DIVISION 6. COMMUNITY FACILITIES

Introduction

State law requires that a specific plan shall include "the proposed distribution, location, and extent and intensity of major components of public and private transportation, sewage, water, drainage, solid waste disposal, energy, and other essential facilities proposed to be located within the area covered by the plan and needed to support the land uses described in the plan" (Section 65451, California Government Code). Division 6 is included to comply with State requirements for public facilities planning in the Specific Plan. This Division will summarize the existing facilities serving the planning area, as well as required improvements needed to serve proposed land uses under the Specific Plan. The final chapter contains a proposed phasing plan for required improvements.

Portions of the following sections were abstracted from engineer's reports prepared for the Specific Plan. To obtain detailed descriptions of technical engineering design standards for water, sewerage and drainage systems, refer to the East Valley Corridor Specific Plan Engineer's Report, Appendix "A" of the Specific Plan.

CHAPTER 1. ROADS

Section EV6.0101 Existing Facilities

Arterial access to the study area from the south, east and west is adequately provided via four closely spaced interchanges along Interstate 10. However, arterial access to the study area from the north and northwest is severely limited by the physical presence of the Santa Ana River Wash and Norton Air Force Base. South of I-10, east/west access is provided via Barton Road and Redlands Boulevard from Redlands to San Bernardino through the study area. In recent years, the combination of increasing inter-regional travel along I-10, increasing local development within the study area, and the limited adjacent arterial facilities through the corridor have led to increased peak hour congestion on I-10 and at key intersections within the study area.

(a) Regional Highway System

(1) Interstate 10

In 1984, Caltrans reported that the existing 6 travel lanes of I-10 were carrying approximately 87,000 vehicles daily at level of service (LOS) D. They forecast that by the year 2005, that portion of I-10 from SR-30 to I-215 will carry 172,000 vehicles daily. In order to meet that demand, Caltrans has included funds for the addition of two travel lanes on I-10 from SR-30 to the I-215 interchange, in the 5-Year State Transportation Improvement Program.

Even with those improvements, however, LOS E operation, with average daily speeds of 42 miles per hour, are forecast (Caltrans "I-10 Route Concept Report," November 1984).

(2) State Route 30

SR-30 is a new, high speed, grade separated facility designed to serve intra-regional and local trips for those communities developing between the foothills of the San Gabriel and San Bernardino Mountains. SR-30 connects those communities to I-10. SR-30 is planned to extend from I-10 to north of Highland Avenue, then turn west, to parallel Highland Avenue. Ultimately, SR-30 is proposed to interchange with I-215, and eventually terminate in the City of La Verne.

SR-30 is presently incomplete, with a segment missing north of the study area between Fifth Street and Highland Avenue in San Bernardino. Further, SR-30 now terminates at SR-259, just short of I-215. An extension of the existing terminus is planned to bring SR-30 into an interchange with the I-215 and beyond to merge it into Highland Avenue on the west side of the City of San Bernardino. That extension plus the construction of the missing segment, the upgrading of the SR-30/I 10 interchange to a fully grade separated four way interchange, and the addition of two lanes to the existing portion or SR-30, are all programmed into the current 5-Year State Improvement Program.

Currently, the traffic volumes on SR-30 are very low (8,800 ADT in 1983) due to the missing segment and lack of a connection to I-215. According to Caltrans' fore-cast, however, with the completion of the facility, and the growth anticipated in the subregion, SR-30 will carry a daily traffic volume of 56,000 vehicles and operate at LOS D, with average speeds of 40 miles per hour, by the year 2005 (Caltrans "SR-30 Route Concept Report", June 1985).

(b) Access to the Regional Highway System

In general, the study area has good access to the regional highway system. Four arterials (Alabama Street, California Street, Mountain View and Anderson Street) have an interchange with I-10, and one, San Bernardino Avenue, has an interchange with SR-30. As noted previously, arterial access to the northern portion of the study area is poor; consequently, the connection of the local street system in this portion of the study area to those in the surrounding communities is limited.

(1) I-10 North

The primary cause of this isolation of the study area from the north is the cost and difficulty of roadway construction across the Santa Ana River Wash. The Wash forms the northern boundary of the study area, angling from the northeast to the southwest, crossing I-10 just west of I-215. The only arterial access into this portion of the study area from the north is provided by Alabama Street, which crosses the wash adjacent to SR-30. The Alabama Street crossing is a causeway and not a bridge, and is subject to inundation and washing out. Although the crossing has been upgraded recently, it cannot be considered to be all weather.

Contributing to the isolation of the study area from the communities to the north is Norton Air Force Base, which lies north of the wash. Tippecanoe Avenue, at the west end of the study area, crosses the wash but does not directly connect the study area to the north; it ends at the main entrance to the Base, where it intersects with Mill Street. Tippecanoe Avenue serves as the primary entrance to the Air Force Base and was recently upgraded to four lanes across the wash by the City of San Bernardino.

Access to and from the west is similarly constrained. San Bernardino Avenue is identified on the County's Circulation Element as continuous from Redlands to downtown San Bernardino. While San Bernardino Avenue is continuous from Redlands through the study area, the street ends at Tippecanoe Street, east of the Santa Ana Wash and just west of the planning area.

The County's Master Plan calls for a bridge over the wash, and a connection to Pioneer to extend into downtown San Bernardino. This connection to Pioneer has not been made, however, and indications from the City are that it is unlikely in the foreseeable future. This is due again to the cost of bridging the wash and, further west, the presence of a church which would require an offset of Pioneer Street, west of Waterman Avenue.

The most likely means of east/west arterial circulation would be along San Bernardino Avenue to Mill Street or Central Avenue, using the Tippecanoe Avenue crossing. The City of San Bernardino is considering an upgrading of the Tippecanoe/Mill Street intersection which would enhance that movement.

(2) I-10 South

The portion of the study area to the south of Interstate 10 is better served by arterial access. Adjacent to the freeway, Redlands Boulevard provides east/west circulation through the study area. Together with the freeway, Redlands Boulevard forms-a corridor dominated by highway-oriented commercial development. This facility is continuous from Redlands through Loma Linda to San Bernardino.

Farther south, Barton Road, a high speed, divided major arterial, forms the southern boundary of the project area. This facility provides excellent access into the study area from both the east and west and connects to the I-215/SR-91 freeway to the west. That connection requires the traversing of a low ridge off Blue Mountain, however, and results in a reduced cross section due to the steeper terrain west of its intersection with Washington Street. Because Washington Street avoids Blue Mountain, and provides a more direct connection, access to I215/SR-91 from Barton Road in the study area can be expected via Washington Street.

(c) Arterial Highway System

Within the project area, the arterial system is dominated by a commercial corridor adjacent to I-10 and generally bounded by Redlands Boulevard to the south and Lugonia Avenue to the north. Outside of this area, the local street system has not yet been developed to County standards, due to the agricultural nature of the land use. Curb, gutters, and sidewalks are absent and pavement widths are less than standard. Pavement conditions are poor throughout the study area, and the median in Redlands Boulevard is deteriorating.

Currently, traffic in the study area is generally light, although some congestion is occurring at intersections in the commercial corridor during peak hours. Several of the major intersections along Redlands Boulevard are currently congested during peak traffic hours. This congestion is compounded at Anderson Street and Alabama Street by traffic from the freeway interchanges located just to the north of these two intersections.

The majority of traffic uses Alabama Street, Redlands Boulevard, Anderson Street and Lugonia Street. This pattern reflects commercial development and some freeway bypass activity. Conditions currently identifiable as restrictions to local circulation that have implications for impact on future development include:

(1) Local street offsets and terminations often associated with the railroad tracks and irrigation and flood control facilities which cross the study area.

(2) Traffic delays related to train activity at the numerous crossings in the study area.

(3) Higher than average highway construction costs related to irrigation and flood control facilities and needs.

(4) The large number of commercial driveways and their proximity to intersections, particularly on Redlands Boulevard.

(5) The proposed removal of the existing median in Redlands Boulevard which will result in increased turns and reduce the carrying capacity of the arterial.

(6) The acute angle intersection of West Colton and Redlands Boulevard.

(7) The geometrics of the Interstate 10 off ramps have limited sight distance and minimal merge distances. Also, the interchange configuration forces a number of left turns that can become seriously congested with increased volumes. Particularly impacted are Anderson Street and Alabama Street.

(8) Alabama Street from Redlands Boulevard to Lugonia Street over the I-10 freeway has many constrictions and high potential for delay. Within less than one-half mile there are several traffic signals, off-ramp merges, left turns on to and off of the freeway and a rail crossing. A similar situation exists on Anderson Street between Redlands Boulevard and the freeway although there is no rail crossing at this location.

(d) Public Transit

Public transportation in the East Valley Corridor is provided by Omnitrans. Reflecting both the limited development of the land and arterial highway system, public transportation in the study area is minimal. Omnitrans currently provides 3 routes through the study area which connect the cities of Redlands, Loma Linda and San Bernardino. With the exception of a short portion serving the County Museum and Norton Air Force Base, all the routes are south of I-10. Two routes cross the corridor on Tippecanoe/Anderson, then travel east/ west on Barton Road. The third route enters from Loma Linda on University Avenue and meanders through the southern portion of the study area.

(e) Rail

Two major rail lines traverse the study area both trending east/west. The northernmost line has the most potential to slow traffic, crossing Mountain View Avenue, California Avenue, Nevada Street and Alabama Street between Redlands Boulevard and I-10. The southern line is grade separated where it crosses Barton Road, a branch then turns north to parallel California Street to State Street, where it turns east and continues out of the study area. Several spurs have been constructed off these main branches.

Section EV6.0105 Planned Road System Improvements

(a) Planning Objective for Circulation System

The primary objective in planning the circulation network for the East Valley Corridor was to improve and expand the public roadway system to meet existing and future travel demands within the Corridor, and to provide sufficient roadway and intersection capacities to maintain a minimum level of service "C".

(b) Recommended Facilities

A traffic analysis model was generated for the East Valley Corridor project to estimate future traffic volumes and their distribution. The model considered existing traffic counts, proposed development adjacent to the East Valley Corridor, and future internal trips generated at plan build-out.

The traffic model was used to finalize the Circulation Plan for the Specific Plan, contained in Section EV4.0105. Because the existing road network within the planning area is inadequate and roads are substandard, it was determined that conformance with the Circulation Plan will require construction of approximately twenty-nine (29) miles of new roads. In addition, forty-one (41) signals will be required, and two (2) bridges must be constructed (one at Palmetto Avenue and SR-30, and one at Redlands Boulevard and California Street).

The traffic analysis concluded that "as with most traffic networks, the congestion is at intersections... The major constraint in the CSA-110 network is Alabama Street." In order to mitigate congestion on Alabama, the study recommended use of a coordinated signal system on that arterial. It is also recommended that an all-weather crossing be provided over the Santa Ana River at Alabama Street, to carry northbound traffic from the planning area up to the Route 30 interchange at Fifth Street.

Additional turning lanes will also be required at many of the intersections to reduce congestion from existing and projected traffic levels.

For a more detailed presentation of specific road improvements, see the Engineer's Report prepared for the Specific Plan (Appendix B.).

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CHAPTER 2. WATER SUPPLY

Section EV6.0201 Existing Facilities

Existing water supply facilities are described in this section. Water supply facilities include groundwater wells, water treatment plants, transmission and distribution pipelines, storage reservoirs, booster pumping stations and pressure reducing valves. Key facilities within the study area are described, as well as overall water supply and demands for each agency serving the area.

(a) Institutional and Regulatory Setting

(1) Water Supply Agencies

The study area is currently served by the City of Redlands and the City of Loma Linda for its domestic supply. The City of Loma Linda has a major intertie with the city of San Bernardino for supplemental supply when needed. The area north of Lugonia Avenue in the City of Redlands has no major water distribution facilities due to limited development. However, both cities have plans to eventually serve the entire areas within their current city limits or spheres of influence when development occurs. Because the study area is still largely agriculturally oriented, there are numerous private and small mutual water company's non-potable water wells and distribution systems. There are over 50 wells located in the study area. Additional agricultural water is obtained from Santa Ana River and Big Bear Lake releases. The existing agricultural facilities are expected to be phased out with the conversion of the land from agriculture to higher density residential or commercial use. The City of Redlands also operates an agricultural non-potable system called the Contract "B." area which is generally south of Redlands Boulevard.

The study area is also under the jurisdiction of the San Bernardino Valley Municipal Water District (SBVMWD) formed in 1954 as a State Project Water contractor and a regional water supply planning agency. Under the Mill creek Cooperative Exchange Plan, Santa Ana River water or State Project water will be transported to the City of Redlands water treatment plants which in turn can supply the study area.

(2) Regulatory Agencies

The primary water supply regulatory agency for larger domestic water supply facilities is the State Department of Health Services (SDOHS). This agency has enforcement power to ensure that all potable water supplies meet State and Federal, primary and secondary, water quality standards.

(b) Quality and Quantity of Water Supply

(1) City of Redlands

The City has been intensively planning future water supply facilities since their 1981 Water Master Plan update identified increasing contaminant problems in a significant number of their wells. The City's water supply is currently from four sources, including Mill Creek, the Santa Ana River, State Project water, and groundwater. On a yearly average, approximately half of the demand is supplied from the Tate Water Treatment Plant which treats water from Mill Creek. The remaining supply is from 26 ground-water wells located throughout the City, including several wells in the study area.

The City historically has had nitrate concentrations above the 45 mg/L public health limit in several of their wells. Other groundwater quality problems include volatile organic compounds (TCE, DBCP, etc.), which were first identified in 1981, and high fluoride concentration.

To meet the current and future demands, the City of Redlands has constructed the new 12 mgd Horace P. Hinkley Plant, which treats Santa Ana River water, as well as State Project water delivered through the SBVMWD facilities. The plant is located in Mentone about 3 miles east of the study area.

The Tate Water Treatment plant has been treating water from Mill Creek since 1967. The plant is located in Mentone, about 7 miles east of the study area, at an elevation of about 2,300 feet. The plant has a nominal treatment capacity of 12 mgd. Under the SBVMWD Exchange Plan, the Tate Pumping Station now provides Santa Ana River water. In the future, when Exchange facilities are completed State Project water will be available at the plant for treatment.
There are several key groundwater wells located in or adjacent to the study area. The City is also exploring the possibility of using agricultural wells. The City recently purchased an agricultural well located in the study area (the Mission well on Bryn Mawr). The Orange Street well, located just east of the study area and owned by the Bear Valley Mutual Water Company, is currently being utilized by the City. The groundwater resources available to the study area are abundant in terms of quantity, but water quality problems have limited their use.

Since much of the East Valley Corridor area is still in agricultural use, water demands are low, and the study area requires less than six percent of Redlands total demand. As the area develops and agricultural land is converted to more intensive uses, demand will rise sharply and the East Valley Corridor area can be expected to take a larger percentage of the City's total production.

(2) City of Loma Linda

The City of Loma Linda water supply picture is somewhat less complicated than Redlands, as the City relies only on groundwater and total demands are much smaller. However, this sole supply could be somewhat less reliable if well water quality problems develop. The City in the past has operated several wells between Anderson Street and Mountain View and south of Redlands Boulevard which have experienced nitrate contamination. Currently the City operates two major good quality wells on Cooley Street off Mountain View just to the west of the study area, and a third well on California Street south of Barton Road. Two additional wells have been completed on Richardson Street.

In addition to the wells, the City can receive up to 2.0 mgd of water through an intertie with the City of San Bernardino system at Anderson Street and Redlands Boulevard as an emergency supply. The San Bernardino system also relies completely on groundwater and has a large capacity. Recently several of the San Bernardino wells have had TCE or PCE above the action level and had to be shut down. San Bernardino is currently evaluating this problem and could elect not to provide water outside their Water Department boundary until more capacity is available. In any event, the current Loma Linda peak day demand is 5.7 mgd which is less than their total usable well capacity of 7.5 mgd.

The City does not have a current Master Plan for water supply. The existing and planned well capacity plus the San Bernardino intertie appear to provide more than adequate capacity to meet near-term growth in demand.

(c) Groundwater Levels

The groundwater levels in the study area are impacted by the overall groundwater levels in the Bunker Hill Basin. About one-third of the study area overlies the Basin's pressure zone. The boundary line of the pressure zone runs north-south along California Street. This zone represents an area, particularly in the south-western and downtown portion of the City of San Bernardino, that has historically and recently experienced very high groundwater levels (at or within 3 feet from the ground surface) and artesian flow from some wells. The high groundwater levels have increased liquefaction potential of certain soil types during an earthquake, which may result in severe damage to buildings and structures in the affected areas.

In addition, extreme high groundwater levels affect many existing foundations and increase the cost of new construction. Based on limited existing information, the groundwater levels in the study area are a minimum

of 30 feet below ground surface in the extreme north-western portion of Loma Linda. The average groundwater level throughout the study area is over 50 feet from ground surface. At this average groundwater level, there should not be any severe construction impact in the area of the East Valley Corridor.

(d) Water Distribution Facilities

(1) City of Redlands

The study area falls within the City's two lowest pressure zones, the 1350 and 1570 zones. About two thirds of the study area, within the City, is in the 1350 zone. The current water demand in the 1350 zone is one of the lowest in the City; however, the City has a backbone system in the zone which more than adequately serves existing development. A major east-west primary distribution main runs along Lugonia Avenue from well 34 to the Texas Street water complex. There are three north-south interties with the Lugonia main and another primary main in Redlands Boulevard at Mountain View, California and Alabama Streets. Primary mains also extend south of Redlands Boulevard along New Jersey and Alabama Streets to Barton Road. The 12 inch diameter mains are adequate to carry maximum day demands with fire flows of 2,500 gpm. They also form a strong network which can be systematically expanded to serve development in the study area.

Local storage for the 1350 zone consists of the 1.0 million gallon (MG) Texas Street reservoir. Using City criteria, this amount of in-zone storage is just adequate for existing conditions, so a new reservoir will be required in this zone in the future. Storage in the 1570 zone totals 23.7 MG located in three major reservoirs. This is the largest amount of storage in any zone in the City of Redlands. The storage in the 1570 zone is more than adequate to serve existing and projected requirements to year 2000. Water from the upper zones can be transferred to the lower zones through pressure reducing stations located within the distribution system. There are two pressure reducing stations which can transmit water from the 1570 to the 1350 zone with a normal capacity of 12 mgd and a peak (intermittent) capacity of 26 mgd.

(2) City of Loma Linda

The major distribution facilities in Loma Linda include a 12 inch primary distribution main, located in Redlands Boulevard, which serves the lowest zone of the City and the study area. The City's two wells pump into a 20 inch diameter primary transmission main located in Mountain View Avenue. The City has two inter-tie facilities; one active connection with the City of San Bernardino system at Anderson

Street and Redlands Boulevard, and another emergency connection with the Redlands system at Mountain View. These inter-tie facilities significantly increase the system's reliability, and are evidence of cooperation between agencies in water supply planning.

The low zone in the City is currently served by 6.9 MG of reservoir storage facilities, located in the upper zones, with another 2.0 MG planned in the near future. Pressure reducing valves transfer water between zones.

Loma Linda has recently extended its City Limits below Mission Zanja to halfway between New Jersey and Nevada Streets, and facilities in this area will eventually be transferred to their jurisdiction.

(e) Potential Development

The basic water distribution system in the study area is currently more than adequate to serve existing development and agricultural uses. Intense planned development will require significant additional potable water supply facilities within portions of the planning area. Additional development of the groundwater and surface water resources, including the State Project water. needs to be evaluated.

The current high groundwater problem in the Bunker Hill Groundwater Basin only marginally affects the study area since groundwater levels average over 50 feet below the ground surface. The edge of the basin "pressure zone" runs basically north-south along California Street.

The most significant potential constraint to future development is existing water quality problems, including high nitrates, TCE, and DBCP. This is considered a short-term problem as the City has developed other water sources. In addition, the City may be installing well-head treatment and will be constructing new wells.

Section EV6.0205 Recommended Water Supply Facilities

(a) Planning Objective for Water Supply

The primary objective in planning water facilities for the East Valley Corridor was to develop a storage and transmission system to meet future demands in a cost effective manner. Existing facilities, when appropriate, were utilized in the plan to the fullest extent possible.

(b) Projected Demands

Projection of future water demands in the planning area were made based on the land use plan and on historical data on water use in the area. Peak flows, fire flows, and ultimate demands of total build-out were computed. Projected water demand at ultimate build-out of the planning area was estimated to average 10.66 million gallons per day. The projected need for increased storage capacity was estimated to be 22.9 million gallons.

(c) Recommended Facilities

Recommended facilities include a transmission grid to distribute water to the entire project area at a minimum of 40 psi on the maximum day for peak hourly use, and increased water storage capacity. The recommended water supply system also provides for a pressure reducing station on Redlands Boulevard to support pressures south of Interstate 10 by transferring flow from zone 1570 to zone 1350 during peak periods.

Existing pipelines form the basis of system expansion. New pipelines are to be added in principal streets and roads where rights-of-way are in the public domain.

All storage will be located outside of the project area boundaries due to topography of the area. Storage for the 1350 zone is recommended near the present 1350 zone reservoir on Texas Avenue. Storage sites for zone 1570 and for Loma Linda pressure zone will depend on additional study of these entire pressure zones.

Recommended new water facilities include the following items: 100,320 feet of new pipe (8", 12" and 16"); 18 million gallons of increased storage capacity; and a pressure reducing station with 1800 gallon per minute capacity. For a more detailed breakdown of recommended facilities, see Engineer's Report (Appendix B.).

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CHAPTER 3. SEWAGE FACILITIES

Section EV6.0301 Existing Facilities

(a) Wastewater Collection and Treatment Agencies

Wastewater collection systems are operated by both the City of Redlands Municipal Utilities Department and the City of Loma Linda Community Services Department. Due to the limited development in the area, however, only about 10 to 15 percent of the study area is actually sewered to these collection systems. Both cities have existing master plans to extend sewer service within existing City limits and/or probable spheres of influence.

Sewage treatment agencies serving the study area currently include the City of Redlands and the City of San Bernardino. *The* City of Redlands owns a sewage treatment plant *which is* located along the north boundary of the study area. The plant is operated by the City Municipal Utilities Department. The City of San Bernardino provides treatment and discharge of all flows collected within the City of Loma Linda and minor flows from the City of Redlands sewered areas west of Nevada Street. *The* San Bernardino treatment plant is located approximately two miles west of the study area. A Joint Powers Agreement between San Bernardino and Loma Linda, signed in 1965, provides the terms and conditions under which San Bernardino accepts flow from Loma Linda. No agreement exists between San Bernardino and Redlands.

While the above agencies are the basic providers of existing sewage collection and treatment services, two other agencies, the Santa Ana Watershed Project Authority (SAWPA), and the San Bernardino Valley Municipal Water District (SBVMWD), have on-going planning responsibilities which could potentially affect the study area. Formed in 1972,- SAWPA is a regional agency composed of five member Municipal Water Districts overlying the Santa Ana River Watershed. SAWPA's primary objective is implementing projects which help meet water quality objectives for the watershed. A major project is the Santa Ana Regional Interceptor (SARI) which provides a means of intercepting and transporting high-salt water and non-reclaimable wastewater from the upper basins to the Pacific Ocean. The SARI line currently extends from the treatment and ocean disposal facilities of Orange County Sanitation Districts to Corona and Chino. The final reaches, IV-D and IV-E, are proposed to extend as far as the San Bernardino treatment plant.

The SBVMWD boundaries encompass the study area. Although the District's responsibilities are primarily in water supply and management, it is currently the lead agency for a regional wastewater management facilities plan evaluating water quality and discharge requirements for all of the area treatment plants. At issue is the need for a higher and more costly level of treatment from San Bernardino and other treatment plants in the area.

(b) Regulatory Agencies

The primary agency with regulatory authority over sewage treatment and discharge and other water quality issues is the California Regional Water Quality Control Board, Santa Ana Region. In addition to issuing and enforcing discharge permits for the sewage treatment plants, the Regional Board has planning and regulatory authority for any activities directly affecting surface or groundwater quality. These include water quality impacts from unsewered areas, industrial and toxic waste handling, and construction activities. Regional Board actions are consistent with and subject to Federal water pollution control laws and regulations as developed by the State Water Resources Control Board (SWRCB) and the State Department of Health Services (SDOHS).

(c) Wastewater Flows and Treatment Facilities

Presently, all the wastewater from the study area flows by gravity to the two treatment facilities previously mentioned. Based on existing wastewater flow patterns, the study area can be divided in two sections. Wastewater collected from the area east of Nevada Street flows via the Nevada Street trunk line to the City of Redlands wastewater treatment and disposal facility. Wastewater discharges from the area west of Nevada Street flows via the main Loma Linda outfall line at the western end of the study area, and the Mountain View and Lugonia trunk lines to be treated at City of San Bernardino wastewater facility (WWTF).

(1) City of Redlands Wastewater Treatment and Disposal Facility

The City of Redlands wastewater facility is located at the north end of Nevada Street, north of the study area along the Santa Ana River bank. The facility presently serves the majority of the City of Redlands and has a potential future service area including the unincorporated community of Mentone on the northeast, and San Timoteo Canyon on the south.

The current average wastewater flow to the plant is 5.4 million gallons per day (mgd). On a system-wide basis, the average wastewater flows to the plant are projected to increase to 9.0 mgd in the year 2005, with the ultimate potential at full annexation and build-out as

high as 24 mgd. These projections assume that a proposed pumping station will be built near the intersection of Mountain View and San Bernardino Avenue. All flows from the area west of Nevada Street within the Redlands City limits and/or sphere of influence will be pumped to the Nevada Street trunk line to be treated at the Redlands Wastewater Treatment Facility. These mostly undeveloped and

unsewered areas are presently served by the San Bernardino WWTF, but the City of San Bernardino has indicated that they will not continue to treat wastewater from this area in the future since no agreement exists to accept the flow.

The Redlands wastewater treatment facility was built in 1962 to handle a dry-weather flow of 2.4 mgd. In 1972, construction was started to expand the facility to its current average flow rating of 6 mgd, and to provide capacity for advanced secondary wastewater treatment for the complete flow. The plant appears to be maintained in excellent operating condition. Effluent quality meets all secondary and ammonia discharge specifications for direct discharge to percolation ponds and the Santa Ana River.

In September, 1983, the City completed a capacity analysis and detailed study for expanding the plant to 8.0 mgd [3-3]. In 1987, a plan to expand the plant to 9.0 mgd was adopted. Design work for this expansion is currently nearing completion.

(2) City of San Bernardino Wastewater Treatment Facility

The City of San Bernardino wastewater treatment facility is approximately 1/2 mile southeast of the intersection of Orange Show Road and South "E" Street in the City of San Bernardino. The facility provides treatment of combined domestic and industrial wastewater collected from the City of San Bernardino, City of Loma Linda, East Valley Water District, Highland, a small portion of the City of Redlands included in the East Valley Corridor, and the domestic wastewater from the Norton Air Force Base.

The present influent flow to the San Bernardino facility averages approximately 21 mgd of which less than two percent is contributed by industrial discharges. The plant was designed to treat an average daily flow of 28.0 mgd.

The present San Bernardino facility was constructed in 1958 with a design capacity of 13 mgd (Unit 1). The treatment facility was enlarged in 1970 with an additional 15 mgd capacity (Unit 2). The flow reaches the plant by gravity sewers coming in from the east of Waterman Avenue. Due to a number of process and/or equipment constraints, the effective capacity of the plant has been substantially less than the nominal capacity of 28 mgd. The plant is about to undergo a major upgrade/ expansion project to restore the capacity to the full 28 mgd and is expected to be completed by mid 1988. In the interim, new connections to any of the collections systems served by the plant are limited basically to property owners/developers who purchased "capacity rights" in 1984. Within Loma Linda, rights for 2,122 equivalent dwelling units were purchased by property owners

or developers although it is not known how many of those are held for property within the East Valley Corridor area. An additional 900 were purchased by the City. This gives a total interim capacity right of an additional 0.85 mgd in the Plant.

Most of the existing sewer system in the City of Loma Linda collects and transports wastewater to San Bernardino WWTF via the Loma Linda outfall line. This line was constructed in accordance with the previously referenced Joint Powers Agreement which provided Loma Linda with the right to convey wastewater to San Bernardino WWTF via the outfall line. One exception to the above flow pattern is a portion of the study area, within Loma Linda's boundaries, east of Mountain View and South of I-10, which is served by the City of Redlands Mountain View trunk line conveying wastewater to the San Bernardino plant. Current estimated average and peak flows from Loma Linda are estimated to be 1.5-2 mgd and 3-3.5 mgd, respectively.

Should the proposed Redlands pumping station be built to pump flows from Mountain View line to Nevada Street trunk line, Loma Linda would have to divert its flow to the San Bernardino plant, either via the outfall line or a diversion structure on the Mountain View trunk; or develop an agreement with Redlands for treatment at the Redlands plant.

(3) Santa Ana Regional Interceptor

The SARI line, if extended to the San Bernardino area, would provide a means of conveying wastewater out of the study area for treatment at Orange County Sanitation District's facilities and discharge to the ocean. The fundamental purpose of this line is to transport high salt water and wastewater out of the Santa Ana river and groundwater basins. Certain industrial and brine flows would be potential uses of the pipeline. A portion of its capacity in the line could also be designated for general sewage discharged on an interim basis. A financing study for the uncompleted reaches of the SARI line is currently being completed.

(d) Collection Facilities

Both Loma Linda and Redlands have existing sewers within the study area. Sewer service is provided to most of the Loma Linda portion of the study area, but to very limited sections of the Redlands Portion.

A sewer master plan, developed to provide a basic plan of overall wastewater collection systems for the City of Loma Linda, was completed in November, 1982. A wastewater collection system master plan report was completed for the City of Redlands in 1985.

This report identifies collection system improvements that will be required in the next twenty year planning period and sets forth an ultimate projection.

Since the East Valley Corridor Land Use Plan developed by the County for the study area differs markedly from the land use plan presented in the Redlands Master Plan, it can be expected that sewerage improvement recommended in the present report will differ from those of the earlier plan.

(e) Capacities and Constraints

Adequate collection system capacities currently exist to serve the limited areas of sewered development within the study area. In addition, existing master plans account for some level of development within the area and a basic collection network has been established. The most critical collection system need, which must be addressed as soon as possible for development west of Nevada Street and north of I-10, is the proposed Redlands pumping station. New trunk lines will also be required for any development that occurs north of Lugonia Avenue, and the area south of Redlands Boulevard and east of California Street.

There is short-term capacity in the two existing treatment plants which serve the area, although new connections to the San Bernardino plant are limited for the next few years until completion of the plant upgrade project. Therefore, limited growth in the study area can apparently be accommodated under existing conditions. For the long-term (e.g. beyond 5 to 10 years), substantial additional capacity will be required to accommodate the anticipated growth in the service areas of both plants, including the growth in the East Valley Corridor. This is particularly true for the portion of the study area served by the Redlands treatment plant.

Section EV6.0305 Recommended Sewage Facilities

(a) Planning Objective for Sewage Facilities

The primary objective in planning sewage facilities for the East Valley Corridor is to develop sewage collection facilities and treatment plant capacity to serve ultimate development of the area in a cost effective manner. Existing facilities were used as the starting point to develop, over time, a complete collection and transport system.

(b) Projected Demands

Future sewage flows in the area were determined based on the land use plan and on historical data on average unit flow factors in adjacent communities. Peak wet and dry weather flows were computed for the purpose of sizing collection systems, gravity sewers, and pumping stations in the study area. Ultimate sewage flows at total build-out of the planning area were estimated to average 8.79 million gallons per day.

(c) Recommended Facilities

The proposed collection system layout conveys all sewage flow to final collection points in each of the three sewage zones (Loma Linda, Redlands West, and Redlands East). It is based on existing trunk sewers and drainage paths, and on both existing and proposed road alignments. The design maximizes the number of units served by gravity to minimize collection system costs. All pipes in the collection system were sized for peak flow rates for their respective tributary area, which were computed by applying peaking factors to the average flow rates.

The Redlands East Zone collection system can convey flows by gravity directly to the Redlands treatment plant. Pipelines transporting City of Redlands flows to the treatment plant pass through the East Zone and form an existing grid of major sewer trunk lines in the area. To these existing trunk lines is added the flow generated within the East Valley Corridor along and east of Nevada Street. Some existing lines, however, cannot carry both projected flows for the entire City and projected ultimate flows generated in the East Zone. New and, in some cases, parallel pipelines are therefore recommended to provide adequate capacity for future flows.

The collection system in the Redlands West Zone conveys flows generated west of Nevada Street to a single collection point near the intersection of San Bernardino Avenue and Mountain View Street. It is recommended that a pumping station be located at a site near this intersection and that collected flows be pumped via a force main up to the Nevada Street trunk line in which it can flow by gravity to the Redlands treatment Plant. The pumping station and force main are part of the recommended major facilities for the East Zone collection and transport system.

The ultimate pumping station capacity is sized for a peak wet weather flow at ultimate development of 7.8 mgd, to be installed in phases. The ultimate force main would consist of two parallel 14-inch pipelines, also to be installed in phases. Installation of the pumping system would eliminate the current practice of transferring West Zone sewage to the City of San Bernardino's collection system.

Loma Linda sewage flows originating in the East Valley Corridor are collected and conveyed by gravity along the Redlands Avenue trunk sewer to the San Bernardino Treatment Plant via the Loma Linda Outfall. Loma Linda sewage, which currently flows down Mountain View Avenue and enters the City of San Bernardino collection system at San Bernardino Avenue, would be diverted by a connection between manholes at Mountain View and the I-10 Freeway and directed to the Loma Linda Outfall. This will eliminate the current practice of mixing flows of the two cities before treatment.

Recommended new sewage facilities include the following: 44,390 feet of gravity sewer pipelines (varying sizes); a sewage pumping station with capacity of 7.8 million gallons per day; and 18,480 feet of force main. For a more detailed breakdown on sewage facilities, see the Engineer's Report (Appendix B.).

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CHAPTER 4. STORMWATER DRAINAGE

Section EV6.0401 Existing Facilities

(a) Responsible Drainage Agencies

The following agencies have various degrees of responsibility for stormwater drainage facilities in the East Valley Corridor area.

(1) U.S. Army Corps of Engineers

The Corps plans, designs, constructs, and operates major regional flood protection facilities such as the Santa Ana River, San Timoteo Creek, and Mission Zanja Creek. The operation and maintenance of these facilities is often turned over to a local flood control agency, such as the San Bernardino County Flood Control District. The Corps is presently conducting a study to update the hydrological data and the extent of the flood plain boundary of San Timoteo Creek during a standard project flood and a 100-year flood. The Corps is also in the process of improving the Mission Zanja channel in downtown Redlands, east of the Specific Plan area.

(2) San Bernardino Counts Flood Control District

SBCFCD is responsible for the planning, design, construction, operation, and maintenance of major county flood control facilities. When a flood control district right-of-way is obtained, either as the result of development plans or in a problem area, the District maintains the facilities. SBCFCD also checks design drawings on major development projects with potential drainage problems.

(3) San Bernardino County Surveyor - Land Development Section

The Surveyor's Office is responsible for the detailed checking of development plans within County areas. All developments must submit drainage computations using standard County procedures and basic design data. In areas where "leap frog" development is occurring and where improved drainage facilities are not available to discharge development drainage, the Surveyor's office is concerned mainly with the safe routing of upstream stormwater flows through the proposed development and the safe discharge of flows downstream of the development.

(4) California Department of Transportation (Caltrans)

Caltrans plans, designs, constructs, operates and maintains flood control facilities required to drain State rights-of-way and/or adjacent tributary areas. Within the East Valley Corridor, Caltrans maintains two drainage channels. One channel runs along the south side of Highway 10 between Alabama Street and San Timoteo Creek. The other channel runs along the east side of Highway 30 between the Highway 10 Interchange and the Santa Ana River

(5) City of Redlands

The Public Works Department of the City of Redlands is responsible for the planning, design, construction, and maintenance of any flood control facilities required for local drainage within the City limits. Major drainage facilities should be consistent with the CSDP.

(6) City of Loma Linda

The City Engineer for the City of Loma Linda is responsible for the planning, design, and construction, and the Community Services Department handles maintenance of any flood control facilities required for local drainage within the City limits.

(b) Drainage Pattern and Hydrology

The East Valley Corridor lies within the overflow flood plain of the Mission Zanja and San Timoteo Creek. Both are tributaries of the Santa Ana River, which forms the northern boundary of the Corridor. The Santa Ana River is a major partially improved water course with 360 square miles of mountainous watershed tributary to the study area.

San Timoteo Creek is a partially improved channel with 126 square miles of hilly watershed lying in the counties of San Bernardino and Riverside. The Creek flows generally in a northwest direction and discharges into the Santa Ana River north of Highway 10 and west of Waterman Avenue. In 1973 the Army Corps of Engineers estimated peak discharge of 45,000 cfs for the standard project flood and 23,000 cfs for a 100-year flood. The southwest portion of the study area is affected by flooding in San Timoteo Creek.

The Mission Zanja originates in the Crafton Hills, east of Redlands, and flows westerly through the City of Redlands into the Santa Ana River near Loma Linda. Mission Zanja is an open channel except when it runs parallel and under Redlands Boulevard from 9th Street to Eureka Street, in downtown Redlands, as an underground box culvert. This tributary has a drainage basin which encompasses about 25 square miles. Morey Arroyo, a local tributary of the Mission Zanja, is an unimproved channel draining the southern portion of the study area in Redlands.

In a 1981 Mission Zanja project report by the U.S. Army Corps of Engineers, peak drainage of Mission Zanja downstream from Morey Arroyo was estimated to be 12,400 cfs for the standard project flood and 5,700 cfs for the 100-year flood. for future conditions.

Under current conditions neither Morey Arroyo nor Mission Zanja have sufficient carrying capacity to handle 100-year floods. Major portions of the study area south of Interstate 10 are within the overflow flood plain of Mission Zanja and Morey Arroyo, and have experienced severe flooding in the past.

Portions of Loma Linda and Bryn Mawr lying in the southwest corner of the study area would be flooded by overflow from San Timoteo Creek. The area would receive a minor amount of overflow from Mission Zanja, but the chance for both streams to peak and overflow at the same time are remote. Areas north of Interstate 10 are not a part of any major flood plain.

(c) Existing Flood Control Facilities

(1) Highway 30 (Tennessee Freeway) Storm Drain

This storm drain is an open channel running along the east side of Highway 30, within the Caltrans right-of-way. The channel was constructed with the roadway in 1984, and is mostly concrete lined starting at the I-10 Interchange flowing north to discharge into the Santa Ana River. The channel bottom width varies from 6 to 8 feet, the side slope varies from 1.5:1 to vertical, and the height varies from 3.8 to 6.8 *feet.*

(2) I-10 Storm Drain

The I-10 storm drain is a concrete lined open channel storm drain which runs along the south side of Interstate 10 within the Caltrans right-of-way. Starting at Alabama Street, it flows west to discharge into the Mission Zanja at the bridge and overhead crossing. Starting again west of the crossing, it flows west to discharge into San Timoteo Creek.

(3) Project 4-16

This project was constructed in 1985 and consists of 33, 57, 60, and 69 inch RCP runs along and within the Mountain View Avenue right-of-way, in the City of Loma Linda. It starts at the Mission Road intersection and flows north to discharge into Mission Zanja Creek north of I-10.

(4) Project 4-17

A storm drain consisting of 48 and 54 inch RCP has been constructed along Lugonia Avenue, between Alabama Street and California Street. This recently completed line is a portion of Project 4-17 and eventually would be extended west along Lugonia Avenue to discharge into the Mission Zanja Creek, as the area develops. It will be a dry line until the downstream portion is completed.

(5) Project 4-19

A storm drain consisting of 48 and 41 inch RCP runs along and within Alabama Street right-of-way, in the City of Redlands. Starting north of Redlands Boulevard, it flows south to discharge into Mission Zanja Creek.

(6) Project 4-42

A 42 inch RCP storm drain starts at the intersection of Redlands Boulevard and Ohio Street in Loma Linda. It flows westward along Redlands Boulevard to Anderson Street and turns north along Anderson to discharge into a Caltrans drainage channel along the I-10 Freeway.

(d) Capacities and Constraints

Comprehensive storm drain planning has been conducted in the vicinity of the study area and several major pipeline or open channel facilities have been constructed, generally consistent with the plan. Therefore, most of the developed portions and some of the undeveloped portions already drain to facilities capable of carrying up to a 25-year runoff event from the local sub-basins.

Several constraints must be addressed to allow full development of the area. These include the following:

(1) A significant portion of the portion of the planning area within the City of Loma Linda is contained in the flood plain of San Timoteo Creek. Portions of the planning area south of Lugonia, adjacent to the Mission Zanja and Morey Arroyo, is contained in the flood plain of the Mission Zanja flood channel. These two major drainage ways are regional channels which have been studied by the Corps of Engineers. Improvements to control flooding would require long-term regional facilities. A short-term solution to the problem is locating all building pads above the maximum flood elevation.

(2) The hydrology for the study area (particularly north of the I-10 freeway) was based on low intensity land uses and stormwater flows are expected to increase significantly with high intensity development.

(3) The Mission Zanja bridge at the intersection of Redlands Boulevard and California Street is a very inadequate structure with respect to alignment and creates a dangerous traffic pattern.

Section EV6.0405 Recommended Storm Drain Facilities

(a) Planning Objective for Storm Drain Facilities

The major objective in planning for stormwater drainage facilities within the East Valley Corridor was to provide a backbone system of pipelines and channels to convey stormwater runoff to the Santa Ana River in the north and to the Mission Zanja in the south. The plan includes major collection pipelines and those pipelines which form major axes of flow, as well as necessary improvements to the Morey Arroyo and Mission Zanja channels. No pumping stations or holding basins are recommended for the East Valley Corridor area.

(b) Projected Stormwater Flows

Stormwater flows generated from rainfall within the study area were determined according to the method and procedures outlined in the County of San Bernardino Hydrology Manual, 1986. The design storm for calculating flows was taken as the 10-year storm with a 24-hour duration pattern.

Since the drainage basins of San Timoteo Creek, the Mission Zanja and Morey Arroyo channels extend for beyond the boundaries of the East Valley Corridor, complete drainage studies for these channels were beyond the limits of this study. Design flow rates for the Mission Zanja and Morey Arroyo were taken from other studies which considered the entire basin areas of these channels. The design storm for projecting flow rates was taken as the 100-year storm, in conformance with the design standards set for the reaches beyond the East Valley Corridor boundaries.

It was recommended that an improved channel section for Morey Arroyo be constructed following a new alignment west of Alabama Street to a confluence with the Mission Zanja near Iowa Street. The peak design flow rate corresponding to the 100-year flood level was estimated to be 3,022 cfs for Morey Arroyo.

Peak flow rates for the Mission Zanja within the East Valley Corridor were provided by the San Bernardino County Department of Transportation and Flood Control, based on ongoing flood routing analyses of the channel. Figures assumed for the present study are based on the construction of a detention basin at Wabash Street to hold back peak flows, and on the recommended realignment of the Morey Arroyo described above. With these basic assumptions, the peak design flow rates for the Mission Zanja above the confluence of Morey Arroyo is taken at 6,390 cfs, and below the confluence of Morey Arroyo at 7,200 cfs.

(c) Recommended Drainage Facilities

The recommended backbone stormwater facilities consist of stormwater pipelines and improvements to the Mission Zanja and Morey Arroyo channels. Stormwater pipelines convey local runoff to either the Santa Ana River, Mission Zanja, or Morey Arroyo. These channels in turn transport stormwater flows beyond the East Valley Corridor boundaries. The recommended facilities integrate with existing facilities described above to form a comprehensive drainage plan for the East Valley Corridor.

Flow rates and sizes are of greater magnitude than those projected in the Comprehensive Storm Drain Plan No. 4. These larger flow rates and larger pipe sizes are due to the newer design criteria of the 1986 edition of the County Hydrology Manual and the more intensive development of the area

called for by the East Valley Corridor study land use plan.

Stormwater flows generated north of Lugonia Avenue are collected in local pipelines and conveyed in north/south collectors northward to the Santa Ana River. Runoff on either side of Lugonia Avenue will be collected in one long storm drain installed along Lugonia that will convey flow westward and discharge it in the Mission Zanja just east of Mountain View. The reach between Alabama and California is existing; new pipelines between California and Mountain View will complete this storm drain.

South of the I-10 freeway a major collector is recommended for Redlands Boulevard. Beginning just west of Alabama, this pipeline will run westward along Redlands Boulevard and discharge into the Mission Zanja near California Street. A total of 40,020 feet of storm drain pipelines are required within the planning area; for a detailed breakdown of recommended sizes and locations, see the Engineer's Report (Appendix B.).

The existing Morey Arroyo is inadequate to carry the predicted 100-year storm flows and must be improved in order to carry these flows. The recommended improvements are summarized as follows:

(1) Improvements to the existing channel from west of Tennessee Street and continuing westward along the existing channel to Alabama Street.

(2) Addition of a reinforced concrete box culvert at Orange Street.

(3) Construction of a reinforced concrete double box culvert at Kansas Street.

(4) Realignment of the channel west of Alabama Street, to flow northwesterly and discharge into Mission Zanja in the vicinity of Iowa Street.

(5) Construction of a double box culvert under Citrus Avenue.

(6) Construction of a new confluence with Mission Zanja and any required erosion protection at the confluence.

Improvements in the existing channel and the new channel section would include a rectangular reinforced concrete cross section with bottom controls if necessary. Channel capacity would be provided for the full 100-year design flow of 3,022 cfs.

The existing capacity of the Mission Zanja channel is also inadequate to contain the projected 100-year stormwater runoff. Recommended improvements include the following:

(1) Construct a grouted, rip-rap trapezoidal channel along the existing channel alignment.

(2) Construct a reinforced concrete channel crossing under the I-10 freeway.

(3) Provide additional width to the existing bridges at the Bryn Mawr and Park Avenue crossings.

(4) Construct additional box culvert capacity at the existing box culvert crossings at New Jersey, Nevada, and Iowa Avenue.

Crossing structures at Mountain View, Alabama, and Kansas are adequate to carry the 100-year projected runoffs.

(d) Other Flood Control Provisions

Because of the extensive watershed of San Timoteo Creek, covering over 120 square miles outside of the Plan area, the East Valley Corridor Specific Plan does not propose channel improvements to the Creek at this time. Protection from overflow from San Timoteo Creek will be implemented through adoption of the Safety/Floodplain Overlay District on the Specific Plan Overlay Map, with development standards and locational criteria as contained in Division 5 of this text. This District was established according to maps and guidelines issued by the Federal Emergency Management Agency, which updated the City of Loma Linda portion in 1987.

CHAPTER 5. COMMUNITY FACILITIES

Section EV6.0501 Existing Facilities

(a) Fire Protection

Fire protection is provided to the study area by three separate agencies: the Cities of Loma Linda and Redlands, and San Bernardino County. The Cities provide fire protection within their existing boundaries, and the County serves the unincorporated areas.

The City of Redlands Fire Department currently maintains three stations. The closest one to the Specific Plan area is the recently constructed station at Orange and Pennsylvania. The central station in downtown Redlands is located about 1-1/2 miles east of the study area. Long range plans call for construction of three additional stations and phasing out of the central station. The two proposed stations most pertinent to the study area include one near Brookside and San Mateo, near the southeast corner of the planning area, and one within the planning area at the southwest corner of Lugonia and Nevada.

The City of Loma Linda Public Safety Department has one station at the corner of Barton Road and Loma Linda Drive, just south of the planning area. The only additional expansion under consideration is a second station in the hills at the south end of the City.

The County of San Bernardino Fire Warden Department maintains three stations which could potentially respond to calls in the project area. The closest is a single engine station at Barton Road and Anderson Street in Loma Linda, two miles southwest of the area. Other stations are in Mentone, four miles to the east, and in Highland about two miles to the north. Due to the gradually decreasing unincorporated area, the covered area for response is being reduced and thus there are no plans for expansion in the area.

In general, the existing level of protection offered to the project area is more than adequate with response times generally less than five minutes. Furthermore, a Joint Response Agreement exists between the two cities and other neighboring cities, as well as Mutual Agreements with CDF to more effectively extend the existing coverage. Ultimately, however, an additional station in the northwest portion of the project area will be necessary.

(b) Law Enforcement

Law enforcement is provided by the City of Redlands for areas within the City limits and by the San Bernardino County Sheriff's Department in the unincorporated areas and under contract to the City of Loma Linda. The Redlands Police Department operates from one headquarters building in downtown Redlands. No additional facilities would be required to serve the project area, although additional staffing and equipment would eventually be required. Patrol, traffic and detective operations are provided within the study area by the Sheriff's Department operating out of the main headquarters station in central San Bernardino about two miles north of the study area. In addition, there is an office in the Loma Linda Public Safety building on Barton Road for use by Sheriff's Department personnel while on duty within Loma Linda. No additional facility requirements appear necessary at this time.

(c) Schools

The East Valley Corridor is within the Redlands Unified School District. Three elementary, one junior high, and one senior high school currently service the students living within the site area.

Mission Elementary School is located at California Street and Redlands Boulevard. There are presently four portable classrooms and four trailers in use on the campus. These facilities are operating at capacity and there is no room for further expansion on the site.

Victoria Elementary School is located at 9963 Richardson Street, about one-half mile north of I-10 and west of Mountain View Boulevard. The District has placed four relocatable classrooms and five trailers at this facility, which is now operating at capacity. There is no room for further expansion of this school.

Lugonia Elementary School, at 202 East Pennsylvania Avenue, is located on the north side of Redlands approximately one and one-half miles east of the study area. The school has two relocatable classrooms, with space on campus to accommodate two more for future expansion.

The planning area is served by Clement Junior High School, which is located across the street from Lugonia School. There are three portable classrooms at this facility, and the campus has room for future expansion.

Redlands Senior High School, at 840 East Citrus Avenue in central Redlands, has one trailer and six portable classrooms. A second high school proposed for the east side of Redlands (near Mentone) is in the planning stage, but will not serve the study area. Long range planning by the District includes a possible third high school, to be located in northwest Redlands, which would serve the Specific Plan area. However, the need for this facility would be assessed based on development trends in the area over the next 10 to 15 years.

The District owns a 60-acre site south of Redlands Boulevard between Mountain View and California, but has no plans to develop a school there. Instead they are hoping to sell or lease this property to generate income for school facilities elsewhere. The District is not presently planning any school facilities within the planning area.

Section EV6.0505 Planned Facilities

While development within the Corridor will result in additional staffing and equipment needs for fire protection, law enforcement and schools, the only facility currently planned within the study area is the new fire station to be located at Lugonia and Nevada. The City is in the process of purchasing the property for this station. Construction and financing of the facility, which is estimated to cost about one million dollars, will be coordinated with infrastructure and financing plans for CSA-110.

However, updated information indicates that the Redlands Unified School District is actively seeking school sites within the East Valley Corridor Specific Plan area.

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CHAPTER 6. INFRASTRUCTURE PLAN

Section EV6.0601 Introduction

An integral part of the East Valley Corridor Specific Plan is the assessment of infrastructure needs to support proposed development, and the coordination of infrastructure improvements with development implementation. Given the magnitude of the planning area and the multiplicity of property owners, it is anticipated that development within the area and build-out of plan uses will occur over a number of years. The anticipated 40-year build-out period for the Specific Plan area will require that infrastructure construction is coordinated with development in order to provide adequate lead time for financing and infrastructure design.

The infrastructure plan outlined in this Chapter is meant to function as a guide to staff and decision-makers in developing long-term and annual capital improvement plans and financial decisions. It is recognized that future economic conditions are not totally predictable and that adjustments and revisions will be an inherent part of the development and financing process. Since these adjustments and revisions may need to occur frequently in order to respond adequately, such changes should not be interpreted as requiring a Specific Plan Amendment.

Section EV6.0605 Infrastructure Planning Areas

New development within the East Valley Corridor is expected to occur first in areas where existing infrastructure can support new development, and later in other areas as additional infrastructure is completed. Areas of the Corridor where adequate infrastructure exists to support near-term development include land adjacent to Interstate 10 and Redlands Boulevard; adjacent to the eastern portion of Barton Road; and adjacent to State Route 30 south of San Bernardino Avenue. These areas were grouped together as Areas I, IA and IB, based upon estimates of relative time of development. Area I includes areas which are already substantially developed and where infill development could occur without major improvements. Area IA includes areas which are not yet developed but where plans for development are underway. Area IB includes areas which may be developed without substantial improvements, but which may be slower to develop based upon marketing considerations, such as the Regional Commercial district.

Within the remaining areas of the Plan, development will be constrained by inadequate access, drainage facilities, and water and sewer lines. Additionally, portions of the area north of I-10 are within an Agricultural Preserve and contain parcels which are under Williamson Act contracts. Area II was determined to contain land which, though requiring substantial infrastructure improvements, was determined to have fairly good potential for development in the near future. Area II includes the central portion of the planning area south of I-10, which will require improvements to the Mission Zanja prior to development; the northwest portion of the planning area, which will require substantial road improvements; and areas adjacent to San Bernardino Avenue, which will require disestablishment of a portion of the Agricultural Preserve, but which are in a logical location for extensions of sewer, water and stormwater drainage lines.

Area III was also considered to have good development potential, but is probably not likely to develop prior to Areas I and II due to the nature of the infrastructure systems required for development. An area adjacent to California and Barton Road, within Loma Linda's sphere of influence, was included in Area III based upon information from the City indicating that this area will not be sewered in the near future. Sewer and water facilities within the northern portion of the study area will be extended from south to north. Similarly, the improvements to California Street and Palmetto Avenue, the major arterial into the northern area, will occur from south to north. While these improvements could be installed initially to open up the entire area for development, it was felt that the cost of such an effort would make this alternative unlikely. Therefore, the north and northeast portions of the planning area were also included in Area III. Figure EV6-1 shows the proposed phasing plan as discussed in this section.

Section EV6.0610 Infrastructure Improvement Plan

(a) Introduction

This Section contains a review of the proposed construction of infrastructure improvements needed to support development within the Corridor, including circulation, water, sewer, drainage and community facilities. The phasing of certain infrastructure improvements is sometimes determined by the nature of the system itself, such as drainage and sewer systems which generally require that downstream trunk facilities be constructed prior to the construction of upstream lateral lines. Other infrastructure facilities, such as street and water improvements, can often be phased in conjunction with the timing or phasing of development.

This analysis attempts to identify the major infrastructure improvements required to support development within Areas I, II, and III. In addition to identifying facilities needed, costs of required improvements have been estimated.

It should be noted that the proposed infrastructure plan facilities is intended only as a general guideline, and is based on the assumption that development will occur as described in the previous section. If development projects or patterns differ from the assumed sequence, then infrastructure improvements should be phased in a way that will support the actual development condition. Also, the priority of importance given to certain infrastructure improvements may not always conform to the order of projected phasing of new development. Some facilities associated with later phases of development could have a higher construction priority because they may be important in providing support to development of large land areas. An example of this would be construction of California Street and Palmetto Avenue through the northern portion of the planning area, which would facilitate near-term development to occur on various sites in Areas II and III, even though Area I is considered to have more potential for early development.

It should also be noted that some infrastructure facilities shown for construction in Area I are also needed to support later phases of development. While the initial cost of constructing these facilities is incurred in one area, other areas which may develop at a later date also benefit from this work. Therefore, costs for various improvements will be allocated to each area based on the benefit gained by each area from the improvements, in the financing plan for the project.

(b) Circulation

As indicated in Section EV6.0101, most of the major and secondary highways within the East Valley Corridor are not currently improved to ultimate design standards, and will eventually require extensive improvements to meet these standards. In addition, other major circulation system improvements needed for plan build-out will include an all-weather crossing over the Santa Ana river wash at Alabama; construction of a bridge over the Mission Zanja at California and Redlands Boulevard along with improvement and realignment of the intersection; construction of a bridge over Route 30 at Palmetto; and signal systems.

The construction of roadway improvements may be approached in various ways. One approach would be to construct all major and secondary highways to ultimate design standards in a series of construction phases corresponding with the assumed phasing of development. Following this approach, Redlands Boulevard, Lugonia, and portions of Palmetto Parkway and Alabama, along with the Zanja bridge and freeway interchange improvements, would be constructed during development of Area I. Another approach would be to construct interim roadway improvements in a series of construction phases in which partial improvements for a reduced number of lanes are constructed initially while traffic volumes are low, and the final widened roadways with the full number of lanes and median and parkway improvements are constructed at a later date as development occurs and traffic volumes warrant the full improvements. A third approach would be to construct roadway improvements in a piece-meal fashion as development occurs on a site-by-site basis.

The approach that is followed could depend somewhat on the methods of financing that are used for construction of public improvements. It is generally recommended, however, that an approach involving the acquisition of right-of-way and construction of interim improvements in a phased program be followed, with ultimate improvements constructed when traffic volumes require the full improvements. This approach would provide improved circulation and access conditions for new development at a minimum initial cost. It will also provide for greater flexibility in the timing of construction of other infrastructure improvements such as drainage and utility facilities.

This approach is made more workable in the East Valley Corridor by the computerized traffic model which was generated for the planning area. The model can be used to monitor trips as the plan area develops, and to predict levels of service throughout plan implementation for the purpose of identifying needed improvements.

Table EV6.1, contains a summary of preliminary estimated costs for ultimate roadway improvements associated with the three Infrastructure Planning Areas of development described above. The estimated costs are for full roadway improvements including grading, paving, curbs, sidewalks, medians, traffic signals and other miscellaneous items based on 1987 unit prices. Right-of-way costs are also shown at estimated 1987 costs. That the costs shown on the following tables indicate the area in which the improvements are located, rather than the area of benefit. Ultimate costs borne by each phase are based on benefit derived from the improvement, as determined in the financing study described in Chapter 7.

TABLE 6.1

SUMMARY OF RECOMMENDED ROAD FACILITIES AND COSTS BY AREA

	Road Improvement (feet)	No of Proposed Signals	Acres of Right-of-Way	Bridges	Total Cost
Area I	67,320 $24,545,700	18 $1,980,000	18.49 $1,386,501	Calif/Redlands $2,000,000	$29,912,201
Area IA	13,270 $5,094,700	5 $550,000	11.53 $864,876	------	$6,509,576
Area IB	4,990 $1,909,450	1 $110,000	3.60 $270,076	------	$2,289,526
Area II	40,050 $13,852,650	12 $1,320,000	28.27 $2,120,248	------	$17,292,898
Area III	30,520 $9,410,400	6 $660,000	24.36 $1,827,135	Palmetto/SR-30 $2,500,000	$14,397,535
Totals	156,150 $54,812,900	42 $4,620,000	86.25 $6,468,836	$4,500,000	$70,401,736

(c) Water Supply

As stated in Section EV6. 0205, water facilities needed for ultimate development include increased water storage capacity, water pipelines, and a pressure reducing station. The water facilities plan calls for water storage to be increased during each phase of development. Water system improvements can be accomplished generally in conformance with the phasing of development. The pressure reducing station will be needed for development of Area III.

The following table summarizes facilities needed and estimated costs for water supply facilities in the Infrastructure Planning Areas described in Section EV6.0805.

TABLE 6.2

SUMMARY OF RECOMMENDED WATER SUPPLY FACILITIES AND COSTS, BY AREA

	Pipelines (feet)	**Storage Capacity (mg)**	**PR Station (gpm)**	**Total Cost**
Area I	17,000 $935,000	3.6 $1,512,000		$2,447,000
Area IA	8,920 $490,600	1.3 $546,000		$1,036,600
Area IB	5,280 $330,000	.9 $378,000		$708,000
Area II	41,740 $2,176,900	7.3 $3,066,000		$5,242,900
Area III	27,380 $1,387,100	4.9 $2,058,000	1,800 $80,000	$3,525,100
Totals	100,320 $5,319,600	18 $7,560,000	1,800 $80,000	$12,959,600

(d) Sewage Facilities

Sewage collection facilities needed for ultimate development of the planning area include gravity sewer pipelines, force mains, and a sewage pumping station. The pumping station is recommended to be constructed in phases, with capacity added as each of the three areas develops. The force mains are required for development of Areas I and II. Pipelines can be installed along with the phasing of development in each area.

The following table summarizes facilities and estimated costs by area for sewage facilities.

TABLE 6.3

SUMMARY OF RECOMMENDED SEWERAGE FACILITIES AND COSTS, BY AREA

	Gravity Sewer Pipelines (feet)	**Force Main (feet)**	**Pumping Station (mgd)**	**Total Cost**
Area I	23,060 $3,733,400	7,920 $554,400	3.0 $720,000	$5,007,800
Area IA	5,490 $888,750			$888,750
Area IB	------	------	------	$-0-
Area II	6,600 $745,800	10,560 $739,200	3.0 $360,000	$1,845,000
Area III	9,240 $1,023,000	------	1.79 $360,000	$1,383,000
Totals	44,390 $6,390,950	18,480 $739,200	7.79 $1,440,000	$9,124,550

(e) Storm Drain Facilities

Drainage facilities needed for plan build-out include improvements to the Mission Zanja and Morey Arroyo channels, as well as storm drain pipelines to be installed throughout the area. Channel improvements will be required for full development of the southern portion of Area II; pipeline installation can be phased with road and utility improvements as each area develops. Drainage facilities will constitute a significant portion of the total infrastructure costs for the area, with a total estimated cost of over $28 million.

The following table summarizes facilities and estimated costs by area for drainage facilities.

TABLE 6.4

SUMMARY OF RECOMMENDED DRAINAGE FACILITIES AND COSTS, BY AREA

	Pipelines (feet)	**Channel Improvements**	**Total Cost**
Area I	10,520 $3,536,400	$13,500,000	$17,036,400
Area IA	5,940 $2,395,800	------	$2,395,800
Area IB	------	------	$-0-
Area II	20,920 $8,191,400		$8,191,400
Area III	2,640 $844,800		$844,800
Totals	40,020 $14,968,400	$13,500,000	$28,468,400

Conclusion

This Division of the Specific Plan has provided a summary of existing infrastructure facilities in the planning area, as well as facilities needed to accommodate future development in the area. A facilities engineering plan and financing plan prepared in conjunction with the Specific Plan provide more detailed information on projected facilities needs and financing methodology, and area included as Appendices to this document under separate cover. These reports address provisions of road, sewer water, drainage and community facilities.

In order to provide all needed infrastructure, construction facilities must be coordinated with development of the planning area. An estimate of how the planning area might build out was undertaken to break down the total infrastructure cost into subareas, designated as Infrastructure Planning Areas. These areas should be considered as preliminary in terms of phasing of infrastructure and development; a more refined phasing plan will be formulated by the Agency responsible for infrastructure coordination upon the completion of more detailed cost-benefit analysis of the area.

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