

FINAL ENVIRONMENTAL IMPACT STATEMENT

For The

**OVERLAND TRANSPORT OF THE
NASA SPACE SHUTTLE ORBITER**

between

U.S. AIR FORCE PLANT 42, PALMDALE, CALIFORNIA

and the

**DRYDEN FLIGHT RESEARCH CENTER
EDWARDS AIR FORCE BASE, CALIFORNIA**

May 1976



National Aeronautics and Space Administration
LYNDON B. JOHNSON SPACE CENTER
Houston, Texas

National Aeronautics and
Space Administration

Environmental Impact Statement

Overland Transport
of the NASA Space
Shuttle Orbiter

May 1976

SUMMARY

Impact Statement for the Overland Transport of the NASA Space Shuttle Orbiter between Air Force Plant 42, Palmdale, California, and the Dryden Flight Research Center, Edwards Air Force Base, California.

() DRAFT (X) FINAL ENVIRONMENTAL STATEMENT

Responsible Federal Agency: National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Texas. Environmental Statement Coordinator: JA/J. V. Piland, Lyndon B. Johnson Space Center, Houston, Texas 77058. (713)-483-3116

1. Name of Action: (X) Administrative Action () Legislative Action
2. Brief Description of Action and Purpose: The proposed action is overland transport of NASA Space Shuttle Orbiters from their final assembly point at Air Force Plant 42, Palmdale, California, to the NASA Dryden Flight Research Center (DFRC), Edwards Air Force Base (EAFB), California. The 31.9-mile route is over properties under the jurisdiction of the U.S. Air Force and the County of Los Angeles. Transport will be over existing, modified, and new roads with the Orbiter supported on a towed transporter. Seven transport operations will occur about equally spaced in time during a 7-year period beginning March 1977. Transport operations will be conducted at night and will require about 11 hours for completion.

The transport route will follow existing right-of-way, including 1.4 miles on Federal property (Air Force Plant 42), 8.5 miles in Los Angeles County, and 22 miles on Federal Property (EAFB). This route requires 10 miles of new roadway (8 miles within EAFB), 6.3 miles of widened roadway, and 15.6 miles of existing roadway with other minor modifications. One mile of utility line will require relocation, and traffic signals and trees will be modified, relocated, or removed to provide adequate clearances.

The purpose of the proposed action is to transport NASA Orbiters between the final assembly point at U.S. Air Force Plant 42, Palmdale and Edwards Air Force Base, beginning in March 1977. The Dryden Flight Research Center at EAFB will conduct Approach & Landing Tests with the first Orbiter. Thereafter, the first Orbiter will be transported from Edwards AFB by air ferry to Marshall Space Flight Center, Alabama for structure testing. Subsequent Orbiters will be ferried to their launch sites at Kennedy Space Center, Florida, and Vandenberg Air Force Base, California.

3. Summary of Environmental Impacts and Adverse Environmental Effects:

Minor adverse environmental effects associated with the proposed action will be: infrequent and short-duration traffic disruptions, slight decrease in the widespread desert habitat, and slight increase in noise and air pollution levels along the route during construction and transport operations. Two Joshua trees will be

relocated and a small number of other trees trimmed or removed. Less than one acre of a nearly 500 acre marsh will be occupied by the new roadway within EAFB.

4. Summary of Major Alternatives Considered: Alternative overland roadway and railway routes were considered; also air ferry, utilizing either a mate/demate device or a stiff-legged crane, has been considered. Alternative roadway routes are along existing road rights-of-way in an area northeast of Air Force Plant 42 but would require acquisition of real property interest from adjacent landowners. Orbiter transport by railroad flatcar on standard gauge tracks presents stability problems as well as serious disruption of normal rail traffic. Delivery of the Orbiter by air requires that the first flight of a specially modified NASA Boeing 747 aircraft with the Orbiter mounted piggy-back be performed from Air Force Plant 42 rather than from the extensive test facility at the Dryden Flight Research Center, Edwards Air Force Base.

5. Federal, State, and Local Agencies and Other Parties From Which Comments Have Been Requested:

a. During preparation of this statement, consultations have been conducted with the following agencies:

U.S. Army, Corps of Engineers

U.S. Air Force

U.S. Forest Service, Pacific Southwest Forest and Range
Experimental Station

State of California, Office of Planning and Research
State of California, Department of Fish and Game, Region 5
County of Los Angeles, Department of Regional Planning
County of Los Angeles, Road Department
City of Palmdale Planning Commission

- b. Copies of the draft statement were distributed to and comments requested from the following agencies:

U.S. Environmental Protection Agency, Region IX
U.S. Environmental Protection Agency, Office of Federal Activities
U.S. Department of the Interior, Office of Environmental Project Review
U.S. Department of the Interior, Bureau of Land Management
U.S. Department of the Interior, National Park Service
U.S. Department of the Interior, U.S. Fish and Wildlife Service
U.S. Department of Transportation
U.S. Department of Housing and Urban Development
U.S. Department of Justice, Land and Natural Resources Division
U.S. Advisory Council on Historic Preservation
U.S. Department of the Air Force
U.S. Department of the Air Force, Hq. AFSC
U.S. Department of the Air Force, Air Force Plant 42

U.S. Department of the Air Force, Edwards AFB

U.S. Army Corps of Engineers

State of California, Office of Planning and Research
(Clearing House)

State of California, Department of Fish and Game

State of California, State Resources Agency, Department
of Parks and Recreation

County of Los Angeles, Department of Regional Planning

City of Palmdale, California

Los Angeles Department of Airports

Southern California Association of Governments

Palmdale Public Library

Antelope Valley College, Library

Property owners whose property might be affected.

c. Comments were received from:

U.S. Advisory Council on Historic Preservation

U.S. Department of the Army, Corps of Engineers

U.S. Environmental Protection Agency

U.S. Department of Transportation, Federal Highway
Administration

U.S. Department of the Interior

State of California, Office of Planning and Research

Southern California Association of Governments

County of Los Angeles, Department of Regional Planning

County of Los Angeles, Road Department

Los Angeles Department of Airports

State of California, The Resources Agency, Office of

Historic Preservation

Eight individual property owners

6. Date Statement Made Available to the Council on Environmental
Quality and the Public:

DRAFT: February 2, 1976

FINAL: May 7, 1976

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I. DESCRIPTION OF PROPOSED ACTION, STATEMENT OF PURPOSE, AND
DESCRIPTION OF ENVIRONMENT OF THE AREA AFFECTED

A. Description of Proposed Action

1. Background

On January 5, 1972, the President announced that the United States should proceed at once with the development of a new type of space transportation system: a piloted, reusable vehicle capable of carrying large payloads to and from earth orbit.¹

The Space Shuttle consists of a manned reusable Orbiter mounted, at launch, "piggy-back" on a large, expendable-propellant hydrogen/oxygen tank and two recoverable and reusable solid rocket boosters. Figure 1 is an artist's rendering of the Orbiter, its external fuel tank and the solid rocket boosters. The Orbiter appears similar to a delta-winged aircraft, about the size of a commercial DC-9 jetliner. It will have three liquid-fueled booster rocket motors, orbital propulsion and maneuvering systems, and a cargo bay 60 ft. long by 15 ft. in diameter (18.29 m by 4.57 m).

The NASA Environmental Statement for the Space Shuttle Program (July 1972) details the environmental implications of the development and operation of the Space Shuttle Program.² One of the key milestones of this program is the final assembly of the first Orbiter at Air Force Plant 42, Palmdale, California, and its testing at Dryden Flight Research Center (DFRC), Edwards Air Force Base, California, beginning in March 1977. This statement addresses the

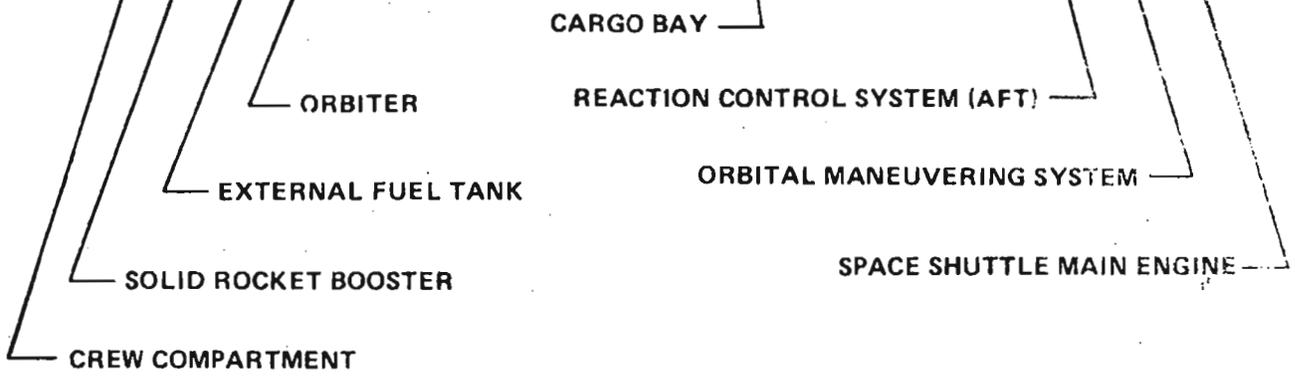
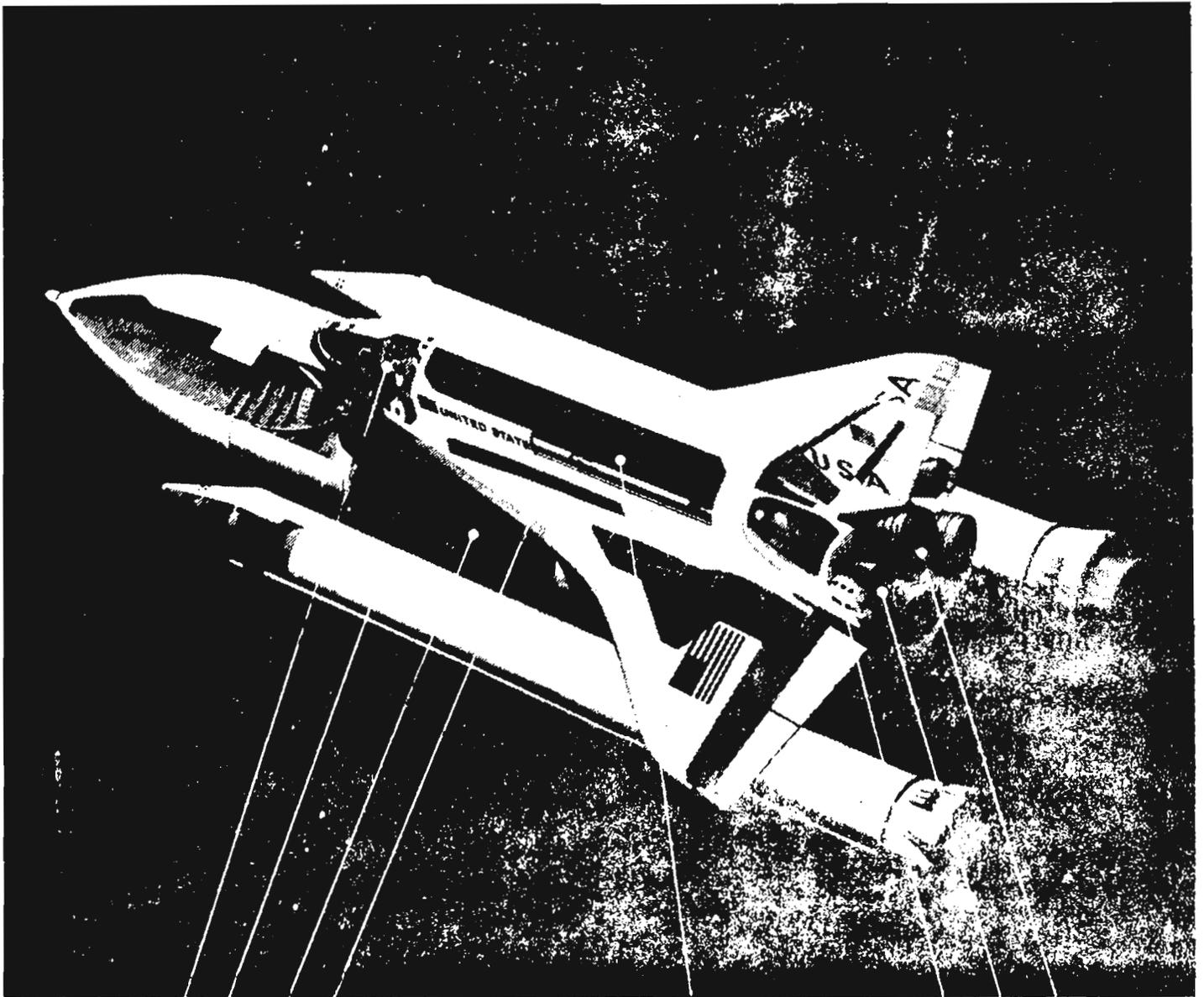


Figure 1 - Artist's Rendering of the Space Shuttle

environmental effects of transporting Orbiters over some 31.9 miles (51.3 km) of road from the Palmdale assembly site to DFRC.

A draft environmental impact statement for this proposed action was prepared and forwarded to the Council on Environmental Quality on February 2, 1976. Copies were forwarded to appropriate Federal, state, local agencies, and owners of potentially affected private property, who were asked to comment. The route that was then proposed for the overland transport (termed the "eastern route") passed through Air Force Plant 42, the City of Palmdale, Los Angeles County, and Edwards Air Force Base. That route, along Avenues N, M, and K, and 90th, 110th, and 140th Streets East, would have required 1 mile (1.6 km) of new roadway, 15.5 miles (24.9 km) of widened roadway, 2.5 miles (4.0 km) of paving on unpaved roadways, and relocation of 1.0 miles (1.6 km) of utility lines. Because the county right-of-way along the eastern route varies from only 30 ft. (9.1 m) to 100 ft. (30.5 m), compared to a requirement for clearance greater than the 78 ft. (23.8 m) wingspan of the Orbiter, easements of other property interests would have had to be obtained from 77 owners of private property which might have been affected by the proposed action.

After release of the draft statement, NASA continued its analysis and exploration of alternatives. Another alternative overland route, not previously considered, was identified. Such alternative, termed the "western route", offers the significant advantage of traversing a right-of-way already wholly owned either by the Federal Government or the County of Los Angeles. This right-of-way is sufficiently wide

so that no land acquisition or easements from private parties are required. Because all other factors - technical, cost, and physical environmental effects - are comparable for the two routes, the proposal now is to use the "western route." This final environmental impact statement has been prepared identifying that route for the proposed action and the analysis described herein is based on that route. The "eastern route" described in the draft statement is included in this final statement as an alternative.

2. Proposed Action

The proposed action is the overland transport of NASA Space Shuttle Orbiters from U.S. Air Force Plant 42, Palmdale, California, to DFRC at Edwards AFB. Modifications will be made to 21.9 miles (35.2 km) of existing roads in a sparsely populated region of the Antelope Valley, and 10.0 miles (16.1 km) of new road will be constructed. Eight miles (12.9 km) of the new construction are within the confines of Edwards AFB.

Seven trips, beginning in March 1977 and spaced approximately one year apart, are currently scheduled. The inert Orbiter (no fuels) will be supported on a specially designed transporter and moved at speeds of 3 to 5 mph (5 to 8 km/hr). Transport will occur at night and will require 9 to 11 hours to complete. Transport operations will be limited to periods with wind speeds of 12 knots (22.2 km/hr) or less, with no precipitation forecast and with no extremes in temperature.

3. Route

Figure 2 is a vicinity map indicating the general location of the area affected by the proposed project. The City of Palmdale is located approximately 60 miles (96.6 km) north-northeast of Los Angeles in the Antelope Valley. The proposed overland route from Site 1 at AF Plant 42 to the instrument runway (04) at Edwards AFB on Rogers Dry Lake is shown in Figure 3. The route passes through AF Plant 42, the City of Palmdale, Los Angeles County which includes unincorporated residential areas of Lancaster, and Edwards AFB.

The south terminal of the overland route is at AF Plant 42, Building 294 on Site 1. The route proceeds westward on existing taxiway B to 15th Street East; north on 15th Street East to Avenue M; west on Avenue M to 10th Street East; north on 10th Street East to Avenue E. The route continues north on 10th Street East onto Edwards AFB property and thence proceeds northwesterly to a point approximately 200 ft (60.96 m) east of Division Street. The route thence proceeds north to Rosamond Boulevard on a new road parallel to Division Street; east and northeast on Rosamond Boulevard to 120th Street East; and south on 120th Street East to the access road leading eastward to Runway 04 on Rogers Dry Lake. The route proceeds over the Edwards AFB runway and taxiway to the north terminal of the overland route at DFRC.³

The total distance to be traversed on the proposed overland route is approximately 31.9 miles (51.3 km), of which about 1.4 miles (2.3 km) is within the Air Force Plant 42, 8.5 miles (13.7 km) on right-of-way owned by the Los Angeles County Road

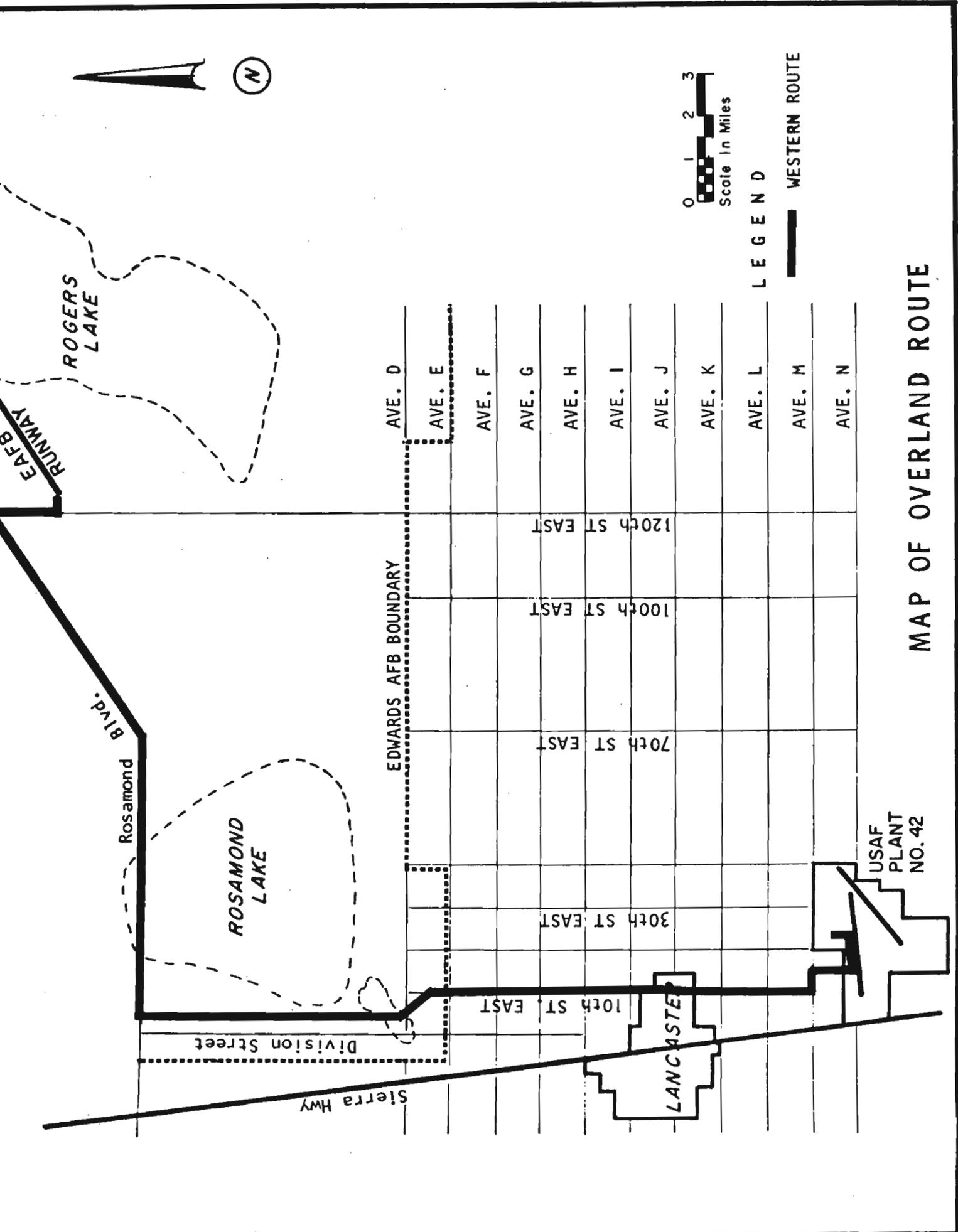


Figure 3

Department, and 22.0 miles (35.4 km) on roads located within the confines of Edwards AFB. Existing dedicated county right-of-way along the planned Orbiter transport route between Avenue M and Avenue E is 100 ft (30.48 m) wide.

4. Transport Operations

Overland movement of the Orbiter will require a total of 36.5 hours from Orbiter roll-out at U.S. Air Force Plant 42 at Palmdale until it is removed from the transporter at DFRC. Transport of the the Orbiter along the overland route will require from 9 to 11 hours at a currently planned maximum speed of 5 mph (8 km/hr).⁴

The Orbiter will be transported mounted on a specially fabricated strongback frame supported on commercially available wheel dollies. The strongback and dollies comprise a vehicle designated "commercial transporter," which can be towed by a standard heavy-duty truck tractor. Figure 4 shows the Orbiter supported on the commercial transporter for moving it over standard roads.

The weight of the combined transporter and Orbiter will be 240,000 lb (108,862 kg). The transporter will be designed for possible later use at NASA Marshall Space Flight Center, Alabama, and Vandenberg Air Force Base, California. Multiple dollies having a total of 80 pneumatic tires with a maximum road loading of 65 lb/in.² (4.6 kg/cm²) will support the load.⁵ The transporter will be about 110 ft (33.5 m) long, with a maximum width of 20 ft (6.1 m). Its turning radius (inboard wheel) will be 60 ft (18.29 m). The maximum dimensions of the Orbiter on the transporter are 110 ft long, 78 ft

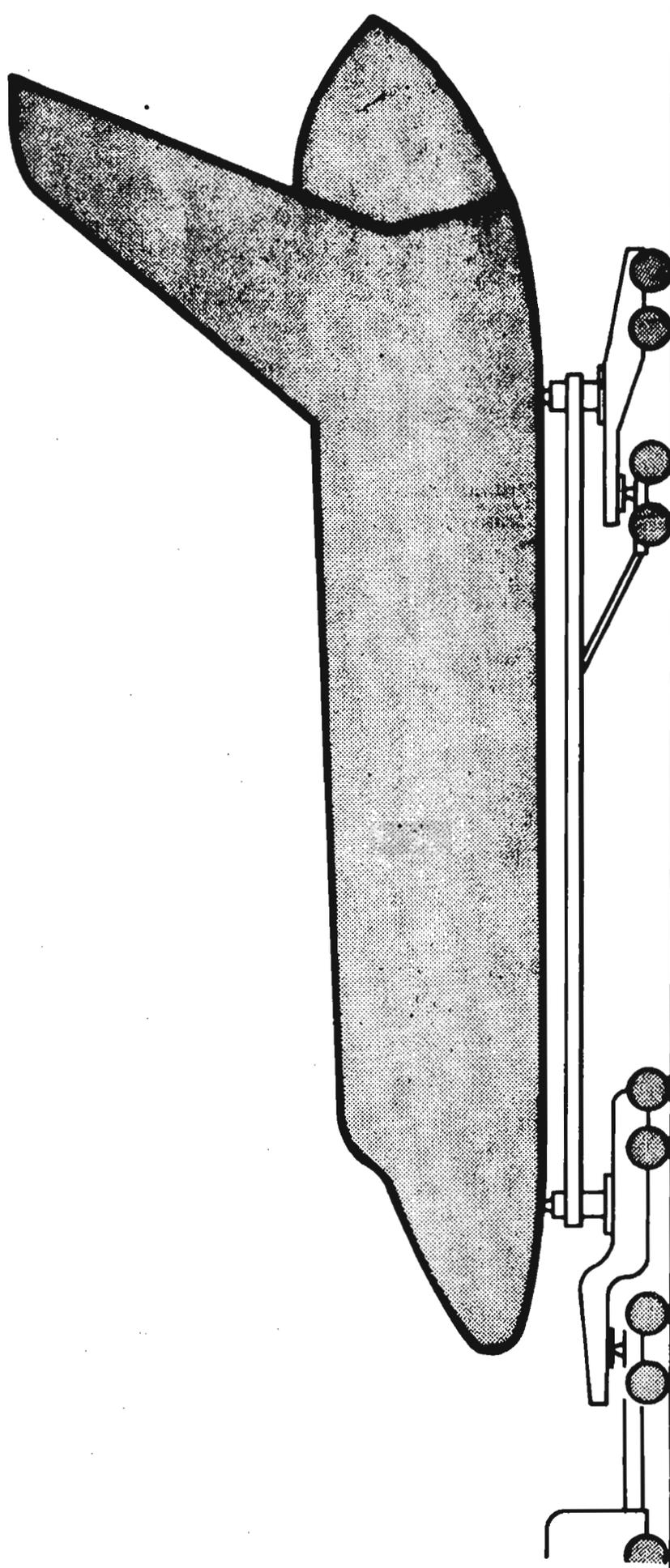


Figure 4 - Concept of Shuttle Orbiter Supported on Commercial Transporter

wide and 58 ft high (33.53 m, 23.77 m, 17.68 m). The bottom of the Orbiter wings as it sits on the transporter will vary from 10 to 12 ft (3.05 to 3.66 m) above the ground. The transporter will be provided with forward and aft fittings to anchor the Orbiter securely during transport.

The Orbiter will be transported along roadway centerlines over the entire length of the route.

The Orbiter, transporter and tow vehicle will be accompanied by support vehicles and personnel. Spare tow vehicles and equipment will be available to minimize any delay caused by equipment failure enroute. Communications will be maintained between vehicles in the transport convoy and with local emergency service agencies. Provisions for crowd control and other necessary security measures will be coordinated with appropriate local authorities.

5. Route Development

a. Acquisition of Entry Rights

Orbiter transport will take place entirely on Los Angeles County and U.S. Air Force rights-of-way and will not encroach upon private properties along the route. The acquisition of entry rights or easements will therefore not be required.

b. Construction Activities

Construction activities will consist of constructing new road, widening existing roads, relocating utility poles and electrical transformers, temporarily modifying traffic signals, and removing traffic islands. Existing roads on both county right-of-way

and on Air Force property have been evaluated and have more than adequate strength to support the loads that will be imposed by Orbiter movement. These construction activities are required to provide: (1) a suitable roadway for the transporter (a prepared surface with a minimum width of 24 ft (7.32 m) and intersections to accommodate a 60 ft (18.29-m) turning radius), and (2) clearance from existing obstructions. The Orbiter is 78 ft (23.77 m) wide from wing tip to wing tip; the wing tips will be approximately 12 ft (3.66 m) above the surface of the roadway during transport. No obstructions higher than 8 ft (2.44 m) under the Orbiter wings, or closer than 2 ft (0.61 m) from the wing tips and vertical stabilizer, can be allowed. A clearance of 5 ft (1.52 m) in all dimensions is preferred.

Existing taxiway B will connect the Shuttle parking ramp on AF Plant 42 with 15th Street East. North of taxiway B, 15th Street East will be modified to remove a dip in the roadway grade line, and a culvert will be installed. At the intersection of 15th Street East and Avenue M, the existing light pole and sign will be relocated to provide Orbiter wing clearance. Two Joshua trees in the vicinity of Avenue M and 10th Street East will be transplanted to permit passage of the Orbiter.

Pavement widths along 10th Street East between Avenue M and Avenue G are generally adequate for Orbiter transport; however, roadway edges will be repaired as required to ensure paved surface of sufficient width. Along the 10th Street East portion of the route between Avenue M and Avenue G, overhead utility crossings at

nine intersections will be modified to permit passage of the Orbiter. In addition, the 12 Kva power poles along the west side of 10th Street East between Avenue M and Avenue L will be relocated, and 14 trees within county right-of-way along 10th Street East will be trimmed or removed. Other modifications include the removal of the traffic island north of Avenue J and the modification of traffic signals above Avenue J and Avenue I so they can be swung clear of the route before passage of the Orbiter. Two miles (3.2 km) of new 24-ft-wide (7.32-m) roadway will be constructed on county right-of-way between Avenue G and Avenue E at the Edwards AFB property limit.

From 10th Street East and Avenue E, 7.5 miles (12.1 km) of new 24-ft-wide (7.32-m) roadway will be constructed on Edwards AFB property, following the alignment shown on Figure 3 north to Rosamond Boulevard. In the vicinity of the marsh area, plastic soils and organic material will be removed and replaced with granular fill for a required length of approximately 600 ft (182.88 m). One multiple-pipe culvert and additional single-pipe culverts will be installed along this segment of new road construction.

The eastbound lanes of the divided sections of Rosamond Boulevard - 5.1 miles (8.2 km) - will be widened to accommodate Orbiter transport. Additional pavement will be added to 120th Street to provide a 24-foot-wide (7.32-m) pavement, and 0.6 miles (1.0 km) of new 24-ft-wide (7.32-m) roadway will be constructed to connect 120th Street to Runway 04 on Edwards AFB.

In summary, approximately 10 mi (16.1 km) of totally new roadway will be constructed and 6.3 mi (10.1 km) of currently paved roadway will be widened. A summary of roadway pavement modifications required by the proposed action is shown in Figure 5.

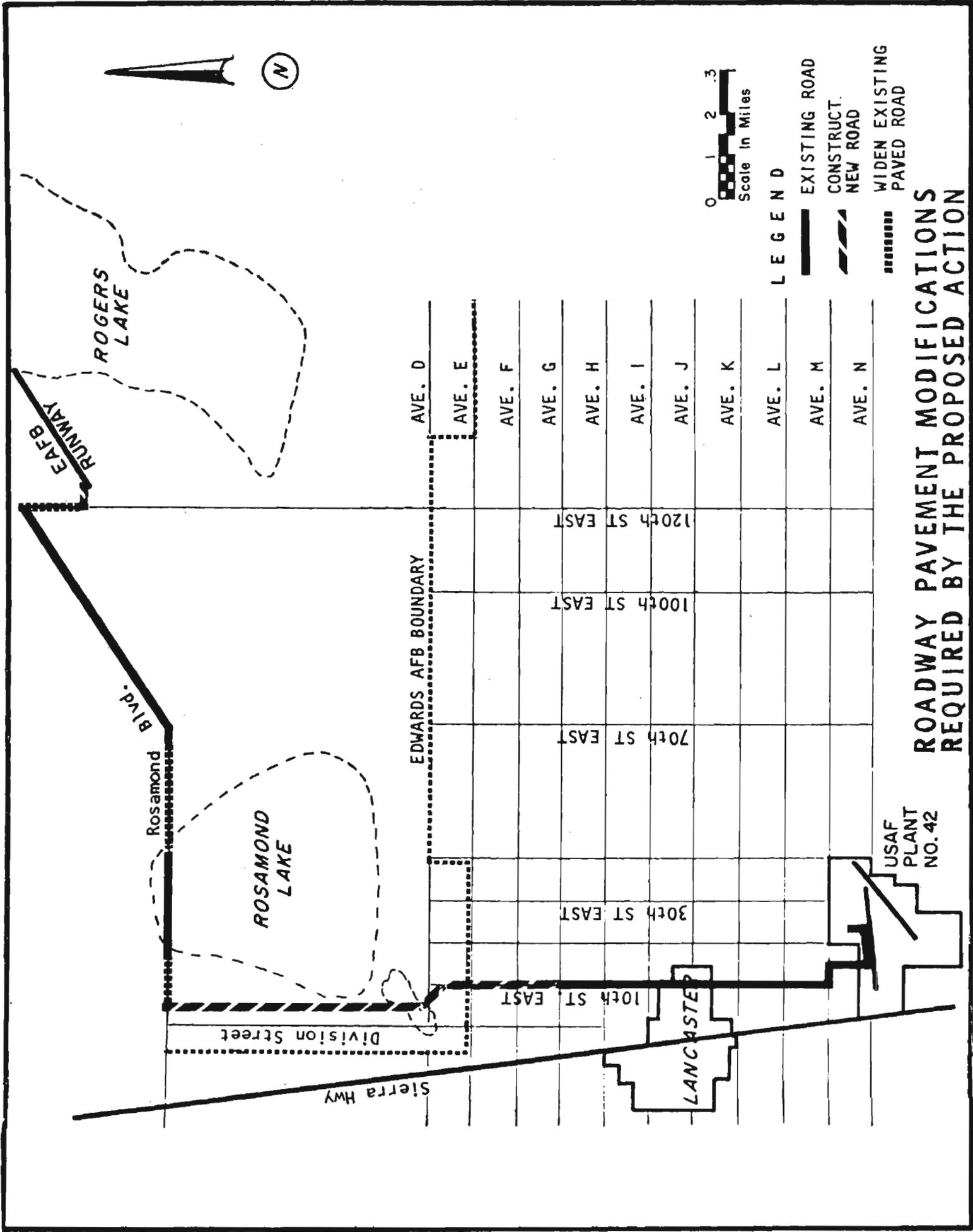
B. Statement of Purpose

NASA Space Shuttle Orbiters will be assembled and checked out at Building 294, the Shuttle Orbiter Final Assembly and Checkout Facility, on Site 1 of AF Plant 42, Palmdale, California. The Orbiter will then be transported to DFRC for approach and landing tests and/or for transportation elsewhere.

Five Orbiter vehicles are scheduled for transportation from Palmdale to DFRC. In addition, one vehicle will be transported from DFRC to Palmdale for refurbishing and then returned to DFRC. Thus, seven moves are scheduled to be made over a period of seven years, beginning in March 1977. This schedule anticipates that these moves will be spaced approximately one year apart.

C. Description of Environment of the Area Affected⁶

The proposed route is located in the Antelope Valley, which lies at the southwestern corner of the Mojave Desert. The general area around the site is largely undeveloped, rolling dry desert with mountain ranges in the distance. Except in the towns such as Mojave, Palmdale and Lancaster, the typically desert area is only sparsely populated. Aerial photographs showing areas along portions of the route are shown in Figure 6.



**ROADWAY PAVEMENT MODIFICATIONS
REQUIRED BY THE PROPOSED ACTION**

Figure 5

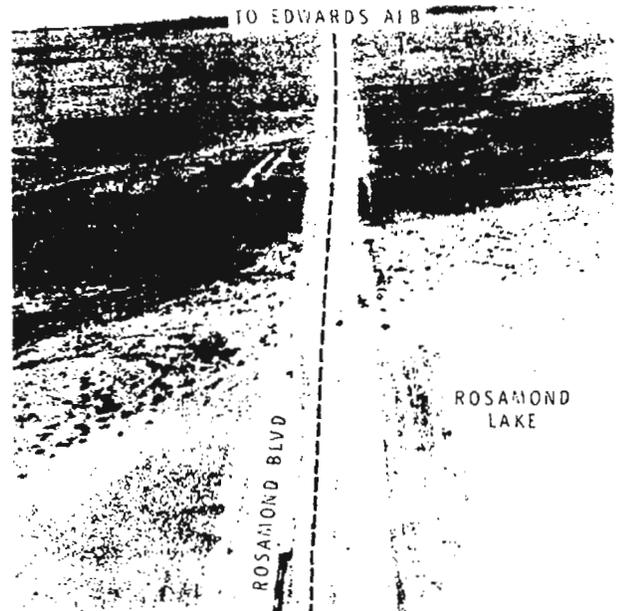
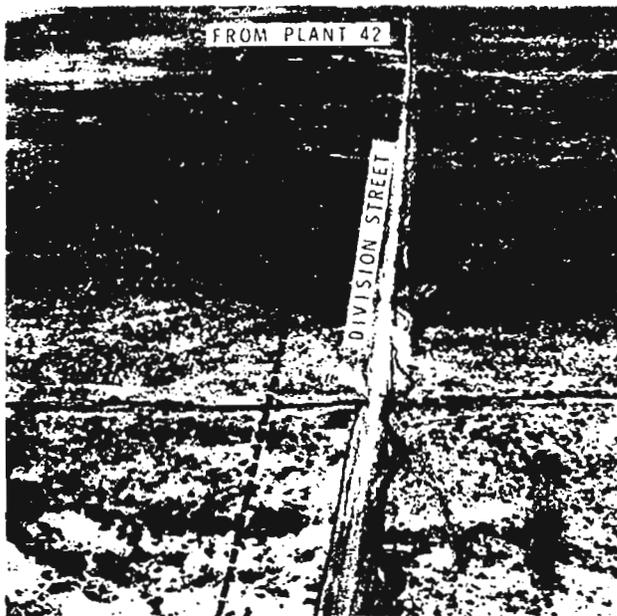
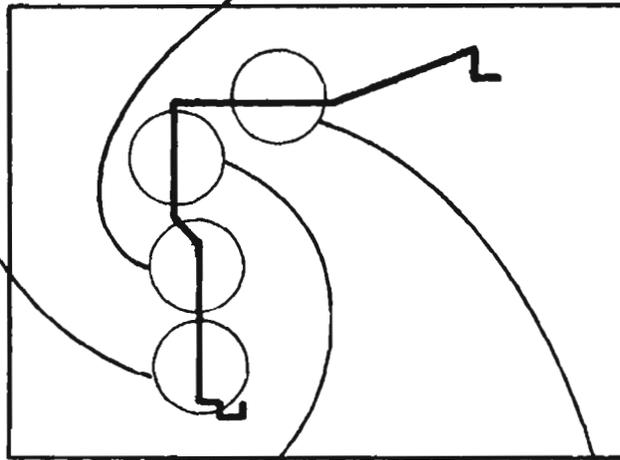
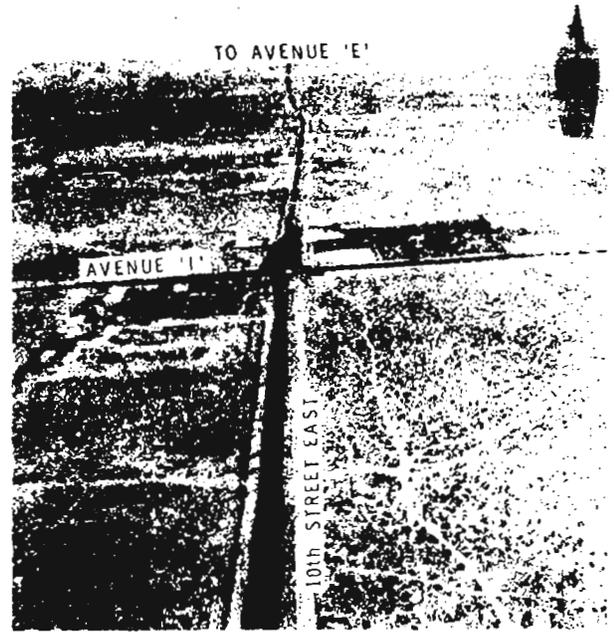
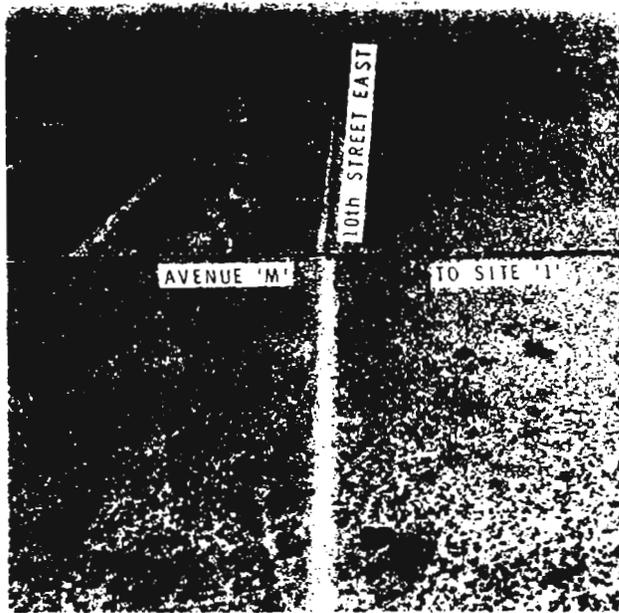


Figure 6. Typical Areas Adjacent to Route

1. Topography

The terrain covered by the proposed route is fairly level with a general downward slope to the north. Grades along the route do not exceed $2\frac{1}{2}$ percent. Site 1, AF Plant 42, is 2,500 ft (762.00 m) above sea level; Rogers Dry Lake is 2,270 ft (691.90 m) above sea level.

2. Climatology and Meteorology

The climate of the Antelope Valley is generally quite dry; the relative humidity varies from a mean maximum of 68 percent to a mean minimum of 23 percent. In Palmdale, the relative humidity varies during the early morning hours from 40 percent in midsummer to almost 80 percent in midwinter. In the afternoon hours, it varies from 45 to 50 percent in December and January, and from 15 to 20 percent during August and September.

In this arid climate, the summers are characteristically hot; the mean daily maximum and minimum temperatures are 95°F (35°C) and 63°F (17°C), respectively, with extremes as high as 113°F (45°C). Winters are mild to cold with a mean minimum of 30°F (-1°C) in January and an extreme low of 3°F (-16°C).

Prevailing surface winds along the route are generally light from the southwest or west-southwest. Mean wind speeds are 16 mph (26 km/hr) or less 42 percent of the time, and exceed 27 mph (43 km/hr) less than 1 percent of the time. Wind velocities of

65 mph (105 km/hr) occur perhaps once in 100 years. The strong winds generally blow from the northwest or west-northwest. At night the wind is normally calm.

Visibility is 10 miles (16.1 km) or greater 96 percent of the time, less than 7 miles (11.3 km) 2 percent of the time. Sky conditions are excellent, providing ceilings of 10,000 ft (3,048 m) or greater 95 percent of the time. Problems with visibility are usually associated with high winds, which cause dust.

Precipitation is almost always in the form of rainfall, which averages 4 in. (10.3 cm) annually, 90 percent of which occurs from November through April. Snowfall averages 1 in. (2.5 cm) per year and occurs mostly in January. Occasionally, over 1 ft (30.5 cm) of snow accumulates, but it melts quickly.

3. Biota

Flora and fauna in the vicinity of the proposed overland route are typical of desert communities on well-drained alluvial soils below an elevation of 5,000 ft (1,524.00 m). This habitat is relatively common in northeast portions of Los Angeles County.

The plant community found here includes:

- o Buckthorn (Ceanothus spp.)
- o Sage (Salvia spp.)
- o Creosote Bush (Larrea tridentata)

- o Joshua Tree (Yucca brevifolia)
- o Reed (Phragmites australis).

The few trees which have been planted close to buildings at the roadside include cypress, cottonwood, black walnut, locust and elm.⁷

Wildlife associated with desert woodland, desert and freshwater habitats have been identified in the Environmental Resources Data Base of the Preliminary North Los Angeles County General Plan.⁸

The relative abundance of individual species is designated in Table 1 by letters as follows: "a" (abundant), "c" (common) and "u" (uncommon).

Table 1

Desert Woodland

Scott's Oriole (u)	Gambel's Quail (c)
Cooper's Hawk (u)	Red-Tailed Hawk (c)
Mourning Dove (c)	American Kestrel (c)
Pinyon Jay (c)	Collared Lizard (u)
Cactus Wren (c)	Dusky-Footed Woodrat (c)

Desert

Black Raven (u)	Western Box Turtle (c)
Phainopepla (u)	Desert Horned Lizard (u)
Zebra-Tailed Lizard (c)	Finge-Toed Lizard (u)
Kangaroo Rat (a)	Rattlesnake (several species) (c)
Desert Tortoise (u)	Dusky-Footed Woodrat (c)
Antelope Ground Squirrel (c)	

Freshwater

Osprey (u)	Canada Goose (c)
Mourning Dove (a)	Cinnamon Teal (u)
Belted Kingfisher (c)	Tricolored Blackbird (c)
Black-Crowned Night Heron (u)	Green-Winged Teal (u)
Pacific Pond Turtle (c)	Northern Shoveler (u)
Two-striped Garter Snake (c)	Mallard (c)
California Newt (c)	American Widgeon (u)
Bullfrog (a)	Hooded Merganser (u)
Pacific Tree Frog (c)	American Coot (a)
Raccoon (a)	Common Gallinule (c)
Muskrat (a)	Long-Billed Marsh Wren (c)

No significant numbers of rare, endangered or threatened plant species are expected to be encountered along the route.⁹ All California native plants are protected under state law to prevent depletion by unplanned and cumulative acts.

Rare, endangered and protected wildlife occur in the dry wash species, the desert reptile group and the riparian species as follows¹⁰:

- o Dry Wash Species - Rosy Boa, Banded Gecko, California Legless Lizard, Prairie Falcon, Collared Lizard, Mountain King Snake, Desert Tortoise.
- o Desert Reptile Group - Desert Tortoise, Collared Lizard, Prairie Falcon, Desert Horned Lizard, Desert Iguana, Long-Nosed Leopard Lizard (all protected by state law).
- o Riparian Species - Bald Eagle (seldom seen), Red-Legged Frog, Two-Striped Garter Snake, California Condor, Mountain Kingsnake.

A small marsh has been created where the outflow from the Lancaster Water Renovation Plant crosses Division Street at Avenue D. Various species of waterfowl, amphibians and other aquatic life now inhabit this area.

4. Geology and Seismology

The geology of the proposed site is relatively uncomplicated. The Antelope Valley has been filled with a wide range of alluvial sediments derived from the mountains to the south and west. These deposits extend to a depth of 2,000 ft (609.60 m) or more, and consist of alternating layers and lenses of well-graded sand, gravel, silt and clay. Local discontinuities are the result of ancient stream channels that were later filled with different sediments to form sinuous changes in the sedimentation, which tend to break the horizontal continuity. These well-graded mixtures of silt, sand and gravel may be confined by a relatively impermeable fine-grained layer. For the most part, groundwater contained in these sediments is unconfined. The permeability of the sediment varies, but because of the high percent of coarse-grained materials, it is considered moderately to highly permeable.

The material in Rogers Dry Lake, at the northern end of the proposed route, consists of a playa clay, which is the fine playa or mud-flat facies of recent alluvium.

Site 1, AF Plant 42, is located 5 miles (8 km) northeast of the San Andreas Fault, a major active fault transecting the state. The most recent movement of the fault, from San Bernardino on the south to Fort Tejon on the north, is believed to have occurred in 1857 during an earthquake comparable in magnitude to the 1906

San Francisco earthquake. Since that time, however, this section of the fault has been unusually quiescent compared to other sections where such seismic activities as small earthquakes and slow creep have been reported regularly.

No faults are mapped in the immediate vicinity of DFRC. The nearest active fault zone is located more than 20 miles (32.2 km) to the northwest and is known as the Garlock Fault: the San Andreas Fault is 30 miles (48.3 km) to the southwest. These are the only potential sources of strong earthquake motion in the DFRC area. Records of earthquake epicenters for the general area indicate that fewer than ten earthquake-related events have occurred within 20 miles (32.2 km) of DFRC since 1934; these events all had magnitudes of less than 4 on the Richter scale.

5. Soils and Drainage

The natural soils in the area of the proposed project are quite similar to those at AF Plant 42 -- primarily sand, silty sand and silt with small amounts of clay. Gravel and clay in either a sand or silt matrix have been found and may be anticipated at any depth.

The most important depth-related variations are those of density and strength of soils. In the upper 2 ft (0.61 m), the dry weight of the soil averages 90 lb/ft³ (1,443 kg/m³). Between 2 and 5 ft (0.61 and 1.52 m) in depth, this average density increases to 102 lb/ft³ (1,635 kg/m³). The upper natural soils are moderately firm

at existing moisture content but would become weaker when wet. Below 3 to 4 ft (0.91 to 1.22 m) beneath the natural surface, the soils are firm.

Regional drainage occurs as seasonal sheet flow and by way of shallow watercourses. No regional flood control facilities exist except in urban areas; and, since no serious problems have been encountered or are expected, no flood control projects are planned. Occasional localized flooding can occur, causing short duration overflow of roadways.

Water in the marsh area located in the southwest corner of Edwards AFB (Avenue C and 10th Street East) is derived primarily from discharge from the Lancaster Water Renovation Plant, located in the vicinity of Avenue D and 20th Street West. The treatment plant utilizes the marsh area for additional evaporation ponding and discharges from 50,000 gal per day (189,265 liters/day) to over 2,000,000 gal per day (7,570,600 liters/day) of outflow into the marsh. The photographs in Figure 7 show this marsh area in the vicinity of the proposed route.

An additional source of water for the marsh is Amargosa Creek, though this drainage is seasonably variable. Amargosa Creek collects runoff from the north face of the Sierra Pelona Mountains and enters the Antelope Valley in the vicinity of Avenue Q and 25th Street West. As the flow proceeds northerly, it divides into two segments.

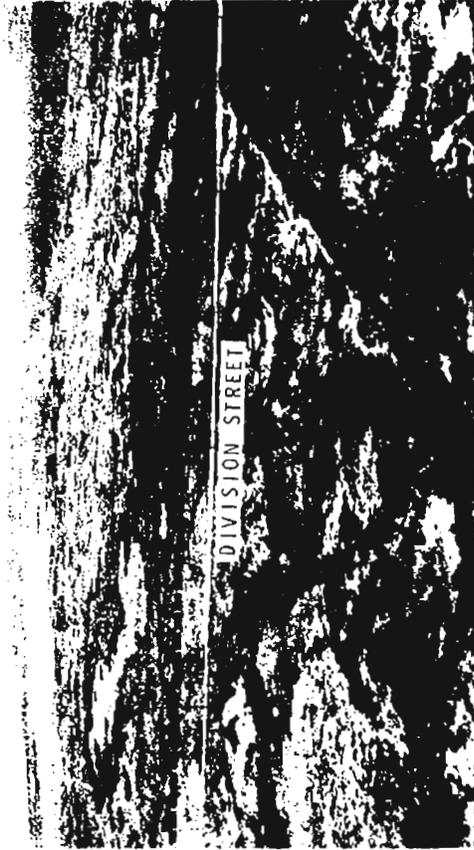


Figure 7. Route Section Showing Marsh Area in Vicinity of Division Street

The westerly flow is concentrated at 20th Street West and Avenue J in a channel constructed for the Antelope Valley Freeway and progresses northerly to a retention basin located near Avenue G and 30th Street West. The second flow is diverted to the east of Lancaster following a northerly course between the Southern Pacific Railroad tracks and 10th Street East. It then merges with other drainage waters at Avenue G.

The depth of groundwater on and adjacent to AF Plant 42 ranged from 260 to 313 ft (79.25 to 95.40 m) in 1963. Present water levels at the site are unknown, but the average drop in water levels beneath the site was 6 ft (1.83 m) per year for the 24-year period from 1939 to 1963. From 1940 to 1963 the maximum drop in groundwater level recorded near the site in any one year was 10 ft (3.05 m); groundwater levels over the entire Antelope Valley fell an average of about 6 ft (1.83 m) per year during the period from 1920 to 1960. It is anticipated that above-normal rainfall will tend to raise water levels in general.

Recharge of the groundwater basin results from direct percolation of rain or applied water, surface water percolation, and subsurface underflow. Rain falling directly on the area is very sparse; therefore, the chief source of replenishment is derived from percolation of surface waters originating in the San Gabriel and San Bernardino Mountains.

The quality of the groundwater is considered good. The total dissolved solids content ranges from 163 to 373 parts per million (ppm). The water is a calcium-sulfate type with high bicarbonation content. Fluoride-ion concentration is less than 0.5 ppm.

Most of the domestic water for AF Plant 42 and the surrounding area is obtained from deep wells. The Palmdale irrigation district has several deep wells located south of the AF Plant 42 area. These sources are augmented by a storage reservoir at Little Rock Dam. The Lancaster area also receives its domestic water from a deep well system.

6. Utilities

The principal utilities along the proposed overland route are electric power, telephone service, high-pressure natural gas - 350 psig (2.46 kg/cm^2) - and cable television. There are power poles and lines on one side of the roadway over approximately one-third of the route. Electrical power is supplied by the Southern California Edison Company, telephone service by the Pacific Telephone and Telegraph Company and the General Telephone Company of California, and natural gas by the Southern California Gas Company. Water is supplied from deep wells, and sewage is handled by septic systems and by the Lancaster Water Renovation Plant (County Sanitation District 14 of Los Angeles County). Cable television is supplied by WGN-Electronic Systems Company.

7. Acoustics

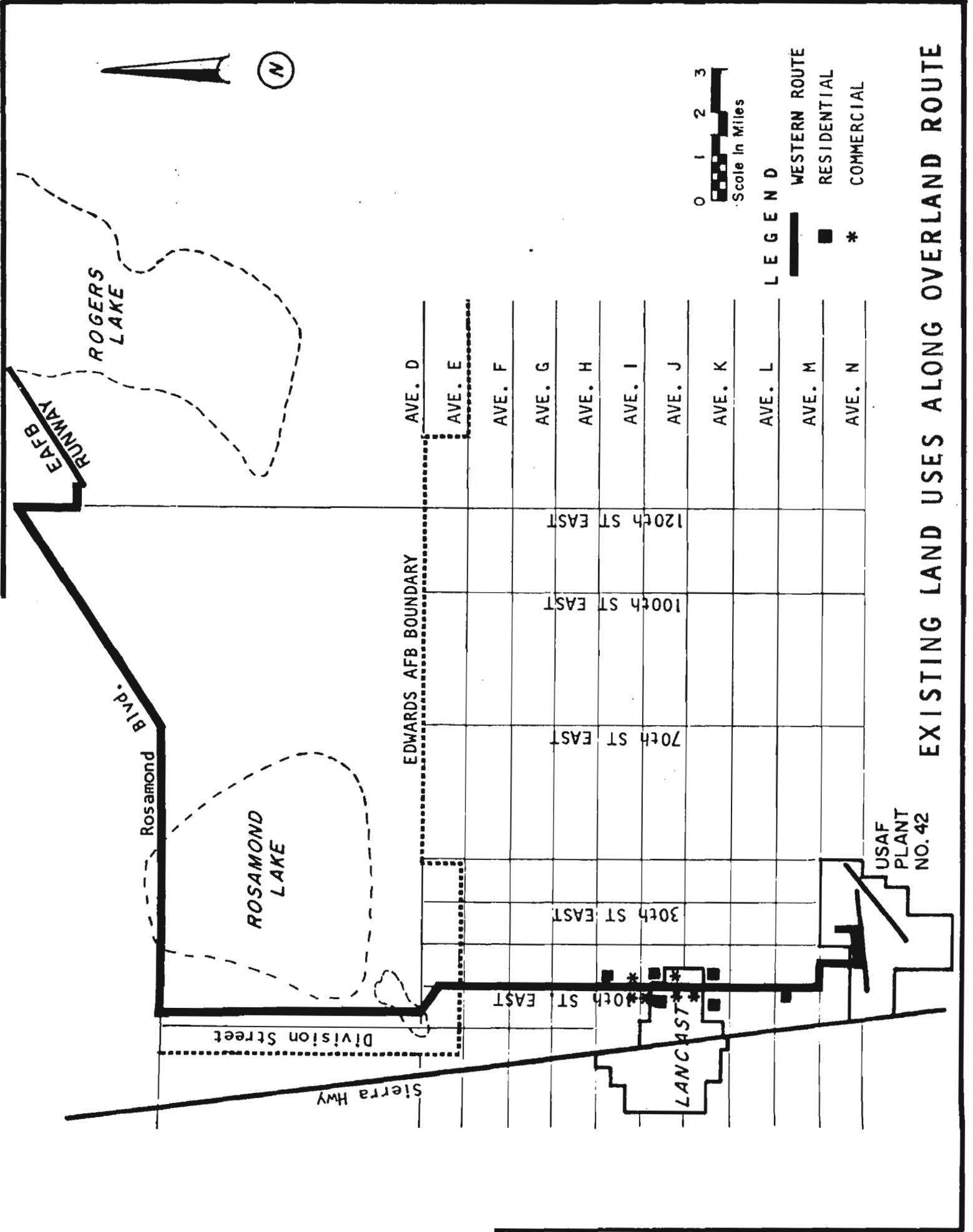
Acoustic levels along the route are typical of sparsely developed regions with a probable 24-hour average level below 50 L_{dn} . (L_{dn} is the average A-weighted sound level, during a 24-hour time period, with a 10-decibel penalty applied to nighttime sound levels.)¹¹ Acoustic levels of approximately 95 L_{dn} (Composite Noise Rating 130) have been reported in localized areas of AF Plant 42 from jet engine testing.¹² Levels at DFRC are similar to those at AF Plant 42.

8. Land Use

Areas along the transport route are mostly undeveloped. Typical urban area residential development and associated neighborhood commercial development occur along 10th Street East, primarily between Avenue K and Avenue I. For short distances north of Avenue I and south of Avenue K, the route is sparsely populated; the remainder of the route corridor is typified by totally undeveloped desert areas. The approximate location of residential areas and existing commercial development along the route is shown in Figure 8. Figure 9 is an aerial photograph of the densest development along the route -- 10th Street East between Avenue K and Avenue I.

9. Transportation and Traffic

The proposed route follows an existing grid pattern of roads consisting of key north-south arteries and good east-west routes. In general, these streets are paved or graded for two-lane transportation and normally carry light traffic.¹³



EXISTING LAND USES ALONG OVERLAND ROUTE

TO EDWARDS AFB

AVENUE 'J'

10th STREET EAST

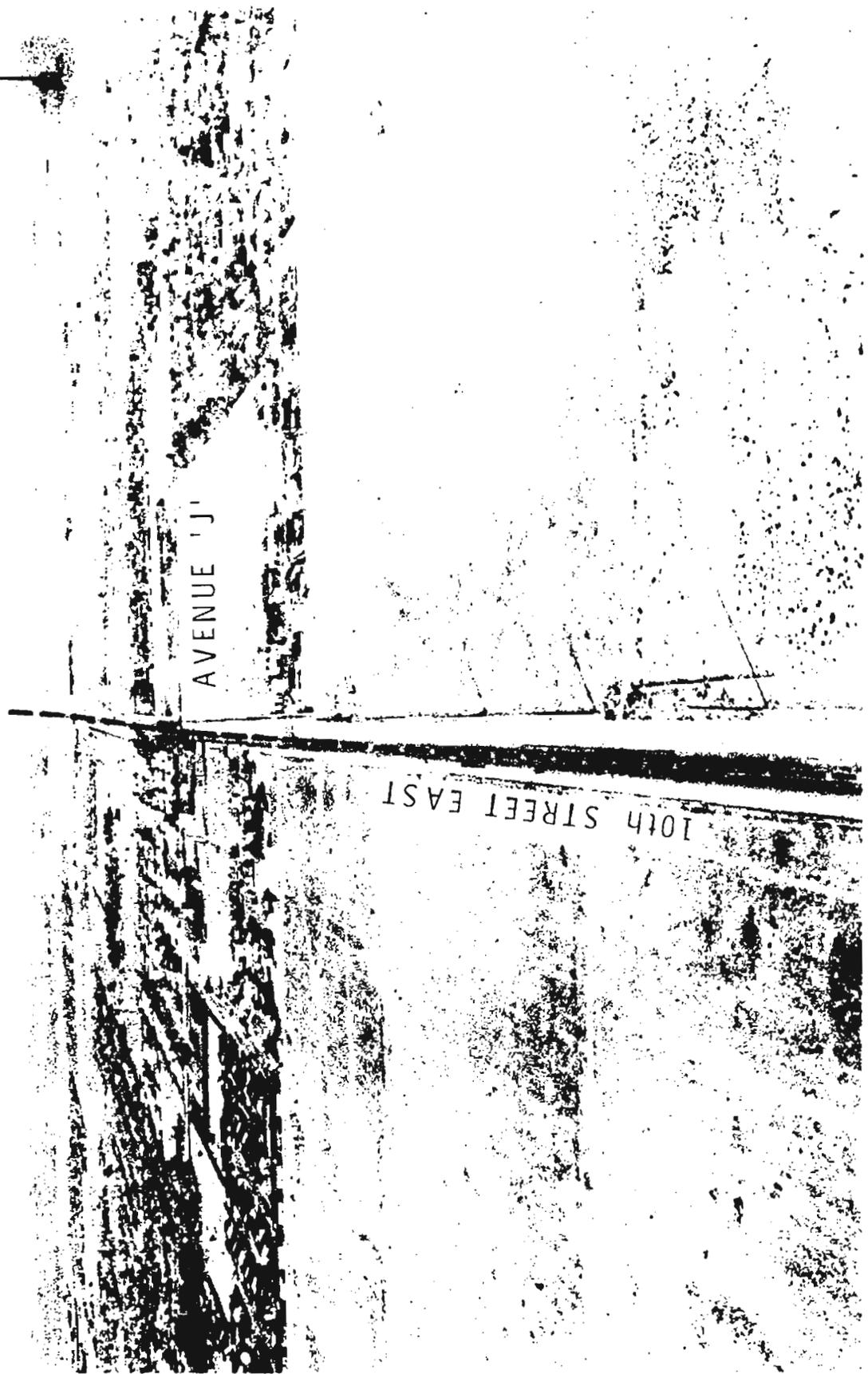


Figure 9. Route Section Along 10th Street East Showing Densest Development

10. Population

Population in the Antelope Valley is approximately 90,000 persons. Growth has been steady since the 1940 population of 11,000.¹⁴ Population along the proposed transportation route is estimated to be 1,000 persons. No significant development or population increase in areas along the route is expected during the next 10 years.¹⁵ The portion of the route along 10th Street East between AF Plant 42 and Avenue H is included in the Lancaster Primary Urban Development Area.¹⁶

11. Community Facilities

Schools, churches, hospitals and recreational facilities such as theatres, golfing, swimming and skating are located in the adjacent community. None of these facilities are located along the proposed transport route.

12. Archaeological and Historical Sites

The first aboriginal inhabitants of the Antelope Valley area predate the time of Christ, and lived along the valley margins. Later inhabitants, probably Shoshone peoples, apparently were the first to exploit the resources along streams near the present (dry) lake beds. The transporter route does not pass through any of the major archaeological areas identified in the Environmental Resources Data Base of the Preliminary North Los Angeles County General Plan.¹⁷ No sites listed in the National Register of Historic Places, California Historical Landmarks, or California Points of Historical Interest are along the route of transport.

An independent archaeological study^{17a} of the proposed new construction portion of the route was undertaken in compliance with regulations of the Advisory Committee for Historic Preservation ("Procedures for the Protection of Historical and Cultural Properties," 36 CFR Part 800) to identify archaeological and historical resources in the area that might be eligible for inclusion in the National Register. The area of the right-of-way and the nearby borrow pits that could be used to provide fill materials for roadway construction were examined. Six sites of historic or prehistoric activity were identified on the right-of-way itself. The prehistoric sites were found to contain scatterings of flaking debris; they represent further verification of the lifeways and migratory patterns of the prehistoric inhabitants of the Antelope Valley. The historic sites were found to consist of concrete slabs, dams, reservoirs, fence posts, and trash heaps. These findings verify the agricultural pattern known to have existed for the Valley and are of the period A.D. 1910-1954. All of sites were judged to be minor in nature; none are considered to be eligible for listing in the National Register of Historic Places.

Seven other similar sites, both historic and prehistoric, were identified in nearby areas outside the right-of-way. One of these is in the vicinity of a borrow pit. Here again, all are considered to be minor sites not eligible for listing in the National Register.

II. RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS, POLICIES AND CONTROLS FOR THE AFFECTED AREA

A. Existing Land Use Plans, Policies and Controls

The proposed action does not conflict with land use plans and policies described in the Preliminary North Los Angeles County General Plan. This plan is currently being reviewed and has not yet been adopted as final policy; however, it does reflect, in broad terms, the nature of expected or planned land uses by the year 1995. The Summary of the Areawide General Plan indicates an airport buffer zone extending 1 mile (1.6 km) north and south, and 2 miles (3.2 km) east and west of the proposed Palmdale Intercontinental Airport. (The proposed airport will be located to the east of AF Plant 42 and will therefore not affect the proposed western route.) Lands along the transport route between the airport buffer zone and Edwards AFB are indicated for rural and low-density urban usage, with neighborhood commercial usage indicated at major street intersections.¹⁸

A full-grid network of major and secondary roads is planned for the area.¹⁹ Constructing 2 mi (3.2 km) of new road on existing county right-of-way along 10th Street East conforms with this plan. Significant future traffic increases may occur along Avenue M west of 90th Street, on Avenue K from 25th Street West to 50th Street East, on Avenue J and Avenue I from 30th Street West to 20th Street East, on Avenue H from the Antelope Valley Freeway to 90th Street East, and on 10th Street East between Avenue L and Avenue H.²⁰ The proposed

action is consistent with existing circulation plans since overland transport will occur infrequently and will be conducted during nighttime hours.

Zoning along the Los Angeles County portion of the route is primarily residential-agricultural. The area along 10th Street East between the airport buffer zone (Avenue L) and Avenue I is zoned for light agriculture, low density residential and commercial use. The remainder of the route along 10th Street East north of Avenue I is zoned desert-mountain, which allows heavy agriculture and light industrial use.²¹ The proposed action is consistent with allowable land uses.

B. Growth-Inducing Impact of the Proposed Action

The proposed action will not induce growth in the project area. Road construction will occur over a 4-month period and will not involve any permanent influx of workers. If the transporter is fabricated at AF Plant 42, it will involve limited personnel over a short period of time. Transport operations will occur only about once a year and will involve existing government and NASA-Contractor personnel. Construction of new 24-ft-wide (7.32-m) roadways conforms with traffic planning and will not increase traffic through the area.

C. Private Lands

The dedicated county right-of-way along the overland route has been verified to be 100 ft (30.48 m) wide. There will therefore be no encroachment of the Orbiter onto private lands adjacent to the route.

III. PROBABLE IMPACT OF THE PROPOSED ACTION ON THE ENVIRONMENT

A. Direct Effects

1. Route Development

a. Easements

Easements, permits or other forms of authorization will not be required from property owners along the route because the Orbiter will not encroach on private property adjacent to the route and utilities will be relocated within county right-of-way.

b. Construction

1) Land Form. The proposed action requires constructing approximately 10 mi (16.1 km) of new roads, widening existing paved roadways along Rosamond Boulevard and 120th Street on Edwards AFB, relocating approximately 1 mi (1.6 km) of utility poles, and modifying overhead utility crossovers and other obstructions in the Orbiter wing overhang area. These measures will not affect the existing land form of the area. Minimal recontouring of the land will result from the minor grading of roadways on the existing flat floor of the desert, and from removing soft material and replacing it with granular fill in the marsh area at the southwest corner of Edwards AFB.

2) Air Quality. Fugitive dust and exhaust emissions will be released to the atmosphere during construction. Dust control measures consistent with state and local regulations and good construction practices will reduce amounts of dust generated.

Construction may involve two crews with up to five vehicles each. These emissions may have a temporary, localized effect on air quality; they are insignificant compared to activities occurring in the Palmdale and Lancaster population centers.

3) Water Quality. Construction activities will have no effect on water quality. Water quality in seasonal washes will not be affected by the limited construction activities and by storm runoff, which is usually characterized by high velocity and high turbidity. Groundwater quality will not be affected since the aquifer lies below 200 ft (60.96 m) deep. Recharge of groundwaters will not be affected by the approximately 30 acres (12.1 hectares) of new road surface. The remoteness of groundwaters precludes their degradation from this one-time construction activity, including possible fuel spills from road-building equipment and the remote possibility of splitting cases of electrical transformers during their relocation with leakage of the insulating PCB (polychlorinated biphenyl) fluid.

4) Biota. Approximately 20 acres (8.1 hectares) of existing desert habitat will be removed along the 31.9-mi (51.3-km) route because of the construction of new roads. This habitat is widespread in North Los Angeles County; its animal and plant communities will not be significantly affected.

The relocation of two Joshua trees, and the trimming or removal of approximately 14 deciduous cottonwoods will not

have a significant effect on wildlife because these trees are not a limiting factor on the carrying capacity of the environment of this area.²² However, the Joshua trees will be transplanted, and the cottonwoods will be trimmed rather than removed where possible. Necessary tree removal permits and agreements will be obtained before any tree is removed or relocated.

The route crosses a narrow portion of a marsh area which is sustained in the most part by outflow from the Lancaster Water Renovation Plant, and is located in the southwest corner of Edwards AFB property. This 480-acre (194-hectare) marsh provides a valuable and limited habitat for a large number of wildlife species, including numerous migratory waterfowl and several protected species listed previously in Section I.C.3. The route in this area has been located to minimize the impact of road construction on the marsh. The marsh will be disturbed only where it intersects the roadway route; no construction activity will occur in areas not immediately adjacent to the roadway.

Approximately 0.75 acre (0.3 hectare) of existing freshwater habitat, less than 0.2 percent of the total marsh area, will be removed as a result of constructing the new roadway. This relatively small loss of habitat will have little effect on the carrying capacity of the marsh, and no significant displacement of wildlife is anticipated.²³ Improving and widening the roadway in the marsh area will not impede the water flow because culverts will be provided under the road bed.

It is also noted that the California Condor has been observed to feed in this area perhaps two or three times a year during October and November. Activity along existing roadways will not affect these endangered birds.

5) Geology and Seismology. Construction proposed for this action will not affect geologic structures since it is restricted to shallow grading, roadway surfacing, and removing man-made and vegetative obstructions.

6) Soils and Drainage. Maintaining existing drainage patterns will require installing approximately 20 culverts for the section of new road between Avenue E and Rosamond Boulevard. The additional paved surfaces will contribute to sheet flow during and after rainy periods, and will retard drainage into the soil. However, the proportion of additional pavements required by the proposed action is very small, and no significant effect to existing drainage patterns is anticipated.

7) Utilities. Relocating or modifying power and telephone lines will be coordinated with responsible utility companies; no significant effect on service is anticipated.

8) Acoustics. Construction vehicles and equipment will increase acoustic levels in the vicinity of the construction sites. These levels will be typical of small road construction crews. No blasting operations are required. Wildlife disturbed by temporary

increases in noise levels may be displaced into the surrounding habitat until construction of that portion of the route is completed. No significant effects resulting from construction noise is anticipated.

9) Land Use. Construction associated with the proposed action will have no adverse effect on existing or planned land uses. Development of paved roadways on existing rights-of-way conforms with the Preliminary North Los Angeles County General Plan.

10) Transportation and Traffic. Roadway construction along the route will occur over a 4-month period. The effect of any traffic delays resulting from construction activities will be minimal because of the light traffic along the affected streets and the availability of alternate travel routes.

11) Population and Community Facilities. No effect on population or community facilities from proposed road construction is anticipated.

12) Archaeology. Construction of the roadway will destroy, at least in part, the six minor historic or prehistoric sites identified in the archaeological survey as being on the right-of-way. There will be no identifiable effect on the seven other sites examined outside the right-of-way. None of the sites to be affected by the proposed construction are considered eligible for inclusion in the National Register of Historic Places. However, in accordance with the recommendations of the archaeological report to the Corps of Engineers^{23A}

and with that of the State Historic Preservation Coordinator (See Section X-C), data gathering and collection of cultural materials will be accomplished for those sites on the right-of-way. A qualified archaeologist will be engaged to evaluate cultural resources, if any, prior to grading operations at these locations and all artifacts recovered will be consigned to an appropriate curatorial organization for recording and analysis.

The sites outside the right-of-way will be staked off to insure no encroachment during construction operations. Borrow pit D, located one half mile west of 120th Street, and identified by the archaeological report as being adjacent to three sites possibly eligible for inclusion in the National Register, is two miles (3.2 km) from the proposed route and will not be affected by the proposed action. Fill material will not be obtained from this borrow pit.

13) Local Economy. The direct economic effect of the proposed construction will be negligible since the project involves limited funds and will be spread over a substantial period of time. The residential and commercial area along 10th Street East between Avenue K and Avenue H will receive special attention to minimize adverse economic effects.

14) Aesthetics. No degradation of existing aesthetic values of the area is anticipated because of the limited scope of construction. Placing overhead utilities underground will enhance aesthetics.

2. Transport Operations

The actual transport of the Orbiter along the overland route will not affect land form, geology, soils and drainage, utilities, land use, community facilities, and historic sites.

a. Air Quality.

Exhaust emissions from the vehicles associated with the transport operations will be released to the atmosphere. This operation will occur about once a year, over a period of seven years. Even if as many as 50 vehicles (including spare vehicles, police cars and security control vehicles) are required, the impact of these once-a-year operations would not significantly alter the existing air quality in the region. The Orbiter itself will contain no hazardous materials during transport.

b. Water Quality.

The transport convoy will contain no significant volumes of potential water pollutants; hence no effect on water quality will occur even in the case of an accident.

c. Biota.

The seven transport operations will have no effect on the surrounding habitat nor on animal species which seek out the warm road pavement at night.

d. Acoustics.

Vehicle noise will increase acoustic levels along the route during transport operations. This noise will occur at night when it will be most noticeable. Wildlife may be displaced from the area adjacent to the route and residents may be awakened. However, the non-impact nature of the noise (i.e., a continuous rise in noise to a maximum level, and a smooth decline to ambient levels) and the infrequency of its occurrence minimize adverse effects.

e. Transportation and Traffic.

The proposed action requires the use of roads along the route for a period of 9 to 11 hours about once a year for seven years. Many vehicles will be directly or indirectly involved during transport operations to provide traffic management, vehicle security, spare parts and backup tow vehicles. Specific sections of the route between intersections may be closed for less than an hour. Transport of the Orbiter during nonpeak traffic hours reduces the effect of the action on traffic flows.

No significant adverse effect on traffic is expected because of the infrequency of transport operations and the overall management of the operation by experienced NASA and NASA-Contractor personnel.

f. Population and Community Facilities.

No significant effect on the population along the route or in adjacent communities is anticipated. A possible adverse

effect of the proposed transport action is reduced access to the area by emergency vehicles such as fire engines and ambulances. The trailer park at 10th Street East and Avenue H is surrounded by a concrete block wall with only two access points, both from 10th Street East. Both entrances to the trailer court will be blocked for a short period of time because of the combined length of the towing vehicle and the Orbiter/transporter. During transport operations provision will have to be made to maintain emergency access to or exit from the trailer park. In such situations, access to the trailer park can be provided by an escort of police or other designated officials. Coordination with appropriate agencies will be initiated prior to transport operations and maintained throughout each move to minimize or eliminate this potential problem.

B. Indirect Effects

No direct environmental effects are associated with the proposed action. The limited funds and seven-year period of operations preclude project-related population growth in the area. Activities at AF Plant 42 and at Edwards AFB are established ongoing functions and will not be altered by the proposed action.

C. Cumulative Effects.

Roadway construction associated with the proposed action is along Los Angeles County right-of-way identified for road development or on U.S. Air Force property; no cumulative adverse effects associated with this development have been identified. No cumulative effects are associated with transport operations.

IV. ALTERNATIVES TO THE PROPOSED ACTION

The alternatives to the proposed action include no action, alternate methods of overland transport, and air ferry.

A. No Action

The alternative of no action -- in the sense of taking no actions to transport NASA Orbiters from their Palmdale assembly point to DFRC, to Marshall Space Flight Center for testing, and to Kennedy Space Center and Vandenberg AFB for launch -- is not a reasonable or appropriate alternative to the proposed action. The Space Shuttle Program is an ongoing national program for which a Final Environmental Statement has been prepared. The alternative of no action would preclude the continuation of this program.

B. Overland Transport

Transporting the Orbiter by rail and using alternate roadway routes have been investigated. Nighttime versus daytime movement of the Orbiter has also been considered.

1. Railroad

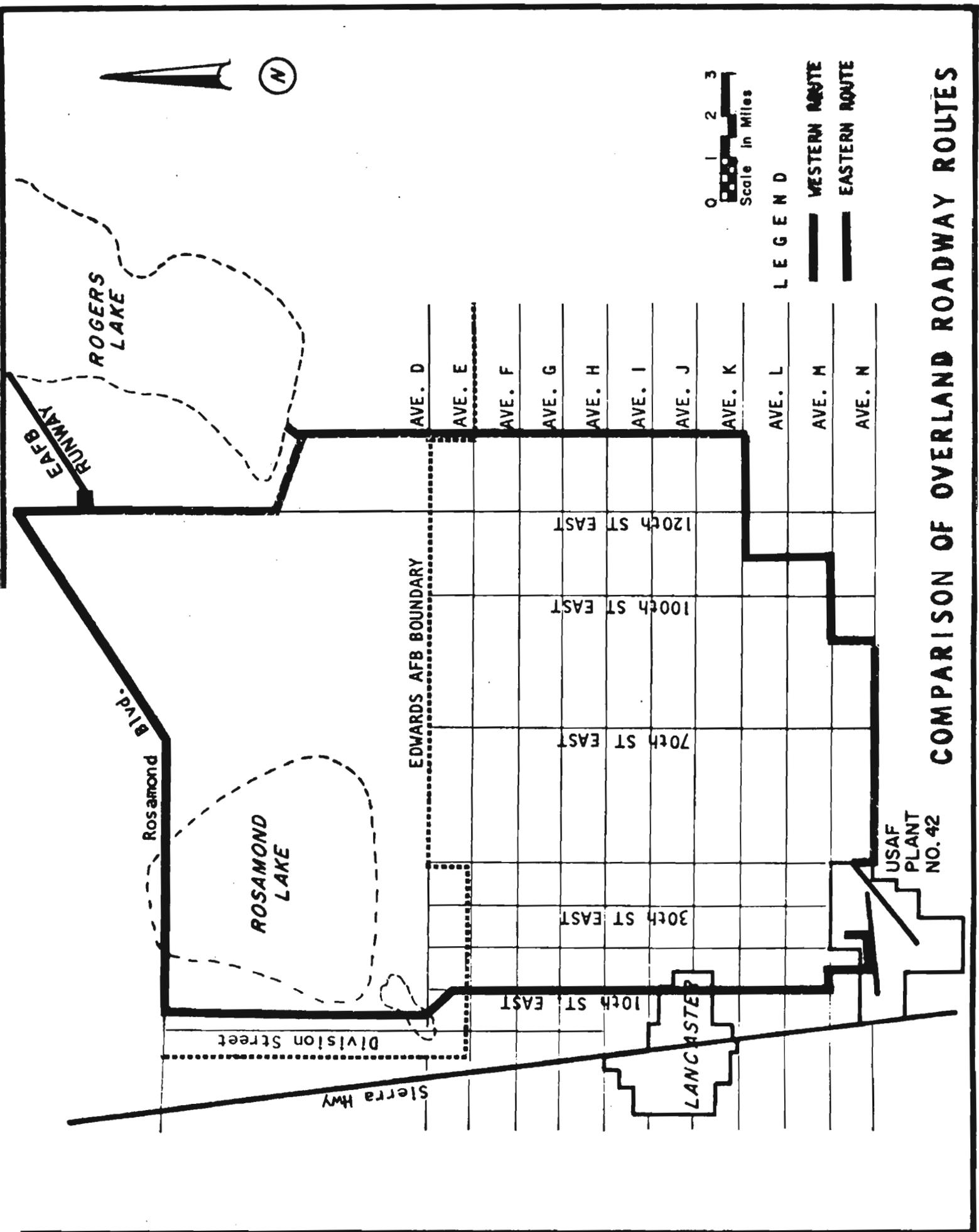
A stability analysis of the Orbiter/flatcar combination has been previously developed in a U.S. Air Force study related to Orbiter transport at Vandenberg Air Force Base, California.²⁴ This analysis concludes that an Orbiter mounted on top of a railroad flatcar with standard gauge rail tracks is only marginally stable on a level track in a steady wind of 34.4 knots. Furthermore, many obstructions

along the route would have to be removed to provide adequate clearance. Because of these problems and because the Southern Pacific Railroad would not agree to interrupt normal operations on its main line, the alternative of Orbiter transport by rail was rejected.

2. Roadway Routes

Alternate roadway routes along existing roads and rights-of-way were examined. The alternate route designated as the "eastern route" in Figure 10 has been extensively investigated and is fully described in the draft environmental impact statement for this action. Over one-half of this eastern route is along Los Angeles County right-of-way. This route would follow existing roadways except for 0.75 mi (1.2 km) of new roadway at AF Plant 42 and at Edwards AFB to connect roadways to the taxiways on the airfields; 15.5 mi (24.9 km) of existing paved roadways would be widened and 2.5 mi (4.0 km) of currently unpaved graded roadway would be surfaced. Utility poles, electrical transformers, irrigation standpipes, traffic signals and trees would be modified, relocated or removed to provide adequate clearances.

Minor adverse environmental effects associated with the eastern route include infrequent and short-duration traffic disruptions, a slight decrease in the widespread desert habitat, and a slight increase in noise and air pollution levels along the route during construction and transport operations. These impacts are not unlike those associated with the proposed action. However, since



COMPARISON OF OVERLAND ROADWAY ROUTES

FIGURE 10

dedicated county right-of-way along the eastern route varies from only 30 to 100 ft. (9.14 to 30.48 m), a total of seventy-seven private property owners would be affected. Orbiter wing overhang, utility line relocation, road widening, and tree relocation or removal would impact the beneficial use of the properties owned by these persons for the period required to accomplish the seven moves (approximately 7 years). Such would require the acquisition of easements and other formal limitations on property usage. Because of this potential adverse impact on these properties and the owners thereof, the eastern route is not favored.

Other roadway routes from Avenue N at 40th Street East (adjacent to AF Plant 42) to Avenue B at 140th Street East (about 2 miles (3.2 km) south of Edwards AFB) were also considered.²⁵ These alternate routes would have increased still further the number of privately-owned parcels affected by wing overhang. These roadway routes were therefore rejected because of the increased number of properties involved and because they did not reduce environmental effects compared to the proposed route.

Using portions of Rosamond or Rogers Dry Lake Beds as part of the route was also considered. The present schedule of orbiter moves requires that two of the first three moves be made during the rainy season (90% of the rainfall in the area occurs from November through April). Analysis of thirty year climatological records show that the lakebed is unusable for an average of three weeks per year

during the rainy season due to excessive moisture conditions. Three major inundations in recent years (1966, 1969, and 1970) have closed the lakebed for multi-month periods. In order to use the lakebed as a part of the tow route, either an all weather road would have to be constructed across the lakebed, or, in case of wet conditions, a delay would have to be accepted in the movement of the orbiter until the lakebed dried sufficiently to support a crossing. The construction of a road across Rosamond Dry Lake would represent no appreciable savings over the presently proposed route. In addition, construction of a road across the lakebed would destroy the emergency runway characteristic of the lakebed and therefore is unacceptable to the U. S. Air Force. If the lakebed were to be used in its existing condition, there is the potential for delays due to wet conditions since two of the first three moves are to be made during the rainy season. A delay in movement of the orbiter is unacceptable to NASA since important program milestone dates would be affected. Delays in movement of the first orbiter would be reflected throughout the line of sequential development activities which culminates in the first orbital flight of the Space Shuttle. The amount of time of any delays would cause a commensurate extension of the development program at a cost of several million dollars for each week of delay. Therefore, it is unacceptable to NASA to risk the cost brought about by any delays as compared to the savings, if any, which might be realized by crossing the lakebed in its existing condition. For these reasons, use of the lakebeds as a portion of the tow route was rejected.

3. Nighttime Versus Daytime Towing

Transport of the Orbiter during the daytime has been considered as an alternative to nighttime transport. Movement of the Orbiter during the day would afford greater overall visibility for transport operations. A consideration is that the temperature inside the Orbiter cannot exceed 120°F (49°C), and daytime movement during summer probably would cause higher temperatures in the Orbiter. The Los Angeles County Road Department regulates and issues permits for movement of oversized items. Movement of oversized items is restricted during peak traffic hours (6:00 AM to 9:00 AM and 4:00 PM to 7:00 PM daily, and from 12:01 PM Saturday to 12:00 PM Sunday). Permits are normally issued for oversize movement between 12:01 AM to 6:00 AM on weekdays. Because the transport operations will take approximately 11 hours, a variance of the normal permit times will be required for either daytime or nighttime movement. It is therefore planned that the transport operations will take place during nighttime to include the normal permit times as well as some additional time when a variance will be required.

C. Air Ferry

Ferrying the Orbiter on a specially modified Boeing 747 aircraft is the only practical alternative to overland transport. The NASA air ferry 747 is the only aircraft capable of transporting the Orbiter. Using a helicopter is precluded because of the weight and size of the Orbiter. Transporting the Orbiter from AF Plant 42 to

Edwards AFB atop a B-747 will require about 3,200 gal (21,000 lb) of jet fuel. Air and noise pollution from this flight will not be significantly higher than the existing level. (Both AF Plant 42 and Edwards AFB are sites of extensive aircraft test flights.)

Some type of lifting device would be required to position the Orbiter on top of the 747 aircraft. A specially designed mating/demating device and a commercial stiff-legged crane have been considered. These devices differ in operational capability and in foundation design. Site work required to install the devices is comparable, and neither will affect the surrounding environment.

V. PROBABLE UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

Minimal adverse effects of short duration will occur in traffic flow, atmospheric pollution and acoustic levels.

A limited number of trees will be removed; however, removal of these trees will not reduce the number of wildlife in the area since they are not the limiting factor constraining the environment's carrying capacity. The existing desert habitat along the route is widespread in North Los Angeles County and will not be adversely affected. Paving existing graded roads conforms with the Preliminary North Los Angeles County General Plan and will reduce dust raised by travel over these roads.

Approximately 0.75 acre (0.3 hectare) of existing freshwater habitat (from a marsh totaling about 480 acres (194 hectares)) will be removed by road construction; however, this loss of habitat will have minimal effect on the marsh and will not result in a significant displacement of wildlife.

VI. MITIGATING MEASURES PROPOSED TO MINIMIZE THE IMPACT

Mitigating measures have been discussed in previous sections of this statement. Chief among them are the coordination and communication between NASA and local agencies responsible for emergency police, fire and health protection. Coordination will eliminate any possibility that access by emergency vehicles to persons living along the route could be delayed during Orbiter transport operations. An additional mitigating measure is to trim rather than to remove existing trees along the route to provide the required clearances. The Joshua trees which will be removed will be replanted. Replanting the trees will conform to known and accepted techniques to ensure that the trees have the highest possible survival rate.

Additional measures include maintaining drainage patterns and controls, using vehicles conforming to California noise and emission standards, and coordinating operations with local agencies and private citizens.

VII. RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT
AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Construction activities associated with the proposed action will be a one-time operation of relatively short duration; any adverse effect will also be of short duration. The beneficial effects of the roadway will endure considerably longer than the projected need for transport of the Orbiter.

The minimal adverse effects during the actual transport of the Orbiter will be temporary. Long-term benefits include the advantages to be gained from the Space Shuttle Program -- improved prediction of weather, better estimates of world crop production, identification of water and other resources, and the placing in orbit of satellites for navigation. Moreover, the development of a reusable space vehicle will assist in the conservation of national materials and resources.

VIII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES INVOLVED
IF THE PROPOSED ACTION IS IMPLEMENTED

The commitment of resources for the proposed action will be relatively small. These resources include the energy and materials required for the construction of the transporter and the modification of the roadway, and the energy required for the transport of the Orbiter. Successful development of the Orbiter is essential to the operation of the Space Shuttle, which will conserve resources through the reuse of the Orbiter and solid rocket boosters.

IX. OTHER INTERESTS AND CONSIDERATIONS OF FEDERAL POLICY WHICH OFFSET
ADVERSE ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION

The proposed overland transport of the Space Shuttle Orbiter is only a small though necessary part of the Space Shuttle Program, which in turn is part of the overall national effort in the exploration of space and the satellite program. A Final Environmental Impact Statement for the Space Shuttle Program has been previously prepared.²⁶

The environmental effects of the proposed overland transport and the requisite construction will be limited to those resulting from removing or trimming a small number of trees and transplanting two Joshua trees, building or widening a few miles of roadway, temporarily modifying traffic signals, relocating a few miles of utility poles and line, and removing traffic islands.

The only feasible alternative to overland transport for transferring the Orbiter from Palmdale to DFRC is atop a modified B-747. While there appear to be no significant environmental effects associated with this alternative and its monetary cost is comparable to that of the overland transport method, there is a potential difference in the safety of the first flight depending on the location.

The approach and landing test program, including takeoffs of the 747 with the Orbiter mounted on top, will be conducted at DFRC, Edwards AFB. Selecting the overland transport alternative would permit the first flight operation in this configuration to be

conducted at that test facility. DFERC/Edwards AFB is a national facility established for the purpose of conducting flight tests of new and experimental aircraft. Edwards AFB provides extensive operational flexibility for conducting such flights because of its long runway combined with the dry lake bed. This vast takeoff and landing area is highly useful to accommodate anomalies should they occur in aircraft test flights. Extensive experience in testing aircraft has been acquired over the past years at Edwards AFB; the physical and environmental characteristics of the area are well known.

Selecting the air ferry alternative, on the other hand, would require that the initial flight of the 747/Orbiter combination originate at Palmdale, whose runways, while adequate, are not as long or as wide as those at Edwards. Because Edwards AFB affords greater performance margins and more alternatives for overcoming contingencies, it has been recommended that initial flights of the piggyback configuration be made at Edwards; consequently, overland transport of the Orbiter from Palmdale to Edwards AFB is the recommended alternative.

X. COMMENTS RECEIVED AND NASA RESPONSES

Copies of the draft environmental impact statement were sent to Federal, state, and local agencies and groups and to all the landowners whose property might have been affected had the eastern route been selected. All the comments received as of April 20, 1976, and the NASA responses thereto are contained in the following section. Because the western route now proposed for the overland transport has no effect upon private property owners, no specific responses to the few questions raised by the responding landowners are included here.

A. Comments from Public Organizations (Re Eastern Route)

Comments were received from 11 public agencies and organizations. These comments and the necessary NASA responses are contained in the following pages. Commenting agencies are:

U.S. Environmental Protection Agency, Region IX

U.S. Department of Transportation, Federal Highway Administration, Region Nine

U.S. Department of the Interior, Pacific Southwest Region

U.S. Advisory Council on Historic Preservation

U.S. Department of the Army, Los Angeles District, Corps of Engineers

State of California, Office of Planning and Research

State of California, The Resources Agency, Office of Historic Preservation

Southern California Association of Governments

County of Los Angeles, Department of Regional Planning

County of Los Angeles, Road Department

City of Los Angeles, Department of Airports



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX

MAR -3 11 9:27
100 CALIFORNIA STREET
SAN FRANCISCO, CALIFORNIA 94111

ACTION JA
INFO AC, AT, JU, LA,
MA, PA, WA, NA, EA, EZ
CA, CT, FA, BC, Y

RECEIVED

National Aeronautics and Space
Administration
Lyndon B. Johnson Space Center
Attn: Mr. J. A. Piland
Houston TX 77058

MAR 1 1976

Dear Mr. Piland:

The Environmental Protection Agency has received and reviewed the draft environmental statement for the Overland Transport of the NASA Space Shuttle Orbiter between Palmdale and Edwards Air Force Base, Ca.

EPA's comments on the draft environmental statement have been classified as Category LO-1. Definitions of the categories are provided on the enclosure. The classification and the date of EPA's comments will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions under Section 309 of the Clean Air Act. Our procedure is to categorize our comments on both the environmental consequences of the proposed action and the adequacy of the environmental statement.

EPA appreciates the opportunity to comment on this draft environmental statement and requests one copy of the final environmental statement when available.

Sincerely,

Paul De Falco, Jr.
Regional Administrator

Enclosure

cc: Council on Environmental Quality

EIS CATEGORY CODES

Environmental Impact of the Action

LO--Lack of Objections

EPA has no objection to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER--Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to reassess these aspects.

EU--Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

Adequacy of the Impact Statement

Category 1--Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2--Insufficient Information

EPA believes that the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3--Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement.

If a draft impact statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make such a determination.



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION NINE

ARIZONA
CALIFORNIA
NEVADA
HAWAII
GUAM
AMERICAN SAMOA

Two Embarcadero Center, Suite 530
San Francisco, California 94111

IN REPLY REFER TO
9ED

March 8, 1976

Mr. Duward L. Crow
Associate Deputy Administrator
National Aeronautics and Space Administration
Washington, D. C. 20546

Dear Mr. Crow:

We have reviewed the Draft Environmental Impact Statement for the Overland Transport of the NASA Space Shuttle Orbiter between Palmdale and Edwards Air Force Base, Los Angeles County, California. The EIS should include a discussion of the capability of the roads on the transport route to carry the load without damage.

We appreciate this opportunity to review the Draft EIS and would like to receive two copies of the Final Statement when it becomes available.

Sincerely yours,


F. E. Hawley
Regional Administrator

Action Copy to ADA-1
Info Copy to ADA
AA
ADA
GM
Rec'd in NASA 3-15-76
Suspense Date None
Prepare Reply for —
Signature of —

U.S. Department of Transportation, Federal Highway Administration

NASA Response - The design of the transporter on which the Orbiter will be carried is such that road loading will not exceed 65 psi (4.5×10^5 N/m²). A discussion of the capability of roads of the western route to carry these loads without damage is now included (page ____).



ER 76-98

UNITED STATES
DEPARTMENT OF THE INTERIOR

OFFICE OF THE SECRETARY

PACIFIC SOUTHWEST REGION
BOX 36098 • 450 GOLDEN GATE AVENUE
SAN FRANCISCO, CALIFORNIA 94102
(415) 556-8200

March 19, 1976

Mr. Duward L. Crow
Associate Deputy Administrator
National Aeronautics and Space Administration
Washington, D.C. 20546

Dear Mr. Crow:

The Department of the Interior has reviewed the draft environmental statement for the Overland Transport of the Space Shuttle Orbiter between Palmdale and Edwards Air Force Base, California. We have no comments to offer on this draft statement.

Cordially,

Webster Otis
Special Assistant to the Secretary

cc: OEPR w/c incoming
State Director, BLM, Sacramento
Regional Director, FWS, Portland
Regional Director, NPS, San Francisco
USGS, Reston, Attn: Larry Bonham
Regional Director, BuRec, Boulder City

Action Copy to ADA-1
Info Copy to ADA, AA,
A 24578 G
Rec'd in NSCA 3-25-76
Suspense Exp. None
Prepare Rec. None
Signature of _____

10/1 A23336

Advisory Council
On Historic Preservation

1522 K Street N.W.
Washington, D.C. 20005

February 9, 1976

Action Copy to ADA-1
Info Copy to AA, ADA,
GA, GG

A-23676

Rec'd in NASA 2-13-76

Suspense Date None

Prepare Reply for -

Signature of -----

Rf: A- 23336
23378

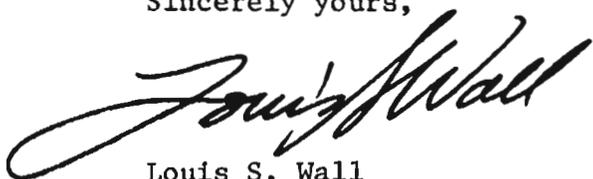
Mr. Duward L. Crow
Associate Deputy Administrator
Office of the Administrator
National Aeronautics and Space
Administration
Washington, D. C. 20546

Dear Mr. Crow:

This is in response to your request of February 2, 1976 for comments on the draft environmental statement (DES) for the Overland Transport of the NASA Space Shuttle Orbiter between U.S. Air Force Plant 42, Palmdale, California and the Dryden Flight Research Center, Edwards Air Force Base, California. The Advisory Council notes from its review of the DES that the National Aeronautics and Space Administration (NASA) has determined that the proposed undertaking will not effect properties included in or known to be eligible for inclusion in the National Register of Historic Places. Accordingly, we have no further comment to make on the undertaking at this time. We would suggest, however, that the final environmental statement for the project contain evidence of the California State Historic Preservation Officer's concurrence in NASA's determination of no effect.

Should you have questions or require additional assistance, please contact Michael H. Bureman of the Council staff at P. O. Box 25085, Denver, Colorado 80225, telephone number (303) 234-4946. Your continued cooperation is appreciated.

Sincerely yours,



Louis S. Wall
Assistant Director, Office
of Review and Compliance

Advisory Council on Historic Preservation

NASA Response - The requisite letter from the California Office of Historic Preservation, dated March 19, 1976, applying to the eastern route appears later in this section. A corresponding letter for the western route is included in Section X-C, following.



DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P. O. BOX 2711
LOS ANGELES, CALIFORNIA 90088

SPLED-E

27 February 1976

Mr. Duward L. Crow
Associate Deputy Administrator
National Aeronautics and Space Administration
Washington, D. C. 20546

Dear Mr. Crow:

This is in response to your letter to Honorable Russell W. Peterson, Chairman, Council on Environmental Quality, Washington, D. C. dated 2 February 1976 in which you requested review and comment on the draft environmental impact statement for the NASA Overland Transport of the NASA Space Shuttle Orbiter between Palmdale and Edwards Air Force Base, California.

We have no comments concerning environmental impacts of the proposed action.

Thank you for the opportunity to review and comment on this draft statement.

Sincerely yours,

GARTH A. FUQUAY
Chief, Engineering Division

Action Copy to ADA-1
Info Copy to AAAD
AA
ADA
G.M.
Rec'd in NASA 3-15-76
Suspense Date none
Prepare Reply for —
Signature of —————





State of California

GOVERNOR'S OFFICE
OFFICE OF PLANNING AND RESEARCH
1400 TENTH STREET
SACRAMENTO 95814

EDMUND G. BROWN JR.
GOVERNOR

March 22, 1976

Mr. George Abbott
Nasa Office
12214 Lakewood Blvd.
Downey, CA

SUBJECT: 76022427 - Overland Transprt. of Space Shuttle

Dear Mr. Abbott:

Clearinghouse review of your Environmental Impact Report is complete.
We have no comments on the project.

This letter verifies your compliance with the review requirements
contained in the National Environmental Policy Act as Implemented
by the Office of Management and Budget Circular A-95.

Sincerely,

William G. Kirkham

William G. Kirkham
Management Systems Officer
State Clearinghouse

WGK/mcd

Do not write to the left of dotted line

FEDERAL GRANT APPLICATION/AWARD NOTIFICATION STATE OF CALIFORNIA STATE CLEARINGHOUSE (916) 445-0613

1 APPLICATION DATE
19__ yr __ mo __ day

3 APPLICANT - Organizational Unit
NASA L. P. JOHNSON SPACE CENTER

4 ADDRESS - Street or P. O. Box

2 FEDERAL EMPLOYER ID NO.

5 CITY HOUSTON 6 COUNTY 7 STATE TEX. 8 ZIP CODE 9 PROG TITLE/NO. (Code of Fed Domestic Assistance)
75.000 REPA

10 TYPE OF ACTION
 New Modification Continuation
TYPE OF CHANGE (Complete if 10b or 10c was checked)
11 Increased Dollars 12 Increased Duration
13 Other Scope Change
14 Cancellation

15 REQUESTED FUND START 19__ yr __ mo
16 FUNDS DURATION (Months) yr __ mo
17 EST. PROJECT START 19__ yr __ mo
18 EST. PROJECT DURATION (Months) yr __ mo
19 APPLICANT TYPE
A. State B. Interstate C. Sub State Dist D. County E. City
F. School District G. Community Action Agency H. Sponsored Organization I. Indian J. Other (Specify in Remarks)
20 FEDERAL () \$ _____ 00
21 STATE () \$ _____ 00
22 LOCAL () \$ _____ 00
23 OTHER () \$ _____ 00
24 TOTAL (20, 21, 22, 23) () \$ _____ 00

25 BRIEF TITLE OF APPLICANT'S PROJECT OVERLAND TRANSPRT OF SPACE SHUTTLE
26 DESCRIPTION OF APPLICANT'S PROJECT (Purpose)
IMPACT STATEMENT FOR THE OVERLAND TRANSPORT OF SPACE SHUTTLE ORBITER BETWEEN AIR FORCE PLANT 42, PALMDALE AND EDWARDS AIR FORCE BASE.

27 AREA OF PROJECT IMPACT (Indicate City, County, State, etc.)
LOS ANGELES CO. STATE WIDE COUNTY WIDE MULTI-COUNTY

28 CONGRESSIONAL DISTRICT Of Applicant Districts Impacted By Project
29 Environmental Assessment Required By State/Federal Agency? Yes No
30 CLEARINGHOUSE(S) TO WHICH SUBMITTED
 State Area Wide None

31 a NAME/TITLE OF CONTACT PERSON GEORGE ABBOTT BC-121
b ADDRESS - Street or P. O. Box NASA OFFICE 12214 LAKEWOOD BLVD. DOWNEY, CA
c TELEPHONE NO. 213 922-2805

31 d IS ENVIRONMENTAL DOCUMENT REVIEW REQUIRED YES NO
If Yes Environmental Impact Statement (Report) Attached (20 copies)
 Draft EIR Final EIR
 Negative Declaration Attached (20 copies)
 None attached - Document Will Be Forwarded On Approximately Mon ___ Day ___ Year
If No Federal Program Does Not Require An Environmental Document
 Project Exempt Under State Categorical Exemption, Class _____
e Will the project require relocation? YES NO
f Does your agency have a civil rights affirmative action policy and plan? YES NO
g Is project covered by A-95 PL IV? YES NO
If yes, is MOA executed? YES NO

32 CLEARINGHOUSE ID B.C. MULTIPLE CLEARINGHOUSE

33 a ACTION BASED ON REVIEW OF Notification Application
33 b ACTION TAKEN
a With Comment b Without Comment c Waived d Unfavorable
34 STATE APPLICATION IDENTIFIER (SAII) c LA 706124107 / 1
State Number

35 CLEARINGHOUSE IMPACT CODE STATE WIDE Yes No
County/ City Ping Area County/ City Ping Area County/ City Ping Area County/ City Ping Area County/ City Ping Area

36 STATE PLAN REQUIRED Yes No
37 RECEIVED DATE AT CLEARINGHOUSE 19__ yr __ mo __ day
38 FINAL CH ACTION DATE 19__ yr __ mo __ day
38 a SIGNATURE OF CH OFFICIAL William B. Kirkham

39 CERTIFICATION - The applicant certifies that to the best of his knowledge and belief the above data are true and correct and filing of this form has been duly authorized by the governing body of the applicant. Check box if clearinghouse response is attached.

40 a NAME (Print or Type) b TITLE c SIGNATURE of Authorized Representative d TELEPHONE NUMBER

41 DATE MAILED TO FEDERAL/STATE AGENCY 19__ yr __ mo __ day
42 NAME OF FEDERAL / STATE AGENCY TO WHICH THIS APPLICATION SUBMITTED

43 GRANT APPLICATION ID (Assigned by Federal Agency) 52 Application Rec'd 19__ yr __ mo __ day
53 a Exp Action Date 19__ yr __ mo __ day
Always Complete 53a OR b

44 GRANTOR AGENCY 45 ORGANIZATIONAL UNIT 46 ADMINISTERING OFFICE

REVISIONS
47 ADDRESS - Street or P. O. Box 48 CITY 49 STATE 50 ZIP CODE 51 TELEPHONE NUMBER

FINAL ACTION
55 a Awarded b Rejected c Withdrawn 19__ yr __ mo __ day
56 FUNDS AVAILABLE 19__ yr __ mo __ day
57 ENDING DATE 19__ yr __ mo __ day
58 FEDERAL PROGRAM NUMBER 745

FUNDS APPROVED (For Changes Show Only Amt. of Inc. (+) or Dec. (-))
60 FEDERAL AMOUNT (if Y funds) () \$ _____ 00
61 STATE SHARE () \$ _____ 00
62 LOCAL SHARE () \$ _____ 00
63 OTHER () \$ _____ 00
64 TOTAL (60, 61, 62, 63) () \$ _____ 00

59 FEDERAL FUNDING ELEMENT NUMBER 65 MULTIPLE PROGRAM NUMBER

PART 1

PART 2

PART 3

PART 4

PART 5

OFFICE OF HISTORIC PRESERVATION

DEPARTMENT OF PARKS AND RECREATION

POST OFFICE BOX 2390

SACRAMENTO, CALIFORNIA 95811



(916) 445-8006

March 19, 1976

Mr. Duward L. Crow
Associate Deputy Administrator
Office of the Administrator
NASA
Washington, D.C. 20546

Dear Mr. Crow:

On March 15, 1976, Mr. Glen Spencer of the Johnson Space Center in Houston, Texas, requested the assistance of the State Historic Preservation Officer for California regarding the proposed overland transportation of NASA's Space Shuttle Orbiter between U.S. Air Force Plant 42 at Palmdale and Dryden Flight Research Center at Edwards Air Force Base in California.

The proposed transporting of the Space Shuttle Orbiter does not appear to be in conflict with the National Historic Preservation Act of 1966, as the selected route will be along existing public and military roadways.

Please do not hesitate to contact this office should you require further assistance regarding this matter.

Sincerely,

William E. Padgett for
Dr. Knox Mellon
Historic Preservation Coordinator

A-4/5

Action Copy to ADA-L
Info Copy to A, AD, AD
B, G, M
A 24608
Rec'd in NASA 3-28-76
Suspense Date none

DATE: March 3, 1976

TO: Duward L. Crow, Associate Deputy Administrator
National Aeronautics and Space Administration

FROM: Metropolitan Clearinghouse

RE: Overland Transport of the NASA Space Shuttle Orbiter
SCAG File Number: 7070-DF

As required by OMB Circular A-95, we have disseminated information on your proposed grant application to cities, counties and some special agencies in the region which may be affected by, or interested in, the project. Additionally the project has been reviewed by the SCAG staff to determine the relationship of your project to adopted regional policies, plans or programs. Comments generated through the A-95 review process are listed below, and must be attached to the "Cover Sheet for Federal Grant Application" (Notice of Intent Form) when it is submitted to the funding agency. Should any additional comments be made by the SCAG Executive Committee or other local agencies, they will be transmitted to your office and to the funding agency.

The SCAG staff review found that:

1. The proposed project is not related to any adopted SCAG goal, policy or plan.
2. The project is primarily local in nature.
3. No comments have been received by SCAG staff in response to the inclusion of this project on the areawide Clearinghouse Listing.

Leshie Kast
Clearinghouse Official

FBW:fjw

Action Copy to ADA-1
Info Copy to A.P.D.

A-24229 AF
ADA
B.G.N.

Rec'd in NASA 3-10-76

Suspense Date None

Prepare Reply for _____

Signature of _____

Ref. 23412

NORMAN MURDOCH
Planning Director
EDGAR T. IRVINE
Deputy Director
JOSEPH K. KENNEDY
Deputy Director

COUNTY OF LOS ANGELES
DEPARTMENT OF REGIONAL PLANNING

320 West Temple Street
Los Angeles, California 90012
Telephone: 974-6401

COMMISSIONERS
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OWEN H. LEWIS
Vice Chairman
ARTHUR J. BAUM
OWEN H. LEWIS
CAROLYN P. LLEWELLYN
SADIE B. CLARK
LUCILLA BARTHEL
Secretary to the Commission

March 11, 1976

National Aeronautics and
Space Administration
Lyndon B. Johnson Space Center
Environmental Statement Coordinator: J.A./J.V. Piland
Houston, Texas 77058

Gentlemen:

In response to your recent communication of February 2, 1976, the Draft Environmental Impact Statement (EIS) for the Overland Transport of the NASA Space Shuttle Orbiter between U.S. Air Force Plant 42, Palmdale, California and the Dryden Flight Research Center, Edwards Air Force Base, California has been reviewed by this Department.

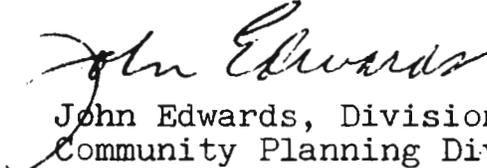
This Draft EIS appears to identify and discuss the critical environmental concerns of the proposed project. However, you may wish to submit a copy of the Draft EIS to the Los Angeles County Road Department for review since County roads are involved in the overland route. That department's address is:

Los Angeles County Road Department
1540 Alcazar Street
Los Angeles, California 90033

If any further assistance should be necessary, please do not hesitate in contacting Ray Ristic or Gerald Wasser at (213) 974-6494.

Very truly yours,

DEPARTMENT OF REGIONAL PLANNING
Norman Murdoch, Planning Director


John Edwards, Division Chief
Community Planning Division

JE:GCW:klk

NORMAN MURDOCH
Planning Director
EDGAR T. IRVINE
Deputy Director
JOSEPH K. KENNEDY
Deputy Director

COUNTY OF LOS ANGELES
DEPARTMENT OF REGIONAL PLANNING

320 West Temple Street
Los Angeles, California 90012
Telephone: 974-6401

COMMISSIONERS
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Vice Chairman
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CAROLYN P. LLEWELLYN
SADIE B. CLARK
LUCILLA BARTHEL
Secretary to the Commission

March 23, 1976

National Aeronautics and
Space Administration
Lyndon B. Johnson Space Center
Environmental Statement
Coordinator: J.A./J.V. Piland
Houston, Texas 77058

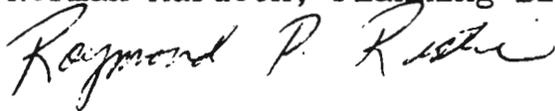
Gentlemen:

Enclosed is a copy of the Los Angeles County Road Department's comments on the Draft Environmental Impact Statement for the Overland Transport of the NASA Space Shuttle Orbiter Between U.S. Air Force Plant 42, Palmdale, California, and the Dryden Flight Research Center, Edwards Air Force Base, California.

If any further assistance should be required, please contact Gerald Wasser or me at (213) 974-6494.

Very truly yours,

DEPARTMENT OF REGIONAL PLANNING
Norman Murdoch, Planning Director



Raymond P. Ristic, Section Head
Impact Analysis

RPR:GCW:klk

Enclosure

COUNTY OF LOS ANGELES
ROAD DEPARTMENT

March 22, 1976

M-5
810.25.1

C

Regional Planning Department
County of Los Angeles
1390 Hall of Records
320 West Temple Street

O

Attention Mr. R. Ristic

Gentlemen:

NASA'S DRAFT ENVIRONMENTAL
IMPACT STATEMENT (DEIS)
OVERLAND TRANSPORT OF THE
SPACE SHUTTLE ORBITER

P

We reviewed the subject DEIS and found that it adequately assesses the impact of the project relative to the interests of the Road Department. The description of the route and the work to be performed correctly reflect discussions with this Department.

Y

Thank you for forwarding the statement to us for review.

Very truly yours,

I. L. MOREHAR
Road Commissioner



R. N. SELTZER
Assistant Chief Deputy

HJW:mmm

City of Los Angeles
Department of Airports
Tom Bradley, Mayor

1 World Way
Los Angeles, California 90009
213 / 646 • 5252 Telex 65 • 3413

Los Angeles
Ontario
Van Nuys
Palmdale

March 18, 1976

Board of
Airport Commissioners
Alexander H. Pope
President
Robert E. Collins
Vice President
Elizabeth K. Armstrong
Stephen C. Bilheimer
Samuel Greenberg

Clifton A. Moore
General Manager

Mr. Duward L. Crow
Associate Deputy Administrator
National Aeronautics and
Space Administration
Office of the Administrator
Washington, D.C. 20546

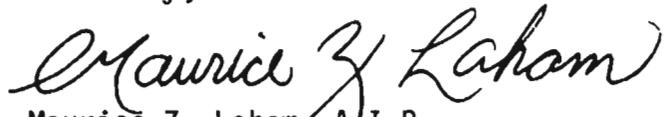
Dear Mr. Crow:

SUBJECT: Comments on Draft Environmental Impact Statement -
Overland Transport of the NASA Space Shuttle Orbiter

The Department of Airports, Office of Environmental Planning has reviewed the draft EIS for the proposed overland transport of the NASA Space Shuttle Orbiter as it relates to Palmdale International Airport (PIA). From an environmental standpoint, the draft EIS adequately addresses the potential environmental effects of the proposed overland transport through PIA property.

The Department of Airports appreciates this opportunity to review and comment on the draft EIS for the proposed project. Further communication regarding implementation of the proposal may be directed to Mr. Sandy Rowe.

Cordially,



Maurice Z. Laham, A.I.P.
Airport Environmental Planner
Office of Environmental Planning

MZL:RMB:bjr

cc: W. M. Schoenfeld
Sandy Rowe

Action Copy to ADA-L
Info Copy to ADA
AA-ADA
D.G.
M
Rec'd in NASA 3-23-76

Suspense Date None
Prepare Reply for —
Signature of —

Ref: A-23336

B. Comments from Landowners (Re Eastern Route)

Comments were received from eight landowners whose property might have been affected had NASA continued its plan to employ the eastern route described in the draft environmental statement for this action. These comments are included here; however, because it is now NASA's intent to employ the western route which will not affect their respective properties, specific responses are not included.

1375 Cole Rd
Arroyo Viejo, Calif
Mar. 9 1974

Mr. ~~Edward~~ L. Crow
Houston:

Please note the change of
my address from 3585 Edgewood
Way Rocklin Cal. to 1375 Cole
Rd Arroyo Viejo, Calif. 95004.

In answer to your letter
asking for any comments in
regard to moving the Space Shuttle
Orbiter, I believe it would
have an adverse effect on
my property as I wish to sell
it within 2 or 3 years.

Sincerely

Action Copy to ADA-1
Info Copy to A.A.D.

J. H. Brennan

A-24350

Rec'd in NASA

Suspense Date

Prepare Reply for

Signature of

Ref: A-23412



National Aeronautics and
Space Administration
Washington, D.C.
20546
Office of the Administrator

*Hand was sold same way
in January 76' to City of
Los Angeles Dept of Airports
Mrs Mark Kim*

FEB 26 1976

Mark & Ellen Kim
2266 Klemcott Court
West Lake Village, CA 91361

Dear Mr. & Ms. Kim

You should have recently received my letter, dated February 5, 1976, informing you of the consideration currently being given to moving the Space Shuttle Orbiter over the road from Palmdale to Edwards Air Force Base, California. That letter also served to transmit to you our draft environmental impact statement (EIS) for this action and requested that any comments which you may have reach us no later than March 22, 1976.

It was recently brought to my attention that an 11-day delay ensued from the time the earlier letter was signed until it was put in the mail. We are therefore extending for you the period for comment by 11 days. Accordingly, in order to be in a position to make the best decision, considering all interests, we should have your comments, if any, no later than by close of business on Friday, April 2, 1976.

We regret very much the delay in mailing and appreciate your cooperation in this matter.

Sincerely,

Duward L. Crow
Associate Deputy Administrator

Action Copy to *ADA-1*
Info Copy to *A, AD, AA, ADA, B, C, M*
A. 24/81
Rec'd in NASA *3-8-76*

Suspense Date *None*
Prepare Reply for *-*
Signature of *-----*

Ref: A-23412

337 N. Mt. Vernon Ave.
Prescott, Arizona 86301
March 7, 1976

NASA
Washington DC. 20546
Attention: Duward L. Crow,
Associate Deputy Administrator

Gentlemen:

We wish to acknowledge receipt of your letter of Feb. 5, 1976 concerning the space shuttle system in the Antelope Valley area of California.

In line therewith, we wish to advise that we have no serious objections to your proposal as long as the property owners are adequately compensated for any rights of way, damages or resulting depreciated value of their land as a result of your endeavor.

The three of us own the property in Joint Tenancy. Would you be interested in buying it?

Sincerely,

Conrad J. Miesmer

Conrad J. Miesmer

Lanora H. Miesmer

Lanora H. Miesmer

Herbert F. Oleson

Herbert F. Oleson

Action Copy to ADA-1
Info Copy to ADA,
AA
ADA-B
GA
NA
A-24251
Rec'd in NASA 3-11-76
Suspense Date 3-15-76
Prepare Reply for
Signature of ADA-1

Ref: A-23412



National Aeronautics and
Space Administration

Washington, D.C.
20546

Office of the Administrator

FEB 26 1976

Action Copy to FDA-1
Info Copy to A, AD,
AA, ADA
B, C,
M
R'd in HODA 3-18-76
Suspension Fee none
Prepared for _____
Signature of _____

Mr. Kerns M. Vaughan
1301 E. Avenue **II, SP 50**
Lancaster, CA 91534

Dear Mr. Vaughan:

You should have recently received my letter, dated February 5, 1976, informing you of the consideration currently being given to moving the Space Shuttle Orbiter over the road from Palmdale to Edwards Air Force Base, California. That letter also served to transmit to you our draft environmental impact statement (EIS) for this action and requested that any comments which you may have reach us no later than March 22, 1976. *Ref: A-23412*

It was recently brought to my attention that an 11-day delay ensued from the time the earlier letter was signed until it was put in the mail. We are therefore extending for you the period for comment by 11 days. Accordingly, in order to be in a position to make the best decision, considering all interests, we should have your comments, if any, no later than by close of business on Friday, April 2, 1976.

We regret very much the delay in mailing and appreciate your cooperation in this matter.

Sincerely,

Duward L. Crow
Associate Deputy Administrator

I see no objections to this route, and the ground route seems the most practical
-78-
3/10/76 Kerns Vaughan

March 10, 1976
Esther L. Vigiletti
1485 Jefferson St.
Warren, Ohio 44485

N.A.S.A.
Washington D.C. 20546

Attention: Duward L. Crow
Subject: Real Estate-Section 31-Township 8N-Range 9W-located
at Avenue F and 140th St. in Balmdale, California.

Dear Sir,

I received your Draft Environmental Impact Statement.

This is how I understand the way in which it will effect
me and my property.

If you decide to tow the Orbiter overland, you will use
one of two concepts. If you use concept 1 which is to tow
the transporter along the existing centerline of the roadway
you will have to relocate utility lines, in which case this
will not effect me as there are no lines on my property. If
you decide to use concept 2 which would require additional
concrete surfacing, this would effect my property.

If my understanding is correct, please give me further
details. If I am incorrect please enlighten me.

Sincerely yours,

Esther L. Vigiletti
Esther L. Vigiletti

Action Copy to ADA-1
Info Copy to AA-AR

AA
ADA
B-G-M

Rec'd in NASA 3-16-76

Suspense Date 3-30-76

Prepare Reply for
Signature of ADA-1

Ref: A. 23412

March 16, 1976

Duward L. Crow, Associate Deputy Administrator,
National Aeronautics and Spce Administration,
Washington, D. C. 20546

Dear Sir:

We have received your correspondence, and Draft Environmental Impact Statement regarding Overland Transport of the NASA Space Shuttle Orbiter, between U. S. Air Force Plan 42, Palmdale, California, and Dryden Flight Research Center, Edwards Air Force Base, California.

We own real estate along your proposed route, and is identified as Parcel 72, Tract 30718, recorded July 7, 1969, in book 787, page 77-98 of map of records, Los Angeles County, State of California. The property borders 110th Street, next to lot bordering Avenue K, Palmdale, California.

We intend to co-operate fully with the NASA Space Shuttle Transport Program, and the granting of the required easements to complete the required transport. The objections we have would be the removal of trees along 110 Street, and the seven year easement that would possibly hinder future development of the property.

Thank you for your interest, and trust we may hear from you regarding your transport decision.

Yours very truly

John F. Bilek
John F. Bilek

Alice M. Bilek
Alice M. Bilek
6349 Bellaire Avenue
North Hollywood, California
91606

Action Copy to ADA-1
Info Copy to A.A.D.
AA
ADA, G
B, M
A-24484
Rec'd in NASA 3-19-76

Suspense Date none
Prepare Reply for —
Signature of —

Ry: A-23412

DAVID LUBIN
2037 RODNEY DRIVE
LOS ANGELES, CALIFORNIA 90027

REG. 662-8870

March 17, 1976

Mr. Duward L. Crow
National Aeronautics and
Space Administration
Washington, D.C.

Dear Mr. Crow,

Your NASA communique of Feb. 5, 1976 outlining the Space Shuttle is on hand. We wish to co-operate with the program. However we would require more specific information as to how it would affect our property on 140th St. and Avenue "G," in the Antelope Valley, California. Will it be necessary to widen 140th St., and would that necessitate acquiring a strip of land on the East side of the street; also how wide a strip ?

We are enclosing a copy of our tentative plan for subdividing our land, and it is therefore imperative that we have the information requested.

Please keep us informed.

Action Copy to A.D.H.-1
Info Copy to A.H.D.
A.A. ADA.
B.G.
M
Rec'd in NASA 3-22-76

Sincerely,

David Lubin

David Lubin

Suspense Date: None
Prepare Reply for —
Signature of -----

Ref: A-23412

Max Bresler
27 Morningside Dr.
San Francisco. Calif. 94132

San Francisco
March. 17th. 1976

" N A S A "

National Aeronautics and
Space Administration.
Washington D.C. 20546

Action Copy to ADA-1
Info Copy to A.P.D.
AA, ADA,
B, G,
AA
Rec'd in NASA 3-22-76

A-24518

Attention: Mr. Duward L. Crow.
Ass. Deputy Administrator.

Suspense Date None
Prepare Reply for —
Signature of —

Ref: A-23412

Dear Sir:

In reply to your letter from Feb. 5th. 1976,
regarding to your Space Shuttle program.

We'll be very glad to discuss this matter
further with your agent.

Please have your representative call us.
Our phone number is 564-2966.

Sincerely yours.

Max Bresler

Max Bresler

C. Comments on Western Route

When the western route was identified and, as a result of preliminary analyses, was deemed of potential value, comments were solicited from the County of Los Angeles, Road Department, which has responsibility for the entire western route non-Federal right-of-way. Their comments are on the following page. In addition, the services of an archaeologist were secured to survey the route in compliance with regulations of the Advisory Council on Historic Preservation. Based on the archaeologist's report,²⁷ the state Office of Historic Preservation has notified NASA that the western route does not appear to be in conflict with the National Historic Preservation Act of 1966, but has recommended that NASA carry out the few studies recommended in the archaeologist's report. NASA will do so.

guf

COUNTY OF LOS ANGELES

ROAD DEPARTMENT

1540 ALCAZAR STREET
LOS ANGELES, CALIFORNIA 90033
TELEPHONE 225-1677



IRVIN L. MORHAR, ROAD COMMISSIONER
EDWIN P. BENEDICT, DEPUTY DIRECTOR
OF TRANSPORTATION

April 9, 1976

ADDRESS ALL CORRESPONDENCE TO:
P. O. Box 4089
LOS ANGELES, CALIFORNIA 90051

IN REPLY PLEASE
REFER TO FILE: C-4
810.25.1

National Aeronautics and Space Administration
Lyndon B. Johnson Space Center
Houston, Texas 77058

Attention Mr. Joseph Piland

Gentlemen:

SPACE SHUTTLE ORBITER

This will confirm our conversation with Captain Kent Gonser of the Los Angeles District Corps of Engineers relative to use of the 10th Street East alternate route for transporting the Space Shuttle Orbiter in Lancaster, California.

This Department has no objection to the use of the County's road facilities provided all applicable ordinances are complied with and appropriate moving permits are obtained. For any further information, please contact Mr. Henry O'Rourke at 213-225-1677, Extension 75103.

Very truly yours,

I. L. MORHAR
Road Commissioner

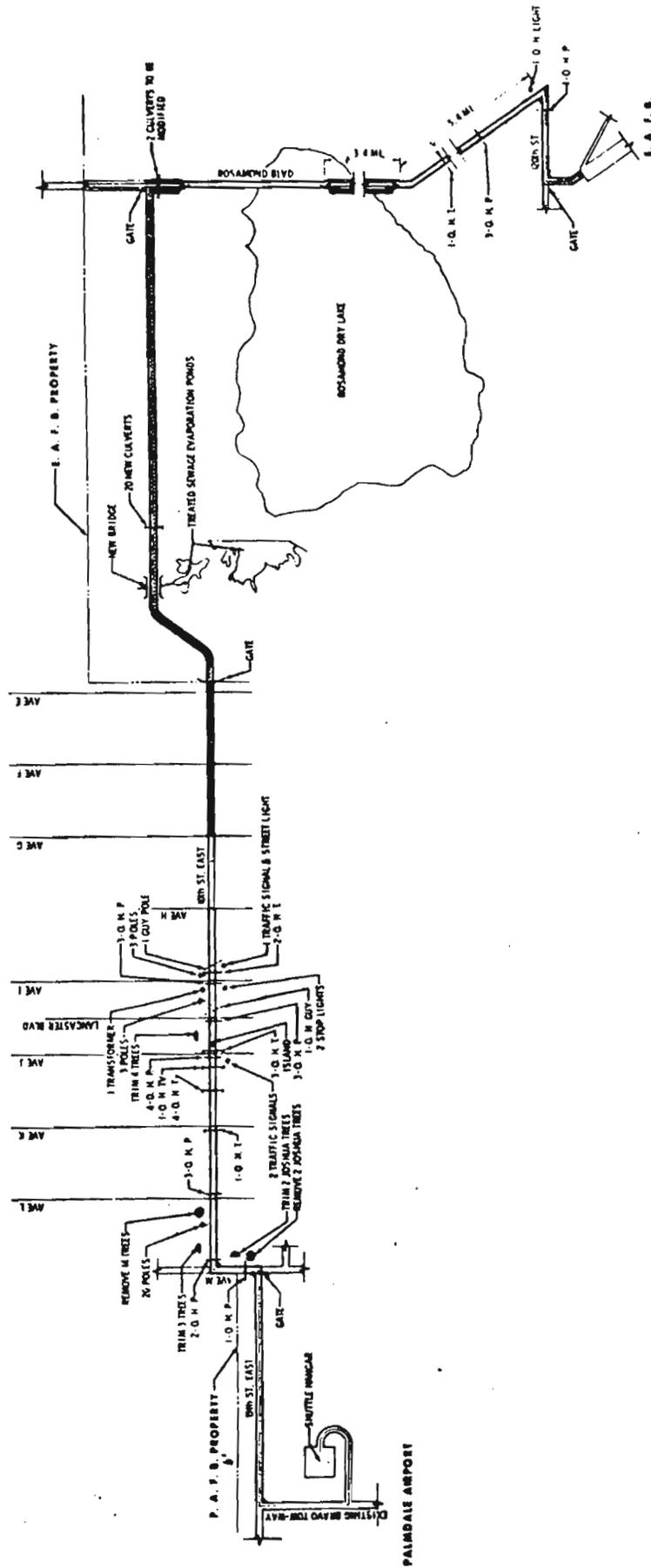
J. MARVIN BLAIR
Assistant Chief Deputy

WLS:mal

cc: Captain Kent Gonser
Regional Planning Department

4/13 - (6)

WESTERN PROPOSED OVERLAND TRANSPORT ROUTE



LEGEND

- POLES
- UNMODIFIED EXISTING ROADS
- EXISTING ROADS TO BE MODIFIED
- NEW ROADS
- NEW ROADS OUTSIDE OF E. A. F. B. PROPERTY
- TREES OR TREES TO BE REMOVED OR RELOCATED
- TREES OR TREES TO BE TRIMMED
- OTHER OBSTRUCTIONS TO BE REMOVED OR RELOCATED
- OVER HEAD POWER
- CULVERT
- OVER HEAD TELEPHONE
- OVER HEAD TV
- OVER HEAD GUY

SCALE 1/8" = 1 MILE

(916) 445-8006

April 21, 1976

Mr. Alan Farrow
National Aeronautics
and Space Administration
Lyndon B. Johnson Space Center
Houston, Texas 77058

Dear Mr. Farrow:

I have received Captain Kent Gosner's letter of April 8, 1976 transmitting a copy of "Report on Cultural Resources Survey Conducted for the US Army Corps of Engineers for the Proposed Route for the Overland Transport of the Space Shuttle Orbiter from Air Force Plant No. 42 to Dryden Flight Research Center" prepared by Mr. A. V. Eggers, dated April 7, 1976.

Archeological site numbers EPB 1-12, identified by the archeological literature research and field investigation, do not appear to be eligible for the National Register of Historic Place. However, I concur with Mr. Eggers' recommendation that a controlled collection of the cultural materials be undertaken prior to grading by professional archeologists using detailed gridding and artifact mapping procedures. If subsurface testing indicates the existence of burial components, then scientific excavations should be carried out prior to grading activities. Historic and prehistoric areas outside of the right of way should be staked off with qualified archeological observers present to control construction activities in the identified site areas.

As the archeological survey report identifies EPB 13, 14, and 15 as significant archeological sites eligible for inclusion in the National Register of Historic Places, I recommend that the Corps of Engineers do not obtain material from the borrow pit site located one half mile west of 120 Street.

Please do not hesitate to contact this office should you require further assistance regarding this matter.

Sincerely,

C. Lowell Signed by
Dr. Knox Mellon

Dr. Knox Mellon
Historic Preservation Coordinator

DRKM:RMI

*David J. 173
26-76
mly*

Mr. Alan Farrow

-2-

April 21, 1976

cc: Captain Kent R. Gosner
CE NASA Project Manager
Department of the Army
P.O. Box 2711
Los Angeles, CA 90053
Attn: Mr. Robert Wood

Edwards Air Force Base
National Aeronautics and
Space Administration
Edwards, CA 93523

bcc: J. P. Tryner

CITATIONS

1. National Aeronautics and Space Administration, Final Environmental Statement for the Space Shuttle Program, July 1972.
2. Ibid.
3. The Ralph M. Parsons Company, "Addendum to Analysis of Overland Routes for the Space Shuttle Orbiter Between Plant 42 at Palmdale and Flight Research Center (Draft)," April 1976.
4. Rockwell International, Space Division, Orbiter Overland Transport Briefing Document, Undated.
5. Ibid.
6. National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Environmental Impact Assessment for the NASA Space Shuttle Orbiter Final Assembly and Checkout Facility at Palmdale, California, February 1974. Unless otherwise noted, information presented in this section is based on data obtained from this source.
7. Ali, A., Rockwell International, Space Division, Palmdale Operations, personal communications at U.S. Air Force Plant 42, Palmdale, California, January 6-9, 1976.

8. Los Angeles County Department of Regional Planning, North Los Angeles County General Plan (Preliminary Draft), "Environmental Resources, Data Base," August 16, 1974.
9. California Native Plant Society, Inventory of Rare and Endangered Plants of California, Special Publication No. 1, 1974.
10. See Citation No. 8, above.
11. Environmental Protection Agency, Impact Characterization of Noise Including Implications of Identifying and Achieving Levels of Cumulative Noise Exposure, July 27, 1973.
12. See Figure 6, Citation No. 6, above.
13. Los Angeles County Department of Regional Planning, North Los Angeles County General Plan (Preliminary Draft), "Circulation," August 16, 1974.
14. Los Angeles County Department of Regional Planning, North Los Angeles County General Plan (Preliminary Draft), "Housing," August 16, 1974.
15. Sweet, B., Los Angeles County Department of Regional Planning, Lancaster, California. Personal communication at Los Angeles County Engineering Offices, Lancaster, California, March 11, 1976.

16. Los Angeles County Department of Regional Planning, North Los Angeles County General Plan, "Volume 1, Plan Summary, EIR Guide," November 1974.
17. See Citation No. 8, above.
- 17a. Eggers, A. V., "Report on Cultural Resource Survey Conducted for the U.S. Army Corps of Engineers for the Proposed Route for the Overland Transport of the Space Shuttle Orbiter from Air Force Plant No. 42 to Dryden Flight Research Center," April 7, 1976.
18. Los Angeles County Department of Regional Planning, North Los Angeles County General Plan, "Summary of the Areawide General Plan," November 1975.
19. See Citation No. 13, above.
20. Los Angeles County Department of Regional Planning, North Los Angeles County General Plan, "Volume 4, Circulation, Public Services and Facilities, Governmental Services," November 1974.
21. See Citation No. 15, above.
22. Gelfand, P. Los Angeles County Wildlife Manager, California Department of Fish and Game. Personal Telecommunication, March 13, 1976.
23. Ibid.
- 23a. See Citation 17a above.

24. Martin Marietta Aerospace, DOD/STS Ground Operations Study
Technical Data Book 1, "Stability Analysis, Orbiter/Flatcar
Combination," July 1974.
25. Rockwell International, Space Division, "Orbiter Overland Trans-
port Route Study, Site 1, Air Force Plant 42 to Edwards Flight
Research Center," December 1975.
26. See Citation No. 1 above.
27. See citation 17a above.