Transit Providers

Currently, there are six local transit service providers and one regional rail network operating in San Bernardino County. The transit routes that these service providers operate cover less than ten percent of the land area of the county, but they provide transit services to more than 90 percent of the population of the county.

- SCRRA - The Southern California Regional Rail Authority (SCRRA) is the joint powers authority that operates the Metrolink commuter rail system. This system serves parts of Los Angeles, Orange, Riverside and Ventura Counties, along with the San Bernardino Valley portion of San Bernardino County.
- Omnitrans - Omnitrans was established as a regional transit authority in 1976 through a Joint Powers Authority (JPA) that serves a 456 square mile service area in the San Bernardino Valley with a population close to 1.4 million.
- Victor Valley Transit Authority - Victor Valley Transit Authority (VVTA) is a Joint Powers Authority (JPA) established in 1991 and comprised of five jurisdictions; the cities of Adelanto, Hesperia, and Victorville, the town of Apple Valley, and several unincorporated areas of San Bernardino County including Phelan, Pinon Hills, Wrightwood, Lucerne Valley, Helendale, and Oro Grande. The combined population of the Victor Valley recently passed 250,000.
- Morongo Basin Transit Authority - Morongo Basin Transit Authority (MBTA) is a JPA that operates in the city of Twentynine Palms, the town of Yucca Valley and in the Morongo Basin.
- Mountain Area Regional Transit - The Mountain Area Regional Transit Authority (MARTA) is a JPA that provides coordinated transit services for all of the mountain communities including, Big Bear Valley, Running Springs, Crestline, Lake Arrowhead and Blue Jay. The agency also provides two "Off the Mountain" services, from Big Bear Valley and Lake Arrowhead to downtown San Bernardino.
- Barstow Area Transit - Barstow Area Transit (BAT) provides transit service to the Barstow area, as well as the communities of Hinkley, Lenwood, Grandview, Yermo, Harvard, Daggett and Newberry Springs.
- Needles Area Transit - The City of Needles administers the Needles Area Transit (NAT) service in the Needles Area.

Development of Alternatives

The recommended LRTP began by developing and analyzing a wide range of alternatives designed to meet the needs of the county. Coordination with transit agencies, local governments and with extensive public outreach led to the development of four alternative scenarios for the planning horizon of 2035. They are summarized as follows:

- The Baseline Alternative – shown in Figure ES-1, continues all transit services currently existing and any improvements currently funded.
- The Plan Alternative – shown in Figure ES-2, an enhancement of the baseline alternative it includes restructuring the existing system of local bus routes plus all projects currently planned for development.
- The Vision Alternative - shown in Figure ES-3, a premium transit scenario that includes additional BRT and Rail service as well as other potential transit services.

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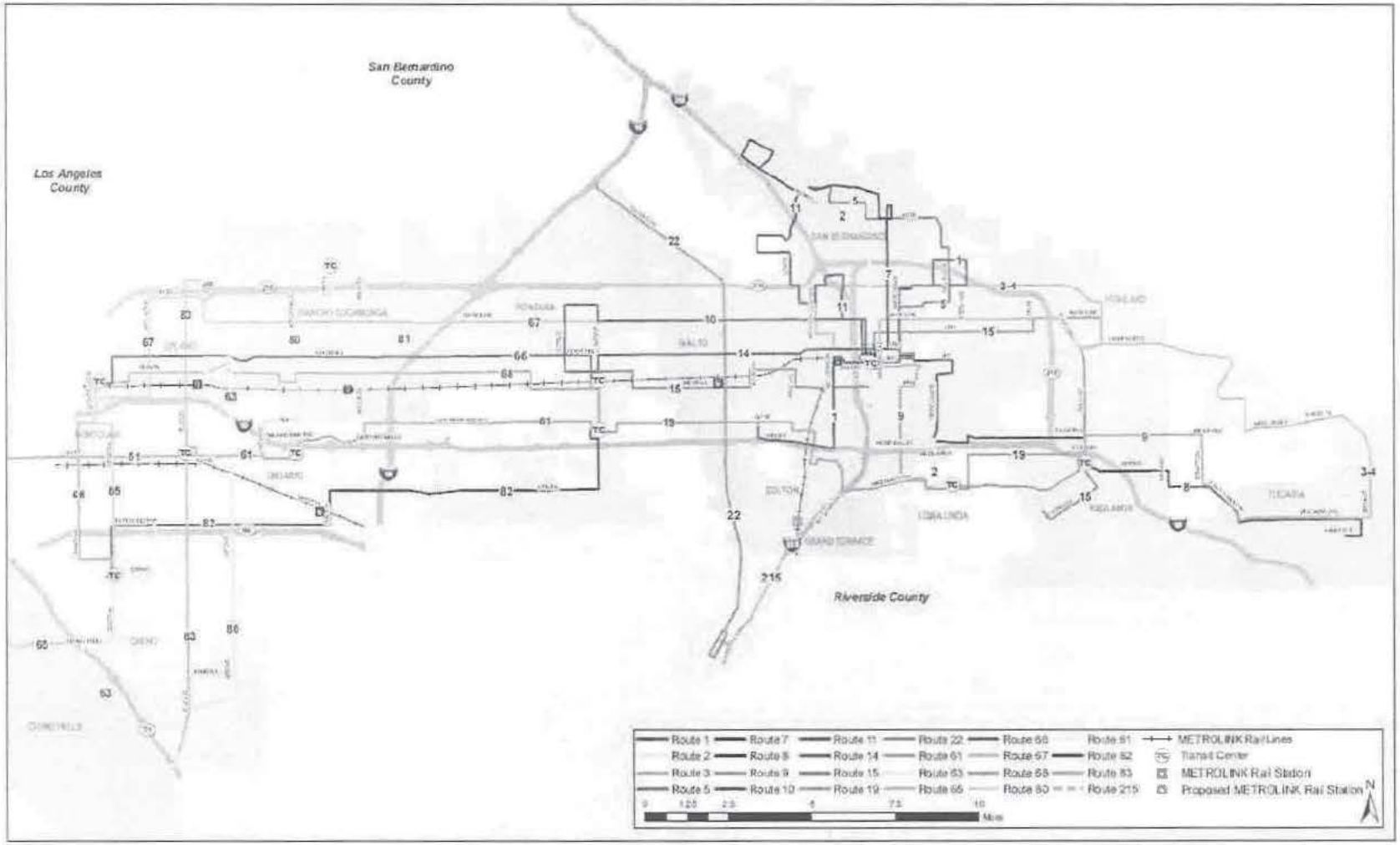

Baseline Transit Alternative

DRAFT LONG RANGE TRANSIT PLAN (LRTP) for the San Bernardino Valley

San Bernardino Associated Governments (SANBAG)
August 2009

Source: Parsons, 2009.

Figure ES-1: Baseline Transit Alternative

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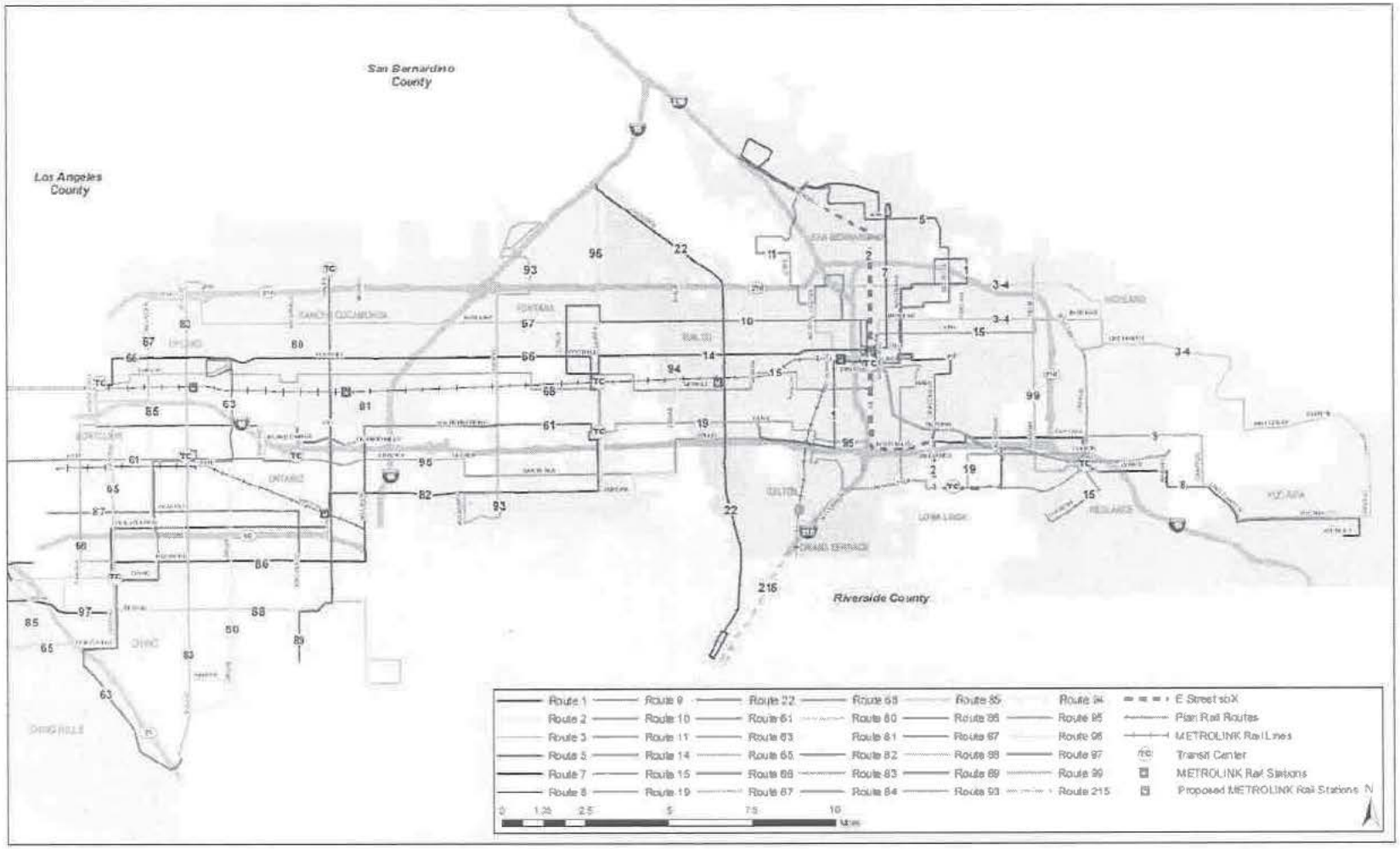


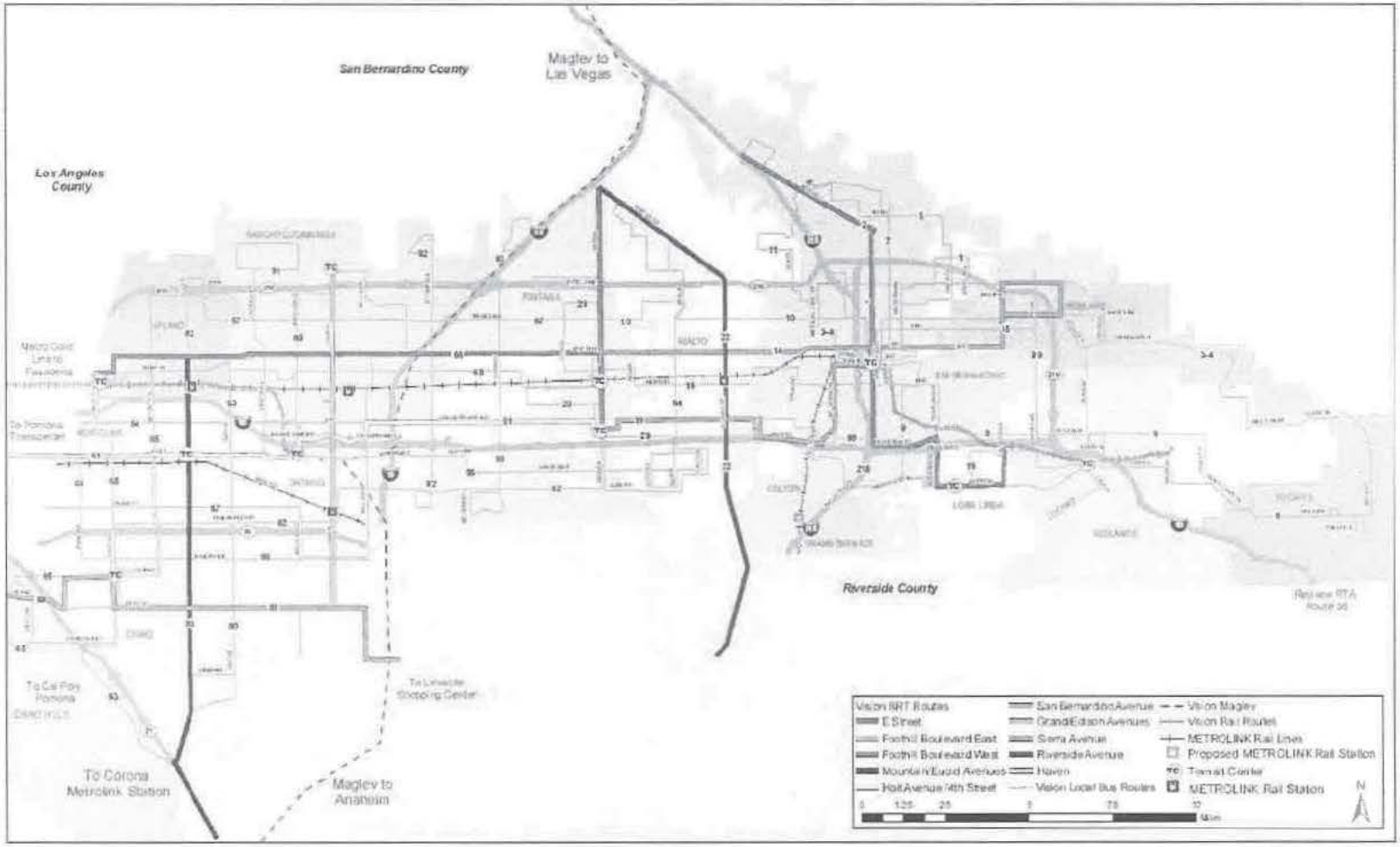
Plan Transit Alternative

DRAFT LONG RANGE TRANSIT PLAN (LRTP) for the San Bernardino Valley

San Bernardino Associated Governments (SANBAG)
August 2009

Source: Parsons, 2009.

Figure ES-2: Plan Transit Alternative



VISION Premium Transit Services
DRAFT LONG RANGE TRANSIT PLAN (LRTP) for the San Bernardino Valley

San Bernardino Associated Governments (SANBAG)
August 2009

Source: Parsons, 2009.

Figure ES-3: Vision Transit Alternative

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- The Sustainable Land Use Alternative - shown in Figure ES-4, the Vision scenario with modified transit supportive land use forecasts.

These four alternatives, described in detail in Chapter 5, were evaluated in Chapter 6 to meet the County's future transit challenges and needs. The evaluation is based on the alternatives ability to serve key travel markets, the total ridership, cost effectiveness, public input and the ability to provide economic development.

Three alternatives were also prepared for the Victor Valley including the Base Alternative, the Plan Alternative, and the Vision Alternative. These alternatives are described in detail and evaluated in Chapter 7.

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Public Outreach

Extensive public outreach has occurred as part of the LRTP process. The first public meetings were a series of workshops held in July and August of 2006 in various locations in the San Bernardino Valley. The alternatives presented included the Baseline and Plan Alternatives and three vision alternatives that became condensed into one Vision Alternative, based on public opinion.

In May of 2009, SANBAG hosted a series of meetings to assist in the development of the Sustainable Land Use Alternative. Those in attendance included representatives of local jurisdictions that had premium transit service identified in the Vision Alternative. Additional public outreach meetings occurred in August of 2009 to receive public input on the selection of the LRTP and to receive input on the recommended LRTP. Chapter 9 provides a summary of all the public meetings.

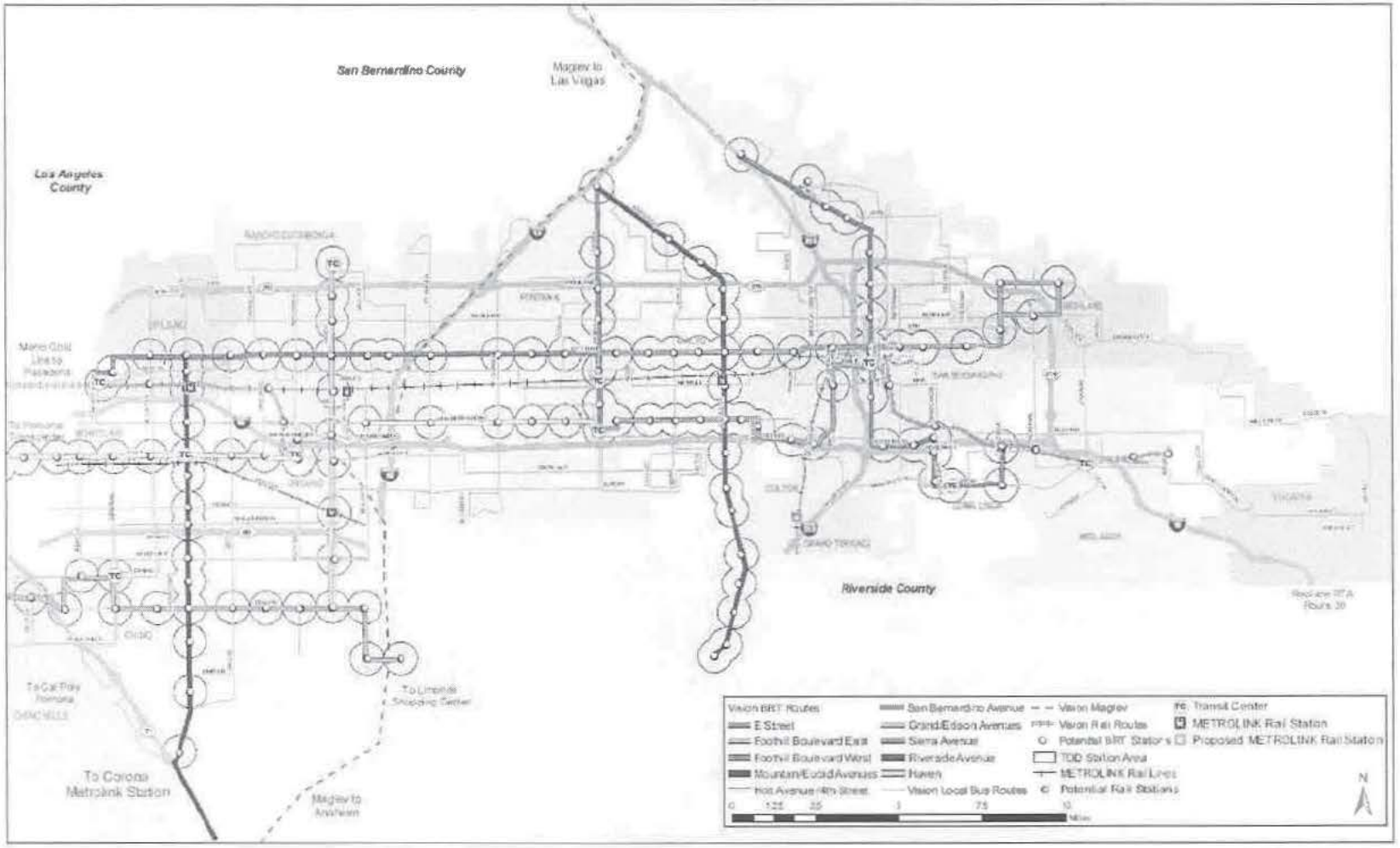
Funding Projections

Funding Projections were prepared for the LRTP and included a variety of Local and Federal Sources. Projections for Measure I, the local half-cent sales tax was provided by SANBAG. Local transportation funds were projected by subareas for the entire county. Federal Funding projections were prepared for the 5317 New Freedom program, 5316 Job Access & Reverse Commute (JARC) program, 5311 Rural Program, 5307 Urbanized Area Formula Program and 5309 Rail modification Program. Funding Projections were not prepared for State Transit Assistance (STA) funds, as the funding source was suspended by the state. Surface Transportation Program (STP), and Congestion Management and Air Quality (CMAQ) Funding, were not included in the projections due to the nature of the funding source, and Federal 5309 New Starts/Small Starts funds were not included in the projections as they are competitive funds and are distributed on a project-by-project basis, but were included in the recommended LRTP.

Recommended LRTP

For the San Bernardino Valley, the Sustainable Land Use Alternative provides the most annual boardings and serves the highest annual passenger miles. Additionally, this alternative provides the opportunity to guide development in line with the implementation of SB 375 and provide the communities of the San Bernardino Valley a vehicle to promote economic development.

SANBAG's recommended LRTP is the affordable portion of the Sustainable Land Use Alternative, and promotes partnering cities in adopting policies to support transit as recommended in Chapter 3. It is anticipated that future project development will progress only when the transportation / land use connection is appropriately addressed. The recommended LRTP includes, the Metrolink Extension to downtown San Bernardino, The Redlands Rail Commuter Rail



VISION Sustainable Land Use Scenario
DRAFT LONG RANGE TRANSIT PLAN (LRTP) for the San Bernardino Valley

San Bernardino Associated Governments (SANBAG)
August 2009

Source: Parsons, 2009.

Figure ES-4: Sustainable Land Use Transit Alternative

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project, the Goldline Extension to Montclair Transit Plaza, increased service for Metrolink and Omnitrans, and four sbX corridors.

A funding deficit is shown in Table ES-1, for the life of the plan and reaches 1.1 billion dollars. This deficit does not include all available funding including STA funds, STP and CMAQ funds as well as a potential increase in Measure I funds. Chapter 10 also identifies various other financial strategies that may be considered for implementation.

For the Victor Valley, the three alternatives were evaluated based on a cost-effectiveness measure, by calculating the ratio of annual boardings over the annual cost of the system. The Vision Alternative, as the highest ranked alternative, is the Recommended LRTP for the Victor Valley. As shown in chapter 11 all three alternatives are well within the funding projections and no shortfall in funding is expected for these alternatives. It is anticipated that only a percentage of the LTF funds will be utilized by the transit network for the area, providing funding for other transportation and transit usage in the Victor Valley.

Victor Valley is a key growth area in the county and with the implementation of SB 375 it is unclear what effect the legislation will have on the development patterns of the valley. Transit's role in providing a choice in mobility to residents of the valley is expected to remain a challenge, and due to the low density nature of the Victor Valley, new services will be implemented primarily as they become feasible in the short range planning process.

The Rural Transit Agencies of San Bernardino County each operate in unique circumstances from the remainder of San Bernardino County. The LRTP analyzed a continuation of the existing level of service throughout the life of the plan, and although funding shortfalls exist, there is sufficient funding sources identified over the life of the plan to support these services.

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Table ES-1: Recommended LRTP for San Bernardino Valley

	Total 2010-2015	Total 2016-2025	Total 2026-2035	Total 2010-2035
Omnitrans Fleet* (exclude NS)	$51,060,000	$143,670,000	$174,500,000	$369,230,000
BRT Corridor New Starts**	$170,650,000	$214,500,000	$346,200,000	$772,050,000
Omnitrans Other Costs	$66,600,000.00	$176,800,000	$251,600,000	$495,000,000
Redlands Rail	-	$240,000,000	-	$240,000,000
Metro Goldline to Montclair		$50,000,000		$50,000,000
Metrolink Extension		$40,000,000	-	$40,000,000
Metrolink Strategic	$120,000,000	$110,000,000	-	$230,000,000
Total Capital Costs	$408,310,000	$974,970,000	$813,000,000	$2,196,280,000
Total Net Operating Costs	$399,123,820	$914,317,700	$1,313,942,860	$2,627,384,380
Projected Revenue	537,091,618	1,175,171,895	$ 1,515,443,758	$ 3,361,560,638
Projected 5309 Funding of Recommended Corridors***	$75,000,000	$150,000,000	$150,000,000	$375,000,000
Total	$(195,342,202)	$(564,115,805)	$(461,499,102)	$(1,087,103,742)

*Includes ADA Fleet

**E Street without Extension

***Redlands Rail and four sbX Corridors

Source: Hexagon, Parsons, 2009.

CHAPTER 1 INTRODUCTION

1.1 COUNTY SETTING

San Bernardino County, located in Southern California boasts a wide variety of natural settings including beautiful mountains and vast deserts as well as numerous prominent institutions, local and regional parks, cultural centers and historic landmarks.

Framed by the Counties of Los Angeles and Orange on the west, Riverside County to the south and extending to Nevada and Arizona to the east, as shown in Figure 1-1, the County is connected to Los Angeles, San Diego and Orange County by several major transportation corridors. Interstate 10 (San Bernardino Freeway) is the major east-west freeway through the highest density population centers of the San Bernardino valley, while Interstates 15 and 215 connect the valley from Riverside and San Diego to the South, and continue over the Cajon Pass to the Victor Valley and the cities of the high desert and eventually to Las Vegas. Scenic State Highway 18 enters the mountains surrounding the San Bernardino Valley and attracts tourists and residents during the weekends and holiday seasons to Lake Arrowhead, Big Bear Lake and other mountain communities and ski resorts on the famous Rim of the World Highway.

The eastern portion of the county is mostly undeveloped and contains the Mojave National Preserve, the Fort Irwin and Twentynine Palms military installations, as well as portions of Death Valley and Joshua Tree National Parks. Twentynine Palms Highway connects the City of Twentynine Palms, Town of Yucca Valley and Morongo Valley to Palm Springs in Riverside County, the nearest major metropolitan area.

SAN BERNARDINO VALLEY

San Bernardino Valley is the most intensely developed portion of the county. Located in the southwest corner of the county, it is bounded by the San Gabriel and San Bernardino Mountains to the north and east, and the counties of Los Angeles, Orange and Riverside to the west and south.

The County is connected to other regional centers by scheduled transit and commuter rail service provided by Metrolink and (to a much lesser degree) by the Southwest Chief and Sunset Limited Services provided by Amtrak. Metrolink serves as an increasingly important commuter rail service between San Bernardino and Los Angeles, with connecting service south to Riverside and Orange County. Ontario International Airport (ONT) is located in the west valley and is the largest airport in the region with several major expansion projects recently completed. Omnitrans provides local and express bus service within the San Bernardino Valley, and five other operators serve outlying communities.

VICTOR VALLEY

The Victor Valley area is located on the western edge of the Mojave Desert just north of the San Bernardino Mountains, roughly 45 miles north of the City of San Bernardino and 80 miles northeast of downtown Los Angeles. Major municipalities in the Victor Valley area include Victorville, Hesperia, Adelanto and Apple Valley. Known as the "high desert", the area has an elevation of about 3,000 feet above sea level.

The valley was historically known for its agricultural, industrial, and military land uses. During the last several decades, however,

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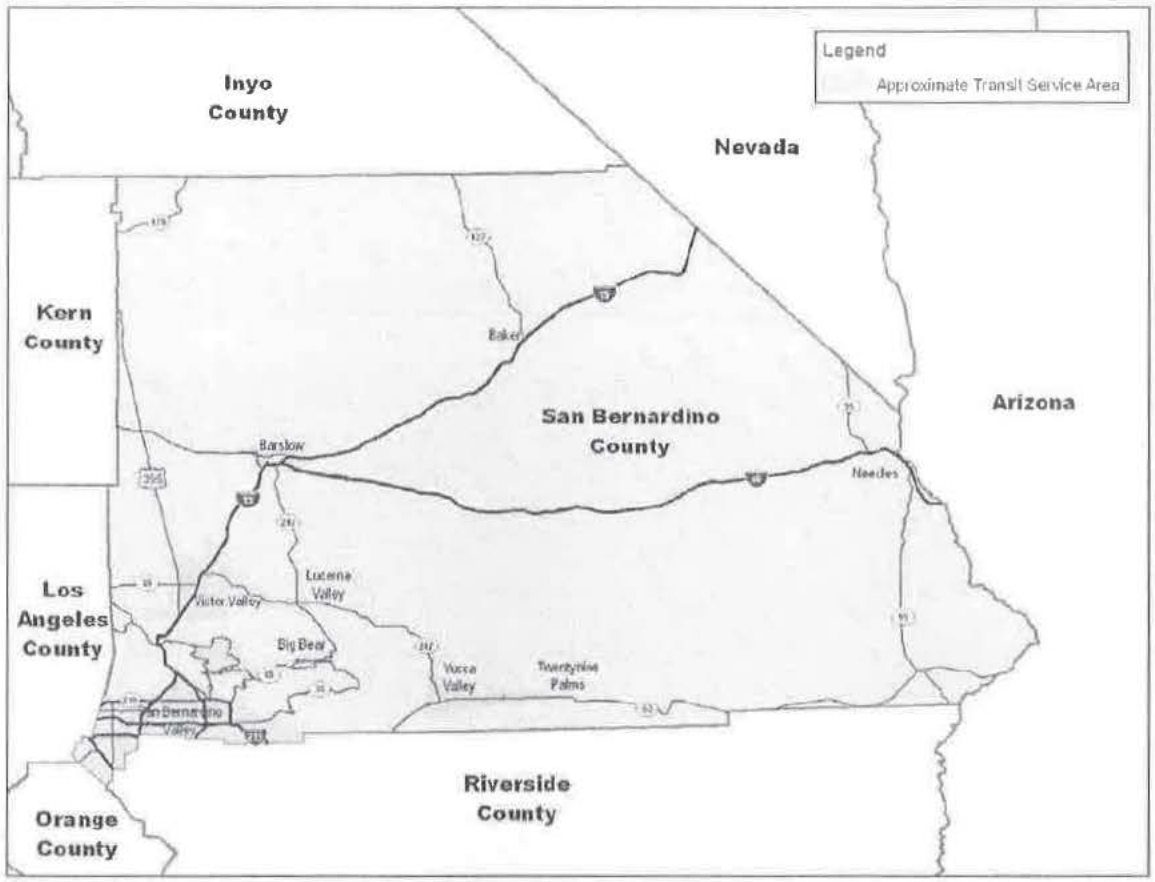

Source: ESRI, Parsons, 2009

Figure 1-1: San Bernardino County and Surrounding Areas

Victor Valley has become an area of increasing development in the Southern California Basin with a population exceeding 200,000. As the area's residential population continues to grow dramatically and as the local economy develops and diversifies, it is vital that transit continues to provide a viable mobility option for residents.

The primary highway in the Victor Valley area is Interstate 15 (I-15), which bisects the area in a north-south direction, entering the Valley between the San Gabriel and San Bernardino Mountains, which divide the Victor Valley area from the Los Angeles and Riverside metropolitan areas to the southeast, and continuing north to Barstow, roughly forty miles to the northeast, and then to Las Vegas, Nevada. State Highways 18 and 395 provide additional highway access to Victor Valley, and Historic U.S. Route 66 passes through Old Town Victorville. The Victorville Amtrak station is also located in Old Town Victorville; the "Southwest Chief" Amtrak rail line stops at the Victorville station once daily in each direction.

1.2 CHALLENGES

GROWTH AND DEVELOPMENT

As a major emerging employment center, employment in the county is forecasted to grow by almost 80% by 2030. The growth in employment will bring the county closer to

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jobs-housing balance and will have a dramatic affect to travel behavior. San Bernardino County's freeways are already highly congested during commute hours and a substantial increase in overall traffic will affect the ability of transit to provide essential mobility and maintain good basic coverage in communities.

The cities of the High Desert have experienced rapid growth and the area now totals over 200,000 people. As the residential growth continues in the area, new economies are emerging, such as the Southern California Logistics Airport (SCLA) a major employment center.

This rapid residential growth has occurred primarily in low densities that strain local infrastructure and results in additional Vehicle Miles Traveled (VMT) as commutes to traditional employment areas become longer. The conversion of vacant land to urban and suburban environments at such a rapid rate challenges local and regional planners to guide development in a beneficial and meaningful way.

Social Challenges

Given the low population density of much of the county, transit's ability to offer mobility to the transit dependent and provide accessibility to key medical and social services will continue to be a major area of focus. SANBAG, in December of 2007, developed the *Public Transit-Human Services Transportation Coordination Plan* for San Bernardino County. This short-term plan identifies mobility needs for five remote areas of the County and recommended strategies and priorities to help improve access to human necessities such as, medical appointments, trips to the pharmacy, social service agency visits, and grocery store shopping for the elderly, disabled and low-income individuals. As the transit dependent populations grow throughout the county, the long-term ability to provide access to these services will play a larger role for transit providers.

Environmental Concerns and Benefits

Good air quality is vital for the health of residents, nature and the economy. Southern California continues to have among the worst air quality in the nation, and although significant improvements have been made, the South Coast Air Basin that includes San Bernardino Valley and mountain communities, still has the highest concentrations of ozone and PM2.5 in the nation.

Since 1980, the region has accomplished significant improvements in its air quality particularly with respect to carbon monoxide (CO) and ozone. For example, the South Coast Air Basin is now a CO attainment area and in the entire Inland Empire (compromising San Bernardino and Riverside Counties), emission levels have been reduced by almost half during the last decade.

According to the 2008 SCAG Regional Transportation Plan (RTP), of all the people nationwide who are exposed to PM2.5 (particulate matter with a diameter of 2.5 micrometers or smaller) levels that exceed the national health-based standard, 52% live in Southern California. Vehicle emissions are a major source of pollution as fossil fuels continue to be the main energy source for vehicles.

In addition to the challenges presented by air quality, transportation represents 38% of greenhouse gas (GHG) emissions. Climate change of which overwhelming evidence shows is occurring, poses serious risks to our economy, water supply, biodiversity and public health, and has led new efforts to

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reduce the amount of GHG emissions released into the atmosphere.

FUNDING CHALLENGES

Transit operators face a continual challenge to grow, operate and maintain transit services. Federal, State and Local funding play a crucial role in determining what transit services can be provided.

Costs of operating transit service are expected to rise at least as fast as inflation. In the short term, funding for transit, particularly state and local funding, may not keep pace with inflation. The recession and budget concerns have led to a cutback in state funding for transit. Although a recent court decision favored the transit operators, it is unlikely to change the state funding picture anytime soon. At the local level, transit funds keyed to taxable sales have fallen during the recession, causing additional difficulties for transit operators.

The long term forecast has the economy rebounding and sales tax and other funding increasing over time. However, the small operators will be challenged to maintain their services through the life of this plan and may find it difficult to obtain the resources to expand. The larger transit operators in the county can call on a wider range of funding sources. Some of these are tied to population and will grow as the population expands.

1.3 LEGISLATIVE FRAMEWORK

Mass Transit and Transit Oriented Developments are consistent with the strategies, policies and plans of many local, regional, state and national governmental agencies and national development organizations. Among these are the Federal Transit Administration (FTA), Southern California Association of Governments, the State of California, and the Urban Land Institute (ULI).

In 1994, the FTA established the Livable Communities Initiative, which aimed to strengthen the integration of transit and community planning and encourage land use policies that support the use of transit.

In 2005 the *Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users* (SAFETEA-LU) was signed. SAFETEA-LU went further than the Livable Communities Initiative, granting priority for funding in its New Starts and Small Starts programs for transit projects with transit-supportive land use policies and implementation measures.

In 2002, with the passage of Assembly Bill (AB) 1493, California launched an innovative and pro-active approach to dealing with GHG emissions and climate change at the state level. AB 1493 requires the Air Resources Board (ARB) to develop and implement regulations to reduce automobile and light truck GHG emissions; these regulations will apply to automobiles and light trucks beginning with the 2009 model year.

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05. The goal of this Executive Order is to reduce California's GHG emissions to: 1) 2000 levels by 2010, 2) 1990 levels by 2020 and 3) 80% below the 1990 levels by the year 2050. In 2006, this goal was further reinforced with the passage of AB 32, the Global Warming Solutions Act of 2006. AB 32 sets the same overall GHG emissions reduction goals while further mandating that ARB create a plan, which includes market mechanisms, and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." Executive Order S-20-06 further directs state agencies to begin implementing AB 32, including the

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recommendations made by the state's Climate Action Team.

Senate Bill 375 signed by the Governor in September of 2008, a housing, land use and air quality bill helps implement AB 32's GHG reduction goals by integrating land use, regional transportation and housing planning. SB 375 requires regional transportation plans to meet the GHG reductions targets set in AB 32 by adopting a "sustainable community strategy" (SCS) or a development strategy that promotes the reduction of Vehicle Miles Traveled (VMT) from passenger vehicles. Transportation projects that are part of the SCS will have priority on State transportation money. Although the law focuses on regional planning efforts, it specifically states that it does not supersede city or county land use powers and local plans are not required to be consistent with the approved SCS. The SCS also allows transit priority projects and projects consistent with the SCS to be exempt or receive streamlined California Environmental Quality Act (CEQA) clearance.

Two types of projects are eligible for CEQA incentives if they are consistent with the SCS: Transit Priority Projects, and residential or mixed use residential projects. Transit Priority Projects are defined as having at least 50% residential use, a density of at least 20 units per net acre and located within a half mile of a regional transit corridor. Residential or mixed use residential projects must have at least 75 percent of the total square footage for residential use.

Transit Priority Projects qualify for a CEQA exemption if they: (1) are consistent with the SCS; (2) meet eight environmental criteria, including no wetlands/riparian areas, historic resources, hazards or endangered species located on the site; and (3) meet seven land use criteria, including affordable housing or open space requirements. Transit Priority projects that do not meet the exemption requirements may still qualify for a streamlined environmental review under CEQA if certain criteria are met. The form of streamlined review includes a limited Initial Study or Environmental Impact Review (EIR).

Residential or mixed use residential projects do not need to analyze the following impacts in their CEQA documents: growth-inducing impacts; project or cumulative impacts from vehicle trips on global warming or the regional transportation network; or a reduced residential density alternative.

1.4 Planning Framework

The LRTP was developed in conjunction with the comprehensive regional planning process that includes the following Planning Efforts:

Regional Transportation Plan (RTP)

The Regional Transportation Plan (RTP) is a 20-year transportation blueprint adopted by SCAG that outlines a long-range strategy to meet mobility, financial, and air quality requirements. This plan shows how the region will meet federal air quality standards and other needs based on realistic estimates of transportation funding. Only programs and projects outlined in the final document are eligible for state and federal funding. The RTP establishes transportation priorities and identifies projects that support its goals.

The RTP is updated every three years. For the last update, in May 2008, SANBAG staff and all 24 cities in San Bernardino County provided extensive input to this regional plan and submitted future county transportation projects for inclusion. The RTP reflects population, housing, employment, environmental, land use forecasts, and technology changes for the Southern California region.

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Public transit priorities included in the public transportation system in the RTP include:

- BRT: Designed to provide fast, high-quality bus service to attract choice riders and effect a mode shift to reduce congestion.
- Metrolink Commuter Rail: Provides the backbone of a mass transit regional commute service.
- Land Use – Transit Coordination: The regional transit program calls for increased and better coordination between transit and land use planning.
- Transit-Oriented Development (TOD): Local and regional planning agencies are encouraged to promote TOD initiatives cooperatively along major transit corridors.
- Transit Centers: Develop a network of transit-based centers and corridors, supported by in-fill development that maximizes use of existing infrastructure, supports increased ridership, reduces air pollution, and preserves green space and undeveloped areas.

The LRTP is a strategy that reflects the goals and public transit priorities of the RTP.

COMPASS BLUEPRINT 2% STRATEGY

As stated earlier, the region is expected to experience explosive growth. In 2001, SCAG began an ambitious study to examine how the region should grow. In 2004, the results indicated that if growth were concentrated in only 2% of the land area of Southern California, the region could accommodate the growth while still maintaining the single family neighborhoods that make up Southern California cities. But in that 2% area, largely in built up areas and along existing and proposed transit corridors, densities would have to increase and efforts would have to be made to integrate land uses so as to improve the jobs-housing balance.

Since 2004, SCAG has been undertaking a series of studies, entitled *The Compass Blueprint 2% Strategy*, which is a guide for how and where to implement SCAG's Growth Vision for Southern California. While recognizing valuable quality of life goals, the Compass Strategy provides a guide to local decision-makers, demonstrating how minor changes in land use and transportation decision-making can reap unexpected economic, mobility, and environmental benefits locally, sub-regionally and regionally.

The Strategy proposes increasing the region's mobility by encouraging transportation development and transit-oriented development focusing on in-fill development and redevelopment opportunities.

In 2006, as part of SCAG's *Compass Blueprint 2% Strategy*, SANBAG began to examine in more detail how anticipated growth in San Bernardino County could be accommodated as part of the *SANBAG Transportation Land Use Integration Project*. Released in March of 2008, the Transportation Land Use Integration Project, building on the initial SCAG efforts, identified "opportunity" areas in the San Bernardino Valley where growth would likely occur and transit ridership could support TOD's, as shown in Figure 1-2. These opportunity areas include city centers, transit hubs or Transcenters, and other high-density growth areas. The Project identified seven opportunity sites and generated preliminary recommendations to guide development, consistent with the key goals of the Compass Blueprint 2% Strategy.

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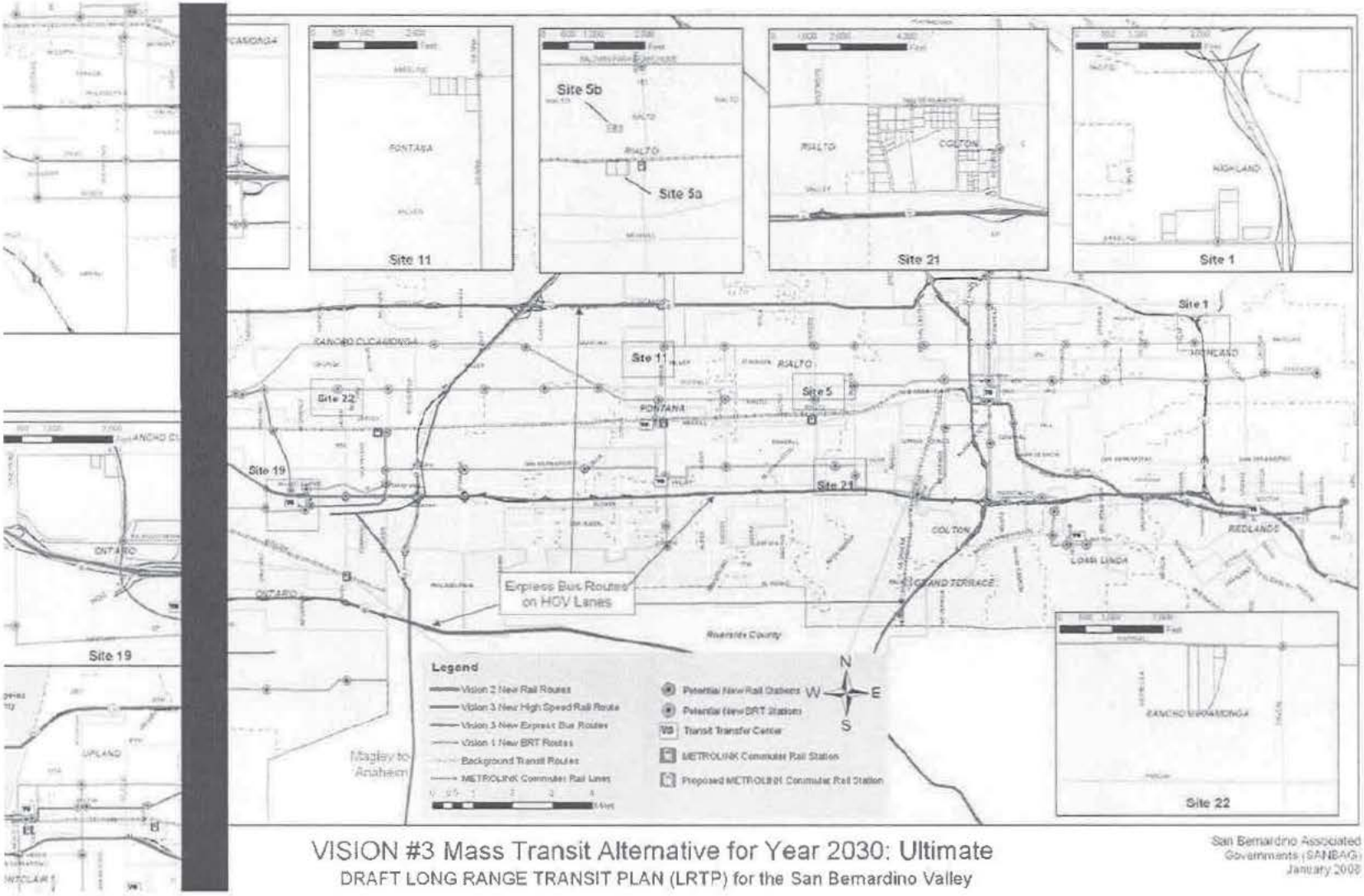

VISION #3 Mass Transit Alternative for Year 2030: Ultimate

DRAFT LONG RANGE TRANSIT PLAN (LRTP) for the San Bernardino Valley

San Bernardino Associated Governments (SANBAG)
January 2008

Figure 1-2: Compass Blueprint Sites

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CHAPTER 2 EXISTING CONDITIONS

2.1 EXISTING TRANSIT CONDITIONS

SAN BERNARDINO VALLEY

SCRRA

The Southern California Regional Rail Authority (SCRRA) is the joint powers authority that operates the Metrolink commuter rail system and is comprised of the following public agencies: Los Angeles County Transportation Commission, Orange County Transportation Authority, Riverside County Transportation Commission, San Bernardino Associated Governments, and the Ventura County Transportation Commission. Metrolink has the highest ridership of any commuter rail operation in California and is the fifth largest in the United States. It is also one of the youngest, having started operations in October 1992. Metrolink operates seven routes in the southern California region and operates three routes in the San Bernardino Valley. The San Bernardino Line paralleling the I-10 freeway contains the highest ridership in the Metrolink system and serves six stations in the valley. The Riverside line paralleling State Route 60 serves one station in the valley. The Inland Empire-Orange County Line originates in San Bernardino and parallels the 91 freeway.

Omnitrans

Omnitrans was established as a regional transit authority in 1976 through a Joint Powers Authority (JPA) that included the cities of Chino, Colton, Fontana, Loma Linda, Montclair, Ontario, Redlands, Rialto, San Bernardino, Upland and the County of San Bernardino. The cities of Chino Hills, Grand Terrace, Highland, Rancho Cucamonga, and Yucaipa have since joined the JPA. The County and all member cities are represented on the Omnitrans Board of Directors.

Omnitrans serves a 456 square mile service area in the San Bernardino Valley with a population close to 1.4 million. The range of Omnitrans services includes:

29 fixed bus routes, including 17 routes in the East Valley (east of I-15), 11 routes in the West Valley (west of I-15), and one regional express route to the City of Riverside. These Routes are shown in Figure 2-1.

- Two OmniLink general public demand-response services in Chino Hills and Yucaipa designed for low-density service areas.
- An ADA complementary paratransit service, Access, operated throughout the Omnitrans service area.
- OmniLink, a dial-a-ride service designed for low-density service areas.

Omnitrans' fixed route transit system provides scheduled, general public service along planned, predetermined routes in accordance with established frequencies. Those frequencies are generally based on passenger volumes: enough people have to ride each bus so that productivity and fare box recovery standards are met.

OmniLink demand responsive service is available in two areas, Chino Hills and Yucaipa. In addition to providing policy-based service coverage in low-density areas, the Chino Hills OmniLink service is designed to provide feeder service to/from Omnitrans fixed route bus service. The Yucaipa OmniLink provides service to/from neighboring Calimesa, but is not provided for trips that begin and end in Calimesa.

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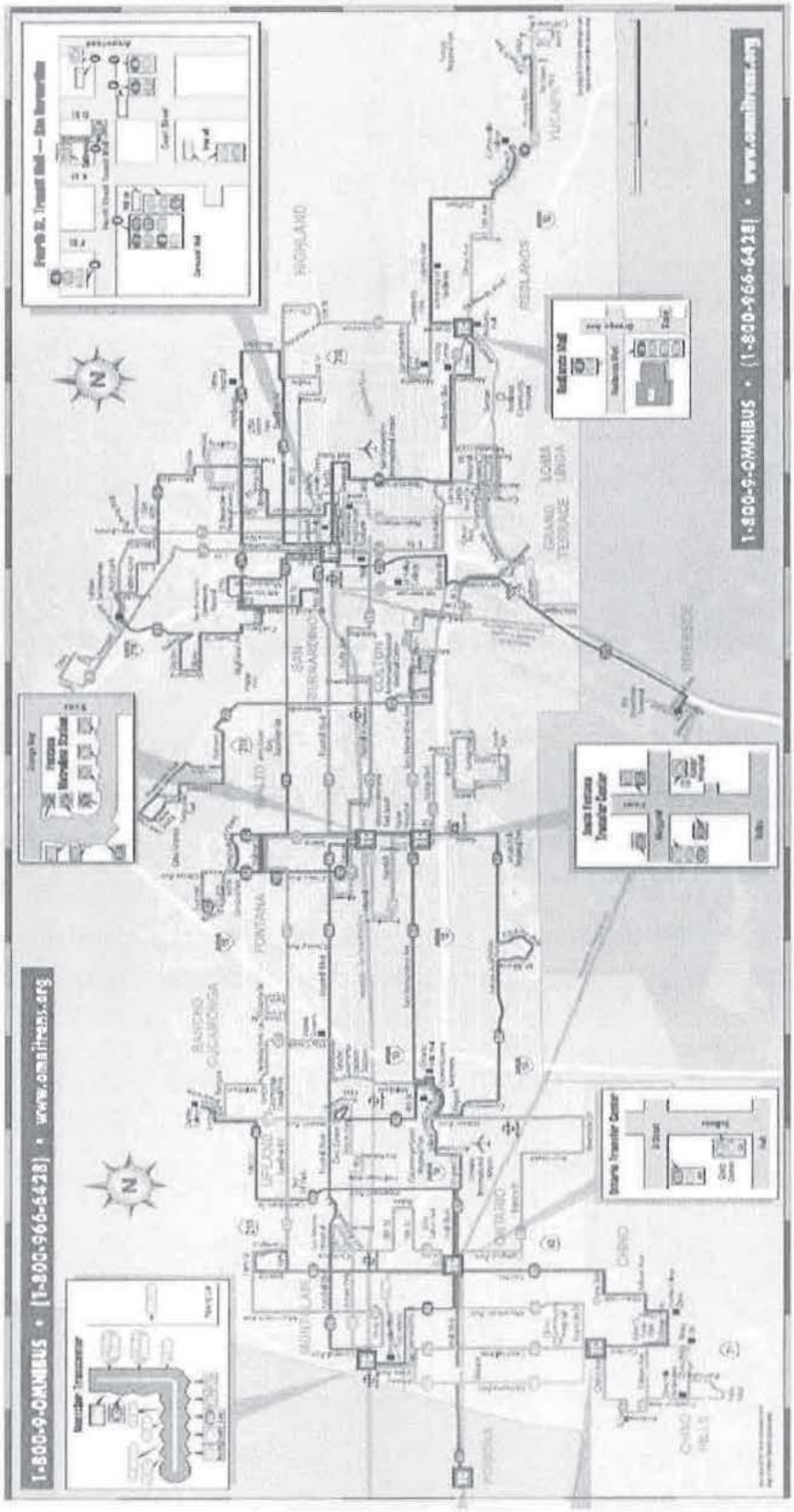

Figure 2-1: Existing Omnitrans Routes

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The Americans with Disabilities Act (ADA) requires that fixed route transit operators provide, or ensure the provision of "Complementary" (i.e. comparable) paratransit service for those individuals who, because of their disability, cannot use the regular general public fixed route service. Access service is available through the Omnitrans service area within a 3/4 mile radius on either side of an existing Omnitrans regular bus route. Access service is contracted out to First Transit, and the three zone fare structure is shown in Figure 2-2.

Additional Transit Services

Additional transit services and connections in the Valley are provided by the following transit agencies:

- Riverside Transit Agency, which operates route 204 from Riverside to Montclair with service to Ontario Mills;
- Foothill Transit, which operates local bus and the Silver Streak, a commuter express bus service from the Montclair Transcenter to Downtown Los Angeles;
- Orange County Transportation Authority, which operates route 758 from the Chino Transcenter to the Irvine Spectrum in Orange County;
- METRO, which operates route 484 from Downtown Los Angeles to the Pomona Transcenter;
- Pomona Valley Transportation Authority, which operates Access and Dial-A-Ride services throughout the Pomona Area;
- Mountain Area Regional Transit Authority, which operates the "Off the Mountain Service" route into downtown San Bernardino; and
- Greyhound, a private bus operator that provides service to the cities of Victor Valley and Barstow into downtown San Bernardino.

Table 2-1 provides service information to the existing Transcenter sites in the San Bernardino Valley Existing Transcenters.

Victor Valley

Victor Valley Transit Authority (VVTA) is a Joint Powers Authority (JPA) established in 1991 and comprised of five jurisdictions; the cities of Adelanto, Hesperia, and Victorville, the town of Apple Valley, and several unincorporated areas of San Bernardino County including Phelan, Pinon Hills, Wrightwood, Lucerne Valley, Helendale, and Oro Grande. The Board of Directors includes representatives from the above jurisdictions, who contract out management and operations, with operations overseen by a transportation advisory committee (TAC).

VVTA is the second largest transit operator in San Bernardino County and operates 18 local fixed routes with a mixed fleet of 38 buses. The city of Victorville is served by 12 routes, routes 21, 22, 31, 32, 41, 43, 44, 45, 51, 52, 53 and 54; the city of Hesperia with five routes, routes 44, 45, 46, 48 and 53; the city of Apple Valley with five routes, routes 23, 40, 41, 43 and 47; and Adelanto with three routes, Routes 31, 32 and 33. Buses operate from 6:00 a.m. to 9:00 p.m. Monday through Friday and from 7:00 a.m. to 8:00 p.m. on Saturday. There is no Sunday service. In addition to the 18 fixed-route schedules, VVTA operates a fleet of 27 cutaway vehicles for ADA Complementary paratransit bus services for the Victor Valley Area. Additional fixed route deviation service to Wrightwood, Pinon Hills, Phelan, Helendale, and Lucerne Valley is available.

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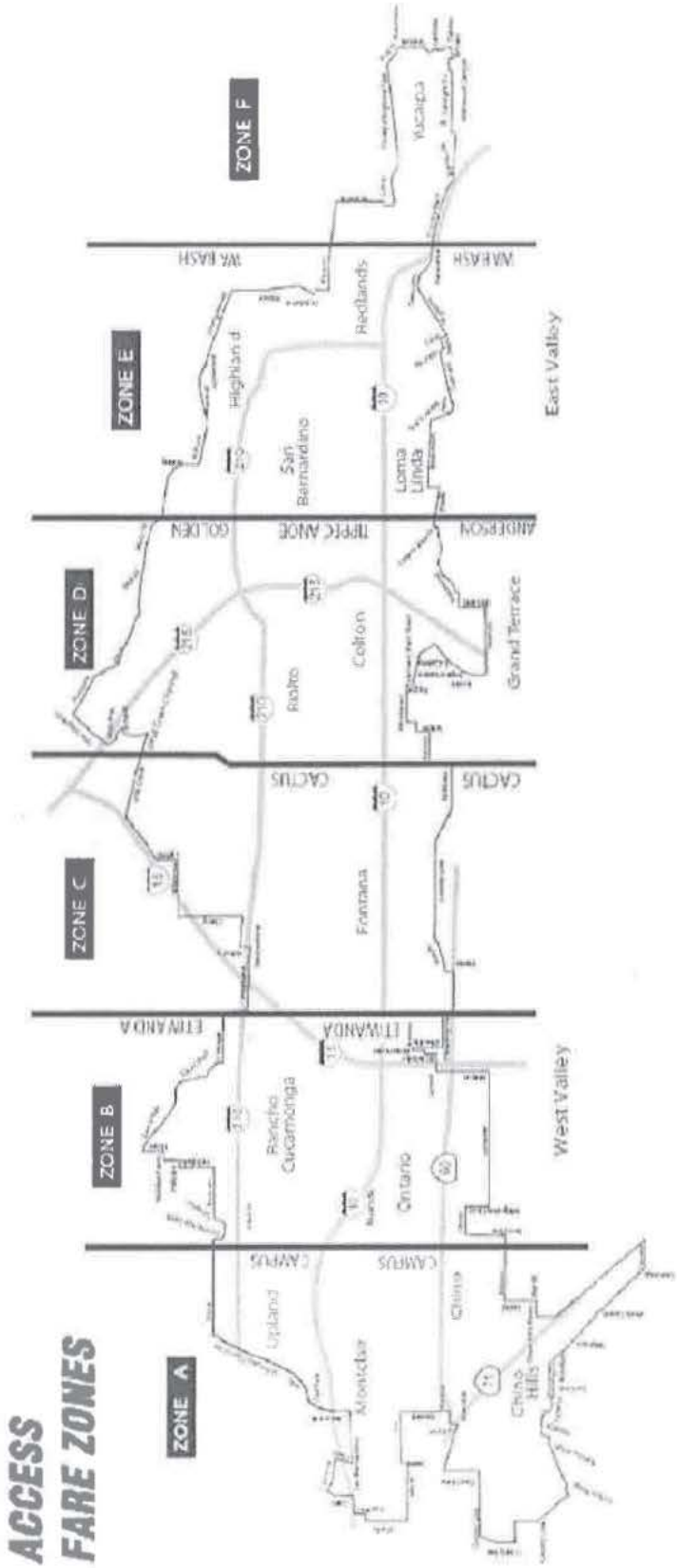

Source: Omnitrans, 2009.

Figure 2-2: Existing Access Fare Zones

Table 2-1: Existing Transcenters

Transit Center	Bus Bays	Services/Routes
Montclair Transcenter	14	Omnitrans: 62, 65, 66, 68
		Regional Transit Connections Available:
		Omnitrans IEC: 90
		RTA Route: 204
		Metrolink: San Bernardino Line
		Foothill Transit: 699, 187, 292, 294, 492, 480, 190, 197, 690, Silver Streak BRT
Chino Transcenter	7	Omnitrans: 62, 63, 65a, 65b, 68, OmniLink
		Regional Transit Connections Available:
		Foothill Transit: 497
		OCTA: 758
Ontario Transcenter	6	Omnitrans; 61, 62, 63, 67, 70, 75
South Fontana Transcenter	4	Omnitrans: 19, 20, 28, 29, 61, 71
Fontana Metrolink Station Transcenter	9	Omnitrans: 10, 14, 15, 19, 20, 61, 66, 67, 71
		Regional Transit Connections Available;
		Metrolink: San Bernardino Line
Redlands Mall	5	Omnitrans: 8, 9, 15, 19
		Regional Transit Connections Available:
		RTA: 36
4th Street Transit Mall (San Bernardino)	14	Omnitrans: 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 14, 15
		Regional Transit Connections Available:
		MARTA: Off The Mountain Service
		Omnitrans: 215
Inland Center Mall (San Bernardino)	1	Omnitrans: 2
		Regional Transit Connections Available:
		N/A
Ontario Mills Center	4	Omnitrans: 60, 61, 70, 71, 75
		Regional Transit Connections Available:
		RTA: 204
Ontario Airport	1	Omnitrans: 61
		Regional Transit Connections Available:
		Airport Shuttle
Arrowhead Medical Center	4	Omnitrans: 1, 19, 22
Pomona Transcenter	10	Omnitrans: 61
		Regional Transit Connections Available:
		Foothill Transit: 191, 193, 195, 292, 294, 291s, 291n, 480w, 480e, 482
		LAMTA: 484
		Metrolink: San Bernardino Line

Source: Parsons, 2009.

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Transit Service into San Bernardino Valley is currently provided by Greyhound Lines. SANBAG and VVTA have implemented a ticket subsidy program that provides discounted fares for trips into San Bernardino Valley and into Barstow.

OTHER AREAS

Morongo Valley & Joshua Tree

MBTA is a JPA that operates in the city of Twentynine Palms, the town of Yucca Valley and in the Morongo Basin. Current operations include 9 deviated fixed route services as well as a limited dial-a -ride service that provides door to door service for seniors and the disabled. Two of the fixed routes connect the Morongo Basin area with Palm Springs. Ready-Ride provides door-to-door service that is divided into zones. The zones are generally split among the communities in the service area, including Yucca Valley, Morongo Valley, Joshua Tree and Twentynine Palms.

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Mountain Areas

The Mountain Area Regional Transit Authority (MARTA) is a rural transit agency, organized as a JPA by the city of Big Bear Lake and San Bernardino County. The goal of the JPA is to provide coordinated transit services for all of the mountain communities including, Big Bear Valley, Running Springs, Crestline, Lake Arrowhead and Blue Jay. The agency also provides service "Off the Mountain" to the downtown San Bernardino. MARTA provides local fixed route in the Arrowhead/Crestline area and in Big Bear Valley, dial-a-ride bus services, and intercity commuter express service to downtown San Bernardino.

Barstow

Barstow Area Transit is administered by the City of Barstow and is contracted out. The agency operates five fixed route services to the Barstow area, as well as the communities of Hinkley, Lenwood, Grandview, Yermo, Harvard, Daggett and Newberry Springs.

Needles

The City of Needles administers the Needles Area Transit service, which is contracted out and provides deviated fixed route service. The city also provides Dial-a-Ride service for seniors and persons with disabilities, including to Bullhead City.

2.2 EXISTING LAND USE PLANS AND POLICIES

The San Bernardino Valley was first developed towards the end of the 19th century. The introduction of the railroads and the citrus industry in the 1870's enabled the area and the surrounding "citrus belt" to fast become a major economic area. The arrival of Route 66 in the 1920's brought in tourists and migrants and the introduction of the interstate system opened the valley up for real estate development in the 1950's. The real estate boom of the 1950's allowed for a massive suburban expansion and the growth of the employment areas of San Bernardino, Ontario and Riverside that combine to make the Inland Empire, and ultimately the eastern portion of the larger Los Angeles Metropolitan area.

The valley is governed by various small to medium sized cities and unincorporated communities. As the valley evolved from a rural to suburban environment, affordable home ownership has played a leading role in the economic growth and ultimately the land use of each of the cities. As the primarily suburban residential population grew, retail and service industries have grown too, and several major shopping centers serve the region.

Industrial land uses have historically benefited from proximity to the local

highway and rail transportation networks as well as inexpensive land prices when compared to the greater Los Angeles region. As a result there is a large warehousing and manufacturing industry in the valley that is expected to continue to play a large role in the regional and state economies.

Existing Land Use and General Plan Land Use was analyzed from the SCAG regionally adopted travel Demand Model, described in detail in Chapter 4. This Land Use data is shown in Figures 2-3 and 2-4, respectively.

Additionally, a land use survey of existing plans and policies in current General and Specific plans was prepared in May of 2009 for select cities in the valley. The survey was prepared in conjunction with the city outreach process discussed in Chapter 9 and corresponds to the development of the Vision Sustainable Land Use Alternative discussed in detail in Chapter 5. A review of the cities' general plans, many in various states of revision, was prepared to gauge the cities' current thinking on transit as preparation for engaging the cities in the LRTP planning process. The result of the survey is summarized in Table 2-2 below and is included in Appendix A.

Key Activity Centers

As part of the existing plans and policies survey, key activity centers in the San Bernardino valley were identified. Key activity centers are identified to analyze potential improvements in transit service. The following key activity centers have been identified in the San Bernardino valley and are presented in Figure 2-5.

Planned Development Areas

As part of the City outreach efforts that occurred in May of 2009, the following areas have been identified to accommodate planned growth.

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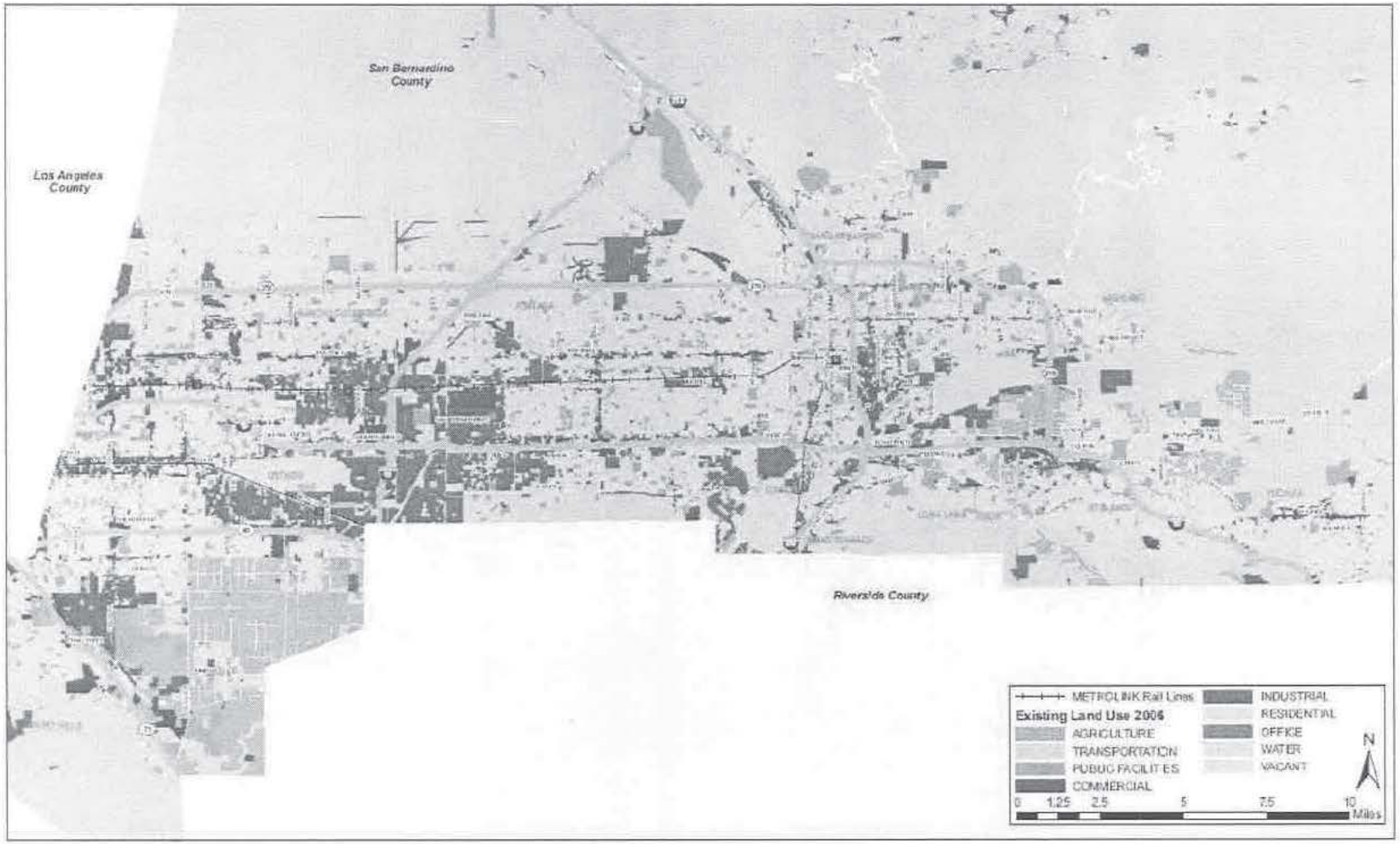
Table 2-2: Summarized Results of Land Use Survey.

	Chino	Chino Hills	Colton	Fontana	Highland	Loma Linda	Montclair	Ontario	Rancho Cucamonga	Redlands	Rialto	San Bernardino	Upland
Mixed Use Designation	X	X	X	X	X				X				X
Maximum Density (DU/AC)	40	35	30	40	30	20	40	25	30	27	35	36	30
Transit Supportive Policies			X	X		X	X	X		X	X	X	
Parking Management Strategies	X	X	X		X	X					X	X	X
TOD Policies	X					X		X	X			X	
Urban Design Policies	X	X		X	X	X		X	X	X	X	X	X
Growth Management	X	X				X		X					

Source: Parsons, 2009.

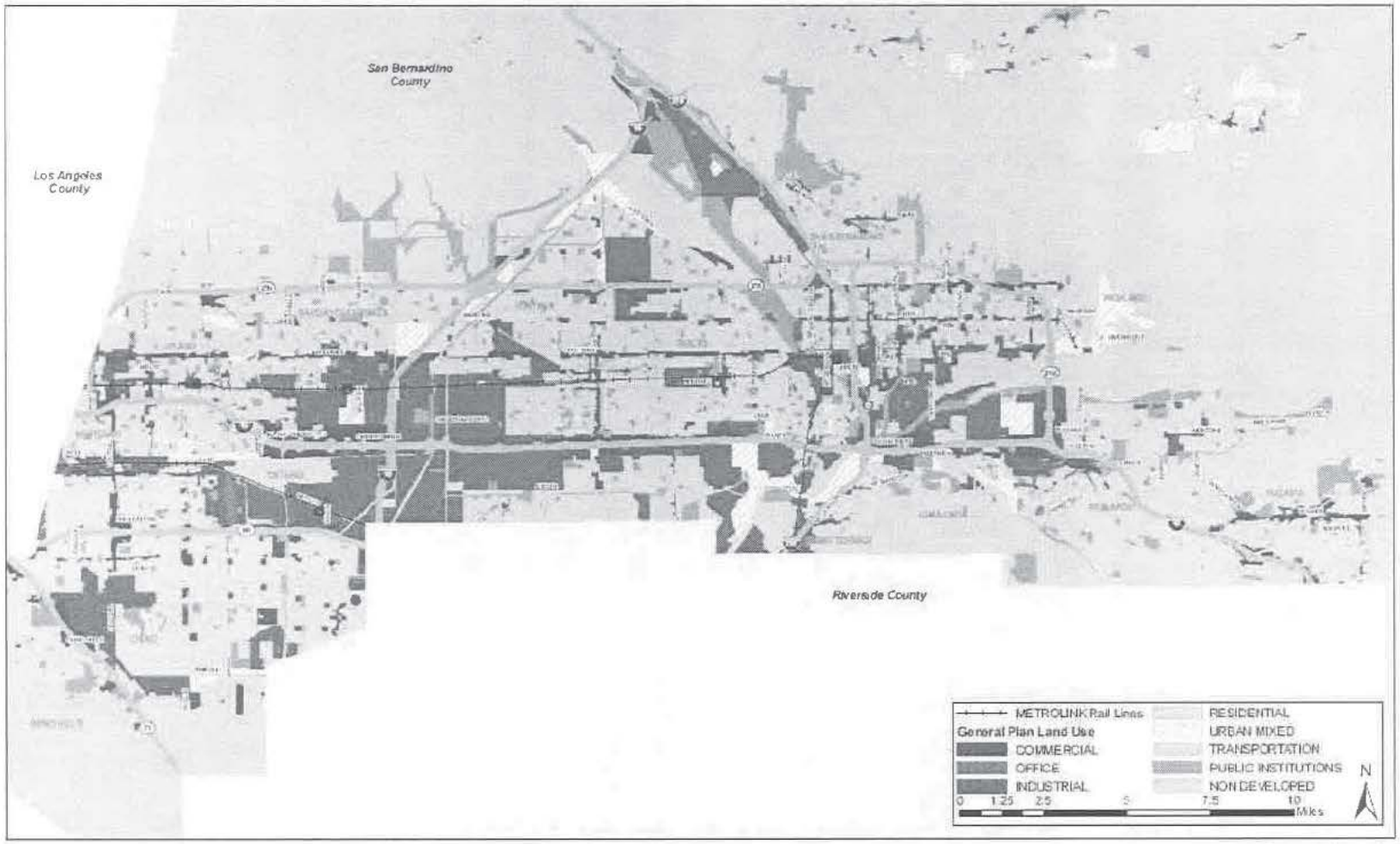


Existing Land Use
DRAFT LONG RANGE TRANSIT PLAN (LRTP) for the San Bernardino Valley

San Bernardino Associated Governments (SANBAG)
August 2009

Source: Parsons, 2009.

Figure 2-3: Existing Regional Land Use



General Plan Land Use

DRAFT LONG RANGE TRANSIT PLAN (LRTP) for the San Bernardino Valley

San Bernardino Associated Governments (SANBAG)
August 2009

Source: Parsons, 2009.

Figure 2-4: Existing Regional General Plan Land Use

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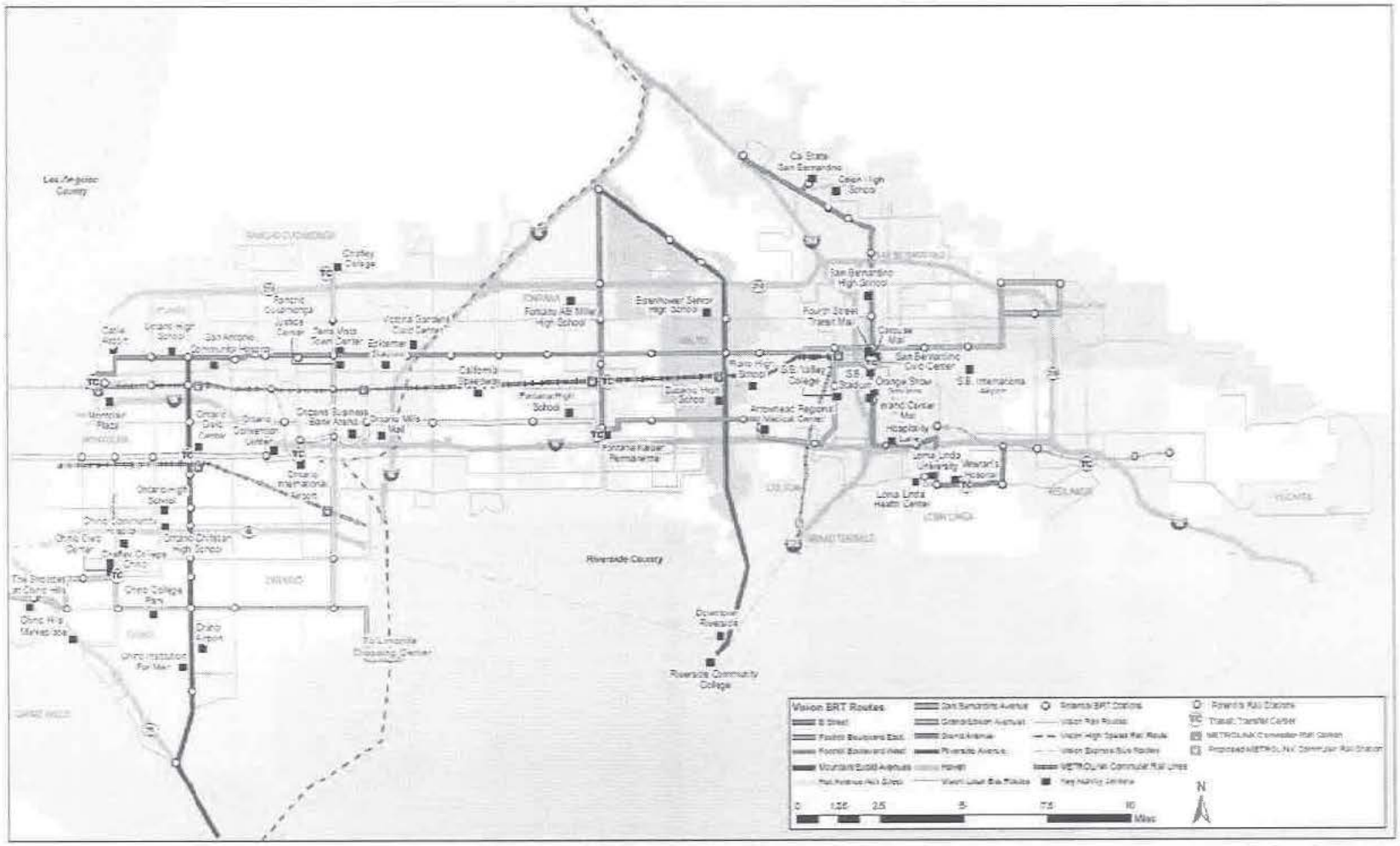


VISION Alternative for Year 2035

DRAFT LONG RANGE TRANSIT PLAN (LRTP) for the San Bernardino Valley

San Bernardino Associated Governments (SANBAG)
August 2009

Source: Parsons, 2009.

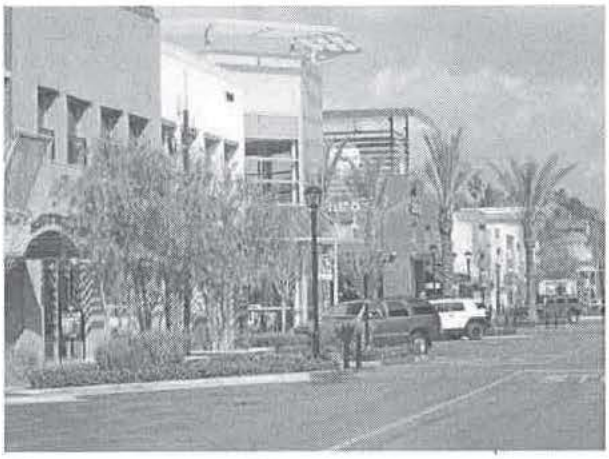
Figure 2-5: Key Activity Centers

Chino

The city of Chino is developing the Ag Preserve as a TOD based development with a maximum 40 dwelling units per acre (DU/Ac) for residential land uses. This specific plan area is set to accommodate most of the growth planned in the city. A second area of growth is around the current Transcenter which is planned to develop into a civic center.

Chino Hills

The Shoppes, a Specific Plan area, has mixed uses and a hotel in the downtown and is located next to the civic center. It features over 70 retail tenants and 60,000 square feet



The Shoppes, Chino Hills

of 2nd story office space. The surrounding trade area encompasses a population of one million. The master plan for the Shoppes at Chino Hills includes a new Chino Hills Community Park and a new Chino Hills Civic Center, featuring a police department, library, city hall and five administration facilities.

Colton

The city is currently working on two Specific Plan areas, the West Valley Specific Plan which is the location of one of the Compass Blueprint sites and covers 285 acres, next to Arrowhead Medical Center. The second Specific Plan is for the Pellissier Ranch, an urban village near a proposed Metrolink station. The superblock area would have about 4,200 dwelling units plus office and retail at densities up to 30 DU/Ac.

The city is also looking to accommodate planned growth along Mount Vernon Street and at Colton Avenue and Valley Boulevard.

Fontana

Fontana is currently developing the Metrolink station and Transcenter site to include more intensive uses including affordable senior housing. Fontana is also accommodating planned growth on Foothill Boulevard and on Baseline Road.

Highland

The City of Highland is planning for growth in various locations throughout the city. Planned developments include:

- East Highlands Ranch Planned unit development to the east of SR-30 has been the prime shaper of the development in the city.
- Sunrise Ranch is a potential residential development that may accommodate 2,000 to 10,000 dwelling units and up to 30 DU/Ac. There is no specific plan for this area at this point.
- Many of the midblock commercial uses along Baseline, which is the principal east-west corridor through the city, have been re-designated as medium-density residential uses.
- Golden Triangle, a specific plan area formed by two creeks and Boulder Avenue is a master-planned, mixed-use development.

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- 5th Street and Victoria Avenue are planned to be major employment centers to support the San Bernardino airport, that includes Business Parks and other industrial land uses.

Loma Linda

Loma Linda has recently passed a city ordinance that manages growth in the city. Planned growth areas are located next to transit stations, and for Loma Linda University housing.

Montclair

The existing commercial and industrial land uses north of I-10 and between Holt Boulevard and Mission Boulevard attract many people. Residential neighborhoods are predominant in the southern portion of the I-10 Freeway up to Holt Boulevard.

The North Montclair Downtown Specific Plan proposes a mixed-use, transit-oriented development between the Montclair Gold Line/Metrolink station and the Montclair Plaza. Mixed-use development is intended to create a transit village with a range of medium to high-density housing, retail, commercial, and office development.

Montclair Transcenter, Montclair

This development will reinforce the significance of the Montclair Transcenter as an Omnitrans service focal point.

Ontario

Major commercial developments in Eastern Ontario include:

- Ontario Mills: 8 million square feet of office, commercial, residential, and industrial uses.

Ontario Mills, Ontario

- CA Commerce center: 1420 acres of development.
- Centerlake: 1.3 million square feet of commercial and business uses.
- Village industrial park: Large-scale warehousing and distribution uses for Hyundai, Honda and Inland Container.

Unique areas that have special attention for development are:

- Citizens Bank Arena
- Grove Avenue Corridor Business Park
- Town Center Study Area
- East Holt Boulevard Study Area

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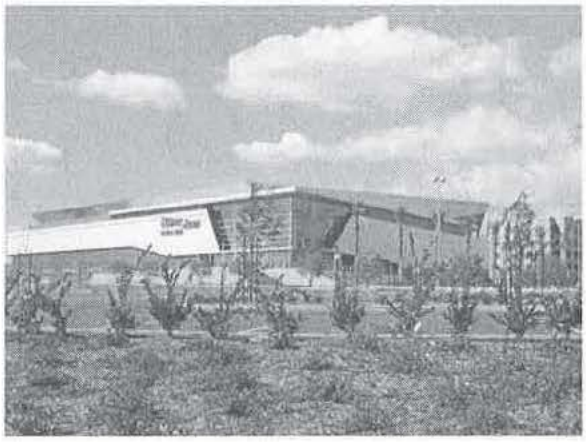

Citizens Bank Arena, Ontario

Rancho Cucamonga

Rancho Cucamonga aims to increase mixed-use development along Foothill Boulevard and the Empire Lakes area. Additionally, the city aims to consolidate open space preserves. The following Specific Plans and Planned Communities have been approved:

- Foothill Boulevard Visual Improvement Plan: The plan proposes a series of activity centers and gateways, linked through a unifying streetscape design.

Foothill Boulevard, Rancho Cucamonga

- Etiwanda Specific Plan: This rural area is located in the northeast corner of the city and the purpose of the Plan is to ensure long-term rural character.
- Etiwanda North Specific Plan: The General Plan aims to make open space a prominent feature in these 6,840 acres of land, located just above the Etiwanda Specific Plan area.
- Victoria Community Plan: With Victoria Park Lane as the central corridor, the City plans to build residential villages and related uses in the 2,150 acres of land bounded on the north by Highland Avenue, the east by Etiwanda Avenue, and the south and west by the I-15, Arrow Route, Base Line Road, Milliken, Pacific Electric Trail and Deer Creek.
- Terra Vista Community Plan: This central core area is planned for a mixed-use development along Foothill Boulevard and Haven Avenue.

Redlands

The Downtown Redlands Specific Plan makes specific proposals for the development of the downtown area between Redlands Boulevard and the I-10 Freeway. This includes two- and three-story mixed-use development in the Town Center District and industrial buildings in the Service Commercial District.

Rialto

The city of Rialto has identified Foothill Boulevard and its downtown area for potential infill development. The downtown area will bring more mixed-uses including commercial and residential development.

Vacant sites on Foothill Boulevard are being looked at for redevelopment.

San Bernardino

The City of San Bernardino is currently developing the downtown specific plan for revitalizing the downtown area. The plan will include mixed development as part of the revitalization and is based on the transit

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village concept. The city is also planning for development at the San Bernardino International Airport for industrial uses.

Looking North on E Street, Downtown San Bernardino

Upland

The City of Upland is reopening the Vision Plan for Foothill Boulevard. Also, there is a Downtown Specific Plan, which allows 30 or more DU/Ac. The City is especially interested in planning in the southwestern portion of the city, which has been recently annexed and is near the Montclair Transit Center.

The Downtown Specific Plan for Historic Downtown Upland is meant to guide future growth and economic development in this area of the City. It will address land use, public facilities and services, urban design, transportation, housing, and other issues of interest to the community and provide specific guidance for private property owners, businesses, and residents.

The College Park Specific Plan is a 39.7-acre mixed-use development consisting of two land use components; commercial and residential. The commercial component is approximately 8.0 acres and consists of a 40,500 square foot retail center (shops and restaurants); a 4,000 square foot service station and mini-mart. The square footages described above are considered the maximum allowed. The residential component is approximately 31.7 acres and consists of a mixture of single-family units, multi-family units, private recreation areas/ facilities for each residential use and a park.

Development on Foothill Boulevard, Upland

2.3 EXISTING DEMOGRAPHIC AND RIDERSHIP PROFILE

Existing demographic data is provided in the SCAG Travel Demand Model, described in detail in Chapter 4. 2006 levels of employment and population densities were analyzed as part of the LRTP, and are shown in Figures 2-6 and 2-7, respectively.

Year 2006 population and employment data for San Bernardino Valley cities are summarized in Table 2-3.

This table shows that San Bernardino is currently the largest city in the valley, with just over 200,000 residents, followed by the cities of Ontario, Rancho Cucamonga, and Fontana.

The City of Ontario has the highest employment in the region, followed by the cities of San Bernardino and Rancho Cucamonga.

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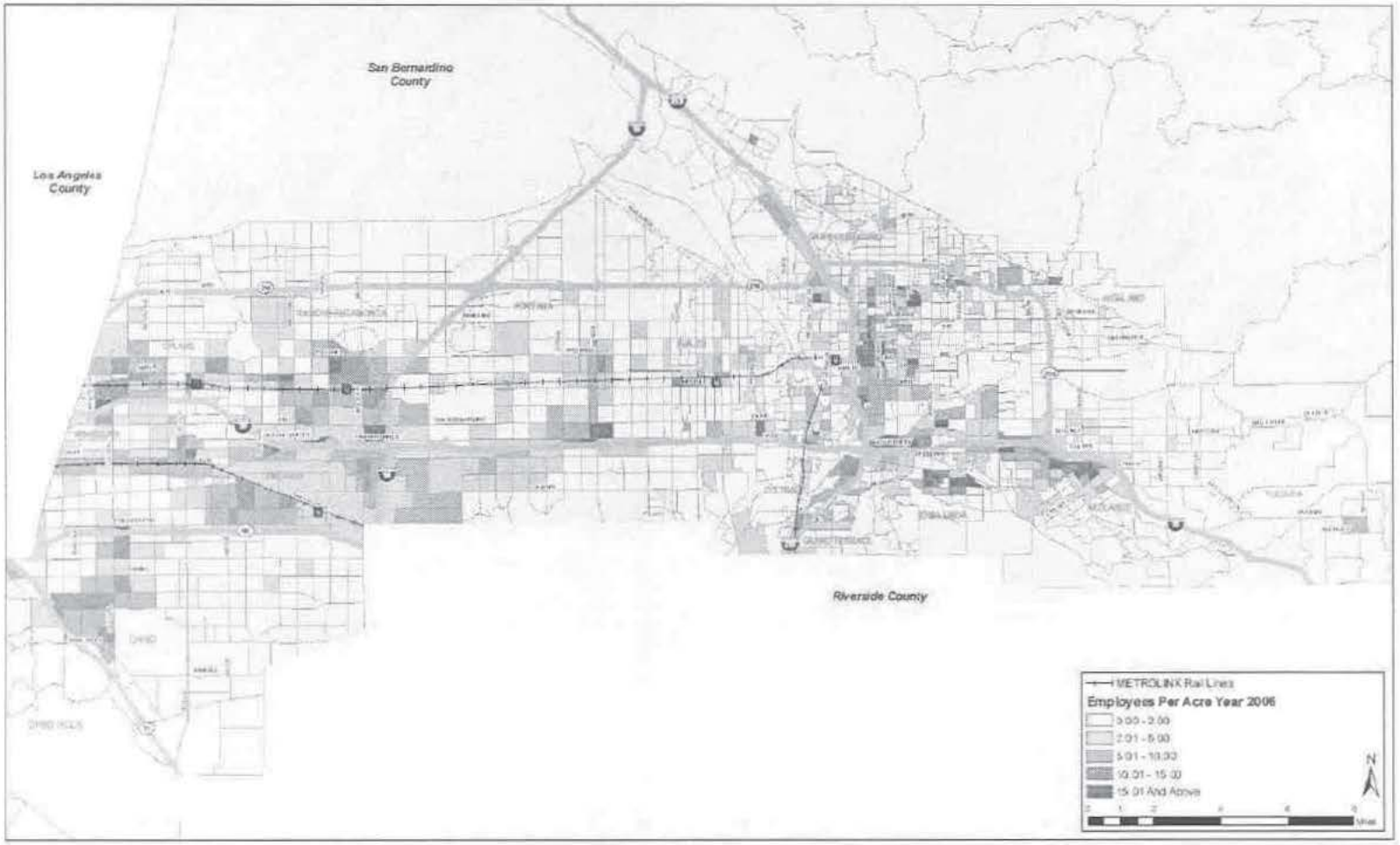

Existing Employment Density
DRAFT LONG RANGE TRANSIT PLAN (LRTP) for the San Bernardino Valley

San Bernardino Associated Governments (SANBAG)
August 2009

Source: Parsons, 2009.

Figure 2-6: Existing Employment Density

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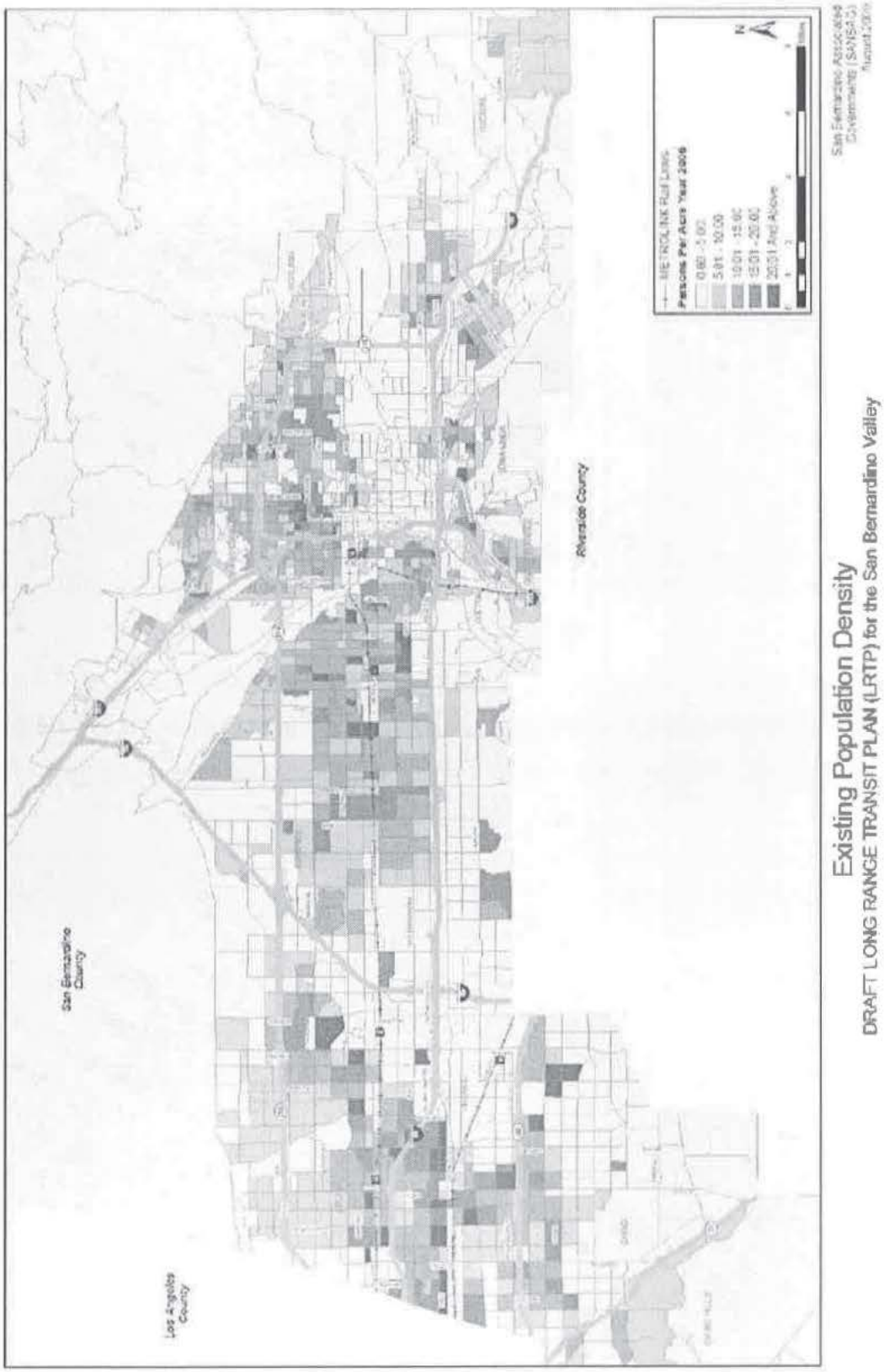

Source: Parsons, 2009.

Figure 2-7: Existing Population Density

Table 2-3: Year 2006 Population and Employment Data - San Bernardino Valley Cities

City	Population	Households	Employment
Chino	78,116	18,902	12,915
Chino Hills	78,251	22,226	13,074
Colton	53,177	15,300	6,102
Fontana	165,292	41,313	47,759
Grand Terrace	12,505	4,293	8,971
Highland	52,059	14,873	45,790
Loma Linda	22,518	8,429	3,075
Montclair	36,361	9,171	16,157
Ontario	174,173	45,313	16,771
Rancho Cucamonga	167,474	50,888	15,969
Redlands	71,319	25,202	3,049
Rialto	101,037	25,665	110,886
San Bernardino	203,503	58,334	61,464
Upland	74,381	25,323	22,750
Yucaipa	50,570	17,703	3,451
Unincorporated	124,466	32,578	35,244
San Bernardino Valley Total	1,465,202	415,513	423,427

Source: SCAG, 2009.

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On-Board Transit Surveys

On Board surveys were collected for Metrolink, and prepared for transit operators in the county to identify trip needs and priorities tor transit patrons, as well as provide trip and demographic information.

In April through June, 2004, Strategic Consulting and Research (SCR) conducted an independent survey of weekday Metrolink passengers for the Southern California Regional Rail Authority (SCRRA). In 2005, Strategic Consulting and Research (SCR) conducted another independent survey of weekend Metrolink passengers for the SCRRA.

In April, 2005, AMPG surveyed fixed route and demand-response riders from the Barstow, MARTA, MBTA, and Needles transit systems.

In March and April, 2006, AMPG surveyed fixed route and demand-response riders from the Omnitrans system. This survey addressed the same demographic issues as the surveys of the other transit providers, but the survey of fixed route riders on Omnitrans was geared towards collection of origin-destination data, instead of the attitudinal data collected in the surveys of the smaller systems.

In April, 2006, the Victor Valley Transit Authority (VVTA) conducted an independent survey of its passengers.

The complete results of these surveys can be found in Appendix B, Profile of Transit Riders in San Bernardino County. A summary is provided in Table 2-4.

Senior Concentrations

The proportion of the San Bernardino Valley population age 65 and over is 7.4%. This is below the proportion of the California population age 65 and over (10.6%). The majority of the cities have elderly population proportions lower than the State average. The exceptions are Grand Terrace (10.7%), Loma Linda (15.4%), Upland (11.1%) and Yucaipa (15.5%).

Table 2-4: Survey Results

	Service Provider							County Total	
	Omnitrans	Metrolink	VVTA	MARTA	MBTA	Barstow	Needles	Unweighted	Weighted
Daily Riders	43,000	6,500	1,790	800	730	620	180		53,620
Gender									
(Sample Size)	3,915	2,570	728	263	268	212	77	8,033	
Male	50%	47%	45%	53%	59%	40%	36%	49%	49%
Female	50%	53%	55%	47%	41%	60%	64%	51%	51%
Age									
(Sample Size)	3,789	2,457	698	255	257	195	65	7,716	
12 to 15	2%	0%	8%	8%	2%	2%	0%	2%	2%
16 to 19	15%	3%	17%	13%	16%	11%	3%	11%	13%
20 to 29	28%	15%	23%	22%	27%	21%	23%	23%	26%
30 to 39	20%	22%	16%	19%	16%	21%	17%	20%	20%
40 to 49	18%	30%	18%	21%	16%	21%	20%	22%	19%
50 to 59	12%	23%	11%	8%	12%	10%	11%	15%	13%
60 or older	5%	7%	6%	10%	11%	14%	26%	7%	6%
Ethnicity[1]									
(Sample Size)	397	2,489	713	263	263	212	72	4,409	
African American	29%	24%	26%	5%	14%	26%	3%	23%	27%
Asian/Pacific Islander	2%	12%	3%	2%	4%	1%	0%	8%	3%
Caucasian	22%	32%	37%	61%	62%	39%	54%	36%	25%
Hispanic	43%	29%	27%	19%	14%	21%	17%	28%	39%
Other/Multiple	5%	3%	7%	13%	7%	13%	26%	5%	5%
Household Income[2]									
(Sample Size)	3,303	2,332	611	242	230	183	65	6,966	
Less than $20,000	53%	11%	58%	54%	65%	86%	85%	41%	49%
$20,000 to $29,999	18%	8%	22%	14%	17%	4%	6%	14%	17%
$30,000 to $39,999	9%	9%	4%	10%	5%	4%	2%	8%	9%
$40,000 to $49,999	6%	8%	7%	5%	2%	2%	3%	7%	6%
$50,000 to $59,999	4%	10%	3%	10%	4%	2%	0%	6%	5%
$60,000 to $74,999	3%	14%	3%	1%	3%	0%	2%	7%	4%
$75,000 to $99,999	2%	17%	1%	4%	1%	0%	2%	7%	4%
$100,000 to $149,999	1%	16%	1%	2%	1%	1%	2%	6%	3%
$150,000 to $199,999	1%	4%	0%	1%	0%	1%	0%	2%	1%
$200,000 or more	1%	3%	0%	1%	1%	1%	0%	1%	1%
Did Transit Riders Have an Auto Available for their Trip?									
(Sample Size)	3,906	2,531	731	270	272	217	79	8,006	
Yes	15%	75%	22%	16%	17%	6%	8%	34%	22%
No	85%	25%	78%	84%	83%	94%	92%	66%	78%
Driver's License Possessed by Rider? [3]									

[1] Omnitrans data for this question based on 2003 Survey (other socioeconomic questions based on data collected in 2006 survey).

[2] VVTA shares for income groups above $50,000 are estimated because VVTA survey used different income groups than other surveys.

[3] Metrolink survey did not ask riders about the possession of driver's licenses.

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	Service Provider							County Total	
	Omnitrans	Metrolink	VVTA	MARTA	MBTA	Barstow	Needles	Unweighted	Weighted
Daily Riders	43,000	6,500	1,790	800	730	620	180		53,620
(Sample Size)	3,781	N/A	717	271	273	221	79	5,342	
Yes	36%	N/A	39%	42%	51%	36%	35%	37%	36%
No	64%	N/A	61%	58%	49%	64%	65%		64%
Driver's License Possessed by Someone Else in Household?									
(Sample Size)	1,982	N/A	457	147	125	134	48	2,893	
Yes	73%	N/A	69%	65%	54%	43%	46%	69%	72%
No	27%	N/A	31%	35%	46%	57%	54%	31%	28%
Average Household Size									
(Sample Size)	3,838	N/A	N/A	254	250	191	64	4,597	
Mean	4.1	N/A	N/A	3.1	3.5	3.7	3.1	4.0	4.1
Median	4	N/A	N/A	3	3	3	3	4	4
Do You Have a Permanent Disability?[4]									
(Sample Size)	3,831	N/A	656	266	267	214	75	5,309	
Yes	15%	N/A	22%	19%	22%	30%	37%	17%	16%
No	85%	N/A	78%	81%	78%	70%	63%	83%	84%
What Type of Disability?[5]									
Daily Riders	6,450	N/A	399	151	161	186	67		7,015
(Sample Size)	465	N/A	182	48	57	60	23	835	
Mobility	47%	N/A	51%	63%	60%	50%	61%	50%	51%
Hearing	16%	N/A	18%	17%	12%	7%	13%	15%	17%
Sight	11%	N/A	10%	19%	16%	20%	13%	12%	12%
Other	45%	N/A	21%	27%	35%	37%	30%	37%	45%
Frequency of Usage of Transit Riders[6]									
(Sample Size)	4,055	2,383	693	271	267	221	78	7,968	
5-7 days per week	62%	67%	59%	34%	35%	42%	24%	61%	62%
3-4 days per week	15%	18%	26%	32%	28%	32%	55%	19%	17%
1-2 days per week	16%	11%	10%	17%	19%	16%	12%	14%	15%
less than 1 day per week	6%	4%	5%	17%	19%	10%	9%	6%	6%
Duration of Usage of Transit Riders									
(Sample Size)	3,962	2,614	751	272	271	223	78	8,171	
More than 2 Years	49%	53%	46%	46%	38%	41%	51%	49%	49%
1-2 Years	21%	15%	17%	22%	21%	20%	23%	19%	20%
6-12 Months	13%	13%	11%	10%	10%	10%	14%	13%	13%
Less than 6 Months	17%	19%	26%	22%	31%	29%	12%	19%	18%
Primary Trip Purpose									
(Sample Size)	4,569	2,574	757	235	212	144	53	8,544	
Work/Work Related	41%	87%	40%	34%	27%	25%	8%	54%	46%
Shopping	11%	0%	12%	14%	21%	38%	58%	9%	10%
Medical/Personal	7%	2%	18%	22%	22%	27%	23%	8%	8%
Recreation/Social	12%	5%	2%	12%	13%	1%	6%	9%	11%

[4] The Metrolink survey did not ask riders about their disabilities.

[5] The Metrolink survey did not ask riders about their disabilities.

[6] The Metrolink and VVTA surveys used different response categories, so some responses are interpolated.

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	Service Provider							County Total	
	Omnitrans	Metrolink	VVTA	MARTA	MBTA	Barstow	Needles	Unweighted	Weighted
Daily Riders	43,000	6,500	1,790	800	730	620	180		53,620
School	16%	4%	21%	11%	10%	3%	2%	12%	14%
Other	13%	1%	8%	7%	8%	6%	4%	8%	11%
Access Mode									
(Sample Size)	4,569	2,432	743	N/A	N/A	N/A	N/A	7,744	
Walk	73%	2%	69%	N/A	N/A	N/A	N/A	51%	66%
Transfer	16%	6%	15%	N/A	N/A	N/A	N/A	13%	15%
Drive Auto	1%	69%	7%	N/A	N/A	N/A	N/A	23%	10%
Auto Passenger	4%	21%	7%	N/A	N/A	N/A	N/A	10%	6%
Bicycle	2%	1%	3%	N/A	N/A	N/A	N/A	2%	2%
Other	1%	0%	0%	N/A	N/A	N/A	N/A	1%	1%
Egress Mode									
(Sample Size)	4,569	1,945	723	N/A	N/A	N/A	N/A	7,237	
Walk	72%	10%	65%	N/A	N/A	N/A	N/A	56%	67%
Transfer	17%	51%	27%	N/A	N/A	N/A	N/A	28%	23%
Drive Auto	0%	17%	2%	N/A	N/A	N/A	N/A	5%	2%
Auto Passenger	3%	20%	4%	N/A	N/A	N/A	N/A	8%	5%
Bicycle	2%	2%	3%	N/A	N/A	N/A	N/A	2%	2%
Other	1%	1%	0%	N/A	N/A	N/A	N/A	1%	1%

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Six percent of all riders in the county are over 60 years of age. The shares of elderly riders are directly related to the urban nature of the service areas. The rapidly growing suburban areas of San Bernardino Valley and Victor Valley have relatively low shares of elderly riders. The more secluded rural areas have increasingly high shares of elderly riders, peaking at 26 percent in Needles

POVERTY AND VEHICLE OWNERSHIP

The proportion of households in the San Bernardino Valley living below the poverty line is 15.6%. This is higher than the proportion of California households living below the poverty line (10.6%). Cities with high concentrations of households below the poverty line include Colton (19.6%), Fontana (14.7%), Highland (21.5%), Loma Linda (15.1%), Rialto (17.4%), San Bernardino (27.6%), and the community of Muscoy (36.5%). A number of these communities also have high proportions of households without a vehicle. Almost 11% of households in Colton do not own a vehicle, while the proportions in Loma. Linda and San Bernardino are 11.2% and 10.5% respectively.

DEMOGRAPHICS

Two service providers serve more males than females (MARTA and MBTA) and four providers serve more females than males (Metrolink, VVTA, Barstow and Needles).

Almost two-thirds of all transit riders in San Bernardino County are between 20 and 49 years of age.

The median age for all transit riders is approximately 35 years of age. The riders of all service providers have median ages between 30 and 39 years of age except Metrolink and Needles, which have median ages between 40 and 49 years of age.

Fifteen percent of all riders in the county are less than 20 years of age. VVTA and MARTA have the highest shares of young riders, with over 20 percent on each of those systems. Metrolink and Needles each have fewer than five percent shares of young riders.

Hispanics represent a plurality of transit riders in San Bernardino County, with 39 percent of total riders. However, Omnitrans is the only service provider that has more Hispanic riders than any other ethnic group.

African-Americans represent the second highest share of transit riders in the county, with 27 percent of the countywide transit ridership.

Caucasians, who account for only one-quarter of the total transit riders in the county, represent either a plurality or a clear majority of riders on each of the other transit operators (besides Omnitrans).

Other/Multiple race riders account for five percent of countywide ridership, with shares of greater than ten percent observed on MARTA, Barstow, and Needles services.

Asian/Pacific Islanders account for only three percent of total ridership. The only system that carries a significant share of Asian/Pacific Islanders is Metrolink, with a 12 percent share.

"Choice" Riders

Transit riders who have an auto available for their trips are assumed to be "choice riders". Transit riders who do not have an auto available for their trips are assumed to be "captive riders". Overall, only 22 percent of the transit riders had an auto available in their household for their transit trip. Three-quarters of Metrolink riders had an auto available for their trip. Metrolink is the only service provider with more than a 22 percent share of choice riders.

Almost half of all transit riders in San Bernardino County have household incomes of less than $20,000 per year. All service providers except Metrolink have median incomes of less than $20,000 except Metrolink, which has a median income of over $60,000.

Barstow and Needles had the highest shares of captive riders, both of which had more than 90 percent of their riders claiming that they did not have an auto available to make their trip.

Another measure used to differentiate between choice riders and captive riders is the possession of a driver's license. The survey of Metrolink riders did not include questions regarding the possession of driver's licenses. Table 2-4 shows that only 36 percent of the public bus riders in San Bernardino County possessed driver's licenses. MBTA is the only operator with more than half of the riders reporting that they possessed a driver's license. The table also shows that approximately 70 percent of the transit riders who do not have driver's licenses live in households where someone else does own a driver's license.

The surveys of Metrolink and VVTA riders did not include questions regarding household size. The table shows that the average household size for transit riders in San Bernardino County is approximately four persons per household. The MARTA and Needles services reported the smallest average household sizes in the county.

The survey of Metrolink riders did not include questions about disabilities. Approximately one-sixth of all transit riders in San Bernardino County have permanent disabilities. Omnitrans carries the smallest proportion of disabled passengers not including access service (15 percent), and Needles and Barstow carry the largest shares

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(37 and 30 percent, respectively). The most commonly stated disability for all service providers was mobility-related disability. Riders were allowed to claim more than one disability.

TRANSIT USAGE

Transit riders were asked how often they used the fixed-route transit services. More than sixty percent of transit riders in San Bernardino County use transit at least five days per week. The services that have the greatest percentages of "regular" passengers (those who use the service at least five days per week) are Metrolink and Omnitrans, with 67 percent and 62 percent, respectively. The services that have the highest percentages of "occasional" riders (those who use the service twice per week or less) are MARTA and MBTA, both of which have more than one-third of their ridership in that category.

Transit riders were asked how long they have used the fixed-route transit services. Almost half of fixed-route transit riders in San Bernardino County have used transit for at least two years. The services that have the greatest percentages of "long-time" passengers (those who use the service for at least two years) are Metrolink and Needles, with 53 percent and 51 percent, respectively. The services that have the highest percentages of "new " riders (those who have used the service for less than six months) are MBTA and Barstow, with 31 percent and 29 percent, respectively.

Transit riders were asked to give the primary purpose of their transit trip. The most common trip purpose for transit riders in San Bernardino County is for work or work-related trips, with 46 percent of the total ridership. However, the seven services varied widely in the percentage of work trips on their services, from 8 percent on Needles to 87 percent on Metrolink.

The second most common trip purpose was for school trips, with 14 percent of the total transit trips in the county. The percentage of riders making school trips also varied widely, from greater than twenty percent of riders on VVTA, to less than five percent of riders on Metrolink, Barstow and Needles.

Shopping trips were the most common trip purposes for Needles (58 percent) and Barstow (38 percent) transit riders.

Transit riders on three of the service providers were asked how they got from their origin site to their transit stop. The surveys of the smaller bus services (MARTA, MBTA, Barstow and Needles) did not include questions relating to access modes. Walking was the most common access mode for fixed-route transit riders in San Bernardino County, with 66 percent of the total ridership. Other common modes of access are transferring from other transit vehicles (15 percent), driving (10 percent) and getting a ride (6 percent).

The access modes for bus riders and Metrolink riders were completely different. Walking is a much more likely mode of access to transit for bus riders (approximately 70 percent) than for Metrolink riders (2 percent). Meanwhile, driving or getting a ride is a much more likely mode of access to transit for Metrolink riders (90 percent) than for bus riders (5-15 percent).

Transit riders on three of the service providers were asked how they got from their transit stop to their final destination. The surveys of the smaller bus services (MARTA, MBTA, Barstow and Needles) did not include questions relating to egress modes.

Walking was the most common egress mode for fixed-route transit riders in San Bernardino County, with 67 percent of the

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total ridership. Other common modes of egress are transferring to other transit vehicles (23 percent), and getting a ride (5 percent).

The egress modes for bus riders and Metrolink riders were completely different. Walking is a much more likely mode of egress to transit for bus riders (approximately 70 percent) than for Metrolink riders (10 percent). Metrolink riders are much more likely to transfer to another transit route (51 percent vs. 17 percent for Omnitrans riders and 27 percent for VVTA riders). Driving or getting a ride is also a much more likely mode of egress from transit for Metrolink riders (37 percent) than for bus riders (3-6 percent).

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CHAPTER 3 THE TRANSPORTATION LAND USE CONNECTION

3.1 INTRODUCTION

The LRTP is intimately connected with planned land use. Land use plans and policies that promote and guide increased development density along transportation corridors help to ensure the vitality of transit networks and the land-uses that encourage transit usage. Conversely, continued growth patterns of low density suburban development will result in an environment that is not conducive to the development and implementation of transit alternatives.

This synergy between land use and transportation is a goal of the "livable communities" or "smart growth" philosophies. Experience in other parts of the country has shown that concentrating development near transit stations and providing linkages to stations, often called Transit Villages or Transit-Oriented-Development (TOD), is an effective way to shift more trips to transit from automobile-associated modes of travel. This relief in traffic congestion helps to improve the overall environmental quality for both local communities and the County by protecting mature, established neighborhoods as well as environmentally sensitive areas.

The passage of SB 375 in November of 2008 affirms the connection of land use and transit. As discussed in Chapter 1, SB 375 prioritizes state transportation funds to transportation projects that promote the goals of reducing greenhouse gas emissions from passenger vehicles. TOD's are a key element of SB 375, and as part are eligible for streamlined environmental clearance.

Development of the LRTP Vision Alternatives presented in Chapter 5, occurred as part of a collaborative planning process that worked closely with the *SANBAG Transportation – Land Use Integration Project*, under the *Southern California Associated Governments (SCAG) Compass Blueprint 2% Strategy Program* to develop integrated land use and transportation planning concepts for selected cities in the San Bernardino Valley. The SANBAG Transportation – Land Use Integration Project identified seven potential TOD opportunity sites along mass transit corridors in the valley which are illustrated in Figure 1-1. The SANBAG Transportation – Land Use Integration Project assisted local communities in developing land use concepts for these identified sites, as shown in Figure 3-1 to create catalysts for economic development, improve transit ridership, and assist SANBAG in their support for TODs.

3.2 TRANSIT ORIENTED DEVELOPMENT

TODs are a form of Smart Growth that refers to a compact, mixed-use, pedestrian-oriented neighborhood surrounding or adjacent to a transit station. TODs often feature a variety of residential types (townhouses, rental units, condominiums, single-family homes) combined with retail, employment centers, public areas and other services. TODs typically have a radius of one-quarter to one-half mile (which represents the average distance a pedestrian can walk within five to ten minutes) to or from a rail or bus station that is surrounded by high-density development with lower density development gradually spreading outwards. By locating a mix of amenities and activities around transit stations, adjacent retail and residential space become more desirable

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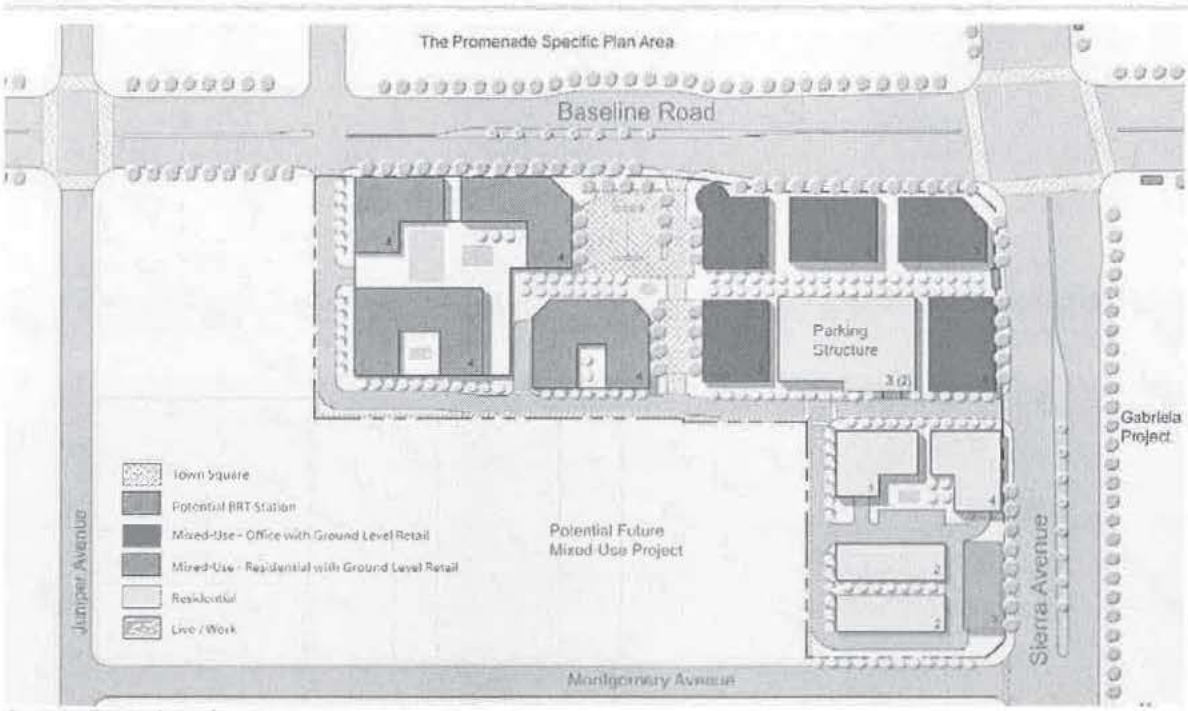

Source: Gruen Associates

Figure 4.8: Phase 2 Town Square Concept

Figure 3-1: Fontana Land Use Concept

through enhanced accessibility, and transit ridership increases as it becomes a viable and convenient mode of travel.

As shown in Figure 3-2, typical characteristics of a TOD within one-quarter to one-half mile of a station are:

- An attractively designed transit station with pedestrian amenities
- Diversity of uses such as residential, retail, office, entertainment and recreational facilities.
- Higher development intensity nearest to the transit station tapering off near the edges of TOD
- Public and civic spaces near stations
- Interconnected network of streets
- Pedestrian connections, such as continuous sidewalks and pedestrian paths to the station and throughout the development with features such as:
  - adequate sidewalk widths
  - decorative sidewalk and crosswalk treatments
  - appropriately sized street trees in tree wells at the curb
  - pedestrian-oriented signage
  - properly scaled street lighting
  - buildings and their entrances oriented toward the street
  - parking behind buildings
  - traffic calming measures in neighborhoods adjacent to the station
- Well-designed and managed parking, and a reduction in parking requirements near transit

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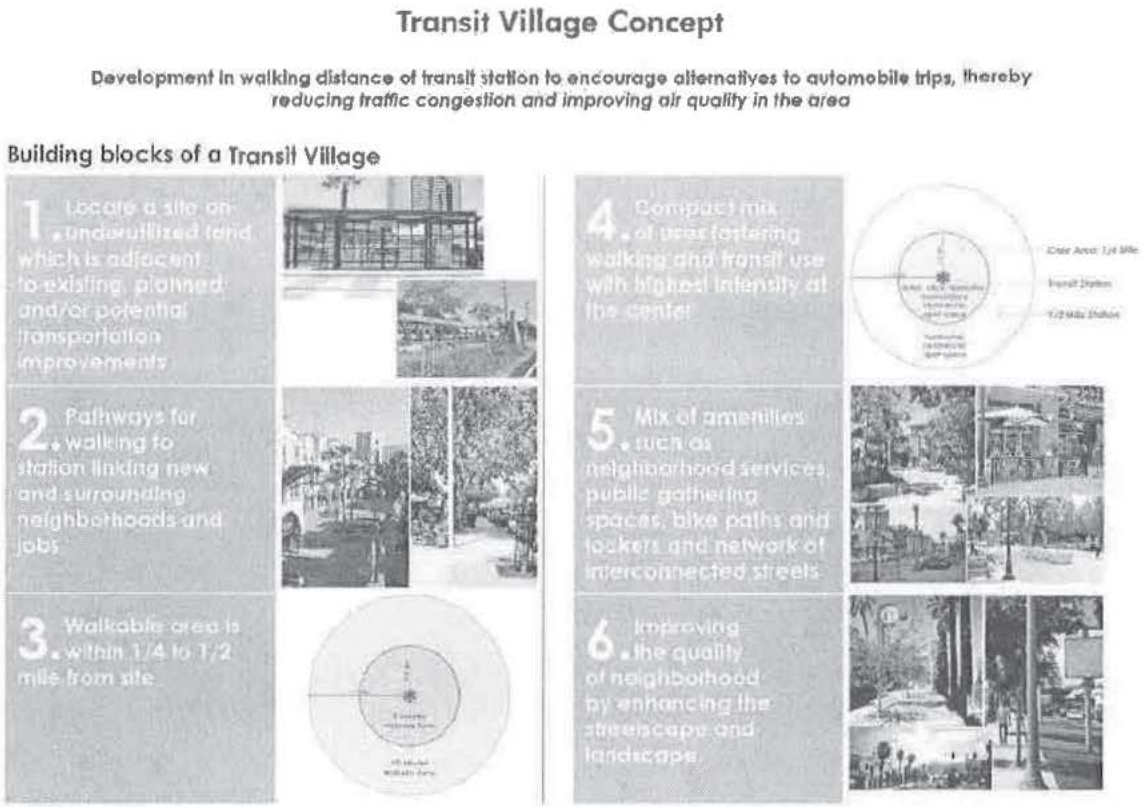

Source: Gruen Associates, 2008.

Figure 3-2: TOD Characteristics

- A bicycle network and other non-motor vehicle modes connecting the transit station with other transit stops and the surrounding area
- Special attention focused on buildings designed to enhance the pedestrian environment

3.3 Regional Examples of TOD's

The following is a brief list of TODs that have been successfully implemented in Southern California:

Village Walk, Claremont, CA – Village Walk is a transit-oriented development located within an eight-minute walk of Metrolink's Claremont Station. It is also near Claremont Village, as well as the five Claremont Colleges. Completed in 2006, Phase I and II consist of 186 condominiums, lofts, town homes and duplexes. Village Walk is the main residential component of the City of Claremont's Village Expansion plan. The plan for the area includes the transformed lemon-packing house into the new Claremont Museum of Art, live/work lofts, restaurants, and shops. On the main street of Indian Hill Boulevard and the adjacent blocks, new shops, offices, restaurants, a boutique hotel, a five-screen movie theater, and a public parking structure with retail tenants, as well as a public plaza were constructed. (Source: City of Claremont website).

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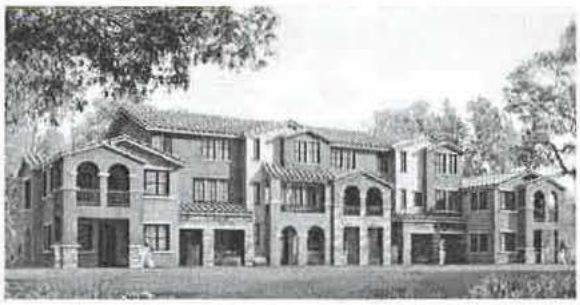

http://www.condominiums.com/california/Claremont/images/villagewalk_claremont.jpg

Mission Meridian Village, South Pasadena CA – The South Pasadena Metro Gold Line was designed to include a town square with pedestrian amenities and artwork. The Mission Meridian Village, adjacent to the Metro Gold Line in South Pasadena includes 67 condominiums, 5,000 square feet of retail space, two levels of subterranean parking containing 280 parking spaces, and a bicycle store and storage facility. It is located within two minutes of the Metro Gold Line Mission station and is designed in styles in keeping with the surrounding neighborhood. As a TOD, Mission Meridian Village has been a success. In 2006, it won both the AIA Honor Award for Multifamily Residential developments and Congress for New Urbanism Charter Award. This development and the station have stimulated other pedestrian-friendly compatible developments in the area. (Source: Gruen Associates and Moule and Polyzoides Architects).

Del Mar Station, Pasadena CA – Completed in 2007 in Pasadena on the Metro Gold Line, Del Mar Station is an intense, mixed-use development based on the concept of historic transit plazas of Europe. The four- to seven-story buildings, organized around a 1-acre plaza and the train station, have 347 apartment units and 11,000 square feet of retail use. (Source: The New Transit Town, Best Practices in Transit-Oriented Development).

The Stuart at Sierra Madre Villa Station, East Pasadena, CA – The 1999 East Pasadena Specific Plan encouraged TOD uses around the then proposed Gold Line light rail station at Sierra Madre Villa and provided development guidelines. The Stuart, located adjacent to the final stop of the Metro Gold Line on 7.5 acres of property, and completed in 2006, is the first phase of the TOD. Part of this 188-unit complex is the former Stuart Pharmaceutical plant and office building that was designed by architect Edward Durell Stone in 1958 and is listed in the U.S. National Register of Historic Places. The Stuart features a direct pathway to the Sierra Madre Gold Line station and park-and- ride, and preserves portion of the Stuart Pharmaceutical. The second phase of the project (still under review) will include an additional 322 units. (Source: Gruen Associates and Pasadena Star News).

http://bredebuts.typepad.com/photos/uncategorized/2008/06/17/barbara_2.jpg

Wilshire-Vermont Station Mixed-Use Project, Los Angeles, CA – Recently completed, the Wilshire-Vermont Station of the Metro Red Line includes a central courtyard (the entrance to the station is within the courtyard), approximately 400 rental units, 26,000 square feet of ground level retail, and 700 underground parking spaces. The Wilshire-Vermont Station was partially financed with Community

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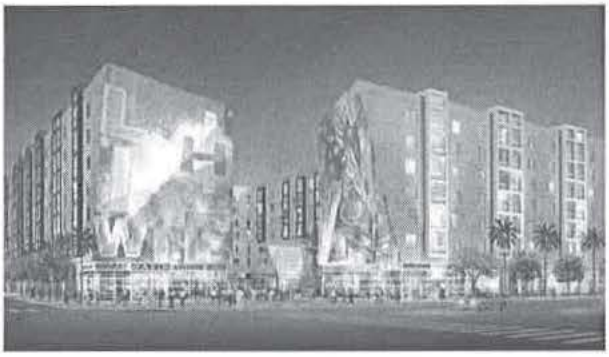
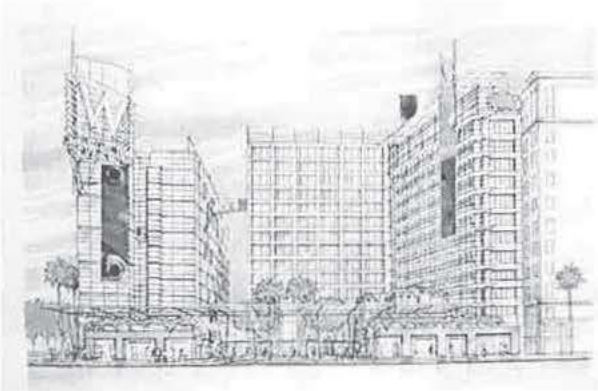
Redevelopment Agency (CRA) funds, and 20 percent of the rentals are affordable. A new middle school and childcare center are also located on this block. (Source: Los Angeles County Metropolitan Transportation Authority).



http://www.jamessuhrandassociates.com/WV-crp04.jpg

Hollywood & Vine, Hollywood, CA – Currently under construction and scheduled to be completed in 2009, this project is adjacent to the Hollywood/Vine Metro Red Line station. The project being developed jointly between Legacy Partners, Gatehouse Capital Corporation, and the Los Angeles Community Redevelopment Agency, will include a 12-story, 300-room Hotel, 61,500 square feet of retail and restaurant space, 150 for-sale condominiums, and 375 rental units, of which 20 percent will be affordable units on a 4.6 acre parcel. It is currently under consideration for certification by the U.S. Green Building Council as an environmentally, friendly development. (Source: Los Angeles Times).



http://mayor.lacity.org/labt/media/Hollywood_Vine_Project.jpg

Downtown Brea, CA – With the decline of old Downtown Brea, the City of Brea hosted a design charrette in 1989 to bring new life into downtown. What resulted from the charrette was a new downtown mixed-use district, which required the City acquisition of land. Built from scratch, the pedestrian friendly 60 acre entertainment/retail district consists of movie theaters, restaurants, and retail as well as a mixture of housing options with live/work apartments and townhomes. (Source: www.epa.gov)

3.4 Strategies for TOD Implementation & Example Policies

In developing the LRTP, SANBAG builds upon the unique assets of the individual communities that guide county-wide decision making. Successful TODs require a mix of supportive public policies. The local communities that benefit from transit must enhance their roles by developing and implementing policies that encourage higher density mixed use residential and commercial developments within walking distance of the transit nodes within their community. Implementation of TOD supportive policies entails collaboration and coordination between public and private entities. Therefore, considerations of incentive mechanisms aimed at both local

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communities and developers will further help to achieve the goals of TOD.

SANBAG has identified strategies for TOD implementation, as well as examples of how effective TOD policies and strategies have been implemented in other cities. Local communities can use these examples to develop a policy framework that strengthens the relationship between land use and transportation in their city, and throughout the San Bernardino Valley.

UPDATE GENERAL PLANS/PREPARE SPECIFIC PLANS

California State Law requires cities and counties to adopt a comprehensive General Plan to guide its future development. General plans indicate the goals, priorities and future visions at a citywide level. Larger cities also frequently develop policy documents for the various geographic communities within it, called Specific Plans. Specific Plans are comprised of the land use elements of the General Plan, and provide more site-specific policy recommendations and detailed land use designations consistent with the goals and policies of the General Plan.

SANBAG encourages all local jurisdictions to update their general plans and prepare specific plans, if appropriate, for the corridors identified as TOD opportunity sites in order to designate the entitlements and incentives that support TOD.

There are many effective planning and regulatory mechanisms that communities can pursue to achieve successful TOD. Updates to general plans and the development of specific plans should include policies and strategies related to station area planning, urban design, parking management, zoning, and affordable housing. Below are just a few strategies and policy examples implemented by other cities.

Station Area Planning

SANBAG, in its participation with SCAG Compass Blueprint 2% Strategy Program and the Redlands Passenger Rail project, has taken the lead in developing Station Area Plans. SANBAG encourages local communities to review and streamline their project approval process to encourage development under the applicable Station Area Plan. Methods that have been used to streamline the Project Approvals process include the development of Memorandums of Understanding (MOU's) and Intergovernmental Agreements (IGA's).

Station Area Plans, as shown in Figure 3-3, are developed for both existing stations and future transit facilities. They allow communities to achieve the goals and visions outlined in their General Plans and Specific Plans by addressing elements that are unique to their station areas and surrounding neighborhoods. Station Area Plans establish development guidelines for the area within a half-mile radius of a transit station, including the amount of office, retail, housing, streets, sidewalks and parking. Components of Station Area Plans include market studies, land use plans, infrastructure and utility needs, redevelopment strategies, and regulatory recommendations and incentives that encourage TOD. It is during the station area planning process that urban design policies, parking management guidelines, zoning strategies and affordable housing goals are established.

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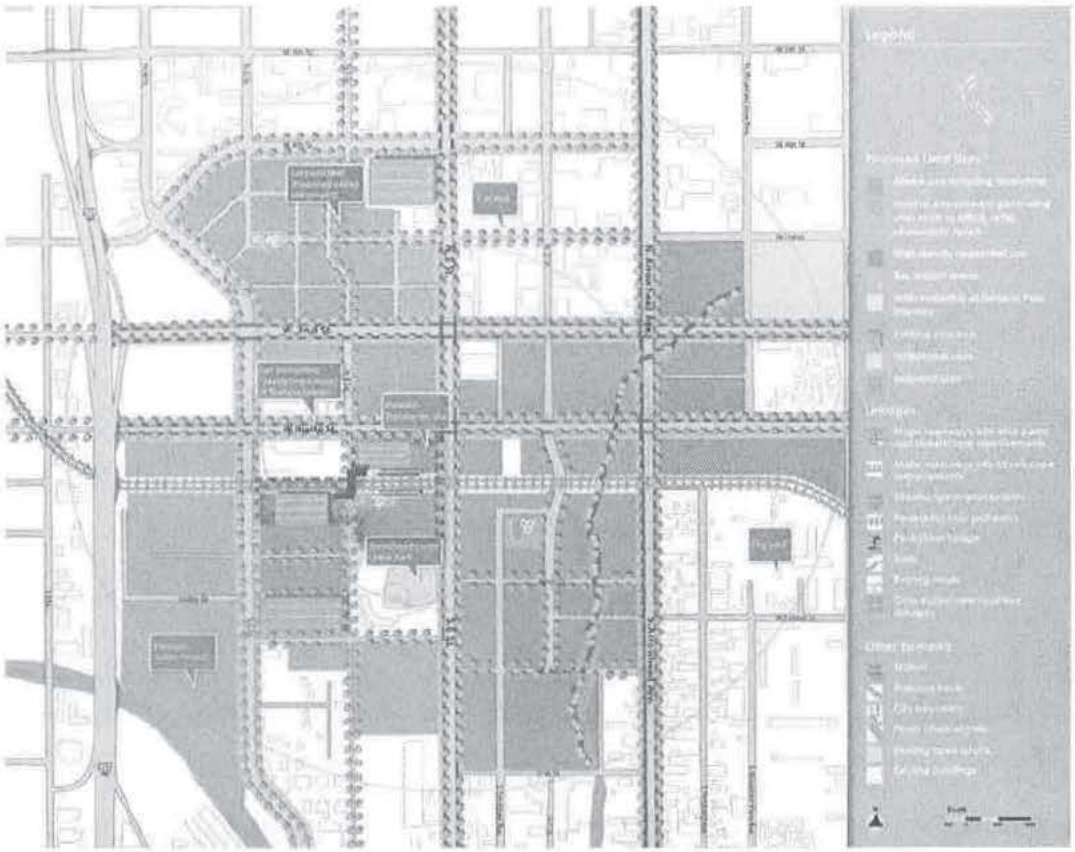

Source: Gruen Associates, 2008.

Figure 3-3: Station Area Planning

Examples of Station Area Planning

Successful Station Area Planning processes involve a variety of planning efforts[7]:

Building Community Support

- In an effort to take a more proactive approach to station area planning, the City of Los Angeles is shifting its focus from planning for general station prototypes to developing neighborhood plans for each station area; this approach recognizes the value of creating specific plans for each individual station.
- Involving local businesses contributed to the ongoing successes at BART's Fruitvale station and along San Francisco's Third Street light rail line. When transit operators and local governments seek the neighborhood business community's participation, the potential for transit-oriented development coupled with neighborhood revitalization increases.

Integration with Other Planning Efforts

- In the San Francisco Bay Area, specific plans at the Hayward and Fruitvale BART stations have integrated new and old development, and the plans themselves have become integrated into other planning efforts. The Hayward station plan was part of the City's overall effort to revitalize its downtown. At Fruitvale,

[7] All examples have been taken from the document located here: http://www.seattle.gov/transportation/SAP/Background_Report_Profiles/chapter3.pdf

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the station plan was integrated with the provision of vital housing and community services to local residents.

- In San Jose, a solid framework comprised of the General Plan, specific plans, and Housing Initiative policies support transit-oriented development. San Jose has been successful in implementing transit-supportive projects because of its policy base and the implementation of those policies.

Expedited permit review procedures to encourage TODs around station areas

- In the Bay Area, "umbrella" environmental review has shortened the review period around some BART stations for projects that conform to particular station area plans.

Work with Redevelopment agencies to promote private development in station areas

- In the City of San Francisco, MUNI staff sought to engage and cooperate with the San Francisco Redevelopment Agency in order to plan for appropriate land uses and catalyst projects. Muni's role in the process was to plan for and provide transit and enhancements, with the SFRA taking the lead on land use planning and providing other redevelopment incentives, such as land assembly. Both agencies worked cooperatively by hosting joint economic revitalization forums as part of the light rail planning process.

Locating public buildings at rail stations

- In Portland, Tri-Met encouraged the location of government office buildings and regional attractions at MAX stations. For example, the Rose Garden basketball arena and the Oregon Convention Center were both built at existing light rail stations and integrated with the transit system. In the western suburb of Hillsboro, a major justice center is located at the terminus of the Westside light rail line, and the design incorporates landscaping and wide sidewalks to facilitate access to the rail platform and make the station area more attractive for pedestrians. At the Old Town/Chinatown station in downtown Portland, the Oregon Department of Transportation relocated one of its offices to a location near the station several years ago, and the State of Oregon is constructing a new government office building.

Urban Design

Urban design plays an important role for the achievement of TODs. Urban design policies are used not only as aesthetic tools to enhance or maintain the image and identity of a city through built form, but also to direct growth and guide developments to create pedestrian and transit user friendly environments. The goal of urban design policies for TODs is to ensure a cohesive and compact urban form that is pedestrian friendly, attractive, and creates neighborhood connections to transit.

Examples of Urban Design Policies

The 2030 Sacramento General Plan (March, 2009) outlines policies that address both land use and urban design. Listed below are design policies from the 2030 Sacramento General Plan that relate to TODs:

- **LU 2.1.3 Complete and Well-structured Neighborhoods.** The City shall promote the design of complete and well-structured neighborhoods whose physical layout and land use mix promote walking to services, biking and transit use; foster community pride; enhance neighborhood identity; ensure public safety; are family-friendly and address the needs of those of all ages and abilities.

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- **LU 5.** Urban Centers. Urban design policies for urban centers should include:
  - Convenient and attractive pedestrian connections from adjoining neighborhoods and transit;
  - Internal streets designed to integrate and balance safe pedestrian, bicycle, and transit use with efficient vehicular traffic flow; and
  - Street design integrating safe pedestrian, bicycle, transit and vehicular use and incorporates traffic-calming features and on-street parking;
- **LU 6.1.10.** Corridor Transit. The City shall encourage design and development along mixed-use corridors that promotes the use of public transit and pedestrian and bicycle travel and maximizes personal safety through development features such as:
  - Safe and convenient access for pedestrians between buildings and transit stops, parking areas, and other buildings and facilities; and
  - Roads designed for automobile use, efficient transit service as well as pedestrian and bicycle travel.
- **LU 7.1.4 Urban Design.** The City shall require that new and renovated employment center development is designed to accommodate safe and convenient walking, biking, and transit use, and provide attractive, high-quality "campus environment," characterized by the following:
  - A highly inter-connected system of streets and walkable blocks;
  - Buildings sited around common plazas, courtyards, walkways, and open spaces;
  - Extensive on-site landscaping that emphasizes special, features such as entryways, and screens parking lots and service areas;
  - A coordinated and well-designed signage program for tenant identification and way finding;
  - Attractive streetscapes and lighting to promote pedestrian activity;
  - Clearly-marked entrance drives, pedestrian routes, and building entries that minimize potential conflict between service vehicles, private automobiles, and pedestrians; and
  - Facilities and services such as child care, cafes, and convenience retail that address employee needs.

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Parking Management Strategies

Parking management strategies result in more efficient use of parking resources that when implemented, reduce automobile use; reduce the amount of land required for parking facilities; and increases infill affordability. Parking is an essential component to the planning process of creating TODs. Reduced parking requirements along with parking management strategies and policies must work hand-in-hand in order to make TODs successful.

Currently, most of the cities in the San Bernardino Valley have land values that support surface parking. For example, many of the cities have land use policies with high parking requirements which is a reflection of the current auto-dependant and suburban nature of development. High parking

requirements have been shown to significantly increase the cost of development and lower the density which may actually decrease the value of property in some areas. Reductions in parking requirements for land uses are an important and critical ingredient of TOD.

Today, when designing mixed-use developments or transit projects, structured parking is often necessary to achieve compact development at reasonable densities and to accommodate parking requirements. Parking infrastructure contributes substantially to the cost of a project. A March 2006 *Exposition Line Infill Development Potential Analysis* by Solimar found that parking reductions play a more important role in making a project economically feasible than density bonuses.

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According to *Statewide Transit-Oriented Development Study, Special Report Parking and TOD: Challenges and Opportunities* prepared in February 2002 for the California Department of Transportation, a TOD can potentially reduce parking per household by approximately 20% compared to non transit oriented land uses. It also states "a wide range of parking reductions (from 12% to 60%) has been found for commercial parking in TODs." However, this document also states that there is no clear conclusion and parking reductions should be considered on a case-by-case basis. As a general rule, parking requirements serving the uses of a TOD should be lower than that of conventional development. The report also states that "a reasonable supply of parking for those who need or want to drive is required to sustain development viability. Moreover, insufficient park-and-ride parking at a TOD, without compensatory park-and-ride spaces elsewhere, can reduce transit ridership by limiting the auto access ridership component."

There are many opportunities to implement parking management strategies that reduce the demand as well as the need for parking in a TOD.

- Parking Requirements: For developments constructed near planned future transit, allow an increase in density on the site without an increase in parking requirements. Although a transit system is not yet built, parking reductions should be considered due to the mix of uses near transit. This provides the option of sharing parking between daytime/nighttime and weekend/weekday demands, and better utilizes existing available parking in the immediate vicinity.

- Parking Benefit Districts: A concept advocated by UCLA Urban Planning Professor Donald Shoup, a parking benefit district is an area where metered parking revenue is earmarked directly for the community to pay for public services or improvements. An example of this in practice is Old Pasadena where 690 parking meters resulted in $1.2 million in net revenue to fund additional public services. The application of this policy directly contributed to the successful redevelopment of Old Pasadena, making it one of the more successful shopping and entertainment areas in the Los Angeles region.

- Parking Meters: There are various parking meter strategies that have benefits for TODs. San Francisco is experimenting with meters that allow for variable pricing as well as payment options. Where meter prices can be adjusted based on demand, it becomes feasible to increase the price of a curbed space depending on how long a car is parked. For example, charging higher fees after the first hour of parking. Allowing for various payment methods is

another parking meter strategy, where the convenience of paying by credit card, debit card or cell phone may increase the chance that users will pay a higher fee for parking. Similarly, San Francisco's Translink card, a system currently being used as a universal fare card across multiple regional systems, is being tested to serve as a single card for both parking and transit fares.

Examples of Parking Management Policies

The City of San Diego General Plan (March 2008) proposes broad policies that create a platform for more detailed parking solutions to be developed in community-based specific plans. Listed below are the broad policies in the City of San Diego General Plan in which each specific plan should conform to:

- **ME-G.1.** Provide and manage parking so that it is reasonably available when and where it is needed.
  - Where parking deficiencies exist, prepare parking master plans to inventory existing parking (public and private), identify appropriate solutions, and plan needed improvements.
  - Implement strategies to address community parking problems using a mix of parking supply, management, and demand solutions.
  - Optimize parking prices to reflect equilibrium between supply and demand. Consider the positive and negative implications of parking pricing when developing solutions to parking problems.
- **ME-G.2.** Implement innovative and up-to-date parking regulations that address the vehicular and bicycle parking needs generated by development.
  - Adjust parking rates for development projects to take into consideration access to existing and funded transit with a base mid-day service frequency of ten to fifteen minutes, affordable housing parking needs, shared parking opportunities for mixed-use development, provision of on-site car sharing vehicles and parking spaces and implementation of TDM plans.
  - Strive to reduce the amount of land devoted to parking through measures such as parking structures, shared parking, mixed-use developments, and managed public parking (see also ME-G.3), while still providing appropriate levels of parking.
- **ME-G.3.** Manage parking spaces in the public rights-of-way to meet public need and improve investment of parking management revenue to benefit areas with most significant parking impacts.
  - Continue and expand the use of Community Parking Districts (CPD). The CPDs can be formed by communities to implement plans and activities designed to alleviate parking impacts specific to the community's needs. The CPDs also improve the allocation and investment of parking management revenue by providing the Community Parking Districts with a portion of the revenue generated within their boundaries for the direct benefit of the district.
  - Implement parking management tools that optimize on-street parking turnover, where appropriate.
  - Judiciously limit or prohibit on street parking where needed to improve

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safety, or to implement multi-modal facilities such as bikeways, transit ways, and parkways.

- **ME-G.4.** Support innovative programs and strategies that help to reduce the space required for, and the demand for parking.
- **ME-G.5.** Implement parking strategies that are designed to help reduce the number and length of automobile trips. Reduced automobile trips would lessen traffic and air quality impacts, including greenhouse gas emissions.

Los Angeles County has implemented parking policies that directly correspond to surrounding transit:

- Allows 40% parking reduction for new residential development, and 60% reduction for some commercial and civic activities in TOD districts established around the Metro Blue Line stations at Slauson, Florence, Firestone and Imperial.

City of Los Angeles

- Allows 15% parking reduction within 1,500 feet of Metro Rail Red Line.

Zoning

Zoning regulates land-uses, lot sizes, densities, heights, setback and parking within a zone district. Traditional zoning assigns specific areas of a community one of several zones identified in a community's zoning code and tends to focus on the segregation of land uses. Traditional zoning does not address the qualitative features of development such as building orientation, pedestrian spaces, and public realm.

Changes in zoning or the implementation of zoning strategies, particularly in the vicinity of existing and future transit stations, are essential for encouraging TODs. There are various zoning strategies that permit a mix of land-uses and dwelling types to co-exist within a zoning district. The most critical elements of zoning strategies for TODs include increased density, reduced parking requirements, mixed-uses, as well as pedestrian and bicycle access to transit. The objective of zoning for TODs is to link a variety of land uses nearby transit stations that generate transit demand, and to facilitate the design of well-connected and vibrant pedestrian environments between these land uses and transit stations.

Examples of Zoning Strategies

An Overlay Zone is a separate zoning district with regulations tailored to address a specific topic or issue within a specific area, which is overlayed over the current zoning district. An overlay zone is typically more restrictive than the underlying zoning, and in the case of a conflict with the existing code, the more restrictive requirement will apply. TOD goals can be met with this regulatory approach because overlay zones can address the specific context of an area and ensure that the land uses, densities, and site designs that support TOD principles.

- San Diego created an Urban Village Overlay Zone which has been used to create a mix of land uses. The intent of this overlay is to develop at higher densities than is currently allowed in the current zoning districts, and to provide various height and density bonuses for projects located within close proximity to an existing or planned light rail transit station.
- The City of Mountain View created a Transit Overlay Zone to help guide neighborhood development to be well integrated with a new light rail station. The City requires developers to implement higher density development

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and various design features that foster a pedestrian-oriented environment, and restrict auto-oriented uses within the Transit Zone.

Where overlay zones address specific goals and issues, Plan Districts are tailored to meet the needs of a specific geographic area when other zoning mechanisms cannot accomplish the desired results. They are designed to work with the existing zoning regulations, and are used to modify zoning for areas defined in plans and studies, for example, an area identified as a future transit corridor, redevelopment site, or a TOD development site.

- Oakland applied a new zoning classification that was created specifically for the BART Fruitvale Station area. The TOD District classification encourages a balance of commercial, civic, and residential uses and was used as a catalyst for community revitalization and redevelopment of a declining commercial strip.

Affordable Housing[8]

Americans spend over half of their incomes on housing and transportation. Lower-income families spend as much as 30 percent of their total annual income on transportation costs alone which are driven by the cost of owning and operating a vehicle, and by land uses that are dispersed and difficult to access. By placing housing in proximity to public transportation, TODs provide the opportunity to lower the combined cost of housing and transportation. Affordable housing located near transit allows families and seniors to access employment, education, retail, and community opportunities, and reduce their reliance on automobiles. Not only does reduced household spending on transportation result in more affordable housing, but the increased density required for TODs increases the opportunities to build and include affordable housing in TOD projects.

Studies show that the desire to live near transit is increasing dramatically in recent years, where by 2030; it is forecasted that 16 million households will want to live near transit[9]. The market demand for housing within close proximity to public transit, job markets, and amenities will cause housing prices to climb, and higher property values may make the building of affordable housing seem financially infeasible to developers. For this reason, policy tools are necessary to ensure the development, availability, and preservation of affordable housing in TOD projects.

Affordable Housing Development Strategies

To encourage the development and preservation of affordable housing in TODs, both financing strategies and policy incentives are beneficial:

Federal Housing Tax Credits is a major form of financing affordable housing. The federal government distributes housing tax credits to each state, and each state then allocates these credits to low-income housing developers. The State of California incorporates additional criteria to the federal requirements to evaluate potential projects. In order to encourage affordable housing close to transit, points are based on proximity to transit, frequency of transit service, and density. BART's Castro Valley

[8] TCRP report 102 TOD's in the US.

[9] Center for Transit Oriented Development, "Preserving and Promoting Diverse Transit-Oriented Neighborhoods," http://www.cnt.org/repository/diverseTOD_FullReport.pdf, p. 2.

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Station used federal housing tax credits to help finance the construction for the affordable housing provided for both low-income families and seniors.

Affordable Housing Financing Strategies

Obtaining financing is one of the biggest challenges for low-income households to afford housing. Various financing strategies are being used to expand homeownership opportunities:

A common approach for making homeownership affordable is to offer silent second mortgage programs, which provide secondary home loans to low- or moderate-income homebuyers to supplement a primary mortgage. The loan is silent because repayment of the principal or interest doesn't occur until the home is resold or refinanced, allowing the funds to be recycled to assist other homebuyers. The recycling of public dollars allows this funding to serve more families each year.

Another approach for making homeownership affordable is to offer Location Efficient Mortgages (LEM). LEM's allow people to qualify for larger loan amounts for homes in densely populated and transit-rich communities. Those living in compact communities drive less, own fewer cars, and therefore spend less on transportation costs and have a greater expendable income. The borrowing capacity of homebuyers' increases with LEM's by allowing for a greater housing-to-income ratio. This adds buying power to the budgets of low-income families who are shopping for homes, and gives them strong incentive to purchase in neighborhoods with TODs

Inclusionary zoning is a voluntary program where cities can require developers to include a specified number of affordable housing units as part of a residential development. Inclusionary housing practices can help to reduce commutes and encourage TODs by addressing housing supply in proximity to job markets and amenities. Inclusionary zoning practices are often implemented in conjunction with incentives to offset the financial impact of producing below-market housing.

Density bonuses for projects that provide certain levels of affordable or senior housing are common and effective incentives that allow for the production of more units than typically permitted under the jurisdictions zoning. Density bonuses not only provide incentive for affordable housing, but they encourage higher density construction which is vital to reducing sprawl, encouraging transit, and promoting the development of TOD projects.

California State law requires that a city or county must grant a density bonus or other incentive when a developer sets aside a minimum of 10% of its development for lower income households. A developer is allotted a 20% density bonus, and the law allows for a 1.5% increase for every 1% above the minimum 10% set aside for lower income housing, with a maximum density bonus of 35%.

A developer is entitled to density bonuses for providing condominium units for families of moderate income as well. Moderate income families are defined as "persons and families whose income does not exceed 120 percent of area median income." A density bonus of 5% is available to developers who set aside a minimum 10% of the total dwelling units in the condominium project for moderate income families. For every percentage increase above the 10% minimum, an additional 1% density bonus will be provided, with a maximum density bonus of 35%.

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A developer is also entitled to a density bonus for constructing housing for senior citizens. Senior citizen housing is defined as "a residential development developed, substantially rehabilitated, or substantially renovated for, senior citizens that has at least 35 dwelling units." A density bonus of 20% is available to developers that set aside a minimum of 35 dwelling units for senior citizens.

On a local level, counties can implement other development incentives that further encourage the development of affordable housing for TOD projects. The Density Bonus program in Sonoma County, for example, provides developers of affordable housing with a density bonus as well as one other incentive such as a 20 percent reduction in the local open space requirements, reductions in parking requirements, minimum lot size and width requirements, and setback requirements.

The City of Los Angeles' has also implemented incentives in the form of reductions in the amount of parking required for affordable housing projects. Parking reductions are based on the number of affordable housing units, and also on the distance of the development from a transit station or bus route.

Density Thresholds & Pass/Fail Criteria

The book, *"The New Transit Town: Best Practices in Transit-Oriented Development,"* describes the best practices in TODs. This source states that there are no absolute densities for a TOD and some of the case studies presented have densities ranging from 10 to 100 units per acre. Table 3-1 shows the estimated densities of some of the examples of TODs discussed previously.

At densities of around six to seven households per acre transit use begins to increase and vehicle trips begin a corresponding decline. At about 50 households per acre, the number of trips taken daily by vehicles, transit, and walking become about the same. The Urban Land Institute has developed the following minimum densities for Supporting Transit, shown in Table 3-2.

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Table 3-1: Examples of TOD Densities

Project	Estimated Density (DU/acre)
Mission Meridian, South Pasadena	40
Del Mar Station, Pasadena	100
The Stuart, Pasadena	25
Fruitvale Village, Oakland	22
Wilshire/Vermont Station, Los Angeles	129
Hollywood & Vine (+ Legacy Apts.), Los Angeles	122
Mandela Gateway, Oakland	36
Museum Place, Portland	333
Orenco Station, Portland	11
Village Walk, Claremont	23

Source: Gruen Associates

Table 3-2: ULI's Minimum Densities for Supporting Transit

MINIMUM DENSITIES FOR SUPPORTING TRANSIT

	Local Bus, Intermediate Service[1]	Local Bus, Frequent Service[2]	Light Rail[3]	Transit[4]
Dwelling units per acre	7	15	9	12
Residents per acre	18	38	23	30
Employees per acre	20	75	125+	N.A.[5]

Note: The density of the employment destination is more important in influencing trips than the density of the residential area where the trips originate.

1. Average density; varies as a function of downtown size and distance to downtown.
2. Average density over a two-square-mile tributary area.
3. Average density for a corridor of 25 to 100 square miles; transit to downtowns of 20 to 30 million square feet of nonresidential space.
4. Average density for a corridor of 100 to 150 square miles; transit to downtowns of more than 50 million square feet of nonresidential space.
5. Not available.

Sources: For residential densities, Boris Pushkarev and Jeffrey Zupan, *Public Transportation and Land Use Policy* (Bloomington and London: Indiana University Press, 1977). For employment densities, Reid Ewing, "Transit Oriented Development in the Sunbelt," *Transportation Research Record* 1552 (Transportation Research Board, National Research Council, Washington, D.C., 1996). L.D. Frank and Gary Pivo, *The Relationship between Land Use and Travel Behavior in the Puget Sound Region* (Olympia: Washington State Department of Transportation, 1994).

Source: Urban Land Institute, 2003.

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What is important to note is that higher densities and compact developments indirectly lead to higher transit ridership and less automobile use. In mixed use, high density developments, the origins and destinations of any given trip are physically closer. In other words, goods and services are closer together, resulting in shorter travel distances and less vehicle miles traveled (VMT). Studies have shown that employment densities at trip-destinations have a greater influence on ridership than do land-use mix and population densities at trip origins.[10] It is therefore critical to increase development densities and locate employment opportunities near transit in order to ensure high TOD ridership.

A person living in a mixed use, high density development would likely opt for a mode of transit other than an automobile and instead use bus, rail, bicycle, or walk. Less VMT means that there are fewer cars on the road, which reduces energy consumption, decreases air pollution, and lowers traffic congestion. A forthcoming study for Transit Cooperative Research Program *Ensuring Full Potential Ridership from Transit-Oriented Development (TCRP H-27A)* by PB Place Making, Dr Robert Cervero, The Urban Land Institute and the Center for Transit Oriented Development, shows that, on average, TOD housing produces 50% fewer automobile trips in the four urbanized areas (Philadelphia/N.E. New Jersey; Portland, Oregon; metropolitan Washington D.C.; and the East Bay of the San Francisco Bay Area).

Many cities around the United States are looking to TOD's to protect natural resources and sensitive environmental areas, including mature established neighborhoods. Growth management areas and protection zones are often considered complementary policies and often used in conjunction with TOD's to

[10] Cervero, Robert. 2008. Effects of TOD on Housing Parking and Travel. TCRP Report 128. August 1, 2008.

strengthen the focus of growth near transit and sustainable neighborhoods.

Another benefit of increased density is the reduced costs associated with the building of infrastructure (sewer, water, highway, and utility lines). It stands to reason that if housing, jobs, and other associated activities are closer together, then fewer roads, sewers, and utility lines are needed to serve the area.

Table 3-3 illustrates TOD principles and potential benefits of TODs.

In order to best address the multiple goals of TOD, development thresholds or Pass/Fail Standards can be implemented to ensure that TOD development is successful. Corridor–level housing thresholds can be set even before Station Area Plans are developed to quantify the appropriate minimum level of development around transit stations along new corridors. Thresholds can be set by transit type, and do not need to reflect urban style-growth along the entire transit corridor, station areas deemed unsuitable for development by local communities can be accommodated at other stations. If existing development does not meet the corridor thresholds then station area plans can be developed to raise the level of development to reach the corridor threshold. The Metropolitan Transportation Commission (MTC) has released an interim evaluation of their TOD policy that clearly shows that corridor thresholds can be a successful implementation tool to accommodate future growth.

Table 3-4 shows corridor housing unit thresholds averaged by station area for project types in the MTC Jurisdiction. Table 3-5 shows performance of TOD's in other regions.

MTC notes that employment densities have the potential to be effective in developing corridor thresholds or as a mean to gain credit to meeting housing thresholds, however significant challenges exist in enacting employment thresholds including:

- Employment works best in generating transit ridership if job centers are concentrated at hubs as opposed to being spread along a corridor. Large central business districts are usually critical destinations, and corridor thresholds may encourage the dispersal of employment sites.
- Overall demand for office space varies by corridor and needs to be related to market demand.
- In outlying areas, residential achievable densities are generally much higher than achievable densities for employment.
- Cross-commuting to outlying employment areas may have a limited effect on transit ridership without strong parking management.
- Local jurisdictions already have many reasons to zone for employment, such as sales tax revenue, whereas affordable housing is usually not promoted.
- Housing units are easier to define and measure than employment uses, which rely heavily on assumptions such as the type of tenant and the number of workers expected to occupy the building.

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Table 3-3: TOD Principles and Benefits

TOD Principles	Benefits
▪ TODs occupy land within ¼ mile to ½ mile radius around a rail or bus station, or within 125 to 500 acres. ▪ Typically, TOD areas are composed of three elements: ○ station area with platforms, and transit and passenger amenities, ○ core area within a five-minute walk of the station or about a 1/4 mile of the station, and the most intense employment, residential, and retail uses as well as convenience commercial for passengers, and ○ a neighboring ring within a ten-minute walk of station or about 1/4 to 1/2 mile of the station containing residential, commercial and other uses. ▪ A TOD must be a walkable, pedestrian-oriented area with amenities such as street trees, benches, crosswalks, decorative paving, and public art. Direct connections between different land uses should be provided. ▪ TODs have connectivity to the regional transit system and bicycle/trail and shuttle links to the area outside the ½-mile area ▪ Plans, policies and zoning provisions relating to mix of uses and building setbacks, and providing incentives such as density bonuses, floor area ratio increases, reduction of parking requirements, etc. play a significant role in facilitating a TOD.	▪ Environmental ○ Improved air quality and energy consumption: Decreased auto trips lead to lower emissions which results in improved air quality. ○ Increased transit ridership and decreased congestion: By decreasing driving, TODs result in reduced congestion. ○ Conservation of land and open space: TODs are compact developments, and therefore, consume less land than lower-intensity, auto-oriented development ▪ Economic ○ Catalyst for economic development: TODs can act as a catalyst for nearby properties to invest in their development as well. ○ Redevelopment: TODs can be used to redevelop vacant or underutilized properties and declining urban neighborhoods. ○ Increased property value: TODs can be used to revitalize the area within ¼ mile of the station. ○ Decrease infrastructure costs: TODs help in the reduction of infrastructure costs due to compact and infill development. ○ Revenue for transit systems: Increased ridership leads to additional revenues for transit systems. ○ Reduced household spending: By reducing gasoline costs, TODs contribute to a reduction in household spending on transportation. ▪ Social ○ Increased housing and employment choices: TODs provide a diversity of housing and employment types within close proximity to the transit station. ○ Greater mobility choices: By creating activity nodes linked by transit, TODs increase mobility options in congested areas. Young people, the elderly, those without cars and those not wanting to drive also have mobility. ○ Health benefits: By providing more opportunities

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TOD Principles	Benefits
	for walking and bicycling, TODs offer health benefits. o Enhanced sense of community: By bringing more people and businesses closer, and creating an activity hub, TODs enhance the sense of community. o Enhanced public safety. By creating more active places used throughout the day and night providing "eyes on the street", TODs help increase safety. o Quality of life – by reducing the driving time for long automobile commutes, people can recapture this wasted time or other activities.

Sources: Statewide Transit-Oriented Development Study; Gruen Associates

Table 3-4: MTC's Housing Threshold by transit Mode

Project Type	BART	Light Rail	Bus Rapid Transit	Commuter Rail	Ferry
Housing Threshold	3,850	3,300	2,750	2,200	750

Source: Metropolitan Transportation Commission, 2006

Table 3-5: Performance of TOD's in other regions

System	Average Housing Units/Station	MTC's Equivalent TOD Policy Threshold	% Difference from TOD Policy Threshold
New Jersey - Hudson Bergen light Rail	7,063	3,300	+114%
New Jersey - Transit Villages	3,558	2,200-3,850*	+39%
Chicago - Evanston	4,192	2,200	+91%
Arlington County - Rosslyn Ballston Corridor	5,022	38,50	+30%
California - Various Examples	3,113	2,200-3,850*	-4%

*Varies depending on station

Source: Metropolitan Transportation Commission, 2006

Pass/Fail standards can be developed as an implementation tool to determine if the existing policy framework exists to support successful TOD's. Standards can include the development of milestones that must be reached at certain points in the project approval process. Two examples of applicable policies are: local communities must adopt transit-friendly zoning before construction can proceed; or parking and affordable-housing requirements must be developed before station area plans are approved.

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Chapter 4 Travel Demand Forecasting and Future Conditions

4.1 Travel Demand Forecasting Methodology

This section summarizes the methodology used and the validation of the San Bernardino Valley Focus Model (SBVFM) that was used to produce travel forecasts for the Long Range Transit Plan. This information is intended to demonstrate the model's ability to replicate existing transportation and transit ridership behavior, and the utility of the model for forecasting future ridership and comparing transit alternatives in San Bernardino County.

This document provides a summary of the development and derivation of the SBVFM from the SCAG regional model, followed by a summary of the model validation effort specifically required for the analysis of transit services in the San Bernardino Valley. The regional nature of the remainder of the model (outside of the San Bernardino Valley) also allows for future transit analysis of the remainder of San Bernardino County, to a sketch planning lower level of accuracy.

The forecasting tool employed for the Long Range Transit Plan is the San Bernardino Valley Focus Model, which is a focused model derived from the Southern California Association of Governments (SCAG) regional model. The SCAG model was updated in conjunction with the 2008 Regional Transportation Plan (RTP), using a Year 2003 validation year. Elements of the SCAG regional mode are documented in 2003 SCAG Model Validation and Summary – Regional Transportation Model (January 2008).

The San Bernardino Valley Focus Model uses the basic structure of the SCAG model, with the mode choice model customized for use in the San Bernardino Valley, and an increased level of definition based on the networks and zone systems found in the San Bernardino Valley.

The SBVFM employs the traditional 4-step modeling process used in the SCAG model. Special features of the SBVFM include:

- All person trips are modeled (including non-motorized)
- Auto-ownership is tied to transit accessibility
- Person trip data is split into peak and off-peak trips before application of distribution models
- Feed-back loops are used for highway and transit skims
- Log-sums are used to estimate composite impedance for application within trip distribution models for home-based work trip purpose
- Vehicle trip data is split into four time periods and converted to origin-destination format using time-of-day models
- Transit trip data is assigned to peak (AM) and off-peak (midday) time periods in production-attraction format

Zone System

The SBVFM uses a zone system comprising 3,056 transportation analysis zones (TAZs) in the SCAG region. The development of the SBVFM zone system was accomplished in two steps. First, 259 TAZs in the two regional statistical areas (RSAs) that comprise the San Bernardino Valley area were split into 1,811

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TAZs, using zone boundaries defined in other local models used in the San Bernardino Valley. Then, the SCAG TAZs in remote areas of Ventura, Los Angeles, Orange, Riverside, and Imperial Counties were aggregated to coarser levels of detail, reducing the number of zones outside of San Bernardino County by 2,605. The net result was to decrease the number of zones in the SCAG region from 4,109 to 3,056. Table 4-1 displays a comparison of the number of TAZs in each of the six SCAG counties, plus the other centroids, in the SCAG zone system and in the SBVFM zone system.

Table 4-1: Transportation Analysis Zones in SCAG Counties

County	SCAG TAZs	SBVFM TAZs
Ventura	210	6
Los Angeles	2,243	541
Orange	666	225
Riverside	475	320
San Bernardino	701	1,954
Imperial	110	6
Total	4,109	3,056

Source: Hexagon, 2009.

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Socioeconomic Data

The SBVFM uses the same socioeconomic input data used in the SCAG model, except that the data has been aggregated or split to fit into the SBVFM zone system. Key socioeconomic data used in the SBVFM include the following variables:

- Total population
- Resident population
- Workers
- Single-family households
- Multiple family households
- K-12 school enrollment
- College/university enrollment
- Retail employment
- Service employment
- Basic employment
- Median household income

Trip Purposes

Trips made for different purposes have been found to have different characteristics, such as average trip lengths and mode shares. Therefore, separate models are used to estimate the different trip purposes. The most popular trip purposes used in travel demand models are home-based work, home-based other, and non-home based.

The SBVFM uses the same 13 trip purposes that are used in the SCAG models. These include six home-based work trip purposes, five home-based other trip purposes, and two non-home based trip purposes. These trip purposes are summarized below.

- Home-based work-direct
  - Low income (<$25,000)
  - Middle income ($25,000 - $49,999)
  - High income ($50,000 or more)
- Home-based work-strategic
  - Low income
  - Middle income
  - High income
- Home-based elementary & high school
- Home-based college & university
- Home-based shopping
- Home-based social-recreational
- Home-based other
- Work-based other
- Other-based other

Trip Generation

Trip generation is the process of estimating how many person trips are generated within each TAZ. The trip generation procedures used in the SBVFM are identical to the procedures used in the SCAG model. Trip generation models estimate both productions (the home end of trips) and attractions (the non-home end of trips).

Finally, the productions and attractions are "balanced" so that the regional totals match for each trip purpose.

Trip productions are estimated for each TAZ using a cross-classification procedure. First, the households in each TAZ are stratified into household categories. For example, for home-based work trips the households are stratified into a matrix of household categories based on the number of persons in the household, the number of workers in the household, and the income level of the household. The cross-classification variables for the work and non-work trip purposes are summarized below.

- Home-based work & work-based other (3-way cross classification)
  - 6 household size groups (1, 2, 3, 4, 5, 6+)
  - 4 workers per household groups (0, 1, 2, 3+)
  - 3 income level groups (low, middle, high)
- Home-based non-work & other-based other (2-way cross classification)
  - 6 household size groups (1, 2, 3, 4, 5, 6+)
  - 5 auto ownership level groups (0, 1, 2, 3, 4+)

After households have been stratified, trip production rates are applied to each household category, and the resulting trips are aggregated in each TAZ for use in subsequent models. Trip attractions are estimated by a set of linear equations that convert households, employees, and school enrollment to trip attractions.

Transportation Networks

The SBVFM uses an integrated transportation network that includes mixed-flow and exclusive facilities for highway, truck and transit modes. The network structure is similar to the structure developed for the SCAG models, with some refinements designed to ease the analysis of trips that may be influenced by the transportation alternatives in the detailed analysis, such as a refined coding of access to transit stations.

Highway Networks

The SBVFM uses separate networks for four different time periods:

- AM Peak - 6 to 9 AM
- Midday - 9 AM to 3 PM
- PM Peak - 3 to 7 PM
- Nighttime - 7 PM to 6 AM

The primary difference between the four networks is the highway capacity, which is a function of the number of hours of duration of each time period.

The links in the networks are coded with each of the modes that are available. The available highway modes include mixed flow links, shared ride HOV links (two or more persons), carpool HOV links (three or more persons), toll links, and truck links for three classes of heavy vehicles.

The highway networks are comprised of nodes and links that connect centroids that represent the 3,056 TAZs in the SCAG region. The Year 2007 highway network also includes 40 external stations that represent highway connections to areas outside of the SCAG region, 12 airports, 40 port zones, and 150 park-and-ride stations that allow the model to simulate travel between the highway network and the integrated transit network.

The highway network comprises over 100,000 directional highway links. Each link is characterized by several attributes, including seven area types, ten facility classes, number of travel lanes, the link capacity, free-flow speed, and observed

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speed. The latter three attributes are estimated for each link with the use of lookup tables, based on the area type, facility type, number of lanes and other link variables.

The highway network includes attributes and modes that identify toll facilities and truck facilities. Toll facilities in the region are currently restricted to Orange County. Link attributes defining truck facilities serve two purposes. First, they allow the user to restrict or prohibit the use of links by certain classes of heavy duty trucks. Second, they allow the model assignment algorithm to assign truck trips separately from other modes, which allows the user to convert truck trips to Passenger Car Equivalents (PCEs).

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Transit Networks

The SBVFM includes two transit networks integrated with the AM Peak period and Midday period highway networks. The AM Peak transit network is used to assign and model transit trips made in the peak periods, and the Midday transit network is used to assign and model transit trips made in the off-peak periods.

The transit networks are integrated with the highway networks so that mixed flow links can carry both highway and transit modes, and exclusive links can carry various transit modes. The transit networks also include auxiliary transit links that allow trips to access transit services and to transfer between transit routes. In all, the SBVFM transit networks include 13 transit modes and eight auxiliary transit modes.

The transit networks include transit lines that are characterized by itineraries, stop locations, and headways. The AM Peak transit network includes over 1,500 transit lines in the region, including 30 Omnitrans routes, three Metrolink routes, and two other operators serving the San Bernardino Valley.

Highway and Transit Skims

One of the main objectives of the highway and transit networks is to allow an accurate and comparative representation of the travel times and costs between centroids by various modes of travel. The travel times and costs estimated by the model are commonly referred to as skims. The highway and transit skims are used as input to both the trip distribution and mode choice models.

Highway skims for both the peak and off-peak time periods are based on the travel time on the shortest time paths. The highway operating speeds are estimated using equilibrium assignment algorithms that adjust the operating speeds on the links as a function of the demand-capacity ratio for the link. In model application, the highway skims are based on feedback speeds resulting from three iterations of the four-step modeling procedure. The in-vehicle highway travel times are augmented with terminal times associated with the locations of the trip ends. The SBVFM calculates separate highway skims for both HOV trips and drive alone trips (which are restricted from using HOV links).

Transit skims comprise a combination of variables that have been found to affect both the choice of the transit mode and the path choice for transit options. The variables include the in-vehicle transit travel time, access time between centroids and transit stops, wait time, number of transfers, and transit fare. The in-vehicle travel times are estimated using different procedures for transit routes using mixed-flow and exclusive facilities. For transit routes that operate on links that are coded as mixed flow facilities, the transit operating speeds are estimated as a function of the highway operating speed.

For exclusive transit links, the operating speeds are derived from published schedules. The SBVFM calculates separate transit skims for four sets of transit paths for both walk-access and drive-access paths. The four sets of transit paths are distinguished by the transit modes that are allowed for the trip, as follows:

- The *local bus* paths allow only transit modes defined as local;
- The *premium express bus* paths can use transit modes described as either local or express bus;
- The *premium LRT/BRT* paths can use any transit mode described as bus, light-rail transit or subway transit; and
- The *commuter rail* paths can use any transit mode.

Trip Distribution

The SBVFM trip distribution models use a gravity model to distribute trips. These models use the same procedures and gamma function friction factors similar to those developed for the SCAG trip distribution models. However, the gamma function coefficients are recalibrated specifically for use in the SBVFM.

The input data to the trip distribution models include productions and attractions output from the trip generation models, and impedance data from highway and transit skims. Three different types of travel impedance are used for different types of trip distribution models. The six home-based work trip purposes use composite impedance log-sums, which also serve as the denominator in the mode choice equations. The composite impedance log-sums for the medium income and high income households include all travel modes, while the composite impedance log-sums for the low income households exclude drive alone skims from the log-sum calculation. The other seven trip purposes use impedances derived exclusively from highway travel times.

The distribution process creates 26 person trip tables, including both peak period and off-peak period trip tables for each of the 13 trip purposes estimated by the trip generation models. Following application of the trip distribution models, the 26 resulting trip tables are aggregated to 14 person trip tables, as summarized below in Table 4-2.

Mode Choice

The SBVFM mode choice model uses the basic structure developed for the OCTAM mode choice model. However the modal bias constants have been recalibrated specifically for use in the SBVFM.

The mode choice model application is performed separately for the peak and off-peak time periods for five trip purposes (home-based work, home-based school, home-based other, work-based other, and other-based other).

Different model constants are used for households in the three income classes for home-based work and home-based other trips. The home-based work stratification of households by income class is output from the trip distribution models. The home-based other stratification of households by income class is estimated for each TAZ as a constant share of the total person trips.

The TAZ data is split into three walk access markets - short walk, long walk, and no transit - based on a GIS analysis of the relationship between the zone boundaries and the transit stop locations.

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Table 4-2: Trip Purposes from Trip Generation and Trip Distribution Models

Exhibit 3: Trip Purposes from Trip Generation and Trip Distribution Models

Trip Generation Models (26 Tables)	Trip Distribution Models (14 Tables)
Peak Period Home-Based Work Direct - Low Income	Peak Period Home-Based Work - Low Income
Peak Period Home-Based Work Strategic - Low Income	
Peak Period Home-Based Work Direct - Medium Income	Peak Period Home-Based Work - Medium Income
Peak Period Home-Based Work Strategic - Medium Income	
Peak Period College/University	
Peak Period Home-Based Work Direct - High Income	Peak Period Home-Based Work - High Income
Peak Period Home-Based Work Strategic - High Income	
Peak Period School (K-12)	Peak Period School (K-12)
Peak Period Home-Based Shopping	Peak Period Home-Based Other
Peak Period Home-Based Social-Recreational	
Peak Period Home-Based Other	
Peak Period Work-Based Other	Peak Period Work-Based Other
Peak Period Other-Based Other	Peak Period Other-Based Other
Off-Peak Period Home-Based Work Direct - Low Income	Off-Peak Period Home-Based Work - Low Income
Off-Peak Period Home-Based Work Strategic - Low Income	
Off-Peak Period Home-Based Work Direct - Medium Income	Off-Peak Period Home-Based Work - Medium Income
Off-Peak Period Home-Based Work Strategic - Medium Income	
Off-Peak Period College/University	
Off-Peak Period Home-Based Work Direct - High Income	Off-Peak Period Home-Based Work - High Income
Off-Peak Period Home-Based Work Strategic - High Income	
Off-Peak Period School (K-12)	Off-Peak Period School (K-12)
Off-Peak Period Home-Based Shopping	Off-Peak Period Home-Based Other
Off-Peak Period Home-Based Social-Recreational	
Off-Peak Period Home-Based Other	
Off-Peak Period Work-Based Other	Off-Peak Period Work-Based Other
Off-Peak Period Other-Based Other	Off-Peak Period Other-Based Other

Source: Hexagon, 2009.

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The regional modal bias constants were adjusted to match observed modal shares derived from regional household survey data. The modal bias constants were further refined for San Bernardino County to match data from transit boarding counts collected for Omnitrans and Metrolink in the Year 2006.

Time-of-Day and Assignment Procedures

The procedures from the preceding three steps (trip generation, trip distribution, and mode choice) are used to create vehicle and transit trip tables in production-attraction format for peak and off-peak trips for five trip purposes.

The time-of-day factors are used to convert the vehicle trip tables from production-attraction format to origin-destination format for the four time periods (AM Peak, Midday, PM Peak, and Nighttime). The resulting vehicle trip tables are then assigned to the highway networks using a multi-class assignment procedure for three auto modes (drive alone, two-person, and three-or-more person) and three truck modes (light-heavy vehicle, medium-heavy vehicle, and heavy-heavy vehicle).

The transit trip tables are assigned in production-attraction format to the AM Peak transit network (peak transit trips) and the midday transit network (off-peak transit trips). The transit trips are assigned separately to the four sets of transit paths before the assignment results are aggregated together.

Additional Model Development and Validation Tools

Additional tools used to complete this model validation include the following.

- *SCAG 2008 Regional Transportation Plan* (RTP), and *SCAG 2008 Regional Transportation Improvement Program* (RTIP) are used to validate the background highway and transit networks for the Base Year (2007) conditions.
- *Omnitrans Short Range Transit Plan, 2008-2013, Final Report* (July 2007) is used to validate the model's ability to replicate transit ridership on individual transit routes.
- *San Bernardino Associated Governments Profile of Transit Riders in San Bernardino County – Final Report* (March 2007) is used to validate the model's ability to replicate characteristics of transit riders served by Omnitrans bus routes and Metrolink rail routes.
- Omnitrans On-board Survey data (2006) is used to validate the model's ability to replicate transit trips and origin-destination data in the San Bernardino Valley.

Omnitrans on/off count data, collected in 2006, is used to validate activity at bus stops in the San Bernardino Valley.

4.2 Travel Demand Model Validation

The model validation process is presented sequentially from the coarser level to the finer level of analysis as follows:

- Regional model validation
- San Bernardino Valley/Omnitrans system-wide validation
- San Bernardino Valley study area and bus route segments
- Origin-destination of trips in study area

Regional Validation

The regional transportation system in the SBVFM is virtually identical to the transportation system in the parent SCAG Regional Model, except in the San Bernardino Valley. The SCAG model was validated to Year 2003 conditions. Validation of this model is documented in 2003 SCAG Model Validation and Summary – Regional Transportation Model (January 2008).

The San Bernardino Valley Focus Model (SBVFM) is a focus model derived from the most recent update of the SCAG Regional Model, with the mode choice component of the model derived from the OCTA Model. First developed in 2004, the SBVFM has been used in several projects in the San Bernardino Valley. The SBVFM was developed specifically to satisfy FTA guidelines for transit modes for New Starts projects. The SBVFM was applied successfully to complete the Alternatives Analysis phase of the E Street Corridor Project, and to bring that project into the Project Development phase.

For purposes of this model validation, the SBVFM was updated to base year 2006/2007 conditions. This base year update includes:

- SE data interpolated between 2003 and 2010 data;
- Highway network updated to reflect freeway projects throughout the region;
- Transit networks updated to reflect regional rail and rapid bus services;
- Highway network updated to reflect highway improvements in the San Bernardino Valley; and
- Transit networks updated to reflect Omnitrans bus services.

Several regional validation issues arose from the conversion of the SCAG regional model to

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the San Bernardino Valley Focus Model. The most important was related to the trip distribution and mode choice models. Each of these issues were identified and addressed to maintain validation of the regional application of the models to the focus model.

The key issue with the trip distribution model arose as a result of the disaggregation of zones within the San Bernardino Valley focus area. The finer zone structure within the focus area resulted in many more opportunities for short trips than within the SCAG regional model. Since the trip distribution element of the regional model had been calibrated with relatively few short trips (less than six minutes in highway travel time) there was limited data with which to calibrate the gravity models for the shorter trip lengths.

Meanwhile, the focus model has a significant number of possible trips of the shorter trip lengths to consider. When the regional trip distribution model was applied within the context of the focus model, the result was that far more very short trips than desired. In order to correct this problem it was necessary to recalibrate the friction factors for the short trip lengths. The result of this effort produced trip distributions and trip tables that were consistent with the results of the regional model validation. Separate recalibration efforts were completed for home-based work trips for three income groups, plus seven other trip purposes, each in two time periods.

The key issue with the mode choice model was the ratio of transit boardings to linked transit trips, resulting from the average number of transfers assigned to each transit trip. To correct this problem the coefficients for second wait (transfer wait) were adjusted from 2.0 times first wait to 3.0 times first wait. This adjustment was applied to all travel modes for both the path-builder and mode choice model to maintain consistency within the models.

Other elements of the models were not adversely affected by the transition from the regional model to the focus model, and did not require additional adjustment. These elements include the trip generation model and highway algorithms.

San Bernardino Valley/Omnitrans Bus System

The primary providers of transit service in the San Bernardino Valley are Omnitrans, which operates 29 local bus routes and one express bus route, and Metrolink, which provides regional commuter rail service between downtown Los Angeles and several suburban areas, including the San Bernardino Valley.

For purposes of this model validation, the San Bernardino Valley portion of the SBVFM was updated from the Year 2003 conditions reflected in the SCAG model validation to Year 2006/2007 conditions. This update includes highway improvements in the San Bernardino Valley and local bus service updates. Since the on-board transit survey was conducted in 2006, the validation transit network replicates the local bus routes as they existed in 2006.

Several validation issues were encountered during validation of the mode choice models at the San Bernardino Valley level of detail. The issues requiring the most significant effort to achieve model validation include issues with trip purpose and the assignment results on bus routes with low-frequency vs. high-frequency service.

The original application of the regional models within the context of the San Bernardino Valley Focus Model resulted in a lower percentage of work and school trips on Omnitrans bus routes than were observed during the Omnitrans on-board bus survey.

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This problem was corrected by applying distinct adjustments to the transit bias constant within the mode choice models for each of the five trip purposes.

The transit assignments resulting from the original application of the focus model resulted in a system-wide under-assignment of transit trips on high-frequency transit routes (less than 30-minute headways) and over-assignment of transit trips on low-frequency transit routes (60-minute headways). The original version of the path-builders used in the model included a cap on wait time equivalent to a 30-minute headway. This cap was adjusted to a 60-minute headway and the relative assignments on low-frequency vs. high-frequency services improved.

Other important elements of the model were not adversely affected by the transition from the regional model to the focus model, and did not require additional adjustment. These elements include the wealth variable and the relative shares of ridership on local and premium transit modes. The transit travel time functions required only a very minor adjustment to calibrate travel times to bus schedules.

The total boardings on each of the local bus routes operated by Omnitrans are summarized in Table 4-3. This table shows that the daily assignments for most of the transit routes are within +/- 900 daily boardings, or within +/- 30% of the daily ridership, and the root mean statistically error (RMSE) for the transit routes is 0.262.

Relative shares of local bus trips in the San Bernardino Valley made for five trip purposes are summarized in Table 4-4. The results shown in this table are expected since the transit bias constants for the San Bernardino Valley were calibrated to match the distribution of transit trips by trip purpose.

The Year 2006 Omnitrans on-board bus survey reports that 53 percent of Omnitrans riders are from households with annual incomes of less than $20,000. The SBVFM accurately reflects this fact, with the mode choice models creating 54 percent of its transit trips from lower income households.

4.3 Year 2035 Population and Employment Forecasts

The population of the San Bernardino Valley is expected to grow to over 2 million people in the Year 2035, which is 37 percent higher than the Year 2006 population. Table 4-5 displays population and employment growth data for the year 2035 for San Bernardino Valley cities.

The City of San Bernardino, which is currently the largest city in the valley, is expected to grow by 30 percent to a population of over 265,000. The city of Ontario is expected to experience the greatest population growth, with a year 2035 population estimate of over 337,000.

Employment in the San Bernardino Valley is expected to grow to over 928,000 in the Year 2035, which is 62 percent higher than the Year 2006 employment. The cities of Ontario, San Bernardino, and Rancho Cucamonga are expected to maintain their current positions as the three cities with the highest employment in the valley. Figures 4-1 and 4-2 show the forecasts for Employment and Population Densities for Year 2035, respectively.

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Table 4-3: Omnitrans Ridership Validation by Route

Route Number	Type of Route	Headway	Ridership Observed	Estimated	Difference	Ratio
1	East Valley Local	15	3,462	4,064	602	1.17
2	East Valley Local	15	4,113	4,441	328	1.08
3	East Valley Local	20	2,821	2,313	(508)	0.82
4	East Valley Local	20	2,876	2,212	(664)	0.77
5	East Valley Local	30	1,820	1,409	(412)	0.77
7	East Valley Local	30	1,030	1,414	384	1.37
8	East Valley Local	60	828	1,237	409	1.49
9	East Valley Local	60	1,041	1,208	167	1.16
10	East Valley Local	30	1,278	1,574	296	1.23
11	East Valley Local	30	1,272	895	(377)	0.70
14	East Valley Local	15	3,968	3,154	(814)	0.79
15	East Valley Local	30	2,591	3,444	853	1.33
19	East Valley Local	30	2,627	2,992	365	1.14
20	East Valley Local	30	635	209	(426)	0.33
22	East Valley Local	20	2,000	1,672	(328)	0.84
28	East Valley Local	60	150	120	(30)	0.80
29	East Valley Local	60	209	113	(96)	0.54
31	East Valley Local	60	94	299	205	3.19
60	West Valley Local	60	723	655	(68)	0.91
61	West Valley Local	15	5,349	4,620	(729)	0.86
62	West Valley Local	30	1,370	1,758	388	1.28
63	West Valley Local	30	1,203	908	(295)	0.76
65	West Valley Local	30	1,094	1,132	38	1.03
66	West Valley Local	15	3,072	2,970	(102)	0.97
67	West Valley Local	60	702	587	(115)	0.84
68	West Valley Local	30	1,373	1,926	553	1.40
70	West Valley Local	60	348	326	(22)	0.94
71	West Valley Local	60	807	881	74	1.09
75	West Valley Local	60	107	144	37	1.34
90	Express	45	1,225	979	(246)	0.80
Total			50,189	49,656	(533)	0.99

Source: Hexagon, 2009.

Table 4-4: Omnitrans Ridership by Trip Purpose

Trip Purpose	Actual	Target
Home-based Work	34%	34%
Home-based Other	34%	34%
Work-based Other	7%	7%
Home-based School	16%	16%
Other-based Other	9%	9%

Source: Hexagon, 2009

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Table 4-5: Year 2035 Population and Employment Growth Data - San Bernardino Valley Cities

City	Year 2035 Data			Growth - 2006-2035		
	Population	Households	Employment	Population	Households	Employment
Chino	112,038	28,800	64,869	43%	52%	36%
Chino Hills	82,880	24,848	14,720	6%	12%	64%
Colton	89,604	27,851	53,412	69%	82%	123%
Fontana	224,011	57,784	70,782	36%	40%	55%
Grand Terrace	14,911	5,324	5,866	19%	24%	91%
Highland	72,497	21,911	16,492	39%	47%	167%
Loma Linda	41,385	17,286	33,086	84%	105%	97%
Montclair	54,643	15,032	24,434	50%	64%	53%
Ontario	337,095	91,936	187,671	94%	103%	69%
Rancho Cucamonga	172,420	55,181	97,874	3%	8%	59%
Redlands	93,196	34,316	51,206	31%	36%	31%
Rialto	143,308	39,736	46,581	42%	55%	105%
San Bernardino	265,515	78,619	157,088	30%	35%	61%
Upland	82,444	31,716	30,888	11%	25%	15%
Yucaipa	63,357	24,033	18,006	25%	36%	87%
Unincorporated	160,987	43,290	55,838	29%	33%	58%
San Bernardino Valley Total	2,010,291	597,663	928,813	37%	44%	62%

Source: SCAG, 2009.

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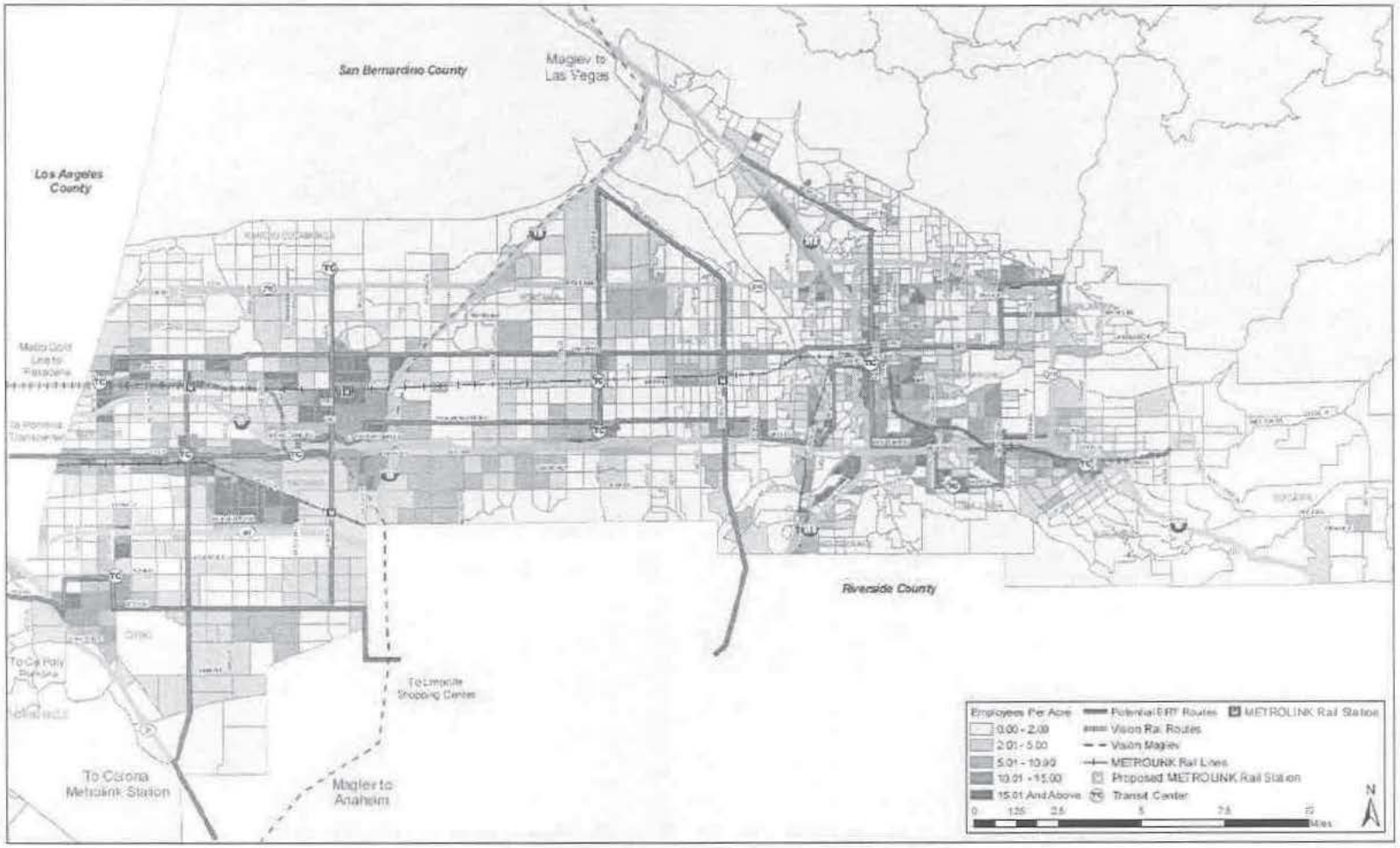
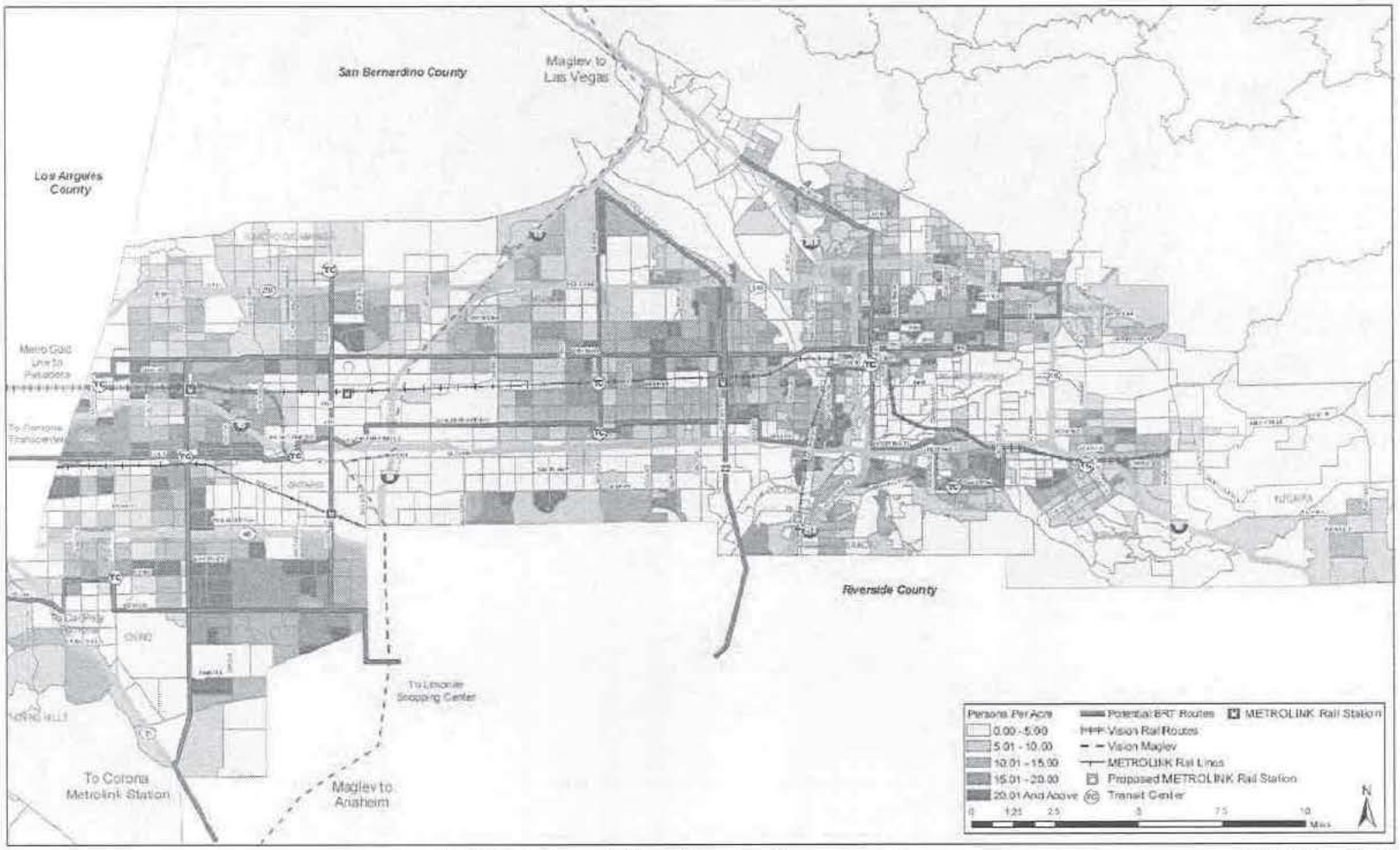


VISION Employment Density Year 2035
DRAFT LONG RANGE TRANSIT PLAN (LRTP) for the San Bernardino Valley

San Bernardino Associated Governments (SANBAG)
August 2009

Source: Parsons, 2009.

Figure 4-1: VISION Employment Density Year 2035



VISION Population Density Year 2035

DRAFT LONG RANGE TRANSIT PLAN (LRTP) for the San Bernardino Valley

San Bernardino Associated Governments (SANBAG)
August 2009

Source: Parsons, 2009.

Figure 4-2: VISION Population Density Year 2035

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CHAPTER 5 DEVELOPMENT OF ALTERNATIVES

This chapter first presents descriptions of existing regional transit plans and planning projects that are under study. These plans form the basis for the four future transit alternatives that are analyzed in the Long Range Transit Plan. The reason for studying the different alternatives is to be able to assess the ridership benefits of different levels of transit investment in the San Bernardino Valley. The four future transit alternatives include:

- The Baseline Alternative, shown in Figure 5-1 which includes existing transit services;
- The Plan Alternative, shown in Figure 5-2 which includes an increase in coverage and service frequency designed to serve the future growth in the region;
- The Vision Alternative, shown in Figure 5-3, which includes an investment in a higher level of transit services – BRT and rail – in the region; and
- The Sustainable Land Use Alternative, shown in Figure 5-4 which redistributes population and employment growth to transit corridors, allowing us to study the potential ridership benefits of public policy efforts to shape the transit/land use connection in the region.

Based on the April 26, 2006 workshop at SANBAG, five LRTP Conceptual Alternatives for the San Bernardino Valley were carried forward for initial analysis and presentation to the general public. In conjunction with the Compass Blueprint 2% Strategy and in preparation for SB 375 it became desirable to revise the transit alternatives to combine three "vision alternatives" into one transit alternative and prepare a Sustainable Land Use Alternative. Table 5-1 compares mass transit Service Assumptions for each alternative.

5.1 REGIONAL PLANS

The LRTP is an integral part of the regional planning process and serves in conjunction with the following plans:

SYSTEM-WIDE TRANSIT CORRIDOR PLAN

The 2004 System-wide Transit Corridor Plan developed for Omnitrans identified seven key transit corridors, shown in Figure 5-5 for the San Bernardino Valley to introduce higher quality transit service (higher frequency, express or BRT services) known as the sbX, to attract choice riders and effect a positive transit mode shift. Major transit corridors include: Corridor 1 (E Street); Corridor 2 (Foothill East); Corridor 3 (Foothill West); Corridor 4 (Mountain & Euclid); Corridor 5 (San Bernardino Avenue); Corridor 6 (Holt & Fourth Street); and Corridor 7 (Grand & Edison). Three additional corridors have been identified for study, including: Corridor 8 (Sierra Avenue); Corridor 9 (Riverside Avenue); and Corridor 10 (Haven Avenue).

Corridor 1, Shown in Figure 5-6 was identified as the highest priority corridor and has progressed into the Project Development Process with planned operation of the E Street sbX in 2012. The remaining corridors form the framework for the establishment of a base fixed route network, with the possible introduction of limited stop or full express services as a precursor to sbX network expansion. All ten of these corridors will be the subject of an update to the System-wide Transit Corridor Plan, which is due to be completed later in 2009.

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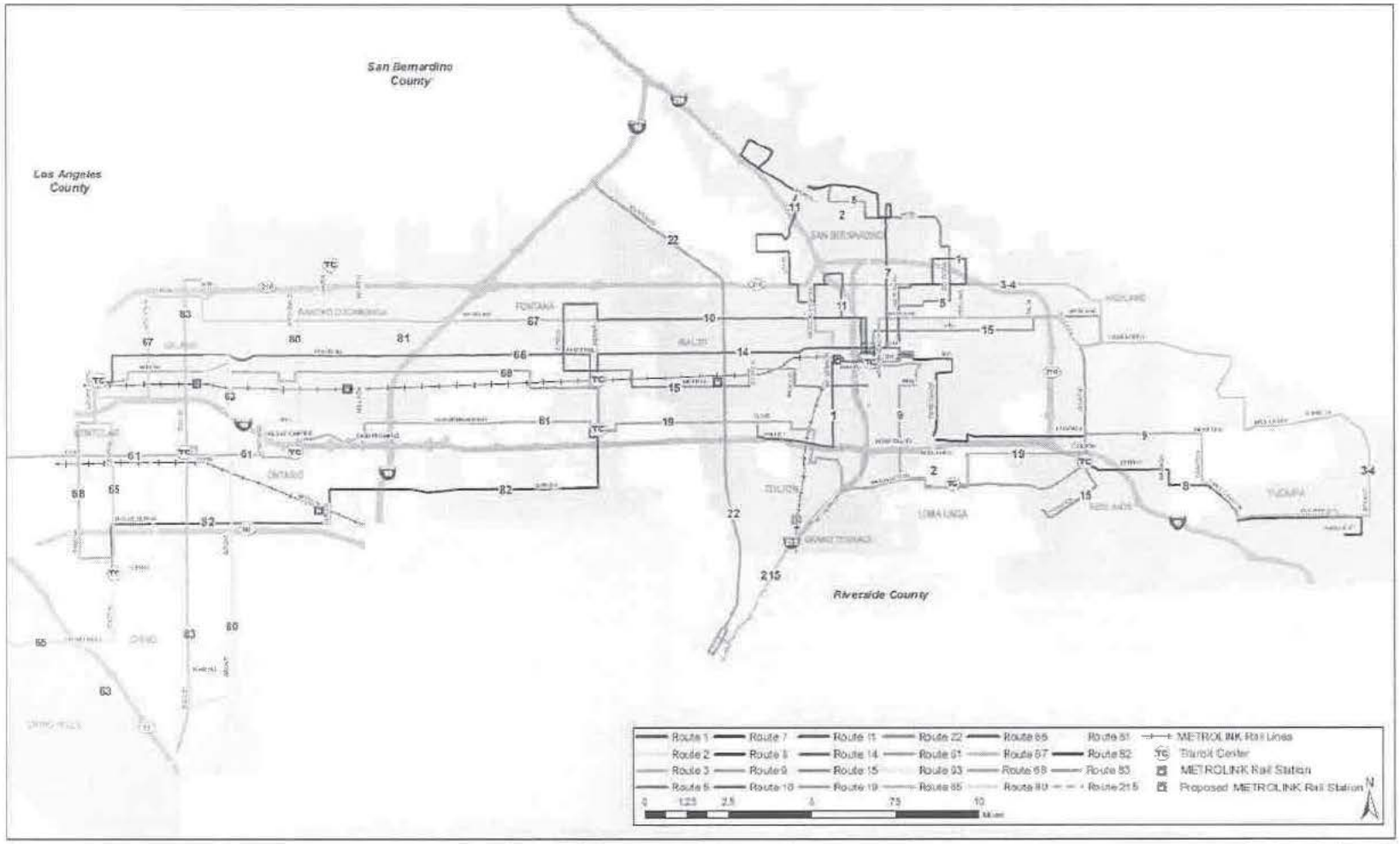


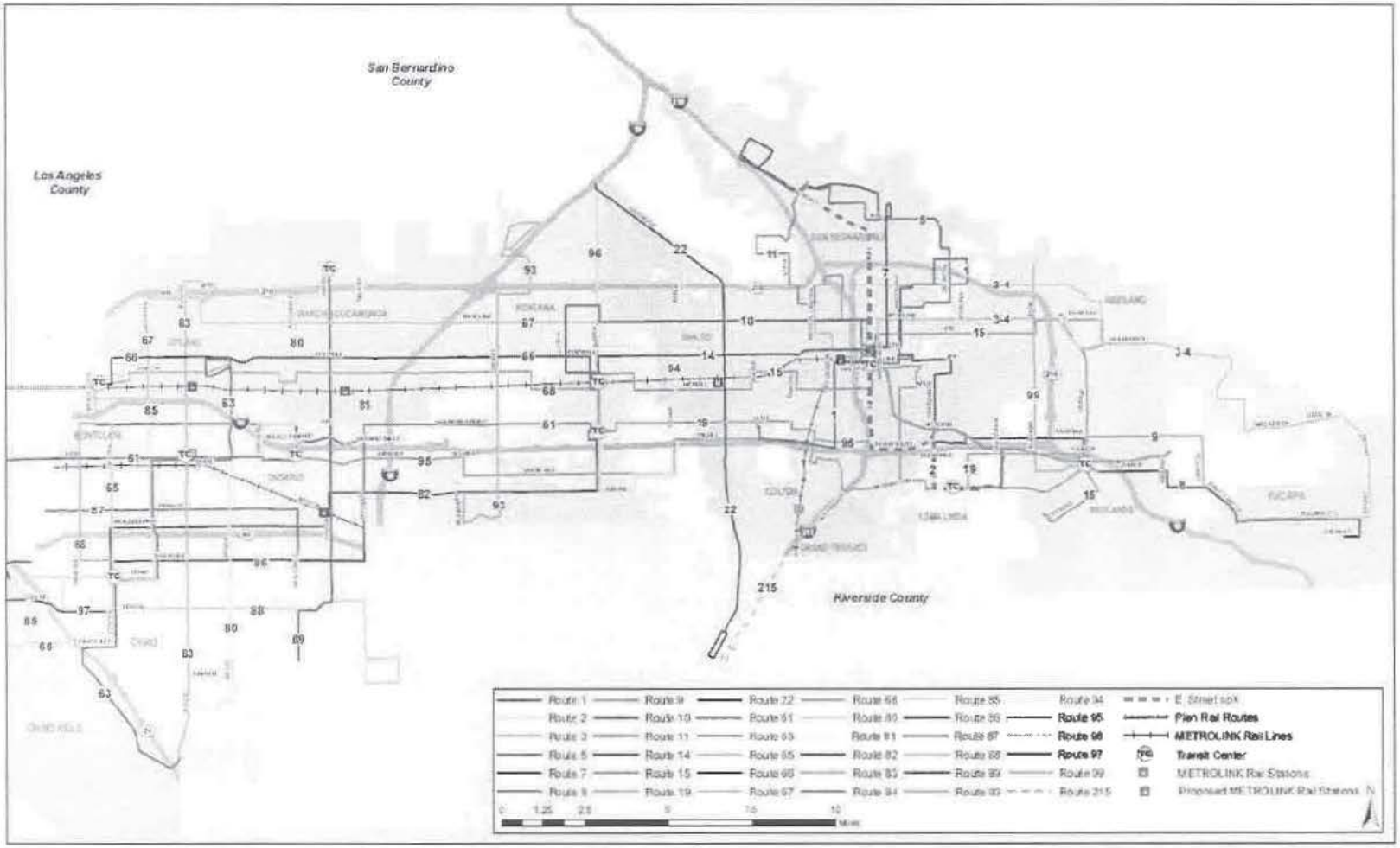
Baseline Transit Alternative

DRAFT LONG RANGE TRANSIT PLAN (LRTP) for the San Bernardino Valley

San Bernardino Associated Governments (SANBAG)
August 2009

Source: Parsons, 2009.

Figure 5-1: The Baseline Alternative



Plan Transit Alternative

DRAFT LONG RANGE TRANSIT PLAN (LRTP) for the San Bernardino Valley

San Bernardino Associated Governments (SANBAG)
August 2009

Source: Parsons, 2009.

Figure 5-2: The Plan Alternative

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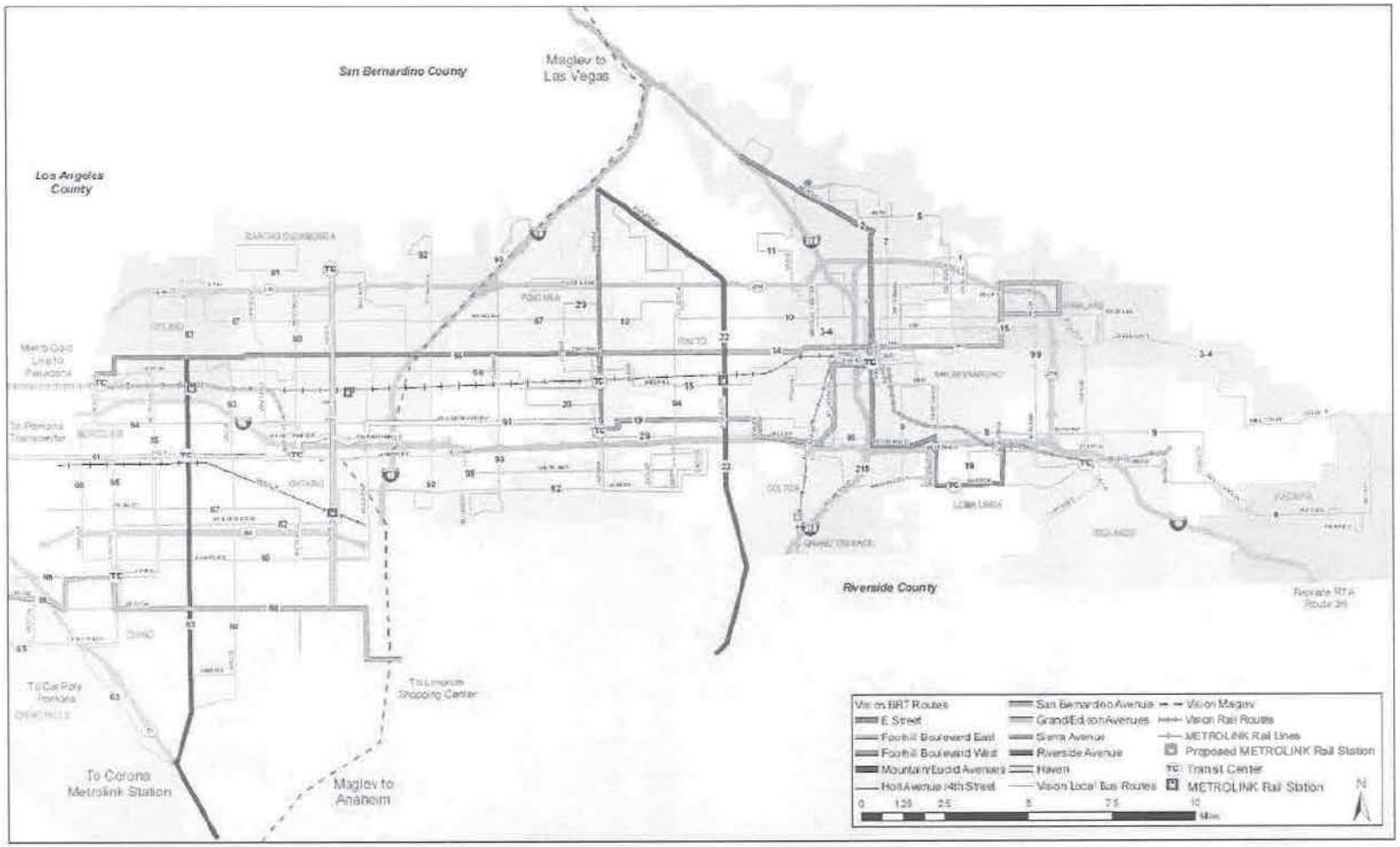
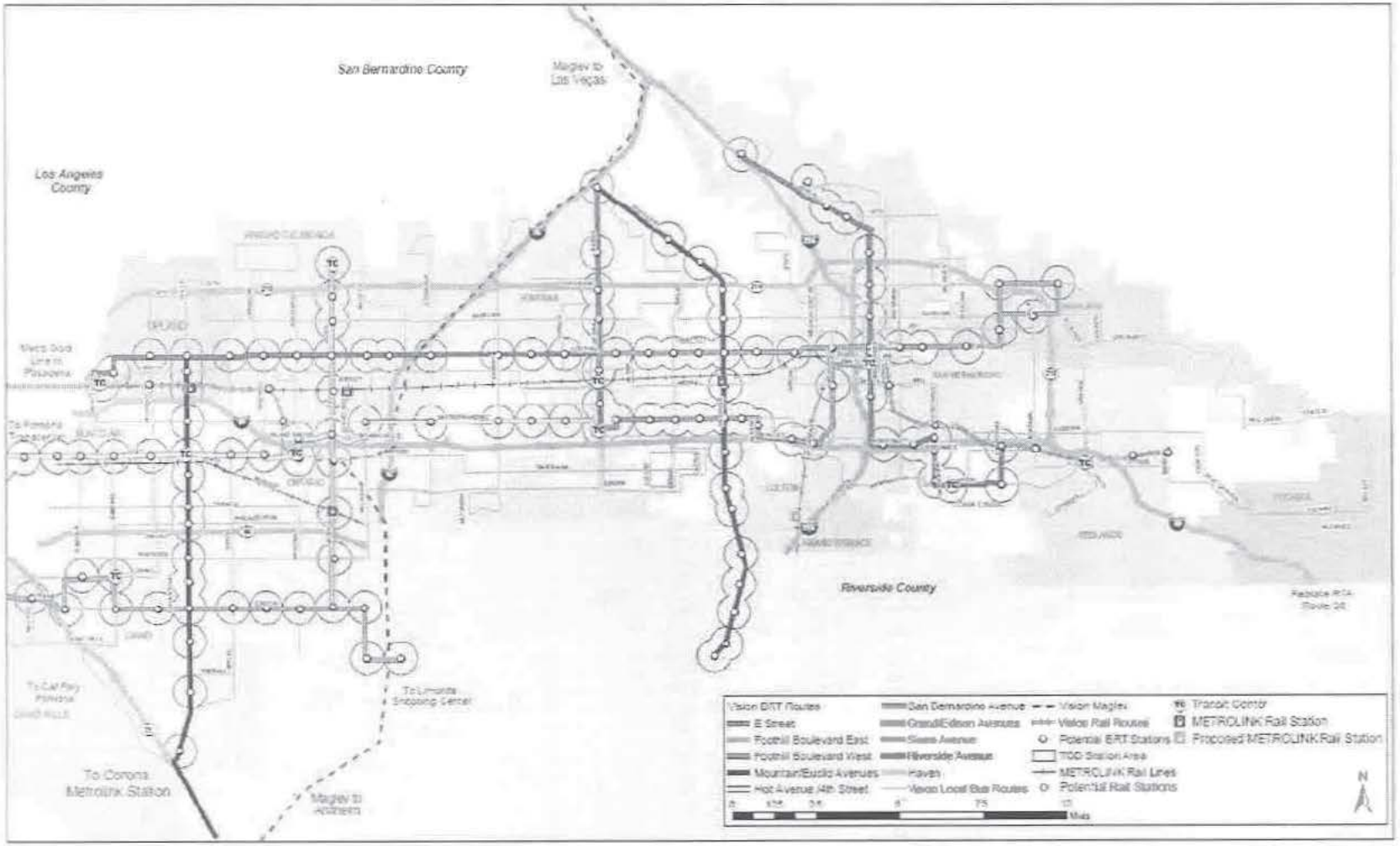


VISION Premium Transit Services
DRAFT LONG RANGE TRANSIT PLAN (LRTP) for the San Bernardino Valley

San Bernardino Associated Governments (SANBAG)
August 2009

Source: Parsons, 2009.

Figure 5-3: The Vision Alternative



VISION Sustainable Land Use Scenario

DRAFT LONG RANGE TRANSIT PLAN (LRTP) for the San Bernardino Valley

San Bernardino Associated Governments (SANBAG)
August 2009

Source: Parsons, 2009.

Figure 5-4: The Vision Sustainable Land Use Alternative

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Table 5-1: Mass Transit Service Assumptions for LRTP Alternatives

Transit Modes	2035 Baseline Alternative	2035 Planned Alternative	2035 Vision Alternative
Omnitrans Fixed Route Service	Omnitrans service similar to existing service with Routes 1, 3/4, 5, 7, 8, 9, 10, 11, and 14 realigned to new San Bernardino Transit Station	Omnitrans service reconfigured to create grid system of trunk routes supported by circulator routes; E Street BRT (sbX) Refined LPA operated at 5 minute headway - 16 stations over a total of 16 miles in length with 4 park-and-ride lots.	Same as 2035 Planned Alternative plus extension of E Street BRT to California Station of Redlands Rail line; Nine additional corridors operated with for BRT service.
Other Transit Operators	MARTA service from Lake Arrowhead to San Bernardino (new Midday round trip service); MARTA service from Big Bear to San Bernardino (Tripper service); RTA service as existing on Route 25; Add RTA Route 204 Riverside to Montclair; Foothill Transit "Silver Streak" service, other Foothill service as exiting to Montclair on Routes 187, 190, 480, 492, 690, and 699, and Foothill Transit service to Chino Hills on Route 497; No VVTA service from Victor Valley	Gold Line Extension to Montclair. VVTA service from Victor Valley to CSUSB and San Bernardino Transcenter; VVTA service from Victor Valley to Ontario and Fontana Metrolink; MARTA service as in Baseline; RTA service as in Baseline on Routes 25 and 204; Foothill Transit "Silver Streak" service and other services to Montclair on Routes 187, 190, 480, 492, 497, 690, and 699; and OCTA service from Irvine to Chino Hills on Route 758	Background bus is the same as the 2035 Planned Alternative, with minor route deviations to serve BRT stations; Gold Line is extended to Ontario Airport
Metrolink Commuter Rail	Metrolink service same as existing except that the line is extended to serve the new San Bernardino Transit Station; New Parking structure at existing San Bernardino Station	Metrolink service with headways improved to levels shown in the new draft Strategic Plan (18 minutes peak and 60 minutes off-peak on San Bernardino Line)	Same as 2035 Planned
Redlands Rail	No Rail service.	Rail service with 10 minute headways and three feeder routes.	Same as 2035 Planned, plus Extension to Mentone

Source: Hexagon, 2009.

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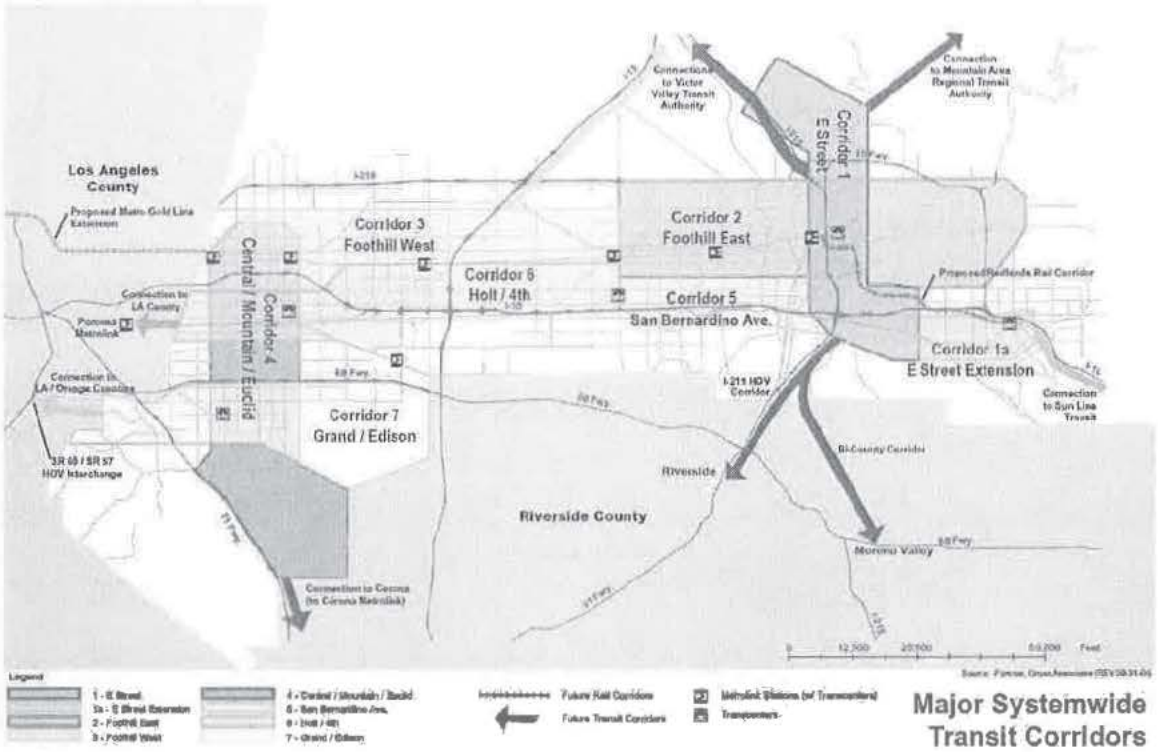

Source: Gruen Associates, 2004.

Figure 5-5: sbX Systemwide Plan

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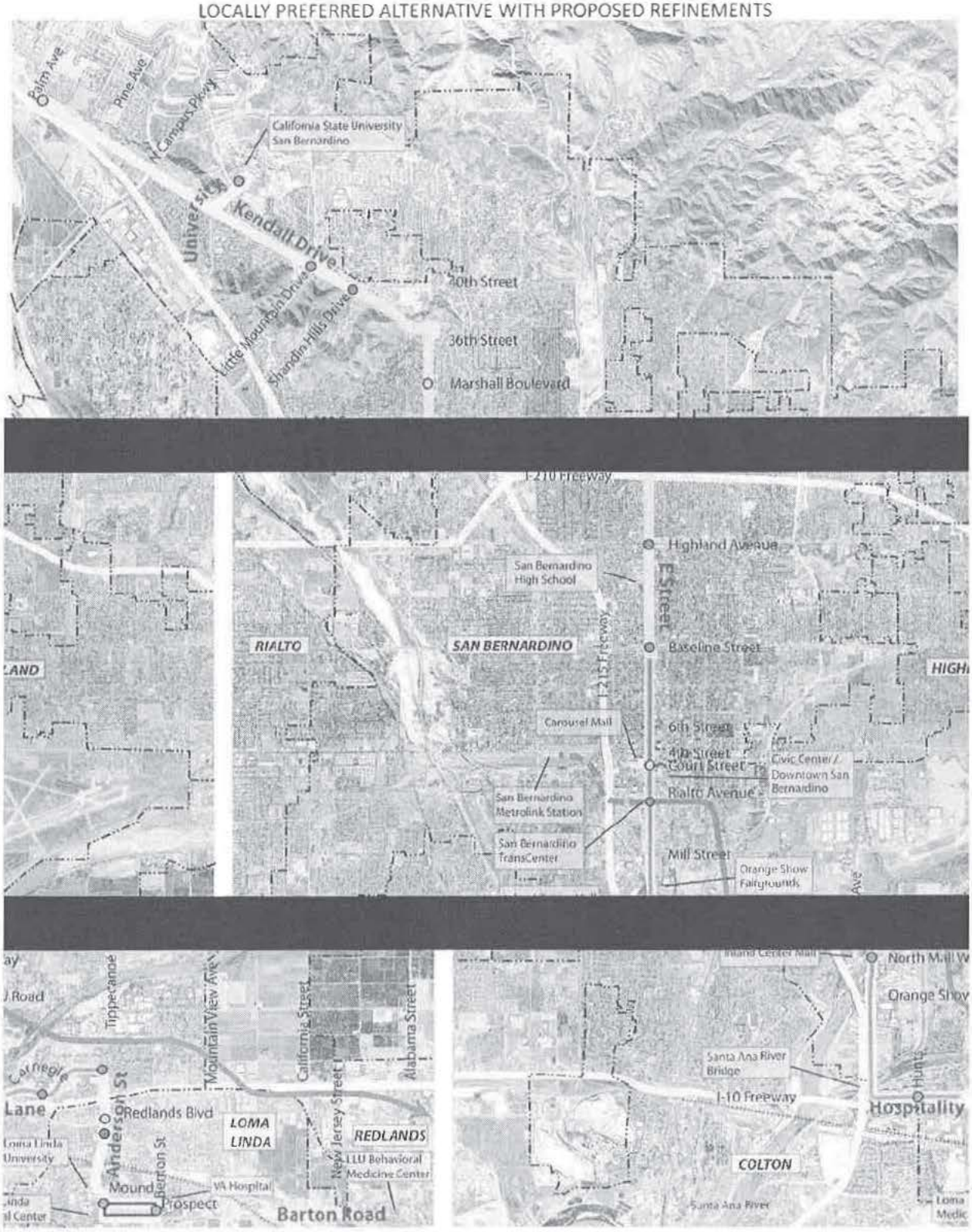
LOCALLY PREFERRED ALTERNATIVE WITH PROPOSED REFINEMENTS



Source: Gruen Associates, 2009.

Figure 5-6: E Street sbX

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OMNITRANS SRTP

The *Short Range Transit Plan (SRTP)* is a Comprehensive Operational Assessment that lays the foundation for increasing ridership, providing reliable service that reflects their projected financial situation.

SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY'S (SCRRA) STRATEGIC ASSESSMENT

The *SCRRA Strategic Assessment* is a conceptual plan for the development of the Metrolink commuter rail system through 2030. While the potential for increasing demand is clearly recognized, the plan prioritizes demand-driven service expansion with operational and fiscal realities.

Six Service Scenarios were developed for the *SCRRA Strategic Assessment*. Under each scenario, service levels, ridership and costs/benefits were projected for 2010, 2015, 2020 and 2030. Possible service levels were determined for each line. For the lines serving the Omnitrans service area:

- San Bernardino Line service levels would remain constant at 34 trains/weekday through 2010 and be increased to 48 in 2015.
- Inland Empire-Orange County Line service levels will rise from the current 12 trains/weekday to 20 in 2010 and 24 in 2015.
- Riverside Line service levels will rise from the current 12 trains/weekday to 22 by 2015.

If the increased service levels on the Inland Empire-Orange County Line are implemented, demand is expected to increase for enhanced feeder service to the San Bernardino Metrolink Station.

SANBAG COMPREHENSIVE TRANSPORTATION PLAN (CTP)

SANBAG is currently updating San Bernardino County's CTP to the year 2030[11]. Goals, objectives, performance indicators and alternative transportation scenarios are being defined and analyzed to create a preferred plan alternative. In cooperation with local agencies, this work has involved updating the socioeconomic forecasts to the year 2030 and the base year streets and highway network for the CTP traffic model.

The updated CTP will:

- Identify transportation improvements and strategies to enhance system performance and achieve emission reductions to meet air quality requirements; and
- Integrate goods movement strategies currently under development and serve as a basis for action programs to be implemented through the Congestion Management Program.

PUBLIC TRANSIT- HUMAN SERVICES TRANSPORTATION COORDINATION PLAN FOR SAN BERNARDINO COUNTY

The remote portions of the County face their own unique challenges and opportunities in developing their transit ridership. A recent study prepared by SANBAG entitled "San Bernardino County Public Transportation-Human Services Transportation Coordination Plan.

SANBAG in December of 2007 developed a *Public Transit-Human Services Transportation Coordination Plan* for San Bernardino County. This plan identified the short term mobility needs for six remote areas of the County and recommended strategies and priorities to

[11] http://www.SANBAG.ca.gov accessed 07/07/09

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help improve access to human necessities such as, medical appointments, trips to the pharmacy, social service agency visits, and grocery store shopping for the elderly, disabled and low-income individuals. With the reauthorization in 2005 of the federal transportation bill, SAFETEA-LU, new regulations specify that it is desirable for federal monies to be coordinated and consolidated in "a process through which representatives of different agencies and client groups work together to achieve any one or all of the following goals: more cost-effective service delivery; increased capacity to serve unmet needs; improved quality of service; and services which are more easily understood and accessed by riders." Moreover, FTA mandates that projects receiving FTA 5310, JARC or New Freedom funds be part of the plan adopted by SANBAG – addressing ways to improve service through coordination and/or consolidation.

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5.2 2035 BASELINE ALTERNATIVE

This alternative assumes all existing roadway and transit services will continue and be supplemented by improvements already funded.

PLANNED ROADWAY IMPROVEMENTS

For roadway improvements in the 2035 Baseline Alternative, the most significant funded projects are carpool lanes that will be constructed on the I-10 and I-215 freeways. The Valley also has a limited number of street improvements funded along with improvements to traffic signal systems. The highway network used for the analysis of the Baseline Alternative is based on the SCAG Baseline network, plus highway improvements in the San Bernardino Valley that are funded by the extension of Measure I.

No additional Rail service expansions are included. Bus service for the San Bernardino Valley in the Baseline Alternative is shown in Figure 5-1 and specified as follows:

- Omnitrans fixed route bus service is constrained to existing bus services operated as of January, 2009, which include 26 local bus routes and one express bus route. The planned E Street BRT service is specifically excluded from the Baseline Alternative in order to provide a baseline context for the transit ridership analysis.
- Foothill Transit service includes eight local and express bus routes providing transit service to either Montclair Transcenter or Chino Transit Center, including the "Silver Streak" service from the Montclair Transcenter to downtown Los Angeles.
- MARTA service includes 3 daily round trips connecting Big Bear Valley to San Bernardino and Highland, and four daily trips serving Lake Arrowhead to San Bernardino and Highland.
- OCTA services include Route 758, and express bus service between Irvine and Chino Transit Center.
- RTA service includes Route 25 from Riverside to Loma Linda, and Route 204 from Riverside to Montclair through Ontario Mills Mall.

Service frequencies for rail and bus routes serving the San Bernardino Valley in this alternative are summarized in Table 5-2.

Table 5-2: San Bernardino Valley Mass Transit Service Assumptions for the baseline Alternative

Operator	Route Number	Route Description	Service Type	Peak Headway	Off-Peak Headway
Omnitrans	1	Colton-Del Rosa	Local Bus	15	15
Omnitrans	2	Cal State-E St-Loma Linda	Local Bus	15	15
Omnitrans	3	Baseline-Highland-SB-Yucaipa	Local Bus	20	20
Omnitrans	5	Cal State-Del Rosa-Downtown SB	Local Bus	30	30
Omnitrans	7	N San Bern-Sierra-Downtown SB	Local Bus	30	60
Omnitrans	8	San Bernardino-Mentone-Yucaipa	Local Bus	60	60
Omnitrans	9	San Bernardino-Redlands-Yucaipa	Local Bus	60	60
Omnitrans	10	Fontana-Baseline-San Bernardino	Local Bus	30	30
Omnitrans	11	San Bernardino-Muscoy	Local Bus	30	30
Omnitrans	14	Fontana-Foothill-San Bernardino	Local Bus	15	15
Omnitrans	15	Fontana-Rialto-SB-Highlands-Redlands	Local Bus	30	30
Omnitrans	19	Redlands-Colton-Fontana	Local Bus	30	30
Omnitrans	20	Fontana-Metrolink	Local Bus	30	30
Omnitrans	22	S Rialto-N Rialto	Local Bus	30	30
Omnitrans	29	Fontana-Cedar-N Rialto	Local Bus	60	60
Omnitrans	61	Fontana-Ontario-Pomona	Local Bus	15	15
Omnitrans	63	Chino-Ontario-Upland	Local Bus	30	30
Omnitrans	65	Montclair-Chino Hills	Local Bus	30	30
Omnitrans	66	Fontana-Foothill-Montclair	Local Bus	30	30
Omnitrans	67	Montclair-Baseline-Fontana	Local Bus	60	60
Omnitrans	68	Chino-Montclair-Chaffey	Local Bus	30	30
Omnitrans	80	Montclair-Ontario-Chaffey	Local Bus	30	30
Omnitrans	81	Ontario-Ont. Mills-Chaffey	Local Bus	60	60
Omnitrans	82	Rancho-Fontana-Sierra Lakes	Local Bus	60	60
Omnitrans	83	Upland-Euclid-Chino	Local Bus	30	60
Omnitrans	215	San Bernardino-Riverside Express	Express Bus	30	30
Metrolink	-	San Bernardino Line	Commuter Rail	20	60
Metrolink	-	Riverside Line	Commuter Rail	36	-
Metrolink	-	IE/OC Line	Commuter Rail	45	120
Foothill	-	Silver Streak	Express Bus	12	15
Foothill	187	Montclair-Pasadena	Local Bus	20	20
Foothill	197	Montclair-Pomona	Local Bus	30	60
Foothill	480	Montclair-Los Angeles	Local Bus	30	30
Foothill	492	Montclair-El Monte	Local Bus	30	30
Foothill	497	Chino-Los Angeles Express	Express Bus	15	-
Foothill	690	Montclair-Pasadena Express	Express Bus	30	-
Riverside	25	Riverside-Loma Linda	Local Bus	60	60
Riverside	204	Riverside-Montclair	Express Bus	45	-
MARTA	-	Lake Arrowhead Off Mountain	Express Bus	120	120
MARTA	-	Big Bear Off Mountain	Express Bus	180	-
OCTA	758	Chino-Irvine Express	Express Bus	90	-

Source: Hexagon, 2009.

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By definition, the 2035 Baseline Alternative includes only existing plus funded transportation because ridership is holding somewhat steady in recent years and current funding is limited for service improvements.

Boarding on northeast side of E Street/4th Street

Metrolink has prepared a Strategic Assessment to chart expansion of service through 2035. At this time, however, only the current level of service is funded. For the purposes of this study, all alternatives tested by the model will assume that all Metrolink trips will serve both the existing station and the new one at the proposed San Bernardino Transcenter at Rialto and E Streets. The Baseline Alternative also assumes increases in service between now and year 2030 as shown in internal Metrolink documents, even though those service levels have not been adopted or funded. In this way the need for commuter rail service, Park and Ride spaces and other features can be assessed.

There will be, however, some significant changes in transit operations in the San Bernardino Valley. These include:

- **New San Bernardino Transit Station.** Omnitrans plans to move their downtown transfer function from the temporary but long-lived 4th Street location to a new facility at Rialto and E Street. Omnitrans has completed the purchase of the land for the new facility. This project is now in the design phase and it is scheduled to be ready for transit operations in 2012, and for completion of the depot in 2013.

  The new San Bernardino Transit Station will become the major transfer point for all the various modes of transit in the area. The San Bernardino Transit Station will serve as the major transfer site for Omnitrans' routes serving the East Valley. Routes approaching downtown San Bernardino from the south will be rerouted directly into the new facility before heading back to their current route. Routes approaching downtown from the north will be extended down to Rialto.

  Additionally, the San Bernardino Transit Station will serve as the site of a new Metrolink station, with the trips now terminating at the San Bernardino Metrolink Station (Old Santa Fe Depot) extended to the new Transit Station. The planned E Street BRT and Redlands Rail services (see Plan Alternative) will also serve the San Bernardino Transit Station.

Other transit services featured in the 2035 Baseline Alternative include:

- **Metrolink Commuter Rail** – Metrolink service on the San Bernardino Line terminates (or originates) at the existing San Bernardino Station on 3rd Street west of downtown San Bernardino. The City plans to build a 350 space parking structure on site to relieve overcrowding. No additional service to this station is planned. However, when the new San Bernardino Transit Station is built, the commuter train trips will be extended to the new station on Rialto Avenue and E Street.

The Baseline Alternative also includes a constrained level of transit service in the

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Victor Valley, commensurate with service described in the Short Range Transit Plan.

5.3 2035 Plan Alternative

By definition, this alternative is an enhancement of the 2035 Baseline Alternative. In this alternative, the transit services included in the 2035 Baseline Alternative are supplemented with transit improvements beyond what is currently funded. It adds all feasible major transit investments and facility improvements in the Valley that are considered to be in the detailed project development pipeline. These include increases in levels of service to keep pace with additional ridership due to population and employment growth and to maintain headways in light of reduced bus speeds resulting from increased levels of traffic congestion.

The service plan for the 2035 Plan Alternative includes a redesign of many trunk routes in the Omnitrans service area which will result in a grid system of local transit routes serving much of the San Bernardino Valley. The Omnitrans routes included in this alternative are displayed in Figure 5-7.

The travel demand model was used to assess the ridership potential of each transit route, and an equilibration procedure was used to adjust the service frequencies.

The LRTP Planned alternative also includes:

- **Redlands Rail Line plus supporting shuttles.** The proposed Redlands Rail Line is a partially funded east-west rail line with one end in the E Street Corridor (see Figure 5-8). The rail line has been planned by SANBAG as a key connection between Redlands and central San Bernardino. The *Redlands Passenger Rail Station Area Plan* identifies nine Redlands Passenger Rail stations with TOD along the former BNSF Redlands Subdivision right-of-way, shown in Figure 5-8. Possible station sites include the proposed San Bernardino Transit Station, Mill Street, Orange Show Road, Tippecanoe Avenue, Mountain View Avenue, California Street, Alabama Street, New York Street, Downtown Redlands (with three possible alternatives), and Grove Street.

  The service is envisioned to operate with Diesel Multiple Unit (DMU) trains on 7.5 minute headways. The western terminus will be the new San Bernardino Transit Station at Rialto Avenue and E Street. Shuttle service between specific stations and San Bernardino International Airport, Loma Linda Medical University and Medical Center, Loma Linda VA Hospital, University of Redlands, Crafton Hills College and the planned Yucaipa Transcenter may be warranted.

- The introduction of this rail passenger service will impact east-west transit ridership in the East Valley and also require East Valley service restructuring as feeders around the final Redlands Passenger Rail stations. TOD development proposed around each station will concentrate densities and activities, potentially generating increased local transit demand.

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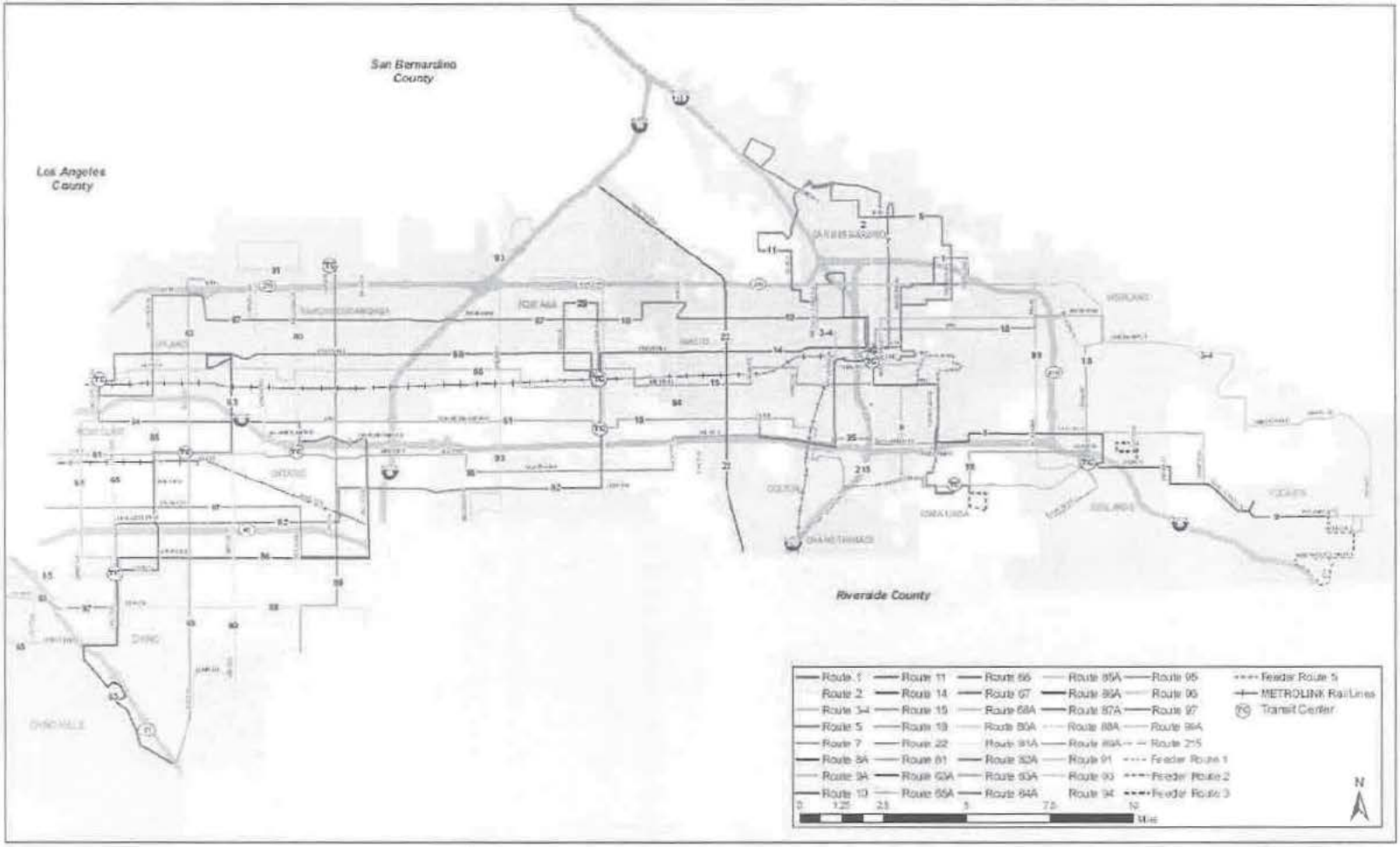
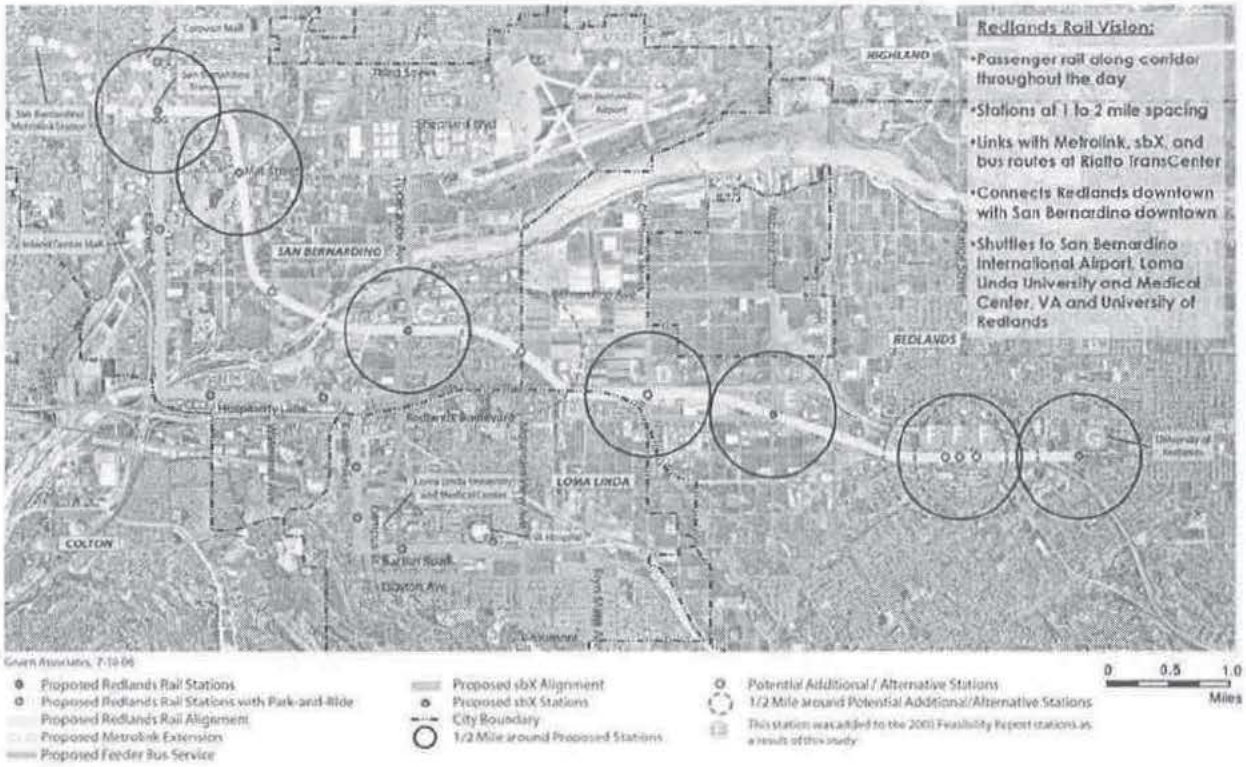


Plan Local Bus Services Year 2035
DRAFT LONG RANGE TRANSIT PLAN (LRTP) for the San Bernardino Valley

San Bernardino Associated Governments (SANBAG)
August 2009

Source: Parsons, 2009.

Figure 5-7: Planned Omnitrans bus routes



Source: Gruen Associates, 2006.

Figure 5-8: Redlands Rail Alignment and Station Locations

In addition to the Redlands Passenger Rail Service, SANBAG is also examining the transit-oriented development of the proposed extension.

The plan was released in November 2006 and has been presented to the three involved cities. Recommendations for transit-oriented zoning changes are set out for the proposed stations. Some aspects of the extension remain to be worked out, including the location of a station in downtown Redlands.

At the April 4, 2007 SANBAG Board meeting, the Board decided to continue studying the passenger rail extension. While the extension is still several years away, approval was given for more in-depth studies, and for SANBAG to prepare an application for $75 million in federal funding. With approval of the plan, the Cities of San Bernardino, Loma Linda, and Redlands will be asked to start considering land use changes around the proposed stations, such as denser housing, commercial development, pedestrian and bicycle paths and other amenities.

E Street Bus Rapid Transit (sbX)

- Of the Seven Corridors identified in the 2004 Omnitrans Systemwide Plan, the sbX E Street BRT Corridor emerged as the highest priority transit Corridor in the San Bernardino Valley. The 16 mile BRT has 16 stations and 4 park-and-ride facilities at key locations along the corridor. It is

scheduled for Construction in 2010 and revenue operation in 2012.

The sbX E Street Corridor BRT Project will connect the northern portion of the City of San Bernardino with the City of Loma Linda (see Figure 5-2). The proposed transit route would begin in the vicinity of Palm Avenue and Kendall Drive and terminate in the vicinity of the Veterans Administration Hospital located at Barton Road and Benton Street.

The sbX service will operate on 5-minute headways throughout the day. Headways will be 10 minutes in the evening hours of weekdays. sbX will be supported by a system of transit services. This system includes shuttles at CSUSB on the northern end of the Corridor and in Loma Linda on the southern end in addition to the shuttles which will feed the Redlands Rail Line. The sbX service on E Street will be supported by a continuation of Route 2 service as a "shadow service" serving "in-between" bus stops. The sbX service will be enhanced by priority treatment at intersections and will operate both in "mixed traffic" and in its own exclusive lane.

The planned Alternative also includes:

- **Higher Metrolink Commuter Rail 2030 Service Levels.** Metrolink commuter rail service will be enhanced from that shown in the 2035 Baseline Alternative with additional peak and off-peak service.
- **Metro Gold Line Extension to Montclair-** Currently, the Metro Gold Line train service operates from L.A. Union Station to Pasadena. An extension east along the I-210 to San Bernardino County (a line to Montclair is in the detailed corridor planning stages).

The Metro Gold Line Authority is proposing to extend the current Gold Line Light Rapid Transit system 16 miles east from Pasadena, where it currently ends, to Montclair (Figure 5-9). Preliminary Engineering Studies are underway and federal funding for construction is expected, even though the alignment faces stiff competition in the City of Los Angeles from other proposed transit alignments. The first segment of the Gold Line extension, from Arcadia to Azusa, is scheduled for completion in 2013. The second phase, to the Montclair Transcenter, is currently undertaking an extensive transit-oriented development (TOD) study, evaluating stations along the proposed 16 mile extension. Each city along the corridor is at different development stages in regards to TOD readiness and acceptance.

The TOD analysis is particularly relevant to the LRTP as the third phase is proposed to connect the Montclair Transcenter to the Ontario Airport. Montclair has recently completed the *North Montclair Specific Plan*, which significantly increases the range of uses and proposed densities in and around the Transcenter into the area in order to build on the existing commercial center and support transit initiatives, such as the Gold Line extension and Omnitrans efforts to enhance transit connections to other parts of the San Bernardino Valley. Service to the Ontario Airport would support a unique opportunity to create a multi-modal transit center.

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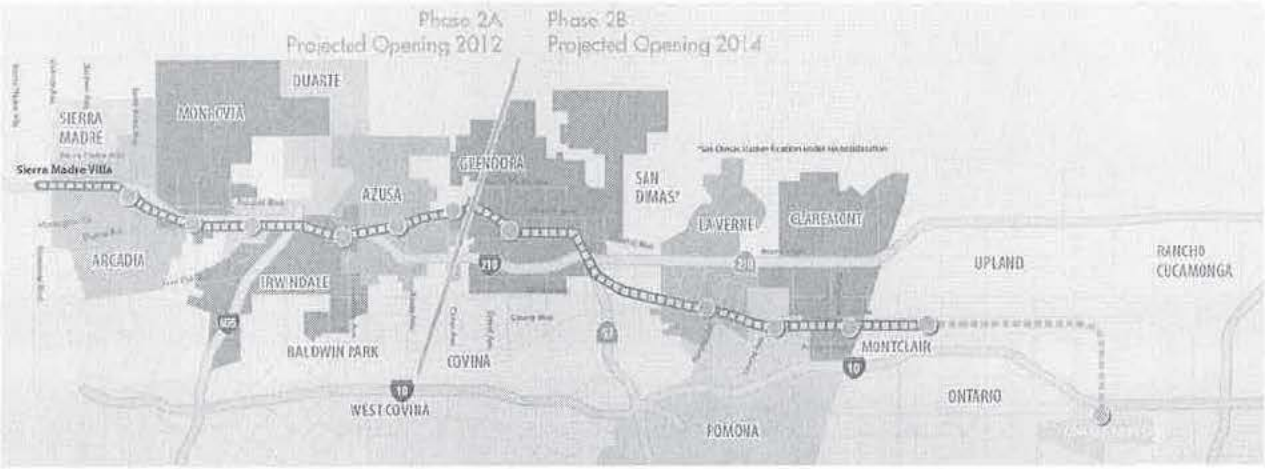

Source: Metro Gold Line Foothill Extension Construction Authority, 2009.

Figure 5-9: Metro Gold Line Extension

- **Loma Linda Shuttle** – The disbursed nature of the medical and educational facilities in the City of Loma Linda and the increasing need for people to move between those facilities will support a Loma Linda circulator service. The circulator will serve major facilities, large parking areas and major transit stops.
- **California State University-San Bernardino (CSUSB) Shuttle** – CSUSB, anchoring the northern end of the E Street transit Corridor will provide a circulator to move people from remote parking lots to the center of campus and the transit station as well as around the large campus.

Other bus operators – Foothill Transit serving the San Gabriel Valley, Mountain Area Regional Transit Authority (MARTA) serving Big Bear and Lake Arrowhead, Orange County transportation Authority (OCTA) and Riverside Transit Agency – operate bus routes that serve the San Bernardino Valley. These bus routes are included in the 2035 Baseline Alternative and will remain in place for the 2035 Plan Alternative.

The 2035 Baseline Alternative does not provide transit connections to two significant population centers adjacent to the San Bernardino Valley – the Victor Valley to the north and the Coachella Valley to the east. Victor Valley Transit Authority provided service into the San Bernardino Valley until June 2005. Given the projected population growth in the Victor Valley, the 2035 Plan Alternative assumes that funding will be found to implement such service before 2035.

The 2035 Plan Alternative includes two transit lines between the Victor Valley and the San Bernardino Valley – one route serving Cal State University – San Bernardino and the E Street BRT line, and another route serving the Ontario Mills Mall and Rancho Cucamonga Metrolink Station.

The 2035 Plan Alternative also includes a proposed bus service between the Coachella Valley and hospital services in Loma Linda. This service would be operated by Sunline Transit Agency, and would provide transfer services to the San Bernardino Valley for Morongo Basin residents.

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The analysis of the 2035 Plan Alternative began by coding all transit routes in the Omnitrans system with high service frequencies – 15-minute peak and off-peak period headways. Iterative model runs (equilibration) were used to fine tune the headways to provide cost-effective service with high seating probability throughout the system. The results of this equilibration process, and all other service frequencies for transit routes serving the San Bernardino Valley for the 2035 Plan Alternative, are displayed in Table 5-3.

Table 5-3: San Bernardino Valley Route Service Frequencies in the Plan Alternative

Operator	Route Number	Route Description	Service Type	Peak Headway	Off-Peak Headway
Omnitrans	301	E Street sbX	BRT	5	10
Omnitrans	1	Colton-Del Rosa	Local Bus	10	15
Omnitrans	2	Cal State-E St-Loma Linda	Local Bus	20	30
Omnitrans	3	Baseline-Highland-SB-Yucaipa	Local Bus	30	60
Omnitrans	4	Baseline-Highland-San Bernardino	Local Bus	15	20
Omnitrans	5	Cal State-Del Rosa-Downtown SB	Local Bus	30	30
Omnitrans	7	N San Bern-Sierra-Downtown SB	Local Bus	15	30
Omnitrans	8	San Bernardino-Mentone-Yucaipa	Local Bus	15	30
Omnitrans	9	San Bernardino-Redlands-Yucaipa	Local Bus	20	30
Omnitrans	10	Fontana-Baseline-San Bernardino	Local Bus	10	20
Omnitrans	11	San Bernardino-Muscoy	Local Bus	30	30
Omnitrans	14	Fontana-Foothill-San Bernardino	Local Bus	10	15
Omnitrans	15	Fontana-Rialto-SB-Highlands-Redlands	Local Bus	10	15
Omnitrans	19	Redlands-Colton-Fontana	Local Bus	15	15
Omnitrans	22	S Rialto-N Rialto	Local Bus	15	20
Omnitrans	61	Fontana-Ontario-Pomona	Local Bus	10	20
Omnitrans	63	Chino-Ontario-Upland	Local Bus	30	30
Omnitrans	65	Montclair-Chino Hills	Local Bus	15	30
Omnitrans	66	Fontana-Foothill-Montclair	Local Bus	15	20
Omnitrans	67	Montclair-Baseline-Fontana	Local Bus	15	30
Omnitrans	68	Chino-Montclair-Chaffey	Local Bus	15	30
Omnitrans	80	Montclair-Ontario-Chaffey	Local Bus	20	30
Omnitrans	81	Ontario-Ont. Mills-Chaffey	Local Bus	60	60
Omnitrans	82	Rancho-Fontana-Sierra Lakes	Local Bus	20	30
Omnitrans	83	Upland-Euclid-Chino	Local Bus	15	30
Omnitrans	84	San Bernardino Street E/W Corridor	Local Bus	60	60
Omnitrans	85	Mountain Avenue N/S Corridor	Local Bus	20	30
Omnitrans	86	Chino-Ontario (Riverside/Milliken)	Local Bus	60	60
Omnitrans	87	Francis Avenue E/W Corridor	Local Bus	60	0
Omnitrans	88	Edison Avenue E/W Corridor	Local Bus	30	60
Omnitrans	89	Haven Avenue N/S Corridor	Local Bus	20	60
Omnitrans	93	Cherry Avenue N/S Corridor	Local Bus	60	0
Omnitrans	94	Cedar/Ayala N/S Corridor	Local Bus	30	60
Omnitrans	95	Santa Ana Avenue E/W Corridor	Local Bus	60	0
Omnitrans	96	Sierra Avenue N/S Corridor	Local Bus	30	30

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Operator	Route Number	Route Description	Service Type	Peak Headway	Off-Peak Headway
Omnitrans	97	Chino-Industry Metrolink	Local Bus	60	0
Omnitrans	98	Yucaipa-Beaumont	Local Bus	30	30
Omnitrans	99	Palm/Alabama N/S Corridor	Local Bus	30	60
Omnitrans	215	San Bernardino-Riverside Express	Express Bus	15	30
Metrolink	-	Riverside Line	Commuter Rail	23	240
Metrolink	-	San Bernardino Line	Commuter Rail	18	60
Metrolink	-	IE/OC Line	Commuter Rail	20	60
Redlands	-	Redlands Rail	DMU Rail	10	10
Redlands	101	Redlands Rail Feeder Bus #1	Feeder Bus	30	30
Redlands	102	Redlands Rail Feeder Bus #2	Feeder Bus	30	30
Redlands	104	Redlands Rail Feeder Bus #4	Feeder Bus	20	20
MTA	-	Gold Line	Light Rail	5	10
Foothill	187	Montclair-Pasadena	Local Bus	20	20
Foothill	197	Montclair-Pomona	Local Bus	30	60
Foothill	480	Montclair-Los Angeles	Local Bus	30	30
Foothill	492	Montclair-El Monte	Local Bus	30	30
Foothill	497	Chino-Los Angeles Express	Express Bus	15	-
Foothill	690	Montclair-Pasadena Express	Express Bus	30	-
Foothill	-	Silver Streak	Express Bus	12	15
Riverside	204	Riverside-Montclair	Express Bus	45	-
Riverside	25	Riverside-Loma Linda	Local Bus	60	60
MARTA	-	Big Bear Off Mountain	Express Bus	180	-
MARTA	-	Lake Arrowhead Off Mountain	Express Bus	120	120
OCTA	758	Chino-Irvine Express	Express Bus	90	-
Sun Line	-	Coachella-Loma Linda Express	Express Bus	120	120

Source: Hexagon, 2009.

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5.4 2035 Vision Alternative

The 2035 Vision Alternative, shown in Figure 5-3 has the same background transit services as those defined in the 2035 Plan Alternative, with minor deviations to serve specific transfer locations.

The transit service assumptions for the LRTP Vision Alternative are shown in Table 5-4. The 2035 Vision Alternatives described below feature all of the transit and roadway elements that are included in the 2035 Planned LRTP Alternative. To this level of transit, they add various additional modes and alignments. In conjunction with the System-wide plan, the 10 transit corridors identified are presented along with preliminary alignment alternatives to be further analyzed. The Omnitrans routes included in the Vision Alternative are displayed in Figure 5-3.

Table 5-4: San Bernardino Valley Route Service Frequencies in 2035 Vision Alternative

Operator	Route Number	Route Description	Service Type	Peak Headway	Off-Peak Headway
Omnitrans	301	E Street sbX Redlands Extension	BRT	5	10
Omnitrans	302	Foothill East sbX	BRT	5	10
Omnitrans	303	Foothill West sbX - Foothill	BRT	10	15
Omnitrans	304	Euclid sbX	BRT	10	15
Omnitrans	305	San Bernardino Avenue sbX - San Bernardino	BRT	10	10
Omnitrans	306	Holt/Fourth sbX	BRT	10	15
Omnitrans	307	Grand/Edison sbX	BRT	10	20
Omnitrans	308	Sierra sbX	BRT	10	20
Omnitrans	309	Riverside sbX	BRT	10	10
Omnitrans	310	Haven sbX	BRT	10	15
Omnitrans	1	Colton-Del Rosa	Local Bus	10	15
Omnitrans	2	Cal State-E St-Loma Linda	Local Bus	20	30
Omnitrans	3	Baseline-Highland-SB-Yucaipa	Local Bus	60	60
Omnitrans	4	Baseline-Highland-San Bernardino	Local Bus	20	20
Omnitrans	5	Cal State-Del Rosa-Downtown SB	Local Bus	20	30
Omnitrans	7	N San Bern-Sierra-Downtown SB	Local Bus	20	30
Omnitrans	8	San Bernardino-Mentone-Yucaipa	Local Bus	15	30
Omnitrans	9	San Bernardino-Redlands-Yucaipa	Local Bus	30	30
Omnitrans	10	Fontana-Baseline-San Bernardino	Local Bus	15	30
Omnitrans	11	San Bernardino-Muscoy	Local Bus	30	30
Omnitrans	14	Fontana-Foothill-San Bernardino	Local Bus	20	20
Omnitrans	15	Fontana-Rialto-SB-Highlands-Redlands	Local Bus	10	15
Omnitrans	19	Redlands-Colton-Fontana	Local Bus	20	20
Omnitrans	22	S Rialto-N Rialto	Local Bus	20	30
Omnitrans	61	Fontana-Ontario-Pomona	Local Bus	20	30
Omnitrans	63	Chino-Ontario-Upland	Local Bus	30	30
Omnitrans	65	Montclair-Chino Hills	Local Bus	15	30
Omnitrans	66	Fontana-Foothill-Montclair	Local Bus	20	30
Omnitrans	67	Montclair-Baseline-Fontana	Local Bus	20	30
Omnitrans	68	Chino-Montclair-Chaffey	Local Bus	20	30
Omnitrans	80	Montclair-Ontario-Chaffey	Local Bus	15	30
Omnitrans	81	Ontario-Ont. Mills-Chaffey	Local Bus	60	60
Omnitrans	82	Rancho-Fontana-Sierra Lakes	Local Bus	20	30
Omnitrans	83	Upland-Euclid-Chino	Local Bus	30	30
Omnitrans	84	San Bernardino Street E/W Corridor	Local Bus	30	60
Omnitrans	85	Mountain Avenue N/S Corridor	Local Bus	20	30
Omnitrans	86	Chino-Ontario (Riverside/Milliken)	Local Bus	30	60
Omnitrans	87	Francis Avenue E/W Corridor	Local Bus	60	60
Omnitrans	88	Edison Avenue E/W Corridor	Local Bus	30	30
Omnitrans	89	Haven Avenue N/S Corridor	Local Bus	30	30
Omnitrans	91	Vineyard/Carnelian N/S Corridor	Local Bus	60	0
Omnitrans	93	Cherry Avenue N/S Corridor	Local Bus	30	60
Omnitrans	94	Cedar/Ayala N/S Corridor	Local Bus	20	30
Omnitrans	95	Santa Ana Avenue E/W Corridor	Local Bus	60	0

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Operator	Route Number	Route Description	Service Type	Peak Headway	Off-Peak Headway
Omnitrans	96	Sierra Avenue N/S Corridor	Local Bus	30	60
Omnitrans	97	Chino-Industry Metrolink	Local Bus	30	60
Omnitrans	98	Yucaipa-Beaumont	Local Bus	30	30
Omnitrans	99	Palm/Alabama N/S Corridor	Local Bus	60	60
Omnitrans	215	San Bernardino-Riverside Express	Express Bus	30	60
Metrolink	-	Riverside Line	Commuter Rail	23	240
Metrolink	-	San Bernardino Line	Commuter Rail	18	60
Metrolink	-	IE/OC Line	Commuter Rail	20	60
Redlands	-	Redlands Rail	DMU Rail	10	10
Redlands	101	Redlands Rail Feeder Bus #1	Feeder Bus	30	30
Redlands	102	Redlands Rail Feeder Bus #2	Feeder Bus	30	30
Redlands	104	Redlands Rail Feeder Bus #4	Feeder Bus	20	20
MTA	-	Gold Line	Light Rail	5	10
Foothill	187	Montclair-Pasadena	Local Bus	20	20
Foothill	197	Montclair-Pomona	Local Bus	30	60
Foothill	480	Montclair-Los Angeles	Local Bus	30	30
Foothill	492	Montclair-El Monte	Local Bus	30	30
Foothill	497	Chino-Los Angeles Express	Express Bus	15	-
Foothill	690	Montclair-Pasadena Express	Express Bus	30	-
Foothill	-	Silver Streak	Express Bus	12	15
Riverside	204	Riverside-Montclair	Express Bus	45	-
Riverside	25	Riverside-Loma Linda	Local Bus	60	60
MARTA	-	Big Bear Off Mountain	Express Bus	180	-
MARTA	-	Lake Arrowhead Off Mountain	Express Bus	120	120
OCTA	758	Chino-Irvine Express	Express Bus	90	-
Sun Line	-	Coachella-Loma Linda Express	Express Bus	120	120

Source: Hexagon, 2009.

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BRT Corridors

Corridor 1: E Street

Over the past four years, the sbX E Street Corridor has evolved as the highest priority corridor identified in the System-Wide Transit Corridor Plan for the San Bernardino Valley, through the Alternatives Analysis and selection of the Locally Preferred Alternative (LPA), through the FTA Small Starts rating process, to the current Project Development phase. The sbX E Street Corridor BRT Project shown in Figure #-# is a proposed approximately 16-mile long BRT project that will connect the northern portion of the City of San Bernardino with the City of Loma Linda. The BRT alignment starts south of Kendall Drive and Palm Avenue and continues south along Kendall Drive into CSUSB. From CSUSB it returns to Kendall Drive south to E Street where it passes through Downtown San Bernardino to Hospitality Lane. The route then heads east along Hospitality Lane, and then south along Tippecanoe Avenue and Anderson Street to Barton Road. The corridor then heads north on Benton Street and West on Prospect Avenue back to Anderson Street, completing a loop.

Possible future transit connections with the E Street Corridor from outside of the San Bernardino Valley include a Metrolink

connection at the planned downtown San Bernardino Transcenter site, connections to the Victor Valley, Mountain Area Regional Transit Authority, Sun Line Transit, Riverside County (I-215 HOV Corridor and the Bi-County Corridor) and the proposed Redlands Rail Line.

Corridor 2: Foothill Boulevard East

The corridor centered on Foothill Boulevard runs from the Los Angeles County line past San Bernardino International (SBI) Airport and the Highland Plaza area. This corridor has been divided into two segments for easier study and for a phased implementation of future premium transit services. Corridor 2 is the eastern part of the Foothill Corridor. It runs from the Fontana Metrolink station past SBI, with the northern boundary running along Highland Avenue and the southern boundary at Randall and San Bernardino Avenues. Corridor 2 overlaps Corridor 1 (E Street) in downtown San Bernardino. Major activity centers in Corridor 2 include the Fontana Metrolink Station (a major transfer point for Omnitrans riders), the San Bernardino Civic Center, the 4th Street Transit Mall, Highland Plaza, and SBI. As shown in Figure 1-1, possible future transit connections are envisioned from the Victor Valley on I-215.

Potential Alignment

sbX Route 2 is an east/west BRT route with a western terminal station at the Fontana Metrolink Station. This route follows Foothill Blvd to 5th Street in San Bernardino and then heads north on Victoria Avenue, west on Highland Avenue, south on Boulder Avenue, and east on Baseline Avenue to the eastern terminal station at Palm Street (in Highland), and then closing the loop by heading south on Victoria Avenue This 16 mile alignment includes 17 transit stations and two park-and-ride lots. Four of the stations are optional stations, subject to elimination depending on the model-generated ridership potential. The three eastern-most stations are located on a loop, the only loop on any of the ten alignment alternatives studied in the preliminary model run.

Corridor 3: Foothill Boulevard West

Corridor 3 contains the western part of the Foothill Boulevard Corridor. This corridor is anchored on the west by the Montclair Transcenter, which includes the Montclair Metrolink Station and a major transit transfer hub, and on the east by the Fontana Metrolink Station. Other major activity centers include San Antonio Community Hospital, Montclair Plaza, and new developments in the City of Rancho Cucamonga including Victoria Gardens Mall.

Possible regional connections to Corridor 3 from the Victor Valley would occur along I-15 and inter-county transit connections to Los Angeles exist from the Montclair Transcenter and Metrolink Stations. In the future, a possible extension of the Metro Rail Gold Line along the I-210 will reach Corridor 3 at the Montclair Transcenter.

Potential Alignment

sbX Route 3 is an east/west BRT route with a western terminal station at the Montclair Transcenter. This alignment alternative follows Foothill Boulevard through the cities of Upland, Rancho Cucamonga and Fontana to an eastern terminal station at the Fontana Metrolink Station. The alignment connects with Corridor 4 Mountain/Euclid Avenue as well as Corridor 10 Haven Avenue. This alignment includes 15 transit stations and three park-and-ride lots. Four of the stations studied are optional stations subject to elimination.

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