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ENVIRONMENTAL ASSESSMENT

**Proposed Morongo Basin Pipeline Project
Right-of-Way Application
and
Proposed Exception to Utility Corridor Element
of the
California Desert Conservation Area Plan**

**BUREAU OF LAND MANAGEMENT
California Desert District Office
6221 Box Springs Boulevard
Riverside, CA 92507-0714**

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IN REPLY REFER TO:
CA-29620
1790, 2800
(CA-060.5)

Dear Reader:

This Environmental Assessment (EA) for the Mojave Water Agency's proposed Morongo Basin Pipeline Project has been prepared in compliance with the National Environmental Policy Act (NEPA). We request your review and written comments, if any. Any written comments must be received by December 15, 1992 and should be sent to:

Bureau of Land Management
ATTN: Stephen L. Johnson
6221 Box Springs Blvd.
Riverside, CA 92507-0714

Any comments received by the close of the comment period will be evaluated and those letters that identify issues where clarification or discussion is required will be addressed in our Decision Record (DR). Copies of this DR will be provided to any person or agency commenting, or to other interested parties, upon written request.

Furthermore, the proposed action, if approved, will involve an amendment to the California Desert Conservation Area (CDCA) Plan. The resource management planning process includes an opportunity for administrative review through a plan protest to the BLM Director. Only those persons or organizations who participated in our planning process leading to this proposed plan exception may protest. The protest period extends for 30 days from the date of publication of our "Notice of Availability" in the *Federal Register* and the procedures to be followed are fully described in Chapter V of this EA.

Sincerely,

Henri R. Bisson
ACTING District Manager

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**ENVIRONMENTAL ASSESSMENT
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ENVIRONMENTAL ASSESSMENT

Date: November 1992

Proponent: Mojave Water Agency

Address: 22450 Headquarters
Apple Valley, CA 92307

Phone: (619) 240-9201

Proposed Project: Morongo Basin Pipeline Project Right-of-Way Application

Proposed Planning Action: Exception to the Utility Corridor Element of the California Desert Conservation Area Plan

Location: Follows existing roads north and east of the San Bernardino Mountains, beginning in the City of Hesperia at the California Aqueduct and passing through Apple Valley, Lucerne Valley, Johnson Valley, and Landers to a terminus just north of the Town of Yucca Valley; see attached maps for specific alignment

Land Status Verified: Federal, State and private lands

Quad Names (7.5'): Barstow RA: Apple Valley South, Big Horn Canyon, Cougar Butte, Fifteen Mile Valley, Hesperia, Joshua Tree North, Lake Arrowhead, Landers, Lucerne Valley, Melville Lake, Old Woman Springs, Rattlesnake Canyon, Silverwood Lake, and Yucca Valley North.

Multiple-Use Classes: L and M

Authorization for Action: Federal Land Policy and Management Act of 1976 (PL94-579)

Name of Plan: California Desert Conservation Area Plan (CDCA Plan) establishes uses for the project area, in particular the Energy Production and Utility Corridors Element, Goal (1): *To establish a network of joint-use planning corridors capable of meeting projected utility service needs to the year 2000.* The proposed route for the Morongo Basin Pipeline generally follows Contingent Corridor "S" as shown on the Draft Plan (Table E-1 and the Draft Element "Balanced" and "Use" Maps, pages 106 and 107 of the Draft Plan). Since the proposed Morongo Basin Pipeline Project exceeds the pipeline size criteria as specified in the CDCA Plan for contingent Corridor S, the proposed right-of-way (ROW) permit application must be considered either as an exception to the CDCA Plan or the CDCA Plan must be amended to activate the corridor. The proposed action seeks an exception to the CDCA Plan and no amendment is proposed.

ENVIRONMENTAL ASSESSMENT

I. PURPOSE AND NEED FOR THE ACTION

A. Introduction

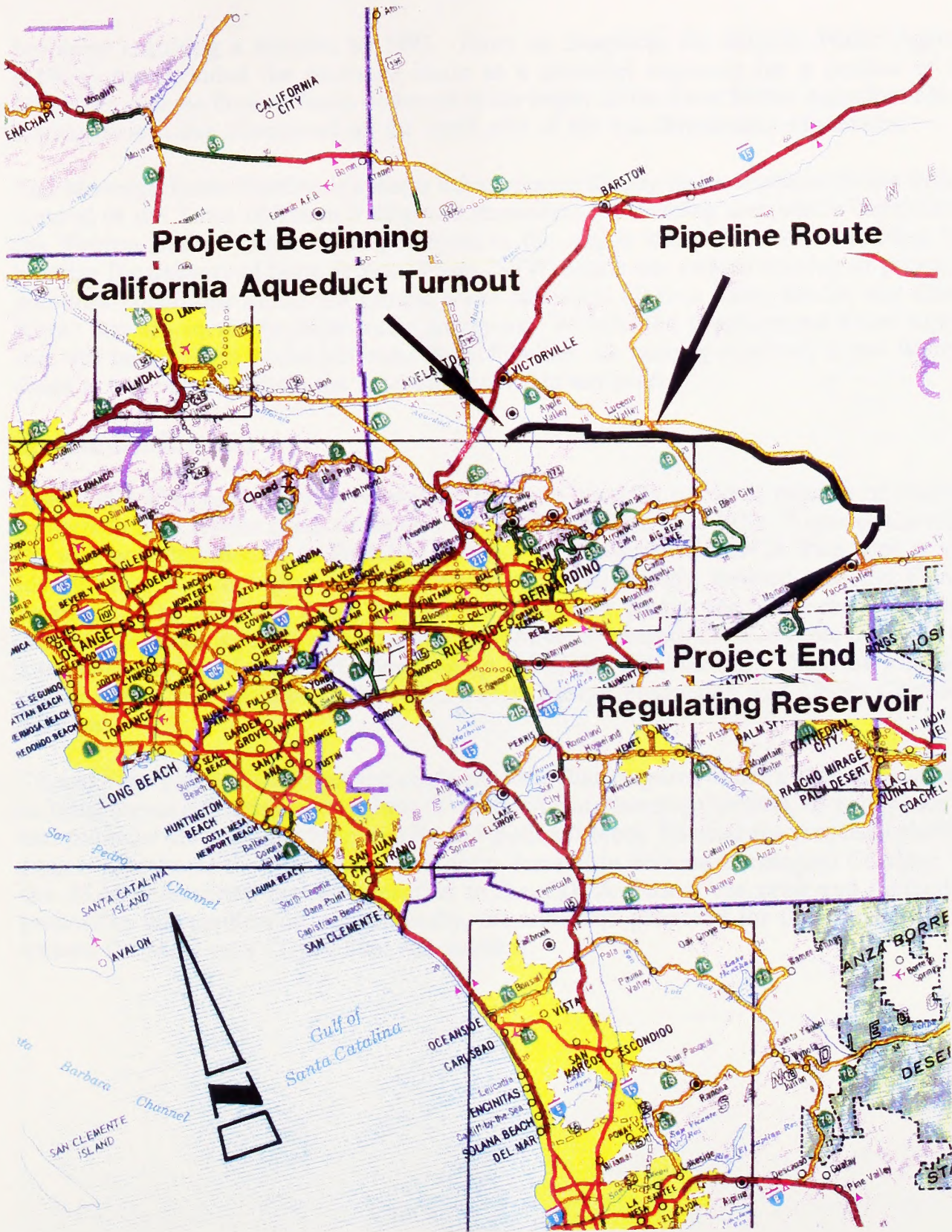
This Environmental Assessment (EA) has been prepared in response to an application by the Mojave Water Agency (MWA) to construct, operate and maintain a water pipeline that crosses public land under the jurisdiction of the Bureau of Land Management (BLM). The pipeline route is shown relative to the region in Figure 1. MWA is requesting access rights over several miles of public land administered by the BLM in the eastern portion of this route. The total pipeline right-of-way is approximately 68.2 miles long, of which public land comprises approximately 9.7 miles and the remainder is on state or private land.

This EA describes the proposed action (project) and alternatives considered; identifies the affected environment that occurs along the linear alignment of these alternatives; identifies potential impacts of the proposed action and alternatives, and identifies mitigation measures designed to reduce potential impacts to a level of insignificance. As required for all actions on public land, this EA evaluates the effects of the proposed alternatives to determine whether they conform with the CDCA Plan.

The Morongo Basin Pipeline Project (project) originates in south Hesperia where it connects to the State Project Water Aqueduct. The route described in the text can be followed on Figures 2a through 2f. From the turnout at the Aqueduct it traverses east through Antelope Valley to Deep Creek Road on the east side of the Mojave River. It turns follows Deep Creek north to Tussing Ranch Road where it turns east for approximately 40 miles. Following Tussing Ranch and Foothill Roads east through Lucerne Valley, the pipeline alignment encounters State Highway 247 and follows it east and south (with a short jog on Pony and Joshua Tree Roads) to Reche Road in the community of Landers. At Reche Road it turns east to Landers Road where it turns south for the final five miles of its route. The pipeline will end at a terminal or regulating reservoir to be constructed on four acres of a 20 acres of parcel located at the northwest corner of Warren Vista Avenue and Aberdeen Drive (Homestead Valley, south of Landers). With three small exceptions, the proposed alignment is adjacent to existing, paved or graded roads.

B. Purpose and Need for the Proposed Action

In 1972 (Lewis 1972), and in many subsequent publications over the past 20 years (VTN 1973, Owen & Associates 1977, Dodson & Associates 1988), data has been published demonstrating an extreme overdraft of the Warren Basin, the primary source of domestic water supplies for what is now the Town of Yucca Valley. Lewis' 1972 Open File Report for the U. S. Geological Survey, Water Resources Division "Ground-Water Resources of the Yucca Valley - Joshua Tree Area, San Bernardino County, CA" projected water supply



MOJAVE WATER AGENCY
 MORONGO BASIN PIPELINE PROJECT

BOYLE ENGINEERING CORPORATION

PROJECT VICINITY
 MAP

FIGURE

1

problems requiring a solution by 1993. From its inception, the Mojave Water Agency (MWA) has included the Morongo Basin as a potential customer for a portion of its allocation of State Project Water delivered to the region in the State Water Aqueduct which terminates at Lake Silverwood on the north side of the San Bernardino Mountains.

The Morongo Basin Pipeline is a water infrastructure facility that is essential to the future survival of the Town of Yucca Valley and immediate surrounding area which depends on the Warren Basin. Other water purveyors in the region will participate in funding the pipeline for delivery of State Project Water (SPW) which can reduce existing or potential overdraft conditions within the ground water subbasins (Joshua Tree, Reche, and Giant Rock) that are served by these water purveyors. Without the supplemental water supply that will be provided by the Morongo Basin Pipeline, the existing overdraft in the Warren Basin is forecast to deplete the local aquifer within ten years.

C. Plan Conformance

The CDCA Plan established "a network of joint-use planning corridors capable of meeting projected utility service needs to the year 2000" (CDCA Plan, page 115). Proposed Corridor "S" was not identified as a Planning Corridor in the adopted CDCA Plan, but it was identified as a "Contingent" Corridor which could be brought forward into the Plan if necessary. The Morongo Basin Pipeline has a diameter greater than 12 inches (a 30 inch diameter pipeline is proposed across public land) which exceeds the allowable diameter for a pipeline outside of a Utility Corridor (page 115 of the CDCA Plan). Thus, the proposed pipeline does not conform to the CDCA Plan Energy Production and Utility Corridors Element.

To make the pipeline ROW permit conform to the Plan requires either a Plan Amendment to bring forward Contingent Corridor "S" to an official Planning Corridor, or to approve an exception for the proposed Morongo Basin Pipeline Project. Because the proposed pipeline project constitutes the only known near-term demand to activate Contingent Corridor "S", the BLM determined that an exception to the CDCA Plan is the preferred method of processing this application. Procedurally, the exception proposed for this project will be treated the same as a CDCA Plan Amendment.

D. Environmental Considerations

This EA considers the following issues as areas of environmental concern. The following topics are addressed in this document:

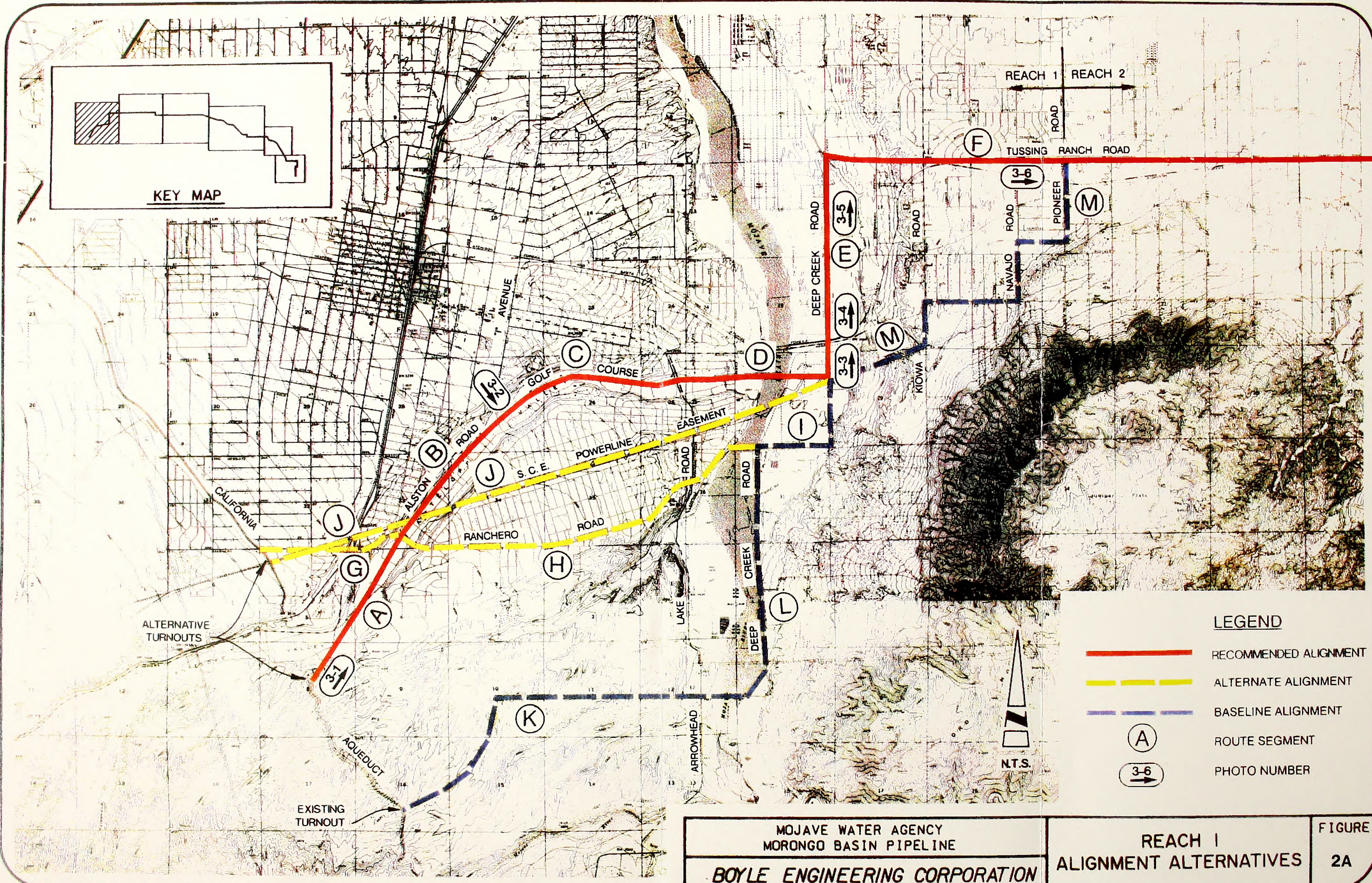
1. Geology, Soils, and Geologic Hazards
2. Surface Runoff and Flood Hazards
3. Fire Hazards
4. Noise
5. Aviation Safety
6. Hazardous/Radioactive Materials
7. Biological Resources
15. Housing/Demographics/Socioeconomics
16. Public Services
17. Land Use
8. Cultural/Paleontologic Resources
9. Air Quality
10. Water Supply/Water Quality
11. Open Space/Recreation/Visual
12. Mineral Resources
13. Utilities/Infrastructure
14. Transportation/Circulation

E. Planning Issues and Criteria

As part of the evaluation of the exception to the CDCA Plan, the following two major planning issues will be considered:

1. The potential and extent to which granting the exception and the ROW permit will affect resource values, land uses and multiple use classifications; and
2. The additional demand or need for the activation of Contingent Corridor "S".

These issues will be evaluated using planning criteria which considers the need to provide for utility demand in a manner that avoids or minimizes adverse impacts to resource values, land uses, and multiple use classifications.

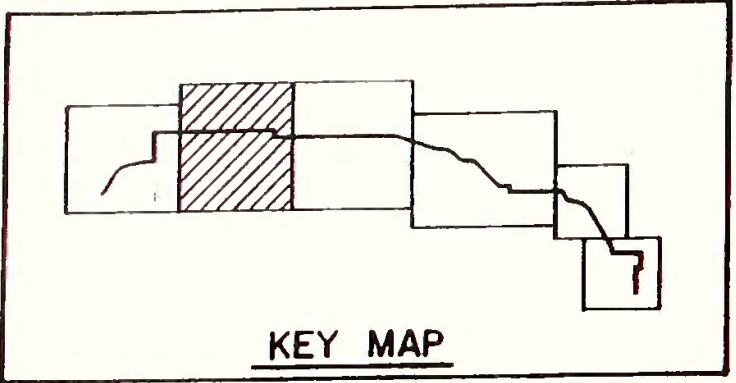


LEGEND	
	RECOMMENDED ALIGNMENT
	ALTERNATE ALIGNMENT
	BASELINE ALIGNMENT
	ROUTE SEGMENT
	PHOTO NUMBER

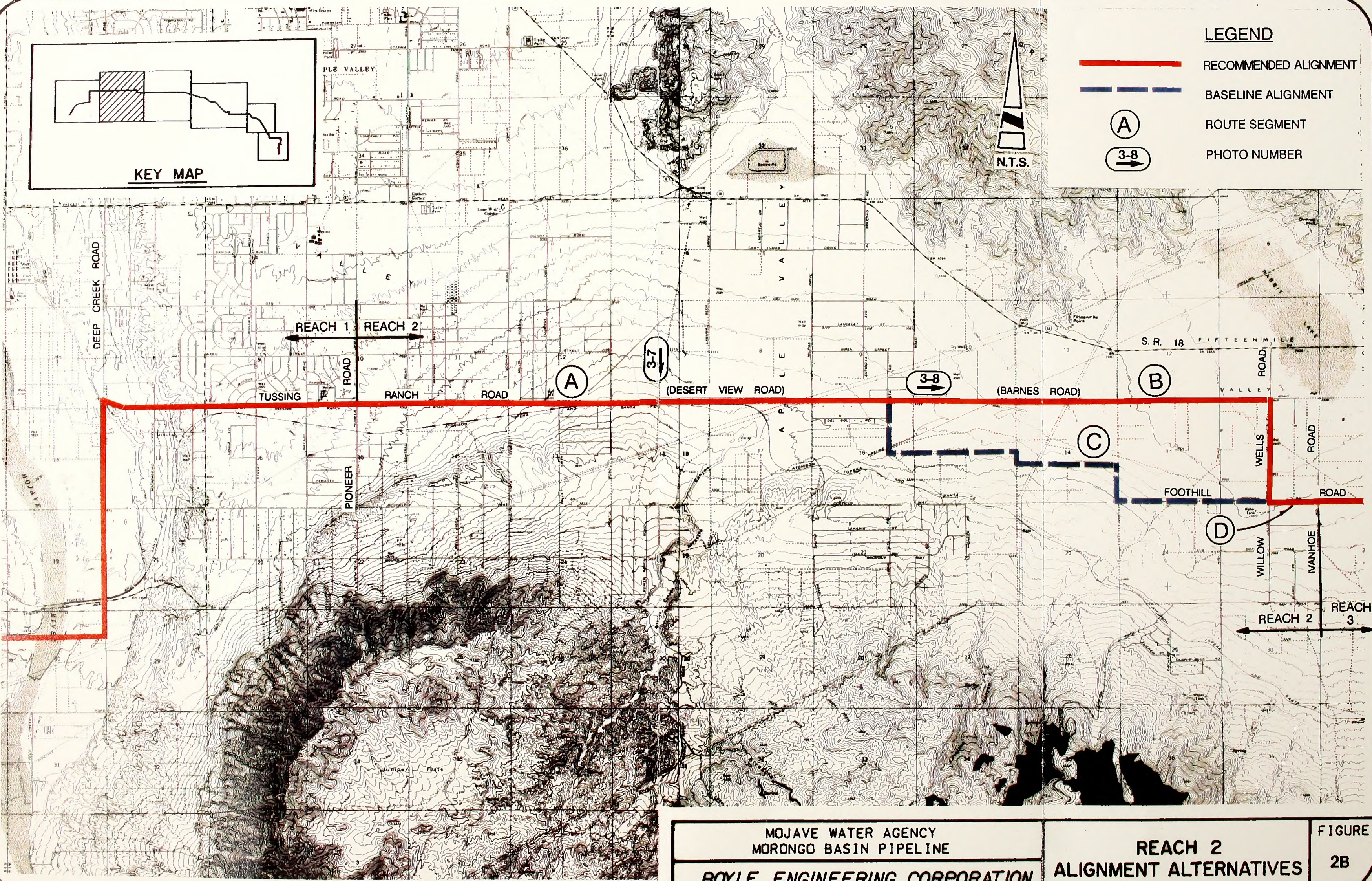
MOJAVE WATER AGENCY
 MORONGO BASIN PIPELINE
 BOYLE ENGINEERING CORPORATION

REACH 1
 ALIGNMENT ALTERNATIVES

FIGURE
 2A



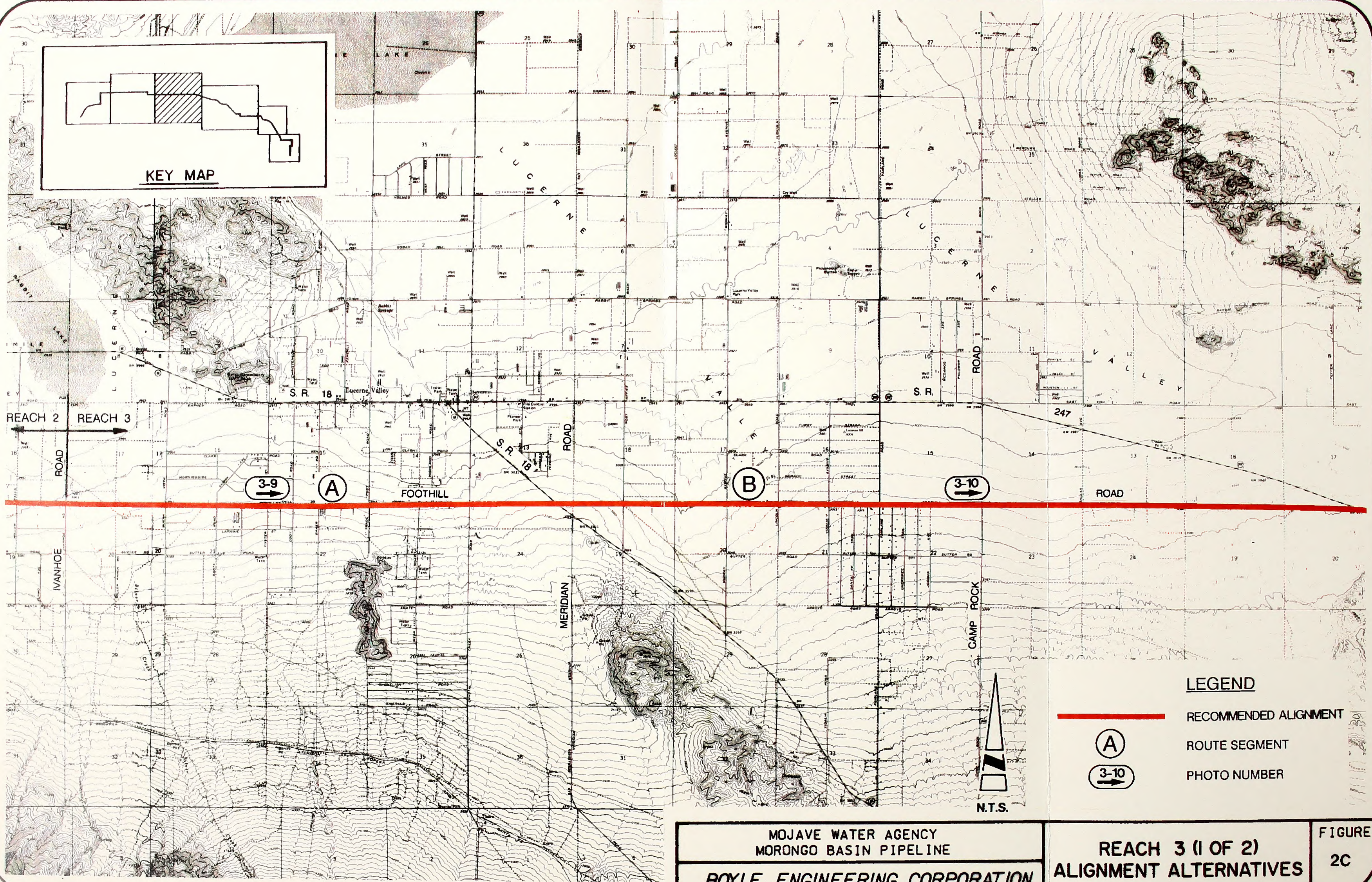
- LEGEND**
- RECOMMENDED ALIGNMENT
 - - - BASELINE ALIGNMENT
 - (A) ROUTE SEGMENT
 - (3-8) PHOTO NUMBER



MOJAVE WATER AGENCY
 MORONGO BASIN PIPELINE
BOYLE ENGINEERING CORPORATION

**REACH 2
 ALIGNMENT ALTERNATIVES**

FIGURE
 2B



KEY MAP

REACH 2 REACH 3

3-9

A




FOOTHILL

B

3-10

ROAD

LEGEND

-  RECOMMENDED ALIGNMENT
-  ROUTE SEGMENT
-  PHOTO NUMBER

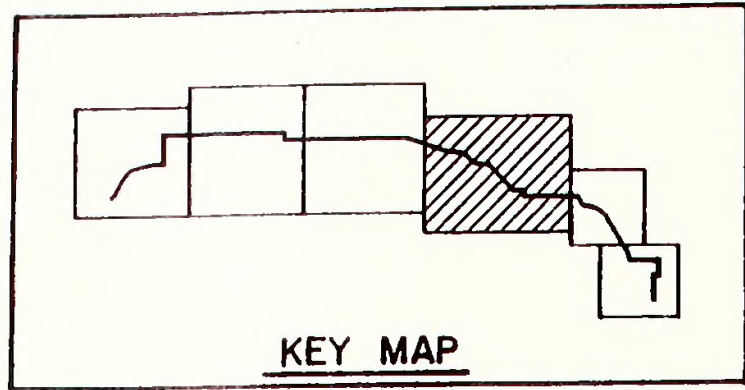


N.T.S.

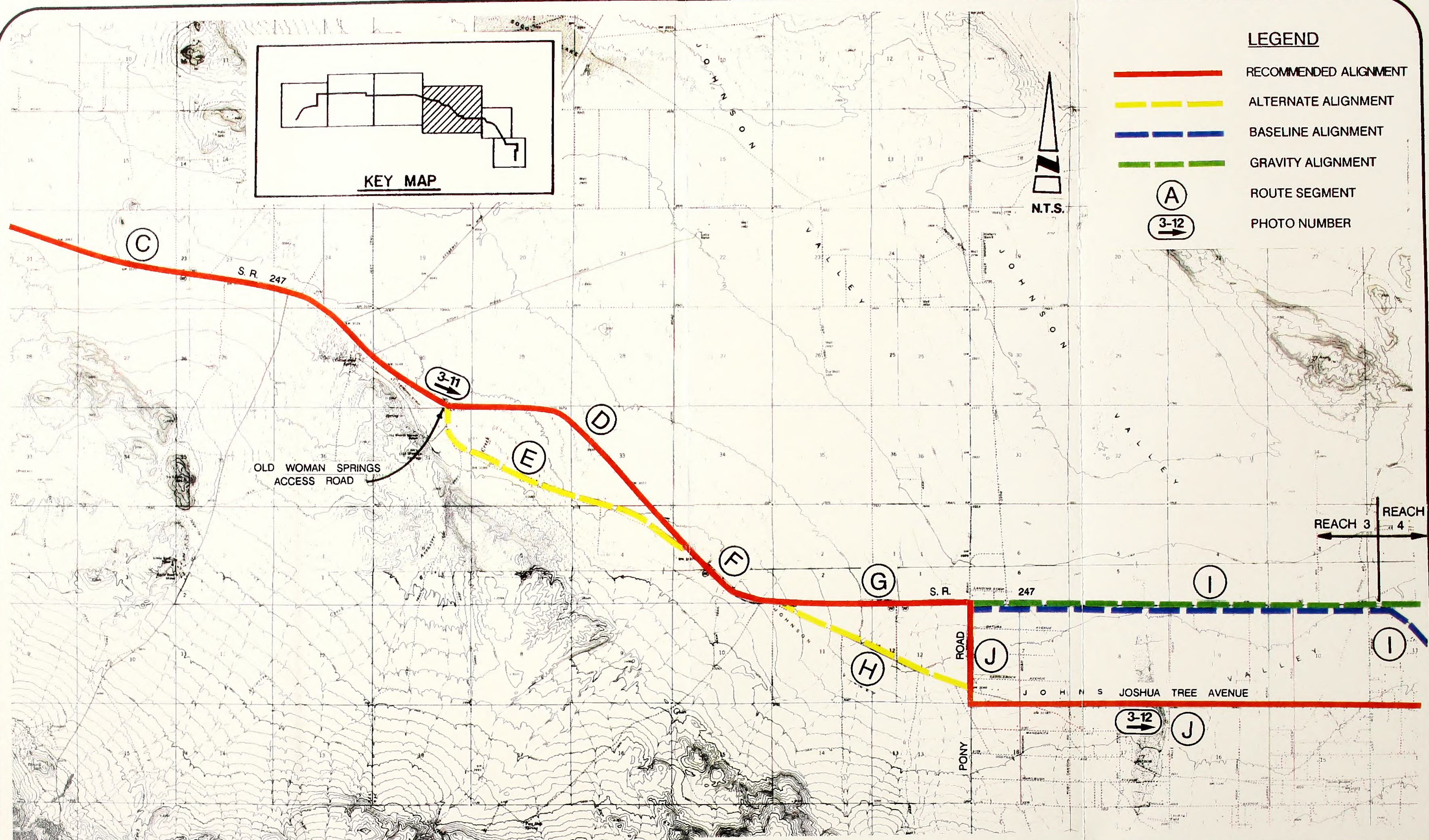
MOJAVE WATER AGENCY
 MORONGO BASIN PIPELINE
 BOYLE ENGINEERING CORPORATION

REACH 3 (1 OF 2)
 ALIGNMENT ALTERNATIVES

FIGURE
 2C



- LEGEND**
- RECOMMENDED ALIGNMENT
 - - - ALTERNATE ALIGNMENT
 - - - BASELINE ALIGNMENT
 - - - GRAVITY ALIGNMENT
 - (A) ROUTE SEGMENT
 - (3-12) PHOTO NUMBER

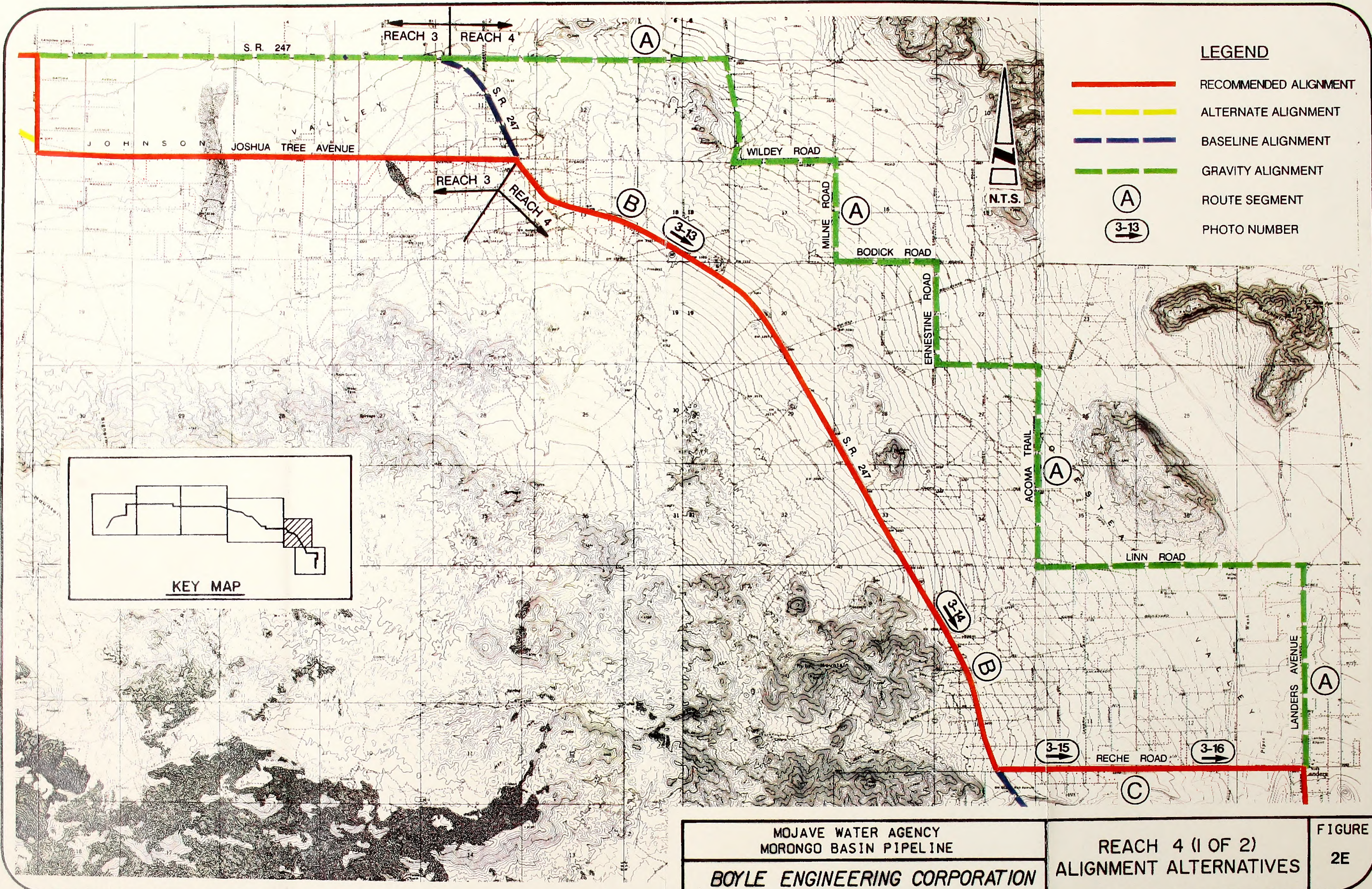


REACH 3 ← | → REACH 4

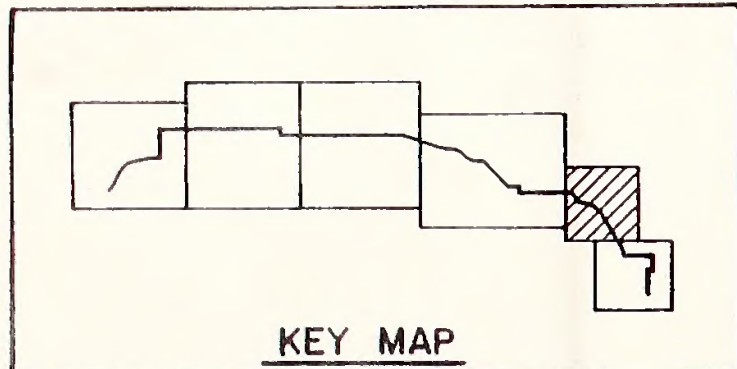
MOJAVE WATER AGENCY
 MORONGO BASIN PIPELINE
 BOYLE ENGINEERING CORPORATION

REACH 3 (2 OF 2)
 ALIGNMENT ALTERNATIVES

FIGURE
 2D



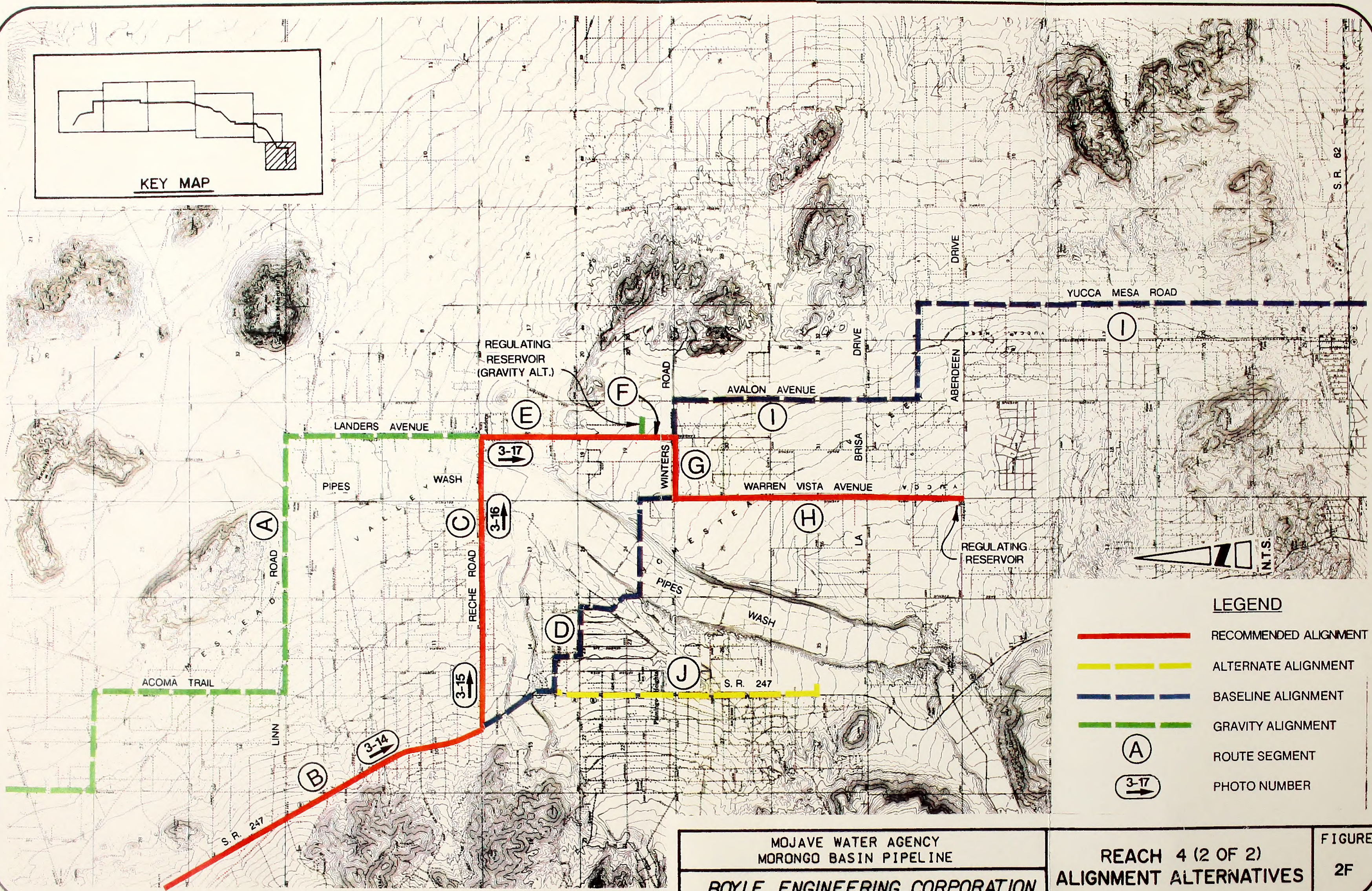
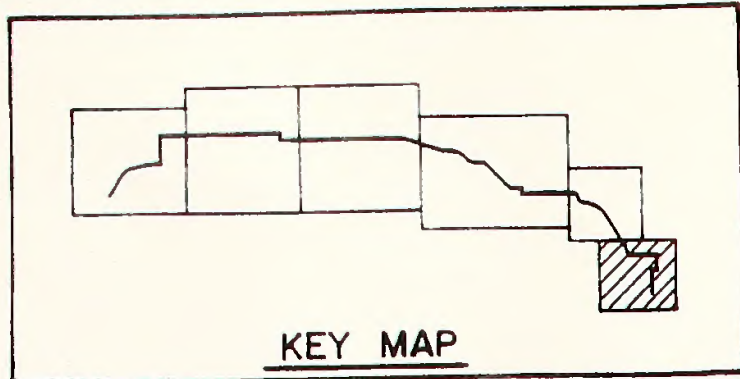
- LEGEND**
- RECOMMENDED ALIGNMENT
 - - - ALTERNATE ALIGNMENT
 - - - BASELINE ALIGNMENT
 - - - GRAVITY ALIGNMENT
 - (A) ROUTE SEGMENT
 - (3-13) PHOTO NUMBER



MOJAVE WATER AGENCY
 MORONGO BASIN PIPELINE
BOYLE ENGINEERING CORPORATION

REACH 4 (1 OF 2)
 ALIGNMENT ALTERNATIVES

FIGURE
 2E



LEGEND	
	RECOMMENDED ALIGNMENT
	ALTERNATE ALIGNMENT
	BASELINE ALIGNMENT
	GRAVITY ALIGNMENT
	ROUTE SEGMENT
	PHOTO NUMBER

MOJAVE WATER AGENCY
 MORONGO BASIN PIPELINE
BOYLE ENGINEERING CORPORATION

REACH 4 (2 OF 2)
 ALIGNMENT ALTERNATIVES

FIGURE
 2F

II. PROPOSED ACTION AND ALTERNATIVES CONSIDERED

The following text provides a description of the action proposed by the Mojave Water Agency (MWA). In summary, the proposed project is the acquisition of right-of-way, installation of an approximate 68.2 mile long water delivery pipeline (about 9.7 miles of the pipeline is on public land), and delivery of up to 15 cubic feet of water per second (approximately 10,900 acre feet per year) from the State Aqueduct in Hesperia to water purveyors in the Morongo Basin. For the Bureau of Land Management (BLM) to issue the right-of-way permit across public land, an exception to the CDCA Plan must also be approved. The location and characteristics of each component of the project are identified and the activities associated with each phase of the project (construction and operation/maintenance) are described. This section also defines alternatives no longer under consideration. It indicates the environmental impacts that would result with the implementation of these alternatives and the reasons why they were rejected from further consideration.

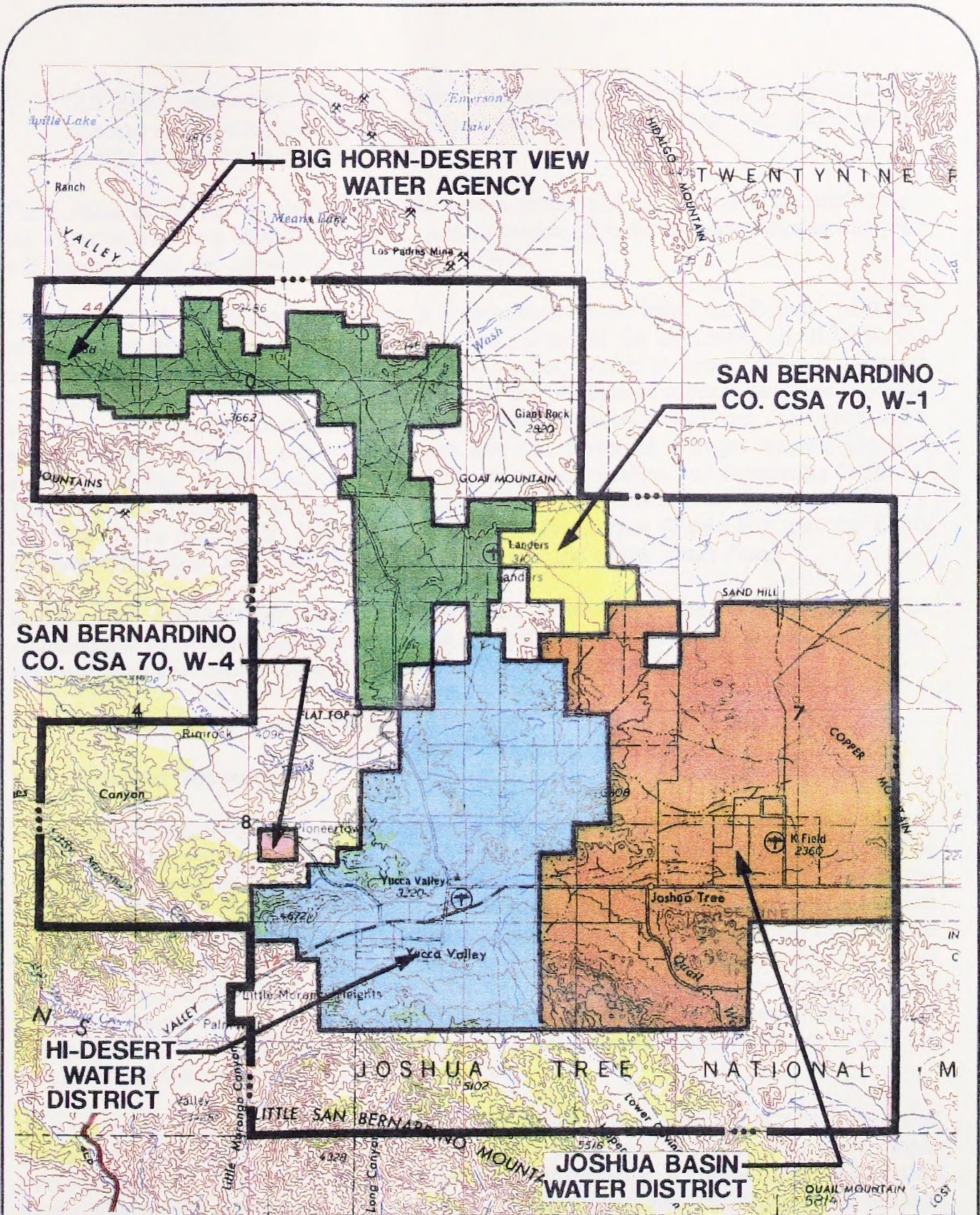
A. Proposed Project

1. Introduction

In December 1990 the Mojave Water Agency (MWA), the regional State Water Project wholesaler for the High Desert, approved an agreement and issued general obligation bonds to fund the engineering and construction of an approximate 68.2-mile pipeline to deliver water to water purveyors in the Agency's Improvement District "M", shown in Figure 3. Figure 3 also shows five water purveyors in Improvement District "M" (the area funding the bonds) that are presently allowed to receive State Project Water (SPW) deliveries based on the agreement. The engineering has progressed to a stage where the specific alignment has been identified and the site specific environmental issues have been assessed.

The physical components of the project are defined in the Agreement as follows:

- a. A turnout structure on the California Aqueduct;
- b. A pipeline from the turnout to a terminal (regulating) reservoir in Improvement District "M" with a minimum delivery capacity of 15 cubic feet per second and with a 30" diameter pipe across public land;
- c. A booster pumping station in Johnson Valley;
- d. A terminal or regulating reservoir with a minimum of five million gallons storage capacity;
- e. Turnout and metering facilities in Improvement District "M"; and



MOJAVE WATER AGENCY
MORONGO BASIN PIPELINE PROJECT

BOYLE ENGINEERING CORPORATION

DIVISION NO. 2 AND
IMPROVEMENT DISTRICT
"M" BOUNDARY

FIGURE
3

- f. All other associated facilities, rights, properties and improvements appurtenant thereto as provided and necessary therefore, including a 60 foot wide ROW across public land administered by BLM.

The volume of SPW to be delivered by the above system and the allotment percentages to the water purveyors is shown in Table 1. Actual volume of water delivered during any year will depend upon the allocation received by MWA.

The portion of the project requiring a right-of-way grant from the Bureau of Land Management (BLM) is shown in Figure 4. The portion of the alignment on BLM public land contains approximately 51,070 feet (9.672 miles) which is about 15% of the total alignment of 360,300 feet (68.2 miles). None of the permanent support facilities (turnout structure, pump station, or regulating reservoir) are located on public land. The evaluation which follows addresses the total project and the potential changes to the physical environment that may be caused by installing the whole pipeline and supporting facilities. The proposed route for the Morongo Basin Pipeline generally follows Contingent Utility Corridor "S" in the CDCA Plan (as shown on the Draft Plan (Table E-1 and the Draft Element "Balanced" and "Use" Maps, pages 106 and 106 of the Draft Plan).

Because the pipeline's 30" diameter exceeds the thresholds in the CDCA Plan, a Plan Amendment to activate the corridor or an exception to the CDCA Plan will have to be reviewed and approved before the right-of-way can be granted.

2. *Morongo Basin Pipeline Facilities and Facility Requirements*

a. **Turnout Structure**

A Turnout Structure, using a syphon concept, is proposed to be constructed at the aqueduct on a ridge just south of Antelope Valley in the City of Hesperia (see Figure 2a). The structure and support facilities will occupy an area of about one-half acre adjacent to the aqueduct. Figure 5 illustrates the location at the project site that is proposed as the location for the Turnout Structure. The site is located adjacent to the existing aqueduct service road in an area highly disturbed by off-highway vehicle activity. The Turnout Structure will syphon untreated SPW out of the California Aqueduct and place it in the Morongo Basin Pipeline where it will flow by gravity to the pump station located in Johnson Valley. At the pump station the water pressure will be boosted to the level necessary for water to flow the remainder of the route to the terminal reservoir.

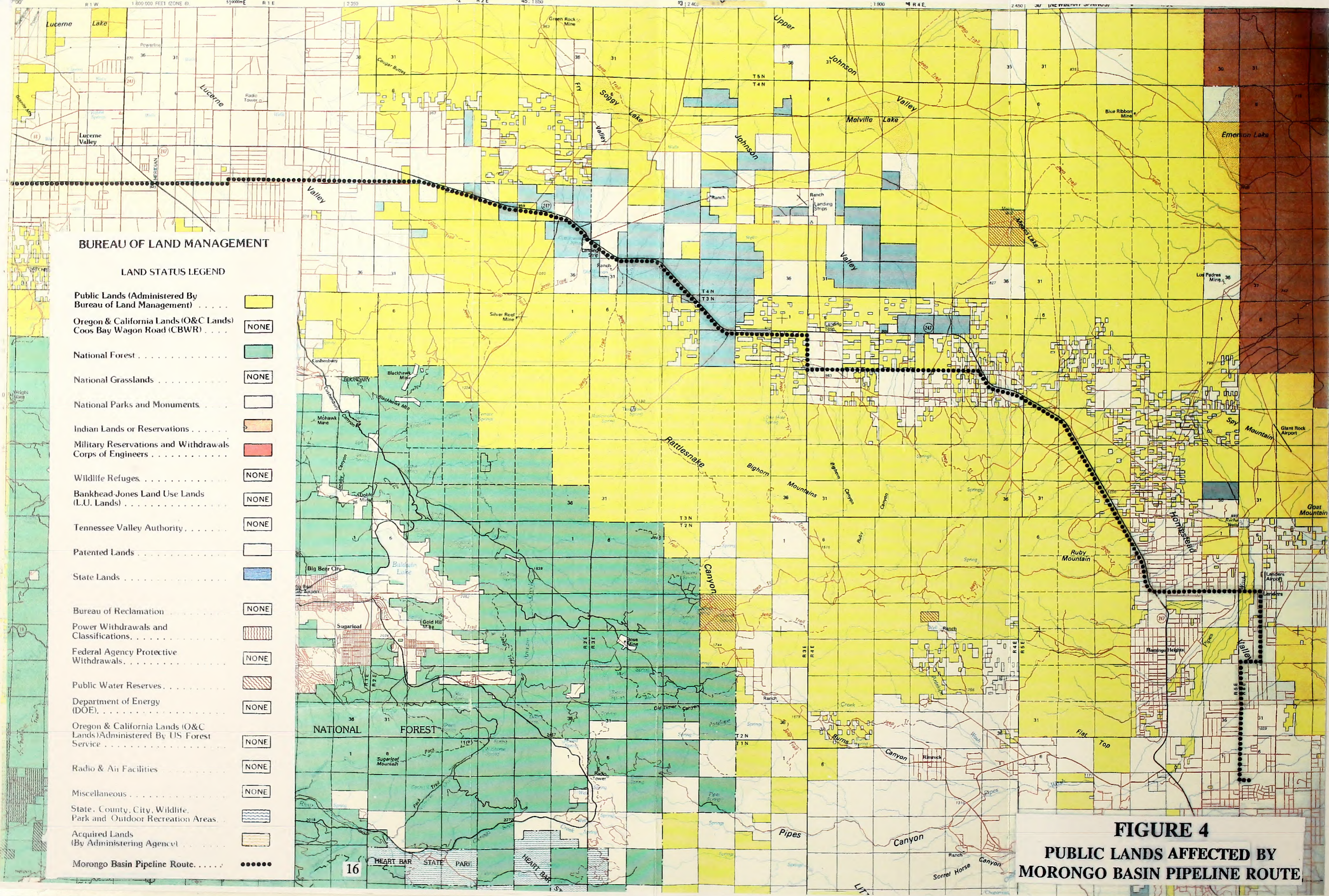
The maximum area that may be disturbed by this facility is 5 acres. It is anticipated that the construction activity on this Turnout Structure parcel will continue over a six month period and about .5 acre will remain permanently disturbed as a maintenance and storage yard. The facility contains some above ground components and the syphon will operate intermittently (depending upon SPW availability). Power is available a few hundred yards from the proposed structure in Antelope Valley and it can be delivered within the existing

TABLE 1

Schedule of Project Participants, Project Allotment Percentages of Project Capacity and of Fixed O & M Costs and Peak Delivery Rates*

<u>Water Purveyor</u>	<u>Project Allotment Percentage of Project Capacity and of Fixed O & M Costs</u>	<u>Peak Delivery Rate Based on 10,900 A-F/Year</u>	<u>Peak Delivery Rate Based on 7,257 A-F/Year</u>
1. Bighorn-Desert View Water Agency	9%	1.35 cfs	1.19 cfs
2a. County Service Area Number 70, Improvement Zone W-1	4%	0.60 cfs	0.53 cfs
2b. County Service Area Number 70, Improvement Zone W-4	1%	0.15 cfs	0.13 cfs
3. Hi-Desert Water District	59%	8.85 cfs	7.83 cfs
4. Joshua Basin Water District	<u>27%</u>	<u>4.05 cfs</u>	<u>3.58 cfs</u>
Total	100%	15.00 cfs	13.26 cfs

* Reference: Exhibit A of the Agreement

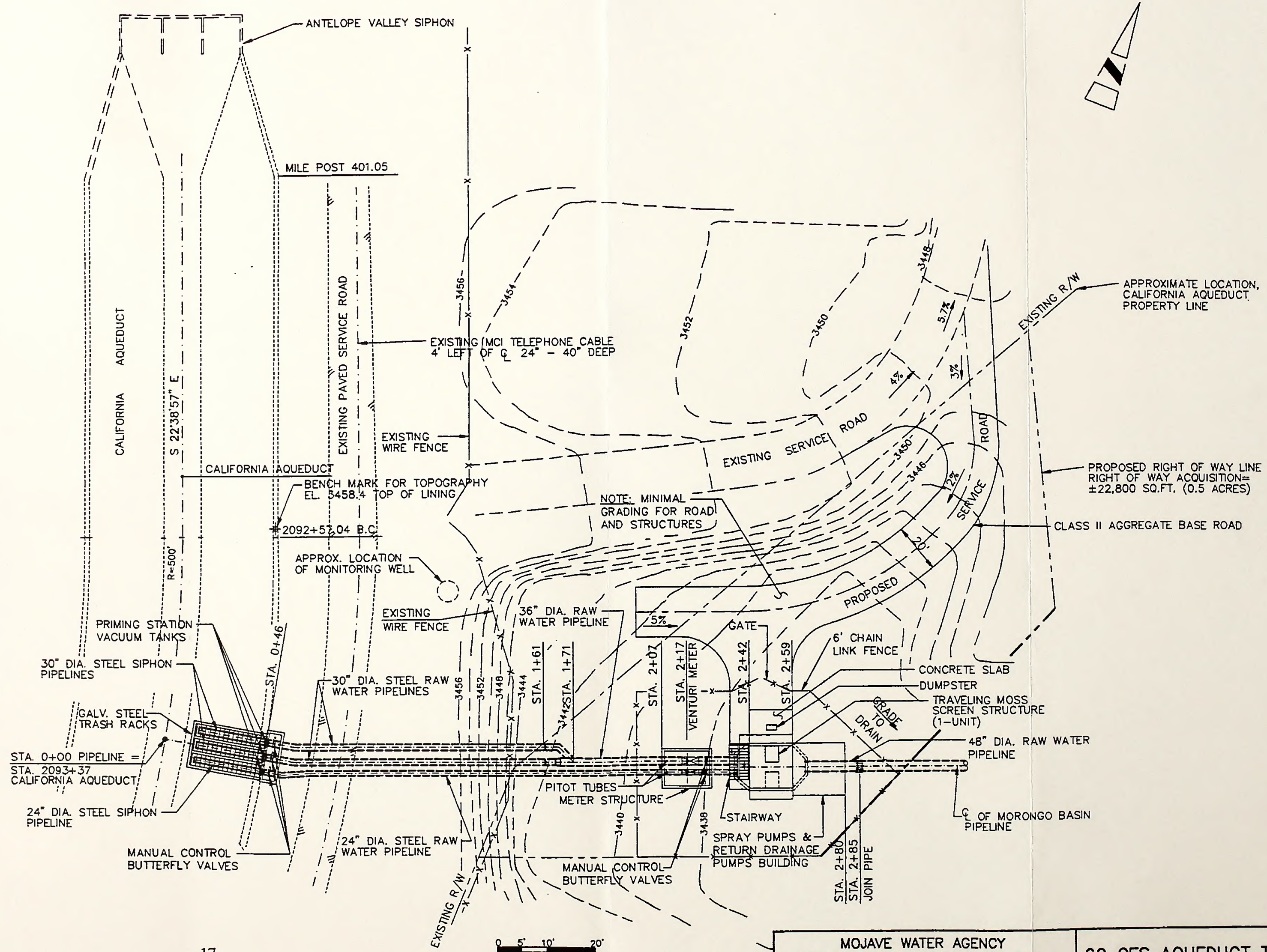


BUREAU OF LAND MANAGEMENT

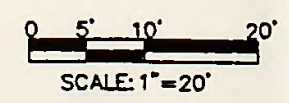
LAND STATUS LEGEND

- Public Lands (Administered By Bureau of Land Management)
- Oregon & California Lands (O&C Lands) Coos Bay Wagon Road (CBWR) NONE
- National Forest
- National Grasslands NONE
- National Parks and Monuments
- Indian Lands or Reservations
- Military Reservations and Withdrawals Corps of Engineers
- Wildlife Refuges NONE
- Bankhead-Jones Land Use Lands (L.U. Lands) NONE
- Tennessee Valley Authority NONE
- Patented Lands
- State Lands
- Bureau of Reclamation NONE
- Power Withdrawals and Classifications
- Federal Agency Protective Withdrawals NONE
- Public Water Reserves
- Department of Energy (DOE) NONE
- Oregon & California Lands (O&C Lands) Administered By US Forest Service NONE
- Radio & Air Facilities NONE
- Miscellaneous NONE
- State, County, City, Wildlife, Park and Outdoor Recreation Areas
- Acquired Lands (By Administering Agency)
- Morongo Basin Pipeline Route

FIGURE 4
PUBLIC LANDS AFFECTED BY
MORONGO BASIN PIPELINE ROUTE



17



MOJAVE WATER AGENCY MORONGO BASIN PIPELINE PROJECT BOYLE ENGINEERING CORPORATION	60 CFS AQUEDUCT TURNOUT SITE PLAN
--	--------------------------------------

FIGURE 5

service road. No chemicals need to be stored at this facility since the primary functions of the facility are flow metering and coarse screening. The facility will require periodic service and the Agency may store equipment and other materials at the Turnout Structure site.

b. Pipeline

The project envisions the installing a pipeline of approximately 54" in diameter west of the Mojave River and 30" in diameter east of the River. The total length of pipeline that will be installed is summarized below for each reach (engineering subdivision) of the project (all numbers are rounded to the nearest tenth of a mile based on hand calculations on the U.S. Geological Survey 7.5' Topographic Maps along the alignment).

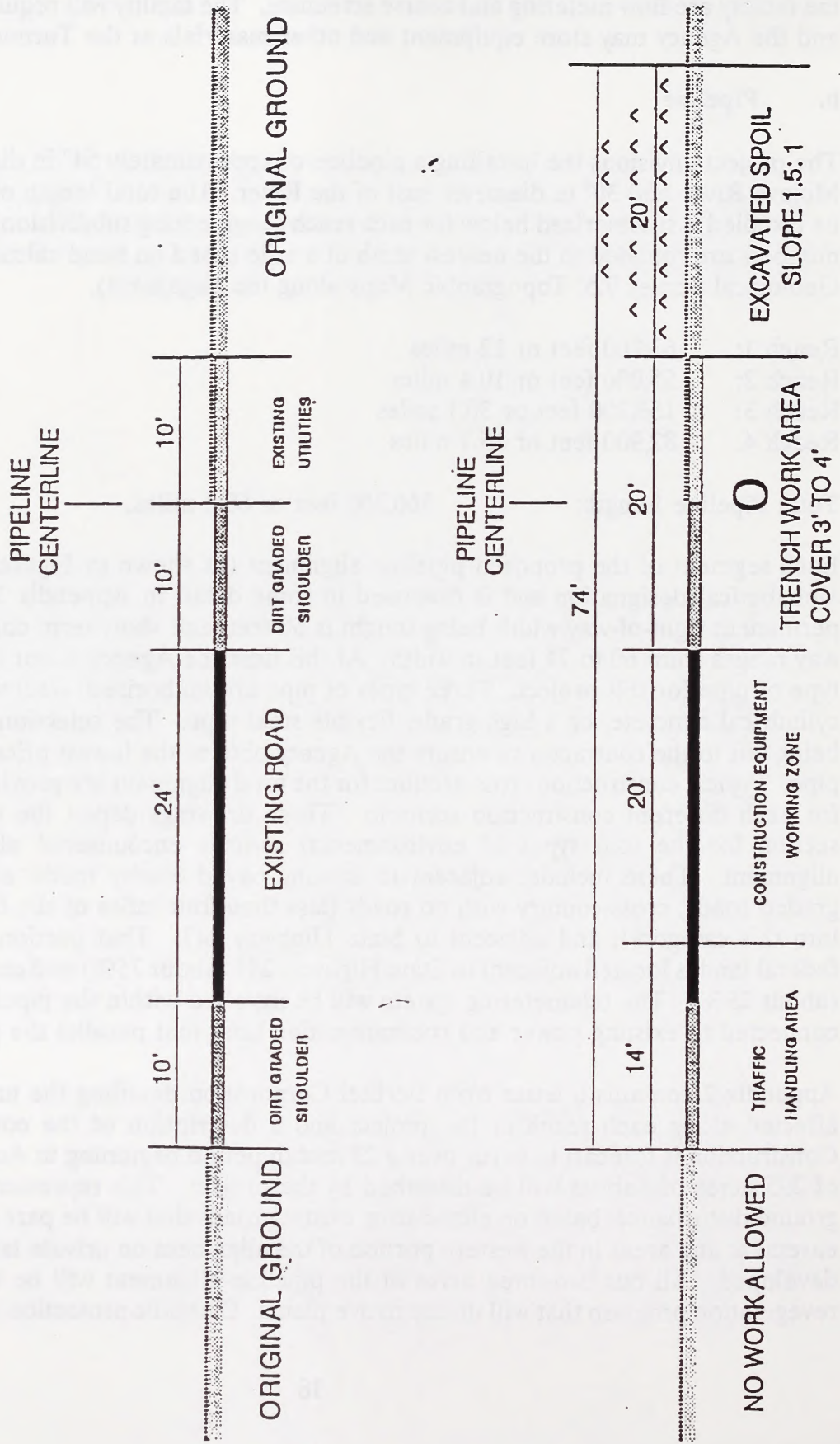
Reach 1:	63,200 feet or 12 miles
Reach 2:	55,000 feet or 10.4 miles
Reach 3:	159,200 feet or 30.1 miles
Reach 4:	82,900 feet or 15.7 miles

Total Pipeline Length: 360,300 feet or 68.2 miles.

Each segment of the proposed pipeline alignment (as shown in Figures 2a-f) is given an alphabetical designation and is discussed in some detail in Appendix 1 to this EA. The permanent right-of-way width being sought is 60 feet, and short-term construction right-of-way ranges from 60 to 74 feet in width. At this time the Agency is not requiring a specific type of pipe for this project. Three types of pipe are authorized: steel with cement lining, cylindrical concrete, or a high-grade, flexible steel pipe. The selection of type of pipe is being left to the contractor to ensure the Agency obtains the lowest price for an acceptable pipe. Typical construction cross-sections for the total alignment are provided in Figures 6a-d for each different construction scenario. These drawings depict the construction cross-section for the four types of environmental settings encountered along the proposed alignment. These include: adjacent to existing paved county roads; adjacent to existing graded roads; cross-country with no roads (less than four miles of the 68.2 mile route fall into this category); and adjacent to State Highway 247. That portion of the project on federal land is located adjacent to State Highway 247 (about 75%) and existing graded roads (about 25%). The telemetering system will be installed within the pipeline alignment and connected to existing power and communication lines that parallel the pipeline.

Appendix 2 contains a letter from Bechtel Corporation detailing the undisturbed acreage affected along each reach of the project and a description of the construction process. Construction is forecast to occur over a 23 month period beginning in August 1992. A total of 295 acres of habitat will be disturbed by the project. This represents the area of new ground disturbance, based on eliminating existing roads that will be part of the construction easement and areas in the western portion of the alignment on private land that are already developed. All but two-three acres of the pipeline alignment will be restored through a revegetation program that will utilize native plants. Cathodic protection will not be require

MORONGO BASIN PIPELINE PROJECT
 TYPICAL CONSTRUCTION CROSS SECTION
20 FOOT WIDTH



MORONGO BASIN PIPELINE PROJECT
 TYPICAL CONSTRUCTION CROSS SECTION
40 FOOT WIDTH

SECTION 6B

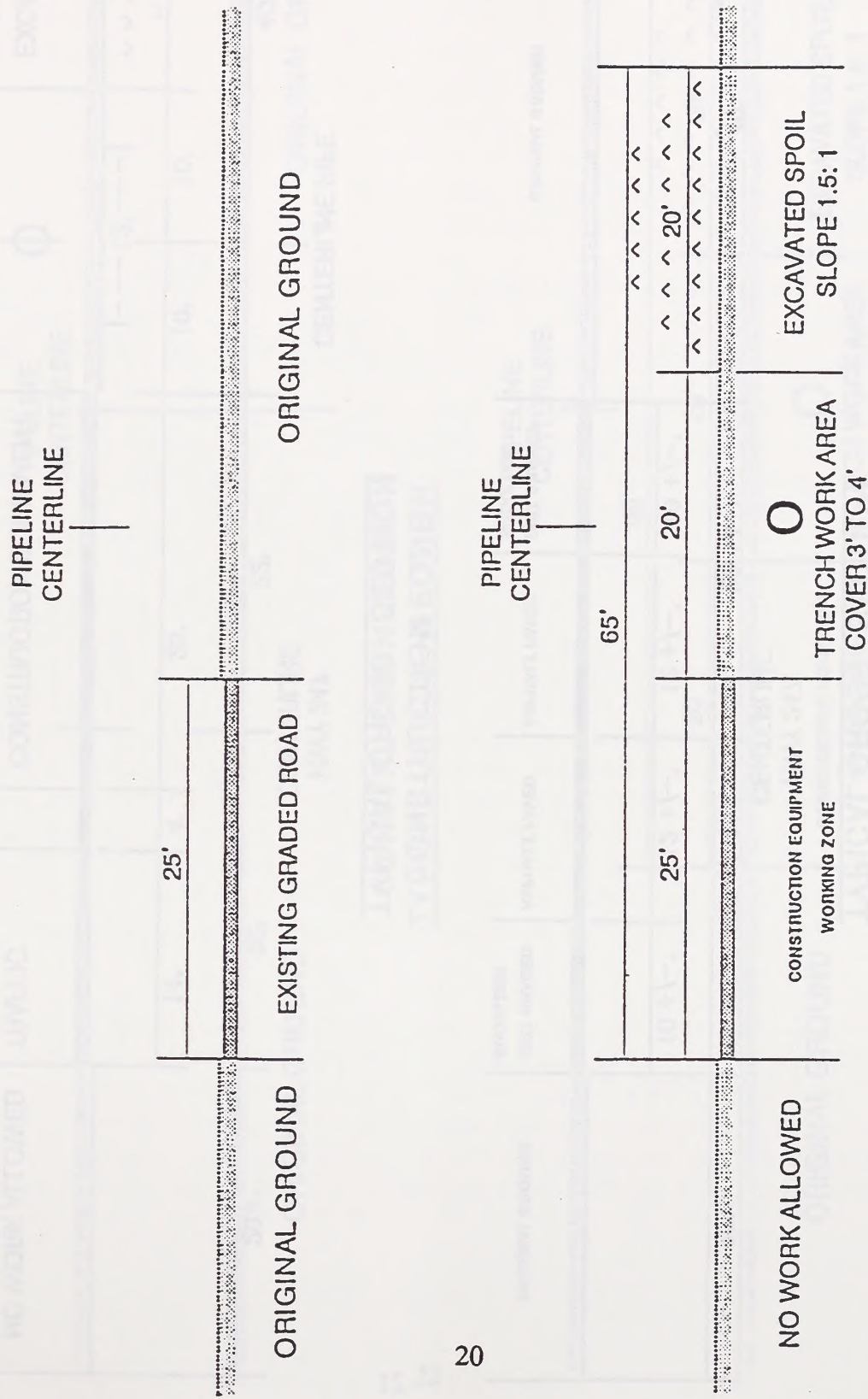
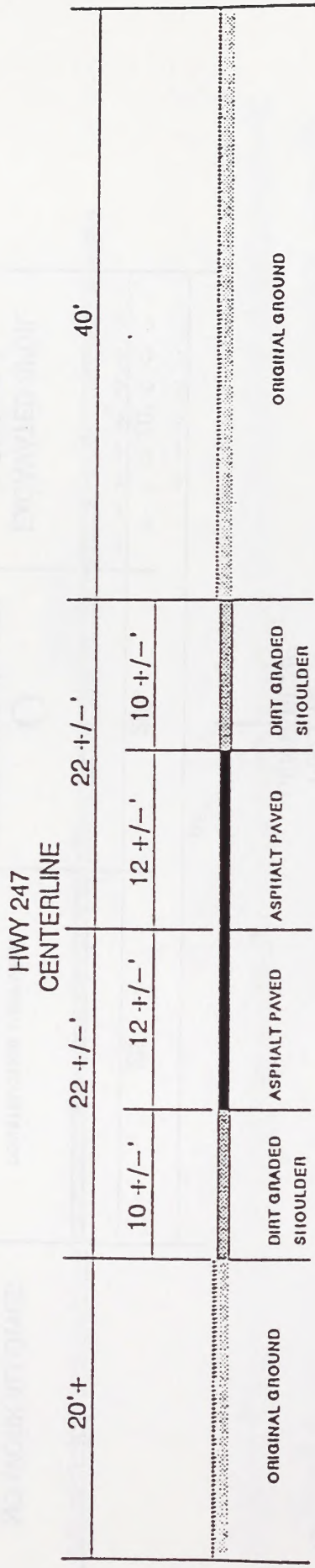


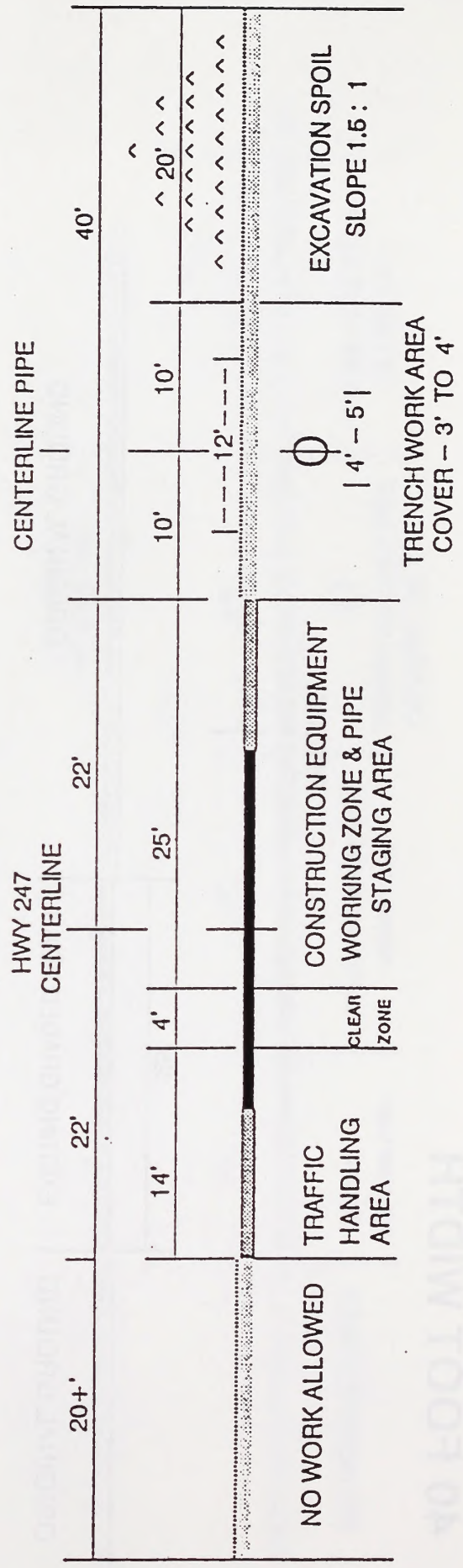
FIGURE 6B

MORONGO BASIN PIPELINE PROJECT
 TYPICAL CONSTRUCTION CROSS-SECTIONS
STATE HIGHWAY 247

**EXISTING
 TYPICAL CROSS-SECTION**



**CONSTRUCTION ZONE
 TYPICAL CROSS-SECTION**



60 FOOT WIDTH

EXISTING TYPICAL CROSS-SECTION

PIPELINE
CENTERLINE

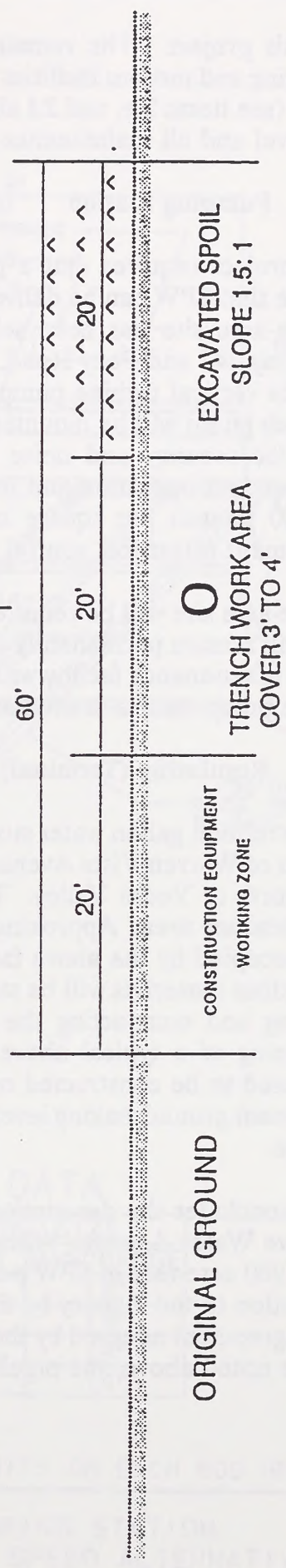
ORIGINAL GROUND

CONSTRUCTION ZONE TYPICAL CROSS-SECTION

PIPELINE
CENTERLINE

ORIGINAL GROUND

ORIGINAL GROUND



for this project. The remaining acreage will remain disturbed for maintenance areas, metering and turnout facilities in Homestead Valley, blow-off pipes and emergency drainage pipes (see items 2.e. and 2.f above). All future access will be along existing roads or routes of travel and all maintenance will be conducted within the requested right-of-way.

c. Pumping Station

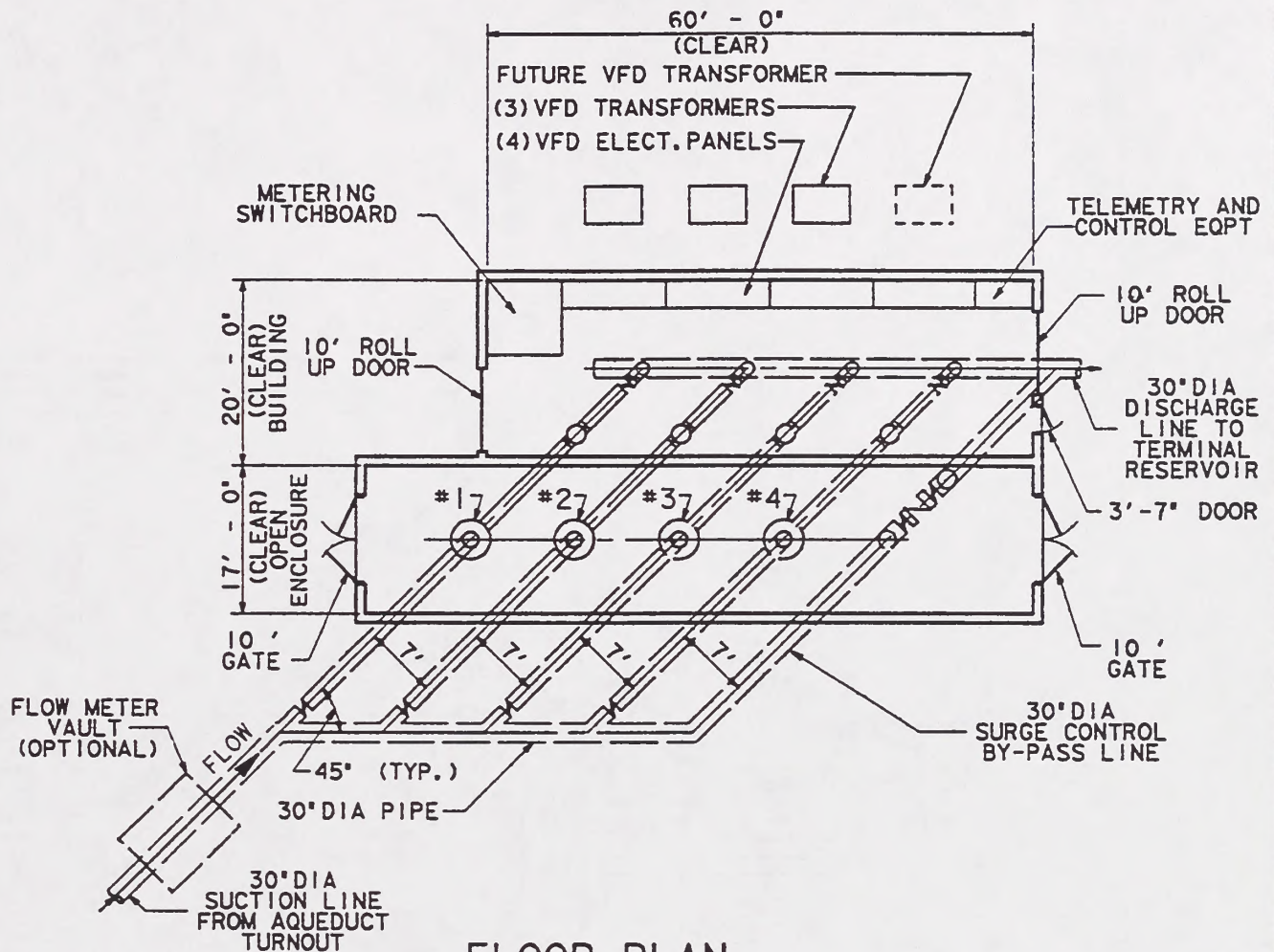
The project requires that a pumping station be installed in Johnson Valley in order to ensure that SPW can be delivered to the regulating reservoir located in Homestead Valley. A one-acre site has been selected on private land located at the intersection of State Highway 247 and Pony Road, as shown on Figure 2d. The pumping facility is proposed to include vertical turbine pumps placed in steel cans below grade. Vertical electric motors on each pump will be mounted on concrete slabs at grade and enclosed in a concrete block wall for security and noise control. There will be three sets of pumps capable of independent operation and the maximum operating pressure of the station is expected to be 400 pounds per square inch. A small building on the site will house the support equipment (electrical control panels, pump discharge valving, and telemetry equipment).

A one-acre site will be required for this facility which is illustrated in Figures 7 and 8. This site will remain permanently disturbed. It will not house any hazardous wastes or materials and a maintenance facility will be located at this site for the pump equipment. Construction of the pump station is estimated to require about eight months.

d. Regulating (Terminal) Reservoir

A five million gallon water storage reservoir will be constructed on a parcel at the northwest corner of Warren Vista Avenue and Aberdeen Drive in Homestead Valley, south of Landers and north of Yucca Valley. This facility will include a reservoir and support facilities and maintenance area. Approximately four acres will be permanently disturbed at this location and occupied by the above facilities. Since no water treatment is proposed at this site, no hazardous materials will be stored or used (such as chlorine) at it. This facility will involve grading and compacting the site and installing the reservoir and support facilities. A rendering of a typical above ground reservoir is provided in Figure 9. This facility is proposed to be constructed over an eight month period and will be designed to withstand the recent groundshaking levels experienced in the Landers earthquake without catastrophic failure.

This concludes the description of the Morongo Basin Pipeline Project as proposed by the Mojave Water Agency. When in operation the Pipeline will be able to deliver a minimum of 10,900 acre feet of SPW per year. Actual deliveries each year will depend on the annual allocation to the Agency by the State Department of Water Resources and the contents of the Agreement adopted by the Agency and the participating water purveyors listed in Table 1. As noted above, the pipeline route through BLM land is illustrated on Figure 4.



7.5 CFS PUMP DATA

PUMP #	MOTOR (HP)	PIPING SIZE	
		SUCTION	DISCHARGE
1	600	18"	14"
2	600	18"	14"
3	600	18"	14"
4	(FUTURE)	18"	14"

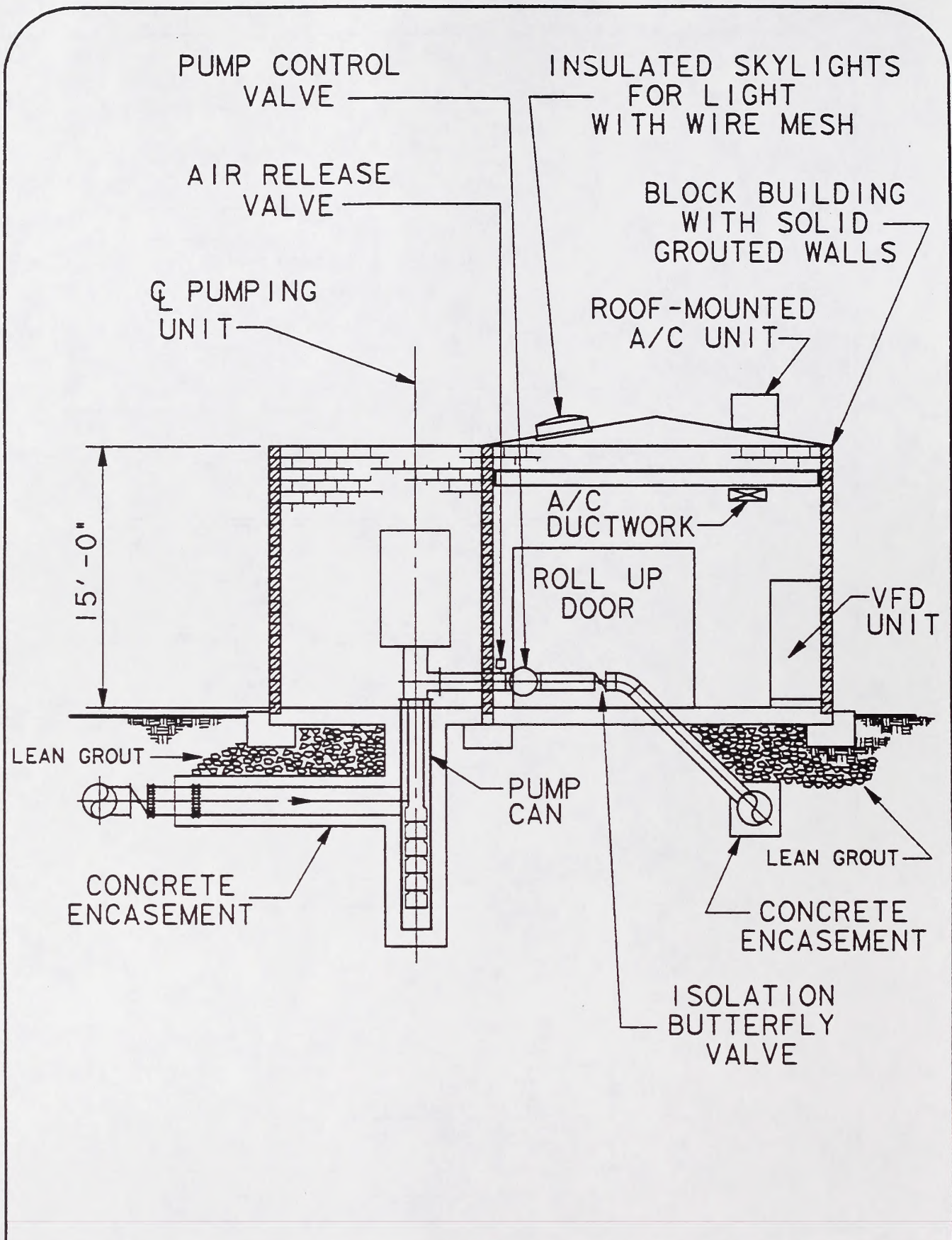
NOTE: VARIABLE FREQUENCY DRIVE (VFD) UNITS ON EACH 600 HP PUMP

MOJAVE WATER AGENCY
MORONGO BASIN PIPELINE PROJECT

PUMPING STATION
VARIABLE SPEED ALTERNATIVE
FLOOR PLAN

FIGURE
7

BOYLE ENGINEERING CORPORATION



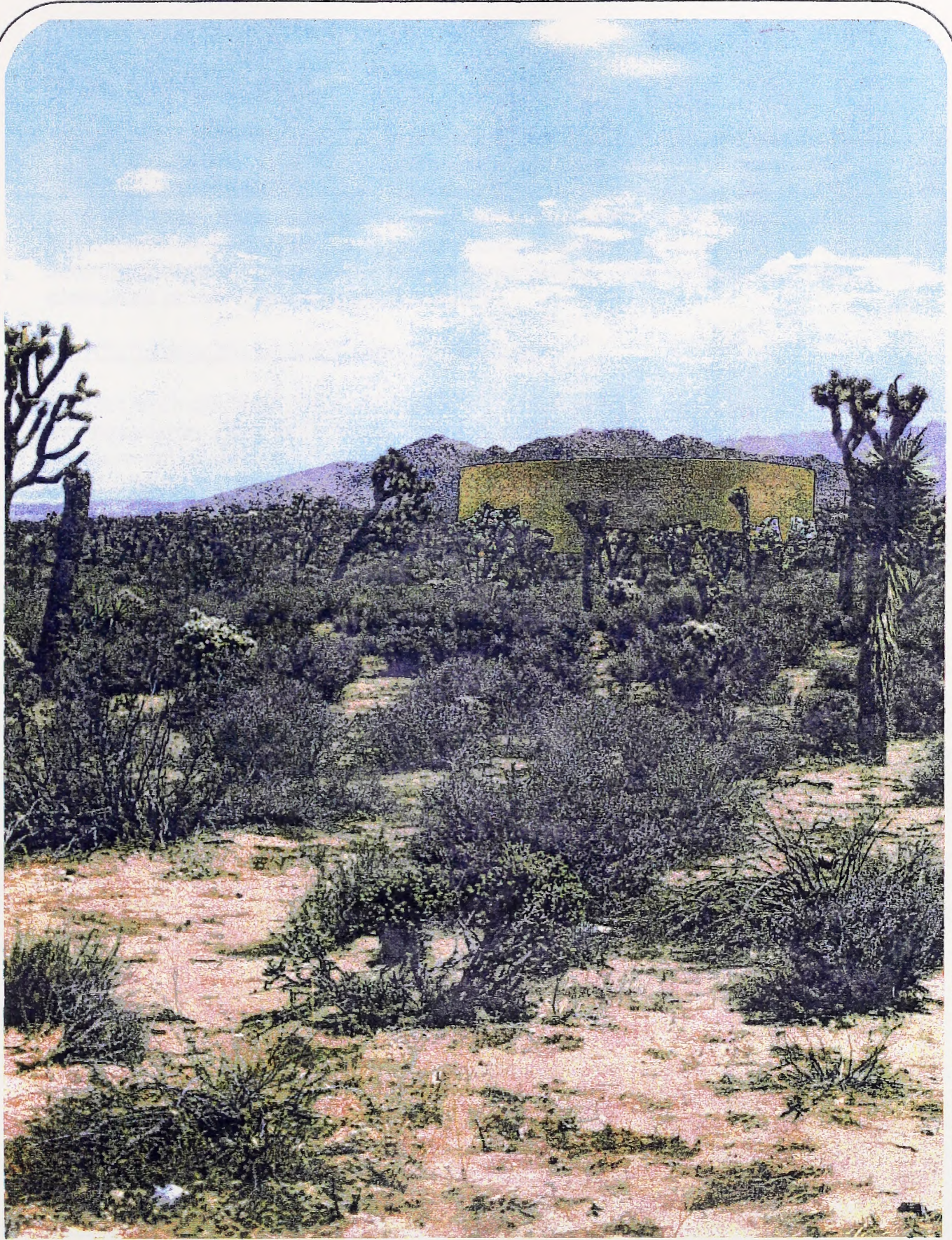
MOJAVE WATER AGENCY
 MORONGO BASIN PIPELINE PROJECT

BOYLE ENGINEERING CORPORATION

PUMPING STATION
 VARIABLE SPEED ALTERNATIVE
 TYPICAL SECTION

FIGURE

8



MOJAVE WATER AGENCY
MORONGO BASIN PIPELINE PROJECT

BOYLE ENGINEERING CORPORATION

RENDERING OF REGULATING
RESERVOIR

FIGURE

9

B. No Project Alternative

As required by the National Environmental Policy Act, this document will consider a No Action Alternative. A no action alternative would deny issuance of the right-of-way grant for the proposed pipeline. Since all routes from the California Aqueduct in Hesperia to Morongo Basin must cross public land under the jurisdiction of the Bureau of Land Management (BLM), selection of the no action alternative by BLM would be equivalent to adopting a no project alternative for the whole project. The no action alternative will be considered in this Environmental Assessment.

C. Alternatives No Longer Under Consideration

In order to obtain State Project Water (SPW), a local water purveyor must be located within the boundaries of a SPW wholesaler and must have supported the construction and development of the State Water Project. The local water purveyors in Homestead Valley and the Morongo Basin (which includes Yucca Valley and Joshua Tree) recognized early on that local water resources were limited and when the opportunity availed itself in the 1960's this area voted to include itself within the Mojave Water Agency's (MWA) boundaries. These historical decisions effectively restrict the delivery of SPW to the local water purveyors by the MWA as the only wholesaler in the region.

Since SPW is the only existing source of imported water for this water deficient region, the next concern is by what route a pipeline can be installed to serve the region. Since the Agency's inception, a pipeline around the north slope of the San Bernardino Mountains has been considered the only viable option. This is based on minimizing the loss in elevation and the amount of energy that must be used to deliver the water to the consuming areas in Landers and Morongo Basin. The route selected by MWA and its engineers reflects a series of engineering studies that balanced costs of the system, difficulties in acquiring right-of-way, and environmental considerations. Figures 2a-f illustrate the proposed alignment and alternative routes that were given consideration (see also Appendix 1). These alternatives have all been eliminated after careful engineering study and public consideration by both the Morongo Basin Pipeline Commission and MWA Board. The rationale for rejecting these route alternatives are summarized below.

1. Existing Aqueduct Turnout Alignment, Alternative Route K

The original baseline alignment (1970's) envisioned using the existing California Aqueduct turnout located several miles south of the City of Hesperia (see Figure 2a). However, circumstances have changed substantially since the baseline alignment was established. The most important change has been the design and approval of a new community, Rancho Las Flores, that encompasses the original alignment. The original pipeline route, Route K, could severely conflict with future development of Rancho Las Flores and the potential to incur substantial costs in the future to accommodate the residential and commercial

development envisioned by Rancho Las Flores. Add in the increased length of the pipeline, about two miles, the difficult topography (rolling hills and valleys with steep terrain), and the undisturbed environment along the route, and this alternative was identified as very difficult to develop. Based on reduction in pipe length (cost reduction), difficulty of construction, overall construction costs and substantially greater environmental effects, Route K has been eliminated from further consideration.

2. *SCE Powerline Easement Alignment, Alternative Route J*

The SCE Powerline Easement was considered as an alternative alignment (see Figure 2a). Field review determined that complex topography and conflicting land uses east of the Mojave River made this an infeasible alternative. Additional ground disturbance in relatively undisturbed portions of the SCE easement made this a less environmentally suitable alternative compared to the proposed route. Further, after meeting with SCE it was determined that permission would not be granted to use the easement. Based on the SCE difficulties in granting a permanent easement for the pipeline, the difficulty of justifying the taking of an easement from SCE by eminent domain, and the time required to complete these activities, this alternative was considered impractical. It has been eliminated from further consideration. Alternative route M (see Figure 2a) was eliminated from further consideration with the deletion of the SCE easement both because the connection to Kiowa Road was eliminated to the west and because this route is longer and in more complex topography than the proposed alignment in this area.

3. *Ranchero Road Alignment, Alternative Routes G and H*

Ranchero Road was also considered as a possible alternative alignment for the pipeline in the initial segment from the aqueduct to the Mojave River (see Figure 2a). Preliminary research on this alternative determined that Ranchero Road is a heavily used utility corridor that would require substantial relocation of existing utilities during construction. The City of Hesperia is also in the process of realigning Ranchero Road and the pipeline alignment cannot be set until the realignment is completed which may be after construction must begin on the Morongo Basin Pipeline Project. Based on the above issues, this alternative was eliminated from further consideration.

4. *Reach 2, Alternative Route C*

The original baseline alignment had the pipeline route stepping down from Tussing Ranch Road to Foothill Road in Apple Valley (see Figure 2b). Each alternative follows existing roads but the proposed alternative would result in traversing approximately 1/2 to one mile of relatively undisturbed desert tortoise habitat and adding about one-quarter mile of additional pipeline length and habitat disturbance. The additional habitat that would be disturbed by this alternative is approximately five acres. This additional disturbance resulted in Alternative Route C being eliminated from further consideration.

5. *Reach 3, Alternative Routes E and F*

The original route was designed to reduce the length of the pipeline by going cross country near Old Woman Springs and west of Pony Road in Johnson Valley (see Figure 2d). Both Alternative Routes E and F were found to have greater tortoise sign and individual tortoises along the alignment. This was to be expected due to the more limited disturbance along these two alignments. These two alignments were eliminated from further consideration based on the biological resource impacts. Alternative Routes E and F were eliminated from further consideration based on this factor.

6. *Reach 4, Gravity Pipeline Route (Alternative A)*

The gravity pipeline alternative alignment is depicted on Figures 2e and 2f as Route A. This route was examined and found to cross several miles of relatively undisturbed territory east of State Highway 247. Numerous tortoise burrows were found in this area. In addition, to meet the contract flows the size of the pipeline would have to be increased to a minimum 36" size. After examining the cost of the larger pipe, it was determined that the bond issue did not provide sufficient capital to complete the 36-inch pipeline construction. Alternative Route A was eliminated from further consideration based on the lack of funds and the substantial increase in damage to the biological resources along that alignment.

7. *Reach 4, Alternative Routes D, J, and I*

Alternative Route I was examined to determine how far south the pipeline could be extended (see Figure 2f). However, based on the needs of all of the water districts served by the Morongo Basin Pipeline, it was determined that the elevation of a more southerly terminus would be too low an elevation to serve them. It would also add approximately five additional miles of pipeline disturbance along Yucca Mesa Road. Due to the inability of Alternative Route I to meet engineering requirements and the additional habitat damage, this alternative was eliminated from further consideration. Alternative Route D crosses two washes by going cross country, contains steep topography, and contains several pipe bends in order to follow the alignment. Because of the disturbance in undisturbed areas and the reduced efficiency of this alternative, it was eliminated from further consideration. Alternative Route J reduced the total mileage of pipeline by the District, but would have required line extensions from the water purveyors to the south and east (Hi Desert and Joshua Tree). Relative to the proposed terminus at the end of Route H, the terminus at the end of Alternative Route J would not have delivered water to a suitable location for these two water districts in conformance with the contract. Therefore, Alternative Route J was eliminated from further consideration.

D. Proposed Plan Exception

In order to ensure conformance with the CDCA Plan for the proposed Morongo Basin Pipeline Project, the BLM proposes to adopt an exception to the Plan. An exception is a

one time action that would apply only to the proposed project. An exception to the CDCA Plan will not result in activation of Contingent Corridor "S" nor the identification of the alignment as a planning corridor. Therefore, the exception would not enable any future utility projects to utilize the proposed alignment. The physical impacts of approving the exception are the same as those outlined for the proposed project in the following discussion of impacts.

E. No Action Alternative/No Change In Plan

This alternative consists of denial of the exception and any plan amendment. It is equivalent to the no project alternative (see Alternative B above) that will be considered in this EA.

F. Plan Alternative Considered But Eliminated From Detailed Analysis

Under this alternative Contingent Corridor "S" would be activated. At this time there are no known utility projects that have any proposals to establish any major utility transmission systems or other utility systems that would require a utility planning corridor. The effect of bringing Contingent Corridor "S" forward would be to establish a two to five mile wide planning corridor which would facilitate utilization of the corridor for major utility systems, including "bulk transfers of electricity, gas, water, petroleum, and other commodities" (page 116 CDCA Plan). At this time there is no known demand for the activation of Contingent Corridor "S" and establishing it as a planning corridor could result in a significant change in the land use allocations and associated impacts along the corridor's alignment. At this time BLM has concluded that the evidence does not justify a major change in the CDCA Plan and this alternative was eliminated from further consideration.

III. AFFECTED ENVIRONMENT

A. Geology, Soils and Geologic Hazards

1. *Soils*

Soils along the alignment are all derived from alluvial materials eroded from the San Bernardino Mountains to the south and west. With the exception of the soils located at the turnout and the first 1/2 mile of the pipeline alignment, the soils are all very deep, coarse to fine sandy materials that are identified on the General Soil Map for the region as the following Mapping Units: Cajon-Manet, Kimberlina-Wasco, and Bryman-Helendale units. The Mapping Unit found at the turnout consist of the Avawatz-Oak Glen unit. These units and their Soil Series are discussed in detail within the "Soil Survey of San Bernardino County, California: Mojave River Area" (SCS 1986).

The turnout and first half-mile of pipeline will be constructed in the soils located on the older alluvium. The only constraint identified for these soils related to use for the turnout and pipeline alignment are steep slopes and potential for erosion. Once the ground surface is disturbed the potential for fugitive dust generation is moderate based on its sandy loam texture.

The remainder of the alignment is located on relatively flat good quality soils developed from alluvial deposits. These soils have good drainage, low water erosion potential, and range from coarse texture to sandy loam texture. The potential for water erosion is low both due to the good drainage and flat topography. Disturbed areas are moderate sources of fugitive dust as the size of the soil particles requires a higher velocity wind to initiate pick-up and transport. The only developed portions of these soils occurs in Antelope Valley, west of the Mojave River. A part of the pipeline alignment must cross a golf course and irrigated farming areas (alfalfa and sudan grass).

The geotechnical investigation (Converse 1992, copy of this study is available at the Desert District Office) identified one other major constraint for the soils along the pipeline alignment. The soils represent a moderate corrosion potential which will require cathodic protection to minimize corrosion damage over the life of the pipeline.

2. *Geologic Resources/Geotechnical Constraints*

The pipeline route passes through a range of depositional geologic sediments (alluvium) and encounters a few areas of crystalline granitic and metamorphic rock. The alluvium consists of both older and younger alluvium that is typical of that found on the north slope of the San Bernardino Mountains. A few small areas of dune sand occur along the route in Reach 3 and both recent and older fanglomerates occur along the route in Reaches 3 and 4 (see Figures 2c-2f). Recently deposited alluvium is found in the Mojave River channel. Granite rock outcrops occur in portions of Reaches 3 and 4 and metamorphic rock outcrops occur westerly of Highway 247 along the eastern flank of Ruby Mountain in Reach 4.

The pipeline alignment, as with most of southern California, is located within a seismically active region. It is anticipated that over the life of this project, the region will be subject to moderate to strong ground shaking, and possible ground rupture. The following faults are crossed by the pipeline and related facilities:

Helendale Fault (active)
Silver Reef Fault (potentially active)
Old Woman Springs Fault (active)
Lenwood Fault (active)
Johnson Valley Fault (active)

No documented faults are known to occur within Reach 1 or Reach 2. Reaches 3 and 4 contain the known active fault locations. In addition to the documented active and potentially active faults identified above, the results of a seismic refraction survey performed by Converse Consultants indicates the possibility of four previously unidentified faults or some other form of subsurface discontinuity within the project area. Note that the Landers 7.5 magnitude (June 1992, Modified Richter Scale) earthquake caused surface rupture along the Johnson Valley Fault and other faults located in the general vicinity of the Johnson Valley Fault.

Soil liquefaction occurs during strong groundshaking associated with seismic events. Based on Converse Consultant's investigation, the following areas were identified as having a potential to experience liquefaction: Antelope Valley Wash, Mojave River Crossing, Rabbit Dry Lake area, and Pipes Wash. Converse concluded that liquefaction could potentially occur at these locations at a depth ranging from 5 to 20 feet below the ground surface.

B. Surface Runoff and Flood Hazards

The Morongo Basin Pipeline is proposed to be installed along an alignment with no permanent surface water features, including streams, lakes, or springs. The pipeline will be constructed parallel to the north slope of the San Bernardino Mountains (see Figures 2a-2f); therefore, it will encounter many ephemeral stream channels that originate in this mountain range and traverse either north or east depending on the orientation of the mountains. In most instances the channels are located far from the mountain front where the presence of stream flow is rare. However, two major stream channels, the Mojave River and Pipes Wash, will be crossed by the pipeline and one stream channel, Antelope Valley in Hesperia, will be paralleled for several miles. One major stream channel is located on BLM public lands, Pipes Wash in Landers.

The majority of the pipeline route is located on alluvial deposits which are exposed to periodic sheet flow when it rains. Surface flows are generated only after prolonged rainfall, intense rainfall or due to spring snowmelt in the San Bernardino Mountains located south and west of the pipeline alignment. The "Geotechnical Investigation" by Converse Consultants Inland Empire examined the potential for scour from surface flow to affect the

pipeline. For all stream channels that may carry concentrated surface flow, Converse forecasted that scour depth which ranges from 5-10 feet. This includes the Mojave River, Pipes Wash, Antelope Valley Wash, and other ephemeral stream along the alignment as identified in the Revised Draft of Volume II of the Geotechnical Investigation (Converse 1992, pages 3 and 4). No major surface flow or stream channels exist within the public land portion of the pipeline alignment. Several small, unnamed stream channels do cross the pipeline alignment as shown on the 7.5' topographic maps of the area (Cougar Buttes, Old Woman Springs, Rattlesnake Canyon, Bighorn Canyon, and Landers).

Of the three permanent above ground facilities the pump station and terminal reservoir (see Figures 2d and 2f) are located in essentially flat topography with no incised channels and no potential for concentrated runoff. The turnout facility is proposed to be located adjacent to the California Aqueduct at the top of a stream channel. The Aqueduct interrupted the historic drainage pattern in the area and the turnout facility site no longer has any drainage area contributing to surface flows. Therefore, the potential for runoff through the channel at the turnout facility site has been eliminated by previous disturbance.

C. Fire Hazards

The Morongo Basin Pipeline alignment and the above ground permanent facilities are all located within the disturbed or natural desert conditions. Vegetation loadings in the natural desert setting are low along the whole route (except for the first mile) and the potential for fire hazards is very low. The Juniper and Joshua Tree Woodland along the first mile of the project contains a higher fuel loading than the remainder of the project although it is low relative to areas designated with wildland fire hazards because the vegetation at the turnout facility is discontinuous and highly disturbed by off road vehicle activity and construction projects. All portions of the alignment on public land are within very low density Creosote Bush Scrub habitat with very limited ground cover and minimal wildland fire hazard.

D. Noise

The noise environmental in the vicinity of the project is dominated by traffic noise generated on adjacent roads. The only existing permanent source of noise occurs at the project turnout location at the California Aqueduct. It is adjacent to the Aqueduct and a small background noise level is produced by the Aqueduct operations at this point. The nearby Hesperia Airport (1/2 mile north) also serves as a local source of noise as does off-highway vehicle (OHV) activities which are common in the area. The existing construction activity for the new aqueduct siphon across Antelope Valley is a short-term noise source.

Data from the Hesperia General Plan, from the Rancho Las Flores indicates that noise level along Rancho Road and Lake Arrowhead Road range from a low of 48.4 dBA to 60.5 dBA Community Noise Equivalent Level (CNEL) at 100 foot from the roadway centerline. Data from the County General Plan indicates that noise levels along Highway 247 in the

vicinity of Reche Road are about 60.1 dBA CNEL. This latter noise setting would be found on those portions of the alignment across public land along State Highway 247.

The rural setting along the whole route, except Antelope Valley in Hesperia and Deep Creek Road and Tussing Ranch Road just east of the Mojave River, would be consistent with a background noise level from 45 dBA to 50 dBA CNEL. The more urban settings probably experience a 50 dBA to 55 dBA CNEL background noise setting. The loudest individual noise sources probably consists of aircraft overflights, 18-wheel trucks, off-highway vehicles and occasional residential maintenance equipment, such as lawn mowers, chain saws, etc.

E. Aviation Safety

The only airport near the project with safety zones and hazard areas is the Hesperia Airport. This facility lies approximately one-half mile north of the turnout facilities. All proposed facilities are located outside of any of this airport's safety zones and hazard areas (SBCO 1989). The above ground facilities in Johnson Valley (pump station) and Homestead Valley (terminal/regulating reservoir) are not exposed to any airport safety zones. No airport safety zones occur along the public land portion of the pipeline alignment.

F. Hazardous/Radioactive Materials

Based on a review of existing County records, no hazardous or radioactive material constraints occur along the pipeline alignment nor at any of the proposed facility sites. Hazardous material or wastes may be transported along the local roads and highways, but no information is available regarding the type of materials nor the extent to which these roads are used for such transport. No hazardous or radioactive material issues were discovered for the public land portion of the pipeline alignment along State Highway 247.

G. Biological Resources

A detailed Biological Assessment has been prepared for the Morongo Basin Pipeline Project by Tierra Madre Consultants. That document "Biological Assessment for the Morongo Basin Pipeline Project" contains the detailed investigative data and evaluation of potential biological impacts summarized in this section. A copy of this document is available for review at the Desert District Office.

Tierra Madre identified four plant communities that occur along the pipeline route. These are: Joshua tree woodland, Mojavean creosote bush scrub, riparian scrub woodland (desert washes), and California juniper woodland. The alignment also passes through agricultural fields (mainly alfalfa and other field crops), a golf course, and suburban landscaped areas. Common names of plants and animals are used in the following description. Scientific names can be found in the Biological Assessment.

Joshua tree woodland is a complex community which is characterized by relatively dense stands of the distinctive Joshua tree, and includes a number of microhabitats. It occurs locally over a large portion of the Mojave Desert. Along the pipeline alignment, it occurs primarily at the eastern and western ends of the pipeline, from Yucca Valley to approximately seven miles west, and from the western end of Lucerne Valley west to the Mojave River, where it generally occurs at higher elevations than the creosote bush scrub within the pipeline alignment. The terminal/regulating reservoir site is located in the Joshua tree woodland.

Joshua trees, Mojave yuccas, silver cholla, and the various shrubs occurring in Joshua tree woodland provide cover and food for many birds, reptiles, and mammals. Among the birds known to utilize Joshua tree woodland for nesting are Scott's Oriole, Ladder-backed Woodpecker, Ash-throated Flycatcher, Loggerhead Shrike, American Kestrel, Cactus Wren, House Finch, and Black-throated Sparrow.

Various reptiles occur in Joshua tree woodland, but one species, the Desert (Yucca) Night Lizard, is entirely restricted to habitats containing yuccas. They are most commonly found under fallen dead branches, trunks, and leaves of Joshua trees and Mojave yuccas.

Mojavean creosote bush scrub covers extensive areas near the middle of the pipeline route from Johnson Valley to the eastern end of Lucerne Valley. Much of this community contains relatively little perennial plant species diversity, but ephemeral spring annuals can be abundant following winters with adequate rainfall. The diversity of perennial shrubs increases in areas transitional to Joshua tree woodland or desert washes. The pump station is located in the Mojavean creosote bush scrub habitat.

Desert washes are present in both Joshua tree woodland and creosote bush scrub. A few of these are rocky; others have primarily sandy banks. Distinctive plant species associated with desert washes include desert willow, indigo bush, scalebroom, catclaw acacia, showy groundsel, wash rabbitbrush, bladderpod, and cheesebush.

Washes are extremely important to desert wildlife. Shrubs such as catclaw, desert willow, rabbitbrush, and cheesebush provide nesting sites and cover for various desert animals. A species of mistletoe which parasitizes catclaw and mesquite is common in the region, and produces an abundance of berries which are an important food source for Phainopeplas, Northern Mockingbirds, and other species. During the field surveys nests of Phainopeplas and Loggerhead Shrikes were found within clumps of this mistletoe. Another shrub found along desert washes, bladderpod, produces nectar which serves as the primary food source for Costa's Hummingbirds nesting in the area. The banks of washes are often utilized by Desert tortoises for the construction of their burrows.

California juniper woodland occurs along the pipeline alignment from the California Aqueduct northeast for approximately two miles. California juniper predominates, with a variety of both coastal and desert shrubs also present. Joshua trees also occur within this

community. As with the vegetation, an ecotonal influence can be seen in the wildlife of this community. Several "coastal" animals occur with "desert" animals in the area near the Aqueduct. Nesting species such as California Towhee, Bushtit, Lazuli Bunting, California Thrasher, Scrub jay, and Bewick's Wren area essentially coastal, while most other in this area, including Ladder-backed Woodpecker, Scott's Oriole, Cactus Wren, and Black-throated Sparrow, are more closely associated with desert habitats.

A total of 272 plant species was identified within the project area. With twenty-seven of these introduced, 90.1% are native to the region. Because of southern California's prolonged drought, additional species would be detectable if surveys were performed following years of above average rainfall. The abundance and diversity of annuals was fairly high overall following heavy rains of March 1991, but this abundance was somewhat patchy and localized. The number of animal species detected during the surveys are as follows: thirteen reptiles and amphibians, 107 birds, and seventeen mammals.

Sensitive species (potential and actual) were identified for the project area based on review of literature and the field surveys. The status of all sensitive species is described in Tierra Madre Consultant's Technical Study. The following sensitive plant species were identified as potentially occurring in the project area:

Cushenbury milkvetch (*Astragalus albens*)
Alkali mariposa lily (*Calochortus striatus*)
Desert cymopterus (*Cymopterus deserticola*)
Utah cynanchum (*Cynanchum utahense*)
Parish's daisy (*Erigeron parishii*)
Mojave tarweed (*Hemizonia mohavensis*)
Mojave Monkeyflower (*Mimulus mohavensis*)
Robison's monardella (*Monardella robisonii*)
Pigmy muilla (*Muilla coronata*)
Little Mousetail (*Myosurus minimus* var. *apus*)
Short-jointed beavertail cactus (*Opuntia basilaris* var. *brachyclada*)
Parish's phacelia (*Phacelia parishii*)

The following sensitive plants were identified as occurring within the project alignment in small numbers: Utah cynanchum, Pygmy muilla, and Short-jointed beavertail cactus.

The following sensitive animal species were identified as potentially occurring in the project area:

Cooper's Hawk (*Accipiter cooperii*)
Golden Eagle (*Aquila chrysaetos*)
Ferruginous Hawk (*Buteo regalis*)
Swainson's Hawk (*Buteo swainsoni*)
Yellow Warbler (*Dendroica petechia*)

Spotted Bat (*Euderma maculata*)
California Mastiff Bat (*Eumops perotis californicus*)
Merlin (*Falco columbarius*)
Desert Tortoise (*Gopherus [Xerobates] agassizi*)
Bald Eagle (*Haliaeetus leucocephalus*)
San Diego Horned Lizard (*Phrynosoma coronatum blainvillei*)
Pale Big-eared Bat (*Plecotus townsendii pallescens*)
Summer Tanager (*Piranga rubra*)
Mohave Ground Squirrel (*Spermophilus mohavensis*)
Burrowing Owl (*Speotyto cunicularia*)
Bendire's Thrasher (*Toxostoma bendirei*)
Le Conte's Thrasher (*Toxostoma lecontei*)

The following sensitive animal species were identified as occurring in the project area: Desert Tortoise, Burrowing Owl, Mojave Ground Squirrel, Bendire's Thrasher, and Le Conte's Thrasher. No tortoise or tortoise sign were found within the proposed project ROW.

H. Cultural/Paleontologic Resources

From October through December, 1991, a Class III intensive cultural resources inventory was conducted on a seventy-mile long pipeline corridor from Hesperia to Landers, San Bernardino County, California, on behalf of the Morongo Basin Pipeline Project. The study was conducted by Michael K. Lerch & Associates and a copy of the detailed cultural resources inventory is available for review at the Desert District Office. The purpose of the study was to identify and record all prehistoric and historic cultural resources on or adjacent to the project corridor, to conduct a preliminary evaluation of significance for each identified resource, to assess the extent to which significant cultural resources might be subject to adverse impact from the project, and to recommend measures to mitigate potential impacts.

With the exception of Reach 1, the project route traverses an area of relatively low sensitivity for archaeological and historical resources. Few resources important to aboriginal populations, such as surface water, lithic tool sources, or major food sources, are found along the project route away from the Mojave River. With respect to potential historic resources, much of the project route follows roads created later than 1950. In addition, virtually all of the project route has been subject to previous disturbance from road construction, water lines, and telephone cables.

In reach 1, two prehistoric archaeological sites, one site with both prehistoric and historic components, one historic archaeological site, and five prehistoric isolated artifacts, were identified. These are described as follows:

- Site 1: This site, located near the aqueduct turnout, consists of two hearth areas which may have been used to roast juniper-berry cakes, and a few scattered quartzite flakes. It has been severely disturbed as a result of off-highway vehicle (OHV) activity and erosion, and lacks integrity.
- Site 2: This site, located east of the dogleg between the aqueduct turnout and Antelope Valley, consists of the historic remains of a homestead that was present in 1940. At the same location is a badly disturbed prehistoric hearth area with a few quartzite flakes similar to Site 1. Both the historic and prehistoric components of this site are also badly disturbed from the heavy OHV activity in the area.
- Site 3: This prehistoric site, located on the floor of Antelope Valley, is like Site 1, an area of darkened soil and a few associated lithic flakes that appear to be the result of roasting or baking activities. It, too, is severely disturbed from OHV activity and erosion.
- Site 4: This site consists of a possibly historic building foundation made of rock and concrete. It is located near the intersection of Deep Creek Road and Rock Springs Road. The foundation appears to have been abandoned prior to completion of any structure, and no structure is shown at that location on any recent or historic maps of the area. no trash deposits or historic artifacts were observed.

Isolated Artifacts: Five prehistoric isolated artifacts, all quartzite flakes, were found in the area between the aqueduct turnout and Alston Road. They are located in the general vicinity of sites 1-3, above, and are similar to the few flakes found at those sites.

Buried Deposits: Reach 1 of the project, from the aqueduct turnout to the east side of the Mojave River, was found to have potential for buried archaeological resources due to the depositional nature of the area's geomorphology adjacent to the river. Buried sites with no surface evidence have been found in other areas along the Mojave River in similar settings.

Based on data provided by the San Bernardino County Museum Earth Sciences Section, the portions of the proposed pipeline alignment (Hesperia, Mojave River bluffs, older alluvium areas) may contain significant paleontological resources.

I. Air Quality

The 1990 Annual Air Quality Report for the San Bernardino County Air Pollution Control District (APCD) addresses air quality along the whole project route. Tables 2 and 3 indicate the air quality at monitoring stations in the region. Two pollutants, ozone and PM₁₀ (Particulate Matter smaller than ten microns aerodynamic diameter), exceed the state and federal standards and are the subject of an Air Quality Attainment Plan adopted by the District in 1991. The ozone violations are primarily attributed to transported pollutants from the South Coast Air Basin. However, local sources appear to be the cause or a major contributor to PM₁₀ and local violations range from 19 exceedances in Victorville to 4 exceedances in Twentynine Palms, the only Morongo Basin monitoring station. All other pollutants (except Hydrogen Sulfide in Trona) are in compliance with both state and federal standards as shown in Table 2.

TABLE 2

1990 ANNUAL AIR QUALITY REPORT

EXCEEDANCES OF STANDARDS AND MAXIMUM CONCENTRATIONS

STATION	OZONE			CARBON MONOXIDE				NITROGEN DIOXIDE		SULFUR DIOXIDE		
LOCATION	DAYS OVER STATE STD	DAYS OVER FEDERAL STD	MAX 1-HR PPM	DAYS OVER STATE 8HR/1HR	DAYS OVER FEDERAL 8HR/1HR	MAX 8-HR PPM	MAX 1-HR PPM	DAYS OVER STATE STD	MAX 1-HR PPM	DAYS OVER STATE STD	MAX 24-HR PPM	MAX 1HR PPM
BARSTOW	35	1	.13	0/0	0/0	3.83	5.4	0	.12	*	*	*
HESPERIA	119	59	.27	0/0	0/0	3.31	7.1	0	.08	0/0	.008	.05
PHELAN	105	53	.24	0/0	0/0	3.78	9.2	0	.07	0/0	.006	.05
TRONA	1	0	.11	*	*	*	*	0	.20	0/0	.025	.05
29 PALMS	37	1	.14	*	*	*	*	*	*	*	*	*
VICTORVILLE	56	9	.18	*	*	*	*	0**	.07**	0/0	.049	.08

* NOT MONITORED

**MEASURED IN DECEMBER ONLY

TABLE 3

1990 ANNUAL AIR QUALITY REPORT

PM-10

EXCEEDANCANCES OF STATE AND FEDERAL STANDARDS AND MAXIMUM CONCENTRATIONS

STATION	NUMBER OF SAMPLES	MAXIMUMS ug/m3	DATE	EXCEEDANCES		MEANS	
				STATE	FEDERAL	ARITH- METIC	GEO- METRIC
BARSTOW	44	381	Dec.19	12	1	48.3	39.0
HESPERIA	57	171	Nov. 2	15	1	45.9	41.6
LUCERNE VALLEY	59	317	Feb. 16	9	4	47.8	32.4
TRONA	59	366	Apr. 23	18	1	48.3	38.6
TWENTYNINE PALMS	50	297	Dec.19	4	1	34.4	26.2
VICTORVILLE-FG	26	105	Sep. 2	19	0	55.7	54.0

J. Water Supply/Water Quality

The project lies within four ground water basins as identified by the State Department of Water Resources (DWR 1975). These are: Upper Mojave River Valley (6-42), Lucerne Valley (7-19), Johnson Valley (7-18), and the Ames Valley (7-16). The numbers after each basin name refers to the State assigned Ground Water Basin Number. Based on available data, Converse Consultants concludes that the ground water table along most of the pipeline alignment will occur well below the installed pipeline elevation (invert). Possible exceptions to this conclusion exist in Antelope Valley, the Mojave River crossing, Rabbit Dry Lake, Old Woman Springs Fault area, and Pipes Wash crossing. Minimum forecasted ground water depths are as follows:

Reach 1, ± 55 feet in the Mojave River channel
Reach 2, ± 25 feet in the vicinity of Rabbit Dry Lake
Reach 3, ± 125 feet in Central Lucerne Valley, and
Reach 4, ± 100 feet in the vicinity of Flamingo Heights, south of Landers.

Seasonal fluctuations in ground water levels may occur based on the amount of precipitation received.

In the project description several reports are referenced that describe the extent of the existing overdraft within the Agency's Division 2. The existing water resources are very limited in the Warren Basin and currently adequate in the Homestead Valley and Joshua Tree. Extensive literature supports a significant overdraft along the Mojave River and its ground water basins. The MWA has a 50,800 acre feet allocation of State Project Water (SPW), but actual deliveries in each year are limited to water available in the system. For the past several years the drought has substantially reduced SPW available for delivery to water wholesalers. MWA has not purchased large quantities of SPW in the past and has recently begun purchase of a few thousand acre feet each year for the purpose of recharging the Mojave River ground water basins.

Water quality of each water system in the delivery area remains good. Some areas have relatively high Total Dissolved Solids relative to the existing primary drinking water standard 500 parts per million or milligrams per liter (TDA 1990). SPW delivered to Lake Silverwood is presently averaging 360 mg/liter based on the most recent published Department of Water Resources figures (DWR 1989).

K. Open Space/Recreation/Visual

With the exception of two locations, discussed below, the pipeline alignment follows existing roads or existing man-made facilities. In Reach 1, the turnout and pipeline begin adjacent to the existing California Aqueduct just south of Antelope Valley (Figure 2a). For approximately two miles the pipeline will cross undeveloped, but highly disturbed portions of Antelope Valley. Both natural gas pipelines and power lines occur within the pipeline

alignment. This area is used for off-highway vehicle (OHV) recreation activities. Since the area consist of private property, the OHV activity appears to be a trespass activity. The area along the alignment is designated for rural residential development. Visually the turnout facility will be hidden from all but adjacent views by a ridge to the north between the turnout and Antelope Valley. The pipeline will cross Antelope Valley which is highly disturbed by aqueduct construction activities, power lines, severe OHV disturbance, a few residences and the natural gas pipeline above ground facilities.

From Alston Road (in Antelope Valley) to the Mojave River the pipeline will follow existing roads with adjacent residential development, cross a golf course and cross an open alfalfa field. At the Mojave River the pipeline will cross the channel at a right angle and cross highly disturbed open space (adjacent to, and east of, the River channel) until it reaches Deep Creek Road (Figure 2a). The channel is used for recreation activity (OHV activity and horseback riding, etc.). From the point where the pipeline enters the Deep Creek Road easement until the pipeline exits Foothill Road in eastern Lucerne Valley, the pipeline follows existing paved and graded roads. Except for random OHV activity none of the alignment serves as open space, recreation or visually significant resources.

From the terminus of Foothill Road east of Cavetto Road in eastern Lucerne Valley, the pipeline route traverses partially disturbed territory for about a mile and a half (Figure 2c). This area is passive open space (not being used for any active recreation at this time) with some evidence of limited OHV activity and no major visual qualities as it is part of the flat portion of Lucerne Valley's background visual setting.

From the point where the pipeline alignment intercepts State Highway 247 (Old Woman Springs Road), it follows existing paved or graded roads with power lines adjacent to these roads. The visual setting is man-made with the road and power lines predominating and occasional residences located adjacent to the road. Random OHV activity occurs in the area and a primary access to the Johnson Valley Open Area occurs along the portion of the alignment just east of Old Woman Springs Ranch. No other important open space, recreation or visual values are known to occur along this portion of the alignment to its terminus as shown on Figures 2c-2f.

L. Mineral Resources

No historic or active mining operations occur along the Morongo Basin Pipeline alignment. A review of the San Bernardino County Mineral Resource Zone (MRZ) maps indicates that no MRZ's are designated for the alignment. A field review of the alignment indicates that the only potential mineral resource would be sand and gravel materials located within the active channel of the Mojave River. The CDCA Plan Economic Minerals Element identifies unverified potential for oil/gas and uranium resources in the general area, and sand and gravel resources located near the southern end of the project area (Saleable Minerals). No claims are known to occur along the alignment. The BLM Master Title Plats, Leasable Mineral Plats and Use Plats were checked for the presence or absence of mineral leases,

permits or applications for leasable minerals. Two Placer Mining Claims were identified which are located in Sections 20 and 21, T4N, R2E, SBBM. A total of two hundred acres have been claimed approximately two miles west of Old Woman Springs (see Figure 4). The proposed project alignment is adjacent to State Highway 247 which just touches the northern edge of both claims.

M. Utilities Infrastructure

The project will require power at the California Aqueduct turnout, at the pump station in Johnson Valley and at the terminal reservoir. Power will be provided from existing SCE electricity lines adjacent to or within a short distance of these sites. The only other infrastructure system affected is the Mojave River channel. The channel is operated and maintained by the San Bernardino County Transportation and Flood Control Department and it is designed to provide flood control for the area and downstream region. The Department does not maintain any of the fifty or more channels that cross the alignment, except at Pipes Wash where culverts under Reche Road are maintained.

N. Transportation/Circulation

The project will cross numerous roads and will parallel several major paved and graded roads along the project alignment. The parallel crossings will occur at a few local collector roads, such as Rancho Road and Lake Arrowhead Road in Hesperia. More importantly the pipeline will parallel Deep Creek Road, Tussing Ranch Road, Willow Wells Road, Foothill Road, State Highway 247, Pony Road, Joshua Tree Avenue, Reche Road, and Landers Road. These roads are shown in Figures 2a-2f. Of these roads Deep Creek, State Highway 247, Reche Road and Landers Road carry substantial traffic volumes related to area and regional traffic. A review of the County General Plan Transportation-Circulation System Background Report indicates that none of the above roads have an Average Daily Traffic (ADT) flow of 5,000 vehicles per day (SBCO 1988). Based on the two lane occupancy rate of about 12,000 ADT before the lane capacity is exceeded (equivalent to Level of Service (LOS) C) none of the identified roads is operating beyond its existing capacity to carry traffic.

O. Housing/Demographics/Socioeconomics

The community (now Town) of Yucca Valley, and the communities of Landers and Joshua Tree have experienced less than 4% growth per year over the past decade, due partially to location and partially to a connection moratorium in Yucca Valley over the past two years. Actual growth within the Joshua Basin Water District between 1980 and 1987 was estimated at 1,100 persons (4,083 to 5,180). In Yucca Valley the comparable growth rate was 4,008 persons (6,401 to 10,418). The growth rate in Landers has been approximately the same based on water connection data (personal communication Mr. Mike Maline, General Manager of the Big Horn-Desert View Water Agency), but the data on the local population

is not quantifiable. The current housing vacancy rate in the project area is about 6-10% based on recent real estate figures.

The primary employment bases in the region are the military, tourism (Joshua Tree National Monument), retirees, and local service and commercial businesses. No major industrial facilities or major employers occur within the Agency's Division 2. However, large mining activities are located in Lucerne Valley approximately 15 miles to the west. Recreation activities in the region include off-highway vehicle activity located in the Johnson Valley Open Area on federal land under the BLM's jurisdiction.

P. Public Services

Fire protection for the above ground facilities will be provided by the City of Hesperia and the California Division of Forestry under contract to San Bernardino County in Johnson and Homestead Valleys. The County Sheriff provides law enforcement services throughout the pipeline alignment. Schools, parks and other governmental services are not affected by the project as no school, park or other governmental facilities are located within the project alignment and the project will make no demands of these services.

Q. Land Use

The alignment of the Morongo Basin Pipeline has been modified by human activities along the whole route. The turnout and beginning of the pipeline is located adjacent to the California Aqueduct which winds its way south from Antelope Valley to Lake Silverwood. Antelope Valley, between the turnout and Rancho Road/Alston Way, contains a few residences, natural gas lines, dirt roads, flood control facilities, and extensive off-highway vehicle paths, and power lines. From Rancho Road to the Mojave River the landscape is dominated by residential, golf course and farming activities. The river channel itself is intensively modified for flood control purposes and the Santa Fe Railroad bridge and Rock Springs Road cross the river channel just north of the pipeline crossing.

Along Deep Creek and Tussing Ranch Roads (as far east as Japatual Road) a combination of residential and agricultural uses are the dominant uses. Electricity, phone, and cable lines are buried adjacent to the paved and graded dirt roads. East from Japatual Road all the way to the end of Foothill Road at Cavetto Road, the adjacent land uses included rural residences, power lines, cable lines, and graded dirt roads (some paved sections in Lucerne Valley). From Cavetto Road to State Highway 247 (a partially disturbed extension of Foothill Road) there is an ungraded path that generally follows an alignment consistent with Foothill Road. This area contains the least disturbance of any portion of the alignment. At the State Highway 247/Foothill Road (extension) intersection, the first public land is encountered (see Figure 4).

From its intersection with State Highway 247 the pipeline follows existing disturbed road alignments that are bordered by power lines, cable lines, and residential and commercial

uses. These rural residential uses extend along the remainder of the route except where public land occupies both sides of the Highway 247 road easement. Caltrans does not have a formally granted right-of-way for State Highway 247 for those portions of State Highway 247 affected by the project.

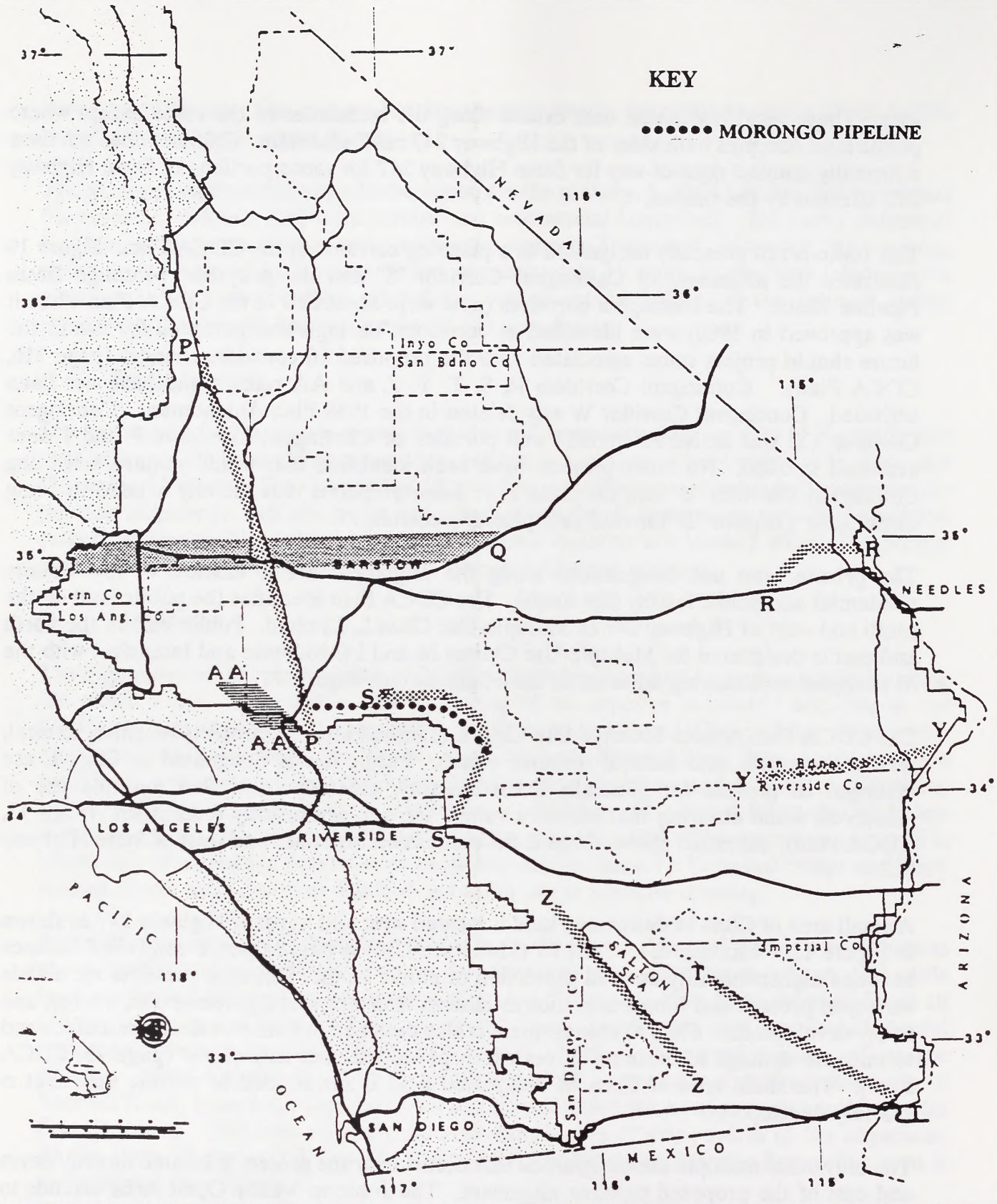
This route is not presently designated as a planning corridor in the CDCA Plan. Figure 10 illustrates the alignment of Contingent Corridor "S" and the proposed Morongo Basin Pipeline Route. The contingent corridors (nine were identified in the CDCA Plan when it was approved in 1980) were identified as corridors "having some potential for use in the future should project status associated with the proposed 16 corridors change" (page 116, CDCA Plan). Contingent Corridors R, S, T, Y, Z and AA remain and have not been activated. Contingent Corridor W was deleted in the 1988 Plan Amendment. Contingent Corridor CC was activated in 1981 and portions of Contingent Corridors P and ! were activated in 1986. No other projects have been identified that would require activating Contingent Corridor "S" and no plans have been prepared that identify a need to bring Contingent Corridor "S" forward as a planning corridor.

The private land use designations along the alignment are a mixture of low density residential and public facility (for roads). The CDCA Plan identifies the public land on the south and west of Highway 247 as Multiple-Use Class L, Limited. Public land to the north and east is designated for Multiple-Use Classes M and I (Moderate and Intensive) with the M designation occurring adjacent to the Highway (see Figure 11).

The CDCA Plan defines Multiple-Use Class L (Limited Use) as "protects sensitive, natural, scenic, ecological, and cultural resource values. Public Lands designated as Class L are managed to provide for generally lower-intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished" (page 13, CDCA Plan). As noted above, Class L designation occurs south and west of State Highway 247.

A small area of Class M designated land is located west and north of Highway 247 as shown in Figure 11. "Multiple-Use Class M (Moderate Use) is based upon a controlled balance between higher intensity use and protection of public lands. This class provides for a wide variety of present and future uses such as mining, livestock grazing, recreation, energy, and utility development. Class M management is also designed to conserve desert resources and to mitigate damage to those resources which permitted uses may cause" (page 13, CDCA Plan). The small area of Class M designated land is surrounded by private land that is sparsely developed.

The only other multiple use designation that occurs near the project is located directly north and east of the proposed pipeline alignment. The Johnson Valley Open Area extends to within a half mile of Highway 247 (north of the Highway) and is designated Multiple-Use Class I. "Multiple-Use Class I is an "Intensive Use" class. Its purpose is to provide for concentrated use of lands and resources to meet human needs. Reasonable protection will

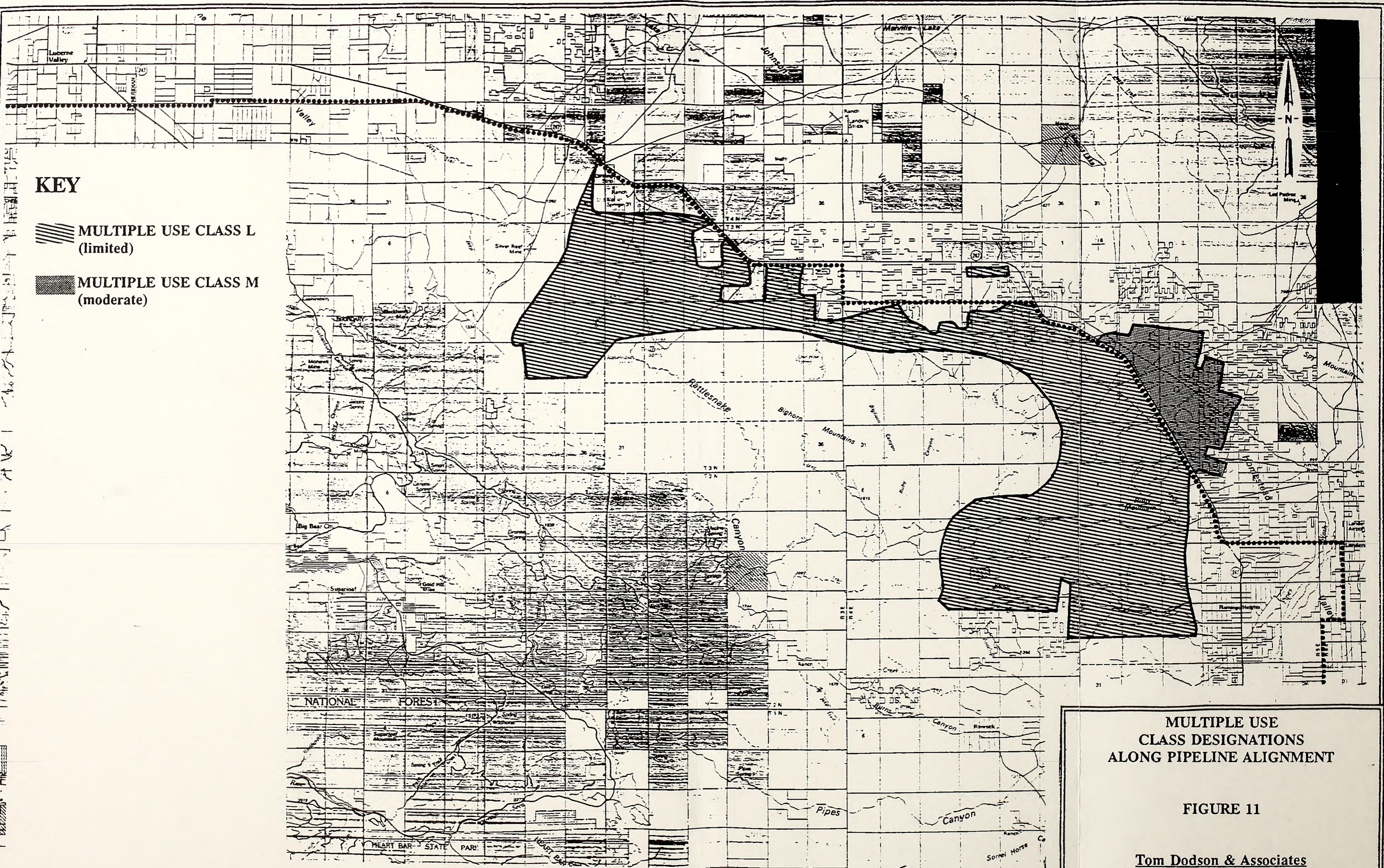


**CONTINGENCY UTILITY
 PLANNING CORRIDORS**

Tom Dodson & Associates
 environmental consultants

Source: Bureau of Land Management

FIGURE 10



be provided for sensitive natural and cultural values. Mitigation of impacts on resources and rehabilitation of impacted areas will occur insofar as possible" (page 13, CDCA Plan). A review of the individual CDCA Plan Elements indicates no issues of concern for the following Elements: Native American Values, Wildlife, Wilderness, Wild Horse and Burro, Livestock Grazing, Motorized-Vehicle Access, Energy Production and Utility Corridors, and Areas of Critical Environmental Concern.

The following Elements identified resources of concern along the route or in close proximity: Vegetation Element (possible presence of sensitive species (*Calochortus excavates*, *Puccinellia parishii*, and *Arabis shockleyi*; Johnson Valley/Lucerne Valley Creosote bush Clones), and the Economic Minerals Element which identifies unverified potential for oil/gas and uranium resources in the general area, and sand and gravel resources located near the southern end of the project area (Saleable Minerals). The desert tortoise was listed as a federal Threatened Species in 1989 and although no special mention is made of this species along the route it is generally discussed in the Plan's Wildlife Element and has been the subject of extensive management activity since adoption of the CDCA Plan. Finally, the contingent corridor, Corridor "S", is discussed in the Energy Production and Utility Corridor Element of the CDCA Plan as noted above.

IV. ENVIRONMENTAL CONSEQUENCES OF PROPOSED ACTION, ALTERNATIVES, AND MITIGATION MEASURES

A. Geology, Soils and Geologic Hazards

Impacts of the Proposed Project/Plan Exception

The water transmission system facilities can not cause changes in geologic substructures because of the shallow depth to which the pipeline would be installed. The turnouts, reservoir, and pump station all consist of small, surface facilities without any potential to alter geologic substructures. The water pipeline would be placed beneath the ground surface at from 5-12 feet deep within the public land ROW. This would occur as a long narrow trench that has no potential to affect a feature as large as a geologic substructure. The potential for adverse impact to such structures from the facilities would be nonsignificant.

The pipeline alignment would traverse about 68.2 miles from near Hesperia to a location north of, but near, the communities of Joshua Tree and Yucca Valley. A review of the available geologic literature for this area indicates that at least five known active or potentially active faults must be crossed by the water line. These faults represent unstable areas where ground shaking and surface rupture could occur and damage the water line. Included in the several known active faults are the Helendale Fault (a NW/SE trending fault in Lucerne Valley), Old Woman Springs Fault (a WNW/ESE trending fault at the south end of Johnson Valley), and the Johnson Valley Fault. Portions of the Helendale Fault near the generalized alignment of the pipeline are shown as having been active during the Holocene, and are considered active (Bortugno and Spittler 1986 and Converse 1992). The Old Woman Springs Fault is shown as older than 10,000 years and should not be a major source of unstable earth conditions. The Johnson Valley Fault has a associated Alquist-Priolo Zone designation which indicates recent fault activity. The pipeline would cross the recent surface rupture created by the June 1992 Landers 7.5 (Richter Magnitude) earthquake. This surface rupture generally follows the Johnson Valley Fault alignment in the area adjacent to the proposed pipeline.

Other potential unstable earth conditions were investigated along the general alignment of the pipeline and the majority of the area is located in coarse, young alluvial deposits from the north and east front of the San Bernardino Mountains. Visual surveys of the general alignment, review of the County's General Plan (SBCO 1989) and Converse's geotechnical investigation, supporting background reports (SBCO 1988), and other publications (cited below) indicate that only two other sources of unstable earth conditions may occur along the whole 68.2 mile pipeline alignment.

The pipeline could have crossed the tip of the Blackhawk landslide , but by staying in the road alignment, as proposed, this potential impact is avoided. Also, when crossing major

river channels or washes (such as the Mojave River channel or Pipes Wash), steep slopes may create very limited unstable earth conditions along the pipeline.

The County General Plan (SBCO 1989) identifies "water works" as an essential land use, i.e. one that must remain functional during a disaster, such as a seismic event. However, since the pipeline delivers raw water that is not directly utilized by the water purveyors, MWA has concluded that it is not an "essential" facility that must remain operational during a disaster. Short-term outages can occur without diminishing the value of the pipeline based on this finding. Therefore, no potential exists for an essential land use to be exposed to damaging unstable earth conditions.

To avoid significant adverse impact from geotechnical hazards, the following mitigation measures shall be implemented:

1. The Agency shall install pipelines that cross unstable earth conditions based on specific recommendations of geologic engineering studies for such areas. Because of the potential for the pipeline to be broken at certain locations, such as the Helendale and Johnson Valley Faults, the Agency will install appropriate equipment to minimize loss of water and related damage caused by leakage from a damaged pipeline. The Agency shall have prepared and shall implement an emergency response plan for controlling the effects of damage to project facilities, particularly fault rupture damage to the water pipeline. All pipeline diversion turnouts shall be located in natural drainage channels of a size suitable to carry the flows in the pipeline.
2. The Agency shall select stable areas for all other facilities, unless such a location is infeasible. Under such circumstances, the Agency shall obtain a geologic engineering study for a facility located in an unstable area and shall implement the measures required to ensure that the facility is not adversely impacted by the geologic condition creating the instability.
3. With the exception of pipelines the final grade of all other facilities shall be maintained at less than a 10% slope. Pipeline placement on steep slopes (river or wash banks) shall include engineering measures to ensure that the slopes are not unstable after construction is completed.

Based on a field review after the Landers earthquake, the project geotechnical consultants concluded that if the pipeline had been in place during the recent earthquake, it would have been ruptured near the intersection of Highway 247 and Reche Road in Landers. Some water would have been released at the rupture location, but the total damage estimate for repairs to the pipeline would be estimated to be approximately \$50,000 and repairs could have been completed in a short period of time. The MWA concluded that this level of geotechnical hazard does not constitute a significant constraint or impact on the proposed pipeline project.

The pipeline would be installed perpendicular to (across) the north sloping alluvial fans along the pipeline route. The line would be buried and would not cause any change in topography along the route. The individual surface facilities are small and can be located on shallow sloping ground without altering any topographic features. Based on the size and

type of facilities, the project would not cause any significant topographic or ground surface relief alterations.

A field and literature review of the general alignment indicates that, aside from the Blackhawk landslide, no major unique geologic or physical features are identified along the pipeline alignment. Since the pipeline would be buried, it has no potential to cause the destruction, covering, or significant modification of such features. The remaining above ground facilities have been located in alluvial areas that ensure no unique geologic or physical features are significantly damaged. The field survey indicates the Blackhawk Landslide would be avoided, but the following mitigation measure shall be implemented to ensure any data related to it is recorded:

4. The Agency shall implement a data recovery contingency plan for that portion of the alignment which crosses near the Blackhawk Landslide. It shall be implemented to document the geologic values of this resource if any significant information can be gleaned from the trench which crosses this feature.

As noted above, the project facilities (property), particularly the pipeline, would be exposed to seismic ground shaking and potential fault rupture. These impacts, including the potential liquefaction hazards, can be mitigated to a level that would allow the Agency to protect the facilities and to respond to damage in a timely manner. The emergency response plan, identified as part of Mitigation Measure 1 above, would identify the required time response time frame to ensure the water transmission system does not cause significant delays in water deliveries. The following mitigation measure would ensure that facilities are designed to handle the seismic hazards that exist within the project area and prevent a significant adverse impact to project facilities (property):

5. The Agency shall implement the measures identified in the Converse Consultants geotechnical evaluation to protect essential facilities from the maximum seismic hazard associated with regional and project area seismic events.
6. The storage reservoir shall be designed to withstand the regional ground shaking levels or water be released from the reservoir shall be contained or channeled in a manner that does not threaten any property or human life downstream of the facility.

No major water bodies exist within the project's general alignment and therefore, no potential exists for water-related seismic hazards such as a seiche.

The project would cause disruption, compaction, and/or overcovering of an estimated 295 acres throughout the project area. Of this total about 11 acres (four acres at the reservoir site, four acres at the pump station, 1/2 acre at the turnout, and about 2.5 acres along the route) will be permanently disturbed and removed from natural productive use. The impact of the increased runoff from overcovering the soil with impervious (impermeable) covering is addressed below and it can be mitigated below a significant level. The remaining 287 acres of soil will be disturbed by installing the water pipeline and a majority of the soil removed would be placed back into the trench. The excess material shall be either used

directly by the Agency or Project Participants for other project fill requirements or shall be made available to other parties for their use. No significant adverse impact to soils are forecasted based on the type and extent of disruptions.

The soils in the project area are generally coarse alluvial derived soils (such as Cajon-Manet, Kimberlina-Wasco, and Bryman-Helendale (General Soil Map Units, SCS 1985) and portions of the project area contain potential agricultural soils under irrigated conditions. As a result of increased costs of water supply, agricultural production occurs in very limited locations along the 68.2-mile project route. Implementation of the following mitigation measures by the Agency can reduce potential soil impacts below a significant level.

7. All above ground facilities shall be located outside of areas being used for productive agricultural activities.
8. The pipeline can be installed beneath agricultural operating areas between Lake Arrowhead Road and the Mojave River channel if the location does not cause adverse impacts to the water line.

The issue of interfering with existing agricultural operations has been addressed in the previous item. Loss of land under agricultural production can be minimized by the mitigation measures outlined above and the net loss of farm land along the project route has been kept to zero acres, i.e. no adverse impact to agricultural operations or important farmlands as defined by the State.

Based on the field and literature data reviewed for this project and based on the proposed mitigation measures, the project can be constructed without causing any significant adverse environmental effects to geologic resources or without being exposed to geologic constraints that cannot be mitigated. No significant geologic or soil resource impacts have been identified.

If the CDCA Plan exception is granted, it would allow the pipeline to be installed and the potential impacts to geologic and soils resources would occur as outlined in the project impact analysis above. No additional impacts to geology and soil resources are forecast to occur as a consequence of approving the Plan exception.

Impacts of the No Project Alternative/No Plan Exception

The no project alternative/no Plan exception would eliminate nonsignificant geologic and soil resource impacts identified above and the potential geological constraints that would be encountered from developing the project facilities. There are potential adverse geological effects associated with the no project option that are associated with continued withdrawal of ground water from the Warren Basin. If this alternative were to be selected as the decision, the Hi-Desert Water District would have to continue extracting water from the Warren Basin. Ultimately the ground water aquifer will be dried-up. Under such conditions the potential exists for the aquifer to undergo compaction (through loss of

hydrostatic pressure) and loss of storage capacity for future water recharged to the aquifer. The potential damage to the Warren Basin aquifer could be significant and subsidence associated with compaction of alluvial sediments could cause damage to structures in the Yucca Valley area on these sediments. No potential mitigation is known if such damage to the aquifer occurs. Structures could ultimately be repaired or replaced, but at significant cost. The potential adverse impact of this alternative is considered potentially significant and unavoidable.

B. Surface Runoff and Flood Hazards

Impacts of the Proposed Project/Plan Exception

The pipeline would cross the Mojave River channel and several major desert washes. The pipeline would be buried and has no potential to change the current or course or direction of any surface water flows. Therefore, no adverse impact to surface flows is possible.

The remaining facilities are small and surface flow within the areas where they are located is rare. However, the facilities do have the potential to change direction of surface flows when they have been installed. The sites selected for the pump station and the terminal/regulating reservoir are outside of any flow channels and no mitigation will be required as the surface sheet flows can be captured and released downstream without any adverse effect. For the turnout which is located in the complex topography south of the City of Hesperia, the following mitigation measures would prevent this facility from causing a significant change in direction of surface flows:

9. The Agency shall design facilities to handle channelized surface flow and shall carry such flows around facilities and back into the original channel without causing downstream erosion.
10. At each facility location where the impervious surface exceeds one acre, the Agency shall contain and release flows at levels consistent with natural conditions of the site or shall provide a hydrological data demonstrating that the increased runoff will not change the current significantly relative to existing flows.

During construction of the facilities, including the pipeline, the potential exists for increased erosion and deposition. Due to the lack of flows and the high quantity of sediment in flows in the project area no specific problems with siltation have been identified.

While construction is in progress, the following mitigation measure shall be implemented to ensure that significant erosion and deposition impacts do not result from installing the facilities:

11. Temporary erosion control measures, including diversions, sediment basins and other measures, shall be installed when working within river channels or washes. If erosion or deposition occurs downstream of construction sites, the Agency shall implement remedial actions to return the area to its pre-disturbed status.

12. **Permanent erosion control measures, including diversions, sediment basins, landscaping, and other measures, shall be included in the design of facilities that have the potential to increase runoff downstream from the facility. The Agency shall establish a maintenance program that includes facility site inspections following precipitation and surface runoff events and when erosion or deposition damage occurs on- or offsite, remedial actions shall be completed that return erosion damaged areas to natural or design conditions.**

Flood flows are rare events in the project area, except within the Mojave River channel and other major washes located along the north and east fronts of the San Bernardino Mountains. Because the pipeline would be buried at all channel crossings, no potential exists for it to alter the course of flood waters. Mitigation Measures 9 and 10 are sufficient to ensure that the other facilities do not cause a significant alteration in the flow of flood waters at the turnout location.

No permanent surface water bodies exist within the general area of the project. Therefore, no potential exists to alter the volume of water in such water bodies.

The pipeline would be buried and would be covered with native material removed from the pipeline trench. No impervious surface would affect the estimated 287 acres that may be disturbed for the pipeline alignment.

As discussed above, the compacted and impervious surface area for the remaining facilities consist of an estimated 11 acres spread over 68.2 miles of improvements. The affect of this impervious surface given the large amount of undisturbed land within the project area (densities are low in this area based on visual observation and the County General Plan Improvement Levels for the whole alignment) would be nonsignificant on potential recharge areas along the pipeline route. Mitigation measures 11 and 12 minimize any effects of increased runoff from the proposed facilities.

The potential exists for the project facilities to be exposed to flooding. The following mitigation measures ensure that flood hazards are reduced to acceptable, nonsignificant levels:

13. **The pipeline shall be buried to sufficient depths below major flood channels to ensure that flood flows cannot scour the channel and expose the pipeline to damage. The Agency now has engineering design data to ensure that the depth beneath the ground surface of such channels is sufficient to ensure no damage from flood flows, and the Agency shall require the pipeline to be installed at such depths.**
14. **No permanent above ground major facilities (as defined in the project description) shall be placed within flood hazard areas that threaten the continuous functioning of a given facility or the facility shall be raised above the flood hazard level to eliminate any threat.**

Implementation of the above mitigation measures can reduce adverse surface flow and flood hazard impacts below a significant level.

If the CDCA Plan exception is granted, it would allow the pipeline to be installed and the potential impacts to surface water resources and flood hazards would occur as outlined in the analysis of project impacts above. No additional impacts to surface water resources or flood hazards are forecast to occur as a consequence of approving the Plan exception.

Impacts of the No Project Alternative/No Plan Exception

The no project/no exception alternative would eliminate any potential surface water and flood hazard impacts and the need for the above mitigation to control potential impacts. The potential negative effect of the project is the continuing need for the water purveyors in Division 2 to develop water supplies to meet current demands. This would logically include development of surface water diversion and retention basins to increase the efficiency of using existing water that falls within the region. Although there is not sufficient water to meet the total demand, the facilities could divert and control future surface water flows through new facilities that would disturb the existing environment. Mitigation is generally available to reduce potential adverse impacts to the environment from such facilities, and the potential impacts are not considered significant and unavoidable.

C. Fire Hazards

Impacts of the Proposed Project/Plan Exception

The project would create a small wildland fire hazard during construction, but the area being traversed by the proposed pipeline has a low overall wildland fire hazard because the fuel loading is small. The presence of construction equipment onsite would allow the construction contractor to suppress any small fire associated with construction activities. Over the long-term the nature of the facilities being constructed minimizes potential fire hazards of the facilities themselves (concrete and steel construction and minimal use of flammable materials). The proposed facilities would increase the region's water supplies and provide additional support for fire fighting purposes. The lack of wildland fire hazards, structure design mitigation, and increased water availability result in no significant adverse impacts being created by the project. It can enhance regional fire safety by providing adequate water supplies to fight fires along the route. The potential for fire hazards along the public land portion of the alignment is considered very small since the plant community is a low density creosote bush scrub habitat.

If the CDCA Plan exception is granted, it would allow the pipeline to be installed and the potential short-term fire hazard impacts would occur as outlined in the analysis of project impacts above. No additional impacts to fire hazards are forecast to occur as a consequence of approving the Plan exception.

Impact of the No Project Alternative/No Plan Exception

Selection of the no project/no exception alternative eliminates the short-term potential fire hazards during construction, but eliminates the increased water supply to Improvement District "M" for suppressing fires and enhancing fire safety over the long-term. As future water supplies become critical in the Town of Yucca Valley due to overdraft of the Warren Basin, lack of supplemental water delivered by the proposed project could result in significant impacts to structures due to fires.

D. Noise

Impact of the Proposed Project/Plan Exception

Construction noise levels commonly exceed 65 dBA (for single noise events, SENEL) during the actual construction activities. Of the proposed activities/facilities associated with this project, only construction activities (short-term) and the pump station (long-term) pose any potential for adverse noise impacts. No severe noise sources (greater than 100 dBA) are known to be associated with this project. Construction noise levels can be mitigated by observing the following measures when construction activities are within 1/2 mile of a residence or other sensitive noise receptor (campground, etc.):

15. All construction activities shall be restricted to the hours 6 a. m. through 7 p.m., except in a documented emergency.
16. The Agency shall ensure that all construction equipment is operated with required noise attenuation devices (such as mufflers) based on the regulations in place at the time of construction. Enforcement shall be accomplished by random field inspections by Agency personnel or a qualified noise consultant during construction activities. All residences within 1/4 mile of a facility, including the pipeline shall be notified of the construction activity and given a phone number to contact with noise complaints.

The pump station would have pumps that would function as a permanent noise source at the pump station. The pump station has residences within a few hundred feet and noise attenuation would be required to ensure that sensitive noise receptors at the residences are not adversely affected. The following mitigation measure shall be implemented to reduce noise from the pumping station to acceptable levels:

17. The Agency shall ensure that any permanent noise sources, such as the pump station, do not cause a 55 dBA day/night noise level (L_{dn}) to be exceeded at the nearest sensitive noise receptor. If the level of impact at a sensitive noise receptor is in question, the Agency shall require a noise study from a qualified noise consultant to determine the level of impact and the type of noise control measures (such as enclosure or outdoor noise attenuation features, walls, berms, etc.) that is needed and the Agency shall implement these measures.

Implementation of the above short-term and long-term noise mitigation measures can reduce noise impacts of the project to an acceptable level. There are no potential

permanent noise impacts along the public land portion of the project because the only facility on public land would be the pipeline which would be underground and have no physical source of noise.

If the CDCA Plan exception is granted, it would allow the pipeline to be installed and the potential short- and long-term noise impacts would occur as outlined in the analysis of project impacts above. No additional noise impacts are forecast to occur as a consequence of approving the Plan exception.

Impacts of the No Project Alternative/No Plan Exception

If the project is rejected in favor of the no project/no exception alternative, both the short-term and long-term noise impacts would be eliminated from the project alignment. Generically, the water districts that would have received the SPW would have to expend additional effort, including construction and operation of pumps, to obtain some additional water resources to meet future demand. The location and significance of such potential noise impacts cannot be predicted and with adequate funding noise impacts can be reduced to acceptable levels. No unavoidable significant adverse noise impacts would be forecast if the no project alternative were implemented.

E. Aviation Safety

Impacts of the Proposed Project/Plan Exception

No airport or other aircraft operating facilities occur along the pipeline alignment and none of the project facilities would be large enough to affect aircraft operations, except the terminal reservoir in Homestead Valley. The proposed project has no potential to adversely affect aircraft operations and is not exposed to any unusual aviation safety hazards.

If the CDCA Plan exception is granted, it would allow the pipeline to be installed and no potential short- and long-term aircraft safety impacts would occur as outlined in the analysis of project impacts above.

Impacts of the No Project Alternative/No Plan Exception

The no project/no exception alternative has no known potential to adversely affect aircraft operations and would not expose any persons or facilities to unusual aviation safety hazards.

F. Hazardous/Radioactive Materials

Impacts of the Proposed Project/Plan Exception

None of the facilities would contain hazardous substances (the pumps would be powered with electricity) which could be released accidentally or during upset conditions. Therefore,

no potential exists for explosions or release of hazardous substances for project operations. The project has no components that would adversely affect emergency response or evacuation plans. Measures are proposed in the Traffic/Circulation section to ensure that traffic flow can be maintained at all times. The addition of a major new water source will enhance emergency responses to fires.

A review of each of the proposed facilities indicates that no potential health hazard will be created by installing and operating the water transmission line, the turnouts, the pump station, and the reservoir. Therefore, the project cannot expose nearby residents to any specific health hazards. However, to reduce potential hazards that may be created by these facilities due to attracting trespass activities, the following measure shall be implemented by the Agency:

18. **The Agency shall install adequate fencing around new facilities that pose any hazard from trespass activities. Such fencing shall restrict access to the facility to Agency employees or contractors, as appropriate.**

If the CDCA Plan exception is granted, it would allow the pipeline to be installed and the potential short- and long-term hazardous material impacts would occur as outlined in the analysis of project impacts above. No additional hazardous material impacts are forecast to occur as a consequence of approving the Plan exception.

Impacts of the No Project Alternative/No Plan Exception

The no project/no exception alternative would eliminate the potential for any health hazards associated with the project. However, the failure to provide a SPW to the residents in Warren Basin could expose water consumers to poorer quality water over the long-term and could increase the public's health, safety and welfare by reducing the volume of water available for emergency responses.

G. Biological Resources

Impacts of the Proposed Project/Plan Exception

The project would permanently remove approximately eleven acres of habitat within the project area. This includes eight acres of Mojavean creosote bush scrub habitat and three acres of California Juniper/Joshua Tree woodland habitat. A total of 287 acres of habitat would be disturbed over the short-term as a consequence of installing the Morongo Basin Pipeline over its 68.2 mile route. The biological report identifies 97 acres of Mohave ground squirrel habitat that would be affected by the project and 295 acres of Desert Tortoise habitat that will be disturbed. Mitigation for lost and disturbed habitat is identified as purchasing and setting aside 295 acres of combined squirrel and tortoise habitat as compensation, and revegetating and restoring the 287 acres disturbed by installing the pipeline. Restoration would consist of returning the disturbed areas to 50% of their current

Tierra Madre Consultants conducted detailed floral and faunal surveys along the alignment at three different periods of the year (spring, winter, and summer). As noted above, a total of 295 acres of Mojavean creosote bush scrub, riparian scrub woodland, Joshua tree woodland, and California juniper woodland would be affected by the project. The following sensitive plant species impacts were identified:

Utah cynanchum (*Cynanchum utahense*): A few individuals may be affected by the project in its alignment. If present during construction, these plants can be relocated to adjacent habitat by the biologists.

Mohave tarweed (*Hemizonia mohavensis*): This species was not found during surveys, but due to its rarity, a special search would be conducted in the Mojave River before construction of the pipeline across the river. Mitigation would be provided through avoidance, replanting, or seed collection and establishment of replacement plants.

Pigmy Muilla (*Muilla coronata*): This plant occurs in the alignment and would be transplanted out of harm's way if encountered in the field.

Short-jointed beavertail cactus (*Opuntia basilaris* var. *brachyclada*): One individual of this species was identified in the pipeline alignment and it would be transplanted out of harm's way by Tierra Madre.

Based on the site specific surveys and the mitigation that would be implemented to reduce or eliminate effects on the individuals of the four species discussed above, the project can be implemented without causing any unavoidable significant adverse impacts. The loss of approximately 295 acres of the four plant habitats would be mitigated over the long-term by revegetating and restoring the disturbed portions of the pipeline alignment as described below. Tortoise compensation was developed using the BLM compensation formula. Thus, mitigation will consist of purchasing 295 acres of high quality tortoise habitat and revegetating 284 acres as indicated below.

The compensatory mitigation and habitat restoration outlined above for the two listed species, Desert Tortoise and Mohave ground squirrel, were judged adequate to reduce the impact on these two species to a nonsignificant level. Consultation is already in progress with the State Department of Fish and Game (DFG) for a 2081 Permit (California Endangered Species Act) by MWA. The U. S. Fish and Wildlife Service (FWS) has completed its Section 7 consultation and a copy of the biological opinion is attached as Appendix 3. The terms and conditions of the Service's Biological Opinion that will be implemented as mitigation are as follows:

19. Worker education programs, defined construction areas, habitat mitigation, and well defined operational procedures shall be implemented.
20. Restrictions on construction and maintenance activities necessary to minimize the take of desert tortoises shall be implemented.

21. Project construction shall be monitored by on-site qualified biologist(s) to avoid or minimize the take of desert tortoises and loss of desert tortoise habitat during construction.
22. Attraction of common ravens and other potential desert tortoise predators to the project area shall be reduced to the maximum extent possible.
23. Biological monitor(s) shall be required at each location where preconstruction or construction activities are occurring.
24. Qualifications of proposed desert tortoise handlers shall be submitted to the Service no later than 60 days prior to initiation of preconstruction activities. The Service shall be contacted at least 5 days prior to any changes in handler personnel.
25. Any incident occurring during pipeline construction which is considered by a biological monitor to be in non-compliance with the mitigation plan shall be documented immediately by the monitor. The following incidents shall require immediate cessation of construction activities causing the incident, including: 1) imminent threat of injury or death to a State or Federally listed species; 2) handling of a listed species by unauthorized personnel, regardless of intent; 3) operation of construction equipment or vehicles outside the pipeline alignment, except on designated roads; and 4) conducting any construction activity without a biological monitor.
26. Within 90 days after completion of the pipeline project and the initiation of the revegetation plan (Tierra Madre Consultants, Inc. 1992b), a post-construction mitigation compliance report shall be submitted to the Service. This report shall describe and document all mitigation and monitoring efforts, and shall specify additional monitoring needs. The report shall also document the effectiveness of the desert tortoise mitigation measures, the number of desert tortoises excavated from burrows, and the number of desert tortoises moved from construction sites. The report shall make recommendations for modifying or refining these terms and conditions to enhance desert tortoise protection and reduce needless hardship on the project proponent. The report shall also state the actual acreage of desert tortoise habitat disturbed.
27. All mitigation measures of this plan shall be specified in all drawings and specifications for the Morongo Basin Pipeline Project.
28. Project related vehicle access, construction activities, and equipment storage shall be restricted to established roads, designated access roads, the construction right-of-way, designated storage areas, and designated staging and parking areas. Off-road traffic outside of designated areas shall be prohibited. All designated areas listed above shall be clearly marked with stakes containing highly visible flagging a minimum of 24 inches above the ground. Maximum spacing of flagged stakes shall be 150 feet. All such designated areas shall be inspected during preconstruction surveys for the presence or sign of desert tortoise. If evidence of desert tortoise occupation is found, the biological monitor(s) shall consult with the project engineer about the feasibility of relocating the alignment or facilities. If such a change is not possible, the desert tortoise(s) present shall be relocated. Whenever possible, designated construction areas shall be located in already disturbed areas. If construction activities are repeatedly documented outside of the staked boundaries by biological monitors, the monitors shall have the authority of specifying that the boundaries be delineated with continuous taping.

29. **Unauthorized, public off-road use of any project areas shall be discouraged by posting of signs and by monitoring by the biological monitor and the construction crew.**
30. **Construction and other project related vehicles (including privately owned vehicles) shall be restricted to speeds of no more than 20 miles per hour, except on County or State highways. Monitors shall have the authority to report speed violation by construction personnel to construction supervisors, who shall take corrective action.**
31. **Trenches must be backfilled as soon as possible following placement of the pipe. The maximum length of open trench at any one time shall not exceed 5 miles. Any trench left open overnight shall be equipped with escape ramps at each end. The ramps shall be no steeper than 1-1/2:1. Open trenches shall be inspected by biological monitors each morning no later than 1-1/2 hours after official sunrise, at which time trapped desert tortoises shall be removed.**
32. **Immediately prior to backfilling, monitors shall inspect trenches for trapped animals. Also prior to backfilling, monitors shall inspect spoil piles to ensure that desert tortoises have not taken refuge there.**
33. **In areas where blasting is necessary during trench excavation, monitors shall perform intensive desert tortoise surveys within a 200 foot radius of the blasting area prior to blasting. If any desert tortoises are located within 50 feet of the blasting area, they shall be removed and held until blasting in the area has been completed. All handling of desert tortoises shall be consistent with Arizona Game and Fish Department, et al. (1991). Any occupied desert tortoise burrows from 50 to 200 feet from blasting area shall be inspected following blasting. Collapsed burrows shall be hand-dug to free any trapped desert tortoises.**
34. **All vehicles, stored pipes, or any other material or equipment possessing openings or shaded areas where desert tortoises could seek refuge shall be inspected prior to being moved by construction personnel. If a desert tortoise is found in a pipe or beneath a vehicle or other equipment, the biological monitor shall be contacted to move it out of harm's way. Alternatively, the equipment could be left in place until the desert tortoise has left on its own accord. The biological monitor shall be responsible for taking appropriate measures to ensure that any desert tortoise moved in this manner is not exposed to temperature extremes which could be harmful to the animal (see terms and conditions 44 and 46). All in-place, uncovered pipe shall be capped overnight to prevent the entry of desert tortoises.**
35. **Construction personnel or other related to the project shall not be permitted to bring pets or firearms into pipeline construction areas.**
36. **Trash from construction and maintenance personnel, especially food items or packaging, shall be disposed of in raven-proof containers and removed daily to avoid attracting ravens or other desert tortoise predators to the area.**
37. **Gasoline, diesel fuel, lubricants, solvents, explosives, or any other hazardous materials shall be handled only in specified refueling, maintenance, or storage areas. The biological monitor shall have the authority to restrict handling or storage in areas considered environmentally sensitive.**

38. The biological monitor shall inspect the pipeline right-of-way following project completion, and shall have the authority to direct further cleanup if necessary, including cleanup of dumped or spilled hazardous materials.
39. A revegetation plan shall be implemented for this project as described in Tierra Madre Consultants, Inc. (1992b). This plan calls for an intensive revegetation effort, including land imprinting, Joshua tree transplantation, and cactus transplantation.
40. Qualified biologists shall survey all portions of the pipeline alignment within 48 hours before construction activities begin. All desert tortoise burrows found during these surveys shall be clearly flagged with a color of flagging contrasting with other colors being used on the project.
41. Desert tortoise burrows found during preconstruction surveys or during construction and maintenance which are clearly active shall be mapped and marked with flagging. The biological monitor shall then consult with the project engineer(s) to consider the feasibility of minor re-routing of the pipeline to avoid the burrow(s). For burrows outside of the actual area of disturbance, the biological monitor shall consider the direction the borrow runs, and that burrows may be as long as 30 feet, in determining whether or not an adjustment in the alignment is necessary. Immediately prior to brushing (within 4 hours), the biologist(s) shall excavate by hand all potentially occupied burrows which will be affected by construction activities. Any desert tortoises which must be moved out of harm's way shall be weighed, sexed, measured, and given individual identification numbers with paint and epoxy as described in Arizona Game and Fish Department et al, (1991). All of the above data, plus date, location, time, and name of data collector, shall be recorded on data sheets and summarized in the report to the Service described in term and condition 34. Biological monitors shall attempt to track the movements of relocated desert tortoises only if such tracking does not detract from the monitoring of construction activities as described in these terms and conditions.
42. Disposable gloves shall be worn during handling and data collection, with each pair of gloves being discarded after handling one desert tortoise. Bags or straps used for weighing, files, calipers, or other equipment used during collection shall be disposable or disinfected. All handling procedures shall be in accordance with the Service's handling protocol (Game and Fish Department, et al. 1991).
43. When the alignment is near a major paved highway, the relocation shall be on the side of the highway where the desert tortoise was found to minimize the likelihood of the desert tortoise homing in the direction of the highway.
44. Each desert tortoise requiring relocation found above ground within 3 hours of nightfall or when ambient air temperatures exceed 90 degrees Fahrenheit shall be placed in a clean disposable cardboard box and held overnight in a cool location. The box shall be covered and kept in possession of a designated biologist for release of each desert tortoise the next morning in the manner described above. Cardboard boxes used to hold desert tortoises shall be new, used once, and discarded. All materials which come into contact with desert tortoises shall be used only once and then properly discarded to minimize contact with the causative factor(s) for upper respiratory tract disease and other diseases.
45. The Mojave Water Agency shall provide off-site mitigation by acquiring, within 1 year of the start of construction, 292 acres of category 1 desert tortoise habitat. These acquired lands shall be deeded to the Bureau. As an alternative, Mojave Water Agency may contribute to the

Bureau comparable per acre funds, based on appraised value of the affected lands. The Bureau shall use these funds to acquire category 1 desert tortoise habitat. Acquired lands shall be managed by the Bureau for the benefit of the desert tortoise pursuant to the management goals and objectives for category 1 habitat described in Bureau (1988).

46. Desert tortoises which must be moved out of harm's way shall be relocated by the biological monitor at least 200 feet away from the alignment in the direction of undisturbed habitat. If the relocation occurs in the season of above-ground activity, the desert tortoise shall be placed in the mouth of a burrow of appropriate size or in the shade of a large shrub. If the relocation is not in the season of above-ground activity, desert tortoises shall be moved on a seasonably warm day and placed at the mouth of a burrow of appropriate size. If the desert tortoise does not enter the burrow, or a burrow is not available, an artificial burrow shall be constructed and the desert tortoise placed within it. Artificial burrows shall be at least 6 feet in length and of the same diameter, dept, and orientation as the one in which the desert tortoise was found or as appropriate for the size of the subject desert tortoise. Wood or plastic materials may be used to strengthen the tunnel and/or chamber of the burrow. In coordination with the Service and the Bureau, the biological monitor shall be allowed some judgement and discretion to ensure that survival of the desert tortoise is likely.
47. An individual shall be designated as a field contact representative (FCR) who shall have the authority to ensure compliance with protective stipulations for the desert tortoise and be responsible for coordination with the Service. Such designated representative shall have the authority to halt activities that are in violation of Service stipulations.
48. Construction and maintenance personnel shall be briefed on the status of the desert tortoise and protection measures designed to reduce potential impacts to this species. Personnel shall be advised that handling, harming, or harassing desert tortoise without specific authorization is a violation of the Act. Personnel shall also be advised of the potential penalties up to a \$25,000 fine and 6 months in prison for taking a listed species without a permit. Handouts summarizing this information shall be provided.
49. Vehicular and equipment use during maintenance inspections shall be limited to existing routes. The Bureau shall be notified prior to any maintenance activities causing land disturbance. All land-disturbing activities, whether they are in the pre-construction, construction, or maintenance phases of this project, shall be subject to the terms and conditions of this biological opinion.
50. The Mojave Water Agency shall send a letter (a draft is attached) to all customers of the water supplied by the pipeline informing them of the presence of the desert tortoise, the status of the species, and the need for them to obtain a section 10(a)1(B) permit from the Service before initiating any land-disturbing activities which might result in a take of desert tortoise.

It is anticipated that the mitigation outlined above will provide the DFG with the ability to also issue a "no jeopardy" opinion for the project.

Additional animal species that may be affected by the project include Burrowing Owls (*Speotyto cunicularia*), Bendire's Thrasher (*Taxostoma bendirei*), and Le Conte's Thrasher (*Taxostoma lecontei*). No nests were found within the project alignment, but nesting pairs were identified within a zone of influence along the pipeline route. Mitigation is provided during the nesting season by restricting construction activities during this period. Since the

project alignment is already an activity corridor, the restrictions on construction during the nesting period was judged sufficient to reduce potential adverse impacts to these species below a significant level.

All yuccas along the alignment, regardless of species, would be protected during project implementation. They would be stockpiled outside of the alignment prior to brushing operations and stored in a manner most likely to assure survivability. Following pipeline installation, they would be placed back into the right-of-way at approximately their original location.

Of the biological resources and impacts described above, only the tortoise and perhaps the thrashers have been identified as occurring on public land under the BLM's jurisdiction. The remainder of the impacts occur on private lands to the west and south. The specific mitigation measures to minimize biological resource impacts are listed below.

51. At all permanent facility locations the Agency shall minimize the amount of disturbance that occurs at a given site. Access to the pipeline right-of-way shall be from existing roadways that intersect the pipeline. No new access roads shall be constructed.
52. The Agency shall not remove any Joshua trees or junipers at permanent facility locations unless the facility cannot be sited without such removal. If either of these trees must be impacted on a permanent facility site, the Agency shall obtain a qualified biologist's evaluation regarding whether the plant can be collected and transplanted on or adjacent to the project site. If such transplantation is feasible, it shall be undertaken.
53. At the completion of construction, all disturbed areas not covered with impervious surface shall be revegetated using locally obtained native plant seeds. The Agency shall obtain and implement a landscape plan prepared by a qualified biologist/landscape architect/native plant horticulturalist that will ensure revegetation with native plants over the long-term.
54. Suitable habitat within the historic range of the Mohave ground squirrel should undergo a pre-construction survey to locate extant populations of this species. When active burrow systems are found within or adjacent to those facility locations that cannot be avoided, the animals should be captured and relocated to adjacent areas of suitable habitat. The burrow systems areas to be disturbed shall be carefully destroyed. A qualified biologist should be present to monitor the excavations and to rescue and relocate additional individuals unearthed.
55. For Mohave ground squirrel habitat that will be disturbed, the Agency shall contact the DFG and negotiate a compensatory mitigation program that will allow the Department to issue a "no jeopardy" opinion for the impact. The Agency shall base the compensatory mitigation package upon the 291 acres of compensation identified in the Tierra Madre "Biological Assessment" and Report.
56. To avoid possible nesting failure by LeConte's thrashers and other less sensitive birds, seasonal timing of construction activities in this bird's vicinity will be controlled. Areas containing known nesting pairs of LeConte's thrashers are identified in Tierra Madre's Biological Report and the construction limitations identified in the shall be observed if nesting birds are still present at the time of construction.

57. Plant species, such as the short-jointed beavertail cactus, that are sensitive and that can be relocated shall be transplanted adjacent to or back into the disturbed areas at the completion of construction along a portion of the route.

Based on the evaluation of resources provided above and implementation of the proposed mitigation measures, the project can be implemented without causing a significant adverse impact to biological resources.

If the CDCA Plan exception is granted, it would allow the pipeline to be installed and the potential biological resource impacts would occur as outlined in the analysis of project impacts above. No additional biological resource impacts are forecast to occur as a consequence of approving the Plan exception.

Impact of the No Project Alternative/No Plan Exception

Implementing the no project alternative would eliminate all of the habitat loss and disturbance along the pipeline route. With no SPW the individual water districts would be required to develop what water augmentation projects they could within their respective districts. The same species, with the exception of the Mohave ground squirrel which does not occur within Improvement District M, would be impacted to some lesser degree during development of such water resources. The same mitigation could be implemented as outlined above and it is probable that potential impacts of future, unspecified water development facilities in Improvement District M could be mitigated in the same fashion as outlined above. The net result would be a similar set of biological resource impacts, of smaller scale which would be mitigable to a nonsignificant level of impact.

H. Cultural/Paleontologic Resources

Impacts of the Proposed Project/Plan Exception

An evaluation of significance with reference to potential eligibility for listing in the National Register of Historic Places (NRHP) was conducted for all cultural resources located within and adjacent to the project corridor. The detailed evaluation of eligibility is provided in the Cultural Resources Investigation prepared by Michael Lerch and Associates which is available for review at the Desert District Office. Of the four archaeological sites identified in the field survey, sites 1-3 were found to lack integrity of setting and association and thus are considered to be ineligible for listing in the NRHP. Site 4 and the prehistoric isolates do not meet the NRHP criteria for eligibility because they do not have the potential to yield information important to history or prehistory. The Cultural Resources Investigation has been submitted to the State Historic Preservation Office (SHPO) for Section 106 consultation and concurrence with the Investigation's conclusions.

In the event that any buried cultural resources are exposed during project excavation, those resources could be potentially significant if they contain datable materials in a cultural context. Mitigation is provided below to address the potential impact.

Because none of the cultural resource identified during the surface inventory were found to be potentially eligible for listing in the NRHP, they are not considered subject to adverse impacts and will not receive further consideration in the planning process for the project if the SHPO concurs. In the event that intact buried cultural deposits are encountered during project excavation, those deposits could be subject to potential adverse impacts if they are destroyed prior to evaluation and data recovery. Mitigation to address potential buried cultural deposits based on the detailed site investigation are provided below.

58. An archaeological monitor shall be present during project excavation on Reach 1, from the pipeline turnout at the California Aqueduct to Pioneer Road. The monitor will have the authority to temporarily halt construction in the event that intact subsurface archaeological deposits are encountered, until such deposits have been evaluated for significance (NRHP eligibility) and data recovery measures are implemented.
59. If human remains are encountered on any property within San Bernardino County, then the San Bernardino County Coroner's office must be contacted, and all work within the immediate vicinity of the find halted until a clearance is given by that office and any other involved agencies. Contact the County Coroner at 825 East Third Street, San Bernardino, CA 92415-0876; (714) 387-2978. If on Federal land, contact BLM and BLM will contact the coroner and provide additional instructions, as needed, to meet Federal statutes.
60. The cultural resource data and artifacts collected within this project area shall be permanently curated at a repository within the county. The repository selected should possess archival and collection standards equivalent to those discussed in 36 CFR 79, Curation of Federally-Owned and Administered Archaeological Collections; Proposed Rule, published in the Federal Register, August 28, 1987.

Because significant paleontological resources may occur in the older sediments that occur along the first two reaches of the pipeline alignment (sensitive areas do not include the ROW across public land), the following mitigation measure will be implemented to ensure that any significant paleontological resources encountered during excavation in sensitive areas are collected, identified and properly curated:

61. The Agency shall retain a qualified vertebrate paleontologist to monitor project excavation on Reach 1 and a portion of Reach 2, from the pipeline turnout to Willow Wells Road. The monitor will have the authority to temporarily halt construction in the event that intact subsurface paleontological deposits are encountered, until such deposits have been evaluated for significance and data recovery measures are implemented. Data recovery may include salvage of fossils and adequate samples of fossiliferous sediments; preparation of recovered specimens to a point of identification, including screen washing fossiliferous sediment samples to recover small to microscopic vertebrate fossils; identification and curation of specimens into the retrievable storage collections of the Earth Sciences Division of the San Bernardino County Museum; and a report of findings with an itemized inventory of recovered specimens. The report will signify completion of the paleontologic mitigation program.

The survey data indicate that no significant cultural resources occur on the ground surface and that mitigation measures are available to protect any subsurface cultural or paleontological resources that may be encountered during construction. With

implementation of these mitigation measures and the concurrence from the SHPO with this finding prior to authorizing the project, the impact on cultural and paleontological resources is considered nonsignificant.

If the CDCA Plan exception is granted, it would allow the pipeline to be installed and the potential cultural resource impacts would occur as outlined in the analysis of project impacts above. No additional cultural resource impacts are forecast to occur as a consequence of approving the Plan exception.

Impact of the No Project Alternative/No Plan Exception

The no project/no exception alternative would eliminate ground disturbance by the project and any direct impact to cultural resources from this proposal. As noted in the above evaluations, if water resources are not provided by the pipeline, each water district in Improvement District M would need to develop other sources of water supply. This would result in alternative locations of disturbance and other potential locations for cultural resource impacts. Given that most cultural resource impact can be mitigated by an effective recovery program and curation program, most cultural resource impacts from other water resource development projects are capable of being mitigated below a significant level. Based on such mitigation, it is probable that any cultural resource impacts associated with development of alternative water resources under the no project/no exception alternative could be reduced to a nonsignificant level if and when such resource development occurs in the future.

I. Air Quality

Impacts of the Proposed Project/Plan Exception

With the exception of fugitive dust emissions, the project would not cause any potential long-term increase in air pollutant emissions within the Southeast Desert Air Basin (SEDAB) and the San Bernardino County Air Pollution Control District (APCD). The fugitive dust emissions and potential mitigation measures for both short- and long-term conditions are discussed below. Implementation of the project does have a potential to increase the short- and long-term wind erosion from disturbed areas. This potential generation of fugitive dust can come from graded areas or from material stockpiles. Due to the limited size of the disturbance within the whole project area, areawide or regional dust emission impacts are not considered significant. The potential for significant local impacts shall be mitigated by implementing the following measures:

62. **During construction activities all material excavated or graded shall be watered a minimum of two times daily and more often should exposed areas generate dust during higher wind conditions. All disturbed areas shall be watered and the first watering shall occur early in the morning before construction proceeds and after work is done for the day.**

63. Any disturbed areas or piles that would remain exposed and unworked for more than one month shall be physically stabilized. The Agency shall require contractors to use chemical stabilizers, plastic or other covers, or gravel on such areas.
64. When wind speeds exceed 30 mph averaged over one hour at the nearest weather or air pollution monitoring station, the Agency shall require all off-road vehicle and ground disturbing activities to cease.
65. After construction is completed, the Agency shall require exposed ground surface to be treated in one or more of the following ways: revegetate the areas not paved or covered with structures using native vegetation; or compact the soil and treat it with a chemical stabilizer or other material that would minimize dust generation (such as gravel). Along the pipeline revegetation is the recommended method of restoring the disturbed area so that it does not serve as source of fugitive dust.

Fugitive dust emissions can be reduced below a significant level by implementing these measures. None of the project facilities contain sources of permanent stationary source emissions and the Agency is not proposing the use of an emergency generator at the pumping station since short-term outages pose no impact on deliveries of SPW.

The only other source of emissions is mobile equipment used during construction and in operating and maintaining the system over the long-term. It is assumed that the a maximum of five vehicles would be in use at any one time in support of the long-term maintenance and operation of the project, except during emergencies. During construction the short-term emissions from the construction equipment can be mitigated by requiring all equipment to meet the Air Resources Board requirements for mobile sources in place at the time of construction. A mitigation measure to accomplish this is provided below. Thus, with implementation of the proposed mitigation measures the potential for significant air pollution impacts is reduced to a nonsignificant level in both the short- and long-term.

66. The Agency shall obtain permits to construct and operate any stationary equipment used in support of this project from the San Bernardino County Air Pollution Control District. Such equipment shall be operated in conformance with the permit requirements.
67. The Agency shall require the contractor to maintain construction equipment in good condition and proper tune as per the manufacturer's specifications to minimize pollutant emissions.
68. The Agency shall require the contractor to minimize construction employee trips by requiring ridesharing or by using buses to transport employees to work locations from park and ride locations.
69. The Agency shall purchase or require a contractor to use clean fuel or low emitting vehicles for employees during daily operations and maintenance activities after the water line is installed.

Based on a review of project facilities, there is no potential for the release of odorous emissions. None of the project facilities has the capability to alter air movement or other area climatic variables identified. They are too small or do not have any mechanism for

affecting the area's climate. Overall, the mitigation measures identified to control air pollution are adequate to reduce the potential air quality impacts below a significant level.

If the CDCA Plan exception is granted, it would allow the pipeline to be installed and the potential air quality impacts would occur as outlined in the analysis of project impacts above. No additional air quality impacts are forecast to occur as a consequence of approving the Plan exception.

Impacts of the No Project Alternative/No Plan Exception

The no project/no exception alternative would eliminate ground disturbance, fugitive generation and other emission sources related to the project. As noted in the above evaluations, if water resources are not provided by the pipeline, each water district would need to develop other sources of water supply. This would result in alternative locations of disturbance and other potential locations for emission of air pollution. Given that most mobile and fugitive dust sources can be mitigated by effective transportation control measures and fugitive dust control measures, most air quality impacts can be mitigated below a significant level. Based on such mitigation, it is probable that any air pollution impacts associated with development of alternative water resources under the no project/no exception alternative could be reduced to a nonsignificant level if and when such resource development occurs in the future.

J. Water Supply/Water Quality

Impacts of the Proposed Project/Plan Exception

At this time it is not known how each of the Project Participants would use the SPW delivered by the project. It is possible that one or more of the water purveyors would use the SPW to recharge ground water aquifers within their jurisdiction. However, it would be speculative at this stage of the project to make firm predictions of how the SPW would be used by each Project Participant. None of the proposed facilities has the potential to intercept the ground water table, except the pipeline. A mitigation measure is provided below for ensuring that changes in ground water quantity do not occur as a result of any such potential interaction with the ground water table.

Assuming that one or more of the Participants does recharge SPW rather than treat and use directly, the only impact identified during this review is to raise the water table within a ground water basin from their current levels. For a Participant like Hi-Desert Water District which is currently extracting water from the heavily overdrafted Warren Basin (USGS 1972 and VTN 1977), raising the ground water table would be an immense benefit. (A side benefit would be that the SPW which must be treated before it can be used can be percolated into the ground water aquifer and ultimate reclamation through pumping is one means of making the water available for domestic use without the capital cost of a treatment plant.)

The only negative impacts identified during the review of this concern, are (1) the potential for raising the ground water table too high and to cause the potential for liquefaction during a seismic event; allowing water to pond or support phreatophytes and causing substantial waste of water through evapotranspiration; or ground water contamination due to the quality of the SPW. The potential evapotranspiration in the Morongo Basin is approximately 80 inches based on published data (UC 1987). Water quality data for each basin is published annually as part of each Participant's annual reports to its citizens. Water quality is adequate with some areas having moderately high Total Dissolved Solids relative to the existing primary drinking water standard of 500 parts per million per gallon (or mg/liter). SPW delivered to Lake Silverwood is presently 360 mg/liter based on the most recent published Department of Water Resources figures (DWR 1989)

Mitigation is available to prevent these potential impacts from coming into being. By implementing the following mitigation measures the Agency can reduce each of the above potential adverse impacts to a nonsignificant level.

70. **If a Project Participant recharges SPW to the local ground water aquifer, Project Participants must obtain and implement a ground water table monitoring program that identifies thresholds of recharge within the aquifer that should not be exceeded. This can prevent recharge from causing potential liquefaction or loss of water through evapotranspiration.**
71. **If a Project Participant recharges SPW to the local ground water aquifer, Project Participants must obtain and implement a ground water quality monitoring program that establishes maximum concentrations of dissolved solids related to recharge that should not be exceeded. This would prevent any unacceptable (significant) water quality deterioration.**
72. **If during installation of the pipeline, it intercepts any high water table at any location along its alignment (such as the Mojave River channel or locations near fault barriers), the Agency shall design that portion of the project water line so that it does not leak or collect water from the ground water table. This shall be confirmed during construction by the project engineer.**

The Project Agreement proposes to deliver 1/7 of the Agency's present SPW allotment (50,800 acre feet) to Division 2 (Improvement District M) within the Agency's boundaries. This amount of water may be reduced as a result of inadequate deliveries from the Department of Water Resources or raised to a higher delivery rate if extra water can be purchased and the Project Participant wants to purchase additional SPW.

No SPW is presently being purchased or consumed within the Agency's boundaries by water purveyors. The MWA periodically purchases small quantities of SPW for recharge and other uses. Therefore, the Agreement to deliver water to Improvement District M does not reduce any existing SPW for use as a public water supply. Other water purveyors within the Agency's boundaries have expressed concern that allocation of SPW to any user could reduce future water supplies available to the rest of the Agency's Divisions (there is a total of seven Divisions). In reality, no physical reduction in water availability would occur. Also, under Agency water allocation policy when the vote occurred in Division 2, each Division

is entitled to 1/7th of the total water available from the State. The allocation of 1/7th of this entitlement (subject to availability from the State) to Division 2 (Improvement District M) is consistent with this policy and does not remove any water potentially available to other Divisions. The Project Agreement calls for reducing deliveries to Division 2 commensurate with other water allocations within the Agency's boundaries.

Therefore, the conclusion reached through this analysis is that the allocation of water under the Project Agreement does not cause a "substantial reduction in the amount of water otherwise available for public water supplies." This conclusion is based on the existing language in the proposed Agreement and no additional mitigation measures are required. It is also consistent with comments by the City of Barstow to the City of Hesperia in the Las Flores Ranch Environmental Impact Report (EIR): "The point is that imported water should not be dedicated to new development (new uses) before taking care of the existing overdraft on water supplies to meet existing uses." (City of Hesperia 1990, Volume II)

None of the proposed actions, including percolation of ground water, would alter the direction of ground water flow. Management of SPW after it is delivered to each water agency is a decision that has not been made at this time and the decision by an agency to percolate SPW or treat and use it directly is not a component of this project. The possibility exists of increasing the rate of flow within individual ground water aquifers in Improvement District M, but this increase is not associated with any known negative impacts unless water quality deteriorates. The mitigation measure proposed above can prevent this from occurring. No significant, adverse changes in direction or rate of flow are forecasted and no mitigation beyond that already identified is required.

The only potential water quality impact would be from percolation of SPW into local ground water aquifers. Based on the water quality data for the SPW most recently delivered to Silverwood Lake, the quality is sufficient to not cause substantial degradation in the ground water in individual aquifers (see attached water quality data for each water purveyor). However, if a Project Participant has concerns with the potential for degradation, the following mitigation measure shall be implemented:

73. Prior to percolating any SPW, the Project Participant must obtain and implement a percolation management program that would define the volume of water that can conservatively be allowed into the affected aquifer without causing unacceptable (significant) deterioration of water quality in that aquifer or without causing unacceptable rises in the water table.

At this point in time no releases of SPW into any surface waters are proposed but the Agency periodically releases SPW into the West Fork of the Mojave River which occasionally carries flows. The project area does not have any permanent surface water bodies (except small springs) and the potential for adverse impacts from water discharges is not considered significant. No mitigation is required or proposed.

If the CDCA Plan exception is granted, it would allow the pipeline to be installed and the potential water supply and water quality impacts would occur as outlined in the analysis of project impacts above. No additional water supply and water quality impacts are forecast to occur as a consequence of approving the Plan exception.

Impact of the No Project Alternative/No Plan Exception

The no project alternative would cause continued overdraft in each of the four ground water basins in Division 2, Improvement District M. Without an imported water supply the continued overdraft would cause a significant and unavoidable adverse impact on ground water resources for the region. Based on hydrogeological data published in several documents, implementation of the no project alternative could cause the Warren Basin aquifers to become unproductive due to poor water quality or lack of ground water. An indirect effect of lack of water supplies could be damage to the Town of Yucca Valley's local economy. Alternatively, the burden of providing water to the Town of Yucca Valley could be shifted to neighboring ground water basins resulting and more rapid depletion of their aquifers. Overall, the no project alternative has the potential to cause significant, unavoidable adverse environmental effects on both ground water resources of aquifers within Division 2, Improvement District M and to the local socioeconomic underpinnings of the Town of Yucca Valley.

K. Open Space/Recreation/Visual

Impacts of the Proposed Project/Plan Exception

No major recreation areas occur within the BLM portion of the pipeline alignment, but the alignment would cross the Hesperia Golf and County Club near the State Aqueduct. The project has no potential to affect the quality or quantity of existing recreational opportunities within the project area. The portion of the alignment across the golf course would be returned to its existing condition following construction. None of the proposed above ground facilities is large enough, including the terminal/regulating water storage reservoir, to obstruct any scenic vista or public view. The major feature of the project would be the water pipeline scar which would be regraded and revegetated. All vistas along the route are disturbed with man-made features (paved and unpaved roads, power lines, and other human structures) and the project would not significantly alter the existing visual setting.

The water storage reservoir and pump station facilities are located in developed areas where they do not create an isolated human intrusion into the visual setting. The existing landscape at each location contains power lines, roads, houses, other water storage reservoirs and other structures on adjacent lots or in nearby areas. Views from the local roads and State Highway 247 would be altered but not in a fashion that would conflict with the surrounding visual setting.

Because of the Scenic Corridor designation for Highway 247 (SBCO 1989), mitigation is also required to ensure that the corridor requirements are met. The Agency shall implement the following measures:

74. The Agency shall implement the County's Scenic Corridor guidelines (in the County Development Code) and shall not install any facilities with 200 feet of the Scenic Highway without adequate screening and visual buffering.

The above ground facilities may have exterior lights placed on them to allow identification and nighttime maintenance. The following mitigation measures shall be implemented by the Agency to reduce potential light/glare impacts to a nonsignificant level.

75. The Agency shall not install night lights unless essential to operations or security.
76. If located in an area with no sensitive light receptors, lights can be installed without special consideration. In areas with sensitive receptors, lighting shall be restricted so that the lighting pattern is totally enclosed within the boundary of the facility. The Agency shall use nonglare exterior lighting that minimizes electricity consumption in all instances.

As noted above, the proposed above ground facilities and the underground pipeline would be located within a developed corridor that already contains extensive man-made facilities and disturbance. Minor conflicts with the surrounding visual setting, such as night lighting, can be managed in a fashion that restricts the impact to the project site. No recreation facilities or areas would be adversely impacted by the project and no designated open space areas would be affected by the project. Based on the data and mitigation measures provided above, the project would not result in significant impacts to open space, recreation, or visual resources.

If the CDCA Plan exception is granted, it would allow the pipeline to be installed and the potential open space, recreation and visual impacts would occur as outlined in the analysis of project impacts above. No additional open space, recreation or visual impacts are forecast to occur as a consequence of approving the Plan exception.

Impacts of the No Project Alternative/No Plan Exception

The no project/no exception alternative would eliminate the three above ground facilities from being constructed in support of the proposed project. However, the need for water supplies would still require the local agencies to construct new water storage reservoirs and wells in an effort to increase water supplies locally, even if this would increase overdraft. The location of such facilities cannot be predicted and it is assumed that locations can be selected to minimize visual impacts and potential conflicts with recreation and open space uses. Implementation of the no project/no exception alternative does not ultimately avoid the impacts associated with proposed project's above ground water facilities, but it is probable that the effect of constructing substitute facilities would not result in a significant impact if measures similar to those outlined above are implemented.

L. Mineral Resources

Impacts of the Proposed Project/Plan Exception

Although no state or local mineral resource area designations occur along the general alignment (it is too far north of the north slope of the San Bernardino Mountains to fall within any designated mineral resource zones (SBCO 1989)), the project could affect some areas that may have potential for sand and gravel extraction and two placer mining claims are located along the alignment about two miles west of Old Woman Springs Ranch (Sections 20 and 21, T4N, R2E, SBBM). The limited extent of the required right-of-way of the pipeline minimizes any major restriction on development of such resources. The individual project facilities are limited in size and area requirements. Based on the size and the limited designations along the general project route, the potential for conflicts with mineral resource development is considered nonsignificant.

The unverified designation of a portion of the alignment as having potential uranium and oil and gas resources in the vicinity of State Highway 247 and Joshua Tree Road has not resulted in any exploration activities along the alignment since the CDCA Plan was released in 1980, twelve years ago. The pipeline route is adjacent to existing street corridors which would serve as access to these mineral resource areas if they were to be developed in the future. The undergrounding of the pipeline along this corridor through these mineral resource areas poses no significant constraint on future exploitation of these resources and therefore, no potential significant effect on the resources themselves. No mitigation is proposed or required.

If the CDCA Plan exception is granted, it would allow the pipeline to be installed and the potential mineral resource impacts would occur as outlined in the analysis of project impacts above. No additional mineral resource impacts are forecast to occur as a consequence of approving the Plan exception.

Impact of the No Project Alternative/No Plan Exception

The no project/no exception alternative would have no direct effect on any mineral resource development along the pipeline alignment. There is a potential indirect effect of causing local water purveyors to utilize ground water resources of the aquifers in the vicinity of the BLM's designated mineral resources. Consumption of water for domestic purposes is considered a higher use of water resources in the State of California, and by indirectly causing the local water purveyors to exploit the aquifers in mineral resource designated areas to the south, the no project/no exception alternative could impede future development of such resources which would require some water for mining, drilling, and processing. No potential for significant impacts to mineral resource development is forecast as a result of this indirect impact of the no project/no exception alternative.

M. Utilities Infrastructure

Impacts of the Proposed Project/Plan Exception

Electrical consumption would increase to support pumping requirements at the pumping station and other power requirements. Expanded electricity use is part of the forecasted growth for the region and, based on the most recent California Energy Commission electricity production forecast (CEC 1990), adequate electricity resources are available through the end of the century to meet project growth demand. Power distribution lines are located adjacent to the project site and Southern California Edison has indicated that electricity can be provided to the pump station. No major extension of power lines is proposed because the project would utilize variable speed pumps that can dampen the initial electricity demand on this distribution system. Because no significant energy impacts are forecasted, no mitigation measures are proposed.

The project would not consume any natural gas; therefore no impact is possible.

The only communication system that is required for this project is a telemetering system to monitor and operate the system facilities. The few additional telephone lines required to serve a maximum of seven facilities would not cause a significant impact on the communication system in the region.

Water consumption during construction is the only demand for water created by this project. Adequate commercial water sources exist along the general project route to provide water and the project would fully offset this consumption over the long-term by delivering much larger volumes of water to local water purveyors. No significant impact to existing water systems is forecasted as a result of implementing this project.

This project would not require any sewer or septic tank systems to support its installation or operation. No potential exists to adversely impact such systems. The project would locally increase runoff and cross storm water drainage systems. Mitigation measures have been identified for both types of impacts due to project facilities. No additional mitigation measures are required to reduce impacts below a significant level.

Aside from the short-term generation of vegetative waste from removing the vegetation during construction, this project would not generate any major quantities of solid waste. The Agency shall implement the following measure to reduce the vegetative (green) waste requiring disposal during construction.

- 77. The Agency shall require all scraped vegetative matter to be shredded or crushed and placed in the top lift of the trench cover. This would increase the organic matter of the top layer and may provide some seed and cutting stock that would support revegetation.**

Based on the data available, the project would not cause any significant adverse effects on the existing utility infrastructure serving the project alignment. The single mitigation

measure is sufficient to reduce green waste disposal at the local landfills (Hesperia and Landers).

If the CDCA Plan exception is granted, it would allow the pipeline to be installed and the potential utility system impacts would occur as outlined in the analysis of project impacts above. No additional utility system impacts are forecast to occur as a consequence of approving the Plan exception.

Impacts of the No Project Alternative/No Plan Exception

The no project/no exception alternative eliminates all direct project demands on the utility infrastructure in the project area. Indirectly, the no project alternative would require the expenditure of energy for drilling and pumping alternative ground water supplies. Similar communication facilities, water consumption, and storm water drainage effects would occur for the various individual facilities constructed in the future to augment water supplies from local aquifers. As is the case with the project, adequate resources are generally available within the existing utility infrastructure to meet these needs and potential impacts of future water supply facilities on the utility infrastructure can be mitigated in the same fashion as described for the project. No potential significant utility infrastructure impacts are forecast to occur if individual water facilities must be developed in place of the project.

N. Transportation/Circulation

Impacts of the Proposed Project

The project may require a work force of about one hundred employees during construction. However, being spread out over such a great distance and based on the requirement for employers to provide incentives for use of rideshare and buses (see mitigation measure #52 below), the potential for generation of substantial additional vehicular traffic in the project area would not be significant. The existing roads along the route are two lane roads (paved and unpaved) that have no identified traffic flow constraints at this time and an additional 200-300 trips per day for short periods would not cause their capacity to be exceeded. No additional mitigation measures are required to minimize potential traffic generation by the project. Existing rideshare parking areas are not fully utilized in the High Desert and the additional parking demand can be accommodated at the existing facilities, or the Agency can create additional facilities after the work force is identified. The following mitigation measure shall be implemented by the Agency:

78. The Agency shall provide additional rideshare parking spaces or areas if it is found that the existing parking areas are insufficient to accommodate the demand by project employees.

Based on the volume of traffic generated in support of this project, estimated at less than 300 trips per day (the equivalent of thirty single family residences), the project would not cause a substantial adverse impact on existing transportation systems. By starting work

earlier than the peak rush hours in the local area, the project can also reduce its potential impact on the area's circulation system.

No potential alterations in present circulation patterns have been identified in association with this project; therefore, no potential impact to this system feature is possible. The project would not affect any water or air traffic systems. None exist in the project area. The pipeline must cross the railroad line going into Lucerne Valley at the Deep Creek Road crossing. The following mitigation measure shall be implemented by the Agency to ensure no significant adverse impact affects this rail system.

79. The Agency shall obtain permission to encroach on the railroad alignment from the railroad owner and this permission shall include concurrence with the measures that the Agency would use to construct and operate the water line where it crosses the railroad bed.

The project may also create road hazards as a result of construction and maintenance of the water transmission line. An undefined number of paved and graded roads would be crossed by the pipeline and many paved roads, including State Highway 247, would be crossed by the pipeline. This creates the potential for an increase in traffic hazards at all crossings during construction. The following mitigation measures shall be implemented by the Agency to reduce such potential hazards below a significant level.

80. The construction contractor or Agency shall provide adequate traffic control resources (signing, protective devices, crossing devices, detours, flagpersons, etc.) to maintain safe traffic flows on all streets crossed by the pipeline. If construction beneath a road is not completed by the end of the days work, the contractor or agency shall ensure that an adequate traffic access route exists to all areas where access exists at the time of construction.
81. Traffic hazards that may affect vehicles, bicycles, or pedestrians shall be identified and controlled by the contractor or Agency.
82. No open trenches or traffic safety hazards shall be left in roadways during periods when construction personnel are not present. Such hazards shall be corrected or an alternative provided without hazards before employees leave a working area at or adjacent to a roadway.
83. All roads shall be adequately repaired after installation of the pipeline to ensure that traffic can move in the same manner as before construction without damage to vehicles.

No long-term traffic or circulation system impacts are forecast from carrying out the project. Implementation of the above measures in conjunction with construction activities can reduce potential adverse impacts to the road system to nonsignificant levels by minimizing hazards along roads when construction is present.

If the CDCA Plan exception is granted, it would allow the pipeline to be installed and the potential traffic and circulation system impacts would occur as outlined in the analysis of project impacts above. No additional traffic or circulation system impacts are forecast to occur as a consequence of approving the Plan exception.

Impacts of the No Project Alternative/No Plan Exception

The no project/no exception alternative would eliminate the potential short-term effects on the transportation system identified in the above analysis. As in the previous instances, a no project alternative would shift the responsibility for developing water supply facilities to the local water purveyors which would cause similar, but reduced effects on the transportation system at the future locations of such facilities. These effects would be subject to the same mitigation as identified above and no significant effects to transportation systems from implementing the no project alternative is forecast.

O. Housing/Demographics/Socioeconomics

Impacts of the Proposed Project/Plan Exception

The project would result in a short-term increase in demand for pipe laying and construction employees. This demand would be spread over a period of one-two years. The majority of the personnel can be drawn from the existing labor pool in southern California and more particularly from the High Desert region where unemployment among construction workers is high due to the current recession. With a population of more than one million people (SBCO 1990) within one hour driving time of the project's beginning point in Hesperia, it is not anticipated that the project would cause a significant increase in regional population or in demand for housing. Permanent employment would be increased by 3-5 additional field personnel to maintain and operate the completed project. This is too small an increase in employment to substantially increase population or housing demand in the project area which has a current combined population of well over 200,000 residents (SBCO 1990).

The region is currently suffering a recession with unemployment at approximately 8% for the High Desert region. A large segment of the unemployed population are construction related trades which would benefit from the project. The proposed project would result in the expenditure of approximately \$40,000,000 on construction of the pipeline. The project would not cause a significant direct change in the location, distribution, density, or growth rate of Division 2's (Improvement District M) population. The issue of growth inducement is fully addressed in the Land Use section of this EA.

Aside from providing needed employment within the area, the proposed project would also prevent further economic stagnation from occurring in the region as ground water supplies become inadequate, particularly in the Town of Yucca Valley which draws its water from the Warren Basin.

If the CDCA Plan exception is granted, it would allow the pipeline to be installed and the potential housing/demographic/socioeconomic system impacts would occur as outlined in the analysis of project impacts above. No additional housing/demographic/socioeconomic system impacts are forecast to occur as a consequence of approving the Plan exception.

Impacts of the No Project Alternative/No Plan Exception

The no project/no exception alternative would eliminate a major construction project and the socioeconomic benefits to the High Desert region. The individual water purveyor projects to offset the loss of some Morongo Basin Pipeline SPW would provide some socioeconomic benefit to the region, but not at the same level as this major infrastructure improvement.

The potentially significant adverse impact of lack of water supplies on the Town of Yucca Valley have already been noted in the water supply/water quality discussion. The Warren Basin aquifer is so severely overdrafted that serious damage to the local economy is likely to occur if imported or supplemental water is not provided by the Morongo Basin Pipeline. The other water purveyors would be affected over the long-term, but based on water stored in aquifers, the impact would not be as severe as that forecasted for the Town of Yucca Valley.

Adoption of a no project alternative could cause significant changes in future location and distribution of the 30,000 individuals affected by the Morongo Basin Pipeline Project in Division 2. Several thousand houses which are currently occupied may no longer be safe due to lack of adequate fire flow and a major shift in demand for housing could occur. All of these factors indicate a potential for significant adverse socioeconomic and human impacts if the no project alternative is selected.

Another significant socioeconomic impact of the no project alternative is to deny the residents of Division 2 access to SPW that they have been paying taxes on for the past 20 years. These lost tax dollars, plus the potential default on several million dollars of bonded indebtedness, would have a severe impact on the individuals, the community and existing land uses.

P. Public Services

Impacts of the Proposed Project/Plan Exception

The project would not cause a significant direct increase in demand for fire, police, school, parks, or any other governmental services. This is based on the type of facilities (reservoir, buried pipeline, pump station, and turnouts) that will be installed by the project. None of these facilities would require any of the above public services, except for response to emergencies by police and fire services. The nature of the facilities and the type of construction (reservoirs and pump stations do not invite trespass and are constructed to minimize fire hazards to all for low maintenance) minimize the demand for such emergency services.

The facilities that would be installed by this project require long-term, low level maintenance effort in support of operations. MWA is responsible for such maintenance and

funding mechanisms are provided in the Project Agreement between MWA and the water purveyors to ensure that the facilities can be maintained over the life of the Agreements. Thus, no additional demand would be placed on existing governmental agencies for maintenance and MWA has established a funding mechanism to ensure that the additional maintenance responsibilities associated with this project can be fulfilled. No significant public service impacts are predicted from implementing the project.

If the CDCA Plan exception is granted, it would allow the pipeline to be installed and the potential public service impacts would occur as outlined in the analysis of project impacts above. No additional public service impacts are forecast to occur as a consequence of approving the Plan exception.

Impacts of the No Project Alternative/No Plan Exception

The no project/no exception alternative eliminates the small demand for emergency services associated with the project, but other water supply projects developed by local water purveyors would create a similar, though probably reduced, demand for these services. The major effect of the no project alternative is to remove an assured supply of imported water and force reliance on local ground water aquifers. Should these supplies be inadequate, as is probable in the Town of Yucca Valley which relies on the heavily overdrafted Warren Basin, the ability to provide fire protection and adequate fire flows may be significantly reduced. This is a potential significant public service impact that may not be avoided through attempts to develop alternative local water supplies to support the Town.

Q. Land Use

Impacts of the Proposed Project/Plan Exception

From a direct land use standpoint the facilities proposed by the project would not cause a substantial alteration of present or planned land uses of the project area. The project follows existing road easements for the majority of its extent from Hesperia to Homestead Valley. The water system facilities are permitted within any County land use zone (SBCO 1990) and water system facilities are found throughout the general project area, although pipeline sizes are smaller and conform with the 12 inch diameter limits of the CDCA Plan.

The BLM commonly grants roads, electrical transmission and distribution lines, gas and water pipelines and other linear facilities a right-of-way across federal land where such grants are essential to the functioning of the facility. At present the corridor of the proposed ROW for the Morongo Basin Pipeline contains State Highway 247, a cable communication system, and an electrical distribution system. In this instance State Highway 247 does not have a typical right-of-way grant as it was approved under Revised Statute 2477 which gave it *de facto* recognition. But the Highway does exist across public land under the Bureau's jurisdiction, as do the local underground cable lines and Southern California Edison electrical power distribution lines along most of the proposed right-of-way

across public land. Thus, the use of land along the alignment on both public and private land is consistent with adjacent uses and poses no known land use conflicts.

The water transmission facilities would not cause any alteration of the present or planned surface land uses allowed on public or private land in the general project area. If the exception is granted, none of the resource or land use management options in either the Multiple-Use Class L and M areas adjacent to the ROW would be affected. Because the use is consistent with existing ROW's in the corridor and because no other major utility systems are proposed for Contingent Corridor "S", no potential increase in demand to activate this contingent corridor is forecast to occur. The area disturbed by the proposed pipeline across public land would be revegetated in accordance with requirements in mitigation measures 19 through 31, and the long-term habitat value would be compensated for by purchasing high quality tortoise habitat.

Since all future land uses allowed can only be developed after approval from the entity with land use jurisdiction (County, BLM, State Lands Commission, or the Town of Yucca Valley), the potential to change land uses is beyond the effect of the pipeline as it is a separate decision requiring a separate environmental review by the entity with land use jurisdiction. The private land adjacent to the route is within the jurisdiction of San Bernardino County, the City of Hesperia, and the Town of Apple Valley. BLM manages the federal public land and the State Lands Commission (SLC) the state public land along the route. The County, BLM and the Town of Yucca Valley control land uses in the area to be served by the pipeline. Future land use is controlled by the existing general plans and zoning in these jurisdictions and future land uses cannot be altered without prior revision of the general plan and zoning for the site. The SLC and BLM manage their lands under general guidelines (State) and the CDCA Plan (BLM). The project would not alter the authorized land uses established in the affected jurisdictions. Therefore, no potentially significant direct alterations in present or planned land use in the project area are forecast to occur as a result of implementing the project.

It is assumed that no changes in uses permitted on public land by the CDCA Plan would occur based on the combined Multiple-Use Class designations of L and M (on public land along the pipeline route). This is because the SPW being transported is authorized for use only by the water purveyors, and no others may purchase water. Therefore, no changes or pressures for changes in land use on public land is forecast to occur as a result of implementing the project.

A more difficult issue to evaluate is the indirect effect that imported water would have on future growth on private land. For an area such as the Town of Yucca Valley, which has been under a water connection moratorium, the provision of additional water supplies can affect potential growth. In order to examine the relationship between water supply and growth, it is necessary to look at whether growth is occurring regardless of the additional water supplies and the affect on growth of the area.

Most communities assume that growth would occur as evidenced by master plans of development which project yearly expansions of infrastructure systems to accommodate such growth. Both the Joshua Basin Water District and Hi-Desert Water District Water Master Plans (Krieger and Stewart 1984 and VTN Consolidated, Inc. 1977) planned their water systems for substantial growth.

In fact, actual growth within the Joshua Basin Water District since 1980 has been about 1,100 persons (through 1987) which represents a 25% increase in population from 4,083 to 5,180 over a seven year period (SBCO 1990). A detailed analysis of population in the Hi-Desert Water District service area (Dodson 1988) indicates that over a comparable period (1980 to 1988) population increased from 6,410 to an estimated 10,418, or a 62.5% increase over the eight year period. The population of the Landers area (Bighorn-Desert View and CSA 70) has grown about the same rate but from a smaller population base. This is based on the growth rate data in water connections obtained from Bighorn-Desert View in late-1988 (Personal Communication Mr. Mike Maline, General Manager Big Horn-Desert View Water Agency).

It is clear that growth has been occurring throughout the area up to the present. However, Hi-Desert has established growth limitations (1988) and more recently a growth moratorium because of limited ground water supplies. The size of the overdraft of the Warren Basin and the need to meet existing and future local water supply requirements is the primary reason imported water from the project is so essential to the Town of Yucca Valley.

From the perspective of development in Improvement Zone M (Division 2), implementation of the project would not affect existing or future development within three of the water purveyor service areas. These are: Joshua Basin Water District, Bighorn-Desert View Water Agency, and both CSA 70 Improvement Zones. Growth can occur in these areas without the project under the County's current General Plan and zoning. No specific constraints have been imposed on development in these areas. Therefore, the project has been judged to have no potential to induce growth in these areas. Water is already available and the project would not attract new residents to the area nor would it generate new economic activity which would attract new development.

The circumstances are different in Yucca Valley. The additional water supplies would allow the Hi-Desert Water District to remove the growth moratorium and allow the community to continue growing (within whatever future constraints are established by the District) as it has throughout the 1980's. The additional water provided by the project would allow the District to continue meeting its current water commitments. However, any growth that would occur would be accommodated or allowed, not induced, and it would continue to occur within the limits imposed by the County's General Plan (SBCO 1989) and Development Code (SBCO 1990).

Removal of a growth restricting resource constraint (in this case water for domestic consumption) and allowing growth to occur in accordance with adopted land use plans is

arguably different from growth that exceeds development that is envisioned and sanctioned by the area's Master Plan, in this instance the County General Plan. The County has adopted land use designations that would allow the Yucca Valley area to have a build-out population greater than 50,000 individuals (SBCO 1989). The infrastructure systems have been and must be planned to meet this ultimate population. All utility and infrastructure systems (roads, sewers, police, fire, schools, water, etc.) must be planned and designed to meet this ultimate vision of development, or the community must reevaluate its ultimate vision of itself and alter the master plan, i.e. the General Plan. Since the County General Plan was approved three years ago, the current land use designations are considered to reflect the community's vision of ultimate development. Therefore, development consistent with the County General Plan is not considered to be induced growth.

The additional water available to Hi-Desert through the Project Agreement is about 4,282 acre feet per year (assuming full delivery of SPW). This is comparable to the current extractions by Hi-Desert (about 4,000 acre feet per year) to serve a population of approximately 11,000 people. Thus, the additional water delivered by this project would allow growth to occur (accommodate growth) but only well within the existing land use plan limits about (50,000 ultimate population permitted by the General Plan). This assumes that all imported water goes to support growth which is not planned by Hi-Desert Water District. The District would use part of the SPW received to recharge the severely depleted Warren Basin and to meet current customer demand for water.

The conclusion reached in this analysis is that the project is growth accommodating and would support future growth that is well within the planned build-out for the area within the County's General Plan. The possibility exists that growth that may be accommodated by the Morongo Basin Pipeline Project may be considered too much growth, i.e. significant growth. This is a subjective issues that the Town of Yucca Valley needs to address. Since land management is not within the jurisdiction of the BLM and since such supposition gets into the realm of speculation regarding future land use management by the Town and County, it is considered beyond the scope of the project.

It is clear that the project would play a growth accommodation role that is well within that provided for in the County General Plan. Based on this analysis, the potential for significant growth inducement or accommodation from implementing the project is considered nonsignificant.

If the CDCA Plan exception is granted, it would allow the pipeline to be installed and no potential for additional demand to activate Contingent Corridor "S" has been identified. The potential surface land uses in both Multiple-Use Class L and M areas would not be altered. No potential for impact to the existing mineral claims west of Old Woman Spring Ranch is forecast since only a minor portion of each claim would be affected by the proposed project, and that is adjacent to State Highway 247 which provides access to the claims. No additional land use impacts are forecast to occur as a consequence of approving the Plan exception.

Impacts of the No Project Alternative/No Plan Exception

The no project/no exception alternative would continue the existing growth limit on water connections and would ultimately require the local water districts, particularly Hi-Desert Water District, to take measures to acquire and develop water resources outside of its boundaries. Without imported water from the project or some other source, the Warren Basin aquifers are forecast to be exhausted within ten years and the Town and its related land uses would gradually be altered to accommodate the existing natural water supply, which is about 400 acre feet per year, or 1/10 of the existing water consumed. Alternatively, the no project/no exception alternative would result in Town's water demand impacts being shifted to other desert water basins (assuming the Town could get water rights to ground water resources in other ground water basins) with all of the attendant impacts of constructing the pumping, water transmission line, and storage facilities. Land uses in the affected areas could be significantly altered as could land uses along the water transmission lines. Under the project no other entities, but those in Division 2 Improvement District M, would receive any water deliveries from the proposed project. Under either of the above no project scenarios the potential exists for significant land use and socioeconomic impacts.

R. Cumulative Impacts

The potential for cumulative impacts to occur is dependent upon other projects that may be constructed or placed in operation during the same time frame as the proposed project. A review of proposed projects within Improvement District M (the water delivery area) indicates that the only other project being considered at this time is the installation of the remaining water infrastructure to deliver water to the Hi-Desert Water District. As presently proposed, a pipeline will be installed from the terminal reservoir following existing roads to several recharge basins that will be located in the Town of Yucca Valley, over the Warren Basin aquifer. The pipeline will be approximately seven miles long and the water recharge basins are forecast to impact approximately 50 to 100 acres. The impacts would be similar to those outlined for the proposed project and are anticipated to occur sometime in the next two years. Mitigation measures as outlined for the proposed project should be sufficient to reduce potential adverse impacts to biological resources, cultural resources and air quality to nonsignificant levels.

No other large projects (beyond individual homes or commercial establishments) are being proposed within Improvement District M.

Within the High Desert region residential and commercial growth continues to occur albeit at a slower rate due to the recession and current litigation over ground water resources in the Mojave River Basin. With the closure of George Air Force Base, the various cities the Victor Valley are assessing alternatives for future redevelopment of the base and its surrounding area, but no firm plans have yet been established for this area. The MWA is considering the construction of a similar SPW delivery pipeline to the Barstow and Yermo areas, but a specific route and destination have not yet been selected. No specific projects

are proposed along the proposed alignment of the Morongo Basin Pipeline that would add to cumulative effects of the project.

During the period in which the proposed project will be constructed, the potential for cumulative impacts is considered nonsignificant. Based on data presently available, the cumulative impact in the affected area of the project, Improvement District M, is not forecast to be significant.

B. Coastal Consultation

Section 7 consultation was initiated with the U. S. Fish and Wildlife Service for the proposed project in August 1992 and will be completed prior to any authorization to proceed with the project which shall occur in December 1992 or the earliest date. Consultation has also been initiated with the State Historic Preservation Officer, under Section 106 of the National Historic Preservation Act and it should also be completed during the month of November 1992.

C. Final Decision

The resource management planning process provides an opportunity for administrative review via a plan protest to the BLM Director if you believe the approval of the proposed plan acceptance would be in error. (See 43 CFR 16105-3.) Careful adherence to these guidelines will assist in preparing a protest that will ensure the greatest consideration to your point of view.

Only those persons or organizations who participated in our planning process leading to this plan acceptance may protest. If our records do not indicate that you became involved in any way in the preparation of this proposed acceptance, your protest will be deemed invalid, further review.

A protesting party may raise only those issues which he or she submitted to the record during the planning process. New issues raised in the protest period shall be directed to the California Desert District Manager for consideration in plan amendments, or separate plan submissions, or an alternative agreement.

The protest by filing a plan protest begins when the California Desert District Manager issues notice of the effective date of the proposed acceptance. The protest period extends 60 calendar days. There is no protest fee or amount of time. To be considered "timely," your protest must be postmarked no later than the last day of the protest period. Also, although

V. PUBLIC PARTICIPATION, CONSULTATION AND COORDINATION

A. Scoping

Scoping for the proposed project was accomplished through review of the responses to the environmental document prepared under the California Environmental Quality Act (CEQA) and internal scoping with BLM and FWS technical specialists. We were able to utilize the original responses to the CEQA Initial Study, discussions with the State Lands Commission and Department of Fish and Game, the Corps of Engineers, and our technical specialists in Barstow and Riverside to identify the issues of concern to be address in this Environmental Assessment.

B. Ongoing Consultation

Section 7 consultation was initiated with the U. S. Fish and Wildlife Service for the proposed project in August 1992 and will be completed prior to any authorization to proceed with the project which could come in December 1992 at the earliest date. Consultation has also been initiated with the State Historic Preservation Officer, under Section 106 of the National Historic Preservation Act and it should also be completed during the month of November 1992.

C. Protest Procedures

The resource management planning process includes an opportunity for administrative review via a plan protest to the BLM Director if you believe the approval of the proposed plan exception would be in error. (See 43 CFR 1610.5-2.) Careful adherence to these guidelines will assist in preparing a protest that will assure the greatest consideration to your point of view.

Only those persons or organizations who participated in our planning process leading to this plan exception may protest. If our records do not indicate that you had any involvement in any stage in the preparation of this proposed exception, your protest will be dismissed without further review.

A protesting party may raise only those issues which he or she submitted for the record during the planning process. New issues raised in the protest period should be directed to the California Desert District Manager for consideration in plan implementation, as potential plan amendments, or as otherwise appropriate.

The period for filing a plan protest begins when the California Desert District Manager issues notice of the effective date of the proposed exception. The protest period extends for 30 days. There is no provision for any extension of time. To be considered "timely," your protest must be postmarked no later than the last day of the protest period. Also, although

not a requirement, we suggest that you send your protest by certified mail, return receipt requested.

Protests must be filed in writing to:

Director (WO-760)
Bureau of Land Management
1849 "C" Street, NW
Washington, D.C. 20240

In order to be considered complete, your protest must contain, at a minimum, the following information:

1. The name, mailing address, telephone number, and interest of the person filing the protest.
2. A statement of the issue or issues being protested.
3. A statement of the part or parts of the proposed plan exemption being protested. To the extent possible, this should be done by reference to specific pages, paragraphs, sections, tables, maps, etc. included in the document.
4. A copy of all documents addressing the issue or issues that you submitted during the planning process or a reference to the date the issue or issues were discussed by you for the record.
5. A concise statement explaining why the proposed decision is believed to be incorrect. This is a critical part of your protest. Take care to document all relevant facts. As much as possible, reference or cite the planning documents, environmental analysis documents, available planning records (i.e., meeting minutes or summaries, correspondence, etc.). A protest which merely expresses disagreement with the proposed decision, without any data, will not provide us with the benefit of your information and insight. In this case, the Director's review will be based on the existing analysis and supporting data.

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VII. REFERENCES

- Barto, Ron, CSA 70-W1, East Landers Water System, Focused Environmental Impact Report; Hydrogeology, 1985
- Bechtel - Southern California, Design Basis Report and Technical Appendix, Morongo Basin Pipeline Project, September 1991
- Bortugno, E. J. and Spittler, T. E., Geologic Map of the San Bernardino Quadrangle, Map No. 3A (Geology), Scale 1:250,000, 1986
- California Energy Commission, 1986 Electricity Report, 1986
- City of Hesperia, Rancho Las Flores Environmental Impact Report, Volume II-Responses & Addenda, 1990
- City of Hesperia, Rancho Las Flores Specific Plan, March 1990
- City of Hesperia, Supplement to the Draft Program EIR for the Hesperia General Plan, March 1991
- Converse Consultants, Draft - Geotechnical Investigation, Morongo Basin Pipeline. 2 vols. November 1991
- Department of Water Resources, California's Ground Water, Bulletin Number 118, 1975
- Department of Water Resources, Ground Water Basins in California. A Report to the Legislature in Response to Water Code Section 12924, 1980
- Department of Water Resources, Management of California State Water Project, 1989
- Don Owen & Associates, Final Baseline Environmental Impact Report for the Master Plan of Water Supply and Distribution Facilities, 1978
- Federal Highway Administration, Highway Traffic Noise Prediction Model
- Fox, Robert C. and Roberts, Mark W., Mainstream Well No. 1 EIR: Hydrogeology, for Hi-Desert Water District, July 1988.
- Jennings, Charles W., Fault Map of California with locations of Volcanoes, Thermal Springs, and Thermal Wells, Geologic Data Map No. 1, Scale 1:750,000, 1975
- Krieger & Stewart, Incorporated, Joshua Basin Water District General Plan for Water Supply and Water Distribution, 1984
- Lewis, R. E., Ground-Water Resources of the Yucca Valley - Joshua Tree Area San Bernardino County, CA, Open File Report of the U.S. Geological Survey, 1972
- San Bernardino County, Background Report Natural Hazards Geologic Issue, 1988
- San Bernardino County, Development Code Title 8 of the San Bernardino County Code, Volume 2, 1990

San Bernardino County, General Plan, 1989

San Bernardino County, General Plan Update Background Report Man-Made Hazards Noise Issue, 1988

San Bernardino County, General Plan Update Noise Element, 1988

San Bernardino County, Population-Housing Bulletin, July 1990

San Bernardino County, Seismic and Public Safety Element, 1974

San Bernardino County Department of Transportation, Appendix A, Chapter 2.5, Division 1, Title 7, California Planning & Zoning Law, 1988.

San Bernardino County Department of Transportation, Appendix D, Road Financing Alternatives, July 1988

Soil Conservation Service, Soil Survey of San Bernardino County, California, Mojave River Area, 1985

South Coast Air Quality Management District Handbook, Draft Air Quality Handbook for Implementing the California Environmental Quality Act (CEQA), not yet published

South Coast Geological Society, Geology and Mineral Wealth of the California Transverse Ranges, 1982

Tierra Madre Consultants, Inc., Biological Assessment for the Morongo Basin Pipeline Project. Prepared for Mojave Water Agency, December 1991

Tom Dodson and Associates, Hi-Desert Water District Focused EIR/EIS: Conversion of Section 24 Well to Operational Status, 1988

University of California Cooperative Extension, Determining Daily Reference Evapotranspiration (ET_o), Leaflet 21426, 1987

U.S. Department of Interior, Bureau of Land Management, Appendix: The California Desert Conservation Area - Plan Alternatives and EIS. Draft revision April 1980.

U.S. Department of Interior, Bureau of Land Management, The California Desert Conservation Area Plan, 1980

U.S. Department of Interior, Bureau of Land Management, Environmental Assessment for San Bernardino Valley Water Conservation District Haul Road. Prepared by STA Planning, Inc., August 1991.

U. S. Environmental Protection Agency, Compilation of Air Pollutant Emission Factors, Volume 1 Stationary Point and Area Sources, 1985

U. S. Environmental Protection Agency, Control of Open Fugitive Dust Sources, 1988

U. S. G. S., Topographic Map Series, 7.5: Apple Valley South, Big Horn Canyon, Cougar Butte, Fifteen Mile Valley, Hesperia, Joshua Tree North, Lake Arrowhead, Landers, Lucerne Valley, Melville Lake, Old Woman Springs, Rattlesnake Canyon, Silverwood Lake, and Yucca Valley North.

VTN Consolidated, Inc., Master Plan of Water Supply and Distribution for Hi-Desert County Water District, Revised 1977

APPENDICES

APPENDIX 1

Alternative Pipeline Alignments

Chapter 3 – ROUTE SELECTION

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Chapter 3 – ROUTE SELECTION

A. Chapter Summary

Field reconnaissance and office evaluation of possible routes for the Morongo Basin Pipeline Project (Project) were the primary undertakings in this initial phase of route selection. United States Geological Survey (U.S.G.S.) maps with contour intervals of 20 feet were utilized in the alignment studies.

Route studies included a review of a previously proposed alignment (designated in this report as the "Baseline Alignment") as well as alternative alignments, other alignments taking into account current and proposed developments, and environmental factors. Alternative alignments were compared and evaluated on the basis of construction economy, pipeline length, right-of-way acquisition, utility conflicts, community disruption, natural features, and environmental impacts. The Recommended Alignment is an evolution of many comparisons that were integrated into a feasible route selection for the pipeline.

An alignment for an all-gravity pipeline was investigated for this project, but eliminated due to environmental and construction cost considerations.

The Recommended Alignment, as shown in Figure 3-1, represents a pipeline alignment which appears to best satisfy known constraints and conditions for the conveyance of State Water Project (SWP) water from the California Aqueduct to the end users in Improvement District "M."

B. Factors Affecting Pipe Alignment

1. Construction Economy

The design of a pipeline involves the evaluation of conditions which would be encountered during construction. Variables which affect the economy of construction include the minimum required depth of cover for the alignment; the accessibility of the alignment for construction equipment; the number of pipeline bends and special fittings required; and the hydraulic pipe design requirements.

All of the above factors have a direct effect on the costs of construction for a pipeline and, therefore, impact many of the decisions made during the design process.

2. Pipeline Length

Ideally, the most favorable alignment would be the route which results in the shortest length between the beginning and ending points (a straight line). However, this ideal situation is rarely feasible, due to existing obstructions, soil conditions, accessibility, changes in elevation, environmental conditions and jurisdictional restrictions.

The overall length of the pipeline in each alternative alignment has an obvious effect on overall construction costs. In addition, increased pipe lengths have an adverse effect on hydraulic design, pump sizing, and the annual costs of operation and maintenance.

3. Right-of-Way Acquisition

Evaluation of alternatives includes an assessment of the extent and nature of right-of-way acquisition which would be required in order to utilize the alignment. The extensive use of existing or future public right-of-way will have a direct effect on the costs of acquisition, and is generally more acceptable to the public than acquisition of right-of-way through private property.

4. Utility Conflicts

Disruption to existing utilities is a major factor to consider during the evaluation of pipeline alignment alternatives. Construction in areas with existing utilities requires a high level of care by the contractor, which in turn slows down the construction activity and results in higher construction costs. In addition, emergency repairs of broken utilities, and the relocation of existing facilities can greatly increase the disruptive effects of utility service to customers in the affected areas.

5. Community Disruption

Pipeline construction activity in existing communities can have a very disruptive effect on the community as a whole, due to temporary alterations in traffic patterns, increased levels of noise and dust, safety conditions in the construction zone, and security in the adjacent areas. The evaluation of pipeline alignment alternatives places a high priority on selecting an alignment which keeps community disruption to the lowest possible level.

6. Environmental Impacts

In order to comply with the Mitigated Negative Declaration which has been adopted for the project, the alignment alternatives must be evaluated for their environmental impact on the affected areas, including the cost of mitigation measures necessary for keeping the pipeline within acceptable environmental standards. In a letter dated June 26, 1991, Bechtel prepared an analysis of the cost impacts of the mitigation measures to the Agency to account for increased project costs.

7. Traffic Control

Pipeline alignments in and along traffic corridors must be located to keep traffic pattern disruption at a minimum. Any construction which adversely affects the existing traffic patterns must include traffic control plans consistent with the requirements of the governing jurisdiction.

It is anticipated that the alignment will either parallel or be within existing roadways under the jurisdiction of Caltrans, County of San Bernardino, City of Hesperia and Town of Apple Valley. During the construction permitting, these agencies will require traffic control plans. The majority of the traffic control in construction areas can generally be accomplished using the guidelines presented in Figures 3-2a, and 3-2b which depict typical shoulder and lane closures, respectively, on 2-lane rural roads. For the more heavily travelled intersections and special circumstances, site specific traffic control plans will be required. However, these special traffic control plans cannot be developed until the pipeline alignment is final, and the cities, county, and state have issued their specific traffic control requirements.

8. Cover Requirements

In general, minimizing the depth of burial reduces the construction cost of a pipeline. This consideration, however, must be balanced against higher incidences of utility interference, greater live loading, potential flotation concerns, and protection of the pipeline, as well as possible future development restriction.

The minimum cover required over the pipeline will be established by determining the soil weight required to prevent flotation of the empty pipeline in high ground water conditions with a minimum safety factor of 1.25. The design cover will then be established after considering other criteria such as utilities, physical protection of the pipeline, tie-in points, and localized topography. As a general rule, the minimum depth of cover has been established at 3 feet 6 inches for the 30-inch-diameter pipeline.

An additional consideration would be to keep the top of the pipe elevation approximately the same as adjacent existing pipelines. This is especially important in undeveloped areas which may be subject to extensive grading operations in the future.

9. Slope Stability

In certain areas, the proposed pipeline may be constructed downslope from existing parallel pipelines, electric power transmission towers, and buildings.

The stability of these slopes during construction and upon project completion will be addressed. The geotechnical consultant will determine if potential stability problems exist, and Boyle will adjust the pipeline design to mitigate stability problems by altering its alignment or grade, or by providing stabilizing structures.

10. Minimum Separation Distance

The Morongo Basin Pipeline may be constructed adjacent to existing pipelines. By minimizing the separation distance between the pipelines, the required amount of new easement can be reduced. However, unless shored trench construction is utilized, a minimum separation must be maintained to protect the integrity of the existing pipelines. This minimum separation distance will be determined by the lateral soil support required to maintain stability of the existing pipelines (see Figure 3-3).

11. Minimum Radii for Thrust Considerations

Significant cost savings can be accomplished by minimizing thrust considerations. Thrust due to horizontal and vertical discontinuities will be resisted through soil-pipe friction design techniques (this requires restrained joints). A separate calculation is required for each bend which has a radius of curvature less than the calculated minimum. To minimize the expense of restrained joints, the horizontal alignment, where possible, will be established with curves greater than the calculated minimums (see Chapter 6).

C. Alternative Pipeline Alignments

Previous studies performed for the Agency¹ have devoted a large amount of effort on determining an optimum pipeline alignment for the Project. In order to avoid unnecessary duplication of effort, the current effort focused on the evaluation of alternatives which are refinements to the recommended alignment as presented in the

¹ See list of references in Technical Appendix.

May 1990 report "Morongo Basin Pipeline - Preliminary Engineering," by Malcolm-Pirnie, Incorporated. For reference purposes, this alignment has been named the Baseline Alignment, and is shown on Figures 3-4 through 3-9 where it differs in location from the Recommended Route in this report.

Factors affecting the evaluation of alternative routes are listed in Tables 3-1 through 3-4, for each identified route segment.

Two major issues have made it necessary to investigate significant changes in the pipe alignment:

1. In Reach 1 (Figure 3-4), the Baseline Alignment anticipated the use of the existing turnout on the California Aqueduct. However, in order to use the existing turnout, the pipe alignment must cross an area currently being planned for a future development, known as the Rancho Las Flores development.

Existing topography in the Rancho Las Flores property consists of rolling hills and relatively steep canyons. Significant changes to the existing topography have been proposed in planning studies performed by the developer's engineer. Since design and construction of the development is not yet completed, the pipeline construction would have to cross this rough area in a manner which would be compatible with the planned development. Pipeline construction under these conditions may be difficult and expensive. It was recognized early in this project that alternative alignments, while requiring a new turnout on the aqueduct, could reduce pipe length, difficulty of construction, and overall construction costs.

Two alternate locations for a new turnout were identified south of Ranchero Road (Identified as Route Segment "G" and Route Segment "J"). Alternative pipeline alignments which utilized the new turnout locations were delineated as shown on Figure 3-4.

2. In Reach 4, considerable effort was expended to determine location for a regulating reservoir at the termination of the project that best meets the needs of the Project Participants. This included a study of an alternative pipeline system

which would not require pumping. Other right-of-way considerations have also resulted in the need to investigate additional alignment alternatives.

ROUTE ALIGNMENT	DESCRIPTION	APPROXIMATE LENGTH (FEET)	FACTORS AFFECTING ROUTING CONSIDERATION
A	Over County Park Loop Road Alignment to Freedom Trail	3,400	<ol style="list-style-type: none"> 1. Alignment crosses a 30' high bridge over road 2. Elevation range from 1000 feet to 1200 feet 3. Valley is well-defined, but bridge structure is substantial 4. Gentle slope exists in the valley, with some grades near the mountain
B	North Road from Mountain Road to T Avenue	6,500	<ol style="list-style-type: none"> 1. North Road is a paved 2-lane road with moderate traffic 2. Plans required to cross 800' overpass 3. South side of road is on north side of road 4. 10' wide cut on north side of road 5. Power poles on south side of road west of 800' bridge, north side of road east of 800' bridge 6. Elevation range from 1270 feet to 2400 feet, on uniform slope
C	Mountain County Loop Road from T Avenue to Freedom Loop Road	10,000	<ol style="list-style-type: none"> 1. It involves a private golf course crossing 2. Alignment involves a wide bridge and golf course 3. Elevation range from 1000 feet to 2400 feet. Slope is generally uniform 4. Heavy traffic on Mountain Loop Road will require wide lanes 5. Pipeline construction during primary and secondary is required to reduce power line on the golf course 6. Pipeline crosses 40' wide line in Mountain Loop Road
D	Over County Park Loop Road and Mountain Loop Road to Freedom Loop Road	3,200	<ol style="list-style-type: none"> 1. Alignment with slope from Mountain Loop Road to Freedom Loop 2. Existing pipeline crossing in valley 3. Mountain Loop Road 4. Elevation range from 2200 feet to 2400 feet on uniform slope 5. Alignment crosses over bank on west side and above on the east side of Mountain Loop Road

TABLE 3-1

**Reach 1 Alternative Pipeline Alignment
(See Figure 3-4)**

ROUTE SEGMENT	DESCRIPTION	APPROXIMATE LENGTH (FEET)	FACTORS AFFECTING PIPELINE CONSTRUCTION
A	Open country from California Aqueduct to Rancho Road	9,600	<ol style="list-style-type: none"> 1. Alignment crosses a 36" high pressure gas main. 2. Elevations range from 3200 feet to 3440 feet. 3. Valley is undeveloped, but heavily disturbed by recreational vehicles. 4. Gentle slopes prevail in the valley, with steep grades near the aqueduct.
B	Alston Road from Rancho Road to "I" Avenue	8,800	<ol style="list-style-type: none"> 1. Alston Road is a paved 2-lane road with moderate traffic. 2. Permit required to cross SCE easement. 3. Buried telephone cable on north side of road. 4. 12" water line on north side of road. 5. Power poles on south side of road west of E St. and north side of road east of E St. 6. Elevation drops from 3200 feet to 3080 feet, on uniform slopes.
C	Hesperia Country Club Golf Course, from "I" Avenue to Arrowhead Lake Road	10,600	<ol style="list-style-type: none"> 1. Traverses a private golf course, crossing several fairways. 2. Alignment parallels a wash through the golf course. 3. Elevation drops from 3080 feet to 2940 feet. Slopes are generally uniform. 4. Heavy traffic on Arrowhead Lake Road will require traffic control. 5. Pipeline construction during January and February is suggested to reduce down-time on the golf course. 6. Pipeline crosses 18" water line in Arrowhead Lake Road.
D	Open country and farm fields from Arrowhead Lake Road to Deep Creek Road	8,600	<ol style="list-style-type: none"> 1. Agriculture with crops from Arrowhead Lake Road to Mojave River. 2. Existing irrigation piping in farm fields. 3. Mojave River crossing. 4. Elevation drops from 2940 feet to 2890 feet (low point on project). 5. Alignment crosses river bank on west side and a levee on the east side of Mojave River.

TABLE 3-1 continued

<u>ROUTE SEGMENT</u>	<u>DESCRIPTION</u>	<u>APPROXIMATE LENGTH (FEET)</u>	<u>FACTORS AFFECTING PIPELINE CONSTRUCTION</u>
E	Deep Creek Road north from segment D to Tussing Ranch Road	12,300	<ol style="list-style-type: none"> 1. Paved 2-lane road with moderate to heavy traffic. 2. 8" gas line on west side of road. 3. Buried telephone cable, location varies. 4. Power poles on east side of road. 5. A. T. & S. F. Railroad bridge overpass on Deep Creek Road. Pipeline will cross under bridge. 6. Heavy traffic on Rock Springs Road intersection with Deep Creek Road. Extensive traffic control required. 7. South of Rock Springs Road - fiber optic cable on east side of road. 8. Elevations range from 2890 feet to 2900 feet. Very gentle slopes.
F	Tussing Ranch Road from Deep Creek Road to Pioneer Road	13,300	<ol style="list-style-type: none"> 1. Paved 2-lane road with moderate traffic east of Kiowa Road. 2. Dirt road with light traffic west of Kiowa Road. 3. Fiber optic cable on south side of road. 4. Buried telephone cable, location varies. 5. Water line on north side of road. 6. Power poles on south side of road. 7. Critical access concerns for a fire station and a school on north side of Tussing Ranch Road at Pioneer Road.
G	Ranchero Road from California Aqueduct to Alston Road	7,900	<ol style="list-style-type: none"> 1. Paved 2-lane road with moderate traffic west of SCE easement. 2. Permit required to cross SCE easement. 3. Tunneling required to cross A. T. & S. F. Railroad. 4. Abrupt grade change at A. T. & S. F. Railroad. Difficult construction area. 5. Power poles on north side of road west of 7th St. and south side of road east of 7th St. 6. Storm drain under paved roadway. 7. Water line on south side of road. 8. Elevations range from 3200 feet to 3470 feet. Relatively uniform grades.
H	Ranchero Road, Capella Road, projection of Deep Creek Road across Mojave River	22,500	<ol style="list-style-type: none"> 1. Paved 2-lane road with moderate traffic. 2. Power poles on north side of road. 3. Mojave River Crossing. 4. Heavy traffic along Arrowhead Lake Road near the pipeline alignment. 5. Buried telephone cable, location varies. 6. Water line on north side of Ranchero Road. 7. Proposed sewer in Capella. Plans not available. 8. Buried cable T. V. line, location varies. 9. Water line on west side of Capella Road.

TABLE 3-1 continued

<u>ROUTE SEGMENT</u>	<u>DESCRIPTION</u>	<u>APPROXIMATE LENGTH (FEET)</u>	<u>FACTORS AFFECTING PIPELINE CONSTRUCTION</u>
I	Deep Creek Road east then north to SCE easement (Baseline Alignment)	7,400	<ol style="list-style-type: none"> 1. Paved 2-lane road with moderate traffic. 2. Fiber optic cable on south and east side of road. 3. Power poles on north and west side of road. 4. Residential area on west side of road.
J	SCE easement from California Aqueduct to Deep Creek Road	32,600	<ol style="list-style-type: none"> 1. Pipeline alignment parallels and is adjacent to the north side of the SCE right-of-way. 2. Abrupt grade change at A. T. & S. F. Railroad. Difficult construction area. 3. Tunneling required to cross A. T. & S. F. Railroad. 4. Heavy traffic on Arrowhead Lake Road at the proposed alignment. 5. SCE power structures pose access and safety concerns. 6. Crosses Antelope Valley through a residential area. 7. Mojave River crossing. 8. Houses with small lots along north side of SCE easement, west of 7th St.
K	Open country from California Aqueduct to Arrowhead Lake Road (Baseline Alignment)	20,400	<ol style="list-style-type: none"> 1. Alignment crosses the proposed Rancho Las Flores development. 2. Elevations range from 2980 feet to 3500 feet with steep grades and mountainous terrain. 3. Heavy traffic on Arrowhead Lake Road. 4. Difficult access for construction and maintenance equipment.
L	Open country across Mojave River Deep Creek Road (Baseline Alignment)	16,900	<ol style="list-style-type: none"> 1. Mojave River crossing. 2. Parallels Mojave River in flood plain. 3. Paved 2-lane road with moderate traffic. 4. Alignment crosses a 36" high pressure gas main. 5. Easement required to cross an SCE power line.
M	SCE easement to Kiowa Road, Roundup Way, Navajo Road, Pacific Road and Pioneer Road (Baseline Alignment)	23,800	<ol style="list-style-type: none"> 1. Parallels SCE right-of-way between Deep Creek Road and Kiowa Road. 2. 180 foot rise in elevation. Steep grades along SCE easement. 3. Kiowa is paved 2-lane road with moderate traffic. 4. Fiber optic cable on east side of Kiowa. 5. Roundup is paved 2-lane road in residential area. 6. Gas line on south side of Roundup. 7. Water line on north side of Roundup. 8. Power poles on north side of Roundup. 9. Buried telephone cables, locations vary.

TABLE 3-1 continued

ROUTE SEGMENT	DESCRIPTION	APPROXIMATE LENGTH (FEET)	FACTORS AFFECTING PIPELINE CONSTRUCTION
M	(continued)		<ul style="list-style-type: none"> 10. Fiber optic cable along Navajo, locations vary. 11. Power poles on east side of Navajo. 12. Six 90-degree bends required for the pipeline in the alignment. 13. Power poles on north side of Pacific. 14. Water line on south side of Pacific. 15. Water line and well on west side of Pioneer. 16. Power poles on east side of Pioneer.

TABLE 3-2

**Reach 2 Alternative Pipeline Alignments
(See Figure 3-5)**

ROUTE SEGMENT	DESCRIPTION	APPROXIMATE LENGTH (FEET)	FACTORS AFFECTING PIPELINE CONSTRUCTION
A	Tussing Ranch Road from Pioneer Road to Loma Vista Road (Baseline Alignment)	27,300	<ol style="list-style-type: none"> 1. Paved 2-lane road west of Central, with light traffic. 2. Dirt road east of Central. 3. Fiber optic cable on south side of road. 4. 4" high pressure gas line on south side of road. 5. Parallels A.T. & S.F. Railroad. 6. Drainage culverts at 3 locations convey flow across A.T. & S.F. Railroad into washes which cross Tussing Ranch Road. Potential scour protection at each site. 7. Power poles on south side of road. 8. Sparsely populated residential area. 9. Elevations range from 3280 feet down to 3150 feet. Gentle, uniform slopes along alignment.
B	Tussing Ranch Road from Loma Vista Road to Willow Wells Road; Willow Wells Road to Foothill Road	25,100	<ol style="list-style-type: none"> 1. Dirt road with very light traffic. 2. Sparsely populated residential area. 3. Crosses 36" high pressure gas main. 4. Fiber optic cable on south side of road. 5. 4" high pressure gas main south side of road. 6. Power poles on east side of Willow Wells Road. 7. Elevations range from 3150 feet down to 3000 feet. Gentle, uniform slopes along alignment.
C	Loma Vista Road, Clark Road, Canyon View Road, Sherwood Street, Joshua Road, and Foothill Road (Baseline Alignment)	25,000	<ol style="list-style-type: none"> 1. Crosses 36" high pressure gas main. 2. Six 90-degree bends on pipeline in this alignment. 3. Sparsely populated residential area. 4. Alignment follows dirt roads and undeveloped areas. 5. Elevations along alignment rise 50 feet to a high point, then fall 200 feet.
D	Foothill Road (Baseline Alignment)	2,600	<ol style="list-style-type: none"> 1. Dirt road. 2. Unpopulated area. 3. Buried telephone cable, location varies. 4. Elevation of 3000 feet.

TABLE 3-3

**Reach 3 Alternative Pipeline Alignments
(See Figures 3-6, 3-7)**

<u>ROUTE SEGMENT</u>	<u>DESCRIPTION</u>	<u>APPROXIMATE LENGTH (FEET)</u>	<u>FACTORS AFFECTING PIPELINE CONSTRUCTION</u>
A	Foothill Road from Ivanhoe Road to Meridian (Baseline Alignment)	26,300	<ol style="list-style-type: none"> 1. Alignment follows unimproved dirt road. 2. Crosses S.R. 18 - potential tunneling location due to high speed traffic. 3. Mostly unpopulated area. 4. Power poles along pipe alignment. 5. Elevation ranges from 3000 feet to 3080 feet with very mild slopes.
B	Foothill Road from Meridian to State Route 247 (Baseline Alignment)	40,500	<ol style="list-style-type: none"> 1. Alignment follows unimproved dirt road. 2. Wastewater Reclamation Facility on north side of road, east of Camp Rock Road. 3. Crosses a 8" high pressure gas line. 4. Mostly unpopulated area. 5. Power poles along pipe alignment. 6. Elevation ranges from 3000 feet to 3100 feet, with very mild slopes.
C	S.R. 247 from Foothill Road to Old Woman Springs access road (Baseline Alignment)	29,400	<ol style="list-style-type: none"> 1. Alignment parallels a paved 2-lane highway with moderate traffic. 2. Unpopulated area. 3. Power poles parallel to roadway. 4. Alignment crosses access road to mining operation. Occasional heavy truck traffic. 5. Elevation 3100 feet, nearly level grades.
D	S.R. 247 between west and east ends of private road (Baseline Alignment)	16,300	<ol style="list-style-type: none"> 1. Alignment parallels a paved 2-lane highway with moderate traffic. 2. Power poles parallel to roadway. 3. Unpopulated area. 4. Elevations range from 3020 feet to 3120 feet with very mild slopes.
E	Unimproved dirt road, from Old Woman Springs access road to S.R. 247	16,000	<ol style="list-style-type: none"> 1. Alignment follows unimproved 1-lane dirt trail. 2. Unpopulated area. 3. Elevations range from 3120 feet to 3180 feet, with moderate slopes.
F	S.R. 247 from unimproved dirt road to Joshua Tree Avenue (Baseline Alignment)	5,600	<ol style="list-style-type: none"> 1. Alignment parallels a paved 2-lane highway with moderate traffic. 2. Power poles parallel to roadway. 3. Unpopulated area. 4. Elevation of 3120, nearly level grades.

TABLE 3-3 continued

<u>ROUTE SEGMENT</u>	<u>DESCRIPTION</u>	<u>APPROXIMATE LENGTH (FEET)</u>	<u>FACTORS AFFECTING PIPELINE CONSTRUCTION</u>
G	S.R. 247 from Joshua Tree Avenue to Pony Road (Baseline Alignment)	10,400	<ol style="list-style-type: none"> 1. Alignment parallels a paved 2-lane highway with moderate traffic. 2. Power poles parallel to roadway. 3. Unpopulated area. 4. Elevations range from 2920 feet to 3080 feet.
H	Joshua Tree Avenue from S.R. 247 to Pony Road	11,600	<ol style="list-style-type: none"> 1. Alignment follows an unimproved 1-lane dirt trail. 2. Unpopulated area. 3. Elevations range from 3000 feet to 3080 feet with mild grades.
I	S.R. 247 from Pony Road to Joshua Tree Avenue (Baseline Alignment)	28,700	<ol style="list-style-type: none"> 1. Alignment parallels a paved 2-lane highway with moderate traffic. 2. Buried telephone cable, elevation varies. 3. Houses close to the road along south side of highway. 4. Elevations range from 2920 feet to 3240 feet, with mild grades.
J	Pony Road Joshua Tree Avenue	30,700	<ol style="list-style-type: none"> 1. Alignment follows an unimproved dirt road. 2. Buried telephone cable, locations vary. 3. Power poles along road, locations vary. 4. Two wash crossings, with steep grades on each side of washes. 5. Sparsely populated residential area. 6. Elevations range from 3050 feet to 3240 feet, with moderate grades except at washes.

TABLE 3-4

**Reach 4 Alternative Pipeline Alignments
(See Figures 3-8, 3-9)**

ROUTE SEGMENT	DESCRIPTION	APPROXIMATE LENGTH (FEET)	FACTORS AFFECTING PIPELINE CONSTRUCTION
A	Extension of S.R. 247, Ye Olde Ghost Road Wildey Road, Milne Road Bodick Road, Ernestine Road, University Road, Acoma Trail, Linn Road, Landers Avenue (Gravity Alignment)	82,000	<ol style="list-style-type: none"> 1. First 4 miles of alignment cross BLM lands. 2. Alignment crosses 2 miles of undisturbed desert in BLM land. Strict environmental impact standards are enforced. 3. Several changes in alignment required to maintain gravity alignment and to stay within existing roadways. 4. Linn Road is paved 2-lane road with light to moderate traffic. All other roads are dirt roads with light traffic. 5. Sparsely populated area. 6. Longer route due to alignment changes.
B	S.R. 247 from Joshua Tree Avenue to Reche Road (Baseline Alignment)	42,600	<ol style="list-style-type: none"> 1. Most of alignment crosses BLM lands, parallel to the highway. 2. Alignment follows the paved 2-lane highway with moderate traffic. 3. Crosses 24" CMP culvert. 4. Alignment parallels and crosses buried telephone cables. Locations vary. 5. Power poles on east side of highway. 6. Alignment parallels and crosses water lines at various locations. 7. Houses close to highway at several locations alignment of pipeline must be adjusted. 8. Fire station on west side of highway at Jesse Road. Critical traffic control and access conditions. 9. Elevations range from 3240 feet to 3480 feet. (First high point in Reach 4). Grades are moderate.
C	Reche Road	15,900	<ol style="list-style-type: none"> 1. Alignment follows the paved 2-lane road with moderate traffic. The road is a primary means of access to local residents, so traffic control is important. 2. School on north side of road at Cambria Avenue. Access and safety concerns are critical. 3. Alignment parallels 12" water mains. 4. Crosses Pipes Wash. 5. Buried telephone cables, locations vary. 6. Grades along alignment are moderate, except for steep grade on east side of Pipes Wash.

TABLE 3-4 continued

<u>ROUTE SEGMENT</u>	<u>DESCRIPTION</u>	<u>APPROXIMATE LENGTH (FEET)</u>	<u>FACTORS AFFECTING PIPELINE CONSTRUCTION</u>
D	S.R. 247 to Eureka Road, Ripon Avenue, Delgada Avenue, Tahoe Avenue across Pipes Wash to Warren Vista Avenue to Pioneer Road (Baseline Alignment)	21,300	<ol style="list-style-type: none"> 1. Alignment follows paved roads with light traffic west of Pipes Wash. 2. Alignment follows dirt roads or undeveloped land on east side of Pipes Wash. 3. Sparsely populated residential area. 4. Crosses two washes. Scour protection required at each crossing. 5. Moderately steep grades each side of washes. 6. Several pipe bends required to follow the alignment.
E	Landers Avenue to Regulating Reservoir site for gravity alignment	7,900	<ol style="list-style-type: none"> 1. Alignment follows a paved 2-lane road with moderate traffic. 2. Elevation ranges from 3100 feet to 3240 feet, with light to moderate grades. 3. Sparsely populated residential and light commercial area. 4. Alignment parallels and crosses water mains. 5. Power poles on west side of road.
F	Landers Avenue from Regulating Reservoir site for gravity alignment to Pioneer Road	2,500	<ol style="list-style-type: none"> 1. Paved 2-lane road with moderate traffic. 2. Unpopulated area. 3. Alignment parallels a water line.
G	Pioneer Road from Warren Vista Avenue to Landers Avenue (Baseline Alignment)	3,400	<ol style="list-style-type: none"> 1. Alignment follows dirt road. 2. Unpopulated area. 3. Grades along alignment are moderate.
H	Warren Vista Avenue from Pioneer Road to La Brisa (second high point in Reach 4 and Regulating Reservoir site)	10,600	<ol style="list-style-type: none"> 1. Alignment follows dirt road. 2. Elevation ranges from 3320 feet to 3540 feet, with mild grades. 3. Sparsely populated residential area. 4. Telephone, electric and water utilities in various locations along alignment.
I	Pioneer Road, Avalon Avenue, Sunny Sands Drive, Yucca Mesa Road (Baseline Alignment)	44,400	<ol style="list-style-type: none"> 1. Alignment follows paved 2 lane roads with light to moderate traffic. 2. Alignment crosses oil transmission pipeline. 3. Three 90-degree pipe bends are needed to keep pipe within the alignment. 4. Elevations range from 3140 feet to 3360 feet. Grades are mild to moderate. 5. Telephone, electric and water utilities in various locations along alignment.

TABLE 3-4 continued

<u>ROUTE SEGMENT</u>	<u>DESCRIPTION</u>	<u>APPROXIMATE LENGTH (FEET)</u>	<u>FACTORS AFFECTING PIPELINE CONSTRUCTION</u>
J	S.R. 247 from Eureka Road to Alternative Reservoir site	14,500	<ol style="list-style-type: none"> 1. Alignment parallels paved 2-lane highway with moderate traffic. 2. Parallels a seismic fault zone for 3 miles. 3. Elevations consistent at approximately 3400 feet. 4. Sparsely populated residential area.

Detailed offers and field evaluations of the alternative alignments were conducted by Boyle Engineering Corporation, Pacific Engineering, Inc., and Associates, General Consultants, and Tom Quinn & Associates. Based on these evaluations, the recommended alignment is shown on Figures 3-4 through 3-5.

2. Route 1 Route Solution

a. Overview of Alternatives

i) SCE Power Line Alignment Evaluation

In the very early stages of formulating possible alternatives to the Baseline Alignment, it was noted that the shortest, most direct pipeline alignment in Reason 1 would be to follow the existing Southern California Edison (SCE) powerline from Redwood Road westerly to the point where the pipeline crosses Turkey Ranch Road. In a subsequent field tour of the alignment, the route segment between Deep Creek Road and Turkey Ranch Road was dropped from consideration for the following reasons:

The topography along the segment was found to be very rough in several locations.

There were several residences adjacent to the pipeline alignment which were using the property under the power lines for parking, barns, horse stables, and parking areas. Pipeline installation would significantly impact these land uses.

D. Recommended Alignment

1. Introduction

Detailed office and field evaluations of the alternative pipe alignments were conducted jointly by Boyle Engineering Corporation, Bechtel Corporation, Hunsaker and Associates, Converse Consultants, and Tom Dodson & Associates. Based on these evaluations, the recommended alignment is as shown on Figures 3-4 through 3-9.

2. Reach 1 Route Selection

a. Overview of Alternatives

1) SCE Power Line Easement Alignment

In the very early stages of formulating potential alternatives to the Baseline Alignment, it was noted that the shortest, most direct pipeline alignment in Reach 1 would be to follow the existing Southern California Edison (SCE) powerline from Ranchoero Road easterly to the point where the powerline crosses Tussing Ranch Road. In a subsequent field tour of the alignment, the route segment between Deep Creek Road and Tussing Ranch Road was dropped from consideration for the following reasons:

- The topography along the segment was found to be very rough in several locations.
- There were several residences adjacent to the powerline easement which were utilizing the property under the power lines for gardens, barns, horse stables, and parking areas. Pipeline installation would significantly impact these land uses.

- Most of the alignment in the segment from Deep Creek Road to Tussing Ranch Road consists of relatively undisturbed desert, with relatively dense concentration of Joshua trees and other natural features which would be disturbed by pipeline installation.

The remainder of the powerline easement, from Rancho Road to Deep Creek Road, still appeared to be a very attractive alternative pipeline alignment.

On June 25, 1991, representatives from Boyle met with the Right-of-Way Department from SCE to discuss the feasibility of installing the pipeline along the north edge of the powerline easement. The result of the meeting, along with follow-up discussions and correspondence, was that SCE would not grant permission to use their right-of-way for any parallel pipeline installation. This information was presented to Bechtel and the Agency, along with a discussion on the possibility of the Agency exercising its power of eminent domain for the easement. Based on the SCE refusal to grant an easement for the pipeline, the difficulty of justifying the taking of an easement from SCE by eminent domain, and the anticipated length of time required to complete these activities, the Agency decided not to pursue the alternative alignment which utilizes the existing SCE powerline property. Therefore, this alignment was eliminated from further consideration.

2) Rancho Road Alignment

Another alternative alignment which was identified in field investigations involved the use of an aqueduct turnout at Rancho Road, with the pipeline installed in Rancho Road from the turnout to the Mojave River.

After the alternative alignment was identified, a utility search was conducted, and a meeting was held with the City of Hesperia (City) to discuss the alignment. Based on the results of the utility search and the meeting with the City, the Rancho Road alignment was eliminated for the following reasons:

- Rancho Road is a heavily used utility corridor. Installation of the pipeline in Rancho Road would affect these utilities, resulting in relocations and generally higher construction costs when compared with construction in a less urbanized road.
- The City is currently in the planning stages for a major realignment of Rancho Road, in conjunction with the design of a bridge over the A.T. & S.F. Railroad. The proposed realignment is not yet finalized, but the City expects to have a significant realignment in the vicinity of the railroad. Therefore, the pipeline alignment could not be set until the roadway realignment study is completed.

The Recommended Alignment in Reach 1 is completely different from the Baseline Alignment, since a new turnout location has been utilized which does not affect the proposed Rancho Las Flores development, and is approximately one mile shorter in overall length.

b. Reach 1 Recommended Alignment

The Recommended Alignment for Reach 1 follows route segments A, B, C, D, E and F, extending northeast from the California Aqueduct through Antelope Valley to the Mojave River, then north along Deep Creek Road, then east along Tussing Ranch Road to Pioneer Road. Figure 3-4 shows Reach 1 and its alternative route segments.

The first segment of Reach 1 (Route Segment A) travels from the turnout at the aqueduct northeasterly for a distance of 9,600 feet to the intersection of Rancho and Alston Roads. This segment drops 100 feet, from 3420 at the turnout, to 3320 on the valley floor, and then gently slopes to an elevation of 3200 at its northerly end (see Photo 3-1). The pipeline will cross a 36-inch, high-pressure gas line owned by Southern California Gas Company, and the alignment of a proposed sanitary sewer interceptor by the City. The area is undeveloped, but the native vegetation has been disturbed by its frequent use as a playground for all-terrain vehicles.

The second segment (Route Segment B) travels along Alston Road to "I" Avenue for a distance of 8,800 feet. The pipeline parallels a water line, a buried telephone cable, and a set of power poles. At "I" Avenue the pipeline will cross a 12-inch waterline. Alston Road parallels a flood control channel owned by San Bernardino County Flood Control. The area is in a fully developed residential subdivision.

The third segment (Route Segment C) traverses through the Hesperia Country Club Golf Course for a distance of 10,600 feet. The pipeline will parallel a wash that meanders through the length of the private golf course (see Photo 3-2), and will traverse several of the course's fairways. The primary consideration is to avoid locating the pipeline through tees and greens within the course. Construction of the pipeline through the golf course should be scheduled to take place during the months of January and February to minimize disruption of play. At Arrowhead Lake Road, the pipeline crosses an 18-inch water line.

Arrowhead Lake Road is a heavily travelled road, and the pipeline may have to be tunneled beneath the roadway, or traffic control measures provided during construction of the crossing.

The fourth segment (Route Segment D) proceeds east from Arrowhead Lake Road through an irrigated farm field and across the Mojave River to Deep Creek Road for a distance of 8,600 feet. The pipeline will travel along the northern edge of the field to the Mojave River and will cross irrigation lines within the field. The pipe in the Mojave River crossing must be designed to take into account the potential for scour in the river bed.

The fifth segment (Route Segment E) is along Deep Creek Road traveling north to Tussing Ranch Road for a distance of 12,300 feet. South of Rock Springs Road, the pipeline will parallel a fiber optic cable and a set of power poles (see Photo 3-3).

Just north of Rock Springs Road, the pipeline will travel beneath an A. T. & S. F. Railroad wooden bridge (see Photo 3-4). The 8-inch gas line changes alignment to approximately the center of the road under the railroad bridge. Both Deep Creek Road and Rock Springs Road are heavily traveled and the pipeline may have to be tunnelled beneath Rock Springs Road, or traffic control measures will be provided during construction.

North of the A. T. & S. F. Railroad bridge, the pipeline will parallel an 8-inch, high pressure gas line; a buried telephone cable; and a line of power poles (see Photo 3-5).

The sixth and final segment of Reach 1 (Route Segment F) is along Tussing Ranch Road easterly from Deep Creek Road to Pioneer Road for a distance of 13,300 feet. The pipeline will parallel a water line, a fiber optic cable, a buried telephone cable, and a line of power poles. West of Kiowa Road, Tussing Ranch Road is a dirt road; and east of Kiowa Road, it is a paved 2-lane road.

The Town of Apple Valley has stated that they would prefer that the pipeline be located along the south side of the street within their city limits. The primary reason is to avoid disruptions in access to a fire station and school located along the north side of the road between Navajo and Pioneer Roads (see Photo 3-6).

Access during construction to the residences, fire station and school will be a primary consideration during the design of the critical areas of Reach 1.



Photo 3-1

View of Antelope Valley looking northeast from location near proposed turnout location. The pipeline crosses the undeveloped valley after dropping 100 feet from the turnout to the valley floor.

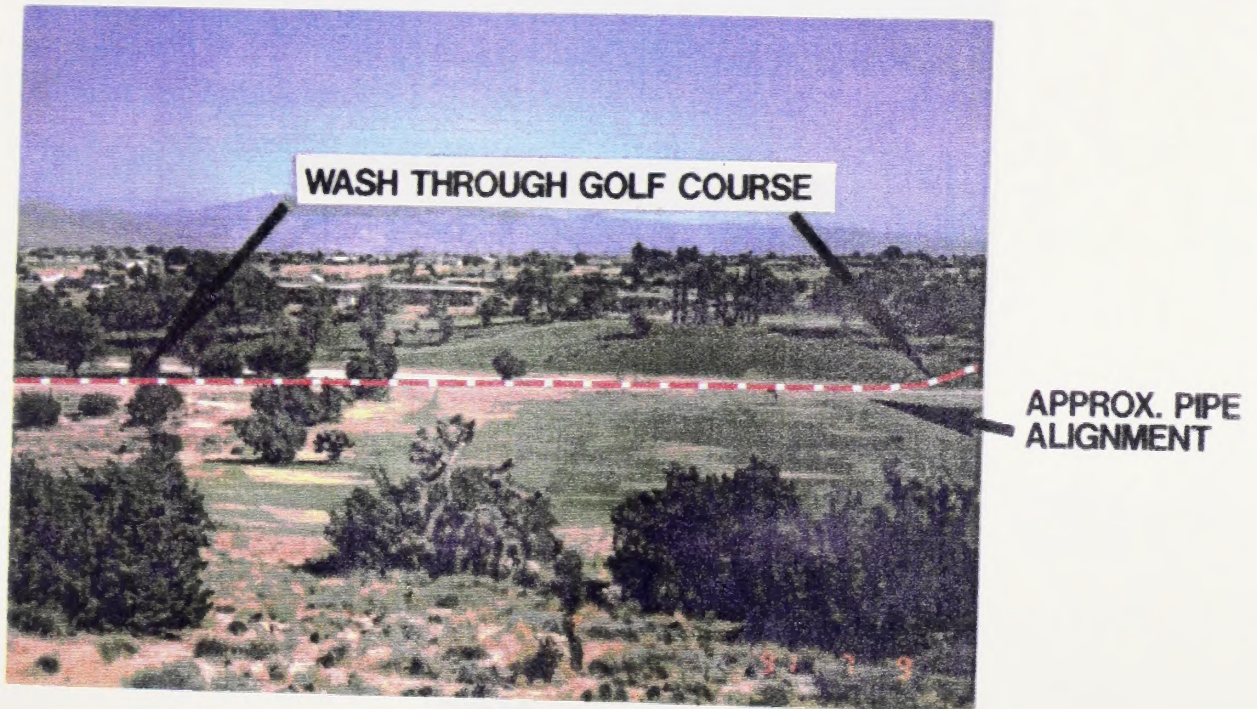


Photo 3-2

View to the south across Hesperia Country Club Golf Course from Buckthorn Street, showing drainage channel within the golf course. The pipeline will be installed along the north side of the channel.

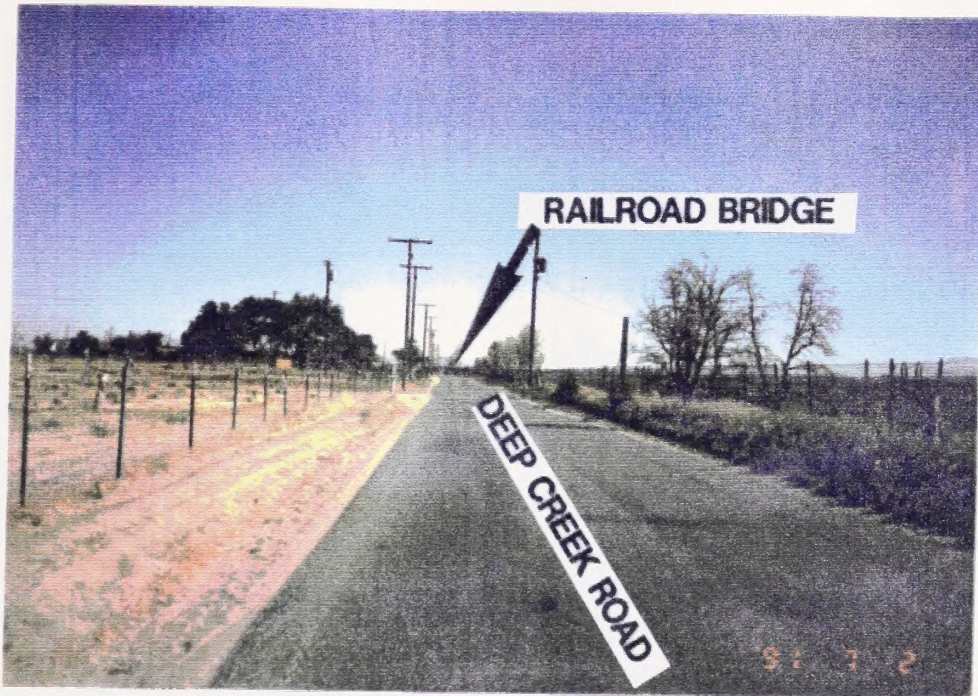


Photo 3-3

Deep Creek Road looking north from location near the Mojave River pipeline crossing south of Rock Springs Road A.T. & S.F. Railroad bridge in the background.

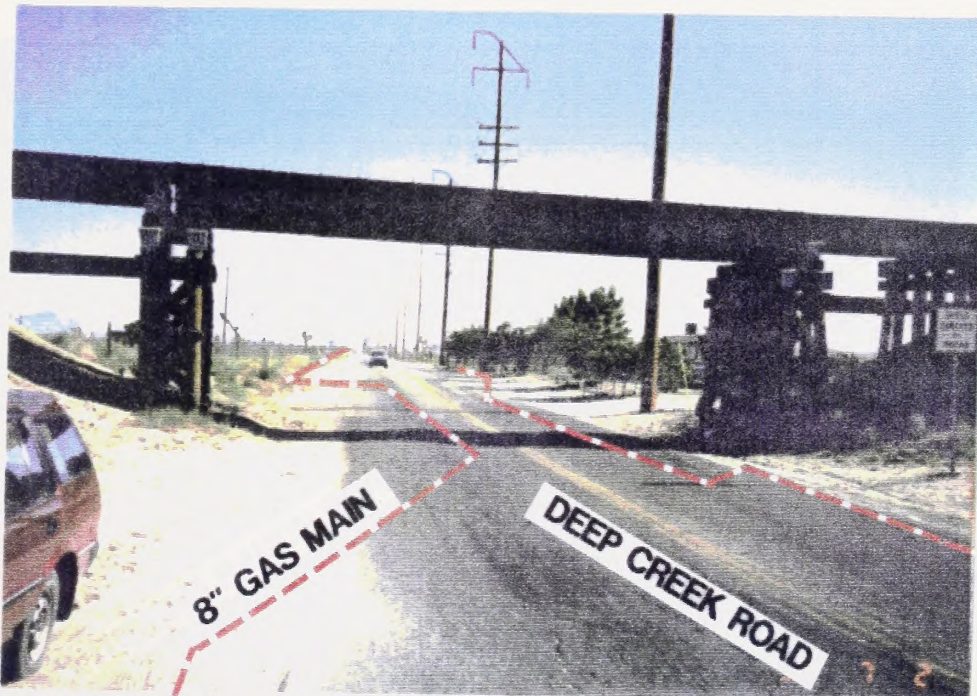


Photo 3-4

Deep Creek Road looking north from Rock Springs Road showing A.T. & S.F. Railroad bridge. Pipeline will cross under the bridge in the paved roadway. Potholing of existing utilities required to determine pipeline location.



Photo 3-5

Deep Creek Road looking north from location near Ocotillo Road. Moderate traffic volumes will require extensive traffic control on the 2-lane roadway. Pipeline will be installed along the east side of road.

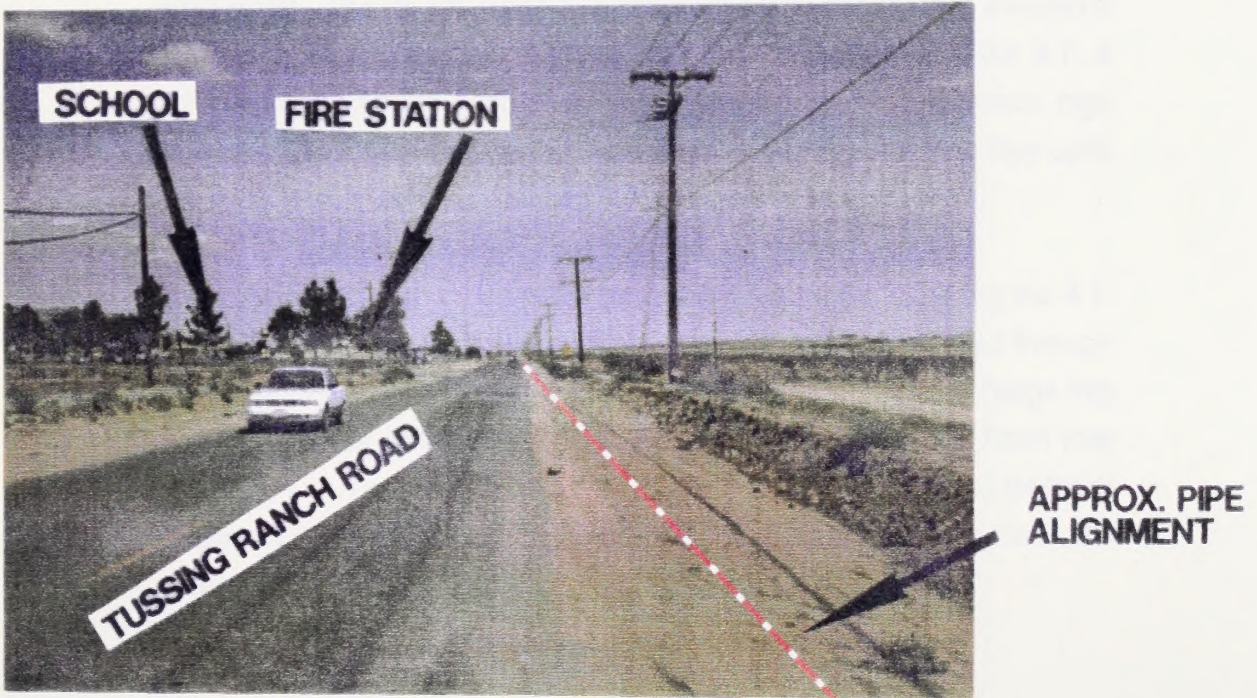


Photo 3-6

Tussing Ranch Road looking east from Navajo Road showing Marianna School and Apple Valley Fire Station in the background. Sequencing of construction will be critical in this area to avoid disruptions to school traffic and emergency vehicles. Pipeline will be installed along the south side of the road.

3. Reach 2 Route Selection

a. Overview of Alternatives

In Reach 2, a minor realignment (Route Segment B) is recommended to a portion of the Baseline Alignment which eliminates four bends in the pipeline and places the Recommended Alignment on relatively mild slopes. No other alternative alignments were identified.

b. Reach 2 Recommended Alignment

The Recommended Alignment for Reach 2 follows Route Segments A, B, and D, extending east from the intersection of Tussing Ranch Road and Pioneer Road to the intersection of Foothill Road and Ivanhoe Road. Figure 3-5 shows Reach 2 and its alternative route segments.

The first segment of Reach 2 (Route Segment A) begins at the intersection of Tussing Ranch Road and Pioneer Road and continues easterly along Tussing Ranch Road for a distance of 27,300 feet to Loma Vista Road. The slopes along this segment are gentle, having elevations that range from 3060 to 3200 feet. The pipeline will parallel the A.T. & S.F. Railroad; a fiber optic cable owned by Contel; and a 4-inch, high pressure gas line owned by Southwest Gas Corporation. The fiber optic cable is the sole communications link to Lucerne Valley.

The pipeline will also cross an easement owned by SCE. Along the A.T. & S.F. Railroad, storm flows are conveyed beneath the railroad through three pairs of 48-inch corrugated metal pipe culverts that discharge into drainage swales which direct the flows across Tussing Ranch Road (see Photo 3-7). An evaluation of scour potential must be performed for these swale crossings in order to determine the depth of cover over the pipeline.

The second segment (Route Segment B) continues along Tussing Ranch Road to Willow Wells Road and then southerly along Willow Wells Road to Foothill Road for a distance of 25,100 feet. Along Tussing Ranch Road the pipeline will cross a 36-inch, high pressure gas line owned by Southern California Gas Company, and an SCE powerline easement. The pipeline also parallels power lines along the north and south sides of Tussing Ranch Road (see Photo 3-8). The fiber optic cable and 4-inch high pressure gas line continue to be paralleled by the pipeline to Willow Wells Road, where the pipeline turns southerly and crosses both the fiber optic cable and the 4-inch, high pressure gas line.

The third and last segment of Reach 2 (Route Segment D) is along Foothill Road from Willow Wells Road (a distance of 2,600 feet) easterly to Ivanhoe Road.

There are several roads with moderate traffic which intersect the pipeline within Reach 2. Access during construction to residences in the area will be an important factor to consider during design of this segment.

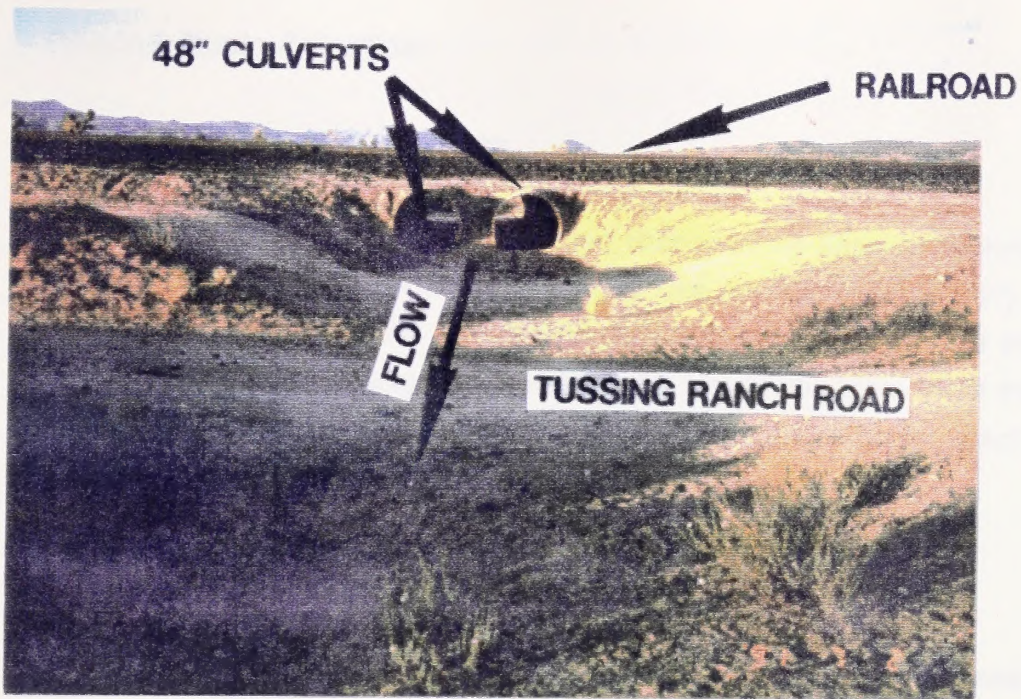


Photo 3-7

View to the south from Tussing Ranch Road, from location near Japatul Road, shows a pair of 48-inch CMP's and drainage swale. Scour protection for the pipeline will be required at three similar locations in Reach 2. Pipeline will be along the south side of road in this area.



Photo 3-8

Tussing Ranch Road looking east from Corto Road. Note the parallel power lines along each side of the dirt road. Pipeline will be along the north side of the road in this area.

4. Reach 3 Route Selection

a. Overview of Alternatives

In Reach 3, the only recommended change to the Baseline Alignment is the five-mile-long segment on Joshua Tree Avenue, between Pony Road and State Route 247. The higher elevations along Joshua Tree Avenue will reduce the design pressures for the pipe in this area. Note that the gravity alignment follows the Baseline Alignment throughout Reach 3, to avoid the higher elevations along Joshua Tree Avenue.

b. Reach 3 Recommended Alignment

The Recommended Alignment for Reach 3 follows Route Segments A, B, C, D, F, G and J, extending east from the intersection of Foothill Road and Ivanhoe Roads along Foothill Road to its intersection with State Route 247, and then southeasterly to Last Mile Road. Figures 3-6 and 3-7 show Reach 3 and its alternative route segments.

The first two segments of Reach 3 (Route Segments A and B) begin at Ivanhoe Road and proceed easterly along Foothill Road for a distance of 66,800 feet to State Route 247. The slopes along this segment are gentle with elevations that range from 3000 to 3100 feet. Between Ivanhoe Road and State Route 18, the pipeline will parallel power poles located along the north and south sides of Foothill Road (see Photo 3-9). At State Route 18, traffic control measures will be provided during construction of the pipeline crossing.

The Big Bear Area Regional Wastewater Agency has a wastewater reclamation area that borders Foothill Road on the north side between Camp Rock Road and Dallas Avenue (see Photo 3-10). The primary access for this facility is along State Route 247, but the reclaimed water mains from the Big Bear area must be crossed by the pipeline as they approach the reclamation area from the south along Foothill Road.

The last mile of Route Segment B follows the extension of Foothill Road through private property to State Route 247.

The third through sixth segments (Route Segment C, D, F and G) follow the alignment of State Route 247 southeasterly for a distance of 61,700 feet to Pony Road. State Route 247 is paralleled by a line of power poles located on the south side, west of Bessemer Road, and on the north side, east of Bessemer Road (see Photo 3-11). In Route Segment C there is a road that serves as access for a quarry and a private access road to Old Woman Springs. Maintaining access to these roads during construction will be a concern which will be addressed in the design phase of the Project.

The seventh and final segment of Reach 3 travels along Pony Road and then Joshua Tree Avenue for a distance of 30,700 feet. The pipeline will parallel a line of power poles located along the south side of Joshua Tree Avenue, and will cross a wash located between Gin and Valley Vista Roads (see Photo 3-12). Scour protection for the pipeline may be required for the wash crossing.

Since Joshua Tree Avenue is an unimproved dirt road, maintaining access to residences during construction will be addressed during the design of the Project. Although traffic volume is very low on this road, the lack of alternative accesses into the area may indicate a need for traffic control measures during pipeline construction.



Photo 3-9

Foothill Road looking east from Custer Road. Typical view of Foothill Road between Willow Wells Road and State Route 18, in Reach 3. Pipeline will be along the north side of the road.

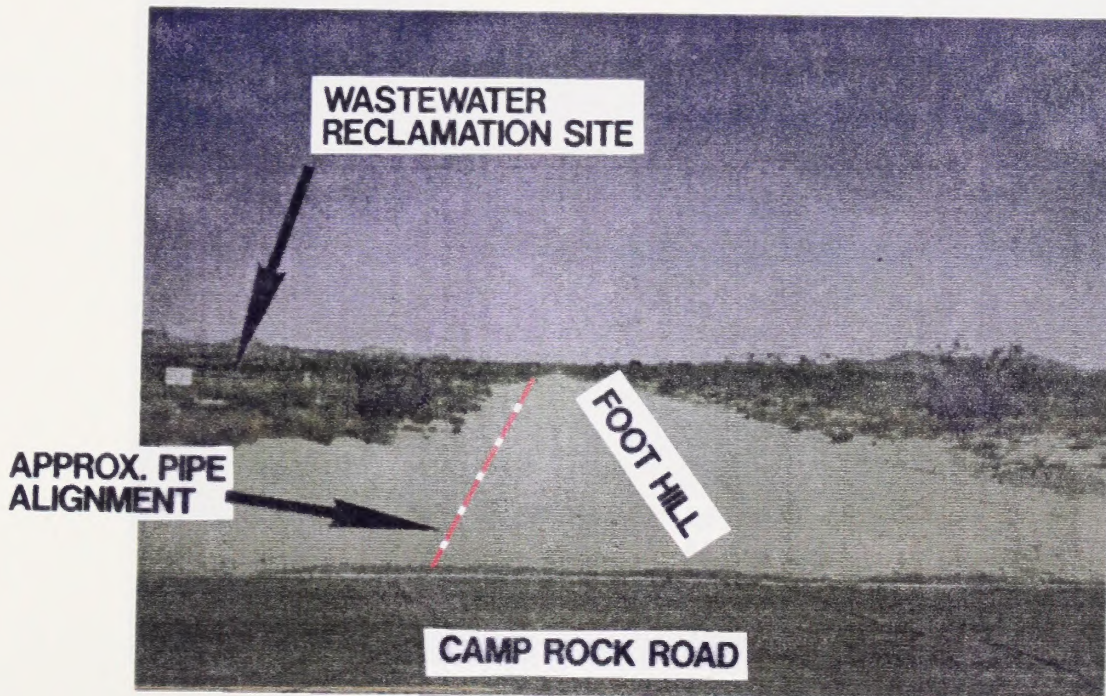


Photo 3-10

Foothill Road looking east from Camp Rock Road, showing Big Bear Area Regional Wastewater Agency's wastewater reclamation area. Wastewater pipeline must be located by potholing prior to final excavation of Morongo Basin Pipeline.



Photo 3-11

State Route 247 looking southeast from Old Woman Springs Road. Pipeline location will be on the south side of the highway, adjacent to the existing right-of-way.

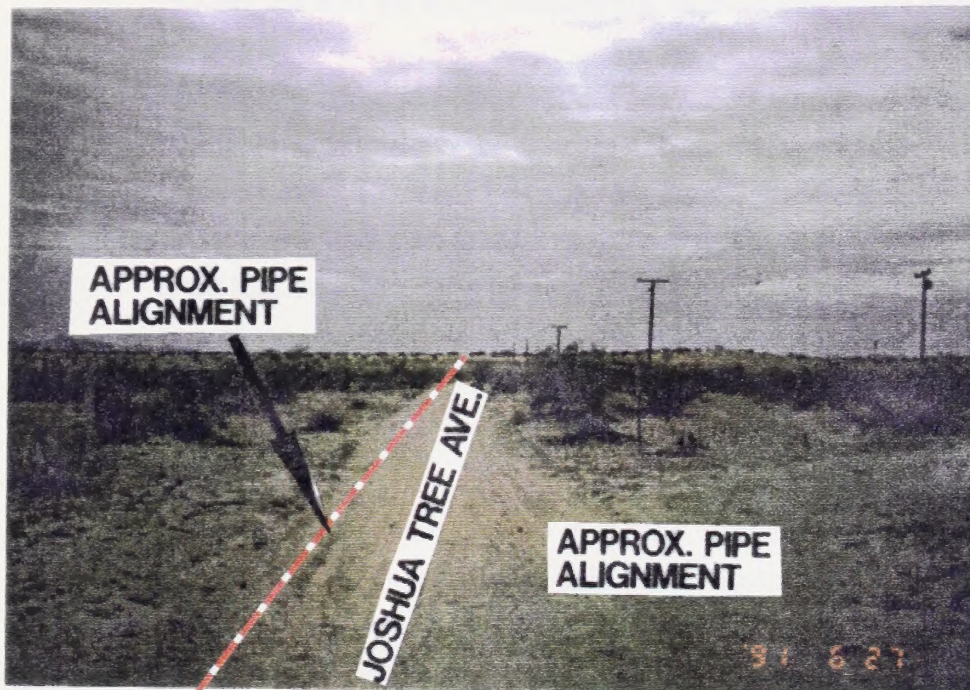


Photo 3-12

Joshua Tree Avenue looking east from location near Valley Vista Road. Surface elevations rise approximately 300 feet before reach State Route 247. Pipeline will be along the north side of the dirt road.

5. Reach 4 Route Selection

a. Overview of Alternatives

In Reach 4, an alignment is proposed which follows existing roadways across Pipes Wash (BLM land) to the recommended location for the regulating reservoir along Warren Vista Road. This realignment also eliminates a potential conflict with a known earthquake fault zone which parallels State Route 247 south of Reche Road.

b. Reach 4 Recommended Alignment

The Recommended Alignment for Reach 4 follows Route Segments B, C, E, G and H, extending southeasterly along State Route 247 from Joshua Tree Avenue to Reche Road, then easterly along Reche Road to Landers Avenue, then southerly along Landers Avenue to Winters (Pioneer) Road. At Pioneer Road the alignment proceeds westerly to Warren Vista Road and then southerly along Warren Vista Road to the regulating reservoir. Figures 3-8 and 3-9 show Reach 4 and its alternative route segments.

The first segment of Reach 4 (Route Segment B) proceeds southeasterly along State Route 247 from Joshua Tree Avenue to Reche Road for a distance of 42,600 feet. This segment rises from an elevation of 3220 feet to 3400 feet and then follows gently rolling terrain that stays close to the 3400 foot elevation. The pipeline parallels a buried telephone cable and a line of power poles which are located on the northeast side of State Route 247 (see Photo 3-13). The pipeline will cross a 24-inch culvert beneath State Route 247 and will cross a water line at Linn Road.

There is a fire station located along the west side of the highway at the intersection of Jesse Road and State Route 247 (see Photo 3-14). Access to this fire station and to the residences along State Route 247 will be maintained during construction. This segment is located on BLM land, and a permit will have to be obtained from the BLM.

Route Segment B also traverses an area which is believed to have bedrock at relatively shallow depths. This will result in difficult construction conditions, and the extent of bedrock in the pipe trench should be investigated in the early stages of design when the geotechnical report is completed.

The second segment (Route Segment C) extends easterly along Reche Road to Landers Avenue for a distance of 15,900 feet. Slopes in this segment are moderate, with elevations ranging from 3080 feet to 3420 feet. The pipeline will parallel a 12-inch water line, a buried telephone cable, and a line of power poles on the north side of Reche Road. There is a school located on the north side of Reche Road at Cambria Avenue (see Photo 3-15). The pipeline will cross Pipes Wash (see Photo 3-16), where scour protection must be investigated.

The third segment (Route Segments E and F) extends southerly along Landers Avenue to Winters (Pioneer) Road for a distance of 10,400 feet. The pipeline will parallel a line of power poles and a buried telephone cable, both of which are on the west side of Landers Avenue (see Photo 3-17). There are two water mains (one 8-inch and one 12-inch) which proceed northerly from a storage tank site located along the west side of Landers Avenue.

The fourth segment (Route Segment G) extends westerly along Winters (Pioneer) Road to Warren Vista Avenue for a distance of 3,400 feet.

The fifth and final segment of Reach 4 (Route Segment H) extends southerly along Warren Vista Avenue to La Brisa Drive for a distance of 10,600 feet. The pipeline will parallel a waterline, a buried telephone cable and a line of power poles located along Warren Vista Avenue.



APPROX. PIPE ALIGNMENT

Photo 3-13

State Route 247 looking southeast from location near Ocotillo Road. View is typical of State Route 247 between Joshua Tree Avenue and Reche Road. Pipeline will be installed along west side of the road, outside of the highway right-of-way.



FIRE STATION

APPROX. PIPE ALIGNMENT

Photo 3-14

State Route 247 looking southeast from Jesse Road. Fire Station is located along the west side of the road.

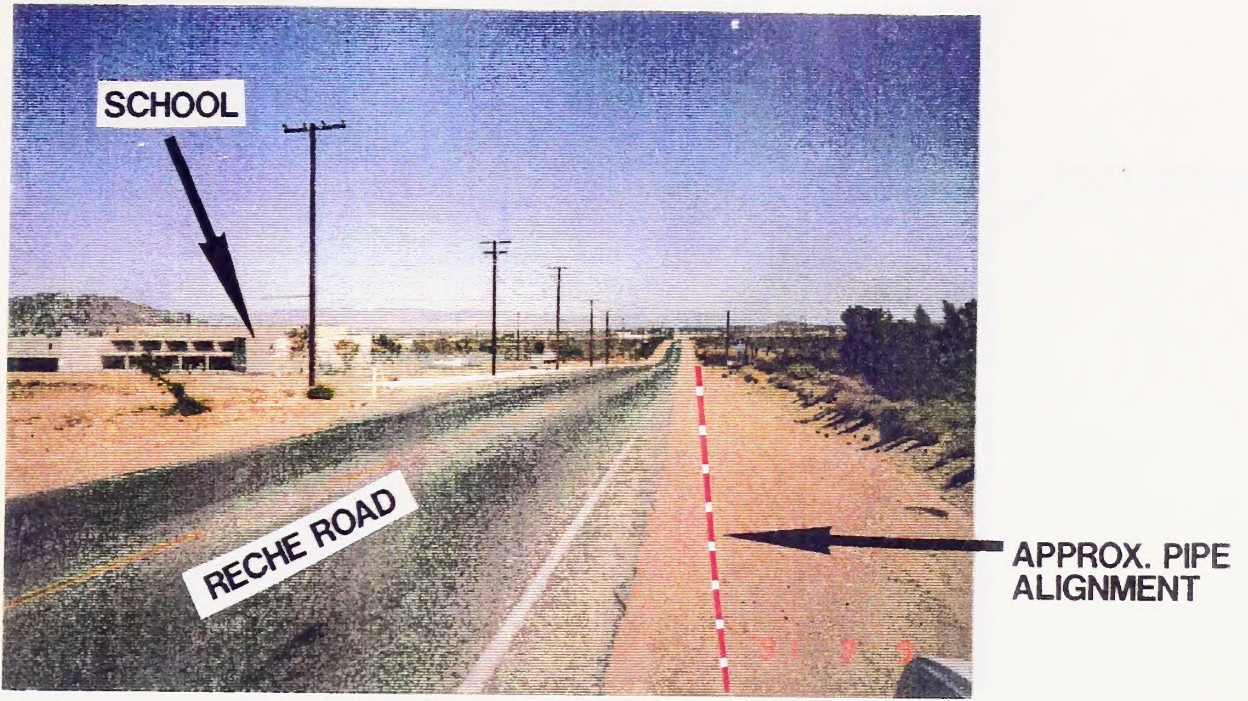


Photo 3-15

Reche Road looking east from location between Acoma Trail and Cambria Road, shows school on the north side of the road. Moderate traffic volumes on this road will require continuous traffic control.

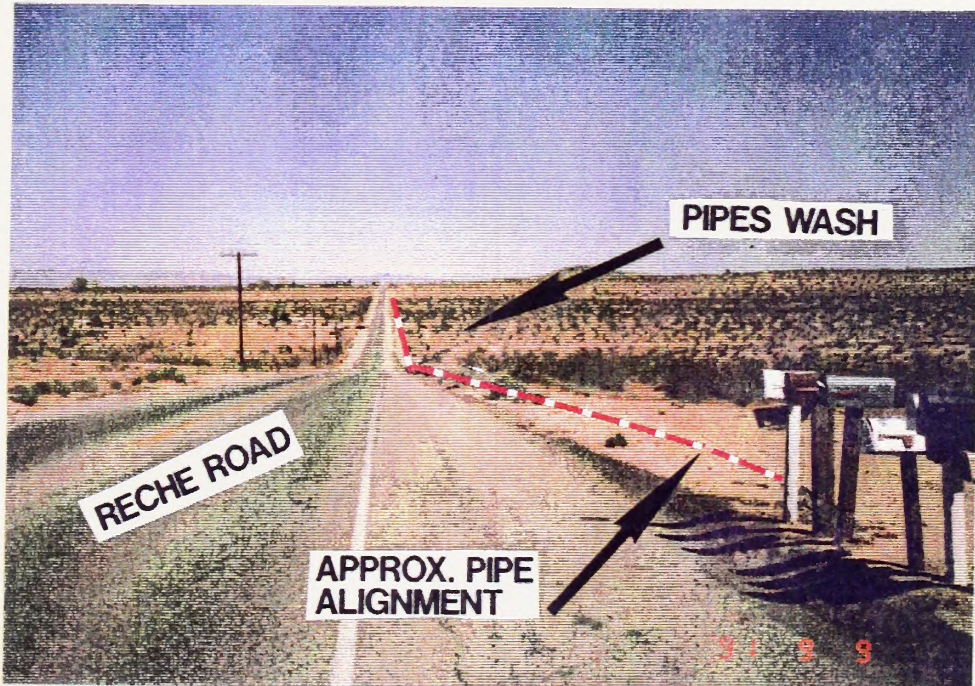


Photo 3-16

Reche Road looking east from Golden Slipper Lane, on the western edge of Pipes Wash. Scour protection will be required for the pipeline in the wash.

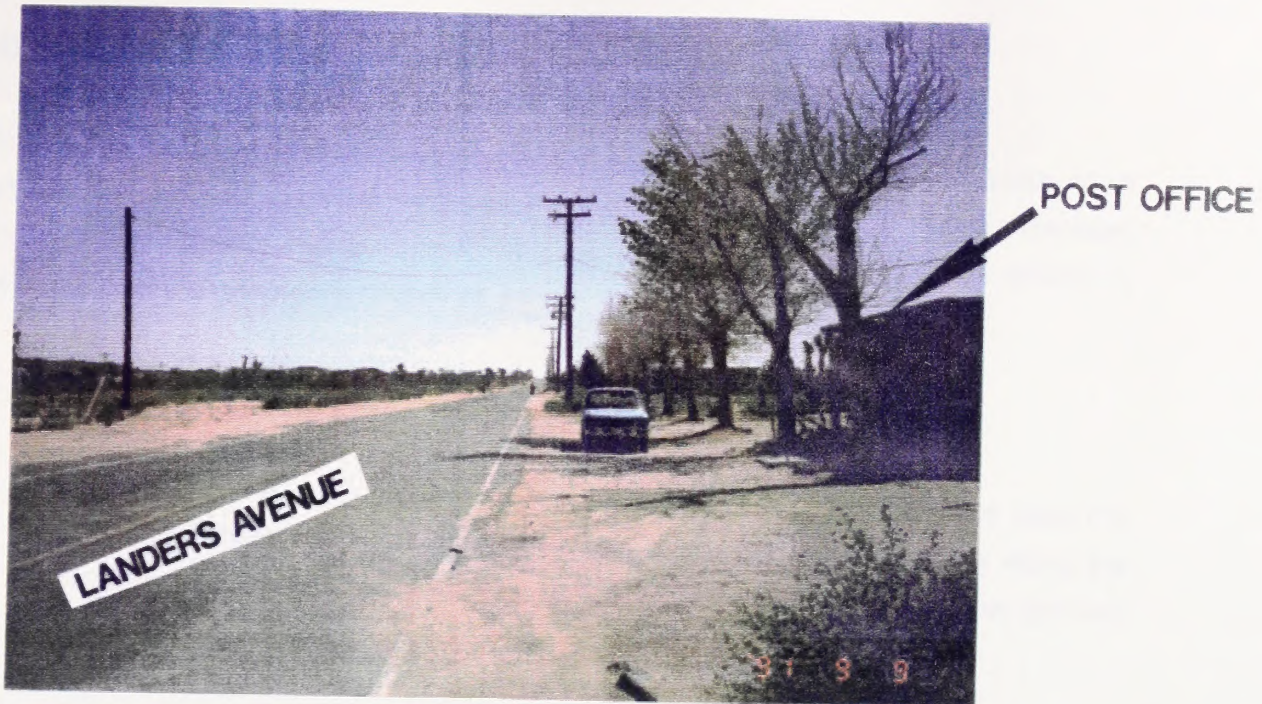


Photo 3-17

Landers Avenue looking south from Reche Road, shows post office along west side of Landers Avenue. Traffic along Landers Avenue is moderate, since it is primary access route to a country landfill. Traffic controls in this area will be critical.

E. Alignment for Alternative Gravity Pipeline

An investigation and additional analysis was performed to determine the feasibility of an alternative which could deliver SWP water to Improvement District "M" without the need for an intermediate pumping station. For the purposes of discussion, the system is referred to as the Alternative Gravity Pipeline.

1. Criteria

The fundamental requirement for the Alternative Gravity Pipeline is to keep the hydraulic grade line approximately 50 feet above the ground surface along the proposed alignment, while the pipeline is delivering 15 cfs to the terminal reservoir.

The elevation and location of the terminal reservoir will be determined primarily by the hydraulics of the pipeline.

2. Alignment

A comparison of the Recommended Alignment for this project, as presented in earlier sections of this chapter, with a preliminary hydraulic grade line for the Alternative Gravity Pipeline, was made for the purpose of determining areas where ground elevations would not allow the HGL to stay above the ground surface. This comparison was made in early August 1991, and was based on the information which was available at the time.

This investigation concluded that the following route segments, as shown on Figures 3-7 and 3-8, were not suitable for use in the Alternative Gravity Pipeline:

- * Reach 3, Route Segment J

- * Reach 4, Route Segments B and C

Alternative alignments which meet the hydraulic requirements of the Alternative Gravity Pipeline were identified on U.S.G.S. maps, and the alignments were field checked in order to confirm their suitability for the project. As a result of this office and field investigation, the proposed alignment for the Alternative Gravity Pipeline was selected, and is shown as Route Segment A in Reach 4 (Figures 3-8 and 3-9), and Route Segment I in Reach 3 (Figure 3-7).

3. Hydraulics

Preliminary hydraulics indicate that the Alternative Gravity Pipeline is only feasible if 36-inch diameter or larger pipe are utilized to minimize friction loss. For 36-inch pipe, assuming a starting HGL of 3400 feet and a Hazen-Williams "C" of 130, the elevation of the HGL at the terminal reservoir would be at approximately 3270 feet.

Following the contours on U.S.G.S. maps, the terminal reservoir for the Alternative Gravity Pipeline would be located along Landers Avenue, north of Pioneer Road, as shown on Figure 3-9.

4. Environmental Considerations

Prior to the start of this Design Basis Report, an environmental review of the conceptual project was conducted by Tom Dodson and Associates. As a result of this review, a "mitigated negative declaration" was issued for the project which will apply to pipeline work as long as the final alignment is in general conformance with the alignment shown in the final environmental document.

The Recommended Alignment for the Alternative Gravity Pipeline has one critical area which differs markedly from the general alignment investigated for the "mitigated negative declaration." As shown on Figure 3-8, Route Segment A in Reach 4 (the selected gravity alignment) proceeds east from the State Route 247 alignment (a distance of approximately three miles), before it turns south and follows an existing road (Ye Olde Ghost Road). The first three miles of the segment lie entirely within BLM lands, and follow an alignment which cuts across two miles of relatively undisturbed desert (see Figure 3-10).

After a field walk-through of the affected area, Tom Dodson and Associates noted that the proposed alignment does not match the conditions anticipated in the mitigated negative declaration, and that the use of the alignment in Route Segment A might result in the cancellation of the existing environmental document. This process could easily add at least one year to the schedule before pipeline construction could begin.

This information was presented to the Morongo Basin Pipeline Commission on August 12, 1991, for their consideration, and for their direction regarding further work on the Alternative Gravity Pipeline.

5. Summary

After further discussion of both the environmental impacts, and the potential lack of sufficient capital to complete the 36-inch pipeline construction, the Agency gave the directive not to continue with the development of the Alternative Gravity Pipeline.

F. Utilities Search

1. Introduction

An extensive search was performed to locate existing and proposed utilities in the general vicinity of the Project route. The position of utilities along the Project route needs to be compiled and transferred to the plan and profile construction plans. Utility facilities are defined to include pipelines, cables, structures, drain structures, street structural sections, or any type of facility aboveground or underground that the contractor might encounter and that might effect construction of the water transmission main. In addition, obstacles, such as trees, fences, and concrete slabs, are being identified. The objective is to develop a precise pipeline alignment and to provide a contractor with the construction plans needed to build the project.

2. List of Agencies and Utilities

Agencies and utilities throughout San Bernardino County and as far away as Sacramento have been contacted. Response from the contacts was excellent. A list of agencies and utilities contacted is included in the Technical Appendix of this report.

3. Procedure

A precise pipeline alignment based on the location of existing utilities will be developed during design when base sheets are developed. All known facilities will be compiled and transferred to plan and profile construction plans to determine where a pipeline can be constructed. The location of the pipeline will be finalized based on the following factors:

- * Minimizing temporary loss of service to existing utilities during construction of the Project.
- * Minimizing costly relocations of existing facilities.
- * Coordinating the Project location with future facilities planned by other agencies and/or utilities in order to minimize conflicts during construction.
- * Providing the Project contractor with sufficient space to construct a pipeline of the proposed diameter.

A preliminary list of agencies who were thought to have facilities in the general pipeline alignment was compiled. All known utilities located within permanent easements, temporary easements, and public right-of-way were determined. The basic utility search procedure is as follows:

- * Initial contact of entity, and determination of horizontal location of existing facilities.

- * Field investigation to determine terrain and obtain insights to existing facilities along the general pipeline alignment.
- * Request field survey and pothole of existing facilities where "record drawing" information is sketchy or nonexistent to determine the pipeline profile in critical areas along the precise pipeline alignment.
- * During the design phase of the Project, determine the precise horizontal alignment for the pipeline and obtain profile information for all areas of conflict with existing facilities.
- * Last, a final review by the various agencies within the general pipeline alignment to confirm locations of their facilities as depicted on the construction plans.

4. Initial Agency and Utility Contact

The initial contact with agencies and utilities was required to provide them with a project description and an overall map indicating the general pipeline alignment as an informational tool. A request was made to each entity to furnish horizontal control of existing facilities in the proposed pipeline corridor in the form of "record drawing" construction plans, general utility atlases, survey notes, general descriptions or maps, or any information that would provide details of the horizontal position of existing utility facilities. A contact, who had knowledge of utility information, was established at each entity having utilities along the pipeline alignment and was the basis of all future correspondence with that entity.

5. Field Investigation

A field investigation was conducted by project personnel who drove the general alignment noting aboveground structures and obstacles that would affect the design and construction of the pipeline. Manhole covers, valve covers, and utility markers were examined for clues to the identity of agency ownership. A check was set up to examine incoming utility information with existing field conditions.

6. Precise Pipeline Alignment (Design Phase)

During the early stages of the Design Phase of the Project, and after receipt of the horizontal control for existing utilities and other data collected from field investigations, the precise horizontal pipeline alignment and final right-of-way requirements will be determined. Meetings will be arranged with all agencies who will be affected by construction of the Project. The proposed alignment will be discussed and changes in the alignment made, when necessary, to facilitate future improvements or avoid areas of conflict with existing facilities. Additional information will be gathered on all utilities that could affect construction of the pipeline and to determine the precise vertical alignment of the Project. The following information will be collected at each meeting, if it has not yet been furnished by the entity:

- * Physical characteristics of the utility (pipe or cable size, material, ducting, encasement, etc.).
- * Structural dimensions and sections.
- * Additional horizontal definition of existing facilities.
- * Profile or general cover depth information for underground facilities, especially those crossing the proposed pipeline.
- * Importance of the utility facility to be affected or significance of service should the facility be damaged during construction of the pipeline.
- * Status of abandoned facilities.
- * Status of future improvements and coordination of construction sequencing.
- * Minimum separation distance requirements.

- * 24-hour emergency telephone number and address in case of damage to existing facilities during construction.
- * Knowledge of other agency utilities in the area was known to the agency contacted.

The data listed above will be processed and transferred to the construction plans. Where profile information is lacking, a field survey will be requested. Surveys will be requested to determine inverts of existing sewers, storm drains, and culverts that cross the proposed pipeline. Straight grades will be assumed between manhole locations and inlet/outlet structures.

Some existing utilities may not be determined by field survey and, as a last recourse in obtaining existing profile data of a facility, a "pothole" will need to be conducted by the surveying consultant. The necessary profile elevation will be determined from a level survey performed by the surveying consultant while the potholed utility is uncovered.

The information on existing and proposed utility locations will be used to determine the precise vertical and horizontal pipeline alignment. The final pipeline alignment will then be incorporated into the plan and profile construction plans. Horizontal locations of utilities will be shown along the general pipeline route, and profile crossings of existing and future facilities will be depicted on the pipeline profile.

7. Final Agency Review (Late in the Design Effort)

After the work described above is incorporated into the plan and profile sheets, each agency having facilities along the general pipeline corridor will be provided a set of final construction plans within their service area to review the position of their facilities and review the Project alignment. Final comments and completion of relocation plans of existing facilities will need to be added to the plans after this information is received.

APPENDIX 2

Letter from Bechtel

Bechtel

Southern California

18484 Highway 18, Suite 295
Apple Valley, CA 92307
(619) 946-3011 Fax: (619) 946-3132

November 20, 1991
B/GEN-093

Tom Dodson
Tom Dodson & Associates
444 N. Arrowhead Avenue
Suite 203
San Bernardino, CA 92401

SUBJECT: Morongo Basin Pipeline Project
Bechtel Job No. 21146
Project Description Information
BLM Lands Application Package

Dear Tom:

Per your request, please find attached information to be utilized with the BLM submittal package. Please note that we felt that the zero footage disturbances are in areas of our alignment that follow within areas such as the Golf Course, flood channel, Mojave River, asphalt surfaced street and other disturbed lands. If our thoughts do not coincide with your actual knowledge of how this needs to be calculated, please give us a call.

All other questions contained in your letter of November 19, 1991 should be answered with the enclosure. If not, again, please let us know.

Sincerely,



Keith Blow,
Bechtel Permit Agent

KB:aes
Attachment/Enclosure

File: 10.3/11.1



Bechtel Corporation

Pipeline

1)	Permanent	-	turnout	-	1/2 acre	
			pump station	-	1 acre	
			reservoir	-	4 acres	
			valve sites 50 @	-	10' x 10'	
a.	Aqueduct to Rancho	-		60'		12.4 acres
b.	Along Alston to Hesperia Country Club	-		0'		0 acre
c.	Through Hesperia Country Club	-		0'		0 acre
d.	Hesperia Country Club to Mojave River	-		0'		0 acre
e.	Mojave River to Deep Creek	-		0'		0 acre
f.	Deep Creek to Tussing Ranch Road	-		0'		0 acre
g.	Tussing Ranch Road through to Central	-		0'		0 acre
h.	Barnes Road from Central to Willow Wells	-		40'		41.32 acre
i.	Willow Wells to Foothill Road	-		40'		5.05 acre
j.	Foothill Road to Dallas Avenue	-		40'		51.42 acre
k.	Dallas to Highway 247 along Foothill	-		60'		19.28 acre
l.	Along Highway 247	-		40'		52.34 acre
m.	Pony to Joshua Tree	-		40'		4.59 acre
n.	Joshua Tree to Highway 247	-		60'		34.43 acre
o.	Highway 247 to Reche	-		40'		34.9 acre
p.	Reche to Landers Lane	-		20'		7.35 acre
q.	Landers to Pioneer Rd.	-		20'		5.05 acre
r.	Pioneer to Warren Vista	-		40'		2.76 acre
s.	Warren Vista to Reservoir Site	-		40'		14.69 acre

2) Type of Disturbance-

Construction of pipe - use of construction equipment trucks, trailers to excavate and install and backfill trench with pipeline.

3) 250 employees local labor pool

4) Electric Power - Portable generator and local water agencies.

Construction will be accomplished by standard pipeline installation procedures. These procedures call for the selective clearing of the area required for the installation of the pipe, the excavation of the trench to the appropriate depth required for clearance of existing utilities (approximately a trench 60 to 96

inches in depth), stringing out the pipe along the trench, welding and placing the pipe into the trench and then backfilling the open trench. The construction area and areas adjacent to the pipeline trench that are disturbed during construction will be graded and restored pursuant to those guidelines required by the Federal, State, local agencies and private land owners.

The typical equipment utilized will be a trenching machine or tracked vehicle backhoe, tractor trailer truck to deliver pipe materials, a side boom tracked vehicle for pipe handling and placement of pipe in trench, water trucks for dust abatement, tracked vehicle with front blade for clearing and initial cleanup and multiple rubber tire vehicles including tractors and pickup trucks during final restoration.

- 5) August 1992 - July 1994 - Pipeline and Valve Station
- June 1994 - July 1994 - Reservoir
- November 1992 - April 1993 - Turnout
- April 1993 - December 1993- P.S.

6) California State Water Project - California Aqueduct - DWR

SCE

5 persons from MWA

All maintenance will be along existing roads adjacent to the 40' easement of pipe facility and maintain of the pump station and tank will be performed within MWA property.

Pipeline system failure will result in the loss of raw water supply from the State aqueduct in Hesperia to the reservoir in the Morongo Basin. In the event of a leak, water will accumulate at the low points along the line. Should failure occur, the pipe will be drawing into existing waterways such as the Mojave River and Pipes Wash.

APPENDIX 3

**Biological Opinion
from
U.S. Fish and Wildlife Service**



United States Department of the Interior



FISH AND WILDLIFE SERVICE

FISH AND WILDLIFE ENHANCEMENT
SOUTHERN CALIFORNIA FIELD STATION
2730 Loker Avenue West
Carlsbad, California 92008

October 13, 1992

Memorandum

To: State Director, Bureau of Land Management, Sacramento, California

From: Field Supervisor

Subject: Biological Opinion for Construction of the Morongo Basin Water Pipeline, San Bernardino County, California (1-6-92-F-64)

This biological opinion responds to your request for formal consultation with the Fish and Wildlife Service (Service) pursuant to section 7 of the Endangered Species Act of 1973, as amended (Act). Your request was dated September 4, 1992, and received by us on September 10, 1992. At issue are impacts resulting from proposed construction of a water pipeline between Hesperia and Yucca Valley in San Bernardino County, California, which may affect the desert tortoise (Gopherus agassizii), a Federally listed threatened species.

This biological opinion was prepared using information from the following sources: your September 4, 1992, request for consultation and accompanying documentation, informal consultation between our staffs, and our files.

Biological Opinion

It is the opinion of the Service that the proposed project is not likely to jeopardize the continued existence of the desert tortoise. Critical habitat has not been designated for the Mojave population of the desert tortoise in California. Therefore, no critical habitat will be affected by the proposed action.

Description of the Proposed Action

The purpose of the proposed pipeline is to deliver water from the California Aqueduct to the Morongo Basin via a buried pipeline. The Mojave Water Agency has proposed the project which would traverse primarily public lands administered by the Bureau of Land Management. Project features include 70 miles of buried 30-inch pipeline (figure 1), a new turnout at the California Aqueduct, a pump station in Johnson Valley, and a 5-million gallon storage tank at the pipeline terminus in Yucca Valley. The project would be operated and maintained by the Mojave Water Agency.

The alignment follows road shoulders for most of its route. The width of disturbance along the pipeline would vary between 20 and 60 feet. Additional disturbance would occur at the California Aqueduct turnout, the pump station in Johnson Valley, and during construction of the 5-million gallon storage tank.

After construction, maintenance personnel would periodically drive the 70 mile route to inspect the pipeline. Other maintenance activities, including excavating portions of the pipeline, may be necessary.

The Bureau and Mojave Water Agency have proposed the following measures to reduce impacts to the desert tortoise and its habitat. All preconstruction, construction, and post-construction activities which may affect desert tortoise habitat are subject to the following stipulations. These measures were included as recommendations by Tierra Madre Consultants, Inc. (1992a), but the Bureau has adopted them as integral features of the proposed project (Don Armentrout, Bureau, Riverside, September, 1992, pers. comm.):

1. Biological monitor(s) shall be required at each location where preconstruction, construction, or post-construction activities are occurring.
2. Biological monitors shall be approved by the appropriate resource agencies prior to any monitoring. Names of proposed biological monitors shall be submitted to the Bureau and the Service no later than 60 days prior to initiation of preconstruction activities. The Bureau and the Service shall be contacted at least 5 days prior to any changes in the monitoring personnel.
3. Any incident occurring during pipeline construction which is considered by a biological monitor to be in non-compliance with the mitigation plan shall be documented immediately by the monitor. The following incidents shall require immediate cessation of construction activities causing the incident, including: 1) imminent threat of injury or death to a State or Federally listed species; 2) handling of a listed species by unauthorized personnel, regardless of intent; 3) leaving the pipeline alignment with construction equipment, except on designated roads; and 4) conducting any construction activity without a biological monitor.
4. A report summarizing preconstruction surveys shall be provided to responsible agencies at least 30 days prior to any pipeline construction activities. This report shall summarize the occurrence of the desert tortoise and other sensitive biological resources.
5. Within 90 days after completion of the pipeline project and the initiation of the revegetation plan, a post-construction mitigation compliance report shall be submitted to the responsible agencies. This report shall describe and document all mitigation and monitoring efforts, and shall specify additional monitoring needs.
6. All mitigation measures of this plan shall be specified in all drawings and specifications for the Morongo Basin Pipeline Project.

7. Project-related vehicle access, construction activities, and equipment storage shall be restricted to established roads, designated access roads, the construction right-of-way, designated storage areas, and designated staging and parking areas. Off-road traffic outside of designated areas shall be prohibited. All designated areas listed above shall be clearly marked with stakes containing highly visible flagging a minimum of 24 inches above the ground. Maximum spacing of flagged stakes shall be 150 feet. All such designated areas shall be inspected during preconstruction surveys for the presence or sign of desert tortoise. If evidence of desert tortoise occupation is found, the biological monitor(s) shall consult with the project engineer about the feasibility of relocating the alignment or facilities. If such a change is not possible, the desert tortoise(s) present shall be relocated. Whenever possible, designated construction areas shall be located in already disturbed areas. If construction activities are repeatedly documented outside of the staked boundaries by biological monitors, the monitors shall have the authority of specifying that the boundaries be delineated with continuous taping.

8. Unauthorized, public off-road use of any project areas shall be prevented by signing and by monitoring by the biological monitor and the construction crew.

9. Construction and other project-related vehicles (including privately-owned vehicles) shall be restricted to speeds of no more than 20 miles per hour, except on County or State highways. Monitors shall have the authority to report speed violations by construction personnel to construction supervisors, who shall take corrective action.

10. Trenches must be backfilled as soon as possible following placement of the pipe. The maximum length of open trench at any one time shall not exceed 5 miles. Any trench left open overnight shall be equipped with escape ramps at each end. The ramps shall be no steeper than 1-1/2:1. Open trenches shall be inspected by biological monitors each morning no later than 1-1/2 hours after official sunrise, at which time trapped animals shall be removed. Each biological monitor shall be included on a California Department of Fish and Game memorandum of understanding and be authorized under the Service's biological opinion, to handle desert tortoises.

11. In areas where blasting is necessary during trench excavation, monitors shall perform intensive desert tortoise surveys within a 200 foot radius of the blasting area prior to blasting. If any desert tortoises are located in burrows within 50 feet of the blasting area, they shall be removed and held until blasting in the area has been completed. Any occupied desert tortoise burrows located 50 to 200 feet from the blasting area shall be inspected following blasting; any collapsed burrows shall be hand-dug to free any trapped desert tortoises. All handling of desert tortoises shall be consistent with Arizona Game and Fish Department et al. (1990).

12. Immediately prior to backfilling, monitors shall inspect trenches for trapped animals. Also prior to backfilling, monitors shall inspect spoil piles to ensure that desert tortoises have not taken refuge there.

13. All open, stored pipes, or any other material or equipment possessing openings into which animals could seek refuge overnight shall be inspected each morning prior to being moved by construction personnel. The monitor shall also inspect around vehicles or other equipment prior to their being moved. Only the authorized biological monitor may move any animals that are found. All in-place, uncovered pipe shall be capped overnight to prevent the entry of animals.

14. Construction personnel or others related to the project shall not be permitted to bring pets or firearms into pipeline construction areas.

15. Trash from construction personnel, especially food items or packaging, shall be disposed of in containers and removed from the construction area daily to avoid attracting wildlife to the construction area overnight.

16. Gasoline, diesel, lubricants, solvents, explosives, or any other hazardous materials shall be handled only in specified refueling, maintenance, or storage areas. The biological monitor shall have the authority to restrict such handling or storage in areas considered environmentally sensitive.

17. No intentional killing, harassment, or collection of wildlife or plants shall be allowed within or near the construction area. If undesirable species are encountered, such as rattlesnakes, they shall be removed by the biological monitor with appropriate equipment.

18. The biological monitor shall inspect the pipeline right-of-way following project completion, and shall have the authority to direct further cleanup if necessary, including cleanup of dumped or spilled hazardous materials.

19. A revegetation plan has been prepared for this project (Tierra Madre Consultants, Inc. 1992b). This plan calls for an intensive revegetation effort, including land imprinting, Joshua tree transplantation, and cactus transplantation.

20. Qualified biologists shall survey all portions of the pipeline alignment within 48 hours before construction activities begin. All desert tortoise burrows found during these surveys shall be clearly flagged with a color of flagging contrasting with other colors being used on the project.

21. Desert tortoise burrows found during preconstruction surveys or during construction which are clearly active shall be mapped and marked with flagging. The biological monitor shall then consult with the project engineer(s) to consider the feasibility of minor re-routing of the pipeline to avoid the burrow(s). Immediately prior to brushing (within 4 hours), the biologist(s) shall excavate by hand all burrows which will be affected by construction activities. Any desert tortoises unearthed shall be weighed, sexed, and measured. If responsible agencies desire it, desert tortoises shall be marked with identification numbers. All of the above data, plus date, location, time, and name of data collector, shall be recorded on data sheets.

22. Disposable gloves shall be worn during handling and data collection, with each pair of gloves being discarded after handling one desert tortoise. Bags or straps used for weighing, files, calipers, or other equipment used during collection shall be disposable or disinfected in accordance with Arizona Game and Fish Department et al. (1990). Following data collection, salvaged desert tortoises shall be relocated away from and perpendicular to the right-of-way a minimum distance of 200 feet.

23. Relocated desert tortoises shall be placed in the shade of a shrub. When the alignment is near a major paved highway, the relocation shall be on the side of the highway where the desert tortoise was found, to minimize the likelihood of the desert tortoise homing in the direction of the highway.

24. If a desert tortoise is salvaged when the temperature exceeds 90 degrees F., it shall be held in a clean cardboard box and released the following morning within one hour of sunrise. Desert tortoises shall also be held overnight in lieu of releasing them within 2 hours of sunset. Following the release of salvaged desert tortoises, the biological monitor shall attempt to track the movements of the relocated animals.

25. The Mojave Water Agency shall provide off-site mitigation by acquiring, within 1 year of the start of construction, 292 acres of category 1 desert tortoise habitat and deeding such lands to the Bureau. As an alternative, the Mojave Water Agency may contribute to the Bureau comparable per acre funds, based on appraised value of the affected lands. The Bureau shall use these funds to acquire category 1 desert tortoise habitat.

Effects of the Proposed Action on the Listed Species

Species Account

On August 4, 1989, the Service published an emergency rule listing the Mojave population of the desert tortoise as endangered. In a final rule dated April 2, 1990, the Service determined the Mojave population of the desert tortoise to be threatened. The desert tortoise is a large, herbivorous reptile found in portions of the California, Arizona, Nevada, and Utah deserts. It also occurs in Sonora and Sinaloa, Mexico. The threatened Mojave population is found in California, Nevada, and north of the Colorado River in Arizona and southwestern Utah. In the California deserts, desert tortoises are most active during the spring and early summer when annual plants are most common. Additional activity occurs during warmer fall months and after infrequent summer monsoons. Desert tortoises spend the remainder of the year in burrows, escaping the extreme weather conditions of the desert.

Further information on the range, biology, and ecology of the desert tortoise can be found in Burge (1978), Burge and Bradley (1976), Hovik and Hardenbrook (1989), Luckenbach (1982), Turner et al. (1984), and Weinstein et al. (1987).

Description of the Environment

The pipeline alignment traverses 3 plant communities including the Joshua tree, Yucca brevifolia and creosote, Larrea tridentata series of Mohave desertscrub, and an ecotone area intermediate between Great Basin conifer woodland and the Joshua tree series of Mohave desertscrub (Turner 1982, Tierra Madre Consultants, Inc. 1992a). Along the alignment, the Joshua tree series is visually dominated by Joshua trees with an understory of Mojave yucca, Yucca schidigera; silver cholla, Opuntia echinocarpa; and other shrubs (Tierra Madre Consultants, Inc. 1992a). Perennial shrubs such as creosote; bursage, Ambrosia dumosa; paperbag bush, Salazaria mexicana; and wolfberry, Lycium andersonii dominate the creosote series (Turner 1982). The ecotone community is characterized by California juniper, Juniperus californica and various shrubs typical of both coastal and Mojave Desert communities (Tierra Madre Consultants, Inc. 1992a). The alignment also traverses some developed and urban lands near Hesperia. The terrain along the alignment is primarily desert flats and bajadas.

The public lands involved in this action are within an area currently classified as Category 3 desert tortoise habitat by the Bureau (1988). Category 3 lands are characterized by low to medium density desert tortoise populations which are not essential to maintenance of viable populations (ibid.). Surveys conducted in 1978-79 estimated desert tortoise densities in the affected area to be in the range of 0 to 20 tortoises per square mile (Berry and Nicholson 1984).

A 100% desert tortoise survey of a 60-foot swath along the entire alignment was carried out from March to December, 1991. Survey techniques were consistent with Service protocol (U.S. Fish and Wildlife Service 1992), except that no zone of influence transects were performed. Surveys consisted of 2 parallel and adjacent 30-foot wide transects along the entire length of the alignment (Tierra Madre Consultants, Inc. 1992a).

During the survey 2 desert tortoises, 9 burrows or pellets, 1 scat, and 1 group of shell fragments were found. Tierra Madre Consultants, Inc. (1992a) concluded that nearly all of the proposed pipeline alignment was within habitat presently or historically occupied by desert tortoises. The small number of sign encountered indicate that densities were relatively low.

Analysis of the Impacts

An estimated 351 acres would be disturbed by construction and maintenance activities. The majority of those impacts would occur in the pipeline alignment and would be temporary. The revegetation plan would speed recovery of all but 12 acres, which would be permanently disturbed by construction of the pump station, storage facility, and turnouts (table 1). Of the 351 acres disturbed, Tierra Madre Consultants, Inc. (1992a) estimated that 292 acres were habitat for the desert tortoise.

Table 1: Summary of Construction Impacts by Project Feature

Project Feature	Acres Impacted
Pipeline Alignment	335
California Aqueduct Turnout	5
Pump Station	5
Water Storage Facility	4
4 In-line Turnouts	2

The biological monitors and construction crews are likely to encounter few desert tortoises along the pipeline alignment because of the relative scarcity of this animal in the area. Nevertheless, there is a possibility that desert tortoises could be crushed by construction equipment or die of exposure after becoming entrapped in trenches. Desert tortoise burrows could also be destroyed, or desert tortoises could be trapped and die in collapsed burrows. Take of desert tortoise in these ways would be minimized by the presence of biological monitors and other mitigation measures.

Common ravens (Corvus corax) are efficient predators of desert tortoises (Campbell 1983, Miller 1932) and are attracted to refuse. Trash generated during this project could attract ravens and increase predation of desert tortoises.

The Service believes the impacts described above will not jeopardize the continued existence of the desert tortoise. We present this conclusion for the following reasons:

1. The project description includes efforts to minimize take of desert tortoises and mitigate the direct and indirect impacts of the proposed action.
2. The area which would be disturbed by the project is linear and limited in size, supports few desert tortoises, and is adjacent to or traverses existing disturbed areas, such as roads, for much of its route. As a result, its loss as desert tortoise habitat would not contribute to further fragmentation of desert tortoise populations.

Cumulative Effects

Cumulative effects are those impacts of future State and private actions that are reasonably certain to occur in the project area. Future Federal actions will be subject to the consultation requirements established in section 7 of the Act and, therefore, are not considered cumulative to the proposed project. Due to the extent of the lands in this area of the Mojave Desert administered by the Bureau, many of the actions which are reasonably expected to occur within the vicinity of the project site will be subject to section 7 consultations.

By supplying water to the Morongo Basin, the proposed project may have a growth-inducing effect on the region which could result in additional impacts to the desert tortoise on private lands. The community of Yucca Valley is

currently under a water connection moratorium which limits growth. By providing new water resources to Yucca Valley, the proposed project would likely result in a lifting of the moratorium and increased growth. In addition, although the growth of surrounding communities are not currently limited by water supply; the proposed project could accomodate future growth that otherwise would not be possible. If this growth may result in a take of desert tortoise, and there is no Federal nexus, such take could only be authorized under a section 10(a)(1)(B) permit, issued by the Service.

The Service has contacted the Counties of San Bernardino, Kern, Riverside, and Los Angeles (and the incorporated areas within the desert) regarding the listing of the desert tortoise and its implications for activities authorized by local governments. Many cities within the range of the desert tortoise in San Bernardino, Kern, and Los Angeles Counties have expressed interest in obtaining a section 10(a)(1)(B) permit from the Service. This permit would allow take of desert tortoises as long as that take is "incidental to, and not the purpose of carrying out otherwise lawful activities" (16 U.S.C. 1539). Regional planning efforts, such as the West Mojave Coordinated Management Plan, could serve as model habitat conservation plans for local governments. Cumulative impacts of future State and private projects will be addressed in regional plans, such as this, and in the section 10(a)(1)(B) permit process.

Incidental Take

Section 9 of the Act prohibits the take of listed species without special exemption. Taking is defined as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, collecting, or attempting to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering (50 CFR 17.3). Under the terms of sections 7(b)(4) and 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the Act provided that such taking is in compliance with this incidental take statement. Reasonable and prudent measures, as well as terms and conditions in this biological opinion are nondiscretionary, and must be undertaken by the agency or made a binding condition of any grant or permit, as appropriate.

This biological opinion anticipates the following forms of take:

- 1) Two desert tortoise in the form of direct mortality resulting from project construction and maintenance.
- 2) Ten desert tortoises through harassment associated with excavation of active burrows or movement of desert tortoises found above ground which must be moved out of harm's way.

This biological opinion does not authorize any form of take not incidental to construction and maintenance of the Morongo Basin Water Pipeline. This biological opinion does not authorize take of desert tortoise which may result from development or construction induced by supplying water to the Morongo Basin.

If the incidental take authorized by this opinion is met, the Bureau shall immediately notify the Service in writing. If the incidental take authorized by this opinion is exceeded, the Bureau shall ensure that the activity resulting in the take ceases until formal consultation is reinitiated and a revised biological opinion is issued by the Service.

Reasonable and Prudent Measures

The Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize the incidental take authorized by this biological opinion:

1. Worker education programs, defined construction areas, habitat mitigation, and well-defined operational procedures shall be implemented.
2. Restrictions on construction and maintenance activities necessary to minimize the take of desert tortoises shall be implemented.
3. Project construction shall be monitored by on-site qualified biologist(s) to avoid or minimize the take of desert tortoises and loss of desert tortoise habitat during construction.
4. Attraction of common ravens and other potential desert tortoise predators to the project area shall be reduced to the maximum extent possible.

Terms and Conditions

The following terms and conditions are established to implement the reasonable and prudent measures described above. Terms and conditions 1 through 23 are taken from the project description (Tierra Madre Consultants, Inc. 1992; Don Armentrout, Bureau, Riverside, September 1992, pers. comm.), but contain slight modifications or added detail.

1. Biological monitor(s) shall be required at each location where preconstruction or construction activities are occurring.
2. Qualifications of proposed desert tortoise handlers shall be submitted to the Service no later than 60 days prior to initiation of preconstruction activities. The Service shall be contacted at least 5 days prior to any changes in handler personnel.
3. Any incident occurring during pipeline construction which is considered by a biological monitor to be in non-compliance with the mitigation plan shall be documented immediately by the monitor. The following incidents shall require immediate cessation of construction activities causing the incident, including: 1) imminent threat of injury or death to a State or Federally listed species; 2) handling of a listed species by unauthorized personnel, regardless of intent; 3) operation of construction equipment or vehicles outside the pipeline alignment, except on designated roads; and 4) conducting any construction activity without a biological monitor.

4. Within 90 days after completion of the pipeline project and the initiation of the revegetation plan (Tierra Madre Consultants, Inc. 1992b), a post-construction mitigation compliance report shall be submitted to the Service. This report shall describe and document all mitigation and monitoring efforts, and shall specify additional monitoring needs. The report shall also document the effectiveness of the desert tortoise mitigation measures, the number of desert tortoises excavated from burrows, and the number of desert tortoises moved from construction sites. The report shall make recommendations for modifying or refining these terms and conditions to enhance desert tortoise protection and reduce needless hardship on the project proponent. The report shall also state the actual acreage of desert tortoise habitat disturbed.
5. All mitigation measures of this plan shall be specified in all drawings and specifications for the Morongo Basin Pipeline Project.
6. Project related vehicle access, construction activities, and equipment storage shall be restricted to established roads, designated access roads, the construction right-of-way, designated storage areas, and designated staging and parking areas. Off-road traffic outside of designated areas shall be prohibited. All designated areas listed above shall be clearly marked with stakes containing highly visible flagging a minimum of 24 inches above the ground. Maximum spacing of flagged stakes shall be 150 feet. All such designated areas shall be inspected during preconstruction surveys for the presence or sign of desert tortoise. If evidence of desert tortoise occupation is found, the biological monitor(s) shall consult with the project engineer about the feasibility of relocating the alignment or facilities. If such a change is not possible, the desert tortoise(s) present shall be relocated. Whenever possible, designated construction areas shall be located in already disturbed areas. If construction activities are repeatedly documented outside of the staked boundaries by biological monitors, the monitors shall have the authority of specifying that the boundaries be delineated with continuous taping.
7. Unauthorized, public off-road use of any project areas shall be discouraged by posting of signs and by monitoring by the biological monitor and the construction crew.
8. Construction and other project-related vehicles (including privately-owned vehicles) shall be restricted to speeds of no more than 20 miles per hour, except on County or State highways. Monitors shall have the authority to report speed violations by construction personnel to construction supervisors, who shall take corrective action.
9. Trenches must be backfilled as soon as possible following placement of the pipe. The maximum length of open trench at any one time shall not exceed 5 miles. Any trench left open overnight shall be equipped with escape ramps at each end. The ramps shall be no steeper than 1-1/2:1. Open trenches shall be inspected by biological monitors each morning no later than 1-1/2 hours after official sunrise, at which time trapped desert tortoises shall be removed.

10. Immediately prior to backfilling, monitors shall inspect trenches for trapped animals. Also prior to backfilling, monitors shall inspect spoil piles to ensure that desert tortoises have not taken refuge there.
11. In areas where blasting is necessary during trench excavation, monitors shall perform intensive desert tortoise surveys within a 200 foot radius of the blasting area prior to blasting. If any desert tortoises are located within 50 feet of the blasting area, they shall be removed and held until blasting in the area has been completed. All handling of desert tortoises shall be consistent with Arizona Game and Fish Department, et al. (1991). Any occupied desert tortoise burrows from 50 to 200 feet from the blasting area shall be inspected following blasting. Collapsed burrows shall be hand-dug to free any trapped desert tortoises.
12. All vehicles, stored pipes, or any other material or equipment possessing openings or shaded areas where desert tortoises could seek refuge shall be inspected prior to being moved by construction personnel. If a desert tortoise is found in a pipe or beneath a vehicle of other equipment, the biological monitor shall be contacted to move it out of harm's way. Alternatively, the equipment could be left in place until the desert tortoise has left on its own accord. The biological monitor shall be responsible for taking appropriate measures to ensure that any desert tortoise moved in this manner is not exposed to temperature extremes which could be harmful to the animal (see terms and conditions 22 and 24). All in-place, uncovered pipe shall be capped overnight to prevent the entry of desert tortoises.
13. Construction personnel or others related to the project shall not be permitted to bring pets or firearms into pipeline construction areas.
14. Trash from construction and maintenance personnel, especially food items or packaging, shall be disposed of in raven-proof containers and removed daily to avoid attracting ravens or other desert tortoise predators to the area.
15. Gasoline, diesel, lubricants, solvents, explosives, or any other hazardous materials shall be handled only in specified refueling, maintenance, or storage areas. The biological monitor shall have the authority to restrict handling or storage in areas considered environmentally sensitive.
16. The biological monitor shall inspect the pipeline right-of-way following project completion, and shall have the authority to direct further cleanup if necessary, including cleanup of dumped or spilled hazardous materials.
17. A revegetation plan shall be implemented for this project as described in Tierra Madre Consultants, Inc. (1992b). This plan calls for an intensive revegetation effort, including land imprinting, Joshua tree transplantation, and cactus transplantation.
18. Qualified biologists shall survey all portions of the pipeline alignment within 48 hours before construction activities begin. All desert tortoise burrows found during these surveys shall be clearly flagged with a color of flagging contrasting with other colors being used on the project.

19. Desert tortoise burrows found during preconstruction surveys or during construction and maintenance which are clearly active shall be mapped and marked with flagging. The biological monitor shall then consult with the project engineer(s) to consider the feasibility of minor re-routing of the pipeline to avoid the burrow(s). For burrows outside of the actual area of disturbance, the biological monitor shall consider the direction the burrow runs, and that burrows may be as long as 30 feet, in determining whether or not an adjustment in the alignment is necessary. Immediately prior to brushing (within 4 hours), the biologist(s) shall excavate by hand all potentially occupied burrows which will be affected by construction activities. Any desert tortoises which must be moved out of harm's way shall be weighed, sexed, measured, and given individual identification numbers with paint and epoxy as described in Arizona Game and Fish Department et al. (1991). All of the above data, plus date, location, time, and name of data collector, shall be recorded on data sheets and summarized in the report to the Service described in term and condition 12. Biological monitors shall attempt to track the movements of relocated desert tortoises only if such tracking does not detract from the monitoring of construction activities as described in these terms and conditions.

20. Disposable gloves shall be worn during handling and data collection, with each pair of gloves being discarded after handling one desert tortoise. Bags or straps used for weighing, files, calipers, or other equipment used during collection shall be disposable or disinfected. All handling procedures shall be in accordance with the Service's handling protocol (Game and Fish Department, et al. 1991).

21. When the alignment is near a major paved highway, the relocation shall be on the side of the highway where the desert tortoise was found to minimize the likelihood of the desert tortoise homing in the direction of the highway.

22. Each desert tortoise requiring relocation found above ground within 3 hours of nightfall or when ambient air temperatures exceed 90 degrees Fahrenheit shall be placed in a clean disposable cardboard box and held overnight in a cool location. The box shall be covered and kept in possession of a designated biologist for release of each desert tortoise the next morning in the manner described above. Cardboard boxes used to hold desert tortoises shall be new, used once, and discarded. All materials which come into contact with desert tortoises shall be used only once and then properly discarded to minimize contact with the causative factor(s) for upper respiratory tract disease and other diseases.

23. The Mojave Water Agency shall provide off-site mitigation by acquiring, within 1 year of the start of construction, 292 acres of category 1 desert tortoise habitat. These acquired lands shall be deeded to the Bureau. As an alternative, Mojave Water Agency may contribute to the Bureau comparable per acre funds, based on appraised value of the affected lands. The Bureau shall use these funds to acquire category 1 desert tortoise habitat. Acquired lands shall be managed by the Bureau for the benefit of the desert tortoise pursuant

to the management goals and objectives for category 1 habitat described in Bureau (1988).

24. Desert tortoises which must be moved out of harm's way shall be relocated by the biological monitor at least 200 feet away from the alignment in the direction of undisturbed habitat. If the relocation occurs in the season of above-ground activity, the desert tortoise shall be placed in the mouth of a burrow of appropriate size or in the shade of a large shrub. If the relocation is not in the season of above-ground activity, desert tortoises shall be moved on a seasonably warm day and placed at the mouth of a burrow of appropriate size. If the desert tortoise does not enter the burrow, or a burrow is not available, an artificial burrow shall be constructed and the desert tortoise placed within it. Artificial burrows shall be at least 6 feet in length and of the same diameter, depth, and orientation as the one in which the desert tortoise was found or as appropriate for the size of the subject desert tortoise. Wood or plastic materials may be used to strengthen the tunnel and/or chamber of the burrow. In coordination with the Service and the Bureau, the biological monitor shall be allowed some judgement and discretion to ensure that survival of the desert tortoise is likely.

25. An individual shall be designated as a field contact representative (FCR) who shall have the authority to ensure compliance with protective stipulations for the desert tortoise and be responsible for coordination with the Service. Such designated representative shall have the authority to halt activities that are in violation of Service stipulations.

26. Construction and maintenance personnel shall be briefed on the status of the desert tortoise and protection measures designed to reduce potential impacts to this species. Personnel shall be advised that handling, harming, or harassing desert tortoises without specific authorization is a violation of the Act. Personnel shall also be advised of the potential penalties up to a \$25,000 fine and 6 months in prison for taking a listed species without a permit. Handouts summarizing this information shall be provided.

27. Vehicular and equipment use during maintenance inspections shall be limited to existing routes. The Bureau shall be notified prior to any maintenance activities causing land disturbance. All land-disturbing activities, whether they are in the pre-construction, construction, or maintenance phases of this project, shall be subject to the terms and conditions of this biological opinion.

28. The Mojave Water Agency shall send a letter (a draft is attached) to all customers of the water supplied by the pipeline informing them of the presence of the desert tortoise, the status of the species, and the need for them to obtain a section 10(a)1(B) permit from the Service before initiating any land-disturbing activities which might result in a take of desert tortoise.

Disposition of Dead, Injured, or Sick Desert Tortoises

Upon locating dead, injured, or sick desert tortoises, initial notification must be made to the Service's Law Enforcement Office in Torrance, California

at (310) 297-0062 within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph, and any other pertinent information. The notification shall be sent to the Service's Torrance office with a copy to the Ventura office. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible state. If possible, the remains of intact desert tortoises shall be placed with educational or research institutions holding the appropriate State and Federal permits. If such institutions are not available or the shell has been damaged, the information noted above shall be obtained and the carcass left in place. Marking the carcass in a manner that would not be toxic to other wildlife to ensure that it would not be re-recorded in the future, should be considered.

Arrangements regarding proper disposition of potential museum specimens shall be made with the institution prior to implementation of the action. Injured animals should be transported to a qualified veterinarian. Should any treated desert tortoises survive, the Service should be contacted regarding the final disposition of the animals.

Conservation Recommendations

In furtherance of the purposes of sections 2(c) and 7(a)(1) of the Act that mandate Federal agencies to utilize their authorities to carry out programs for the conservation of listed species, we recommend implementing the following actions:

1. The condition of desert tortoises encountered during this project, particularly in regards to upper respiratory tract disease or other diseases, should be recorded. This information would be transmitted to the Service in the report required in term and condition 5.
2. The Mojave Water Agency should participate in the West Mojave Coordinated Management Plan. This plan would be the basis for section 10(a)(1)(B) permit applications to provide programmatic Endangered Species Act compliance for actions by the Mojave Water Agency and other local entities. This plan would also define a process whereby users of the water from the pipeline could be authorized to take desert tortoises during actions authorized by the Mojave Water Agency. Without such authorization, the Mojave Water Agency could be subject to prosecution under the Act if a customer implemented an action authorized by Mojave Water Agency that resulted in a take of desert tortoise.

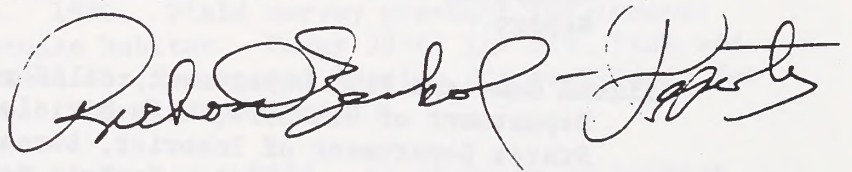
The Service requests notification of the implementation of any conservation recommendations so we can be kept informed of actions that either minimize or avoid adverse effects, or that benefit listed species or their habitats.

Conclusion

This concludes formal consultation on the Morongo Basin Water Pipeline. Reinitiation of formal consultation is required if: 1) the amount or extent

of incidental take is reached; 2) new information reveals effects of the agency action that may adversely affect listed species or critical habitat in a manner or to an extent not considered in this opinion; 3) the agency action is subsequently modified in a manner that causes an effect to a listed species or critical habitat that was not considered in this opinion; or 4) a new species is listed or critical habitat designated that may be affected by this action (50 CFR 402.16). We would appreciate notification of your final decision on this matter. Any questions or comments should be directed to Jim Rorabaugh of the Ventura Office at (805) 644-1766.

Attachment



Literature Cited

- Arizona Game and Fish Department, California State Resource Agencies, Nevada Department of Wildlife, Utah Division of Wildlife Resources, United States Department of Interior, Bureau of Land Management, and Fish and Wildlife Service. 1990. Interim techniques handbook for collecting and analyzing data on desert tortoise populations and habitats. Unpublished Report.
- Arizona Game and Fish Department, California State Resource Agencies, Nevada Department of Wildlife, Utah Division of Wildlife Resources, United States Department of Interior, Bureau of Land management, and Fish and Wildlife Service. 1991. Interim techniques handbook for collecting and analyzing data on desert tortoise populations and habitats. Unpublished report.
- Berry, K.H. and L.L. Nicholson. 1984. The distribution and density of desert tortoise populations in California in the 1970's. Ch. 2 in K.H. Berry (ed.): The status of the desert tortoise (Gopherus agassizii) in the United States. Report from the Desert Tortoise Council to U.S. Fish and Wildlife Service, Sacramento, California. Order No. 11310-0083-81.
- Bureau of Land Management. 1988. Desert tortoise habitat management on the public lands: a rangewide plan. Bureau of Land Management, Division of Wildlife and Fisheries, Washington, D.C.
- Burge, B.L. 1978. Physical characteristics and patterns of utilization of cover sites by Gopherus agassizii in southern Nevada. Proceedings 1978 Desert Tortoise Council Symposium. pp. 80-111.
- Burge, B.L., and W.G. Bradley. 1976. Population density, structure and feeding habits of the desert tortoise, Gopherus agassizii, in a low desert study area in southern Nevada. Proceedings 1976 Desert Tortoise Council Symposium. pp. 51-74.
- Hovik, D.C., and D.B. Hardenbrook. 1989. Summer and fall activity and movements of desert tortoises in Pahrump Valley, Nevada. Abstract of paper presented at Fourteenth Annual Meeting and Symposium of the Desert Tortoise Council.
- Luckenbach, R.A. 1982. Ecology and management of the desert tortoise (Gopherus agassizii) in California. In: R.B. Bury (ed.). North American Tortoises: Conservation and Ecology. U.S. Fish and Wildlife Service, Wildlife Research Report 12, Washington, D.C.
- Tierra Madre Consultants, Inc. 1992a. Morongo Basin Pipeline project; biological assessment and mitigation monitoring plan for the desert tortoise. Tierra Madre Consultants, Inc., Riverside, California.

Tierra Madre Consultants, Inc. 1992b. Morongo Basin Pipeline project; revegetation plan. Tierra Madre Consultants, Inc., Riverside, California.

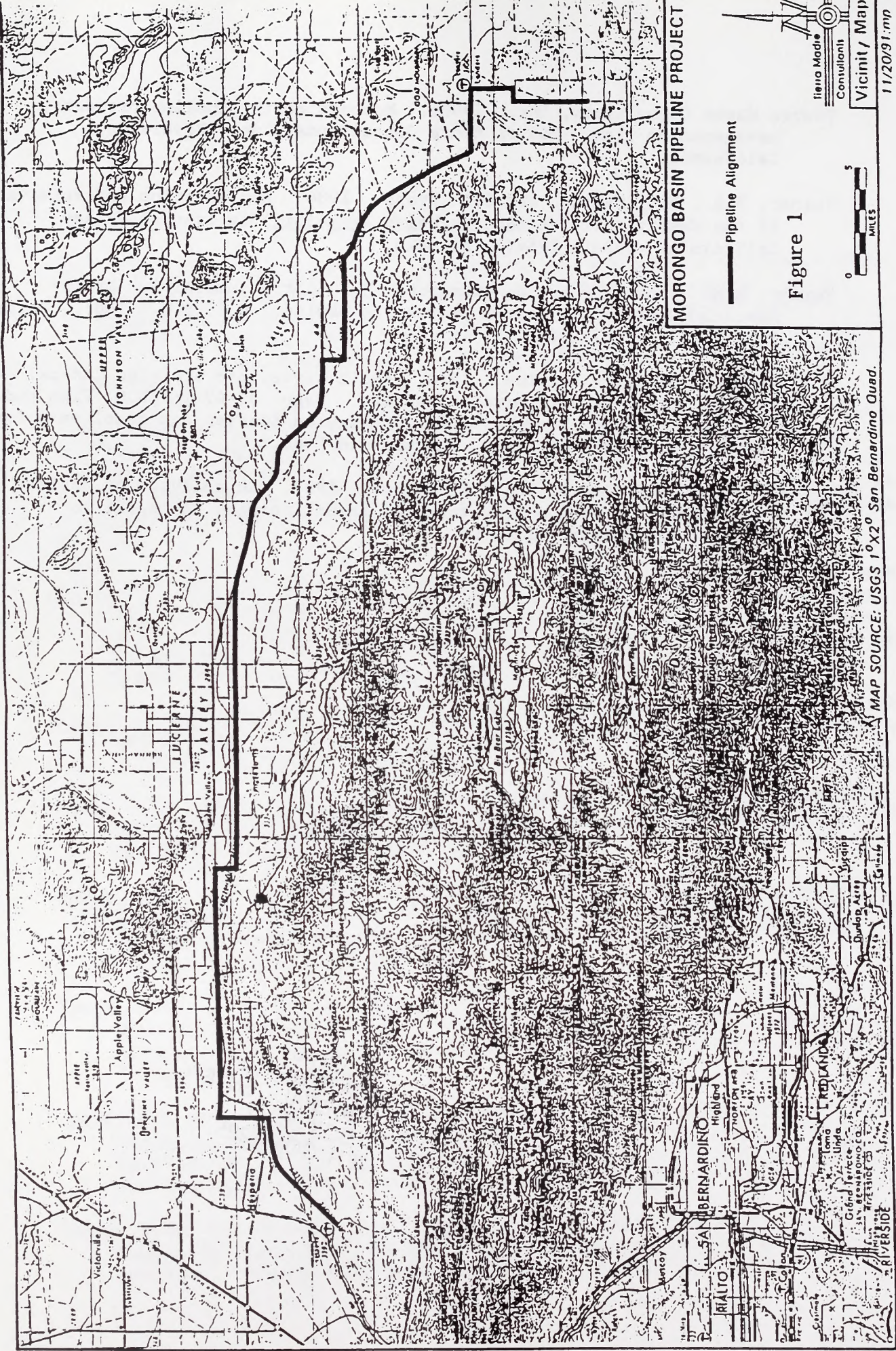
Turner, F.B., P.A. Medica, and C.L. Lyons. 1984. Reproduction and survival of the desert tortoise (Scaptochelys agassizii) in Ivanpah Valley, California. Copeia 1984(4):811-820.

Turner, R.M. 1982. Mohave desertscrub. In: Biotic communities of the American Southwest - United States and Mexico. D.E. Brown (ed). Desert Plants 4(1-4):157-168.

U.S. Fish and Wildlife Service. 1990. Field survey protocol for federal actions within desert tortoise habitat. Pages 39-47 In: U.S. Fish and Wildlife Service. Procedures for Endangered Species Act compliance for the Mojave desert tortoise. Unpublished Report.

Weinstein, M., K.H. Berry, and F.B. Turner. 1987. An analysis of habitat relationships of the desert tortoise in California. A report to Southern California Edison Co.

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MORONGO BASIN PIPELINE PROJECT

— Pipeline Alignment

Figure 1



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MAP SOURCE: USGS 1° X 2° San Bernardino Quad.

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