 to 27.8 VMT per capita) based on land use and 4-D improvements only. When accounting for transit and TDM improvements using the Quick Response Tool, 2020 Scenario 2 produces a 1.4% reduction in daily VMT per capita when compared to 2020 Scenario 1 (from 27.7 to 27.4 VMT per capita). Daily CO2 emissions per capita are 1.8% lower (11.4 to 11.2 kg CO2 per capita) in 2035 Scenario 2 than in 2035 Scenario 1.

Table 15. Baseline comparison of VMT and GHG figures for 2008 and 2020

Evaluation Criteria (2008 base year vs. 2020 interim year)	2008 Base Year	2020 Scenario 1 "Business-As-Usual"	2020 Scenario 2 "Preferred Growth Scenario"	% Increase / % Reduction		
				2008 BY vs. 2020 S1	2008 BY vs. 2020 S2	2020 S2 vs. 2020 S1
Population	269,300	288,000	288,000	6.9%	6.9%	0.0%
Daily VMT (land use and 4-D improvements only)	8,016,501	8,070,899	8,013,341	0.7%	-0.04%	-0.7%
Daily VMT per capita (land use and 4-D improvements only)	29.8	28.0	27.8	-5.9%	-6.5%	-0.7%
Quick Response Tool reduction rate (applied to Daily VMT to account for transit and TDM improvements)	--	-1.00%	-1.68%	--	--	--
Daily VMT (land use, 4-D and transit and TDM improvements)	8,016,501	7,990,190	7,878,717	-0.3%	-1.7%	-1.4%
Daily VMT per capita (land use, 4-D and transit and TDM improvements)	29.8	27.7	27.4	-6.8%	-8.1%	-1.4%
Daily CO_2 emissions per capita (kg per capita)	12.2	11.4	11.3	-6.6%	-7.4%	-0.9%

Note: The Pavley II and Low Carbon Fuel Standard adjustments are not applied in this planning scenario process.

Section 7. Findings and Conclusions

Based on the results from this preliminary analysis of several planning scenarios, **changes in the land use development pattern identified in the "preferred growth scenario" for 2035 (2035 Scenario 2) may result in a 7.9% reduction in VMT per capita from the 2008 base year** (from 29.8 to 27.4 VMT per capita). Investments in transit and in travel demand management programs may produce an additional reduction in VMT per capita for the same alternative land use scenario.

For the interim year of 2020, land use changes identified in the "preferred growth scenario" (2020 Scenario 2) may result in a 6.5% reduction in VMT per capita from the 2008 base year (from 29.8 to 27.8 VMT per capita). Future investments in transit and in travel demand management programs may produce an 8.1% reduction in VMT per capita for the same alternative land use scenario.

The following are key findings at the conclusion of this scenario planning effort:

1. No single variable can generate a significant shift in VMT alone. Noticeable shifts can be achieved through coordinated efforts effect change in: land use patterns, application of 4-D elements, transit, and TDM.
2. Land use shifts (and 4-D improvements) that resulted in a slight reduction in total daily VMT in the 2020 Scenario 2 (from the 2008 base year) may in part be attributable to an improved balance of jobs and housing in the Central County subregion for that time period (as compared to the overall time period of 2008 to 2035). This may warrant a closer examination of the relationship of jobs-housing balance in the region and total daily VMT in the scenario planning process of the Sustainable Communities Strategy in the next two years.
3. Population growth from 2008 to 2035 (22.8% increase) in the San Luis Obispo region outpaces growth in VMT in the region for both 2035 scenarios (15.9% increase for Scenario 1 and 13.1% increase for Scenario 2), resulting in a reduction in daily VMT per capita for both 2035 scenarios. Historically, growth in VMT has outpaced population growth. From 1970 to 2005, growth in vehicle miles of travel has outpaced growth in population by nearly three-fold in the United States.
4. Pricing adjustments are expected to have noticeable impacts on VMT, but are not easily adjusted by SLOCOG (including adjustments to parking costs, fuel cost or lane-pricing). An additional benefit would be the resulting revenues to further fund VMT-reducing improvements or incentives.
5. The SLOCOG VMT Quick Response Tool provides a low-cost approach to ascertain the affect of TDM and transit improvements on VMT without the very costly investment (potentially $1 million or more) to build a sophisticated, mode-choice, travel demand model.
6. The process requires directions for consistency, especially for: handling of IX, XI, and XX trip, use of statewide projections at MPO boundaries, application of post-processor results, and a list of specific metrics expected from MPOs.
7. The smaller variation between 2020 Scenario 2 and 2020 Scenario 1 for daily VMT per capita results (a 0.7% difference) may reflect the slow pace of growth anticipated in the next decade. A modest variation in results between 2035 Scenario 2 and 2035 Scenario 1 for daily VMT per capita (a 2.4% difference) may reflect the

assumption that many of the smart growth investments in existing corridors, downtowns and villages will take a longer time to realize; likewise, the VMT reduction expected from such projects may not show up until the later years in the planning horizon.

8. The modeling tools used in this scenario planning effort allow SLOCOG staff to reflect future housing and employment growth at the parcel-level, which allows for a relatively detailed reflection of a potential future land use scenario. However, there may be over-riding considerations made for SLOCOG's staff ability to accurately reflect the timing of future growth in the region relative to the 2020 interim year. This may impact the ability to present a likely reflection of a future growth in the region for the interim year, which could overstate reductions in total VMT and VMT per capita.