TOWN OF YUCCA VALLEY

DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE COMPREHENSIVE GENERAL PLAN

III. EXISTING ENVIRONMENTAL CONDITIONS, PROJECT IMPACT, AND MITIGATION MEASURES

Introduction

The adoption of the Town of Yucca Valley General Plan constitutes a "project" for the purposes of the California Environmental Quality Act (CEQA) Statutes and the State CEQA Guidelines. An the Initial Study and Environmental Checklist were completed by the Town of Yucca Valley on June 27, 1995, and specific areas of potential significant effect on the environment associated with adoption and implementation of the proposed General Plan were identified. At that time it was determined that an Environmental Impact Report was required. A Notice of Preparation was completed and transmitted to local, regional, state and federal responsible agencies, as well as other interested groups. Both the Initial Study and Notice of Preparation can be found in Appendix A of this document.

This section of the Environmental Impact Report addresses those issues which have been identified by the Town of Yucca Valley Planning Staff in their Initial Study, those raised in numerous public meetings of the General Plan Advisory Committee, Town Council and Planning Commission, those identified by the environmental consultant and subconsultants, and those issues raised by local and state agencies in response to the EIR Notice of Preparation. Issues raised are those which potentially constitute significant environmental hazards or impacts to resources, which preclude implementation of the General Plan, or constitute potentially significant impacts which may result as a consequence of the implementation of the General Plan.

Existing conditions within the general Plan Study Area are first briefly discussed. Then the identified hazards/impacts are assessed and finally proposed mitigation measures and their efficacy are presented. Satisfactory mitigation is measured by the reduction or elimination of hazards/impacts to acceptable or insignificant levels. Where appropriate, mitigation monitoring and reporting programs are recommended in conformance with AB 3180 (California Public Resources Code 21081.6), which shall assure compliance over the implementation life of the General Plan.

A. Land Use Compatibility

1. Existing Conditions

The Town of Yucca Valley incorporated in 1991 and since that time development planning and regulation has been through implemented the San Bernardino County General Plan. Yucca Valley is essentially a rural community, but has a substantial urban core which has developed along the roughly east-west trending State Highway 62. Most commercial development in the Town occurs along this roadway, while industrial uses are more broadly distributed, with industrial development to be found off of State Highway 247 in the vicinity of the Yucca Valley Airport and in the extreme northern limits of Town. In addition, some industrial development has also occurred in the eastern extreme of the community, south of State Highway 62 and west of La Contenta.

Residential development has been broadly dispersed throughout the community, occurring both north and south of Highway 62 and in progressively lower densities the greater the distance from the highway. Generally, development in much of the Town has been constrained and directed by topography and only about 25% (6,225

acres) of Town lands are currently developed. Of this, about 84% is in residential uses dominated by low density single family development; approximately 73% (5,456 units) of the housing stock is single family and about 27% (2,001 units) is found in multi-family development. Existing commercial and industrial land uses each occupy about 5% of all developed lands. Public/quasi-public (parks, floodways, civic center lands, etc.), including developed open space, comprises an additional 6%. Please see Table I-1 for a breakdown of acreages as calculated for the proposed General Plan.

Development outside the Town boundaries has been largely limited, being generally restricted to residential development that is primarily scattered in character. Development adjacent to and in the vicinity of Yucca Valley can generally be characterized as follows: to the north is primarily scattered large-lot residential subdivisions with limited development;

* To the northwest is the small community of Pioneertown which is isolated from Yucca Valley by the Saw Tooth Mountains and Water Canyon;

* Immediately west-southwest of the Town corporate limits is the community of Morongo Valley, which extends for several miles along Highway 62, with scattered residential on large lots both north and south of the highway, while the easterly most portion of Morongo Valley is very narrow with only a few residences for the first few miles. The limited commercial development that does occur in Morongo Valley is largely restricted to the western areas of the valley, approximately seven miles west of the Town limits.

* The southern limits of the Town are bounded by the Joshua Tree National Park along all but one section in the extreme southwest corner, where steep terrain has precluded development on these lands.

* To the east of Yucca Valley is the community of Joshua Tree, which extends several miles to the east, both north and south of Highway 62. This community is more densely developed, with a central core development area including some commercial services located approximately three miles east of the Yucca Valley town limits, with well developed smaller lot single family subdivisions and scattered residential. development intervening.

2. Project Impacts

The following discussion focuses on the worst case impacts associated with land use planning resulting from adoption and implementation of the General Plan Land Use Map and associated goals, policies and programs. Each land use category is discussed separately.

Residential Land Uses

Currently, there are approximately 7,671 dwelling units within the Town. The proposed General Plan provides lands for an additional maximum of approximately 16,730 units for a total maximum potential of 24,401 dwelling units at buildout. These additional units are distributed in a manner consistent with existing residential land use patterns, with a substantial overall approximate reduction of 32% from the County Land Use Plan maximum potential of 35,524 units.

Proposed residential land use distributions reduce long-term, indirect impacts associated with buildout populations and demand for infrastructure and natural resources. The distribution pattern also more directly addresses the issues of preserving the rural character of the community and placing the least intensive residential development adjacent to sensitive biological resource areas and potentially hazardous areas of Town (steep terrain and floodways). The following table indicates the total acreage and maximum residential development potential of the proposed General Plan.

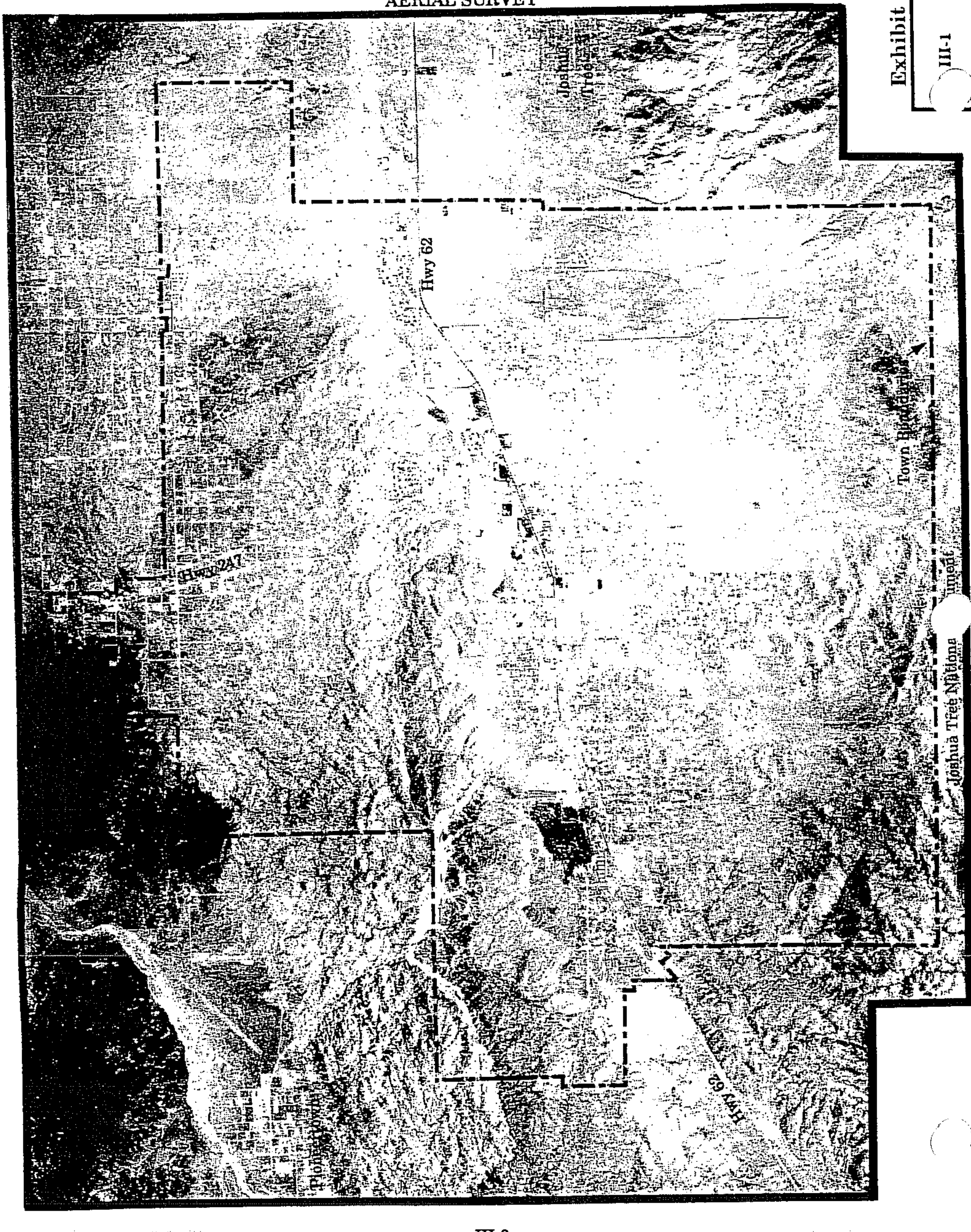


Exhibit III-1

Table III-1
Designated Vacant Residential Lands
and Potential Residential Development

Residential Designations	Maximum Density*	Acres	Units**
HR (Hillside Reserve)	1 du/20 ac	3,847	192
R-L-10 (Rural Living)	1 du/10 ac.	86	9
R-L-5 (Rural Living)	1 du/5 ac.	3,781	756
R-L-2.5 (Rural Living)	1 du/2.5 ac.	3,527	1,411
R-L-1 (Rural Living)	1 du/1 ac.	1,819	1,819
R-S-2 (Residential Single Family)	2 du/ac.	2,425	4,850
R-S-3.5 (Residential Single Family)	3.5 du/ac.	17	60
R-S-4 (Residential Single Family)	4 du/ac	10	40
R-S-5 (Residential Single Family)	5 du/ac	872	4,360
R-M-4 (Residential Multi-Family)	4du/ac.	9	36
R-M-8 (Residential Multi-Family)	8 du/ac.	24	192
R-M-10 (Residential Multi-Family)	10 du/ac	234	2,340
R-M-F (Residential Multi-Family)	12 du/ac.	7	84
R-M-14 (Residential Multi-Family)	14 du/ac.	97	1358
TOTALS		**16,755**	**17,507**

* Does not assume possible future granting of 25% density bonuses applicable to residential land use designations, which provide a significant opportunity to increase densities for affordable and senior housing.
** Potential units do not necessarily reflect a direct division of acres per unit or units per acre. Potential units also reflect already subdivided lands which reflect higher densities than would otherwise be permitted by the underlying land use designations.

Higher density development is sited closest to the commercial corridor to provide convenient pedestrian and/or mass transit access to commercial, medical and professional services located along Highway 62. These areas are also encouraged to be developed as in-fill consistent with surrounding development. These higher density developments may be subject to exterior noise levels which may result in unacceptable or significant impacts on interior residential noise levels if mitigation measures are not implemented (also see Section III-I, Noise Environment).

Progressively lower residential densities are planned further from Highway 62 and toward steeper terrain and sensitive biological and hydrologic resource areas. The lowest permitted densities (1 du/20 ac.) serves as buffer between more intense development and mountainous and other open space areas.

As discussed above and throughout this EIR, opportunities for development are restricted by topographic and other physical constraints, as well as by limited available infrastructure and natural resources. Planning for development within these parameters results in substantial overall reductions in maximum potential residential development within the Town boundaries.

Commercial Land Uses

Currently, there are approximately 292 acres of developed commercial lands within the Town's corporate limits. Approximately 841 acres of currently vacant land has been designated for commercial development in the proposed General Plan. These commercially designated lands are located primarily along State Highway 62, which is the predominant commercial corridor serving the Town. The following table indicates the total acreage and maximum commercial development potential of the proposed General Plan.

Table III-2
Commercial and Industrial Land Uses (Undeveloped)

Residential Designations	Acres*	Estimated Sq. Ft. (000s)**
C-RR ((Resort/Recreation Commercial)	114	1,241.5
C-O (Office Commercial)	23.25	253.19
C-S ((Service Commercial)	41	446.5
C-G (General Commercial)	359.25	3912.23
C-N (Neighborhood Commercial)	64.5	702
C-C (Community Commercial)	6.5	70
C-MU (Commercial Mixed Use)	232.5	2531***
Commercial Subtotal	841	9,156.4
I (Industrial Lands)	556	8,476.7
TOTALS	**1,397**	**17,633.1**

* Is gross acreage not weighted for loss of lands to public rights-of-way and other dedications which may affect net developable area. Therefore, acreages are conservative.
** Potential square footage also assumes unweighted gross acreage and 25% lot coverage of single story construction.
*** Weighted to account for permitted development of up to 35% of acreage as residential units.

Resort/Recreation Commercial (C-RR) designated lands are limited to two locations, one being along State Highway 62 at the eastern end of Town and the other being a portion of the southeast corner of Burnt Mountain in the Town's southeast quadrant. These lands are planned for such uses as destination resort and other larger planned transient occupancy uses, as well as for commercially oriented recreation uses and RV parks, campgrounds and similar uses. This designation recognizes the growing attractiveness of the area as a tourist and vacation area with growing potential.

Commercial Office (C-O) designations are assigned to lands that are already occurring within a pattern of professional and medical office development, and which are not suited for a more commercial designation due to limited access and proximity to sensitive uses, including residential development. These lands are dispersed along Highway 62 and especially southward along Yucca Trail and lands west of Sage.

Service Commercial (C-S) designated lands allow for the development of small scale commercial centers that provide a limited range of convenience commercial services, smaller grocery and convenience stores, service stations, and other limited retail operations. Lands so designated are typically found separate and largely isolated from other Town commercial areas, and are also appropriate for quasi-industrial uses such as mirror and glass shops, plumbing and lumber warehouse and wholesale, and similar uses.

General Commercial (C-G) lands are located throughout the Highway 62 commercial corridor and provide for a wide variety of smaller commercial centers, specialty retail shops, a broad range of clothing and apparel, jewelry stores and a variety of personal service businesses. Smaller, moderately priced department stores may also be

appropriate under this designation. Development may range from free-standing retail buildings and restaurants, to planned commercial centers. Typically assigned to smaller, in-fill commercial areas that are too small for planned neighborhood scale centers, these lands may also be appropriate for hotel and motel development.

Neighborhood Commercial (C-N) designated lands are located on parcels or groupings of vacant land that are of sufficient size to provide for neighborhood scale shopping centers conveniently located near residential areas. These development areas are typically anchored by supermarkets and super drugstores. A wide range of other uses, including banking, barbers/beauty salons, dry cleaners, restaurants and other related activities are typically found in these planned centers. Neighborhood commercial development is meant to serve the primary day-to-day needs of local residents.

Community Commercial (C-C) designated lands are quite limited but will be supplemented by the development of C-MU designated lands (see below). Those lands so designated augment and add to an existing community-scale shopping center anchored by WalMart in the east- central portion of Town. Development of this type and related uses are meant to serve a market including and extending beyond the community.

Mixed Use Commercial (C-MU) designated lands allow for the development of a mix of coordinated land uses, including community scale commercial, transient occupancy uses, office commercial and residential. These lands have been so designated along and in the vicinity of the Highway 62 commercial corridor. Its purpose is to allow highly integrated commercial uses with residential development that can rely on pedestrian access to commercial services and employment centers, and to create new consumer retail markets in the downtown area.

Industrial Land Uses

The proposed general Plan provides for a total of approximately 860 acres, of which approximately 556 acres are currently vacant. The types of development envisions on these lands are expected to be largely limited to "clean" industries characterized by low emissions of hazardous fumes or other materials, limited noise generation, warehousing operations, fabrication of cabinets and other wood products, and the limited use of outdoor storage. More intense industrial development will be subject to discretionary permit approval (Conditional Use Permit). Existing and new industrial lands are situated to take advantage of major transportation infrastructure, including State Highways 247 and 62 and the Yucca Valley Airport. For a statistical summary of industrial lands please see Table III-2, above.

Public and Quasi-Public Land Uses

These designations include lands assigned an "Open Space" designation, and provides for the Civic Center, other Town and County offices, libraries, airport, schools, hospitals, parks, golf courses, floodways, police and fire stations, utility substations, as well as other public administrative offices. Most of these lands are developed, excepting, of course, open space lands. They are distributed throughout the community and include utility substations and maintenance yards as well as Town parks located in the southern and northwestern extreme portions of the community. Not included in the open space acreage counts but essentially constituting the same are 1,140± acres of federal lands under the jurisdiction of the Bureau of Land Management. Additional lands may be added to the public/quasi-public category in the future as stormwater detention basin are sited in various locations.

Summary of Impacts

Impacts within the Town of Yucca valley and on surrounding lands resulting from adoption and implementation of the General Plan Land Use Plan are not expected to be significant. No substantial or significant incompatibilities with internal or external land uses are expected to result from the proposed plan of development, even if all land uses build out at the maximum potential. The potential for traffic noise impacts on existing, approved and/or proposed residential lands is reduced by reductions in overall traffic (see Section III-B, below). Nonetheless, some residential development can be expected to be exposed to potentially significant noise levels.

Mitigation measures may be necessary to reduce these potential impacts to acceptable levels (see Section III- I, below).

3. Mitigation Measures and Monitoring/Reporting Program

Mitigation Measures

- Inasmuch as no significant land use compatibility impacts are expected to result from the adoption and implementation of the Yucca Valley General Plan, no mitigation measures are needed to address this area of concern. However, in order to assure that potential impacts associated with future traffic noise on residential land use are adequately addressed, all future residential development occurring on lands within an existing or projected 65 dBA noise contour shall be required to prepare a noise impact assessment and mitigation plan, which minimizes impacts to outdoor living space and assures a maximum interior noise level of 45 CNEL.

Mitigation Monitoring/Reporting Program

- The Town shall establish procedures which involve identification of potentially adverse or unacceptable noise exposures, which analyze proposed mitigation programs and assure construction in accordance with the approved noise mitigation plan. Said plan shall be approved by the Planning Division as part of its plan check and the efficacy of mitigation demonstrated as part of the department's building inspection function. Results shall be recorded and maintained with building inspection records.
  Responsible parties: Community Development Department

B. Traffic/Circulation

1. Existing Conditions

Topographic and other physical constraints have shaped the development of the local and regional transportation system in the Town of Yucca Valley and the Morongo Basin.

A regional traffic study was prepared by Robert Kahn , John Kain & Associates to identify existing circulation and traffic conditions, and to assess traffic-related impacts potentially associated with the adoption and implementation of the Town of Yucca Valley General Plan. Exhibit I-2 shows the Yucca Valley/project boundaries which is roughly bounded by Buena Vista Drive/Skyline Ranch Road to the north, Joshua Tree National Park to the south, the Community of Joshua Tree to the east, and the Sawtooth Mountains to the west.

The traffic model developed as a part of this analysis included data collected for traffic generated within the Town, and traffic originating from communities to the north , east, and west that access and pass through the community via the regional State Highways 62 and 247.

The technical report is summarized below and is contained in its entirety in Appendix E. The traffic and circulation study analyzed existing (1993) traffic conditions and the circulation network of the Town. It also Modeled and projected potential long range traffic impacts associated with the maximum possible buildout of the previously circulated General Plan. Finally, an analysis of the previously circulated preferred alternative and three other alternatives are included in Appendix H.

Several interim land use plans were analyzed to develop a close correspondence between land use and traffic levels which could be accommodated on local and state roadways. The traffic and circulation analysis detailed the impacts associated with the Preferred Alternative, and prescribed reasonable mitigation measures necessary to provide acceptable Level-of-Service (LOS)within the circulation system.

TABLE III-3

DAILY ROADWAY CAPACITY VALUES[1]

TYPE OF ROADWAY	LEVEL OF SERVICE				
	A	B	C	D	E
8 lanes divided	45,000	52,500	60,000	67,500	75,000
6 lanes divided	33,900	39,400	45,000	50,600	56,300
4 lanes divided	22,500	26,300	30,000	33,800	37,500
4 lanes undivided	15,000	17,500	20,000	22,500	25,000
2 lanes divided	11,300	13,200	15,000	17,000	18,800
2 lanes undivided	7,500	8,800	10,000	11,300	12,500

Traffic Model Description

This section of the report describes the operational procedures and data input formats of the model. The subdivision of the modeling area into a representative zone system, and the representation of the roadway network are described. The procedures utilized for trip generation and distribution, and assignment of traffic to the roadway network are discussed.

The computer modeling process consists generally of seven individual but interrelated steps. These are:

- Definition of a traffic analysis zone system;
- Definition of a roadway network to serve the zone system;
- Determination of efficient and logical route paths through the network between the individual traffic analysis zones;
- Collection of land use data for each of the traffic analysis zones;
- Determination of trip generation within each traffic analysis zone;
- Determination of the distribution of trip ends between the traffic analysis zones for five individual trip purposes; and
- Assignment of trips to the individual roadway segments of the overall roadway network.

1 These roadway capacities are approximate figures only, and are used at the General Plan level. They are affected by such factors as intersections (numbers & configuration), degree of access control, roadway grades, design geometrics (horizontal & vertical alignment standards), sight distance, level of truck and bus traffic, and level of pedestrian and bicycle traffic. Average daily traffic (ADT) is used by the Town only as a long range planning tool to assist in determining roadway highway classification (number of through lanes) needed to meet traffic demand.

Morongo Basin (RSA 33) Transportation Model

The boundaries of the Morongo Basin Transportation Model coincide with the boundaries defined as the Morongo Basin Subarea (Regional Statistical Area 33) for purposes of the Comprehensive Transportation Plan for San Bernardino County.

The Comprehensive Transportation Plan (CTP) is a long-range, twenty-year plan which identifies the programs, projects, and financing strategies needed to meet the county's transportation goals, consistent with economic development, social, and environmental objectives. Although plan development is being coordinated by San Bernardino Associated Governments (SANBAG), the CTP is viewed as the product of a collaborative effort that relies on input from many sources including the Town of Yucca Valley.

An appropriate traffic analysis zone (TAZ) structure has been defined for the overall model area based upon 1990 federal census geography and adopted general plans of local jurisdictions. Exhibits "E" and "F" illustrate the census tract and census block boundaries within RSA 33. Exhibit "G" depicts the TAZ boundaries. In general, TAZ's comprise individual census blocks, block groups, or aggregates of block groups (See Exhibits in Appendix "E").

Plots of the Morongo Basin Transportation Model network, TAZ boundaries, and centroid connectors have been reviewed by members of the Project Review Committee.

In cooperation with the Project Review Committee, the network of roadways to be modeled, including but not limited to all State highways, major and secondary arterials, and any other roadways within the designated Congestion Management Program network were compiled and encoded by RKJK staff. Additional roadways were identified for inclusion in the network as needed to ensure proper loading and distribution of trips.

Exhibit "H" shows the roadway system map which was used as a base in the preparation of the model network. Plots of the Morongo Basin Transportation Model network (see Exhibit "I") were reviewed by members of the Project Review Committee, with data showing critical network information, including facility type, area type, and number of lanes (See Exhibits in Appendix "E").

Both census tract level socioeconomic data and land use data were provided by SCAG. Disaggregation to the TAZ level was performed by RKJK in cooperation with the local jurisdictions in the modeled area, represented through the Project Review Committee. Exhibit "J" illustrates the coverage of SCAG 1993 land use data. During September and October of 1995 data for the modeled area from SCAG's 1991 Origin and Destination Survey is scheduled to be incorporated into the trip generation and distribution components of the model by RKJK, under the direction of SCAG staff.

Zone System

To produce a forecast of traffic volumes within the modeling area, traffic must be loaded onto the roadway network in a manner which approximates how real traffic enters and uses the real roadway system. To accomplish this, the study area traffic analysis zone (TAZ) system was developed by RKJK staff, under the direction of the Morongo Basin Transportation Model Project Review Committee. The TAZ structure was created from existing census block boundaries, census tract boundaries, and digital street centerlines using ArcCAD software tools. Exhibit "K" illustrates the integrated GIS process.

Each TAZ represents the area where traffic is generated (expressed as a number of trip "productions" and "attractions") by the land uses in that TAZ. During the trip distribution stage of the process, traffic is distributed

from each "production" zone to all other zones of the modeling area based on the "attractiveness" of each other zone. In this way, the zones interact with each other. To insure that there is adequate interaction, the zone system must be subdivided into areas which are small enough to accurately represent the distribution process and the manner in which traffic loads to the roadway network. The Town of Yucca Valley area of the RSA 33 traffic model has been subdivided into zones which are depicted on Exhibit "L" (See Exhibits in Appendix "E").

The study area is tied to the outside world through external zones called cordon stations. Traffic enters and leaves the study area through the cordon stations. In addition, traffic which passes through the study area, but does not interact with it, (termed "through" traffic) is represented as traffic which passes directly from one cordon station to another. These "cordons" are assigned trip "productions" and "attractions" for the external ends of internally generated trips which leave the model area. The Morongo Basin (RSA 33) traffic model has 14 cordon stations.

RKJK overlaid the traffic analysis zone boundaries with SCAG 1993 Land Use coverage to generate a detailed correspondence list containing the four-digit modified Anderson land use codes, traffic analysis zone number and the associated acreages. The resulting land use data for the Town of Yucca Valley is summarized in Table III-2. Appendix "A" of Appendix "E" provides a zone-by-zone breakdown of existing (1993) land uses within the Town.

Roadway Network

The roadway network generally excludes local level streets because it is impractical to model at that level of detail. The network is described in the model as a series of roadway links connected at node points. Traffic generated within each internal TAZ is introduced to the roadway network through one or more zone "centroid" connectors. These are fictitious roadway links which connect the zone center (the idealized point of zone trip generation) to the arterial roadway system. In a similar manner, cordon stations have special connectors termed cordon links.
Each roadway link is defined in terms of its link end points (nodes), a unique length and a facility code. The facility codes for the network, which define an initial link speed and capacity for each of three assignment periods (AM, PM and off-peak), are listed in Table III-3.

Exhibit "M" illustrates the existing conditions model network drawn using digital street centerline data and road classifications. Tranplan networks were built to scale by RKJK in the UTM coordinate system (consistent with SCAG, USGS, Census Bureau and Thomas Brothers Data). All node points are explicitly defined, usually at existing intersection points. Attributes such as Area Type, Facility Code and Link Group are defined in ArcCAD and output to Tranplan (ASCII) format.

Trip Generation

In this initial application of the RSA 33 traffic model, the trip generation process is generally based on the trip generation process used in the CTP (RIVSAN) transportation model. The trip generation component of the model is independent of the TRANPLAN software used to process most of the other model components. However, the output structure from trip generation, zonal productions and attractions, has been designed for compatibility with TRANPLAN data format requirements.

The trip generation model estimates the number of person-trips generated by the residents of each traffic analysis zone on an average weekday. Trips are estimated by five trip types or purposes: (1) home-to-other, (2) other-to-other, (3) other-to-work, (4) home-to-work, and (5) home-to-shop.

The RIVSAN trip generation model was derived through multiple linear regression methods using base year data for the estimation of tripmaking units. The tripmaking units were defined as: (1) housing units with no vehicles,

(2) housing units with one vehicle, and (3) housing units with two or more vehicles. The trip generation model assumes that the number of tripmaking units in each of the three categories can be estimated as a function of zonal median household income, proportion of single-family housing units to total housing units, and the population per housing unit. The equations representing these relationships are presented in Table III-4.

Trip generation is expressed in terms of "productions" and "attractions". Each trip made in the model has two "trip ends", a production end and an attraction end. The majority of production trip ends in the model are related to residential dwelling units; residences have relatively few attraction trip ends. Regardless of whether the direction of the trip is from the residence to a shopping location, or from the shopping location to the residence, it is expressed as a home-based production at the residence end of the trip. Retail land uses on the other hand, have relatively few production trip ends; they primarily attract trips made from other land uses.

Person-trip productions for each zone are estimated by applying trip generation rates to tripmaking units in each zone. The trip generation rates were developed from survey data using cross-classification techniques. Table III-5 shows the person-trip production trip generation rates. Productions are estimated based on housing type and level of vehicle ownership for five trip purposes. The result is a set of five two-by-three person-trip matrices for each zone. All person-trip productions are initially generated at the home zone and represent the most accurate estimate of total productions for all purposes, including non-home-based trip purposes. A second set of equations are employed to reallocate the non-home-based trip productions on the basis of both population and employment intensity in each zone. The non-home-based person-trip productions are essentially regenerated for each zone using the equations presented in Table III-6.

Finally, trip attraction factors are estimated for each zone for each trip type. The quantity of person-trip attractions is a function of intensity of activity, which is represented as a linear combination of total employment, retail employment, and population. Table III-7 presents the regression equations for estimating attraction factors for each trip purpose. Unlike the previous regional model person-trip attraction equations, the RIVSAN person-trip attraction equations contain no constant coefficient.

TABLE III-4

RSA 33 TRIP GENERATION MODEL TRIP-MAKING UNIT ESTIMATION

$Z = B_0 + B_1 (S) + B_2 LN (P) + B_3 (1/I) + B_4 (1/I^2)$

where:

Z	=	ratio of zero vehicle to total housing units
S	=	ratio of single housing units to total units
P	=	ratio of population to total units
I	=	median household income in $1,000's
B_0-B_4	=	regression coefficients:

B_0	B_1	B_2	B_3	B_4
0.02	-0.12	0.02	1.53	-1.06

$LN (R) = C_0 + C_1 (S) + C_2 (1/P) + C_3 (1/I) + C_4 (1/I^2)$

where:

R	=	ratio of one to two+ vehicle housing units
S	=	ratio of single housing units to total units
P	=	ratio of population to total units
I	=	median household income in $1,000's
C_0-C_4	=	regression coefficients:

C_0	C_1	C_2	C_3	C_4
0.14	-1.79	-0.60	8.41	-9.68

Trip Distribution

Once the trip generation within each TAZ has been calculated, the distribution of trips between zones where trips are produced and zones where trips are attracted must be determined. In the traffic model, this function is achieved using a "gravity" distribution model. The gravity model is utilized because it has been demonstrated to perform reasonably well and is widely accepted.

The gravity distribution model is based on the well known gravity formula, where the distribution of trips is proportional to the attractiveness of a land use and the distance (or travel time) from the point of trip production. The propensity to favor trips over shorter distances as opposed to trips over longer distances in the distribution process is expressed in terms of a travel time distribution function or curve. A unique distribution curve is utilized for each of the five trip purposes. These curves reflect the tendency of trips to be made over longer distances for employment purposes, while trips for non-employment purposes, such as shopping, are generally shorter.

Each distribution curve is represented in the gravity formula through travel time friction factors which identify the curve for different elements of time.

The distribution process is performed uniquely for each trip purpose. The end result of the process is a trip table or matrix for each trip purpose which records the trip interaction between zones on a production/attraction basis. Because the production/attraction trip table is not directional, it must be transformed to an origin/destination table through the matrix processes of transposition and factoring. The time period directional factors used in the model are shown in Table III-8.

TABLE III-5
RSA 33 PERSON-TRIP PRODUCTION GENERATION RATES

	SAN BERNARDINO AND RIVERSIDE COUNTY					
	HS0	HS1	HS2*	HM0	HM1	HM2*
Home-Other	1.03290	2.92710	4.34380	0.72380	2.13510	3.16850
Other-Other	0.36630	1.79410	2.66240	0.75240	1.42340	2.11230
Other-Work	0.03300	0.41910	0.62190	0.00000	0.59510	0.88310
Home-Work	0.26620	1.05710	1.56870	0.11550	1.10000	1.63240
Home-Shop	0.18370	1.15940	1.72050	0.46310	0.80190	1.19000

Notes:
HS denotes single-family households.
HM denotes multiple-family households.
0, 1 or 2 denote the number of vehicles (0, 1 or 2+ vehicles) in the household.
* = Adjusted to account for 1991 Southern California Origin-Destination Survey data.

TABLE III-6
RSA 33 PERSON-TRIP PRODUCTION REALLOCATION EQUATIONS

R (trip type 2) $= A_0 + A_1 (P) + A_2 (RE)$
R (trip type 3) $= B_0 + B_1 (RE) + B_2 (NR)$

where: R = person trip reallocation factor
P = population
RE = retail employment
NR = non-retail employment
$A_0 - A_2$ and $B_0 - B_2$ = regression coefficients:

A_0	A_1	A_2	B_0	B_1	B_2
0	0.229	6.702	0	1.842	0.483

TABLE III-7
RSA 33 ESTIMATION OF PERSON-TRIP ATTRACTIONS

$A = C_0 + C_1 (P) + C_2 (E) + C_3 (RE)$
where:
A = person-trip attractions
P = population
E = total employment
RE = retail employment
$C_0 - C_3$ = regression coefficients:

TRIP TYPE	C0	C1	C2	C3
San Bernardino County				
1 (home-other)	0	0.640	-	6.681
2 (other-other)	0	0.256	-	4.408
3 (other-work)	0	-	0.596	-
4 (home-work)	0	-	1.675	-
5 (home-shopping)	0	-	-	6.178

Traffic Assignment

Traffic assignment is the process by which trip interchanges between zones, determined in the distribution process, are assigned to specific route paths in the roadway network. The end result is a forecast of daily traffic volume on each roadway link.

The traffic assignment process for RSA 33 has also been adapted from the procedures used in the CTP model. The equilibrium assignment procedure available in the PM, and off-peak included in the RSA 33 model. The CTP model uses the equilibrium assignment procedure for all periods of the day except the nighttime period. The RSA 33 model off-peak period, which combines the CTP model mid-day and nighttime periods, uses the equilibrium assignment procedure. The more detailed RSA 33 model zone structure "spreads" traffic more evenly, and the use of the equilibrium assignment procedure also allows for more flexibility in performing specialized model analyses.

TABLE III-8
TIME PERIOD DIRECTIONAL FACTORS

	PURPOSE					
	HOME-WORK		OTHER-WORK		NON-WORK	
FACTORS	P ==> A	A ==> P	P ==> A	A ==> P	P ==> A	A ==> P
AM Peak	0.3403	0.0152	0.1492	0.0166	0.0939	0.0210
PM Peak	0.0196	0.3215	0.0343	0.3089	0.1309	0.1962
Off-Peak	0.1730	0.1304	0.2455	0.2455	0.2680	0.2900
SUM BY PURPOSE	0.5329	0.4671	0.4290	0.5710	0.4928	0.5072
TOTAL		1.0000		1.0000		1.0000

Post Processing

Regardless of the level of detail incorporated into a modeling tool, further refinement is almost always required. The RSA 33 model is no exception to this rule. The RSA 33 model provides fairly accurate daily traffic volume forecasts. It is recommended that the highest volume reported by the model for any particular roadway segment be used for purposes of daily traffic volume forecast reporting.

The relatively rare roadway segments which do not meet the validation/consistency criteria outlined later in this section may be candidates for daily volume adjustment using the incremental additive approach. This approach is described in the document Highway Traffic Data for Urbanized Area Project Planning and Design (National Cooperative Highway Research Program Report 255, Transportation Research Board, National Research Council.). This document is commonly referred to as NCHRP-255.

The first step for producing any peak hour forecasts using the RSA 33 model is to collect existing peak hour data at all desired forecast locations. Failure to collect existing traffic count data should cause any resulting traffic volume forecasts to be used with great caution.

The post processing procedure utilized by RKJK can be described in three very broad steps:

Step 1) Perform additive incremental adjustments to future model forecasts to account for differences between the existing conditions model and actual traffic count data.

Step 2) Verify reasonableness of relationship between peak hour forecasts and daily traffic volume forecasts. Adjust growth if necessary.

Step 3) Review resulting forecasts for conservation of flow, or other factors such as anticipated development patterns, etc. Adjust forecasts to provide reasonable conservation of flow, etc., as necessary.

Population/Employment

The function of the Circulation Element of the General Plan is to serve as the blueprint for development of the circulation system much in the same way as the Land Use Element serves to guide development of land uses. Accordingly, the travel demand within the circulation system exhibited by traffic from the population and employment in a future forecast year (post 2015) must be estimated to determine the adequacy of roadway classifications. The purpose of the traffic model is to provide an analysis tool which can forecast future traffic volumes within the circulation system. This section of the report presents the application of the Morongo Basin Transportation Model for this purpose with the new preferred land use plan.

Future population and employment data within the Town of Yucca Valley General Plan study area has been tabulated for buildout of the General Plan using the rates shown (See Table 11 in Appendix "E"). Population and employment projections derived from future land uses are summarized by category (See Table 12 in Appendix "E"). Population and employment projections included in the model, but outside of the Town of Yucca Valley, have been excluded from Table 12 (Appendix "E").

Trip Generation

At buildout, the Morongo Basin study area land uses are estimated to generate approximately 835,587 total trip-ends. Trip attractions for all trip purposes have been balanced against trip productions. External trips at the cordon stations are estimated to total approximately 115,642 trip-ends. Through trips between cordon stations at buildout are estimated to increase by 100% over existing conditions.

Traffic Projections

Daily traffic volumes projected by the model for the General Plan network appear on Exhibit "R". The comparison of 1993 volumes to General Plan buildout volumes are shown (See Table 11 in Appendix "E").

Projected General Plan buildout volumes on Highway 62 with the preferred land uses and network will range from approximately 46,000 daily vehicles east of Palomar Avenue to approximately 60,000 vehicles per day east of Acoma Trail. Existing volumes (shown on Exhibit "B") on Highway 62 range from 23,600 to 32,000 daily vehicles at the same locations.

Intersection Analysis

The current technical guide to the evaluation of traffic operations is the 1994 Highway Capacity Manual (HCM) (Transportation Research Board Special Report 209). The 1994 HCM defines level of service as a qualitative measure which describes operational conditions within a traffic stream, generally in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. The criteria used to evaluate LOS (Level of Service) conditions vary based on the type of roadway and whether the traffic flow is considered interrupted or uninterrupted.

TABLE III-9

COMPARISON OF EXISTING AND FUTURE VOLUMES (PREFERRED LAND USES/PREFERRED NETWORK)

ROADWAY	1993 ADT	GENERAL PLAN DESIGNATION	GENERAL PLAN BUILDOUT (ADT)
Highway 62:			
• W of Camino Del Cielo	32,000	Highway - 6 Lanes	60,000
• W of Pioneertown Rd.	35,000	Highway - 6 Lanes	50,000
• W of Hwy. 247	39,000	Highway - 6 Lanes	55,000
• W of Yucca Mesa Rd.	27,000	Highway - 6 Lanes	46,000
Highway 247:			
• N of Buena Vista	5,400	Highway - 4 Lanes	23,000
• S of Buena Vista	7,900	Highway - 6 Lanes	34,000
• N or Hwy. 62	10,200	Highway - 6 Lanes	32,000
Yucca Trail:			
• E of Joshua Lane	7,400	Arterial - 4 Lanes	21,000
• W of Avalon/Palomar	6,300	Arterial - 4 Lanes	19,000
• W of La Contenta Road	4,500	Collector - 4 Lanes	14,000
Onaga Trail:			
• W of Avalon/Palomar Ave.	700	Collector - 4 Lanes	8,000
• W of Joshua Lane	3,600	Arterial - 4 Lanes	15,000
• E of Acoma Trail	4,600	Arterial - 4 Lanes	17,000
• E of Deer Trail	2,900	Arterial - 4 Lanes	20,000
Pioneertown Rd.:			
• N or Yucca Trail	800	Collector - 4 Lanes	9,000
Sunnyslope Dr.:			
• E of Pioneertown Rd./N of Hwy. 62	800	Collector - 4 Lanes	12,000
Sage Avenue:			
• N of Onaga Trail	3,700	Collector - 4 Lanes	12,000
• N of Hwy. 62	1,500	Collector - 4 Lanes	12,000
Acoma Trail:			
• S of Onaga Trail	1,200	Collector - 4 Lanes	14,000
• S of Hwy. 62	2,500	Collector - 4 Lanes	8,000
Joshua Drive:			
• W of Joshua Lane	2,000	Collector - 4 Lanes	13,000
• E of Palomar Ave.	2,200	Collector - 2 Lanes	3,000
Joshua Lane:			
• N of Joshua Dr.	3,700	Collector - 4 Lanes	11,000
• S of Hwy. 62	4,400	Arterial - 4 Lanes	19,000

ROADWAY	1993 ADT	GENERAL PLAN DESIGNATION	GENERAL PLAN BUILDOUT (ADT)
Avalon/Palomar Ave.:			
• N of Yucca Trail	2,200	Collector - 4 Lanes	12,000
• N of Onaga Trail	2,300	Collector - 4 Lanes	13,000
• S of Onaga Trail	2,600	Collector - 4 Lanes	10,000
• N of Hwy. 62	1,500	Collector - 4 Lanes	6,000
Yucca Mesa/La Contenta Rd.:			
• N of Hwy. 62	3,300	Collector - 4 Lanes	7,000
• S of Hwy. 62	1,500	Collector - 4 Lanes	7,000
Skyline Ranch Rd.:			
• W of Hwy. 247	1,500	Collector - 4 Lanes	8,000
Buena Vista Dr.:			
• E of Hwy. 247	1,700	Collector - 4 Lanes	9,000
Kickapoo Trail:			
• S of Hwy. 62	2,300	Collector - 4 Lanes	10,000
Camino Del Cielo:			
• S of Hwy. 62	--	Collector - 4 Lanes	14,000
• N of Hwy. 62	900	Collector - 4 Lanes	13,000
Santa Fe Trail:			
• E of Kickapoo Trail	1,400	Collector - 4 Lanes	6,000
Deer Trail:			
• S of Hwy. 62/N of Onaga Trail	2,000	Collector - 4 Lanes	9,000
Palm Ave.:			
• S of Hwy. 62	1,000	Collector - 2 Lanes	6,000
Baron Dr.:			
• W of Yucca Mesa Rd./E of Avalon Rd.	1,900	Collector - 2 Lanes	4,000
Balsa Ave.:			
• S of Hwy. 62/N of Yucca Trail	1,900	Collector - 4 Lanes	19,000
• N of Hwy. 62/S of Paxton Rd.	2,600	Collector - 4 Lanes	18,000
Indio Ave.:			
• N of Hwy. 62/S of Baron Rd.	1,000	Collector - 2 Lanes	4,000
Paxton Rd:			
• W of Avalon Dr.	600	Collector - 4 Lanes	16,000

The definitions of level of service for uninterrupted flow (flow unrestrained by the existence of traffic control devices) are:

- LOS "A" represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream.
- LOS "B" is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver.
- LOS "C" is in the range of stable flow, but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream.
- LOS "D" represents high-density but stable flow. Speed and freedom to maneuver are severely restricted, and the driver experiences a generally poor level of comfort and convenience.
- LOS "E" represents operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform value. Small increases in flow will cause breakdowns in traffic movement.
- LOS "F" is used to define forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount which can traverse the point. Queues form behind such locations.

Uninterrupted flow is generally found only on limited access (freeway) facilities in urban areas. The level of service is based on the HCM, Table III-1.

The definitions of level of service for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control.

The level of service is typically dependent on the quality of traffic flow at the intersections along a roadway. The 1994 Highway Capacity Manual (HCM) methodology expresses the level of service at an intersection in terms of delay time for the various intersection approaches. The HCM uses different procedures depending on the type of intersection control. The levels of service determined in this study are determined using the HCM methodology.

For signalized intersections, average delay per vehicle is used to determine level of service as follows:

LEVEL OF SERVICE	AVERAGE STOPPED DELAY PER VEHICLE (SECONDS)
A	0 to 5.00
B	5.01 to 15.00
C	15.01 to 25.00
D	25.01 to 40.00
E	40.01 to 60.00
F	60.01 and up

A level of service analysis has been conducted for General Plan buildout conditions at key intersections (see Exhibit "S" Appendix "E") on the Town of Yucca Valley roadway network. The LOS analysis for signalized intersections has been performed using optimized signal timing. This analysis has included an assumed lost time of three seconds per phase in accordance with 1994 HCM recommended default values. Signal timing optimization has considered pedestrian safety and signal coordination requirements. Appropriate time for pedestrian crossings have also been considered in the signalized intersection analysis. The following formula has been used to calculate the pedestrian minimum times for all HCM runs:

[(Curb to Curb distance - 6) / 4] + 7

Saturation flow rates of 1,900 vehicles per hour of green (vphg) have been assumed for all capacity analysis.

The intersection operations analysis for buildout conditions with the Preferred Land Use and Circulation Plan and with recommended ultimate improvements are summarized in Table III-17. The operations analysis worksheets for these future conditions with improvements are included in Appendix "F". As shown in Table III-17, the key Town intersections are expected to experience LOS "D" or better peak hour operations with future improvements which include the widening of Highway 62 to three through travel lanes in each direction.

Regional Facilities

State Highway 62

This highway generally trends in an east/west direction and bisects the Town of Yucca Valley. HWY 62 is currently (1994) a four-lane divided facility with a parking/turnout lane on both the north and south side of the highway from Sage Avenue to Kickapoo Trail. State Highway 62 travels from Interstate 10 at its most western point, through the Morongo Basin (which includes the communities of Morongo Valley and Joshua Tree, the City of Twenty- Nine Palms and the Town of Yucca Valley) and eastward toward the Colorado River. Existing daily traffic volumes range from 14,490 to 22,300 vehicles per day through the Town of Yucca Valley.

The State Highway serves as access and the main traffic circulation artery for the Town. An important component to the analysis of this roadway facility is determining what is termed "pass-by trips" or "background traffic." In this document we will refer to these types of trips as simply, "pass-by trips." Pass-by trips are the trips that originate outside of the Town with destinations also outside of the Town that utilize the State Highway through Town.

In order to determine a peak hour trip ratio for these pass-by trips, the Town traffic was compared to the traffic count volume data. The difference between these two values resulted in a pass-by trip ratio of 8.18%. Appendix E illustrates the actual calculations utilized in order to derive this average pass-by trips ratio.

State Highway 247

This Highway generally trends in a north/south direction and bisects the northern half of the Town. Hwy 247 travels from its intersection with Hwy 62 northward into the Johnson and Lucerne Valleys to its terminus at Interstate 15 in Barstow. From its intersection with Sunnyslope Drive, about a half mile north of the Hwy 62 intersection, north to approximately one mile south of Buena Vista Drive at the intersection of Hillcrest Drive, Hwy 247 has a rather steep grade with curves tending toward the northwest. The majority of the adjacent development along this stretch of the highway is rural residential. From Sunnyslope Drive north to the Town limits and beyond, the existing (1994) lane configuration is predominately two lane undivided. Existing daily traffic volumes along Hwy 247 within the Town range from 9,330 to 14,250 vehicles per day.

Intra-Town Roadways

All existing roadway designations described below are taken from the San Bernardino County General Plan Circulation Element. Table III-6 illustrates the roadway dimensions, including right-of-way, curb-to-curb separation and the number of lanes, as designated by the San Bernardino County General Plan. It should be noted that although a roadway is designated as a specific roadway type with specified dimensions, the current (1993) roadway geometrics may vary from the planned designations. Therefore the current roadway geometrics have been included in the table. Recommendations for future roadway designations are given in the project impacts section.

Table III-10
County General Plan of Roads
Town of Yucca Valley

Highway Designation	Planned Number of Lanes	Planned Right-Of-Way Width	Planned Curb-To-Curb Separation	1993 Road Geometrics
Highways:				
Hwy 62*:	6	110' Minimum	90'	4 Ln Dvd/ Paved
Hwy 247*:	6	110' Minimum	80'	4 Ln Dvd/
	4	104		2 Ln Undvd/ Paved
Pioneertown Road:	4	80' Minimum	60'	2 Ln Undvd/ Paved
Yucca Mesa Road: North of HWY 62	4	80' Minimum	60'	2 Ln Undvd/ Paved
Joshua Lane: Between HWY 62 and Onaga	4	100' Minimum	80'	4 Ln Dvd/ Paved/ 2 Ln Undvd/ Paved
Onaga & Golden Bee	4	80Minimum	60	2Ln Undvd/ Paved
Golden Bee to Term.	2	66Minimum	46	2 Ln Undvd/ Paved
Secondary Highways:				
Skyline Ranch Road:	4	80'	60'	2 Ln Undvd/ Paved
Buena Vista Drive:	4	80'	60'	2 Ln Undvd/ Paved
Avalon Avenue: North of HWY 62	2	66'	46'	2 Ln Undvd/ Paved/Dirt
Paxton Road:	4	80'	60'	2 Ln Undvd/ Paved/Dirt
Sunnyslope Drive: Between Pioneertown Road and HWY 247	4	80'	60'	2 Ln Undvd/ Dirt/Paved
Yucca Trail: Between Kickapoo Trail and HWY 62;	2	70'	54'	2 Ln Undvd Paved
Between 62/Sage and La Contenta Road	4	100'	80'	2/4 Ln Undvd Paved
Onaga Trail: Between Kickapoo Trail and Joshua Ln	4	100'	80'	2 Ln Undvd/ Paved/Dirt
Joshua Ln & Palomar	4	80'	60'	
Joshua Drive: Between Acoma Trail and Joshua Lane;	4	80'	60' Paved/Dirt	2 Ln Undvd/

West of Palomar Avenue				
Golden Bee Drive:	2	66'	46'	2 Ln Undvd/ Paved/Dirt
Between Acoma Avenue and Joshua Lane				
San Andreas Road:	2	66'	46'	2 Ln Undvd/ Paved/Dirt
Between Warren Vista Ave and Joshua Lane				
La Contenta Road:	4	88'	64'	2 Ln Undvd/ Paved/Dirt
Between HWY 62& Yucca Trail				
Yucca Trail to Joshua	2	66'	46	Dirt-2/Ln
Indio Avenue:	2	70'	40'	2 Ln Undvd/ Paved/Dirt/ No Road
Between SR 62 &Yucca Trail				
Palomar Avenue:	4	88'	64'	2 Ln Undvd/ Paved
Between HWY 62 and Joshua Lane				
Warren Vista:	4	80'	60'	2 Ln Undvd/ Paved/
Between HWY 62 and Yucca Trail;	2	66	46	No Road
Between Joshua Lane and San Andreas Road				
Sage Avenue:	4	88'	64'	2 Ln Undvd/ Paved/Dirt
Between Sunnyslope Drive and Golden Bee Drive				
Palm Avenue:	2	66'	46'	2 Ln Undvd/ Paved/Dirt
Between Sunnyslope Drive and Onaga Trail				
Acoma Trail:	4	80'	60'	2 Ln Undvd/ Paved
Between Sunnyslope Drive and Golden Bee Drive				
Deer Trail:	4	80'	60'	2 Ln Undvd/ Paved
Between HWY 62 and Onaga Trail				
Camino Del Cielo:	4	80'	60'	2 Ln Undvd/ Paved
North of HWY 62				
Santa Fe Trail:	4	80'	60'	2 Ln Undvd/ Paved
Between Kickapoo Trail and Acoma Trail				

*Ultimate planned roadway geometrics are subject to review by Caltrans.

Table III-11
Calculated Average Daily Traffic Volume
Existing Conditions (1993)

Roadway	Location	Existing ADT
Buena Vista	E/O HWY 247	2,530
HWY 247	S/O Buena Vista	9,330
HWY 247	N/O HWY 62	14,250
HWY 62	W/O Kickapoo Trail	19,940
HWY 62	E/O Acoma Trail	18,950
HWY 62	W/O HWY 247	22,300
HWY 62	W/O Yucca Mesa Road	14,490
Yucca Trail	E/O Joshua Lane	7,390
Yucca Trail	W/O Avalon/Palomar	6,330
Yucca Trail	W/O La Contenta	4,530
Avalon Avenue/Palomar Avenue	N/O Yucca Trail	2,200
Avalon Avenue/Palomar Avenue	N/O Onaga Trail	2,300
Onaga Trail	W/O Avalon/Palomar	3,660
Onaga Trail	W/O Joshua Lane	3,550
Onaga Trail	E/O Acoma Trail	4,630
Onaga Trail	E/O Deer Trail	2,900
Sage Avenue	N/O Onaga Trail	3,650
Joshua Lane	N/O Joshua Drive	3,700
Joshua Lane	S/O Hwy 62	4,440
Palm Avenue	S/O HWY 62	1,020
Acoma Trail	S/O Onaga Trail	4,630
Acoma Trail	S/O HWY 62	2,500
Deer Trail	N/O Onaga Trail	2,040
Kickapoo Trail	S/O HWY 62	2,310
Paxton Road	W/O Avalon Drive	590
Pioneertown Road	N/O HWY 62	820

The existing land uses in the Planning Area were calculated to generate approximately 164,980 total daily trips.

Intersections

Included within the scope of this traffic and circulation study was an analysis of key intersections. Intersections are the most constraining feature to the free flow of the roadway network. Table III-11 lists the Town's key intersections as determined through the traffic study. This table lists all intersections that represent key locations for traffic distribution and warrant special attention due to their existing geometrics and projected LOS values.

Table III-12
Town of Yucca Valley
Key Intersections

1) HWY 62 at Camino Del Cielo
2) HWY 62 at Kickapoo Trail
3) HWY 62 at Pioneertown Road/Deer Trail
4) HWY 62 at Acoma Trail
5) HWY 62 at Sage Avenue
6) HWY 62 at HWY 247/Joshua Lane
7) HWY 62 at Warren Vista Avenue
8) HWY 62 at Balsa Avenue
9) HWY 62 at Avalon Avenue
10) HWY 62 at Yucca Mesa Road/La Contenta Road
11) Joshua Lane at Yucca Trail
12) Joshua Lane at Joshua Drive
13) Yucca Trail at Avalon Avenue/Palomar Avenue
14) Onaga Trail at Acoma Trail

The Key Intersections listed in Table III-12 should be improved to enhance traffic safety and traffic capacity.

Appendix E of Appendix H illustrates the existing geometrics, existing turn movement counts at p.m. peak hour, levels-of-service, and for all of the intersections listed in Table III-12, except number five (5), Hwy 62 at Bannock Trail/Yucca Trail. It should be noted that all of these key intersections are currently(1994) operating at level-of-service "A."

2. Project Impacts

Buildout Trip Generation

The impacts to the Town's local and regional roadways due to the buildout of the proposed Preferred Alternative were calculated by the traffic modeling process discussed in the Existing Conditions section. The methods used to project future traffic are somewhat conservative and actual impacts at buildout are likely to be less. This is in part due to the inherent nature of buildout projections, which assumes that all available land is converted to the highest density and capacity of that allowable land use. Also, the buildout figures are not entirely weighted to exclude lands that will be converted to roadways and utility easements, and this may have minor effects in reducing actual buildout. In addition, as discussed in the "Trip Generation" section of Existing Conditions, relatively conservative traffic generation factors were utilized.

Land uses associated with buildout of the Preferred Alternative are estimated to generate approximately 835,587 total trip ends, while the preferreed Yucca Valley land use plan generates 411,000 trip ends and 255,500 trips within Yucca Valley. Table III-13 quantifies the cumulative traffic volumes for specific links of the major roadway in the community.

The Highway designation is also recommended for Highway 247. This facility may provide four to six through travel lanes with separate left turn and right turn lanes. With buildout traffic, this roadway is to be divided by a landscaped median island with openings at intersections only. Access to and from private properties should be limited as much as possible.

Both State Highway 62 and 247 are under the jurisdiction of Caltrans and as such, require improvement identification in the 20-year Caltrans Capital Improvement Plan. It is recommended that proposed improvements to State Highway 62 and State Highway 247 be placed on the 20-year Capital Improvement Project list.

The highway roadway mid-block link at its ultimate buildout has a right-of-way of one-hundred and ten feet (110'). It is a six (6) lane facility, three (3) travel lanes in each direction, with a center turn lane, no parking lanes and an adjacent landscaped buffer/parkway on either side measuring ten (10') feet. The exact dimensions are as follows: (The dimensions of State Highway 62 and 247 as designated per this General Plan may be subject to change based on future consultations with Caltrans.)

- Four (4) twelve foot (12') lanes, two in each direction.
- Two (2) thirteen foot (13') lanes, one in each direction.
- One (1) sixteen foot (16') center turn lane that is a raised and landscaped median except at the turn pockets of intersections where the raised landscaped median will decrease to four (4') feet in width.
- No on street parking.
- Curb and gutter.
- Two (2) ten foot (10') wide landscaped parkways, which may include a minimum four to six foot wide meandering sidewalk.

Arterial Roadway Designation:

Onaga Trail:	Between Kickapoo Trail and Joshua Lane
Yucca Trail:	Between HWY 62 and Palomar Avenue/Avalon Avenue
Joshua Lane:	Between HWY 62 and Onaga

The arterial roadway link at its ultimate buildout has a right-of-way of one-hundred feet(100'). It is a four (4) lane facility, two (2) travel lanes in each direction, with a center turn lane, two(2) parking lanes and an adjacent landscaped buffer/parkway on either side. The exact dimensions are as follows:

- Four(4) twelve foot (12') lanes, two in each direction.
- One (1) sixteen foot (16') center turn lane that is a raised and landscaped median except at the turn pockets of intersections where the raised landscaped median will decrease to four (4') feet in width.
- Two(2) eight (8) foot parking lanes, one on each side of the roadway.
- Curb and gutter.
- Two (2) ten foot (10') wide landscaped parkways to include a minimum five(5') foot wide meandering sidewalk.

Collector Roadway Designation:-4 Lane

Camino Del Cielo:	North of Hwy 62/South of Hwy 62 to Onaga Trail
Kickapoo Trail:	South of Hwy 62 to Onaga Trail
Pioneertown Road:	North of Hwy 62
Deer Trail:	South of Hwy 62 to Onaga Trail
Acoma Trail:	South of Hwy 62 to Golden Bee
Sage Avenue:	North of Hwy 62 to Sunnyslope Drive/South of Hwy 62 to Golden Bee Drive

Joshua Lane:	South of Onaga Trail to Golden Bee
Balsa Avenue:	North of Hwy 62 to Paxton Road/South of Hwy 62 to Yucca Trail
La Contenta Road/ Yucca Mesa Road:	North of Hwy 62 to the Town limits/South of Hwy 62 to Joshua Drive
Palomar Avenue:	South of SR 62 Joshua Lane
Skyline Ranch Road:	West of Hwy 247
Buena Vista Drive:	East of Hwy 247 to Yucca Mesa Road
Paxton Road:	East of Hwy 247 to Avalon Avenue
Yucca Trail:	East of Avalon Avenue to Indio
Onaga Trail:	East of Joshua Lane to Palomar Avenue/West of Kickapoo Trail
Joshua Drive:	East of Acoma Trail to Joshua Lane/East of Palomar Avenue to La Contenta Road
Sunnyslope Drive:	Camino Del Cielo/West of Hwy 247

The ultimate right-of-way for the collector roadway is eighty feet (80'). The paved width section is sixty feet (60'). At its ultimate buildout the collector can be either a two (2) lane facility with a center turn lane and two(2) parking lanes or a four (4) lane facility with a center turn lane and no parking lanes. Either type of facility can be accommodated within the paved width section by restriping the roadway. Exhibit III-3 illustrates the two (2) roadway cross-sections for the roadway designated as collector. The exact striping configuration of each type of collector are tentatively envisioned as follows:

Two (2) Lane Collector:

Palm Avenue:	North of Hwy 62 to Sunnyslope Drive/South of Hwy 62 to Onaga Trail
Warren Vista:	South of Hwy 62 to Yucca Trail
Indio Avenue:	North of Hwy 62 to Barron Drive
Barron Drive:	East of Avalon Avenue to Yucca Mesa Road
Golden Bee Drive:	East of Acoma Avenue to Joshua Lane
Joshua Drive:	East of Acoma Trail to Joshua Lane/East of Palomar Avenue to La Contenta Road

Two (2) Lane Collector

- Two (2) twelve foot(12') travel lanes, one in each direction.
- One (1) twelve foot (12') center turn lane, no raised median.
- Two (2) five foot (5') bike route, one on each side of the roadway.
- Curb and gutter.
- Two (2) ten foot(10') wide landscaped parkways, one on each side of the roadway, to include a meandering sidewalk, with a minimum width of five feet(5').

Four (4) Lane Collector:

- Two (2) eleven foot (11') travel lanes, one in each direction.
- Two (2) thirteen foot (13') travel lanes, one in each direction.
- One (1) twelve foot (12') center turn lane, no raised median.
- Curb and gutter.
- Two (2) ten foot (10') wide landscaped parkways, one on each side of the roadway, to include a meandering sidewalk, with a minimum width of five feet (5').

Industrial Roadway Designation:

Indio Avenue:	South of HWY 62 to Yucca Trail
Yucca Trail:	West of Hwy 62 to Kickapoo Trail

The ultimate roadway right-of-way is seventy feet (70'). The ultimate paved section is fifty- four feet (54'). The exact dimensions of the industrial roadway are illustrated in Exhibit III-3 and described below:

- Two (2) twelve foot(12') travel lanes, one in each direction.
- One (1) fourteen foot(14') center turn lane, no raised median.
- Two (2) eight foot(8') parking lanes, one on each side of the roadway.
- Curb and gutter.
- Two (2) eight foot (8') wide landscaped parkways, one on each side of the roadway, to include a meandering sidewalk, with a minimum width of five feet (5').

Local and Rural Local Roadway Designations:

Exhibit III-3 illustrates the cross-sectionals of these two roadway designations, which make-up the balance of the Town's roads.

The "Rural Local" roadway is a facility designed to service the most rural areas of Town. The necessary right-of-way to accommodate the "Rural Local" is fifty feet (50').

- The paved section is thirty feet (30').
- Two (2) fifteen foot (15') travel lanes in either direction.
- AC dike at pavements edge.
- Inverted street profile with ribbon gutters.
- A ten foot (10') easement on either side will provide drainage courses where appropriate.
- Driveways that cross drainage courses must provide for unobstructed flows under the driveway.
- Parking can be accommodated on this roadway, however on one side only.

The determination as to whether the "Rural Local" is deemed appropriate depends upon the character of the area that this roadway will service. A minimum lot size of two and a half (2.5) acres fronting this roadway type is typically required. Qualification for development proposals to incorporate this roadway type within future developments and/or subdivisions will be determined on a case by case basis. Determining factors include; lot size, the number of lots loading the roadway, topography, drainage courses and other considerations that affect public safety as determined by transportation, fire and flood officials.

The "Local" roadway will serve as the Town's general residential facility. The necessary right-of-way to accommodate this facility is sixty feet (60').

- The paved section is forty feet (40').
- Two twenty foot (20') travel lanes in either direction.
- Parking on both sides of the roadway.
- Curb and gutter.
- Two (2) ten foot (10') wide landscaped parkways, one on each side of the roadway, to include a sidewalk, with a minimum width of five feet (5').

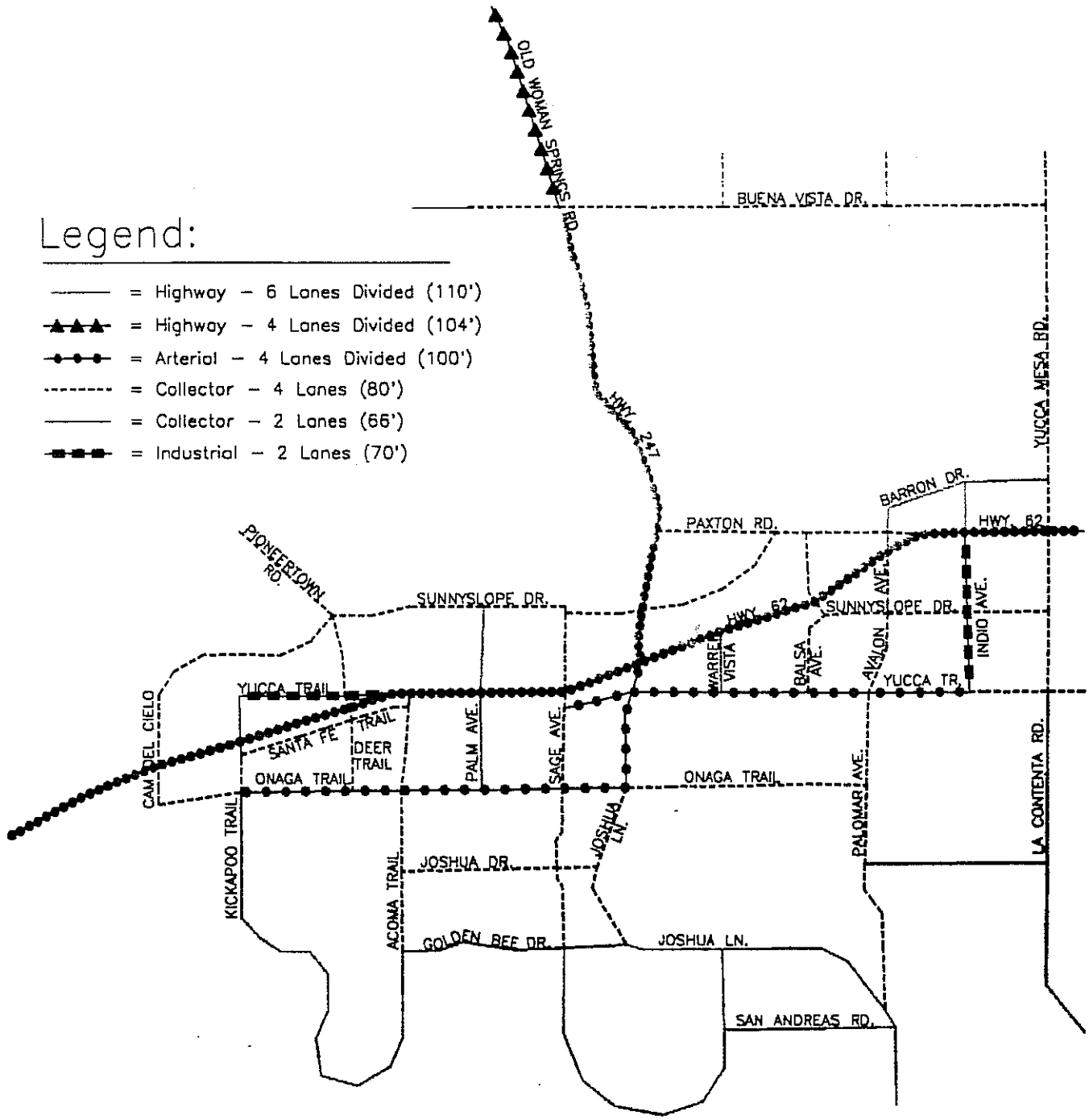
A level of service analysis has been conducted for General Plan buildout conditions at key intersections (see Exhibit 14, Appendix "E") on the Town of Yucca Valley roadway network. The LOS analysis for signalized intersections has been performed using optimized signal timing. This analysis has included an assumed lost time of three seconds per phase in accordance with 1994 HCM recommended default values. Signal timing optimization has considered pedestrian safety and signal coordination requirements. Appropriate time for pedestrian crossings have also been considered in the signalized intersection analysis. The following formula has been used to calculate the pedestrian minimum times for all HCM runs:

[(Curb to Curb distance - 6) / 4] + 7

Saturation flow rates of 1,900 vehicles per hour of green (vphg) have been assumed for all capacity analysis.

The intersection operations analysis for buildout conditions with the Preferred Land Use and Circulation Plan and with recommended ultimate improvements are summarized in Table III-13. The operations analysis worksheets for these future conditions with improvements are included in Appendix "F". As shown in Table III-12, the key Town intersections are expected to experience LOS "D" or better peak hour operations with future improvements which include the widening of Highway 62 to three through travel lanes in each direction.

TOWN OF YUCCA VALLEY
CIRCULATION PLAN



north

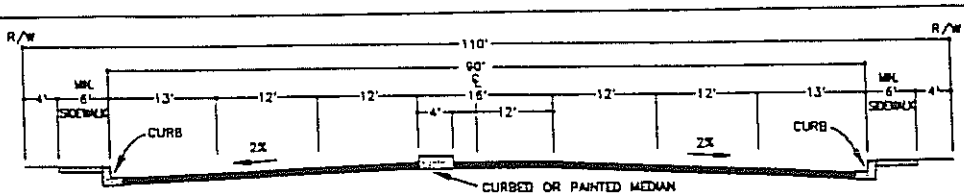
TOWN OF YUCCA VALLEY
GENERAL PLAN
CIRCULATION ELEMENT

EXHIBIT III-2

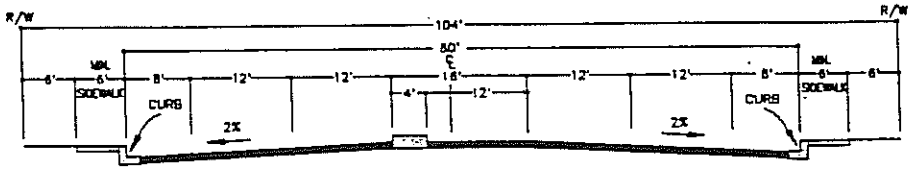
636-94-001:26

Robert Kahn, John Kain & Associates, Inc.

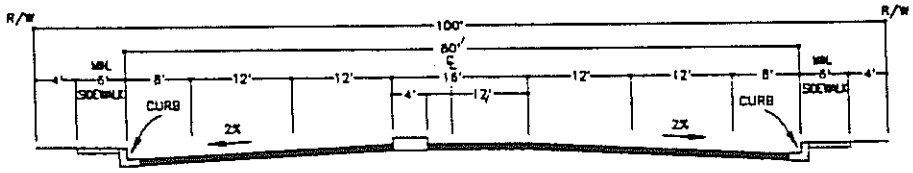
PREFERRED PLAN ROADWAY CROSS-SECTION



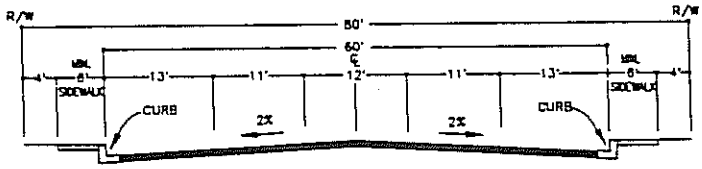
HIGHWAY – 6 LANES DIVIDED



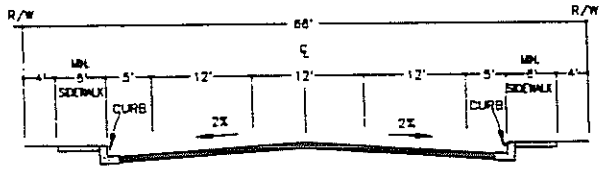
HIGHWAY – 4 LANES DIVIDED



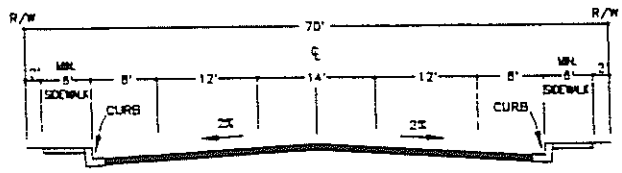
ARTERIAL – 4 LANES DIVIDED



COLLECTOR – 4 LANES (WITH OPTIONAL STRIPED MEDIAN LANE)

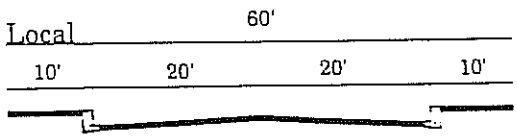


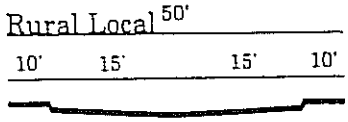
COLLECTOR – 2 LANES (WITH OPTIONAL STRIPED MEDIAN LANE)



INDUSTRIAL – 2 LANES (WITH STRIPED MEDIAN LANE)

*PART WIDTH STREET SECTION FOR ALL COLLECTOR STREETS – 34' IMPROVEMENTS ON 48' R/W





636-94-001:13A

EXHIBIT III-3

Robert Kahn, John Kain & Associates, Inc.

Exhibit "T"(See Appendix "E") identifies the intersection improvement requirements at selected locations. The 13 signalized intersections will require the following improvements:

Highway 62 (EW) at Camino Del Cielo)
- Two northbound left turn lanes
- One northbound shared through/right turn lane
- One southbound left turn lane
- One southbound shared through/right turn lane
- One eastbound left turn lane
- One eastbound through lane
- One eastbound right turn lane
- One westbound shared through/right turn lane

Highway 62 (EW) at Kickapoo Trail (NS)
- One eastbound shared through/right turn lane
- One westbound shared through/right turn lane

Highway 62 (EW) at Deer Trail (NS)
- One northbound shared left turn/through lane
- One southbound shared left turn/through lane
- One eastbound shared through/right turn lane
- One westbound shared through/right turn lane

Highway 62 (EW) at Acoma Trail (NS)
- One eastbound shared through/right turn lane
- One westbound shared through/right turn lane

Highway 62 (EW) at Sage Avenue (NS)
- One northbound left turn lane
- One northbound shared through/right turn lane
- One southbound left turn lane
- One southbound shared through/right turn lane
- One eastbound through lane
- One eastbound right turn lane
- One westbound shared through/right turn lane

Highway 62 (EW) at Highway 247 (NS)
- One northbound through lane
- One northbound right turn lane
- One eastbound left turn lane
- One eastbound shared through/right turn lane
- One westbound left turn lane
- One westbound shared through/right turn lane

Highway 62 (EW) at Warren Vista Avenue (NS)
- One eastbound left turn lane
- One eastbound shared through/right turn lane
- One westbound left turn lane
- One westbound shared through/right turn lane

Highway 62 (EW) at Balsa Avenue (NS)
- One northbound left turn lane
- One northbound shared through/right turn lane
- One southbound left turn lane
- One southbound shared through/right turn lane
- One eastbound shared through/right turn lane
- One westbound shared through/right turn lane

Highway 62 (EW) at Avalon Avenue (NS)
- One northbound left turn lane
- One northbound shared through/right turn lane
- One eastbound shared through/right turn lane
- One westbound shared through/right turn lane

Highway 62 (EW) at Yucca Mesa Road (NS)
- One northbound shared left turn/through lane
- One southbound shared left turn/through lane
- One eastbound shared left turn lane
- One eastbound shared through/right turn lane
- One westbound shared left turn lane
- One westbound shared through/right turn lane

Yucca Trail (EW) at Joshua Lane (NS)
- One northbound left turn lane
- One northbound shared through/right turn lane
- One southbound left turn lane
- One southbound shared through/right turn lane
- Two eastbound left turn lanes
- One eastbound shared through/right turn lane
- Two westbound left turn lanes
- One westbound shared through/right turn lane

Yucca Trail (EW) at Palomar Avenue (NS)
- One northbound shared through/left turn lane
- One southbound shared through/left turn lane
- One eastbound left turn lane
- One eastbound shared through/right turn lane
- One westbound left turn lane
- One westbound shared through/right turn lane

Onaga Trail (EW) at Acoma Trail (NS)
- One northbound shared left turn/through lane
- One southbound shared left turn/through lane
- One eastbound left turn lane
- One eastbound shared through/right turn lane
- One westbound left turn lane
- One westbound shared through/right turn lane

Additional Mitigation:
The following are requirements in order that the Town's circulation system functions at its most optimum and efficient level while keeping required improvements as cost-effective as possible.

- The Town shall establish and maintain on-going communications and cooperation with Caltrans with regard to phasing of highway improvements that assure minimum acceptable operating levels at mid-block and intersections along Highways 62 and 247.

- Every effort shall be made to limit and integrate shared access drives along State Highway 62 as a means of preserving and enhancing capacity and improving roadway safety.

- Specific to individual projects and throughout community planning efforts, the Town shall encourage the utilization of mass/public transit facilities of the Morongo Basin Transit Authority to the greatest extent practical.

- As development proposals come before the Town of Yucca Valley for subdivision or permit approval, project and phase-specific traffic impact analyses may be necessary to identify buildout and "opening year" traffic impacts, service levels and to exact mitigation measures required on a cumulative and individual project/phase basis.

- All proposed project-related or induced roadway upgrades, or necessary facilities and other improvements within the boundaries of the Town, are to be considered the sole responsibility of the developer.

- Prior to approval of each development phase in the General Plan Area, developers shall be required to confer with the Morongo Basin Transit Authority, which provides bus services in the Town, to determine where bus turnouts and passenger waiting shelters shall be placed within the project and in the vicinity of the project.

- The Town of Yucca Valley will be responsible for the creation of an equitable fee program for the design, construction and installation of required mitigation measures. An equitable fee (fair share cost of traffic mitigation measures based on the project's contribution of traffic to the areas roadways) will be collected prior to issuance of building permits. Thus fees will be collected upon each phase of the development.

- As required by MDAQMD, a comprehensive transportation demand management program (TDM) must be prepared by all employers of 100 or more persons at a single worksite. This program is designed to reduce work commute trips and gain maximum efficiency from existing and future transportation facilities. A wide range of programs should be offered to encourage the use of carpools, vanpools, transit, and alternative work hours. A comprehensive strategy for creating and implementing TDM measures is included within the Traffic/Circulation Report, see Appendix E.

Mitigation Monitoring/Reporting Program:

- Prior to the approval of subdivision maps or any other discretionary permits from the Town, developers in the General Plan Planning Area shall submit detailed development and preliminary roadway improvement plans to the Town for approval. Said plans shall be reviewed by staff to assure their compatibility and conformance with other Town circulation improvement plans; the originally approved development plans, as conditioned; and the mitigation measures cited above.
  Responsible parties: Developer and Consulting Traffic Engineer, Town Engineer, Community Development Department.

- Phasing of improvements shall be permitted as determined appropriate to assure their installation while also

assuring the necessary level of traffic control and safety. Internal roadway mitigation measures shall be incorporated into development designs, the inclusion shall be verified by the Community Development Department.
Responsible parties: Developer, Town Engineering and Community Development Departments

- Implementation of the traffic mitigation measures specified above for roadways and intersections shall be monitored, and necessary fair-share costs shall be calculated and collected by the Town. Maintenance of the specified mitigation measures shall be performed.
  Responsible parties: Town Public Works, Building and Community Development Departments.

- Subdivision map approval shall be withheld until the Town Community Development Department verifies that the developer has consulted with the Morongo Basin Transit Authority and that public transit has been incorporated into project design to the greatest extent practical.
  Responsible parties: Developer, Town Community Development Department, Town Engineer and Morongo Basin Transit Authority.

C. Soils and Geology

1. Existing Conditions

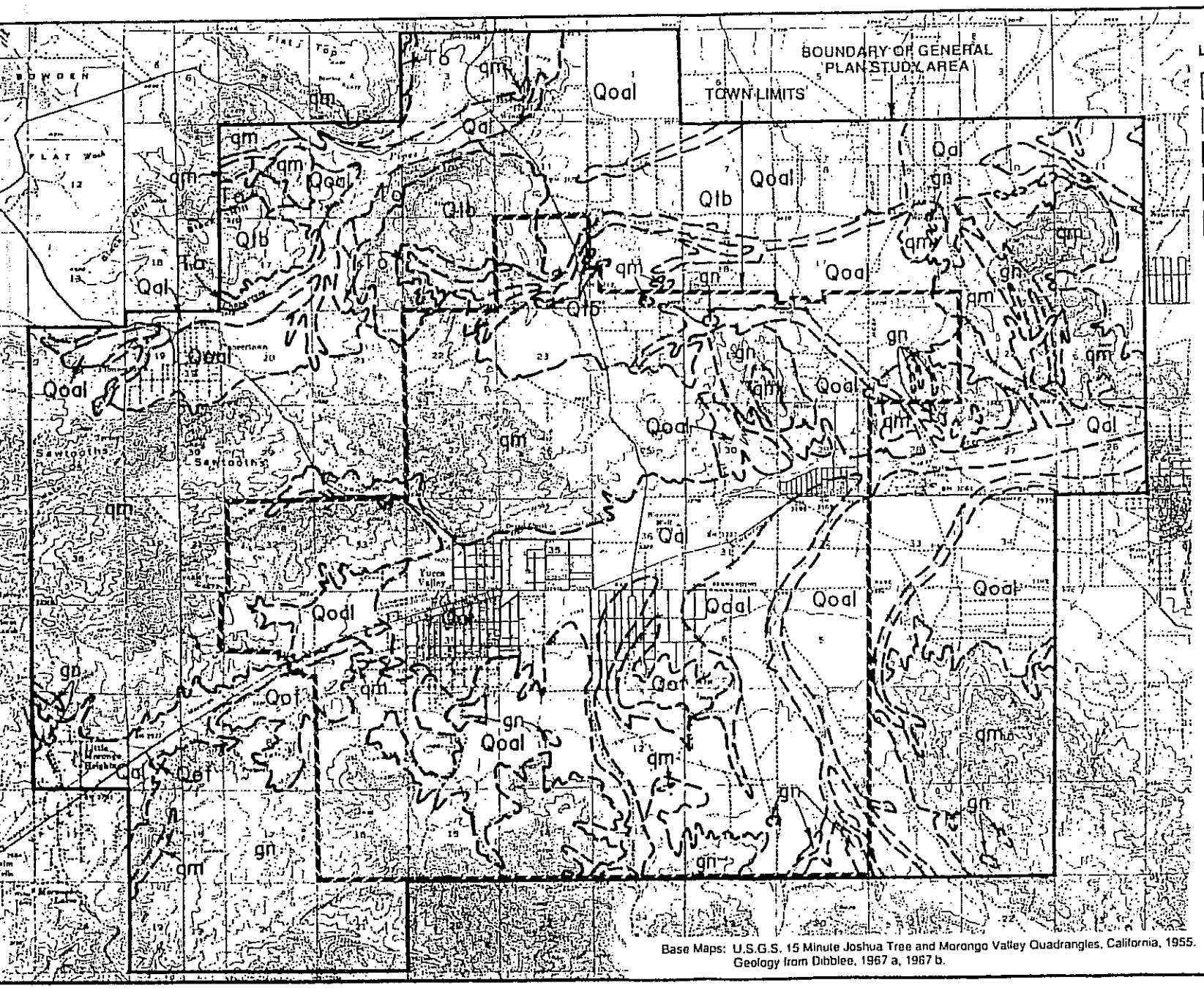
Introduction
Several studies and sources of information have been consulted in preparing the discussion on soils and geologic conditions in the Town of Yucca Valley. These included analyses conducted by several geologists, seismologists, and engineers utilized as reference information by the geotechnical engineers at Leighton and Associates who conducted an evaluation of the geotechnical and seismic conditions occurring in the Town of Yucca Valley, the surrounding contiguous lands, and in the greater region. A complete list of references is documented within Appendix C[1]. In addition to the above cited sources of information, the study also includes a review of field data in the area, accumulated from various reports conducted and prepared by the consultants. Field observations were also conducted to verify some of the conditions discussed herein.

Soils and Surficial Rocks
The Yucca Valley area is controlled by the geotechnical and soils conditions that underlie this area. The earth materials underlying the community and vicinity are comprised of Quaternary rocks (deposited within the last 1.6 million years) surficial sediments that rest on a thick sequence of Tertiary to Precambrian (about 1.6 million and older). Exhibit III-4: Surficial Geology illustrates the makeup of the geologic units exposed in the Study area.

Recently deposited alluvial sediments (deposited in the last 11,000 years) occur in the area along the bottoms of the canyons draining the mountains. Most of these canyons drain towards the middle of Town and State Highway 62. Much of the Town's development along the highway is underlain by these recent alluvial deposits. These alluvial soils consist primarily of porous, unconsolidated sand and gravel with minor amounts of clay and silt. The thickness of these soils is estimated to be 100 feet or less (Dibblee, 1967a).

Other surficial sediments that occur in the Planning Area include older Quaternary alluvium and fanglomerates. The older alluvium consists of coarse-grained sediments. including cobbles, pebbles and coarse sand. These sediments derived from the mountains in the area and have been uplifted above the presently-active floodplain. Continual stream erosion has dissected these older deposits. This alluvium may be greater than 500 feet thick in the Planning Area, where it occurs north and east of the Little San Bernardino and Sawtooth Mountains.

[1] Technical Background Report For The Safety Element Of The Town Of Yucca Valley General Plan, prepared Leighton and Associates, Inc., December 1993.



Base Maps: U.S.G.S. 15 Minute Joshua Tree and Morongo Valley Quadrangles, California, 1955.
Geology from Dibblee, 1967 a, 1967 b.

TOWN OF YUCCA VALLEY

SURFICIAL GEOLOGY

Project No. 2920997-02
Scale 1"=1 mile
Geologists TKG/REL
Drafted by lah
Date 12/9/93

Exhibit III-4

Along State Highway 62, and the Pinto Mountain fault, in the southwestern portion of the study area are erosional remnants of fanglomerate deposits. Fanglomerate also form the top of Burnt Mountain. These deposits consist of subrounded boulders (some as large as five feet across) and cobbles in a weakly-consolidated sandy matrix. The fanglomerates comprising Burnt Mountain were derived from the mountains to the south, and those present along Highway 62 were derived from the mountains to the northwest and transported along the Pinto Mountain fault to their present location. The fanglomerate deposits are estimated to be 300 feet thick (Dibble, 1967 a).

Beneath the surficial sediments and exposed in the mountains to the north, south, and west are basement rocks. The basement rocks include Quaternary/Tertiary basalt; Tertiary old Woman Sandstone; Mesozoic granitic rocks; and Precambrian gneissic rocks.

The basalt is black, hard, and massive, and consists of several flows that total over 400 feet thick. The basalt occurs in the northern part of the area, capping Black Hill and Alters Peak, and resting conformably on the Old Woman Sandstone. The sandstone is a light buff, massive, friable, fine- to medium-grained arkosic deposit with scattered gravel lenses. The unit is approximately 400 feet thick and rests unconformably on rocks of Mesozoic age.

The Mesozoic rocks are massive, fine- to coarse-grained granitic rocks of various mineral compositions. Quartz veins and intrusive dikes are also present. These rocks comprise the Sawtooth Mountains and most of the Bartlett Mountains, and are also exposed east of Lower Covington Flat, in the southeastern corner to the Planning Area.

The Precambrian gneissic rocks are massive, medium to coarsely crystalline rocks. These rocks comprise the Little San Bernardino Mountains in the south, and occur as small exposures in the Bartlett Mountains and Paxton Peak.

Ground Subsidence

Ground subsidence is the gradual settling or sinking of the ground surface with little or no horizontal movement. This phenomenon is usually associated with the extraction of oil, gas or ground water from below the ground surface. Ground subsidence can also occur as a response to natural forces such as earthquake movements, the folding and subsiding activity of sedimentary basins, or hydrocompaction, which occurs when poorly consolidated or compressible soils are wetted and collapse.

Ground surface effects related to subsidence are generally restricted to structures sensitive to slight changes in elevations such as canals, sewers and drainages. Ground subsidence can disrupt canal or drainage systems and cause localized flooding. The Town currently extracts ground water for domestic use from the valley's local aquifer. Static ground water levels have dropped from about 290 feet below ground surface in the 1950's (Bader and Moyle), to a present day (1993) average depth of approximately 400 feet[2].

Although ground subsidence as a result of ground water withdrawal has not been documented in the Planning Area, continued depletion of the underlying aquifer could result in ground subsidence unless efforts are made to stop overdrafting of the basin, and the water supply of the aquifer is replenished. Construction of the two proposed recharge basins is expected to increase the water levels in the basin.

Ground-level changes as a result of earthquake movement can also cause the ground to subside. Earthquakes have caused abrupt elevation changes in excess of one foot across faults. An earthquake occurring along one of the faults in the Planning Area, and centered in Town, could cause abrupt changes in ground elevation across the fault, resulting in ground subsidence.

[2] Ibid. M. Stockstell, 1993 personal communication with Leighton staff.

Directly related to the phenomenon of ground subsidence and another contributing factor thereof are the soils physical characteristics. Soil characteristics that can lead to subsidence are categorized into what is collectively termed collapsible and expansive soils. Low density soils may collapse and settle as a result of static or seismic loading and hydrocompaction. Hydrocompaction of near the surface, poorly consolidated soils is a common problem in arid regions. This phenomenon is typically associated with granular, sandy soils deposited by wind or river processes. Hydrocompaction occurs when significant amounts of water infiltrate into the soil, softening, weakening and/or dissolving the clay, salts, or other cementing agent binding the sand grains together, causing a general collapse of the soil. Most documented cases of hydrocompaction have been associated with landscaping or crop irrigation, leaking septic tanks, and grading activities that result in poor drainage of the land.

Sediments in the Yucca Valley area that could be susceptible to hydrocompaction include the recent and older alluvial deposits and fanglomerates. Increased development in the area, with resultant increase in landscaping and/or over-irrigation could result in hydrocompaction in localized areas. Soil collapse can result in significant damage to foundations and structures.

Expansive soils are soils with a significant amount of clay particles that have the ability to give up or take on water. When these soils swell, the change in volume exerts tremendous pressures on loads, such as buildings, that are placed on them. In the Yucca Valley area, expansive soils are not considered a hazard because of the relatively minor amount of clay present in the soils.

Geology

The Town of Yucca Valley is located at the boundary of the Transverse Ranges and the Mojave Desert Geomorphic Provinces. The Transverse Ranges Geomorphic Province includes several ranges trending generally in an east-west direction, from the Pinto and Eagle Mountains to the east, to the Santa Monica and Santa Ynez Mountains to the west. The San Gabriel, San Bernardino and Little San Bernardino Mountains are located within the Transverse Ranges. The Transverse Ranges Geomorphic Province in the Yucca Valley area is bounded on the north by the Pinto Mountain fault and on the southwest by the San Andreas Fault.

The Town is located in an east-west trending valley bounded by the Little San Bernardino Mountains on the south, and the Sawtooth Mountains to the north. The Sawtooth Mountains, which extend eastward through the middle of the Yucca Valley area, are highest in the western portion of the area, and level out near Paxton Mountain to the east. The remnants of the Bartlett Mountains occur near the eastern boundary of Town. Overall, area relief is gentler in the south than in the north.

The Town of Yucca Valley is located at the juncture of the east-trending Pinto Mountain fault and the Eastern California or Mojave Shear Zone. The Eastern California Shear Zone (ECSZ), proposed by Dokka and Travis (1990a; 1990b), is a broad belt, or zone, of faults in the Mojave Desert which transfers motion from the San Andreas fault in the Imperial Valley to the Basin and Range Province (Death Valley Region) in eastern California, Nevada, and Utah (Savage et al., 1990; The Working Group, 1992). Approximately 15 to 20 percent of the motion between the North American and Pacific plates is being accommodated by the ECSZ, making this area part of one of the most seismically-active regions in the United States. Almost all of the remaining motion between the two plates is occurring along the San Andreas and its related faults, located to the west and southwest of the ECSZ.

The Town is located within a very seismicity active area subject to ground shaking, originating from several active faults, including the San Andreas Fault System located approximately 9 miles to the southwest. Major faults within the Planning Area include; the Pinto Mountain, Johnson Valley, Burnt Mountain, and the Eureka Peak faults. Outside the Planning Area other active faults in the Southern California region include the Whittier-Elsinore, Newport-Inglewood, Cucamonga, and San Gabriel faults, all of which occur more than 40 mile from Yucca Valley and are expected to have a less pronounced ground shaking potential on the region. The San

Andreas fault is also considered capable of generating the greatest levels of ground shaking in the region, and is included in the State Alquist-Priolo Special Studies Zones, which requires conducting comprehensive fault investigations of these areas prior to permitting development.

As evidenced by the Landers earthquake and other seismic activity occurring in the ECSZ (Landers earthquake: June 28, 1992, magnitude 7.6 on the Richter Scale), the Planning Area may be particularly susceptible to strong ground shaking and significant earthquake damage. This is especially true if a moderate to large earthquake were to occur along one of the faults located within the study area. Although an earthquake on the San Andre as fault, to the southwest of Town, is likely to occur in the relative near future, its impact on the Town of Yucca Valley would possibly be less than the damage caused by the Magnitude 7.5 Landers earthquake.

Given the likelihood of another major earthquake occurring in this region, the Town government, residents and emergency relief organizations are well advised to develop and implement policies and programs designed to reduce the risk posed by seismic hazards. Appendix C outlines and defines the scientific measuring system which classifies the intensity of seismic events (earthquakes).

Fault Zones

With the exception of surface fault rupture, ground shaking during an earthquake is the most significant seismic hazard that will impact the Planning Area. Table III-15 lists the faults that, given their proximity to the Town, have the potential for causing strong ground motions in Yucca Valley. The table also shows the estimated magnitude that these faults are capable of generating, that is the peak ground motion that could be experienced in Yucca Valley if the predicted magnitude occurs on one of these faults, and the seismic intensity values are calculated for Yucca Valley. All of the faults listed in Table III-15 are located within the Planning Area, except the San Andreas fault.

Table III-15
Town of Yucca Valley
Estimated Horizontal Peak Ground Accelerations and Seismic Intensities

Fault Name	Mce*	PGA(g)**	MM Intensity in Yucca Valley	Impact in Yucca Valley
Pinto Mountain	7.4	0.60	IX-X	Most Severe
Johnson Valley	7.3	0.60	IX-X	
Burnt Mountain	6.4	0.55	VIII-X	
Eureka Peak	6.7	0.57	VIII-X	
San Andreas (Mojave, San Bernardino & Coachella Valley Segments combined)	8.0	0.43	VII-IX	Least Severe

* The Maximum Credible Earthquake (Mce) values represent estimated M_s or surface magnitude values. Much higher acceleration could occur if local site conditions, such as at the top of ridges, amplify the seismic waves generated by the earthquake.

** The horizontal peak ground acceleration (PGA) is a measurement of the ground motion generated by an earthquake and expressed as a fraction of the acceleration of gravity (g) (g is the acceleration of gravity, equal to 32 ft/sec^2). The PGA values presented herein are based on the maximum credible earthquake each fault is estimated capable of generating, and an interpretation of the methods developed by Idriss (1987). The ground acceleration values decrease as the distance from the causative fault increases.

The faults that are listed in Table III-15 are all considered to be active. Exhibit III-5 illustrates the local faults directly impacting the community and vicinity. Appendix C includes four exhibits showing the predicted strong ground motions, represented as peak ground accelerations, that would occur in the Planning Area, as a result of the maximum credible earthquake each one of these faults is predicted capable of generating. These exhibits illustrate how peak ground accelerations decrease with increasing distance away from the causative fault. All of the faults are described further below.

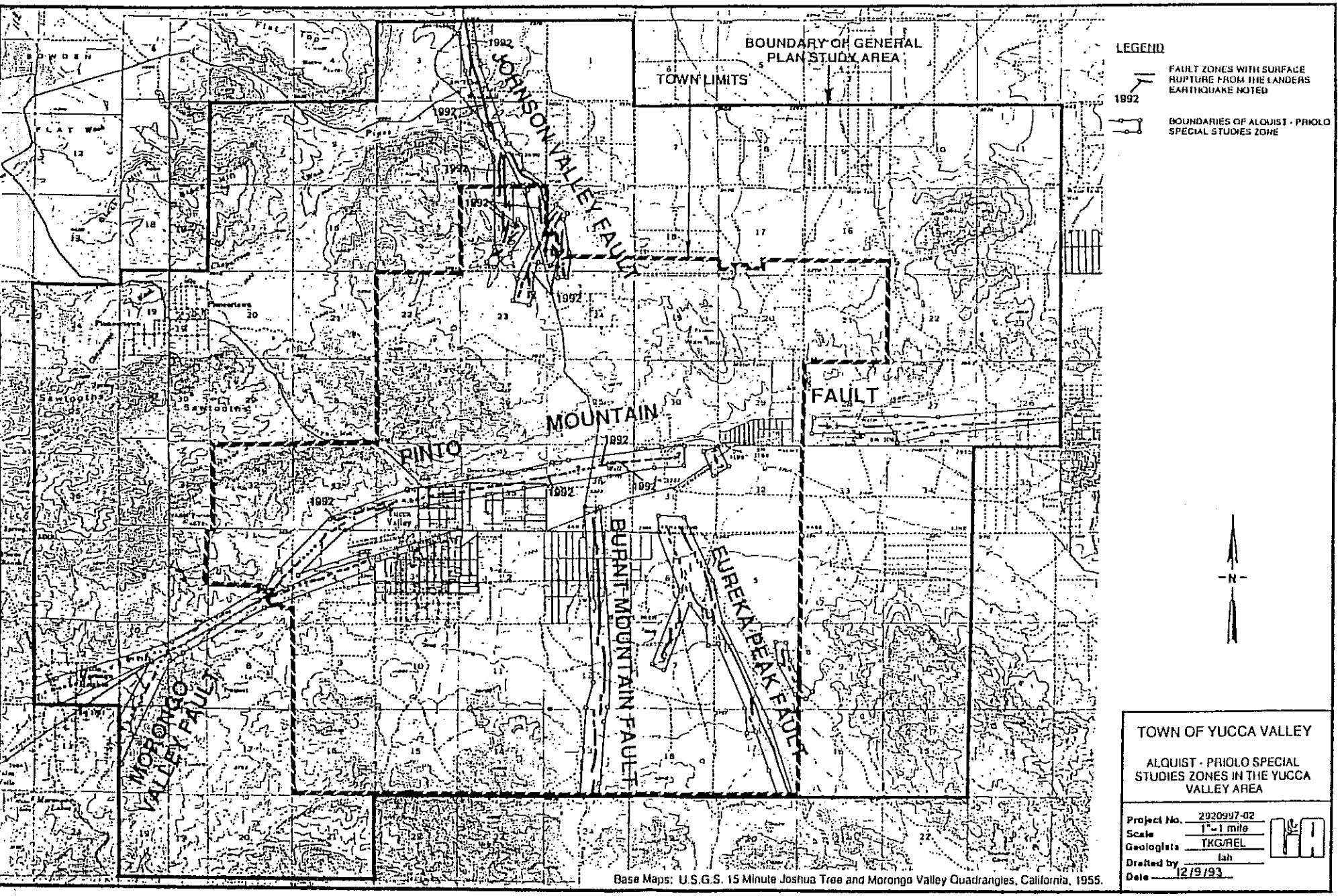


Exhibit III-5

Pinto Mountain Fault

This fault is one of the major east-west trending, high angle strike-slip faults associated with the San Andreas fault in southern California. The fault is traceable from the San Andreas fault to just east of Twentynine Palms. It extends through the Planning Area as a zone of faults that occur near the base of the Sawtooth Mountains, and parallel to Highway 62. This fault has displayed significant uplift, as evidenced by the presence of the Sawtooth and San Bernardino Mountains to its north. Although this fault is considered active, historically it has not produced a well-defined zone of seismicity, but rather a cluster of epicenters at depth (Bryant, 1986). As shown in Table III-11, this fault is capable of producing a maximum credible earthquake of 7.4. Such an event could produce peak ground accelerations with an estimated duration of strong ground shaking of 31 seconds.

Johnson Valley Fault

This fault is a northwest-trending fault which extends from just south of Pipes Canyon Wash (along Old Woman Springs Road) to Soggy Lake (near the Fry Mountains). About 3.5 miles of the southern portion of this 34-mile long fault have been mapped within the Planning Area. The epicenter of the Landers earthquake is located on the Johnson Valley fault, about 3 miles north of the Yucca Valley area. The southernmost one mile of mapped surface rupture occurred along a previously unmapped segment of the fault located within the Planning Area. To the north, the earthquake generated horizontal displacements along the fault of about six to nine feet. In the study area, displacements generally were a foot or less.

As a result of the Landers earthquake the increase in the stress field upon the Johnson Valley fault suggest that a future large earthquake may occur on this fault in the Yucca Valley area. A seismic event on this fault under worst case conditions could sustain about 26 seconds of ground shaking.

Burnt Mountain and Eureka Peak faults

These two faults were discovered as a result of the Landers earthquake. These two faults are located in the Town of Yucca Valley and extend south into Joshua Tree National Park. The Burnt Mountain fault is approximately four miles in length as delineated by ground rupture. The fault trends in a southward direction from near State Highway 62 along the east side of Burnt Mountain and into the Park. There is evidence that the Burnt Mountain fault is a segment of a fault linking, the Johnson Valley fault with the Eastside Canyon fault (Sieh et al., 1993). This implies the Johnson Valley fault extends almost to Desert Hot Springs. The Burnt Mountain fault, if it breaks independently of the Johnson Valley fault, is estimated capable of sustaining ground shaking lasting about 16 seconds.

The Eureka Peak fault extends to the southeast from near State Highway 62 into Joshua Tree National Park, following the Lower Covington Flat Wash area along much of its trend. After the Landers earthquake this new fault was in fact found to be the reactivation of a preexisting, unrecognized fault. This fault is estimated capable of producing a magnitude of 6.7 with the potential for ground shaking to last about 18 seconds.

The San Andreas Fault System

The portion of this fault system that extends through the Southern California region has been subdivided into three segments. The Mojave, San Bernardino Mountain, and Coachella Valley segments. The Town is located approximately nine (9) miles from the junction of the San Bernardino Mountain and the Coachella Valley segments. Unlike the other two segments, the San Bernardino Mountain segment has not produced any large earthquakes in historic times.

Studies have shown that this fault segment may be the source of a large earthquake in the near future (The Working Group, 1988; 1992). Seismic field studies indicate that several segments of the San Andreas fault may break simultaneously during large earthquakes. If all three segments of the southern San Andreas Fault Zone rupture in one event, the resulting seismic event is estimated at a magnitude of 8.0. The peak ground accelerations would result in strong ground shaking that is estimated would last about 50 seconds.

Alquist-Priolo Special Studies Zone(APSSZ)

The yardstick to gauge the surface rupture potential of faults is evidence of fault-displaced sediments that are less than 11,000 years old. The objective of fault investigations within and APSSZ is to locate the trace of the fault so that setbacks away from the fault can be prescribed. Exhibit III-5 illustrates the Alquist-Priolo Special Studies Zones that have been designated for the study area (California Division of Mines and Geology, 1974; 1993 a; 1993b; 1993c; 1993d).

Rockfalls/Landslides and Slope Instability

There are no landslides documented within the Planning Area. This is generally due to the lack of geologic conditions necessary for landsliding. However, earthquake-related slope failures and rockfalls/landslides commonly occur in steep, rocky terrain. Wilson and Keefer (1985) have reported that a ground acceleration of at least 0.10g in steep terrain is necessary to induce earthquake-related rockfalls, although this does not guarantee that rockfalls will occur if this acceleration value is exceeded.

A maximum credible earthquake occurring along the San Andreas fault (San Bernardino segment) or in the Planning Area along either the Pinto Mountain, Burnt Mountain, Eureka Peak, or Johnson Valley faults would generate at least 0.10g within the Town. Therefore, the potential for seismically-induced rockfalls to occur in this area cannot be dismissed. Exhibit III-6 illustrates the distribution of areas susceptible to rockfall and /or landslide problems in the vicinity of the Town. Generally these areas are located in the mountain and hilly areas, including the slopes of Burnt Mountain.

Heavy rainfall often triggers surficial sliding, debris and mud flows, on bluff faces and on steep slopes. The bluff faces along drainage channels, such as Pipes Canyon and Lower Covington Flat, especially if not vegetated, are extremely susceptible to storm-induced erosion.

Liquefaction and Other Secondary Ground Failure

Liquefaction may occur when loose, unconsolidated, saturated, sandy soils are subjected to ground vibrations during an earthquake. This occurs in areas where the ground water table is within 50 feet of the ground surface, and usually when the magnitude fairly substantial. When these sediments are shaken, a sudden increase in pore water pressure causes the soils to lose strength and behave as a liquid. Liquefaction-related effects include loss of bearing strength, ground oscillations, lateral spreading, and flow failures or slumping. Structures built on soils that liquefy may sink or topple over as the soil loses its bearing strength. The hazard from liquefaction is considered to be low in the Yucca Valley area because the water table is currently (1994) about 400 feet below the surface of the ground. However, there is the future potential for saturated soil conditions to occur in the areas where the ground water recharge basins have been proposed. These areas may fail in the event of an earthquake (M. Stockstell, 1993 personal communication)[3].

Other seismic event related secondary ground failures that can occur in the event of an earthquake include dynamic settlement, ground cracking or fissuring, lateral spreads, slumps, landslides, and earth or rock falls. Dynamic settlement occurs when a subsurface soil layer is densified by the ground motion of an earthquake, resulting in verticle displacement of the ground surface. Ground fissuring and lateral spreads are the result of liquefaction of relatively flat areas. Slumps, landslides and earth or rock falls can occur along road embankments or mountain slopes as a result of seismically induced ground motion.

Numerous cases of secondary ground failure, including all of the types discussed above, have been documented in the Yucca Valley area as a direct result of the Landers earthquake. These include: Abundant and wide-spread ground fracturing throughout the Planning Area; Small slope failures along Lower Covington Flat and Pipes Canyon Wash; and Numerous rockfalls in the mountain areas along the Homestead Valley and Camprock-Emerson faults.

[3] Ibid.

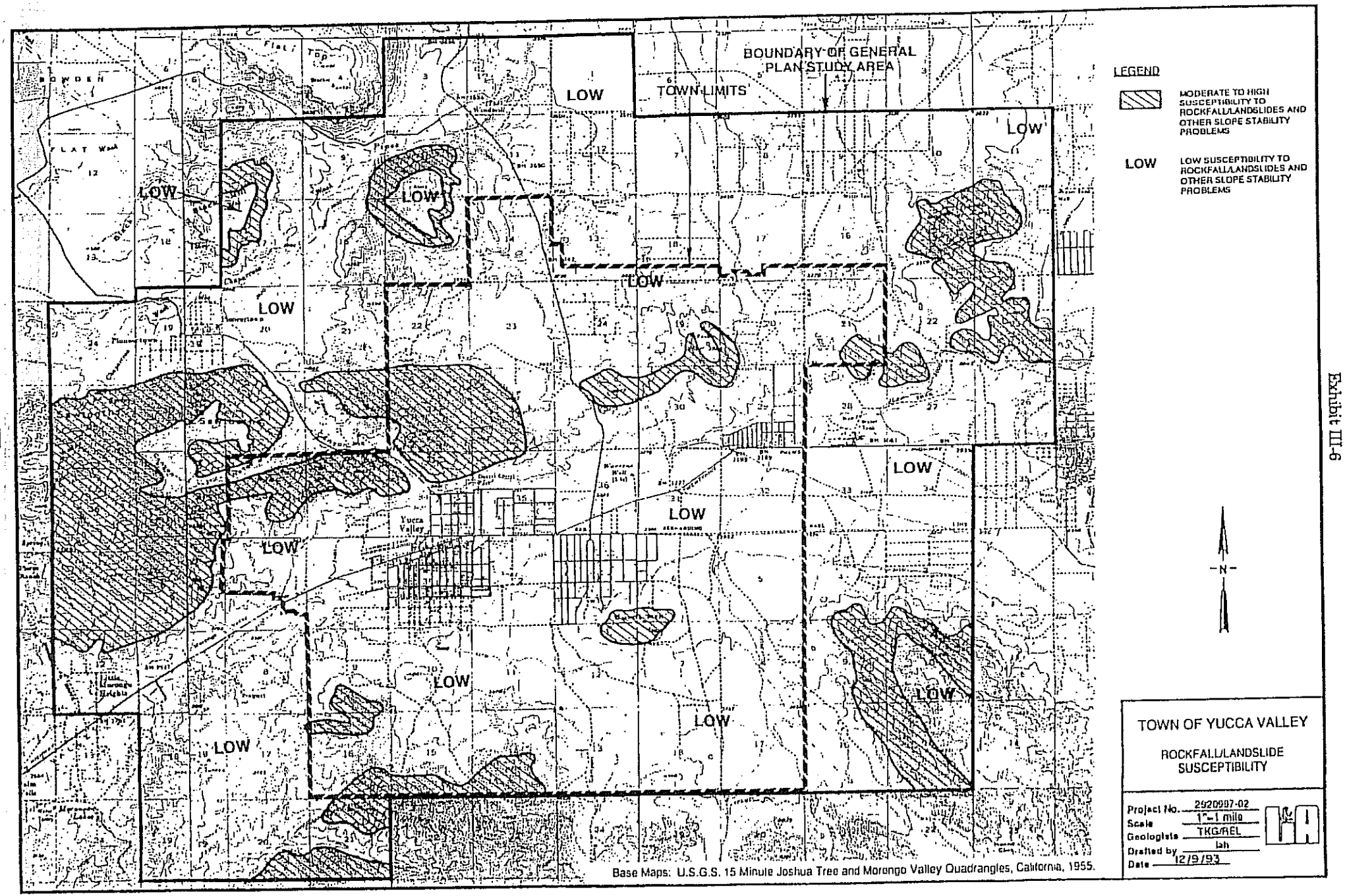


Exhibit III-6

2. Project Impacts

Development in the Planning Area will consist of major and minor projects, ranging from single family addition permits to master planned community developments (Specific Plans) consisting of mixed residential, commercial and industrial uses. The implementation of some development may require extensive site grading and earthwork. Also, identified active faults will continue to pose problems with potentially significant ground shaking. Potential impacts associated with the development of the Planning area are discussed below.

Soils

Based on the classification and nature of the soils within the Planning Area, it is anticipated that the deposits of alluvial soils within the Town may be susceptible to consolidation and hydrocompaction. In areas proposed for development, site-specific studies need to be conducted to evaluate the settlement potential of these soils.

Seismicity

The most significant seismic hazard that could impact the Town is strong ground shaking. Strong ground shaking will result from a seismic event occurring along the Pinto Mountain, Johnson Valley, Burnt Mountain, Eureka Peak faults or the San Andreas fault. This expected ground shaking motion could be damaging to low. to mid-rise buildings. Although it is not possible to prevent earthquakes from occurring, their destructive effects can be minimized by enforcing building and fire codes, and retrofitting or rehabilitating weak structures. Ground rupture, as well as ground acceleration, is a significant potential impact to the already developed areas in Town

These faults are considered seismically active and are believed to be capable of producing large earthquakes and strong ground shaking. Therefore, the project site may be affected by very strong ground shaking resulting from major earthquakes. Potential ground motions of the Planning Area resulting from earthquakes on these, and other faults, have been considered in the seismic design criteria, discussed below.

An average repeatable ground acceleration of 0.43g (g = accelerating effect of gravity) may be expected to affect the planning area within the economic lifetime of any future planned development. Those portions of the Uniform Building Code (UBC) which address seismic design requirements are based upon criteria limited to fulfilling life safety concepts.

According to the Structural Engineer's Association of California, structures designed in accordance with the 1991 ICBO (Uniform Building Code) should be able to resist major earthquakes without structures collapsing, although structural damage could occur. Based on UBC acceptance of some structural damage without collapse, development within the planning area may be designed in accordance with the seismic requirements presented in the UBC.

Four faults, or fault segments located within the Planning Area are designated as Alquist-Priolo Special Studies Zones, see Exhibit III-5. The Johnson Valley, Burnt Mountain, and Eureka Peak faults were designated Special Study Zones after the Landers earthquake. The Pinto Mountain fault, which had been zoned prior to the Landers earthquake, experienced minor secondary movement during the Landers event. All development planned within the Special Studies zones will have to meet the guidelines recommended in the Alquist-Priolo Act.

Liquefaction

Liquefaction is defined as the total or substantial loss of shear strength in saturated, fine grained, sandy soils. It can cause structural distress or failure as a result of excessive settlements, a loss of bearing capacity in the foundation soils, and the buoyant rise of buried structures. Although the liquefaction susceptibility is considered low within the Planning Area, isolated areas could liquefy during and earthquake if the soil and ground water conditions are conducive to failure, for example, loose, unconsolidated, saturated sandy soil. These conditions could develop locally near the proposed water retention, or ground water recharge basins.

Rockfall/Landslides and Slope Instability
Areas in the Planning Area that have a moderate to high susceptibility to rockfall/landsliding and other slope instability problems are generally limited to mountainous regions north and south of Highway 62, see Exhibit III-6. Slides and/or falls may occur in these areas during a seismic event. Also failure of bluff faces along drainage channels, for example, Lower Covington Flats, could occur during periods of heavy rainfall.

Subsidence
Deposits of alluvium within the Planning Area may be susceptible to consolidation and hydrocompaction. In addition, proper groundwater management of the Planning Area and surrounding areas will minimize the potential for ground subsidence from this source, which is currently (1993) determined to be low within the Town.

3. Mitigation Measures

- The Town shall require the preparation of soils studies and/or geotechnical studies for future development proposals in the community. Said analyses shall address seismic and soils conditions and shall provide concrete recommendations which mitigate soils/geotechnical hazards or constraints.

- Mitigation for ground shaking hazards consists of proper structural engineering design which shall take into account the forces that will be applied to structures by the anticipated ground motions. At a minimum, seismic design shall be in accordance with the most recent editions of the Uniform Building Code and the seismic design parameters of the Structural Engineer's Association of California.

- Blowing dust and sand during grading operations shall be mitigated by adequate watering of soils prior to and during grading, combined with limiting the area of dry exposed soils during grading. After site development, a level of mitigation against wind erosion shall be provided by maintaining moist surface soils, planting stabilizing vegetation, use of chemical soil stabilizers, establishing vegetative winds breaks with non-invasive species, and/or perimeter block walls.

- During site grading operations all existing vegetation and debris shall be removed from areas to receive compacted fill. Man-made objects shall be over-excavated and exported from the site. Any trees to be removed, shall have a minimum of 95% of the root systems extracted. Removal of unsuitable materials may require excavation to depths ranging from 2 to 4 feet or more below existing site grade.

- All fill soil, whether natural on site or import, shall be approved by the individual project soils engineer prior to placement as compacted fill. All fill soil shall be free from vegetation, organic material, and cobbles and boulders greater than 6 inches maximum diameter, and other debris. Approved fill soil shall be placed in horizontal lifts of appropriate thickness as prescribed by the soils engineer and watered or aerated as necessary to obtain near-optimum moisture content.

- Fill materials shall be completely and uniformly compacted to not less that 90% of the laboratory maximum density as determined by ASTM test method D-1557-78. Project soils engineer shall observe the placement of fill and shall take sufficient tests to verify moisture content, and uniformity and degree of compaction obtained. In place soil density should be determined by the sand-cone method, in accordance with ASTM Test Method D1556-64 (74), or equivalent test method acceptable to the Town Building Division.

- Finish fill slopes shall not be inclined steeper than 2:1 (horizontal to vertical). Fill slope surfaces shall be compacted to 90% of the laboratory maximum density by either over filling and cutting back to expose a compacted core, or by approved mechanical methods.

- Finish cut slopes shall not be inclined steeper than 2:1 (horizontal to vertical). Attempts to excavate near

vertical temporary cuts for retaining walls or utility installations in excess of 5 feet may result in gross failure of the cut and possible damage to equipment and injury to workers. All cut slopes must be inspected during grading to provide additional recommendations for safe construction.

- Foundation systems utilizing continuous and spread footings are recommended for the support of one- and two-story structures. Foundations for higher structures must be evaluated based on design of each structure and local soil conditions.

- Restrained and unrestrained retaining walls supporting bedrock, slopewash, mudflow deposits, alluvium, or compacted fill, shall be constructed to proper building code standards and inspected by the building inspector.

- An adequate subdrain system shall be constructed behind and at the base of all retaining walls to allow adequate drainage and to prevent build-up of excessive hydrostatic pressures.

- Positive site drainage shall be established during finish grading. Finish lot grading shall include a minimum positive gradient of 2% away from structures for a minimum distance of three (3) feet, and a minimum gradient of 1% to the street or other approved drainage course.

- All roof and canopy drainage shall be conducted to the street or off the site in an approved non-erosive manner. Drainage of development sites shall be accomplished in an approved manner to prevent erosion or instability. Water from off site sources shall not be allowed to discharge onto development sites, or should be conducted across the area in a non-erosive manner.

- Utility trench excavations in slope areas or within the zone of influence of structures should be properly backfilled in accordance with the following recommendations:

  a) Pipes shall be bedded with a minimum of 6 inches of pea gravel or approved granular soil. Similar material shall be used to provide a cover of least 1 foot over the pipe. This backfill shall then be uniformly compacted by mechanical means or jetted to a firm and unyielding condition.

  b) Remaining backfill may be fine grained soil. It shall be placed in lifts not exceeding 6 inches in thickness or as determined appropriate, watered or aerated to near optimum moisture content, and mechanically compacted to a minimum of 90% of the laboratory maximum density.

  c) Pipes in trenches within 5 feet of the top of slopes or on the face of slopes, shall be bedded and backfilled with pea gravel or approved granular soils as described above. The remainder of the trench backfill shall comprise typical on-site fill soil mechanically compacted as described in the previous paragraph.

- Development proposals within the mapped Alquist-Priolo Special Studies Zones, see Exhibit III-5, are required to conduct fault investigations that follow the Alquist-Priolo Special Studies Zones guidelines.

Mitigation Monitoring and Reporting

- Throughout any project site preparation, the Town Community Development Department shall visit the site to ensure compliance with Town ordinances and conditions of approval, as well as additional erosion control mitigation measures specified in this document.
  Responsible parties: Community Development Department and Building Departments, developer, grading contractor.

- Subsequent to preparation of final development plans and specifications, but prior to construction and grading, the foundation plans should be reviewed by the Geotechnical Consultant and/or Town Engineer to verify compatibility with site geotechnical conditions and conformance with recommendations contained herein. The need for additional subsurface exploration will be determined on a project by project basis.
  Responsible parties: Town Engineer, Geotechnical Consultant and County Geologist.

- When so prescribed, rough grading of a project site shall be performed under geological and engineering observation of the Geological Consultant and/or the Town Engineer. Rough grading includes, but is not limited to, grading of over excavation cuts, fill placement, and excavation of temporary and permanent cut slopes.
  Responsible parties: Town Engineer, Geotechnical Consultant and County Geologist.

- As determined appropriate by the Town Engineer and County or Consulting Geologist, the Geotechnical Consultant and/or the Town Engineer shall perform the following observations during site grading and construction of foundations to verify or modify, if necessary, conclusions and recommendations in this report:

  1. Observation of all grading operations.
  2. Geologic observation of all cut slopes.
  3. Observation of all key cuts and fill benching.
  4. Observation of all retaining wall back cuts, during and following completion or excavation.
  5. Observation of all surface and subsurface drainage systems.
  6. Observation of backfill wedges, and subdrains for retaining walls.
  7. Observation of pre-moistening of subgrade soils, and placement of sand cushion and vapor barrier beneath the slab.
  8. Observation of all foundation excavations for the structure or retaining walls prior to placing forms and reinforcing steel.
  9. Observation of compaction of all utility trench backfill.

  Responsible Party: Town Engineer and/or Geotechnical Consultant.

D. Hydrology

1. Existing Conditions

The long-term average annual rainfall has been between 8 and 10 inches, during the 35-year period from 1957 to 1990 the annual average rainfall was 6.44 inches, with the highest recorded season (1977-78) generating more than 15 inches[4]. The typical 24-hour rain fall used to estimate the 100-year storm in the area is approximately 4.5 inches, but varies by location.

Rates of runoff are calculated taking into account such variables as slope, percentage of vegetation coverage and soil type. Development in the community has primarily consisted of residential construction on larger single family lots, limiting the amount of impervious surface that has been generated. Many roads have remained unpaved and while some percolation along these roadways may occur during periods of rainfall, erosion and sand and soils transport has also ben a consequence.

The community is crossed by several major channels and washes passing through and affect the Town. The principle drainage feature is Yucca Wash located along the lowest east-west axis, which provides the backbone drainage to which all other washes and channels are tributary.

[4] Basin Perennial Yield and Quantity of Groundwater in Storage. Report prepared for the Hi-Desert Water District. Fox, R.C., and J. Egan and Associates. August, 1991.

Where Yucca Wash passes beyond the Town s easterly limits, the discharge at this point from the 100-year storm is estimated at approximately 11,630 cubic feet per second (cfs)[5]. Other major drainages include Long Canyon Wash, Hospital Channel, High School Channel, Water Canyon Wash, Covington Wash, Carmelita Wash-West Fork and Skyline Ranch Wash, among others.

Improvements to community drainage facilities is limited, some having been constructed as part of regional improvements made by the County, others as part of highway culvert construction, a few as a consequence of private (primarily commercial) development. While the County Transportation/Flood Control Department has prepared various drainage studies for the Town over the years, a comprehensive drainage and flood control master plan has never been prepared for Yucca Valley[6].

Major areas of the community are currently subject to damage and isolation during larger storm events. Most of the natural drainage courses have inadequate capacity and are subject to erosion and deposition of sediment. Rainfall is infrequent in Yucca Valley but can be intense during thunderstorms, resulting in both storm flows and sediment transport, which frequently concentrate in the more densely developed parts of Town. The soils prevalent in the community are susceptible to erosion and transport and are a major consideration in flood control planning.

The Federal Emergency management Agency (FEMA) has mapped areas of flooding within the Town. While not comprehensive in scope, this mapping effort has identified many of the areas subject to significant flooding in the 100-year storm event, that is the most intense storm expected to occur at a frequency of once on 100 years. As can be seen from Exhibit III-7, shaded areas are those designated occurring in Zone A and subject to flooding in a 100-year storm. It is also evident that large areas of the Town, designated Zone D, have not been fully analyzed for their potential flooding hazard. Currently designated Zone A hazard zones are limited to Yucca Creek Wash and one to two mile stretches of tributary washes feeding into Yucca Creek Wash.

2. Project Impacts

The adoption and implementation of the Yucca Valley General Plan will result in land use, roadway, flood control and general planning policies, programs and implementation measures which directly address the flooding hazard faced in the Town. The Land Use Plan establishes an overall development intensity that is substantially less than that expected from implementation of the County Plan. It also includes policies and programs which require and/or encourage the integration of on-site stormwater detention facilities which will help reduce peak flows and sedimentation of flood control facilities.

General Plan policies and programs also address issues of site clearance and revegetation, limiting the amount of impervious or striped surface which may be created in various types of development. In addition to close coordination and participation in the County's efforts to develop a Master Plan of Drainage for regional facilities, in accordance with proposed general Plan policy, the Town is developing local drainage controls and improvements which will complement the regional facilities. The General Plan also calls for coordination with Caltrans and the County to assure the provision of all-weather road crossings at critical locations in the community.

Implementing Town policies and programs, both the County and the Town are integrating the maximized use of natural materials to create flood control facilities which all and encourage the development of wildlife habitat, while helping to reduce sediment transport and peak storm flows. The General Plan also sets the stage for project financial planning, working in concert with the County, State and Federal agencies in planning and funding.

5 Yucca Valley Master Plan of Drainage-Policy Report and Conceptual Master Plan. Prepared for San Bernardino County Flood Control District. Prepared by John M. Tettemer & Associates. June, 1994.
6 Yucca Valley Master Plan of Drainage/Policy Report and Conceptual Master Plan. Prepared for San Bernardino County Flood Control District. Preparer- John M. Tettemer & Associates, Ltd. June 1994.

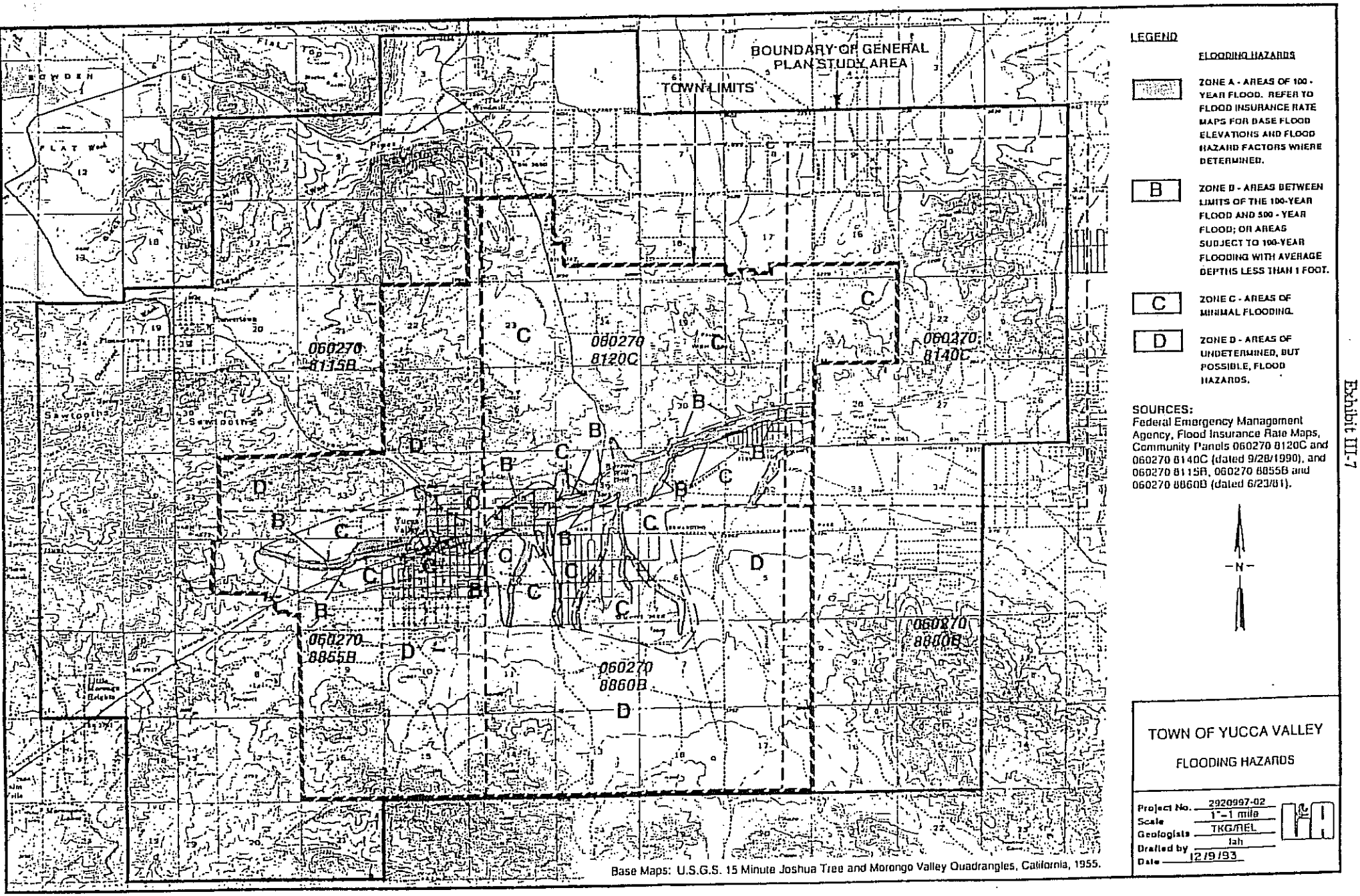


Exhibit III-7

Overall, the adoption and implementation of the proposed General Plan is not expected to result in any significant adverse impacts. Rather, it is expected that the various levels of regulation embodied therein will greatly enhance inter-agency planning and cooperation, facilitate development of effective and cost-efficient local and regional drainage plans, and encourage the environmentally sound integration of these facilities into the community.

3. Mitigation Measures

While the General Plan will not result in adverse impacts to the environment, there are several additional measures set forth below that will further enhance the policies, programs and implementation strategies of the General Plan.

- On site and regional stormwater detention basins shall be used to the greatest extent practical to lower the cost and intensity of development of stormwater conveyance, enhance their function as open space and wildlife habitat areas, and to provide enhanced opportunities for groundwater recharge.

- Hazards associated with ponding at roadway intersections shall be engineered and improved to maximize drainage capacity of the streets and reduce driving hazards associated with ponding water.

- Development proposals encompassing acreage or with the potential of generating significant runoff shall be required to prepare and submit a hydrology study and mitigation plan which implements regional and local requirements, policies and programs.

- On an interim basis, development applications shall be accepted and processed in accordance Town Flood Plain Management Ordinance which addresses local drainage and safety and property protection issues associated with development in recognized flood plains.

- Prior to the construction of any drainage improvements on private lands, project developers shall be required to obtain an authorization letter from the appropriate Town and/or County agency which will assume responsibility for maintenance of improvements. Said letter shall clearly identify the source of funding for said maintenance.

- Future flood control plans required of developers shall include specific recommendations and/or designs regarding pollution control techniques to be applied to preclude excess siltation and to keep pollutants, including herbicides, pesticides, oils, other hydrocarbons and other pollutants out surface and groundwaters. Mitigation measures may include specifically designed open space areas such as artificial wetlands where nuisance and otherwise contaminated on-site runoff shall be retained separate from channels conveying off-site flows.

Mitigation Monitoring/Reporting

- Within one year from completion of the regional master drainage plan, the Town shall develop a local drainage ordinance which complements and maximizes the County- sponsored Master Plan of Drainage currently under way.
  Responsible parties: Town Council, Community Development Department, Town Engineer

- Within two years from completion of the regional master drainage plan, the Town shall develop a Local Master Drainage Plan which addresses the long-tern development of intermediate facilities, where necessary, to convey local runoff into regional facilities.
  Responsible parties: Town Council, Community Development Department, Town Engineer

E. Water Quality/Resources

1. Existing Conditions

The Town of Yucca Valley is located within the Mojave Water Agency (MWA) service boundaries. MWA services the western portion of San Bernardino County (4,800+- square miles[7]. The Mojave Water Agency was formed by a special legislative act in 1959 in response to growing groundwater overdraft conditions and increased water demand. The MWA's Regional Water Management Plan (RWMP) evaluates specific alternatives to meet the immediate and long-term water needs of the region. The MWA service boundary includes the Mojave River, Lucerne Valley, Johnson Valley, El Mirage Basin, and the Morongo Basin/Johnson Valley, which, in turn, includes the communities of Joshua Tree, Landers, and Yucca Valley[8].

The Regional Water Management Plan (RWMP) area is divided into two major drainage areas, which are the Mojave River area and the Morongo/Basin/Johnson Valley area. These watersheds are further divided into hydrologic subareas which provide a means of tracking water supplies, demands, and groundwater extractions. Exhibit III-8 shows the hydrologic subareas of the RWMP area. As illustrated, the Town of Yucca Valley lies within the Warren Valley Hydrologic Subarea. The primary source of water supply to the Town of Yucca Valley is the Warren Valley Groundwater Basin (WVGB). The Basin is characterized by three topographic units which are: a north sloping alluvial fan which generally lies south of the San Bernardino Base Line; a plateau-like-area which stands at an elevation of about 3,000 feet; and a mountainous area to the south and west[9].

Water Production

Early water production in the Yucca Valley area resulted from the drilling of Warren's well in 1881. Within the immediate area of this well sprang the Yucca Valley community. In 1912, the Talmadge Brothers Tanks were constructed at a spring to provide water to ranchers for cattle and for domestic uses such as laundry. Later, as the area developed, many privately owned water companies formed to provided water for domestic consumption. It was not until 1962 that several of these water companies merged to form the Yucca Valley County Water District (YVCWD), which is known today as the Hi-Desert Water District (HDWD)[10].

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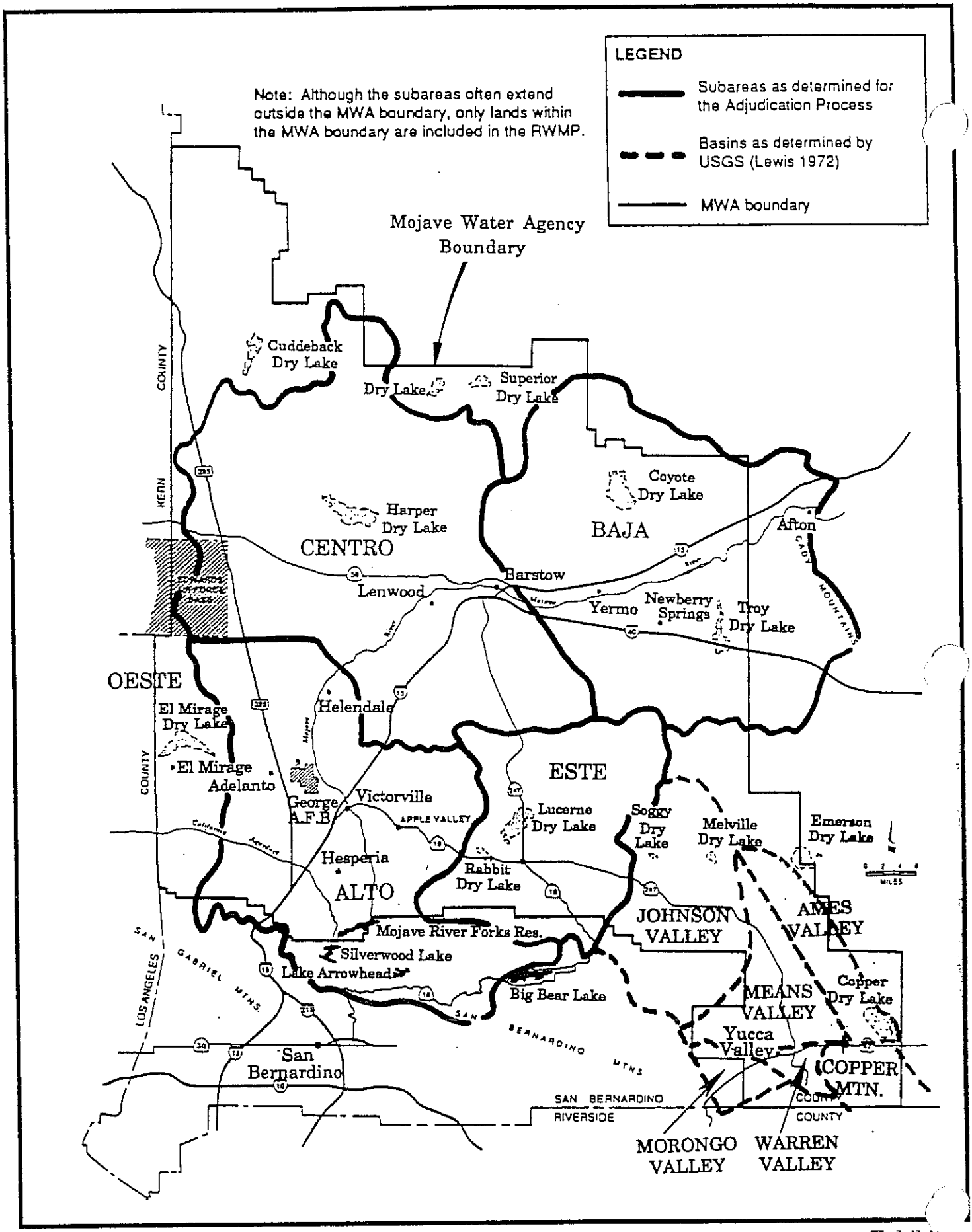
7 Notice of Preparation of a Program Environmental Impact Report for the Mojave Water Agency Regional Water Management Plan, Prepared by Jones and Stokes Associates, Inc., May 1993.
8 Ibid.
9 Ibid
10 Final Draft Report, Warren Valley Basin Management Plan, Warren Valley Basin Watermaster, Yucca Valley, California, Prepared by Kennedy/Jenks/Chilton, January 1991.



Exhibit

Hydrologic Subareas in the
Regional Water Management Plan Area

III-8

Until recently, the two principal water purveyors offering service to the Yucca Valley area were the Hi-Desert Water District (HDWD) and the Yucca Water Company, Ltd. (YWC). However, in 1990, HDWD acquired YWC and currently assumes responsibility for water provision of the Yucca Valley area, with the exception of the Blue Skies Country Club, the institute of Mental Physics, and approximately 16 individual domestic users. These users have their own wells that extract water from the Warren Valley Groundwater Basin[11].

All domestic water served by the District to its customers is extracted from the Warren Valley Groundwater Basin by deep wells. Most of the District wells are drilled to depths ranging between 423 and 1,450 feet. Wells have capacities ranging between 70 and 900 gallons per minute (gpm). Total capacity of all wells is approximately 4,300 gpm. Table III-16 below shows water production during the fiscal years between 1990-1993 in acre feet. It can be seen from this table that most of the water was extracted during the summer months between May and September. Supplemental water is not shown for the 1990-91 fiscal year due to the construction of pipelines at that time. Supplemental water is a source other than that provided by the Warren Valley Groundwater Basin. Two outside sources of supplemental water include an agreement with the Bighorn Desert Water Agency (Mainstream Well) and the State Water Project. These are discussed further below.

Table III-16
Monthly Water Production History
Fiscal Years 1990-1993
(Acre Feet)

	FY 1990-91[1]	FY 1991-92[2]		FY 1992-93	
Month	Wells	Wells	Supp. Water	Wells	Supp. Water
July	195.0	276.3		344.4	00.0
August	193.6	277.0		298.9	35.6
September	169.2	243.4		242.0	37.9
October	146.1	226.9		185.1	46.2
November	116.7	191.6		148.2	61.0
December	179.5	165.2		138.3	30.5
January	105.8	158.4		151.0	34.7
February	172.7	144.7		95.5	39.3
March	159.2	157.7		125.5	52.7
April	185.6	169.2	28.0	165.1	
May	231.1	240.6	49.4	207.4	
June	248.0	269.5	00.0	215.1	
Total	2,202.5	2,520.5	77.4	2,316.5	337.9

1 Supplemental water was not available during this fiscal year
2. Supplemental water was not available for these months due to the construction of pipeline to divert it to Yucca Valley.

11 Final Draft Report, Warren Valley Basin Management Plan, Warren Valley Basin Watermaster, Yucca Valley, California, Prepared by Kennedy/Jenks/Chilton, January 1991.

Distribution System

The water distribution system through the Town of Yucca Valley consists of wells, storage tanks, different sizes of water lines and several booster pumps. There are twenty (20) pressure zones for different elevations. Pressure zones range between 30 pounds per square inch (psi) in the higher elevations and 160 (psi) in the lower elevations.

Groundwater Supply

Yucca Valley is underlain by relatively permeable, unconsolidated gravels, sands and finer sediments eroded from adjacent highlands which are composed of igneous and metamorphic rocks. The groundwater basin is structurally controlled by several northeast trending faults related to the Pinto Mountain fault zone. The groundwater basin is bordered by the Sawtooth Mountains to the north and the Little San Bernardino Mountains to the south. Groundwater in the valley is primarily recovered from recent and older alluvial deposits, and is surrounded and underlain by bedrock[12].

According to the most recent study (1983), the groundwater basin contained approximately 45,000-59,000 acre feet of remaining extractable water. The study used a depth of 200 feet to the top of the aquifer and found that the total usable storage capacity of the basin was estimated to be 160,000 acre feet[13].

The HDWD service area is currently operated by sixteen (16) wells with water storage facilities provided by sixteen (16) above-ground steel reservoirs with a total capacity of 12.41 million gallons[14]. Currently, there are no plans to construct new water storage facilities. However, it should be noted that as the Town continues to grow, additional water storage facilities may be needed and the District will have to construct them in order to meet the demand.

Mainstream Well

In 1987, the HDWD contracted with the Mainstream Water Development Company to locate and develop a well outside the overdrafted Warren Valley Basin and into another aquifer known as the Ames Groundwater Basin. This aquifer lies within the sphere of influence of the Bighorn Desert Water Agency. The well was successful and is capable of producing approximately 2,100 acre feet of water per year out of the Ames Groundwater Basin, which much of the HDWD's mesa area overlies. During the environmental review process, certain issues arose which prevented production of the well. After years of litigation, an agreement was reached which allows the HDWD to extract 800 acre feet per year and an additional one- half acre foot for every new service connection in the mesa area. This agreement allows the District to supply water to the mesa area and ease the overdraft on the WVGB[15]. The mainstream well is currently operational and monitored by the HDWD.

Overdraft Conditions

Groundwater is extracted from the Warren Valley Groundwater Basin primarily by the Hi- Desert Water District to serve residents and businesses within Yucca Valley and surrounding areas. The demand for the basin's resources far exceeds the natural supply. At current rates of drawdown, the basin could potentially be exhausted, with an increased worsening in water quality. The shortage of a readily available long-term water supply has limited growth in the Yucca Valley area and has resulted in a water table decline of more than 200 feet during the past 20 years [16].

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12 Final Draft Report, Warren Valley Basin Management Plan, Warren Valley Basin Watermaster, Yucca Valley, California, Prepared by Kennedy/Jenks/Chilton, January 1991.
13 An acre foot contains approximately 325,830 gallons.
14 Hi-Desert Water District, Mary Stockstell, Assistant General Manager of Operations, Yucca Valley, CA., August 1993.
15 Hi-Desert Water District, Water Notes, Yucca Valley, California, June 1993.
16 Warren Basin Perennial Yield and Quantity of Groundwater in Storage, A Report for Hi Desert Water District, Prepared by Robert C. Fox, Consulting Engineering Geologist and John Egan and Associates, Inc., Consulting Engineers, August 1991

Since the 1950's, extractions from the Warren Valley Groundwater Basin have exceeded its safe yield and have caused an overdraft condition. As the Yucca Valley area experienced significant growth, the overdraft condition worsened and groundwater levels declined. The groundwater table is currently being lowered by as much as 40 feet per year. In 1972, the United States Geologic Survey estimated that the groundwater would be completely depleted by the year 2000[17].

Due to this increasing overdraft problem, the Warren Valley Groundwater Basin was adjudicated in 1977. In its adjudication judgement, the Court appointed a Hi-Desert Water District Watermaster, a board composed of five members, and ordered them to develop a physical solution to the overdraft problem. In 1990, the court appointed an additional six members to the board. In response to the need to develop a consensus regarding a solution to the overdraft problem, the Watermaster Board authorized the preparation of the Warren Valley Basin Management Plan.

The preparation of this plan resulted in various engineering evaluations and monthly review meetings, reflecting the significant levels of current HDWD activities. It is based on a 50 year water supply planning horizon, starting in 1991, and provides sufficient time to accommodate changing water supply and demand without unnecessary commitment of financial resources. It is intended that the plan will be reviewed on an annual basis so that water supply planning functions 50 years ahead of water demands[18].

The entire community of Yucca Valley has and will continue to experience limitations on growth, restrained by groundwater conditions and water delivery limitations. The water management plan, adopted by the HDWD limits water connections to two percent or approximately 194 per year. A certain level of growth and expansion is important for the community to remain economically vibrant and healthy. A locally strong economy will allow Yucca Valley and the HDWD to plan for future wastewater facilities. It is, therefore, desirable for the District to accommodate growth, within the limits of available water resources [19].

Groundwater Replenishment

The long-term availability of domestic water is one of the most important resources needed for a stable community and to allow the community to continue anticipated growth. Future demands on water resources requires that the community anticipate increased long-term water resources. The following discussion addresses potential/anticipated water sources and ways in which recharging the Basin can be accomplished.

State Water Project

Currently, significant activities related to the importation of State Water are being undertaken by the HDWD. With the completion of the voter-approved Morongo Basin Pipeline being constructed by the Mojave Water Agency, State Water Project (SWP) water will be made available to the Hi-Desert Water District. Water via the Morongo Basin Pipeline, a $66.5 million project consisting of a 71 mile pipeline, was completed in 1994 and will be operated by the Mojave Water Agency[20].

The water line will consist of 36 and 30 inch pipelines and a pumping station in Johnson Valley. The pipeline will be capable of delivering approximately 11,000 acre feet per year, equivalent to 15 cubic feet per second. At the terminus of the Morongo Basin Pipeline project, the Mojave Water Agency will install a five million gallon reservoir and additional pipelines to direct water into Yucca Valley. This water line will consist of approximately five (5) miles of thirty inch pipe and two miles of twenty-four inch pipe. The entire water line will be underground and will operate by gravity flow.

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17 Final Draft Report, Warren Valley Basin Management Plan, Warren Valley Basin Watermaster, Yucca Valley, California, Prepared by Kennedy/Jenks/Chilton, January 1991.
18 Final Draft Report, Warren Valley Basin Management Plan, Warren Valley Basin Watermaster, Yucca Valley, California, Prepared by Kennedy/Jenks/Chilton, January 1991.
19 Hi Desert Water District, Water Supply Master Plan, Prepared by John Egan and Associates, Inc., Consulting Engineers, 1990.
20 Feasibility Study for the Incorporation of Yucca Valley, Sponsored by the Committee for Yucca Valley, 1991.

There are several divisions within the Mojave Water Agency service area. The HDWD and the former YWC lie within Division 2 of the Mojave Water Agency (MWA). Division 2 has an entitlement to 7,257 acre feet per year of SWP water. The HDWD receives 4,282 acre feet of water, which includes 2,302 acre feet per year allocated to the Yucca Water Company, which is now part of the HDWD. The pipeline is completed and water has been delivered.

"Banking" water can also be used to recharge the basin to optimize available water supplies. Discussions have been initiated with the Metropolitan Water District of Southern California (MWD) regarding the possibility of banking water in the Warren Valley Groundwater Basin. MWD could either bank SWP water through the Morongo Basin Pipeline or Colorado River by constructing a delivery system from the low desert. Discussions between the two districts indicate an interest in this opportunity and MWD is continuing to evaluate the potential of these projects[21]. However, no determination has been made at this time.

There is a possibility of interagency conjunctive use. In interagency conjunctive use, another agency with unused water rights can bank their water in the Basin. When the water is needed by the agency, it could be extracted and conveyed to the agency or transferred by water exchange agreements.

Natural Runoff

To replenish the groundwater of the Basin and to reduce pumping costs, the Basin must be recharged by sources outside the area. The natural source of recharge of the Warren Valley Groundwater Basin is precipitation and runoff within its limited watershed[22]. Natural groundwater recharge occurs as precipitation runs off from adjacent highlands and infiltrates all portions of the Basin and especially along streams which flow into the Valley. The Basin has an average annual recharge of approximately 200 acre feet per year (af'y)[23] but is established at 900 acre feet by court order.

Stormwater Recharge

Rainfall in the Yucca Valley area is infrequent, but occasionally of high intensity. There are a number of existing drainage channels and tributaries in the Yucca Valley area which may provide a means of enhancing the capturing of flood waters to recharge the basin. The construction of a series of retention basins within existing drainage courses would retain runoff and recharge the groundwater basin during low intensity storms. During high intensity storms, these dikes should be designed so as not to impede the flood control purpose of the drainage courses. This water management strategy is common in Southern California[24].

Detention and Recharge Basins

The main purpose of detention basins is to catch peak runoff from tributary areas for downstream control. There are two existing detention basins in Yucca Valley that are owned and maintained by the San Bernardino County Flood Control District[25]. One is located next to Old Woman Springs Road, south of Paxton Road, and was constructed by San Bernardino County Flood Control District 6. The capacity of the basin is approximately 20 acre feet, with a 42 inch concrete pipe at the lowest point releasing water to the downstream channel.

The second basin is located off Long Canyon Wash, south of Joshua Drive, and east of Sage Avenue. This basin has a design capacity of approximately 10 acre feet, and is designed to drain within 24 hours after the design storm. These detention basins provide an opportunity to retain water behind additional downstream dikes or in spreading basins to help recharge the groundwater basin.

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21 Final Draft Report, Warren Valley Basin Management Plan, Warren Valley Basin Watermaster, Yucca Valley, California, Prepared by Kennedy/Jenks/Chilton, January 1991.
22 Final Draft Report, Warren Valley Basin Management Plan, Warren Valley Basin Watermaster, Yucca Valley, California, Prepared by Kennedy/Jenks/Chilton, January 1991.
23 Ibid.
24 Final Draft Report, Warren Valley Basin Management Plan, Warren Valley Basin Watermaster, Yucca Valley, California, Prepared by Kennedy/Jenks/Chilton, January 1991.
25 Hi-Desert Water District, Marty Stockstell, Assistant General Manager of Operations, Yucca Valley, CA., August 1993.

The construction of recharge basins is another way of capturing water to replenish the groundwater in the Basin. When the State Water Project is completed, project water will be percolated into the Warren Valley Groundwater Basin through the use of groundwater recharge basins[26] The Hi-Desert Water District is currently conducting soil tests to determine where water percolates best[27]. These areas may be utilized during periods of heavy rainfall to enhance natural recharge.

Wastewater

Currently, the Hi-Desert Water District does not have a sewer collection or wastewater treatment system for the Town of Yucca Valley. By developing such a system, the water collected can be utilized for a number of other potential uses. The Yucca Valley area is fortunate that it has a large potential user of reclaimed water which is the Blue Skies Country Club.

Based on topographic and reclamation considerations, a two phase wastewater collection and treatment system was developed as a concept by the HDWD. Phased development allows implementation to progress at a level that can be financed by the District. According to the study, Phase one would utilize wastewater in the western portion of the District for water reclamation at Blue Skies Country Club. Phase two would create a hydraulic barrier to Basin outflow by recharging the aquifer downgradient. This recharge is intended to create a hydraulic mound which will retard Basin outflow.

Service areas of phases 1 and 2 are approximately 1,100 and 4,200 acres respectively. Gravity flow sewer systems and a wastewater treatment plant would service each area. Phase 1 would have a plant located southeast of the Blue Skies Country Club and phase 2 would have a plant located at the corner Avalon and Paxton[28]. Preliminary treatment capacities, average daily flows, and amounts of irrigation water generated from the proposed plant are presented in under Project Impacts below.

Water Conservation

Possible ways of effectively increasing the water resource, or at least stretching out what is available, include water conservation. The HDWD is actively engaged in an aggressive campaign of water conservation and is showing positive results in reduced water usage[29]. A water conservation ordinance has been written by the HDWD to regulate landscape irrigation and other wasteful uses of water.

In addition, the State Department of Water Resources has adopted a Model Water Efficient Landscape Ordinance in July of 1992 which was required by Assembly Bill 325: The Water Conservation in Landscaping Act (AB 325). This model ordinance automatically went into effect on January 1, 1993 in all cities and counties which do not have such an ordinance. The Town of Yucca Valley has recently adopted a water conserving landscape ordinance. The ordinance is expected to reduce water usage and provides guidelines for landscape and irrigation design.

In addition, other water conserving activities which are currently being implemented by the HDWD are leak detection tests of water distribution facilities, retrofitting low water use plumbing fixtures for residents, plan check new construction plans for specific guidelines on landscaping, and implementation of more stringent water conservation measures through the Emergency Stage Response Program (ESRP).

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26 Warren Valley Basin Groundwater Recharge Program, Prepared by CM Engineering Associates, Inc., February 1991.
27 Article in The Desert Star Newspaper, July, 1993.
28 Final Draft Report, Warren Valley Basin Management Plan, Warren Valley Basin Watermaster, Yucca Valley, California, Prepared by Kennedy/Jenks/Chilton, January 1991.
29 Hi Desert Water District, Water Supply Master Plan, Prepared by John Egan and Associates, Inc., Consulting Engineers, 1990.

This program was created to implement more stringent water conservation measures when the District's ability to provide water is exceeded by systems demands. There are three stages in this program. The provisions are implemented when the system exceeds the first stage, which is eighty percent (80%) of capacity for three consecutive days. As demands increase, stage two goes into effect, which places increased restrictions on water use. If delivery capacity continues to be inadequate, stage three goes into effect which requests a fifty percent (50%) cutback. This measure is designed to be short-term until delivery problems are mitigated and demands are reduced[30].

Other programs the HDWD is currently evaluating to help conserve ~~water are retrofitting landscape irrigation systems to use drip systems or bubblers, replacing old water meters~~, customer water audits where District staff provide water conservation advice and distribute literature and retrofit kits and, new construction offsets utilizing water savings from a voluntary plumbing fixture retrofit program in existing homes to offset the estimated annual use of a new service[31].

These programs should help reduce per capita water demands on the Warren Valley Groundwater Basin to a minimum level until supplemental water sources can be delivered. Assuming five year programs are implemented, the landscape retrofit and customer water audit programs are expected to save up to 200 acre feet of water per year. The other programs cannot be estimated at this time but are considered to have a significant potential savings as well[32].

Water Reclamation

Another anticipated source of water is that of reclaimed wastewater. This becomes an effective means for additional water resources only if it can substantially increase water availability versus return from the discharge of private waste systems, via septic tanks and leach fields. Reclaimed wastewater has increasingly become a valuable water resource.

There appears to be two alternative approaches to water reclamation. One is wastewater collection, treatment, and reuse, and the other is the use of grey water by individual property owners. Currently, the Town of Yucca Valley does not have a sewer collection or wastewater treatment system. The Town's entire sewage is managed through the use of septic tanks and leach fields. There are several public health concerns related to septic systems, including groundwater contamination and improper disposal of septic tank pumpage.

Of serious concern is nitrate contamination of the groundwater. Although nitrate concentrations do not appear widespread in the Basin, nitrate contamination has rendered one of the District's wells unusable. Because groundwater levels have decreased continuously, the potential of contamination of nitrates may be lessened until groundwater levels are stabilized and start to recover. However, it should be noted that nitrate removal is costly and once groundwater aquifers are contaminated, they are difficult to remediate.[33]

Grey water may be safely used for limited irrigation purposes in a carefully designed and constructed system. Grey water is used water from washing machines, bathtubs, showers, bathroom sinks, kitchen sinks and dishwashers. To obtain approval for grey water use, proof must be demonstrated to the County Department of Environmental Health Services that grey water represents a critically needed water supply, and that the District can administer an approval and enforcement program that protects the public from potential harm.

Although the California Department of Health Services and the San Bernardino Department of Environmental Health Services have regulations which discourage the use of grey water, this approach is not entirely precluded. The counties of San Luis Obispo and Santa Barbara have approved certain uses of grey water[34].

30 Final Draft Report, Warren Valley Basin Management Plan, Warren Valley Basin Watermaster, Yucca Valley, California, Prepared by Kennedy/Jenks/Chilton, January 1991.
31 Ibid.
32 Final Draft Report, Warren Valley Basin Management Plan, Warren Valley Basin Watermaster, Yucca Valley, California, Prepared by Kennedy/Jenks/Chilton, January 1991.
33 Ibid.
34 Ibid

Water Use

Water use in Yucca Valley is primarily for domestic and commercial purposes. In 1990, the total demand on the Basin was estimated to be 3,565 acre feet, of which 1,661 acre feet was delivered by the HDWD, 1,263 acre feet by the YWC, 585 acre feet by Blue Skies Country Club, 40 acre feet by the Institute of Mental Physics, and 16 acre feet by other users. The current per capita water usage excluding non-residential uses is approximately 103 gallon per day compared to the statewide average of 140 gallons per day[35].

Water Quality

Domestic water must meet stringent health standards. In 1974, the Federal Safe Drinking Water Act was established. The purpose of this act was to ensure the quality of water supplies. The United States Environmental Protection Agency (EPA) sets certain standards and monitoring requirements for every water utility. The Safe Drinking Water Act divides these standards into two categories, which are ranked primary and secondary. Primary standards govern the substances which may be harmful to the public if consumed for a long period of time. Secondary standards govern the aesthetic qualities of the water including taste, odor, clarity and mineral content. In the event test results show non-compliance with a standard, the HDWD must take immediate action to correct the situation[36].

The HDWD tests water at each of its wells and at numerous locations throughout the distribution system measuring chemicals such as total dissolved solids and nitrates. Depending on which chemical is being tested, water quality is tested on a weekly and annual basis. According to the 1992 Annual Water Quality Report, quality of the groundwater basin is generally good. The maximum contaminant level allowed for total dissolved solids is 500 milligrams per litre (mg/l).

Tests showed that total dissolved solids range between 119 and 125 mg/l with an overall average of less than 164 mg/l. The maximum contaminant level allowed for nitrate is 45 milligrams per litre. Additional tests showed that nitrate resulted in a range between 2.9 and 24.1 mg/l with an overall average of less than 10.88 mg/l[37]. Although these tests results show good water quality, they could be contaminated by several sources. These are further discussed under Project Impacts.

2. Project Impacts

Buildout of the Town will increase water consumption. The Hi-Desert Water District is responsible for making sure that adequate supplies of water are available to serve the residents of the Town in the future. The following discusses impacts to water resources including water production and consumption, water use, distribution facilities, overdraft conditions, wastewater, and water quality.

Water Production and Consumption

Water production comes from the wells within the Hi-Desert Water District's boundaries. According to the District, water production has been increasing. Table III-17 below shows water production and consumption within the Town between the fiscal years of 1991 and 1993.

35 Final Draft Report, Warren Valley Basin Management Plan, Warren Valley Basin Watermaster, Yucca Valley, California, Prepared by Kennedy/Jenks/Chilton, January 1991.
36 Ibid.
37 Water Notes, Hi-Desert Water District, June 1993.

Table III-17
Hi-Desert Water District Water Production and Consumption
Fiscal Years 1991-1993
(Acre Feet)

Fiscal Year	Production (Acre Feet)	Consumption (Acre Feet)	Difference (Acre Feet)
1991-92	2,597.9	2,439.5	158.4
1992-93	2,654.4	2,447.2	207.2
Totals	5,252.3	4,886.7	365.6

Source: Telecommunications with Joe Johnson, Hi-Desert Water District, March 1994.

As can be seen, there is an increase in the difference between production and consumption during the fiscal years 1991-92 and 1992-93. This may be due to efforts made by residents on water conservation. It can be expected that the District will continue to increase water production with supplemental water from other sources as those mentioned above. It is anticipated that this trend will continue, and therefore, help alleviate impacts to the groundwater overdraft condition.

Water Use

Water use in Yucca Valley is primarily for domestic purposes. As mentioned earlier, in 1990, the HDWD and YWC delivered 1,661 and 1,263 acre feet of water, respectively. The sum of these two figures totals 2,924 acre feet. To provide a better understanding and to determine water use on a daily basis per capita, a calculation was conducted and is described below. It is estimated by the Hi-Desert Water District that current per capita water use is approximately 104 gallons per day.

First, the quantity of acre feet of water delivered in a year is multiplied by a factor of 326,700 (gallons in an acre foot) which results in number of gallons. This figure is then divided by the population to get gallons/person/year. This number is then divided by 365 to yield gallons/person/day. Consider the following calculation:

Given Factors:

2,924 ac. ft. of water (delivered by HDWD & YWC)
955,270,800 ÷ 16,403 = 58,238 gallons/person/year
326,700 (gallons in an acre foot)
16,403 (1990 population)
365 (days in one year)

Calculation:

2,924 x 326,700 = 955,270,800 gallons
955,270,800 ÷ 16,403 = 58,238 gallons/person/year
58,238 ÷ 365 = 160 gallons/person/day

Based on this calculation, total community consumption on a per capita basis is approximately 160 gallons of water per day for all types of uses. Table III-18 shows past, current and projected(buildout) water use based on population. The figure of 160 used in this table is closely related to the typical water use in the United States on a per capita basis which is 150 gallons. Table III-19 shows the break down per land use. It also shows that current water use in the Town of Yucca Valley is approximately 2,864,000 gallons per day. Projected water use at buildout is expected to be approximately 10,180,320 gallons per day.

Table III-18
Town of Yucca Valley Past, Current and Projected Water Use
(1990,1993 and Buildout)

Year	Water Use (gpcpd)	Population[1]	Gallons per Capita per Day
1990	160	16,403	2,624,480
1993	160	17,900	2,864,000
Buildout	160	62,223	9,955,680[2]

1 Population figures taken from the Housing Element, 1994
2 Projected Water Use at Buildout. Assumes no improvement in per capita water usage. Future water conservation enhancements may reduce the per capita demand.

Table III-19
Typical Water Demand in the United States

Class	Quantity (gpcpd) Normal	Average
Residential	20-90	55
Commercial	10-130	20
Industrial	20-80	50
Public and unaccounted for	10-50	25
Total	**60-250**	**150**

Source: Principles of Water Resource Planning Alvin S. Goodman, 1984. Quantities are in gallons per capita per day (gpcpd).

For comparative purposes, Table III-20 below is provided to show the amount of water used by several types of establishments throughout the United States. This table should not be taken for granted, but it does provide a benchmark for comparison of those land use shown in Table III-19 above.

Table III-20
Water Demand for Various Types of Uses in the United States

Type of Use	Water Demand (gpd)
Single Family Home (per resident)	50-75
Multi-Family (per resident)	40
Apartments (per resident)	60
Hotels (with private baths)	60
Laundromats (per washer)	50
Service Station (per vehicle)	10
Schools (per pupil)	25
Restaurants (per patron)	7-10
Shopping Centers (per square foot)	0.015-0.18
Offices (per square foot)	0.070-0.084

Source: Principles of Water Resource Planning. Alvin S. Goodman, 1984.

Water Distribution Facilities

According to the Hi-Desert Water District, no additional wells are needed. However, further development of the Town will require pipelines to be extended to those areas from existing wells in the vicinity. It will be necessary for the District to conduct an analysis in order to determine the necessity of drilling additional wells to serve other areas. The pipe sizes within the Town for water distribution are determined by the District. If it is determined that water tanks are necessary to supply water to other areas of Town, then the District shall coordinate with those in need and be responsible to place facilities in the best and most feasible locations. Capacity of the water storage tanks are determined by the requirements of the District's specifications for design, fire flow requirements and reserve. The District shall be responsible for maintaining the tanks upon completion of construction.

Since development within the Town will incur financial and legal responsibilities for the construction of water system infrastructure, a method of financing and management will be implemented to maintain these facilities once built. Several financing and maintenance options can be used. There is potential to implement a Community Facilities District which would levy a special tax within the district to finance construction and maintenance. The final decision as to the financing mechanism will be made at a future stage of project design.

Overdraft Conditions

If the current overdraft condition remains and growth continues within the Town, impacts to domestic water supplies could be significant. Since the 1950's, extractions from the Warren Valley Groundwater Basin have exceeded its safe yield and have caused an overdraft condition. The groundwater table is currently being lowered by as much as 40 feet per year[38]. The shortage of a readily available long-term water supply has limited growth in the Yucca Valley area and has resulted in a water table decline of more than 200 feet during the past 50 years[39]. Due to this increasing overdraft problem, the Court ordered the Water Master to develop the Warren Valley Basin Management Plan to identify a solution to the issue. The Plan is based on a 50 year water supply planning horizon, starting in 1991. It is intended that the plan will be reviewed on an annual basis so that water supply planning functions 50 years ahead of water demands[40].

The entire community of Yucca Valley has and will continue to experience limitations on growth, restrained by groundwater conditions and water delivery limitations. The water management plan, adopted by the HDWD and ordered by the Court, limits water connections to two percent or 200 per year. Once the overdraft problem has been resolved, the Court may wish to increase the number of connections, or remove the number of connections. A certain level of growth and expansion is important for the community to remain economically vibrant and healthy. A locally strong economy will allow Yucca Valley and the HDWD to plan for future wastewater facilities. It is, therefore, desirable for the District to accommodate growth, within the limits of available water resources[41]

Wastewater

Currently, the Town of Yucca Valley does not have a wastewater treatment plant. However, if a wastewater treatment plant were to be constructed, impacts to groundwater could be minimized. Based on the feasibility evaluation mentioned above, phase one would have an average daily flow of 0.35 million gallons per day (mgd) and phase 2 would have a capacity of 1.34 million gallons per day (mgd). Treated water from phase 1 would be used to irrigate the Blue Skies Country Club golf course. If sufficient effluent storage facilities were available, then the phase 1 system could provide as much as 392 acre feet per year of the 585 acre feet per year of irrigation water required by the country club. Treated wastewater from phase 2 would be used for recharge in spreading basins to create a barrier. Up to 1,492 acre feet per year of treated effluent would be used for this purpose[42].

38 Final Draft Report, Warren Valley Basin Management Plan, Warren Valley Basin Watermaster, Yucca Valley, California, Prepared by Kennedy/Jenks/Chilton, January 1991.
39 Warren Basin Perennial Yield and Quantity of Groundwater in Storage, A Report for Hi Desert Water District, Prepared by Robert C. Fox, Consulting Engineering Geologist and John Egan and Associates, Inc., Consulting Engineers, August 1991.
40 Final Draft Report, Warren Valley Basin Management Plan, Warren Valley Basin Watermaster, Yucca Valley, California, Prepared by Kennedy/Jenks/Chilton, January 1991.
41 Hi Desert Water District, Water Supply Master Plan, Prepared by John Egan and Associates, Inc., Consulting Engineers, 1990.
42 Ibid.

According to the District nothing is concrete, however, this concept is still being considered and an additional engineering study is to be conducted to further determine the feasibility of constructing a wastewater treatment facility. This study will include a master plan for a wastewater collection and treatment facility. Although the master plan will be the end result of the study, a wastewater collection treatment facility is not foreseen in the near future. The District has stated that the master plan will be done and readily available when it is needed[43]. It should be noted that impacts to the groundwater may occur as a result of continued use of septic tank systems. These are discussed below under water quality.

Water Quality

The District tests the water in their wells for a variety of chemicals and have met stringent health standards established by the Federal Safe Drinking Water Act of 1974. The most important are total dissolved solids and nitrates. The maximum contaminant level allowed for total dissolved solids is 500 milligrams per litre (mg/l). Tests showed that total dissolved solids range between 119 and 125 mg/l with an overall average of less than 164 mg/l. The maximum contaminant level allowed for nitrate is 45 milligrams per litre. Additional tests showed that nitrate resulted in a range between 2.9 and 24.1 mg/l with an overall average of less than 10.88 mg/l[44]. However, in the event test results show non-compliance with a standard, the HDWD must take immediate action to correct the situation [45].

There are several sources of possible groundwater contamination, including failing septic tank systems, specifically leaching fields, and underground gasoline and oil storage tanks. Of the sixteen wells in the District, one is listed as being contaminated with high levels of nitrates due to failing septic system of a condominium project near the Blue Skies Country Club golf course. This well is currently not being utilized by the District and is to be removed[46].

As mentioned above, the Town is currently in an overdraft situation. With supplemental water being diverted to Yucca Valley to recharge the Warren Valley Groundwater Basin, there is potential for the groundwater in storage to increase. If the groundwater rises and comes into contact with septic tanks and leach fields, it could be potentially contaminated. Measures will need to be taken by the District if this were to occur. According to the District, if this happens, then the master plan for the wastewater collection and treatment plant will go into effect[47].

3. Mitigation Measures

The following are mitigation measures which are expected to mitigate any significant impacts to water resources.

- The Town shall promote and encourage the protection and wise utilization of the Valley's domestic water supplies to assure the long-term viability and availability of clean and healthful water resources.
- All existing and future developments shall be carefully analyzed by the Town and Hi- Desert Water District to determine the potential impacts of such activities on the local groundwater.
- The Town shall coordinate with the HDWD in requiring the use of low-flush toilets, and low-flow shower heads and faucets in all new construction in conformance with Section 17921.3 of the Health and Safety Code, Title 20, California Administrative Code Section 1601(b), and applicable sections of Title 24 of the State Code. The HDWD shall encourage the wise and careful use of the Valley's potable water resources, and the utilization of water conserving designs and technology to protect this vital resource.

43 Telecommunications with Roger Duran, Hi-Desert Water District Board Member, March 1994.
44 Water Notes, Hi-Desert Water District, June 1993.
45 Ibid.
46 Hi-Desert Water District, Marty Stockstell, Assistant General Manager of Operations, Yucca Valley, CA., August 1993.
47 Telecommunications with Roger Duran, Hi-Desert Water District Board Member, March 1994.

- The Town and Hi-Desert Water District shall encourage the use of drought resistant landscaping in public and private development as an important means of reducing water consumption for irrigation of lawns and gardens and delaying the need for additional pumping capacity and expansion of demand on the local water table. All development plans shall be required to adhere to the landscape requirements adopted by the HDWD and the Town.

- Wherever feasible, the Town shall encourage that the Hi-Desert Water District coordinate with the County of San Bernardino Flood Control District and encourage the replenishment of the Warren Valley Groundwater Basin through the use of recharge basins throughout the Town.

- The Hi-Desert Water District, Warren Valley Basin Watermaster and the Mojave Water Agency shall promote the use of State Water and actively participate in discussions regarding the purchasing and/or transferring of water rights from/to users outside of the area.

- The Town shall encourage the HDWD to continue to conduct studies to evaluate the feasibility of constructing a wastewater collection and treatment facility. Such study should include, but not be limited to, the location of the plant(s), type of plant(s), design flows, operation capacities, projections and project financing.

- In the event that a wastewater treatment facility is constructed to provide sewer service to the Town, the Hi-Desert Water District shall encourage the retirement of septic tanks and promote hook-ups to the municipal wastewater treatment system wherever possible.

- The Hi-Desert Water District shall maintain adequate capacities and capabilities at municipal wastewater treatment plant facilities and assure that discharges of effluent are sufficiently treated to meet the requirements of the California Regional Water Quality Control Board.

Mitigation Monitoring/Reporting Program

- All development proposals brought before the Town of Yucca Valley shall be reviewed by the Community Development Department to assess the potential for adverse effects on water quality and quantity. In addition, all developments proposals shall be required to mitigate any significant impacts. Said review shall occur during, and be documented in, the Initial Study.
  Responsible parties: Developer, HDWD, Town Community Development Department, Town Engineer

- The HDWD shall monitor, coordinate and cooperate with local, state and federal agencies to assure the protection of water resources from over-utilization and excessive extractions from the groundwater aquifer.
  Responsible parties: HDWD

F. Biological Resources

1. Existing Conditions

Data and information relating to the occurrence of biological resources in the Town of Yucca Valley and vicinity came from a variety of sources, including the biological resource assessment prepared by Tierra Madre Consultants, Inc.[48] (See Appendix D). Other sources of information included the US Fish and Wildlife Service, California Department of Fish and Game and the California Natural Diversity Data Base. The lands contiguous to the southern Town limits are largely those under federal management and occurring within the Joshua Tree National Park and therefore were not included in this analysis, although references to this highly valuable biological resource area are made throughout this section.

In addition to a comprehensive literature search, the biological resource consultants utilized personal observations of special-status elements that have been conducted in the area. These observations have included bird records offered by Michael Patten, and special-status elements reported from the area by the U.S. Fish and Wildlife Service (the Service's response is included in Appendix B of Appendix D). General plant communities expected to occur in the area are based on the author's survey experience, and discussions with Robin Kenehr, Bureau of Land Management Botanists (July 28,1993). Also of special importance to this region is the U.S. Fish and Wildlife Service's Recovery Plan for the Desert Tortoise.

The unique geographic and geophysical makeup of the Morongo Basin, of which the Town is a part, has established an environment for many diverse and occasionally highly specialized communities of plants and animals, which occupy ecological niches ranging from the desert saltbush scrub in the valley floor to the Mohavean pinyon-juniper woodland scrub region of the San Bernardino and Little San Bernardino Mountains (4,000 to 8,000 feet). The rocky hillsides between these two ranges are dominated by the Joshua Tree Woodland.

Native animal species occurring within the Planning Area are associated with the mountainous communities to the south and west, and with the desert regions in the remaining areas of Town. Both the desert and mountain ecologies are very fragile and highly interdependent. Both are highly susceptible to damage or disruption, the effects of which may last many years.

Reptiles are very common in the area. Within and immediately adjacent to the Planning Area are the known distributions of 42 different species (Zeiner et al. 1988). Some of the more common lizards include desert iguana, zebra-tailed lizard, desert collared lizard, desert spiny lizard, western fence lizard, side-blotched lizard, long-tailed brush lizard, desert horned lizard, desert night lizard, and western whiptail. Snakes include the ringneck snake, coachwhip snake, western patch-nosed snake, glossy snake, gopher snake, long-nosed snake, speckled rattlesnake, sidewinder, western rattlesnake, and the Mojave rattlesnake.

In addition to the many reptiles, there are many rare bird species in the Morongo Basin. Many common birds visit and are residents within the Planning Area. In 1982 the Bureau of Land Management estimated that 235 species of birds have been observed in the area, of which 71 species were estimated to breed there. Given the large number of birds that may occur within the Planning Area and adjacent areas, a listing within this document would not be practical. Some birds are mostly restricted to a particular plant community, others are more versatile and can range between habitat communities, some are seasonal visitors. In addition, some are even benefited by the presence of humans.

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[48] Technical Biological Assessment for the Town of Yucca Valley General Plan. Prepared by Tierra Madre Consultants, Inc. March-1994.

Zeiner et al. (1990) lists 59 mammal species with distributions encompassing the Planning Area, or found in the immediate proximity. The area is within the ranges of at least 12 common bat species. Also, small burrowing mammals that are common to the area include desert cottontail, jackrabbit, several chipmunks, antelope ground squirrel, California ground squirrel, pocket gophers, several varieties of pocket mice, kangaroo rats, various mice, and wild rats.

The larger mammals that occur in the general vicinity, which includes the Joshua Tree National Park, include coyote, kit fox, gray fox, ringtail, raccoon, striped skunk, spotted skunk, mountain lion, bobcat, and mule deer. Most of these larger animals are not common in residential areas, but may be expected in undeveloped, open-space areas, and will occasionally frequent slightly developed areas, such as those areas that occur in the northestern portions of the Planning Area.

Resource Areas

The Town of Yucca Valley and the vicinity support a variety of biological resource areas. Tierra Madre Consultants, Inc. has assigned three categories which rate these biological resource areas: Expected low, medium, and high biological resource values. These designations are by no means intended to be a disclaimer. For example, tortoises, LeConte's thrasher, and burrowing owls, may often occur in medium value habitat, and occasionally in low value habitat. Below are the definitions of these categorized biological resource areas. Exhibit III-9 identifies the location of these biological resource zones as well as locates proposed Open Space/Conservation areas. These resource areas, especially those with a high biological resource value, provide the most significant habitat in the area.

Low Biological Resource Areas

Those lands mostly along and south of Highway 62, where urban and commercial uses are most common are identified as low biological resource areas. In these areas most of the native scrub has been eliminated and many of the natural resources have been displaced. Non-native plant species, including ornamental shrubs and trees, and invasive annuals, such as mustards, Russian thistle, and grasses are common in these areas.

Larger mammals are excluded from such areas, although smaller mammals may be common on cleared and uncleared lots. Bird species tend to be either tolerant or dependent of humans, and those that are not are displaced. Tortoises and other scrub-associated special-status species have mostly been displaced, but may occur in isolated, undeveloped pockets of habitat. Isolated tortoises are effectively segregated from the breeding population, and it is entirely likely that these tortoises would be harmed, killed or even taken as pets. Vacant lots within these areas should still be surveyed for tortoises and other sensitive resources.

Medium Biological Resource Areas

These areas are mostly found north of Highway 62 along and east of Highway 247. In addition some of the periphery areas of the low value resource areas south of Highway 62 serve as medium biological resource areas. Residential development in these resource areas is comprised mostly of 2.5 to 5.0 acre lots. In these large lot residential areas some of the lots have had a majority of the native vegetation removed only around the house itself with the remainder of the lot left in its natural state, while other lots have been completely cleared.

Dogs and horses are relatively common in these areas, and have a potentially negative impact upon tortoises and other special-status species. Even so, the author has observed tortoises, sometimes in backyards, within such areas, and LeConte's thrashers are known to breed across dirt roads from occupied residences. Larger mammals may pass through these areas, and there is likely abundant prey available for them. Some birds may rely on the human presence, but others are typically associated with native scrub communities and are not displaced by human activity. These areas should definitely be surveyed for sensitive species, which may occur in many places, particularly when there are vacant lots contiguous to open, undeveloped desert areas.

High Biological Resource Areas

These areas are mostly undeveloped with very little scattered residential development present. The open-space areas proposed in this report and shown on Exhibit III-9 are prime examples of high biological resource areas. A majority of the scrub-associated species occurring in scrub and woodland habitats occur in these areas. Exhibit III-9 shows that much of the remaining, undeveloped areas within the Planning Area is considered to have high biological resource values.

Sensitive Species

Several species of plant and animals have been identified as sensitive to the loss of habitat and foraging areas due to urbanization or human activity. Appendix D lists all the plant and animal special-status species within and immediately adjacent to the Planning Area that are considered to be sensitive. The species included in this table are only those designated by the State or Federal Government as special-status species. Elements listed as sensitive by other groups such as the Audubon Society's "Blue List" or the California Native Plant Society's "Inventory" are not included in the table unless they are also designated by the State or Federal Government as a special status species.

A special-status species is so called "because of their limited distribution, restricted habitat requirements, particular susceptibility to human disturbance, or a combination of these factors" Tierra Madre Consultants, 1988.

Exhibit III-10 identifies and generally locates some of the special-status species in and around the Planning Area. Tables III-21, 22, and 23, below, summarize the more comprehensive information contained in Table 1 within Appendix D of this EIR. All three of the tables below list the species, as well as the associated habitat, elevation, and the detection period of these species. The species outlined in Tables III-21, 22 and 23 correspond with those located on Exhibit III-10. The tables are divided into three categories, "Plants and Communities" Table III-21, "Reptiles" Table III-22, and "Birds" Table III-23.

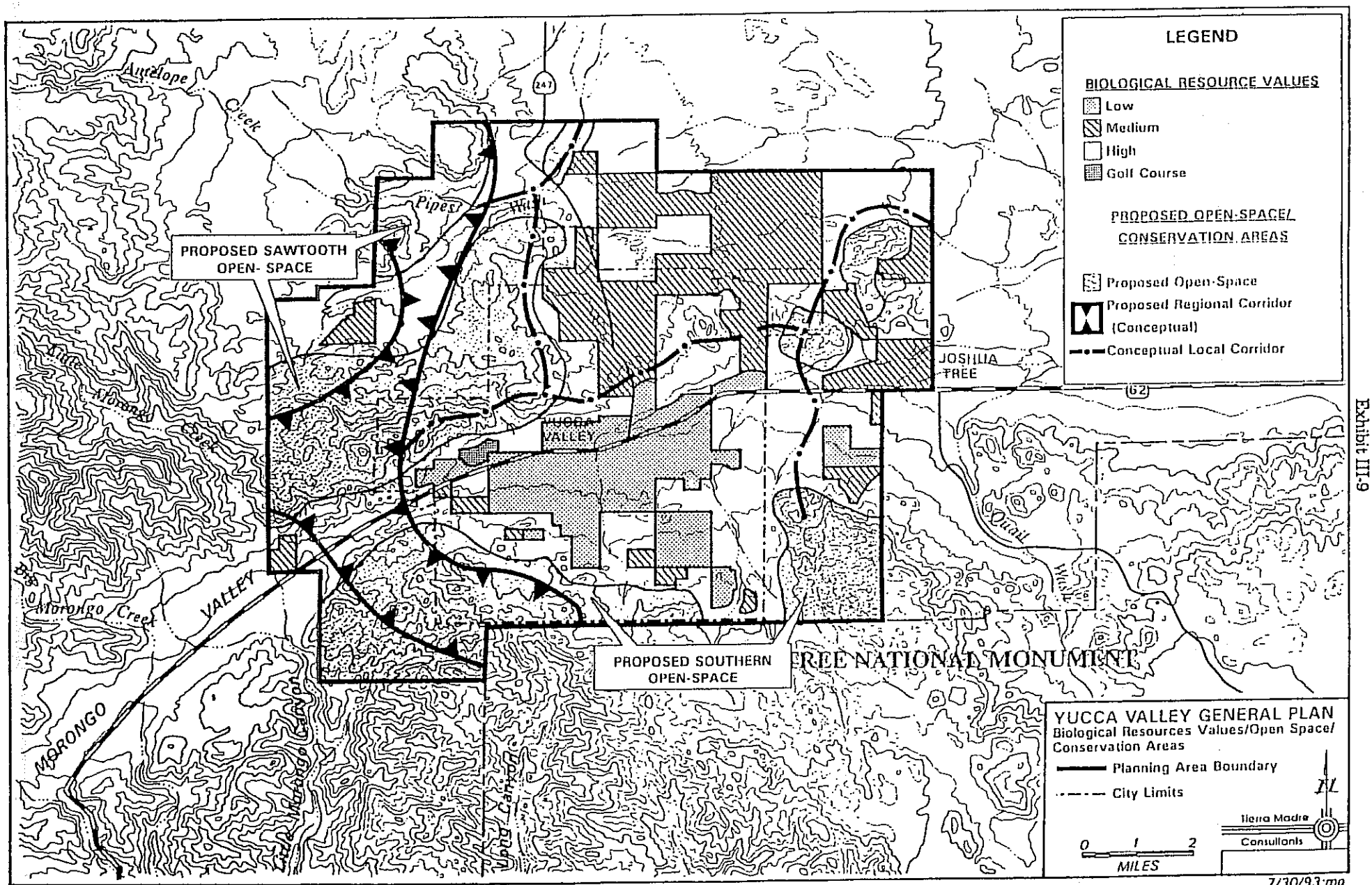


Exhibit III-9

TMC #93-040

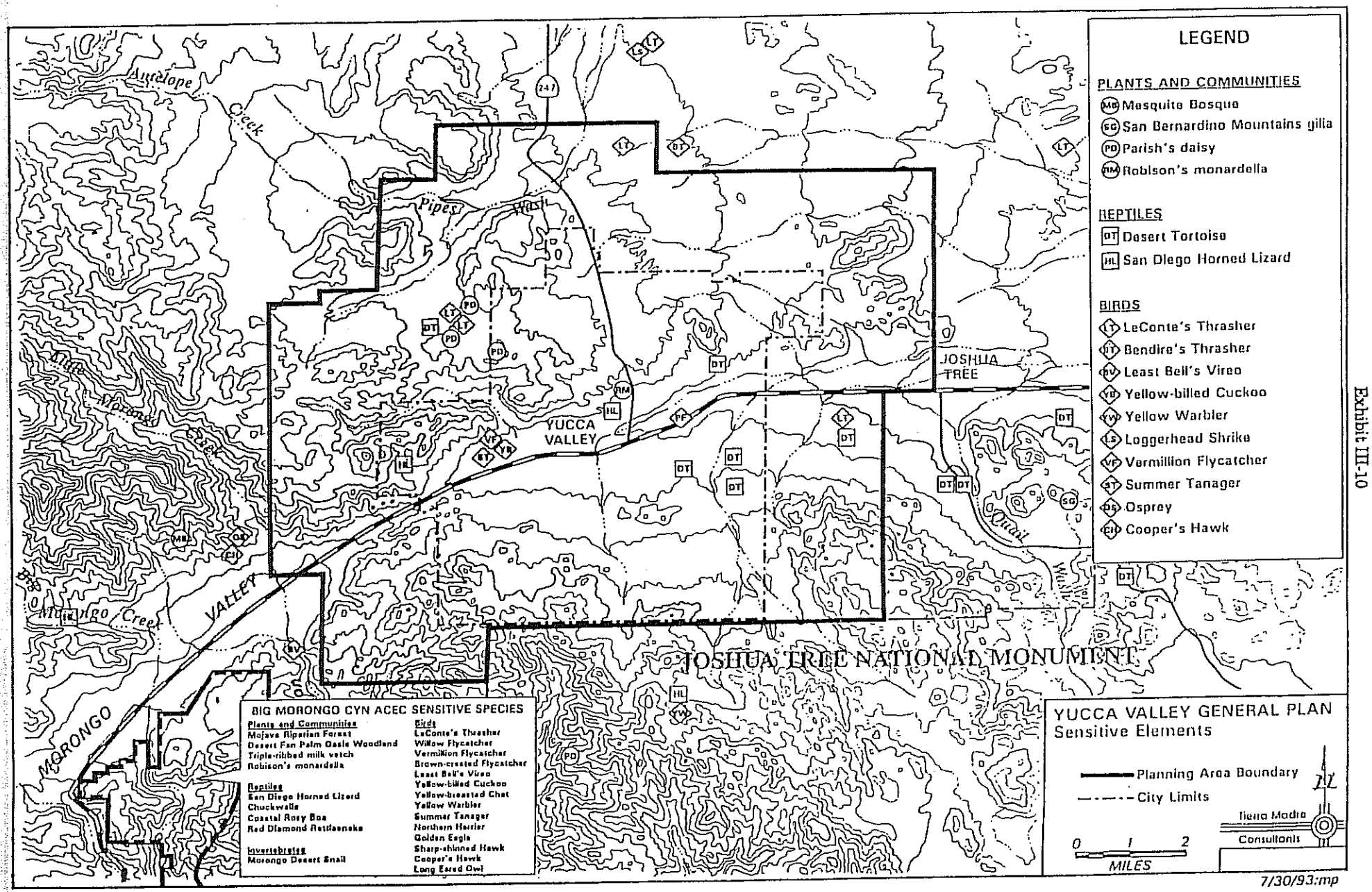

LEGEND
PLANTS AND COMMUNITIES
MB Mesquite Bosque
SG San Bernardino Mountains gilia
PD Parish's daisy
RM Robison's monardella
REPTILES
DT Desert Tortoise
HL San Diego Horned Lizard
BIRDS
LT LeConte's Thrasher
BT Bendire's Thrasher
BV Least Bell's Vireo
YB Yellow-billed Cuckoo
YW Yellow Warbler
LS Loggerhead Shrike
VF Vermillion Flycatcher
ST Summer Tanager
OS Osprey
CH Cooper's Hawk
Antelope Creek
Pipes Wash
Dale
Mesquite
Creek
YUCCA VALLEY
JOSHUA TREE
Quail
Morongo Creek
VALLEY
MORONGO
TOSHUA TREE NATIONAL MONUMENT
BIG MORONGO CYN ACEC SENSITIVE SPECIES
Plants and Communities
Mojave Riparian Forest
Desert Fan Palm Oasis Woodland
Triple-ribbed milk vetch
Robison's monardella
Reptiles
San Diego Horned Lizard
Chuckwalla
Coastal Rosy Boa
Red Diamond Rattlesnake
Invertebrates
Morongo Desert Snail
Birds
LeConte's Thrasher
Willow Flycatcher
Vermillion Flycatcher
Brown-crested Flycatcher
Least Bell's Vireo
Yellow-billed Cuckoo
Yellow-breasted Chat
Yellow Warbler
Summer Tanager
Northern Harrier
Golden Eagle
Sharp-shinned Hawk
Cooper's Hawk
Long Eared Owl
YUCCA VALLEY GENERAL PLAN
Sensitive Elements
Planning Area Boundary
City Limits
Tierra Madre
Consultants
0 1 2
MILES
7/30/93:mp
TMC #93-040

Table III-21
Sensitive Species of Plants and Communities

Species & Plants and Communities	Associated Habitat, Elevation, and Detection Period
1) Mesquite Bosque (MB)	No elevation or data provided.
2) Little San Bernardino	This community is found in Creosote bush scrub and Mountains Gilia (SG) Joshua tree woodland in the Little San Bernardino Mountains; 500 to 4,000 feet. Detected May.
3) Parish's Daisy (PD)	In the Planning Area, this community is found in pinyon-juniper woodland on quartz monzonite substrate, but mostly restricted to carbonate substrates on north slopes of San Bernardino Mountains; 3,500 to 5,000 feet. Detected May to June.
4) Robison's Monardella (RM)	Found mainly in the Pinyon-juniper woodland and about rocks in Joshua Tree National Park; no elevation given. Detected June.
5) Joshua Tree Woodland This community is found throughout much of the Planning Area and region. Elevation ranges from 2,500 to 5,000 feet.	(Not Mapped in Exhibit III-10)

Table III-22
Sensitive Species of Reptiles

Species	Associated Habitat, Elevation, Detection Period
1) Desert Tortoise (DT)	Tortoises are found in burrows in creosote bush scrub, Joshua tree woodland, saltbush scrub, and maybe pinyon pine below 5,000 feet elevation. Tortoise sign can be detected year round, particularly from late March through early June.
2) San Diego Horned Lizard (HL)	Found in scrubland, grassland, coniferous forests, and broadleaf woodland. Most readily detected from April through August, occasionally in September and October: may be confused with desert horned lizard.

Table III-23
Sensitive Species of Birds

Species	Associated Habitat, Elevation, Detection Period
1) LeConte's Thrasher (LT)	Nests and forages in sparse creosote bush scrub and Joshua tree woodland., particularly along washes. Detected uncommonly throughout the year.
2) Bendire's Thrasher (BT)	Nests and forages in Joshua tree woodland with scattered shrubs and patches of grassland, mostly in the east Mojave Desert, only uncommonly in the Joshua Tree National Park. Detected fairly commonly from late March through mid-July; and casually from early to mid-August.
3) Least Bell's Vireo (BV)	Nests and forages in willow thickets and other dense, low riparian growth, along permanent or near permanent streams. Detected rarely from mid-March through early September.
4) Yellow-billed Cuckoo (YB)	Nests and forages in dense riparian groves, particularly with a dense understory of willow or mesquite. Detected uncommonly June through August; and, rarely in late May and early to mid-September.
5) Yellow Warbler (YB)	Nests and forages in riparian woodlands. Commonly detected in riparian areas during May, and late-August to mid-September; uncommonly from mid-April, from mid-June to mid-August, and from late September to mid-October; and rarely from late October to mid-November.
6) Loggerhead Shrike (LS)	Nests in vegetation often slightly taller than surrounding scrub or grassland, and forages in adjacent areas. Detected fairly commonly throughout the year.
7) Vermillion Flycatcher (VF)	Nests near water in both riparian groves and mesquite with bordering fields. Rarely detected throughout the year.
8) Summer Tanager (ST)	Nests and forages in mature riparian groves dominated by cottonwoods. Detected uncommonly from early May through mid- September; rarely in late April, and mid-September to mid-October; and casually in mid-April, and late October to late November.
9) Osprey (OS)	Nests in tree tops near large bodies of water, and feeds exclusively on fish. rarely detected April, September, and October; casually detected during other months of the year.
10) Cooper's Hawk (CH)	Nests in Mojave Riparian Forest in Big Morongo Canyon, and forages over native scrub areas and in residential areas. Uncommonly detected year round; fairly commonly in mid-

	September to October.
11) Praire Falcon (PF)	Nests on cliff faces and rugged mountainous areas, and forages over fields and native desert scrub. Uncommonly detected throughout the year.

In addition to the species listed in the three tables above, there are other regionally significant species that may occur in the Planning Area. This more regionally oriented list is broken down into the same categories as the tables above. Plants and communities species include the Triple-Ribbed Milk Vetch, the Desert Fan Palm Oasis, and the Mojave Riparian Forest. Invertebrates include the Morongo Desert Snail. Reptiles include the Coachella Valley Fringe-Toed Lizard, Coastal Rosy Boa, the Red Diamond Rattlesnake, and the Chuckwalla. Birds include; the Sharp-Shinned Hawk, the Golden Eagle, the Ferruginous Hawk, the Norther Harrier, the Long-Eared Owl, the Burrowing Owl, the Willow Flycatcher, the Brow- Crested Flycatcher, and the Yellow-Breasted Chat. Mammals include; the Spotted Bat, the Townsend's Big-Eared Bat, the Pallid Bat, the Pocketed Free-Tailed Bat, and the Nelson's Bighorn Sheep.

2. Project Impacts

The direct results of continued development in the Town of Yucca Valley will have the cumulative effect of removing native animal and plant species, removal of breeding and foraging habitat, and the introduction of non-native plants and animals which may compete with native plant and animal species for the remaining habitat. Intrusion of non-native species, and their impact upon the native habitat has been well documented in the Morongo Basin and elsewhere. Cumulative impacts are also discussed in Section VIII.

The greatest threats to biological resources is the development and/or over utilization of sensitive resource areas, specifically within the Planning Area, this means the medium and high resource value areas. Exhibit III-9 identifies these areas, which are mainly comprised of the areas to the north and south of the developed community adjacent to Hwy 62. In addition to the medium and high resource value areas there are areas proposed by Tierra Madre Consultants as Open-Space/ Conservation Areas. These areas incorporate a conceptual regional corridor and conceptual local corridors. Exhibit III-9 also illustrates these proposed open space and conceptual wildlife corridors. As illustrated in Exhibit III-9 these open space/ conservation areas and conceptual wildlife corridors are located in the undeveloped and mostly mountainous areas of the Planning Area. Development or a concentration of recreational uses in these areas could greatly diminish the utilization of these sensitive habitats by the regional and local species. This is especially true for the proposed regional and local wildlife corridors. In order for these corridors to function as travel routes for ground based species there must be unobstructed natural habitat.

Presently, the areas along the Planning Area boundaries and some washes are impacted by the relatively unregulated use of off-road vehicles which have a devastating impact on the fragile desert ecology where loose soils are always a difficulty for plants to contend with. Whether off-road vehicle use, or other intense uses are permitted within these resource areas, they pose a significant threat to the long-term viability of this important habitat which supports the Desert Tortoise, the San Diego Horned Lizard, the Cooper's Hawk, and foraging habitat for the golden eagle and other sensitive species. Exhibit III-10 (Plants and Communities, Reptiles, and Birds Location) identifies siting locations of sensitive species within the Planning Area.

Threats to the mountainous resource areas from continued urbanization include further hillside development and encouraged human intrusion into the resource area in a manner incompatible with species living and foraging in the mountain habitat. Off-road vehicles, particularly mountain bikes which have the potential to startle and pose a significant stress to the bighorn sheep, constitute a significant potential impact to this sensitive species. The Big Morongo Canyon is located about three (3) miles to the southwest of the Planning Area and is an important

water source for the many sensitive species in the region (see Exhibit III- 10), especially during the dry, hot summer months. Their willingness to visit the water source will be discouraged if human intrusion is permitted, particularly during this critical period. Nesting sites of the prairie falcon and golden eagle which occur on the rocky cliffs of the canyons would also be adversely affected and forced to seek nesting sites elsewhere if intrusion by development and unregulated human use is permitted.

The proposed "Preferred Alternative" has designated the majority of the mountain areas within the Planning Area as H-R (Hillside Reserve), which permits only residential development at one dwelling unit per 20 acres. Other portions of the mountainous areas and those areas that are proposed as open space/conservation areas as well as medium and high resource value areas are designated with a variety of land uses with the majority being residential with densities ranging from one (1) dwelling unit per 10 acres to 5 dwelling units per acre. No biological resource areas on the valley floor have been identified for areas of native habitat preservation, nor have potentially significant resource areas been identified.

3. Mitigation Measures

It is the expressed goal of the General Plan to protect and preserve the Town's biological resources, especially those sensitive, rare, threatened or endangered species of wildlife and their habitats. Policies of the General Plan include specific steps to preserve the long-term viability of sensitive habitat and species. Land use designations have been established which permit development, but at an intensity which is likely to be compatible with the Planning Areas sensitive species, assuming certain restrictions are placed on development in some of these areas. Also, in areas that have been identified as having a high resource value, special development policies will be created in order to preserve and enhance the biological resource in these areas.

Within the Planning Area there are currently lands under public ownership and management of the Bureau of Land Management (BLM), the State Department of Fish and Game, the Burns Pinon Ridge Reserve. ELM lands within the Town boundaries coincide with the areas of steep terrain, which have been designated R-HR 20, one (1) dwelling unit per twenty (20) acres and/or very low residential densities. See Map No. 2 within Appendix D. Consultation with the BLM did not indicate a need for these lands to be designated as open space. However, in the future the Town and the BLM should consult on the possible assignment of more restrictive land use designations, for example, open space, which would preclude development in these areas entirely.

A species of special concern with the Planning Area is the desert tortoise. The desert tortoise is protected under the Federal Endangered Species Act. The State and Federal listing information and desert tortoise life history are included in Appendix A of Appendix D. As a State designated threatened Species, the tortoise is protected by the State Endangered Species Act, and must be addressed as a CEQA issue. Without appropriate precautions, tortoises may be killed by construction activities, and occupied tortoise habitat may be lost.

Within the Planning Area, tortoises may be encountered in many places, such as backyards and under houses. In several areas most likely to contain the desert tortoise, development proposals must be accompanied by a specific plan of land use, which will provide opportunities for the coordinated management of tortoise and other habitat in conjunction with development planning.

These areas are in section 5 and 32 along the central eastern boundary of the Planning Area. Through the specific plan process the careful planning of the development recognizing the sensitive biological resources will allow the development to occur and should be able to avoid adverse significant impacts to the significant biological resources. Tortoise surveys and other biological resource assessments are expected to be a part of any development planning activity in these areas.

In addition to the mechanism afforded by the Specific Plan process providing protection to sensitive biological

resources in the eastern boundary areas of the Town's limits, the Covington wash can also provide protected and enhanced habitat. This wash has been the subject of regional flood control planning and is proposed to be managed flood plain capable of providing enhanced habitat for a variety of wildlife. This would provide opportunities for the preservation and enhancement of the biological resources in these areas. The wash is also expected to function as a wildlife corridor for the tortoise and other species.

The following general mitigation measures are also recommended and are reflected in Policies set forth in the Biological Resources Element and elsewhere in the General Plan.

- Development proposals in the vicinity of sensitive habitat and/or species sightings shall be required to be accompanied by a biological resource assessment prepared by a qualified biologist to determine the potential impacts on resources, and recommend appropriate mitigation measures.

- In order to protect and preserve sensitive hillside areas, especially those which serve as foraging habitat and important migratory corridors, developments within areas designated as R-HR on the General Plan shall be limited in the amount of grading that may occur on site and the amount of fencing which may be installed. Uncontrolled roaming or foraging by domestic animals in these areas shall be restricted. Maximum disturbance shall be limited to 20% and should be contiguous. Fenced areas, which shall be incorporated into the 20% disturbed area shall be secure and preclude domestic animals from access into undisturbed and unfenced areas.

- The Town shall draft a "minimum requirements for tortoise reports" to ensure that the reports utilized for the assessment, enhancement and preservation of the tortoise and its habitat will be adequate and complete and in compliance with State and Federal regulations pertaining to the State and Federal Endangered Species Act.

- The Town shall continue its participation in the implementation of the Western Mojave Coordinated Management Plan (West Mojave Plan), which is being drafted by the BLM. The effect of the West Mojave Plan on Town planning cannot be fully ascertained until the plan is completed and adopted.

- The Town should consider the development an impact mitigation fee program to help fund the purchase and management of unique or sensitive biological resource areas occurring on private lands, including habitat of the desert tortoise. It is anticipated that the West Mojave Plan will likely be fee-based.

- To enhance sensitive and non-sensitive habitats, encourage the use of native trees and shrubs in project landscaping, including those most common to the "Joshua tree woodland," which is the most dominant plant community within the Planning Area. See page 4 of Appendix D, "Common Plant Communities" for a complete list of appropriate native plant species.

- The Town should cooperate in the on-going management of biological resource areas with the Bureau of Land Management, California Department of Fish and Game, and other local jurisdictions to assure a coordinated effort to protect the long-term viability of these resources.

G. Cultural Resources

Introduction

Cultural resources are an integral part of any community. Their identification and protection provides the community with a meaningful sense of its own history and heritage. Cultural resources in the Morongo Basin Region, which encompasses Yucca Valley, include Native Indian settlements and sites that were established before the arrival of European-Americans and following this period, the historical features and locations from

the early settlement and development of the area.

A study of the area was conducted and report was prepared which is included in this document as Appendix B. An extensive data and background search was conducted that included records searches at the San Bernardino County Museum Archaeological Information Center and the Tomas Rivera Map Library, and UCR. In addition, drive through and spot field checks were also performed in the planning area.

1. Existing Conditions

Archaeological studies and surveys are typically conducted to satisfy the requirements of current county, State (CEQA), and federal (NEPA) laws and guidelines concerning the identification and preservation of prehistoric and significant historic sites on property proposed for development. These studies and surveys include the review of the records of the California Archaeological Inventory (CAI), the archaeologic, ethnographic, and historic literature pertinent to a specific area, and an on-site survey of the specific area.

In order to understand Indian cultures prior to the period of European contact, archaeologists have developed a chronological framework that goes back some 12,000 years. This framework is based upon artifacts and site types. There are five distinct time periods that have consistent artifacts and site characteristics applicable to the Yucca Valley area. The periods and their estimated chronological time spans are listed below.

- Lake Mojave Period: 12,000 years ago to 7,000 years ago.
- Pinto Period: 7,000 years ago to 4,000 years ago.
- Gypsum Period: 4,000 years ago to 1,500 years ago.
- Saratoga Springs Period: 1,500 years ago to 800 years ago.
- Protohistoric Period: 800 years ago to European contact.

The prehistoric record of human habitation in the Morongo Basin is not exactly known. However, it is likely that the Native Indians historically common to this area have utilized the planning area, and certainly some of the surrounding areas, as far back as the Lake Mojave Period. Artifacts common to all of the prehistoric periods have been located within or very near the planning area.

The Native American group that occupied the general area surrounding the planning area during the later prehistoric and historic times was the Serrano tribe. The Serrano homeland was a large area encompassing the San Bernardino Mountains, including Cajon Pass on the west, San Gorgonio Pass on the south, Twentynine Palms on the east, and encompassing Lucerne Valley on the north. Exact tribal boundaries are impossible to assign but they have been approximated by various anthropologists based on linguistic evidence rather than real political or territorial claims[1].

The Indians that inhabited this area, in fact, did not have a single name that referred to them as a single all inclusive tribe. There collectiveness was determined by lineage and divided into clans. The clans were grouped into two main divisions, of Serrano social organization. These divisions, or moieties, were known as the Wildcat and Coyote moieties.[2]

Appendix B delineates the Serrano territorial boundaries and the general locations of these two Moieties. Individual clans did have territories that each considered their own. These were lands they considered theirs for purposes of hunting game and gathering food and other necessary resources. Interactions among the various tribes was very common for the purposes of trade, intermarriage, and performing various ceremonies.

[1] Cultural Resources Element, Yucca Valley General Plan, San Bernardino, Bruce Love, CRM TECH., August 19, 1994.
2 Ibid

A thorough records search at the Archaeological Information Center at the San Bernardino County Museum provided an inventory of archaeological sites within the planning area. Sites include "recorded sites" and "pending sites," recorded sites being those that are duly recorded and recognized by the State. "Pending sites" are those sites that have not yet been recorded with the State. Undoubtedly, there are dozens if not hundreds of sites, historic and prehistoric, known to the local residents of Yucca Valley and vicinity that have never been officially recorded. Within Appendix B, page six (6) is a list of all the recorded sites within the planning area.

In total there are currently (1993) twenty-two (22) recorded sites and three (3) pending sites in the planning area. There are a variety of types of archaeological sites that are likely to be found in or near the planning area. These sites are divided into two categories, "historic" and "prehistoric." Historic sites are the remains of human activities that took place during the period after initial European contact. Prehistoric sites are remains from the period of Indian occupation prior to European contact[3].

The following is a brief summary of the various types of archaeological sites typical to the region. For a more comprehensive definition of these various archaeological sites please refer to Appendix B.

Prehistoric Sites

Village Sites: These sites are areas occupied for extended periods of time, recognized by deep rich deposits of dark, organic and ashy soil filled with artifacts and plant and animal remains. These are the most significant kinds of sites.

Campsites or Temporary Habitation Sites: These sites are similar to village sites in that there is a variety of types of artifacts but these sites are shallower with fewer items.

Food Processing Sites or Milling Stations: Milling stations are areas where grinding or pounding was performed on food materials.

Rock Art Sites: There are three basic types; pictographs, petroglyphs, and cupule boulders.

Lithic Reduction Sites or Lithic Workshops: Lithics, meaning rocks, and reduction refers to the practice of reducing stone material to useful shapes.

Lithic Quarries: Quarries are bedrock outcrops of certain kinds of rock that were particularly valuable to the Indians for their tool-making potential.

Sparse Lithic Scatters: These are the remains of stone chipping activities.

Pot Drops: Pottery fragments that come from the breakage of a single vessel.

Aboriginal Trails: The remains of Indian trails that often represent important travel corridors.

Historic Sites

Any evidence of human activities older than 45 years can technically be called a site.

Homes or Ranches: Remains of historic homes or ranches may include remnants of house foundations, out buildings, wells, rock walls, fences, and other features associated with living activities.

Mining Sites: Mining sites range from whole districts with mine shafts and milling equipment to minor prospects with only shallow pits.

[3] Ibid.

Trash Dumps or Can Scatters: Trash that can be accurately dated.

Roads and Trails: Historic roads are important markers of transportation and movement between economic centers.

Recorded and pending sites located within the planning area provide a sample cross-section of various types of archaeological sites, although some major site types are missing. There are no village sites or rock art sites recorded; nor have any mining sites been listed. However, just outside of the planning area there are two (2) major village sites that exhibit characteristics that are associated with permanent habitation for long periods of time. One is the well known village and rock art site around Coyote Hole Springs south-east of Joshua Tree. The other one centers around Morongo Lakes at the head of Little Morongo Canyon, just two and one-half mile the western Town boundary.

Most springs will almost certainly have and associated archaeological site, and probably some historic construction as well. Other surrounding springs that are likely locations for fairly significant archaeological sites include Chaparrosa Springs, west of Pioneertown and Rattlesnake Springs, on the border with Joshua Tree Park[4].

Approximately sixty (60) cultural resource surveys have been done within the planning area. These archaeological studies have ranged from linear surveys along a water district improvement right-of-way to a rather large 460 acre survey along Skyline Ranch Road. The majority of these surveys were negative for cultural resources. Typically an area was surveyed by a field archaeologist and nothing was reported. However, the San Bernardino County Museum Archaeological Information Center has called into question the adequacy of most of these reports. The majority of them were conducted during the 1970's, many by the Museum itself, but these surveys were performed using field methods that today would be called sub-standard. Today's standard method of systematic walking transects in evenly spaced parallel lines was not employed. Historic sites were virtually ignored twenty years ago[5].

Cultural Resource Probabilities

The following predictions of various cultural resource types and their potential of occurring within the planning area are based on the foregoing review of the existing literature and a "windshield" survey of the planning area by the archaeology consultant[6]. Virtually any parcel of land within the General Plan Study Area has the potential to contain historic sites. But the types of sites that can be predicted vary according to their location.

Historic Buildings

Historic buildings are most likely to be found at the heart of Yucca Valley, especially on either side of Highway 62. These would be the structures most likely associated with the early development and growth of the Town. Although the cut-off age for listing a structure as a historical site or building is 45 years of age, it should be remembered that being 45 years old does not make a building a significant historic structure, however it does mean that the building needs to be evaluated.

Remains of Buildings

In Pipes Wash, near Old Woman Springs Road, there is an old cement and rock foundation associated with a gate, fence posts, and other remains from, apparently, an early ranching or homesteading operation. This particular site is unrecorded and it may or may not be significant, depending on its association with an important person or event or period of history or whether it has unique characteristics such as first, oldest, last remaining example of its kind, unique style, or other features that might put it into a category of significance. Remains similar to this are frequently found in wash and drainage areas where there is shallow groundwater accessible by hand dug wells.

[4] Ibid.
[5] Ibid.
[6] Ibid.

Roads and Trails
Roads and trails also qualify as historic sites. The 1893 San Bernardino Forest Reserve Plan shows a wagon road in Morongo Valley heading northeast and entering the Yucca Valley planning area in approximately the same location as present-day Highway 62. Remnants of this wagon road may be visible in portions of the planning area. In order to preserve such information for future historians and the general public alike, proper recording would be necessary.

Mining designations on USGS topographic quad sheets show several "prospects" within the planning area and the surrounding region. Most of these are in the rugged mountains and canyons in the eastern part of the planning area. There is one identified on the USGS topographical map in the Bartlett Mountain area. Remnants of the mining operations provide important information regarding the early history of Yucca Valley.

Prehistoric Sites

Clearly, the most significant prehistoric habitation sites exist near springs. But other sites, also significant, may occur far from any water sources. For example, lithic quarry sites, food processing sites, or rock art sites. Literally every vegetation and geologic zone within the planning area was utilized and exploited at one time or another by the Serrano Indians. The present day location of sites exhibiting evidence of prehistoric activities largely depends upon what types of activities were occurring at that site. In the flat sandy slopes of the northeast quadrant of the planning area, there are probably no habitation sites, but the wild grasses, creosote bushes, and Joshua Trees were surely used as resources. Evidence to that effect may only remain in the occasional grinding stone, milling feature, pot drop, or lithic scatter.

Habitation Sites
Within the planning area there are no village sites matching the significance of the two villages that are just outside the planning area. However, lesser habitation sites certainly do exist. The highest probability for these sites will be near springs, of which a number exist within the planning area, especially in the east and south-east mountainous zones. Other habitation sites are known to exist in the Pinyon-Juniper regions also in the eastern and southeastern area. These sites would most likely be used the Native peoples as seasonal camps during the harvesting seasons.

Food Processing Sites or Milling Stations
These sites can occur anywhere there are boulders or exposed bedrock. The only place in the planning area where these sites are not likely to occur are on steep slopes like the rugged southern face of the Mick's Mountain region or the slopes of Bartlett Mountain. Also the sandy flat areas in the north and east are unlikely to have milling features because of the lack of boulders or bedrock outcrops.

Rock Art Sites
These sites are especially likely to occur on basalt outcrops. The particular quality of the patina, or varnish, that develops on basalt, was prized by prehistoric people for producing artwork. Flat Top Mountain and the steep rocky sides of Pipe's Wash are very likely candidates to have some type of rock artwork.

Lithic Reduction Sites or Lithic Workshops
These are usually associated with either habitation sites or near a lithic quarry. These reduction sites or workshops most likely exist in many areas of the planning area.

Lithic Quarries
These areas occur only where there are exposed parent rocks of usable and desirable material. The basalt area in the northwest quadrant of the planning area would be highly desirable material for stone tool manufacture. There is a high probability for a quarry site of granitic material, probably diorite, right off of Avalon Avenue

north of the flood control channel.

Sparse Lithic Scatters
These unique kinds of archaeological sites, consisting of any number of flakes from three to dozens or even hundreds of pieces of stone debitage, can occur anywhere in the planning area except probably on very steep slopes.

Pot Drops
Scatters of broken pottery, not associated with habitation areas, are, like the sparse lithic scatters, likely to appear anywhere the indigenous peoples traveled.

Aboriginal Trails
Ancient trails are important resources for reconstructing transportation and communication routes. They connect areas of high population and help archaeologists reconstruct prehistoric social and economic systems. Most likely, the vast majority of these routes have been obliterated by modern roads and highways that follow the same routes, but occasionally they can be found leading to important gathering areas or remote habitation areas far from modern transportation routes. Their predictability is low because they can exist on rather surprising landscapes, but generally they follow canyons and arroyos, in the same way that modern roads do.

2. Project Impacts

The objectives of a cultural resource assessment are to locate, interpret, and evaluate indications of past human activities and to provide recommendations for the mitigation of potential adverse impacts to cultural resources as necessary. The scope of the study concerned all archaeological and historical materials 45 years of age or older. The forty-five (45) years is the cut-off for potentially being historically significant.

According to Appendix K of the California Environmental Quality Act (CEQA) Guidelines[7] cultural resources must be evaluated for their importance or significance. CEQA articulates, the criteria of an "important archaeological resource is one which:

A. Is associated with an event or person of:
   1. Recognized significance in California or American history, or
   2. Recognized scientific importance in prehistory.

B. Can provide information which is both of demonstrable public interest and useful in addressing scientifically consequential and reasonable or archaeological research questions;

C. Has a special or particular quality such as oldest, best example, largest, or last surviving example of its kind;

D. Is at least 100 years old and possesses substantial stratigraphic integrity; or

E. Involves important research questions that historical research has shown can be answered only with archaeological methods.

Based on the findings of the record searches, literature searches and field surveys, it is clear that the planning area has had evidence of cultural resources.

7 California Environmental Quality Act-Statutes and Guidelines. Prepared by the Governor's Office of Planning and Research, State of California. June 1992. Appendix K: Archaeological Impacts.

For other projects that may be proposed in the future within the planning area careful consideration should be given to cultural resources. Archaeological investigations should be conducted on all future projects within the planning area if deemed appropriate and necessary at the initial study stage. Since the general area was known to be the home of the Serrano Native American group, there is the potential for buried cultural resources to be found in the area in the future. Similarly, there may be important historic resources which have not been covered or developed over and may be found during development. Therefore, mitigation measures are recommended for potential impacts to these important and expected resources.

3. Mitigation Measures

Given the potential of lands within the Town and planning area to harbor potentially important prehistorical and historical archaeological resources, it is essential that preliminary review be given to each development proposal to determine the potential for impacts to these resources. Their protection and preservation thereby assures the further recordation, maintenance and continuity of the Morongo Basin's cultural heritage and enriching the cultural heritage of the Town's residents. Specific mitigation measures which should be implemented are as follows:

- A comprehensive cultural resource data base shall be developed utilizing resources from the Archaeological Information Center at the San Bernardino County Museum, General Land Office Survey plats and original resources to be developed in the future.

- Town Planning staff shall maintain and periodically update the archaeological resources probability map, in coordination with the Archaeological Information Center at the San Bernardino County Museum. Record maintenance should include the mapping of sites that have been surveyed and assigned trinomials, as well as pending sites. Information should remain confidential and should not be made available indiscriminately in order to protect resources against disturbance and vandalism.

- Individual development proposals will be reviewed and evaluated to determine potential impacts to identified and suspected cultural resources of potential importance or significance to determine appropriate mitigation measures, where necessary.

- The Town shall, in cooperation with local historical societies or the Community Services Commission, work to identify and secure resource and site assessments of important historical sites and shall have these sites recorded and properly catalogues, as appropriate.

- Recognizing the potential occurrence of aboriginal archaeological resources at unexpected locations, the Town shall require that if such potential resources are discovered during construction, development shall cease and a professional archaeologist shall be employed to examine and document the resources and determine appropriate mitigation measures.

- The Town shall encourage the continuation and expansion of Federal and State programs which provide tax and other incentives for the rehabilitation of historically or architecturally significant structures.

Mitigation Monitoring and Reporting

- The Town shall institute an annual review of the Cultural Resources reference materials and shall update records and resource inventories maintained at the Town.
  Responsible parties: Community Development Department, Archaeological Information Center.

- Potential impacts of development on cultural resources shall be evaluated through the Initial Study

review process, and impacts shall be clearly documented and mitigation measures recommended where appropriate.
Responsible parties: Developer/Consulting Archaeologist, Community Development Department, Archaeological Information Center.

- The Town shall establish a citizen's advisory committee which shall assist the Community development Department in the development of a cultural resources data base and establish criteria for the selection, protection and preservation of identified cultural resources.
Responsible parties: Community Development Department, Town Council.

H. Air Quality

1. Existing Conditions

The air quality of a particular locale is based on the amount of pollutants emitted and dispersed, and upon climatic conditions that may reduce or enhance the formation of pollutants. In the Yucca Valley area, the responsibility for establishing criteria by which air quality is measured rests with the Mojave Desert Air Quality Management District (MDAQMD).

The Town of Yucca Valley, in relation to other areas in Southern California, essentially has good air quality. In the past few decades noticeable deterioration of air quality has occurred, however, due to increased development and population growth, traffic, construction activity and various site disturbances. It is apparent that although air pollution is emitted from various sources in the Morongo Basin, the most evident degradation of air quality may be attributed mainly to sources outside of the area, including Los Angeles County and other portions of San Bernardino County.

Pollutants are generally classified in two categories, primary and secondary. Primary pollutants are those which are a direct consequence of energy production and utilization, while secondary pollutants are those which undergo chemical changes after emission. Primary pollutants typically affect only local areas, and do not undergo chemical modification or further dispersion. Secondary pollutants, on the other hand, do disperse and undergo chemical changes under conditions of high ambient temperatures and high rates of solar insolation. Primary sources and their pollutants are a direct consequence of the combustion of petroleum and other fuels resulting in the production of oxides of carbon, sulphur, nitrogen, and a number of reactive hydrocarbons and suspended particulates. Principal secondary pollutants are termed oxidants and include ozone (03), peroxynitrates, nitrogen dioxide (NO_2), and chemical aerosols.

<u>The Mojave Desert Air Quality Management District</u>
Air quality planning in the region is directed at meeting ambient air standards set by the Federal Environmental Protection Agency (EPA) and the California Air Resources Board (CARB). Each State Implementation Plan is designed to meet ambient air quality standards by the deadlines specified in the Federal Clean Air Act (CAA) and emission reduction targets of the California Clean Air Act (CCAA). These Acts base the extent of required emission reductions and the length of time to attain standards on the severity of a District's pollution.

The State Legislature enacted Assembly Bill 2595 in 1989, which became known as the California Clean Air Act, in order to assure that the future health and welfare of the people of the State of California and the State's environment and economy are protected, regardless of action or direction from the federal government.

The California Air Resources Board, which shares the primary responsibility for air quality management in the State, has taken a committed approach to expeditious implementation of the Act[8]. The CARB has been entrusted with an overseer role, to advise and evaluate local air pollution control agency and District efforts to comply with CCAA requirements.

The Town of Yucca Valley is located within the portion of the South East Desert Air Basin (SEDAB), which previously was regulated by the San Bernardino County Mr Pollution Control District. In past years, the area was transferred to the South Coast Air Quality Management District (SCAQMD), and then back to the San Bernardino County Air Pollution Control District with revisions to District boundaries[9].

As of July 1, 1993 the Town of Yucca Valley was included in a new air quality management district. Several desert area communities coordinated the establishment of this new district, called the Mojave Desert Air Quality Management District (MDAQMD). This District was officially instituted to contain a portion of the Mojave Desert region, including the following cities: Needles, Barstow, Adelanto, Victorville, Apple Valley, Hesperia, Twentynine Palms and Yucca Valley. Several other cities have indicated interest in the new District[10].

The Mojave Desert region is a geographical and meteorological area wholly contained within the Southeast Desert Mr Basin. The region currently has air pollution problems caused by the transport of air pollution from upwind districts and by the growing number of motor vehicles and numerous stationary sources, and atmospheric and meteorological conditions which are conducive to the formation of a variety of pollutants[11]. The reasoning behind the development of this District was the assurance of effective control of air pollution in the region through greater coordination between air quality management decisions and the land use and transportation decisions of local governments within the region.

The existing boundaries, responsibilities, regulations and resolutions of the San Bernardino County Air Pollution Control District have essentially remained the same, however they are now implemented by the MDAQMD, which was instituted as an autonomous rather than a county agency. The participating cities have established a governing board consisting of eleven members. Eight of these members are representatives of the participating incorporated cities, and the remaining three are County representatives. These County responsibilities, regulations and resolutions shall remain in effect and shall be enforced by the Mojave Desert District until superseded or amended by the Mojave Desert District Board[12].

The Mojave Desert District Board shall adopt rules and regulations that are not in conflict with State and federal laws, and that reflect the best available technological and administrative practices. The rules and regulations adopted shall require the level of control necessary to achieve the emission reduction requirements of the federal Clean Air Act of 1988[13].

In February 1993, CARB approved the Air Quality Attainment Plan (AQAP), with minor revisions to be made by the San Bernardino County Air Pollution Control District. The District made the appropriate revisions and resubmitted the AQAP for final approval. This resubmittal was approved by CARB, and formally amended to call out the MDAQMD as the governing agency in the Mojave Desert Air Basin, officially replacing the San Bernardino County Air Pollution Control District[14].

Pollutants

There is widespread concern about the serious detrimental effects caused by even the most common pollutants. Ozone, particulates, carbon monoxide and other pollutants pose a very real threat to health and property in the desert. The following is a brief summary of the primary pollutants that can be found in the Yucca Valley area.

8 The San Bernardino County Air Pollution Control District's Final 1991 Air Quality Attainment Plan, August 26, 1991.
9 Bob Ramirez, Supervising Air Quality Technician, South Coast Air Quality Management District, East Desert Air Basin, personal telecommunication August 19, 1993
10 Christian Ibenacho, Supervising Air Quality Planner, South Coast Air Quality Management District, East Desert Air Basin, personal telecommunication August 17, 1993
11 California Health and Safety Code "Air Quality - Mojave Desert Air Quality Management District." Chapter 642: A.B. No. 2522 Legislative Counsel's Digest, p.2446.
12 Ibid.
13 Ibid.
14 Bob Ramirez, Supervising Air Quality Technician, South Coast Air Quality Management District, East Desert Air Basin, personal telecommunication August 19, 1993

Ozone (03)

Most commonly known as smog, ozone is a pungent, colorless, highly reactive gas which is the main component of photochemical smog. It is formed in the atmosphere when oxides of nitrogen combine with reactive organic gases, such as hydrocarbons, in the presence of sunlight. This is a daily occurrence that commonly takes place from the pollution emitted by mobile sources[15].

The potential impact ozone can have on human health is significant, as the ozone molecules react with sensitive lung tissues, irritating and inflaming the lungs, compromising the body's ability to fight respiratory infections. Ozone can also cause extensive damage to vegetation. Studies have shown that leaf drop, stunted growth, burnt tissues, and fewer seeds produced are defects which are a direct result of the pollutant.

Precursors to ozone formation are sunlight, reactive organic gases and oxides of Nitrogen. The majority of smog experienced in the Yucca Valley area results from the transport of pollutants from Los Angeles County, and other portions of the San Bernardino County Air Basin. During the winter months, in the Yucca Valley area, cooler ambient temperatures retard ozone formation and encourage the buildup of higher concentrations of reactive organic gases in the atmosphere. Sunlight and increasing air temperature cause the smog forming chemical reactions.

Oxides of Nitrogen (NOx)

Nitric Oxide (NO) and nitrogen dioxide (NO2), commonly referred to as NOx, are the two most significant oxides of nitrogen for air pollution. Nitric oxide is a colorless gas that is formed when combustion takes place at a temperature high enough to cause a reaction between nitrogen and oxygen. Therefore, NOx is formed primarily in automobile engines, railroad engines, refineries, electric power plants, and other large energy conversion processes[16].

Nitric oxide is neither an irritant nor a health threat at concentrations found in the ambient atmosphere, but is a major contributor to acid rain. Nitrogen dioxide, however, can be lethal in high doses, as it can damage the cell lining of the respiratory tract and increase susceptibility to respiratory infections.

Particulate Matter (PM 10)

PM10 refers to small particles, both solid and liquid, such as dust, sand, metallic and mineral particles, road-surfacing materials, pollen, smoke, fumes and aerosols. These various particles are categorized by "settling" characteristics, and those which are the size of 10 microns or smaller are called PM 10. PM10 particles can cause serious health problems, as they can pass through the lung's filtering system, lodge deep in the lung's tissues, and directly irritate these tissues[17]. PM10 is considered to be one of the most prevalent forms of air pollution in the Yucca Valley area, and therefore is discussed further in relation to "Blow sand Effects."

Carbon Monoxide (CO)

Carbon Monoxide is a colorless, odorless, toxic gas which is generally produced by the incomplete combustion of carbon containing substances. The pollutant results from emissions from internal combustion engines, principally in automobiles and industrial uses. Carbon Monoxide does not irritate the respiratory tract, but passes through the lungs directly into the blood stream. While in the blood, CO binds with hemoproteins and reduces the amount of oxygen which reaches the vital organs such as the heart, brain and tissues[18]. .

15 The California Environmental Quality Act Air Quality Handbook, prepared by the South Coast Air Quality Management District, April 1993.
16 Ibid.
17 Ibid.
18 Ibid.

Sulfur Dioxide (S02)

Sulfur Dioxide is a heavy pungent, colorless gas which primarily results from the combustion of sulfur containing fuels such as oil or coal. In the Yucca Valley area, the presence of sulfur dioxide arises from the use of sulfur rich fuel for combustion equipment, rather than from refineries and industrial boilers, which are considered traditional sources[19]. The health effects of S02 are irritation of the respiratory tract, impairment of respiratory functions, and the promotion of the development of lung disease.

Lead (Pb)

In ambient air, lead exists as an inhalable particulate. The primary sources of lead in the air have included leaded fuels in motor vehicles, air stripping of contaminated soil and emissions released from smelters. Particles of lead, which are considered to be air pollutants, are so small that as much as fifty percent of what is inhaled may be retained[20].

Toxics

In addition to the above mentioned pollutants for which there are adopted ambient air quality standards, there is a second regulated class known as toxic air pollutants. These are known to be injurious, even in small quantities. These pollutants pose a significant threat to human health depending on the toxic properties of the chemical, and may cause mutagenic changes or cancer in humans.

The CCAA does not provide for, and does not specify any requirements for toxic air pollutants, however they do exist, and pose a significant risk to the general public. The District is currently in compliance with the Toxic Hot Spot Bill (AB 2588), which requires that toxic/hazardous waste users in the area are provided to, and listed by, the State[21].

Of all of the pollutants, Ozone and PM_{10} are the most prevalent. Other pollutants are more difficult to infer and are not believed to constitute significant threats to public health[22]. Present air quality in the Town can generally be expected to be equal or superior to that of all but one of the other communities in the MDAQMD region, with the possible exception of occasionally high amounts of ozone and suspended particulates which are transported from other areas of the region.

Blow Sand Effects

PM_{10} in the Yucca Valley area comes mostly from locally generated fugitive dust. Each year, winter rains cause erosion of adjacent mountains, and water run-off produces substantial deposits of sand throughout the area. During the spring months, persistent, strong winds carry the sand methodically down the valley.

Sometimes referred to as "blow sand," this natural sand migration produces PM_{10} in two ways: (1) by direct particle erosion and fragmentation (natural PM_{10}), and (2) by secondary effects, such as sand deposits on road surfaces which can be ground into PM_{10} by moving vehicles, and resuspended in the air by those vehicles (man-made PM_{10})[23].

19 Ibid.
20 Ibid.
21 Ibid.
22 Bob Ramirez, Supervising Air Quality Technician, SCAQMD, East Desert Air Basin, personal telecommunication August 19, 1993.
23 The Federal Register, Volume 52, No 126 "Rules and Regulations." Wednesday, July 1, 1987, p. 24725.

Weather and PM_{10}

In the spring and the early summer months, meteorological conditions favor the development of strong winds. Seasonally, as the deserts begin to heat up, surface pressures are systematically lowered. This creates a vacuum-like effect, whereby cooler, ocean-modified air is pulled toward the deserts. While rain storms may dampen and compact the desert soils, flooding can cause the exposure of new, silty materials that can easily be lifted into the air by lighter breezes, as well as by the strong winds, that are very common in the area. Desert visibilities, which typically exceed 35 miles, may be reduced to less than a mile by blowing sand and dust. In addition, on other occasions, summer thunderstorms generate strong gusts and can produce large scale dust storms.

Blowing particulate matter is deposited on fabrics, buildings and automobiles. Extensive wind borne soil can obliterate landscaping and dirty streets. Losses and damage occur to materials and finishes, as blowing sand can pit windshields, destroy finishes and require additional cleaning and sweeping of exposed areas. Dust on vegetation can suppress plant growth and interfere with respiration through leaves.

State and Federal Standards

Federal and State ambient air quality standards are set at levels believed adequate to protect the health of the most sensitive population groups, particularly the elderly, children and people with respiratory diseases. State standards are more restrictive than federal.

The following table shows a breakdown of the pollutants monitored in the Mojave Desert Air Quality Management District and the applicable State and federal standards.

Table III-24
State and Federal Ambient Air Quality Standards

Pollutant	State Standards		Federal Standards	
	Averaging Time	Concentration	Averaging Time	Concentration
Ozone	1 Hour	.09 ppm	1 Hour	.12ppm
Carbon Monoxide	1 Hour	20 ppm	1 Hour	35ppm
	8 Hour Ave.	9 ppm	8 Hour Ave.	9ppm
Nitrogen Dioxide	1 Hour	.25 ppm	Annual Ave.	.053ppm
Sulfur Dioxide	1 Hour	.25 ppm		Dry Deposition
	24 Hours	.05 ppm		
Particulate Matter	Annual	$50ug/m^3$	Annual	$150ug/m^3$
	Geo. Mean	$30ug/m^3$	Arith.Mean	$50ug/m^3$

ppm = parts per million
Source: The San Bernardino County Air Pollution Control District's Final 1991 Air Quality Attainment Plan August 26, 1991.

Air Quality Monitoring Stations

There are seven air quality monitoring stations in the MDAQMD, outside of the Yucca Valley area, which are currently operated in the cities of Barstow, Hesperia, Phelan, Trona, Twentynine Palms, Victorville and Lucerne Valley. All of these monitors, with the exception of Lucerne Valley, are capable of monitoring wind speed and direction, which are critical in the evaluation of pollutant sources.

The monitoring stations are strategically located throughout the District, set up in specific corridors, where intra-District and inter-District pollution levels may be monitored[24]. The monitoring stations measure the various pollutants indicated in the following table.

[24] The San Bernardino County Air Pollution Control District's Final 1991 Air Quality Attainment Plan August 26, 1991.

Table III-25
Pollutants and Parameters Recorded at
MDAQMD Monitoring Stations

Site	Ozone	Nitric Oxides	Sulfur Oxides	Carbon Monoxide	PM_{10}	Wind Speed	Wind Dir
Barstow:	Yes	Yes	No	Yes	Yes	Yes	Yes
Hesperia:	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Phelan:	Yes	Yes	Yes	Yes	No	Yes	Yes
Trona:	Yes	Yes	Yes	No	Yes	Yes	Yes
29 Palms:	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Victorville:	Yes	Yes	Yes	No	Yes	Yes	Yes
Lucerne Valley:	No	No	No	No	Yes	No	No
Yucca Valley*:	Yes	No	No	No	Yes	Yes	Yes

*Monitoring sites installed in the Town of Yucca Valley in August 1993.
Source: The San Bernardino County Air Pollution Control District's Final 1991 Air Quality Attainment Plan August 26, 1991. Mojave Desert AQMD, 1993.

Yucca Valley Monitors

In the beginning of August, 1993 the MDAQMD installed two monitoring devices at the Community Center Complex, located at 57090 Twentynine Palms Highway, in the Town of Yucca Valley[25]. These devices monitor Ozone and PM10 levels in the Town, along with wind speed and wind direction levels, and provide information essential to preserving and enhancing area air quality. The monitoring stations need to collect a large amount of data which must be correlated in order to draw meaningful conclusions regarding air quality in the Town and region.

The first four months of data collected at the Yucca Valley Monitoring Site included Ozone, Wind Speed and Wind Direction measurements for July 19 through October 31, 1993. The instrument measuring particulate matter was not yet operational. An analysis of the data illustrated that the State standard for Ozone was exceeded a total of six times within this period, including August 2nd, 3rd, 4th, 6th and 29th, and September 11. It was also apparent that the highest ozone levels occurred between the hours of 4:00 and 7:00 PM, with wind direction generally from the southwest[26]. This data, again suggests that this pollutant is transported into the Yucca Valley area from Los Angeles and other portions of San Bernardino County.

However, although these measurements are important in the long run, their short term significance is questioned, as the EPA, which sets all federal air quality standards, suggests that at least a year of data (365 days) is necessary to begin to draw conclusions regarding air quality of a planning area. Most of the analyses required by EPA suggest a minimum of three years of data to prevent hasty and unfounded conclusions, which may affect State and federal mitigation measures required for the planning area.

Therefore, in order to roughly gauge air quality in the Town of Yucca Valley, data from the Twentynine Palms monitoring site shall be used. Twentynine Palms is similar to Yucca Valley in that it is a high desert community that shares the same geographic and climatologic conditions, and has the same general rural characteristics. Due to these similarities, and its close proximity to Yucca Valley, the data from the Twentynine Palms monitoring facility is useful to illustrate the general air quality status of the Town.

The following table displays Ozone and PM_{10} levels in Twentynine Palms from 1989 to 1992.

[25] Bob Ramirez, Supervising Air Quality Technician, SCAQMD, East Desert Air Basin, personal telecommunication August 19, 1993.
[26] AQ-DHS Air Quality Data Report from the Yucca Valley Monitoring Site, located at 57090 29 Palms Highway, August 1 through August 24, 1993.

Table III-26
Exceedances of Standards and Maximum Concentrations
at the Twentynine Palms Monitoring Site, 6078 Adobe Road

	Ozone			PM-10		
Year	Days Over State Standard	Days Over Federal Standard	Max 1-hr PPM	Days Over State	Days Over Federal Standard	Max 24-hr mg/m3 Standard
1989	33	3	.13	15	n/a	n/a
1990	37	1	.14	4	1	297
1991	61	6	.129	8	1	297
1992	33	0	.12	0	0	49

n/a: Data not available
Source: San Bernardino County Air Pollution Control District's "Annual Air Quality Reports" for 1989 and 1990, and "Air Quality Data" and "24-hour Summary Reports" for 1991 and 1992.

The Twentynine Palms Monitoring Site, which is the most representative of the Yucca Valley area has exceeded the State standard for Ozone (.09ppm/hr.) 164 days, and has exceeded the federal standard (.12ppm/hr.) 10 days from 1989 to 1992. For PM10, measurements at the Twentynine Palms Monitoring Site have exceeded the State standard (50ug/m^3) twenty-seven times, and the federal standard (150ug/m^3) two times from 1989 to 1992[27]. In relation to other districts in Southern California, the air quality in the Twentynine Palms area is comparatively good. The following table shows a comparison of the Ozone levels recorded at six monitoring sites within the MDAQMD.

Table III-27
California Ozone Standard
Exceedance Days/Year

Site:	Year:					
	1985	1986	1987	1988	1989	1990
Hesperia	125	139	141	126	127	119
Phelan	n/a	n/a	n/a	136	107	105
Victorville	105	56	56	80	87	56
Barstow	34	46	31	77	67	35
29 Palms	n/a	n/a	n/a	37	33	37
Trona	n/a	6	8	10	5	1

n/a: Data not available.
Source: The San Bernardino County Air Pollution Control District's Final 1991 Air Quality Attainment Plan August 26, 1991.

A detailed analysis of the Ozone exceedance table illustrates that there is, in fact, a definite correlation between the exceedance dates for Twentynine Palms and those for Hesperia, Phelan and Victorville. Also, the Twentynine Palms monitoring station recorded fewer exceedances than the others. Therefore, it is most likely that the Ozone was transported from west to east, rather than produced locally.

2. Project Impacts

The continued urbanization of the Yucca Valley area can be expected to result in continued and increased potential for air quality degradation in the valley. The most significant impacts are expected to come from emission of pollutants generated by vehicular traffic. Another important source of pollutants is site disturbance and construction activities. The consumption of natural gas and the use of electricity also contribute to the degradation of local air quality. The following discussion describes the major sources of air pollutants associated with the implementation of the proposed General Plan, and calculates emissions where possible.

[27] Ibid.

Fugitive Dust

Fugitive dust generation is associated with the disturbance, grading and development of vacant or undeveloped acreage. While it is beyond the scope of this study to attempt to accurately quantify the potential impacts, the following formula and its direct application to vacant or undeveloped acreage available for eventual urban development under the proposed General Plan is presented below.

Table III-28
Calculations of Fugitive Dust Potential[28]

Total Area to be Disturbed at Buildout		Factor		Dust Generation Total Potential
24,916 ± acres	x	1.2 tons/acre/month	=	29,899 tons/month
				or
24,916 ± acres	x	110 lbs./acre/working day	=	2,740,076 lbs./day

Fugitive dust generation is expected to occur on a short-term, site-specific basis, and will be spread out over the life of General Plan buildout. Therefore, the quantifying of these emissions, unlike those calculated for moving emissions and stationary sources, does not provide a meaningful analysis of short-term impacts. Reflecting the limited growth experienced in the area, it is more realistic to assume that the area disturbed on an annual basis will generate approximately 200 tons per month. The potential for wind erosion and dust generation associated with continued development of roads and structures is particularly high in the planning area. The formula presented above in Table III-28 will, nonetheless, provide a benchmark by which the potential of a specific project to generate dust can be measured.

Stationary Source Emissions

Calculations of stationary source emissions include emissions from electrical power plants outside of the Town of Yucca Valley and the consumption of natural gas for space heating, cooking etc. Power plant emissions consist primarily of combustion products, such as carbon monoxide, oxides of nitrogen, sulfur oxides, particulate matter and reactive organic gases (ROG). Table III-29 and III-30 below indicate the power plant emissions associated with annual electricity consumption by both residential and commercial development upon buildout of the planning area. For residential, the table is generated by applying the Southern California Edison electrical power usage factors to the development on a per unit basis, and multiplying them by the emission generation factors set forth in the South Coast Air Quality Management District (SCAQMD) EIR Handbook. The Handbook only lists one usage factor for residential development, whereas for commercial and industrial, several usage factors are listed.

[28] CEQA Air Quality Handbook, prepared by South Coast Air Quality Management District, April 1993. Appendix to Chapter 9.

Table III-29
Power Plant Emission Factors
for Residential Development
(Factor: lbs. per 1000 KWH)

Annual Electric Energy Usage (per unit)			Total Number of Dwelling Units		Total Annual Electric Usage
5,626.50 kwh/unit/year		x	24,401Units	=	137,292,262.5 kwh
Pollutant	Carbon Monoxide	Nitrogen Oxides	Sulfur Oxides	Particulates	Reactive Organic Gases
	137,292	137,292	137,292	137,292	137,292
Factor	x .20	x 1.15	x .12	x .04	x .01
Lbs./Year	27,458	157,886	16,475	5,492	1,373

Source: CEQA Air Quality Handbook, prepared by South Coast Air Quality Management District, April 1993. Appendix to Chapter 9. Assumes continued availability and use of natural gas in power plants, and an average contribution from hydro-electric sources. Represents total pounds emitted.

For commercial and industrial, the table is generated in the same manner, except as mentioned above, different annual usage factors are used. Also, the electrical power usage factors are given on a per square foot basis. The AQMD Handbook separates the commercial uses by different types. The uses chosen were, Retail, Restaurant, Hotel/Motel, and Office. The industrial uses are also categorized into different types. The industrial uses chosen for this analysis were warehouse and miscellaneous. The uses are weighted by a certain percentage of the actual usage factors based on the assumption that commercial and industrial uses proposed within the planning area will most likely continue to follow the current development pattern within the Town of Yucca Valley. The same calculations were performed and Table III-30 below shows the results of total annual electric energy usage per square foot for the commercial uses mentioned.

Table III-30
Power Plant Emission Factors
for Commercial Development
(Factor: lbs. per 1000 KWH)

Estimated Total Annual Electric Usage :141,591,399 kwh/year.

Pollutant	Carbon Monoxide	Nitrogen Oxides	Sulfur Oxides	Particulates	Reactive Organic Gases
	141,591	141,591	141,591	141,591	141,591
Factor	x .20	x 1.15	x .12	x .04	x .01
Lbs./Year	28,318.2	162,829.7	16,990.92	5,663.64	1,415.91

[1]Combined usage factor based on the following percentages and factors: Retail 75% at 13.55, Restaurant 10% at 47.45, Hotel/Motel 5% at 9.95, and Office 10% at 12.95 as given in the CEQA Air Quality Handbook, April 1993. Square footage calculations assume 25% lot coverage on all single story industrial development.
Source: CEQA Air Quality Handbook, prepared by South Coast Air Quality Management District, April 1993. Appendix to Chapter 9. Assumes continued availability and use of natural gas in power plants, and an average contribution from hydro-electric sources. Represents total pounds emitted.

Table III-31
Power Plant Emission Factors
for Industrial Development
(Factor: lbs. per 1000 KWH)

Estimated Total Annual Electric Usage :101,488,588.8 kwh/year.

Pollutant	Carbon Monoxide	Nitrogen Oxides	Sulfur Oxides	Particulates	Reactive Organic Gases
	101,489	101,489	101,489	101,489	101,489
Factor	x .20	x 1.15	x .12	x .04	x .01
Lbs./Year	20,297.8	116,712	12,178.69	4,059.56	1,014.89

[1]Combined usage factor based on the following percentages and factors: Miscellaneous Industrial 50% at 10.5 Kwh/sf/year and Warehouse Industrial 50% at 4.35 Kwh/sf/year as given in the CEQA Air Quality Handbook, April 1993. Square footage calculations assume 35% lot coverage on all single story industrial development.
Source: CEQA Air Quality Handbook, prepared by South Coast Air Quality Management District, April 1993. Appendix to Chapter 9. Assumes continued availability and use of natural gas in power plants, and an average contribution from hydro-electric sources. Represents total pounds emitted.

Natural gas related emissions are calculated using the average monthly consumption factor as established by the Southern California Gas Company and applied by the SCAQMD. As with power plant emissions, the various types of commercial development proposed for the Town of Yucca Valley were also analyzed. The same pollutants calculated for power plant emissions were also calculated for natural gas.

Table III-32
Emissions Associated with
Average Monthly Natural Gas Consumption for Dwelling Units
(lbs. per 10^6Cu. Ft.)

Annual Natural Gas Usage Per Unit			Total Number of Dwelling Units		Total Monthly Gas Usage
6,665 cf/mo/unit		x	24,401	=	162,632,665cf/mo
Pollutant	Carbon Monoxide	Nitrogen Oxides	Sulfur Oxides	Particulates	Reactive Organic Gases
	162.6	162.6	Negl.	162.6	162.6
Factor	x 20	x 80	Negl.	x 0.20	x 5.3
Lbs./Mo.	3,252	13,008	--	32.52	861.78

Source: CEQA Air Quality Handbook, prepared by South Coast Air Quality Management District, April 1993. Appendix to Chapter 9.

Table III-33
Emissions Associated with
Average Monthly Natural Gas Consumption for Commercial Uses
(lbs. per 10^6Cu. Ft.)

Annual Natural Gas Usage Per Sq Ft			Total Square Footage of Commercial Building Coverage		Total Monthly Gas Usage
2.90 cf/mo/sq. ft.		x	9,365,400	=	27,159,660cf/mo.
Pollutant	Carbon Monoxide	Nitrogen Oxides	Sulfur Oxides	Particulates	Reactive Organic Gases
	27.2	27.2	Negl.	27.2	27.2
Factor	x20	x120	Negl.	x 0.15	x 5.3
Lbs./Mo.	544	3,264	- -	4.08	144.16

Source: CEQA Air Quality Handbook, prepared by South Coast Air Quality Management District, April 1993. Appendix to Chapter 9.

Moving emissions were calculated utilizing the California State Composite Moving Exhaust Emission Rates for Calendar Year 2002[29]. Actual per mile emissions over subsequent years can be expected to be reduced as combustion technology improves vehicle emissions. In accordance with AQMD guidelines, total vehicle emissions are computed based upon trip emissions and distance related running emissions, multiplied by the vehicle miles traveled. As shown, crankcase blowby and diurnal emissions are also calculated.

[29] CEQA Air Quality Handbook, prepared by South Coast Air Quality Management District, April 1993. Appendix to Chapter 9.

Table III-34
Moving Exhaust Emission Rates
Calendar Year 2009
(pounds/day)

Miles Travelled in one day: 2,577,300*

SPEED	POLLUTANTS			PARTICULATE S	
(MPH)	CO	ROC	NO	TIRE WEAR	EXHAUST
30	12,179	465	1,596	665	33
35	10,449	399	1,543	665	33
40	9,117	332	1,397	665	33
45	8,186	266	1,330	665	33
50	7,387	199	1,543	665	33
55	6,655	199	1,996	665	33
Cold Start (pounds/day)	258,790	8,276			
Hot Start (pounds/day)	13,675	374		348	
Diurnal Emissions (grams/vehicle/day)		Not Applicable			
Hot Soak (grams/trip)		1,646			

* Assumptions include: 604,303 Average Daily Trips of 5 miles each
Source: CEQA Air Quality Handbook, prepared by South Coast Air Quality Management District, April 1993, Appendix to Chapter 9.

Summary of Impacts

The generation and emission of pollutants associated with development include fugitive dust from site disturbance and development, vehicular traffic emissions, power plant emissions and emissions associated with the consumption of natural gas. While the level of impacts anticipated from future proposed developments are not expected to be significant, once mitigated, there will be an additional increment to the cumulative impact on air quality in the Yucca Valley area. As the majority of the area's electrical power is generated in the Mojave Desert Air Basin, projects within the Town will also contribute to the cumulative impact on air quality within the Basin.

Table III-35
Anticipated Cumulative Daily Project-Related Emissions
(lbs./day)

	Stationary Source Emissions		Moving Source Emissions		Threshold Criteria*
	Power Plants	**Consumption of Natural Gas**	**Vehicles at 50 mph**	**Total Pounds Per Day**	**Total Pounds Per Day**
Carbon monoxide	207	127	7387	7721	550.00
Nitrogen oxide	1197	542	1547	3286	55.00
Sulfur oxide	122	n/a	n/a	122	150.00
Particulates	41	1.21	698	740.21	150.00
ROCs	10	33.53	199	242.53	55.00

*Threshold criteria: Offered by the South Coast Air Quality Management District for assistance in determining the significance of air quality impacts. If the project is capable of daily emissions of one or more listed pollutants exceeding the threshold noted, the responsible lead agency may wish to require impact assessment and mitigation measures in an EIR. The suggested criteria are the District's New Source Review (NSR) rule limits. Detailed analysis and mitigation strategies are provided in this EIR for the proposed project.
Sources: CEQA Air Quality Handbook, prepared by South Coast Air Quality Management District, April 1993, Appendix to Chapter 9.

Table III-35 summarizes expected emissions per pound per day of the planning area. Threshold criteria was exceeded for all of the pollutant categories except for sulfur oxide. It should be kept in mind that the emission generation factors used in the above calculations are based on current rates of emission extended to the year 2002. It is expected in all cases that the emitters of pollutants will become more efficient as new combustion technologies come online. The impact of new technologies is difficult to anticipate; even projected future rates of emissions for vehicular traffic cannot be considered definitive.

3. Mitigation Measures

It is safe to assume that combustion technology, particularly that associated with vehicular movement, will continue to improve, and overall reductions from improved efficiency can be expected. Building technologies can also be expected to reduce the impacts of pollutant emissions from power plants and the use of natural gas, through the implementation and updating of California Title 24 building codes and the more efficient use of energy.

Alternative methods of electric power generation have and will continue to replace the need for additional fossil fuel based generating capacity. Higher efficiency automobiles will probably emerge. While these emissions are beyond the direct control of local regulators, the State of California has implemented mandatory smog checks which will help to assure compliance with existing standards. Nonetheless, there are several actions which can be taken to further reduce the various impacts on air quality. Listed below are mitigation measures provided by the Mojave Desert Air Quality Management District for most projects within the Yucca Valley area. These measures will most likely be required for all future development projects in the planning area.

To minimize construction activity emissions, the future developers shall implement the following:

- Water site and equipment morning and evening
- Spread soil binders on site, unpaved roads, and parking areas
- Operate street-sweepers on paved roads adjacent to site
- Re-establish ground cover on construction site through seeding and watering
- Pave construction access roads, as appropriate
- Clean up the access roads and public roadways near the project site of soil

To minimize construction equipment emissions, the future developers shall implement the following:

- Wash off trucks leaving the site
- Require trucks to maintain two-feet of freeboard
- Properly tune and maintain construction equipment
- Use low sulfur fuel for construction equipment

To reduce construction-related traffic congestion, developers and contractors shall implement the following:

- Provide rideshare incentives for construction personnel
- Configure construction parking to minimize traffic interference
- Minimize obstruction of through-traffic lanes
- Provide a flag person to ensure safety at construction sites, as necessary
- Schedule operations affecting roadways for off-peak traffic hours

To limit emissions from vehicle trips and roadways construction, developers shall implement the following:

- Establish a Transportation Management Program, as appropriate

- Provide commuter rideshare incentives as appropriate
- Provide commuter transit incentives
- Provide merchant rideshare incentives
- Establish a program of alternative work schedules
- Schedules goods movements for off-peak traffic hours
- Contribute to local shuttle and regional transit systems
- Provide dedicated turn lanes, as appropriate
- Provide incentives for alternative fuels
- Provide transit shelters
- Limit on-street parking

To minimize indirect-source emissions, developers shall implement the following:

- Implement energy conservation measures beyond state and local requirements
- Install low-polluting and high-efficiency appliances
- Install solar pool heaters
- Install solar water heaters, to the greatest extent feasible
- Install energy-efficient street lighting
- Include energy costs in capital expenditure analyses
- Landscape with native drought-resistant species to reduce water consumption and to provide passive solar benefits
- Provide incentives for purchase of low-polluting and high-efficiency appliances as feasible

To minimize building energy requirements, developers shall implement the following:

- Improve the thermal integrity of buildings, and reduce the thermal load with automated time clocks or occupant sensors
- Introduce window glazing, wall insulation, and efficient ventilation methods
- Introduce efficient heating and other appliances, such as water heaters, cooking equipment, refrigerators, furnaces and boiler units
- Incorporate appropriate passive solar design, and solar heaters
- Use devices that minimize the combustion of fossils fuels
- Capture waste heat and re-employ this heat, in nonresidential buildings, to the extent greatest feasible

To minimize potential public exposure to air toxic emissions, the Town Community Development Department and Department of Building and Safety shall implement the following measures, as development occurs:

- Integrate additional mitigation measures into site design such as the creation of buffering area between potential sensitive receptors boundary and a potential pollution source
- Require design feature, operating procedures, preventive maintenance, operator training, and emergency response planning to prevent the release of toxic pollutants

To reduce PM10 emissions, future developers may implement the following:

- Chemically treat soil at construction sites where activity will cease for at least four consecutive days
- Pave construction access roads as they are developed, extend paving at least 120 feet from roadway into construction site and clean at the end of each working day
- Restore vegetative ground cover as soon as construction activities have been completed
- Trucks that haul dirt, sand or soil shall be covered or shall maintain at least 24 inches of free board
- Construction sites shall be watered to reduce fugitive dust

- Chemically treat unpaved roads that carry 20 vehicle trips per day or more
- Chemically stabilize soil surfaces within 100 feet of roadways or establish snow fences within 50 feet of roadways
- Plant tree windbreaks, utilizing non-invasive species, on the windward perimeter of construction projects, where feasible
- All construction grading operations and earth moving operations shall cease when winds exceed 30 miles per hour.

Mitigation Monitoring/Reporting Program

It is the responsibility of the Mojave Desert Air Quality Management District to coordinate with the Town of Yucca Valley to monitor pollutant levels and regulate air pollution sources. With the installation of the monitoring devices at the Town Community Center, the Town has already taken the first step in the implementation of the regulations of the CCAA which require monitoring of pollutant levels throughout each AQMD. However, air quality management is an ongoing process, and the Town must determine what actions and development activities have the potential to adversely affect air quality in the area.

- The Town Community Development Department shall continue to cooperate with the Mojave Desert Air Quality Management District to facilitate the maintenance and expansion of the existing air quality monitoring equipment located at the Town Community Center.
  Responsible Agencies: Town Department of Community Development, Mojave Desert Air Quality Management District.

- The appropriate code enforcement division shall record, consolidate and retain all complaints regarding air quality degradation from vehicle emissions, industrial generators, odors from stockyard operations, and other sources of air quality impacts. A report on air quality complaints and identified problems shall be provided in the annual review of the General Plan. In addition, development may be temporarily halted until inadequate controls or unacceptable conditions are corrected to the satisfaction of the Town and/or MDAQMD.
  Responsible agencies: Town Code Enforcement and Building Division.

- Grading and development permits shall be reviewed and conditioned to require the provision of all available methods and technologies to assure the minimal emissions of pollutants from the proposed development. The Town Department of Community Development shall review grading plan applications to ensure conformance with the mitigation measures set forth in the EIR and as otherwise conditioned by the Town.
  Responsible agencies: Town Community Development Department, Building Division

I. Noise

1. Existing Conditions

The existing noise environment is quiet and typical of a rural setting. Background noise levels in the planning area are primarily from automobile traffic on State Highway 62 with contributions from local streets within and surrounding the planning area including State Highway 247, Yucca Trail, Onaga Trail and Joshua Lane. A portion of the planning area may be subject to periodic noise impacts from road traffic on State Highway 62 and airplane traffic from both the local airport and the 29 Palms Marine Corps Air Ground Combat Center.

Applicable Noise Standards
The Federal Highway Program Manual Vol. 7, Ch. 7, Sec 3, 1982 provides a land use compatibility chart for

community noise. The "normally acceptable" noise limits are 50 to 60 db for residential land uses (single and multi-family dwellings, group quarters, and mobile homes); 50 to 65 db for commercial land uses. Noise levels up to 70 db are considered "conditionally acceptable" for residential, transient lodging, schools, libraries, and commercial land uses. However, exposure only up to 65 db is "conditionally acceptable" for recreational land uses.

The State of California Office of Noise Control recommends the "normally acceptable" limits are 60 dB (Ldn) or CNEL] for low density residential development, and 65 dB for multiple family residential and transient lodging. Exterior noise exposures up to 70 dB are considered "conditionally acceptable" for all residential and transient lodging uses, provided an acoustical analysis is undertaken.

Noise Monitoring

Noise monitoring was executed at a total of nine sites selected to be representative of the existing noise sensitive uses or generators. The noise monitoring was administered by the acoustical engineering professionals, Walker & Celano. The locations are described below.

Site 1: Northerly edge of 29 Palms Outer Highway North, at the easterly side of Fortuna Avenue. This location was representative of yards of existing single family residences fronting HWY 62 along the easterly approach of Town.

Site 2: Easterly side of HWY 247, sixty feet (60') from the centerline, northerly of Farrelo Road. This location was adjacent to the north bound steep (8%) up grade and would be subject to the maximum truck noise exposure.

Site 3: Southerly side of Joshua Lane, sixty feet (60') from the centerline, westerly of Hardesty Drive. This location was opposite the Moyle's Sky Harbor Health Care Center which was identified as an existing noise sensitive land use.

Site 4: Westerly side of Palomar Avenue, fifty feet (50') from the centerline, southerly of Lisbon Drive, This location was representative of front yards of existing single family residences.

Site 5: Southerly property line of water pumping station adjacent to residence located at 8543 Palomar Avenue. This location was an instance of and existing noise generator located in a residential area.

Site 6: Southeasterly corner of Benecia Trail and Inca Trail. This location was opposite the southerly side of the Granite Construction Batch Plant.

Site 7: Southerly side of Yucca Trail, fifty feet (50') from centerline, westerly of Emerson Avenue. This location was representative of front yards of existing single family residences.

Site 8: Southerly side of Onaga Trail, fifty feet (50') from centerline, at the westerly side of Yucca Valley High School.

Site 9: Northerly side of Buena Vista Drive, fifty feet (50') from centerline, easterly of Terry Lane. This location was representative of front yards of existing residences adjacent to areas proposed for future commercial development.

The results of the noise monitoring tests at the sites referenced above are listed in both the General Plan, Noise Element, and in Appendix F of this document. The Town's existing noise environment is very typical of a rural community.

Appendix "F" includes the complete acoustical analysis report for the Town of Yucca Valley, prepared by Robert Kahn, John Kain & Associates. Included within this report is a detailed description of the noise monitoring equipment, the results of the noise monitoring and a description of the traffic noise modeling process utilized to anticipate the noise impacts of the projected future traffic volumes on the Town's roadways. The initial Acoustical Analysis prepared by Walker, Celano & Associates, Consultants on Acoustics is in Appendix "I".

The General Plan for the Town of Yucca Valley stipulates through policies and programs the development and adoption of a Noise Ordinance which establishes noise exposure thresholds and standards that will preserve an acceptable noise environment. These standards will be tailored to the specific needs of the Town of Yucca Valley.

2. Project Impacts

Noise impacts associated with the buildout of the planning area may take several forms, including: construction noise; noise due to stationary sources, such as mechanical equipment and water pumping stations; noise due to outdoor recreation areas, like tennis courts and sports fields; and noise generated from development-related traffic on the Town's roadways.

Construction Noise

Construction noise of various levels will be generated over the buildout phase of any development within the planning area. Construction noise usually has a short-term impact on the ambient noise level in the community. However, construction noise is often characterized by periods of high noise levels associated with the operation of heavy equipment. Also, noise and vibration caused by blasting, if necessary during site preparation, and/or pile driving, if required, could be a source of considerable noise disturbance to the community.

Typical A-weighted noise levels for various kinds of heavy construction equipment range from approximately 70 and 95 dB(A) at a distance of 50 feet. Thus, the maximum noise generated by construction activity could be a source of short term annoyance to adjacent low density neighborhoods. It is crucial that every effort be made during construction to minimize noise exposure to surrounding residences.

On-Site Stationary Noise Sources

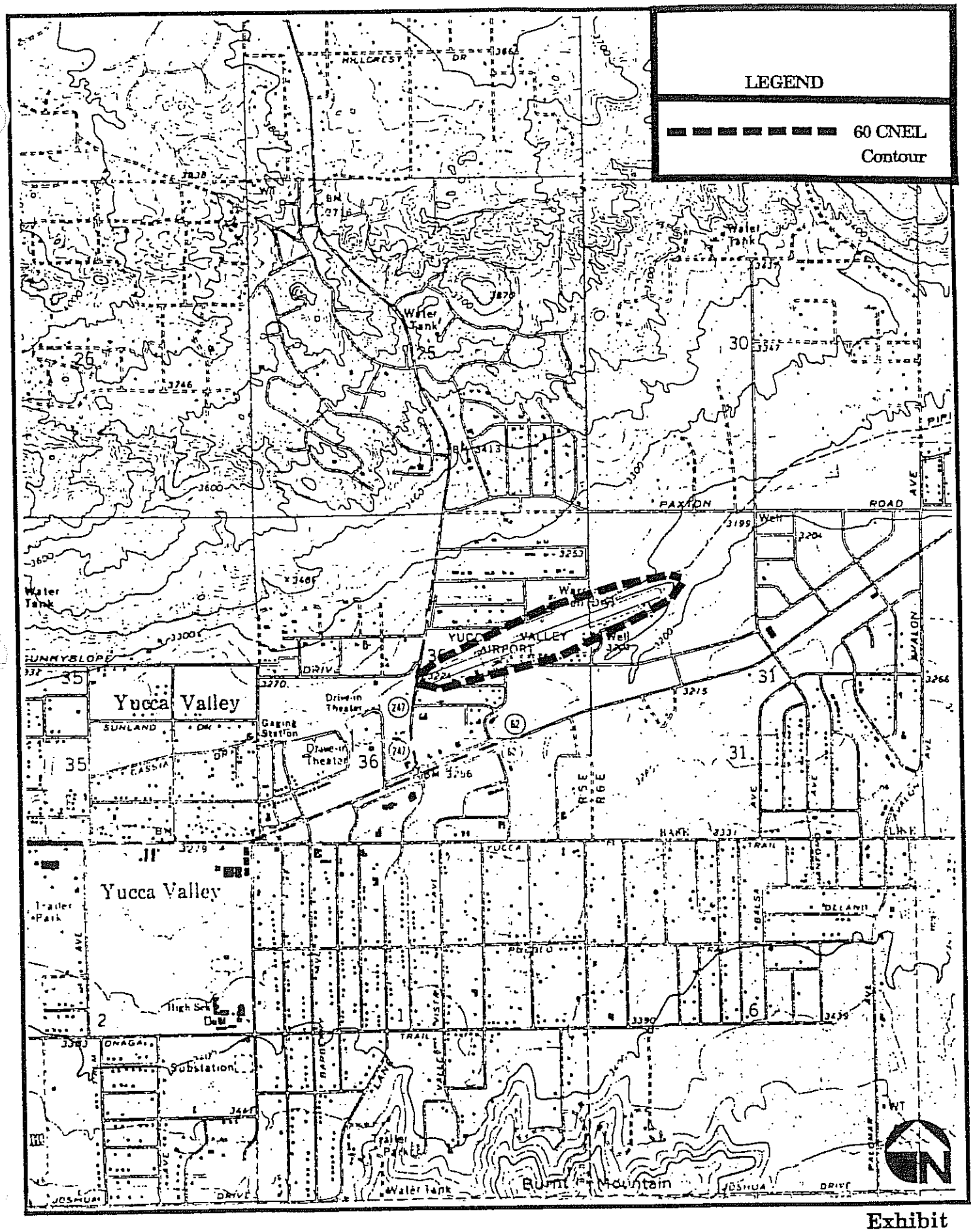
Mechanical equipment for air conditioning and refrigeration systems for the hotel facilities and commercial buildings could be a source of adverse noise impacts on the nearby residences, both within the development and in the surrounding community, if it is not selected and located with proper consideration of the potential noise. Outdoor equipment such as cooling towers, air-cooled chillers and refrigeration compressor systems can produce A- weighted noise levels in excess or 70 dB, at distances of 30 to 50 feet. In addition, equipment noise often contains tonal components that can be clearly audible and annoying at levels that are below the ambient noise at the receiving location.

Aircraft Noise Sources

Aircraft noises impacting the community emanate from two sources, general aviation operations at the Yucca Valley Airport and military aircraft overflights originating from and destined for the Twentynine Palms Marine Corps Air Ground Combat Center.

The Yucca Valley Airport is a privately owned airstrip which has been leased on a long term basis to the Yucca Valley Airport District. It supports approximately 12,500 operations per year. The current noise impacts due to the airport effect only the residences directly adjacent to the facility, many of which utilize the airport. Exhibit III-11 illustrates the 60 CNEL contour generated by the aircraft traffic. Any potential expansion of this airport is restricted by surrounding development and terrain[30]. The general aviation activity of this airport is not a significant noise problem.

[30] Airport Comprehensive Land Use Plan, Yucca Valley Airport, San Bernardino County Planning Department. February, 1992.



Exhibit

YUCCA VALLEY AIRPORT
60 CNEL CONTOUR

III-11

Off-Site Noise Sources

All proposed projects within the planning area shall be considered in the preliminary and final site plans for noise impacts. The arrangement of attached housing to provide necessary shielding of outdoor living areas and the incorporation of additional setbacks from roadways should be reviewed.

Exterior noises could impact interior residential dwellings. Every effort should be made to keep interior noise levels below CNEL 45. Residences that experience noise exposures of CNEL 65 or above should require special acoustical dampening materials be utilized in construction in order to maintain acceptable interior noise levels. Windows serve as noise "portals" into residences. To minimize noise impacts through windows, acoustically upgraded glazing, such as heavier than "normal" monolithic or laminated acoustical glass, could be required in those locations.

3. Mitigation Measures

The following discussion describes the mitigation measures, which are stated on a categorical basis to address identified impacts.

Construction Noise

- All construction equipment operating in the planning area shall be fitted with well maintained functional mufflers to limit noise emissions.
- Construction activity shall be restricted to between 7:00 a.m. and 7:00 p.m. and 10:00 p.m. when residences are not impacted, excluding federal holidays. Only emergency work shall be allowed to occur outside of these hours. Also, please see Town Noise Ordinance.
- To the greatest extent feasible, earth moving and haul routes shall be located away from nearby existing residences.
- Any portion of development in the planning area involving blasting or pile driving operations shall have a focused acoustical study conducted, to establish the level and duration of off-site noise and vibration impacts and appropriate mitigation measures.

On-Site Stationary Noise Sources

- The design, selection and placement of the mechanical equipment for the various buildings within the planning area shall include consideration of the potential noise impact on nearby residences, both within any development and in the surrounding community.
- Appropriate sound attenuating measures such as silencers and/or barriers shall be provided where necessary at outdoor equipment, such as cooling towers, air cooled condensers and refrigeration compressors/condenser units, and at the air intake and discharge openings for building ventilation systems.
- Appropriate sound barriers shall be provided surrounding any and all public facilities capable of generating disturbing levels of noise, such as water pumping stations.

Off-Site Traffic Noise

- Potential noise impacts shall be considered in the final site plans for all proposed projects within the

planning area. Factors to be considered shall include the strategic arrangement of attached housing to provide necessary shielding of outdoor living areas and the incorporation of additional setbacks from roadways.

- For residences within a project with exterior noise exposure levels higher than CNEL 65, closed windows and mechanical ventilation with cooling shall be necessary to keep interior noise levels below CNEL 45.

- During the preparation of construction drawings for project-specific phases, the exact acoustical specifications for window glass in buildings with unshielded first floor windows and second floor windows shall be determined. This is due to the potential for said windows to experience noise exposures of CNEL 65 or above, depending on specific site conditions. Acoustically upgraded glazing, such as heavier than "normal" monolithic or laminated acoustical glass, could be required in those locations.

- Design of specific projects of all development types, shall include and meet State Code requirements for unit-to-unit airborne sound isolation, both laterally and vertically, and for vertical impact sound isolation in multi-family residential and hotel construction.

Recommended Project Design Criteria

- Locate areas of greatest sensitivity away from potential noise sources wherever possible. The use of proper setbacks shall be required according to the Town of Yucca Valley Zoning Ordinance and the result of acoustical studies.

- Utilize natural noise barriers such as hills, berms, boulders, and dense vegetation to mitigate any potential noise sources.

- Utilize man-made noise barriers such as block walls or wooden fences to provide noise shields.

- Utilization of dense landscaping is highly recommended. High biomass species planted in large number, in a mature state and at close intervals may be effective in reducing noise impacts. Plantings should be used with earthen berms, setbacks and/or block walls.

Mitigation Monitoring/Reporting Program

Pre-Construction

During project-specific site planning and building design, ensure acoustical analysis takes into account:

- selection and placement of mechanical equipment for all buildings,

- shielding & buffering of mechanical equipment for all buildings,

- strategic location of attached residences to provide for shielding of outdoor living areas,

- theme wall is constructed to noise barrier specifications,

- mechanical ventilation and cooling are provided in all units which experience out door noise levels above CNEL 65, in order to maintain interior noise levels below CNEL 45,

- Designate acceptable truck/construction equipment route(s), as appropriate,

- Construction drawings shall include exact acoustical specifications for window glass in buildings with unshielded first and second floor windows which experience noise exposures above CNEL 65 and,

- Verify that design plans of specific projects within the planning area comply with State Code requirements of unit-to-unit airborne sound isolation

- The Town shall require and verify that an acoustical study has been prepared to assess the impact that projected traffic will have on existing residences in the area. Following the results of the study, necessary mitigation measures shall be implemented; however the method of funding of the needed improvements shall be at the discretion of the Town.
  Responsible agencies/parties: Developer, acoustical engineer, Building Division, Community Development Department.

- Designate acceptable truck/construction equipment route(s), as appropriate.
  Responsible parties: Town Building Division, Community Development Department.

During Construction

- Ensure functional mufflers on all construction equipment.
  Responsible parties: Developer, general contractor, Building Division.

- Ensure that designated truck routes are being utilized.
  Responsible parties: General and grading contractors, Building Division.

- Ensure construction equipment operates on weekdays, 7 a.m. to 7 p.m. only except in emergencies.
  Responsible parties: General contractor, Building Division.

J. Visual Resources

1. Existing Conditions

The Town of Yucca Valley and its planning area are located in a rapidly developing area of the Morongo Basin. Topography of the area consists of gently sloping terrain with the exception of steeper hills surrounding the area to the south, west, and north. Several intermittent streams such as those originating from Water Canyon, Little Morongo Creek, Chaparrosa Wash, and Pipes Wash traverse the planning area on its western and northern edges following the twists and turns of the foothills that predominate the area. In addition a water control channel known as the Main Flood Control Channel transacts the area through the center of town. No natural standing water bodies are present within the planning area.

Elevations of the planning area range from approximately 3,200 feet in the center and east of Town, while higher elevations up to 4,673 ft. surround the planning area to the west, north, and south. The topography in the planning area provides a variety of opportunities for exploiting the surrounding viewsheds. The higher elevations of the developable portions of the area provide spectacular views of the Morongo Basin and local mountains. Exhibit II-1 illustrates these local ranges. Major peaks in these mountains range from 3,800 to 4,395 feet.

The planning area itself is highly visible from surrounding areas to the east, due to its elevated location in portions of the surrounding foothills. Mountain ranges block most views of Yucca Valley when travelling east on Highway 62, however, the site can be seen from Highway 62 travelling west, which cuts directly through the planning area.

Open areas located near the Town include the Joshua Tree National Park and the Big Morongo Canyon Wildlife Preserve. In addition to these two preserves, the Town of Yucca Valley offers its own park facilities. Table III-36 details the park and recreational facilities within the Town. These parks are scattered primarily through the southern portion of the Town since hilly topography has somewhat restricted recreation-oriented parks/open space in the northern areas.

Table III-36
Town of Yucca Valley Developed Parks Inventory

Name	Type	Dev. Acres	Total Acres	Tot. Acres[31] per 1,000	Property Owner	Amenities
Community				**0.78 acres**		
1. Community Center	Active	14 ac.	29 acres		Town	2,5,6,7,8,9,10,11,14, 16,18,19,20,22,23,24, 26
Special Facilities						
Senior Center	Active				Town	Featurescommunity activitiesandnutrition services for seniors.
Hi-Desert Nature Museum					Town	Nature museum w/live reptiles and other animals.
2. North Park (ND)[32]	Passive	0 ac.	80.0 acres		BLM (lease)	undeveloped
3. South Park (ND)	Passive	0 ac.	40.0 acres		BLM (lease)	undeveloped
Neighborhood				**0.84 acres**		
4. Machris Park	Active	10.0 ac.	12.5 acres		Town	5,8,9,10,11,16,17,22 26
5. Hi-Desert Park	Active	5.0 ac.	5.0 acres		Morongo Unified (lease)	2,5,8,9,10,11,16,17,19
Mini				**.061 acres**		
6. Paradise Park	Active	1.0 ac.	1.0 acres		Town	2,8,9,10,16
7. Triangle Park	Passive	0.1 ac.	0.1 acres		Town	16

Total Dev. Acres in 1995= 30.1 **Current Total Dev. Acres per 1,000 in 1995= 1.6**
Total Possible Dev. Acres= 159.6 **Total Possible Dev. Acres per 1,000 in 1995= 8.4**
Total Possible Dev. Acres per 1,000 in 2015=2.6
Acres Currently Needed to Dev. Town Parks in 2015=311

Possible Cooperative Use Agreement Recreational Facilities (Lands not owned or leased by the Town)

Doran May Park (ND)	Active	0 ac.	5.0 acres	Co. Flood District	undeveloped
La Contenta Jr. High	Active	N/A	N/A	School District	2,3,5,7,14,15,16,21
Yucca Valley High	Active	N/A	N/A	School District	1,2,3,5,7,12,13,14,15, 16,17,21
Yucca Valley Elem.	Active	N/A	N/A	School District	2,4,5,6,7,9,14,15,16
Yucca Mesa Elem.	Active	N/A	N/A	School District	2,5,6,7,9,15,16
Boys and Girls Club	Active	2.5 ac.	13.7 ac.	Boys and Girls Club	13,14,15,16,22,26
Roadrunner Park	Active	7.5 ac.	7.5 ac.	Tri-Valley Little League	1,5,8,11,15,16
Desert Christ Park	Passive	2.0ac.	2.0ac.	Museum Association	8,15,16

1=BASEBALL	10=BARBECUE	19=HORSESHOES
2=BASKETBALL	11=SNACK BAR	20=SHUFFLEBOARD
3=FOOTBALL	12=POOL	21=BADMINTON
4=HANDBALL	13=GYMNASIUM	22=CRAFTCENTER
5=SOFTBALL	14=MULTI-PURPOSE ROOM	23=SENIORCENTER
6=TETHERBALL	15=REST ROOMS	24=MUSEUM
7= VOLLEYBALL	16=DRINKING FOUNTAIN	25=HIKING TRAILS
8=PICNIC AREA	17=TENNIS	26=MEETINGROOMS
9=PLAYGROUND	18=SOCCER	

[31] Total number of developed (built up) park acres as dictated by the Quimby Act.
[32] "Not Developed," as stated in the Quimby Act to be used in acres per 1,000 population calculations.

2. Project Impacts

Any grading within the study site is likely to follow existing contour lines wherever possible, however, engineering and hydrological constraints may require that elevated areas be created to accommodate particular development requirements and site limitations. Additional potential environmental impacts associated with grading activities are exposed slopes and excessive erosion as a result of grading activities. While extensive development in this planning area will take place over several years, nonetheless, development in the planning area should be given careful consideration to minimize visual impacts especially along major scenic corridors.

With the mix and integration of various land uses and major public facilities, including groundwater recharge basins, major floodways, and utility corridors, the potential exists that remaining fore and mid-ground visual resources will be eliminated and replaced by an incoherent and visually degraded built environment.

3. Mitigation Measures

It is difficult to develop specific mitigation measures for each situation, site or viewshed that may be affected by proposed development. However, general measures can be applied to assure that minimal impacts result from grading and landform alteration, site planning and infrastructure development, building construction, and landscaping. Mitigation measures should also anticipate and direct how a project will appear at maturity. Therefore, the following general mitigation measures will provide the basis for subsequent plan development and analysis, while guiding developers/applicants and Town staff in future site plan development and review.

- All major development plans submitted to the Town for site planning and architectural review shall be required to provide viewshed analyses, which accurately illustrate the impacts of proposed development on critical viewsheds and community design standards.

- Architectural themes, building materials and colors, and landscaping in the planning area shall be designed to complement the desert environment and minimize potential view blockage and other adverse impacts of development.

- The Town shall assure the preservation of viewsheds along major public roadways, including Highway 62, Joshua Lane, Pioneertown Road, Highway 247 and other major and/or sensitive roadways with valuable scenic resources. These routes have also been recommended for scenic highway status, making it imperative that scenic roads be maintained to protect existing viewsheds.

- Grading plan development standards incorporated into any Specific Plan, or as conditioned by approvals, shall address local and large-scale viewshed impacts. The Town shall further regulate site engineering and grading, through mitigation measures contained in project-specific environmental analysis.

- An architectural theme for all residential uses should be incorporated on a project-by- project basis within the planning area. Consistency, with variety, should be kept throughout any Specific Plan Area. Architectural styles should be compatible with those that are currently being developed within the Town such as stucco exterior finishes, Spanish tile roofs, slump block walls, water tolerant desert landscaping, architectural trimming on the exterior of structures such as windows, entry doors, and garage doors. In order to soften the architectural edge at area boundaries, building heights shall maintain a low profile and varied setbacks throughout the area.

- All grading and other development activities shall conform to the Air Quality Management District and the Town requirements and guidelines regarding control of fugitive dust (PM_{10}). These guidelines shall address particulate matter generation and place specific restrictions on grading activities and the length

of time land can remain exposed to wind erosion. These guidelines must be adhered to by all development.

Mitigation Monitoring and Reporting

- Site planning and architectural review processing shall be conducted and specific mitigation measures shall be incorporated into project approvals that avoid adverse grading impacts, assure use of setbacks and control of building heights to preserve viewsheds in the planning area.
  Responsible parties: Community Development Department, Planning Commission and Town Council

- The Community Development Department shall review all conceptual and detailed grading plans proposed for any project within the planning area. In addition to technical feasibility, the engineer shall determine if the plans will create visual intrusions on the fore and mid-ground viewsheds. Mass grading and leveling of foothills must be avoided and the engineer shall require necessary revisions. During the grading period of each phase of the project, the Town Engineer shall visit the project site to ensure that grading is conducted in a manner consistent with approved plans.
  Responsible parties: Community Development Department

K. Utilities/Public Services/Facilities

Solid Waste

1. Existing Conditions

Solid waste in the community is primarily handled by Hi-Desert Disposal, which offers both residential and commercial services, with pick-up provided once a week. Generally, as of 1993, residents of the Town can expect to pay approximately $13.15 per month for service, while commercial customers (with dumpsters) will pay $50.23 per month[33].

Hi-Desert Disposal offers special services for customers, which produce large levels of waste, for example restaurants, which generally require a minimum of two pick-ups per month. A cost effective and efficient service is essential in assuring use by residents, and a clean, trash-free community. All of the trash collected in the Town of Yucca Valley is distributed between the Landers and Morongo Valley Landfills.

Recycling Service and AB939

Hi-Desert Recycling, a state certified recycling center, is located at 55525 Yucca Trail in the Town of Yucca Valley, and recycles glass, plastic, aluminum, tin and newspapers. They offer pick-up for large loads of recyclable material, but do not offer weekly or monthly residential pick up. Residents of the Town can bring their recyclables to the recycling center and be paid approximately a penny a pound for plastics, and 75 a pound for aluminum. The company also buys non-ferrous scrap metal and will take newspapers and tin to recycle at no cost to the resident[34].

In 1993, it was estimated that each month the Hi-Desert Recycling Center took in about twenty tons of aluminum, fifteen to twenty tons of glass, two tons of plastic and a large amount of newspaper.

The continuous recycling effort of the community is essential in extending the life of the existing and limited landfills, and providing opportunities for the manufacturing of new products from the recycled materials. In 1989, the State of California passed Assembly Bill 939 (AB939) which requires that every city and county in California

[33] Hi-Desert Disposal, September 1993.
[34] Personal telecommunication with the General Manager of Hi-Desert Recycling, Yucca Valley September 29, 1993.

implement programs to recycle, reduce at the source and compost (RSC) 25% of their solid waste by the year 1995 and 50% by the year 2000. In 1992, the Town of Yucca Valley initiated the Source Reduction and Recycling Element (SRRE), which was the first step in coordinating with Hi-Desert Disposal and Hi-Desert Recycling to meet the requirements of AB939.

2. Project Impacts

Given the proposed density of the residential development and the intensity of commercial uses proposed for the Town, large amounts of solid waste will be generated.

Additional waste generated by buildout of the Town could have a significant impact on both the Landers and Morongo Valley landfills capacities. This further stresses the importance of incorporating recycling into proposed projects to allow for the Town's compliance with Assembly Bill 939.

3. Mitigation Measures

The measures specified below will mitigate solid waste impacts and assist in Town compliance with A.B. 939.

- Developers in the planning area shall work with the Town and develop a comprehensive recycling program for the development. This program shall include recycling provisions for both residences and commercial establishments (i.e. hotels, restaurants, stores, club house and health spa).

- Recycling provisions for single family and duplex residential dwelling units should take the form of curb side recycling or designated dumpsters.

- Recycling provisions for the multi-family residential dwelling units should take the form of dedicated source separation containers (i.e. glass-only, can-only and paper- only dumpsters).

- Although resident participation in the recycling program may be voluntary, adequate facilities to allow recycling shall be provided within a reasonable distance from residences (i.e. beside the general garbage dumpsters). Adequate space for recycling facilities shall be incorporated into designs of all project components. Of the space dedicated towards solid waste management at any site, generally 50% should be dedicated to source separation, or recycling containers.

- At a minimum, residential recycling on a project site should collect glass, newspaper and aluminum cans.

- Recycling programs for commercial establishments should include separate recycling bins. Items to be recycled by commercial establishments may include white paper, computer ledger paper, cardboard, glass and aluminum cans.

- As landscaping debris make up a large percentage of a development's solid waste, developers/operators shall contract for professional landscaping services from a company which composts its waste. Several landscaping firms are currently utilizing composting for waste disposal.

Mitigation Monitoring and Reporting

- The Town's Community Development Department shall work closely with the project developer to assure the development of recycling areas and containers which correspond with Town programs currently in effect and those planned for the future.
  Responsible Party: Community Development Department.

Electricity

1. Existing Conditions

Electrical services are provided in the Yucca Valley area by Southern California Edison (SCE). Every year, residential users are offered various rebates for the installation of energy efficient equipment. Several rebates offered by SCE include: up to $150 for the replacement of a "through-the wall" heat pump; up to $120 per nominal ton for the installation or replacement of a central electric air conditioner; up to $200 per nominal ton from the replacement of a central electric heat pump; and $500 for the replacement or retrofitting of a heat pump water heater, to name a few. In addition to providing electrical services to their customers, SCE has special rates for low income customers at 15% off the current residential rates. The following table offers a general breakdown of rates offered by Southern California Edison for service in the Yucca Valley area[35].

Table III-37
1993 Southern California Edison - Electric Rates
Available in the Town of Yucca Valley

Residential	$.10	per day for no consumption
	$.11095	per KWh - Baseline
	$.14018	per KWh - over Baseline
Commercial /Industrial		
GS-1 Account	$.43	per day service charge
	$11.50	per KWh
GS-2 Account	$44.00	per month service charge
	$9.25	per KWh

Source: Southern California Edison, September 1993.

It is important to provide cost-effective electrical power in the community in order to attract residents and businesses alike. The cost of electricity can have a substantial impact on businesses and its affordability through reasonable rates and energy conservation incentives is essential to the continued growth of the Yucca Valley commercial center.

In 1993, there were two 115 kilovolt lines which run through the area, serving both as primary and emergency back-up lines. The first line runs along the Twentynine Palms Highway and converges with the more southerly line to the west at the Devers Substation in Desert Hot Springs, and to the east at the Hi-Desert Substation, located in Twentynine Palms.

2. Project Impacts

Electrical service provided by Southern California Edison is expected to continue through the buildout of the General Plan. The proposed General Plan will generate an increased Town- wide electric power demand of approximately 348million KWHs per year[36]. The impacts of increased electric power consumption are multiple and difficult to assess. Increased demand will cumulatively contribute to the need for additional generating capacity (although currently SCE has excess capacity). SCE has a broad mix of power sources, including nuclear, gas turbines, hydro-electric, wind and limited solar electric capacity.

Actual energy demand may be affected by a number of factors, including a project's design and state and federal energy conservation regulations in effect at the time of project development. Electric consumption estimates are conservative and coincide with those used in Section III-H of this document, to calculate air quality impacts associated with project development.

[35] Southern California Edison Co., September 1993.
[36] CEQA Air Quality Handbook: Appendix to Chapter 9. South Coast Air Quality Management District. April 1993.

Southern California Edison indicated that it will be able to supply electricity to the planning area provided that the necessary easements are available. This additional service will most likely feed off of the existing 115 kv transmission lines, but the final determination will be made by SCE when the need has been established on a project by project basis. All work required of any project within the planning area, such as overhead and/or underground extensions, conversion of existing overhead lines to underground, etc. ,will be at the expense of the project proponent.

3. Mitigation Measures

No significant impacts are associated with the provision of service to the Town. Any proposed development within the planning area will be subject to the requirements of the Uniform Building Code and Title 24 of the California Administrative Code. Project developers should be encouraged to utilize energy efficient design to minimize summer-time solar gains and reduce air conditioning loads and related power demands. The use of energy efficient lighting fixtures in all portions of the project should be encouraged.

Developers should also cooperate with Southern California Edison in load management programs which level the demand load on generating capacities. Every effort should be made throughout to assure the highest level of energy conservation possible. The developer should also investigate the potential for the use of alternative energy sources including solar and co-generation technologies. The Town should strictly enforce Title 24 energy conservation code requirements.

Mitigation Monitoring and Reporting

- The Community Development Department shall inspect all detailed project plans for conformance with Title 24 energy conservation code requirements. The Town and Southern California Edison should provide the developer with references for energy efficient design.
  Responsible parties: Community Development Department and SCE.

Natural Gas

1. Existing Conditions

Southern California Gas Company provides natural gas service to the majority of the Town. There are offices located in Yucca Valley which service the area. Two, four and six inch transmission and distribution gas lines run throughout the community along many of the Town streets.

This map does not include the locations of two inch distribution lines that are widespread throughout the Town. The four inch and six inch line locations illustrate that the Southern California Gas Company provides gas to a majority of the community and has the facilities to extend service to existing unserved and future development. Major gas lines do not exist in the southwest and northwest portions of the Town, due to the rough terrain in these areas which severely restricts development[37].

Gas service is available to both commercial, industrial and residential users in the Town, with costs varying with seasons and amount of use. The following table gives a general idea of rates offered by the Southern California Gas Company in the Yucca Valley area.

Propane, coal and wood burning are also widely used in the Town of Yucca Valley for space heating, water heating and cooking. While these energy sources are efficient it should be noted that their extensive use has the potential to cause adverse impacts to ambient air quality due to emissions of carbon, nitrates and soot.

[37] Southern California Gas, Co., October 1993.

Table III-38
1993 Southern California Gas Company Rates
Available in the Town of Yucca Valley

Residential	$.10192	daily customer service
	$.53970	per therm baseline
	$.75640	per therm non-baseline
Commercial	$.42740	daily cust. serv. charge
	$.61071	per therm 4/1 through 11/30 (summer) under 5,000 therms
	$.54058	per therm 4(1 through 11/30 (summer) over 5,000 therms
	$.75419	per therm 12/1 through 3/30 (winter) under 5,000 therms
	$.58375	per therm 12/1 through 3/30

A therm is a standard unit of energy utilized by the Gas Company for billing purposes.
Commercial and Industrial rates may vary with type of use.
Source: Southern California Gas Company, October, 1993.

2. Project Impacts

The buildout of the proposed General Plan will result in increased consumption of natural gas. At buildout, development in the Town can be expected to consume approximately 190 million cubic feet per month[38]. The additional growth potential implied by the General Plan will increase the rate of consumption of this non-renewable resource. While this additional consumption from expanded development, in and of itself, is not expected to significantly impact natural gas supplies and the utility's ability to deliver it, increased consumption will have a cumulative impact on the long-term availability of natural gas.

3. Mitigation Measures

- To insure that the existing facilities are adequate to accommodate the new development within the planning area, an engineering study by the Southern California Gas Company shall be required. Detailed information including tract maps and plot plans must be submitted to the Gas Company Market Services Representative six months prior to construction of the natural gas pipeline.

- Developers shall use the most efficient water heaters, furnaces, pool heaters and other equipment which uses natural gas. In kitchens and throughout the developments, the use of appliances which utilize natural gas should be encouraged.

- The Town shall strictly enforce Title 24 of the California Administrative Code, which is related to energy conservation in new developments. Every effort should be made throughout developments to assure the highest level of energy conservation possible. Developers should also investigate the potential for the use of alternative energy sources including solar and co-generation technologies.

Mitigation Monitoring and Reporting

- The Community Development Department shall inspect all detailed project plans for conformance with Title 24 energy conservation code requirements. The Town and Southern California Gas should provide the developer with references for energy efficient design.
  Responsible parties: Town Community Development Department and Southern California Gas Co.

[38] Ibid.

Telephone Service

1. Existing Conditions

Business and residential telephone service in Yucca Valley and all Morongo Basin communities is provided by GTE California. Headquartered in Thousand Oaks, GTE California provides a variety of basic and special services and features to businesses and residential customers. Three types of residential telephone service are offered. Flat rate service provides for unlimited local calls at one price, measured service has a lower monthly rate but incremental charges for local calls, and their Lifeline service is also available, within certain restrictions, to low income customers.

Local calls are considered to be any location from zero to twelve miles, and the cost of a local call is 40¢ for the first minute, and 10¢ for every minute thereafter. A variety of service options are available including calling cards, Personal Secretary, Smart Call services and Business Line 800[39].

Table III-39
1993 GTE - Telephone Rates Available in the Town of Yucca Valley

Residential	$9.75	flat base rate per month
	$3.00	measured service, customer responsible for all local calls above $3.00 per month.

Source: GTE, September 1993

2. Project Impacts

Given the large scale of the planning area, GTE indicated that negotiations with developers will be necessary in order to establish a conduit system to service their projects. No significant impacts were identified on their ability to provide telephone service to the planning area[40].

3. Mitigation Measures

- Developers shall provide required right-of ways for new GTE conduit systems to provide telephone services to their sites.

Police Protection

1. Existing Conditions

Police protection is provided by the San Bernardino County Sheriffs Department, located at 6527 White Feather Road in Joshua Tree. The Department serves Yucca Valley, Joshua Tree and unincorporated areas of the County and has a total of seventy (70) paid employees which offer response services, criminal investigation services, traffic enforcement and preventative patrol. Of the 70 Employees, approximately 17 work directly for the Town of Yucca Valley. The following tables give a breakdown of existing employees of the Sheriffs Department, and the portion serving the Town of Yucca Valley[41].

[39] GTE California, September 1993.
[40] Ibid.
[41] Personal telecommunication with the San Bernardino County Sheriffs Department, Lt. Ed Ripley, November 1993.

Table III-40
Employees of Sheriffs Department (1995)

Position	Employees of Sheriffs Department
Captain	1
Lieutenant	1
Sergeant	7
Deputy 3	6
Deputy 2	37
Jail Deputy	5
Civilian Employee	13

Source: San Bernardino County Sheriffs Department, Lt. Ed Ripley, November 1993; and Lt. Mike Howell, Sept. 1995.

Table III-41
Employees Serving Yucca Valley (1993)

Position	Employees Serving* Yucca Valley
Lieutenant	.37
Sergeant	1.57
Patrol Officers	9.86
Detectives	1.11
Station Clerks	2.19
Motor Pool Service Assistance	.25
Dispatchers	1.63

Source: San Bernardino County Sheriffs Department, Lt. Ed Ripley, November 1993.
* % is called the relief factor. San Bernardino County currently covers this remainder.
The service contract also covers vehicle maintenance and gas cost.
Lt. Mike Howell, Sept. 1995.

In addition, the Citizens on Patrol (C.O.P.) currently have two vehicles and twenty-one (21) volunteers sanctioned by and serving the Town of Yucca Valley. In addition to patrol services, some of these volunteers offer services to the Sheriffs Department for the incident command systems unit, line reserve, search and rescue, explorers, and cave rescue[42].

During the 1992-1993 fiscal year, the Sheriffs Department received 16,386 calls for service from within the Town of Yucca Valley. During this same year there were 2,872 reported crimes, of which the Department cleared (solved) 1,378, approximately 47.9%. There were 414 Part 1 (felony) arrests and 1,878 traffic citations. The Department handled 329 traffic collisions in the Town of Yucca Valley, of which, 279 were property damage only, 50 included injuries, and 3 resulted in fatalities. There were 69 drunk drivers cited within this period[43].

For the 1992 calendar year, the Sheriffs Department had an average pro-active patrol level of 15%. This means that officers on patrol had an average of 15% of their time free from calls. The desired response time for emergency situations is five minutes or less, with non- emergency call response time at twenty minutes or less.

[42] Ibid.
[43] Ibid.

2. Project Impacts

The Town currently has two patrols active at any one time. This constitutes one patrol for about every 8,950 population. As the Town continues to grow and its area expand, the Town will be required to expand it police force to meet increased demand. Based upon current officer to population ratios, the Town can expect to have an on-duty patrol force of approximately 6 at General Plan buildout. The need for expanded police protection will result in substantial increases in cost to the Town to provide these services.

3. Mitigation Measures

To assure the provision of the highest level of security and police protection to preserve and protect the health, safety, welfare and property of community residents and businesses, the following mitigations are recommended:

- Encourage the utilization of crime prevention principles through the integration of project planning which results in "defensible space," or high security designs, as a means of providing increased security in residential, commercial and industrial developments.

- The San Bernardino County Sheriffs Department, in its review of new development proposals, shall evaluate project plans on the Department's ability to provide proper police protection. This review shall include, but shall not be limited to internal circulation, project directories, street names, and numbering systems. New developments shall comply with recommended Police Department standards.

- Encourage and promote the Neighborhood Watch Program in all Town neighborhoods.

Mitigation Monitoring and Reporting

- The Town Sheriff shall monitor calls in the planning area and shall evaluate the need for additional patrol capabilities to cover the planning area. Adequate patrolling shall be reviewed.
  Responsible parties: San Bernardino County Sheriff's Department, Town Manager.

Fire Protection Services

1. Existing Conditions

The threat of fire poses hazards to both life and property. These hazards exist in both developed and undeveloped regions of the Town of Yucca Valley. Fires occurring in developed areas are usually building fires, rubbish fires, automobile fires, and brush fires on vacant lots. Fires in undeveloped areas include large brush and grass fires that can engulf several hundred acres or more.

Wild Land Fires

Wild land fires are usually caused by human activities such as equipment use and smoking, and result in the loss of valuable natural resources, soil erosion and damage to life and property. Once a wild land fire has been ignited, its outcome is affected by three environmental factors: fuel, climate and topography.

Topography

Topography influences wild land fire behavior and the ability of fire fighters to suppress fires once they occur. Fires tend to burn more rapidly upslope than down, and the steeper the slope, the greater the rate at which the fire spreads. Steep slopes also contribute to the channeling effects of winds which spread fires more quickly. In addition, steep slopes increase travel times for fire vehicles and fire fighters and restrict the methods possible for fighting the fire. Three classes of slope are used by the California Department of Forestry in calculating the topographic effects on fire severity. The definition of these three classes are provided below.

Table III-42
California Department of Forestry
Slope Classifications

Class	Slope	Possible Fire fighting Methods
I	0% to 30%	Direct attack possible with all-drive fire trucks, bulldozers, handcrews and aircraft.
II	31%to 50%	Beyond operating capability of all-wheel drive vehicles. Drive attack possible with bulldozers handcrews and aircraft.
III	51% or more	Mostly beyond operating capability of bulldozers. Handcrews and aircraft become primary tools.

Source: San Bernardino County General Plan Fire Appendix, BA-II-A-110.

Urban and Structural Fires

Due to the proximity of people and structures, fire in the Yucca Valley area poses a great threat to life and property. In the future, the proportion of industrial and commercial building will increase, the existing housing stock will age and new residential developments will be built in undeveloped areas adjacent to wild land fire hazard areas. These trends will have an effect on fire hazards and will require greater staff and equipment levels to maintain the Town 5 existing high standard of fire prevention and safety[44].

California Dept. of Forestry

Fire protection and life safety services are provided to the Town of Yucca Valley by the San Bernardino County Fire Department and the California State Department of Forestry. The California Department of Forestry operates out of the Yucca Valley Forest Fire Station (South Desert Battalion Headquarters) located at 7105 Airway Avenue, and provides protection to areas primarily outside of the community for vegetation/wild land fires. The California Department of Forestry does not have jurisdiction within the Town, but is contracted to provide fire protection services strictly on a need basis[45].

[44] Personal telecommunication with Chief Bob Munsey of the San Bernardino County Fire Department, November 1993.
[45] Personal telecommunication with Risk Manager Mr Dean Buyer of the State of California Department of Forestry, November 1993.

San Bernardino County Fire Department

The San Bernardino County Fire Department has two stations serving the Town of Yucca Valley: Station #121, located at 57201 29 Palms Highway and Station #122 located at 58612 Aberdeen Road. The Yucca Valley Fire Protection District encompasses sixty-one (61) square miles and had a total Assessed Valuation of $776,998,452 for 1992. The Fire Department's fire protection, suppression and rescue equipment consists of thirteen (13) vehicles, including: four engines (three Type 1/Class A pumpers and one tele-squirt pumper); three paramedic ambulances; one water tender; two four-wheel drive staff vehicles; two additional sedans, and a utility truck. The Department's paid personnel numbers twenty-two (22), and the department is authorized for twenty four (24) positions. In addition to these two unfilled positions, the Department is authorized for fifteen (15) paid on call positions for use on an as needed basis[46].

Table III-43
Fire Related Peakload
Water Supply System Guidelines

Residential Density	Fire Flow System Flow (gallons/minute) x Duration (hours)	
up to 1du/20acre	***	***
>1 du/20 acre-1 du/5 acre	750	1
>1 du/5 acre-1 du/acre	750	2
>1 du/acre-2 du/acre	1,000	2
>2 du/acre-4 du/acre	1,500	2
>4 du/acre-7 du/acre	2,000	2
>7 du/acre-12 du/acre	2,500	2
>12 du/acre	3,000	3
Commercial	3,000	3
Industrial	3,500	3

Source: San Bernardino County General Plan, Fire Appendix, BA-II-A110.
*** In areas where water systems are not required, individual dwellings should generally have a minimum of 3,000 gallons of on-site storage for total peak load water supply

National Fire Insurance Organizations and the National Fire Protection Association formally recommend a maximum emergency response time of five minutes. With the two existing stations which serve the Town of Yucca Valley, the Fire Department currently meets this emergency response standard.

Fire Prevention

In addition to adequate means of fire suppression, fire prevention efforts are essential to an effective fire protection program. The best way to control a fire is to prevent it form occurring. The San Bernardino County Fire Department encourages this approach through its public education programs and regularly scheduled inspection of all non-residential buildings. The Building and Fire When there is inadequate water flow within the supply system, the Department also require, for non-residential buildings, built-in fire protection systems including automatic fire sprinklers, fire resistant construction, early warning fire detection systems, in addition to access and setback requirements which facilitate fire fighters' entry and provide fire breaks[47].

[46] Personal telecommunication with Chief Bob Munsey of the San Bernardino County Fire Department, November 1993.
[47] Ibid.

2. Project Impacts

Expanded urbanization in accordance with the proposed General Plan is expected to increase the demand for fire protection services. As the planned urban areas build out, it will be necessary to determine the need for additional services, i.e. additional fire trucks, rescue vehicles, and possibly a second fire station. Some of the future urban areas may lie outside the five minute response time area, and could result in the need for the additional fire station and equipping of same.

3. Mitigation Measures

To assure the provision of the highest level of fire protection to preserve and protect the health, safety, welfare and property of community residents and businesses, the following mitigations are recommended:

1. Maintain the Mutual Aid Agreement with the California Department of Forestry and continue close coordination with regard to the timely expansion of services.

2. Enforce fire codes and other applicable standards and regulations in the course of reviewing building plans and conducting building inspections.

3. The siting of industrial facilities which involve the storage of hazardous, flammable or explosive materials shall be conducted in such a manner as to assure the highest level of safety in strict conformance with the Uniform Fire Code and other applicable codes and regulations.

4. Potentially hazardous materials associated with the health and life-saving function of medical facilities shall be reviewed and regulated by the Town and other appropriate agencies.

5. The San Bernardino County Fire Department, in its review of new development proposals, shall evaluate project plans on the Department's ability to provide proper fire protection. This review shall include, but shall not be limited to, internal circulation, project directories, street names, and numbering systems. New developments shall comply with Fire Department standards.

6. Standards shall be established for street addressing, naming, and lighting in order to facilitate and improve emergency response.

Mitigation Monitoring and Reporting

- The San Bernardino County Fire Department shall inspect all detailed project plans for conformance with all fire protection requirements of the Town and County as outlined above.
  Responsible party: San Bernardino County Fire Department.

Schools

1. Existing Conditions

The Town of Yucca Valley lies within the Morongo Unified School District. Existing schools which serve the project area include Yucca Valley Elementary (K-6), Yucca Mesa Elementary (K-6), La Contenta Junior High (7-8), Yucca Valley High (9-12), and Sky Continuation Schools (9-12). Table III-44 below shows capacity and enrollment information for 1993.

Table III-44
1993 Capacity and Enrollment for MUSD

School	Capacity	1993 Enrollment	Capacity Deficit
Yucca Valley Elementary	817	897	+80
Yucca Mesa Elementary	518	591	+73
La Contenta Junior High	618	923	+305
Yucca Valley High	950	1,345	+395
Sky Continuation High	125	118	-7
Onaga Elementary School	717	750	-50

Source: Jeannine T. Sabel, Facilities Planning and Development Director, Morongo Unified School District, December 10, 1993.

As illustrated in Table III-44, all schools, except the Sky Continuation High School, have enrollments that well above their facility capacities. La Contenta Junior High and Yucca Valley High have particularly alarming capacity surpluses.

2. Project Impacts

Future impacts to the Town's school system will be calculated on a project-by-project basis. Without knowing the exact demographic make-up of future residential development, it can be difficult to estimate the actual number of students to be generated.

Based on the number and type of dwelling units existing in the Town in 1993 and projecting this type of development, consistent with the land use pattern of the General Plan, the District has estimated that the General Plan will generate an enrollment of 3,877, 2,418, and 3,815 for elementary, middle schools and high schools, respectively. Total projected enrollment would be 10,110 students.[48]

These figures are for buildout of the Town, thus the increase in enrollment will occur gradually over the projected years of development phasing. Although it can't be quantified at this time a portion of households within future projects will more than likely be occupied by seniors, and thus not add children to the local schools.

The commercial portions of the planning area will create additional jobs and new households within the District, further contributing additional students. Students generated by commercial development should be evaluated on a project by project basis since this is determined by the square footage of the development and figures have not been quantified at this stage of planning.

The District has recommended that three elementary schools, one middle school, and two additions to existing high schools be provided within the Morongo Unified School District. Provided that these facilities are actually incorporated within the District, significant impacts upon student capacity within the Morongo Unified School District can be lessened.

Although the school district has plans for providing additional school sites and additions to existing facilities, the additional students generated by future residents within the Town of Yucca Valley will result in a significant impact upon the School District. Since annual operating costs of public schools are primarily covered by State Average Daily Attendance (ADA) payments, significant impacts from this increased population by the Town will be on the financing of construction for new facilities and the proposed additions to existing facilities. For the success of future school construction projects, a financing agreement for these facilities must be made between the project applicant and the District prior to development.

[47] Ibid.
[48] Sabel, Jeannine T., Director of Facilities Planning and Development, Morongo Unified School District, February 28, 1994.

3. Mitigation Measures

In the event that developers in the planning area attempt to utilize Mello-Roos or other types of public facilities financing districts, the school district shall be included in discussions to see if and how the developer may cooperate with the district and participate in its funding streams. The District has the following alternatives available to mitigate significant impacts to area schools.

- Leroy F. Greene State School Building Lease-Purchase Law-This act provides for the construction, reconstruction, or replacement of school facilities by the State Allocation Board under an agreement between the school district and the state. The State is currently unable to fund many of the requests throughout California. First priority for future state funding will go to districts with 1) a substantial enrollment in year-round schools, 2) the ability to raise 50 percent of project costs and 3) the opening of a new facility as a year-round school. Morongo Unified School District has been relying on this program as much as possible. Additions to Yucca Valley High School and the future construction of Nobb Elementary School will have construction costs covered 100% by this program.[49]

- Lease-Purchase Arrangements-Many districts may enter into lease-purchase arrangements with private builders of portable classrooms (Section 39240 and 39290 of the State Education Code). This method can also be used to finance capital outlay. An additional advantage of lease-purchase agreements is that they offer the benefits of long-term debt financing without obtaining voter approval of special taxes or benefit assessments. The Morongo Unified School District has developed this option for the construction of relocatable classroom needed within the District.[50]

- Developer Fees-In 1986 the State Legislature approved AB 2926 (Chapter 887), which authorized school districts to charge development fees to fund construction or reconstruction of schools. With the failure of related legislation on the ballot in 1993, school fees have been set at $1.72 per square foot of residential development and $0.27 per square foot of commercial development. Limits on the maximum fee that can be collected are set by Government Code Section 65995. Also applicable are Government Code Sections 53080 constraining the issuance of development permits until proof of compliance with the School District's resolution has been provided.

- Mello-Roos Community Facilities Act-Provisions for this funding option are located in Government Code Sections 55311 et.seq. A school district must initiate proceedings to declare itself a community facilities district to benefit from this Act. A community facilities district is defined as a governmental entity established to carry out specific activities within specifically defined boundaries. Such a district may engage in the purchase, construction or rehabilitation of any real or tangible property with an estimated useful life of five years or longer. The Morongo Unified School District is not currently exploring the formation of a Mello-Roos district, however, as funds for school construction from the State begin to dwindle, this may be a necessary option for the Town of Yucca Valley and other Morongo Basin communities in the future. The Mello-Roos funding mechanism is. increasingly being used throughout the state.

Mitigation Monitoring and Reporting

- As discussed above, several mitigation measures exist to mitigate impacts to District schools. The Morongo Unified District will utilize the measures it determines best fit the situation.
  Responsible parties: Morongo Unified School District, Community Development Department.

[49] Sabel, Jeannine T., Director of Facilities Planning and Development, Morongo Unified School District, February 28, 1994.
[50] Sabel, Jeannine T., Director of Facilities Planning and Development, Morongo Unified School District, February 28, 1994.

Libraries

1. Existing Conditions

The Yucca Valley Branch Library is a part of the San Bernardino County Library System. Yucca Valley's branch consists of an 8,200 square foot facility that houses over 30,000 books and more than 1,000 video and audio cassettes. The library also subscribes to 116 magazines and 6 newspapers.[51] This branch is considered adequate in size for the present population level with .5 square feet per capita and 1.7 volumes per capita. The desired level of service is calculated at .5 square feet per capita and 1.2 volumes per capita.

2. Project Impacts

Buildout of the Town of Yucca Valley's General Plan land use scenario would add a substantial amount of people to the Town's population and increase the demand on library services. This increase in population would adversely impact library services requiring such support items as additional reading tables, staff assistance, computers, and space. In order to maintain the current level of service, an additional library will be needed in the area to serve the increased population from future projects in the Town.

There are currently (1993) no plans for the expansion of the existing Yucca Valley Library facility. However, due to the library's location in the community center complex just north of Highway 62, expansion of this facility might not be the most appropriate manner in which to address the predicted lack of services. This is due in a large part to the Libraries location. The location of the existing site is not easily gained by the more populous areas of Town that lie to the south of Highway 62, especially the children. There is also a complete absence of trails accessing the facility, and with the greater numbers of school age children living in the south end of town, safe access to the facility may be in question.

3. Mitigation Measures

Mitigation is unnecessary for direct impacts associated with proposed development at this time. Increased tax revenue will be generated by future development in Town and may be used to help fund the San Bernardino County Library System. The San Bernardino County Library System provides library materials, services and maintenance to the Yucca Valley Library, paid for through the general fund of San Bernardino County. In addition, this County library may apply to the Board of Supervisors for funding for a specific project from the county fund for facilities now in effect. However, it should be noted that a county library must compete with other county agencies for that funding. Originally, the Yucca Valley Library was financed in October of 1973 through a joint powers agreement with the Yucca Valley Parks and Recreation Department[52].

Mitigation Monitoring and Reporting

- While library facilities are currently supported by a portion of property taxes, the Town may wish to consider the establishment of a facilities impact fee to finance future library facilities.
  Responsible parties: San Bernardino County Library System, Community Development Department.

[51] Chamber of Commerce, Informational Sheets on the Town of Yucca Valley-"Library Services," Chamber of Commerce, Yucca Valley, 1993

[52] Kopach, Paul, Head Librarian, Yucca Valley Public Library, December 17, 1993.

Medical Services

1. Existing Conditions

Health facilities planning has become an increasingly important issue as people continue to live longer. Seniors over the age of 65 make up 25% of the Town's population.[53] Most professional health Care facilities are provided by the Hi-Desert Memorial Hospital District, which was created in 1972. The Hi-Desert Memorial Hospital District is a business organization that makes decisions as to the location and need of certain facilities within the Morongo Basin area while providing for short and long term institutional care.

The closest primary hospital facility to Yucca Valley is the Hi-Desert Medical Center (HDMC), located in Joshua Tree. The HDMC is a non-profit, acute primary care hospital and continuing care center. Of its 176 beds, 56 are acute care beds in the acute primary care hospital (4 are ICU/CCU), 98 are long term care resident beds for transitional care, and 22 are sub-acute care beds for patients needing around-the-clock care. Hospice services are offered through the Hi- Desert Medical Center to any person and their families coping with a terminal illness on an outpatient (or in-home) program.

Desert Hospital is a private non-profit licensed 398 bed hospital located in Palm Springs. It serves as a specialty hospital for the area offering the most notable intensive care facility between Riverside and the Arizona border. This hospital has a twenty-four hour emergency room and a level II Trauma Care facility with a staff of specially trained trauma surgeons to offer their aid in the event of a major injury. Like the Hi-Desert Medical Center, Desert Hospital also has a Home Health Care department which provides in-home nursing and household maintenance service. The Hospice of the Desert has been incorporated into the Desert Hospital operations to provide specialized counseling for the terminally ill.

The next closest hospital to the planning area is Eisenhower Medical Center, located in the City of Rancho Mirage. This hospital is licensed for 239 beds with an occupancy rate of approximately 80%. Twenty-four hour emergency facilities are also available here with at least one full time physician on duty at all times. Located on the same grounds are the Betty Ford Center for Chemical Dependency, the Annenberg Center for Health Education and the Barbara Sinatra Center for Abused Children.

The Town of Yucca Valley is served by two major emergency response organizations: the San Bernardino County Fire Department and the San Bernardino County Sheriffs Department. The Hi-Desert Medical Center is located four miles from the eastern Town limits, however if a trauma situation is encountered needing specialized services, Desert Hospital facilities in Palm Springs may be necessary. Desert Hospital is located approximately thirty miles from the western Town limits.

2. Project Impacts

Demand for additional services, especially emergency medical services, has grown dramatically in the Morongo Basin area. Nearly 13,000 patients were treated in the emergency department in 1991. This is a 100% increase in usage over 1985. As a result of this alarming trend, the emergency department of the Hi-Desert Medical Center will be doubled in size and the outpatient service will be modernized. There are no plans for the future construction of health facilities within the Town of Yucca Valley proper.

[53] 1990 U.S. Census of Population and Housing.

The Hi-Desert Medical Center is responding to anticipated future growth by first addressing their existing shortfall in their emergency room facilities. As stated, in the first paragraph of this "Projects Impacts" discussion, the emergency department will be doubled in size to include two trauma rooms a cast room, three cardiac rooms, four examination rooms, and other necessary facilities totalling approximately 5,620 square feet.[54] These future expansions are planned pending the acquisition of future financing.

3. Mitigation Measures

No significant impacts to hospital services have been identified, that local and regional facilities have not anticipated and planned for, therefore no mitigation measures are necessary.

L. Socio-Economic Resources

1. Existing Conditions

Southern California Regional Growth

The Town of Yucca Valley and the larger Morongo Basin are directly impacted by the economic conditions of the Southern California region. The region, as defined by the Southern California Association of Governments (SCAG) includes all of the Southern California Counties, excluding San Diego County. The SCAG region includes Los Angeles, Ventura, San Bernardino, Riverside, and Imperial Counties. More than 6% of the nation's population reside in the region. If the region were a state, it would rank second only to New York in personal income.

Since 1920, growth in the SCAG region has been rapid with a population increase of 171% between 1920 and 1940. World War II initiated explosive growth which increased regional population to more than ten million by 1970. The pattern has continued with a 1985 population estimated at 12.8 million and a 1992 population of 15.2 million. If current demographic and economic trends continue, the Southern California (SCAG) region would increase to 18.3 million people by the year 2010, representing an increase of 5.5 million people or an increase of 43% over the 1885 population.

Yucca Valley Economic Background

The earliest economic activities in the Yucca Valley area, with the exception of the hunting and trading of native Indian tribes, were cattle ranching, and the mining of gold and turquoise. In the early 1900's, Yucca Valley was considered to be the hub of mining activity. The area served as a popular stop for miners, prospectors and freighters passing through to the Pipes Canyon area, Dale Mining District, and the many mines south of Twentynine Palms to the railroads at Garnet or Banning[55].

In the 1940's, with land promoters and the arrival of additional people in the Valley, real estate and construction became the main industries in the area. Additional homes and population created the need for a variety of commercial uses, including both professional and shopping facilities. Between 1946 and 1960, cafes, grocery stores, furniture and drug stores, variety and hardware stores, beauty and barber shops and the Security First National Bank were established within the Town.

The years from 1960 to 1965 showed tremendous growth. Many new and larger businesses came to the Town, including several large chain operations such as the Golden State Dairy (Foremost), Cornet, Safeway and Bank of America. Modern service stations, shopping centers and professional buildings were built, and the residential community continued to grow with the establishment of professional businesses, including physicians, dentists and attorneys throughout the area[56].

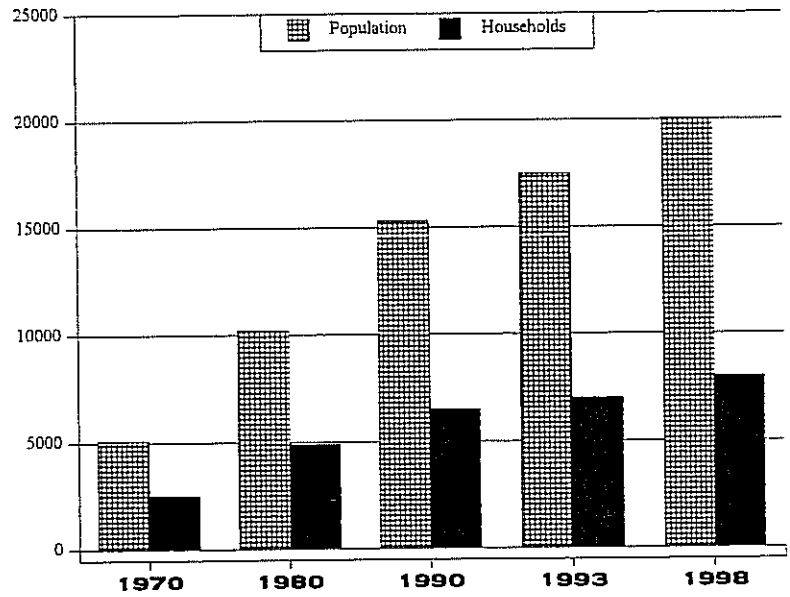
[54] Hi-Desert Medical Center Foundation, "Providing for Today.. and.. Tomorrow," Hi-Desert Memorial Hospital District, Joshua Tree, CA, 1993.
[55] "Yucca Valley and Its History " written by May Lillian Clark and Twilla G. Couzens. Copyright 1966.
[56] Ibid.

The following discussion includes economic development trends for the Town of Yucca Valley from 1970 to 1993. Population, housing and income trends are included in order to define the demographic characteristics of the area and to provide a basis for growth trends and analysis. Building valuations, the role of tourism and taxable sales data are also included to illustrate the active economic environment of the Town. All of these characteristics of the community are essential in determining the status and long term potential for the economic development of the area. Projections for the year 1998 are also included where possible.

Population

From 1970 to 1990, growth continued in the Yucca Valley area, with population and the number of households increasing annually by 10% from 1970 to 1980, and approximately 9% from 1980 to 1990. From 1990 to 1993, population growth slowed to 3% annually, reaching 18,336 persons by 1994. The following graph shows the population and household trends and projections from 1970 to 1998[57].

Graph III-1
Town of Yucca Valley



Source: Urban Decision Decisions, Inc., Area Profile 1990 for the Yucca Valley Town Limits, Area Summary and the California Department of Finance, 5/93.

[57] Urban Decision Systems, Inc. Area Profile; Yucca Valley proposed City Limits. Area Summary, the U.S. 1990 census June 29, 1993

Population by Age Group and Race

The median age in Yucca Valley as of 1990 was 40.8 years. Table III-45 presents the number of persons for various age ranges and the percent of total population for each group.

Table III-45

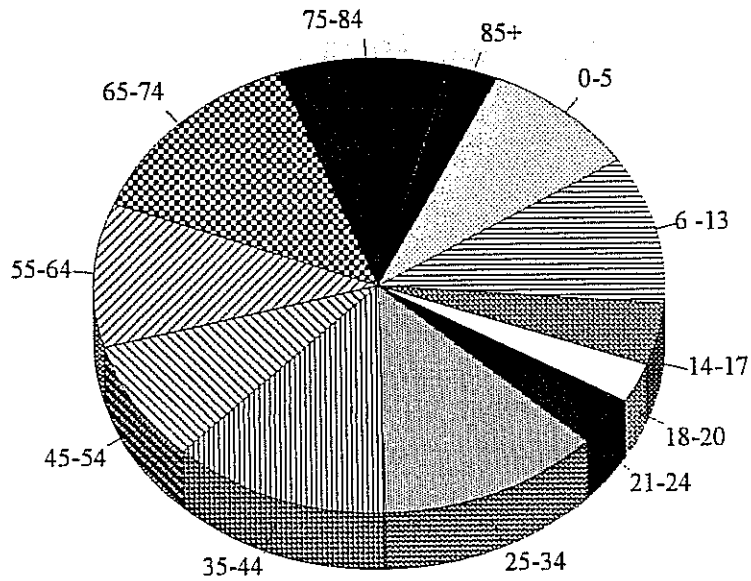
Town of Yucca Valley Age Distribution-1990

Age	Number	% of Total
0-5	1,422	8.7%
6-13	1,751	10.7%
1417	715	4.4%
18-20	484	3.0%
21-24	591	3.6%
25-34	2,048	12.5%
35-44	2,056	12.5%
45-54	1,412	8.6%
55-64	1,645	10.0%
65-74	2,186	13.3%
75-84	1,598	9.7%
85+	495	3.0%
Total	16,403	100%

Source: 1990 U.S. Census of Population and Housing

This table and the following graph illustrate the age characteristics of the Yucca Valley community in 1990. These numbers show that in 1990, dependent children made up approximately 23.8% of the total population, and seniors 65 years and older make up about 26%, with 36% of the population at 55 years and older.

Graph III-2
Town of Yucca Valley
Age Distribution 1990



Source: 1990 U.S. Census of Population and Housing

These age characteristics have varied slightly over the past few years, and as of April 1, 1993, it has been estimated that the median age has risen to 41.8 years of age. In addition, dependent children make up 24.2% of the total population, and seniors of 65 years and older make up approximately 27.9%. It is estimated that the median age will decrease in 1998 to 40.4 years of age, falling below that of 1990.

Ethnic Characteristics

The Town of Yucca Valley, along with the entire Morongo Basin, is primarily a Caucasian community, as few Blacks, Asians or American Indians reside in the area. Although the number of minorities has increased over the past few years, it is projected that the Caucasian population will still make up over 90% of the Town's total population in the foreseeable future. The following two tables illustrate the current and projected number and percentage of each ethnic group in the Town of Yucca Valley.

Table III-46
Ethnic Characteristics- 1990

Race	1990	1993	1998
White	15,356	16,611	18,344
Black	213	304	461
Asian/Pacific Islander	228	286	421
American Indian	170	161	140
Other	436	538	662
Hispanic Origin	1,148	1,432	1,925
Total	16,403	17,900	20,048

Source: Urban Decision Systems, Demographic Trends for the Yucca Valley Town Limits, based on the 1990 U.S. Census of Population and Housing

Table III-47
Ethnic Characteristics Percentages

Race	1990(%)	1993(%)	1998(%)
White	93.6%	92.8%	91.5%
Black	1.3%	1.7%	2.3%
Asian/Pacific Islander	1.4%	1.6%	2.1%
American Indian	1.0%	0.9%	0.7%
Other	2.7%	3.0%	3.3%
Hispanic Origin	7.0%	8.0%	9.6%
Total	100%	100%	100%

Source: Urban Decision Systems, Demographic Trends for the Yucca Valley Town Limits, based on the 1990 U.S. Census of Population and Housing

Household Size

In the Town of Yucca Valley, the average household size in 1970 was estimated at 2.21 persons. With continued population growth, the average household size continued to increase, reaching 2.25 persons by 1980 and 2.35 persons by 1990. The average household size is estimated again to have increased in 1993 to 2.49 persons per household, and it is estimated that this number will rise to 2.52 by 1998. However, these numbers are comparatively low, as in 1990 the state of California's average household size was 2.8 persons, greater than that projected for 1998 in the Town of Yucca Valley, thereby emphasizing the rural character of the community[58] Nonetheless, this trend clearly points to the broadening of family households versus strong historic retirement households in the Town.

The Town of Yucca Valley has, over the years, attracted an older resident due to its clean, dry air and rural lifestyle. Since 1970, following the trend in family household formation, the median age of the community has decreased from 56.6 years of age in 1970 to 40.8 years in 1990[59]. Although the median age has significantly decreased due to the development of a larger commercial base, the Twentynine Palms Marine Base and a more extensive school system, which attract younger families to the area, the median age in 1993, at 41.8 is still comparatively higher than that of the state for 1990 (33.2 years of age)[60]. Additionally, it has been projected, based on the 1990 Census, that the median age for the Yucca Valley area will again decrease to 40.4 years of age by 1998[61].

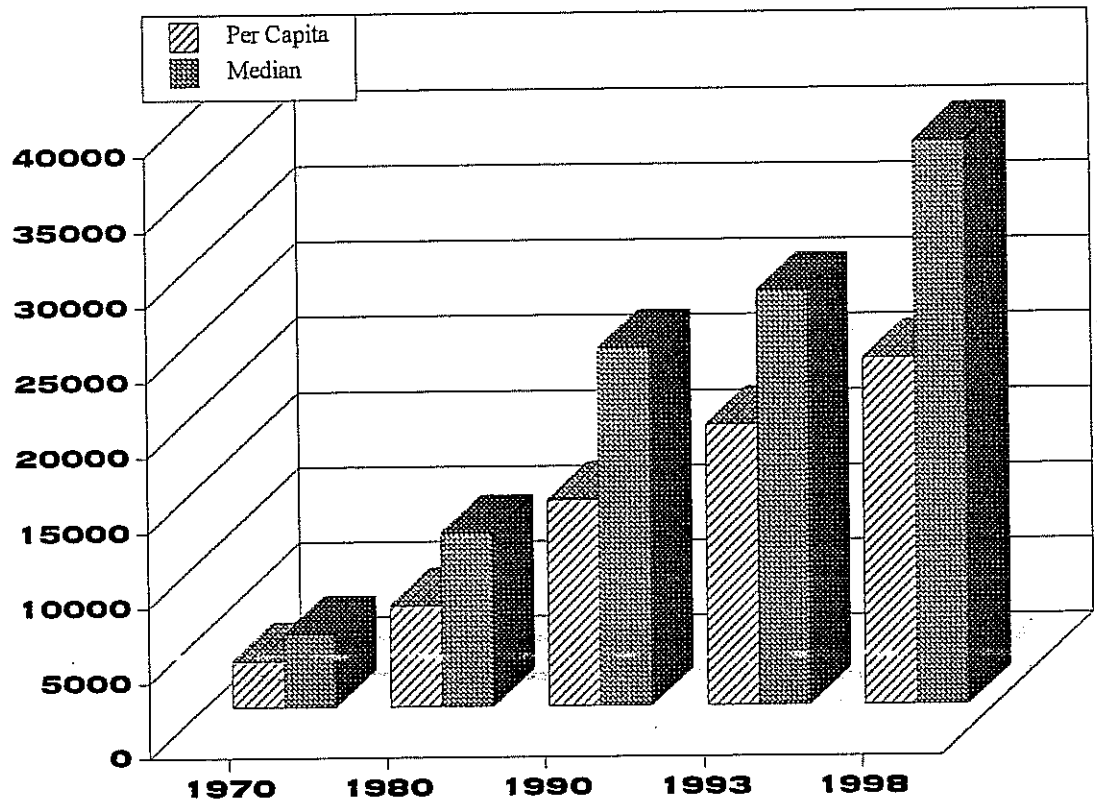
Per Capita and Median Household Incomes

Along with the expansion of housing units and population came an increase in the total per capita and median household income. The per capita income levels have increased from $3,083 in 1970 to $6,692 in 1980. From 1980 to 1990, the per capita income again rose to $13,697, a 105% increase. The per capita income level is currently estimated at $18,622, a 36% increase from the 1990 income level[62].

The median household income in the Yucca Valley area has also shown significant increases over the last twenty years. In 1970, the median household income was $4,860, and currently this level is $23,741, approximately a 17% annual increase. The relatively constant increases in both the per capita and median household incomes reflect the greatly increased buying power of the residents in the area. The following graph shows the increase in both income levels and provides projections for the year 1998, with per capita and median household incomes estimated to be $23,022 and $37,364, respectively.

[58] Ibid.
[59] Ibid.
[60] Ibid.
[61] Ibid.
[62] Ibid.

Graph III-3
Town of Yucca Valley
Per Capita and Median Household
Income Trends from 1970 through 1998



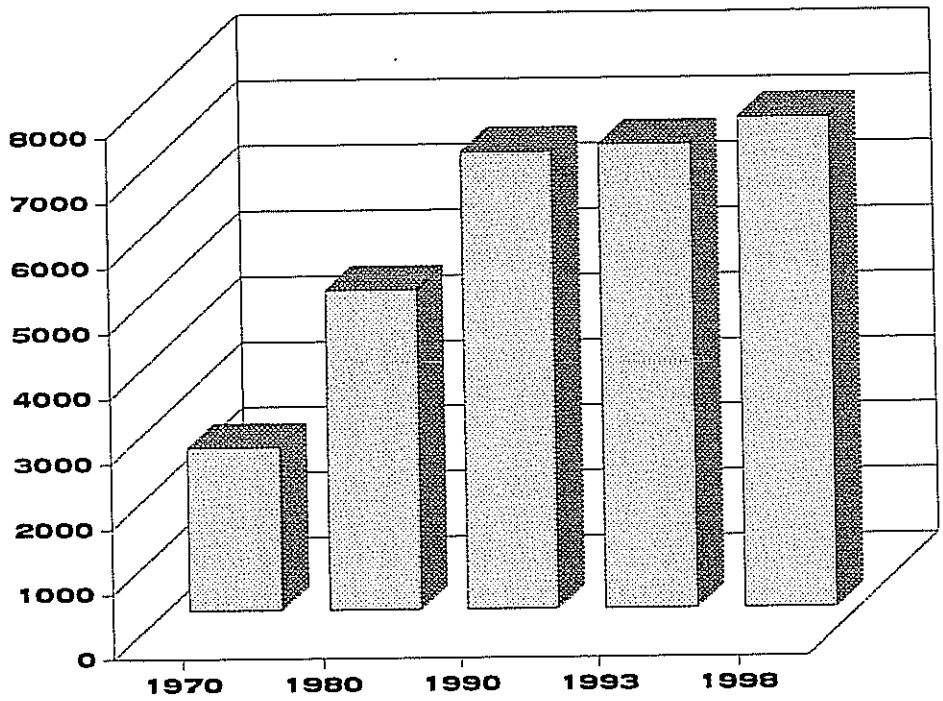
Source: Urban Decision Decisions, Inc., Area Profile 1990 for the Yucca Valley Town Limits, Area Summary and the California Department of Finance, 5/93.

Although these increases indicate an active economy, the median household income for 1990 of $23,741 was still considerably lower than that of San Bernardino County and the State of California, which were estimated to be $36,500 and $39,598, respectively. It is, however, evident that although the Town of Yucca Valley has not had a comparatively high income level, the rather constant increases in both the per capita and median household incomes add significantly to the economic development of the community. The increase of buying power and the expansion of the commercial base in the Town will secure the Town of Yucca Valley as the commercial and economic center of the Morongo Basin.

Housing Market Trends

It is estimated that in 1970 there were approximately 2,493 housing units within the Town boundaries, and 4,853 units by 1980, for an increase over this ten year period of 95%. From 1980 to 1990, the housing growth rate slowed in the area, showing only a 43% increase in units. Despite this slowdown, housing growth rates in the Yucca Valley area still indicate an active and growing economy over the period. In the past three years there has been very little residential growth in the community. With the implementation of suggested programs, the use of available funds, and economic recovery, an estimated 10% increase in total units is projected for the period 1990 to 1998. The following graph illustrates the housing unit trends for the Town of Yucca Valley from 1970 to 1998.

Graph III-4
Housing Unit Trends for the
Town of Yucca Valley 1970-1998



Source: Urban Decision Decisions, Inc., Area Profile 1990 for the Yucca Valley Town Limits, Area Summary and the California Department of Finance, 5/93.

In addition, the following table shows a comparison of housing units in the Town of Yucca Valley in 1990 and 1993. It is evident that the majority of structures in the Town are single family dwellings, which is to be expected in a rural community.

Table III-48
Housing Characteristics for the Town of
Yucca Valley 1990-1993 Comparison

Year	1 unit	2 units	3 to 4 units	5+ units	Total units	MH, trailers
1990	5,971	276	327	367	6,941	777
1993	6,071	276	327	367	7,041	787

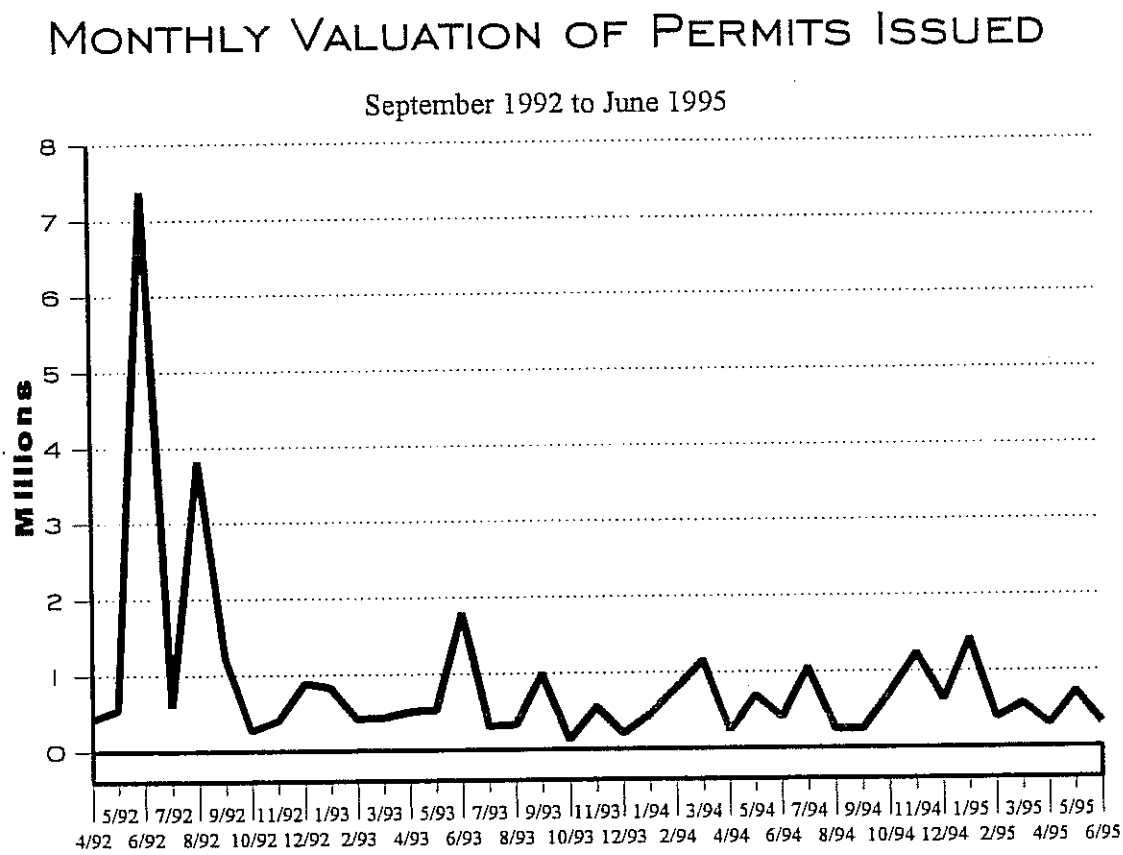
Source: Urban Decision Decisions, Inc., Area Profile 1990 for the Yucca Valley Town Limits, Area Summary; Terra Nova Planning and Research, Inc.

It is evident that residential construction activity continues to be single family home development. These housing characteristics again emphasize the rural character of the Town, which is preserved through the high ratio of single family homes in relation to apartment complexes. Home prices are lower than those found in most of Southern California and 35% lower than the nearby Coachella Valley. Many residential areas feature steep hillsides and expansive flat mesas with spectacular views. Residential construction has been relatively slow but consistent in recent years.

Construction Valuation Trends

As stated earlier, the Town has experienced relatively stable growth since the 1970's. Until the mid-eighties, the value of new construction was primarily concentrated in single family residential construction. While single family home valuation still represents about 35% of total valuation, commercial and industrial values have greatly increased and currently represent 65% of the total building permit valuation for the Town of Yucca Valley. Dependable historical data is unavailable, however, Graph III-5 illustrates the total building valuations from April 1992 to June 1995, providing a benchmark against which future growth can be measured.

Graph III-5
Construction Valuations
September 1992-June 1995



Source: Town of Yucca Valley Community Development Department, September 1995.

The total building valuation for the period of April 1992 through June 1993 was $13,478,659. More specifically, $4,456,808 can be attributed to single family home construction, $6,042,675 to commercial structures and $2,979,175 to other structures built within the Town limits. These numbers indicate that the Town of Yucca Valley is continually expanding as a commercial and industrial center for the Morongo Basin. With the growth of commercial and industrial services, the Town will attract residents of surrounding areas, and increase economic growth and development through the capture of taxable sales from non-residents of the community.

Commercial Trends

Yucca Valley is the commercial center of the Morongo Basin and California's southern Mojave Desert. The area is linked to Interstate 10 via Highway 62, and Interstate 15 via State Highway 247, and benefits from visitors in route to the Colorado River and Laughlin, Nevada and the adjacent Joshua Tree National Park.

The eastern portion of the Highway 62 commercial corridor still has large vacant areas that can serve master planned community-scale commercial and mixed use development. Yucca Valley's west-end business district features many long-time, locally owned businesses. The Civic Center business district offers a mixture of businesses and a variety of services including the Community Center, Post Office, utility and professional offices and financial institutions. Finally, the east end, because of the availability of large parcels of land, has been the site of substantial growth. In 1992, two community-scale shopping centers (K-Mart and Wal-Mart) were built.

Sales Potential

The 1990 aggregate and per capita sales potential for the Town of Yucca Valley are provided in Table III-49 below. The table illustrates that the largest existing expenditure categories are grocery stores, restaurants and department stores. The table also breaks down the per capita sales potential in relation to the various types of stores within the Town of Yucca Valley, with individual residents annually each spending up to $1,049 on groceries, and $591 at restaurants.

Table III-49
1990 Annual Expenditure Estimate
for Town of Yucca Valley Residents

	Store Type Aggregate ($)	Per Capita ($)
Department Stores	$7,434,000	$531.71
Variety Stores	$488,000	$34.89
Catalog Showrooms	$514,000	$36.77
Grocery Stores	$14,668,000	$1,049.07
Convenience Stores	$904,000	$ 64.64
Apparel Stores	$3,302,000	$236.17
Shoe Stores	$608,000	$43.46
Jewelry Stores	$557,000	$39.84
Furniture Stores	$1,272,000	$91.00
Appliance Stores	$492,000	$35.17
Restaurants	$8,264,000	$591.02
Drug Stores	$2,936,000	$209.95
Liquor Stores	$1,210,000	$86.53
Hardware Stores	$658,000	$47.06
Lumber Stores	$3,081,000	$220.35
Lawn & Garden Stores	$219,000	$15.64
Paint Stores	$305,000	$21.79
Flooring Stores	$467,000	$33.42
1990 Total	$47,379,000	

Source: Urban Decision Decisions, Inc., Area Profile 1990 for the Yucca Valley Town Limits, Area Summary; and the California Department of Finance, 5/93.

For 1990, the total sales potential of Town residents is estimated to be $47,379,000. The 1993 population of 17,900 persons can be applied to these per capita calculations to approximate the annual sales potential for the year, which is estimated to be $51,689,162. In addition, for 1998 the annual sales potential is estimated to be $57,891,861.

Taxable Sales and Sales Tax Revenues

The earliest available and reliable taxable sales data for the Town of Yucca Valley is for 1992. These taxable sales figures, provided in Table III-50, indicate an active and thriving economy, with total taxable sales generated within the Town of Yucca Valley for 1995, at $136,749,000. This total illustrates that, on a per capita basis, the Town of Yucca Valley is capturing taxable sales from a population far exceeding that estimated in the previous table. Therefore, it is apparent that Yucca Valley is an important area-wide commercial center, attracting residents from surrounding communities to the actively growing commercial and industrial areas within the Town.

Table III-50
1995 Taxable Sales
for the Town of Yucca Valley

Type of Business	FY 95 First Qtr ($)	FY 94 First Qtr ($)	FY 95 ($)	FY 94 ($)
Gen Merch, Dept Stores, Drug, Variety	93,581	86,374	423,177	365,955
Motor Vehicle	53,527	56,133	226,556	236,599
Grocery Stores	41,216	39,672	165,782	171,078
Service Station	38,473	36,573	154,415	151,970
Fast Food	25,380	22,953	98,149	91,198
Auto Supply Stores, Petroleum Prod	15,271	15,424	59,484	91,690
Lumber & Building Materials	14,196	10,263	51,667	63,498
Restaurants	12,934	10,999	53,342	58,616
Auto Repair Shops, Motorcycles, Boats	9,659	8,817	34,225	33,221
Specialty Stores	5,828	7,354	25,138	26,016
Sporting Goods, Bicycle Stores	3,881	3,895	15,972	14,519
All Other Categories	29,879*	48,610*	142,282*	62,698*
Total All Outlets	**343,825**	**347,067**	**1,450,189**	**1,367,048**

Source: The California State Board of Equalization Taxable Sales in California (Sales and Use Tax), 1995.
* Note: These numbers are either not available or partially skewed due to limited outlets within the category.

The Town offers a unique combination of retail stores, and a broad range of commercial and industrial opportunities, in concert with its uncommon rural character. The Town's potential is, therefore, to provide the basis for far stronger economic development than would be realized merely by the population of Yucca Valley.

In 1990, approximately 722 taxable sales generators/outlets existed in the Town of Yucca Valley[63]. In 1991, this number decreased to 716 and in 1992 to approximately 708, possibly reflecting a weakness caused by the recession, which has hit the Southern California region particularly hard. Nonetheless, the drop in total outlets from 1991 to 1992 was only 1%, illustrating that very few businesses went out of business, but did generally see a reduction in per outlet sales[64].

[63] Town of Yucca Valley Community Development Department and Department of Building and Safety, February 1994.
[64] Town of Yucca Valley Community Development Department, September 1993.

Based on national and regional statistics, it is Possible to categorize the revenues generated by each type of business, and therefore identify the strengths and weaknesses in the sales tax revenue to the Town. The table below provides these approximate categorical distributions.

Table III-51
Categorical Sales Tax Breakdown by Quarter for the Town of Yucca Valley 1992

Sale Type	1st Qrtr	2nd Qrtr	3rd Qrtr	4th Qrtr
General Merchandise	$76,277	$82,511	$54,603	$97,333
Autos &Trans.	$82,434	$82,880	$85,548	$68,367
Food and Drugs	$62,766	$66,730	$73,556	$61,841
Fuel & Serv. Stations	$42,656	$42,632	$38,744	$47,987
Restaurants & Hotels	$39,372	$37,207	$35,678	$38,685
Total:	$303,505	$311,600	$288,129	$314,123

Source: Town of Yucca Valley Department of Community Development, September 1993.

It is difficult to estimate what percentage of the retail sales potential, shown in Table III-49, Annual Sales Potential, would remain within the Town. Currently, the large percentage of retail purchases by non-Town residents are partially due to limited selection of retail outlets in surrounding areas. As the population grows, sufficient demand for goods and services will be created to support an ever broader retail base. Furthermore, the growth of surrounding areas will generate needs for additional commercial and service industrial development.

Tourism and Traveler Revenues

The Yucca Valley economy is strengthened by tourism. In addition to the high traffic volume of recreational vehicles in route to the Colorado River and Laughlin, Nevada, the adjacent Joshua Tree National Park attracts more than 1.2 million visitors each year. To support these travelers, the Town currently has only 207 hotel/motel rooms. The following table shows the transient occupancy tax collected from the various hotels/motels in the area.

Table III-52
Yucca Valley Transient Occupancy Tax
(December 1991- June 1995)

	Average Dollars Per Month	Total
December 1991-June 1992	$6,722	$47,053
July 1992-May 1993	$7,266	$87,197
July 1993-June 1994	$6,197	$74,365
July 1994-June 1995	$5,798	$69,576

Source: Town of Yucca Valley Department of Community Development, September 1995

Hotel/Motel Trends

The Town has a unique potential, due to its location, to promote itself as the "Gateway to the Joshua Tree National Park." Joshua Lane, which intersects Highway 62 and the southerly extension of Old Woman Springs Road (Highway 247), is currently utilized as an access point to the Park. The Town should promote this road, possibly along with Quail Springs/Park Boulevard, as gateways to the Park as a stimulant to the development and expansion of hotels/motels in the community.

Industrial Development

A wide variety of industrial lands are available in Yucca Valley, at five industrial locations throughout the Town. These sites offer undeveloped tracts, as well as improved industrial/commercial sites at the Monterey Business Center, on lots ranging from one acre to 160 acres. The Monterey Business Center and north Highway 247 industrial area are currently the largest industrial areas in the community. They provide for excellent highway and regional roadway access and a local labor pool, which can be attractive to manufacturing companies in the region.

Employment

In 1990, the Town of Yucca Valley had approximately 3,026 residents considered to be white collar workers, and 2,486 residents as blue collar workers[65].

Table III-53
Occupations of Residents in the Town of Yucca Valley 1990

Occupation	Number of Residents
Professional/Tech.	868
Manager/Prop.	675
Clerical	804
Sales	679
Crafts	1010
Operatives	283
Service	870
Laborer	225
Farm Worker	99
Total:	5,513

Source: Urban Decision Systems, Inc. Area Profile: Yucca Valley Proposed Town Limits, Area Summary, based on the 1990 Census, June 29, 1993 based on the US Census Bureau's 1990 Census, and the California Department of Finance, 5/93.

The employment participation rate for the Town in 1990 was 57.8% for males, and 37.5% for females, with an unemployment rate for males of 7.2%, and 6.6% for females. The overall combined unemployment rate for the total labor pool was 6.9% in 1990.

In 1993 it is estimated that these numbers are very much the same, with 54.9% of the labor force as white collar workers, and 45.1% as blue collar workers. The following table shows the top nine employers in the Town of Yucca Valley for 1993.

Table III-54
Top Employers in the Town of Yucca Valley 1993

Business	Estimated # Residents
Morongo Unified School Dist.	600
Moyles Health Care	250
K-Mart Retail Store	190
Stater Brothers	110
Von's Market	90
Hi-Desert Star	75
Wal-Mart	75
JC Penny	40
Town of Yucca Valley	27
Hi Desert Water District	20

Source: County of San Bernardino's Community Profiles, January 1993, Department of Economic and Community Development, Economic Development Division, and telecommunication with store managers 11/93 to 12/93.

[65] Urban Decision Systems, Inc. Area Profile; Yucca Valley proposed City Limits, Area Summary, the U.S. 1990 census June 29, 1993

2. Project Impacts

All of the factors addressed in this section establish that the Town of Yucca Valley is the employment center of the Morongo Basin and an important commercial base for the lower Mojave Desert region. The Town has the potential to become an administrative center, as well as a corporate center for utility companies, banks and other corporations, with the availability of land, prime location and beautiful surroundings. In addition, the Town has the potential to utilize the Joshua Tree National Park for tourist and commercial development as well as RV parks and campground facilities.

Because the Town lies in a unique air basin, is located near an expanding military base and a national Park, and has favorable highway linkage, the potential for expansion of light and medium industrial, and commercial uses, as well as visitor serving facilities is extensive. It is assumed that the Town of Yucca Valley wishes to maximize its economic development potential, while establishing a balanced and secure economic future, which also preserves the best qualities of rural community living with a broadly based and enduring economy. To help diversify the local economy, the Town should examine a range of industrial development scenarios, which look at warehousing/distribution, manufacturing and other types of development that optimize existing facilities, services and transportation infrastructure.

New economic development pressures have arisen which constitute a prime opportunity for the Town and region to revitalize and realize substantial economic growth, while preserving the rural character of the area. The continued importance and viability of the regional transportation system, including Highway 62 and Highway 247, may play a critical role in the broadening of the local industrial base.

The socio-economic impacts associated with the proposed General Plan are expected to be positive. Buildout of the General Plan is not expected to occur within the next 20 years, but may require another decade or more before being realized. However, the General Plan does recognize the economic forces driving development in the Town. Continued growth will come from highway commercial development, traveler and vacation visitors to local motels and RV facilities which have been attracted to the area by the Joshua Tree National Park and desert recreation areas, and from limited industrial development. Inasmuch as future growth will result from continued development and generation of jobs, there is expected to be an overall balance between employment and housing needs. Therefore, no significant impacts to local socio-economic conditions are expected to result from adoption and implementation of the proposed General Plan.

3. Mitigation Measures

The proposed General Plan has been developed to allow the Town to maximize its economic development potential, while establishing a balanced and secure economic future, which also preserves the best qualities of rural community living with a broadly based and enduring economy. To help diversify the local economy, the Town has examined a broad range of industrial development scenarios, which look at tourist and highway commercial, warehousing/distribution, manufacturing or other types of development that optimize existing rural and urban facilities, services and transportation infrastructure.

By improving Town infrastructure and the coordinated promotion of the Town as a diversified urban economy, the groundwork may be laid for making the local economy less susceptible to economic downturns, and assuring a successful and prosperous future. Other mitigation measures are as follows:

- As a means of enhancing and maintaining the Town's financial soundness, every effort should be made to broaden the Town's tax base by actively soliciting revenue and employment generating development compatible and consistent with the Town's General Plan.

- Every effort should be made to enhance the tourist/traveler commercial potential of the Highway 62 corridor by establishing development standards and controls, which will result in functionally planned and attractive service facilities which leave a lasting positive impression on visitors to the Town.

- The Town should actively pursue and, if appropriate, participate in the development of industrial park facilities, which take advantage of existing major transportation facilities, including Highway 62, Highway 247 and the Airport.

- The Town should participate in promoting unique or special events/uses which will enhance the area's image as a tourist resort and recreation area, including appropriately located RV parks, a rodeo facility, desert camping and hiking, and similar events and uses.

- The Town should work closely with the County of San Bernardino to reinforce Yucca Valley's position as a regional administrative center through the cooperative planning of Town and County administrative facilities within the Town limits.

- Individual project applications should be reviewed and analyze to ensure a long term balance between employment and housing within the Town. Necessary analysis may include, but not be limited to, fiscal impact analysis, economic feasibility studies, and similar documents.