Lodi General Plan Update

Working Paper #1

Land Use, Transportation, Environment, and Infrastructure

July 2007

Draft

Opportunities & Challenges Assessment

Lodi General Plan Update

Working Paper #1

Land Use, Transportation, Environment, and Infrastructure

July 2007

Draft

Prepared By

DYETT & BHATIA
Urban and Regional Planners

Fehr & Peers
Environmental Science Associates
West Yost Associates
Mundie & Associates

Table of Contents

List of Tables

List of Figures

1 Introduction and Purpose

Lodi's current General Plan was adopted in 1991 and is nearing its 2007 horizon. In fall 2006—Lodi's centennial year—the City initiated a comprehensive update of the General Plan. While many of the 1991 Plan's policies are still relevant, the context and the setting on which the General Plan was based have changed since its preparation 15 years ago. The General Plan Update is an exciting opportunity for community members to explore long-term goals and development potentials for the city.

As part of the General Plan Update process, four working papers documenting existing conditions, trends, and planning issues and implications are being prepared. Topics covered in the papers include:

- *Working Paper #1: Land Use, Transportation, Environment, and Infrastructure* (this report);
- *Working Paper #2: Urban Design and Livability*; and
- *Working Paper #3: Growth and Economic Development Strategy*;
- *Working Paper #4: Greenbelt*

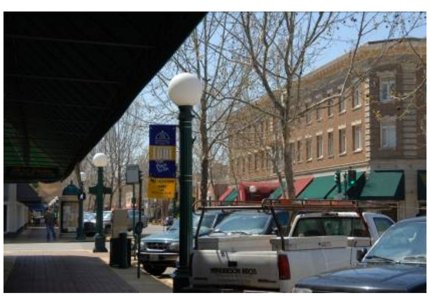
This Working Paper <u>does not</u> contain any policies, and as such, is not intended to be adopted by the City Council.

1.1 LODI GENERAL PLAN UPDATE

What will Lodi be like in the next 20 years? When the community last gathered to create a new vision for the city in 1991, a plan was adopted to create the "Livable, Lovable Lodi" that we know today. These efforts have helped preserve the city's small town charm, revitalize the now vibrant historic downtown, build new neighborhoods and parks, and attract new businesses and industries, while maintaining a compact urban form surrounded by agricultural uses.

Much has changed since 1991 when the existing General Plan was written. Lodi has grown about 20 percent—from a population of 51,847 in 1990 to 62,817 in 2006. Development pressures can be felt both from within and outside the City limits. Perhaps even more critically, new ideas have emerged—the city sees its future increasingly tied to the wine industry, with the surrounding vineyards key to providing economic sustenance and a distinctive character.

The new General Plan provides an opportunity to shape the city's future, define the role of tourism and the city's relation to agricultural/viticulture lands and adjacent communities, identify what the City can do to create



Lodi is a distinctive community surrounded by agriculture and natural amenities, gracious neighborhood streets, and a revitalized downtown.

walkable neighborhoods, foster a strong downtown, and ensure continued economic vitality and a strong sense of place for the community.

SCOPE AND REQUIREMENTS

The General Plan is a document adopted by the City Council to guide development and conservation. The General Plan can be described as the constitution for conservation and development—the framework within which decisions on how to grow, provide public services and facilities, and protect and enhance the community must be made. The General Plan also expresses broad community values and goals, gives a picture of how the city should look in the future, and outlines steps to get there.

The General Plan will:

- Establish a long-range vision for the City, and outline implementing actions to achieve this vision.
- Establish long-range development policies that guide Planning Commission and City Council decision-making.
- Provide a basis for judging whether specific development proposals and public projects are in harmony with Plan policies.
- Allow City departments, other public agencies, and private developers to design projects that will enhance the character of the community.

Topics in the General Plan will include:

- Land Use
- Circulation
- Urban Design
- Parks/Recreation
- Conservation
- Safety
- Noise
- Sustainability

State law requires that the General Plan should be:

- *Long Range*. The General Plan must be a long-range document addressing future development within the community. Most general plans have a 20-year horizon.
- *Comprehensive*. The General Plan must encompass the entire Planning Area, and address the full range of issues associated with the city's physical development.
- *Internally Consistent*. Mandatory and optional elements must be consistent with one another, and all elements have equal legal status. Additionally, principles, goals, objectives, policies, and plan proposals set forth in an area, community, or specific plan, and all capital improvements must be consistent with the overall General Plan.

ENVIRONMENTAL IMPACT REPORT

A comprehensive Environmental Impact Report (EIR) will also be prepared along with the General Plan, pursuant to the California Environmental Quality Act (CEQA). The EIR will evaluate impacts the new Plan on the environment, and will be prepared in parallel with the General Plan so that any necessary mitigation can be folded into Plan policies.

1.2 GENERAL PLAN UPDATE OBJECTIVES

The new General Plan will manage Lodi's growth into a to a vibrant 21st century town, with livable neighborhoods, smart economic development, and preservation of agricultural assets. The General Plan will create a vision defining:

- Lodi's place in the region;
- The city's identity;
- How neighborhoods and districts are structured;
- Physical growth and development management;
- Growth of the wine industry and tourism;
- Greenbelt / community separator;
- Economic and development strategy;
- Downtown, neighborhood, and key corridor revitalization;
- Quality of life, and
- Housing options.

By establishing policies future growth and development, the General Plan will help manage Lodi's ongoing transformation and ensure its continued growth and vitality.

1.3 PUBLIC INVOLVEMENT AND PARTICIPATION

The General Plan is a policy document that implements the vision of the community. Therefore, public participation is an important part of the process of shaping the Plan. Opportunities for public input have been designed to allow the planning team to learn directly from city residents, business and property owners, and other community members about their needs and values, as well as to allow the public to provide feedback throughout the phases of the planning process.

Community members and interested parties are invited to participate and stay informed in many ways, including:

- Newsletters;
- Community workshops;
- City Council and Planning Commission meetings;
- Mail-in survey sent to all residential addresses in the city;
- Stakeholder interviews (completed; report available on the project website);
- Comments via e-mail; and
- Website at www.lodi.gov/community_development/general_plan.

1.4 REGIONAL LOCATION AND PLANNING BOUNDARIES

REGIONAL LOCATION

Located along the Mokelumne River abutting the Sacramento Delta, Lodi is situated in the San Joaquin Valley between Stockton, six miles to the south, and Sacramento, 35 miles to the north, and adjacent to U.S. Highway 99. The City is located on the main line of the Southern Pacific Railroad and is within five miles of Interstate 5 via State Highway 12. Figure 1-1 illustrates the city's regional location.

Lodi's incorporated limits (exclusive of the waste treatment facility located several miles to the west) encompass an area of about 12 square miles. The city is largely flat, distinguished by Lodi Lake and the Mokelumne River that form the northern edge of the City limits.

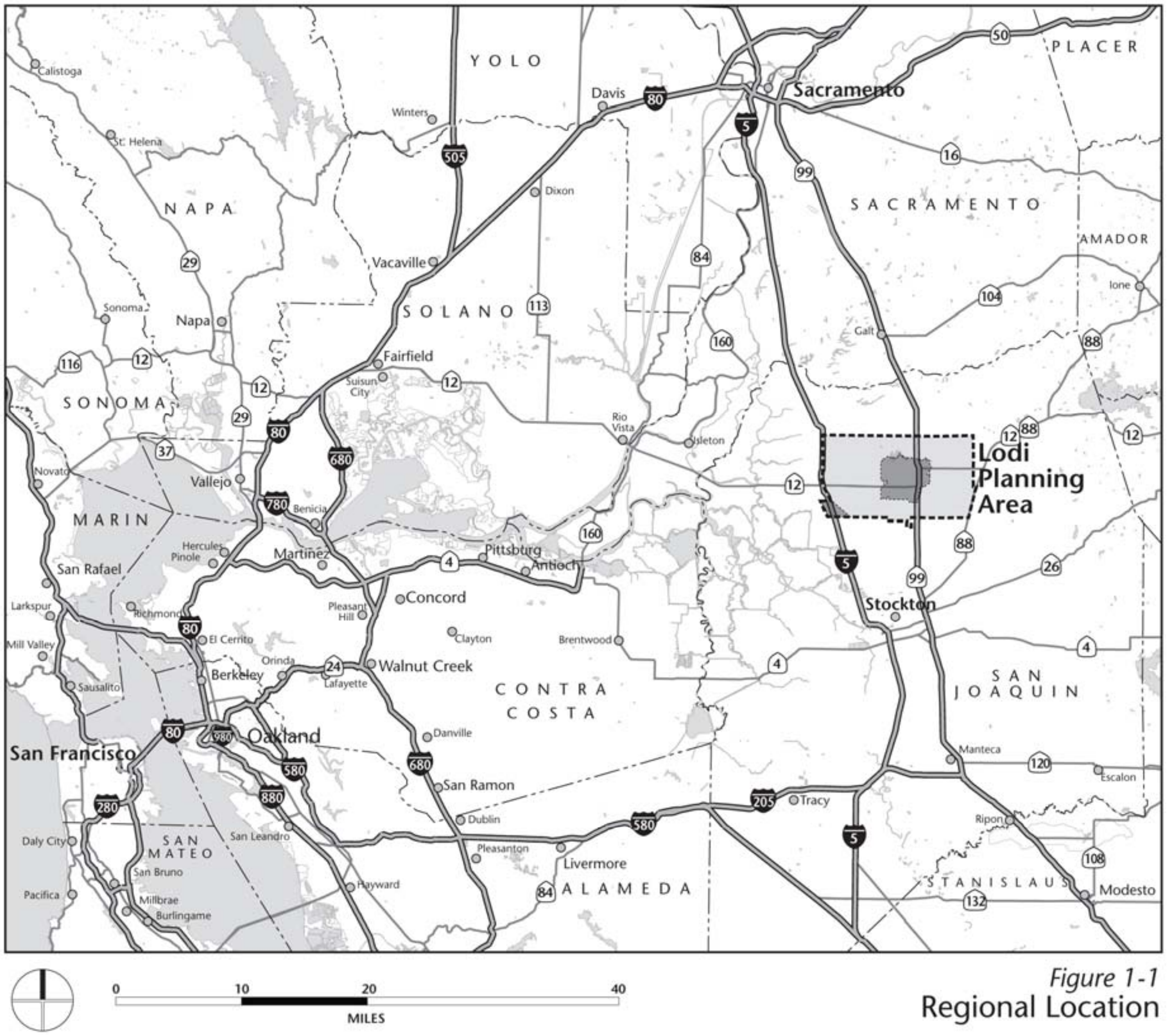


Figure 1-1
Regional Location

Protecting surrounding viticulture, fostering neighborhood livability, and capitalizing on Lodi's emergence as a center of premium wine-making are some of the key general Plan challenges.

PLANNING AREA

The General Plan must cover Lodi's adopted Sphere of Influence (SOI), as well as "any land outside its boundaries which in the planning agency's judgment bears relation to its planning" (California Government Code §65300). Lodi's current Sphere of Influence (SOI) includes the community of Woodbridge, lands west and east of City limits where developments have been recently approved, as well as a small pocket in the northeast portion.

Figure 1-2 shows Lodi's Planning Area. This is the area that will be evaluated for existing conditions, opportunities, and resources. The future urban area is likely to encompass only a portion of land within this larger Planning Area; given the City's interest in ensuring viable and sustainable agriculture in the region, policies to retain much of the land surrounding Lodi in agricultural use will be pursued. This Planning Area is largely similar to the one included as part of the 1991 General Plan, with slight expansion northward, and covers approximately 79.4 square miles.

1.5 REPORT ORGANIZATION

This Working Paper on *Land Use Transportation, Environmental Resources, and Infrastructure Assessment* is one of four working papers that will be used to analyze the opportunities and challenges in Lodi. This assessment is a key step in the General Plan Update process, and provides baseline information on existing conditions in the city, focusing on its physical environment and built form. It also describes opportunities, challenges, and preliminary planning issues that will be considered further in subsequent steps of the General Plan process.

Specifically, this and the other working papers will be used as the basis for:

- Preparing alternative land use and transportation plans (sketch plans);
- Policy formulation for the new General Plan; and
- The Environmental Impact Report (EIR) to be prepared for the draft General Plan elements.

Each chapter in the working paper includes background data and information, an analysis of the information for its pertinence to the General Plan Update; and policy implications of the analysis and resulting issues. The chapters focus upon the following topics:

- Land Use
- Transportation Systems and Circulation
- Parks and Open Space
- Agricultural and Soil Resources
- Environmental Resources and Challenges
- Public Facilities
- Infrastructure

1.6 NEXT STEPS

This working paper will be followed by completion of the other three papers:

- *Working Paper #2: Urban Design and Livability* will seek to outline qualities of Lodi that contribute to its livability and neighborhood vitality, and should be embodied in the future.
- *Working Paper #3: Growth and Economic Development Strategy* would present growth trends, likely demand for various land uses—including retail demand by segment—and opportunities, challenges, and possibilities for their arrangement in Lodi's future.
- *Working Paper #4: Greenbelt Conservation Strategies* report will focus on the issue of the greenbelt—its viability, size, location, and feasible implementation techniques and incentives—as critical component of the General Plan process. In effect, the very definition of the Planning Area/viable Sphere of Influence would rest to some degree on the viability of techniques for agricultural conservation.

Together, the working papers will provide a comprehensive assessment of the opportunities and constraints facing Lodi, and form the research and analysis phase of the project. Following public presentations and reviews of these reports, City staff and the project team will prepare several alternative sketch plans. These land use alternatives will be based on results from stakeholder interviews, community workshops, mail-in surveys, and issues, opportunities, and challenges identified in the working papers.

Following the alternatives, a Preferred Plan—combining the best attribute of the various alternatives—will be prepared. Once decision-makers have endorsed the Preferred Plan, work on the Draft General Plan will begin. The General Plan will include goals, policies and implementation strategies to ensure that visions and policies are carried throughout implementation. A comprehensive Program EIR will also be prepared along with the General Plan. A variety of implementing regulations—such as zoning—and the Capital Improvements Program will need to be revised to be consistent with the Plan following Plan adoption.

Public meetings and workshops will be held throughout this process in order to maintain ongoing communication and feedback with the community.

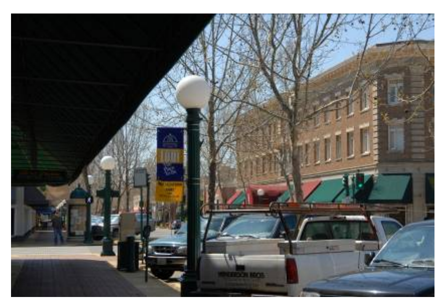
2 Land Use

How the city uses its land in meeting the needs of both residents and the burgeoning wine industry—allowing for growth in population and economic activity, while preserving its small-town identity—is at the heart of the General Plan Update. A review of major patterns, magnitude, and distribution, identification of vacant and underutilized land, and diagnosis of recent development trends will help assess current trends and future opportunities.

Density/Intensity is addressed in greater detail in *Working Paper #2: Urban Design and Livability*.

2.1 CURRENT LAND USE PATTERN

While economic and population trends underlie the potential for growth and development, the importance of Lodi's wine and agricultural industries must also be realized by protecting the fertile farmlands. Examining the city's existing land use pattern is a valuable starting point to understanding patterns and opportunities for type, location, and amount of future development, preservation, and conservation.



Lodi is a distinctive community surrounded by agriculture and natural amenities, gracious neighborhood streets, and a revitalized downtown.

The pattern of Lodi's development can be seen in the aerial photograph in Figure 1-2 and the citywide land use map as of 2006 in Figure 2-1. The information presented below partly relies on analysis conducted using Geographic Information System (GIS) software, and MetroScan data.

HISTORICAL SETTING

Lodi's current land uses are arranged in an overall pattern defined by Lodi's historic growth. Like many early farming communities, the city first developed along the Oakland-Sacramento Central Pacific Railroad when the Town of Mokelumne, as the city was originally called, was founded in 1869. Stores developed on the west side of the railroad on Sacramento, Pine, and Elm streets, and a flour mill anchored the east side on Main and Locust streets. City Hall was also originally located on Main Street until 1928. Industrial uses continued to grow around the rail lines, and commercial uses around the railroad depot, where downtown is today. Residential areas sprouted in a piecemeal pattern between the central industrial and commercial core.

Agriculture was always at the heart of Lodi's economy, which in the early years included wheat, watermelons, and especially grapes. Residential and other urban uses have remained compact. The original City limits, set in 1906 when the City was first incorporated, were bordered by Lockeford Street, Hutchins Street, Cherokee Lane, and a line 1,600 feet south of Lodi

Avenue. Today, this area encompasses downtown, City Hall, and historic residential neighborhoods.

The City's land use planning efforts date back to 1919, when City Council created the first Planning Commission. Previously, planning had taken an ad hoc approach, with streets extended to areas when needed. Even then, growth management was already an important issue to the City. In 1929, the Planning Commission recommended the adoption of a zoning ordinance to define certain district boundaries and to restrict building within various zones. The first ordinance, however, was not drafted until 1936; it was repealed then finally adopted in 1952 as the "Official Plan for Land Use."

The first City Master Plan was adopted in 1955, and included an off-street parking plan and a traffic program for the Central Business District. Until the 1980s, the City managed urban growth by the management of storm drainage capacity.

The existing General Plan was instigated as a recommendation by a Mayor's Task Force in 1986 to address the issue of controlling Lodi's growth. Consequently, Lodi's Sphere of Influence (SOI) was determined and a two-percent growth ordinance enacted.

The edge and the core of Lodi's physical form.

OVERALL PATTERN

Planning Area

The Planning Area covers 79.4 square miles, or 50,827 acres, a majority of whose land use is dominated by vineyards and agriculture. Development in the Planning Area is concentrated in the urbanized areas: within Lodi City limits and Woodbridge, as well as Flag City, an unincorporated commercial center at the junction of Interstate 5 (I-5) and State Road 12 (SR-12). The aerial in Figure 1-2 reveals the dominance of agricultural uses in the Planning Area.

Main Street that once used to be the civic center of Lodi, anchored with City Hall and various stores.

Lodi Sphere of Influence

Lodi's SOI covers 16.6 square miles, or 10,623 acres of land. This area was determined in the 1991 General Plan as the boundary for Lodi's projected urban growth for the duration of the existing General Plan.

City of Lodi

Lodi has a rich history, diverse land uses, intimate neighborhoods, and reputable vineyards—all that distinguish it from other towns and cities in the San Joaquin Valley. These characteristics, revealed in the city's many distinct neighborhoods and districts, include:

Historic residential neighborhoods surround downtown.

- A compact urban form;
- A vibrant and historic downtown with retail, office, mixed, and civic uses;
- Active industrial areas that service a wide variety of needs, especially for the food and wine industries;
- Multiple commercial corridors;
- Public uses serving a diverse community, including parks, schools, hospitals, churches, and places of worship; and
- Established residential neighborhoods with a diverse architectural palette, from historic to contemporary.

The city's even topography and lack of physical constraints have allowed for a relatively uniform street grid, with industrial and commercial uses south of the Mokelumne River and along the railroad and highways. Residential use dominates the landscape, with some historic neighborhoods near downtown, and newer subdivisions spread between commercial corridors and extending west and south to the city's edge. A string of industrial uses lies along the railroad and scatter on the east side of Cherokee Lane and State road 99 (SR-99). Underutilized and vacant lands form a transitioning edge along the southern, western, and eastern perimeter of the city, but are now beginning to fill up with new developments. Beyond the City limits, prime agricultural lands surround the city and nurture its economy. Today, the total urbanized area within City limits is approximately 10 square miles, excluding White Slough.

Woodbridge Irrigation District Canal

The Woodbridge Irrigation District (WID) Canal runs through the city from the northwest to the southwest. It borders the existing City limits in the northwest quadrant, and passes through residential neighborhoods. In general, the narrow canal does not form much of a physical impediment, and is mostly inaccessible except to residences located immediately adjacent to it. According to City staff, residents living next to the canal do not wish to make it a public amenity due to safety concerns.

The Woodbridge Irrigation Canal traverses Lodi from the northwest to the south-east.

White Slough

The White Slough Water Pollution Control Facility has provided wastewater collection and treatment services to the Lodi community since 1966. Through the years, White Slough has expanded and improved to meet the increasingly stringent environmental protection standards in an economically sound manner. The most recent project, completed in 1992, expanded White Slough to a capacity of 8.5 million gallons per day.

White Slough is located within City limits, but is separated from the urbanized area of Lodi. It is located along I-5. See Figure 1-2 for the location of White Slough. White Slough covers approximately 1.7 square miles.

OTHER DISTRICTS

Woodbridge

The Woodbridge Irrigation Dam is currently under construction.

Woodbridge was originally founded before Lodi. Its downtown is a registered California historic site.

Woodbridge is an unincorporated community located immediately northwest of Lodi's City limits, across the Mokelumne River and Woodbridge Irrigation District canal, and is within the Lodi SOI. Home to a population of approximately 5,465 residents in 2000[1], Woodbridge shares much of Lodi's small town character and community amenities. Woodbridge was actually established earlier than Lodi, with ferry and shipping services across Mokelumne River installed in 1852. However, the State's later dependence on agricultural towns with rail access resulted in a shift in commercial and development activity from Woodbridge to Lodi.

While Woodbridge residents go to Lodi for shopping, parks and recreation programs, and elementary and high schools, Lodi residents often use Woodbridge's restaurants, Elks Lodge, Golf and Country Club, and Woodbridge Middle School.[2] Residents of both communities often view them as a single entity, because the land uses and character are similar,a with a mix of new and old residential and retail uses.[3]

Despite the two community's commonalities, shared amenities, and proximity, annexation of Woodbridge into Lodi's jurisdiction is not foreseeable in the short run, as Woodbridge residents have expressed a desire to remain independent[4]. However, inadequate water and sewer services did prompt an annexation of the Woodbridge Middle School in 2001. Further growth in Woodbridge is restricted by the limited capacity of its wastewater treatment plant, which is operating at capacity.

Flag City

Another unincorporated community, Flag City, is located in the Planning Area at the juncture of I-5 and SR-12—roughly five miles west of Lodi's City limits and 1.6 miles north of White Slough. This community acts as

---

[1] According to the 2000 U.S. Census, there were 1,320 people in North Woodbridge and 4,145 people in South Woodbridge; both of these are Census designated places.

[2] Farrow, Ross. Lodi News Sentinel. "Woodbridge, Lodi have much in Common." September 6, 2001.

[3] Lodi News Sentinel - Published October 24, 1994.

[4] San Joaquin County General Plan 2010, Vol. II. Adopted July 29, 1992.

the front door to Lodi. Currently, Flag City encompasses auto-oriented land uses, including a RV park, hotels, auto sales, fast food chains, auto and truck repairs and accessories, convenience stores and gas stations, and vacant or underutilized land.

Housing is Lodi's most dominant land use. The city has a range of historic and new neighborhoods, mostly comprised of single-family units.

OVERALL MAGNITUDE OF USES

Lodi is a compact city with an area if 13.74 square miles (12.04 square miles of urban land and 1.70 square miles at White Slough). It is the densest city in San Joaquin County. Lodi's SOI is larger, encompassing a total of 16.6 square miles. Figure 2-1 displays the land uses within the Lodi SOI.

Land Uses within City Limits

Major land uses (exclusive of streets and other rights of way) in Lodi's City limits, excluding White Slough, are residential (46.9%), industrial (12.6%), public and quasi-public including schools (8.7%), agriculture and wineries (7.7%), commercial and retail uses (6.7%), and vacant land (6.7%). A breakdown of specific acreages for each category of land use is shown in Table 2-1 and Chart 2-1.

Residential Uses

As of 2006, Lodi had a population of 61,753 living in an estimated 23,000 housing units on 2,920 acres of land. A large proportion of residential land use in the city—73.9 percent—is comprised of low-density (0 to 8 dwelling units per gross acre; almost all single-family detached) housing units. These neighborhoods are the heart and soul of Lodi, creating the small town atmosphere that residents cherish.

Multi-family housing are a minority in Lodi's housing stock.

Lodi has a diversity of neighborhoods, not only in terms of demographic makeup, but also in their physical characteristics, ranging from historic ones, such as those west of downtown from the early 20th century, to contemporary master planned subdivisions from the 1950s onward, and a diverse range of neighborhoods in between. Broadly speaking, residential neighborhoods radiate out from downtown, with the historic residences closest to town center, and newer, more homogenous subdivisions further south and west. Housing densities are discussed in greater detail later in the Urban Design and Livability Working Paper. Table 2-2 reveals the breakdown of housing types by densities, with low-density ranging from 0 to 8 dwelling units per gross acre (du/ac), medium-density 8.1 to 15 du/ac, high-density 15 to 25 du/ac, and very-high density 25 du/ac and above. Table 2-3 and Chart 2-2 illustrate the current mix of housing types in Lodi.

Table 2-1: Existing Land Uses within City Limits and Sphere of Influence (exclusive of sheets and other row)

Land Use in City Limits	*Lodi City Limits excluding White Slough*		*White Slough*		*Woodbridge Area*		*Remainder*		*TOTAL in SOI*		*Total in City Limits*	
Existing Land Use	*Acres*	*% of Lodi*	*Acres*	*% of WS*	*Acres*	*% of WA*	*Acres*	*% of Rem.*	*Acres*	*% of Total*	*Acres*	*% of Total*
Residential	2,919.70	46.88%			248.8	46.46%	122.4	12.08%	3,290.90	37.33%	2,919.70	40.17%
Agriculture/Wineries	**480**	**7.71%**	**875.1**	**84.17%**	**108.1**	**20.19%**	**719.3**	**71.01%**	**2,182.5**	**24.75%**	**1,355.1**	**18.64%**
Agriculture	138.4	2.22%	875.1	84.17%	9.8	1.83%	412.9	40.76%	1,436.20	16.29%	1,013.50	13.94%
Viticulture/Winery	341.6	5.48%			98.3	18.36%	306.4	30.25%	746.30	8.46%	341.60	4.70%
Commercial/Retail/Hotels	**414.3**	**6.65%**			**39.4**	**7.36%**	**0.1**	**0.01%**	**453.8**	**5.15%**	**414.3**	**5.70%**
Hotels/motels	21.5	0.35%					0.1	0.01%	21.60	0.24%	21.50	0.30%
Neighborhood Commercial	71.2	1.14%			1	0.19%			72.20	0.82%	71.20	0.98%
General Commercial	204.9	3.29%			1.5	0.28%			206.40	2.34%	204.90	2.82%
Light Commercial (recreation)	11	0.18%			36.2	6.76%			47.20	0.54%	11.00	0.15%
Commercial Industrial	105.7	1.70%			0.7	0.13%			106.40	1.21%	105.70	1.45%
Office (incl. medical and mixed-use)	**114.4**	**1.84%**			**0.8**	**0.15%**	**15.7**	**1.55%**	**130.9**	**1.48%**	**114.4**	**1.57%**
Office	46.8	0.75%			0.8	0.15%	15.7	1.55%	63.30	0.72%	46.80	0.64%
Medical Office, clinics, hospitals	49.5	0.79%							49.50	0.56%	49.50	0.68%
Mixed Use	18.1	0.29%							18.10	0.21%	18.10	0.25%
Industrial	**784.3**	**12.59%**					**33.2**	**3.28%**	**817.5**	**9.27%**	**784.3**	**10.79%**
Light Industrial	630.3	10.12%					12	1.18%	642.30	7.29%	630.30	8.67%
Heavy Industrial	154	2.47%					21.2	2.09%	175.20	1.99%	154.00	2.12%
Public/Quasi public (incl. schools)	**541.6**	**8.70%**			**17.6**	**3.29%**	**5.9**	**0.58%**	**565.1**	**6.41%**	**541.6**	**7.45%**
Public	124.6	2.00%			13.4	2.50%	-0.7	-0.07%	137.30	1.56%	124.60	1.71%
Schools	282.4	4.53%					6.6	0.65%	289.00	3.28%	282.40	3.89%
Quasi-Public	134.6	2.16%			4.2	0.78%			138.80	1.57%	134.60	1.85%
Misc—open space, parking, utilities	**558.7**	**8.97%**	**158.4**	**15.24%**	**77.6**	**14.49%**	**-4.4**	**-0.43%**	**790.3**	**8.96%**	**717.1**	**9.87%**
Open space	420.7	6.75%			39.4	7.36%	-6.3	-0.62%	453.80	5.15%	420.70	5.79%
Parking	23.1	0.37%			2.6	0.49%	1.1	0.11%	26.80	0.30%	23.10	0.32%
Utilities	114.9	1.84%	158.4	15.24%	35.6	6.65%	0.8	0.08%	309.70	3.51%	273.30	3.76%
Vacant	415.5	6.67%	6.2	0.60%	43.2	8.07%	120.7	11.92%	585.60	6.64%	421.70	5.80%
Total	***6,228.50***	***100.00%***	***1,039.70***	***100.00%***	***535.50***	***100.00%***	***1,012.90***	***100.00%***	***8,816.60***	***100.00%***	***7,268.20***	***100.00%***

Source: Dyett & Bhatia, 2007.

Chart 2-1: Existing Land Uses within Lodi City Limits, excluding White Slough

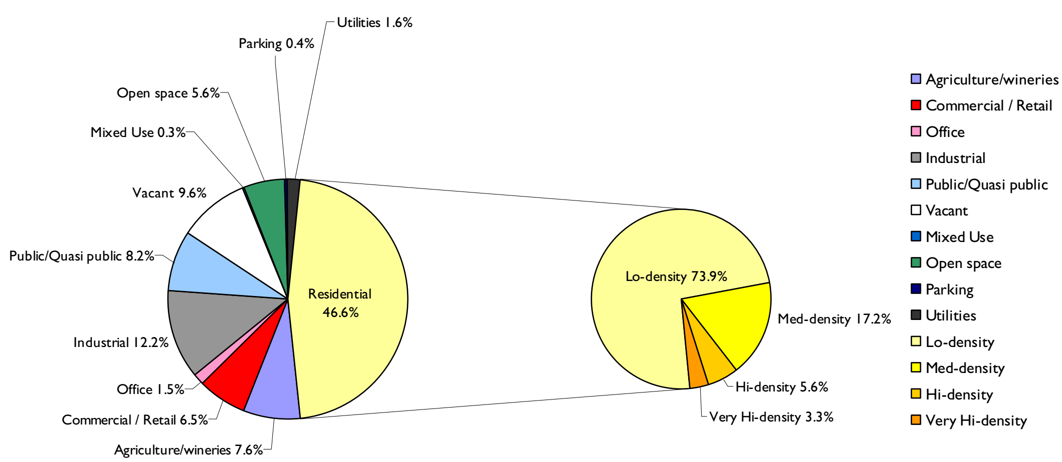


Table 2-2: Summary of Residential Uses within City Limits

Residential	*Density (du/ac)*	*Acres*	*% of Residential use*
Low-density	0 - 8	2,156.2	73.9%
Medium-density	8.1 - 15	504.3	17.2%
High-density	15.1 - 25	162.7	5.6%
Very High-density	25.1+	96.5	3.3%
Total		**2,919.7**	**100.0%**

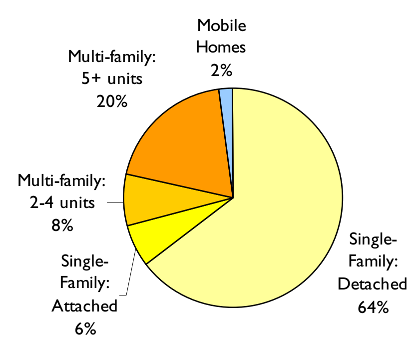
Source: Fehr & Peers, Dyett & Bhatia, 2007.

Table 2-3: Number of Housing Units by Type (2006)

Housing Type	*Housing Units*	*% of Total*
Single-Family: Detached	14,797	64.3%
Single-Family: Attached	1,476	6.4%
Multi-family: 2-4 units	1,762	7.7%
Multi-family: 5+ units	4,500	19.6%
Mobile Homes	465	2.0%
Total	**23,000**	**100.0%**

Source: California Department of Finance, Estimates for January 1, 2006.

Chart 2-2: Breakdown of Existing Housing Units by Type



Downtown is a vibrant city center with retail, entertainment, restaurants, and civic uses. It is home to the Lodi arches, the movie theater, and summer farmers market.

Non-Residential Land Uses

Commercial Uses

Commercial land uses include neighborhood commercial (neighborhood serving storefront retail, grocery, and services), general commercial (shopping centers, strip malls, service commercial, and business-to-business sale), industrial commercial (auto sales and services, wholesalers, gas stations), light commercial uses (recreation related commercial use such as private golf courses and skating rinks), and hotels or motels.

Overall, commercial use accounts for 6.7 percent of Lodi's urbanized land area[5], or 414 acres. Of this, general commercial is the most dominant subcategory at 205 acres, or 3.3 percent of Lodi's total land use. Only 71 acres, or 1.1 percent, of the city's land is dedicated to neighborhood commercial uses; 11 acres, or 0.2 percent, is dedicated to light commercial use.

According to City staff and members of the community interviewed at stakeholder meetings, Lodi has done well to attract some large retailers in recent years, but is lacking the variety of retail that they expect from a city of its size. The majority of commercial uses in Lodi are concentrated either in downtown, Lodi Avenue, Ham Lane, or on one of the major commercial corridors, such as Kettleman and Cherokee lanes.

Downtown

The vibrant state of Lodi's downtown—with walkable streets, historic assets, and thriving business—can be attributed to the City's downtown revitalization efforts over the past decade. The main streets in downtown are School and Pine streets, as well as Sacramento, Elm, and Oak streets. Establishments include gift shops, grocery stores, banks, a new multiplex, restaurants, cafes, and a farmers market in summertime.

Looking toward the future, many community members are desirous of more wine and tourist attractions in downtown, such as wine-tasting rooms, to leverage the momentum of the region's burgeoning wine industry.

Unlike the norm in most cities, downtown has achieved various improvements largely through the General Fund; the City does not have any redevelopment areas. A proposal to create a redevelopment area (RDA) for downtown was considered several years ago, but withdrawn because of public sentiment. Despite the past success of the downtown revitalization efforts, the General Fund is not in the position to continue

---

[5] Excluding White Slough, unless specified.

financing improvements. Therefore, the City is trying to implement a system of modest downtown fees to fund programs like façade improvements, downtown expansion, and maintenance.

Commercial Corridors

Arterials—both east-west and north-south—are the dominant commercial corridors of the city. Kettleman Lane, also known as SR-12, hosts a span of big-box retail, strip malls, and fast-food chains for much of its three-mile stretch across the city, interspersed with new multi-story office buildings, as well as senior complexes and single-family homes. Lowes and Vintner's Square are newly constructed, and vacant sites await developers on the western end of road. A future Wal-Mart Supercenter has been proposed on the 25-acre southwest corner parcel across the street from the existing Wal-Mart. The EIR on the project was challenged in court, and is in the process of being redone to comply with court order. The EIR will go back to the City Council for recertification in 2007.

Kettleman Lane, also SR-12, is a major east-west commercial corridors lined with auto-oriented retailers, new offices, senior complexes, and single-family housing developments.

Other activities along the Kettleman corridor include industrial commercial uses such as gas stations, fast-food chains, and smaller strip malls hosting smaller businesses, such as insurance companies, law firms, restaurants, and other consumer services.

Another major commercial corridor is Cherokee Lane. Parcels here are home to a range of neighborhood, general, and industrial commercial amenities, including auto sales and rentals, restaurants, and economy motels. At the intersection of Cherokee and Kettleman Lane are large auto malls.

Other Commercial Zones

Besides downtown and major corridors, commercial uses can be found dispersed throughout the city, serving residents from all neighborhoods. In particular, Lodi Avenue acts as a commercial artery capturing the energy of downtown and spreading commercial uses laterally across the center of the city. Sections of Central Avenue act as another minor corridor with a concentration of neighborhood commercial amenities such as restaurants. Ham Lane is a minor corridor with general commercial uses and intermittent offices and medical facilities.

Central Avenue hosts a number of restaurants and retail amenities, especially targeting the Latino community.

Office and Medical Facilities

Offices occupy only a small portion of Lodi's land area. Including medical laboratories, offices, and hospitals, office uses comprise merely 92.8 acres, or 1.6 percent of Lodi's land area, trailing behind all other uses except agriculture. This is not surprising given that a majority of the major employers in Lodi is in the manufacturing sector, and only a minority in the services, finance, and insurance sectors (see Economic Strategy and Demographics Working Paper). Community stakeholders have voiced

New office uses cluster around Kettleman Lane.

their concern over a lack of office space for professional businesses, such as attorneys and doctors, most of which are usually located outside of Lodi in places such as Stockton.

- ***General Offices.*** Offices are important for the services and employment opportunities they provide. In Lodi, offices are concentrated in four areas: downtown, Kettleman Lane, Ham Lane, and the industrial zone on the east side of the city. In general, smaller offices providing various services are located in downtown. However, field studies reveal that many upper stories in downtown are vacant. Medium to large offices can be found on Kettleman Lane along side big box retail and strip malls, surrounded by parking lots. Offices for industrial and agricultural companies can be found near their source in the either the industrial east or around SR-99. These larger offices are often single-story.
- ***Medical Offices, Hospitals, Clinics, and Laboratories.*** Medical offices comprise of more than half of office land uses in the city, with 46.8 acres used for hospitals, clinics, medical offices, laboratories, and nursing care facilities. The major player is Lodi Memorial Hospital, one of the largest employers in Lodi and the 14th largest employer in San Joaquin County[6]. The private not-for-profit hospital has two campuses and various facilities clustered around Ham Lane and South Fairmont Avenue, comprised of the hospital, clinics, medical offices, and laboratories. Opened in 1952, the hospital now serves not only the Lodi city region, but also Elk Grove, Rio Vista, Ione, Jackson, and Galt. The hospital plans to expand the central campus next year to accommodate population growth, new technologies, privacy concerns, and state seismic regulations. In 2008, the hospital will complete the state permit processes and begin building a new central plant and a four-story patient wing.

Mixed Use

Mixed-use developments, for the purposes of discussion here, are those with a combination of residential, retail, and/or office uses within the same parcel. In Lodi, most mixed-uses usually encompass retail or office use on the first floor, and residential or office use on the second. In total, only 0.3 percent of land area—roughly 18 acres—within City limits is mixed-use. Most of this is located in or near downtown and Lodi Avenue. Though uncommon today, opportunities to expand mixed-uses are abundant, especially in downtown where the upper stories of buildings are vacant.

---

[6] Mundie & Associates, 2007.

Industrial Uses

After residential, industrial is the next major land use in Lodi, accounting for 784 acres—or 12.6 percent—of the city's land area. Since the beginning of Lodi's history, industry has been an economic driver along side agriculture, and continues to be a major source of employment today. Industrial uses were historically located on the east side of the railroad tracks, beginning with the Lodi Flour Mill on the corner of Locust and Main streets in 1876. Today, industrial uses tend to locate in two regions—along the railroad tracks, and between SR-99 and the eastern City limits. Both concentrations provide convenient freight and/or truck access for production, packing, and distribution sources. On the west side of town is the General Mills factory, which was first built in 1946. Currently, it is the only user of the western rail tracks, but continues to be one of the largest employers in the city.

Lodi's industrial zones paint a mixed picture. The areas east of SR-99 and along the railroad between Cherokee and Main are scattered with large warehouses—including thriving food packaging and manufacturers, offices, the Lodi Unified School District office, and signs for upcoming business parks. However, the productive industrial uses are interspersed with large vacant parcels along with underutilized residential lots and unkempt sites, especially along the railroad tracks between Cherokee Lane and Stockton Avenue. These underutilized sites provide opportunities for more intensive development, including more industrial uses to fill up these large parcels.

The General Mills cereal plant is located along Turner Road in North Lodi, although the majority of industrial uses are east of Highyway 99.

Public and Quasi Public Uses

Public and quasi-public uses comprise 542 acres, or 8.7 percent, of Lodi's urbanized land area (exclusive of White Slough). This is a reasonable proportion, given that Lodi is foremost a residential city, and requires services provided by pubic and quasi-public entities. Public uses include schools, municipal services, berms, swimming pools, recreation centers, cemeteries, and other government owned properties. Quasi-public uses include churches and other places of worship, museums, and special homes for the handicapped. Amongst all public uses, schools are the most dominant, comprising a total of 282 acres, or 4.5 percent of the city's land area.

Many of the civic and public uses can be found in or around downtown, including the City Hall, public library, main police station, train station, Hutchins Street Square, and post office.

Churches are a major quasi-public use in Lodi.

Vineyards, working farms, and distribution-packaging centers are all essential components of Lodi's agricultural economy.

Utilities and Infrastructure

Excluding roads, highways, and other rights of way, infrastructure and utilities comprise 1.8 percent of the city's urbanized land area. These uses include electrical power towers and railroad buffers. Most of these are interspersed amongst industrial uses along the railroad.

Agriculture

Agriculture has always been a major economic force and part of the physical landscape in Lodi. The city has traditionally maintained a compact form, keeping agricultural uses outside its urban core and City limits. Today, Lodi wines and grapes are still the pride of the region, but most agriculture activity takes place outside the City limits. Agricultural uses encompasses 7.7 percent, or 480 acres, of the City's incorporated limits—virtually all located in the newly annexed areas and have proposed plans for urban development in the future. (See section below on Recent, Approved, and Proposed Development.) Besides the newly annexed areas, there is only one small parcel with current agricultural use located on the southeastern edge of the City limits on Harney Lane. It will most likely be urbanized along with the Blue Shields Reynolds Ranch development project. The parcel is currently designated as medium density residential under the current General Plan.

White Slough

The White Slough area encompasses a total of about 1,040 acres of land along I-5. The water pollution control facility encompasses roughly 158.4 acres of land. Adjacent to it, the City owns and leases out nearly 900 acres to local farmers for the cultivation and harvesting of feed and fodder crops not intended for human consumption.

The following pages show images of various land uses and places in Lodi, coded to maps. Shown are the various geographic areas of the City, as well as downtown and two key corridors—Kettleman and Cherokee lanes.

PHOTO PAGE 1

BACK OF PHOTO PAGE 1

PHOTO PAGE 2

BACK OF PHOTO PAGE 2

PHOTO PAGE 3

BACK OF PHOTO PAGE 3

PHOTO PAGE 4

BACK OF PHOTO PAGE 4

PHOTO PAGE 5

BACK OF PHOTO PAGE 5

PHOTO PAGE 6

BACK OF PHOTO PAGE 6

PHOTO PAGE 7

BACK OF PHOTO PAGE 7

PHOTO PAGE 8

BACK OF PHOTO PAGE 8

TOURISM AND HOSPITALITY

Tourism in Lodi has been growing steadily, mostly due to the increasingly popular vineyards in the Lodi region. The number of premium vineyards has grown tremendously, with more than 65 wineries within the appellation.

During outreach to community stakeholders, several community members stated that more can be done to leverage the region's growing popularity as a tourist destination. Indeed, tourist amenities have not expanded despite the growing numbers of visitors. Because of the seasonal and weekend nature of the visitor business, as well as location of wineries outside City limits, visitor-oriented more amenities and accommodations are somewhat limited. This topic is explained in greater detail in *Working Paper #3: Growth and Economic Development Strategy*. Figure 2-2 maps the various visitor amenities and destinations within Lodi's SOI.

Protecting surrounding viticulture and capitalizing on Lodi's emergence as a center of premium wine-making is a big General Plan challenge.

Hotels & Accommodations

Currently, there are 17 hotels, motels, and bed-and-breakfasts in Lodi's City limits, providing a total of 549 rooms[7]. While most of these are conventional economy motels or hotels for the budget travelers, a few are oriented to the wine savvy and leisure tourists found. A majority of economy motels are located on Cherokee Lane. Flag City has two mid-price range hotels that are direct competitors for Lodi accommodations.

The most celebrated of Lodi's hotels is the Wine & Roses Hotel located on West Turner Road. This 36-room luxury resort is set on seven acres of towering trees and serene botanical gardens. The Lodi Wine & Visitor Center is located on the property, and offers wine-tasting and tours. Other amenities include a restaurant, a full-service spa, gardens, and verandas. The high-end boutique resort exemplifies an accommodation that capitalizes on Lodi's food and wine eminence, and small-town rural ambiance.

The popularity of Wine & Roses rests at least partially on its bucolic location near the vineyards. However, it is a relatively small boutique hotel, and does not have the capacity to host larger events such as conferences.

The Lodi Wine-tasting and Visitor Center, located at Wine & Roses Hotel, is one of the major destinations that promote the region's growing wine status.

One major challenge the City faces is to draw the growing tourism potential to downtown. In contrast to the countryside, downtown evokes a genuine small-town and historic atmosphere. The main difficulty in developing a hotel downtown, according to stakeholders familiar with the real estate market in Lodi, is the high cost of property. However, many do agree that hotel accommodations would be highly desirable there.

---

[7] Source: Lodi Wine and Tourism Bureau, 2007.

Lodi already has the low and high end range of lodging accommodations. What the city lacks is the middle-range traveler. These may include bed-and-breakfasts, given the city's quaint setting, and other hotels that are not too expensive, but still of high quality. Currently, only one bed-and-breakfast (Robin's Nest) can be found in Lodi, providing two rooms.

Restaurants in downtown are popular for both visitors and locals.

Restaurants

On the upside, restaurants are flourishing in downtown. Currently, there are 33 restaurants, cafes, and other eateries, and 11 lounges and bars in downtown.[8] However, only a handful are "white-linen" and cater to the wine-and-food connoisseur that the City aims to attract. Most local restaurants are actually located outside of downtown, and concentrated on the commercial corridors of Lodi Avenue, Kettleman Lane, and Cherokee Lane. Other restaurants popular with tourists are located in the historic downtown of Woodbridge, which may have the advantage of attracting tourists staying at the nearby Wine & Roses resort.

The Grape Festival Grounds is a large venue that hosts the annual Grape Festival, Harvest Fair, and Spring Wine Show, which attract visitors from the surrounding region.

Downtown Amenities

Other visitor amenities in downtown include art galleries, book stores, clothing stops, and a movie theater. During the summer, downtown streets turn into farmers markets selling locally-grown produce from nearby farms. The City has been pushing for wine-tasting rooms in downtown to capture the essence of the region's wine industry.

Other Attractions and Destinations

- *Hutchins Square.* This community center also hosts concerts, theater productions, lectures, and performances that reportedly attract visitors from nearby cities.
- *Lodi Wine and Visitor Center.* This tourist hotspot next to Wine & Roses is a popular wine-tasting destination.

Grape Festival Grounds. This 20-acre venue has over 75,000 square feet of inside space, 1,500 seat outdoor amphitheater, RV hookups, and indoor meeting halls. Located on Lockeford Street next to the Sports Complex, The Grape Festival Grounds is home to the Lodi Grape Festival and Harvest Fair held every September, and the yearly Lodi Spring Wine Show. The Grape Festival promotes the agriculture and farm products of San Joaquin County, offering diverse forms of agricultural education aimed at children and family and attracting residents from all over the county. It also has a wine-tasting component from various Lodi wineries. The Spring Wine Show features wines from all over Northern California.

Lodi Lake natural area is a popular recreational place for residents and the venue for the annual ZinFest.

---

[8] Source: Downtown Lodi Business Partnership.

When the venue is not used, the Grape Festival Grounds can be rented for various private events including banquets, parties, road shows and fairs, weddings, and sports events.

- *Lodi Lake*. This natural space park is a popular recreational place for residents. Since 2005, Lodi Lake has also been the home of the annual ZinFest, a three-day showcase of wines and wineries in the Lodi region.

While these events are very popular for people who know about them, their potential to attract tourists can be pushed to a higher level, and used to leverage tourism in the city throughout the whole year.

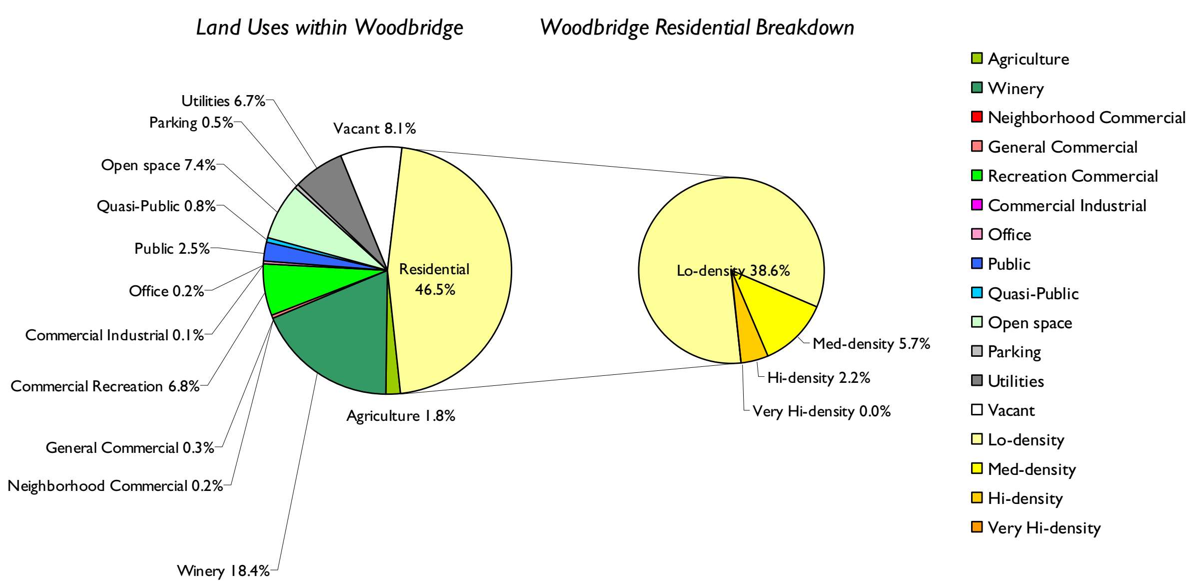
LODI SPHERE OF INFLUENCE (SOI)

Lodi's SOI currently encompasses a total of 16.6 square miles of land, 5,666 acres of which are within City limits, 1,040 acres in White Slough, and 354 acres in Woodbridge. The remaining SOI area—1,616 acres—is located to the south and the west of City limits, and is largely agricultural. A breakdown of land uses in the SOI is listed in Table 2-1.

Woodbridge

The unincorporated area of Woodbridge encompasses 535.5 acres, roughly equivalent to nine percent of Lodi's City urban area. Woodbridge is primarily a residential community, with a historic town center on Lower Sacramento Road, and the Mokelumne River as the foundation of the community's visual character. In 1939, the community itself became a State historic landmark. Other notable features of this community include Woodbridge Golf and Country Club, Woodbridge Regional Park, and the new Woodbridge Irrigation Dam.

Chart 2-3: Distribution of Land Uses in Woodbridge



Source: Fehr & Peers, Dyett & Bhatia, 2007.

Woodbridge's land use is mostly residential, providing a variety of housing types and densities. In the 1980s, severe annexation restrictions in Lodi diverted much of the housing pressure to Woodbridge, and resulted in unprecedented building boom in the community. Chart 2-3 shows the distribution of land uses in the Woodbridge area by land area.

Remaining SOI Area

Within the SOI, outside of City limits and Woodbridge, there are a total of 539 acres of agricultural land and 648 acres of wineries and vineyards, for an aggregate of 1,186 acres of productive farm land. The stark contrast of land uses between the areas inside and outside City limits, and the crisp urban-rural edge reveal Lodi's long-standing attempts for compact growth and agricultural preservation.

Other major uses include low-density and rural single residences (10.0%) and vacant land (10.4%). Occasional spurts of residential, industrial, and office uses can be found, usually clustered near the industrial zone on the east side or on the south west corner of the SOI area, which is also home to a number of churches of different denominations. Henderson Community Day School is also located in the SOI, and provides middle school education for residents of Lodi, Stockton, and Woodbridge.

Agricultural Greenbelt and Community Separator

A Greenbelt Task Force convened by the City in 2003 proposed an agricultural greenbelt community separator between Lodi and Stockton, south of existing City limits. The proposed greenbelt extends from Harney Lane to Armstrong Road, and would establish approximately 3.5 square miles of a new Lodi General Plan Land Use designation to be called Agriculture/Greenbelt—1.5 square miles north of Armstrong Road currently designated as Planned Residential Reserve, and two square miles south of Armstrong Road as the new agriculture greenbelt community separator Planning Area. (See Figure 1-2.)

While a substantial number stakeholder interviewed as part of the General Plan Update process people agree on the concept of a greenbelt community separator, there are differences of opinion related to the viability and equity of the greenbelt. While Lodi residents desire the greenbelt, property owners are generally leery of foregoing opportunities for more lucrative, higher density development. Because this area is currently outside of Lodi's SOI, cooperation with the County will be essential to assure implementation.

The proposed greenbelt community separator aims to protect the agricultural uses and keep the Lodi and Stockton visually and physically distinct.

A number of proposals for implementation are currently being discussed, including five-acre zoning as well as transfer of development rights (TDRs), both of which have inherent challenges in practice. Five-acre zoning may provide more options for property owners to subdivide their land, but may be too small for farming, and too large for single-family homes. TDRs are good in concept, but must be carefully and proportionately coordinated to protect the desired lands without turning off developers. These and other perspectives are examined in greater detail in the companion *Working Paper #4: Greenbelt Separator*.

2.2 MAJOR DEVELOPMENT PROJECTS AND TRENDS

Recent trends show that Lodi has grown at a much slower rate than other cities in the county. However, 15 major development projects concurrent with this General Update process—several at unprecedented scales—are evidence of the future growth that Lodi will face. The challenge of balancing growth with preservation and conservation is a large focus of the General Plan Update. Consideration of the location, size, and land uses of these recent and approved developments is important in considering what type of development to encourage in Lodi over the next 20 years.

The scale of the current major development projects—the Southwest Gateway Project, Westside Project, and Blue Shields Reynolds Ranch—is much larger than any the City has experienced in the past. These projects, contiguous to the City's current limits, will be realized through conversion of agricultural land to urban use.

The Westside Project area has been annexed (top). The new downtown multimodal transit station (middle). A new Lowes at Vintner Square (bottom).

RECENT, APPROVED, AND PROPOSED DEVELOPMENT

Recently constructed, approved, and proposed development in Lodi encompasses a mix of residential, commercial, industrial, and public uses, with residential as the dominant use. Table 2-4 lists these developments and their status. Figure 2-3 shows the location of these projects, which have tended to take place on the southern and western fringes of the city.

Recent Development

Annexation

Two annexations approved in 2006 have expanded the city's boundaries to the south and west, covering the FCB Westside project, Southwest Gateway Project, Blue Shields Reynolds Ranch, and 12 individual parcels. The annexations add approximately 456 acres of land to the City's jurisdiction in the west, and 220 acres in the south. Altogether, the two annexations add 676 acres to Lodi's jurisdiction.

Downtown and the Multimodal Transit Station

New improvements include a movie theater, an important addition to downtown, and a new multimodal station, which the City would like to expand and develop. The City recently received a grant from Caltrans to look into transit-oriented development (TOD) in the area. The rail line lies adjacent to downtown and goes to major Central Valley cities—Sacramento, Stockton, and Baskerville—as well as the Bay Area.

Vintner Square Shopping Center

This new shopping destination on West Kettleman Lane is home to a number of big-box and auto-oriented retail and restaurant establishments, including Lowes and In-N-Out Burgers. Vintner Square encompasses roughly 217,000 square feet of retail space on 28 acres.

Table 2-4: Approved and Proposed Development

Project Name	*Acres*	*Square Foot*			*Residential Units*				*Status*
	Site Area	*Retail*	*Office*	*Industrial*	*density range 0-7.0 du/ac*	*density range 7.1-20 du/ac*	*density range 20.1+ du/ac*	*Total Units*	
FCB Westside Project	151				452	331		783	Proposed
FCB Southwest Gateway Project	257				862	501		1,363	Approved
Lodi Shopping Center/Super Wal-Mart		339,966							Proposed
Legacy Homes Unit 1					77			77	Approved
Legacy Estates Unit 2					141			141	Approved
Century Meadows One Unit 2					55			55	Approved
Century Meadows One Unit 3					74			74	Approved
Kirst Estates	7.92				65			65	?
KB Homes - The Villas					80			80	Approved
Blue Shield /Reynolds Ranch	220	350,000	200,000		378	380	326	1,084	Approved
Miller Ranch						65		65	Proposed
ADM Sugar Manufacturer									Under Construction
San Joaquin Delta Community College	120 total 41campus							76	Proposed
Total	***756***	***689,966***	***200,000***	***0***	***2,184***	***1,277***	***326***	***3,787***	

Note: For FCB developments, average low density is 4.8 units per gross acre; average medium density is 8.48 units per gross acre, and average high density is 17.5 units per gross acre. For Reynolds Ranch, 5 units per gross acre for low-density, 8 units per gross acre for medium density, 22 for high-density (50 for senior homes). In the case of the Kirst Estates, low density equates to a density range of 0 to 7 units per gross acre, medium 7.1-20 units per gross acre, and high density 20 to 30 units per gross acre.

Source: City Staff; Lodi Annexation EIR, Public Review Draft, April 2006; Reynolds Ranch Development Plan.

Growth pressure at the City's edges-Vintner's Square nearing completion, across from site for the proposed Super Wal-Mart; land south of Harney Lane where a large new residential development is proposed; and new homes on the Southside.

ADM Sweetener Distribution Center

The most recent industrial-use proposal involves the Archer Daniels parcel at the northeast corner of Victor Road (SR-12) and North Guild Avenue. The plan will transform the now vacant single-family residence into a fully-operating sweetener manufacturing, packaging, storage, and distribution facility, with a rail connection to the existing Central California Traction Company (CCTA) mainline over an approximate 10-year span. The project recently completed its initial study and negative-mitigation declaration in February 2007.

Approved Projects

Legacy Homes, Century Meadows, and The Villas are three recently approved residential subdivision projects that will add about 427 low-density units to Lodi's housing stock (densities under 7 units per gross acre).

Two new projects—the approved Blue Shields Reynolds Ranch and an almost approved residential development project—will take up much of the remaining 1-percent backlog from previous years. Residential development of such large scale is unprecedented in Lodi, and are encouraging local developers to invest in sites along south of Harney Lane, west of West Lane and Hutchins Street, and at Perrin Ranch.

Table 2-4 shows that about 3,776 housing units have approvals or are proposed, increasing the city's existing supply by 16.4 percent and accommodating approximately 10,573 new residents.[9] New development will contribute a significant number of low (average 4.8 for FCB projects, 5 for Reynolds Ranch) and high density (average 17.5 for FCB projects and 22 for Reynolds Ranch) housing units, diversifying the housing options for new and current residents. These projects are unusual in that the developer has tied up many parcels for a single development effort.

<u>Note to City staff</u>: the main definition we have for "recent" developments is the list of completed projects sent to us by the City; we presume City staff consider them to be recent. In short, we are not able to readily separate out developments from the last 5 years only and so we are relying on the City's list and hope that such direction from the City is adequate for our analysis. Also, different projects define low, medium, and high density differently. Please see table below for a general range of proposed units.

[9] Based on an average household size of 2.8 in 2006; California Department of Finance.

Blue Shield Reynolds Ranch

Aerial view of the Blue Shields Reynolds Ranch project site, recently annexed into Lodi's jurisdiction.

Blue Shield Reynolds Ranch will be a back-office call station for the insurance company, and have plans to include neighborhood commercial amenities and residential units, targeted but not exclusive to future employees. The project covers 400 acres and 350,000 square feet of commercial development on the east, and almost 1000 residential units on the west.

- ***Jobs.*** As the new back-office call-station for Blue Shields, the center will cover approximately 220 acres on Reynolds Ranch and create 600 new jobs in Lodi. The health insurance company, which has other offices in the city, will be closing its other locations and moving 400 jobs to Reynolds Ranch. In total, therefore, the center will accommodate 1,000 jobs, with potential to expand to 1,600 jobs.
- ***Housing.*** Located in the new annexation areas, half mile south of Harney Lane, the Blue Shield Reynolds Ranch will encompass a total of approximately 1,084 new housing units targeted at the employees of the new back-office call-center for Blue Shield, of which 378 are low-density (5 du/ac), 380 are medium-density (8 du/ac), and 326 high-density (22 du/ac). A variety of housing options—detached single-family units, attached medium-density units, higher-density units such as town homes, clusters, apartments, and senior housing—will be available to future residents.
- ***Commercial and Retail Uses.*** Residential units will be located across from pedestrian-oriented retail. Other commercial uses will include large auto-oriented retailers such as Costco.
- ***Community Amenities.*** Proposed pathways and trails will connect the employment center, commercial uses, residential neighborhoods, an elementary school, and a neighborhood park clustered in the center.

Located half a mile south of Harney Lane, the Blue Shields Reynolds Ranch Project is the final potential development on the south. It lies at a critical line in the General Plan process because it abuts the proposed community separator greenbelt.

Southwest Gateway

The Southwest Gateway, headed by Frontier Community Builders (FCB) is located in the newly annexed area south of SR-12 and west of Sacramento Road. The development will consist of 862 low-density units (4.8 du/ac) and 501 medium-density units (8.5 du/ac), as well as other public amenities, such as some parks and schools. DeBeneditti Park, for example, is planned for construction as part of development agreements with the City.

Proposed Development Projects

Westside Project

The Westside project, also led by FCB, is currently on the cusp of approval at the southwest gateway of Lodi, south of SR-12 and west of Sacramento Road. The development will consist of about 2000 homes on 400 acres. The Westside Project will add 452 low-density units and 331 medium-density units; Southwest Gateway will provide 862 low-density units and 501 medium-density units.

These projects are unusual in that the developer has tied up many parcels for a single development effort.

Lodi Shopping Center

The Lodi Shopping Center and Super Wal-Mart are proposed projects located on the west end of Kettleman Lane. They will add about 387,000 square feet of retail establishment to the city. These auto-oriented retail centers will further accentuate the regional draw of the area.

San Joaquin Delta Community College, Lodi Campus

A proposed location for the approximately 120-acre San Joaquin Delta Community College Lodi Campus lies on roughly east of the City limits. The plan includes a campus center with some stores and moderate-density housing for either students or seniors. In addition to the usual courses, this campus will include special programs like viticulture that utilizes and fosters the local economy.

The community college is currently at the due diligence phase, with land tied up for the project. A large part of the campus is in a floodplain, but that will affect only the viticulture and athletic fields, and not the campus buildings themselves. Special attention must be given in the planning process to ensure that future students will not disrupt the existing nearby agricultural activities and way of life.

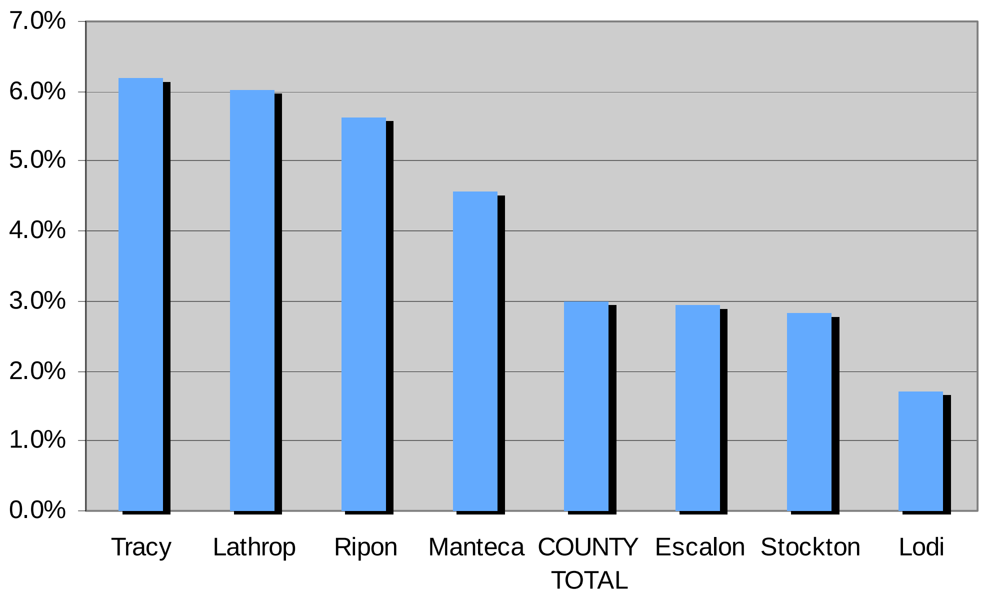
Open space at the City's eastern edge, portion of which is part of Frontier Community Builders Southwest Gateway Project.; together with the Westside Project by February, 2,200 homes will be added.

2.3 POPULATION TRENDS

For a more in-depth analysis of population trends, please see Working Paper #3: Growth and Economic Development Strategies.

Lodi's population has been growing at a rate slower than the two percent limit that would result from the Growth Management Ordinance. Chart 2-4 below shows the annual population growth rate from 2000 to 2006 for cities in San Joaquin County. Lodi's annual population growth rate in this period averaged 1.7 percent—the lowest for any city in the county. In contrast, Tracy and Lathrop's growth rate exceeded six percent, while the countywide rate was three percent.

Chart 2-4: Population growth rate for Cities in San Joaquin County (2000-2006)



Source: April 1, 2000-January 1, 2006; San Joaquin County Cities (U.S. Census; California Department of Finance)

Housing and Population Growth

Table 2-5 shows growth in housing units and population from 1990 to 2006. During period, the number of housing units grew 16.9 percent, while population rose 21.1 percent. This translates to an average annual growth rate of 1.1 percent for housing units and 1.3 percent for the population, reflecting a modest growth in household size–Lodi's average household grew from 2.705 to 2.744 between 2000 and 2006, commensurate with countywide trends (the countywide household size grew from 3.000 to 3.084 in the period).

Table 2-5: Housing and Population Growth in 1990-2006

Year	*Total Occupied Housing Units*	*% Annual Change in Housing Units*	*Population*	*% Annual Change in Population*
1990	19,676		51,874	
1995	20,279	0.6%	53,100	0.5%
2000	21,400	1.1%	56,999	1.5%
2001	21,611	1.0%	58,355	2.4%
2002	21,988	1.7%	59,830	2.5%
2003	22,192	0.9%	60,948	1.9%
2004	22,466	1.2%	61,917	1.6%
2005	22,762	1.3%	62,632	1.2%
2006	23,000	1.0%	62,817	0.3%

Source: California Department of Finance, U.S. Census 1990 and 2000.

Housing Type

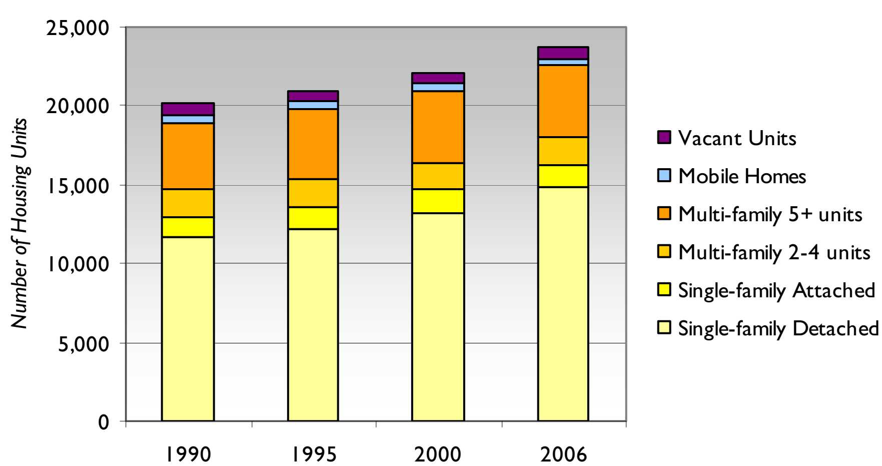
Table 2-6 and Chart 2-5 show that Lodi's growth is resulting from an increase in the city's single-family detached housing unit stock. Single-family attached, multifamily, and mobile homes are growing at a negligible pace. Since 2000, the City has added only 14 new multifamily units.

Table 2-6: Breakdown of Housing Growth by Type

Year	*Total Occupied Units*	*Single Family*			*Multifamily*			*Mobile Homes*	*Vacant*	
		Detached	*Attached*	*Subtotal*	*2-4 units*	*5+ units*	*Subtotal*	*Units*	*Units*	*%*
1990	19,676	11,708	1,248	12,956	1,755	4,236	5,991	516	675	3.32%
1995	20,279	12,176	1,345	13,521	1,873	4,386	6,259	499	696	3.32%
2000	21,400	13,233	1,455	14,688	1,744	4,504	6,248	457	686	3.11%
2006	23,000	14,797	1,476	16,273	1,762	4,500	6,262	465	738	3.11%

Source: California Department of Finance, 2006.

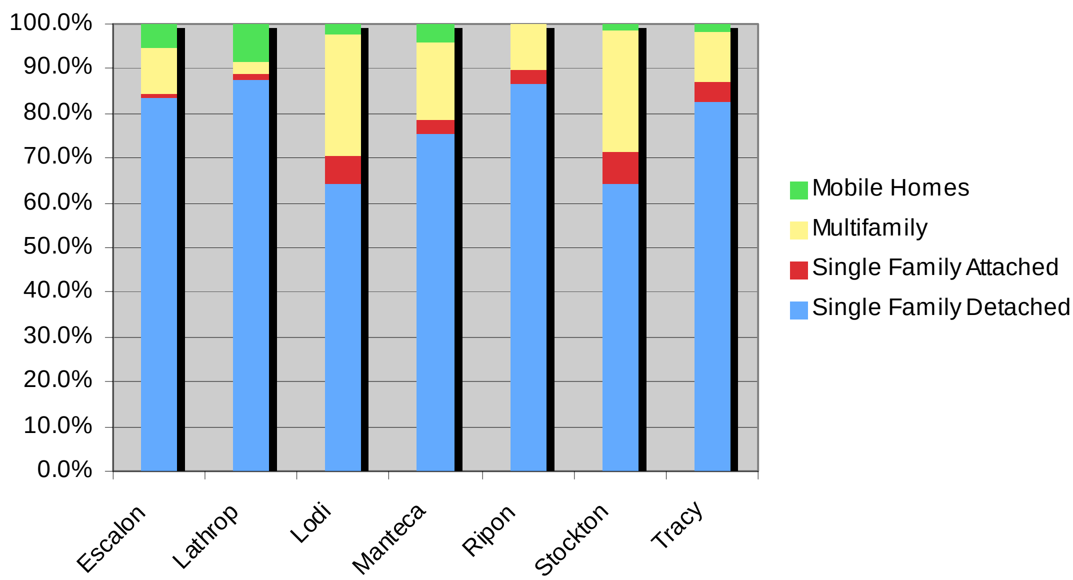
Chart 2-5: Growth of Housing Units by Type 1990-2006



Despite the lack of recent growth in multifamily units, Lodi has the lowest proportion (64.3 percent; tied with Stockton) of its housing stock in single-family detached units, as shown in Chart 2-6 below.

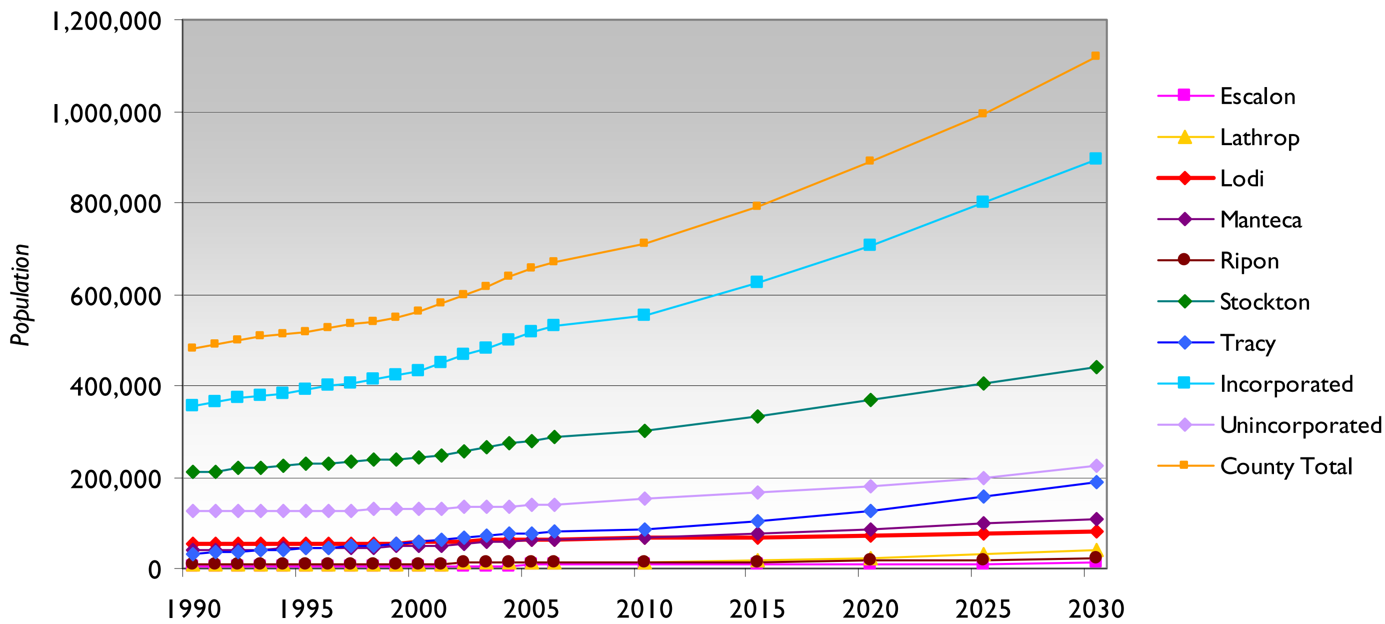
According to the County's most recent projections, Lodi is projected to grow to 81,720 by 2030, or an average of 1.4 percent a year, a rate lower than the City's two-percent growth ordinance. Yet, it still amounts to a 34-percent rise in population from 2005 levels—potentially resulting in a substantial impact on the size and character of the city. New developments such as Blue Shields, the Southwest Gateway, and Westside will likely induce development pressure in the adjacent undeveloped areas.

Chart 2-6: Comparison of 2006 Housing Stock with Other San Joaquin Cities



Source: California Department of Finance

Chart 2.7: Population Growth and Projection (1990-2030)



2.4 RESIDENTIAL GROWTH AND MANAGEMENT

HISTORY OF GROWTH MANAGEMENT IN LODI

The issue of growth management has been an important topic since before the 1980s. The 1991 General Plan Update was instigated as a recommendation by a Mayor's Task Force to address the issue of controlling Lodi's growth. The previous land use element was originally adopted in 1954 and, although amended substantially, did not adequately address contemporary land use planning standards, not to mention the issues of growth management.

Prior to the existing General Plan, the City managed urban growth by the allocation of storm drainage capacity. In 1981, voters approved Measure A, an ordinance that amended the Land Use Element of the General Plan by removing any land outside the City limits from the Element. Any development outside City limits would require a General Plan amendment and approval by the majority of the people voting in a citywide election, thereby limiting the probability of unincorporated lands of being annexed and urbanized. Measure A, however, was challenged and terminated by the Superior Court of California.

Subsequently, the Mayor convened a task force, which then recommended an update of the Land Use Element as well as a growth management strategy. The 1991 General Plan Update installed the two-percent growth ordinance and established an SOI boundary, forming a compact planning study area just outside City limits.

2% GROWTH MANAGEMENT ALLOCATION ORDINANCE

The City Council in 1991 adopted a Growth Management Allocation Ordinance to regulate the location, amount, and timing of residential development. Under the ordinance, the maximum number of housing units approved by the City reflects a two percent increase in population. Unused permits roll on to the next year.

Table 2-7: Growth Ordinance Breakdown by Density

Housing Type	*Units/Acre*	*%*
Low density	<7	65%
Medium density	7-20	10%
High density	>20	25%

Source: City of Lodi, General Plan 1991.

The ordinance specifies a residential density allocation system, whose goal is to promote a broad mix of housing types in the designated quotas listed below in Table 2-7. For example, in 2005, the two-percent growth ordinance translated to a maximum of 450 residential building permits a year; 65 percent of the approved permits were for low density housing units (under seven units/acre), 10 percent medium density units (7-20 units/acre), and 25 percent high-density units (20+ units/acre). Overall, the allowable housing developments average to seven units per acre.

The breakdown by density simply established an upper limit for the number of permits, but does not guarantee that the quotas for the three categories are attained by the end of a year. The ordinance has served to moderate growth in years where demand for housing permits exceeded the available allocation. However, because in most years demand has been less than available permits, an inventory of available permits has built up, standing at a total of 3,268 units of available units in addition to annual two-percent allocation in 2007.

Housing Allocation History

Table 2-8 shows a history of the allowable housing units per the two--percent growth ordinance compared with the number of approved units for the years 1989 to 2004. From 1989 to 1996, the low-density quota was consistently used up, and did not leave a surplus of units until 1997 on. Applications for medium-density housing have occurred in spurts, and applications for high-density housing have essentially halted from 1990 to 2004. Overall, there is a large number of available units, indicating a less than two-percent growth rate.

Table 2-8: Housing Allocation History

Year	Popula-tion	% actual pop growth	2% pop increase	persons per household	Low Density (0-7 du/ac)			Medium Density (7.1-20 du/ac)			High Density (20.1 - 30 du/ac)			Total Units		
					Allowed	Approved	Backlog	Allowed	Approved	Backlog	Allowed	Approved	Backlog	Allowed	Approved	Backlog
1989	50,990		1,020	2.572	258	258	(0)	40	40	(0)	99	99	0	397	397	(0)
1990	52,010	2.00%	1,040	2.567	263	263	0	41	40	0	101	45	56	405	348	57
1991	53,050	2.00%	1,061	2.630	262	262	0	40	28	13	101	-	157	403	290	170
1992	53,186	0.26%	1,064	2.664	260	259	1	40	-	52	100	-	257	399	259	310
1993	53,701	0.97%	1,074	2.680	260	204	57	40	132	(39)	100	(144)	501	401	192	519
1994	53,903	0.38%	1,078	2.680	261	318	1	40	(58)	59	101	-	602	402	260	661
1995	54,694	1.47%	1,094	2.697	264	266	(2)	41	-	99	101	-	703	406	266	801
1996	54,473	-0.40%	1,089	2.662	266	265	(1)	41	-	140	102	-	806	409	265	945
1997	54,812	0.62%	1,096	2.659	268	236	31	41	118	63	103	-	909	412	354	1,004
1998	55,681	1.59%	1,114	2.684	270	2	299	41	(104)	209	104	-	1,012	415	(102)	1,520
1999	56,926	2.24%	1,139	2.695	275	17	557	42	-	251	106	-	1,118	422	17	1,926
2000	57,935	1.77%	1,159	2.709	278	103	732	43	-	294	107	-	1,225	428	103	2,251
2001	58,600	1.15%	1,172	2.710	281	151	862	43	-	337	108	-	1,333	432	151	2,532
2002	59,431	1.42%	1,189	2.745	281	-	1,143	43	-	381	108	-	1,441	433	-	2,965
2003	60,521	1.83%	1,210	2.770	284	209	1,218	44	132	292	109	-	1,551	437	341	3,061
2004	60,769	0.41%	1,215	2.760	286	80	1,425	44	38	298	110	-	1,661	440	118	3,383

Source: City of Lodi

Table 2-9: Projected Housing Allocations

	1989-2006		*Reserved for Reynolds Ranch (8/2006)*	*Reserved for SW Gateway (11/2006)*	*Available Allocation*	*Projected Allocations based on 2% growth rate and 2.77 persons per household*									*2007-2015*
Density	*Scheduled*	*Granted*			*Pre-2007*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*Total*
Low Density	4,903	2,893	150	300	1,560	300	306	313	319	325	332	338	345	352	2,930
Medium Density	754	431	-	-	323	46	47	48	49	50	51	52	53	54	450
High Density	1,885	-	200	300	1,385	116	118	120	122	125	127	130	133	135	1,126
Total Available	7,542	3,324	350	600	3,268	462	471	481	490	500	510	520	531	541	4,506
Allocation per project in accordance with Development Agreements															
Reynold's Ranch															
Low Density						73	73	73	73	73	73	73	73	-	584
Medium Density						-	-	-	-	-	-	-	-	-	-
High Density						-	-	-	-	-	-	-	-	-	-
RR Subtotal: units with development agreements						73	73	73	73	73	73	73	73	-	584
SW Gateway															
Low Density						59	59	59	59	59	59	58	58	-	470
Medium Density						75	29	28	28	-	-	-	-	-	160
High Density						-	-	-	-	-	-	-	-	-	-
SW Gateway Subtotal: units with development agreements						134	88	87	87	59	59	58	58	-	630
Westside Project															
Low Density						215	-	40	40	40	40	40	40	40	495
Medium Density						-	70	-	-	-	-	-	-	-	70
High Density						-	-	180	-	-	-	-	-	-	180
Westside Gateway Subtotal: units with development agreements						215	70	220	40	40	40	40	40	40	745
Total Granted per Development Agreement															
Low Density						347	132	172	172	172	172	171	171	40	1,549
Medium Density						75	99	28	28	-	-	-	-	-	230
High Density						-	-	180	-	-	-	-	-	-	180
Total units with development agreements						***422***	***231***	***380***	***200***	***172***	***172***	***171***	***171***	***40***	***1,959***
Allocation Remaining															
Low Density						1,513	1,687	1,828	1,975	2,128	2,288	2,455	2,629	2,941	1,381
Medium Density						294	242	262	283	333	384	436	489	543	220
High Density						1,501	1,619	1,559	1,681	1,806	1,933	2,063	2,196	2,331	946
Total Allocations Remaining						***3,308***	***3,548***	***3,649***	***3,939***	***4,267***	***4,605***	***4,954***	***5,314***	***5,815***	***2,547***

Source: City of Lodi

In general, development in the medium and high-density categories have been very limited due to a perceived lack of market demand, and because permits in the low-density category have been readily available. Yet, there has not been an explicit backlash from community members for higher density housing, as there have not been many of such developments. Interviewed stakeholders claim that the community is increasingly valuing quality and aesthetics more and appreciate better looking development.

Recent Development

As of 2007, approved development projects total 3,787 units, exceeding the available 2007 backlog of 3,268 units—more growth than the city has seen in the last 15 years. However, as the currently-approved will be phased in over the next decade permits will be available for other projects. The new development projects will contribute denser housing typologies, even though single-family units will continue to dominate.

Housing Allocation Projections

Table 2-9 details the current and projected housing development relative to the two-percent growth cap. As of 2007 there is a total of 3,268 available housing permits left over from previous years' allocation, 1,560 of which are low-density, 323 medium-density, and 1,385 high-density.

New projects like Reynolds Ranch, the Southwest Gateway, and Westside projects are likely to take a large portion from the backlogged units, but will not exhaust the entire stock of allowable housing units from previous years. These three projects have development agreements with the City, and will be allocated 1,959, or 43.5 percent, of the 4,506 estimated allowable housing units from 2007 to 2015, leaving a remainder of 2,547 allowable units available for development from 2007 to 2015.

Despite the perceived lack of demand for higher-density housing, interviewed stakeholders said that there has not been significant backlash from community members for the higher-density units, as there have not been many of such developments. Also, the community increasingly values quality and aesthetics for housing developments.

While Lodi remains a compact city, there is still an abundance of vacant and underutilized sites, especially in the eastern industrial zone, which provides opportunities for development.

2.5 POTENTIAL OPPORTUNITY SITES

Lodi in 20 years may be much different from now. Although the city has not grown drastically since the last General Plan in 1991, the population boom the past few years and projected continued growth in the county, along with the unprecedented scales of newly approved, pending, or constructed development projects, are evident of expansion pressures that Lodi is facing.

Measuring Underutilized Sites

Defining an underutilized parcel varies based on specific circumstances of the surrounding area. In the case of Lodi, a ratio of assessed building value and land value (A/V ratio) was used to indicate underutilized land. Parcels with an A/V ratio equal or less than 1 translated to land value worth more than the building value, and therefore signified a probable below-capacity use. Not all sites resulting from this methodology may undergo intensification over the next 20 years, while other sites might. However, this provides a good sense of the overall magnitude and distribution of underutilized land in the City.

Vacant and Underutilized Sites

Vacant and underutilized sites provide opportunities for development that would reduce pressure for greenfield development. Vacant land comprises 6.7 percent of Lodi's land area inside the city limits (excluding White Slough), contributing 415.5 acres of land ready for development, with an additional 141.2 acres of vacant land outside of the city but within the SOI. Furthermore, there is a substantial amount of underutilized land—99.7 acres, with 73.0 acres within the city limits—that can be redeveloped to more intensive and productive uses. Figure 2-4 illustrates the vacant and underutilized sites in Lodi's SOI.

- ***Industrial Zone.*** Most of the large vacant and underutilized parcels are concentrated in the industrial zone east of SR-99. Vacant parcels provide a range of development opportunities, including but not limited to more industrial, office, and commercial uses. Other parcels are only partially occupied, and can accommodate expansion opportunities for industrial tenants. The industrial zone, though under-developed, emanates a productive atmosphere, with new industrial warehouses, buildings, and offices. Currently, new industrial and office parks are under construction, and demonstrate the potential for the area to reach a higher production capacity and possibilities for complementing uses.

- ***Southwest.*** Another concentration of vacant land lies in the southwest corner of the city and SOI. A portion of this area will be absorbed by the FCB developments and future annexations. These new projects will put pressure on these empty parcels to develop. South on Harney at West Lane, a large lot is also currently vacant. It was the site of the unrealized Perrin's Ranch, which would have been a golf course.
- ***Railroad Corridor.*** Areas around the railroad are also full of vacant and underutilized sites. The difficulty of developing these sites lies in noise and danger of living close to rail lines and the narrow shape of the parcels, limiting suitable uses. While residential development may not be the most appropriate on these parcels, commercial, office, parking, light industrial uses can withstand the noise and act as a buffer for residential neighborhoods. Some of the most opportune sites are located near downtown on Lockeford Street, the former rail corridor on Railroad Avenue, and in front of the Lawrence Park.
- ***Downtown.*** Within downtown, few vacant sites are available for infill development. Most of the identified underutilized sites are parking lots, especially at the intersection of Pine and Church Streets, where all four corners are parking lots. These, however, provide desired parking for the downtown area. The cost of developing in downtown is a major challenge.
- ***Main Street.*** Another area of opportunity is Main Street, which was the historic home of Lodi's original town center and fire station. Now it has vacant buildings interrupted with empty parcels between a few active commercial uses. These underutilized sites have a historical and architectural value that make them opportune for redevelopment. Furthermore, Main Street is close to downtown on the west and residential neighborhoods on the east—a large customer catchment area.

Main Street, which used to be home to Lodi's original city center, is now underutilized and has potential for more intense uses and historic preservation.

The possibilities for the reuse of the opportunity sites discussed above will be examined as part of the Sketch Plans, which are the next stage of the General Plan update process.

A vacant site on Lockeford and Church streets derives high development potential due to its proximity to downtown.

Table 2-10: Vacant Parcels by 1991 General Plan Designations

1991 General Plan Designation	*Description*	*Number of Acres*	*% of Total*
LDR	Low-Density Residential	45.5	12.9%
MDR	Medium-Density Residential	1.2	0.3%
ER	Eastside Residential	4.2	1.2%
NCC	Neighborhood/Community Commercial	6.9	2.0%
GC	General Commercial	12.2	3.5%
DC	Downtown Commercial	2.7	0.8%
O	Office	13.9	3.9%
PQP	Public/Quasi-Public	1.5	0.4%
HI	Heavy Industrial	128.6	36.6%
LI	Light Industrial	113.6	32.4%
DBP	Detention Basins and Parks	20.9	5.9%
Total in City Limits		**415.5**	**100.0%**
-	Outside City Limits (within SOI)	141.2	-
Total		**556.7**	**-**

Source: Dyett & Bhatia, 2007.

Existing General Plan Designations of Vacant Parcels

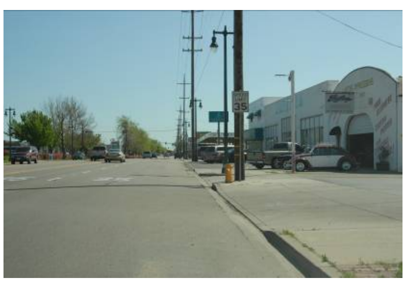
Table 2-10 displays a detailed breakdown of vacant parcels according to 1991 General Plan designations. Roughly 60 percent of the vacant parcels inside City limits are designated for industrial use—31.0 percent for heavy industrial and 30.8 percent for light industrial. These are mostly located in Lodi's eastern industrial zone east of SR-99, as well as some along the railroad tracks.

Other significant vacant land use designations include residential (15.5 percent), and neighborhood/community commercial uses (10.5 percent). Some of the open land in the northeast corner of the city is not considered "vacant" since it is in a significant flood plain and not readily developable.

A cluster of vacant parcels around the ex-rail line on Lockeford, Main, and Sacramento streets provides infill opportunities that could benefit from its proximity to downtown. In general, however, there are not many vacant parcels within Lodi's core neighborhoods. Meanwhile, much of the vacant land located in the new annexation area will be developed as part of the Southwest Gateway Project.



Major commercial activity is concentrated in corridors such as Kettleman (above left and middle) and Cherokee (above right); new residential developments are at increasing distances from these corridors, and infill and reuse opportunities are present(below).



2.6 EXISTING PLANS AND DEVELOPMENT CONTEXT

Existing plans provide a starting point to update the General Plan for Lodi. The vision and the land use and design policies in these plans reflect the expectations of the City and the community for private development and capital improvements. Furthermore, knowledge of the goals of adjacent plans of Stockton, as well as of regional bodies, is needed to enable the updated General Plan to fit into the broader region.

LODI PLANS

Land uses in Lodi are affected by several existing City plans, including the existing General Plan, shown in Figure 2-5.

Lodi General Plan (1991)

The current General Plan was adopted in 1991 as a document of objectives and recommended policies, which have governed all development for past 15 years. The General Plan is broken down into subgroups that reflect the seven elements required by the State—land use, housing, circulation, noise, conservation, open space, and safety—and an additional element on urban design and cultural resources. Also, the City has since updated the Parks, Recreation, and Open Space (1994) and Housing (2004) elements in separate comprehensive documents. State law requires all elements to be consistent with one another. The 1991 General Plan installed the two-percent growth ordinance to manage development in Lodi.

The citywide land use goals laid out in the 1991 Plan update are to:

- Provide for orderly, well-planned, and balanced growth consistent with the limits imposed by the City's infrastructure and the City's ability to assimilate new growth;
- Preserve agricultural land surrounding Lodi and to discourage premature development of agricultural land with nonagricultural uses, while providing urban needs;
- Provide adequate land in a range of residential densities to met the housing needs of all income groups expected to reside in Lodi;
- Promote and retain development in downtown Lodi;
- Provide adequate land and support for the development of office, commercial, and industrial uses that provide goods and services to Lodi's residents, create jobs, and enhance the economy.

- Provide adequate land for development of public and quasi-public uses to support existing and new residential, commercial, and industrial uses;
- Provide for new school facilities as they are needed; and
- Maintain an adequate level of service in the City's water, sewer collection and disposal, and drainage system to meet the needs of existing and projected development.

Lodi 2003-2009 Housing Element (2004)

The Housing Element of the General Plan was updated in 2004. The plan primarily uses the San Joaquin Country Regional Housing Needs Allocation for the 2001-2009 planning period, along with other sources, to determine the community profile, analyses of resources and constraints, and a housing strategy. Findings include the following:

- While the City has been successful in maintaining limited growth, the lack of housing is putting pressure on residents, pushing housing prices and rents up, and making it more difficult for younger families and lower-income households to own their own homes.
- The affordable housing stock decreased significantly between 1990 and 2000. Most homes that are built are detached single-family, and higher density units, such as condo minimum and townhouses, are not significantly more affordable than single family homes.
- Lodi residents are not filling many jobs available in the city, and instead commuting to jobs outside the city. (For more current information on this subject, please see Chapter 3: Circulation and Transportation).
- Even with a two-percent growth ordinance, the City has the capacity to supply more housing units that meets the City and County's projected growth, and provide strategies to manage housing growth, encourage affordable and infill housing, and promote a diversity of housing densities and types.

The Housing Element also includes a series of implementation and financing programs.

Parks, Recreation, and Open Space Plan (adopted 1994)

This plan studies the existing parks and recreation facilities, operations, and services in comparison to the needs of the community, and provides an action plan to implement the necessary amendments to the City's parks and open space system for the years 1994 to 2009.

The plan finds that while the parks system has been successful in serving all residents in the area and receiving high participation rates, there is an extremely large demand for major sports facilities and other recreation programs, but less so for passive recreation amenities.

The plan recommends a range of parks and recreation services improvements and/or expansions, site acquisitions, and management and maintenance changes, as well as a financing and implementation scheme that relies on impact fees, grants, city expenditures, and other outside resources.

Westside Facilities Master Plan (1991)

The City initiated this plan in recognition of potential urban growth in the south-west corner of the Planning Area, between the City Limits and SOI boundary. This plan is intended to identify and plan for the schools, parks and open space, circulation, and storing drainage improvements to support 390 acres of existing and planned growth.

Central City Revitalization Program (1994)

The purpose of this plan is to ensure the dramatic economic and physical improvement of the historic central area of Lodi by instigating a revitalization effort. The Plan concentrates on Lodi's "Old Town" area, which includes Downtown, the Eastside Neighborhood, and parts of Cherokee Lane. The plan recommends a revitalization strategy, public movements, incentive programs, and priority actions.

Downtown Development Standards and Guidelines (1997)

Following the Central City Revitalization Program, this set of guidelines was created to ensure that high quality design was maintained for all new construction and rehabilitation projects in the downtown district. It augments the requirements of the City's Zoning Code. More specifically, it promotes buildings and renovations that strengthen the "Main Street" character of downtown and the pedestrian-friendly environment through site, street, and architectural standards.

Eastside Mobility and Access Plan (2006)

In 2004, the California Department of Transportation awarded the City with a grant to fund this plan. The purpose is to provide improvements to Lodi's Eastside neighborhood, especially focusing on design guidelines, pedestrian and bicycle safety and connectivity, transit service and amenities, vehicular circulation and parking, streetscape elements, and community identity. The study area includes the Lodi Transit Station on Sacramento Street and Pine Street, and Sacramento Street, Lodi Avenue, Central Avenue, and Tokay Street. This plan is still in its drafting stage at the time that this working paper is written. More information about the Eastside neighborhood can be found in the Working Paper on Livability and Urban Design.

Schools Facilities Master Plan (2006)

This recently updated plan by the Lodi Unified School District (LUSD) provides a foundation for improvement and expansion of school facilities. The Lodi Unified School District—which encompasses Lodi, north Stockton, Woodbridge, Victor, Lockeford, and Clements—is concerned about the increasing number of projected new enrollment in the school district as a result of new housing. Overall, LUSD is exceeding its capacity as of 2005, and is projected to serve an increase of 29% by 2015. (For greater discussion on schools, see Chapter 5: Schools and Library.)

Another element is determining the location of future school sites, which should be well integrated into the community as part of a larger land use planning process and located relative to the needs of the district. This plan recommends two elementary schools and a middle school in Lodi, and three high schools in Stockton. Possible school sites are located in west and south of Lodi, as well as in the proposed greenbelt/community separator area.

The 10-year projected costs for the City of Lodi is $235,000,000 and $685,400,000 for the entire school district. The plan states three essential sources of revenue for capital purposes: local bonds, development fees, and state school facility program funding.

The Eastside neighborhood is the densest in Lodi. The City is currently working on a plan to improve mobility and access in the area and will require special focus to ensure that benefits of growth are equitably distributed.

ADJACENT AREA PLANS AND REGIONAL PLANS

The following plans of adjacent communities and regional bodies that affect the City of Lodi.

San Joaquin County General Plan (1992)

This is a countywide General Plan applying to unincorporated areas that contains broad goals, policies, and implementation actions on development and resource management for the years 1992 to 2010. Lodi is one of the seven cities addressed in this General Plan; other are Escalon, Lathrop, Manteca, Ripon, Stockton, and Tracy. Unincorporated communities in the Lodi area include Acampo, Collierville, Coopers Corner, Victor, and Woodbridge.

In summary, the General Plan recognizes the County's growth pressures and the concurrent need to preserve agricultural, environmental, and biological assets. Its strategies support growth mostly around incorporated urban areas, infill in rural communities, and preservation of rural areas and the Mokelumne River confluence. Based on the 2010 projections, the Lodi area, including unincorporated communities, will comprise roughly 10 percent of the county's growth. It also recognizes growth pressures from Stockton in the south.

The Plan shows the Lodi's growth boundaries at Mokelumne River to the north, Harney Lane to the south, preserving agricultural lands beyond these limits. See Figure 2-6 for the map of the County's General Plan.

Land around Lodi, including the proposed greenbelt area, is mostly designated as "general agricultural," aimed at preserving "areas suitable for agriculture...where soils are capable of producing a wide variety of crops and/or supporting grazing[10]." Areas immediately north of the Mokelumne River are labeled "resource conservation," and are planned to remain as open space.

The County General Plan designates the proposed annexation areas as "low density residential," or single residential neighborhoods with typical housing type of detached, single-family housing units in the two to six units per gross acre density range. Flag City is designated as "truck terminals" and "freeway service." Other truck terminal designations are located immediately east of Lodi's City limits, probably to serve the industrial activity.

---

[10] San Joaquin General Plan, The Community Development Department of San Joaquin County.

San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (2005)

This county-wide plan allows voluntary participants to 1) issue incidental-take permits and 2) mitigate impacts to the specified species resulting from greenfield development projects. It is adopted by the San Joaquin Council of Governments (SJCOG), San Joaquin County, and the Cities of Escalon, Lathrop, Lodi, Manteca, Ripon, Stockton, and Tracy. To participate, the applicant must either pay a specified fee based on the location of the project, dedicate habitat lands as conservation easement or fee title, purchase mitigation bank credits, or propose an alternative mitigation plan. Once an incidental-take permit is issued, the plan allows the project applicant to unintentionally "take" a threatened or endangered species listed under the Federal and California Endangered Species acts.

The benefits of participation in the plan include:

- Fulfillment of ESA, CESA, NEPA, and CEQA requirements;
- Provision of consistent and predictable mitigation measures;
- Guarantee of no further mitigation except for Incidental Take Mitigation Measures required in limited cases;
- Provision of a streamlined permitting process that saves time and costs;
- Elimination of costs for both biological surveys and pre-construction surveys for Project Proponents;
- Allowance of off-site mitigation; and
- Protection of covered species.

Lower Mokelumne River Watershed Stewardship Plan (2002)

Prepared by San Joaquin County Resource Conservation District and the Lower Mokelumne River Watershed Stewardship Planning Committee, this voluntary participation plan is an overall approach to preservation of water quality, habitats, and recreational activities provided by the Lower Mokelumne River Watershed. The area stretches from the base of Comanche Dam to the confluence of the Cosumnes and Mokelumne Rivers. The City of Lodi is the only incorporated city within this watershed area. The plan was not officially adopted by any jurisdictions, as it is a voluntary plan.

Stockton General Plan Update (Underway)

The Stockton 2030 General Plan Update is in the drafting stage at the time this report was written, and is expected to be completed by the end of 2007. One major issue addressed in this plan is the expansion of Stockton's SOI to account for the city's tremendous growth in recent years. The General Plan's northern urban boundary is Armstrong Road, which is designated for "village" development up to the SOI limit. (See Figure 2-6.)

[Page left intentionally blank.]

NEARBY DEVELOPMENTS

Stockton

Lodi's large neighbor is undertaking a number of new development projects, in line with its upward growth trajectory. All development projects have asked for a General Plan amendment. Stockton's major projects are listed below in Table 2-11.

Table 2-11: Major Development Projects in Stockton

Name	*Acres*	*Dwelling Units*	*Application Status*
Atlas Tract	360	1,654	Received
Bear Creek East	317	2,050	Received
Bear Creek South	510	2,941	Received
Bear Creek West	1,159	6,811	Received
Cannery Park	450	1,300	Approved
Crystal Bay	172	1,354	Received
Duck Creek Estates	132	950	Anticipated
Empire Ranch	502	2,121	Received
French Camp	810	3,500	Anticipated
Mariposa Lakes	3,810	10,200	Complete
North Stockton Project III	237	1,067	Approved
North Stockton Village	771	3,900	Received
Oakmoore Gateway	530	2,500	Received
Origone Ranch	450	1,500	Received
River Run	2,100	10,500	Received
Riverbend	168	756	Approved
Sanctuary SOI	2,000	7,000	Received
Silver Springs	92	414	Approved
Spanos Gateway	2,231	7,546	Received
Thompson SOI	2,231	7,546	Anticipated
Tidewater Crossing	878	2,492	Received
Westlake	680	2,600	Approved

Source: City of Stockton, March 2007.

These major developments are taking root in a centrifugal pattern near Stockton's urban boundaries. A number of these projects are in North Stockton, edging up against, or in the cases of Spanos Gateway and the Thompson Project, extending past Eight Mile Road. These developments are closing the gap between Lodi and Stockton, and are the reason for Lodi's desire for a greenbelt community separator. None of the developments north of Eight Mile Road (Spanos Gateway and Thompson SOI), however, have filed their Environmental Impact Reports (EIRs) in their applications yet.

In conjunction with its new developments, Stockton has also completed and planned for expansions of various services. To guarantee its 50-year water supply, the City has raised capital for the Goodwin Tunnel that brings bay water to the Stockton East Treatment Plant, and is still establishing funding for the Delta Supply Project along Eight Mile Road to the Sacramento Road Water Treatment Plant, which is in the Lodi General Plan area. Stockton has also established policies to put power centers on the corners of the city, one in Origone Ranch, and another proposed one in Cannery Park.

2.7 PLANNING ISSUES AND IMPLICATIONS

Based on analysis of existing conditions, recent and approved projects, and interviews with stakeholders, the following trends have been identified:

- Residential is the dominant land use in Lodi, and will likely remain so in the coming decades. While detached single-family housing will probably maintain its dominance in both demand and supply in this small town, residential developments are pushing the density boundary, with approved projects providing a surge in medium and high-density housing units (see Recent Developments above) at the City's edges. In fact, the FCB and Blue-Shields Reynolds Ranch Project will provide an estimated 695 medium-density and 833 high-density units.
- According to City staff, Lodi's community has historically been utility oriented, with the concept of master plans based on capacity, logic, and economics. However, the drives now are shifting, with more emphasis on quality design and aesthetics. There has not been a large resistance to higher density residential developments, partly because there have not been many in the City, and partly because people are increasingly appreciative of high quality design.

A well designed open space and recreational system is fundamental to a livable city. Opportunities for new parks and connections, including along canals, can be examined as part of the General Plan.

Handsome street (Pine Street) in the city's downtown residential neighborhood (left). While the City has done much to improve the appearance of arterial streets with median plantings, many of the post-war neighborhoods surrounding downtown and the Eastside could benefit from redesign and more trees.

Lodi's flat topography and Mediterranean climate is conducive to biking and walking through much of the year. While many new bikeways have been designated, many of the City's arterial streets—in their width, design, shade, and the relationship between streets and buildings–are not pedestrian friendly. Most commercial activities outside downtown are located along streets that are wide and carry large traffic columns.

Shorter blocks and more frequent connections between streets and development can promote walking and decrease distances for all transportation modes. Relationship between buildings and streets and open space is also vital –Emerson Park with buildings facing open space, and new neighborhood in Southside, with park fronted by backyards.

- Non-residential intensities, unlike residential projects, show no indication of an upward trend. Recent office and retail developments plans conform to the existing low-intensity scale. The Blue-Shields Reynolds Ranch Project, for example, will have a net FAR of 0.20 (350,000 square feet on 40 acres) for commercial uses and 0.23 for office uses (200,000 square feet on 20 acres). Similarly, Vintner's Square and the Lodi Shopping Center have the big box character with single-story warehouse structures and large surface parking lots. Density and intensity is discussed in more detail in *Working Paper #2: Urban Design and Livability.*

The following discussion identifies opportunities and challenges related to the city's land use, which will be addressed during the preparation of land use alternatives.

1. *What is Lodi's vision of its future?*

The General Plan provides an opportunity for the community to take a step back, and outline a new vision for the coming decades of city building. Initial outreach for the General Plan suggests that this vision would encompass furthering Lodi's small-town character, preserving surrounding agriculture and open space, building on the City's rapidly-maturing wine industry, promoting economic development, and maintaining downtown's revitalization momentum. In addition, several other issues that have cropped up during initial outreach—such as parks an open space, need for access to services, increased and broadened retail opportunities, and the need for senior housing in transit-accessible/walkable settings will be examined as part of the alternatives development process.

One of the main goals of the 1991 Lodi General Plan was to manage the city's growth, protect agricultural lands, and to retain the small town character of Lodi, which resulted in the two-percent growth restriction ordinance. Even with this limitation, over the next 20 years Lodi's population could increase by as much as 40,000 at the outside limit With ongoing and projected growth in both Lodi and Stockton, the City needs to make decisions on how and where to grow. The updated General Plan should also identify the level of development intensity to target for Lodi as well as its ideal height profile—two different but interrelated elements of urban form.

2. *Where should new growth areas be located?*

Since its inception around Elm/Pine streets adjacent to the Union Pacific Railroad, Lodi has grown outward in all directions, although growth has been more pronounced toward the south and the west. The City's northern boundary had touched Mokelumne River by 1960, and by 1980, nearly the entire southern waterfront had been developed with residential subdivisions. Over the past decade, the City has principally grown to the west and the south. The City' southern boundary now has reached the edge of the desired greenbelt with Stockton.

While growth is likely to continue extending westward, growth in only this direction would mean that new development would continue to be located further and further away from the core/downtown. Questions related to direction of growth include:

- Should all growth be concentrated in the west?
- Should industrial areas expand to encompass the southeast quadrant (east of Highway 99)? Given changing regional economics and the decline of manufacturing, should non-residential uses be explored for the southeast quadrant?
- Should development north of Mokelumne River (as suggested by some stakeholders) be explored? This could be accompanied in conjunction with a riverfront park that extends along the northern bank of the river that would provide public access to the length of the river (the southern waterfront is claimed by private residential subdivisions, with almost no public access). This area would also be fairly close to the core/downtown. However, in many people's mind, the river represents Lodi's ultimate northern boundary, and roadway connections across the river will be challenging.
- Should growth east of the city be explored, especially to integrate the proposed Delta College and surrounding residential uses with the rest of the community?

3. *How should infill sites be developed? What is the vision for key corridors such as Kettleman Lane, Cherokee Lane, and Main Street?*

Lodi has developed compactly, and there are few vacant sites within existing City limits. The vast majority of vacant land is at the edges slated for development, or designated for industrial use east of Highway 99.

The total vacant and underutilized acreage in the City is xxx acres, with a fairly conservative definition of what constitutes an underutilized site. Underutilized sites are concentrated along the Union Pacific Railroad/Stockton Street corridor, industrial areas to the east, and well as portions of Kettleman and Cherokee lanes. If more aggressive definitions of underutilized sites are used, additional sites with the same general distribution pattern would result.

While sites east of Highway 99 currently zoned for industrial use are likely to remain as such, other areas—such as along Kettleman and Cherokee lanes, and Main and Stockton streets—offer opportunities for consideration of a broader array of uses. Revitalization of Main Street in particular is an interest of many stakeholders.

4. *How should Lodi leverage its wine industry for tourism?*

As Lodi's wines and wineries gain more acclaim, the City has expressed interest in developing its tourism industry, including through additional lodging facilities, tie-ins with the City's historical heritage and assets such as Lodi Lake, as well as increase in tourist-oriented establishments (wine tasting, restaurants, etc.) downtown. Chapter 6: Tourism Potential of *Working Paper #4: Growth and Economic Development Strategy* examines in detail options for tourism development. Land use planning can help implement strategies that help promote tourist amenities to develop and flourish in downtown Lodi, including hotels—especially in the mid-price range—restaurants, and wine-tasting rooms.

5. *How can downtown Lodi attract more businesses, residents, and other activities to better serve both the community as well as visitors?*

Downtown is the pride and joy for many Lodians. Yet, it is faced with limited parcel sizes and high property values that limit development potential. While many community members see downtown as a logical place for moderate to higher density housing (including for seniors who could be close to amenities) and mixed-use development, the development community remains skeptical of the market for these uses downtown. Similarly, downtown could benefit from addition of office space (and employees in these office spaces would benefit from proximity to restaurants and other downtown amenities); however, the scale of office development downtown has been limited to small renovations, while new and larger developments (such as the Blue Shield call center) are located at the City's edges or along Kettleman Lane.

Policies in the General Plan could help provide incentives for various downtown improvements and attract more businesses, residents, and visitors to create a more vibrant town center with an extended range of uses, activities, and attractions, that is also adjacent to the transit center. The City may also wish to consider strategies that can help parcel consolidation to allow larger establishments to be accommodated downtown.

6. *How can the greenbelt between Lodi and Stockton be achieved?*

There is overwhelming support in the community for a greenbelt between Lodi and Stockton, although there are differences on implementation methods and equity. A community separator will benefit residents of both cities, but disproportionately burden the targeted property owners, who may have to give up their rights to use their land as they please. *Working Paper #4: Greenbelt Strategies* explores issues, opportunities, and case studies related to this topic in detail.

7. *How can community improvements in Eastside neighborhood be accomplished?*

This issue is related to questions of livability. The Eastside neighborhood has undergone major infill and internal subdivisions, and is in need of improvements as well as amenities. The General Plan should derive policies and implementation measures to provide the community incentives for improvement and rehabilitation of both public and private structures.

8. *What densities, character, and use mixes are appropriate for new development?*

A quick look at the City's existing land use pattern reveals a great diversity of uses, small block grid iron pattern, and fine-grained development within a half mile radius of the City's historic center. This area includes virtually all of the uses found in the city in a walkable setting and a great diversity of scales. Both residential and commercial development on the outskirts has tended to be large-scale and single-use in nature, which is easy to develop but consumes large amounts of land and requires driving between destinations. While some of the new approved projects contain more than one use, the uses are still individually arranged within the large sites.

Most of the new growth will occur at the edge of the city, since there are few infill opportunities within the urbanized area. Given the levels of projected growth during the next two decades, maintaining this trend would greatly increase the physical size and amount of traffic in Lodi. Consequently, the updated General Plan may want to consider whether a greater integration of uses, scales, and densities is desirable. Additionally, use of land use regulations and design guidelines to ensure quality design and adequate open space could help imbue a sense of neighborhood and establish more sustainable densities for the city's future.

Urban design issues are addressed in greater detail in *Working Paper #2: Urban Design and Livability*.

9. *What is the future for industrial uses in the city?*

Industrial uses have always been a part of Lodi's economy, yet a large part of the industrial zone in the east is underutilized or vacant. Furthermore, manufacturing uses have been on the decline countywide as well as in Lodi[11], while service jobs have increased. On the other hand, some stakeholders believe that there is a dearth of larger industrially zoned sites in Lodi to attract large employers. The General Plan needs to identify an appropriate strategy for fostering economic and employment

[11] Betwewn 2001 and 2006, Lodi lost 301 manufacturing jobs (decline of 565 in durable goods manufacturing, and increase of 264 jobs in non-durable goods manufacturing).

development. Whether and how to link these trends, particular east of Highway 99, is a key question. This issue is discussed in more detail in *Working Paper #3: Growth and Economic Development Strategy*.

10. *What can be done to reduce potential land use conflicts?*

Conflicts between land uses may occur especially between residential and agricultural or industrial uses. While most existing and future developments will be located in an urban setting, a few residential uses will abut working farms and vineyards, whose noise, smells, and dust may be undesirable to residents. Furthermore, any redevelopment of industrial areas will need to consider what types of land uses and structures will thrive without compromising quality of life for the new users, while enabling nearby viable industrial businesses to continue operations.

11. *How will regional plans and developments affect Lodi?*

Stockton and the San Joaquin County are two separate entities whose actions can directly affect Lodi, especially in the area of the greenbelt community separator. Stockton's development projects are creeping northbound to the Eight Mile Road boundary and threatening to urbanize the remaining land between the two cities. The County's take on the proposed greenbelt and zoning designations may also affect the proposed greenbelt area and the two cities' proposed SOIs. Additionally, Flag City is a commercial node whose land use is managed by the County, as it is for the community of Woodbridge.

12. *What role can the Mokelumne River play in the City's future? Should the City provide more access to the river?*

The river is one of the distinguishing geographic features of the city, and was one of the reasons Lodi founders settled there. While Lodi Lake serves as a very popular recreation destination for the community, there may be opportunities to make the river itself a more accessible public amenity. Possibilities may include a park and open space on the north bank and construction of the West Bank Park. A major factor will be the financing of these natural open space amenities.

3 Transportation

Lodi is positioned in the northern part of San Joaquin County and served by several modes of transportation including highway, transit, bicycle, pedestrian, and rail. The City is located at the confluence of several of Northern California's important inter-regional transportation facilities, including State Route 99 (SR-99), State Route 12 (SR-12), and the transcontinental railroad system (provided by Union Pacific Railroad [UPRR] and Burlington Northern Santa Fe [BNSF]). The safe and efficient transport of people and goods across this multi-modal system is crucial to the social and economic well being of the City – both now and in the future.

This chapter summarizes the current state of the transportation system in the City and includes a brief discussion of the methodologies used to evaluate the current system. Travel trends for the city are summarized, which provides a context for the overall discussion of the transportation system. The sections that follow describe the major transportation elements (i.e., streets, highways, public transportation, bicycle and pedestrian facilities, and freight movement).

3.1 TRAVEL TRENDS

One important measure of travel trends is the rate of change in demand placed on the transportation systems during the past several years. Table 3-1 summarizes the recent changes in demand for highways and transit that serve Lodi. As this information shows, traffic on the State highways entering and exiting Lodi has increased at a moderate pace over the last few years. Ridership on the regional transit service (San Joaquin Regional Transit District, or SJRTD) has recently increased by five percent per year, while the number of passengers using the local Lodi Grapeline bus service decreased over the last few years.

Table 3-1: Changes in Travel Demand by Mode

Travel Mode	*Measurement*	*Annual % Change*
State Route 12	Change in ADT (2002-2005)	+1%
State Route 99	Change in ADT (2002-2005)	+3%
Bus Transit Patrons (SJRTD)	Change in patronage (2002-2004)	+5%
Bus Transit Patrons (Lodi Grapeline)	Change in patronage (2002-2004)	-3%

Notes: ADT = Average Daily Traffic
SJRTD = San Joaquin Regional Transit District

Sources: Caltrans; National Transit Database, 2002 and 2004.

Table 3-2: Work Locations for Lodi Residents

Year	Working Inside Lodi	Working Outside Lodi
1990	49%	51%
2000	46%	54%

Source: U.S. Census Bureau.

Table 3-3: Residential Locations for Lodi Employees

Year	Living Inside Lodi	Living Outside Lodi
1990	64%	36%
2000	51%	49%

Source: U.S. Census Bureau.

According to U.S. Census data, between 1990 and 2000 there have been some shifts in the patterns of where people work and live around Lodi. The work locations for Lodi residents are presented in Table 3-2, and the residential locations for Lodi employees are shown in Table 3-3.

Between 1990 and 2000, the Lodi population increased by about 10 percent, and the information in Table 3-2 shows that there was not much change in the proportion of those people who held jobs within Lodi. In the year 2000, the primary work location for Lodi residents who commuted out of the City was Stockton, where more than 21 percent of Lodi residents worked. About four percent of Lodi citizens commuted to the Sacramento region and about two percent to the Bay Area, with smaller numbers commuting to other cities in San Joaquin and Sacramento Counties.

By contrast, the number of jobs in Lodi increased by over 15 percent between 1990 and 2000, and there was a substantial decrease in the proportion of those jobs that were filled by Lodi residents (dropping from 64 percent to 51 percent). Once again Census data shows a lot of commuting between Lodi and Stockton, with Stockton residents filling about 18 percent of the jobs in Lodi. Galt residents fill about four percent of Lodi jobs, with smaller numbers of workers coming from other cities in San Joaquin and Sacramento Counties.

Census data also provides information regarding commute-related travel trends for City residents. Table 3-4 summarizes the journey-to-work data for Lodi residents in 1990 and 2000. Approximately 76 percent of City residents currently commute via single occupant automobile. This is a decrease of almost four percent since 1990. At the same time, carpooling has increased from 12 percent to 16 percent of commuters, and transit use has increased from 0.1 percent to 0.5 percent of commuters. Bicycling and walking has decreased somewhat from 5.4 percent to 3.9 percent, and the proportion of residents working at home has increased from about two percent to close to three percent.

The average travel time to work has increased from 20 minutes in 1990 to 22.5 minutes in 2000. In addition, the proportion of residents whose travel times exceeded 45 minutes has increased in the last decade, from seven percent to 12 percent. This increase may be partially due to worsening traffic congestion, and partially due to trends in living farther away from the workplace (although, as will be seen in the following section, these trends have not affected Lodi as much as other areas in San Joaquin County). The effects of traffic congestion are also apparent in the statistics on the time of day when people travel to work. Since 1990, there has been a decrease in the proportion of Lodi commuters who leave their homes during "typical" commute hours (7:00 to 9:00 AM), and an almost equivalent increase in those leaving home during the early morning hours (midnight to 7:00 AM). This change correlates with the increased distance to the workplace and the longer duration of the trip.

Table 3-4: Changes in Commute Travel for Lodi Residents

Travel Characteristic	*1990*	*2000*
Commute Mode Choice		
Single Occupant Auto	79.6 %	76.0 %
Carpool	11.9 %	15.8 %
Public Transit	0.1 %	0.5 %
Bicycling/Walking	5.4 %	3.9 %
Other Means	1.1 %	1.2 %
Work at Home	1.9 %	2.6%
Other Commute-Related Data		
Percentage who work outside Lodi	51 %	54 %
Percentage who work outside San Joaquin County	9 %	14 %
Percentage who leave for work between midnight and 7:00 AM	34%	40 %
Percentage who leave for work between 7:00 and 9:00 AM	46%	39 %
Average Travel Time to Work	20.0 minutes	22.5 minutes

Sources: 1990 and 2000 Census, SF-3; SJCOG.

Table 3-5 compares the commute characteristics of Lodi residents to those of San Joaquin County, the State of California, and the United States as a whole. About three-quarters of Lodi and San Joaquin County residents commute via single occupant automobile. This is comparable to the U.S. as a whole, but slightly higher than the average of 72 percent within the State of California. Lodi commuters tend to use carpools more frequently than typical commuters in the rest of the state and the nation, but slightly less than San Joaquin County commuters overall. Public transit usage is much lower in Lodi and San Joaquin County compared to the state and nation, although walking/bicycling rates are similar for all geographic categories. Fewer residents of Lodi commute outside their county of residence than elsewhere in the County or State. Average commute travel times are much lower for Lodi residents than for others in San Joaquin County or the State, reflecting the fact that most Lodi residents work in Lodi or in nearby communities.

Table 3-5: 2000 Census Journey to Work Results

Travel Characteristics	*Lodi*	*San Joaquin County*	*California*	*United States*
Commute Mode Choice				
Single Occupant Auto	76.0 %	74.6 %	71.8 %	75.7 %
Carpool	15.8 %	17.0 %	14.5 %	12.2 %
Public Transit	0.5 %	1.4 %	5.1 %	4.7 %
Bicycling/Walking	3.9 %	3.0 %	3.7 %	3.3 %
Other Means	1.2 %	1.0 %	1.0 %	0.8 %
Work at Home	2.6%	2.9 %	3.8 %	3.3 %
Other Commute-Related Data				
Percentage who work outside County of residence	14 %	23 %	17 %	27 %
Percentage who Leave for Work between midnight and 7:00 AM	40 %	40 %	32 %	31 %
Percentage who leave for work between 7:00 AM and 9:00 AM	39 %	38 %	45 %	47 %
Average Travel Time to Work (minutes)	22.5	29.2	27.7	25.5

Source: 2000 Census, SF-3.

3.2 STREETS AND CLASSIFICATION

The roadway network in Lodi is comprised of freeways, highways, arterials, collectors, and local streets. Each is described in detail below.

Functional Classifications

SR-99 is a major north-south highway that traverses Lodi.

A hierarchy of roadways provides for vehicle travel within the City of Lodi. Freeways are high-speed facilities that move intercity or regional traffic, with access generally limited to grade-separated interchanges. Highways are also higher-speed, regional facilities, but access is provided at-grade in most cases. Arterials are relatively high-volume facilities that connect the regional roadway network to the local roadway network, while collector streets typically connect residential and local-serving commercial areas with the arterial system. The existing Lodi roadway network is shown on Figure 3-1.

Freeways and Highways

State Route 99 (SR-99) is a major north-south highway that traverses the San Joaquin Valley of California, originating near Red Bluff (south of Redding) in northern California and continuing south to Kern County, connecting Sacramento and points north with numerous Central Valley cities including Modesto, Merced, Fresno and Bakersfield. It runs along the eastern side of the City, generally providing two travel lanes in each direction through Lodi. Five interchanges, at Turner Road, State Route 12, Kettleman Lane, Cherokee Lane, and East Harney Lane are provided along the three-mile stretch of SR-99 within the City limits. The bi-directional average daily traffic volume on SR-99 ranges from 65,000 at Turner Road in north Lodi to 74,000 at Cherokee Lane in south Lodi.

SR-12 turns into Kettleman Lane, a primary east-west arterial, within City limits.

State Route 12 (SR-12) crosses the Central Valley, running east-west between State Route 49 to the east and State Routes 29 and 116 to the west. The portion of SR-12 between S. Lower Sacramento Road and SR-99 functions as a major arterial, known as Kettleman Lane. It is a 2.5-mile section that traverses the City in an east-west direction south of the downtown area. SR-12/Kettleman Lane connects SR-99 to I-5 west of the City. SR-12 is concurrent with SR-99 between Kettleman Lane and Victor Road, and continues as SR-12 (Victor Road) to the east of SR-99. The section of SR-12 known as Kettleman Lane currently carries between 27,000 and 41,500 vehicles per day, and the segment known as Victor Road carries approximately 9,700 vehicles per day.

Cherokee Lane, a north-south arterial lined with various commercial activity.

Arterials

The primary function of arterial streets is to connect the regional roadway network with the local roadway network. In many cases, only limited access is provided to abutting parcels. Two to four travel lanes are typically provided on arterial streets in Lodi. The following lists the key north-south and east-west arterials in the City.

North-South Arterials	*East-West Arterials*
Lower Sacramento Road	Turner Road
Ham Lane	Victor Road
Hutchins Street	Lodi Avenue
Stockton Street	Kettleman Lane
Cherokee Lane	Harney Lane

West Harney Lane at North Davis Road.

Collectors

Central Avenue in the Eastside neighborhood is a collector street hosting an array of neighborhood commercial activities.

Elm Street at Church Street.

Collector streets serve to link residential and commercial areas to each other and to the arterial street system. Two travel lanes are typically provided on collector streets in Lodi. Key collectors include:

North-South Major Collectors	*East-West Major Collectors*
Mills Avenue	Lockeford Street
Crescent Avenue	Elm Street
Church Street	Pine Street
Sacramento Street	Tokay Street
Central Avenue	Vine Street

3.3 TRAFFIC CIRCULATION CHARACTERISTICS

The roadway network was evaluated to identify existing operational conditions and deficiencies using three analysis techniques: (1) intersection analyses, (2) roadway segment analyses, and (3) collision data. Analysis results indicate that overall, the City of Lodi roadway network is functioning within capacity, although some deficient conditions were identified. The following describes the analysis results in more detail.

LEVEL OF SERVICE CRITERIA

To measure and describe the operational status of the local roadway network, transportation engineers and planners commonly use a grading system called level of service (LOS). Level of service is a description of a facility's operation, ranging from LOS A (indicating free-flow traffic conditions with little or no delay) to LOS F (representing over-saturated conditions where traffic flows exceed design capacity, resulting in long queues and delays).

Unsignalized Intersections

For unsignalized (all-way stop-controlled and side-street stop-controlled) intersections, the 2000 HCM methodology was utilized. With this methodology, operations are defined by the average control delay per vehicle (measured in seconds) for each stop-controlled movement. This incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue. For side-street stop-controlled intersections, the delay is typically represented for each stop-controlled movement. Table 3-6 summarizes the relationship between delay and LOS for unsignalized intersections.

Table 3-6: Unsignalized Intersection LOS Criteria

Level of Service (LOS)	*Description*	*Average Control Delay Per Vehicle (Seconds)*
A	Little or no delays	≤ 10.0
B	Short traffic delays	> 10.0 to 15.0
C	Average traffic delays	> 15.0 to 25.0
D	Long traffic delays	> 25.0 to 35.0
E	Very long traffic delays	> 35.0 to 50.0
F	Extreme traffic delays with intersection capacity exceeded	> 50.0

Source: Highway Capacity Manual (Transportation Research Board, 2000).

Signalized Intersections

The 2000 HCM methodology was also utilized for signalized intersections. With this methodology, operations are defined by the average control delay per vehicle (measured in seconds). For a signalized intersection, control delay is the portion of the total delay attributed to traffic signal operation. This includes delay associated with deceleration, acceleration, stopping, and moving up in the queue. Table 3-7 summarizes the relationship between delay time and LOS for signalized intersections.

Table 3-7: Signalized Intersection LOS Criteria

Level of Service (LOS)	*Description*	*Average Control Delay (Seconds)*
A	Operations with very low delay occurring with favorable progression and/or short cycle length.	≤ 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	> 10.0 to 20.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	> 20.0 to 35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	> 35.0 to 55.0
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	> 55.0 to 80.0
F	Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	> 80.0

Source: Highway Capacity Manual (Transportation Research Board, 2000).

INTERSECTION ANALYSIS

Several of the major intersections in Lodi were analyzed to determine their current operational characteristics. The intersections analyzed are predominantly along major commercial corridors (such as Kettleman Lane or Lower Sacramento Road) or near the freeway interchanges, and are listed below:

- Victor Road/Highway 12 & Highway 99 Southbound Ramps
- Beckman Road & Highway 99 Northbound Ramps
- Lodi Avenue & Lower Sacramento Road
- Lodi Avenue & Cherokee Lane
- Kettleman Lane/Highway 12 & Lower Sacramento Road
- Kettleman Lane & Ham Lane
- Kettleman Lane & Hutchins Street
- Kettleman Lane & Stockton Street
- Kettleman Lane & Cherokee Lane
- Kettleman Lane & Highway 99 Southbound Ramps
- Kettleman Lane & Highway 99 Northbound Ramps

Existing peak hour intersection volumes, lane configurations, and traffic control information were used to calculate existing intersection operations. Intersection service levels are presented in Table 3-8 for the eleven intersections.

Table 3-8: Existing Intersection Levels of Service

Intersection	*Traffic Control*	*Peak Hour*	*Delay (seconds)* [3]	*LOS*[3]	*Count Date*
Victor Road / SR-99 SB Ramps	SSSC[1]	AM PM	4 (13) 3 (19)	A (B) A (C)	Nov. 2006
Beckman Road / SR-99 NB Ramps	SSSC[1]	AM PM	8 (13) 9 (15)	A (B) A (C)	Nov. 2006
Lodi Avenue / Lower Sacramento Road	Signal[2]	AM PM	25 25	C C	Nov. 2006
Lodi Avenue / Cherokee Lane	Signal[2]	AM PM	20 27	C C	Nov. 2006
SR-12/Kettleman Lane / Lower Sacramento Road	Signal[2]	AM PM	23 27	C C	Nov. 2006
Kettleman Lane / Ham Lane	Signal[2]	AM PM	30 47	C D	Nov. 2006
Kettleman Lane / Hutchins Street	Signal[2]	AM PM	31 56	C E	Nov. 2006
Kettleman Lane / Stockton Street	Signal[2]	AM PM	31 45	C D	Nov. 2006
Kettleman Lane / Cherokee Lane	Signal[2]	AM PM	28 35	C D	May 2005
Kettleman Lane / SR-99 SB Off Ramp	Signal[2]	AM PM	15 16	B B	Nov. 2006
Kettleman Lane / SR-99 NB On Ramp	Signal[2]	AM PM	16 21	B C	Nov. 2006

1. Notes: **Bold** denotes locations where level of service threshold (LOS C) is exceeded.
2. Side-street stop intersection level of service based on worst approach control delay per vehicle, according to the 2000 Highway Capacity Manual.
3. Signalized intersection level of service based on weighted average control delay per vehicle, according to the 2000 Highway Capacity Manual.
4. Delay and LOS for side-street stop intersections is shown as intersection average (worst approach).

Source: Fehr & Peers, 2007.

Most of the intersections operate at LOS C or better (which is the threshold for acceptable operations consistent with current Lodi General Plan policies). Four intersections along Kettleman Lane operate at LOS D or E during the afternoon peak hour: Ham Lane, Hutchins Street, Stockton Street, and Cherokee Lane.

ROADWAY AND FREEWAY SEGMENT ANALYSIS

Figure 3-2 displays the average daily traffic volumes for the 106 local roadways, 32 County roadways, and seven freeway segments evaluated in this report. The service level was determined for each roadway and freeway segment by comparing the existing volume to the capacity of the segment (see Table 3-9 for the LOS thresholds, and Appendix A for detailed results). Of the existing roadway segments included in the analysis, ten operate at LOS E or F, four operate at LOS D, and the remaining 92 operate at LOS C or better. All of the County roads analyzed operate at LOS C or better. Of the freeway segments studied, three operate at LOS E or F, one operates at LOS D, and the remaining three operate at LOS C or better.

Table 3-9: Roadway Segment Daily Volume Level of Service Thresholds

# of Lanes	*Facility Type*	*LOS A*	*LOS B*	*LOS C*	*LOS D*	*LOS E*	*LOS F*
6	Freeway	67,500	78,750	90,000	101,250	112,500	> 112,500
4	Freeway	45,000	52,500	60,000	67,500	75,000	> 75,000
2	Freeway Ramp	18,000	21,000	24,000	27,000	30,000	> 30,000
1	Freeway Ramp	9,000	10,500	12,000	13,500	15,000	> 15,000
6	Divided Arterial	27,000	31,500	36,000	40,500	45,000	> 45,000
4	Divided Arterial	21,000	24,500	28,000	31,500	35,000	> 35,000
4	Undivided Arterial	15,000	17,500	20,000	22,500	25,000	> 25,000
2	Arterial	10,500	12,250	14,000	15,750	17,500	> 17,500
4	Collector	10,700	12,500	14,300	16,100	17,900	> 19,600
2	Collector	7,500	8,750	10,000	11,250	12,500	> 12,500
2	Residential Street	3,000	3,500	4,000	4,500	5,000	> 5,000

1. Note: Volume thresholds for LOS E are based on data from the City of Lodi Citywide Circulation Study. Volume thresholds for the other levels of service are calculated based on percentages of the LOS E volume threshold. The volume thresholds for a 4-lane collector were developed by applying the ratio of volumes for a 4-lane vs. a 2-lane arterial to the thresholds for a 2-lane collector.

Source: City of Lodi Citywide Circulation Study, July 1990.

TRAFFIC SAFETY

All reported traffic collisions in Lodi for the years 2002 to 2005 as recorded by the California Highway Patrol are shown in Table 3-10. Based on this data, Lodi experiences between two and five fatal collisions per year and three- to four-hundred injury collisions per year. Property damage collisions amount to between 850 and 950 per year. Alcohol-involved collisions account for between eight and 12 percent of all injury collisions and 20 to 50 percent of all fatal collisions. Pedestrian collisions account for between six and seven percent of all injury collisions and up to one-third of all fatal collisions. Bicycle collisions account for between five and 11 percent of all injury collisions, and motorcycle collisions account for between two and four percent of all injury collisions. There were no fatal bicycle or motorcycle collisions in Lodi over this three-year period. Most collision types, including total injury, total property damage only, pedestrian, bicycle, and motorcycle, as well as driver and passenger injuries decreased over the three-year period. Total fatalities and alcohol-involved collisions increased over the three years.

Table 3-10: Lodi Traffic Collisions 2002-2004

Year	*TOTAL*			*Alcohol Involved*		*Pedestrian Involved*		*Bicycle Involved*		*Motorcycle Involved*	
	F	*I*	*PD*	*F*	*I*	*F*	*I*	*F*	*I*	*F*	*I*
2002	2	375	946	1	30	0	25	0	25	0	11
2003	3	363	900	0	29	1	27	0	39	0	14
2004	5	298	859	1	37	1	17	0	16	0	7

1. Note: F=Fatal; I=Injury; PD=Property Damage

Source: California Highway Patrol Statewide Integrated Traffic Records System (SWITRS), Tables 8A, www.chp.ca.gov/switrs/

The top ten locations where traffic collisions were reported within the City of Lodi for the five years between 2001 and 2006 are shown in Table 3-11. Not surprisingly, traffic collisions tend to occur on the most heavily traveled corridors in the City. The highest number of collisions occurred at the intersection of Cherokee Lane and Kettleman Lane, where 151 collisions resulting in 43 injuries were reported.

Table 3-11: Summary of Traffic Collisions (2001-2006) Intersections with Most Collisions

	Collision Count	*Injuries*	*Fatalities*
Cherokee Lane & Kettleman Ln.	151	43	0
Hutchins St & Kettleman Ln.	110	52	0
Ham Lane & Kettleman Ln.	97	34	0
Church St & Lodi Ave	90	32	0
Stockton St & Kettleman Ln.	83	34	0
Church St & Kettleman Ln.	79	34	0
Mills Ave & Kettleman Ln.	76	38	0
Cherokee Lane & Lodi Ave.	72	30	0
Stockton St & Lodi Ave.	68	34	1
Cherokee Lane & Lockeford St.	66	23	0

Source: Statewide Integrated Traffic Reporting System, California Highway Patrol, 2001-2006.

3.4 PUBLIC TRANSPORTATION

A variety of transit services are provided in Lodi, as shown on Figure 3-3, including fixed-route local bus, intercity bus service, and demand responsive service. The City of Lodi has a multi-modal station (the Lodi Transportation Center) located downtown at Pine and Sacramento Streets that serves as a transfer point for buses serving local and regional destinations, as well as for Amtrak rail service. The following provides a summary of the transit services currently available in the City.

The City of Lodi works to ensure that adequate transit provisions are included in local plans. Transit-oriented development is encouraged in the downtown area, particularly in proximity to the Lodi Transportation Center. Plans for new developments throughout the City are reviewed to ensure that transit-supportive amenities (bus shelters, signage, easy pedestrian access to bus stops, etc.) are included.

LODI GRAPELINE

Grapeline buses are a city-wide transit service installed in 1994.

The Lodi Grapeline provides local fixed-route and dial-a-ride bus service in Lodi with about 33 vehicles in the fleet. There are five fixed routes; each starts and ends at the Lodi Transportation Center. Service is provided on 45-minute headways on weekdays between 6:15 AM and 7:00 PM, and on weekends between 7:45 AM and 3:00 PM. The routes connect with SJRTD bus lines to Manteca, Lathrop, Tracy and Stockton, as well as South County Transit (SCT/LINK) to Galt, Elk Grove and Sacramento and Calaveras Transit to Calaveras and Amador Counties. There are also three express routes that run during limited hours, specifically peak AM and PM hours, throughout the week, and mostly serve students traveling to school. Annual transit ridership is just over 470,000, which equates to approximately 8 annual transit trips per resident.

- Route One covers northern and western Lodi, traveling along North Church Street, Turner Road, and Lower Sacramento Road.
- Route Two travels through central Lodi, along Central Avenue and Kettleman Lane.
- Route Three runs through central Lodi, along Lockeford Street, Elm Street, and Ham Lane to Harney Lane.
- Route Four covers central and south-western Lodi, traveling along Lodi Avenue, Fairmont Avenue, Vine Street, South Church Street, Century Boulevard, and Mills Lane.
- Route Five includes eastern Lodi, traveling along Cluff Avenue, Cherokee Lane, and Almond Drive.

The Grapeline's Dial-a-Ride service provides curb-to-curb transportation to persons who, due to a disability, are unable to get to or from the fixed-route bus stops. This service is wheelchair accessible and is available by appointment. Buses provide service on weekdays between 8:00 AM and 9:00 PM, on Saturdays between 8:00 AM and 5:00 PM, and on Sundays between 8:00 AM and 3:00 PM.

SAN JOAQUIN REGIONAL TRANSIT DISTRICT

The SJRTD provides two inter-city bus routes that connect major destinations in Lodi and Stockton. Route 23 runs between the Lodi Transportation Center and downtown Stockton, with transfers to local buses at several stops. Service is provided on weekdays from 5:20 AM to 10:00 PM on roughly one-hour headways. Route 24 runs between the Lodi Transportation Center and the Kaiser Permanente Hospital at Hammer Lane and West Lane in northwest Stockton. Service is provided on weekdays from 7:00 AM to 7:00 PM on one-hour headways. Three other SJRTD intercity routes connect Stockton with Lathrop, Manteca, Modesto, Ripon, and Tracy.

SJRTD Hopper Service is a flexible fixed-route service connecting Escalon, Lathrop, Manteca, and Woodbridge to Lodi, Stockton, and Tracy. This service replaces the SJRTD Countywide General Public Dial-A-Ride (DAR), Rural Elderly & Disabled DAR, and County Area Transit (CAT) Fixed-Route during Hopper service hours in the areas covered by the Hopper. Most buses will deviate up to ¾-mile for those passengers that are ADA-certified and are unable to reach the fixed-route stops. Advance reservations are required for all route deviations. However, buses will not deviate from stops in Lodi. Passengers requiring route deviation in Lodi may use the Lodi Grapeline/Dial-a-Ride system.

SJRTD Hopper Route 93 connects Lodi and Stockton with stops at the Community Center for the Blind, Delta College, Sherwood Mall, and other destinations. Service is provided approximately every two hours on weekdays from 8:30 AM to 6:00 PM, and on Saturdays and Sundays from 8:00 AM to 3:30 PM.

The SJRTD also provides an Inter-regional Commuter Service, which is a subscription commuter bus service designed to help commuters who travel more than 50 miles each way to work. A total of 20 subscription buses connect San Joaquin County to Sacramento, the San Francisco Bay Area, and the Bay Area Rapid Transit (BART) system.

ALTAMONT COMMUTER EXPRESS

The Altamont Commuter Express (ACE), operated by the San Joaquin Regional Rail Commission, is a heavy rail service that connects the Central Valley with the Silicon Valley and other destinations in the San Francisco Bay Area. According to data provided by the ACE Authority, service initially began in October 1998 with two outbound trains in the AM and two inbound trains in the PM. A third train was added in March 2001. Currently, four AM outbound and four PM inbound trains provide service between Stockton and San Jose, with stops in Lathrop-Manteca, Tracy, Vasco Road, Livermore, Pleasanton, Fremont, Great America, and Santa Clara. ACE service is oriented towards commuters, with operation Monday through Friday and limited or no service on weekends and holidays. Lodi passengers can access the ACE train in Stockton by taking the SJRTD route 23 bus and transferring to a local bus or walking several blocks to the station. The Regional Rail Commission is undertaking feasibility studies for a potential future service connecting Stockton and Sacramento; if that service used the rail alignment along SR-99, a stop would be offered at the Lodi station.

INTERCITY BUS

Greyhound Bus Lines, a national bus company, has a station at 22 South Sacramento Street in Downtown Lodi, with buses operating from approximately 5:45 AM to 9:15 PM. The office is open on weekdays only from 8:00 AM to 5:00 PM.

AMTRAK

Lodi's Amtrak station is located at 24 South Sacramento Street, and is open from 6:45 AM to 5:30 PM. The Lodi station is on the San Joaquins route, which connects Oakland and Sacramento to Bakersfield, with stops in Stockton, Turlock-Denair, Merced, Madera, Fresno, Hanford, Corcoran, and Wasco, as well as Antioch-Pittsburg, Martinez, Richmond, and Emeryville. There are six San Joaquins trains in each direction between approximately 7:15 AM and 5:00 PM (southbound), and 9:15 AM to 10:30 PM (northbound). Two of those trains travel between Sacramento and Bakersfield, and stop at the Lodi Amtrak station. The other four trains travel between the Bay Area and Bakersfield; from Lodi, passengers can access those trains by riding a bus to the Stockton Amtrak station.

The newly restored historic multimodal station on Sacramento Street provides rail access for commuters.

CARPOOLING AND VANPOOLING

The San Joaquin Council of Governments (SJCOG) operates Commute Connection, which provides referral services to those interested in joining a car or vanpool. Match lists can be obtained by calling or submitting an online application to Commute Connection.

PARK-AND-RIDE FACILITIES

Lodi has three free park-and-ride facilities, as described in Table 3-12. All lots provide connections to public transportation and are equipped with lighting; one provides bicycle parking. All lots provide between 30 and 40 parking spaces. In addition, a new park-and-ride lot is planned at SR-99 and Harney Lane, and Caltrans District 10 is performing feasibility studies for park-and-ride lots as part of all new interchange and interchange modification projects.

Table 3-12: Park-and-Ride Facilities

Location	*Transit Connections*	*Parking Spaces*	*Bike Parking*	*Lighting*
Route 99 and Victor Road (UJ Restaurant)	N/A	30	Yes	Yes
Route 99 and East Route 12 at Victor Road	SJRTD	40	No	Yes
I-5 at Route 12; Flag City	SJRTD	35	No	Yes

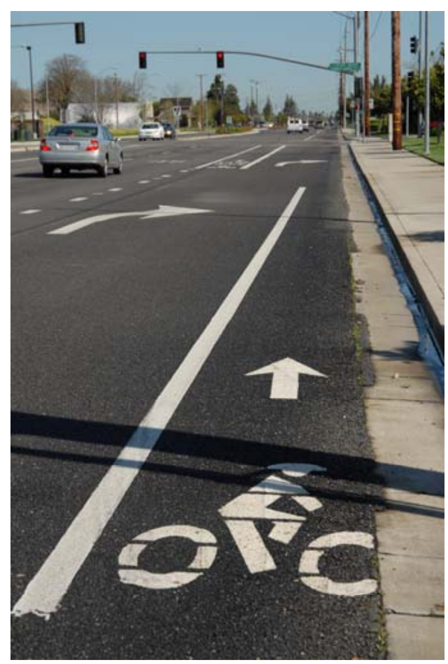
Source: 511.org (Bay Area Rideshare).

3.5 NON-MOTORIZED TRANSPORTATION

The generally level terrain makes bicycling and walking viable forms of mobility for both daily transportation and recreational purposes within the City of Lodi. As shown earlier in Table 3-4, approximately four percent of Lodi residents report bicycling or walking to work; while it is harder to measure, it is apparent from observations that bicycling and walking are popular methods for children to travel to school and for people to achieve their recreational and exercise goals. The following discusses Lodi's existing bicycle and pedestrian systems.

BICYCLE NETWORK

The City of Lodi's existing network of bicycle facilities includes on-street bicycle lanes and bicycle routes. Bicycle facilities are generally divided into Class I Bikeway (Bike Path) - A completely separate facility designated for the exclusive use of bicycles and pedestrians with vehicle and pedestrian cross-flow minimized. Currently there are no Class I Bikeways in the City. However, there is a paved path around Lodi Lake from the swimming area to Lower Sacramento Road, and a multi-use path around the lake that allows vehicle, bicycle, and pedestrian use.



Class II bikeways can be found on Kettleman Lane.

Class II Bikeway (Bike Lane) – A striped lane designated for the use of bicycles on a street or highway. Vehicle parking and vehicle/pedestrian cross-flow are permitted at designated locations. Noteworthy Class II bicycle lanes are provided on segments of Lower Sacramento Road, Mills Avenue, Hutchins Street, Kettleman Lane, Harney Lane, Century Boulevard, and Elm Street. Additional Class II lanes are proposed on several streets, including segments of Stockton Street, Lodi Avenue, Cherokee Lane, Harney Lane, and Guild Avenue.

Class III Bikeway (Bike Route) – A route designated by signs or pavement markings for bicyclists within the vehicular travel lane (i.e., shared use) of a roadway. Portions of Beckman Road and Elm Street are currently designated as Class III bicycle routes, and additional Class III routes are proposed for segments of Turner Road, Ham Lane, Lockeford Street, Lodi Avenue, Hutchins Road, and Cherokee Lane.

Bicycle lanes are designated in some neighborhoods, but not in others.

A relatively new type of bicycle facility is the Bicycle Boulevard. This is an unofficial classification that is not included in the Caltrans Design Manual, but is referenced in the City's Bicycle Transportation Master Plan. Bicycle Boulevards are streets on which bicycles have priority over other modes. They can have features such as forced right turns for vehicles (but not for bicycles and pedestrians), special signage, "flipped stop signs" (cross street stops instead of the street with the bicycle boulevard), and street closures to restrict vehicle access. Lodi's Bicycle Transportation Master Plan suggests designating Bicycle Boulevards on several streets, including Calaveras Street, Central Avenue, Crescent Avenue, Holly Drive, Vine Street, and Walnut Street.

Bicycle racks are provided on some streets in Downtown Lodi, and at some commercial and office buildings. Lodi's 1994 Bicycle Transportation Master Plan recommends that the City require all new commercial construction and renovation to provide bicycle parking as well as showers for employees. The Bicycle Master Plan also recommends that the City encourage existing businesses to provide showers for employees.

The Unincorporated San Joaquin County Bikeway Plan (2002) acknowledges the importance of regional and multimodal connections for bicyclists and encourages additional support for facilities and bicycle safety programs.

Multi-modal facilities where individuals can transfer to another mode of travel are essential to bicyclists because they allow bicyclists to access transit where obstacles may inhibit bike travel. To encourage multi-modal connections, all Grapeline buses have bicycle racks.

The existing and proposed bicycle facilities are shown on Figure 3-4. A total of 21 miles of bicycle facilities are currently provided in the City, with most designated as Class II bicycle lanes and a short segment designated as a Class III bicycle route. An additional 20 miles of Class II lanes, 11 miles of Class III routes, and 7.5 miles designated as Bicycle Boulevards are proposed in the Bicycle Master Plan. The proposed future bicycle facilities fill in some of the missing components of the bicycle grid network, serving some important crosstown streets such as Lodi Avenue, Turner Road, Ham Lane and Cherokee Lane. Bicycle lanes are also proposed to be extended on several streets east of SR-99, as well as along Lower Sacramento Road across the Mokelumne River and along Lodi Avenue/Sargent Road and Kettleman Lane (SR-12) west of the City. The proposed bicycle lane along Kettleman Lane (SR-12) is planned to extend to approximately Davis Road, and then turn into a Class III bicycle route and extend all the way to the boundary of San Joaquin County (according to the County Bikeway Plan).

BICYCLE SAFETY

A total of 175 vehicular collisions involving a bicycle were reported during the period between 2001 and 2006, with 151 injuries and no fatalities. Table 3-13 lists the ten locations where most bicycle collisions were reported. Six collisions were reported at both Church Street/Kettleman Lane and Hutchins Street/Kettleman Lane.

Table 3-13: Summary of Collisions Involving Bicycles (2001-2006) Intersections with Most Collisions

	Collision Count	*Injuries*	*Fatalities*
Church St & Kettleman Lane	6	3	0
Hutchins St & Kettleman Lane	6	2	0
Church St & Lodi Ave	4	3	0
Crescent Ave & Kettleman Lane	4	3	0
Central Ave & Pine St	3	2	0
Cherokee Lane & Victor Rd	3	2	0
Cherokee Lane & Vine St	3	3	0
Church St & Locust St	3	3	0
Church St & Tokay St	3	2	0
Ham Lane & Lockeford St	3	2	0

Source: Statewide Integrated Traffic Reporting System, California Highway Patrol, 2001-2006

Pedestrian Network

The pedestrian network in Lodi consists primarily of sidewalks. Downtown Lodi has excellent pedestrian facilities, including wide, textured sidewalks, curb ramps, and pedestrian signals, as well as landscaping and attractive street furniture such as street lamps, kiosks, and benches. Downtown also has many pedestrian-oriented buildings with interesting storefronts and outside seating. The older residential areas surrounding downtown also have complete sidewalks, curb ramps, and other pedestrian infrastructure. Sidewalks and other pedestrian facilities are sometimes not provided in the outlying neighborhoods and lower-density, more rural areas. There is also a nature trail and a bicycle/pedestrian path at Lodi Lake.

PEDESTRIAN SAFETY

A total of 175 vehicular accidents involving a pedestrian were reported during the period between 2001 and 2006, with 133 injuries and three fatalities. Table 3-14 lists the ten locations where most pedestrian collisions were reported. Six collisions, resulting in four injuries, were reported at the Stockton Street/Tokay Street intersection. Four collisions each were reported at the intersections of Cherokee Lane/Elm Street and Garfield Street/Lodi Avenue.

Table 3-14: Summary of Collisions Involving Pedestrians (2001-2006) Intersections with Most Collisions

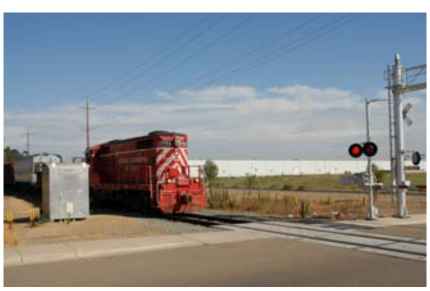
	Collision Count	*Injuries*	*Fatalities*
Stockton St & Tokay St.	6	4	0
Cherokee Lane & Elm St.	4	3	0
Garfield St & Lodi Ave.	4	4	0
Cherokee Lane & Pine St.	3	2	1
Fairmont Ave & Kettleman Ln.	3	3	0
Pacific Ave & Elm St.	3	2	0
Tienda Dr & Kettleman Ln.	3	1	0
Cherokee Lane & Hale Rd.	2	2	0
Cherokee Lane & Oak St.	2	2	0
Cherokee Lane & Victor Rd.	2	2	0

Source: Statewide Integrated Traffic Reporting System, California Highway Patrol, 2001-2006.

3.6 FREIGHT TRANSPORTATION SYSTEMS

Freight transportation systems in the City of Lodi consist of rail and truck facilities. Figure 3-5 shows the rail facilities and designated truck routes.

RAIL



The CCTC railroad serves industrial and warehouse uses on the eastside of the city.

Two railroads operate within Lodi. The Southern Pacific Railroad (SPRR), now part of the Union Pacific Railroad (UP), operates from the Lodi Transportation Center at Pine and Sacramento Streets. SPRR serves 23 western states as well as Mexico and Canada, and operates a major intermodal facility and other terminal operations in nearby Stockton. In addition to SPRR, a short line railroad, the Central California Traction Company (CCTC), also operates from the Lodi Transportation Center. The CCTC, which is jointly owned by the Burlington Northern Santa Fe Railroad (BNSF) and the Union Pacific Railroad (UP), operates 52 miles of freight service between Stockton and Lodi and is the short line operator for the Port of Stockton. CCTC connections are made with BNSF, UP, and the Stockton Terminal & Eastern (STE) Railroads, which runs from Stockton to Linden. The 25 miles of freight service operated by STE includes connections with the BNSF, UP, Tidewater Southern, and CCTC.

TRUCKING

Trucking in Lodi includes 24 regularly scheduled truck lines and 90 contract carriers. Truck routes in the city consist primarily of the State Highway system and the major arterials within the City. There are STAA (Surface Transportation Assistance Act) truck routes on segments of Turner Road, Lower Sacramento Road, Kettleman Lane, Hutchins Street, Stockton Street, Cherokee Lane, Victor Road, and Beckman Road. Commercial vehicles with more than two axels are prohibited on segments of Mills Avenue, Holly Drive, Tokay Street, and Almond Drive, and trucks (except for pickups and deliveries) over two axels are also prohibited on segments of Turner Road and East Lodi Avenue (see Figure 3-5). Additionally, truck parking is allowed only on certain streets east of SR-99, including segments of Turner Road, Cluff Avenue, Thurman Road, Vine Street, and Guild Avenue.

Of particular importance are SR-99 and SR-12, which are major truck routes connecting Central Valley cities to other metropolitan areas throughout the state. As shown in Table 3-15, truck traffic accounts for between six and 13 percent of traffic on these two inter-regional facilities.

Table 3-15: Current Daily Truck Volumes

Route Segment	*Total Daily Traffic*	*Truck Traffic*	*Percent Truck Traffic*
SR-99 – South of SR-12 West Junction	67,000	8,911	13 %
SR-99 – North of SR-12 East Junction	66,000	8,844	13 %
SR-12 – West of South Ham Lane	41,500	3,735	9 %
SR-12 – West of SR-99 Junction	23,000	2,346	10 %
SR-12 – East of SR-99 Junction	11,700	702	6 %

Source: 2005 Annual Average Daily Truck Traffic on the California State Highway System, Caltrans, November 2006.

3.7 EXISTING POLICIES

The 1991 General Plan prioritizes retaining Lodi's small-town community character and preserving agricultural land through a series of growth management measures. These include a limit on the number of residential development permits allocated each year, application of a growth management program on all developments of five units or greater except for senior housing, and institution of a point system for residential development that considers conflicts with agricultural land, preservation of open space, and promotion of circulation and traffic level of service.

A few of the major goals and policies from the current General Plan are listed below:

- *Goal A, Policy 1*: The City shall strive to maintain Level of Service C on local streets and at intersections.
- *Goal A, Policy 2*: The City shall time the construction of new development such that the time frame for completion of the needed circulation improvements will not cause the level of service goals to be exceeded.
- *Goal G, Policy 2*: The City shall promote employment opportunities within Lodi to reduce commuting to areas outside Lodi.
- *Goal G, Policy 4*: The City shall encourage mixed-use developments that promote pedestrian and non-vehicular travel.

3.8 PLANNING ISSUES AND IMPLICATIONS

FUTURE CHALLENGES AND OPPORTUNITIES

Major Transportation Challenges, Opportunities, and Issues Include:

1. ***How should land use and transportation be best integrated?***

Because of Lodi's location and its characteristics as a relatively small, self-contained city, Lodi residents spend less time traveling than residents in other parts of San Joaquin County. As Lodi expands in the future, the City will face the challenge of ensuring that adequate jobs, business services and retail opportunities exist within the City so that residents can continue to meet their daily needs within a relatively short distance of their homes. The City may consider strengthening the standards for new development to require a mixture of uses (residential, commercial, offices, schools), and define performance measures to ensure that new developments are designed to support walking and bicycling to the greatest extent possible by providing direct street connections and/or extensive pedestrian and bicycle path systems.

In addition, the enhancement of local and regional transit services will likely be of greater concern as the City develops over the next 20 years. The local bus services are already experiencing the effects of traffic congestion in certain parts of the City, and are exploring options for implementing traffic signal priority or other systems to ensure more reliable transit travel times. Planning studies involving transit-oriented development in the downtown Sacramento Street corridor will soon be underway, and a realignment of the current downtown-focused bus route structure may be undertaken to better serve the new development areas in the west and south parts of town. Further investigation of options for providing transit shuttle services to those visiting local wineries may also be of use as the City continues to strengthen the tourism component of its economy.

2. *Should the City consider establishing different Level of Service standards in different parts of the City?*

While Lodi aims to preserve agricultural land by encouraging higher densities, mixed-use development, and pedestrian amenities in the developed areas of the City, its current Level of Service standard encourages relatively free-flowing traffic (maintaining LOS C on local streets), which is difficult to achieve and sometimes undesirable in dense, pedestrian-oriented environments.

Instead of the current uniform LOS policy, the City may consider a flexible policy that allows roadways in more densely developed areas to operate at lower levels of service (i.e., LOS E or even F), in exchange for the characteristics of a more compact urban environment in which walking, bicycling, and transit are more attractive transportation options. Another option would be to exempt certain areas, such as downtown, from a Level of Service standard altogether. Such a policy would recognize that traffic congestion is indicative of a thriving place, and is conducive to alternative modes of transportation by creating slower travel speeds and a more pedestrian-supportive environment.

3. *How should connections for pedestrians and cyclists be enhanced?*

Lodi's terrain and its grid street system combine to support walking and bicycling as attractive forms of local transportation. A grid street system allows for easy way-finding and direct routes between a traveler's origin and destination. The City may consider applying standards to new development areas to ensure that the new street system follows a grid pattern to the greatest extent possible, and that there are multiple points of connection between the new development area and adjacent existing neighborhoods.

4. What improvements are appropriate for Kettleman Lane?

Kettleman Lane is both a State highway of regional importance, and one of the major commercial corridors in Lodi. The City's issues of problematic traffic operations and high levels of delay are largely confined to the Kettleman Lane corridor. There are plans to add capacity to the Kettleman Lane corridor, which will require ongoing coordination with Caltrans.

4 Parks, Recreation, and Open Space

Parks and open space are essential in any city, especially in small towns like Lodi where they hold an important place in building community bonds and identity. These green spaces provide opportunities for relaxation, informal sports, passive recreation like walks and bird watching, and a break from the stresses of everyday life. They also serve as important gathering places in a community, where people can casually meet or simply observe the diversity of lifestyles and backgrounds in their neighborhoods. These activities need to be supported with an adequate supply of accessible and appropriately developed space. A city should have parks with a distribution and form that allows them to be enjoyed by workers during the day, used by children and the elderly close to their homes, and to serve as a point of focus for residential neighborhoods.

Lodi already has a diverse range of well-maintained parks that serve various segments of the community—Lodi Lake nature area, the Grape Bowl stadium, Kofu skateboard park and swimming pool, to name a few. Sites for two new parks—Borchardt Park and the Indoor Sports Complex—have been acquired, and one proposed park from the 1994 Park, Recreation and Open Space Plan —Century Meadows Park—has been developed and is now highly utilized by the community. Yet, Lodi continues to face financing challenges when it comes to parkland acquisition and development. Many of the proposed parks remain undeveloped, although some are waiting for implementation process.

Hale Park provides recreational amenities in the Eastside neighborhood.

An aging population and an increasingly diverse community necessitate that park and open space needs are constantly reassessed. This chapter reviews the City's existing parks, recreation, and open space facilities and programs—both quantitatively and qualitatively—in order to identify challenges and opportunities. It also evaluates existing implementation mechanisms for parks and open space acquisition and development funding as they pertain to the projected population growth and changing demographic needs of the community.

4.1 EXISTING PARKS AND FACILITIES

This section presents the existing conditions of Lodi's parks, recreational programs, recreational facilities, and open space areas. Data was largely obtained from the City's 1994 Park, Recreation and Open Space Plan and communication with City staff.

The comprehensive Park, Recreation, and Open Space Plan was adopted in 1994, providing a detailed study, plan, and implementation strategy for parks and open space in Lodi. At the time of the plan, there were 21 developed and four undeveloped parks and open spaces. Today, there are 24 developed and six undeveloped parks and open spaces. Table 4-1 details the addresses, type, and breakdown of park and basin acres for each of the existing parks and open spaces. As the table shows, basins play a large role in the provision of parks and open spaces, accounting for 59 percent of all parkland.

Figure 4-1 illustrates the City's 2007 existing parks and open spaces, and their location and ¼-mile radii. The ¼-mile radius is considered comfortable walking distance (five to 10 minutes) from surrounding neighborhoods.

PARK TYPES

The 1994 Parks Master Plan divides parks into five categories: mini-park, neighborhood parks, community park, regional park, natural open space areas, and special uses areas.

Mini-Parks

Emerson Park is a neighborhood park located close to downtown.

Mini-parks include tot lots, children's playground, and other small single purpose play lots designed primarily for very young children. Due to their petite size, facilities are usually limited to a small open grass area, a children's playground, and occasional picnic site. The 1994 Parks Plan suggests that mini-parks should only occur in areas that are fully developed or where vacant land is scarce. The two mini-parks in Lodi are Candy Cane Park and Century Park.

Neighborhood Parks

Neighborhood Parks compose of playgrounds and parkland primarily designed for non-supervised and non-organized recreation. They also serve as passive recreation open space. Ideally, neighborhood parks serve a ½-mile radius area Currently, there are 12 neighborhood parks in Lodi, with Century Meadows and Borchardt parks as the newest additions in 2005 and 2006. In addition to Facilities include ball fields, basket ball courts, dog areas, playgrounds, soccer fields, swimming pools, and meeting rooms.

Kofu Park is a community park with skateboarding facilities.

According to the Parks Master Plan, most of the parks in Lodi were intended to function as neighborhood parks, but because of their location, use, and facilities, have become primarily places for organized sports commonly found in community parks. Thus, surrounding neighborhoods are affected with more noise, light, and traffic, and are provided with fewer passive recreation amenities than intended for neighborhood parks.

Table 4-1: Existing Developed Parks within Lodi City Limits

Name	*Address*	*Park Acres*	*Basin Acres*	*Total Acres*	*Park Type*
Candy Cane Park	1324 Holly Dr.	0.2		0.2	Mini-park
Century Park	Century Blvd. at Church St.	2.5		2.5	Mini-park
Beckman Park	1426 W. Century Blvd.	0.8	15.8	16.6	Neighborhood
Borchardt Park	275 Culbertson Dr.	0.8		0.8	Neighborhood
Century Meadows Park	1833 Lexington Dr.	2.7		2.7	Neighborhood
Emerson Park	11 N. Hutchins	3.0		3.0	Neighborhood
English Oaks Common	2184 Newbury Circle	3.7		3.7	Neighborhood
Hale Park	209 E. Locust St.	3.1		3.1	Neighborhood
Henry Glaves Park	2206 Oxford Way	4.0	10.0	14.0	Neighborhood
John Blakely Park	1050 S. Stockton St.	10.0		10.0	Neighborhood
Katzakian Park	2735 W. Turner Rd.	5.0		5.0	Neighborhood
Lawrence Park	350 N. Washington St.	2.8		2.8	Neighborhood
Legion Park	835 S. Hutchins St.	6.0		6.0	Neighborhood
Van Buskirk Park	600 N. Pleasant St.	1.0		1.0	Neighborhood
Vinewood Park	1824 W. Tokay St.	0.8	15.2	16.0	Neighborhood
Kofu Park	1145 S. Ham Lane		10.0	10.0	Community
Peterson Park	199 Evergreen Dr.		22.0	22.0	Community
Samuel D. Salas Park	2001 S. Stockton St.	1.0	25.0	26.0	Community
Lodi Lake Park	1101 W. Turner Road	43.0		43.0	Regional
Lodi Lake Wilderness Area	1101 W. Turner Road	58.0		58.0	Natural Open Space
Armory Park/Chapman Field	333 N Washington St.	3.2		3.2	Special Use
Grape Bowl	222 E. Lawrence Ave.		15.0	15.0	Special Use
Softball Complex	401 N. Stockton St.	7.6		7.6	Special Use
Zupo Hardball Field	350 N. Washington St.	3.2		3.2	Special Use
Total Developed		**162.3**	**113.0**	**275.3**	

Source: City of Lodi Department of Parks and Recreation, January 2007.

Katzakian Park provides playground amenities, picnic tables, as well as ball fields.

Community Parks

Community parks serve a larger segment of the population, and are primarily designed for active and structured recreation for both children and adults. While individual and family activities are encouraged, community parks are a main channel for organized activities and sports. Parks of this type have a service area of approximately one to two-mile radius and range from 10 to 20 acres in size. Today, there are a total of three existing community parks—Kofu, Peterson, and Salas Parks—providing ball fields, basketball courts, dog areas, playgrounds, picnic areas, meeting rooms, skateboard park, in-line hockey and tennis court facilities. One common characteristic for all community parks is that all or a large portion of land dual-functions as retention basins during rainy seasons.

Regional Parks

The Lodi Lake Park is the only regional park within Lodi's City limits. A regional park serves the entire region, attracting visitors far beyond the boundaries of the city. Typically exceeding 100 acres in size, regional parks feature a wide range of activities and facilities.

The 43- acre Lodi Lake Park is characterized by the Mokelumne River, swimming, beaches, and large picnic areas. It is also attached to the Lodi Lake Wilderness Area. A proposed expansion of the park is planned on the Lodi Lake West Bank Area will add approximately 13 acres to the regional park.

The Lodi Lake Wilderness area is the only natural open space amenity in the City. It provides both passive recreation as well as walking trails, boating, and picnic areas.

Natural Open Space

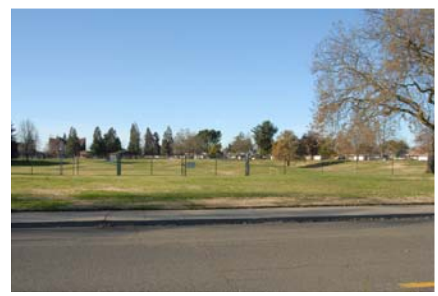
The Lodi Lake Wilderness Area is the only natural open space within City limits. Natural open space is defined in the Parks Master Plan as undeveloped land primarily left in its natural environment with recreation uses and a secondary objective. The Lodi Lake Wilderness Area spans 58 acres, and the lake covers 25 acres. Located adjacent to Lodi Lake Park, this site was intended to preserve the riparian and natural open space along the Mokelumne River. The park provides 0.5 miles of paved and 1.8 miles of unpaved trails.

Special Use Areas

Special Use Areas are defined in the Parks Master Plan as a miscellaneous public recreation area or land occupied by a specialized facility, which includes small or special landscaped areas, community gardens, single purpose sites used for field sports or sites occupied by recreation buildings such as a senior or community center. There are no defined service areas for this type of parks and open spaces. Currently, four City parks fall into this category: Armory Park/Chapman Field, the Grape Bowl, the Softball Complex, and Zupo Field.

PARKS AND RECREATION FACILITIES

Lodi offers a wide range of active and passive parks and recreational facilities within the city. Table 4-2 shows that playgrounds and picnic areas are ubiquitous amenities in most parks, except in special use areas. Many parks also provide ball fields that co-function as detention basins. Some notable recreation facilities in Lodi include in-line hockey at Peterson Park, a skateboard park at Kofu Park, the Softball Complex, the Grape Bowl stadium, and Zupo Hardball Field.



Recreational facilities include basketball courts at Blakely Park, picnic tables and playgrounds at Lodi Lake, and soccer fields that dual-function as detention basis at Henry Glaves Park.

RECREATIONAL PROGRAMS

The Lodi Parks and Recreation Department provides a wide variety of recreation programs and services to the residents of the city. In addition, other entities are also responsible for conduction a number of leisure services for the community.

Youth Sports

In addition to school and church leagues, the Parks and Recreation Department also offers sports programs for the youth. The Spartan League is the junior basketball league and caters to boys and girls from Kindergarten to 3rd grade who are residents of the City. The Comet and Cardinal Basketball League is open to 7th and 8th grade boys and girls who live within the Lodi Unified School District area. It is sponsored by the Boosters of Boys/Girls Organization. The Department also offers a Futures Stars 2000 Tennis Academy at Kofu Park for a fee.

Adult Sports

These programs include soccer, volleyball, and basketball leagues, and offer social, recreational, and competitive opportunities for the adult community. All three programs are catered especially for Lodi residents, but welcome non-resident players as well. A nominal fee is charged per team.

After School and Day Care Programs

The Parks and Recreation Department offers an After School Playground Program, which runs concurrent with the school year, for children currently enrolled in kindergarten through 6th grades at Beckman, Lakewood, Nichols, Reese, Vinewood, Borchardt, and Larson elementary schools. Activities include study time for homework, organized sports, games, art projects, and movies. The program requires an annual fee of $20 and a monthly fee of $100.

Aquatic Programs

Swim lessons and summer swim league programs are available at the John Blakely Pool. Hutchins Street Square also has its own aquatic programs, many catered to seniors and families. Programs usually take place over spring and summer seasons only. Life guarding lessons are also offered at Blakely Pool and Lodi Lake. All aquatic programs are conducted in conjunction with the Lodi Aquatics Club.

Table 4-2: Existing City-owned Parks, Recreation Facilities and Open Spaces

Park	Restrooms	Parking	Ball Fields	Basketball	Dog Area	Horseshoes	Swimming	Play Area	Picnic Area	Soccerfield	Concession	Meeting Room	Football Field	Skate park	In-Line Hockey	Tennis Court	Trails	Detential Basin	Park acres
Candy Cane Park								•	•										0.2
Century Park								•		•									2.5
Beckman Park	•		•		•			•	•									•	16.6
Borchardt Park																			0.8
Century Meadows Park				•				•	•										2.7
Emerson Park	•		•			•		•	•	•									3.0
English Oaks Common								•	•										3.7
Hale Park	•			•		•		•	•			•							3.1
Henry Glaves Park	•		•					•	•	•								•	14.0
John Blakely Park	•		•	•		•	•	•	•										10.0
Katzakian Park	•		•	•				•	•	•									5.0
Lawrence Park	•				•			•	•										2.8
Legion Park	•			•					•			•				•			6.0
Van Buskirk Park				•		•		•	•										1.0
Vinewood Park	•		•		•					•								•	16.0
Kofu Park	•		•					•	•	•		•		•				•	10.0
Peterson Park (Westgate Park)	•		•	•					•	•					•	•		•	22.0
Samuel D. Salas Park	•		•					•	•	•	•							•	26.0
Lodi Lake Park		•				•	•	•	•							•			43.0
Lodi Lake Wilderness Area		•					•										•		58.0
Armory Park / Chapman Field	•		•								•								3.2
Grape Bowl	•		•										•					•	15.0
Softball Complex	•	•	•						•		•								7.6
Zupo Hardball Field	•		•								•								3.2
Total																			**275.3**

Source: City of Lodi Department of Parks and Recreation, January 2007.

4.2 UNDEVELOPED CITY PARKLAND

The City of Lodi has six undeveloped park sites within City limits, two of which are newly acquired. Roget, DeBenedetti, and Pixley Parks and Maple Square have remained undeveloped since the 1994 Parks Master Plan due to financing challenges. Roget, DeBenedetti, and Pixley Parks have proposed plans, but are waiting for City Council's approval. Table 4-3 details the City's undeveloped parks and open spaces.

Table 4-3: Undeveloped City Parkland

Parks	*Address*	*Park Acres*	*Basin Acres*	*Total Acres*	*Type*
Roget Park	2229 Tienda Dr.	7.0		7.0	Neighborhood
DeBenedetti Park	2350 S. Lower Sacramento Rd.		49.0	49.0	Community
Indoor Sports Center	17 E. Elm St.	1.3		1.3	Community
Lodi Lake West Bank Area	Lodi Lake	13.0		13.0	Natural Open Space
Maple Square	2 E. Lodi Ave.	0.5		0.5	Special Use
Pixley Park	930 S. Beckman Rd.		27.0	27.0	Special Use
Total		**21.8**	**76.0**	**97.8**	

Source: Lodi Department of Parks and Recreation, January 2007.

PLANNED PARKS AND FACILITIES

Of the undeveloped parkland, two are in the process of being developed. The Lodi Lake West Bank Area and the Indoor Sports Center will provide a total of 14 acres of both active and passive, indoor and outdoor parkland and open space.

Indoor Sports Center

Located in downtown Lodi on Church and Elm streets, this new community sports center will bridge the city's need for indoor recreation facilities. The facility has plans for six basketball courts, a multi-purpose room, an aerobics room, a child care facility, offices, and outdoor spaces.

Lodi Lake West Bank Area

The West Bank Area will expand the amenities at Lodi Lake and has plans for a discovery center, a RV campground, green open space, restrooms, picnic areas, and tot lots, and a fireworks area by the water. However, the project awaits funding.

DeBenedetti Park

DeBenedetti Park is yet to be developed as part of the Southwest Gateway Project.

Frontier Community Builders, the developers of the Southwest Gateway Project, have agreed to develop the DeBenedetti Park, which will serve as a community park for the residential development project. The plan proposes a combination of several soccer, foot ball, and baseball fields, which are well suited for the basin park. In addition, there will be tot-lots, an adventure area, and seating amenities.

4.3 OTHER PARKS, RECREATION FACILITIES, AND OPEN SPACES

While the City of Lodi is the main provider of parkland recreational facilities for the community, other regional or quasi-public organizations also provide amenities in the planning area. Table 4-4 and Figure 4-1 illustrate these resources. In total, these sites add an addition 258 acres of parkland and open space within the planning area.

Table 4-4: Other Parks and Open Spaces within the Planning Area

Park	*Address*	*Acres*	*Type*	*Owners*
Hutchins Street Square	221 W. Pine St. Lodi	12	Special Use	Hutchins Street Square Foundation
Woodbridge Wilderness Area	301 E. River Meadows Dr. Woodbridge	17	Natural Open Space	San Joaquin County
Micke Grove Regional Park	11793 N. Micke Grove Rd. Lodi	258	Natural Open Space	San Joaquin County
Total		**287**		

Sources: San Joaquin County, January 2007.

Hutchins Street Square

Hutchins Street Square provides open space as well as other cultural, recreational, business, and community venues. It is administered as a separate entity from the Parks and Recreation Department.

This 12-acre facility is a cultural, recreational, business, and community center of Lodi. Originally built in 1919 as Lodi Union High School, the site was burned in arson in 1974, and has transformed over the years into the vibrant community center that is now Hutchins Street Square. It offers student enrichment and adult specialty art and cultural classes, a performance theater, a senior center, a swimming pool, and a conference center. In addition to the educational, health, and cultural programs, Hutchins Street Square also leases its facilities for private events. Although the 1994 Parks Master Plan included Hutchins Street Square as one of the City's parks and recreation amenities, it is now administered by the Hutchins Street Square Foundation, and not by the Department of Parks and Recreation. The community center is financed through bond payments.

Woodbridge Wilderness Area

This regional park provides a ¼-mile of Mokelumne River frontage. The natural area features a riparian environment where fishing enthusiasts catch trout, black bass and catfish.

Micke Grove Regional Park

This 258-acre regional oak tree park features the Micke Grove Zoo, a Japanese Garden, outdoor picnic shelters and indoor venues for receptions and events, Fun Town at Micke Grove Amusement Park, the San Joaquin Historical Museum, softball fields, and children's playgrounds. The Micke Grove Zoo is accredited by the American Zoo and Aquarium Association, and features native animals and exotic species from all over the world. The Micke Grove Zoological Society, a membership organization, assists with the education program and fundraising for zoo improvements.

4.4 STANDARDS

Lodi's existing General Plan lays out standards for park acreage requirements in the city. The 1994 Parks Master Plan uses somewhat different standards based on the National Parks and Recreation Association (NPRA) standards, as well as provides more detailed standards for different types of parks and facilities. This section analyzes whether the parks, open space, and recreation facilities in Lodi meet these standards, how they compare to the city's population growth and demographic changes, and how effectively the implementation policies have been in the acquisition and development of new parks, open spaces, and recreation facilities.

1991 General Plan Goals and Standards

The 1991 General Plan requires 8.0 acres of neighborhood and community parkland per 1,000 population, including school parks and storm drainage detention basin parks, and 3.9 acres of neighborhood and community parkland per 1,000 population, excluding school parks and storm drainage detention basins. However, the current General Plan does not define what neighborhood or community parks are. This standard leaves out other kinds of parks that are crucial to Lodi's park system, including Lodi-Lake Park and Wilderness Area, and the Sports Complex.

The General Plan also emphasized the following kinds of park development:

- Small two to five-acre neighborhood parks;
- Indoor recreation centers;
- Lodi Lake Park and other significant open space areas and natural habitats;
- Preservation areas on the north bank of the Mokelumne River;
- Recreational Program s and facilities for all affected residents, including the physically ;disabled and the elderly;
- Cooperation with Lodi Unified School District; and
- Basin parks.

1994 Parks Master Plan Goals and Standards

Alternatively, the 1994 Parks Master Plan has a different set of standards that require an overall 8.0 park acres per 1,000, broken down by mini-parks, neighborhood, community, and regional parks; natural open spaces, and special use areas. Table 4-5 summarizes the park development standards as stated in the Parks Master Plan:

In addition, the Parks Master Plan specifically recommends:

- More balance between organized sports—which comprises a majority of Lodi's sports facilities—and other recreation needs, including passive and leisure activities;
- Indoor recreation activities;
- Non-basin parks.
- A greenway along Mokelumne River and the eastern City limits.
- A financing and budgeting plan that reflects the City's needs for construction and management of recreation services;
- Meeting sports field demand and support financing from non-resident users of Lodi's park system; and
- Strategic distribution of parks to serve all neighborhoods.

Table 4-5: Summary of Parks Master Plan Standards

Type	*Service Area*	*Size (acres)*	*Acres per 1,000 Population*	
			Total	*Excluding Basins*
Mini-Parks / Tot Lots	1/4 mile radius	< 3	-	-
Neighborhood Parks	1/2 mile radius	5 - 15	2.5	0.63
Community Parks	1-2 mile radius	20 - 30	1.8	0.45
Regional Parks	Community or Region	50+	0.8	-
Natural Open Space	Community or Region	Varies	2.1	-
Special Use Areas	Community or Region	Varies	0.8	-
Total			**8.0**	**1.1**

Source: City of Lodi Park and Recreation Plan, 1994.

OVERALL SUPPLY

As of January 2006, Lodi's park system has 275.3 acres of developed parkland serving a population of 62,817. This translates to a ratio of 4.4 acres per 1,000 residents. Excluding basins would reduce these numbers to 162.3 park acres and a ratio of 2.6 acres per 1,000. For community and neighborhood parks, these ratios are 2.3 and 0.8, including and excluding basins, respectively—and are much lower than the 8.0 and 3.9 standard set in the General Plan and the 8.0 and 4.3 set in the Parks Master Plan. To meet the General Plan's standards, the City would need an additional 359.9 acres of neighborhood and community parks, of which 200.4 acres are non-basins. Developed parks provide only 28.8 percent of the General Plan's neighborhood and community parks requirements including basins, and 20.5 percent excluding basins.

Existing park acreages also fall short of the Parks Master Plan standards. To fulfill those standards, the City would need an additional 229.9 acres of parkland, of which 140.3 acres are non-basins. The only parkland surplus is for non-basin neighborhood parks. Table 4-6 compares Lodi's existing developed parks inventory with the Parks Master Plan standards.

Including undeveloped parkland would increase the ratios to 5.7 acres of total parkland and 2.7 acres excluding basins. Neighborhood and community parks would serve 3.2 and 0.8 acres per 1,000 population, compared with the 8.0 and 3.9 standard in the General Plan, including and excluding basins, respectively. Including undeveloped City-owned parkland, Lodi provides only 40 percent of the General Plan's suggested neighborhood and community parks including basins, and 20.5 percent excluding basins.

Table 4-6: Summary Comparison of Developed Parks to Master Plan Standards

	Developed Park Acres			*Existing Acres/1,000 Population*		*Parks Master Plan Standards*		*Park Acres Needed*	
Park Type	*Non-Basin*	*Basin*	*Total*	*Overall*	*Non-Basin*	*Overall*	*Non-Basin*	*Total*	*Non-Basin*
Mini-parks	2.7	0.0	2.7	0.0	0.0	-	-	-	-
Neighborhood	43.6	41.0	84.6	1.3	0.7	2.5	0.6	72.4	(4.3)
Community	1.0	57.0	58.0	0.9	0.0	1.8	0.5	55.1	27.3
Regional	43.0	0.0	43.0	0.7	0.7	0.8	0.8	7.3	7.3
Natural Open Space	58.0	0.0	58.0	0.9	0.9	2.1	2.1	73.9	73.9
Special Use	14.0	15.0	29.0	0.5	0.2	0.8	0.8	21.3	36.3
Subtotal Neighborhood and Community	*47.3*	*98.0*	*145.3*	*2.3*	*0.8*	*4.3*	*1.1*	*127.5*	*22.9*
Total Developed	**162.3**	**113.0**	**275.3**	**4.4**	**2.6**	**8.0**	**4.8**	**229.9**	**140.3**

Source: City of Lodi Park and Recreation Plan, 1994; Lodi City Staff; Dyett & Bhatia

The City fares a little better when compared with the Parks Master Plan standards and counting undeveloped parkland. While there is still a deficit of 132.1 park acres—roughly 90% of which are non-basins—Lodi provides a slight surplus of neighborhood and regional parks for the current population. Although there seems to be a current surplus of special use areas, many are still located in detention basins, and do not compensate for the deficit in non-basin, year-round amenities. Table 4-7 compares Lodi's park inventory, including developed parkland, with the Parks Master Plan standards.

Basin Parks

Vinewood Park is an example of soccer fields that double functions as a detention basin during rainy seasons.

The calculations above reveal that the parks system depends largely on detention basins dual-functioning as parks. As the table above reveals, 41 percent of all developed park acres serve as detention basins during the winter time, and only 59 percent are available all year round.

School Parks

Unlike basins, schools do not play a role in the City parks system. The General Plan standards count school parks in the 8.0 acres of parkland per 1,000 population ratio. However, as Table 4-1 reveals, the City has not incorporated school parks into the public parks system. Due to a lack of parks in Lodi, especially non-basin ones, the City should consider more joint facilities and programs between the Parks and Rec Department and School District.

New Parks

Data shows that Lodi's park system has grown at the same pace as population increase. Between 1994 and 2006, Lodi's park acres increased 19.6 percent, more or less congruent with the 19.4 percent population growth—however, this means that the City is providing parks at the existing prevailing ratio, rather than the higher standards in the General Plan or the Parks Master Plan. The City has been successful in acquiring and developing new parks and open spaces, working towards the goals of the General Plan. New facilities include the now developed Borchardt Park, Century Meadows Park, and Lodi Lake West Bank area. The City has also acquired a site in downtown for the indoor sports complex. FCB, the developers of the Southwest Gateway Project, have also agreed to develop the DeBenedetti Park.

Despite these accomplishments, the City still lags in its provision of park supply. Since there was a deficiency in park supply to begin with, new park developments only satisfy the requirements for new population, but not cover the existing parks deficit.

Table 4-7: Summary Comparison of Developed and Undeveloped Parks to Master Plan Standards

	Developed & Undeveloped Park Acres			*Existing Acres/ 1,000 Population*		*Master Plan Standard*		*Park Acres Needed*	
Park Type	*Non-Basin*	*Basin*	*Total*	*Overall*	*Non-Basin*	*Overall*	*Non-Basin*	*Total*	*Non-Basin*
Mini-parks	2.7	0.0	2.7	0.0	0.0	-	-	-	-
Neighborhood	50.6	41.0	91.6	1.5	0.8	2.5	0.6	65.4	(11.3)
Community	2.3	106.0	108.3	1.7	0.0	1.8	0.5	4.8	26.0
Regional	56.0	0.0	56.0	0.7	0.7	0.8	0.8	(5.7)	(5.7)
Natural Open Space	58.0	0.0	58.0	0.9	0.9	2.1	2.1	73.9	73.9
Special Use	14.5	42.0	56.5	0.9	0.2	0.8	0.8	(6.3)	35.7
*Subtotal Neighborhood and Community**	*52.9*	*147.0*	*199.9*	*3.2*	*0.8*	*4.3*	*1.1*	*70.3*	*14.7*
Total Developed and Undeveloped	**184.1**	**189.0**	**373.1**	**5.7**	**2.7**	**8.0**	**4.8**	**132.1**	**118.6**

Source: City of Lodi Park and Recreation Plan, 1994; Lodi City Staff; Dyett & Bhatia

Long Term Supply

Lodi's two-percent annual growth ordinance prevents growth spurts in any given year, but the population is projected to grow steadily in the long run. The San Joaquin Council of Governments (SJCOG) projects an additional 18,903 residents, or a 30.1 percent increase, by 2030 for a total population of 81,720. If new residential developments provide park acres at 8.0 (with basins) and 3.9 (without basins) per 1,000 new residents as required in the existing General Plan, 293.8 acres of new neighborhood and community parks should be added, with a total of 118.3 non-basin park acres. This yields a ratio of 3.6 acres per 1,000 population for total parks, and 1.45 acres per 1,000 population for non-basin parks in the year 2030.

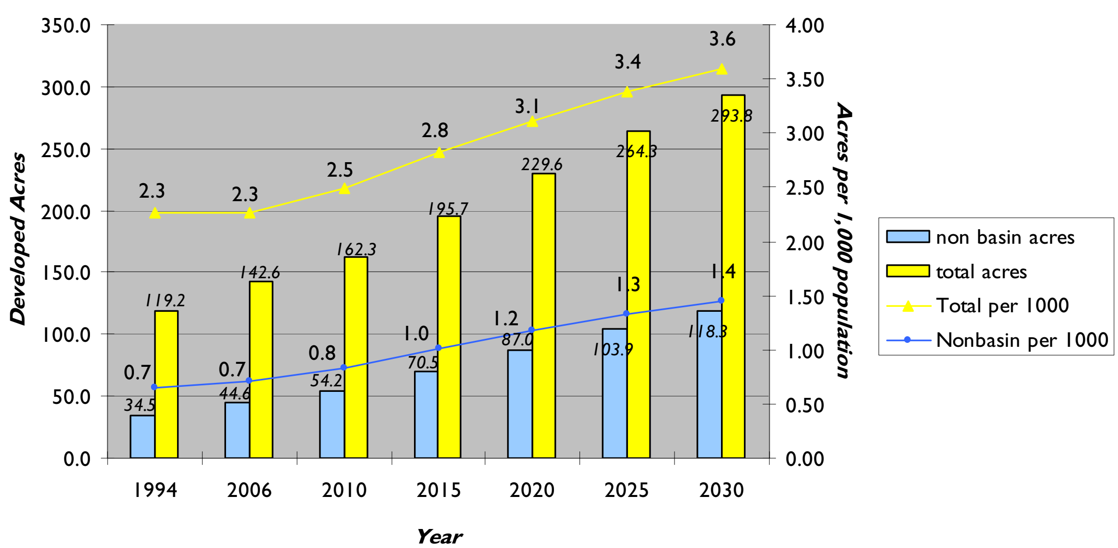
Table 4-8 and Chart 4-1 summarizes the projected population and park acreage up to 2030 with the assumption that developments from now on will adhere to the current General Plan park requirements. Evidently, Lodi's parkland deficiency will lag on unless park standards are upgraded. Furthermore, the General Plan does not specify standards for mini and regional parks, natural open spaces, or special use areas. There are no guarantees that these other types of parks will be developed.

Table 4-8: Projected Neighborhood and Community Park Acres by Year

Year	Population	Developed Park Acres		Acres per 1000 pop	
		Total	Non-Basin	Total	Non-Basin
1994	52,600	119.2	34.5	2.27	0.66
2006	62,817	142.6	44.6	2.27	0.71
2010	65,283	162.3	54.2	2.49	0.83
2015	69,451	195.7	70.5	2.82	1.01
2020	73,697	229.6	87.0	3.12	1.18
2025	78,028	264.3	103.9	3.39	1.33
2030	81,720	293.8	118.3	3.60	1.45

** Projected Population from the San Joaquin Council of Governments, Research and Forecasting Center.*

Chart 4-1: Projected Neighborhood and Community Park Acres by Year



Impact Fees

In addition to establishing the 8.0/3.9 standard, the existing General Plan also requires the City to assess a park development fee on all new residential, commercial, office, and industrial development sufficient to fund the acquisition and development of new parkland consistent with the 8.0/3.9 standard. It also calls for a periodic review of a fee ordinance for park acquisition and development, and to revise it as necessary.

Table 4-9 summarizes the current impact fees for parks and recreation facilities based on land-use. The Residential Acre Equivalent (RAE) factor compares the impact fee of the different land uses relative to low-density residential fee. For example, High-density residential developments pay 2.8 times more in impact fees per acre than low-density developments, while industrial uses pay only 23 percent of low-density residential rate.

Table 4-9: Impact Fees Schedule for Parks and Recreation Facilities

Land Use Category	*Residential Acre Equivalent (RAE)*	*$/ gross acre*
Residential		
Low-density	1.00	26,345
Medium-density	1.43	37,673
High-density	2.80	73,766
Commercial		
Retail	0.32	8,430
Office	0.54	14,226
Industrial		
Light	0.23	6,059
Heavy	0.33	8,694

Source: City of Lodi Public Works Fee and Service Charge Schedule, March 2006; Lodi Municipal Code, Chapter 15.64.

[NOTE TO CITY STAFF: It is unclear what standards (acres/1,000 residents) these fees are based on—please let us know.]

Developers have the option of either providing parkland based on the 8.0/3.9 acres per person standard on-site, or pay park impact fees. The Reynolds Ranch, Southwest Gateway, and Westside Projects have all chosen the first option, and have agreements with the City to provide the required park acres as part of the new development. DeBenedetti Park, for example, is one of the resulting fruits of the FCB agreements.

According to City staff, the fees have not been effective in acquiring and developing parkland due to rising land costs. These standards were originally established in 1991 following the General Plan, and have had spotty course of updates. Although developers are paying their fees, by the time the City accumulates enough capital, land prices have increased and the City can no longer afford the intended properties. The General Plan Update should address and solve this issue.

DISTRIBUTION AND PROGRAMMING

The 1991 General Plan noted that recreation planning in Lodi should take into account the distribution of the City's residents, specifying a ¼-mile service area radii for mini-parks and totlots, and ½-mile for community parks (see Table 4-5). Current most of Lodi's housing units are within a ¼-mile walking radius of a park. Residents that are not served include those living south of Kettleman Lane, west of Cherokee Lane, and the center-northwest of the city, the southeastern parks of the city, and the northeastern portion of the Mokelumne River, although virtually all areas are within a ½-mile radius of a park. There are no developed parks east of Cherokee Lane because most of the area is industrial.

4.5 PLANNING ISSUES AND IMPLICATIONS

Lodi's parks, open space, and recreation network faces three main issues: incongruent standards for park developments, shortage of parkland, and financing challenges. The following discussion identifies opportunities and challenges related to the City's parks, open space, and recreation facilities. These findings will be addressed during the preparation of land use alternatives, as well as through General Plan policies and programs.

As noted in the previous sections, a near-universal point of interviews and visioning sessions with community stakeholders indicated that Lodi needs more park space. Since the last General Plan in 1991, the City has seen park acreage increase at a somewhat faster rate than its population growth—a 78 percent increase in parks versus a 53 percent increase in population—albeit at a rate lower than the standard.

While Lodi has increased park acreage over the past 12 years, the current park provision (4.4 total and 2.6 non-basin acres per 1,000 residents is below the standards established by the General Plan and the Parks Master Plan. Even if new developments contribute parkland at the same rate as population increase, there will still be a shortage that must be addressed by the General Plan Update. A substantial increase in the rate of parks development is necessary to cover the lagging provision of parkland.

At a reasonable standard of 8.0 acres per 1,000 residents as stated in the Parks Master Plan, the city's current park need would be about 230 acres of additional parkland, 140 acre of each would be non-basin. The feasibility of such a standard should be reassessed, as both the exorbitant costs and land availability within City limits are questionable. Nonetheless, provision of parks, especially for year-round use, is one of the fundamental contributors to livability, which is a principal consideration for the General Plan update.

1. Should Lodi's park standards be re-evaluated? Standard according to the Master Plan and General Plan are inconsistent.

Currently, there are two separate set standards for parks under the 1991 General Plan and the 1994 Parks Master Plan. These two different standards are confusing. The new General Plan should evaluate these standards, weather they are feasible, and decide on a single consistent set of standards.

Also, the parks standards partly rely on school and detention basins that serve as parks during the dry seasons. Given the large dependency on basins, the City should address how basins should be incorporated into the system, and how to encourage the development of above-ground level parks and open spaces. However, interviewed stakeholders seemed to have found no hindrances caused by the basins, as the rainy seasons are not suitable for outdoor sports in any case.

2. How can the City ensure that park fees collected result in adequate parkland provision?

Because of the delay between collection of park fees and parkland acquisition and resultant increase in land prices, the actual parkland provision remains lower than the intended standard. The City should consider a multi-pronged strategy to ensure minimal gap between the standards and parklands provisions, which could include:

- Favoring dedication over fee collection. This has actually been the case with the recent new large developments to the west and the south. However, the City needs to ensure that when this happens, parks are located in favorable, publicly-accessible/visible locations, rather than being introverted to developments.
- Using upfront funds (such as through bonds) to pay for acquisitions, repaid through impact fees.

3. *How should new parks be sized and distributed?*

To maximize park accessibility, as part of the General Plan update the City should consider using park accessibility criteria for locating future parks. Accessibility standard typically would ensure that at least one park is within a five to ten-minute walk (¼ to ½-mile distance) of all residents. Additionally, expansion of the City's bicycle and pedestrian networks could improve local access to park sites.

Roget Park is undeveloped but requires maintenance while it awaits funding.

4. *How can impact fees and park dedication requirements help raise funds for parks construction and maintenance?*

One of the major challenges the City is likely to face is finding adequate funding for acquisition, development, operations, and maintenance of park sites. While the City currently maintains a combination of park provision requirements and park impact fee for new developments, such processes have not resulted in the adequate expansion of the overall public park and recreation system. Furthermore, as the costs of individual development sites available increases due to rising land costs, the current approach will be unable to generate parks of usable acreage.

California Government Code Section 66477 (also known as the Quimby Act), permits cities to require dedication or the payment of fees toward providing parkland at a standard of three acres per thousand residents, unless higher parkland acreage is currently provided, in which case the fee/dedication requirement could be as high as the currently available acreage, to a maximum of five acres per 1,000 residents. The City's impact fee needs to remain consistent with this standard. In addition, the City should continue exploring partnerships with other agencies to develop joint facilities, especially with the School District.

5. *How effective are parks as dual-functioning amenities with schools and detention basins?*

Due to the lack of parks in Lodi, especially non-basin ones, the City should consider more joint facilities and programs between the Parks and Recreation Department and the School District. There may also be financing cooperation opportunities and partnerships with the School District to help fund projects.

The parkland in Lodi is already below standards; the reliance on detention basins should be reassessed. The City should work towards acquiring and developing above-grade parkland. However, City staff has expressed the difficulty in obtaining the necessary financing to acquire and development parkland in the City. The General Plan should address these implementation issues to ensure that Lodi provides enough parks for residents.

6. What is the potential of developing a larger park along the Mokelumne River along the north bank?

The Mokelumne River is a wonderful amenity on which the City was founded. The previous Parks Master Plan proposed a greenway along the river, but there has not been much progress in acquiring land or park development. The West Bank Recreational Area, for example, has been acquired and planned for, but the City does not have the funding to develop it.

The forthcoming General Plan Update is an opportunity to determine whether the City should push for the greenway along the river, where it should be located, and how to make it a reality. Since the south side of the river is virtually all occupied with subdivision developments that restrict access to the natural amenity, the north side of the river may be examined for future park and natural open space opportunities.

Access to the Mokelumne River from the south bank is very limited because private housing developments restrict access to the public.

7. Should the City explore the development of recreational paths along the Woodbridge Irrigation District Canal?

Several stakeholders mentioned the possibility of developing walking or biking paths along the WID canal that runs through the city. The idea faces a few challenges, including safety concerns, water contamination, as well as possible opposition from adjacent residences.

The WID Canal could have potential to be a walking or biking trail.

8. Should the City redevelop the existing Grapebowl Stadium into a park?

The Grapebowl stadium was mentioned repeatedly during stakeholder interviews as an opportunity for redevelopment. Currently, it is used only for high school graduations and homecoming football games, and has substandard construction. There are opportunities to redevelop the Grapebowl into a more accessible and actively used recreation facility. However, stakeholders also anticipate opposition from the community due to the historic and personal significance of the stadium to long-time Lodi residents, as well as the high projected costs of redevelopment.

The Grapebowl stadium is only used twice a year for graduations and homecoming football games. Opportunities for redevelopment exist.

9. *How should the park system adjust to the changing recreation needs of a diverse community?*

Lodi's parks and recreation needs should be reassessed to cater to the diverse and changing community. In particular, many stakeholders stated in interviews, the need for cricket fields, especially for the growing Pakistani community. Currently, there are no fields specifically for cricket, and players often have to work around other league sponsored sports. Soccer, according to City staff, is another sport that has gained popularity over the years and may need more field area.

5 Schools and Library

This chapter identifies the existing educational infrastructure in the City of Lodi, and issues related to school and library facility needs that should be addressed in the General Plan Update. Existing facilities in Lodi include elementary, middle, and high schools; other child and adult educational facilities; as well as a City-run library. Information for this chapter was gathered from the internet homepage of the Lodi Unified School District (LUSD) and the Lodi Public Library, the 2006 LUSD Schools Facilities Master Plan, the 2002 Lodi Public Library Facilities Master Plan, information from the County and State, and direct communication with schools and library representatives.

5.1 PUBLIC SCHOOLS

Lodi's educational and academic needs are served primarily by the Lodi Unified School District. The LUSD covers an area of 350 square miles, serving all of Lodi as well as North Stockton, Acampo, Clements, Lockeford, Victor, and Woodbridge. LUSD District headquarters are located at the James Areida Education Support Center on 1305 East Vine Street in Lodi.

LODI UNIFIED SCHOOL DISTRICT

The Lodi Unified School District has a total of 51 schools—33 elementary (grades K-6), six middle (grades 7-8), four comprehensive high schools (grades 9-12), and two continuation high schools (grades 9-12). In addition, the district offers two elementary community day schools, and one middle community day school, a Middle College High School, an adult school, a Career Center, Children's Center, a Developmental Center for disabled students, and several pre-school programs. The LUSD serves a total of 31,106 students in kindergarten through grade 12. Table 5-1 details all the schools in the LUSD.

Lodi High School on South Pacific Avenue serves an estimated 2,230 students from Lodi, North Stockton, Acampo, Clements, Lockeford, and Woodbridge.

Table 5-1: Schools in the Lodi Unified School District

	Name	Address	City	Grades	Enrollment Capacity Dec. 06
Elementary Schools					
	Ansel Adams Elementary School	9275 Glacier Point Dr.	Stockton	K-6	898
*	Beckman Elementary School	2201 Scarborough Dr.	Lodi	K-6	632
*	Borchardt Elementary School	375 Culbertson Dr.	Lodi	K-6	739
	Clairmont Elementary School	8282 Lemans Ave.	Stockton	K-6	550
	Clements Elementary School	19051 E. Highway 88	Clements	K-1	67
	Creekside Elementary School	2515 Estate Dr.	Stockton	K-6	816
	Davis Elementary School	5224 E. Morada Ln.	Stockton	K-6	374
	George Lincoln Mosher Elementary School	3220 Buddy Holly Dr.	Stockton	K-6	397
*	Heritage Primary Elementary School	509 E. Eden St.	Lodi	K-3	472
	Houston School	4600 Acampo Rd.	Acampo	K-8	380
	John Muir Elementary School	2303 Whistler Way	Stockton	K-6	731
	Julia Morgan Elementary School	3777 A.G. Spanos Blvd.	Stockton	K-6	694
*	Lakewood Elementary School	1100 North Ham Ln	Lodi	K-6	384
*	Larson Elementary School	2375 Giannoni Wy.	Lodi	K-6	676
*	Lawrence Elementary School	721 Calaveras St.	Lodi	K-6	519
*	Live Oak Elementary School	5099 East Bear Creek Rd.	Lodi	K-6	242
	Lockeford Elementary School	19456 N. Tully Rd.	Lockeford	K-6	271
	Manlio Silva Elementary School	6250 Scott Creek Dr.	Stockton	K-6	668
*	Needham Elementary School	420 S. Pleasant St.	Lodi	4-6	337
*	Nichols (Leroy) Elementary School	1301 South Crescent Ave.	Lodi	K-6	393
	Oakwood Elementary School	1315 Woodcreek Wy.	Stockton	K-6	708
	Parklane Elementary School	8405 Tam O'Shanter Dr.	Stockton	K-3	654
*	Reese Elementary School	1800 W. Elm St.	Lodi	K-6	638
*	Serna Charter School	339 E. Oak St	Lodi	K-8	282
	Sutherland Elementary	550 Spring River Cir.	Stockton	4-6	422
*	Tokay Colony Elementary School	13520 E. Live Oak Rd.	Lodi	K-6	127
*	Turner Elementary School	18051 North Ray Rd.	Lodi	K-6	83
	Victor Elementary School	17670 N. Bruella Rd.	Victor	K-6	251
*	Vinewood Elementary School	1600 W. Tokay St.	Lodi	K-6	558
	Wagner Holt Elementary	8788 Brattle Pl.	Stockton	K-6	644
*	Washington Elementary School	831 W. Lockeford St.	Lodi	K-6	525
	Westwood Elementary School	9444 Caywood Dr.	Stockton	K-6	628
	Woodbridge Elementary School	1290 Lilac St.	Lodi	K-6	394

Table 5-1: Schools in the Lodi Unified School District

	Name	Address	City	Grades	Enrollment Capacity Dec. 06
Middle Schools					
	Christa McAuliffe Middle School	3880 Iron Canyon Cir.	Stockton	7-8	922
	Delta Sierra Middle School	2255 Wagner Heights Rd.	Stockton	7-8	561
	Elkhorn Elementary School	10505 N. Davis Rd.	Stockton	4-8	278
*	Lodi Middle School	945 South Ham Ln.	Lodi	7-8	872
*	Millswood Middle School	233 N. Mills Ave.	Lodi	7-8	766
	Morada Middle School	5001 E. Eastview Dr.	Stockton	7-8	906
High Schools					
	Bear Creek High School	10555 Thornton Rd.	Stockton	9-12	2151
*	Lodi High School	3 S. Pacific Ave	Lodi	9-12	2,230
	Middle College High School	5151 Pacific Ave.	Stockton	9-12	231
	Plaza Robles High School	9434 Thornton Rd.	Stockton	9-12	159
	Ronald McNair High School	9550 Ronald E. McNair Wy.	Stockton	9-12	1641
*	Tokay High School	1111 W. Century Blvd.	Lodi	9-12	2,143
*	Liberty High School	660 W. Walnut St.	Lodi	9-12	140
Alternative Schools					
	Benjamin Holt College Prep	3293 E. Morada Ln.	Stockton	6-12	497
	Henderson Community Day School	13451 Extension Rd.	Acampo	7-9	137
	River Oaks Charter School	1801 Pyrenees Ave.	Stockton	K-7	356
	University Public School	10038 Hwy 99 E. Frontage Rd.	Stockton	K-5	350
Other					
*	Lodi Adult School	542 E. Pine St.	Lodi	Adult	
*	Independence School	660 W. Walnut St.	Lodi	K-12	612
*	Lincoln Tech Academy	53 S. Cherokee Ln.	Lodi	11-12	
	Mahin Special Ed Center	5080 Armstrong Rd.	Lodi	Infant	
	School Readiness/ Preschool and Services Children's Center	701 Calaveras St.	Lodi	PK	
Total					***31,106***
****Total in the City of Lodi***					***12,758***

Source: LUSD Facilities Master Plan 2006, LUSD Facility Representative

Ellerth E. Larson Elementary School (top) and Millswood Middle School (bottom) both opened in July 2005 as new additions to the LUSD.

LUSD Schools in the City of Lodi

The City of Lodi houses a large proportion of LUSD's school facilities, serving not only the Lodi community, but also students from Stockton, Woodbridge, and other communities. Figure 5-1 illustrates the locations of existing and proposed schools. Currently, 66.2 percent of the City's residential areas are located within a ¼-mile walking distance of a school.

Of the school district's 51 schools, 21 are located in the City of Lodi. Table 5-2 shows a comparison of Lodi's school facilities, enrollment, and costs.

Table 5-2: Comparison of schools in the LUSD and in the City of Lodi

	LUSD	*City of Lodi*	*%*
Schools	51	21	41.2%
Enrollment	31,106	12,758	41.0%
10-year inflated costs *	$685,400,000	$235,500,000	34.4%

Source: Dyett & Bhatia, LUSD Schools Facility Master Plan 2006.
** 10-year projected costs include construction and/or expansions, improvements, and maintenance of existing and/or new schools and school facilities, according to the 2006 Schools Facilities Master Plan.*

Projected Enrollment Increase

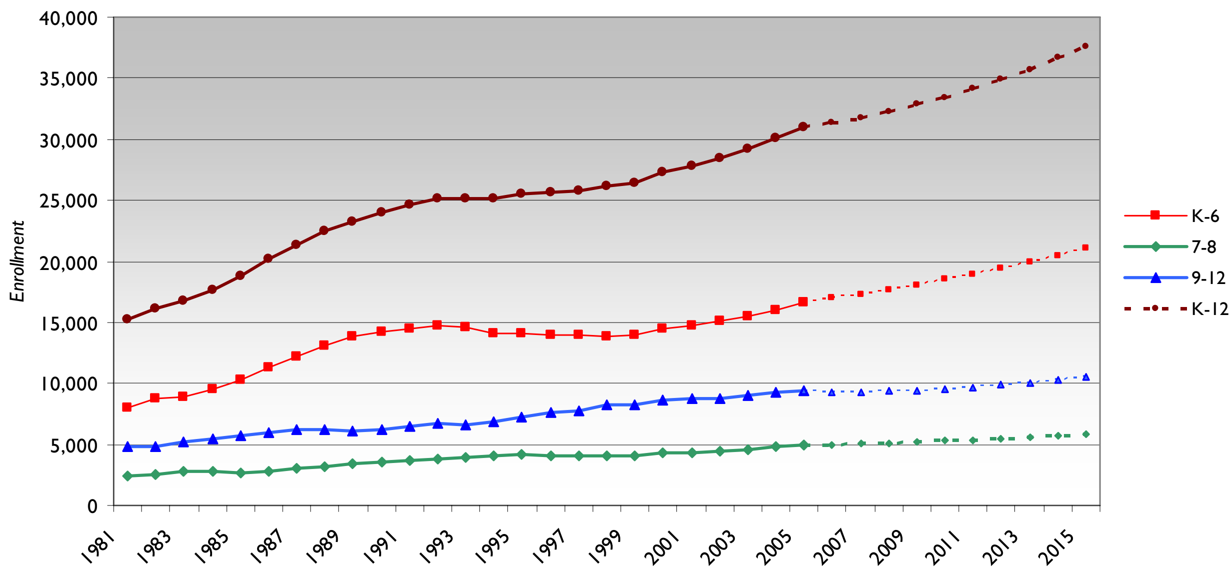
Enrollment in the LUSD has been steadily increasing for the last three decades, slowing down during the 1993 to 1994, but accelerating again since then. The 2006 LUSD School Facilities Master Plan projects this upward trend to continue for its duration. By 2015, the school district is projected to increase to 6,631 students for a total enrollment of 37,622 students. Table 5-3 details the projected kindergarten to grade-12 enrollment for the entire school district.

Table 5-3: Enrollment History and Projection by Year

Year	*K-6*	*7-8*	*9-12*	*Spec Ed*	*K-12*	*Change*	*% Change from Previous Year*
1981	7,939	2,426	4,839	n/a	15,204		
1982	8,720	2,572	4,790	n/a	16,082	878	5.8%
1983	8,832	2,755	5,147	n/a	16,734	652	4.1%
1984	9,474	2,800	5,402	n/a	17,676	942	5.6%
1985	10,329	2,721	5,763	n/a	18,813	1,137	6.4%
1986	11,315	2,822	5,999	n/a	20,136	1,323	7.0%
1987	12,197	2,991	6,191	n/a	21,379	1,243	6.2%
1988	13,132	3,194	6,162	n/a	22,488	1,109	5.2%
1989	13,813	3,367	6,050	n/a	23,230	742	3.3%
1990	14,190	3,591	6,173	n/a	23,954	724	3.1%
1991	14,477	3,628	6,502	n/a	24,607	653	2.7%
1992	14,687	3,751	6,728	n/a	25,166	559	2.3%
1993	14,623	3,954	6,544	n/a	25,121	-45	-0.2%
1994	14,135	4,074	6,903	n/a	25,112	-9	0.0%
1995	14,101	4,136	7,263	n/a	25,500	388	1.5%
1996	13,957	4,126	7,579	n/a	25,662	162	0.6%
1997	13,911	4,047	7,788	n/a	25,746	84	0.3%
1998	13,894	4,030	8,193	n/a	26,117	371	1.4%
1999	14,020	4,113	8,261	n/a	26,394	277	1.1%
2000	14,495	4,270	8,579	n/a	27,344	950	3.6%
2001	14,734	4,373	8,699	n/a	27,806	462	1.7%
2002	15,123	4,487	8,786	n/a	28,396	590	2.1%
2003	15,537	4,606	9,035	n/a	29,178	782	2.8%
2004	16,033	4,807	9,252	n/a	30,092	914	3.1%
2005	16,668	4,908	9,415	n/a	30,991	899	3.0%
2006	16,954	4,952	9,330	135	31,371	380	1.2%
2007	17,311	5,023	9,324	135	31,793	422	1.3%
2008	17,684	5,105	9,368	135	32,292	499	1.6%
2009	18,072	5,192	9,433	135	32,832	540	1.7%
2010	18,486	5,280	9,537	135	33,438	606	1.8%
2011	18,938	5,383	9,670	135	34,126	688	2.1%
2012	19,408	5,493	9,843	135	34,879	753	2.2%
2013	19,910	5,619	10,041	135	35,705	826	2.4%
2014	20,449	5,748	10,303	135	36,635	930	2.6%
2015	21,031	5,880	10,576	135	37,622	987	2.7%

Source: LUSD Schools Facilities Master Plan 2006

Chart 5-1: Historic and Projected LUSD Enrollment



LUSD's upward enrollment projections can be attributed primarily to the construction of new homes in Lodi and North Stockton. Some of the increase is due to the changing demographic profiles of the community, birthrates, openings of new, private, or charter programs, and less significant factors such as home schooling. The following explanations describe how each factor contribute to the projected enrollment.

- *New Housing.* The projection assumes the composite student generation rates listed in Table 5-4 below. These rates are based on the district's housing data and reflects the changing market over time. Stockton's tremendous housing growth, Lodi's incoming Reynolds Ranch, Westgate and Southwest projects, and other developments are estimated to bring in approximately 30,000 homes to the LUSD over the next 20 to 30 years. The Schools Facility Master Plan assumes a construction of 1,500 new homes per year, which translates to a total of 690 students annually or 6,900 students in 10 years.

Table 5-4: Student Generation Rates from New Housing

Grade Level	*Pupils per home*	*New Homes Per Year*	*New Pupils per year*	*New Pupils by 2015*
Elementary (K-6)	0.25	1500	375	3750
Middle (7-8)	0.07	1500	105	1050
High (9-12)	0.14	1500	210	2100
Total (K-12)	**0.46**	**1500**	**690**	**6900**

Source: LUSD Schools Facilities Master Plan 2006.

- ***Demographic Trends.*** Since 2001, the birth rate (births per population) in the district has increased slightly, reflecting the number of young families moving to Lodi and Stockton to find a new home. The birth history data shows a leveling of kindergarten enrollment in most areas after a period of decline with increases expected in new housing development.
- ***Existing Housing.*** The decline of students from existing housing will somewhat offset the increase in hew housing. For example, the high school bubble will be expected to dip in future years. It has also been observed that some families with younger children are buying older homes, bringing a new generation of school-age children to older neighborhoods. The overall effects, however, have not been studied in detail.
- ***New Employees.*** State law (Allen Bill) gives parents the right to apply to register their children in a district where either parent's job is located. However, the child is not guaranteed enrollment. Transfers are always on a space-available basis, and districts have the right to determine whether or not to accept them. To date, this has not significantly affected the enrollment in LUSD because of the lack of space and the local ratio of jobs to housing, but it may affect the enrollment in the future, especially with new employment centers such as the new Blue Shields Reynolds Ranch.

Existing School Facilities and Capacity

As of 2005, LUSD's school facilities were at 108 percent overall capacity. Elementary, high, and special education schools are all exceeding their capacities. Middle schools are the only facilities that have not reached their maximum use level. However, because middle school classrooms also function as Special Education and after school space, they are not as underutilized as the data may suggest. Table 5-5 summarizes total school enrollment, capacity, and utilization.

Table 5-5: LUSD Enrollment, Capacity and Utilization

Grade Level	*Enrolled*	*Capacity*	*Utilized*	*Needed*
Elementary (K-6)	16,174	14,625	110.6%	1,549
Middle (7-8)	4,737	4,995	94.8%	-258
High (9-12)	9,070	8,127	111.6%	943
Special Ed	1,010	824	122.6%	186
Total (K-12)	**30,991**	**28,571**	**108.5%**	**2,420**

Source: LUSD School Facilities Master Plan 2006; May 2005 School facilities Needs Analysis. Breakdown includes the three public Aspire charter schools.

Table 5-6: Ed Specs Standard Capacities for New Schools

Grades	*New School Capacities*
K-6	800
K-8	840
7-8	900
9-12	840

Source: Schools Facilities Master Plan 2006.

Facility Needs

Based on the enrollment projections and existing facilities conditions, the Schools Facilities Master Plan identifies the following needs of the schools district:

- ***New schools.*** Two additional elementary and one middle school site in Lodi, plus three comprehensive high schools in North Stockton are needed to serve future needs within the next 15 years. Some of these proposed sites are located in the proposed greenbelt area, and may need to be reconsidered in conjunction with Lodi's General Plan Update. The educational program specifications (Ed Specs) sets the following standard capacities for new schools, as stated in Table 5-6.

  Ed Specs also suggests that new General Plan areas should house K-8 schools rather than separate elementary and middle schools. In Lodi, There is an approaching need for a new middle school in the City of Lodi, but it is not required at the moment. K-8 schools are anticipated to meet the needs. There are no projected needs for high schools within a 10-year horizon.

- ***Portable Modular Buildings.*** The LUSD depends heavily on portables—55 percent of the schools district's classrooms are housed in modular buildings. These relocatable structures are effective at providing the necessary classrooms for the increasing student population at lowered costs, but are also substandard compared to permanent structures. Moreover, increasing classroom space without increasing other campus facilities—offices, multipurpose, restrooms, parking, laboratories, for example—will still result in overcapacity.

  In the future, aging portables will dictate the need to address LUSD's dependence on portables for classroom use. Older portables should be phased out as long term housing, but kept for interim solutions and during modernization and renovation projects. In particular, Lawrence School and Adult Education facilities need to be replaced with permanent space.

Portable modular buildings comprise of 55% of LUSD's classrooms. They are nessecary and strategic for accommodating enrollment fluctuations in the short run, but permanent classrooms and facilities are desirable in the long run.

- ***Renovation and Modernization***. In addition to new facilities, many older schools need renovation and modernization. In Lodi, older elementary schools were built for a maximum capacity of 400 to 500 students, composed of larger classes because classes used to be larger. Office and support space is non-existent to extremely limited because most of the current services did not existing at the time. Multipurpose rooms were sized for the planned enrollment, and there were no computer labs, few libraries, no preschool programs or special education classes. In particular, Needham School and Henderson Academy need renovations for their non-conforming or outdated facilities.
- ***Maintenance, Operations, Transportation, and Support Facilities.*** Currently, support facilities for the entire LUSD are located in Lodi. With the construction of new schools to serve students in the North Stockton Area, it is no longer efficient to have all support facilities in Lodi.
- ***Additional Science, Art, and Technology Facilities.*** There is a projected deficiency in the overall district when schools are overcrowded, pending the opening of new schools. Science labs, fine arts facilities, and technology labs at middle and high schools should commensurate with planned facilities.
- ***Pre-School and After-School Programs.*** Presently, preschool and after school programs are accommodated only when there is unused existing space, and when grants are received to fund for the necessary facilities. Most programs are housed in portables.
- ***Independence School.*** The alternative school is currently housed in three locations. A permanent location should be established by 2012 to 2013.
- ***Expansion for the Horizon Program.*** This program supports cyesis or pregnant minors, and is housed in the program-appropriate space at Plaza Robles High School. There is a need for additional space as enrollment increases. A location in the northern part of the district is desirable.
- ***Special Ed Facilities for Older Students.***
- ***Restrooms.*** More restrooms are needed to service the expansion of schools.
- ***Conference Spaces.*** There is a general lack of conference space at LUSD schools.
- ***Shared Parks and Recreation Facilities.*** The Schools Facilities Master Plan advocates the sharing of park and school facilities, and has consistently planned schools, especially elementary, adjacent to parks.

PLANNED IMPROVEMENTS AND RECENT PROJECTS

The LUSD has been very proactive in the continued planning, construction, and renovation of school facilities. The following projects have been completed or are nearing completion as recommended by the 2001 Schools Facilities Plan. Starred entries represent schools located in the City of Lodi:

- Establishment of Julia Morgan School as K-6 Elementary School
- Construction of Borchardt School as part of Reynolds Ranch Project*
- Modernization of Woodbridge Elementary School
- Addition to Parklane, Oakwood, Westwood, Morada, Creekside, and Wagner-Holt schools
- Construction of Christa McAuliffe Middle School
- Installation of new Lodi Middle School portables*
- Completion Construction of Serna Charter School*
- Renovation of Henderson Academy*
- Construction of Ansel Adams Elementary School
- Construction of Larson Elementary School in southwest Lodi*
- Construction of Silva Elementary school in northwest Stockton
- Construction of Millswood Middle School*
- Construction of McNair High School
- Establishment Lincoln Tech for Regional Occupational Program
- Construction of George Lincoln Elementary Mosher School
- Planned expansion of Lockeford School from a K-6 to a K-8 school*
- Construction of new warehouse building that houses the mail room, duplicating, categorical IMC functions, and testing and evaluation.
- Planned improvements of Bear Creek High
- Planned replacement of portables with permanent spaces at Lawrence Elementary School*

FUNDING

LUSD public schools are funded by State and local bonds. State funding includes Proposition 47, the Kindergarten-University Public Education Facilities Bond Act of 2002. This Act made California school districts eligible for a $11.4 billion of the $13.05 billion bond for construction and renovation of kindergarten through 12 school facilities ($11.4 billion) and higher education facilities ($1.65 billion). General obligation bonds are backed by the State, meaning that the State is obligated to pay the principal and interest costs on these bonds. General Fund revenues would be used to pay these costs. These revenues come primarily from state income and sales taxes.[1]

The Act also makes $3.3 billion available for the reconstruction or modernization of existing school facilities. Of this amount, $1.9 billion available for backlog projects and $1.4 billion for new proposals. Districts are required to pay 40 percent of project costs from local resources. There is also a total of $1.7 billion to districts with schools that are considered critically overcrowded. Finally, the measure includes $1.65 billion to construct new buildings and related infrastructure, alter existing buildings, and purchase equipment for use in these buildings for California's public higher education systems.

In the 1980s and early 1990s, LUSD undertook numerous modernization projects using the State Lease Purchase (SLP) funding, in which the State provided full funding with no required local match. All buildings that were older than 30 years old at that time received some measure of renovation, primarily to meet handicap access requirements. The School Facility Program (SFP) design funds have also financed various projects, some of which are still incomplete. However, a change in the State formula along with the inflationary increase in the State grant require a much larger amount of local match funding to get State construction funds for modernization, resulting in the need to prioritize the remaining projects relative to the funding available from Measure K and L. Additional funding is also required. One major challenge that LUSD faces is of soaring construction and material costs.

Measure K

In 2002, voters of the LUSD passed the Measure K School Bond to raise money for new schools, school expansions, and improvements. State funds have matched $133,469,994 of the bond funds, almost double the original $77 million goal.

The top priorities were to build seven new schools and complete seven additions. Second priorities were additions at Bear Creek High, Lodi

[1] League of Women Voters, California website: http://www.smartvoter.org. Accessed November 21, 2003.

High, Lockeford Elementary, and Lawrence Elementary, and modernization at other schools. Today, the seven schools and three additions have been completed; Lincoln School is being rebuilt, the Serna Charter School is now opened, and a new elementary school is under construction.

Measure L

In November 2006, voters passed the Measure L Bond to install a new Schools Facilities Improvement District in North Stockton.

Projected Costs

LUSD projects a total inflation adjusted[2] cost of $685,400,000 for the 10-year Schools Facilities Master Plan. Of this amount, improvements in the City of Lodi will cost $235,500,000.

Financing Mechanisms

The Master Plan suggests three funding mechanisms. All forms of financing are needed to meet the LUSD's needs:

- ***Local Bonds.*** Proposition 39 or two-thirds majority vote, and Mello-Roos. Local bonds can be done either district wide or regionally through the School Facilities Improvement District (SFID) Bond. Mello-Roos funds must be developer approved or voted on the district or regional level.
- ***Development Fees.*** Limited to providing interim housing and only for new capacities. Table 5-7 lists the range of developer fees:

Table 5-7: Developers Fees for School Development

Property type	*Dollar per square foot*
Commercial	0.42
Properties Without Agreements	3.17
Properties With Agreements	4.43

Source: Lodi Unified School District, Facilities Planning. April 2007. Properties without agreements will be required to pay double the fee rate if the State runs of money for public schools.

[2] An 8% per year construction inflation factor was used to calculate future costs. Given the volatility of the costs of materials and construction, these costs are subject to adjustment as the budget is determined for each project. See LUSD School Facilities Master Plan 2006.

- ***State School Facility Program (SFP) Funding.*** Local match is required prior to application for State funds. Funds can be used for new construction or modernization.

5.2 PRIVATE SCHOOLS

The City of Lodi has ten private schools, with a total estimated enrollment of 1,875 students ranging from preschool to grade 12. Unlike LUSD schools, many private schools offer preschool education. Table 5-8 provides a summary of the private schools in the City.

St. Peters Lutheran Church is one of the four private elementary schools in Lodi.

5.3 HIGHER EDUCATION

Currently there is one adult school and one Regional Occupation Program (ROP) in the LUSD, both of which are located in Lodi's Eastside neighborhood on 542 East Pine Street at Cherokee Lane. As of 2007, there are an estimated 2,500 students enrolled in the Adult Education Program and 1,290 enrolled in the Lincoln Tech ROP. The Schools Facilities Master Plan has not emphasized the need for expansion of these facilities.

A new San Joaquin Delta College Campus site has been acquired, located immediately south of the Mokelumne River east of the Lodi City limits. In addition to standard community college courses, this campus will also offer programs in viticulture and sustainable agricultural practices. The Delta College currently has two existing campuses, one in Tracy and one in Stockton.

Table 5-8: Private Schools in the City of Lodi

School	*Address*	*Level*	*Grades*	*Enrollment*
Century Christian School	550 West Century Blvd.	Elementary	PK-8	371
Lodi Sda Elementary School	1240 S. Central Ave	Elementary	K-8	225
St. Anne School	200 S. Pleasant Ave.	Elementary	PK-8	263
St. Peters Lutheran School	2400 Oxford Wy.	Elementary	PK-8	226
Jim Elliot Christian High School	2695 W. Vine St.	High School	9-12	199
Lodi Academy	1230 S. Central Ave.	High School	9-12	145
Zion Middle School	105 S. Ham Ln.	Middle	6-8	85
Lodi Day Nursery School	760 S. Ham Ln.	Nursery	PK-K	180
Montessori Villa Llc	11698 N. Hwy 99 2525	Nursery	PK-K	58
Happy Hours Pre-School	444 W. Turner Rd.	Pre-School	PK-K	123
Total				**1,875**

Source: National Center for Educational Statistics, Institute of Educational Sciences; website: www.PrivateSchoolReview.com, California Integrated Waste Management Board. Enrollment as of 2005.

5.4 LODI PUBLIC LIBRARY

This section describes the existing library facility and associated programs administered by the City of Lodi. Information for this section is based on the Lodi Public Library website, the 2002 Lodi Public Library Facilities Master Plan, and direct correspondence with the library services director.

The Lodi Public Library is s single-branch facility that serves the entire city.

MUNICIPAL LIBRARY

Lodi residents are served by the Lodi Public Library, a municipal facility centrally located at 201 West Locust Street between Pleasant and Church streets. The library is open seven days, 64 hours a week; hours of operation are Monday through Thursday 10am to 9pm, Friday and Saturday 10am to 6pm, and Sunday from 1pm to 5pm. The library has holdings of approximately 150,000 books, 235 magazine subscriptions, 12 newspapers, as well as audio-books, videos, music CDs, and CD-rom media. The facilities and associated services, as described below, are available at no charge to Lodi residents. Figure 5-1 illustrates the location of the library within the city.

The Lodi public library serves 52,000 registered borrowers, who check out an approximate 340,000 items a year.

Library Services

The library offers a number of services and programs to assist its users, from computer services, and special programs for youth and non-English speaking residents:

- Performances sponsored by the Friends of the Lodi Public Library sponsor a special performance every month.
- Saturday story time each week in the community room, free for children and their family. The program will include finger-plays, songs and stories.
- Preschool story time for ages three and up held every Wednesday and Thursday morning in the library's Community Room. Stories, songs, finger plays and a movie are featured, along with an occasional craft, lasting a half hour to 45 minutes.
- Toddler time for children age three and under held every Wednesday and Thursday at morning and takes place in the picture book area. This program is 15 to 20 minutes in length.
- A bi-lingual story-time for English and Spanish speakers takes place in the Activity Room Wednesday nights.
- Crafts for school age children in the activity room. Past crafts have included landscape paintings, T-shirt paintings, animal crafts and holiday crafts.

- Adult Literacy Services to assist adult learners in improving their basic literacy skills, including reading, writing and introductory computer lessons. Adult learners work with individual tutors in an optimum learning environment.
- Small-business workshops.
- Computer classes at the computer learning center, for a fee of $10. These cater to beginners on programs such as word processing and spreadsheets.
- Computer access with high-speed internet and various software.

According to library staff, the clientele has changed over the years. In the past, most clients came to borrow books, but now staff has noticed a high usage of computers for people who do not have access at home, especially for internet use. The number of books checked out has been flat or slightly declining.

Existing Library Facilities

The current Lodi Public Library was erected in 1978 and is housed in a 28,260 square feet, single-story building. The site spans 1.5 acres, with both onsite and offsite parking—31 spaces in a parking lot, 12 on an adjacent alley, and 20 to 30 on the street.

Upgrades and Maintenance

According to surveys conducted for the library master plan, the top three most common services that respondents requested were more books, additional study and reading spaces, and more computer resources. The top three amenities to include in the library include study rooms, children story room, and computer classrooms.

The 2002 Lodi Public Library Facilities Master Plan confirms that library facilities are generally well-maintained. There are some inconformances with the American Disabilities Act (ADA) standards, which will require necessary upgrades, such as access ramps.

FUNDING

The library receives funds from three main sources: the City of Lodi, the Lodi Public Library Foundation, and Friends of the Lodi Public Library.

- ***City of Lodi.*** As a municipal run facility, most of the library's funding comes from the City of Lodi, and receives a budget like other municipal departments. For example, the 2007 budget for the library is $1.7 million.

- ***Lodi Public Library Foundation.*** An independent 501(c)(3) philanthropic organization was established in 1999 to cultivate support and raise funds for innovative, major projects for the library. The Foundation fills the gap between the community's need for library services and available public resources through fundraising campaigns and donations.
- ***Friends of the Lodi Public Library.*** The City also receives funding support from Friends of the Lodi Public Library, a membership organization. Members pay a nominal annual membership fee, which translates directly into donations, gifts and services for the library and programs for the people of Lodi. However, the funds raised are minimal compared with the official funding from the City and the library foundation. Funds are mainly used for program purposes.

STANDARDS AND PROJECTED NEEDS

Currently, Lodi provides 0.45 square footage of library space per 1,000 population. The City's goal is to raise the standard to 0.84 square foot per capita.

Using this ratio, The 2002 Lodi Public Library Facilities Master Plan projects a need for 59.802 total square feet of library space within the plan's 20-year time space, until 2021. However, the projection was based on an assumption of 1% annual increase in population—an underestimation under Lodi's current development trends. As of January 2007, SJCOG projects Lodi's population to reach 73,697 by 2020. This translates to a total 61,905 square foot of library space to satisfy the goal ratio of 0.84 square feet per resident.

FUTURE EXPANSION

Based on the desired 59,802 square foot standard, the Library Master Plan proposes a centralized main library. The decision was based on Lodi's compact urban form and the library master plan's deduction that a single location is adequate to provide library services to the entire city.

The plan proposes two alternatives that fit the central library scheme. The first scenario proposes the expansion of the existing library and an immediate temporary satellite branch in the underserved Eastside neighborhood.

The second scenario is to construct a new 59,802 square foot Main Library on the corner of Main and Pine streets or a new undetermined downtown site. The facilities plan also offers several alternatives on the site plan of the two scenarios.

Given the master plan's underestimated population projection, library expansions would have to be reevaluated accordingly.

Estimated Costs

The library master plan estimates that the first scenario—expansion of the existing library with a satellite branch on the east side—would cost $14,040,750. The second scenario—a new 59,802 square foot library at a new site—would require $18,271,250. These estimates are based on the direct constructions; soft costs such as design, consultation, inspection fees; a 25 to 35 percent for incidental costs; and 3% for inflation.

These costs would need to be re-assessed to match any changes in plans. Since projected population has increased since the plan was prepared, more space is required to meet the 0.84 standards. Costs should rise as well.

5.5 PLANNING ISSUES AND IMPLICATIONS

The General Plan Update should meet the education needs of Lodi, and coordinate with the existing schools and library plans. Major planning issues regarding the education and academic infrastructure follow.

1. *Where should new schools be located? How should they be integrated into the city's existing neighborhoods?*

One of the major planning issues regarding schools is the location and integration of new schools. While the LUSD has been highly successful in implementing new schools, expansions, and renovations—school capacity should not be a problem in the foreseeable future—the numerous planned and proposed future schools and improvements will require co-operation amongst the cities of Stockton and Lodi and the County of San Joaquin to select suitable school sites to maximize access and complement residential neighborhoods. This is especially important as the two cities work on their General Plan Updates. For Lodi, some proposed sites are located in the proposed greenbelt area, and require further discussions between the City, the property owners, and the LUSD.

Current LUSD school need projections extend to year 2015. As part of the General Plan Update, population and school need projections will be conducted to the year 2030, and locations of any needed new schools within Lodi identified.

2. *What are the library's future needs?*

The 2002 Lodi Public Library Facilities Master Plan is based on the assumed 2021 projected population of 71,500. However, new projections estimate 2020 population to be 73,697. According to the 0.84 square foot per capita standard, Lodi will need 61,905 square feet. The original plan for having a main library may need to be reassessed.

3. *How should library facilities expand to serve the growing City?*

The library master plan suggests a main library scheme to serve the entire city. However, interview with the library department head suggested that this needs to be reassessed, especially with new concentrations of residential developments proposed on the City's southern and western edges that are located far from the existing library or the proposed downtown sites. The question of having one central library or multiple branches may resurface in the new General Plan.

According to the library director and the master plan, the Eastside neighborhood is also underserved. Residents have to cross the rail tracks and face more traffic hazards to reach the library. One suggestion is to have a branch on the Eastside, with more language-specific amenities catered to the Hispanic and Pakistani community there.

6 Agricultural and Soil Resources

Agriculture and viticulture play a major economic, cultural, and environmental role in the Lodi region.

Agricultural activities play an important role in the City's economic, cultural, and environmental identity. Grapes, processed foods, nuts, fruit, and milk are all major commodities of the Lodi area, with both established national and international markets. Wine growers in the Lodi area alone produce an annual crop with an estimated worth of more than $350 million[1]. In addition to the direct contributions of agriculture, there are secondary economic impacts as well, including sustenance of food processing industry, and winemaking and tourism.

This chapter provides the following information for the Planning Area:

- A general description of existing agricultural operations;
- Description of dominant crops and trends in area agriculture;
- Identification of Important Farmlands and soils; and
- Identification of current Williamson Act lands.

Please see section 6.8: Geology, Soils, and Seismicity of this report for additional information specific to the soil resources of the Planning Area as they relate to public health and safety concerns.

6.1 INFORMATION SOURCES

This evaluation of agricultural resources was based on a review of information from the California Department of Conservation's Farmland Mapping and Monitoring Program (FMMP), the California Department of Water Resources, and the San Joaquin County Agricultural Commissioner's Office.

Geographic Information Systems (GIS) data was also obtained and mapped for various agricultural resources including crop types and farmland classifications.

[1] City of Lodi, 2007.

6.2 KEY TERMS

Commodities. Any unprocessed or partially processed good (e.g., fruits, vegetables, or grains) used for trade or commerce.

Greenbelt Agreement. Greenbelt agreements are adopted by a joint resolution of the affected agencies and represent a policy commitment to the ongoing preservation of agricultural and open space areas.

Important Farmlands. Collective term for farmlands designated as Prime, Unique, or as Farmlands of Statewide Importance under the Department of Conservation's FMMP.

Williamson Act Contract – Active. A contract between a landowner and a City or County to restrict land to agricultural or open space uses in return for lower than normal property tax assessments. The minimum term for a Williamson Act contract is 10 years. Since the term automatically renews on each anniversary date of the contract, the actual term can be indefinite.

Williamson Act Contract – Non-Renewal. Contracts may be terminated at the option of the landowner or local government by initiating the process of non-renewal. Under this process, the remaining contract term (nine years in the case of an original term of 10 years) is allowed to lapse, with the contract null and void at the end of the term. Property tax rates gradually increase during the non-renewal period, until they reach normal (i.e., non-restricted) levels upon termination of the contract.

Farmland Security Zone. A farmland security zone is an area created within an agricultural preserve by a board of supervisors (board) upon request by a landowner or group of landowners. Farmland security zones offer landowners greater property tax reduction. Land restricted by a farmland security zone contract is valued for property assessment purposes at 65 percent of its Williamson Act valuation, or 65 percent of its Proposition 13 valuation, whichever is lower. It is a contract between a private landowner and a county that restricts land to agricultural or open space uses. The minimum initial term is 20 years. Like a Williamson Act contract, farmland security zone contracts self-renew annually, thus unless either party files a "notice of non-renewal" the contract is automatically renewed each year for an additional year.

6.3 REGULATORY SETTING

Relevant State and local programs specific to agricultural and soils resource issues are discussed in this section.

STATE PROGRAMS

Farmland Mapping and Monitoring Program (FMMP)

The California Department of Conservation (DOC), under the Division of Land Resource Protection, has developed the FMMP that monitors the conversion of the State's farmland to and from agricultural use. County-level data is collected and a series of maps are prepared that identify eight classifications and uses based on a minimum mapping unit size of 10 acres. The program also produces a biennial report on the amount of land converted from agricultural to non-agricultural use. The program maintains an inventory of state agricultural land and updates the Important Farmland Series Maps every two years (Department of Conservation, 2004a).

The FMMP is an informational service only and does not constitute state regulation of local land use decisions. Agricultural land is rated according to several variables including soil quality and irrigation status with Prime Farmland being considered the most optimal for farming practices. Table 6-1 provides a summary of the rating categories used by the FMMP.

Table 6-1: Description of FMMP Designations

Designation	*Description*
Prime Farmland	Land that has the best combination of physical and chemical characteristics for the production of crops. It has the soil quality, growing season, and moisture supply needed to produce sustained yields of crops when treated and managed, including water management, according to current farming methods. It must have been used for the production of irrigated crops within the last three years. It does not include publicly owned lands for which there is an adopted policy preventing agricultural use.
Farmland of Statewide Importance	Similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to hold and store moisture. Considered to have an excellent combination of physical and chemical characteristics for the production of crops.

Table 6-1: Description of FMMP Designations

Designation	*Description*
Unique Farmland	Land of lesser quality soils used for the production of specific high-economic value crops at some time during the monitoring program's two update cycles prior to the mapping date. It has the special combination of soil quality, location and growing season, and moisture supply needed to produce sustained high quality or high yields of a specific crop when treated and managed according to current farming methods. Unique farmland is usually irrigated, but may include non-irrigated orchards or vineyards as found in some climatic zones in California.
Farmland of Local Importance	Farmlands not covered by the categories of Prime, Statewide, or Unique. They include lands zoned for agriculture by County Ordinance and the California Land Conservation Act as well as dry farmed lands, irrigated pasture lands, and other agricultural lands of significant economic importance to the County and include lands that have a potential for irrigation from local water suppliers.
Grazing Land	Grazing Land is land on which the existing vegetation, whether grown naturally or through management, is suitable for grazing or browsing of livestock.
Urban and Built-Up Land	Land occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to 10-acre parcel. This land is used for residential, industrial, commercial, construction, institutional, public administration, railroad and other transportation yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, water control structures, and other developed purposes.
Other Land	Land not included in any other mapping category. Common examples include low density rural developments; brush, timber, wetland, and riparian areas not suitable for livestock grazing; confined livestock, poultry or aquaculture facilities; strip mines, borrow pits; and water bodies smaller than forty acres. Vacant and nonagricultural land surrounded on all sides by urban development and greater than 40 acres is mapped as Other Land.
Water	Perennial water bodies with an extent of at least 40 acres.

Table Source: California Department of Conservation, 2004.

California Land Conservation Act of 1965 (Williamson Act)

35.9% of the Planning Area is farmland under the Williamson Act.

The California Land Conservation Act (CLCA) of 1965, Sections 51200 et seq. of the California Government Code, commonly referred to as the Williamson Act, enables local governments to restrict the use of specific parcels of land to agricultural or related open space use. Landowners enter into contracts with participating cities and counties and agree to restrict their land to agriculture or open space use for a minimum of 10 years. In return, landowners receive property tax assessments that are much lower than normal because they are based upon farming and open space uses as opposed to full market value. Local governments receive an annual subvention of forgone property tax revenues from the State via the Open Space Subvention Act of 1971. Contracts are automatically renewed every year, extending out to 10 years.

The DOC reports that the Land Conservation Act Program has remained stable and effective as a mechanism for protecting agricultural and open space land from premature conversion of land to urban uses. The DOC indicates that the program might have remained small if not for the addition of Article 28 (now part of Article 13) to the State Constitution. Article 13 declares the interest of the state in preserving open space land and provides a constitutional basis for valuing property according to its actual use. The amendment originated with groups interested in the preservation of open space land. Agricultural interests added their support after recognizing the importance of a constitutional backing for preferential tax assessments. Article 13 allows preferential assessments for recreational, scenic, and natural resource areas as well as areas devoted to the production of food and fiber.

LEGISLATION AFFECTING THE WILLIAMSON ACT

Farmland Security Zones

In August 1998, the Williamson Act's farmland security zone (FSZ) provisions were enacted with the passage of Senate Bill 1182 (California Government Code Section 51296-51297.4). This sub-program, dubbed the "Super Williamson Act," enables agricultural landowners to enter into contracts with a specific county for 20-year increments with an additional 35 percent tax benefit over and above the standard Williamson Act contract.

Senate Bill 1835 (Johnston, Chapter 690, Statutes of 1998) and the Cortese-Knox Local Government Reorganization Act

Senate Bill 1835 requires the appropriate Local Agency Formation Commission (LAFCO) to determine whether a particular city is required to succeed (adhere) to the rights, duties and powers of the county under the contract or whether the city may exercise an option to not succeed to the rights, duties and powers of the county. The determination would be required pursuant to any proposal by a city that would result in the annexation of Williamson Act contracted land.

SENATE BILL 2227 (MONTEITH, CHAPTER 590, STATUTES OF 1998)

Senate Bill 2227 added new requirements to the Cortese-Knox Local Governmental Reorganization Act regarding any proposed annexation of Williamson contract land. If the proposal would result in the annexation of land that is subject to the Williamson Act, then the petition shall state whether the City shall succeed (adhere) to the contract or whether the City intends to exercise its option to not succeed to the contract.

LOCAL REGULATIONS

City of Lodi 1991 General Plan

The Land Use and Conservation Elements of the City's existing General Plan contain two goals and various policies pertinent to geologic and seismic hazard conditions. Several of these are identified below, in Table 6-2.

Table 6-2: City of Lodi 1991 General Plan Goals and Policies

LAND USE ELEMENT	
Letter	*Goal Text*
B	To preserve agricultural land surrounding Lodi and to discourage premature development of agricultural land with non-agricultural uses, while providing for urban needs
Number	*Policy Text*
#1	The City shall encourage the preservation of agricultural land surrounding the City.
#2	The City should designate a continuous open space greenbelt around the urbanized area of Lodi to maintain and enhance the agricultural economy.
#3	The City should cooperate with San Joaquin County and the San Joaquin County Local Agency Formation Commission (LAFCO) to ensure that the greenbelt is maintained.
#4	The City shall support the continuation of agricultural uses on lands designated for urban uses until urban development is imminent.

Table 6-2: City of Lodi 1991 General Plan Goals and Policies

#5	The City shall promote land use decisions within the designated urbanized area that allow and encourage the continuation of viable agricultural activity around the City.
#6	The City shall encourage San Joaquin County to retain agricultural uses on lands adjacent to the City.
CONSERVATION ELEMENT	
Letter	*Goal Text*
C	To promote the economic viability of in and surrounding Lodi and to discourage the premature conversion of agricultural lands to nonagricultural uses, while providing for urban uses.
Number	*Policy Text*
#1	The City shall ensure, in approving urban development near existing agricultural lands, that such development will not constrain agricultural practices or adversely affect the economic viability of adjacent agricultural practices.
#2	The City shall require new development to establish buffers between urban development and productive agricultural land uses consistent with the recommendations of the San Joaquin County Department of Agriculture.
#3	The City shall adopt a "right-to-farm" ordinance for the purpose of protecting agricultural land from nuisance suits brought by surrounding land uses.
#4	The City shall support economic programs established by San Joaquin County for farm preservation.
Number	*Implementation Measure Text*
7	The City shall adopt a "right-to-farm" ordinance.

Table Source: Jones & Stokes, 1991

6.4 ENVIRONMENTAL SETTING

IMPORTANT FARMLANDS WITHIN THE PLANNING AREA

Land within the City's Planning Area is represented by the breakdown in use between agricultural and urban land. In 2004, an estimated 40,730.7 acres (roughly 80 percent of the total Planning Area) were designated for some type of agricultural use. As shown in Table 6-3, lands designated as Prime Farmland account for an estimated 65 percent of the Planning Area. The Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance designations are often referred to collectively as "Important Farmlands". Important Farmlands account for the vast majority of farmland (40,699.7 acres or 80 percent of the total land area) within the Planning Area (see Table 6-3). These Important Farmlands are identified in Figure 6-1.

Most of the agricultural lands on Armstrong Road, located in the center of the proposed greenbelt community-separator, are designated as Prime Farmland. 65% of the Planning area is designated as Prime Farmland

Table 6-3: Land Use by FMMP Designation

FMMP Designation	*Planning Area Acreage*	*Percentage of Planning Area (50,826.5 acres)*
Prime Farmland	32926.0	65%
Farmland of Statewide Importance	1911.4	4%
Unique Farmland	4442.0	9%
Farmland of Local Importance	1420.3	3%
Grazing Land	31.0	<0.1%
Urban and Built-Up Land	8700.7	17%
Other Categories	1400.4	3%

Table Source: California Department of Conservation, 2004b; Dyett & Bhatia, 2007; and ESA, 2007.

Regional Trends in Farmland Use and Conversion

As more fully described above under the Regulatory Setting section, the FMMP monitors the conversion of the State's farmland to and from agricultural use. San Joaquin County has some of the most productive agricultural lands in the state and has been experiencing conversion of these lands to non-agricultural uses fairly consistently over the past several years. In 1990, San Joaquin had 437,859 acres of Prime Farmland. By 2002, this number was 415,527 acres. This is a net loss of 22,332 acres, or more than 1,800 acres per year. Farmland of statewide importance showed a similar decline, from 100,277 acres to 92,521. Unique Farmland showed a slight increase in acreage, from 46,863 acres to 61,849 acres. This increase in Unique Farmland is most likely due to the conversion of unirrigated lands to vineyards. However, the net loss among all types of agricultural land (including grazing land) was 20,904 acres during this period. The most serious loss is prime farmland—the most productive category of farmland.

The main cause of farmland conversion is urban development. Development pressures will continue in the future, as the population of San Joaquin County increases and the various communities (including Lodi) attempt to provide housing, jobs, and services for new residents.

Farmland Conversion Mitigation and Fees

Several cities within San Joaquin County have developed and adopted farmland conversion and mitigation fees to address the loss of agricultural land through conversion to private urban uses, including residential, commercial and industrial development. For the cities of Manteca, Tracy, and Lathrop, the adoption of this fee was agreed to pursuant to the Settlement Agreement and Release of Claims for the South County Water Supply Project. The City of Stockton has been the most recent city to adopt a fee, which occurred in February 2007. Prior to adoption of these fees, each city developed their own fee consistent with the Mitigation Fee Act (California Government Code §66000, et seq).

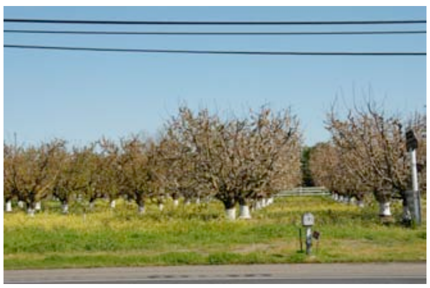
Identifying the types of agricultural land to be mitigated has been a key issue for each city and "agricultural land" has been defined as "important farmland" consistent with the California Department of Conservation's FMMP, including those important farmland resources as shown on the most recent available FMMP map of San Joaquin County. As previously defined, Important Farmland includes Prime Farmland, Farmland of Statewide Significance, and Unique Farmland. This definition is consistent with the purpose of the Mitigation Fee Act, and with the definition of "Agricultural Land" found in the California Environmental Quality Act (Public Resources Code Section 21060.1).

The collection of these farmland conversion fees are intended to be used by the various cities and/or a qualifying land trust to purchase Agricultural Mitigation Land. "Agricultural Mitigation Land" means an easement or fee interest in property that restricts the primary use of the land to agricultural production in perpetuity.

WILLIAMSON ACT CONTRACTS AND FARMLAND SECURITY ZONES

As more fully described above under the Key Terms and Regulatory Setting sections, a Williamson Act contract and a Farmland Security Zone represents agreements to restrict land to agricultural or open space uses in return for lower than normal property tax assessments. Figure 6-1 provides the locations of parcels within the Planning Area that have an active Williamson Act Contract (18,250.6 acres), a Williamson Act Contract in non-renewal status (124.4 acres), or a Farmland Security Zone contract (1,342.7 acres).[2]

[2] Source: California Department of Conservation, 2004b; Dyett & Bhatia, 2007; and ESA, 2007.



Grape and fruit trees are part of Lodi's agricultural landscape and economy.

AGRICULTURAL PRODUCTION

The San Joaquin County Agricultural Commissioner's Office provides a variety of County specific agricultural statistics (i.e., crop types, production values, etc.) on an annual basis. This section provides a summary of the key agricultural crop types produced in the County.

The 2005 Agricultural Report for San Joaquin County indicates that milk is the leading agricultural commodity in the County. The top 10 leading crops and associated economic values are shown in Table 6-4. The gross value of agricultural production for 2005 in San Joaquin County is estimated at $1,749,113,000, an all-time high. This value represents an 8% increase from the estimated 2004 value.[3]

Table 6-4: 10 Leading Crops for San Joaquin County in 2005

Rank	*Crop*	*Value*
1	Milk	$314,565,000
2	Grapes	$289,744,000
3	Almonds	$166,580,000
4	Tomatoes	$103,551,000
5	Walnuts	$ 97,628,000
6	Cherries	$ 91,822,000
7	Cattle & Calves	$ 91,057,000
8	Hay	$ 69,569,000
9	Ornamental Plants	$ 61,945,000
10	Asparagus	$ 59,220,000

Table Source: San Joaquin County Agricultural Commissioner's Office, 2006.

Within the Planning Area, 38,239.8 acres—approximately 75 percent of the total Planning Area—are currently in active agricultural production, with a smaller amount of land—approximately 3 percent—classified as "Idle" agricultural land (see Table 6-5). Table 6-5 and Figure 6-2 identify the distribution of crop types within the Planning Area. As shown in both the table and figure, lands classified as vineyards account for a majority of the lands in agricultural production.

[3] Source: San Joaquin County Agricultural Commissioner's Office, 2006.

Table 6-5: Department of Water Resource Crop Type Distribution

Crop Type	*Planning Area Acreage*	*Percentage of Planning Area (50,826.5 acres)*
Citrus and Subtropical	22	< 0.1 %
Deciduous Fruits and Nuts	4137.5	8%
Field Crops	2272.9	4%
Grain and Hay Crops	975.9	2%
Pasture	3635.1	7%
Truck, Nursery and Berry Crops	1151.6	2%
Vineyard	25274.9	50%
Livestock and Poultry Farms	769.9	2%
Idle	1329.8	3%
Native Vegetation	1982.5	4%
Native Riparian	308.6	<1%
Water	319.1	<1%
Urban	8628.4	17%

Table Source: Department of Water Resources, 1996; Dyett & Bhatia, 2007; ESA, 2007

6.5 PLANNING ISSUES AND IMPLICATIONS

1. *How should agricultural land loss and fragmentation be presented?*

Agricultural lands provide a variety of important functions and generate a wide variety of benefits to the Planning Area. For example, agricultural lands produce commodities that generate various economic benefits (in the form of local jobs and revenue), contribute to the aesthetic value of an area (i.e., greenbelts or transition zones), and create a variety of foraging habitats for several important special status wildlife species (including Swainson's Hawk). In addition to the loss of these key benefits, the conversion of agricultural land has hydrological implications, as loss of open space changes the existing watershed and may reduce groundwater recharge areas.

Development such as low-density housing and other urban uses, can disrupt agricultural and soil resource.

Development in the Planning Area could eliminate or modify important agricultural and soil resources. In some cases, it may also fragment some existing agricultural areas. Fragmentation of existing agricultural lands may increase the likelihood of increased nuisance effects resulting from urban expansion into agricultural areas—also known as "edge effects." These nuisance effects include noise (from farm equipment and crop dusting), dust, odors, and drift of agricultural chemicals. From the agricultural perspective, conflicts with urban development include restrictions on the use of agricultural chemicals, complaints regarding noise and dust, trespass, vandalism, and damage from domestic animals (such as dogs). These conflicts may increase costs to the agricultural operation, and combined with rising land values for residential development, encourage the additional conversion of additional Important Farmland to urban uses.

Maintaining key agricultural land uses, their connectivity to larger agricultural areas, along with a range of farming activities that produce a variety of agricultural commodities is an important consideration for the Planning Area. Equally critical is the need to ensure buffers between agriculture and residential uses. The City may also need to work with surrounding and regional agencies to ensure that non-urbanized land is not divided into parcels that are not viable for farming. Issues related to greenbelt and farmland preservation are addressed in greater detail in *Working Paper #4: Greenbelt Strategies*.

BIBLIOGRAPHY

California Department of Conservation. 2004a. A Guide to the Farmland Mapping and Monitoring Program, 2004 Edition. Sacramento, CA.

California Department of Conservation. 2004b. Division of Land Resource Protection, Farmland Mapping and Monitoring Program. Sacramento, CA.

California Department of Water Resources. 1996. San Joaquin County land use data. Sacramento, CA.

City of Lodi. 2007. “Lodi – Heart of California’s Premium Wine Business”. http://www.lodi.gov/eco_development/overview.html).

Jones & Stokes Associates, Inc. 1991. City of Lodi general plan policy document. Sacramento, CA. Prepared for: City of Lodi, Lodi, CA. With contributions from J. Laurence Mintier & Associates, TJKM, and Pepper Associates.

San Joaquin County Agricultural Commissioner’s Office. 2006. 2005 Annual Crop Report, San Joaquin County. Compiled by Fred D. Minazzoli. Agricultural Commissioner Scott Hudson. Stockton, CA.

7 Biological Resources

The Planning Area includes a variety of biological communities which provide habitat for both rare and common wildlife and plant species. This chapter describes biological resources existing within or potentially occurring within the Planning Area. Results from this assessment may be used in planning and management decisions that may affect these biological resources in the Planning Area.

7.1 INFORMATION SOURCES

This evaluation includes a review of vegetation communities and wildlife habitats, special-status species, and jurisdictional "waters of the United States" that occur or potentially occur within or near the Planning Area. Results from this assessment are based upon literature searches, database queries, and some analysis using existing spatial data, including the following:

- U.S. Fish and Wildlife Service (USFWS) Species List for USGS topographic quadrangles within and immediately surrounding the Planning Area (USFWS, 2007);
- California Natural Diversity Database (CNDDB), Rarefind 3 computer program search of the USGS topographic quadrangles within and immediately surrounding the Planning Area (CDFG, 2007);
- California Native Plant Society (CNPS), Electronic Inventory computer program search of the for the USGS topographic quadrangles within and immediately surrounding the Planning Area (CNPS, 2007);
- California Department of Forestry and Fire Protection (CDF, 2002) Multi-source Land Cover Data v2; and
- USGS Digital Orthophoto Quarter Quadrangles (1994).

7.2 KEY TERMS

Sensitive Natural Community. A sensitive natural community is a biological community that is regionally rare, provides important habitat opportunities for wildlife, are structurally complex, or are in other ways of special concern to local, state, or federal agencies. The California Environmental Quality Act (CEQA) identifies the elimination or substantial degradation of such communities as a significant impact. The California Department of Fish and Game (CDFG) tracks sensitive natural communities in the California Natural Diversity Database. There are no sensitive natural communities within the Planning Area. However, areas surrounding the Planning Area within San Joaquin County host numerous sensitive natural communities, including Coastal and Valley Freshwater Marsh, Elderberry Savanna, Great Valley Cottonwood Riparian Forest, Great Valley Mixed Riparian Forest, Great Valley Valley Oak Riparian Forest, Northern Claypan Vernal Pool, Northern Hardpan Vernal Pool, and Valley Oak Woodland.

Special-Status Species. Special-status species are plants and animals that, because of their documented rarity or vulnerability to various causes of habitat loss or population decline, are recognized by federal, state, or other agencies. Some of these species receive specific protection that is defined by federal or state endangered species legislation. Others have been designated as "sensitive" on the basis of adopted policies and expertise of state resource agencies or organizations with acknowledged expertise, or policies adopted by local governmental agencies such as counties, cities, and special districts to meet local conservation objectives. These species are referred to collectively as "special status species" in this section, following a convention that has developed in practice but has no official sanction. For the purposes of this assessment, the term "special-status" includes those species that are:

- Federally listed or proposed for listing under the Federal Endangered Species Act (50 CFR 17.11-17.12);
- Candidates for listing under the Federal Endangered Species Act (61 FR 7596-7613);
- State listed or proposed for listing under the California Endangered Species Act (14 CCR 670.5);
- Species listed by the National Marine Fisheries Service (NMFS) or CDFG as a species of concern (NMFS), rare (CDFG), or of special concern (CDFG);
- Fully protected animals, as defined by the State of California (California Fish and Game Code Section 3511, 4700, and 5050);
- Species that meet the definition of threatened, endangered, or rare under CEQA (CEQA Guidelines Section 15380);

- Plants listed as rare or endangered under the California Native Plant Protection Act (California Fish and Game Code Section 1900 et seq.); and
- Plants listed by the California Native Plant Society (CNPS) as rare, threatened, or endangered (List 1A and List 2 status plants, CNPS, 2007).

Wetlands and Other Waters of the U.S. Wetlands are ecologically complex habitats that support a variety of both plant and animal life. In a jurisdictional sense, the federal government defines wetlands in Section 404 of the Clean Water Act as "areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support (and do support, under normal circumstances) a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3[b] and 40 CFR 230.3). Under normal circumstances, the federal definition of wetlands requires three identification parameters be present: wetland hydrology, hydric soils, and hydrophytic vegetation. Examples of wetlands include saline and freshwater marshes, seasonal wetlands, and vernal pool complexes that have a hydrologic link to other waters of the U.S (see definition below for "other waters of the U.S."). The U.S. Army Corps of Engineers (Corps) is the responsible agency for regulating wetlands under Section 404 of the Clean Water Act, while the Environmental Protection Agency (EPA) has overall responsibility for the Act.

"Other waters of the U.S." refers to those hydric features that are regulated by the Clean Water Act but are not wetlands (33 CFR 328.4). To be considered jurisdictional, these features must exhibit a defined bed and bank and an ordinary high-water mark. Examples of other waters of the U.S. include rivers, creeks, intermittent and ephemeral channels, ponds, and lakes.

The CDFG does not normally have direct jurisdiction over wetlands unless they are subject to jurisdiction under Streambed Alteration Agreements or they support state-listed endangered species; however, CDFG has trust responsibility for wildlife and habitats pursuant to California law.

Examples of jurisdictional waters that occur in the Planning Area would include the Mokelumne River and potentially jurisdictional features such as agricultural and urban drains where they replaced natural waterways.

7.3 REGULATORY SETTING

Relevant federal, State and local programs specific to biological resource issues are discussed in this section.

FEDERAL PROGRAMS

Clean Water Act – Section 404

Wetlands and other waters of the U.S. (as defined above) are subject to jurisdiction by the Corps and EPA under Section 404 of the Clean Water Act. Wet areas that are not regulated by this act would include stock watering ponds, agricultural ditches created in upland areas, and features that do not significantly contribute to the ecological function of navigable waters (in this case, the Mokelumne River). The discharge of fill into a jurisdictional feature requires a permit from the Corps.

The Corps has the option to issue a permit on a case-by-case basis (individual permit) or at a program level (general permit). Nationwide permits (NWPs) are an example of general permits; they cover specific activities that generally have minimal environmental effects. Activities covered under a particular NWP must fulfill several general and specific conditions, as defined by the NWP. If a proposed project cannot meet these conditions, an individual permit may be required.

Federal Endangered Species Act

The U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) administer the federal Endangered Species Act (16 USC Section 153 et seq.) and thereby have jurisdiction over federally-listed threatened, endangered and candidate species. NMFS assumes jurisdiction over all listed and candidate marine species. Species that are "proposed" for listing but not yet listed are generally considered as well, as there is potential for those species to become listed in the near future.

Projects that may result in "take" of a listed species must consult with the USFWS or NMFS. Under the federal Endangered Species Act, "Take" is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect" (50 CFR Section 10.12). Federal agencies that propose a project that may affect a listed species are required to consult with the USFWS or NMFS under Section 7 of the federal Endangered Species Act. If it is determined that a federally listed species may be adversely affected by the federal action, the USFWS/NMFS will issue a Biological Opinion to the federal agency that describes minimization and avoidance measures that must be implemented as part of the federal action. Projects that do not have a federal nexus must apply for a take permit under Section 10 of the Act. Section 10 of the Act requires that the project applicant prepare a habitat conservation plan as part of the permit application.

Under the federal Endangered Species Act the USFWS/NMFS designates critical habitat, which are areas that are essential for the conservation of a threatened or endangered species and which may require special management considerations. A designation only applies to projects with a federal nexus; it has no specific regulatory impact on landowners who take actions on their land that do not involve Federal funding. However, Federal agencies must consult with the USFWS before taking actions that could harm or kill protected species or destroy their habitat.

Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act

The Migratory Bird Treaty Act (MBTA, 16 USC Section 703-711) and the Bald and Golden Eagle Protection Act (16 USC Section 668) protect certain species of birds from direct "take." The MBTA protects migrant bird species from take by setting hunting limits and seasons and protecting occupied nests and eggs. The Bald and Golden Eagle Protection Act (16 USC Sections 668-668d) prohibits the take or commerce of any part of Bald and Golden Eagles. The USFWS administers both acts and reviews federal agency actions that may affect species protected by the acts.

The USFWS has defined the term "disturb" as used in the Bald and Golden Eagle Protection Act. The definition reads as follows: "Disturb means to agitate or bother a bald or golden eagle to the degree that causes injury or death to an eagle (including chicks or eggs) due to interference with normal breeding, feeding, sheltering behavior, or nest abandonment. Injury would be defined as "a wound or other physical harm, including a loss of biological fitness significant enough to pose a discernible risk to an eagle's survival or productivity" (USFWS, 2006). The definition must undergo a 30-day comment period, but if approved, will be used to protect the bald eagle if it is removed from the federal Endangered Species List.

STATE REGULATIONS

California Fish and Game Code Sections 1600 – 1616

The CDFG regulates the modification of streams, rivers, and lakes under Sections 1600-1616 of the California Fish and Game Code. Modification includes diverting, obstructing, or changing the natural flow or bed, channel, or bank of a regulated feature. While most of the features regulated by the Fish and Game Code meet the definition of other waters of the U.S., the Code may regulate some ephemeral features that do not have all the criteria to qualify as other waters of the U.S. A project proponent, including both private parties and public agencies, who proposes an activity that may modify a feature regulated by the Fish and Game Code must notify the CDFG before project construction. The CDFG will then decide whether to enter into a Streambed Alteration Agreement with the project proponent.

California Endangered Species Act

The CDFG administers the California Endangered Species Act of 1984 (Fish and Game Code Section 2080), which regulates the listing and "take" of endangered and threatened species. "Take" may be permitted by CDFG through implementing a management agreement. Under the State laws, the CDFG is empowered to review projects for their potential impacts to listed species and their habitats.

CDFG maintains lists for Candidate-Endangered Species (SCE) and Candidate-Threatened Species (SCT). California Candidate species are afforded the same level of protection as listed species. Species that are "proposed" for listing are also considered as they may become listed during the development of the project. California also designates Species of Special Concern (CSC), which are species of limited distribution, declining populations, diminishing habitat, or unusual scientific, recreational, or educational value. These species do not have the same legal protection as listed species, but may be added to official lists in the future. The CSC list is intended by CDFG as a management tool for consideration in future land use decisions.

LOCAL PROGRAMS

San Joaquin County Multi-Species Conservation and Open-Space Plan

The San Joaquin County Multi-Species Conservation and Open-Space Plan (SJMSCP) is a 50-year habitat conservation plan (HCP) that allows SJMSCP Permittees to issue incidental take permits or allows project applicants to mitigate for impacts to SJMSCP-covered species resulting from covered projects where there is a loss of open space land (SJCOG 2005). Benefits of this comprehensive plan include fulfillment of regulatory requirements, streamlining the permitting process, provision of consistent and predictable mitigation measures, and off-site mitigation (SJCOG 2005). Covered projects include urban development, mining, expansion of existing urban boundaries, non-agricultural activities occurring on agriculturally-zoned properties, projects which could affect fisheries or wetlands indirectly which are located within non-jurisdictional waters, transportation projects, school expansions, non-federal flood control projects, new parks and trails, utility installation, maintenance activities, managing preserves, and similar public agency projects (SJCOG 2005).

USFWS approved the SJMSCP in 2000 and issued an incidental take permit in 2001. The City of Lodi is participating in the SJMSCP as a Permittee. As a Permittee, the City will issue Incidental Take Permits or help facilitate future project applicants mitigation actions for impacts under the SJMSCP Covered Species (see “Environmental Setting” below).

In preparing the SJMSCP, land uses and habitats were mapped throughout the County, categorized into land use categories, and incorporated into a geographic information system (GIS) database to help determine compensation fees. SJMSCP land use categories consist of the following:

- No-Pay Zone
- Open Space Zone
- Agricultural Habitat Open Space
- Natural Land
- Vernal Pool

The “Environmental Setting” section below defines these land use categories and identifies the various biological resources that have potential to occur within each of the SJMSCP land use categories in the Planning Area.

CITY OF LODI GENERAL PLAN

The Conservation Element of the City’s existing General Plan contains a goal, policies, and several implementation measures pertinent to biological resources. Several of these are identified below in Table 7-1:

Table 7-1: City of Lodi 1991 General Plan Goals and Policies

CONSERVATION ELEMENT	
Letter	*Goal Text*
E	To protect sensitive native vegetation and wildlife habitats and fisheries resources.
Number	*Policy Text*
#1	The City shall protect the river channel, pond and marsh, and riparian vegetation and wildlife communities and habitats in the Mokelumne River and floodplain areas.
#3	New development shall be sited to maximize the protection of native tree species and sensitive plants and wildlife habitat.
#5	The City shall require site-specific surveys to identify significant vegetation and wildlife habitat for development projects located in or near sensitive habitat areas.

Table 7-1: City of Lodi 1991 General Plan Goals and Policies

#6	The City shall support federal and state laws and policies preserving rare, threatened, and endangered species by ensuring that development does not adversely affect such species or by fully mitigating adverse effects consistent with the recommendations of the U.S. Fish and Wildlife Service and California Department of Fish and Game.
#7	The City shall prohibit the development of facilities and trails in Lodi Lake Park that will degrade or destroy riparian habitat values.
#8	The City shall direct park use away from sensitive habitat areas through careful placement of facilities and trails in Lodi Lake Park.
#9	The City shall explore the purchase of or establishment of a joint agreement for open space preservation and habitat enhancement in the WID's property located north of the Mokelumne River.
#11	The City shall prohibit any activity that will disturb bottom sediments containing zinc deposits in Mokelumne River, because such disturbance could cause fish kills.
#12	The City shall support strong regulatory action by the State Regional Water Quality Control Board to prevent the discharge of substances harmful to fish into the Mokelumne River.
#13	The City shall prohibit activities that could disturb anadramous fish in the Mokelumne River during periods of migration and spawning.
#14	The City should work with the California Department of Fish and Game in identifying an area or areas suitable for Swainson's hawk and burrowing owl habitat; this land should be preserved and put into a mitigation land bank to mitigate impacts on existing habitat for these species. A mechanism should be established for developer funding of acquisition and management of lands in the mitigation bank.
Number	*Implementation Measure Text*
8	The City shall add a policy to the City's development review guidelines which requires that new development be evaluated to ensure consistency with Policy E-1
10	The City shall explore options, in conjunction with the WID, for ensuring the open space preservation and enhancement of the WID's property located north of the Mokelumne River.

Table Source: City of Lodi, 1991

7.4 ENVIRONMENTAL SETTING

The City's Planning Area is located in the northern San Joaquin Valley. Characteristic vegetation communities in the region include agricultural habitats and annual grassland. Freshwater emergent wetland, lacustrine, water, and valley foothill riparian habitats are also located within the Planning Area, but account for a very small portion—each less than one percent—of the total Planning Area.

WILDLIFE HABITATS

Wildlife habitats provide food, shelter, movement corridors, and breeding opportunities for wildlife species. They are classified in general terms with an emphasis on vegetation structure, vegetation species composition, soil structure, and water availability. Some wildlife species are generalists and may use a variety of habitats, while other species may be adapted to very specific habitats. Species that are limited to a single habitat type are more vulnerable to habitat loss and disturbance than are generalists, and therefore may be more at risk to experience population declines.

Habitat for many wildlife species includes a mosaic of habitat types. More common wildlife species, such as red-shouldered hawk (*Buteo lineatus*), great-horned owl (*Bubo virginianus*), northern flicker (*Colaptes auratus*), brown-headed cowbird (*Molothrus ater*), raccoon (*Procyon lotor*), and western toad (*Bufo boreas*) frequently use more than one habitat type. They may use riparian habitat for breeding sites, resting sites, cover while moving from one area to another, or thermal cover, and range into open upland grasslands, scrub, or over open water to forage. Frequently it is at the edges of habitats, where habitats convert from one type or another, where the greatest number of these more common wildlife species will be found.

The Planning Area contains mostly human-modified habitats (Figure 7-1 and Table 7-2). The majority of the area is urban or under agricultural production. A mosaic of smaller areas of lacustrine, wetland, riparian, grassland, and open water habitat types occur along the Mokelumne River and other waterways in the Planning Area. Agricultural lands surround the main urban center of the City of Lodi.

All of these habitats, as classified in California Wildlife Habitats[1], are listed and briefly described below. The habitat spatial data are from the California Department of Forestry and Fire Protection's Multi-Source Land Cover Data v2. (2002)

---

[1] Mayer and Laudenslayer 1988.

Table 7-2: Habitat and Land Use Acreage for the Planning Area

Land Use/Habitat	*Planning Area Acreage*	*Percentage of Planning Area (50,850 acres)*
Agriculture	41,110	81%
Annual Grassland	620	1%
Freshwater Emergent Wetland	130	Less than 1%
Lacustrine	120	Less than 1%
Urban	8,400	17%
Valley Foothill Riparian	350	Less than 1%
Water	120	Less than 1%
Total	50,850	100%

Table Source: California Department of Forestry and Fire Protection 2002; San Joaquin County, 2003; Dyett & Bhatia, 2007; and ESA, 2007.

Urban

Land classified as urban areas encompasses approximately 8,400 acres of the total Planning Area and is mainly located in the center of the Planning Area (See Table 7-2 and Figure 7-1). Wildlife species that use urban habitat are variable, depending on the density of development, the surrounding land use, and the types and availability of vegetation and other habitat features available for foraging, nesting, and cover. In general, however, wildlife habitat in urban areas consists of landscaped areas with a mix of both native and exotic ornamental plant species. Species using these areas are conditioned to a greater level of human activity than those in natural and less developed areas. Generally, the more developed an urban area—such as downtown—the less diversity of species occurring in that area will be.

Wildlife species typically found in urban habitat include American crow (*Corvus brachyrhynchos*), rock dove (*Columba livia*), American robin (*Turdus americana*), Brewer's blackbird (*Euphagus cyanocephalus*), house finch (*Carpodacus mexicanus*), house sparrow (*Passer domesticus*), northern mockingbird (*Mimus polyglottos*), mourning dove (*Zenaida macrocoura*), raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), and striped skunk (*Mephitis mephitis*).

Agriculture

Agricultural land covers the largest portion of the Planning Area at approximately 41,110 acres (see Table 7-2 and Figure 7-1). Vegetation composition and structure in agricultural habitats are variable, depending on the type of crops grown and the time of year. For these reasons, habitat value for wildlife is also variable. In addition, the types and timing of operational activities of agricultural lands affects habitat suitability for wildlife. Agricultural crops are either annual (e.g. lettuce) or perennial (e.g. strawberries), and may be grown in rows. Annual crops are usually planted in spring and harvested in summer or fall; however, they may be planted in rotation with other irrigated crops. Tall and maintained crops different wildlife species than short crops with a lot of exposed bare ground between rows or pasture land. Refer to Chapter 6: Agricultural and Soil Resources for more information regarding agriculture.

Different agricultural land covers can support different wildlife species.

Typical wildlife species that may use agricultural habitat include a variety of rodents – such as California ground squirrel (*Spermophilus beecheyi*) and California vole (*Microtus californicus*), and birds – such as red-winged blackbird (*Agelaius phoeniceus*), northern harrier (*Circus cyaneus*), white-tailed kite (*Elanus leucurus*), and yellow-billed magpie (*Pica nuttali*). Croplands provide food and water for these species, but do not generally provide long-term shelter due to the frequency of disturbance.

[This page intetntionally left blank.]

Annual Grassland

Annual grasslands cover approximately 620 acres scattered in small areas throughout the Planning Area (see Table 7-2 and Figure 7-1). These areas are generally surrounded by agricultural land, but may also border smaller areas of wetland or riparian habitat. Along the Mokelumne River, annual grassland habitats are interspersed with lacustrine and open water habitats as well. Annual grassland is typically composed of herbaceous exotic grasses and forbs, and may include weedy species such as perennial ryegrass (*Lolium perenne*), soft chess (*Bromus hordeaceus*), foxtail barley (*Hordeum murinum*), ripgut brome (*Bromus diandrus*), wild oats (*Avena sp.*), and stork's bill (*Erodium botrys*). Annual grassland habitats that contain or are adjacent to more complex habitats or habitat features (i.e., riparian, etc.) are more likely to have a greater habitat value and support a greater diversity of wildlife species.

Grasslands comprise 620 acres of the planning area.

Wildlife species that use annual grassland include a variety of sparrows, white-tailed kite, northern harrier, red-tailed hawk, burrowing owl (*Athene cunicularia*), ring-necked pheasant (*Phasianus colchicus*), various rodents, lizards, snakes, and salamanders.

Valley Foothill Riparian

Within the Planning Area, valley foothill riparian habitat covers 350 acres, mainly along the Mokelumne River in the northern portion of the Planning Area (see Table 7.4-1 and Figure 7-1). This habitat type consists of an overstory canopy of valley oak (*Quercus lobata*) and may include interior live oak (*Quercus wislizenii*), black walnut (*Juglans hindsii*) and boxelder (*Acer negundo*). Understory vegetation may include toyon (*Heteromeles arbutifolia*), wild grape (*Vitus californicus*), and Himalaylan blackberry (*Rubus bicolor*). Riparian habitats can be complex in structure and composition, and abundant in wildlife diversity and richness. Many species of wildlife use this habitat type for movement corridors, foraging, cover, and breeding.

Riparian habitats can be found in the Lodi Lake Natural Area along the Mokelumne River.

Wildlife species that use valley foothill riparian habitat include black phoebe (*Sayornis nigris*), Nuttall's woodpecker (*Picoides nuttalii*), ruby-crowned kinglet (*Regulus calendulus*), red-shouldered hawk (*Buteo lineatus*), gray squirrel (*Sciurus griseus*), and raccoon.

Freshwater Emergent Wetland

Freshwater emergent wetland accounts for approximately 130 acres of the Lodi Planning Area (see Table 7-2 and Figure 7-1). Vegetation that comprises this habitat is adapted to frequent inundation and ponding and includes hydrophilic emergent species such as common cattail (*Typha latifolia*) and tule rush (*Scirpus acutus*). Within the Planning Area, freshwater emergent wetland occurs in small patches adjacent to annual grassland, and can be surrounded by agricultural lands, or interspersed with a variety of other habitats along the Mokelumne River corridor and other waterways in the Planning Area. Wetland habitats provide habitat for wildlife species such as waterfowl and wading birds, blackbirds (*Agelaius sp.*), amphibians, and reptiles such as garter snake (*Thamnophis sp.*) and pond turtle (*Emys marmorata*).

Lacustrine

Lacustrine is an aquatic habitat type occurring in relatively small numbers predominately along the Mokelumne River. This habitat is limited within the Planning Area, covering approximately 120 acres. Lacustrine habitat includes lakes, reservoirs, ponds, and ponded areas along streams. Permanent lacustrine habitats typically support fish species and also provides foraging, cover, and breeding habitat for other aquatic species such as pond turtle, amphibians, various waterfowl and piscivorus species such as belted kingfisher (*Ceryle alcyon*), great blue heron (*Ardea herodias*), and bald eagle (*Haliaeetus leucocephalus*).

Lodi Lake along the Mokelumne River is an example of a lacustrine habitat.

Open Water

Open water or riverine habitats in the Planning Area include the Mokelumne River, which runs through the northern portion of the Planning Area, and the White Slough Water Pollution Control Plant in the southwestern portion of the Planning Area along I-5. Approximately 120 acres (see Table 7-2) of this open water habitat is mapped; it is the least abundant habitat type in the Planning Area (Figure 7-1). Open water, like similar lacustrine habitat, provides habitat for a variety of fish and other aquatic or semi-aquatic species.

SJMSCP LAND USE COMPENSATION ZONES

For San Joaquin County, the various habitats described above can be organized by SJMSCP land use compensation zone for purposes of compensation and mitigation requirements outlined in the conservation plan. Table 7-3 and Figure 7-2 identify the amounts and general locations of the land use compensation zone categories. Each of the land use compensation zone categories is briefly described below.

Table 7-3: SJMSCP Land Use Compensation Zones within the Planning Area

Land Use Compensation Zone	*Biological Communities*	*Planning Area Acreage**	*% of Planning Area (50,850 acres)*
No-Pay Zone	Urban	8,710	17%
Natural Land	Riparian, vernal pool, grassland habitats, and some agricultural rangeland	1,670	3%
Multi-Purpose Open Space	Orchards, vineyards, and some water features	21,820	43%
Agricultural Habitat Open Space	Perennial and annual croplands	18,590	36%
Vernal Pools	Vernal Pools	40	Less than 1%
Total		***50,830***	***100%***

*Total acreage for each land use compensation zone does not correspond entirely to the total acreage identified for each habitat described in Table 7.4-1.

Table Source: San Joaquin County, 2003; Dyett & Bhatia, 2007; and ESA, 2007.

No-Pay Zone

Lands designated as no-pay zone under the SJMSCP include urban land uses already converted from previous open space uses. No-pay zone land covers approximately 8,710 acres, which represents 17 percent of the Planning Area (see Table 7-3). As shown in Figure 7-2, Planning Area lands classified as no-pay zone are predominately located within the center or more developed portions of the Planning Area. From a habitat perspective, urban lands can be described as follows.

Urban habitat is highly variable and includes several types of landscape vegetation which generally fall into one of the following categories: lawn, shade tree/lawn, shrub cover, tree grove, and street strip. The structure of each type of landscape depends on species composition and landscape architecture. Lawns are the most uniform and least diverse, usually consisting of the continuous cover of an area with one grass species. Shade tree/lawn habitats are usually composed of many different plant species and are found in residential areas and parks. Shrub cover usually occupies a limited area and is used mainly as hedges, borders, or is incorporated into small-scale landscaping. Tree groves may be composed of any species, but generally have a continuous canopy and are found in parks, greenbelts, and cemeteries. Street strips consist of trees planted long rows with or without a grass/groundcover understory. Landscaping is usually irrigated, and many landscape plants are ornamental and non-native.

Wildlife use of urban areas is grouped into three zones: downtown, urban residential, and suburbia. Generally, species richness and diversity is lowest in downtown, where development is highest, and increases toward urban residential and suburban areas where there is more vegetative cover and less high-density development. The wildlife in urban areas is limited to generalist species such as rock doves, house sparrows, starlings, opossums, raccoons, and striped skunk.

Natural Land

As shown in Table 7-3, the Natural Land, land use compensation zone includes riparian, vernal pool, and grassland habitats as well as some agricultural rangeland. Natural land includes an estimated 1,670 acres (3 percent), of the Planning Area. As expected, these lands classified as Natural Lands are predominately located along the Mokelumne waterway (see Figure 7-2). Agricultural rangelands are classified as Natural Land since they are considered to be classified primarily as grasslands or vernal pool grassland areas. Natural Lands retain natural vegetation and are not irrigated or cultivated agricultural land. Natural Lands are considered to have higher open space value than lands designated as Agricultural Habitat and Multi-Purpose Open Space.

Multi-Purpose Open Space Land

Multi-Purpose Open Space lands support a variety of uses including agriculture, recreation, scenic values and other beneficial open space uses. These open space lands may also provide flood control, groundwater recharge, and interpretive/educational opportunities. Although these lands do not qualify for designation as Natural Lands, Agricultural Habitat Lands, or Urban Lands, the conversion of Multi-Purpose Open Space Lands contribute to the overall loss of open space. These lands have the potential to supply food for SJMSCP Covered Species and provide habitat for several SJMSCP covered bat species. Additionally, conversion of these lands limits the ability of plants and wildlife to disperse through or move through open space corridors within the Planning Area.

As shown in Table 7-3, approximately 21,820 acres (43 percent) of the Planning Area are classified under this land use category. Multi-Purpose Open Space Lands are mapped on the SJMSCP GIS Database as barren, cropland, orchards and vineyards, ruderal, cultivated parks and golf courses, and some water features (cement lined aqueducts and ditches without riparian vegetation). As shown in Figure 7-2, these areas are predominately located in the northern half of the Planning Area but are also scattered in smaller portions through out the Planning Area.

Agricultural Habitat Open Space

Agricultural Habitat Lands include perennial and annual croplands along with some ruderal vegetation types. Agricultural Habitat Lands are found primarily on the valley floor and in the Delta. Approximately 18,590 acres, or three percent, of the Planning Area consists of lands classified as agricultural habitat open space. Agricultural rangelands are classified as Natural Lands since they are considered to be primarily grasslands or vernal pool grasslands.

Vernal Pools

A description of vernal pools is provided under annual grasslands habitat since vernal pools are generally found within grasslands habitat. Although annual grasslands are found under the natural land designation, the SJMSCP identifies vernal pools as separate from the natural land designation. Less than one percent, approximately 40 acres, of the Planning Area contains vernal pool habitat (see Table 7-3 and Figure 7-2).

SPECIAL STATUS SPECIES IN THE PLANNING AREA

The list of sensitive status wildlife species presented in Table 7-4 was developed using information from the sources listed at the beginning of this section. General habitat requirements are included for each species presented. The table also identifies whether the species is covered under the SJMSCP. Figure 7-3 shows where CNDDB-listed species may potentially occur in the Planning Area. Species covered by the SJMSCP as identified in this Table 7-4 are subject to the requirements for mitigation or compensation as identified in the SJMSCP or as required by Federal and state regulations.

7.5 PLANNING ISSUES AND IMPLICATIONS

1. *How can wildlife habitat loss and fragmentation be presented?*

Annual grassland and riparian habitats provide important advantages to several sensitive species in the Planning Area. Development in the Planning Area could eliminate or modify important riparian and seasonally wet grassland. In some cases, it may also fragment Planning Area habitats from those larger habitat areas occurring to the west (Delta) and east (larger agricultural areas) of the Planning Area. Maintaining some of these key habitats, their connectivity to larger habitat areas, along with their associated plant and wildlife species is an important consideration for the Planning Area.

Table 7-4 Special-Status Species Potentially Occurring within the Planning Area

Scientific Name *Common Name*	*Status:* *Fed/State/CNP* *S*	*General Habitat*	*SJMSCP Covered?*
INVERTEBRATES			
Branchinecta conservation Conservancy f airy shrimp	FE/ - / -	Lifecycle restricted to large, cool-water vernal pools with moderately turbid water.	Yes
Branchinecta lynchi Vernal pool fairy shrimp	FT/ - / -	Lifecycle restricted to vernal pools.	Yes
Branchinecta mesovallensis Midvalley fairy shrimp	- / - / -	Lifecycle restricted to vernal pools in the Central Valley.	Yes
Desmocerus californicus dimorphus Valley elderberry longhorn beetle	FT/ - / -	Breeds and forages exclusively on elderberry shrubs (*Sambucus mexicana*) typically associated with riparian forests, riparian woodlands, elderberry savannas, and other Central Valley habitats. Occurs only in the Central Valley of California.	Yes
Hydrochara rickseckeri Ricksecker's water scavenger beetle	- / - / -	Occurs in slow moving waters, adults and larvae are aquatic.	No
Lepidurus packardi Vernal pool tadpole shrimp	FE/ - / -	Lifecycle restricted to vernal pools.	Yes
Linderiella occidentalis California linderiella	- / - / -	Lifecycle restricted to vernal pools.	No
AMPHIBIANS			
Ambystoma californiense California tiger salamander	FE, FT/CSC/ -	Annual grassland and grassy understory of valley-foothill hardwood habitats in central and northern California. Needs underground refuges and vernal pools or other seasonal water sources.	Yes
Rana aurora draytonii California red-legged frog	FT/CSC/ -	Breeds in slow moving streams, ponds, and marshes with emergent vegetation; forages in nearby uplands within about 200 feet.	Yes
Rana boylii Foothill yellow-legged frog	- /CSC/ -	Breeds in shaded stream habitats with rocky, cobble substrate, usually below 6,000 feet in elevation. Absent or infrequent when introduced predators are present.	Yes
REPTILES			
Emys (=Clemmys) marmorata marmorata Northwestern pond turtle	- /CSC/ -	Ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation. Requires basking sites and suitable upland habitat for egg-laying. Nest sites most often characterized as having gentle slopes (<15%) with little vegetation or sandy banks.	Yes

Emys (=Clemmys) marmorata Western pond turtle	- /CSC/ -	Ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation. Requires basking sites and suitable upland habitat for egg-laying. Nest sites most often characterized as having gentle slopes (<15%) with little vegetation or sandy banks.	Yes
Thamnophis gigas Giant garter snake	FT/ST/ -	Generally inhabits marshes, sloughs, ponds, slow-moving streams, ditches, and rice fields that have water from early spring till mid-fall. Emergent vegetation (cattails and bulrushes), open areas for sunning and high ground for hibernation and cover.	Yes
BIRDS			
Agelaius tricolor Tricolored blackbird	- /CSC/ -	Largely endemic to California, most numerous in the Central Valley and nearby vicinity. Typically requires open water, protected nesting substrate, and foraging grounds within vicinity of the nesting colony. Nests in dense thickets of cattails, tules, willows, blackberry, and silage.	Yes
Ardea alba Great egret	- / - / -	Fresh and salt marshes, marshy ponds and tidal flats, nests in trees or shrubs.	Yes
Ardea Herodias Great blue heron	- / - / -	Groves of tall trees, especially near shallow water foraging areas such as marshes, tide-flats, lakes, rivers/streams and wet meadows.	Yes
Athene cunicularia Burrowing owl	- /CSC/ -	Forages in open plains, grasslands, and prairies; typically nests in abandoned small mammal burrows.	Yes
Buteo swainsoni Swainson's hawk	- /ST/ -	Forages in open plains, grasslands, and prairies; typically nests in trees or large shrubs.	Yes
Dendroica petechia brewsteri Yellow warbler	- /CSC/ -	Nests in dense riparian cover.	Yes
Elanus leucurus White-tailed kite	- /CFP/ -	Forages in open plains, grasslands, and prairies; typically nests in trees.	Yes
Haliaeetus leucocephalus Bald eagle	FPD, FT/SE/ -	Nests in large trees with open branches along lake and river margins, usually within one mile of water.	No
Laterallus jamaicensis coturniculus California black rail	- /ST, CFP/ -	Freshwater, brackish, or tidal salt marshes.	Yes
Nycticorax nycticorax Black-crowned night heron	- / - / -	Forages in marshes swamps and wooded streams; nests in thickets or reedbeds.	Yes
MAMMALS			
Taxidea taxus American badger	- /CSC/ -	Occurs in a wide variety of open forest, shrub, and grassland habitats that have friable soils for digging.	Yes

Vulpes macrotis mutica San Joaquin kit fox	FE/ST/ -	Occurs in native valley and foothill grasslands and chenopod scrub communities of the valley floor and surrounding foothills. Prefers open level areas with loose-textured soils supporting scattered, shrubby vegetation and little human disturbance.	Yes
FISH			
Hypomesus transpacificus Delta smelt	FT/ST/ -	Open surface waters in the Sacramento/San Joaquin Delta. Seasonally in Suisun Bay, Carquinez Strait and San Pablo Bay. Found in Delta estuaries with dense aquatic vegetation and low occurrence of predators. May be affected by downstream sedimentation.	Yes
Oncorhynchus mykiss Steelhead - Central Valley ESU	FT/ - / -	This ESU enters the Sacramento and San Joaquin Rivers and their tributaries from July to May; spawning from December to April. Young move to rearing areas in and through the Sacramento and San Joaquin Rivers, Delta, and San Pablo and San Francisco Bays.	No
Oncorhynchus tshawytscha Chinook Salmon - Central Valley Fall / Late Fall-Run ESU	FC/CSC/ -	This ESU enters the Sacramento and San Joaquin rivers and their tributaries from July to April; spawning October to February. Young move to rearing areas in and through the Sacramento and San Joaquin Rivers, Delta, and San Pablo and San Francisco Bays.	No
Oncorhynchus tshawytscha Spring-Run Chinook Salmon	FT/ST/ -	This ESU enters the Sacramento and San Joaquin Rivers and tributaries March to July; spawning from late August to early October. Young move to rearing areas in and through the Sacramento and San Joaquin Rivers, Delta, and San Pablo and San Francisco Bays.	No
Pogonichthys macrolepidotus Sacramento splittail	- /CSC/ -	Currently known only from the Delta, Suisun Bay and associated marshes. Prefers slow moving river sections and dead end sloughs. Requires flooded vegetation for spawning and juvenile foraging habitat. Spawning occurs over flooded vegetation in tidal freshwater marsh.	Yes
PLANTS			
Aster lentus Suisun Marsh aster	- / - /1B.2	Rhizomatous herb occurring in tidal brackish and freshwater marshes. Found at 0-3 m elevation. Blooms May-Nov.	Yes
Astragalus tener var. *tener* Alkali milk-vetch	- / - /1B.2	Generally found in playas, valley and foothill grasslands with adobe clay soils, and vernal pools. Generally found in alkaline soils. Blooms Mar-Jun.	Yes
Atriplex joaquiniana San Joaquin spearscale	- / - /1B.2	Generally found in chenopod scrub, alkali seasonal wetlands and grassland, meadows and playas. Blooms Apr-Oct.	No
Carex comosa Bristly sedge	- / - /2.1	Generally found in lake-margin and edge habitats, 0-1400 feet in elevation.	Yes
Castilleja campestris ssp. *Succulenta* Succulent owl's-clover	FT/SE/1B.2	Occurs under vernally-flooded conditions in vernal-pool habitats such as valley and foothill grassland.	Yes

Cordylanthus palmatus Palmate-bracted bird's-beak	FE/SE/1B.1	Prefers marshes and swamps, lake margins, vernal pools and wet places. Blooms May-Oct.	No
Delphinium recurvatum Recurved larkspur	FSC/ - /1B.2	Perennial herb occurring in chenopod scrub, cismontane woodland, and in alkaline substrate in valley and foothill grassland. Found at 3-750 meters elevation. Blooms Mar-May.	Yes
Downingia pusilla Dwarf downingia	- / - /2.2	Prefers lake margins, vernal pools and wet places sometimes playas and grasslands. Blooms Mar-May.	No
Erodium macrophyllum Round-leaved filaree	- / - /2.1	Generally found in Valley grasslands and foothill woodlands, 0-3937 feet in elevation. Blooms Mar-May.	No
Hibiscus lasiocarpus Rose-mallow	- / - /2.2	Prefers freshwater marshes and swamps. Blooms Jun-Sep. 0-120 meters.	Yes
Lathyrus jepsonii var. *jepsonii* Delta tule pea	- / - /1B.2	Occurs in both tidal freshwater and brackish marshes in the Central and San Joaquin Valleys and in the Bay Area. Blooms May-Sept.	Yes
Legenere limosa Legenere	- / - /1B.1	Occurs in vernal pool beds. Blooms Apr-Jun.	Yes
Lilaeopsis masonii Mason's lilaeopsis	- /SR/1B.1	Generally occurs in riparian scrub, freshwater-marsh and brackish-marsh habitats, 0-33 feet in elevation. Blooms Apr-Nov.	Yes
Limosella subulata Delta mudwort	- / - /2.1	Generally occurs under wet conditions in tidal freshwater-marsh habitats, 0-9 feet in elevation.	Yes
Orcuttia viscida Sacramento orcutt grass	FE/SE/1B.1	Occurs in vernal pools. Blooms Apr-Jul.	No
Sagittaria sanfordii Sanford's arrowhead	- / - /1B.2	Found in assorted freshwater habitats including marshes, swamps and seasonal drainages. Blooms May-Oct.	Yes
Scutellaria lateriflora Blue skullcap	- / - /2.2	Meadows and seeps, marshes and swamps. Blooms Jul-Sep. 0-500 meters elevation.	Yes

Source: USFWS, 2007; CNDDB, 2007; CNPS, 2007

STATUS CODES

Federal			State		
FE	=	Endangered	SE	=	Endangered

FT	=	Threatened	ST	=	Threatened
FPE	=	Proposed Endangered	SR	=	Rare
FPT	=	Proposed Threatened	SFP	=	Fully Protected
FC	=	Candidate	CSC	=	(CA) Department of Fish and Game Special Concern species
FPD	=	Proposed Delisted			

FSC = (Former) Federal Species of Concern: Species of Concern is an informal term, not defined in the federal Endangered Species Act. The Sacramento Office of the United States Fish and Wildlife Service no longer maintains a Federal Species of Concern list. However, these species still meet the definition of "Rare" under Section 15380 of CEQA and are evaluated in this document.

California Native Plant Society

List 1B.x	=	Plants rare, threatened, or endangered in California and elsewhere
List 2.x	=	Plants rare, threatened, or endangered in California, but more common elsewhere
List 3.x	=	Plants about which we need more information–a review list
List 4.x	=	Plants of limited distribution–a watch list

BIBLIOGRAPHY

California Department of Forestry and Fire Protection (CDF). 2002. Multi-source Land Cover Data v2. (Spatial Data.)

California Department of Fish and Game (CDFG). 2007. California Natural Diversity Database (CNDDB) Rarefind 3 computer program. Database search of the following USGS 7 ½-minute Quads: Lodi North, Lodi South, Lockeford, Waterloo, Stockton West, Stockton East, Clay, Galt, Bruceville, Thornton, Terminous, and Holt, CA. Biogeographic Data Branch, Sacramento, CA;

California Native Plant Society (CNPS). 2007. Electronic Inventory of Rare and Endangered Plants (v7.06d 10-03-2006). Database search of the following USGS 7 ½-minute Quads: Lodi North, Lodi South, Lockeford, Waterloo, Stockton West, Stockton East, Clay, Galt, Bruceville, Thornton, Terminous, and Holt, CA. Sacramento, CA.

City of Lodi. 2006. City of Lodi Website. Accessed January 2007 from the following URL: http://www.lodi.gov. Website last updated 2006. Lodi, CA.

Mayer, Kenneth E., and W.F. Laudenslayer, Jr. 1988. A Guide to Wildlife Habitats of California. State of California Resources Agency, Department of Fish and Game. Sacramento, CA. Accessed from the following URL: http://www.dfg.ca.gov/whdab/html/wildlife_habitats.html.

San Joaquin County Council of Governments (SJCOG). 2005. San Joaquin County Multi-Species Conservation and Open-Space Plan. Stockton, CA.

U.S. Fish and Wildlife Service (USFWS). 2006. News Release: U.S. Fish and Wildlife Service Releases Draft Environmental Assessment for the Definition of Disturb under the Bald and Golden Eagle Protection Act. December 12, 2006. Accessed online from the following URL: http://www.fws.gov/news/NewsReleases/showNews.cfm?newsId=77F1D9D4-F22D-B7F9-E105A71D37E51687

USFWS. 2007. List of Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the following USGS 7 ½-minute Quads: Lodi North, Lodi South, Lockeford, Waterloo, Stockton West, Stockton East, Clay, Galt, Bruceville, Thornton, Terminous, and Holt, CA. Document Number 070108032952. Database Last Updated January 4, 2007. Sacramento Fish and Wildlife Office, Sacramento, CA.

U.S. Geological Survey (USGS). 1994. USGS Digital Orthophoto Quarter Quadrangles. (Spatial Data.)

[This page intentionally left blank.]

8 Cultural Resources

Cultural Resources are defined as buildings, sites, structures, or objects that may have historical, architectural, archaeological, cultural, or scientific importance. Information on cultural resources was obtained through archival research, contacts with knowledgeable people, and a reconnaissance-level field survey of the Planning Area. To better understand the City's cultural heritage, the following topics are covered in this section:

- Federal, State, and local regulations;
- Narrative of recent City History; and
- Existing cultural resources (e.g., sites, monuments, etc.) in the Planning Area.

8.1 INFORMATION SOURCES AND KEY TERMS

INFORMATION SOURCES

Information regarding known and recorded cultural resources within the Planning Area was identified through a records search of pertinent survey and site data at the Central California Information Center, California State University, Stanislaus, in February, 2007 [CCIC # 6606L]. An inventory of properties listed in the National Register of Historic Places, the California Register of Historic Resources, the California Inventory of Historic Resources (1976), the California Historical Landmarks (1996), or the California Points of Historical Interest (1992 and updates) was also generated for the purposes of this report. Results of the historic properties listed by the Office of Historic Preservation are also provided. Due to the extensive number of surveys and archaeological sites in the project vicinity, a comprehensive listing of the reports is not included for the purposes of this working paper. Rather, an example of the types of studies and archaeological sites is provided.

KEY TERMS

Archaeology. The study of historic or prehistoric peoples and their cultures by analysis of their artifacts and monuments.

Ethnography. The study of contemporary human cultures.

Complex. A patterned grouping of similar artifact assemblages from two or more sites, presumed to represent an archaeological culture.

Historic Site. A property, site, neighborhood, or area having historic, cultural, or geographic significance; structures on historic sites do not necessarily relate to the site's significance.

Isolate. Artifacts or Features found apart from recognized archaeological sites. By and large, isolates lack the necessary context in order to adequately judge its significance or be scientifically meaningful.

Landmark. Any structure or natural feature designated as a Cultural or Historic Monument under the provisions of the City's Planning and Zoning Code or as listed in California Historical Landmarks.

Midden. A deposit marking a former habitation site and containing such materials as discarded artifacts, bone and shell fragments, food refuse, charcoal, ash, rock, human remains, structural remnants, and other cultural leavings.

State Historical Landmark. Historic structure or site of local or statewide interest.

State Point of Historical Interest. Historic structure or site of local or countywide interest.

8.2 REGULATORY SETTING

Relevant federal, State and local programs specific to cultural resource issues are discussed in this section.

FEDERAL PROGRAMS

National Historic Preservation Act (NHPA)

Most applicable federal regulations concerning cultural resources have been established to comply with the National Environmental Policy Act (NEPA) and the National Historic Preservation Act (NHPA) of 1966, as amended. The NHPA established guidelines to "preserve important historic, cultural, and natural aspects of our national heritage, and to maintain, wherever possible, an environment that supports diversity and a variety of individual choice." The NHPA includes regulations specifically for federal land-holding agencies, but also includes regulations (Section 106) which pertain to all projects that are funded, permitted, or approved by any federal agency and which have the potential to affect cultural resources. All projects that are subject to NEPA are also subject to compliance with Section 106 of the NHPA and the NEPA requirements concerning cultural resources can be addressed through compliance with Section 106 of the NHPA process. Provisions of NHPA establish a National Register of Historic Places (The National Register) maintained by the National Park Service, the Advisory Council on Historic Preservation, State Offices of Historic Preservation, and grants-in-aid programs.

American Indian Religious Freedom Act and Native American Graves and Repatriation Act. The American Indian Religious Freedom Act recognizes that Native American religious practices, sacred sites, and sacred objects have not been properly protected under other statutes. It establishes as national policy that traditional practices and beliefs, sites (including right of access), and the use of sacred objects shall be protected and preserved. Additionally, Native American remains are protected by the Native American Graves and Repatriation Act of 1990.

Other Federal Legislation. Historic preservation legislation was initiated by the Antiquities Act of 1966, which aimed to protect important historic and archaeological sites. It established a system of permits for conducting archaeological studies on federal land, as well as setting penalties for noncompliance. This permit process controls the disturbance of archaeological sites on federal land. New permits are currently issued under the Archeological Resources Protection Act (ARPA) of 1979. The purpose of ARPA is to enhance preservation and protection of archaeological resources on public and Native American lands. The Historic Sites Act of 1935 declared that it is national policy to "Preserve for public use historic sites, buildings, and objects of national significance."

STATE REGULATIONS

California Environmental Quality Act (CEQA)

CEQA requires that lead agencies determine whether projects may have a significant effect on archaeological and historical resources. This determination applies to those resources which meet significance criteria qualifying them as “unique,” “important,” listed on the California Register of Historical Resources (CRHR), or eligible for listing on the CRHR. If the agency determines that a project may have a significant effect on a significant resource, the project is determined to have a significant effect on the environment, and these effects must be addressed in the appropriate environmental document. If a cultural resource is found not to be significant or unique under the qualifying criteria, it need not be considered further in the planning process.

CEQA emphasizes avoidance of archaeological and historical resources as the preferred means of reducing potential significant environmental effects resulting from projects. If avoidance is not feasible, an excavation program or some other form of mitigation must be developed to reduce the impacts. In order to adequately address the level of potential impacts, and thereby design appropriate mitigation measures, the significance and nature of the cultural resources must be determined. The following are steps typically taken to assess and mitigate potential impacts to cultural resources for the purposes of CEQA:

- Identify cultural resources,
- Evaluate the significance of the cultural resources found,
- Evaluate the effects of the project on cultural resources, and
- Develop and implement measures to mitigate the effects of the project on cultural resources that would be significantly affected.

California Register of Historic Resources (CRHR)

California State law also provides for the protection of cultural resources by requiring evaluations of the significance of prehistoric and historic resources identified in CEQA documents. Under CEQA, a cultural resource is considered an important historical resource if it meets any of the criteria found in Section 15064.5(a) of the CEQA Guidelines. Criteria identified in the CEQA Guidelines are similar to those described under the NHPA. The State Historic Preservation Office (SHPO) maintains the CRHR. Historic properties listed, or formally designated for eligibility to be listed, on The National Register are automatically listed on the CRHR. State Landmarks and Points of Interest are also automatically listed. The CRHR can also include properties designated under local preservation ordinances or identified through local historical resource surveys.

State Laws Pertaining to Human Remains. Section 7050.5 of the California Health and Safety Code requires that construction or excavation be stopped in the vicinity of discovered human remains until the county coroner can determine whether the remains are those of a Native American. If the remains are determined to be Native American, the coroner must contact the California Native American Heritage Commission. CEQA Guidelines (Public Resources Code Section 5097) specify the procedures to be followed in case of the discovery of human remains on non-federal land. The disposition of Native American burials falls within the jurisdiction of the Native American Heritage Commission.

Tribal Consultation Guidelines (Senate Bill 18). SB 18, authored by Senator John Burton and signed into law by Governor Arnold Schwarzenegger in September 2004, requires local (city and county) governments to consult with California Native American tribes, when amending or adopting a general plan or specific plan, or designating land as open space, in order to aid in the protection of traditional tribal cultural places ("cultural places"). SB 18 also requires the Governor's Office of Planning and Research (OPR) to include in the General Plan Guidelines advice to local governments for how to conduct these consultations. The intent of SB 18 is to provide California Native American tribes an opportunity to participate in local land use decisions at an early planning stage, for the purpose of protecting, or mitigating impacts to, cultural places. These consultation and notice requirements apply to adoption and amendment of both general plans (defined in Government Code §65300 et seq.) and specific plans (defined in Government Code §65450 et seq.).

LOCAL PROGRAMS

City of Lodi General Plan

The Urban Design and Cultural Resources Element of the City's existing General Plan contain several goals and policies pertinent to cultural resources. These are identified below in Table 8-1:

Table 8-1: City of Lodi 1991 General Plan Goals and Policies

URBAN DESIGN AND CULTURAL RESOURCES ELEMENT	
Letter	*Goal Text*
E	To maintain and enhance the aesthetic quality of the CBD and civic center, to maintain a clear definition and distinction between the CBD and the surrounding areas, to preserve the small-town character of the City.
J	To preserve and enhance Lodi's historical heritage.
Number	*Policy Text*
#1	The City shall develop an historic preservation ordinance.
#2	The City shall work with the State Office of Historic Preservation in developing the historic preservation ordinance.
#3	The City shall work with property owners in seeking registration of historic structures as State Historic Landmarks or listing on the National Register of Historic Places.
Number	*Implementation Measure Text*
9	The City shall prepare and adopt an historical preservation ordinance.
10	The City shall adopt a building code for historic buildings, consistent with the State Historic Building Code, that regulates the updating of structural deficiencies in historically significant buildings.

Table Source: Jones & Stokes, 1991

8.3 ENVIRONMENTAL SETTING

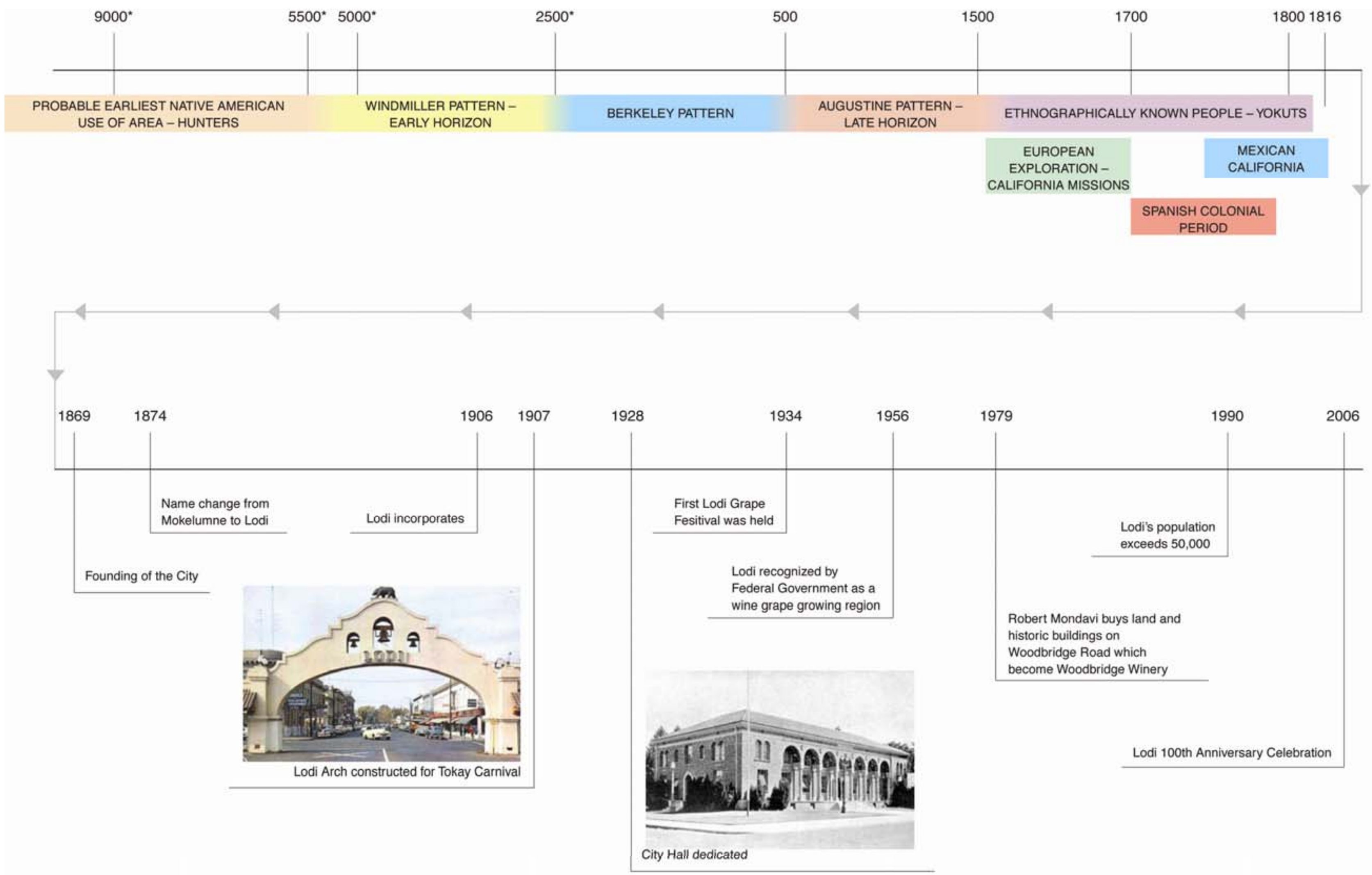
The following section summarizes the Planning Area's prehistoric, ethnographic, and historic setting. Figure 8-1 provides a visual timeline of the Planning Area's historic setting.

PREHISTORIC AND ETHNOGRAPHIC SETTING

Although the Planning Area may have been occupied by Native Americans for 12,000 years or longer, the evidence of early human use is likely buried by alluvial deposits that have accumulated during the last several thousand years. Reliable evidence from archaeological excavations indicates that this region of California has certainly been occupied for at least 6,000 years. Later periods are better understood because there is more representation in the archaeological record.

Central California archaeology has been described as a series of patterns. Fredrickson (1973) defines pattern as an essentially non-temporal, integrative cultural unit—the general life way shared by people within a given geographic region. Specifically three such patterns which overlap somewhat in adjoining areas are recognized for central California: the Windmiller Pattern (roughly from 4,500 to 3,000 before present), the Berkeley Pattern (roughly from 3,000 to 1,500 before present), and the Augustine Pattern (from about 1,500 before present to European contact).

The ethnographically known people (the Native American people occupying the Planning Area at the time of contact with non-Native American peoples such as explorers and settlers) are called Northern Valley Yokut. The Northern Valley Yokut Indians held an extensive region within north-central California, which ranged between the Diablo Mountain range to the west, the Sierra Nevada to the east, the north bend of the San Joaquin River to the south, and the Mokelumne River to the north. Semi-sedentary, the Yokuts lived in single-family dwellings and depended heavily on salmon, waterfowl and acorns for subsistence. Their technology included pottery, baskets, bow and arrow, bedrock mortars, pestles, portable mortars, and flaked stone tools. The Yokut traded with the Paiute and Shoshone to the east, Salinan and Coastanoan on the coast, and Miwok in the western central valley. (Wallace 1978)



Source: ESA, 2007

Figure 8-1
Historic Timeline for the City of Lodi

HISTORIC SETTING

By the early 1800s, Spaniards had started exploring the area, adversely impacting the Native population. The 1848 Gold Rush further affected the Yokut population as white settlers began to inhabit the area permanently or travel through on their way to the gold fields in the Sierra Nevada. Lodi began in 1869 as the Town of Mokelumne, founded by the Central Pacific Railroad (refer to Figure 8-1 Historic Timeline for the City of Lodi). The railroad connected Lodi with Sacramento to the north and Oakland and Stockton to the south, and the town was laid out parallel to the tracks. To avoid confusion with Mokelumne Hills and Mokelumne City, the townspeople changed the name to Lodi in 1874.[1] The Ivory Store, at the corner of Pine and Sacramento streets, was established in 1869, and other merchants soon followed with their businesses.[2]

City Hall, the Southern Pacific Train Station, and the Lodi Arch are some of the City's current restoration projects.

Local industries, such as the Lodi Flouring Mill, and agriculture promoted further growth in the area. Access to rail transportation allowed crops and products to be transported throughout the country. Wheat and watermelons were the predominant crops throughout the nineteenth century.

In 1885, Japanese immigrants settled the area to work on ranches. Over time, they purchased lands and grew grapes. In the late 1890s German nationals settled Lodi and also participated in the grape industry. Flame Tokay grapes were first planted in the area in the late nineteenth century and by 1900, Lodi had over two million grape vines. In 1906, the City was incorporated, and held its first Tokay Carnival the next year, which would later evolve into the Lodi Grape Festival.[3] The Lodi Arch, which covers the gateway entrance to downtown, was built to commemorate the first Grape Festival.

Over the following century, Lodi grew from a population of 2,000 to over 60,000. In 1912 Lodi's first City Hall/fire station was built on Main Street. The current City Hall building was dedicated in 1928. In 1913, the Lodi Union High School opened for classes, and in 1919, entrepreneur Roy Allen brewed and sold his first batch of A&W Root beer in Lodi. Local farmers and wineries weathered the Prohibition Era well, growing grapes and shipping them out in secret for wine making. 1934 was the year of the first Lodi Grape Festival, and in 1956 the Federal Government officially acknowledges Lodi as a wine grape growing district. The City's continued

[1] Gudde, 1998.

[2] City of Lodi, 2006.

[3] City of Lodi, 2006.

growth led to the creation of numerous schools and public utilities and services throughout the second half of the twentieth century. Since the mid-1990s, the city has been involved in numerous restoration projects for its historic resources throughout the City, including the City Hall, the Lodi Arch, and the Southern Pacific Lodi Train Station.

EXISTING CULTURAL AND HISTORIC RESOURCES

Known and recorded cultural resources within the Planning Area were identified through a records search of pertinent survey and site data by the staff at the Central California Information Center, California State University, Stanislaus on February 21, 2007. The records were accessed by utilizing the Thornton, Lodi North, Lockeford, Terminous, Lodi South, and Waterloo USGS 7.5-minute quadrangle maps in San Joaquin County. The review incorporated the entire Planning Area for the City of Lodi. Previous surveys and studies and archaeological site records were accessed as they pertained to the Planning Area. Historical records, such as those found in the Directory of Properties in the Historic Property Data File for San Joaquin County, were accessed. An inventory of properties listed in the National Register of Historic Places, the California Register of Historic Resources, the California Inventory of Historic Resources (1976), the California Historical Landmarks (1996), the Survey of Surveys (1989), the Caltrans State and Local Bridge Survey (1989 and updates), the Archaeological Determinations of Eligibility, or the California Points of Historical Interest (1992 and updates) was also developed for the purposes of this report.

Much of Lodi's historic structures and buildings, including Carnegie Hall, the Women's Club, and Hotel Lodi, can be found in downtown.

In areas where comprehensive cultural resource surveys have not been undertaken—such as the current Planning Area where only six percent of the total area is estimated to have been surveyed—there is a general greater utility in the protection and management of the resources than presenting specific site locations. Areas of relative cultural resource sensitivity can be identified based on the patterns that are reflected in the known site locations and by applying certain assumptions regarding the environmental factors that predict archaeological site locations. For instance, areas proximal to water sources, high ranking food resources, relatively flat slope aspect, and areas of social and political importance would be factors that would predict prehistoric use.

According to the record search data and the foregoing assumptions, most prehistoric settlements within and surrounding the Planning Area were focused along the Mokelumne River and Bear Creek, while much of the historically significant resources (i.e., structures, buildings, etc.) are clustered around the downtown area. Although some areas have greater sensitivity than other areas for the presence of prehistoric or historic archaeological resources, it is possible to encounter archaeological deposits during ground-disturbing activities in almost any location, including areas considered to have low sensitivity.

Native American Consultation

Cultural resource identification inquiries also included a letter to the Native American Heritage Commission requesting a review of the sacred lands file in regards to the Planning Area and a list of Native American contacts within the region. The Commission's February 13, 2007 response stated that the sacred lands files did not contain cultural resources information for the immediate Planning Area, but cautioned that absence of specific site information does not indicate the lack of cultural resources. The response also included eight contacts who have requested information on projects such as this and who may have knowledge of cultural resources within the Planning Area. On March 7, 2007, ESA sent letters to designated contacts with information about the proposed project and a request that they contact us if there were any questions or concerns.

Since that time, one letter had been received from Billie Blue Elliston of the Ione Band of Miwok Indians, who stated that their research indicated that the project may be within their tribe's ancestral territory and asked to remain informed about the project. On May 9, 2007, follow-up phone calls were made to the individuals and organizations identified by the Native American Heritage Commission. No additional information was obtained as a result of these calls. However, as of May 14, 2007, Randy Yonemura has responded to this request for additional information and expressed interest in meeting with the City to discuss the cultural resources present in the Planning Area.

Prehistoric Archaeological Resources

The evidence from previous survey work and site investigations in the Planning Area would indicate that the prehistoric site types that may be encountered throughout unsurveyed portions of the Planning Area may encompass the following:

- Surface scatters of lithic artifacts and debitage associated with or without associated midden accumulations, resulting from short-term occupation, and/or specialized economic activities, or long-term occupation.
- Bedrock milling stations, including mortar holes and metate slicks, in areas where suitable bedrock outcrops are present.
- Petroglyphs and/or pictographs.
- Isolated finds of cultural origin, such as lithic flakes and projectile points.

Lodi Historic Resources

Many historic properties in the Planning Area have been identified through historic building surveys and previous cultural resource studies. A list of properties either listed on or found eligible for listing in the National Register of Historic Places is presented in Table 8-2. Figure 8-2 presents an aerial view of the historic downtown area and the location of several historic buildings in the downtown area. Table 8-2 also includes information on properties that have not yet been evaluated for significance.

IOOF Hall in Woodbridge is listed on the National Register of Historic buildings.

Historic Archaeological Resources

The evidence from previous survey work and site investigations in the Planning Area would indicate that the historic archaeological site types that may be encountered through out portions of the Planning Area may encompass the following:

- Historic artifact scatters and buried deposits of historic debris and artifacts;
- Building foundations and associated deposits;
- Levees and roads; and
- Remains of farms and ranches.

8.4 PLANNING ISSUES AND IMPLICATIONS

1. How can impacts to archaeological resources be minimized?

A review of previously conducted studies indicates that only six percent of the proposed Planning Area has been inventoried as of March 2007 for cultural resources. These previous studies included a majority of the developed portions of the City and any structures occupying these areas. The remaining unsurveyed portions of the Planning Area consist primarily of undeveloped lands. Consequently, future development activities (e.g., construction or groundbreaking activities) associated with implementation of projects related to the updated general plan could result in the disturbance of previously unknown archaeological resources or human remains; where such findings are encountered, established appropriate procedures should be follow.

2. What steps should the City take to protect and enhance its historical resources?

Lodi includes several properties that are on the National Register, as well as several others that are eligible for the National Register. Downtown and the surrounding neighborhoods contain many fine examples of architecture dating as far back as late 19th century, as well as from early 20th century.

Source: ESA, 2007

Figure 8-2
Places of Historical Significance

Table 8-2: Historic Properties for the City of Lodi

Site/Building	*Location*	*Year Constructed*	*Historic Landmark Designation*	*National Register Status*
Bridge #29-2R	SR-99	1930		Identified, not evaluated.
Hotel Lodi	5 S. School Street, Lodi	1915	NR	Listed in NR as individual property
IOOF Hall/ Woodbridge IOOF Hall	18961 Lower Sacramento Road, Woodbridge	1860	NR	Listed in NR as individual property
Lodi Arch/Mission Arch	Pine Street, Lodi	1907	NR, SHL No 931	Listed in NR as individual property
Lodi Armory	333 N. Washington Street, Lodi	1930		Determined eligible for NR as an individual property
Lodi Carnegie Library	305 W. Pine Street, Lodi	1909		Determined eligible for NR as an individual property
Lodi City Hall	221 W. Pine Street, Lodi	1928		Determined eligible for NR as an individual property
Miyajima Hotel	4 N. Main Street	1937		Identified, not evaluated
Morse/Skinner Ranch House	13063 SR 99, Lodi	1869	NR[1]	Listed in NR as individual property
San Joaquin Valley College	18500 N Lilac St, Woodbridge	1879	S.H.L.[2] No. 520	CR[3], needs reevaluation
Southern Pacific Railroad Depot	2 N. Sacramento Street, Lodi	1907		Removed from eligibility for NR
Theodore H Beckman Ranch House	1150 W. Kettleman Lane	1902	SPHI[4]	Determined eligible for NR as a contributor to a historic district
Women's Club of Lodi	325 W. Pine Street, Lodi	1923	NR	Listed in NR as individual property
Wood's Ferry and Wood's Bridge	County Hwy J10, Woodbridge	1852 and 1858	S.H.L. No. 163	CR, needs reevaluation
Woodbridge	County Hwy J10, Woodbridge	1859	S.H.L. No. 358	CR, needs reevaluation
Woodbridge Masonic Lodge #131	1040 Augusta Street, Woodbridge	1882	NR	Listed in NR as individual property

1. NR – National Register
2. S.H.L – State Historic Landmark
3. CR – California Register
4. SPHI – State Point of Historic Interest

Source: Directory of Properties in the Historic Property Data File for San Joaquin County, Office of Historic Preservation.

While Lodi has many individual buildings on the National Register, it does not have any designated historic districts that would ensure that the overall neighborhood character and buildings that may not be individually designated but contribute to the overall character are protected and enhanced. This will also help address issues of incompatible new constructions and additions that have been occurring in some of the historic neighborhoods. While delineation of historic districts would be beyond the scope of the General Plan, the Plan can provide the policy basis and direction for more detailed evaluation and delineation of historic districts, as well basis for implementing standards and guidelines for conservation of the character of historic districts.

BIBLIOGRAPHY

City of Lodi. 2006. The History of the City of Lodi. http://www.lodi.gov/clerk/history.htm

Fredrickson, D.A. 1973. Early Cultures of the North Coast Ranges, California. Ph.D. dissertation, Department of Anthropology, University of California, Davis.

Gudde, Erwin. 1998. California Place Names: The Origin and Etymology of Current Geographical Names. pp 231.

Jones & Stokes Associates, Inc. 1991. City of Lodi general plan policy document. Sacramento, CA. Prepared for: City of Lodi, Lodi, CA. With contributions from J. Laurence Mintier & Associates, TJKM, and Pepper Associates.

Wallace, William. 1978. Northern Valley Yokuts. in R.F. Heizer, editor, Handbook of North American Indians, Vol 8, p 464, California. William C Sturtevant, General Editor. Smithsonian Institution, Washington, DC.

9 Energy and Mineral Resources

This section provides a general overview of the energy and mineral resources that are located within and adjacent to the Planning Area. Topics addressed in the section include applicable regulatory programs (including the California Surface Mining and Reclamation Act of 1975, etc.) and a description of known active mines and energy production sites within the Planning Area. Please refer to Chapter 14: Geology, Soils, and Seismic Conditions for additional information specific to soil resources.

9.1 INFORMATION SOURCES AND KEY TERMS

INFORMATION SOURCES

Information used to prepare this section was obtained from a variety of sources including the California Geological Survey, the San Joaquin County General Plan 2010, the City of Lodi 1991 General Plan, and the California Department of Conservation's Division of Oil, Gas, and Geothermal Resources.

KEY TERMS

Mineral Resource Zone (MRZ). Mineral resource zones are lands classified by the State Geologist based on the known or inferred mineral resource potential of the land. The classification process is based solely on geology, without regard to land use or land ownership.

9.2 REGULATORY SETTING

Relevant State and local programs specific to energy and mineral resource issues are discussed in this section.

STATE REGULATIONS

California Surface Mining and Reclamation Act of 1975. The loss of regionally significant mineral resource deposits to land uses that preclude mining activities is one of the main emphasis that the California Surface Mining and Reclamation Act (SMARA) was designed to address. The law specifically mandates a two-phased process, commonly referred to as classification-designation, for mineral resources. The California Geological Survey (previously called the California Division of Mines and Geology) is responsible under SMARA for carrying out the classification phase of the process. The California Mining and Geology Board is responsible for the second phase, which allows the board to designate areas within a production-consumption (P-C) region that contain significant deposits of Portland cement concrete (PCC)-grade aggregate (valued for its versatility and its importance in construction) that may be needed to meet the region's future demand.

SMARA requires the State Geologist to classify lands into Mineral Resource Zones (MRZ) based on the known or inferred mineral resource potential of that land. The classification process is based solely on geology, without regard to land use or land ownership. The primary goal of mineral land classification is to help ensure that the mineral resource potential of lands is recognized and considered in the land use planning process. The MRZ categories are as follows:

- **MRZ-1.** Areas where adequate information indicates that no significant mineral deposits are present or where it is judged that little likelihood exists for their presence.
- **MRZ-2.** Areas where adequate information indicates significant mineral deposits are present, or where it is judged that a high likelihood exists for their presence.
- **MRZ-3.** Areas containing mineral deposits the significance of which cannot be evaluated from available data.
- **MRZ-4.** Areas where available information is inadequate for assignment to any other MRZ.

In addition to mineral resource conservation, the SMARA regulates surface mining operations within California. The California Mining and Geology Board has established reclamation regulations that fulfill the reclamation requirements of SMARA. These regulations are summarized below.

SMARA requires that a mining report be submitted annually and include such information as the amount of land disturbed during the previous year, acreage reclaimed during the previous year, and amendments to local reclamation plans.

Before a mining project is approved by a local jurisdiction, a reclamation plan must be prepared and approved. In general, the plan must include and satisfy the following requirements:

- Maximum anticipated depth of extraction;
- A description of the reclamation land use;
- A description of the manner in which reclamation will be accomplished;
- A description of the manner in which affected streambed channels and streambanks will be rehabilitated to a condition to minimize erosion;
- Final slope stability as determined by a registered geotechnical engineer;

- Compaction of areas sited for roads, buildings, or other improvements; and
- Location of planned temporary stream or watershed diversions.

A reclamation plan is also required to include performance standards for:

- Revegetation;
- Drainage and erosion controls;
- Reclamation of prime agricultural land and other agricultural land;
- Stream protection, including protection of surface water and groundwater; and
- Top soil salvage.

Title 24 Energy Efficiency Standards. Title 24 energy standards, the energy efficiency standards for residential and nonresidential Buildings, were established in 1978 in response to a legislative mandate to reduce the State's energy consumption. The standards are reviewed and updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods.

The California Energy Commission recently adopted several changes to the Building Energy Efficiency Standards, to accomplish the following:

- To respond to California's energy crisis to reduce energy bills, increase energy delivery system reliability, and contribute to an improved economic condition for the State;
- To respond to the AB 970 (Statutes of 2000) urgency legislation to adopt and implement updated and cost-effective building energy efficiency standards;
- To respond to urgency legislation to adopt energy efficiency building standards for outdoor lighting; and
- To emphasize energy efficiency measures that save energy at peak periods and seasons, improve the quality of installation of energy efficiency measures, incorporate recent publicly funded building science research, and collaborate with California utilities to incorporate results of appropriate market incentives programs for specific technologies.

At the present time all new residential and nonresidential buildings are required to comply with Title 24 energy conservation requirements, including the recent amendments highlighted above, to reduce energy conservation and promote sustainability.

LOCAL PROGRAMS

City of Lodi General Plan

The Housing Element of the City's existing General Plan contains several goals and policies pertinent to a variety of energy conservation issues. These are identified below in Table 9-1:

Lodi's Housing Element encourages the use of solar energy in residential construction.

Table 9-1: City of Lodi 1991 General Plan Goals and Policies

HOUSING ELEMENT	
Letter	*Goal Text*
E	To encourage energy efficiency in all new and existing housing.
Number	*Policy Text*
#1	The City shall require the use of energy conservation features in the design of all new residential structures and shall promote incorporation of energy conservation and weatherization features in existing homes.
#2	Solar access shall be a consideration in the design of all residential projects.
Number	*Implementation Measure Text*
7	The City shall post and distribute information on currently available weatherization and energy conservation programs.
10	The City shall enforce state requirements, including Title 24 requirements for energy conservation, in new residential projects and encourage residential developers to employ additional energy conservation measures with respect to the following: Siting of buildings Landscaping Solar access Subdivision design

Table Source: Jones & Stokes, 1991

9.3 ENVIRONMENTAL SETTING

Important mineral deposits are located in the vicinity of the Planning Area and the City currently receives a variety of energy sources. These local resources are described in greater detail below. The location of energy resources within the Planning Area is identified in Figure 9-1.

MINERAL RESOURCES

The California Geological Survey's (formerly the Division of Mines and Geology) Special Report 160 identifies the classification of aggregate resources within the Stockton-Lodi Production-Consumption (P-C) Region. The Region covers 430 square miles and includes several large urbanizing portions of San Joaquin County. The primary emphasis of the study was to delineate land containing sand and gravel deposits suitable for the production of high-quality, Portland cement concrete (PCC) aggregate and calculate the quantity and adequacy of those reserves. According to Special Report 160, the Planning Area is designated as MRZ-1. (California Division of Mines and Geology 1988) The SMARA definition of the MRZ-1 classification states that areas classified as MRZ-1 are highly unlikely to contain significant mineral resources.

No additional mineral resources are currently mined within the Planning Area. Alluvial materials in the Planning Area are suitable for use as construction fill. No aggregate material suitable for use in concrete is present. Other resources historically mined within the County (but most likely outside the Planning Area) include placer gold, silver, coal, and manganese ore. Extraction of these minerals is focused in the southwestern portion of the County in the vicinity of the San Joaquin River. (California Division of Mines and Geology 1988; San Joaquin County 1992)

OIL AND GAS RESOURCES

Within the County, natural gas has been extracted since 1854 when a water-well drilled near the City of Stockton supplied both gas and water to the area. The first commercial gas deliveries, made in 1935, came from a field near Tracy. (San Joaquin County 1992) Natural gas production reached a high during the 1960's and early 1970's, with between 30,000 and 56,000 billion cubic feet being extracted annually. Since then, net gas volumes have declined, while the number of shut-in wells has risen to 80 in 2005. Abandoned and active gas fields are present through out San Joaquin County, including areas of the Delta, in Stockton, and in the vicinity of Lodi. As of 2005, there were only 74 active wells in the County producing approximately 9,600,000 million cubic feet (mcf) of natural gas. (California Department of Conservation 2006)

As shown in Figure 9-1, several oil and gas fields are located in the vicinity of the City's Planning Area. These fields include:

- Galt
- Lodi
- Lodi Airport Gas
- Lodi Southeast Gas
- Harte
- King Island Gas
- East Islands Gas
- River Island Gas

Historically, wells in these fields have produced gas. However, most of these wells have produced very little gas within the past five years. The annual reports compiled by the State Oil and Gas Supervisor for the last five years have shown no production figures for these gas fields. As seen on Figure 9-1, a large number of inactive gas wells are located in the vicinity of the Planning Area and within these gas fields. Wells identified in the figure as "Inactive" are reported in the State Digital Well Database as "Plugged and Abandoned – Dry Hole" or "Plugged and Abandoned – Gas". Wells identified in the figure as "Active" are reported in the State Digital Well Database as "Drilling", "Drilling – Idle", "Completed – Gas", and "Idle – Gas." Although a well may be shown on the figure as being active it has not necessarily produced any oil or gas in recent years. For example, the well identified in the Lodi Southeast Gas field, which is eastern portion of the Planning Area, has not produced any oil or gas in the last five years.[1]

The River Island Gas field and the Lodi Gas field are worth noting (see Figure 9-1). Gas wells associated with River Island Gas field have consistently produced gas within the last five years. Production ranged from 1,650,000 million cubic feet (mcf) to 4,130,000 mcf. The River Island Gas field is located approximately 4 miles northeast of the Planning Area.[2]

The Lodi Gas field is located approximately one mile north of the northeastern corner of the Planning Area (see Figure 9-1). Lodi Gas Storage, LLC. utilizes wells in this field for gas storage. The 1,450-acre field was originally determined to be depleted in 1972. However, there are still large pockets of gas in two reservoirs. These reservoirs are now used to store gas, which is transported via a 33-mile long pipeline along the northern portion of the Planning Area (see Figure 9-1). The pipeline connects the storage facility with two PG&E connections east of the Planning Area. The City's Planning Area is buffered from the Lodi Gas Storage facility by agricultural land.[3]

---

[1] California Department of Conservation 2002, 2003, 2004, 2005, 2006, 2007.

[2] California Department of Conservation 2002, 2003, 2004, 2005, 2006.

[3] Jones and Stokes, 1999.

ENERGY SOURCES AND SERVICE PROVIDERS

Electrical service to the City is provided by the Lodi Electric Utility. The Lodi Electric Utility is a customer-owned and City-operated utility that provides electrical services for residential, commercial, and industrial customers in the city.

For 30 years, the Lodi Electric Utility has been a member of the Northern California Power Agency (NCPA), which is a collective comprised of utilities that own and operate their own power plants. The NCPA is a California Joint Action Agency, with membership open to municipalities, rural electric cooperatives, irrigation districts and other publicly owned entities interested in the purchase, aggregation, scheduling and management of electrical energy. The NCPA allows the Lodi Electric Utility to purchase and supply electricity at cost.

The NCPA owns and operates a variety of electric generation facilities, which include the following.

- Five quick-response Combustion Turbine units (G.E. frame 5) located in the cities of Alameda, Roseville, and Lodi.
- Combustion Turbine Project No. 2, a 49 MW steam-injected gas turbine (STIG) plant, is located near Lodi.
- The North Fork Stanislaus River Hydroelectric Development Project is a hydroelectric project on the North Fork of the Stanislaus River.
- Two geothermal power plants and the associated steam field.

The two NCPA power plants have two generators each and the project produces 147 megawatts. Dry, superheated steam is delivered to the power plants from 65 to 70 production wells via approximately eight miles of pipeline.

Natural gas service for the Planning Area is provided by Pacific Gas and Electric Company (PG&E) and is piped from gas fields in Tracy and Rio Vista.

CITY ENERGY CONSERVATION PROGRAMS

The City currently administers and implements a variety of local energy conservation and sustainability programs. They include, but are not limited to, the following:

- The City implements a Water Conservation program that includes restricted watering schedules, education programs, and enforcement personnel.

The City's energy conservation programs encourage bikeway expansions and pervious landscape plans.

- Energy conservation is included in the design and construction of public infrastructure including traffic signals that are equipped with low-voltage LED lighting equipment.
- The City requires solar assisted equipment to be furnished at all new bus shelters/stops.
- The Lodi Electric Utility has lighting, heating, and air conditioning rebate programs when energy-conserving facilities are installed for non-residential customers.
- Transit services in Lodi are often added in areas where new development is proposed or augmented in existing developed areas where an increase in transit ridership is anticipated.
- The City routinely amends its Citywide Bikeway Master Plan to address the need for new or expanded bikeways in areas undergoing new development.
- The City encourages the use of drought-tolerant landscape species in landscape plans that are submitted to the City for review and approval.

9.4 PLANNING ISSUES AND IMPLICATIONS

Mineral Resources

The Planning Area does not contain any known significant mineral deposits.

Energy

1. Should the City encourage or require additional energy-saving measures?

Several cities in California have adopted green building ordinances and other measures that seek to reduce energy dependence. Should the city pursue these measures?

BIBLIOGRAPHY

California Department of Conservation, Division of Oil, Gas, and Geothermal Resources. Annual Report of the State Oil and Gas Supervisor. 2002.

California Department of Conservation, Division of Oil, Gas, and Geothermal Resources. Annual Report of the State Oil and Gas Supervisor. 2003.

California Department of Conservation, Division of Oil, Gas, and Geothermal Resources. Annual Report of the State Oil and Gas Supervisor. 2004.

California Department of Conservation, Division of Oil, Gas, and Geothermal Resources. Annual Report of the State Oil and Gas Supervisor. 2005.

California Department of Conservation, Division of Oil, Gas, and Geothermal Resources. Annual Report of the State Oil and Gas Supervisor. 2006.

California Department of Conservation, Division of Oil, Gas, and Geothermal Resources. Oil and Gas Well Database, updated February 22, 2007. http://www.consrv.ca.gov/DOG/maps/goto_welllocation.htm Accessed February 26, 2007.

California Division of Mines and Geology. Mineral Land Classification of Portland Cement Concrete Aggregate in the Stockton-Lodi Production-Consumption Region, Special Report 160. 1988.

City of Lodi Community Development Department. City of Lodi General Plan Background Report. January 1988.

City of Lodi Community Development Department. City of Lodi General Plan Policy Document. April 1991.

Jones and Stokes Associates, Inc. Lodi Gas Storage, LLC's Application for a Certificate of Public Convenience and Necessity – Draft Environmental Impact Report. September 1999.

San Joaquin County. General Plan 2010. July 1992.

[This page intentionally left blank.]

10 Hydrology and Water Quality

The Planning Area includes a number of rivers, streams, and canals. This chapter provides an overview of the regulations that affect these water resources and generally describes the quality of these surface and groundwater resources. Additional information related to water supply is described in Chapter 16 Infrastructure. Flooding concerns for the Planning Area are more fully described in Chapter 11 Flooding.

10.1 INFORMATION SOURCES AND KEY TERMS

INFORMATION SOURCES

A variety of data related to the City's water resources was reviewed in preparing this section. Primary sources of data include information from the California State Water Resources Control Board (SWRCB) and the City of Lodi.

KEY TERMS

Aquifer. An aquifer is an underground layer of permeable rock, sand, or gravel that contains water. An aquifer is the area underground that stores groundwater resources and is sometimes referred to as a water table.

Groundwater Basin. A groundwater basin is the aboveground area from which water flows or seeps into a particular aquifer or series of linked aquifers.

Overdraft. Overdraft is a condition of a groundwater basin or aquifer in which withdrawals exceed inflow (i.e., more water is removed than put back in).

Total Maximum Daily Loads. A total maximum daily load (TMDL) refers to the amount of a specific pollutant a river, stream, or lake can assimilate and still meet federal water quality standards as provided under the Clean Water Act.

Watershed. Similar to a groundwater basin, a watershed is the area or region from which surface water flows to a particular water body.

10.2 REGULATORY SETTING

At a statewide level, the California Water Code provides a legal framework and the California State Water Resources Control Board serves as the administrative vehicle for managing water resources. Federally, the Clean Water Act and the Safe Water Drinking Act have established water quality standards and attainment programs, which are administered by the EPA. A brief overview of these regulations follows.

FEDERAL PROGRAMS

Clean Water Act. The Federal Clean Water Act (CWA, 33 USC 1251-1376), as amended by the Water Quality Act of 1987, is the major federal legislation governing water quality. The objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's water." Important applicable sections of the federal CWA are as follows:

- Sections 303 and 304 provide for water quality standards, criteria, and guidelines.
- Section 401 requires an applicant for any federal permit that proposes an activity which may result in a discharge to "waters of the United States" to obtain certification from the state that the discharge will comply with other provisions of the Act. The local Regional Water Quality Control Board (RWQCB) provides certification.
- Section 402 establishes the National Pollutant Discharge Elimination System (NPDES), a permitting system for the discharge of any pollutant (except for dredge or fill material) into waters of the United States. This permit program is administered by the RWQCB, and is discussed further below.
- Section 404 establishes a permit program for the discharge of dredge or fill material into waters of the United States. The U.S. Army Corps of Engineers (Corps) administers this permit program.

STATE REGULATIONS

California Water Code. The California Water Code establishes the foundation for acquisition and protection of water rights. The code is derived from several sources, including the riparian doctrine taken from English common law, Spanish pueblo rights, the appropriative doctrine of western mining and irrigation tradition, and the correlative doctrine as it related to groundwater. These water doctrines, with some originating hundreds of years ago, remain relevant to current water law discussions to varying extents, and have been used by the court system over the years to resolve conflicts and establish precedents.

During the middle to late 1800s, when the mining and agricultural industries were growing throughout California, questions often arose regarding who had rights to how much surface water. In general, the deciding factor was who was there first. This is characterized as the appropriative doctrine of water rights: "first in time, first in right." Currently, new acquisitions of surface water are obtained under the appropriative doctrine, as constrained by the reasonable and beneficial use test and California's public trust doctrine.

Rights to groundwater are more complex and groundwater as a resource is generally considered in three separate classes: (1) as stream underflow, (2) as definite underground streams, and (3) as percolating waters. The first two are treated legally as surface water, and all underground water is legally considered percolating water unless proven otherwise.

Landowners whose property overlies an aquifer have rights to develop the water. That right is conditional, however, through provisions of the correlative doctrine. Under the correlative doctrine, all landowners must share scarce water resources during shortages and must limit their use to the amount of water reasonably required to meet each landowner's beneficial needs. This doctrine assumes that all landowners have similar and equal rights to the underlying groundwater.

To provide a basis for groundwater management, the California State Legislature has passed a law to allow for the creation of groundwater management districts.

Porter-Cologne Water Quality Control Act. The State of California's Porter-Cologne Water Quality Control Act (California Water Code Section 13000 et seq.) provides the basis for water quality regulation within California. The Act requires a "Report of Waste Discharge" for any discharge of waste (liquid, solid, or otherwise) to land or surface waters that may impair a beneficial use of surface or groundwater of the state. Waste Discharge Requirements (WDRs) resulting from the Report are issued by the RWQCB.

California State Water Resources Control Board. Responsibility for administering California water rights procedures lies with the California State Water Resources Control Board (SWRCB), which also is responsible for managing and administering various federal and state water quality control programs (see Table 10-1). Procedures are provided by statute, but the board has the authority to establish rules and regulations to help it carry out its work. All board activities are governed by state water policy and are administered in accordance with policies and procedures in the California Water Code.

Table 10-1 Summary of State Agency Responsibilities

State Agency	*Primary Responsibilities*
State Water Resources Control Board	Administers water rights, water pollution control, and water quality functions.
Regional Water Quality Control Board	Conducts planning, permitting, and enforcement activities.

Source: California State Water Resource Control Board.

The SWRCB carries out its water quality protection authority through the adoption of specific Water Quality Control Plans (Basin Plans). These plans establish water quality standards for particular bodies of water. California water quality standards are composed of three parts: the designation of beneficial uses of water, water quality objectives to protect those uses, and implementation programs designed to achieve and maintain compliance with the water quality objectives.

The SWRCB recently adopted the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California. This policy provides implementation measures for numerical criteria contained in the California Toxics Rule, promulgated in May 2000 by the U.S. EPA. (SWRCB 2005) When combined with the beneficial use designations in the Basin Plan, these documents establish statewide water quality standards for toxic constituents in surface waters.

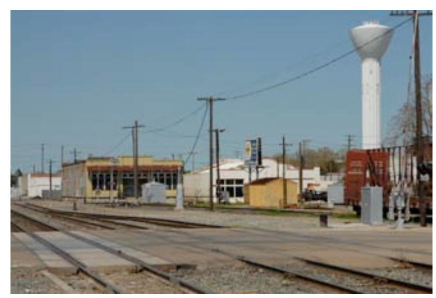
Central Valley Regional Water Quality Control Board. Within the City's Planning Area, the Central Valley Regional Water Quality Control Board (CVRWQCB) is responsible for the protection of beneficial uses of water resources (see Table 10-1). Designation of beneficial uses defines the resources, services, and qualities of the aquatic system that are the ultimate goals of protecting and achieving high water quality. The CVRWQCB uses planning, permitting, and enforcement authorities to meet this responsibility, and has adopted the Central Valley Region Water Quality Control Plan (Basin Plan) to implement plans, policies, and provisions for water quality management. Beneficial uses of surface waters are described in the Basin Plan and are designated for major surface waters and their tributaries. In addition to identification of beneficial uses, the Basin Plan also contains water quality objectives that are intended to protect the beneficial uses of the Basin. The CVRWQCB has region-wide and water body/beneficial use specific water quality objectives.

Beneficial uses of the surface waters of the Delta include municipal, agricultural, industrial, and recreational uses, freshwater habitat, migration, spawning, wildlife habitat, and navigation. Beneficial uses for all groundwater resources in the Central Valley region include or potentially include municipal, agricultural, and industrial uses.

The CVRWQCB has set water quality objectives for all surface waters in the region concerning bacteria, bioaccumulation, biostimulatory substances, color, dissolved oxygen, floating material, oil and grease, population and community ecology, pH, salinity, sediment, settleable material, suspended material, sulfide, tastes and odors, temperature, toxicity, turbidity, and ammonia. Water quality objectives for groundwater include standards for bacteria, chemical constituents, radioactivity, tastes and odors, and toxicity.

The CVRWQCB also administers the NPDES stormwater permitting program for both construction and industrial activities. NPDES requirements for these two activities are more fully described below.

- **Construction Activities.** Construction sites disturbing one acre or more of land are subject to the permitting requirements of the NPDES General Permit for Discharges of Storm Water Runoff Associated with Construction Activity (General Construction Permit). For qualifying projects, the project applicant must submit a Notice of Intent (NOI) to the RWQCB to be covered by the General Construction Permit prior to the beginning of all construction activities. The General Construction Permit requires the preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP), which also must be completed before construction, begins. Implementation of the plan starts with the commencement of construction and continues though the completion of the project. Upon completion of the project, the applicant must submit a Notice of Termination to the RWQCB to indicate that construction is completed.
- **Industrial Activities.** Stormwater discharges associated with industrial facilities are subject to the permitting requirements of the NPDES General Permit for Discharges of Storm Water Associated with Industrial Activities excluding Construction Activities (General Industrial Permit). The regulations defining "storm water discharges associated with industrial activity" were published on November 16, 1990, with the EPA identifying eleven categories of industrial activities that are required to obtain permit coverage. To obtain authorization for continued and future storm water discharge under the General Industrial Permit, each facility operator must submit a NOI. All storm water discharges from industrial sites must meet all applicable provisions of Sections 301 and 402 of the Clean Water Act. These provisions require control of pollutant discharges using the best available technology (BAT) that is economically achievable and best conventional pollutant control technology (BCT) to prevent and reduce pollutants and to meet water quality standards. Stormwater discharges from an industrial site shall not cause or contribute to a violation of all applicable water quality standards, which include all federal receiving water standards and all state standards under the Regional Board Basin



Construction and industrial activities are both subject to permitting requirements of the NPDES General Permit for Discharges of Storm Water.

Plan. The General Industrial Permit generally requires facility operators to:

- Eliminate unauthorized non-storm water discharges;
- Develop, retain on site, and implement a Storm Water Pollution
- Prevention Plan (SWPPP) to identify sources of pollution and to prescribe implementation of best management practices (BMPs) to reduce or prevent pollutants in industrial storm water discharges and authorized non-storm water discharges; and
- Perform monitoring of storm water discharges and authorized non-storm water discharges.

Areas of industrial activity where surface runoff must be controlled and treated include all storage areas and storage tanks, shipping and receiving areas, fueling areas, vehicle and equipment storage/maintenance areas, material handling and processing areas, waste treatment and disposal areas, dust or particulate generating areas, cleaning and rinsing areas, and all other areas of industrial activity that are potential pollutant sources. Any changes to the industrial site or activity require an update of the SWPPP and implementation of new control measures.

LOCAL PROGRAMS

City of Lodi General Plan

The Conservation Element of the City's existing General Plan contains a goal, policies, and implementation measures pertinent to water quality issues. These are identified below in Table 10-2:

City of Lodi Stormwater Management Program. In 2003, the City of Lodi established a Stormwater Management Program (SMP) to protect the quality of water in Lodi Lake, Mokelumne River, and the Woodbridge Irrigation Canal and meet requirements set forth by the Federal Water Pollution Control Act and the National Pollutant Discharge Elimination System. The SMP contains six program areas: public education and outreach, illicit discharge detection and elimination, public participation/involvement, construction site runoff control, post-construction runoff control, and pollution prevention/good housekeeping. The SMP outlines Best Management Practices, measurable goals, and timetables for implementing the components of each of these program areas. (City of Lodi, 2003)

Table 10-2. City of Lodi 1991 General Plan Goals and Policies

URBAN DESIGN AND CULTURAL RESOURCES ELEMENT	
Letter	*Goal Text*
A	To protect water quality in the Mokelumne River, Lodi Lake, and in the area's groundwater basin.
Number	*Policy Text*
#1	The City, together with San Joaquin County, shall monitor the water quality of the Mokelumne River and Lodi Lake to determine when the coliform bacterial standard for contact recreation and the maximum concentration levels of priority pollutants, established by the California Department of Health Services, are exceeded. The City shall also monitor the presence of pollutants and variables that could cause harm to fish, wildlife, and plant species in the Mokelumne River and Lodi Lake.
#2	The City shall post signs at areas used by water recreationists warning users of health risks whenever the coliform bacteria standard for contact recreation is exceeded.
#3	The City shall prohibit new industrial development that will adversely affect water quality in the Mokelumne River or in the area's groundwater basin.
#4	The City shall explore the potential development of surface water sources to augment the City's groundwater supply.
#5	The City shall regularly monitor water quality in municipal wells for evidence of contamination from DBCP, saltwater intrusion, and other toxic substances that could pose a health hazard to the domestic water supply.
#6	The City shall close or treat municipal wells that exceed the action level for DBCP.
#7	The City shall explore a program of complete wastewater reclamation and reuse at the White Slough Water Pollution Control Facility (WSWPCF).
#8	The City shall support efforts on a county, regional, state, and federal level to reduce runoff of toxic chemicals from agricultural lands.
#9	The City shall provide for an adequate high-quality water supply prior to approving future development.
#10	The City shall monitor outfalls to the Mokelumne River and the WID Canal consistent with EPA and State Water Quality Control Board requirements.
Number	*Implementation Measure Text*
1	The City, together with the County, shall monitor the water quality of the Mokelumne River and Lodi Lake in conformance with Policy A-1. The City shall participate in implementing remedial action, as feasible.
2	The City shall monitor water quality in City wells for evidence of DBCP, saltwater intrusion, and other contaminants and take remedial action as necessary.

Table Source: Jones & Stokes, 1991

10.3 ENVIRONMENTAL SETTING

PLANNING AREA TOPOGRAPHY AND CLIMATE

The Planning Area is a low-lying, gently sloping former floodplain of the Mokelumne River that lies within six miles of the San Francisco Bay-San Joaquin River Delta (Delta). The Mokelumne River originates in the Sierra Nevada Mountains to the east of the Central Valley and passes through the northeastern portion of the Planning Area. Elevations of the Planning Area range from about 50 feet above sea level along the river bank in the northeastern portion to about 25 feet in the southwest corner. The average slope is about 0.1-0.2 percent, with west-southwest aspect toward the Delta sloughs.

The climate in the Planning Area consists of long, dry, hot summers and mild winters. Between 1948 and 2006, the average annual temperature ranges from a low of 46 degrees Fahrenheit and a high of 74 degrees Fahrenheit. Within this same time period, annual rainfall is approximately 18 inches. (Western Regional Climate Center 2007)

SURFACE WATER RESOURCES

The Planning Area is located in a predominately level alluvial plain that is located west of the Coast Ranges and east of the Sierra Nevada mountains in the Central Valley of California. Waterways passing through the Planning Area and in the vicinity of the Planning Area generally originate in the Sierra Nevada and are tributaries to the larger San Joaquin River.

Small streams or creeks that pass through the Planning Area include Pixley Slough and Bear Creek, located in the southeastern portion of the Planning Area (see Figure 10-1). A number of canals and drainages are scattered throughout the Planning Area and in particular near the western boundary closer to the Delta. No other surface streams are recognized within the Planning Area.

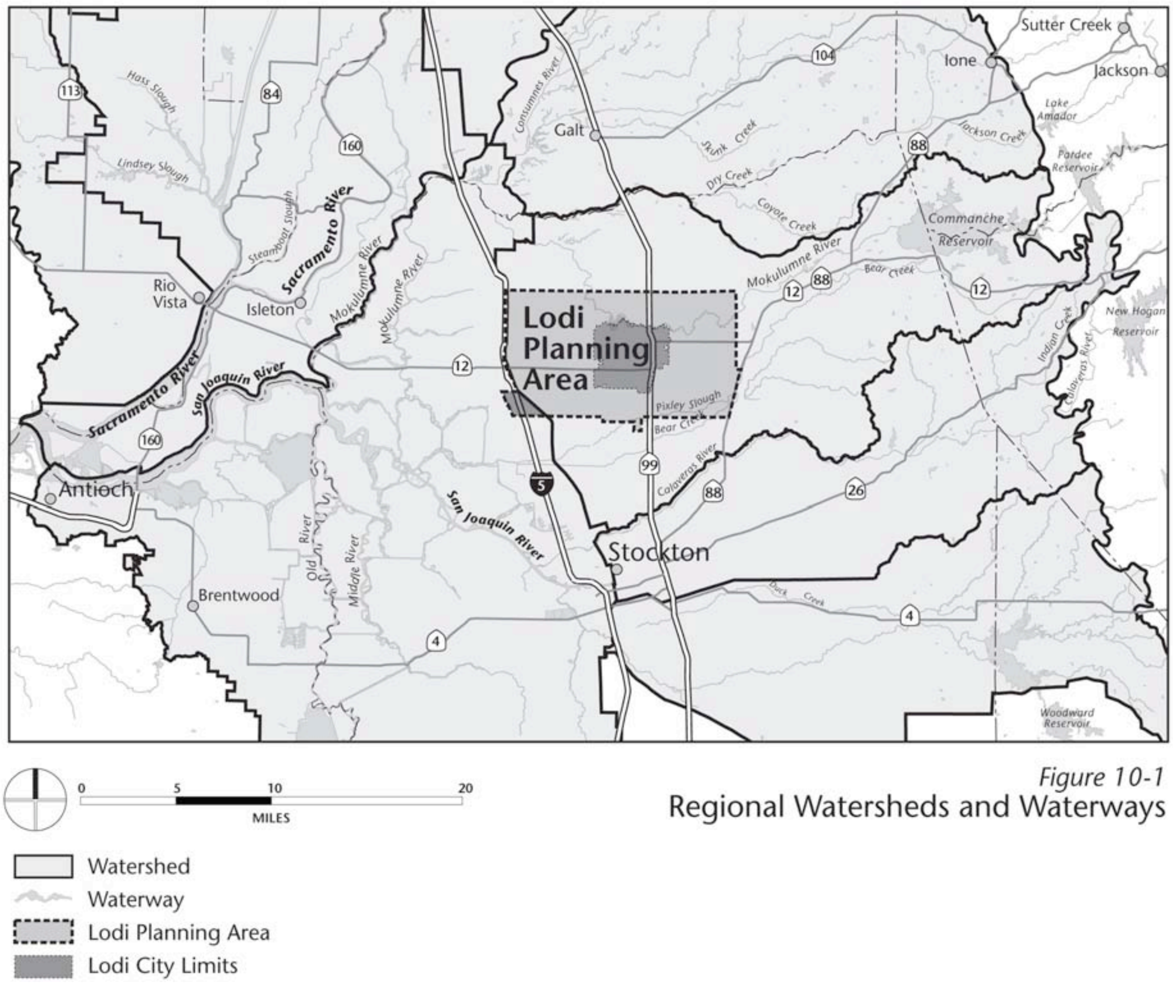


Figure 10-1
Regional Watersheds and Waterways

Lodi Lake, located south of the Woodbridge Dam on the Mokelumne River, serves as a diversion for the canal.

Lodi Lake is located behind Woodbridge Dam on the Mokelumne River within the City's northern boundary (see Figure 10-1). Lodi Lake also serves as a diversion for Woodbridge Irrigation District's (WID) South Main Canal, providing irrigation waters to currently undeveloped lands in the western and southern portions of the Planning Area. The South Main Canal runs through the central portion of the Planning Area and within the existing City limits.

The Mokelumne River is the major waterway running through the northeastern portion of the Planning Area (see Figure 10-1). The existing boundary for the City of Lodi is formed by the Mokelumne River. This important waterway is located within the San Joaquin Valley watershed and drains about 660 square miles above the Planning Area and extends to 10,000 feet in the Sierra Nevada. The Comanche Reservoir is located on the Mokelumne River approximately 20 miles northeast of the Planning Area. (City of Lodi 1988, Department of Water Resources 2006)

Surface Water Quality

Impacts to water quality result from runoff during wet weather events, direct discharge associated with industrial/commercial activities, leaking sewer infrastructure, and illicit dumping. Additionally, sewage generated in the Planning Area eventually is discharged to the San Joaquin River via the City's wastewater treatment facility. Additional pollutant sources within the Planning Area include past waste disposal practices, agricultural chemicals, and chemicals and fertilizers applied to landscaping. Typical contaminants may include sediment, hydrocarbons and metals, pesticides, nutrients, bacteria, and trash.

The SWRCB, in compliance with the Clean Water Act, Section 303(d), has prepared a list of impaired water bodies in the State of California. The list was recently updated by the SWRCB and submitted to the EPA for approval in September 2006. The Lower Mokelumne River is listed as being impaired by zinc and copper. These contaminants likely originated upstream from the Planning Area from mining activities. The CVRWQCB is required to develop and implement a plan to lower the amounts of these contaminants in this water body to an acceptable level. (SWRCB 2006)

GROUNDWATER RESOURCES

The Planning Area overlies the Eastern San Joaquin sub-basin of the greater San Joaquin Valley Groundwater Basin (see Figure 10-2). Groundwater in the Planning Area is recharged by local precipitation and through percolation from surface waters. The Mokelumne River is the primary source of groundwater recharge in the Planning Area. This is indicated by the higher water table in the areas around the Mokelumne River.

The City of Lodi, as well as the entire Central Valley, is underlain by a vast thickness of alluvium that was derived from surrounding mountains, transported by the Mokelumne River and other streams, and deposited in shallow seas of river floodplains. This alluvium is now saturated below a relatively shallow depth. Thus, the sedimentary layers underlying the Planning Area are a part of the major aquifer system that extends throughout the Central Valley from Red Bluff to Bakersfield. (Department of Water Resources 2006)

Groundwater Quality

As the primary source of water supply for the City of Lodi, any potential water quality issues can seriously threaten the City's water supply. The four primary contaminants of concern within the City are Dibromochloropropane (DBCP), Methyl-Tert-Butyl-Ether (MTBE), Tetrachloroethylene (PCE), and Trichloroethylene (TCE). Several of the City's wells are equipped with chlorination equipment intended to release controlled amounts of chlorine to help purify the City's water supply. It is not necessary to constantly chlorinate the City's water and, thus, chlorine is only released into the water in the event of an emergency. (City of Lodi 2006)

DBCP was formerly used in vineyards as a fumigant and nematocide. Although its use has been banned since 1977, the groundwater still contains trace amounts of DBCP. Six of the City's wells utilize granular activated carbon (GAC) for to remove DBCP from the water. (City of Lodi 2006)

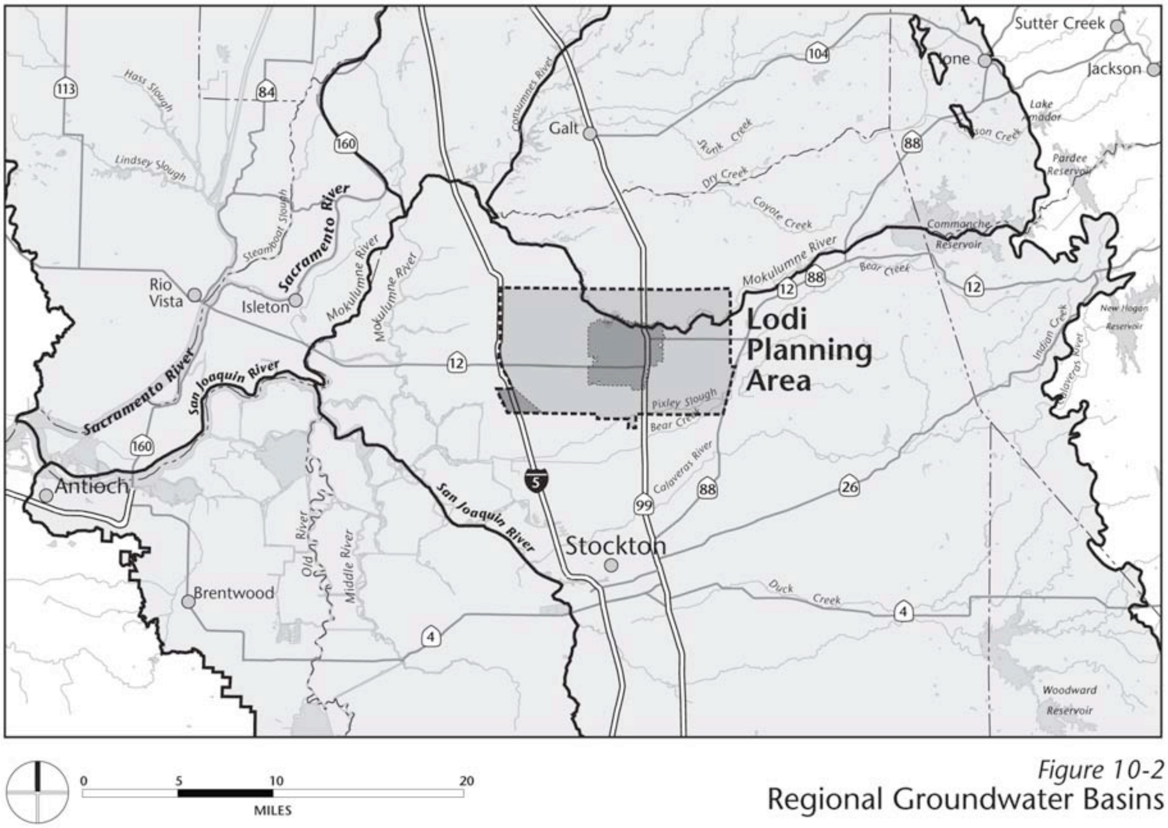


Figure 10-2
Regional Groundwater Basins

Groundwater Basin
Waterway
Lodi Planning Area
Lodi City Limits

MTBE, PCE, and TCE have affected the City's groundwater supply to a lesser extent than DBCP. MTBE is an additive to gasoline that may leak from gas stations into the groundwater. The City's 2005 Urban Water Management Plan did not identify any MTBE contamination in the City's groundwater. (City of Lodi 2006)

PCE primarily originate from dry cleaning operations. TCE is commonly present with PCE as a by-product of PCE. PCE and TCE groundwater contamination is generally found in the north and central Lodi area. While PCE and TCE have been detected in some of the City's wells, the wells are still compliant with drinking water standards. Efforts to clean up the contamination are underway. (City of Lodi 2006)

Over the past 40 years, pumping for municipal and industrial uses in eastern San Joaquin County has exceeded the basin's sustainable yield and caused groundwater elevations to decline at an average rate of 1.7 feet per year and has dropped by as much as 100 feet in some areas. Groundwater overdraft during the past 40 years has reduced storage in the basin by as much as 2 million acre feet. Groundwater depressions present in the subbasin have resulted from the groundwater overdraft. The nearest groundwater depression to the Planning Area is in the area east of Lodi. Over drafting has the potential to decrease the water quality in the groundwater basin by allowing saltwater from the Delta to move into the basin underlying the western portion of the Planning Area. (Department of Water Resources 2006)

10.4 PLANNING ISSUES AND IMPLICATIONS

Key planning issues to consider will continue to include future developments impacts to local surface water quality and its impacts to the local groundwater basin resulting from the development of additional impervious surfaces which could reduce future recharge of the groundwater basin.

BIBLIOGRAPHY

City of Lodi. Stormwater Management Program. January 2003.

City of Lodi. Urban Water Management Plan. March 2006.

City of Lodi. Water Quality Report for 2005. April 2006.

Department of Water Resources. Bulletin 118: San Joaquin Valley Groundwater Basin Eastern San Joaquin Subbasin. January 20, 2006.

State Water Resources Control Board. Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California. 2005.

State Water Resources Control Board. Proposed 2006 CWA Section 303(d) List of Water Quality Limited Segments. September 15, 2006.

11 Flooding

This section deals primarily with the assessment of flood hazards in the Planning Area. Details on the storm drainage system within the Planning Area can be found in Section 8.4, "Stormwater Drainage". Chapter 10: Hydrology and Water Quality deals with local waterways and groundwater resources in the Planning Area.

11.1 INFORMATION SOURCES AND KEY TERMS

This section addressing flood hazard conditions was prepared through a review of the following resources:

- City of Lodi, Flood Insurance Study, Federal Emergency Management Agency, April 2002.
- San Joaquin County, Flood Insurance Study, Federal Emergency Management Agency, April 2002.
- San Joaquin County Dam Failure Plan, San Joaquin County Office of Emergency Services, December 2003.

KEY TERMS

Frequency. How often an event will occur expressed by the return period or by exceedance probability.

Floodplain. Land adjacent to a stream, slough or river that is subject to flooding or inundation from a storm event. FEMA defines the floodplain to be the area inundated by the 100-year flood.

Floodplain Management. The implementation of policies and programs to protect floodplains and maintain their flood control function.

Levee. A dike or embankment constructed to confine flow to a stream channel and to provide protection to adjacent land. A levee designed to provide 100-year flood protection must meet FEMA standards.

11.2 REGULATORY SETTING

Relevant Federal and local regulations and programs specific to flood hazards are discussed in this section.

FEDERAL PROGRAMS

Federal Emergency Management Agency. The Federal Emergency Management (FEMA) regulations govern delineation of floodplains and establish requirements for floodplain management. FEMA administers the National Flood Insurance Program (NFIP). The NFIP provides available flood insurance to those communities that have enacted local ordinances restricting development within a 100-year floodplain. FEMA requires that these ordinances meet or exceed FEMA's regulations. As part of its program, FEMA prepares a Flood Insurance Rate Map (FIRM) that delineates the flood hazard areas in an area and identifies the location of areas within the 100-year floodplain. These maps form the basis for regulating floodplain development and the rating of insurance policies.

LOCAL PROGRAMS

City of Lodi General Plan

The Health and Safety Element of the City's existing General Plan contains a goal, policies, and implementation measures pertinent to water quality issues. These are identified below in Table 11-1.

City of Lodi Municipal Code – Chapter 15.60 Flood Damage Prevention. The City's Municipal Code implements a variety of restrictions and measures that are intended to protect public health and safety and to minimize public and private losses due to flood conditions. Additionally, the ordinance requires that projects obtain development permits that demonstrate compliance with the requirements of the ordinance prior to approval of the permit and commencement of construction within areas containing flood hazards.[1]

[1] City of Lodi, 2006.

Table 11-1: City of Lodi 1991 General Plan Goals and Policies

URBAN DESIGN AND CULTURAL RESOURCES ELEMENT	
Letter	*Goal Text*
A	To prevent loss of lives, injury, and property damage due to flooding.
Number	*Policy Text*
#1	The City shall continue to participate in the National Flood Insurance Program and ensure that local regulations are in full compliance with standards adopted by FEMA.
#2	The City shall ensure that storm drainage facilities are constructed to serve new development adequate to store runoff generated by a 100-year storm.
#3	The City shall ensure that storm drainage facilities are provided for all new development to make certain that all surface runoff generated by the development is adequately handled.
#4	The City shall evaluate the degree of flood protection afforded to currently developed areas compared to standards for new development.
#5	The City shall only permit development in the 100-year floodplain consistent with FEMA regulations.
#6	The City shall not support approval of land uses or projects that have the potential of greatly increasing flood hazards in Lodi.
#7	The City shall support the implementation of flood hazard reduction measures in neighboring areas.
Number	*Implementation Measure Text*
1	The City shall prepare and periodically update a Drainage Master Plan that will identify new facilities and improvements needed to adequately accommodate runoff from existing and projected development and to prevent damage due to flooding.
2	The City shall prepare an evaluation of selected older areas of Lodi to determine if such areas provide the degree of protection afforded by the standards identified in the City's Drainage Master Plan, and take remedial action as necessary.

Table Source: Jones & Stokes, 1991

11.3 ENVIRONMENTAL SETTING

FLOODPLAINS

The Planning Area is located in a relatively flat portion of the San Joaquin Valley. The Mokelumne River flows through the northern portion of the Planning Area and the delta is located west of the Planning Area. Additionally, the Planning Area is is surrounded by several smaller waterway systems that originate in the foothills and Sierra Nevada Mountains.

Based on revised flood risk evaluations prepared by the Federal Emergency Management Agency (FEMA) for the City of Lodi and San Joaquin County in 1987 and revised in 2002, flood hazards are a constraint to development only in the area immediately adjacent to the Mokelumne River in the 100-year flood flow. Areas located within the 100-year and 500-year floodplains are identified in Figure 11-1. As shown in the figure, the southwest corner of the Planning Area is located in the 100-year floodplain area surrounding the delta. Flooding depths within theses 100-year floodplain areas range from 1-3 feet. A majority of the Planning Area would be inundated during a 500-year flood event. Flooding depths within the 500-year floodplain areas would be greater than one foot.

Levees along the Mokelumne River were privately built and vary in height. Upstream of SR-99, the adjacent agricultural lands are protected against floods up to the 50-year currents (about 5,000 cfs) by low discontinuous levees. Levee overtopping here from larger events (e.g., the 100-year flood) would not, however, cause inundation in the Planning Area. Levees west of SR-99 are higher and provide protection from flows slightly greater than the 100-year event. As long as levees are not over-topped and maintain their structural integrity, flooding is considered to be very unlikely. Should a major storm event cause levees to be over topped or if a levee fails, flooding would occur. Flooding also can occur when runoff exceeds the capacity of local systems and cannot drain adequately.[2]

[2] City of Lodi, 1991.

DAM INUNDATION

Large quantities of water stored in reservoirs along the Mokelumne, Calaveras, and Stanislaus River systems pose a potential threat to inhabitants of the Planning Area and the larger San Joaquin County area. Flooding in the Planning Area may occur as a result of releases from reservoirs upstream of the Planning Area when releases are at maximum levels. Partial or complete failure of a dam along any of these rivers, especially the Mokelumne River, can cause inundation in the Planning Area. Dams that pose a direct threat to the Planning Area include Camanche Dam, Camanche South and North Dikes, and Pardee Dam. The entire Planning Area would be inundated in the event of a failure of any of these dams, except for the Camanche North Dikes Dam whose failure would just flood the Planning Area north of Kettleman Lane.

San Joaquin County has prepared a Dam Failure Plan that identifies hazards to the County from dams and reservoirs. The Dam Failure Plan also identifies actions that will be taken to respond to flood-related emergencies in the event that flooding occurs. These actions would include implementation of the Standardized Emergency Management System and the County's Multi-Hazard Emergency Plan (see "Local Regulations" in Section 6.7, "Hazards and Hazardous Materials").[3]

11.4 PLANNING ISSUES AND IMPLICATIONS

1. ***How should development within floodplains be regulated? Should development be allowed within 100-year floodzones?***

As indicated in Figure 11-1, a majority of the Planning Area is outside a FEMA designated 100 or 500 Year Flood Zone Area. However, portions of the Planning Area are within these flood prone areas. The City's current General Plan contains a number of policies that highlight requirements for development within floodplain areas. However, locating facilities within a 100- or 500-year floodplain area may obstruct the floodplain and occupy space that may cause the intensification of flood impacts elsewhere. The City may wish to consider prohibiting development within the 100-year floodzones.

[3] San Joaquin County, 2003.

BIBLIOGRAPHY

City of Lodi Community Development Department. City of Lodi General Plan Background Report. January 1988.

City of Lodi Community Development Department. City of Lodi General Plan Policy Document. April 1991.

City of Lodi. City of Lodi Municipal Code, Chapter 15.60, Flood Damage Prevention. Approved October 4, 2006. http://municipalcodes.lexisnexis.com/codes/lodi/ Accessed February 15, 2007.

Federal Emergency Management Agency. City of Lodi Flood Insurance Study. April 2002.

Federal Emergency Management Agency. San Joaquin County Flood Insurance Study. April 2002.

San Joaquin County Office of Emergency Services. San Joaquin County Dam Failure Plan. December 2003.

12 Air Quality

As people continue to move to the Central Valley, air quality has become increasing concern for the San Joaquin Valley Air Basin. To provide a better understanding of the current air quality conditions in the Planning Area, this chapter describes:

- Federal and State ambient air quality standards;
- Air quality planning and management for the City's Planning Area;
- Existing regional topography and climate;
- Existing air quality conditions in the Planning Area; and
- Sensitive receptors in the Planning Area.

12.1 INFORMATION SOURCES AND KEY TERMS

INFORMATION SOURCES

Information presented in this chapter is based on printed reports and air quality monitoring data provided from the San Joaquin Valley Air Pollution Control District (SJVAPCD) and the California Air Resources Board (CARB).

KEY TERMS

Climate Change (also referred to as 'global climate change'). This term is sometimes used to refer to all forms of climatic inconsistency, but because the Earth's climate is never static, the term is more properly used to imply a significant change from one climatic condition to another. In some cases, 'climate change' has been used synonymously with the term 'global warming'; scientists however, tend to use the term in the wider sense to also include natural changes in climate.

Global Warming. An increase in the near surface temperature of the Earth. Global warming has occurred in the distant past as the result of natural influences, but the term is most often used to refer to the warming predicted to occur as a result of increased emissions of greenhouse gases. Scientists generally agree that the Earth's surface has warmed by about 1 degree Fahrenheit in the past 140 years.

Greenhouse Effect. The effect produced as greenhouse gases allow incoming solar radiation to pass through the Earth's atmosphere, but prevent most of the outgoing infrared radiation from the surface and lower atmosphere from escaping into outer space. This process occurs naturally and has kept the Earth's temperature about 59 degrees

Fahrenheit warmer than it would otherwise be. Current life on Earth could not be sustained without the natural greenhouse effect.

PM10. Dust and other particulates come in a range of particle sizes. Federal and state air quality regulations reflect the fact that smaller particles are easier to inhale and can be more damaging to health. PM10 refers to dust/particulates that are 10 microns in diameter or smaller.

PM2.5 The federal government has recently added standards for smaller dust particles. PM2.5 refers to dust/particulates that are 2.5 microns in diameter or smaller.

Ozone. Ozone is a pungent, colorless toxic gas created in the atmosphere by a photochemical reaction rather than emitted directly into the air. Motor vehicles are the major sources of ozone precursors.

San Joaquin Valley Air Basin. An air basin is a geographic area that exhibits similar meteorological and geographic conditions. California is divided into 15 air basins to assist with the statewide regional management of air quality issues. The City falls within the northern-most portion of the San Joaquin Valley Air Basin. This air basin covers encompasses eight counties spread across 25,000 square miles of the Central Valley.

San Joaquin Valley Air Pollution Control District (SJVAPCD). The SJVAPCD is the regulatory agency responsible for developing air quality plans, monitoring air quality, and reporting air quality data for the City's Planning Area.

12.2 REGULATORY SETTING

Air quality conditions are subject to various federal, State and local programs. This section begins with a brief introduction to ambient air quality standards and a discussion of the air pollutants of interest to these regulatory agencies. The section also provides a brief overview of key regulations.

POLLUTANTS AFFECTING AIR QUALITY/HEALTH EFFECTS

A discussion of the air pollutants of interest to the regulatory agencies for their potential adverse impacts on the environment and sensitive receptors are described below.

Ozone

Short-term exposure to ozone can irritate the eyes and cause construction of the airways. Besides causing shortness of breath, ozone can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema.

Ozone, the main component of photochemical smog, is primarily a summer and fall pollution problem. Ozone is not emitted directly into the air but is formed through a complex series of chemical reactions involving other compounds that are directly emitted. These directly emitted pollutants (also known as ozone precursors) include reactive organic gases (ROG) and nitrogen oxides (NOx). The time period required for ozone formation allows the reacting compounds to spread over a large area, producing a regional pollution problem. Ozone problems are the cumulative result of regional development patterns rather than the result of a few significant emission sources. Mobile sources are the major source of ozone precursor emissions within the northern region of the SJVAB.[1]

Once formed, ozone remains in the atmosphere for one or two days. Ozone is then eliminated through reaction with chemicals on the leaves of plants, attachment to water droplets as they fall to earth "rainout") and absorption by water molecules in clouds that later fall to earth with rain ("washout").

Carbon Monoxide

Ambient carbon monoxide concentrations normally are considered a local effect and typically correspond closely to the spatial and temporal distributions of vehicular traffic. Wind speed and atmospheric mixing also influence carbon monoxide concentrations. Under inversion conditions, carbon monoxide concentrations may be distributed more uniformly over an area that may extend some distance from vehicular sources.

When inhaled at high concentrations, carbon monoxide combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia, as well as for fetuses.

Carbon monoxide concentrations have declined dramatically in California due to existing controls and programs. Carbon monoxide concentrations are expected to continue declining due to the ongoing retirement of older, more polluting vehicles from the mix of vehicles on

---

[1] SJVAPCD, 2003a.

the road network. U.S. EPA designated the SJVAB as attainment for carbon monoxide in 1998. Although the SJVAPCD has been successful in achieving CO standards, localized CO concentrations may warrant concern.[2]

Respirable Particulate Matter (PM10 and PM2.5)

PM10 and PM2.5 consist of particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively. (A micron is one-millionth of a meter.) PM10 and PM2.5 represent fractions of particulate matter that can be inhaled into the air passages and the lungs and can cause adverse health effects. Acute and chronic health effects associated with high particulate levels include the aggravation of chronic respiratory diseases, heart and lung disease, and coughing, bronchitis and respiratory illnesses in children. Recent mortality studies have shown a direct association between mortality and daily concentrations of particulate matter in the air. Particulates can also damage materials and reduce visibility. One common source of PM2.5 is diesel particulate emissions.

Traffic generates particulate matter and PM10 emissions through entrainment of dust and dirt particles that settle onto roadways and parking lots. PM10 also is emitted by burning wood in residential wood stoves and fireplaces and open agricultural burning. PM10 can remain in the atmosphere for up to seven days before gravitational settling, rainout and washout remove it.

The primary classes of PM10 sources in the SJVAPCD include geological material, ammonium nitrate, burning, motor vehicle exhaust, and sulfates. Geological material is the largest contributor annually, while ammonium nitrate constitutes the larges fraction during winter).[3]

Other Criteria Pollutants

Ozone and particulate matter are the primary focus of this analysis due to the nonattainment status of the air basin for these pollutants. The standards for nitrogen dioxide (NO_2), sulfur dioxide (SO_2), sulfates, and lead are being met in the SJVAB. However, NO_2 is an ozone precursor and thus contributes to the formation of a nonattainment criteria pollutant. Sources and effects of NO_2 are discussed below.

---

[2] SJVAPCD, 2002a.

[3] SJVAPCD, 2003b.

NO_2 is a reddish brown gas that is a by-product of combustion processes. Automobiles and industrial operations are the main sources of NO_2. Aside from its contribution to ozone formation, nitrogen dioxide can increase the risk of acute and chronic respiratory disease and reduce visibility. NO_2 may be visible as a coloring component of a brown cloud on high pollution days, especially in conjunction with high ozone levels.

Toxic Air Contaminants (TACS)

Non-criteria air pollutants or TACs are airborne substances that are capable of causing short-term (acute) and/or long-term (chronic or carcinogenic, i.e., cancer causing) adverse human health effects (i.e., injury or illness). TACs include both organic and inorganic chemical substances. They may be emitted from a variety of common sources including gasoline stations, automobiles, dry cleaners, industrial operations, and painting operations. The current California list of TACs includes approximately 200 compounds, including particulate emissions from diesel-fueled engines.

Diesel particulate matter (DPM) is the most complex of diesel emissions. Diesel particulates, as defined by most emission standards, are sampled from diluted and cooled exhaust gases.

This definition includes both solids and liquid material that condenses during the dilution process. The basic fractions of DPM are elemental carbon, heavy hydrocarbons derived from the fuel and lubricating oil and hydrated sulfuric acid derived from the fuel sulfur. DPM contains a large portion of the polycyclic aromatic hydrocarbons (PAH) found in diesel exhaust. Diesel particulates include small nuclei mode particles of diameters below 0.04µm and their agglomerates of diameters up to 1µm. Ambient exposures to diesel particulates in California are significant fractions of total TAC levels in the State.

Odorous Emissions

Because offensive odors rarely cause any physical harm and no requirements for their control are included in state or national air quality regulations, the SJVAPCD has no rules or standards related to odor emissions, other than its nuisance rule. Any actions related to odors are based on citizen complaints to local government agencies including the SJVAPCD. The SJVAPCD uses screening distances to determine the potential for odor impacts from various land uses.

Sensitive Receptors

Sensitive receptors are typically defined as populations or uses that are more susceptible to the effects of air pollution than the general population. For the Planning Area, sensitive receptors may include the following populations or uses:

- Long-term healthcare facilities;
- Rehabilitation centers;
- Convalescent centers;
- Retirement homes;
- Residences;
- Schools;
- Playgrounds;
- Childcare centers; and
- Athletic facilities.

FEDERAL PROGRAMS

Federal Clean Air Act

The federal Clean Air Act, adopted in 1970 and amended twice thereafter (including the 1990 amendments), establishes the framework for modern air pollution control. The act requires the U.S. Environmental Protection Agency (U.S. EPA) to identify National Ambient Air Quality Standards (NAAQS) (national standards) to protect public health and welfare. National standards have been established for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, respirable particulate matter (PM10 and PM2.5), and lead. These pollutants are called "criteria" air pollutants because standards have been established for each of them to meet specific public health and welfare criteria set forth in the FCAA. California has adopted more stringent ambient air quality standards for the criteria air pollutants (referred to as State Ambient Air Quality Standards, or state standards) and has adopted air quality standards for some pollutants for which there is no corresponding national standard.

Table 12-1 presents current national and state ambient air quality standards and provides a brief discussion of the related health effects and principal sources for each pollutant.

Table 12-1: State and National Criteria Air Pollutant Standards, Effects, and Sources

Pollutant	*Averaging Time*	*State Standard*	*National Standard*	*Pollutant Health and Atmospheric Effects*	*Major Pollutant Sources*
Ozone	1 hour	0.09 ppm	-	High concentrations can directly affect lungs, causing irritation. Long-term exposure may cause damage to lung tissue.	Formed when reactive organic gases (ROG) and nitrogen oxides (NO_X) react in the presence of sunlight. Major sources include on-road motor vehicles, solvent evaporation, and commercial / industrial mobile equipment.
	8 hours	0.07 ppm[1]	0.08 ppm		
Carbon Monoxide	1 hour	20 ppm	35 ppm	Classified as a chemical asphyxiant, carbon monoxide interferes with the transfer of fresh oxygen to the blood and deprives sensitive tissues of oxygen.	Internal combustion engines, primarily gasoline-powered motor vehicles.
	8 hours	9.0 ppm	9 ppm		
Nitrogen Dioxide	1 hour	0.25 ppm	-	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown.	Motor vehicles, petroleum refining operations, industrial sources, aircraft, ships, and railroads.
	Annual Avg.	-	0.053 ppm		
Sulfur Dioxide	1 hour	0.25 ppm	-	Irritates upper respiratory tract; injurious to lung tissue. Can yellow the leaves of plants, destructive to marble, iron, and steel. Limits visibility and reduces sunlight.	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
	3 hours	-	0.5 ppm		
	24 hours	0.04 ppm	0.14 ppm		
	Annual Avg.	-	0.03 ppm		
Respirable Particulate Matter (PM-10)	24 hours	50 $\mu g/m^3$	150 $\mu g/m^3$	May irritate eyes and respiratory tract, decreases in lung capacity, cancer and increased mortality. Produces haze and limits visibility.	Dust and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
	Annual Avg.	20 $\mu g/m^3$	50 $\mu g/m^3$		
Fine Particulate Matter (PM-2.5)	24 hours	-	65 $\mu g/m^3$	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and results in surface soiling.	Fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning; Also, formed from photochemical reactions of other pollutants, including NO_X, sulfur oxides, and organics.
	Annual Avg.	12 $\mu g/m^3$	15 $\mu g/m^3$		
Lead	Monthly Avg.	1.5 $\mu g/m^3$	-	Disturbs gastrointestinal system, and causes anemia, kidney disease, and neuromuscular and neurologic dysfunction.	Present source: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline.
	Quarterly	---	1.5 $\mu g/m^3$		

NOTE: ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter.

1. This concentration was approved by the Air Resources Board on April 28, 2005 and became effective May 17, 2006.

Source: California Air Resources Board, 2006a. Ambient Air Quality Standards, available at http://www.arb.ca.gov/aqs/aaqs2.pdf, May 17, 2006; California Air Resources Board, 2001. ARB Fact Sheet: Air Pollution Sources, Effects and Control, http://www.arb.ca.gov/research/health/fs/fs2/fs2.htm, page last updated December 2005.

Ambient air quality standards are periodically reviewed in light of the results of ongoing research. In June of 1997, U.S. EPA reaffirmed the national PM10 standard, established a new standard for “fine” particulate matter (PM2.5), and changed the 1-hour ozone national standard of 0.12 to an 8-hour standard of 0.08 ppm. The 1-hour ozone standard continues to apply in areas that violated that standard before the 8-hour standard was adopted.

Pursuant to the 1990 Federal Clean Air Act Amendments (FCAAA), the U.S. EPA classifies air basins (or portions thereof) as "attainment" or "nonattainment" for each criteria air pollutant, based on whether or not the NAAQS had been achieved. Table 12-2 shows the current attainment status of the Planning Area. In summary, the area is nonattainment for state and federal ozone, PM10, and PM2.5 standards.

Table 12-2: San Joaquin Valley Attainment Status

Pollutant	*Designation/Classification*	
	Federal Standards	*State Standards*
Ozone – one hour	No Federal Standard[1]	Nonattainment/Severe
Ozone – eight hour	Nonattainment/Serious	No State Standard
PM10	Nonattainment/Serious	Nonattainment
PM2.5	Nonattainment	Nonattainment[2]
CO – San Joaquin County	Unclassified/Attainment	Attainment
Nitrogen Dioxide	Unclassified/Attainment	Attainment
Sulfur Dioxide – San Joaquin County	Unclassified	Attainment
Lead (particulate)	No Designation	Attainment
Hydrogen Sulfide	No Federal Standard	Unclassified
Sulfates	No Federal Standard	Attainment
Visibility-Reducing Particles	No Federal Standard	Unclassified

1. Federal One Hour Ozone National Ambient Air Quality Standard was revoked on June 15, 2005
2. Nonattainment per CARB's website: <www.arb.ca.gov/desig/adm/s4_pm25.pdf>

Source: <www.valleyair.org/aqinfo/attainment.htm> (November 2005), and <www.arb.ca.gov/desig/adm/adm.htm>

The FCAA required each state to prepare an air quality control plan referred to as the State Implementation Plan (SIP). The FCAAA added requirements for states containing areas that violate the NAAQS to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is a living document that is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of air basins as reported by the agencies with jurisdiction over them. The U.S. EPA has responsibility to review all state SIPs to determine if they conform to the mandates of the FCAAA and will achieve air quality goals when implemented. If the U.S. EPA determines a SIP to be inadequate, it may prepare a Federal Implementation Plan (FIP) for the nonattainment area and may impose additional control measures. Failure to submit an approvable SIP or to implement the plan within mandated timeframes can result in sanctions being applied to transportation funding and stationary air pollution sources in the air basin.

Regulation of Toxic Air Contaminants (TACs), termed Hazardous Air Pollutants (HAPs) under federal regulations, is achieved through federal, State and local controls on individual sources. The SJVAPCD regulates toxic air contaminants in District Policies 1905 and 1910, and in regulation VII. The SJVAPCD recognizes all TAC's as defined by the State. The SJVAPCD recognizes federal Maximum Achievable Control Technology (MACT) standards for HAP's in District Rule 4002. The 1977 Clean Air Act Amendments required the U.S. EPA to identify National Emission Standards for Hazardous Air Pollutants (NESHAPs) to protect public health and welfare. These substances include certain volatile organic chemicals, pesticides, herbicides, and radionuclides that present a tangible hazard, based on scientific studies of exposure to humans and other mammals. Although these studies indicate tangible health hazards to humans and other animals, the magnitudes of the hazards are unknown.

STATE REGULATIONS

California Clean Air Act (CCAA)

Under the California Clean Air Act (CCAA), patterned after the FCAA, areas have been designated as attainment or nonattainment with respect to the state standards (see Table 12-2). The Planning Area is nonattainment for particulates (PM10 and PM2.5) and ozone. The State must verify compliance with the SJVAPCD's plan for achieving attainment before inclusion in the SIP. Once the SIP is complete, EPA must verify the SIP's compliance with the FCAA. If EPA determines the SIP to be inadequate in verifying compliance, EPA may prepare a FIP, as described earlier in this section. Responsibility for meeting California's standards lies with CARB and local air pollution control districts such as the SJVAPCD, which covers the City's Planning Area.

California State law defines toxic air contaminants (TACs) as air pollutants having carcinogenic effects. The State Air Toxics Program was established in 1983 under Assembly Bill (AB) 1807 (Tanner). A total of 243 substances have been designated TACs under California law; they include the 189 (Federal) hazardous air pollutants (HAP's) adopted in accordance with AB 2728. The Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588) seeks to identify and evaluate risk from air toxics sources; AB 2588 does not regulate air toxics emissions. Toxic air contaminant emissions from individual facilities are quantified and prioritized. "High-priority" facilities are required to perform a health risk assessment and, if specific thresholds are violated, are required to communicate the results to the public in the form of notices and public meetings. Depending on the risk levels, emitting facilities are required to implement varying levels of risk reduction measures. SJVAPCD implements AB 2588, and is responsible for prioritizing facilities that emit air toxics.[4]

In August of 1998, CARB identified particulate emissions from diesel-fueled engines (diesel particulate matter, or DPM) as TACs. CARB developed the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles* and the *Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines*. The Board approved these documents on September 28, 2000 (CARB 2000). The documents represent proposals to reduce diesel particulate emissions, with the goal to reduce emissions and the associated health risk by 75 percent in 2010 and by 85 percent in 2020. The program aims to require the use of state-of-the-art catalyzed diesel particulate filters and ultra low sulfur diesel fuel on diesel-fueled engines.

CARB recently published the *Air Quality and Land Use Handbook: A Community Health Perspective* (CARB 2005). The primary goal in developing the handbook was to provide information that will help keep California's children and other vulnerable populations out of harm's way with respect to nearby sources of air pollution. The handbook highlights recent studies that have shown that public exposure to air pollution can be substantially elevated near freeways and certain other facilities. However, the health risk is greatly reduced with distance. For that reason, CARB provided some general recommendations aimed at keeping appropriate distances between sources of air pollution and sensitive land uses, such as residences.

California Global Warming Solutions Act of 2006 (Assembly Bill 32)

AB 32, authored by Assemblyman Fabian Nunez and signed into law by Governor Arnold Schwarzenegger in September 2006, outlines measures by which the State of California and its businesses and residents can reduce heat trapping emissions from a variety of sources including power plants and refineries. In addition to setting a binding limit on greenhouse gas emissions, AB 32 requires the California Air Resources Board, the State Energy Resources Conservation and Development Commission (Energy Commission), and the California Climate Action Registry to jointly administer State policy specific to global warming issues and requires the California Air Resources Board to institute a mandatory

[4] SJVAPCD, 2002b.

emissions reporting and tracking system to monitor compliance with the emissions limit. This limit would ensure that global warming pollution would be reduced by 145 million tons by 2020 or to 25 percent below forecasted emissions (reduced to 1990 levels by 2020).

LOCAL PROGRAMS

San Joaquin Valley Air Pollution Control District (SJVAPCD)

The SJVAPCD is the primary local agency responsible for protecting human health and property from the harmful effects of air pollution in the San Joaquin Valley Air Basin, and has jurisdiction over most stationary source air quality matters in the SJVAB, including the NSPS program. The SJVAPCD includes all of Merced, San Joaquin, Stanislaus, Madera, Fresno, Kings and Tulare counties, and the Valley portion of Kern County.

The SJVAPCD is responsible for developing attainment plans for the SJVAB, for inclusion in California's SIP, as well as establishing and enforcing air pollution control rules and regulations. The attainment plans must demonstrate compliance with federal and state ambient air quality standards, and must first be approved by CARB before inclusion into the SIP. The SJVAPCD regulates, permits, and inspects stationary sources of air pollution. Among these sources are industrial facilities, gasoline stations, auto body shops, MSW landfills and dry cleaners to name a few. While the state is responsible for emission standards and controlling actual tailpipe emissions from motor vehicles, the SJVAPCD is required to regulate emissions associated with stationary sources such as agricultural burning and industrial operations. The SJVAPCD also works with eight local transportation planning agencies to implement transportation control measures, and to recommend mitigation measures for new growth and development designed to reduce the number of cars on the road. The SJVAPCD promotes the use of cleaner fuels, and funds a number of public and private agency projects that provide innovative approaches to reducing air pollution from motor vehicles.

The Planning Area is located on the geographic boundary between the San Joaquin and Sacramento valleys, a sub-region within the SJVAB. The SJVAB is designated severe nonattainment for the federal 1-hour ozone standard and serious nonattainment for the federal PM10 standard. In April of 2004, the EPA approved the District's appeal to downgrade its federal 1-hour ozone nonattainment status from "Severe" to "Extreme." While all criteria pollutants are a concern of the SJVAPCD, and a project's air quality impacts are considered significant if they would violate any of the state air quality standards. Ozone precursors, PM10 emissions and toxic air contaminants are emphasized in the review of applications for an Authority to Construct / Permit to Operate. Federal and state air quality laws also require regions designated as nonattainment to prepare plans that either demonstrate how the region will attain the standard or that demonstrate reasonable improvement in air quality conditions. As noted, the SJVAPCD is responsible for developing attainment plans for the SJVAB for inclusion in California's SIP.

The following are the air quality plans with current or recent application to the SJVAB:

- ***1998 Carbon Monoxide State Implementation Plan (SIP).*** With the U.S. EPA's redesignation of 10 urban areas in California (including four urban areas in the SJVAB) from nonattainment to attainment for carbon monoxide in 1998, the South Coast Air Basin is the only basin in the state currently considered nonattainment for this pollutant. The 1998 Carbon Monoxide SIP revision modifies the carbon monoxide maintenance plan for the 10 areas, including the urban areas of the SJVAB.
- ***The Federal Ozone Attainment Demonstration Plan (adopted November 14, 1994 and amended 2001).*** This plan established a regulatory framework to bring the SJVAB into compliance with the national standards for ozone and satisfied a required triennial review for state standards. This plan did not achieve its goal of meeting the national standards for ozone by 1999 (SJVAPCD, 1994).
- ***2000 Ozone Rate of Progress Report, (adopted April 20, 2000 and amended April 27, 2000).*** This report demonstrates that target levels of emissions reductions mandated by the CAA for 1997 to 1999 (9 percent) and for 1990 to 1999 (24 percent) were achieved.[5]
- ***Triennial Progress Report and Plan Revisions 1997–1999.*** This report states that all areas of the SJVAB have attained the state carbon monoxide standard and focuses on attainment of the state ozone standard, in light of the basin's "severe nonattainment" status under the state Health and Safety Code. The report reviews previously adopted and implemented Best Available Retrofit Control Technology (BARCT) measures and includes an adoption and implementation schedule for new measures to achieve additional emission reductions. Planned measures include new controls on stationary, mobile, and indirect sources, and plan revisions. This report was adopted March 15, 2001.[6]
- ***2001 Amendment to the 1994 Ozone Attainment Demonstration Plan.*** These amendments to the 1994 OADP commit the

[5] SJVAPCD, 2000.

[6] SJVAPCD, 2001a.

SJVAPCD to revise, add or delete various Regulation IV rules pertaining to the use and storage of coatings and solvents and specific stationary sources.[7]

- ***2002 and 2005 Ozone Rate of Progress Plan, (adopted May 16, 2002).*** In December 2001 U.S. EPA reclassified the SJVAB from serious to severe nonattainment for the national 1-hour ozone standard. The severe classification triggered a requirement for the SJVAPCD to prepare plans that demonstrate annual reductions of ozone precursors and attainment of the standard by 2005. The SJVAPCD determined that it could not reach attainment in 2005. This plan demonstrates rates of progress in emissions reductions in volatile organic compounds at the mandated average rate of 3 percent per year, based on three-year periods (i.e., 9 percent between 2000 and 2002 and an additional 9 percent between 2003 and 2005). The plan also satisfies the requirement of the CAA that nonattainment areas adopt all reasonably available control measures (RACM) as expeditiously as possible.
- ***2003 PM10 Plan: San Joaquin Valley Plan to Attain Federal Standards for Particulate Matter 10 Microns and Smaller.*** This plan was adopted by the SJVAPCD Governing Board June 19, 2003 and submitted to CARB, which also has approved it and submitted it to U.S.EPA. U.S. EPA approved the plan as amended on May 26, 2004 effective June 26, 2004. The 2003 PM10 plan demonstrates attainment of the national PM10 standard at all monitoring stations within the air basin by 2010. It supersedes the SJVAPCD's previous plan, the 1997 *PM10 Attainment Demonstration Plan*, which failed to meet the national standard by the 2001 target date and was withdrawn by the SJVAPCD.
- ***PM10 Attainment Demonstration Plan Progress Report 1997-1990.*** August 17, 2000. This report describes progress achieved by the SJVAPCD implementing the 1997 PM10 plan, including actions pertaining to stationary, area and mobile sources, research programs and revisions to Regulation VIII (Fugitive PM10 Prohibitions) that were then in progress.

The SJVAPCD's primary means of implementing the above air quality plans is by adopting and enforcing rules and regulations. Stationary sources within the jurisdiction are regulated by the SJVAPCD's permit authority over such sources and through its review and planning activities.

In 2001, the SJVAPCD revised its Regulation VIII-Fugitive PM Prohibitions, in response to commitments made in the 1997 PM10 Attainment Plan to incorporate best available control measures (BACM).

---

[7] SJVAPCD, 2001b.

The revision also includes new rules for open areas and agricultural operations. The provisions of the revised regulation took effect in May 2002. Regulation VIII consists of a series of dust control rules intended to implement the PM10 Attainment Demonstration Plan. The PM10 Attainment Demonstration Plan emphasizes reducing fugitive dust as a means of achieving attainment of the federal standards for PM10.

City of Lodi General Plan

The Conservation Element of the City's existing General Plan contains a goal and several policies pertinent to air quality issues. Several of these are identified below in Table 12-3:

Table 12-3: City of Lodi 1991 General Plan Goals and Policies

CONSERVATION ELEMENT	
Letter	*Goal Text*
F	To promote and, insofar as possible, improve air quality in Lodi and the region.
Number	*Policy Text*
#1	The City shall promote travel by bicycle and foot within Lodi.
#2	The City shall promote transit for trips within Lodi and for regional trips.
#3	The City shall promote ridesharing for Lodi residents commuting to employment centers outside of Lodi.
#4	The City shall promote the development of Caltrans park-and-ride lots to serve Lodi residents working in destinations outside of Lodi.
#5	The City shall promote employment opportunities within Lodi to reduce commuting to areas outside of Lodi.
#6	The City shall cooperate with the City of Stockton and San Joaquin County on the development of an area-wide air quality mitigation program.

Table Source: Jones & Stokes, 1991

12.3 ENVIRONMENTAL SETTING

CLIMATE AND ATMOSPHERIC CONDITIONS

The primary factors that determine air quality are the locations of air pollutant sources and the amounts of pollutants emitted. Meteorological and topographical conditions, however, also are important. Factors such as wind speed and direction, and air temperature gradients interact with physical landscape features to determine the movement and dispersal of criteria air pollutants.

The Planning Area lies within the San Joaquin Valley Air Basin (SJVAB), basically a flat area bordered on the east by the Sierra Nevada Mountains; on the west by the Coast Ranges; and to the south by the Tehachapi Mountains. Airflow in the SJVAB is primarily influenced by marine air that enters through the Carquinez Straits where the San Joaquin-Sacramento Delta empties into the San Francisco Bay (SJVAPCD, 2002a). The region's topographic features restrict air movement through and out of the basin. As a result, the SJVAB is highly susceptible to pollutant accumulation over time.[8] Frequent transport of pollutants into the SJVAB from upwind sources also contributes to poor air quality.

Wind speed and direction play an important role in dispersion and transport of air pollutants. During summer periods, winds usually originate from the north end of the San Joaquin Valley and flow in a south-southeasterly direction through the valley, through the Tehachapi pass and into the neighboring Southeast Desert Air Basin. During winter months, winds occasionally originate from the south end of the valley and flow in a north-northwesterly direction. Also, during winter months, the valley experiences light, variable winds, less than 10 miles per hour (mph). Low wind speeds, combined with low inversion layers in the winter, create a climate conducive to high concentrations of certain air pollutants.

The SJVAB has an inland Mediterranean climate that is characterized by warm, dry summers and cooler winters. Summer high temperatures often exceed 100 degrees Fahrenheit (°F), averaging from the low 90s in the northern part of the valley to the high 90s in the south. The daily summer temperature variation can be as high as 30 degrees °F. Winters are for the most part mild and humid. Average high temperatures during the winter are in the 50s, while the average daily low temperature is approximately 45 degrees °F.

The vertical dispersion of air pollutants in the valley is limited by the presence of persistent temperature inversions. Air temperatures usually

[8] SJVAPCD, 2002a.

decrease with an increase in altitude. A reversal of this atmospheric state, where the air temperature increases with height, is termed an inversion. Air above and below an inversion does not mix because of differences in air density thereby restricting air pollutant dispersal.

EXISTING EMISSION SOURCES AND EMISSION LEVELS

The SJVAPCD's regional air quality monitoring network provides information on existing ambient concentrations of criteria air pollutants. Monitored ambient air pollutant concentrations reflect the number and strength of emissions sources and the influence of topographical and meteorological factors. Table 12-4 presents a five-year summary of air pollutant (concentration) data collected at the three monitoring stations in the vicinity of the project area on Hazelton Street, East Mariposa Road, and at the Wagner-Holt School in Stockton. The Hazelton Street station measures concentrations of all air pollutants, including the two for which the SJVAB remains "nonattainment", ozone, PM10, and PM2.5. The East Mariposa Road Station measures ozone concentrations only and has not been collecting data for the last four year. The Wagner-Holt School Station measures PM10 concentrations only. Pollutant concentrations measured at these stations should be representative of background air pollutant concentrations at or near the Planning Area. In Table 12-4, these measured air pollutant concentrations are compared with state and national ambient air quality standard.

12.4 PLANNING ISSUES AND IMPLICATIONS

Given the nature of air quality emissions, specific air quality issues resulting from implication of the proposed General Plan update can be divided into both short-term and long-term issues. These issues are described below:

1. ***Short-Term Construction Issues.***

Emissions of inhalable particulate matter (PM10 and PM2.5) and ozone precursors (including NOx and ROG) would result from construction equipment and worker vehicles. Earthmoving and grading would generate emissions of PM10 and PM2.5. Asphalt paving and architectural coatings would generate ROG emissions.

2. ***Long-Term Operational Issues.***

Additional vehicle trips associated with development in the Planning Area would generate increased emissions of NOx, ROG, and Carbon Monoxide (CO).

Table 12-4: Summary of Monitoring Data for the Nearest Stations to the Planning Area 2002–2006

Pollutant	*State Standard*	*National Standard*	*Pollutant Concentration by Year* [a]				
			2002	*2003*	*2004*	*2005*	*2006*
Ozone (Hazelton Street)							
Highest 1-hour average, ppm [b]	0.09	NA	**0.102**	**0.104**	**0.096**	**0.099**	**0.109**
Days over State Standard			2	3	1	3	6
Days over National Standard			0	0	0	0	0
Highest 8-hour average, ppm	0.07[c]	0.08	0.081	**0.088**	0.080	**0.086**	**0.092**
Days over National Standard			0	1	0	1	3
Ozone (E Mariposa Road)							
Highest 1-hour average, ppm [b]	0.09	NA	**0.108**	NA	NA	NA	NA
Days over State Standard			5	NA	NA	NA	NA
Days over National Standard			0	NA	NA	NA	NA
Highest 8-hour average, ppm	0.07	0.08	0.086	NA	NA	NA	NA
Days over National Standard			1	NA	NA	NA	NA
PM10 (Hazelton Street)							
Highest 24-hour average, µg/m^3 [b]	50	150	**138.7**	**116.4**	**176.1**	**84.0**	**77.0**
Est. Days over State Standard			58	17	18	47	N/A
Est. Days over National Standard			0	0	1	0	N/A
Annual average, µg/m^3	20	50	**36.1**	**28.4**	**29.4**	**29.8**	N/A
PM10 (Wagner-Holt School)							
Highest 24-hour average, µg/m^3 [b]	50	150	**84.0**	**53.0**	50.0	**74.0**	**52.0**
Est. Days over State Standard			39	20	0	18	N/A
Est. Days over National Standard			0	0	0	0	N/A
Annual average, µg/m^3	20	50	**30.6**	**22.8**	**22.4**	**23.1**	N/A
PM2.5 (Hazelton Street)							
Highest 24-hour average, µg/m^3 [b]	NA	65	64.0	45.0	41.0	63.0	46.2
Days over National Standard			0	0	0	0	0
Annual average, µg/m^3	12	15	**16.7**	**13.6**	**13.2**	**12.5**	**13.0**
Carbon Monoxide (Hazelton Street)							
Highest 8-hour average, ppm	9.0	9	3.2	3.1	2.5	2.9	2.2
Days over Standard			0	0	0	0	0

NOTE: Bold values are in excess of applicable standard. NA = Not Applicable or Not Available.

a. Data was collected at the Hazelton Street monitoring station unless otherwise noted. The E Mariposa Road station monitors for ozone only.

b. ppm = parts per million; µg/m3 = micrograms per cubic meter.

c. This concentration was approved by the Air Resources Board on April 28, 2005 and became effective May 17, 2006.

Source: California Air Resources Board, Summary of Air Quality Data, 2006b, Gaseous and Particulate Pollutants, 2002, 2003, 2004, 2005, and 2006 data are from the ARB web site at <www.arb.ca.gov/adam>.

BIBLIOGRAPHY

California Air Resources Board (CARB) and California Office of Environmental Health Hazard Assessment (OEHHA), 2000. Carbon Monoxide: Evaluation of Current California Air Quality Standards with Respect to Protection of Children. Prepared by Michael T. Kleinman, Ph.D., UC Irvine, September 1, 2000.

California Air Resources Board (CARB), 2001. ARB Fact Sheet: Air Pollution Sources, Effects and Control, <www.arb.ca.gov/research/health/fs/fs2/fs2.htm>, last updated October 2001.

California Air Resources Board (CARB), 2005. Air Quality and Land Use Handbook: A Community Health Perspective, Sacramento, CA

California Air Resources Board (CARB), 2006a. Ambient Air Quality Standards, <www.arb.ca.gov/aqs/aaqs2.pdf>, last updated July 2003.

California Air Resources Board (CARB), 2006b. Summary of Air Quality Data, Gaseous and Particulate Pollutants, 2000, 2001, 2002, 2003 and 2004 data are from the ARB web site at <www.arb.ca.gov/adam>. Web site accessed March 2006.

Jones & Stokes Associates, Inc. 1991. City of Lodi general plan policy document. Sacramento, CA. Prepared for: City of Lodi, Lodi, CA. With contributions from J. Laurence Mintier & Associates, TJKM, and Pepper Associates.

San Joaquin Valley Air Pollution Control District (SJVAPCD). 1994. The Ozone Attainment Demonstration Plan. Adopted November 14, 1994.

San Joaquin Valley Air Pollution Control District (SJVAPCD). 2000. 2000 Ozone Rate of Progress Report.

San Joaquin Valley Air Pollution Control District (SJVAPCD). 2001a. Triennial Progress Report and Plan Revisions 1997-1999. Adopted March 15, 2001.

San Joaquin Valley Air Pollution Control District (SJVAPCD). 2001b. 2001 Amendment to the 1994 OADP [Ozone Attainment Demonstration Plan];<www.valleyair.org/busind/plans/SIP_Amendment.pdf>.

San Joaquin Valley Air Pollution Control District (SJVAPCD). 2002a. Guide for Assessing and Mitigating Air Quality Impacts, Technical Document: Information for Preparing Air Quality Sections in EIRs. Adopted August 20, 1998; January 10, 2002 revision.

San Joaquin Valley Air Pollution Control District (SJVAPCD). 2002b. Annual Air Toxics Report for the Year 2000, March 2001. <www.valleyair.org/aqinfo/2000%20annual%20air%20toxics%20report.pdf.

San Joaquin Valley Air Pollution Control District (SJVAPCD). 2003a. Board Briefing Report: Trends in Ozone Air Quality by County for the San Joaquin Valley Air Basin. April 15, 2003; <www.valleyair.org/aqinfo/2000 annual air toxics report.pdf>.

[This page intentionally left blank.]

13 Hazardous and Toxic Materials

13.1 INTRODUCTION

This section focuses on those human-made hazards associated with the potential exposure to hazardous materials as well as fire hazards and transportation and utility corridor hazards. To provide a better understanding of the extent of existing hazard concerns within the Study Area, topics covered in this section include the following:

- Federal, State, and local regulations;
- Existing human-made hazards in the Study Area;
- Airport hazards;
- Railroad hazards;
- Fire hazards; and
- Utility corridor hazards, including electromagnetic fields, natural gas pipelines, and utility powerlines.

13.2 METHODS AND KEY TERMS

The information provided in this section was obtained from various State agencies (e.g., California Department of Toxic Substances Control, etc.) that monitor or compile information related to the locations of hazardous waste generators, hazardous materials treatment, storage and disposal facilities, and underground storage tank locations.

KEY TERMS

Airport Land Use Commission (ALUC). The purpose of the ALUC is to provide for the orderly development of areas surrounding public airports. It is also intended to minimize the public's exposure to excessive noise and safety hazards and to ensure that the approaches to public airports remain clear of structures that could pose an aviation safety hazard.

Comprehensive Airport Land Use Plan (CALUP). Assists in the preservation, continued development and expansion of existing airports in a manner consistent with the latest California Airport Land Use Planning Handbook. In addition, the plan protects the public health, safety and welfare by identifying land use measures to be implemented in order to minimize the public’s exposure to excessive noise and safety hazards within areas surrounding public airports.

Hazardous Materials. A hazardous material is defined by the California Code of Regulations (CCR) as a substance that, because of physical or chemical properties, quantity, concentration, or other characteristics, may either (1) cause an increase in mortality or an increase in serious, irreversible, or incapacitating illness; or (2) pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported or disposed of (CCR, Title 22, Division 4.5, Chapter 10, Article 2, Section 66260.10).

Hazardous Wastes. Similarly, hazardous wastes are defined as materials that no longer have practical use, such as substances that have been discarded, discharged, spilled, contaminated, or are being stored prior to proper disposal. According to Title 22 of the CCR, hazardous materials and hazardous wastes are classified according to four properties: toxic, ignitable, corrosive, and reactive (CCR, Title 22, Chapter 11, Article 3).

13.3 REGULATORY SETTING

The storage, use, and handling of hazardous materials by industries and businesses are subject to various federal, State and local regulations. A brief overview of these regulations follows.

FEDERAL REGULATIONS

The principal federal legislation is the Resource Conservation and Recovery Act (RCRA), which is administered by the United States Environmental Protection Agency (EPA). RCRA imposes reporting, permitting, and operational control requirements on those who generate, treat, store, or dispose of hazardous waste. The federal Hazardous Materials Transport Act, administered by the U.S. Department of Transportation, requires detailed manifesting and reporting of hazardous materials shipped on the U.S. highway system; it also contains packaging requirements for shipped materials. The Clean Water Act, also administered by the EPA, controls the discharge of hazardous materials or hazardous waste to waters of the U.S. or to local wastewater treatment plants.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

CERCLA, commonly referred to as Superfund, was enacted on December 11, 1980. The purpose of CERCLA was to provide authorities the ability to respond to uncontrolled releases of hazardous substances from inactive hazardous waste sites that endanger public health and the environment. CERCLA established prohibitions and requirements concerning closed and abandoned hazardous waste sites, provided for liability of persons responsible for releases of hazardous waste at such sites, and established a trust fund to provide for cleanup when no responsible party could be identified. Additionally, CERCLA provided for the revision and republishing of the National Contingency Plan (NCP) that provides the guidelines and procedures needed to respond to releases and threatened releases of hazardous substances, pollutants, or contaminants. The NCP also provides for the National Priorities List, a list of national priorities among releases or threatened releases throughout the United States for the purpose of taking remedial action.

The Superfund Amendments and Reauthorization Act (SARA)

SARA amended CERCLA on October 17, 1986. This amendment increased the size of the Hazardous Response Trust Fund to $8.5 billion, expanded EPA's response authority, strengthened enforcement activities at Superfund sites; and broadened the application of the law to include federal facilities. In addition, new provisions were added to the law that dealt with emergency planning and community right to know. SARA also required EPA to revise the Hazard Ranking System to ensure that it accurately assesses the relative degree of risk to human health and the environment posed by sites and facilities subject to review for listing on the National Priorities List.

Resource Conservation and Recovery Act of 1976 (RCRA)

RCRA is the nation’s hazardous waste control law. It defines hazardous waste, provides for a cradle-to-grave tracking system and imposes stringent requirements on treatment, storage and disposal facilities. RCRA requires environmentally sound closure of hazardous waste management units at treatment, storage, and disposal facilities. The EPA is the principal agency responsible for the administration of RCRA, SARA, and CERCLA.

Occupational Safety and Health Administration (OSHA)

Through the enactment of the Occupational Safety and Health Act, OSHA was obligated to prepare and enforce occupational health and safety regulations with the goal of providing employees a safe working environment. OSHA regulations apply to the work place and cover activities ranging from confined space entry to toxic chemical exposure. OSHA regulates workplace exposure to hazardous chemicals and activities through the specification of work place procedures and equipment.

U.S. Department of Transportation (DOT)

The DOT regulates the interstate transport of hazardous materials and wastes through implementation of the Hazardous Materials Transportation Act. This act specifies driver-training requirements, load labeling procedures, and container design and safety specifications.

Transporters of hazardous wastes must also meet the requirements of additional statutes such as RCRA, discussed previously.

Pipeline and Hazardous Materials Safety Administration (PHMSA)

The Pipeline and Hazardous Materials Safety Administration (PHMSA) was created under the Norman Y. Mineta Research and Special Programs Improvement Act (P.L. 108-426) of 2004. The legislation was signed into law on November 30, 2004. The purpose of the Act is to provide a more focused research organization and establish a separate operating administration for pipeline safety and hazardous materials transportation safety operations. PHMSA is the federal agency charged with the safe and secure movement of hazardous materials by all modes of transportation. The agency also oversees the nation's pipeline infrastructure.

The Federal Railroad Administration regulates and monitors the safety of the rail system.

Federal Railroad Administration (FRA)

The U.S. Department of Transportation, Federal Railroad Administration's (FRA) primary function is ensuring the safety of the nation's approximately 700 railroads. FRA monitors the nation's rail transportation system for compliance with federal safety regulations, and utilizes a variety of methods to encourage railroads and shippers to meet federal regulations.

FRA issues a variety of safety regulations and performs various inspections. In addition, FRA administers a safety program that oversees the movement of hazardous materials, such as petroleum, chemical, and nuclear products, throughout the Nation's rail transportation system. The current FRA hazardous materials safety regulatory program includes the following items:

- Hazardous Materials Incident Reduction Program;
- Tank Car Facility Conformity Assessment Program;
- Tank Car Owner Maintenance Program Evaluations;
- Spent Nuclear Fuel and High-Level Nuclear Waste Program;
- Railroad Industrial Hygiene Program;
- Rulemaking, Approvals, and Exemptions;
- Partnerships in Domestic and International Standards-Related Organizations (e.g., AAR, ASME, TDG/CGSB); and
- Education, Safety Assurance, Compliance, and Accident Investigation.

STATE REGULATIONS

At the State level, State agencies accept delegation of federal responsibility for the administration of hazardous materials and hazardous waste management. The Porter-Cologne Water Quality Control Act allows the State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Board (RWQCB) to accept implementation responsibility for the Clean Water Act. The Hazardous Waste Control Act of 1977, and recent amendments to its implementation regulations, has given the Department of Health Services (DHS) the lead role in administering the RCRA (RCRA) program. The Hazardous Substances Highway Spill Containment Act gives the California Highway Patrol (CHP) the authority to respond to spills of hazardous materials on the state's highway system.

Hazardous Substance Account Act (1984), California Health and Safety Code Section 25300 ET SEQ (HSAA)

This act, known as the California Superfund, has three purposes: 1) to respond to releases of hazardous substances; 2) to compensate for damages caused by such releases; and 3) to pay the state's 10 pecent share in CERCLA cleanups. Contaminated sites that fail to score above a certain threshold level in the EPA's ranking system may be placed on the California Superfund list of hazardous wastes requiring cleanup.

California Environmental Protection Agency (CAL/EPA)

The Cal/EPA was created in 1991 to coordinate state environmental programs, reduce administrative duplication, and address the greatest environmental and health risks. Cal/EPA unifies the state's environmental authority under a single accountable, cabinet-level agency. The Secretary for Environmental Protection oversees the following agencies: Air Resources Board, Integrated Waste Management Board, Department of Pesticide Regulation, State Water Resources Control Board, Department of Toxic Substances Control, and the Office of Environmental Health Hazard Assessment.

Department of Toxic Substance Control (DTSC)

Cal/EPA has regulatory responsibility under Title 22 of the California Code of Regulations (CCR) for administration of the State and federal Superfund programs for the management and cleanup of hazardous materials. The DTSC is responsible for regulating hazardous waste facilities and overseeing the cleanup of hazardous waste sites in California. The Hazardous Waste Management Program (HWMP) regulates hazardous waste through its permitting, enforcement and Unified Program activities. HWMP maintains the EPA authorization to implement the RCRA program in California, and develops regulations, policies, guidance and technical assistance/training to assure the safe storage, treatment, transportation and disposal of hazardous wastes. The State Regulatory Programs Division of DTSC oversees the technical implementation of the state's Unified Program, which is a consolidation of six environmental programs at the local level, and conducts triennial reviews of Unified Program agencies to ensure their programs are consistent statewide and conform to standards.

State Water Resources Control Board (SWRCB)

Acting through the RWQCB, the SWRCB regulates surface and groundwater quality pursuant to the Porter-Cologne Water Quality Act, the federal Clean Water Act, and the Underground Tank Law. Under these laws, RWQCB is authorized to supervise the cleanup of hazardous waste sites referred to it by local agencies in those situations where water quality may be affected.

Depending on the nature of contamination, the lead agency responsible for the regulation of hazardous materials at the site can be the DTSC, RWQCB, or both. DTSC evaluates contaminated sites to ascertain risks to human health and the environment. Sites can be ranked by DTSC or referred for evaluation by the RWQCB. In general, contamination affecting soil and groundwater is handled by RWQCB and contamination of soils is handled by DTSC.

California Occupational Safety and Health Administration (Cal/OSHA)

Cal/OSHA and the Federal OSHA are the agencies responsible for assuring worker safety in the handling and use of chemicals in the workplace. Pursuant to the Occupational Safety and Health Act of 1970, Federal OSHA has adopted numerous regulations pertaining to worker safety, contained in the Code of Federal Regulations Title 29 (29 CFR). These regulations set standards for safe workplaces and work practices, including standards relating to hazardous material handling. Cal/OSHA assumes primary responsibility for developing and enforcing State workplace safety regulations. Because California has a federally approved OSHA program, it is required to adopt regulations that are at least as stringent as those found in 29 CFR. Cal/OSHA standards are generally more stringent than federal regulations.

Cal/OSHA regulations concerning the use of hazardous materials in the workplace, as detailed in Title 8 of the CCR, include requirements for safety training, availability of safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation. Cal/OSHA enforces hazard communication program regulations that contain training and information requirements, including procedures for identifying and labeling hazardous substances, communicating hazard information related to hazardous substances and their handling, and preparation of health and safety plans to protect workers and employees at hazardous waste sites. The hazard communication program requires that Material Safety Data Sheets (MSDSs) be available to employees and that employee information and training programs be documented.

Hazardous Materials Transport

California law requires that Hazardous Waste (as defined in California Health and Safety Code Division 20, Chapter 6.5) be transported by a California registered hazardous waste transporter that meets specific registration requirements. The requirements include possession of a valid Hazardous Waste Transporter Registration, proof of public liability insurance which includes coverage for environmental restoration, and compliance with California Vehicle Code registration regulations required for vehicle and driver licensing. Additional requirements can be found in Title 22 CCR, Chapter 13.

State agencies with primary responsibility for enforcing federal and state regulations and responding to hazardous materials transportation emergencies are the CHP and Caltrans. Together, these agencies determine container types used and license hazardous waste haulers for hazardous waste transportation on public roads. The CHP designates State and federal roadways as hazardous materials truck routes. The CHP classifies hazardous materials into three categories: explosives, poisons that can be inhaled, and radioactive material.

LOCAL REGULATIONS

San Joaquin County – Hazardous Waste Management Plan. Assembly Bill 2948 (Tanner, 1986) established procedures for the preparation of a County Hazardous Waste Management Plan (HWMP). The HWMP principally governs the coordination and planning of hazardous waste disposal capacity between the County and state.

San Joaquin County prepared a HWMP in November 1988. The HWMP was intended to serve as the primary planning document for hazardous waste management in the County. The HWMP analyzes the hazardous waste situation within the County and makes recommendations. In 1992 the San Joaquin County Household Hazardous Waste Element (HHWE) was finalized. This element updates the Hazardous Waste Management Plan of 1998. In December 1992 the County joined with the cities of Escalon, Lathrop, Lodi, Manteca, Ripon, Stockton, and Tracy to prepare, adopt, and implement the countywide HHWE.

San Joaquin County – Hazardous Materials Area Plan. San Joaquin County prepared a Hazardous Materials Area Plan in March of

2004. This document describing the San Joaquin County Hazardous Materials Emergency Response System is prepared according to statutory requirements. San Joaquin County organizes and structures hazardous material emergency response according to FIRESCOPE and SEMS guidance. The overall goal of the hazardous materials response system developed by the jurisdictions of San Joaquin County is to protect public health, prevent environmental damage, and ensure proper use and disposal of hazardous materials. This response system has the following:

1. Maintain effective response capabilities to contain and control releases and mitigate their impact on the public and environment.
2. Maintain the capability to oversee long-term cleanup and mitigation of residual release effects on public health and the environment.
3. Ensure that the efforts of all jurisdictions and agencies are effectively integrated.

Preventive Objective: A primary objective is the prevention of incidents in the first place. County prevention activities include a combination of inspections and regulatory oversight, training courses, and enforcement actions. A primary tool for accomplishing prevention is enforcement of State and federal statutory requirements. (Source: San Joaquin Operational Area Hazardous Materials Area Plan, March 2004).

San Joaquin County – Comprehensive Airport Land Use Plan. The San Joaquin County Airport Land Use Plan was adopted in 1993 by the San Joaquin Council of Governments, which serves as the San Joaquin County Airport Land Use Commission. According to the 1993 Airport Land Use Plan, six airports fall under the jurisdiction of the Airport Land Use Commission: Stockton Metropolitan Airport, Tracy Municipal Airport, Lodi (Lind's) Airport, Kingdon Airport, New Jerusalem Airport and Lodi (Precissi) Airpark. In addition to these public access airports, a military airfield is located on the Sharpe Army Depot and numerous private airstrips are used throughout the County by crop dusting aircraft.

The Airport Land Use Plan provides guidelines and land use restrictions to ensure that no new land use that results in a hazard to aircraft or to the health or safety of persons on the ground is permitted within any part of an airport's area of influence. These guidelines also ensure that lands needed for airport facilities and airport-related land uses are reserved for those uses. (Source: San Joaquin County Comprehensive Airport Land Use Plan 1993)

San Joaquin County Multi-Hazard Plan. The San Joaquin County Multi-Hazard Plan was most recently revised in August of 1994. The plan addresses each of the four phases of emergency management: mitigation, preparedness, response and recovery. In addition, the plan makes the common emergency management systems being developed by the Governor's Office of Emergency Services through the Standardized Emergency Management System (SEMS) process an integral part of the County response system.

This Plan identifies those organizations, agencies, and individuals that are assigned duties and responsibilities for responding to emergencies within the unincorporated and in support of incorporated cities. In addition, it provides guidance on how emergencies will be managed by the County as well as specific procedures for persons assigned to the emergency organization. The Plan, using the Multi-Agency Coordination System (MACS) and Incident Command System (ICS) as its basis, is designed to allow County government to respond to any size or type of emergency. (Source: San Joaquin County Multi-Hazard Plan 1994).

San Joaquin County – Environmental Health Department. The San Joaquin County Environmental Health Department is a Certified Unified Program Agency (CUPA). A CUPA is a single local agency designated by the California Environmental Protection Agency as having regulatory authority for the following environmental programs (Source: California EPA Unified Program Website 2006):

- Hazardous Materials Release Response Plans and Inventories (Business Plans)
- California Accidental Release Prevention (CalARP) Program
- Underground Storage Tank Program
- Aboveground Petroleum Storage Act Requirements for Spill Prevention, Control and Countermeasure (SPCC) Plans
- Hazardous Waste Generator and Onsite Hazardous Waste Treatment (tiered permitting) Programs
- California Uniform Fire Code: Hazardous Material Management Plans and Hazardous Material Inventory Statements

City of Lodi 1991 General Plan

The Health and Safety Element of the City's existing General Plan contains two goals and various policies pertinent to hazards and hazardous materials conditions. Several of these are identified below, in Table 13-1.

Table 13-1: City of Lodi 1991 General Plan Goals and Policies

HEALTH AND SAFETY ELEMENT	
Letter	*Goal Text*
C	To prevent loss of lives, injury, and property damage due to urban fires
Number	*Policy Text*
#1	The City shall promote the installation of automatic interior sprinkler systems in all new developments.
#2	The City shall require new development to comply with minimum fire flow rates determined jointly by the City Fire Department and the Public Works Department.
#3	The City shall monitor fire flow capability throughout the City and set a high priority on improving fire flow in those areas where fire flow is not adequate.
#4	The City Fire Department shall maintain a regular program of fire inspection for commercial and industrial buildings.
#5	The City shall ensure, in approving private streets and access areas, that they are adequate in terms of width and turning radius to facilitate access by City fire fighting apparatus. All plans for such streets shall be reviewed by the Fire Department to ensure these standards are met.
#6	The City shall endeavor to at least maintain the existing overall fire insurance (ISO) rating of three.
#7	The City shall endeavor through adequate staffing and station locations to maintain the minimum feasible response time for fire and emergency calls. The goal for travel time by the fire department in responding to an emergency shall be 3 minutes. As areas are developed beyond the 3-minute standard, additional fire stations, capital equipment, and personnel shall be provided or alternative fire protection measures shall be required.
#8	The City shall endeavor to maintain a fire fighting staff level consistent with the provision of three-person companies and a 3-minute emergency travel time. The City shall translate this ratio to land use equivalents to correspond to the City's fee ordinance.
#9	The City shall attempt to offset the need for new fire department staff and equipment and to improve fire safety by promoting the installation of built-in fire projection equipment in all new development.
#10	The City shall assess development fees on all new residential, commercial, office and industrial development sufficient to fund capital improvements and equipment required to provide fire protection.
Letter	*Goal Text*
E	To protect Lodi residents from the effects of hazardous substances.
Number	*Policy Text*

1	The City shall consider the potential for the production, use, storage and transport of hazardous materials in approving new development and provide for reasonable controls on such hazardous materials.
2	Within its authority, the City shall regulate the production, use, storage and transport of hazardous materials to protect the health of Lodi residents.
Number	*Implementation Measure Text*
4	The City shall prepare an evaluation of selected areas of the City to determine if minimum fire flow requirements are being met, and take remedial action as necessary.
7	The City shall maintain and periodically update the hazardous materials emergency plan, including coordinating with the County Office of Emergency Services.

Table Source: City of Lodi, 1991

13.4 ENVIRONMENTAL SETTING

Hazardous wastes generated by both residents and businesses within the Study Area contribute to environmental and human health hazards that have become an increasing public concern. However, proper waste management and disposal practices can minimize public concern over toxicity and the contamination of soils, water, and the air. This section provides information on hazardous conditions within the Study Area. This information is based on existing information from a variety of federal and State agency databases including those maintained by the SWRCB and DTSC. Listed hazardous sites are shown graphically on Figure 13-1. Additionally, this section provides information on fire hazards in the Study Area. Fire threat ratings are shown on Figure 13-2.

UNDERGROUND STORAGE TANKS

The Leaking Underground Storage Tank Incident Report (LUST) contains an inventory of reported leaking underground tank incidents, including location and incident status. A review of the LUST list, as provided by EDR, and dated October 11, 2006 has revealed that there are 78 LUST sites within the study area. A summary of these sites is provided in Table 13-2.

Table 13-2: Leaking Underground Storage Tank Listings in the Study Area

Site	*Address*	*Facility Status*	*Map ID #*
Bp West Coast Products Llc	18970 Lower Sacramento Rd.	Case Closed	3
General Mills Lodi Case	2000 Turner Rd.	Case Closed	19
General Mills - Case #2	2000 Turner Rd. W	Leak being confirmed	19
Guild Winery	1 Winemaster Way	Case Closed	22
Frank Alegre Trucking - #A	802 Cluff Ave. N	Case Closed	26
Frank Alegre Trucking - #B	802 Cluff Ave. N	Case Closed	26
Sanitary Cty Disp.(Thorpe Oil)	1333 Turner Rd. E	Case Closed	26
Lustre Cal Nameplate Corporation	110 East Turner Rd.	Case Closed	28
AT&T	90 Turner Rd. W	Case Closed	28
Isc Wines Of California	1 Turner Rd. W	Case Closed	28
Plaza Liquors	2420 Turner Rd.	Preliminary site assessment workplan submitted	31
Not Reported	32 East Tokay St.	Case Closed	35
Muller Supply Company	412 Sacramento St. S	Case Closed	35
M & R Company	405 S Main St.	Case Closed	35
Reilly's Car Wash	100 Lodi Ave.	Case Closed	35
Arts And Artists	204 Lodi Ave. E	Case Closed	35
Matheson Trucking	102 Walnut St. E	Case Closed	35
Stocks Automotive	126 Main St. S	Case Closed	35
R & J Packing Co	33 Oak St. E	Case Closed	35
Pacific Bell	124 Elm St. W	Case Closed	35
Newfield, Mark Joseph	107 School St. N	Preliminary site assessment underway	35
City Of Lodi Safety Blvd	230 Elm St. W	Case Closed	35
Cain's Electric Works	230 Church St. N	Case Closed	35
Diamond Lumber Aka 224	120 Lockeford St.	Case Closed	35
Quik Stop Market	205 Lockeford St.	Case Closed	35
Wisner Property	550 Sacramento St. N	Case Closed	35
San Joaquin Sulfur Company	711 Sacramento St.	Case Closed	35
Marval Market/Shopping Center	429 W Lockeford St.	Case Closed	47
Brite-N-Clear	504 Lockeford St.	Case Closed	47
Beacon #695	900 Cherokee Ln.	Case Closed	50
Ellis Car Wash	820 S Cherokee Ln.	Case Closed	50
Margrove Prop	510 Lodi Ave. E	Case Closed	50
Lodi Ready Mix	851 Lodi Ave. E	Case Closed	50
Cherokee Service Center	303 Cherokee Ln.	Case Closed	50

Table 13-2: Leaking Underground Storage Tank Listings in the Study Area

Arco #0760	225 Cherokee Ln. S	Suspension of Work Letter from Cleanup Fund	50
Lodi Metal Tech Inc	213 S Kelly St.	Case Closed	50
S.J. Mosquito Abatement District	200 Beckman	Case Closed	50
Rightway Incorporated (Hansen Property)	200 Cherokee Ln. Road	Case Closed	50
Geweke Land Development And Marketing	16 Cherokee Ln. S	Remedial action (cleanup) underway	50
Cal Trans Lodi Maintenance	845 Pine St. E	Case Closed	50
Beacon #502	35 Cherokee Ln. N	Case Closed	50
American Dutch Foundry	42 Cluff Ave. N	Case Closed	50
Don Keller Trucking	940 Victor Rd.	Case Closed	
Woolsey Oil Company (Former Robert's Petroleum)	930 Victor Rd.	Case Closed	50
Teresi Trucking Inc	900 1/2 Victor Rd.	Case Closed	50
Shell	880 Victor Rd.	Preliminary site assessment underway	50
Not Reported	1400 Victor Rd.	Case Closed	50
Payless Building	532 Lockeford St.	Case Closed	50
Claude C. Wood Co.	687 Lockeford St. E	Case Closed	50
Claude C. Wood Equipment Facility	681 Lockeford St. E	Case Closed	50
U-Haul	450 Cherokee Ln. N	Case Closed	50
Parmar Texaco	521 Cherokee Ln. N	Pollution Characterization	50
Chevron #9-4183	236 Ham Ln. N	Case Closed	57
Circle K Store #1339	1225 West Lockford	Case Closed	57
Tucker Construction	336 E Locust St.	Preliminary site assessment underway	61
Togo's (Formerly Texaco)	305 Hutchins St. S	Case Closed	72
Mel Bokides Petro	501 Lodi Ave. W	Case Closed	72
Usa Petroleum	2500 Lodi Ave. W	Pollution Characterization	78
Lusd Transportation Dept	820 Cluff	Case Closed	89
Lodi Lumber Co	1025 Industrial Way	Case Closed	89
Mataga Olds, Buick	880 Beckman Rd. S	Case Closed	94
Hi Hopes Venture	1500 Vine St.	Case Closed	99
Flame Liquors	1301 Kettleman Ln. W	Leak being confirmed	113
City Of Lodi	1331 Ham Ln. S	Case Closed	113
Lodi Academy	1230 S Central Ave.	Case Closed	115
Geweke Ford & Rv	248 Kettleman Ln. E	Case Closed	121

Table 13-2: Leaking Underground Storage Tank Listings in the Study Area

Arco #2076	800 Kettleman Ln. E	Case Closed	122
Unocal #6015	601 Kettleman Ln. E	Case Closed	122
Tokay Shell Autocare	420 West Kettleman Ln.	Case Closed	125
Beacon #513	401 Kettleman Ln. W	Case Closed	125
Arco #434 Case #1	501 Kettleman Ln.	Case Closed	125
Arco #434 - Case #2	501 Kettleman Ln. W	Case Closed	125
Chevron Ss #9-5775	301 Kettleman Ln. W	Post remedial action monitoring	125
Taylored Tours	330 Kettleman Ln.	Case Closed	125
George Kishida, Inc	1725 Ackerman Dr.	Case Closed	129
Color Spot	5400 Harney Ln. E	Case Closed	160
Delta Pub & Grocery	13430 Lower Sacramento Rd.	Case Closed	170
William Burkhardt	5154 Hogan Ln.	Case Closed	173

Source: Environmental Data Resources, Inc. 2007

ABOVEGROUND STORAGE TANKS

The Aboveground Storage Tank database provides a list of registered aboveground storage tanks. A review of the AST list, as provided by EDR, and dated November 2, 2006 has revealed that there are 11 AST sites within the searched area. A summary of these locations by address is provided in Table 13-3.

Table 13-3: Aboveground Storage Tank Listings in the Study Area

Site	*Address*	*Map ID #*
Woodbridge Golf & Country Club	800 E. Woodbridge Rd.	1
Mainland Nursery	J50 W Turner Rd.	28
Ncpa Ct No.1 (Lodi Facility)	2131 W. Turner Rd.	30
Geweke Ford	1045 S. Cherokee Ln.	50
Roberts Petroleum Services	930 Victor Rd.	50
Dart Container Corporation	1400 Victor Rd.	50
Ford Construction Co Inc	639 E Lockeford St.	50
Gannon Trucking, Inc.	1123 E. Vine St.	94
Geweke Toyota	1020 S Beckman Rd.	103
Geweke Rv	248 E. Kettleman Ln.	121
Kettleman Hills Facility	35251 Old Skyline Rd.	124

Source: Environmental Data Resources, Inc. 2007

LANDFILL AND RECYCLING SITE LOCATIONS

The California Integrated Waste Management Board (CIWMB) is responsible for managing California's solid waste stream. The CIWMB works in partnership with local government, industry, and the public to reduce waste disposal and ensure environmentally safe landfills are maintained. The Solid Waste Facilities/Landfill Sites records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. The data come from the Integrated Waste Management Board's Solid Waste Information System (SWIS) database, which contains information on solid waste facilities, operations, and disposal sites throughout the State. The types of facilities found in this database include landfills, transfer stations, material recovery facilities, composting sites, transformation facilities, waste tire sites, and closed disposal facilities. A review of the SWF/LF list, as provided by EDR, and dated 09/13/2006 has revealed that there are 4 SWF/LF sites within the searched area. Table 13-4 provides a list of solid waste facilities or landfills (including closed facilities) identified by the CIWMB as occurring in the Study Area.

Central Valley Waste Services is one of the four solid waste facilities in the Planning Area.

The Solid Waste and Recycling Facilities (SWRCY) list is a listing of recycling facilities in California. A review of the SWRCY list, as provided by EDR, and dated October 10, 2006 has revealed that there are seven SWRCY sites within the searched area. A list of recycling facilities is also provided in Table 13-5.

Table 13-4: Solid Waste Facilities and Landfill Sites in the Study Area

Site	*Address*	*Map ID #*
Lodi City Landfill	N of Awani Dr and Mokelumne River Dr.	21
Not Reported	1333 E. Turner Rd.	26
Central Valley Waste Services	1333 E. Turner Rd.	26
Valley Landscaping	1320 East Harney Ln.	163

Source: Environmental Data Resources, Inc. 2007

Table 13-5: Recycling Facilities in the Study Area

Site	*Address*	*Map ID #*
Pinos Recycling Co	741 S Cherokee Ln.	50
Tokay Recycling Center	60 S Cluff Ave.	50
Tomra Pacific Inc/Apple Market	1320 W Lockeford St.	57
Diaz Recycling	845 S Central Ave.	95
Nexcycle/Save Mart #209	610 W Kettleman Ln.	125
Tomra Pacific Inc/Food 4 Less	2430 W Kettleman Ln.	126
Nexcycle/Safeway #1648	2449 W Kettleman Ln.	126

Source: Environmental Data Resources, Inc. 2007

AIRPORT OPERATIONS HAZARDS

Existing public use airports within or adjacent to the study area include:

- Kingdon Airpark;
- Lodi Airport; and
- Lodi Airpark.

Private airstrips within or adjacent to the study area include:

- Wallom Field Airport;
- Ferdun Ranch Airport;
- Faber Vineyards Airport;
- Lodi Memorial Hospital Heliport;
- Lodi Lakeland Airport;
- Lodi Airport;
- M.C.R. Airport;

- Penske Heliport 2;
- Diedrich Seaplane Base; and
- Lodi Community Hospital Heliport.

Airport-related hazards are generally associated with aircraft accidents, particularly during takeoffs and landings. Airport operation hazards include incompatible land uses, power transmission lines, wildlife hazards (e.g., bird strikes), and tall structures that penetrate the imaginary surfaces, surrounding an airport.

RAILROAD HAZARDS

Potential hazards associated with railroads include collisions and train derailment. Either of these can lead to human injury or death as well as various environmental impacts. The Federal Railroad Administration (FRA) regulates railroad safety and provides oversight to the use of railroads.

Lodi is served by two national rail lines, Union Pacific Railroad and the Burlington Northern Santa Fe. It is also served by a local railroad, Central California Traction that runs contiguous to its industrial park areas. Daily passenger service via Amtrak is available from Lodi to San Francisco, Los Angeles, Sacramento and points in between. Railroad lines located within the study area are shown on Figure 13-1.

FIRE HAZARDS

Both urban and wildland fire hazards exist in the Lodi Planning Area, creating the potential for injury, loss of life, and property damage. Urban fires primarily involve the uncontrolled burning of residential, commercial, or industrial structures due to human activities. Wildland fires affect grass, forest, and brushlands, as well as any structures on these lands. Such fires can result from either human-made or natural causes. The type and amount of fuel, topography, and climate are the primary factors influencing the degree of fire risk.

Urban Fire Hazards

Urban fires primarily involve the uncontrolled burning of residential, commercial, and industrial structures due to human-made causes. Factors that exacerbate urban structural fires include substandard building construction, highly flammable materials, delayed response times, and inadequate fire protection services.

Wildland Fire Hazards

Throughout California, communities are increasingly concerned about wildfire safety as increased development occurs in foothill and mountain areas, and subsequent fire control measures have affected the natural cycle of the ecosystem. Suppression of natural fires allows the understory to become dense, creating the potential for larger and more intense wildland fires. Wind, steepness of terrain, and naturally volatile or hot-burning vegetation contribute to wildland fire hazard potential. Where human access exists in wildland areas, the risk of fire increases because of a greater chance for human carelessness and historic and current fire management practices. Human activities such as smoking, debris burning, and equipment operation are the major causes of wildland fires.

The study area is not characterized by significant areas of wildlands. As noted in Table 6-3 of Chapter 6: Agricultural and Soil Resources, 95 percent of the land within the study area is categorized as some type of agriculture, urban land, or water. Of the remaining five percent, less than one percent is identified as Native Riparian and four percent is identified as Native Vegetation. Data provided by the California Department of Conservation Fire and Resource Assessment Program (FRAP) indicates that the areas listed as "High" Fire Threat (Figure 13-2) are in areas characterized primarily by brush as the groundcover. Additional discussion of fire threat levels will be included below, in the "Fire Hazard Severity" section.

Additionally, the topography of the area is relatively homogenous and steep slopes that could contribute to wildland fires are not common.

Fire Hazard Severity

According to FRAP Fire Threat data, Fire Threat is a combination of two factors: 1) fire frequency, or the likelihood of a given area burning, and 2) potential fire behavior (hazard). These two factors are combined to create the following threat classes:

- Little or No Threat
- Moderate
- High
- Very High
- Extreme

Fire Threat classifications for the study area are shown, graphically, on Figure 13-2. The red areas on the figure show High fire threat. Of the entire study area, less than 0.5 percent (137.6-acres) is classified as High fire threat. The remaining area is classified as Little or No Threat or Moderate threat.

Climate and landscape characteristics are among the most important factors influencing hazard levels. Weather characteristics such as wind, temperature, humidity and fuel moisture content affect the potential for fire. Of these four, wind is the dominant factor in spreading fire since burning embers can easily be carried with the wind to adjacent exposed areas, starting additional fires. Landscape characteristics such as steep slopes also contribute to fire hazard by intensifying the effects of wind and making fire suppression difficult. The study area is not characterized by substantial areas of steep slopes.

Vegetation type influences wildfire hazard levels as well. For example, landscapes dominated by chaparral are more flammable than other vegetation types. As noted previously, the FRAP Surface Fuel data available for the study area shows that the High Fire Threat areas are primarily characterized by brush as the predominant groundcover.

UTILITY CORRIDORS

Natural Gas Pipelines

One of the primary causes of disruption to underground pipelines is external force damage that occurs during excavation activities. Such damage can create pipeline leaks or ruptures and lead to hazardous health and safety conditions. However, a national program is in place to prevent accidental pipeline damage caused by excavation. For areas adjacent to an underground utility pipeline, the U.S. Department of Transportation Office of Pipeline Safety requires that individuals contact the state “One-Call” center prior to beginning excavation. Advanced planning, effective use of these one-call systems, accurate locating and marking of underground facilities and the use of safe-digging practices can all be effective in reducing underground facility damage and subsequently reducing potentially hazardous conditions.

Within the study area Lodi Gas Storage, LLC operates a 24-inch natural gas pipeline. The pipeline is located in the northern edge of the study area, in an east-west corridor (see Figure 9-1). This pipeline transports natural gas to and from gas transmission lines in Sherman Island, north of Antioch, California into and out of an underground natural gas storage reservoir located approximately five miles north of Lodi, California.

Electromagnetic Fields

Electromagnetic fields (EMF) are invisible lines of force surrounding any electrical wire or device. They consist of two components — the electric field, which is the result of voltage, and the magnetic field, which is the result of current flow. Ordinary every day use of electricity produces magnetic and electric fields. These 60 Hertz fields (fields that go back and forth 60 times a second) are associated with electrical appliances, power lines, and wiring in buildings. Several high voltage power lines are located within the study area.

The Federal Communications Commission (FCC) is required by the National Environmental Policy Act (NEPA) of 1969 to evaluate the effect of emissions from FCC-regulated transmitters on the quality of the human environment. At the present time there is no federally-mandated radio frequency (RF) exposure standard. However, several non-government organizations, such as the American National Standards Institute (ANSI), the Institute of Electrical and Electronics Engineers, Inc. (IEEE), and the National Council on Radiation Protection and Measurements (NCRPM) have issued recommendations for human exposure to RF electromagnetic fields. The potential hazards associated with RF electromagnetic fields are discussed in OET Bulletin No. 56, "Questions and Answers About the Biological Effects and Potential Hazards of Radiofrequency Electromagnetic Fields."

Reports by the National Research Council/National Academy of Sciences, American Medical Association, American Cancer Society, National Institute of Environmental Health Sciences, World Health Organization – International Agency for Research on Cancer, and the California EMF Program conclude that insufficient scientific evidence exists to warrant the adoption of specific health-based EMF mitigation measures. The medical and scientific communities generally agree that the available research evidence has not demonstrated that EMF creates a health risk. However, they also agree that the evidence has not dismissed the possibility of such a risk. Federal agencies working on establishing limits and health standards related to EMF include the following: NIOSH, US EPA, FCC, OSHA, National Telecommunications and Information Administration (NTIA), and the National Institutes of Health (NIH).

14 Geology, Soils, and Seismic Conditions

This section describes the general topographical, geologic, and seismic conditions that characterize the City's Planning Area. To provide a better understanding of the existing geologic and seismic conditions of the City, this section describes:

- Regulations associated with geologic and seismic issues;
- Locations of active and potentially active faults and associated seismic hazards; and
- Other geologic hazards unique to the Planning Area.

Background information specific to the Planning Area's agricultural soil conditions is addressed in Section 14.3: Soils. Mineral resource issues are addressed in Chapter 9: Energy & Mineral Resources.

14.1 INFORMATION SOURCES AND KEY TERMS

This evaluation of geologic and seismic hazard conditions was completed using information collected from the United States Geological Survey and the California Department of Conservation – Division of Mines and Geology (CDMG).

KEY TERMS

Alquist-Priolo Fault Zone. The Alquist-Priolo Earthquake Fault Zoning Act, passed in 1972, requires the State Geologist to identify zones of special study around active faults.

Fault. A fault is a fracture in the Earth's crust that is accompanied by displacement between the two sides of the fault. An active fault is defined as a fault that has moved in the last 10,000 to 12,000 years (Holocene time). A potentially active fault is one that has been active in the past 1.6 million years (Quaternary period). A sufficiently active fault is one that shows evidence that Holocene displacement occurred on one or more of its segments or branches.[1]

Landslide. Landslides can be defined as downslope movements of soil and/or rock, which typically occur during an earthquake or following heavy rainfall.

---

[1] Hart, 1997.

Liquefaction. Liquefaction in soils and sediments occurs during some earthquake events, when material is transformed from a solid state into a liquid state because of increases in pressure in the pores (the spaces between soil particles). Earthquake-induced liquefaction most often occurs in low-lying areas with soils or sediments composed of unconsolidated, saturated, clay-free sands and silts, but it can also occur in dry, granular soils or saturated soils with some clay content.

Magnitude. Earthquake magnitude is measured by the Richter scale, indicated as a series of Arabic numbers with no theoretical maximum magnitude. The greater the energy released from the fault rupture, the higher the magnitude of the earthquake. Magnitude increases logarithmically in the Richter scale; thus, an earthquake of magnitude 7.0 is thirty times stronger than one of magnitude 6.0. Earthquake energy is most intense at the point of fault slippage, which is called the epicenter because the energy radiates from that point in a circular wave pattern; the farther an area is from an earthquake's epicenter, the less likely that area is to be affected by groundshaking.

14.2 REGULATORY SETTING

Relevant State and local programs specific to geologic and seismic issues are discussed in this section.

STATE REGULATIONS

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act (formerly the Alquist-Priolo Special Studies Zone Act), signed into law December 1972, requires the delineation of zones along active faults in California. The purpose of the Alquist-Priolo Act is to regulate development on or near active fault traces to reduce the hazards associated with fault rupture and to prohibit the location of most structures for human occupancy across these traces. Cities and counties must regulate certain development projects within these zones, which include withholding development permits until geologic investigations demonstrate that development sites are not threatened by future surface displacement.[2] Surface fault rupture is not necessarily restricted to the area within an Alquist-Priolo Zone.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act was developed to protect the public from the effects of strong groundshaking, liquefaction, landslides, or other ground failure, and from other hazards caused by earthquakes. This act

[2] Hart, 1997.

requires the State Geologist to delineate various seismic hazard zones and requires cities, counties, and other local permitting agencies to regulate certain development projects within these zones. Before a development permit is granted for a site within a seismic hazard zone, a geotechnical investigation of the site has to be conducted and appropriate mitigation measures incorporated into the project design.

California Building Code

The California Building Code is another name for the body of regulations known as the California Code of Regulations (C.C.R.), Title 24, Part 2, which is a portion of the California Building Standards Code. Title 24 is assigned to the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. Under state law, all building standards must be centralized in Title 24 or they are not enforceable.[3]

Published by the International Conference of Building Officials, the Uniform Building Code is a widely adopted model building code in the United States. The California Building Code incorporates by reference the Uniform Building Code with necessary California amendments. About one-third of the text within the California Building Code has been tailored for California earthquake conditions.

California Department of Transportation – Highway Design Manual

The California Department of Transportation (Caltrans) has developed roadway design standards including those for seismic safety. Consideration of earthquake hazards in roadway design is detailed in the Highway Design Manual published by Caltrans (2006). Modifications to local highways and roads would be required to adhere to Caltrans engineering standards.

LOCAL PROGRAMS

City of Lodi General Plan

The Conservation and Health and Safety elements of the City's existing General Plan each contain a goal and several policies pertinent to local geologic, soils, and seismic conditions. Several of these are identified below in Table 14-1:

[3] Bolt, 1988.

Table 14-1: City of Lodi 1991 General Plan Goals and Policies

CONSERVATION ELEMENT	
Letter	*Goal Text*
D	To conserve soil resources.
Number	*Policy Text*
#1	The City shall require developers to prepare an erosion and sediment control plan, prior to approving development that includes features such as mitigation of sediment runoff beyond proposed project boundaries and complete revegetation and stabilization of all disturbed soils (including details regarding seed material, fertilizer, and mulching).
HEALTH AND SAFETY ELEMENT	
Letter	*Goal Text*
B	To prevent loss of lives, injury, and property damage due to the collapse of buildings and critical facilities and to prevent disruption of essential services in the event of an earthquake.
Number	*Policy Text*
#1	For buildings identified as seismically unsafe, the City shall prohibit a change in use to a higher occupancy or more intensive use until an engineering evaluation of the structure has been conducted and structural deficiencies corrected consistent with City building codes.
#2	The City shall encourage rehabilitation of seismically hazardous buildings identified as having historic significance consistent with the State Historic Building Code.
#3	The City shall ensure that all public facilities, such as buildings, water tanks, underground utilities, and levees, are structurally sound and able to withstand seismic activity.
#4	The City shall require that geotechnical investigations be prepared for all proposed critical structures (such as police stations, fire stations, emergency equipment, storage buildings, water towers, wastewater lift stations, electrical substations, fuel storage facilities, large public assembly buildings, designated emergency shelters, and buildings three or more stories high) before construction or approval of building permits, if deemed necessary. The investigation shall include estimation of the maximum credible earthquake, maximum ground acceleration, duration, and the potential for ground failure because of liquefaction or differential settling.
#5	The City should require that signs be posted on buildings or other structures that are identified as seismically unsafe, until structural deficiencies are corrected in accordance with City building codes.
Number	*Implementation Measure Text*
3	The City shall adopt a building code for historic buildings consistent with the State Historic Building Code that provides standards for updating structural deficiencies in historically significant buildings while still maintaining the historic significance of such buildings.

Table Source: Jones & Stokes, 1991.

14.3 ENVIRONMENTAL SETTING

GEOLOGIC SETTING

The Central Valley is filled with a thick sequence of sediments eroded from the Sierra Nevada range to the east. The sediments are so thick on the western edge of the Sacramento Valley that the rocks underlying the sediments have not been penetrated by borings.[4] 60,000 feet or more of these sediments, known as the Great Valley Sequence, may have been deposited in this region from about 65 million years ago.[5] Most of the sediments deposited in the Planning Area formed about 15 to 20 million years ago were deposited on land rather than in the sea. Prior to that time, the sediments were predominately marine. The continental deposits include increasing amounts of sediments derived from Sierra Nevada bedrock and from volcanic activity in the Sierras toward the end of the Tertiary period. Middle to late Tertiary sediments form the principal ground water aquifers of the Central Valley. In this region, these sediments are estimated to be about 3,000 feet thick.[6] During the last 1.6 million years (the Quaternary Period), large amounts of lake and marsh deposits have accumulated in parts of the Central Valley. These deposits include thick clay deposits that act as confining layers for ground water. However, these clay deposits are not found in the region. The most recent deposits in the region are floodplain deposits, consisting of clay, silt, and some sand.[7]

During the Tertiary Period 91.5 to 65 million years ago), a structurally high feature known as the Stockton Arch, developed, separating the southern depositional basin (the San Joaquin Basin) from the northern basin (the Sacramento Basin). The pre-Quaternary (older than 1.6 million years) Stockton Fault forms the northern boundary of the Stockton Arch, which extends south to about Modesto. The structural arch is higher than the surrounding region and therefore, sediment deposition typical of this region does not overlie the Stockton Arch.[8]

---

[4] Hackel, 1966.

[5] Hackel, 1966.

[6] Page, 1986.

[7] Page, 1986.

[8] Bartow, 1991.

SOILS

A soil survey for San Joaquin County was conducted by the United States Department of Agriculture, Natural Resources Conservation Service (NRCS), which creates maps of surface soils for use in land use planning decisions[9]. Various soil types, identified by soil mapping units (see Table 14-2), are found throughout the Planning Area.

The general soil type found throughout the Planning Area is Tokay-Acampo. The Tokay-Acampo soil group is characterized by moderately well drained and well drained, moderately coarse textured soils. The soils are deep to hardpan and located on low fan terraces. The primary detailed soil types present within this group include Tokay and Acampo. The Tokay soils are very deep and well drained. Typically, the surface layer and subsoil are moderately coarse textured. The Acampo soils are 40 to 60 inches to a hardpan and are moderately well drained. The surface layer and subsoil are moderately coarse textured.[10]

The Planning Area consists of a total of 25 different detailed soil types. Most soil types in the Planning Area are sandy loams (such as Tokay and Acampo), which are highly productive for agriculture and present little constraint to development. Limited acreages of additional types of soil types are also found throughout the Planning Area (see Table 14-2).

SEISMICITY

The Planning Area is located 65 miles east of the Bay Area and lies within Seismic Risk Zone 3. Earthquakes in Seismic Risk Zone 3 pose a lesser risk than those experienced in Zone 4 (such as the San Francisco Bay Area). The estimated maximum (moment) magnitudes (Mw) represent characteristic earthquakes on particular faults (Table 14-3). The Planning Area may be affected by regionally occurring earthquakes; however, impacts resulting from such an event would be less in nature than those experienced in the Bay Area. Figure 14-1 identifies active and potentially active faults in the region of the Planning Area.

---

[9] NRCS 1992.

[10] NRCS 1992.

Table 14-2 Soils Resources Within The City Of Lodi Planning Area

Soil Map Unit[a]	*Land Capability Class*[b]	*Storie Index*[c]	*Average Depth (Feet)*	*Erosion Index (K Factor)*[d]	*Shrink – Swell Potential*[e]	*Hydrologic Group*[f]	*Unique Characteristics*
101 – Acampo sandy loam, 0-2% slopes	IIs-8 irrigated and IVs-8 non-irrigated	3	Greater than 6 feet	0.32-0.37	Low	C	Moderately well drained, nearly level soil on low fan terraces.
106 – Archerdale very fine sandy loam, 0-2% slopes, over-washed	IIs-3 irrigated and IVs-3 nonirrigated	2	Greater than 6 feet	0.28-0.37	Low to High	C	Very deep, well drained, nearly level soil is on alluvial fans.
111 – Bruella sandy loam, 0-2% slopes	I irrigated and IVc-1 nonirrigated	2	Greater than 6 feet	0.24-0.32	Low to Medium	B	Very deep, moderately well drained, nearly level soil on low terraces.
112 – Bruella sandy loam, hard substratum, 0-2% slopes	IIs-3 irrigated; IVs-3 nonirrigated	2	Greater than 6 feet	0.24-0.32	Low to Moderate	C	This soil is very deep, moderately well drained, and nearly level on low terraces.
130 – Columbia fine sandy loam, partially drained, 0-2% slopes	IIs-2 irrigated; IVs-2 nonirrigated	1	Greater than 6 feet	0.32	Low	B	Very deep, somewhat poorly drained, nearly level soil on flood plains. Mottles in the profile indicate a somewhat poorly drained soil; however, drainage has been improved by levees and reclamation projects.
131 – Columbia fine sandy loam, drained, 0-2% slopes, occasionally flooded	IIw-2 irrigated and IVw-2 nonirrigated	3	3 to 5 feet	0.32	Low	C	Very deep, somewhat poorly drained, nearly level soil in on flood plains. Mottles in the profile indicate a somewhat poorly drained soil; however, drainage has been improved by reclamation projects. The soil is subject to occasional, brief or long periods of flooding from December through April.
132 – Columbia fine sandy loam, channeled, partially drained, frequently flooded	IIIw-2 irrigated and IVw-2 nonirrigated	4	3 to 5 feet	0.32	Low	C	Very deep, somewhat poorly drained, nearly level soil in on flood plains. Mottles in the profile indicate a somewhat poorly drained soil; however, drainage has been improved by reclamation projects.

Table 14-2 Soils Resources Within The City Of Lodi Planning Area

Soil Map Unit[a]	*Land Capability Class*[b]	*Storie Index*[c]	*Average Depth (Feet)*	*Erosion Index (K Factor)*[d]	*Shrink – Swell Potential*[e]	*Hydrologic Group*[f]	*Unique Characteristics*
149 – Devries sandy loam, drained	IVw-2 irrigated and nonirrigated	5	5 feet or more	0.24-0.28	Low	C	Somewhat poorly drained, nearly level soil on basin rims. It is moderately deep to a hardpan. Mottles in the profile indicate a somewhat poorly drained soil; however, drainage has been improved by levees and reclamation projects.
153 – Egbert silty clay loam, partially drained, 0-2% slopes	IIw-2 irrigated and IVw-2 nonirrigated	3	4 to 6 feet	0.24-0.28	Moderate to High	C	Very deep, poorly drained, nearly level soil on flood plains. Mottles in the profile indicate a poorly drained soil; however, drainage has been improved by levees and reclamation projects.
157 – Exeter sandy loam, 0-2% slopes	IIIs-8 irrigated and IVs-8 nonirrigated	2	Greater than 6 feet	0.32	Low to Moderate	C	Moderately well drained, nearly level soil on low terraces. It is moderately deep to a hardpan.
158 – Finrod clay loam, 0-2% slopes	IIs-8 irrigated; IVs-8 non-irrigated	3	Greater than 6 feet	0.28-0.32	Moderate	C	Moderately well drained, nearly level soil on low fan terraces. It is deep to a hardpan.
160 – Galt clay, 0-2% slopes	IIIs-8 irrigated; IVs-8 nonirrigated	4	Greater than 6 feet	0.24	High	D	Moderately well drained, nearly level soil on basin rims and in basins. Moderately deep to hardpan. Water may be perched above the hardpan for brief periods.
168 – Guard clay loam, 0-2% slopes	IIIw-2 irrigated; IVw-2 nonirrigated	4	1.5 to 3 feet (perched water table)	0.24-0.28	Moderate	C	Very deep, poorly drained, nearly level soil in basin rims.
169 – Guard clay loam, drained, 0-2% slopes	IIw-2 irrigated; IVw-2 nonirrigated	3	Greater than 5 feet	0.24-0.28	Moderate	C	Very deep, poorly drained, nearly level soil on basin rims. Mottles in the profile indicate a poorly drained soil; however, drainage has been improved by levees and reclamation projects.

Table 14-2 Soils Resources Within The City Of Lodi Planning Area

Soil Map Unit[a]	*Land Capability Class[b]*	*Storie Index[c]*	*Average Depth (Feet)*	*Erosion Index (K Factor)[d]*	*Shrink – Swell Potential[e]*	*Hydrologic Group[f]*	*Unique Characteristics*
173 – Hollenbeck silty clay, 0-2% slopes	IIs-5 irrigated; IVs-5 nonirrigated	4	Greater than 6 feet	0.24-0.37	Moderate to High	D	Moderately well drained, nearly level and gently sloping soil is in interfan basins. It is deep to a hardpan.
180 – Jacktone clay, 0-2% slopes	IIIs-8 irrigated; IVs-8 nonirrigated	4	Greater than 5 feet	0.24-0.32	Moderate to High	D	Somewhat poorly drained, nearly level soil in basins. It is moderately deep to a hardpan. Mottles in the profile indicate a somewhat poorly drained soil; however, drainage has been improved by levees and reclamation projects.
189 – Kingdon fine sandy loam, 0-2% slopes	I irrigated; IVc-1 nonirrigated	1	Greater than 5 feet	0.32-0.37	Low	B	Very deep, moderately well drained, nearly level soil on low fan terraces.
226 – Rioblancho clay loam, drained, 0-2% slopes	IIIw-8 irrigated; IVw-8 nonirrigated	4	Greater than 6 feet	0.28-0.37	Low to Moderate	C	Somewhat poorly drained, nearly level soil on basin rims. It is moderately deep to a hardpan. Mottles in the profile indicate a somewhat poorly drained soil; however, drainage has been improved by levees and reclamation projects.
238 – San Joaquin loam, 0-2% slopes	IVs-3 irrigated and nonirrigated	4	Greater than 6 feet	0.24-0.37	Low to High	D	Moderately well drained, nearly level soil on low terraces. It is moderately deep to a hardpan. The native vegetation is mainly annual grasses, forbs, and scattered California white oak. The landscape is characterized by a complex of gently sloping hummocks and depressions, minor drainageways, and areas that have been leveled.

Table 14-2 Soils Resources Within The City Of Lodi Planning Area

Soil Map Unit[a]	*Land Capability Class*[b]	*Storie Index*[c]	*Average Depth (Feet)*	*Erosion Index (K Factor)*[d]	*Shrink – Swell Potential*[e]	*Hydrologic Group*[f]	*Unique Characteristics*
240 – San Joaquin loam, 2-8% slopes, eroded	IIIs-3 irrigated; IVs-3 nonirrigated	4	Greater than 6 feet	0.24-0.37	Low to High	D	Moderately well drained, nearly level soil on low terraces. It is moderately deep to a hardpan. Meandering drainageways and closed depressions fill with water to form vernal pools during the winter in many areas.
250 – Stockton clay, 0-2%	IIs-5 irrigated; IVs-5 nonirrigated	4	Greater than 5 feet	0.24-0.32	Moderate to High	D	Somewhat poorly drained, nearly level soil in basins. Deep to a hardpan. Mottles in the profile indicate a somewhat poorly drained soil; however, drainage has been improved by levees and reclamation projects.
256 – Tokay fine sandy loam, 0-2% slopes	I irrigated; IVc-1 nonirrigated	1	Greater than 6 feet	0.32-0.37	Low	B	Very deep, well drained, nearly level soil on low fan terraces.
257 – Tokay-Urban land complex, 0-2% slopes	I irrigated; IVc-1 nonirrigated (for Tokay soil)	6	Greater than 6 feet	0.32-0.37	Low	B	Very deep, well drained, nearly level soil on low fan terraces. This unit may provide wetland functions and values.
259 – Tujunga loamy sand, 0-2% slopes	IIIs-4 irrigated; Vie-4 nonirrigated	2	Greater than 6 feet	0.20	Low	A	Very deep, somewhat excessively drained, nearly level soil on flood plains and elongated channel remnants. It formed in alluvium derived from granitic rock sources.
260 – Urban land	N/A	6	N/A	N/A	N/A	N/A	The landscape has been so altered by urban work that identification of the soils is not feasible.

Table 14-2 Soils Resources Within The City Of Lodi Planning Area

Soil Map Unit[a]	*Land Capability Class[b]*	*Storie Index[c]*	*Average Depth (Feet)*	*Erosion Index (K Factor)[d]*	*Shrink – Swell Potential[e]*	*Hydrologic Group[f]*	*Unique Characteristics*

A. Soil Map Units contained within the City of Lodi Planning Area, as delineated by the San Joaquin County Soil Survey.

B. Land Capability Class (Under an irrigated scenario, unless noted) – Capability grouping depicts, in general, the suitability of soils most kinds of field crops. The groups are made according to the limitations of the soils when used for field crops. The capability system is grouped according to three (3) levels including, capability class, subclass, and unit. Capability Classes are designated by the Roman Numerals and are designed to indicate a progressively greater limitation and/or narrower practical use according to a corresponding increase from I to VIII. Capability Subclasses are designated by the small letter and give an indication of the main limitation associated with the soil type (i.e. e – erosion, w – wetness, s – shallow, c - climate.) Capability units are soil groups within subclasses and suggest the chief kind of limitation. Generally Capability Class 3 or less is considered Prime Farmland according to the California Department of Conservation.

C. The Storie Index is a numerical expression of the relative degree of suitability of a soil for general intensive agricultural use. The rating is based on soil characteristics only and is obtained by evaluating factors such as soil depth, surface soil texture, subsoil characteristics, drainage, content of salts and sodium, and relief. Six grades of soil based on the Storie Index exist: Grade 1 (80 to 100) – well suited to intensive use for irrigated crops; Grade 2 (60-79) – good agricultural soils; Grade 3 (40-59) – fairly well suited to agriculture; Grade 4 (20-39) – poorly suited to agriculture; Grade 5 (10-19) – very poorly suited to agriculture; Grade 6 (less than 10) – not suited to agriculture.

D. K Factor – The K factor for a particular soil provides an indication of a soil's inherent susceptibility to erosion. The K factor is derived from the Revised Universal Soil Loss Equation, which is an empirical method that evaluates a soil's inherent susceptibility to erosion along with factors such as slope and management practices. The K factor is derived from soil characteristics, such as, soil texture, organic matter content, soil structure, infiltration rate, soil depth, and structure. Erodibility indexes (K factor) range from 0 to 0.6. Erodibility indexes of less than 0.2 indicate a low erosion potential. Erodibility indexes from 0.2 to 0.3 indicate moderate erosion potential. Erodibility indexes greater than 0.3 indicate high erosion potentials. From these ranges, each of the evaluated soil types are ranked low, medium, or high, according to where their average K factor for each of their associated horizons.

E. Shrink-swell is the cyclical expansion and contraction that occurs in fine-grained clay sediments from wetting and drying.

F. Hydrologic Group – Refers to the soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and kind of plant cover are not considered, but are separate factors in predicting runoff. Soils area assigned to four groups. In group A, soils have a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well-drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They typically have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over impervious bedrock or other material.

G NI – Under non-irrigated conditions.

H. Duripan – A mineral soil horizon that is cemented by silica, to the point that air-dry fragments will not slake in water of HCL.

I. Argillic Horizon (Layer) – A mineral soil horizon characterized by the alluvial accumulation of layer-lattice silicate clays.

J. Calcareous – Refers to soils containing sufficient calcium carbonate (often with magnesium carbonate) to effervesce visibly when treated with cold 0.1 N HCL.

SOURCE: USDA Natural Resource Conservation Service, Soil Survey for the San Joaquin County, 1992

Table 14-3 Active and Potentially Active Faults in the Vicinity of the Planning Area

Fault	*Location Relative to Lodi*	*Fault Classification[a]*	*Historical Seismicity[b]*	*Slip Rate[c] (mm/yr)*	*Maximum Moment Magnitude[d]*
San Joaquin Fault	24 miles south	Conditionally Active/ Quaternary	N/A	N/A	N/A
Vernalis Fault	25 miles south	Conditionally Active/ Quaternary	Pre-Historic Activity	N/A	N/A
Greenville Fault	34 miles southwest	Active	5.8	2.0	6.9
Concord-Green Valley Fault	45 miles west-northwest	Active	Active Creep[e]	6.0	6.9
Calaveras Fault Zone	46 miles southwest	Active	M 6.1: 1984 M 5.9: 1979 Many <M 6.5	15.0 (Maximum)	6.8
West Napa Fault	51 miles northwest	Active	N/A	1.0	6.5
Hayward Fault	56 miles west-southwest	Active	M 6.8: 1868 M 7.0: 1838 Many <M 4.5	9.0	6.9
Rodgers Creek Fault	61 miles northwest	Active	N/A	0.2-1	7.0
San Andreas Fault (Peninsula and Golden Gate Segments)	72 miles west	Active	M 7.1: 1989 M 8.25: 1906 M 7.0: 1838 Many <M 6	17.0	7.3

A. The California Geological Survey defines an "active fault" as one that has displayed displacement within Holocene time (about the last 10,000 years). A "potentially" active fault is defined as a fault that has shown evidence of surface displacement within the past 1.6 million years. "Late Quaternary" refers to a fault with displacement in the last 700,000 years. "Pre-Quaternary" refers to a fault without recognized displacement within the past 1.6 million years. These faults are not necessarily inactive. The California Division of Safety of Dams fault activity guidelines (Fraser 2001a) differentiate active seismic sources, conditionally active seismic sources, and inactive seismic sources. There are two subcategories of active seismic sources: Holocene active (within the last 11,000 years) and Latest Pleistocene active (less than 35,000 years old but older than 11,000 years). The distinction between these two subcategories is descriptive and both categories are treated as active seismic sources for design purposes. Conditionally Active faults also have two subcategories: Quaternary active fault (displacement within 35,000 to 1.6 million years) and pre-Quaternary active. A pre-Quaternary fault is one that can be reasonably shown to have attributes consistent with the current tectonic regime. Inactive faults have had no surface or subsurface displacement in the last 35,000 years and inactivity is demonstrated by fault traces that are consistently overlain by unbroken geologic materials that are older than 35,000 years.

B. Richter magnitude (M) and year for recent and/or large events.

C. Slip Rate = Long-term average total of fault movement including earthquake movement, slip, expressed in millimeters.

D. The Maximum Moment Magnitude is an estimate of the size of a characteristic earthquake capable of occurring on a particular fault. Moment magnitude is related to the physical size of a fault rupture and movement across a fault. Richter magnitude scale reflects the maximum amplitude of a particular type of seismic wave. Moment magnitude provides a physically meaningful measure of the size of a faulting event. Richter magnitude estimations can be generally higher than moment magnitude estimations.

E. Slow fault movement that occurs over time without producing an earthquake.

N/A = Not applicable and/or not available.

Sources: Jennings 1994; Peterson et. al. 1996.

Regional Faults

According to the Fault Activity Map of California[11], the nearest active fault is the Greenville Fault, located approximately 34 miles south of the Planning Area. The Maximum Moment magnitude of the maximum probable earthquake on the Greenville Fault is estimated to be 6.9[12]; however, the largest historic earthquake on the Greenville Fault was a Richter magnitude 5.8, comparable to a 6 MM, earthquake that occurred in 1980. That earthquake produced a peak ground acceleration of 0.15g in Brentwood, approximately 35 miles southwest of the Planning Area. Other nearby faults to the Planning Area exhibiting historic displacement (activity within the last 200 years) are the Concord-Green Valley and Hayward faults located approximately 45 miles west-northwest and 56 miles west of the Planning Area, respectively. Portions of the Calaveras fault zone also have been rated as being active within the last 200 years and those portions are located approximately 46 miles southwest of the site.

The nearest Quaternary fault (2 million years ago to present) to the Planning Area showing evidence of activity within the past 1.6 million years is the San Joaquin Fault located approximately 24 miles southwest of the Planning Area.[13] The nearest mapped fault trace, the Stockton Fault, is not considered an active fault. Figure 14-1 illustrates the locations of the Quaternary or younger faults in the region. Table 14-3 illustrates the active and potentially active faults in the vicinity of the Planning Area.

---

[11] Jennings, 1994.

[12] Peterson et al. 1996.

[13] Jennings 1994; Bartow 1991.

Seismic Structural Safety

The CDMG has determined the probability of earthquake occurrences and their associated peak ground accelerations throughout the State of California. According to the CDMG probabilistic seismic hazard map for California, peak ground accelerations in the Planning Area could range from 0.20 g to 0.30 g.[14]

The susceptibility of a structure to damage from ground shaking is also related to the underlying foundation material. A foundation of rock or very firm material can intensify short-period motions, which affect low-rise buildings more than tall, flexible ones. A deep layer of saturated alluvium can cushion low-rise buildings, but it can also accentuate the motion in tall buildings.[15] Other potentially dangerous conditions include, but are not limited to: building architectural features that are not firmly anchored, such as parapets and cornices; roadways, including column and pile bents and abutments for bridges and overcrossings; and above-ground storage tanks and their mounting devices. Such features could be damaged or destroyed during strong or sustained ground shaking.

HAZARDS

Seismic hazards that may exist within the Planning Area include surface fault rupture, groundshaking, and liquefaction. These are discussed below.

Surface Fault Rupture

Surface expression of fault rupture is typically observed and is expected on or within close proximity to a causative fault. The Planning Area is neither located within, nor crosses, a delineated Alquist-Priolo Earthquake Fault Zone and the Greenville fault zone lies over 34 miles west of the Planning Area (CDMG 1997). For this reason, the risk of surface fault rupture within the Planning Area is considered low.[16]

Groundshaking

The greatest geologic hazard in Lodi is the structural danger posed by groundshaking from earthquakes originating outside of the area.

The maximum expected earthquake intensity to be reasonably expected in the Planning Area would correspond to a Modified Mercalli Intensity

---

[14] Peterson et al., 1999.

[15] ABAG, 1998.

[16] CDMG, 1997.

VIII, or possibly higher (see Table 14-4). During an intensity VIII event, some damage would occur to well-made structures and chimneys; some towers would fall; and poorly constructed or weak structures would be heavily damaged. An earthquake with an intensity of VIII would be most probably in areas where the water table is most shallow in proximity to the Mokelumne River. Where the water table is deeper than 30 feet, which it is throughout much of the General Plan Planning Area, a maximum intensity of VII would be more reasonably expected. In such an earthquake, damage in well-built structures would be slight.

Liquefaction

Liquefaction is an unstable ground condition in which water-saturated soils change from a solid to semi-liquid state because of a sudden shock or strain. Liquefaction generally occurs when seismically-induced ground shaking causes pore water pressure to increase to a point equal to the overburden pressure. Areas at risk due to the effects of liquefaction are typified by a high groundwater table and underlying loose to medium-dense, granular sediments, particularly younger alluvium and artificial fill.

The probability of soil liquefaction actually taking place in the Planning Area is considered to be a low to moderate hazard, due to the substantial distance from the active Hayward and Calaveras Fault zones and the type of ground shaking expected from those faults. The presence of liquefaction susceptibility zones located in the Planning Area is unknown. Future site-specific planning and projects within the Planning Area should further investigate the potential for well-graded sand or silt deposits subject to liquefaction to be located at individual sites.[17]

[17] City of Lodi, 1988.

Table 14-4 Modified Mercalli Intensity Scale

Intensity Value	*Intensity Description*	*Average Peak Acceleration (% g)*
I.	Not felt except by a very few persons under especially favorable circumstances.	< 0.17
II.	Felt only by a few persons at rest, especially on upper floors on buildings. Delicately suspended objects may swing.	0.17 – 1.4
III.	Felt quite noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibration similar to a passing of a truck. Duration estimated.	0.17 – 1.4
IV	During the day felt indoors by many, outdoors by few. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.	1.4 – 3.9
V.	Felt by nearly everyone, many awakened. Some dishes, windows, etc., broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees, poles, and other tall objects sometimes noticed. Pendulum clocks may stop.	3.9 – 9.2
VI.	Felt by all, many frightened and run outdoors. Some heavy furniture moved; a few instances of fallen plaster or damaged chimneys. Damage slight.	9.2 - 18
VII.	Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motor cars.	18 - 34
VIII.	Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motor cars disturbed.	34 - 65
IX.	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.	65 - 124
X.	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from riverbanks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks.	> 124
XI.	Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.	124
XII.	Damage total. Practically all works of construction are damaged greatly or destroyed. Waves seen on ground surface. Lines of sight and level are distorted. Objects are thrown upward into the air.	124

g is gravity = 980 centimeters per second squared

Source: Bolt, Bruce A., 1988.

OTHER GEOLOGIC HAZARDS

Additional geologic hazards that may exist within the Planning Area include soil erosion and settlement. The Planning Area is primarily flat and, thus, the risk of unstable soils or landslides is considered relatively low and not discussed further.

Soil Erosion

Soil erosion is the process whereby soil materials are worn away and transported to another area either by wind or water. Rates of erosion can vary depending on the soil material and structure, placement, and the general level of human activity. Soil containing high amounts of sand or silt can be easily eroded while clayey soils are less susceptible. The Tokay soils present in the Planning Area have a moderate potential for wind erosion and the Tujunga soils in the Planning Area have a severe potential for wind erosion if vegetative covering is removed. Figure 14-2 identifies the degree of erosion susceptibility throughout the Planning Area, which is determined by the k-factor for each soil type (also see Table 14-2).[18]

Expansive Soils

Expansive soils possess a shrink-swell characteristic. Structural damage may result over a long period of time, usually resulting from inadequate soil and foundation engineering or the placement of structures directly on expansive soils. Expansive soils are largely comprised of clay, which expand in volume when water is absorbed and shrink when dried. Several of the soil types located within the Planning Area are comprised of potentially expansive materials. As such, these areas would be considered more likely to contain expansive clays, and therefore these factors should be taken into consideration during future planning activities and site-specific project design. In a majority of the developed portions within the Planning Area, this layer of clay has been blended into more granular soils during site excavation or buried beneath more granular soils during excavation operations to reduce the soil's overall expansiveness (NRCS, 1992). Figure 14-3 identifies portions of the Planning Area that are susceptible to low, medium, and high potential for soil shrink-swell. The majority of the Planning Area either has not been measured for soil shrink-swell or has a low potential for soil shrink-swell. Table 14-2 also lists the varying potential for soil shrink-swell for specific soil types in the Planning Area.

---

[18] NRCS, 1992.

Settlement

Settlement is the consolidation of the underlying soil when a load, such as that of a building or new fill material, is placed upon it. When soil tends to settle at different rates and by varying amounts depending on the load weight, it is referred to as differential settlement. Settlement commonly occurs as a result of building construction or other large projects that require soil stockpiles. Areas of the Planning Area that contain fill material may be susceptible to settlement. If the fill materials are unconsolidated they have the potential to respond more adversely to additional load weights as compared to adjacent native soils.

Subsidence

Subsidence is the gradual settling or sinking of the earth's surface with little or no horizontal motion. Subsidence typically occurs in areas that overlie an aquifer where the groundwater level is gradually and consistently decreasing. Additionally, subsidence may also occur in the presence of oil or natural gas extraction. Within the Delta, subsidence can also be caused by oxidation, anaerobic decomposition, shrinkage, and wind erosion.[19]

Subsidence is an ongoing process, occurring since the Delta islands were formed and presently continuing at various rates, with an average estimated rate of 1.0 to 3.0 inches per year. Many of the islands are below sea level and the increasing subsidence puts additional hydrostatic pressure on the levees.[20] A portion of the Planning Area is located to the east of the Delta and therefore is not anticipated to suffer the direct affects of regional subsidence. Subsidence from natural gas or groundwater withdrawals in the Lodi area is not considered to be a significant hazard.[21]

[19] Rojstaczer et. al., 1991.

[20] Rojstaczer et. al., 1991.

[21] City of Lodi, 1988; Rojstaczer et. al. 1991; NRCS, 1992.

14.4 PLANNING ISSUES AND IMPLICATIONS

As previously described, several geologic hazards (including liquefaction, expansive soils) have a low to moderate potential to occur within the Planning Area and surrounding lands. Within these areas, the potential for these geologic hazards can likely be addressed through the implementation of standard construction practices and should not be considered a high constraint for future development of the Planning Area.

BIBLIOGRAPHY

Association of Bay Area Governments (ABAG). On Shaky Ground – Supplement, A Guide to Assessing Impacts of Future Earthquakes Using Ground Shaking Hazard Maps for the San Francisco Bay Area. September 1998.

Bartow, J.A. 1991. The Cenozoic Evolution of the San Joaquin Valley, California. U.S.

Geological Survey Professional Paper 1501.

Bolt, Bruce A., Earthquakes (New York: W. H. Freeman and Company, 1988).

California Division of Mines and Geology. Alquist-Priolo Earthquake Fault Zones. 1997.

California Department of Transportation. Highway Design Manual, Chapter 100, Basic Design Policies. September 1, 2006.

City of Lodi Community Development Department. City of Lodi General Plan Background Report. January 1988.

City of Lodi Community Development Department. City of Lodi General Plan Policy Document. April 1991.

Hackel, O. 1966. Summary of the Geology of the Great Valley. p. 217-238. In: E. H. Bailey (editor). Geology of Northern California. California Division of Mines and Geology Bulletin.

Hart, Earl W. and William A. Bryant. Fault-Rupture Hazard Zones in California, Special Publication 42. Revised 1997.

Jennings, C. W. Fault Activity Map of California (with Appendix), California Division of Mines and Geology, Geologic Data Map No. 6. 1994.

Jones & Stokes Associates, Inc. 1991. City of Lodi general plan policy document. Sacramento, CA. Prepared for: City of Lodi, Lodi, CA. With contributions from J. Laurence Mintier & Associates, TJKM, and Pepper Associates.

Natural Resource Conservation Service, U.S. Department of Agriculture. Soil Survey of San Joaquin County. 1992.

Page, R. W., 1986, Geology of the Fresh Ground-Water Basin of the Central Valley, California, with Texture Maps and Sections, U. S. Geological Survey Professional Paper 1401-C.

Peterson, M. D., W. A. Bryant, C. H. Cramer. Probabilistic Seismic Hazard Assessment for the State of California by the California Department of Conservation, Division of Mines and Geology, Open File Report 96-08, USGS Open-File Report 96-706. 1996.

Peterson, M., D. Beeby, W. Bryant, C. Cao, C. Cramer, J. Davis, M. Reichle, G. Saucedo, S. Tan, G. Taylor, T. Toppozada, J. Treiman, C. Willis. Seismic Shaking Hazard Maps of California. 1999.

Rojstaczer, Stuart A., R. E. Hamon, S. J. Deverel, C. A. Massey. Evaluation of Selected Data to Assess the Causes of Subsidence in the Sacramento-San Joaquin Delta, California. U.S. Geological Survey Open-File Report 91-193. 1991.

Wakabayashi, John and D. L. Smith. Assessment of Recurrence Intervals, Characteristic Earthquakes, and slip Rates Associated with Thrusting along the Coast Range-Central Valley Geomorphic Boundary, California. Bulletin of the Seismological Society of America, Vol. 84, No. 6, pages 1960-1970. December 1994.

[This page intentionally left blank.]

15 Noise

In technical terms, sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. Simply, sound is what we hear. As sounds reach undesirable unacceptable levels, this is referred to as noise.

To develop goals and policies related to noise abatement in the updated General Plan, it is important to understand how sound, and noise, are measured and compared. It is also important to understand existing sources of sound within the Planning Area and their corresponding sound levels. To help understand these key concepts, this chapter:

- Define several key terms;
- Provides an overview of how noise is characterized (measured);
- Describes existing regulations that affect noise issues; and
- Discusses current noise conditions found through out the City's Planning Area.

15.1 INFORMATION SOURCES AND KEY TERMS

INFORMATION SOURCES

The methods used to assess noise are described throughout this section. A summary of noise standards was provided based on a review of all applicable federal, State, and local noise regulations. Estimates of traffic noise were provided using recent average daily traffic volumes collected for Chapter 3: Transportation and Circulation of this report. A discussion of other noise sources was based on noise measurements collected by Environmental Science Associates technical staff. The most current airport noise contour data was obtained from San Joaquin County and the San Joaquin County Council of Governments.

KEY TERMS

Ambient Noise. The total noise associated with a given environment and usually comprising sounds from many sources, both near and far.

Attenuation. Reduction in the level of sound resulting from absorption by the topography, the atmosphere, distance, barriers, and other factors.

A-weighted decibel (dBA). A unit of measurement for noise having a logarithmic scale and measured using the A-weighted sensory network on a noise-measuring device. An increase or decrease of 10 decibels (dB) corresponds to a tenfold increase or decrease in sound energy. A doubling or halving of sound energy corresponds to a 3-dBA increase or decrease.

Community Noise Equivalent Level (CNEL). This term is used to characterize average sound levels over a 24-hour period, with weighting factors included for evening and nighttime sound levels. Leq values (equivalent sound levels measured over a 1-hour period - see above) for the evening period (7:00 p.m. to 10:00 p.m.) are increased by 5 dB, while Leq values for the nighttime period (10:00 p.m. to 7:00 a.m.) are increased by 10 dB. For a given set of sound measurements, the CNEL value will usually be about 1 dB higher than the Ldn value (average sound exposure over a 24-hour period – see below). In practice, CNEL and Ldn are often used interchangeably.

Day-Night Average Sound Level (Ldn). Ldn refers to average sound exposure over a 24-hour period. Ldn values are calculated from hourly Leq values, with the Leq values for the nighttime period (10:00 p.m. to 7:00 a.m.) increased by 10 dB to reflect the greater disturbance potential from nighttime noises.

Equivalent Sound Level (Leq). The level of a steady-state sound that, in a stated time period and at a stated location, has the same sound energy as the time-varying sound (approximately equal to the average sound level- see above). The equivalent sound level measured over a 1-hour period is called the hourly Leq or Leq (h).

Lmax and Lmin. The maximum and minimum sound levels, respectively, measured during the measurement period with a sound meter. When a sound meter is set to the "slow" response setting, as is typical for most community noise measurements, the Lmax and Lmin values are the maximum and minimum levels measured over a 1-second period.

Percentile-Exceeded Sound Level (Lx). The sound level exceeded during a given percentage of a measurement period. Examples include L10, L50, and L90. L10 is the A-weighted sound level that is exceeded 10 percent of the measurement period, and so on. L50 is the median sound level measured during the measurement period. L90, the sound level exceeded 90 percent of the time, excludes high localized sound levels produced by nearby sources such as single car passages or bird chirps. L90 is often used to represent the background sound level. L50 is also used to provide a less conservative assessment of the background sound level.

Sensitive Receptors. Sensitive receptors are defined to include residential areas, hospitals, convalescent homes and facilities, schools, and other similar land uses.

15.2 REGULATORY SETTING

Relevant federal, State and local programs specific to noise conditions are discussed in this section. This section begins with a brief introduction to the characteristics of sound and follows with a brief overview of the key regulations.

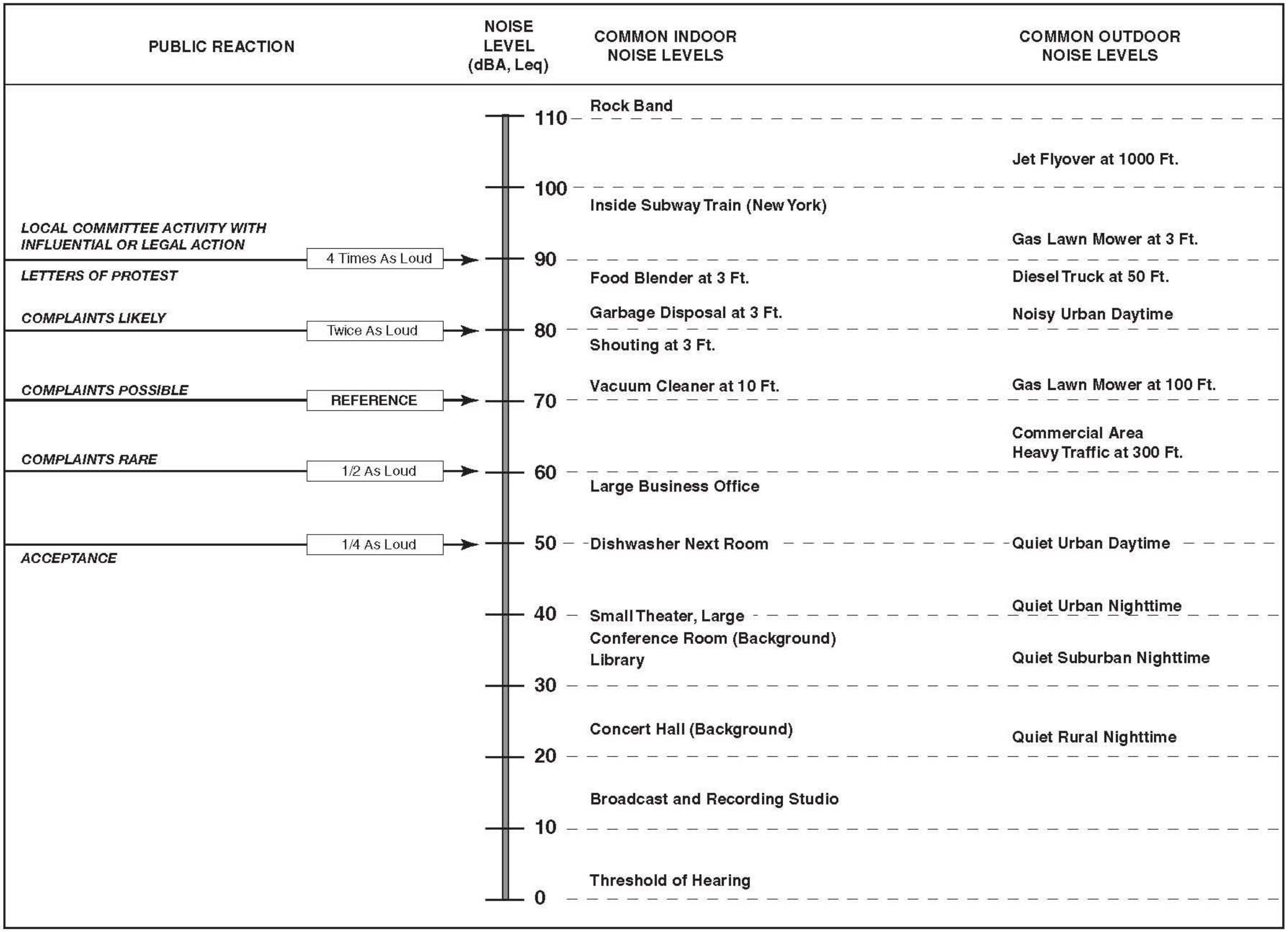
CHARACTERISTICS OF SOUND

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. Noise can be defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude) of a particular sound. The sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level. The decibel or dB scale is used to quantify sound intensity. Because sound pressure can vary by over one trillion times within the range of human hearing, a logarithmic loudness scale (i.e., dB scale) is used to keep sound intensity numbers at a convenient and manageable level.

Since the human ear is not equally sensitive to all frequencies within the entire spectrum, noise measurements are weighted more heavily within those frequencies of maximum human sensitivity in a process called "A-weighting" written as dBA. The human ear can detect changes in sound levels of approximately 3 dBA under normal conditions. Changes of 1 to 3 dBA are typically noticeable under controlled conditions, while changes of less than 1 dBA are only discernable under controlled, extremely quiet conditions. A change of 5 dBA is typically noticeable to the general public in an outdoor environment. Figure 15-1 summarizes typical A-weighted sound levels and its effects on people.

Noise levels fluctuate over time. While some noise fluctuations are minor, others can be substantial. Some noise levels occur in regular patterns, others are random. Some noise levels fluctuate rapidly, others slowly. Some noise levels vary widely, others are relatively constant. Various noise descriptors have been developed to describe time-varying noise levels, and are listed above under the "Key Terms" section.

Figure 15-1 Effect of Noise on People



Source: Dyett & Bhatia, 2007

Calculating Attenuation

Noise may be generated from a point source, such as a piece of construction equipment, or from a line source, such as a road containing moving vehicles. Because of spreading losses, noise attenuates (decreases) with distance. The typical atmospheric attenuation rate for point source noise is 6 dBA per doubling of the distance as predicted by the equation:

dBA Reduction = 20 Log [measured distance]

(Lower bracket to include both reference distance quantities)

Noise from a line source will also attenuate with distance, but the rate of attenuation is a function of both distance and the type of terrain over which the noise passes. Hard sites, such as developed areas with paving, attenuate noise at a rate of 3 dBA per doubling of the distance as predicted by the following equation:

dBA Reduction = 10 Log [measured distance]

reference distance

Soft sites, such as undeveloped areas, open space, and vegetated areas attenuate line-source noise at a rate of 4.5 dBA per doubling of the distance, as predicted by the following equation:

Attenuated dBA = 15 Log [measured distance]

reference distance

True hard sites are fairly rare, particularly in rural areas. Accordingly, soft site attenuation is typically assumed for planning level analyses in rural areas.

Objects such as walls, topography, and buildings which block the line-of-sight between a source and a receptor will attenuate the noise source. If a receptor is located behind the object, but has a view of the source, the wall will do little to attenuate the noise. Additionally, a receptor located on the same side of the object as the noise source may experience an increase in the perceived noise level as the object may reflect noise back to the receptor, possibly increasing the noise.

Noise Contours

The interpretation of noise contours is a generalization, not an exact science. The measurements by sophisticated instruments are affected by many variables in a particular area. However, these individual effects are generalized so that noise contours describe the impact that can generally be expected. Noise contour lines themselves are not specific boundaries of noise tolerance. A contour line denoting a 65 dBA limit, for example, does not imply that residents on one side of the line are seriously affected, while on the other side of the line tolerable conditions exist. Rather, the area between 75 dBA and 65 dBA indicates that residents within this vicinity may experience a high level of noise and potential interference with daily functions.

Effects of Noise

High noise levels can interfere with a broad range of human activities in a way which degrades public health and welfare. Such activities may include:

- Speech communication in conversation and teaching;
- Telephone communication;
- Listening to television and radio;
- Listening to music;
- Concentration during mental and physical activities;
- Relaxation; and
- Sleep.

Interference with listening situations can be determined in terms of the level of the environmental noise and its characteristics. The amount of interference in non-listening situations is often dependent upon factors other than the physical characteristics of the noise. These may include attitude toward the source of an identifiable noise, familiarity with the noise, characteristics of the exposed individual, and the intrusiveness of the noise.

Hearing loss, total or partial, and either permanent or temporary, is a well established effect of noise on human health. The primary measure of hearing loss is the hearing threshold level—the level of a tone that can just be detected by an individual. As a person is exposed to increased noise levels, that person may experience a shift in the threshold at which sound can be detected. Exposure to very high noise levels for lengthy periods of time can generate threshold shifts, which can be temporary or permanent. In general, A-weighted sound levels must exceed 60 to 80 decibels before a person will experience temporary threshold shifts. The greater the intensity level above 60 to 80 decibels and the longer the exposure, the greater length of the temporary threshold shift.

FEDERAL PROGRAMS

Federal Highway Administration (FHWA)

The FHWA has developed noise abatement criteria that are used for federally funded roadway projects or projects that require federal review. These criteria are discussed in detail in Title 23 Part 772 of the Federal Code of Regulations (23CFR772). These noise criteria are based on Leq (h) and are summarized in Table 15-1.

Table 15-1: FHWA Noise Abatement Criteria

Activity Category	*Design Noise Levels LEQ (h) (DBA)*	*Description of Activity Category*
A	57 (exterior)	Lands on which serenity and quiet are of extraordinary significance
B	67 (exterior)	Picnic areas, recreation areas, playgrounds, active sports areas
C	72 (exterior)	Developed lands
D	-	Undeveloped lands
E	52 (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

Table Source: Federal Highway Administration, 1982

Environmental Protection Agency (EPA)

The EPA has identified the relationship between noise levels and human response. The EPA has determined that over a 24-hour period, a Leq of 70 dBA will result in some hearing loss. Interference with activity and annoyance will not occur if exterior levels are maintained at a Leq of 55 dBA and interior levels at or below 45 dBA. Although these levels are relevant for planning and design and useful for informational purposes, they are not land use planning criteria because they do not consider economic cost, technical feasibility, or other needs of the community.

The EPA has set 55 dBA Ldn as the basic goal for residential environments. However, other federal agencies, in consideration of their own program requirements and goals, as well as the difficulty of actually achieving a goal of 55 dBA Ldn, have generally agreed on the 65 dBA Ldn level as being appropriate for residential uses. At 65 dBA Ldn activity interference is kept to a minimum, and annoyance levels are still low. It is also a level that can realistically be achieved.

Department of Housing and Urban Development (HUD)

HUD was established in response to the Urban Development Act of 1965 (Public Law 90-448) and was tasked by the Housing and Urban Development Act of 1965 (Public Law 89-117) "to determine feasible methods of reducing the economic loss and hardships suffered by homeowners as a result of the depreciation in the value of their properties following the construction of airports in the vicinity of their homes."

HUD first issued formal requirements related specifically to noise in 1971 (HUD Circular 1390.2). These requirements contained standards for exterior noise levels along with policies for approving HUD-supported or assisted housing projects in high noise areas. In general, these requirements established the following three zones:

- ***65 dBA Ldn or less.*** An acceptable zone where all projects could be approved.
- ***Exceeding 65 dBA Ldn but not exceeding 75 dBA Ldn.*** A normally unacceptable zone where mitigation measures would be required and each project would have to be individually evaluated for approval or denial. These measures must provide 5 dBA of attenuation above the attenuation provided by standard construction required in a 65 to 70 dBA Ldn area and 10 dBA of attenuation in a 70 to 75 dBA Ldn area.
- ***Exceeding 75 dBA Ldn.*** An unacceptable zone in which projects would not, as a rule, be approved.

HUD's regulations do not include interior noise standards. Rather a goal of 45 dBA Ldn is set forth and attenuation requirements are geared towards achieving that goal. HUD assumes that using standard construction practices, any building will provide sufficient attenuation so that if the exterior level is 65 dBA Ldn or less, the interior level will be 45 dBA Ldn or less. Thus, structural attenuation is assumed at 20 dBA. However HUD regulations were promulgated solely for residential development requiring government funding and are not related to the operation of schools or churches.

The federal government regulates occupational noise exposure common in the workplace through the Occupational Health and Safety Administration (OSHA) under the USEPA. Noise exposure of this type is dependant on site-specific work conditions and is addressed through a facility's or construction contractor's health and safety plan. With the exception of construction workers involved in general facility construction, site-specific occupational noise is outside the scope of this programmatic area wide study and is not addressed further in this document.

STATE REGULATIONS

California Department of Health Services

The Office of Noise Control in the State Department of Health Services has developed criteria and guidelines for local governments to use when setting standards for human exposure to noise and preparing noise elements for General Plans (Office of Planning and Research, 2003). These guidelines include noise exposure levels for both exterior and interior environments. In addition, the California Code of Regulations sets forth requirements for the insulation of multiple-family residential dwelling units from excessive and potentially harmful noise. The State indicates that locating units in areas where exterior ambient noise levels exceed 65 dBA is undesirable. Whenever such units are to be located in such areas, the developer must incorporate into building design various construction features which reduce interior noise levels to 45 dBA CNEL. A summary of the various State standards is provided in Figure 15-2 and Table 15-2. Figure 15-2 presents criteria used to assess the compatibility of proposed land uses with the surrounding noise environment. Table 15-2 indicates State standards and criteria that specify acceptable limits of noise for various land uses.

California Department of Transportation (Caltrans)

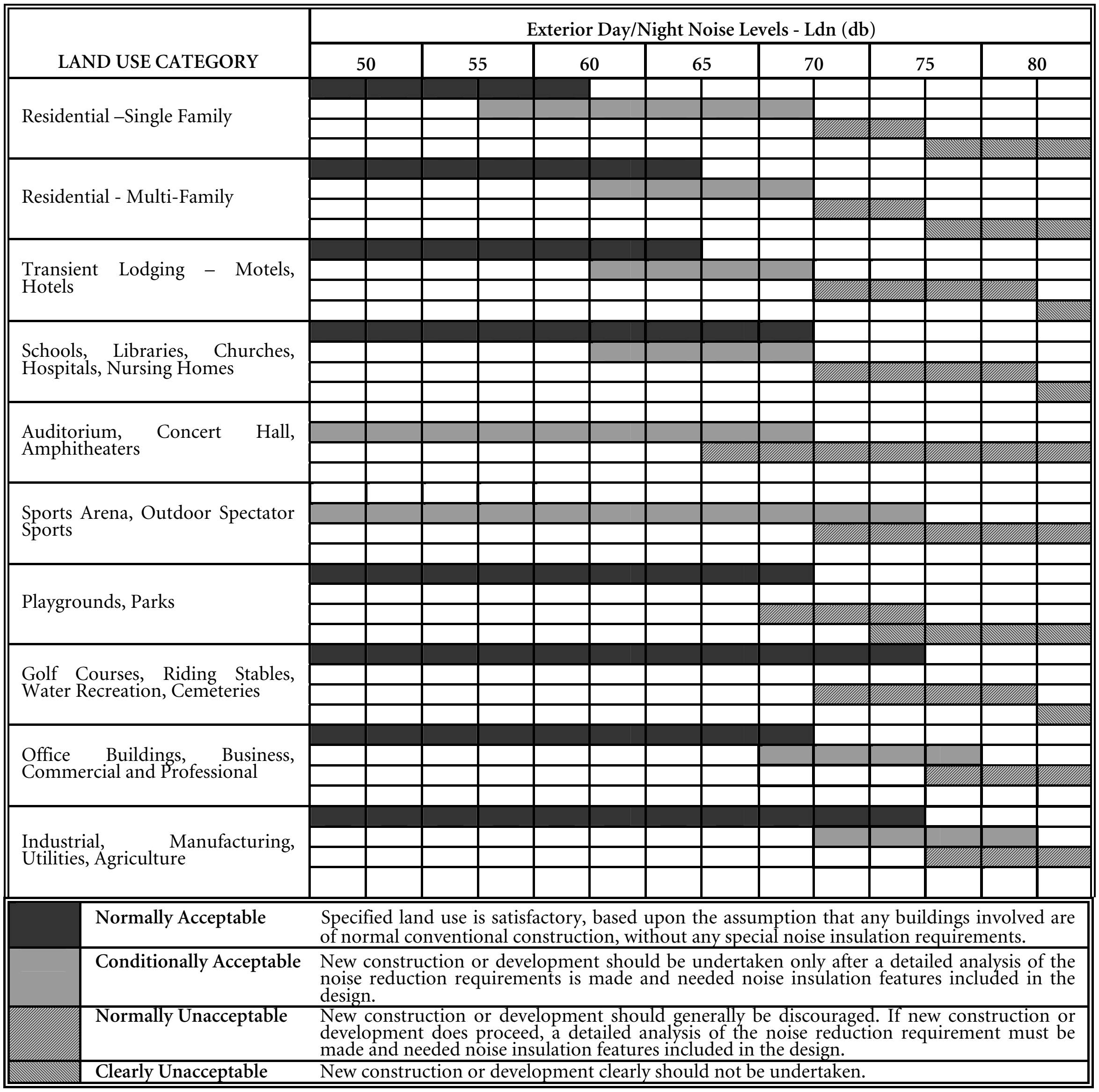
Caltrans has adopted policy and guidelines relating to traffic noise as outlined in Caltran's Trafffic Noise Analysis Protocol (Caltrans 1998). The noise abatement criteria specified in the protocol are the same as those specified by FHWA (see Table 15-1).

LOCAL REGULATIONS

City of Lodi General Plan

The Noise Element of the City's existing General Plan contains several goals and policies pertinent to noise issues. Several of these are identified in Table 15-3.

Figure 15-2: Noise and Land Use Compatibility



Source: ESA Associates

Table 15-2: State of California Interior and Exterior Noise Standards

Land Use		*CNEL*	
Categories	*Land Uses*	*Interior(1)*	*Exterior(2)*
Residential	Single-Family, Duplex, Multiple-Family	45(3)	65(4)
	Mobile Homes	-	65
Commercial Industrial Institutional	Hotel, Motel, Transient Lodging	45	-
	Commercial Retail, Bank, Restaurant	55	-
	Office Building, Research and Development, Professional Office	50	-
	City Office Building	50	-
	Amphitheater, Concert Hall, Auditorium, Meeting Hall	45	-
	Gymnasium (Multipurpose) Sports Club	50	-
	Manufacturing, Warehousing, Wholesale, Utilities	55	-
	Movie Theaters	65	-
Institutional	Hospitals, Schools	45	-
	Classrooms/Playgrounds	45	65
	Church, Library	45	-
Open Space	Parks	-	65

Notes: (1). Indoor environment including: bathrooms, closets, corridors (2). Outdoor environment limited to: private yard of single family; multi-family private patio/balcony which is served by a means of exit from inside the dwelling; balconies six feet deep or less are exempt; mobile home park; park's picnic area; school's playground. (3). Noise level requirement with closed windows. Mechanical ventilating systems or other means of natural ventilation shall be provided as of Chapter 12, Section 1205 of the Uniform Building Code. (4). Exterior noise levels should be such that interior noise levels will not exceed 45 dBA CNEL.

Table Source: California Office of Planning and Research, General Plan Guidelines, 2003

Table 15-3: City of Lodi 1991 General Plan Goals and Policies: NOISE ELEMENT

Letter	*Goal Text*
A	To ensure that City residents are protected from excessive noise.
Number	*Policy Text*
#1	The City shall use the outdoor CNEL criteria on the land use compatibility chart (Figure 6-4 of the existing General Plan Goals and Policies Report) as a primary guide to determine whether all or part of an existing or proposed development site should be considered "noise impacted"; areas shall be considered noise impacted if current or projected exterior noise levels would classify the areas as "conditionally acceptable," "normally unacceptable," or "presumed to be unacceptable" for the existing or proposed use.
#2	The City shall recognize that a CNEL measure does not adequately reflect the disturbance effects of intermittent noise events or noise sources that operate for only part of a day. Intermittent or discontinuous noise sources should be evaluated on a case-by-case basis to determine appropriate land use compatibility classifications.
#3	The City shall require a noise impact analysis for development projects on sites that are wholly or partially noise impacted under existing or projected future conditions.
#4	The City shall require a noise impact analysis for development projects that may cause or significantly contribute to adjacent properties becoming noise impacted.
#5	Noise impact analyses required by Policies A-3 and A-4 above shall: • Be included in any environmental impact study prepared for the proposed project; • Be the responsibility of the project applicant; • Be prepared by persons with the experience and training needed to properly address the noise impact and noise mitigation issues that may arise; • Include, at the discretion of City staff, ambient noise monitoring of the project sire and adjacent areas for sufficient time periods and at appropriate seasons to clarify the land use compatibility status of the property under current conditions; • Estimate future noise levels and land use compatibility conditions following build out of the proposed project; • Include an evaluation of the magnitude, duration, and temporal pattern of noise impacts associated with intermittent noise sources that will be associated with the proposed project or that will affect the project site; • Include identification of noise mitigation measures required to produce "presumed to e acceptable" conditions on the potentially noise-impacted property; • Include an evaluation of the effectiveness of berms, sound walls, or wall-berm combinations for areas significantly affected by noise from railroad operations or traffic on state highways; • Include recommendations regarding feasible noise mitigation measures and an evaluation of their expected effectiveness if it is judged infeasible to reduce noise levels at the noise-impacted property to a "presumed to be acceptable" level; and • Include a discussion of mitigation monitoring procedures that can be used to ensure that recommended mitigation measures are implemented.
#6	The City shall recognize residential uses (including apartments and mobile homes). Motels, hotels, other transient lodgings, hospital, convalescent facilities, and schools as noise-sensitive land uses.

Table Source: Jones & Stokes, 1991

City of Lodi Noise Ordinance

Chapter 9.24 (Noise Regulation) of the City's Municipal Code is designed to prohibit "public nuisance noise" which "disturbs the peace and quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal noise sensitivity" through the establishment of standards that are used in consideration of whether a particular noise violation has occurred. These standards include (but are not limited) to the following:

- The volume of the noise;
- The intensity of the noise;
- Whether the nature of the noise is usual or unusual for the area and hour;
- Whether the origin of the noise is natural or unnatural;
- The volume and intensity of the background noise, if any;
- The proximity of the noise to residential sleeping facilities;
- The nature and the zoning of the area within which the noise emanates;
- The density of the inhabitation of the area within which the noise emanates;
- The time of day or night the noise occurs; and/or
- The duration of the noise.

15.3 ENVIRONMENTAL SETTING

Vehicular traffic (mobile noise sources) along SR-99, SR-12, local roadways (i.e., Cherokee Lane, etc.), the Union Pacific Railroad line, and a variety of stationary noise sources, are the primary noise generators within the City's Planning Area. Although the Lodi Airport is located some distance from the Planning Area, two smaller air parks (i.e., Kingdon and Lodi) are located in the southern portion of the Planning Area. Each of these noise sources is described in greater detail below.

TRAFFIC NOISE

As in most typical urbanized areas, the most pervasive noise sources in the City are motor vehicles, including automobiles, trucks, buses, and motorcycles. The noise generated from vehicles using roads within the Planning Area is governed primarily by the number of vehicles, type of vehicles (mix of automobiles, trucks, and other large vehicles), and their speed.

Traffic generates considerable noise levels, depending on the number, speed, and type of vehicles they accommodate.

The highest noise levels are adjacent to larger and more heavily traveled roadways including SR-99, SR-12. Noise levels that would affect noise sensitive land uses such as residences, schools, and hospitals also occur along major arterials, including Cherokee Lane, Lodi Avenue, Kettleman Lane.

Traffic Noise Measurements

As with most communities, vehicular traffic generates the major source of noise within the City's Planning Area. The traffic noise levels were computed using the Federal Highway Administration Traffic (FHWA) Noise Prediction Model (FHWA-RD-77-108). The model uses traffic volume, vehicle mix, vehicle speed, and roadway geometry to compute Leq. The Leq values were converted into CNEL using FHWA methodology. The traffic volumes are based on traffic data more fully described in Section 3.0 "Transportation Systems and Circulation" of this report.

Roadway noise levels for various streets within the Planning Area are provided in Table NOS-4. ***ESA working with Fehr and Peers to develop roadway noise contours using traffic count data.***

RAILROAD NOISE

Union Pacific Railroad generates railroad noise.

Railroad noise primarily occurs from existing operations along the Union Pacific Railroad (UPRR) line, which generally runs north-south through the Planning Area.

Railroad Noise Measurements

Several factors combine to produce railroad noises, including length of train, speed, grade, type of track, number of engines, and number of trips. Noise contours for the UPRR are provided in Figure 15-3. In developing the noise contours, two long-term (24-hour) sound measurements were collected. **ESA in the process of updating railroad noise contours.**

AIRPORT NOISE

The greatest potential for noise intrusion occurs when aircraft land, take off, or run their engines while on the ground. There are three primary sources of noise in a jet engine: the exhaust, the turbomachinery, and the fan. The noise associated with general aviation propeller aircraft (piston and turbo-prop) is produced primarily by the propellers and secondarily from the engine and an exhaust.

Aircraft noise affecting the Planning Area is primarily generated by the Kingdon Airpark and Lodi Airport. As shown in Figure 15-3, the Kingdon Airpark is located about three miles southwest of the City. This airpark is privately owned and can accommodate small twin-engine airplanes and other small general aviation aircraft. Its primary use is for agricultural activities and a summary of its key characteristics is provided in Table 15-4.

Table 15-4: Characteristics of Airports in the Planning Area

Airport	*Number of Runways*	*Main Runway Length*	*Main Runway Weight Cap (lbs)*	*Largest Aircraft Accommodated*
Kingdon Airpark	1	4,000	12,500	Light twin-engine craft
Lodi Airpark	2	2,705	12,500	Single-engine craft

Table Source: San Joaquin County, 1992

The Lodi Airpark is located three miles south of the City (see Figure 15-3). The facility is owned by an agricultural service firm and accommodates only small light aircraft (see Table 15-4). While it is open to the public, it provides no services except to its owner's aircraft.

Airport Noise Measurements

Note to Reader: ESA in the process of obtaining current airport noise contours for these airports.

COMMUNITY NOISE SURVEY

A community noise survey was conducted in April and May 2007 at eleven locations throughout the Planning Area to characterize typical noise levels. The results of this survey are provided below in Table 15-5. **ESA to confirm this approach and locations with City staff.**

Table 15-5 Short-Term Community Noise Measurements for the Planning Area

Location	*1985/1987 Measured Sound Levels*			*2007 Measured Sound Levels*		
	Time	*Leq(dBA)*	*Lmax*	*Time*	*Leq(dBA)*	*Lmax*
Lower Sacramento Road & Lodi Avenue	12:08 to 12:18	67.2	80.7			
Grant Avenue & Turner Road	12:38 to 1248	68.5	84.8			
Tokay Street &Virginia Avenue	11:37 to 11:47	60.0	74.6			
Stockton Street & John Blakely Park	11:03 to 11:13	63.4	78.4			
Kettleman Lane & Crescent Avenue	10:26 to 10:36	69.9	87.2			
Cherokee Lane, North of Vine Street						
Hutchins Street, South of Lodi Avenue						
Lodi Avenue, East of Hutchins Street						
Stockton Street, South of Vine Street						
Turner Lane, East of Ham Lane						

Table Source: Jones & Stokes, 1991

BIBLIOGRAPHY

California Department of Transportation. 1998. Traffic noise analysis protocol for new highway construction and reconstruction projects. Sacramento, CA.

County of San Joaquin. 1992. San Joaquin County 2010 General Plan Update. Stockton, CA

Federal Highway Administration. 1982. Title 23 Part 772 of the federal code of regulations (23CFR772), Washington D.C.

Jones & Stokes Associates, Inc. 1991. City of Lodi general plan policy document. Sacramento, CA. Prepared for: City of Lodi, Lodi, CA. With contributions from J. Laurence Mintier & Associates, TJKM, and Pepper Associates.

Office of Planning and Research. 2003. State of California general plan guidelines. Sacramento, CA

[This page intentionally left blank.]

16 Infrastructure

This chapter evaluates the existing conditions for the following infrastructure areas:

- Water Supply,
- Water Distribution,
- Sanitary Sewer,
- Wastewater Treatment,
- Recycled Water, and
- Stormwater.

These evaluations are based on existing City documents—several of which are over 15 years old—and discussions with City staff. Consequently, data in this report must be carefully reviewed prior to any decision-making that would affect the General Plan Update.

A critical approach to the City's current infrastructure management and planning is to view all water-related utilities and facilities listed above as interrelated—potable water becomes wastewater; wastewater can become a water supply for certain uses through water recycling; and stormwater can become a water supply through groundwater recharge. Impacts on one water type can influence the others. Therefore, the City currently uses a fully integrated approach to manage its water-related infrastructure and future infrastructural plans.

For the infrastructure areas listed above, there are significant issues that must be addressed for the future growth of the city, as summarized in Table 16-1.

Table 16-1 Overview of Infrastructure Issues

Infrastructure Type	Issues	Current Status	Influences on Future City Growth	Resulting Preferred Growth Progression Around the Existing City
Water Supply	Use of groundwater has exceeded the sustainable yield of the underlying aquifer, and additional water supplies are needed for the future growth of the City.	The City is developing surface water supplies and additional ground water wells. The proposed surface water treatment plant will likely be near the northwest corner of the City.	Future growth should begin near the proposed surface water treatment plant, which will likely be near the northwest corner of the City. The City has the first right of refusal for additional surface water supplies from WID. As the City grows, it will cover a greater area, and the sustainable groundwater supply will increase.	1. Northwest 2. Southwest 3. Southeast 4. Northeast 5. North of River
Water Quality	Pollutants have been found in the City's groundwater supply, including DBCP (used by farmers to kill nematodes until 1977) and Tetrachloroethylene (PCE) and trichloroethylene (TCE)	Six of the City's wells are equipped with granular activated carbon (GAC) filters to remove DBCP. The remaining wells meet state and federal standards, but have trace amounts of DBCP [Prima 2007]. PCE/TCE cleanup work is underway in portions of the City, and the and additional work is to commence in the near future [Prima 2007]. None of the City's operating wells are out of compliance with any drinking water standards.	The City is managing these water quality issues, and they should not create a significant influence on the City's growth.	N/A
Sewer System	The most recent sewer master plan identified many sewers within the City as flowing over capacity (as of 1990).	The City has a sewer replacement program for broken pipes. The capacity issues are mostly in the core area west of downtown, but these issues are manageable.	Growth should avoid areas served by overcapacity sewers. Growth areas should be served by new trunk sewers located around the periphery of the City and flowing to the existing trunk sewer outfall.	Significant infill and densification should be avoided.
Trunk Sewer Outfall	The sewers all flow to the City's trunk sewer outfall from the southwest corner of the City to the White Slough Water Pollution Control Facility (WSWPCF). Also, this trunk sewer has extensive corrosion and damage.	The City is evaluating options to repair (slip line) the outfall or replace the outfall. Slip lining the sewer will reduce its capacity and the most upstream segment (3,000 feet) would not meet the City's standard design criteria at the projected peak wastewater flow for the year 2020.	The trunk sewer outfall must be repaired or replaced to provide adequate capacity for the City to continue to grow. Growth areas should be served by new trunk sewers located around the periphery of the City and flowing to the trunk sewer outfall.	1. Southwest 2. Northwest and Southeast 3. Northeast 4. North of River
Wastewater Treatment	Currently the City's WSWPCF is not able to meet all of its discharge requirements, resulting in the need to expand the WSWPCF.	The design of the WSWPCF expansion is complete, and construction of the expansion is expected to be completed by the end of 2008, which will provide adequate capacity for the projected flows through the year 2020.	Growth beyond that projected for 2020 will result in the need for another expansion of the WSWPCF.	N/A
Recycled Water	The City's WSWPCF produces recycled water that is used for agricultural near the WSWPCF. However, the recycled water can not currently be delivered to the City for use within the City.	The City is studying approaches to provide reclaimed water and untreated WID water for use within the City. Use of these non-potable water supplies would reduce the need for potable surface and ground water supplies.	Recycled water would be pumped from the WSWPCF to the City, in a new pipe, probably adjacent to the existing sewer outfall, which means the recycled water would be available near the southwest corner of the City first.	1. Southwest 2. Northwest and Southeast 3. Northeast 4. North of River
Stormwater	The City and WID have a storm drainage agreement that limits the City's ultimate area and flow rate that can be discharged to the WID canal. This will result in the need for large stormwater detention basins. Stormwater could also be discharged to the Mokelumne River, but utilizing river discharges will likely have significant regulatory and permitting issues.	The City has stormwater discharge options available. However, the discharge rates to the WID canal are very low and will result in the need for large detention basins. After large storms, these detention basins will remain inundated for about 8 days for a 2-year storm to 16 days for a 100-year storm. Discharges to the river will also likely require detention basins to store water if the river is near flood stage and to reduce the capacity of the associated pumping stations.	Development should begin either near the WID canal and/or near the river, and progress away from these locations. Because of the long durations of inundation of detention basins, joint use of detention basins and parks should only be considered if the basins are designed using a "stair step" approach. This type of design would result in the upper "step" only being inundated in very large storms (like the 10-year or 25-year storms). The park facilities would be located on the upper step.	1. Adjacent to the River and South of City 2. West and east of City

Source: West Yost Associates, 2007

16.1 WATER SUPPLY

The City's water supply source is currently groundwater pumped from wells located throughout the city. However, the City is currently planning infrastructure to also provide treated surface water. Existing facilities include:

- 26 groundwater wells with capacities from 800 to 2,070 gallons per minute (gpm). Six of the wells are equipped with granular activated carbon filters to remove dibromochloropropane (DBCP);
- A 1-million gallon ground-level storage tank and a 0.1-million gallon elevated storage tank; and
- A network of pipes ranging in size from two to 14 inches in diameter for distributing the water throughout the City.

GOUNDWATER

Existing Groundwater Supply

Currently the City produces all of its water from the 26 groundwater wells. Thus, the annual groundwater production has equaled the annual water demand. The annual groundwater production from 1970 through 2005 is shown on Figure 16-1 [RMC 2006, all references are listed at the end of this report]. As shown, the annual groundwater production has increased over time (from 1970 to 2005) as the City has grown. The 2005 water production was 15,417 af.

Future Groundwater Supply

The historical groundwater pumping from the local groundwater basin (by the City of Lodi, other cities, agriculture, and private wells) has exceeded the sustainable yield of the aquifer underlying the City. The groundwater levels in City wells have decreased by about 30 feet since 1940. The sustainable yield has been estimated at 15,000 af/yr[1] for the area covered by the existing City.

SURFACE WATER

Future Surface Water Supply

The City has an agreement with Woodbridge Irrigation District (WID) (May 2003) to purchase 6,000 af/yr of surface water. In dry years, the surface water

[1] RMC, 2006.


The Woodbridge Irrigation Canal traverses through Lodi and will likely be the source supply for a future surface water treatment plant.

supply from WID may be reduced to 3,000 af/yr. The City intends to design and construct a surface water treatment plant.[2]

Although the specific site for the plant has not yet been determined, the water intake is likely to be from the WID canal, near its north end. The surface water treatment plant is likely to be near the northwest corner of the City.[3]

Shown on Figure 16-1 are the combined future estimated sustainable yield groundwater supply and surface water supply. The maximum supply is 21,000 af/yr in average and wet years and may be reduced to 18,000 af/yr in dry years. In Figure 16-1, the surface water treatment plant has been assumed to be constructed and operational by the year 2010.

Other Potential Surface Water Supplies

As part of the water purchase agreement, if WID determines that it has excess water rights that can be sold, those water rights must be offered to the City before they can be sold to anyone else [Prima 2007].

As the City grows to the west (within the WID service area) the agricultural land would be converted to urban uses, and the agricultural water supplied by WID to those lands will no longer be needed. This water may be available for the City to purchase, if WID decides to sell the water.

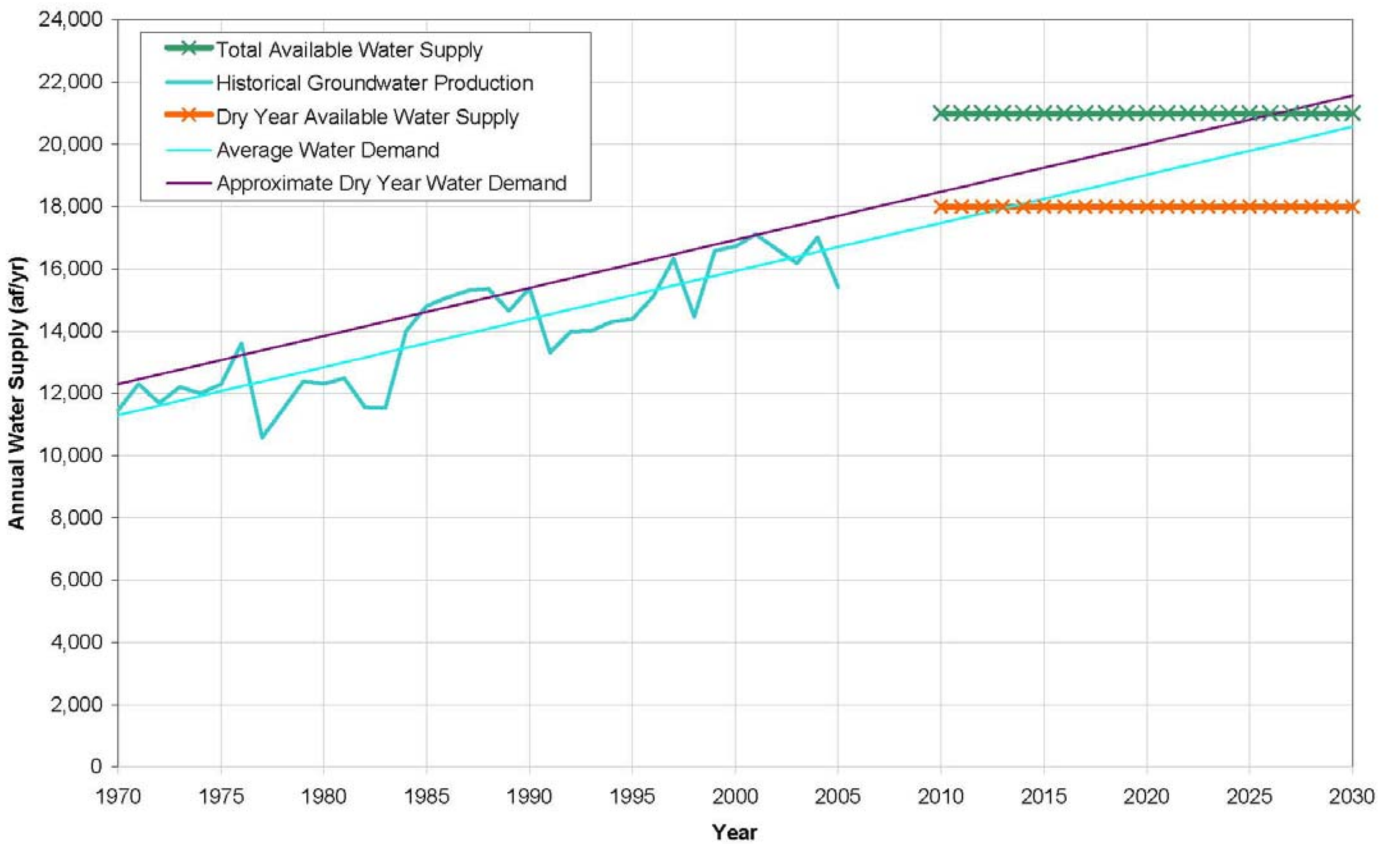
However, because the availability of additional water supply from WID is not certain, only the currently agreed upon 6,000 af/yr has been included in the total water supply shown in Figure 16-1.

---

[2] Prima, 2007.

[3] Prima, 2007.

Figure 16-1: Water Supply Evaluation



West Yost Associates

295\00-06-02L

RECYCLED WATER AND NONPOTABLE IRRIGATION WATER SUPPLY/DEMANDS

The City treats about 7,200 af/yr of wastewater at the White Slough Water Pollution Control Facility (WSWPCF) (discussed below), and about 2,500 af/yr is recycled and used for agricultural irrigation near the WSWPCF for growing animal feed and fodder crops (not for human consumption). Although this recycled water is put to beneficial use, there is currently no way to deliver it back to the City to satisfy nonpotable urban water demands, so it has not been included in Figure 16-1 as a future water supply.

As described below, the City discharges stormwater runoff to the WID canal, and this discharge is governed by the Storm Drainage Discharge Agreement between the City and WID.[4] One of the terms of this agreement allows the City to purchase water from WID for non-potable water uses. The annual quantity of purchased water shall not exceed the average annual storm drain discharge to the WID canal. This water is available for purchase only if WID has satisfied its irrigations demands, and has the ability to deliver it. The City does not currently have a method to distribute this water for use around the City, and consequently, this water has not been included in Figure 16-1 as a future water supply.

WATER QUALITY

DBCP was used by area farmers to kill nematodes in vineyards until it was banned in 1977. Six of the City's wells are equipped with granular activated carbon (GAC) filters to remove DBCP. The remaining wells meet state and federal standards, but have trace amounts of DBCP.[5]

Tetrachloroethylene (PCE) and trichloroethylene (TCE) contamination of the groundwater has been found in the north and central Lodi area. However, none of the City's operating wells are out of compliance with any drinking water standards. Cleanup work is underway in portions of this area, and the City expects clean up work to commence in additional areas in the near future.[6]

---

[4] WID, October 20, 1993.

[5] Prima, 2007.

[6] Prima, 2007.

OVERALL WATER SUPPLY ASSESSMENT

If the water demands from 1970 to 2005 are projected into the future, water supply shortages may occur around the year 2030 (Figure 16-1). In dry years, when the WID supply is reduced from 6,000 af/yr to 3,000 af/yr and water demands are at their highest, water shortages may occur before 2010. This projection of future water shortages is:

- Dependent on the rate of future growth of the City being similar to the past growth rate of the City, which may or may not be the case.
- Assumes that no additional water supplies are acquired in the future. However, because the City currently manages its water related infrastructure and plans future infrastructure with a fully integrated approach to water supply, wastewater treatment/recycling, and stormwater, it is likely that additional non-potable water supplies will be developed in the future.
- In infrequent dry years, groundwater pumping could exceed the estimated safe yield of 15,000 af/yr, temporarily providing increased total supply.

WATER SUPPLY: PLANNING ISSUES AND IMPLICATIONS

Water supply related opportunities and constraints are provided below:

1. The City will need to acquire additional water supply in the near future.
2. The future potable water demands could be reduced by use of non-potable water for landscape irrigation. The City is currently evaluating potential additional potable and nonpotable water supplies.
3. If the future water treatment plant is located in the northwest corner of the City (as anticipated), it would be beneficial for the future development to begin near the northwest corner of the City, and over time, progress southward adjacent to the existing City.
4. As the area of the City increases with future development, the sustainable yield from the underlying groundwater basin available to the City will also increase.

16.2 WATER DISTRIBUTION

The City provides water through a water distribution system. This system includes:

- 26 existing groundwater wells with a total pumping capacity of 35,200 gpm.[7] Also, two new wells are currently under development.[8]
- A network of water pipes, which includes about 225 miles of pipe ranging in diameter from 2 inches to 14-inches.
- Two storage tanks, including a 100,000 gallon elevated tank and a 1 million gallon ground level tank with booster pumping station.

The City's goal for groundwater wells is for the system to have a 20 percent redundancy. However, on one day in the summer of 2005, all of the wells were needed to satisfy the required demand. Thus, the City does not have the desired 20 percent redundancy. When the two new wells are completed, the situation will be significantly improved, but still, the desired redundancy level will not be achieved.

Some of the existing two-inch and three-inch water distribution pipe lines do not have adequate capacity, particularly for providing fire flows and increased housing density, and could not serve increased water demands. The City has a water line replacement program in which about 1 percent of these small water pipes are replaced each year [Prima 2007].[9]

The current water distribution system operates with a single pressure zone. The City operates the water system to maintain a minimum pressure of 45 psi (pounds per square inch).

Based on the minimum pressure of 45 psi, the City is currently capable of maintaining a hydraulic gradeline (HGL) at an elevation of about 165 feet. The highest elevation within the City's current service area is about 60 feet above sea level. If the City expands to the eastern edge of the GP planning boundary, the highest elevation requiring water service will be about 72 feet. Maintaining the current minimum HGL, the water distribution system would be capable of delivery at a minimum pressure of 40 psi. The Department of Health Services (DHS) requires a minimum water delivery pressure of 40 psi [DHS, 2006 (Sec. 6460 2(b))]. Therefore, development

---

[7] RMC 2006.

[8] Prima, 2007.

[9] Prima, 2007.

to the east of the current water delivery system would not likely require an additional pressure zone, although those served at the highest elevations would have a lower water pressure than those within the current City limits. The City could develop eastward under one water delivery pressure zone while meeting DHS regulations particularly if a new production well is located in the northeast corner of the planning area.

Development to the west and south would also not require separate pressure zones as the elevations in these regions have the same or lower elevations as the area within the existing water distribution system.

Prior to further development, additional modeling of the distribution system should be conducted to confirm this preliminary finding.

WATER DISTRIBUTION: PLANNING ISSUES AND IMPLICATIONS

The water distribution system opportunities and constraints include the following:

1. If the future water treatment plant is located in the northwest corner of the City (as anticipated), it would be beneficial for the future development to begin near the northwest corner of the City, and over time, progress southward adjacent to the existing City.
2. A new transmission water main could then be constructed around the periphery of the City as development continues to the south, along the south boundary of the City, and then along the remaining boundary of the existing City.
3. Growth north of the Mokelumne River could be served water through a water main attached to either the Lower Sacramento River Bridge or to the Highway 99 Bridge.
4. There should be no need to create additional pressure zones because of potential growth within the GP planning boundary.

16.3 SANITARY SEWER SYSTEM

The City has a municipal sanitary sewer collection system that generally flows from the northeast to the southwest. This system includes the municipal collection system within the City and a 48-inch outfall from the City to the wastewater treatment plant.

There is also an industrial sewer system that conveys cannery process wastewater to the wastewater treatment plant. This cannery wastewater does not enter the White Slough Water Pollution Control Facility (WSWPCF) major treatment process. Instead it is screened and then used for irrigation (in the summer) or stored in ponds (in the winter).

MUNICIPAL COLLECTION SYSTEM

The municipal sewer system collects wastewater from most of the City (except the northward east industrial wastewater, see below). This system consists of sewer pipes ranging in sizes from 4 to 42-inches in diameter, with 6-inches being the predominant size [B&V 1990]. There are six trunk sewers serving the existing City that generally flow from the north to the south. Near the southern edge of town, there is another trunk sewer that flows from the east to the west, and into a 48-inch trunk sewer to the WSWPCF. The sewer system includes five pump stations in the northern area of the City and one in the southern area of the City.

The most recent City wide evaluation of the municipal sewer system is the document *Sanitary Sewer System Technical Report for the 1990 General Plan Update for The City of Lodi California*, Black & Veatch, 1990 [B&V 1990]. This report identified the following trunk sewer segments as flowing over capacity (as of 1990):

- 10-inch sewer in Beckman Road between Pine Street and Lodi Avenue
- 16-inch sewer in Washington Street between Lodi Avenue and Tokay Street
- 18-inch sewer in Stockton Street between Watson Street and Kettleman Lane
- 10-inch sewer in Turner Road between Lakewood Drive and Ham Lane
- 12-inch sewer in Lockeford Street between Pleasant and California streets
- 12-inch sewer in California Street between Lockeford and Locust streets
- 15-inch sewer in Rose Street between Locust and Walnut streets
- 14-inch sewer in Orange Avenue between Lodi Avenue and Tokay Street
- 15-inch sewer in Lower Sacramento Road between Elm Street and Lodi Avenue
- 18-inch sewer in Lower Sacramento Road between Taylor Road and Kettleman Lane

Parallel relief sewers were recommended to address these existing capacity shortages and to provide for existing and future sewer flows. It was also determined that many existing sewers lacked adequate capacity for the future general plan buildout flows, including much of the Century Boulevard trunk sewer. New sewers were planned for future development.

The EIR for the Reynolds Ranch updated the evaluation of the Century Boulevard trunk sewer, and concluded that it lacked adequate capacity for the flow from the southern area of the City. Consequently, a new 24 to 30-inch sewer, expansion of an existing pump station and a new force main were proposed to serve Reynolds Ranch, and areas east, south, and west of Reynolds Ranch [Willdan 2006].

MUNICIPAL OUTFALL

The existing sewer collection system flows to point along Lower Sacramento Road between Harney Lane and Century Boulevard. From this point, an existing 48-inch sewer outfall conveys wastewater to the City's WSWPCF. This outfall was constructed in 1967 with reinforced concrete pipe (RCP).

This outfall has extensive corrosion and damage, and City Staff have indicated that it will need to be either sliplined or completely replaced in the near future and the City is currently evaluating how to best address this problem [Prima 2007]. The capacity of this outfall was evaluated based on its as-built drawing set, "SANITARY SEWER OUTFALL PIPELINE NO. 2" as-built drawings dated 12-28-67, as shown in Table 16-2. Trunk sewers are designed to flow ¾ full [City of Lodi, 1991]. As shown in Table 16-2, when this trunk sewer was built, it had a design capacity ranging from 21.6 to 26.5 mgd. In its current corroded state, the capacity is probably significantly lower. If it is slip lined, the diameter of the pipe would be reduced (probably to 42-inches) and the capacity would be reduced to about 15.1 to 18.6 mgd.

Current average dry weather flow (ADWF) from the City is about 6.3 mgd, and this ADWF flow corresponds to a peak hour wet weather flow (PHWWF) of about 12 mgd. The PHWWF was projected to increase to 14.4 mgd in the year 2010 and increase to 16.3 mgd in the year 2020 [WYA 2001]. The outfall must convey the PHWWF. Consequently, the most upstream segment of the outfall will lack adequate capacity if the pipe is slip lined and the requirement for ¾ full flow is enforced. If the outfall was allowed to flow full then the slip lined pipe would have adequate capacity for future projected flows through 2020. Also, if future development was connected about 3,000 feet downstream of Lower Sacramento Road, then the sliplined outfall would have adequate capacity for the anticipated flows through 2020.

Table 16-2: Evaluation of Outfall Capacity(1)

Location	*Pipe Capacity*	
	Full Pipe Capacity, mgd	*3/4 Full Capacity, mgd*
As-Built 48-Inch Pipe Capacity		
White Slough WPCF to Thornton Road	29.1	26.5
Thornton Road to Existing Ditch (3,000' downstream of Lower Sacramento Road)	27.1	24.7
Existing Ditch (3,000' downstream of Lower Sacramento Road) to Lower Sacramento Road	23.7	21.6
Slip Lined 42-Inch Pipe Capacity		
White Slough WPCF to Thornton Road	20.4	18.6
Thornton Road to Existing Ditch (3,000' downstream of Lower Sacramento Road)	19.0	17.3
Existing Ditch (3,000' downstream of Lower Sacramento Road) to Lower Sacramento Road	16.6	15.1

1. Capacity analysis is based on the drawing set "SANITARY SEWER OUTFALL PIPELINE NO. 2" as-built drawings dated December 28, 1967.

INDUSTRIAL SEWER

There is also an industrial sewer system that conveys cannery process wastewater to the wastewater treatment plant. This cannery wastewater does not enter the WSWPCF's major treatment process. Instead it is screened and then used for irrigation (in the summer) or stored in ponds (in the winter). This industrial sewer begins as an 8-inch sewer near the intersection of Turner Road and the Union Pacific Rail Road (UPRR). It flows south in Sacramento Street to Kettleman Lane, and then west in Kettleman Lane to Lower Sacramento Road, where it turns south. From Lower Sacramento Road, it parallels the municipal outfall to the WSWPCF. From just north of the intersection of Sacramento Street and Kettleman Lane to the WSWPCF, this industrial sewer is 30-inches in diameter.

SANITARY SEWER: PLANNING ISSUES AND IMPLICATIONS

The sanitary sewer opportunities and constraints include the following:

1. Generally, new development areas should not flow through existing sewers without detailed studies to verify that the existing sewers have adequate capacity (in particular development north of the Mokelumne River).

2. New development should discharge into new trunk sewers that flow around the periphery of the existing City and to the municipal outfall near the southwest corner of the City.
3. Development north of the Mokelumne River could be provided with sewer service through a sewer pump station (located near the north side of the Highway 99 Bridge), and a force main (pipe) attached to the bridge that discharges into a new sewer serving the growth along the east side of the City.
4. If there is going to be future development east of the existing City, the new sewer that is currently proposed to serve Reynolds Ranch should be upsized to convey all wastewater flows from areas east of the City.
5. Because all wastewater flows must enter the existing, sliplined, or new outfall from the City to the WSWPCF, it would be beneficial for future development to begin near the southwest corner of the current City. Development on the west side of the City would extend northward along the west boundary of existing City. Development south of the existing City would extend over time eastward and then northward around the existing City, ending at the area within the proposed planning boundary north of the Mokelumne River.
6. If new development is connected to the existing outfall at a point 3,000 feet downstream of Lower Sacramento Road, then the outfall would have adequate capacity for the projected flows through 2020, even if the pipe is slip lined to a 42-inch diameter.

16.4 WASTEWATER TREATMENT

The White Slough Water Pollution Control Facility (WSWPCF) is located southwest of the City at a location along the west side of Interstate-5 (I-5) about two miles south of the Highway 12 interchange. The plant consists of comminutors, grit removal, primary sedimentation, activated sludge treatment, secondary clarification, and effluent filtration and associated chemical feed facilities and UV disinfection facilities. The WSWPCF accepts both municipal and industrial wastewater.

In the report, *City of Lodi, Wastewater Master Plan*, prepared by WYA in January 2001,[10] future wastewater flows were estimated from 1998 to 2020, as shown on Figure 16-2[11]. Flows were projected at three different growth rates, and a growth rate of 1.5 percent per year was adopted for planning the expansion of the WSWPCF. Provided in Table 16-3 is a summary of the projected flow rates for the years 2010 and 2020. However, the ADWF

---

[10] WYA, 2001.

[11] WYA, 2001.

for 2006 was 6.3 mgd, which is lower than was projected in the Wastewater Master Plan.

Table 16-3 Projected Municipal Wastewater Flows

	2010	*2020*
Average	7.5	8.5
Peak Month	8.5	9.6
Peak Day	9.7	11.0
Peak Hour	14.4	16.3
Peak Day, dry weather	8.9	10.0
Peak Hour, dry weather	12.7	14.5

Source: West Yost, 2007.

EXISTING TREATMENT PLANT

The City has been providing wastewater service for the Lodi community since 1923. Originally, wastewater was treated at a facility located within the City limits. In 1966, the City constructed the treatment facility at the current WSWPCF site, constructed a pipeline from the original wastewater treatment plant to the site, and began practicing agricultural reuse shortly thereafter.[12]

The initial components of the existing WSWPCF were originally constructed in 1966. Since that time, several treatment upgrade and capacity expansion projects have been completed. Today, the WSWPCF treats approximately 6.3 million gallon per day (mgd) (annual average) of municipal wastewater from the City. Since its upgrade in 1992, the WSWPCF was rated at a capacity of 8.5 mgd; however, the plant cannot treat 8.5 mgd to levels specified in the City's current NPDES waste discharge permit for ammonia, and therefore, the effective WSWPCF capacity for which the plant is permitted is 7.0 mgd. The WSWPCF includes a municipal wastewater treatment process, biosolids treatment process, and industrial wastewater treatment process.

The existing municipal wastewater treatment process consists of comminutors, grit removal, primary sedimentation, activated sludge treatment, secondary clarification, and effluent filtration and associated chemical feed facilities and UV disinfection facilities. It also includes biosolids treatment facilities.

[12] WYA, 2001.

DISPOSAL

Some municipal effluent is discharged to Dredger Cut and some is land applied. The municipal effluent discharged to Dredger Cut under the NPDES program is filtered and disinfected to State of California Title 22 recycled water tertiary standards. Domestic municipal wastewater flows discharged to the land application areas are treated to undisinfected secondary standards.

During the summer months, industrial flows (primarily from a large cannery) are blended with flows stored in the City's onsite storage ponds, and directed to the City's fields for agricultural reuse. During the remainder of the year, industrial flows (with little to no cannery flow) are directed to the onsite storage ponds, where they are blended with other flows and stored until being land applied in the following year.

WSWPCF EXPANSION

As part of the City's Improvements Project 2007, the City is currently implementing modifications to the municipal wastewater treatment process, biosolids treatment process, and industrial wastewater screening process at the WSWPCF. The existing municipal treatment process train was originally designed to treat an average dry weather flow of 8.5 mgd, however, the process is not capable of satisfying current regulatory requirements for ammonia at this flow rate. The purpose of the municipal wastewater treatment upgrade is to increase available dry weather treatment permitted capacity from 7.0 mgd to 8.5 mgd and to meet future NPDES permit limits and long-term land management needs. The planned municipal facility improvements for 2007 include:

- Installation of two new influent screens, screenings washers, and two new influent pumps;
- Installation of new diffusers in Aerations Basins 1 and 2;
- Installation of flow modifications to the aeration basins to achieve improved denitrification;
- Construction of Aeration Basins 5 and 6, with denitrification;
- Construction of one Secondary Clarifier; and
- Construction of Primary Digester No. 4

The layout of these planned improvements is shown on Figure 16-2. Following these upgrades, the WSWPCF will be capable of providing oxidized, de-nitrified (to an average of less than 10 milligrams per liter (mg/L) of NO3-N), filtered, and disinfected effluent for up to of 8.5 mgd of average dry weather flow. The City anticipates that the next permit for a discharge limit of 8.5 mgd will be issued after the improvements are constructed in 2007.

In addition to the upgrades included in the Improvements Project 2007, the City is considering the addition of aeration and expansion of the storage ponds and a constructed treatment wetland to polish the filtered, disinfected effluent from the WSWPCF prior to discharge to Dredger Cut. The constructed treatment wetland would be located on a portion of the existing agricultural reuse area, just west of the existing storage ponds.

In conjunction with Improvements Project 2007, the City is also planning to construct a new return activated sludge (RAS) pump station and a fourth anaerobic digester. Additionally, the City is planning to redirect the biosolids lagoon supernatant flows to a location upstream of the municipal treatment system aerations basins. This modification would result in nitrogen removal from the supernatant flows and result in a reduction in the nitrogen load applied to the existing irrigation reuse facilities.

The City is also currently considering requests for additional discharges to the industrial sewer line. To accommodate additional industrial loading, the City is evaluating construction of an aeration basin that would provide treatment for a portion of the increased loads.

WOODBRIDGE AND FLAG CITY

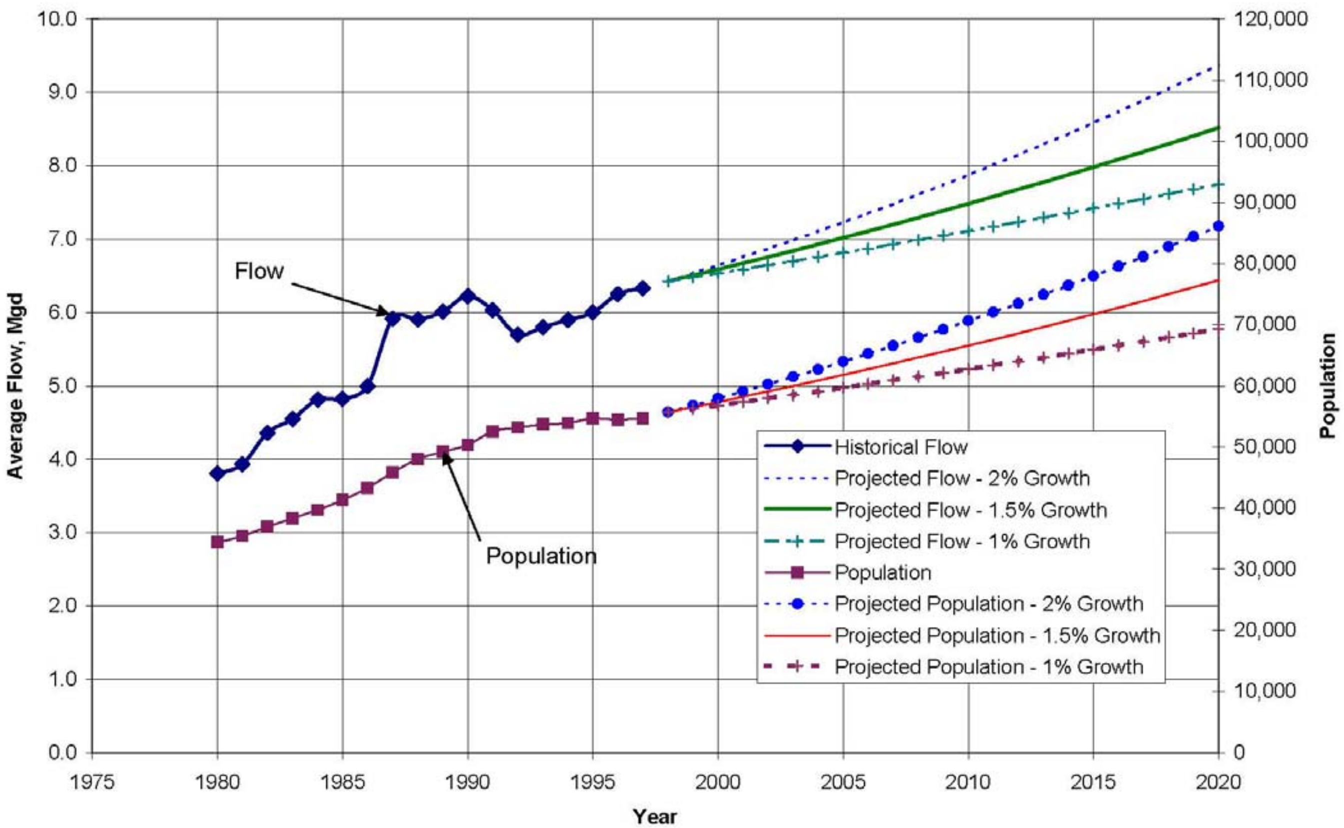
Woodbridge

Woodbridge, an adjacent neighboring community to the north, has its own wastewater treatment plant. This plant is operating at its capacity and cannot accommodate additional growth in its service area. There are no plans to redirect Woodbridge's wastewater to the WSWPCF.

Flag City

The San Joaquin County Service Area 31, also known as Flag City, is located along I-5 at the intersection with State Highway 12, approximately 6 miles west of the City of Lodi. The Flag City Wastewater Treatment Plant (FCWWTP) is located in the southeastern corner of the Flag City service area. The wastewater treatment process train consists of a package-type treatment facility that includes raw sewage pumps, activated sludge extended aeration and secondary clarification (Aero-Mod Treatment Unit), effluent filtration, disinfection with sodium hypochlorite, and dechlorination with sulfite. The existing FCWWTP

Figure 16-2: Historical and Projected Population and Wastewater Flow



average dry weather capacity is 0.16 mgd and peak wet weather capacity is 0.64 mgd.

As development continues in CSA 31, the wastewater flows will eventually exceed the existing plant capacity, necessitating an expansion. The average dry weather flow (ADWF) for buildout of the 80 acres in the Flag City Service Area is expected to range from 0.20 to 0.22 mgd, significantly greater than the 0.16 mgd previously estimated for the service area. Furthermore, assuming existing influent BOD and TSS water quality concentration data would be representative of future conditions, a treatment upgrade would be necessary to comply with Central Valley Regional Water Quality Control Board (CVRWQCB) regulations.

The County is currently completing an evaluation of the facilities needed to upgrade the FCWWTP to provide the level of treatment needed for continued surface water discharge.

An alternative to upgrading the FCWWTP would be to connect the Flag City influent to the City of Lodi's WSWPCF. The future treatment and disposal of wastewater from Flag City is not yet resolved.

WASTEWATER TREATMENT: PLANNING ISSUES AND IMPLICATIONS

The wastewater treatment opportunities and constraints include the following:

1. Current flows to the WSWPCF are about 6.3 mgd, and the existing plant capacity is 7.0 mgd. This leaves an unused capacity of about 0.7 mgd, which would serve about 2,300 single family homes (or the equivalent flow from other land uses).
2. The WSWPCF expansion to an ADWF capacity of 8.5 mgd is expected to be completed by the end of 2008 [Anderson, 2007]. This will provide an additional capacity of about 1.5 mgd, which would serve about 5,000 additional single family homes beyond the 2,300 homes identified above (or the equivalent flow from other land uses).

16.5 RECYCLED WATER

Currently the City recycles about 2,500 acre-feet per year of industrial and domestic wastewater. Before recycling, the domestic water is first treated at the WSWPCF to a secondary level. The City uses industrial and/or domestic recycled water to irrigate over 1,000 acres of agricultural land owned by the City.

In addition to irrigation, the recycled water is used for other purposes. In recent years, the City has supplied recycled water from the domestic treatment process to produce steam for a 49-megawatt natural gaspowered generator, and to replenish mosquito fish-rearing ponds. Additionally, the City has provided a "will-serve" letter to the Northern California Power Agency (NCPA) for a potential power plant that will utilize an average of 1 mgd of treated wastewater.

The City is planning for an expanded recycled water program through the development of a Recycled Water Master Plan (RWMP) for the City's service area. This program would outline a plan for the City's future recycled water program. This program would also provide an increased water supply to meet certain non-potable water demands. According to the 2005 Urban Water Management Plan,[13] the available water supply could increase by about 2,800 acre-feet per year by 2030 as this volume used for municipal landscape irrigation would be supplied in the future with recycled water instead of potable water. Presently, the City has not made any commitments to recycled water uses, although recycled water is considered to be an important aspect of the City's future water supplies. The City's upcoming RWMP will address the technical and economic feasibility of serving the above potential recycled water uses.

With the upcoming development of a RWMP, as well as additional recycled water infrastructure, the amount of treated wastewater discharged to the Delta will likely decrease as demand for recycled water increases. Also, the City's total potable water supply requirements will decrease if recycled water can be used for non-potable urban uses.

RECYCLED WATER: PLANNING ISSUES AND IMPLICATIONS

The recycled water opportunities and constraints include the following:

1. Recycled water can provide additional non-potable water supply for the City, and thereby reduce the demand for potable water.
2. Recycled water could be treated at the WSWPCF and then pumped back to the City or a scalping plant could be constructed near the City that treats only the wastewater flow that is needed for recycled uses within or near the City.
3. Piping for recycled water could be constructed in new developments.

[13] RMC, 2006.

16.6 STORMWATER DISCHARGE SYSTEM

The City's storm drain system consists of drain inlets, storm drain pipes, detention basins, gravity outfalls into the Mokelumne River, and pumping plants with outfalls to the Mokelumne River and the WID canal. This system is shown on Figure 16-3. The storm drain system includes 18 watersheds/outfalls, with 16 of these outfalls discharging to the Mokelumne River and two discharging to the WID canal [B&V 2003]. There are about 110 miles of storm drains ranging in size from 6 to 72 inches in diameter. There are eight detention basins located in City Parks, and there are 14 pump stations.

The City's existing stormwater system functions well, with no significant flooding problems. Like many other relatively flat, Central Valley communities, however, there are areas of minor drainage nuisances.[14]

Mokelumne River Discharges

As shown on Figure 16-3, the watersheds that discharge to the Mokelumne River include watersheds B2, C, E, and H. These watersheds either gravity drain into the river or are pumped into the river. These watersheds comprise a total area of 2,309 acres.[15]

WID Discharges

The City's drainage discharges to the WID canal are governed by the Storm Drainage Discharge Agreement between the City and WID dated October 20, 1993.[16] The key elements of this agreement are summarized below:

- This agreement superseded all previous agreements.
- The area covered by the agreement is defined as the City's corporate boundaries (6,528 acres as of January 1, 1993). However, the City boundary may change, so a maximum, ultimate boundary was also defined. That ultimate boundary is shown on Figure 16-3, and includes 16,800 acres.
- The agreement was for 40 years, but could be canceled by either party for cause, or could be extended by mutual consent.

---

[14] Prima, 2007.

[15] B&V, 2003.

[16] WID, 2003.

- The agreement recognizes that the WID canals are for irrigation purposes and for groundwater recharge. It requires the City to operate its pump stations to avoid overloading the canal and avoid interfering with WID operations.
- It limits the total discharge into the canal from the City to 160 cfs. Also, when the canal is in use by WID for irrigation, the City may not discharge more than 40 cfs for the first 12 hours of a storm (unless otherwise approved by WID). The discharge from any single pump station may not exceed 60 cfs.
- The City was required to install flow meters on its discharge pipes to the WID canal, and provide the flow data to WID. Other minor City requirements were established.
- WID will allow the City to construct/widen several street crossings over the WID canal, Modify the Beckman and Shady Acres pump stations, and construct additional discharge points to accommodate the defined service area.
- This agreement also allows the City to purchase water from WID for non-potable water uses. The annual quantity of purchased water shall not exceed the average annual storm drain discharge. This water is available for purchase only if WID has satisfied its irrigation demands and has the ability to deliver the water.
- The City will take reasonable precautions to prevent/remove toxic substances, pollutants, and wastes before discharging flow into the WID canal.
- The agreement established the fee paid by the City to WID for discharging into the WID Canal. In 1995 the fee was $7.91 per acre within the Corporate boundary. The fee increases by three percent annually.

The conveyance capacity of the WID canal is 400 cfs, thus the City's potential discharge of 160 cfs represents 40 percent of the canal's capacity. City staff stated that the key to ensuring this agreement works well currently and throughout the future is effective communication between the City and WID.

Currently, only the Shady Acres Pump Station and the Beckman Pump Station discharge into the WID Canal.

- **Beckman Pump Station.** This pump station has a tributary watershed of 3,400 acres, which includes watersheds A1, A2, D, F, G1, G2 and I. These watersheds drain to the Beckman Park detention basin. From the detention basin, runoff is pumped into the WID Canal. The pump station has 9 pumps, with a capacities of 6 to 22 cfs (ranging from 14 to 50 horsepower). Normally pump stations are rated by the firm capacity, which means the capacity with one pump (usually the largest) not in use. The firm capacity of the Beckman Pump Station is about 98 cfs, and the total capacity is about 120 cfs. However, the Storm Drainage Discharge Agreement between the City and WID limits the pumped flow into the WID Canal to 60 cfs at any pump station.

- **Shady Acres Pump Station.** This pump station has a tributary watershed of 964 acres (Watershed B1). This watershed drains to the Vinewood Park detention basin. From the detention basin, runoff is pumped into the WID Canal. The pump station has five pumps, with a capacities of 7 or 20 cfs (14 or 40 horsepower). The firm capacity of the Shady Acres Pump Station is 53 cfs, and the total capacity is 73 cfs. Again the discharge from this pump station to the WID Canal is limited to 60 cfs.

The ultimate boundary of the area that could be tributary to the WID canal is shown on Figure 16-3 [WID 1993], and includes about 16,800 acres. Of this area, 2,309 acres currently drains to the Mokelumne River. Runoff from an area of 4,364 acres is currently pumped to the WID canal by the Beckman and Shady Acres pump stations. This leaves an area of 10,127 acres to be discharged into the WID canal, the Mokelumne River or local stream. If drainage is to be discharged to the WID canal, a new pump station would be limited to a maximum discharge rate of 60 cfs. Because the City has numerous detention basins within the Beckman and Shady Acres pump station tributary watersheds, and because the new development will also have detention basins, the City will need to manage the detention and pumping of storm water to stay within the overall discharge limit of 160 cfs. Drainage discharge to other steams or the Mokelumne River will need to be carefully studied to assure no impacts to downstream land or facilities.

Pixley Park, currently undeveloped, acts as a detention basin and is filled with water during rainy seasons.

Joint Use Detention Basins

The limited discharge rates allowed into the WID canal will result in large detention basins holding stormwater for long time periods. For example, in a two year storm there would be water in a basin for about eight days or longer, and for a 100-year storm there would be water for 16 days or longer. Because of these long periods of inundation, combining detention basins and parks in the future may only be appropriate for Lodi if the basins are graded in a "stair step" approach. This type of grading would result in the upper "step" of the basin only being inundated in storms greater than a 10-year or 25-year event. The joint use park facilities would be located in the upper step.

Woodbridge

The Woodbridge area has its own drainage system that discharges to the Tuolumne River. This system is not connected to Lodi's storm drain system, and is not operated or maintained by the City of Lodi.

STORMWATER QUALITY

To protect stormwater quality, the City has developed and implemented a Stormwater Management Program (SMP)[17] that describes best management practices (BMPs), measurable goals, and timetables for implementation of six water quality program areas: public education and outreach; illicit discharge detection and elimination; public participation/involvement; construction site runoff control; post-construction runoff control; and pollution prevention/good housekeeping. This program covers future development as well as the existing City. The goal of the SMP is to reduce the City's discharge of pollutants to the Maximum Extent Practicable (MEP) and help ensure that the Mokelumne River and other receiving waters will be protected.

STORMWATER: PLANNING ISSUES AND IMPLICATIONS

The storm drainage opportunities and constraints include the following.

1. New development areas within the ultimate WID Canal Discharge Boundary can be pumped at a rate of about 0.006 cfs (or more) per acre into the WID Canal. To achieve this discharge rate, detention storage will be needed. This storage could be provided either within each individual development or in large regional detention basins.
2. Areas just south of the Mokelumne River could drain to and be pumped into the river. This would decrease the area that would drain to the WID canal and thereby increase the potential discharge rate per acre.
3. To facilitate this drainage pattern, it would be beneficial for future development to begin near the south-center area of the current City. Development on the west side of the WID Canal would extend westward and then northward around the existing City. Development on the east side of the WID Canal would begin at the WID Canal and extend over time eastward and then northward around the existing City.
4. Areas east and south of the ultimate WID Discharge Boundary will need to develop new stormwater outfalls, probably into Pixley Slough. The discharge rates should not exceed the existing discharge rate from these areas. Thus, on-site detention storage would be required.
5. Areas west of the ultimate WID Discharge Boundary will need to develop new stormwater outfalls, possibly into Pixley Slough or another drainage facility. The discharge rates should not exceed the existing discharge rate from these areas. Thus, on-site detention storage would be required.

[17] B&V, 2003.

6. Areas north of the Mokelumne River will need to develop new stormwater outfalls, probably to the Mokelumne River. The discharge rates should not exceed the existing discharge rate from these areas. Thus, on-site detention storage would be required.
7. Stormwater quality is protected through the City's SMP. This program covers future development as well as the existing City, so stormwater quality does not represent a significant constraint to the growth of the City.

BIBLIOGRAPHY

Anderson. 2007. Personal communication with Dave Anderson, West Yost Associates, February 20, 2007.

B&V. 1990. *Sanitary Sewer System Technical Report for the 1990 General Plan Update for The City of Lodi California*, Black & Veatch, 1990.

B&V. 2003. *City of Lodi Stormwater Management Program*, prepared by Black and Veatch, January 2003.

City of Lodi. 1991. Public Works Department, *Public Works Design Standards*, City of Lodi, May 1991.

Prima. 2007. Personal communication with Richard Prima, City of Lodi Director of Public Works, January 5, 2007.

RMC. 2006. *City of Lodi 2005 Urban Water Management Plan*, Final Report, March 2006, Prepared by RMC.

WID. 1993. Woodbridge – City of Lodi Storm Drainage Discharge Agreement, October 1993.

Willdan. 2006. Reynolds Ranch Project, Final Environmental Impact Report, prepared for the City of Lodi by Willdan, August 2006.

WYA. 2001. *City of Lodi, Wastewater Master Plan*, January 2001, West Yost Associates.

DYETT & BHATIA
Urban and Regional Planners

755 Sansome Street, Suite 400
San Francisco, California 94111
415 956 4300 415 956 7315