

ENVIRONMENTAL ASSESSMENT

INSTALLATION OF FENCING, LIGHTS, CAMERAS, GUARDRAILS, AND SENSORS ALONG THE AMERICAN CANAL EXTENSION EL PASO DISTRICT EL PASO, TEXAS

Lead Agency:

**U.S. Department of Justice
Immigration and Naturalization Service**

Washington, D.C.

Prepared in Conjunction with:

HDR Engineering, Inc.
Alexandria, VA.

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SUMMARY

PROJECT SPONSOR: U.S. Department of Justice
Immigration and Naturalization Service (INS)

COMMENTS DUE TO: Manuel M. Rodriguez
Chief, Policy & Planning
Facilities & Engineering
Immigration & Naturalization Service
U.S. Department of Justice
425 Eye Street, N.W.
Room 2060
Washington, D.C. 20536
Phone: (202) 353-0383
Fax: (202) 353-8551

TIERING: This Environmental Assessment is tiered from the “*Final Programmatic Environmental Impact Statement for JTF-6 Activities Along the U.S./Mexico Border (Texas, New Mexico, Arizona and California)*”, dated August 1994, prepared for the INS.

PROPOSED ACTION: The El Paso Sector of the United States Border Patrol, the law enforcement arm of the INS, proposes to install fencing, lights, cameras, guardrails and sensors along portions of the American Canal Extension in El Paso, TX. The Proposed Action directly supports the mission of the Border Patrol (BP), and will provide considerable added safety to the field personnel.

The project is located near the Rio Grande River in northwestern Texas. All of the project is within the city limits of El Paso. The majority of the Project Location is along a man-made canal and levee system. Portions of the canal are at times adjacent to industrial areas, downtown El Paso, and mixed commercial with limited residential development. Border Highway (Route 375) roughly parallels most of the project site.

- **Erection of Fencing.** The fencing will be placed principally along the south side of the American Canal Extension, a canal recently reconstructed by the International Boundary and Water Commission (IBWC). The fencing will be placed on IBWC property. The project will encompass approximately 20 miles of fencing, and generally parallel similar fencing recently placed by the IBWC.
- **Erection of Lights.** Permanent stadium-type lights will be installed on poles 60 to 300 feet high in three clusters along the 20-mile project area. The clusters are generally where the American Canal Extension is under cover. The locations are near 2600 Paisano Street; near the West Bridge; and near the Second Street overpass. The lights will obviate the need for portable units in these areas, as are currently used by the BP. Electrical power sources will be placed underground as necessary.

- **Construction of Guardrails.** Guardrails will be placed along portions of the IBWC levees in order to prevent vehicles accessing the levee slopes at inappropriate or unsafe locations.
- **Installation of Cameras.** Surveillance cameras will be installed at critical locations along and outside the levee system. Some cameras will be mounted on existing poles, antennae, or buildings, while others will require installation of new poles. The cameras will provide remote surveillance of the BP patrol area. Their use will enhance the law enforcement and apprehension abilities of the El Paso Sector of the BP.

FINDINGS: The impacts of the Proposed Action on the environment were considered pursuant to the National Environmental Policy Act of 1969, as amended. Other applicable legislation and executive directives have also been considered. This assessment has found no significant features or impacts to the environment. No adverse effects to the surrounding land uses, ecosystems, utility systems, traffic patterns, or other community considerations are anticipated.

This assessment is being distributed for agency and public review and comment. Based on this assessment, the Immigration and Naturalization Service would subsequently prepare and sign a Finding of No Significant Impact (FONSI). A Notice of Availability of the FONSI and Environmental Assessment will be placed in the local El Paso newspaper (*El Paso Times*) provided that no information leading to a contrary finding is received or comes to light during the 30-day period afforded for public review and comment.

Coordination with the IBWC and U.S. Fish and Wildlife Service has occurred during the planning stages; appropriate coordination of the construction activities will also be required with the IBWC.

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I. INTRODUCTION

The United States Border Patrol (BP), the law enforcement arm of the Immigration and Naturalization Service (INS), of the U.S. Department of Justice, conducts patrol activities along the borders of the United States in support of the Immigration and Nationality Act, as amended (8 U.S.C. 1101 note). The El Paso Sector of the BP proposes to install fencing along portions of its patrol area, particularly along the south side of the American Canal Extension, a canal recently reconstructed by the International Boundary and Water Commission (IBWC) along the Rio Grande River in northwestern Texas. (See **Figure 1.**) Additionally, the BP proposes to install guardrails and lighting south/west of the canal, and cameras and sensors along the levee canal system and adjacent Border Highway (Route 375). All proposed activities are within the city limits of El Paso, TX. Some property where the lights are proposed to be installed is owned jointly by the IBWC and the Union Pacific Railroad.

This Environmental Assessment has been prepared pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended.

A. PURPOSE OF ENVIRONMENTAL ASSESSMENT

As mandated by NEPA, a federal agency that proposes an activity that may have an impact on the environment is required to prepare an Environmental Assessment. The Border Patrol of the INS proposes to construct specific fencing and lighting and other fixtures in various locations along an approximate 20-mile long corridor, mostly on property owned by the IBWC. This document assesses the impacts from such actions.

Prior documentation of related activities comes from an Environmental Assessment (EA) prepared by the IBWC, entitled "*Final Environmental Assessment, Rio Grande American Canal Extension, El Paso, Texas,*" dated December 1993. That EA addressed impacts to existing natural and socioeconomic conditions relating to (re)construction of the canal, and installation of ancillary features, including fencing. The construction activities covered under that document are nearly completed.

This Environmental Assessment is tiered from the "*Final Programmatic Environmental Impact Statement for JTF-6 Activities Along the U.S./Mexico Border (Texas, New Mexico, Arizona and California)*", dated August 1994, prepared for the INS.

This EA applies the basic background data from these two documents, updated as necessary to supplement the project details.

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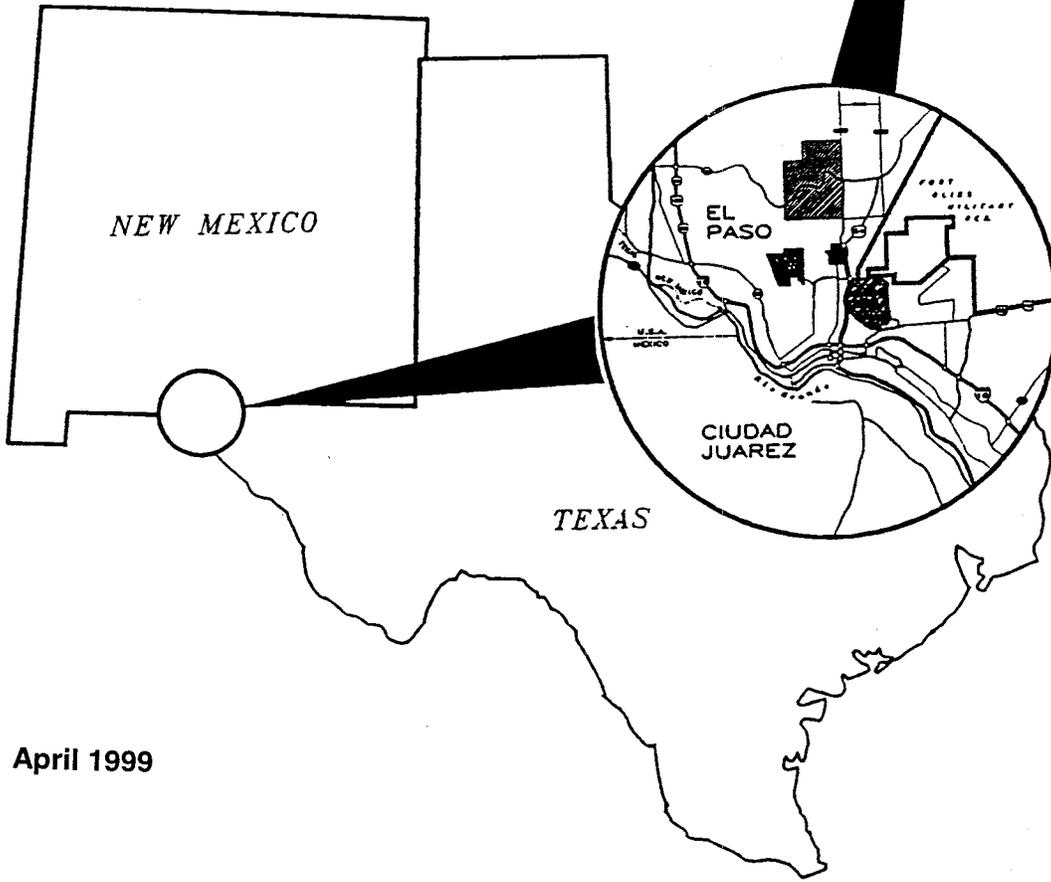
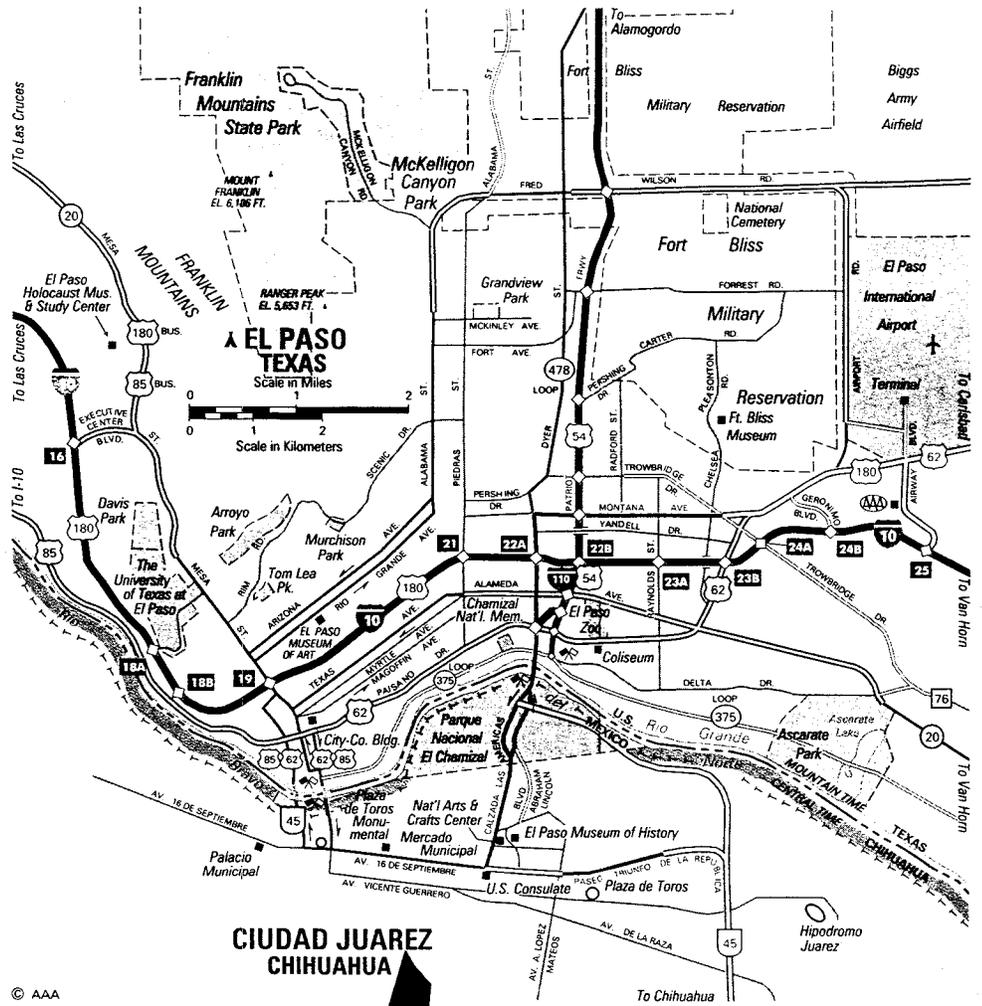


FIGURE 1

LOCATION MAP

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B. NEED FOR THE PROPOSED ACTION

The primary purpose and need for the proposed action is enhancement of the law enforcement and apprehension activities of the U.S. Border Patrol in the El Paso sector. The mission of the BP encompasses:

- Preventing or deterring illegal entry;
- Detecting, interdicting, apprehending undocumented entrants, smugglers, etc.;
- Being the lead agency for drug interdiction on the border between Ports-of-Entry.

Since 1994, the El Paso Sector of the BP has been engaged in a program entitled of “Hold-The-Line”. This program mandates 24-hour surveillance of the U.S.-Mexican border, with agents in sight at all times. Apprehensions dropped dramatically (from 285,781 in FY 93 to 79,688 in FY 94) due to the deterrence effect. With the initiation of Hold-the-Line, the decline in crime in the downtown El Paso area was noted almost immediately.

In FY 98, there were 1,085 agents assigned to the El Paso sector of the BP. This is almost a 75% increase from 621 agents in FY 92. Over 1,072 border drug seizures occurred within the El Paso sector in FY 98. A total of 125,035 apprehensions by the El Paso sector occurred in FY 98.

In specific areas, such as near Roadside Park, fencing between Mexico and the United States has been demonstrated to contribute significantly to reduced traffic of undocumented immigrants, drugs and contraband. Fencing also helps to channel some of the illegal traffic, which helps to contain or deter illegal entry.

The locations proposed for permanent lighting for this project represent the most easily, but illegally, crossed locations, within the city limits of El Paso. The clusters for placement of permanent light poles will be where the canal has been placed underground (in culverts) and where wide surface spaces occur. Lighting both deters illegal entry, and aids in apprehension of individuals.

Similarly, placement of cameras and sensors at strategic locations along the border area in El Paso will assist the BP in carrying out its functions. Cameras will be able to observe attempted illegal crossings; operators at a remote office location will be able to advise BP agents in the field of suspicious movements or activities. Use of such surveillance devices has been an accepted technological tool in the security and police industries, and has been shown to be effective in deterrence of illegal actions and in apprehension of suspects.

The emphasis to maintain a strong border presence and implement the Immigration and Nationality Act was further explained in the PEIS prepared by the JTF-6. The Proposed Action is consistent with the purpose, need and findings of that PEIS.

Safety is an important secondary issue. In fact, the safety issue is twofold. First, is the safety of the BP agents; second, is increased safety by reducing drowning risks of those attempting (illegally) to cross the rechannelized American Canal Extension.

Placement of fencing, guardrails, additional lights, cameras and sensors will protect the agents of the BP in the performance of their duties. Fencing on the south side of the canal will provide added safety to the BP agents patrolling along its edge. The water in the rechannelized canal is expected to flow at 42.5 cubic meters per second (1,500 cubic feet per second), a swift current. The fence would serve as protection to the agents preventing them from falling into the channel. Guardrails will similarly provide additional safety to the BP (and IBWC maintenance) vehicles on the canal service road on the south side of the American Canal Extension, and restrict access of other vehicles to the levee. In some locations, the edge of road is only a few feet from the edge of the reconstructed canal.

The fixed lighting proposed for this project will permanently provide illumination where mobile units currently provide in irregular locations. To receive optimum protection, BP agents on patrol should have visual contact with each other; after dark, this is obviously difficult without lighting. Other proposed protection for the BP agents is in the form of sensors and cameras. In addition to assisting in sighting or detecting undocumented immigrants, the proposed sensors and cameras will provide added security for the BP personnel. Remote observation of border areas will reduce chances of the field agents' being surprised.

The second safety issue involves reducing potential drowning by undocumented immigrants. As mentioned, the water in the canal is estimated to flow at a swift pace. This current can be deceiving even in daylight; however, at night, the risk is increased. The north side of the canal has been fenced by the IWBC, as part of its project under the 1993 EA. The south side remains unfenced. Prior to the reconstruction/rechannelization of the canal, an estimated average of 45 water rescues occurred per year. In 1998, since the canal improvements have been completed, 90 water rescues occurred. The increase can be attributed to the increased flow rate in the canal. There have been 17 drownings reported during 1998, up from 12 in 1997. It can be expected that the fencing on the south side will further deter casual (although illegal) attempts to cross the canal, thus reducing the number of possible drownings.

C. DESCRIPTION OF THE PROPOSED ACTION

1. Background

The Proposed Action would occur on IBWC property, at either end of and adjacent to the Rio Grande American Canal Extension ("canal") in El Paso, TX. (See **Figure 2**.) An overview of the canal and the border area is helpful to understanding the project.

The canal has existed since the mid-1930's, although the reconstruction action has recently been completed. It is fully contained on the American side of the U.S./Mexico border. The sides of the canal are levees. Each levee supports a service road, for authorized vehicles

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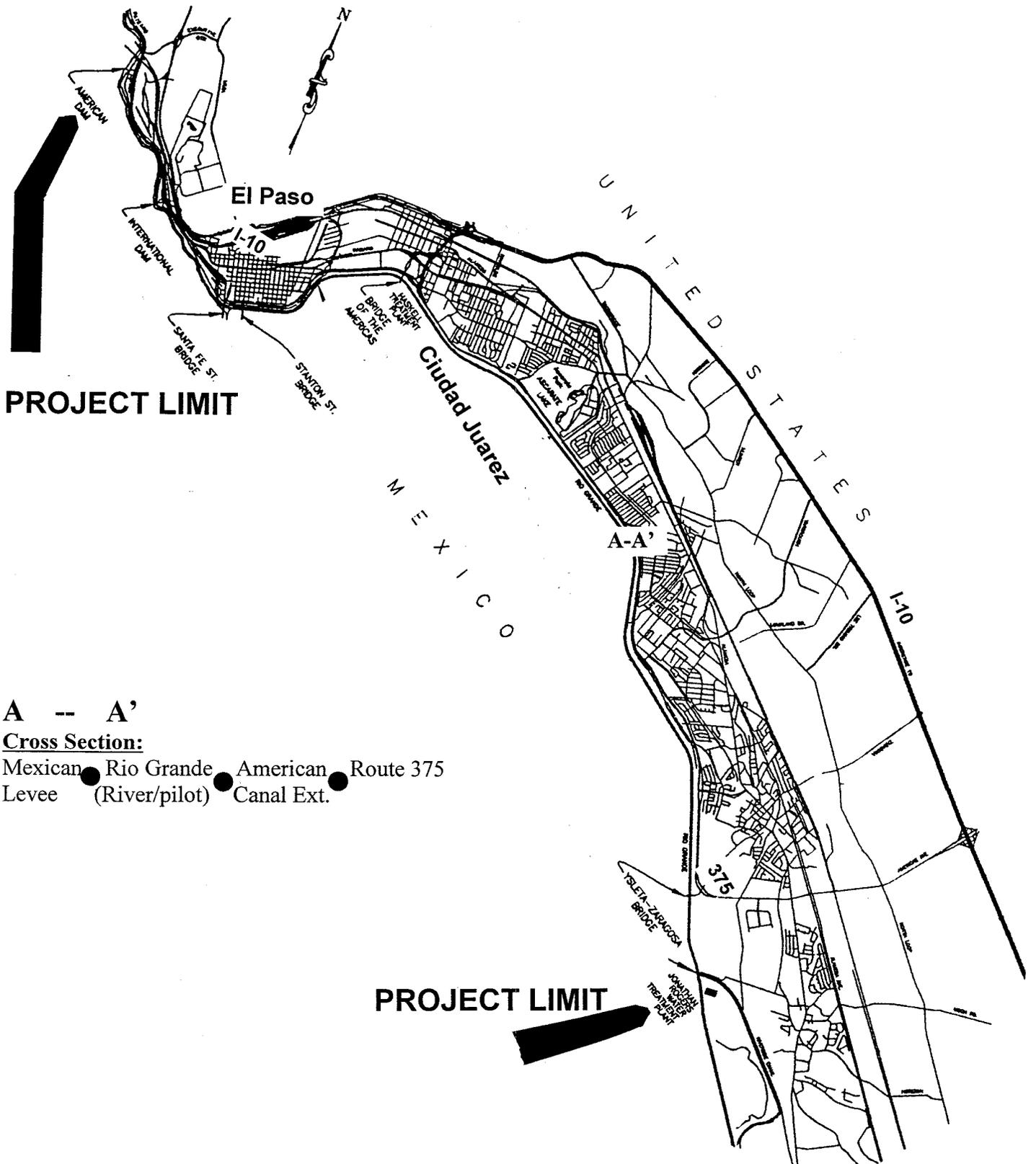


FIGURE 2

PROJECT AREA MAP

only. The southern levee is sometimes the higher of the two, and represents the U.S. River Levee for the Rio Grande. The average distance from the canal to the International Boundary (namely, the centerline of the “rectified pilot channel” of the Rio Grande) is about 90 meters (300 feet). (See **Figure 3.**) The canal has been reconstructed with a concrete lined trapazoid with an average depth of 10 to 12 feet; it is expected to have a flow rate of 42.5 cubic meters per second (1,500 feet per second).

The IBWC regularly mows or clear-cuts the sides of the levees. The tops of the levees are graded gravel and dirt and their width is used for service vehicles. The BP principally patrols on the southern side. IBWC vehicles have access for maintenance of the canal. The IBWC, under the canal reconstruction project, has nearly completed erection of a chain link fence along the canal-edge of the northern levee. The fence is 2.1 to 2.4 meters (7 to 8 foot) high, with an added 0.3 meter (1 foot) of razor or barbed wire along the top. (See **Figure 4.**) Gates will be included, both for vehicles and at escape ladder locations.

2. Proposed Action

The Proposed Action consists of placement of another chain link fence, guardrails, lighting and cameras along the canal. Most of the construction activity would occur on the southern levee of the canal. The BP will coordinate all construction with the IBWC.

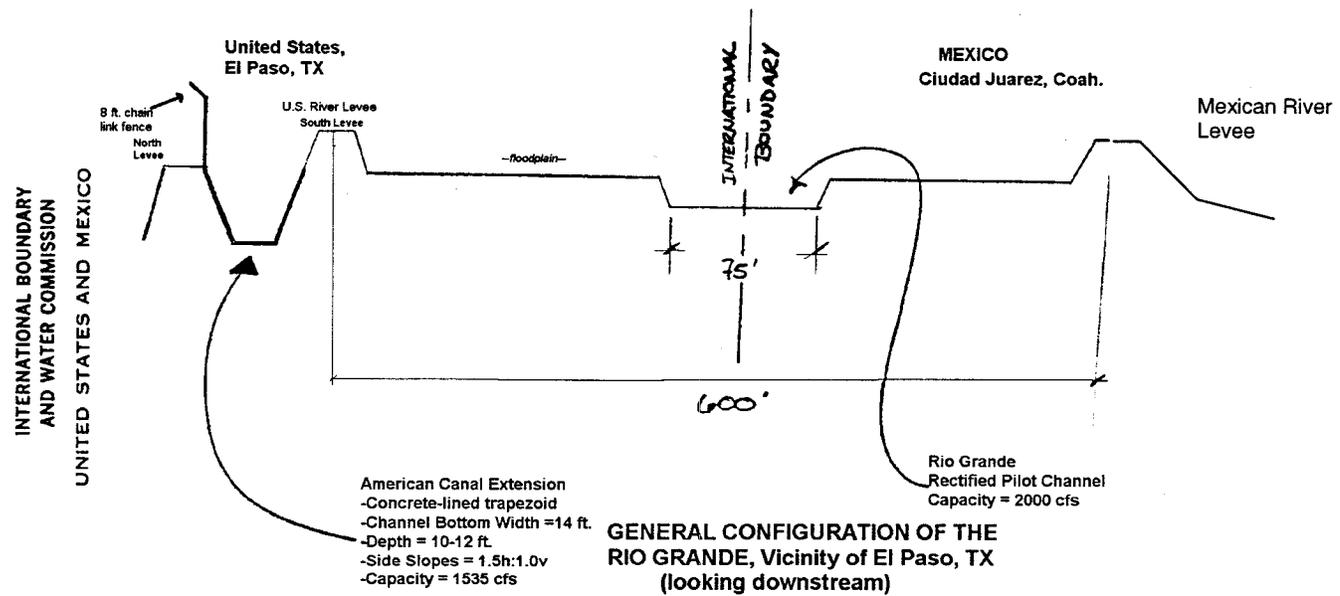
The approximately 2.4 meter (8 foot) high fence would be constructed immediately atop the levee to prevent access into the canal from the south. An additional one foot of strands of barbed wire will be strung along the top. In the locations where the canal improvement project has installed a concrete cap overtop the canal, the fencing would extend parallel to the flow of the canal. Gates will be installed at vehicle crossing points; smaller gates will be installed along the canal at escape ladders.

Guardrails will be installed in various locations along the edge of the service roads (levees) in order to protect vehicles from careening into the canal, or off the levee. Typical metal steel beam rail will be used, placed with suitable posts and at standard height.

Light poles will be installed at three locations along the IBWC property, notably at the sites where the canal has been covered:

- Area 1: Approximately 12 poles will cover approximately one-half mile, on IBWC property at 2600 Paisano Street, near the American Dam.
- Area 2: Approximately 20 poles will cover about two miles on property owned jointly by IBWC and Union Pacific, between Headgates (near the International Dam) and the Leon Spillway (West Bridge).
- Area 3: Approximately 12 poles will cover approximately 0.8 miles on property owned jointly by IBWC and Union Pacific, between the East Railroad Bridge and Second Street overpass.

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FIGURE 3

TYPICAL SECTION OF RIO GRANDE



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**FIGURE 4
EXAMPLE IBWC FENCING**

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El Paso Border Patrol/INS

Where a power source is required, electrical lines to the lights will be installed underground along the levee system. The lights will be directed downward to illuminate the canal and levee, and not be directed toward any residences.

Surveillance cameras will be placed both along the levee system and outside the IBWC property along Border Highway.

The above activities that constitute the Proposed Action have been approved for their general environmental impacts under the PEIS.

II. ALTERNATIVES

A. NO ACTION

Under a “No Action” scenario, additional measures supporting Operation Hold-the-Line would not be undertaken. The No Action alternative would not enhance enforcement activities of the BP, nor provide technological advantages, nor improve the safety and security of the BP agents.

Without fencing, the continued openness for potential transit by undocumented aliens is unchecked. This diminishes the effectiveness of the BP. Additionally, the potential for accidental drowning in the open water of the canal would still be present. Without permanent lighting, visibility is greatly reduced. This limits the ability of the Border Patrol agents from performing their job effectively, and safely, during nighttime patrols. Portable light units operated by generator would continue to emit noise at night. Additional units would be purchased to cover the operation requirements of the BP, if the No Action alternative were selected.

Guardrails also are a safety feature. Inappropriate levee access and unsafe gradient locations would continue to exist, posing a danger for vehicles and increased maintenance of the levee.

Finally, the No Action alternative would not introduce remote surveillance cameras. The technological efficiencies provided by the use of cameras would not be realized. Existing surveillance techniques for implementing the mandates of the BP would remain without improvement. Cameras increase the effectiveness of the BP by increasing the visual areas surveyed, and thus increasing security to their patrolling agents.

B. ALTERNATIVES TO THE PROPOSED ACTION

The BP is directed to monitor the U.S./Mexican border. The El Paso Sector of the BP patrols along the New Mexico/Mexican border west to Fort Hancock, Texas. The Proposed Action would cover approximately 20 miles of this territory along the American Canal Extension.

1. Alternative Location

The project for fencing, etc. could be moved closer to the Rio Grande and Mexico. As shown in Figure 3, there are two levees that support the American Canal Extension. Between the southern levee and the Rio Grande is a floodplain, approximately 300' wide. Anywhere along the floodplain could be an alternative location for placement of the fence.

The disadvantage of locating the fence further from the immediate vicinity of the canal is that the safety benefits are considerably reduced. The need for a fence along the southern edge of the swift-flowing canal would still exist. Similarly, placing lighting within the floodplain area instead of on the levee system would require more lighting. This is because the levee system, being elevated, can take advantage of silhouettes and background light from parallel (civilian) highways and other urban and suburban light sources.

The westernmost (northern) end of the project has the least amount of distance between the canal and the river. Moving the fence or lights closer to the border in this locale would seem intimidating and a visual intrusion to residents on the Mexican side of the border.

2. Increase Border Patrol Agents

This alternative would increase the number of BP agents, or other boundary and emergency service personnel. Providing more manpower does not assist in channeling illegal movements to locations for easier apprehension. Providing more manpower in the field does not eliminate the risk of accidental or unintentional falls into the canal. While more agents could assist in the deterrence and apprehension activities of the BP, available technology such as surveillance cameras, provides a lower-cost alternative than increasing the comparable number of agents. Solely increasing personnel does not cover the entire purpose and need for the Proposed Action.

3. Construction of a Wall

In lieu of a chain link fence, a solid wall could be constructed on the levee. A wall would provide a solid surface and be more noticeable as a permanent feature. Construction for the foundations of a wall would require additional stabilization of the levee for support. From a safety perspective, a wall would protect BP personnel from the canal. However, it could hamper potential rescue operations of anyone who has accessed the canal, because personnel could not see through it. A fence allows the BP (or IBWC, or other emergency service personnel) to observe the location/progress of anyone caught in the flow of the canal. The additional construction preparation and cost, and fewer benefits makes using a wall an infeasible alternative.

C. SELECTED ALTERNATIVE

The Proposed Action is the Preferred Alternative, and recommended to be selected after appropriate agency and public reviews of this document. The Preferred Alternative was described in the previous Chapter. It is consistent with the 1994 PEIS and the policies of the INS and BP. It provides a relatively low cost alternative, and uses readily available technology and materials. It considerably improves the safety of the BP agents in the field. It will assist the BP in more effectively patrolling and performing its duties.

As mentioned in Chapter 1, in the “Description of the Proposed Action”, the BP has a mandate to implement a program called “Hold-The-Line”. This is a major law

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enforcement initiative focussing on deterrence and apprehension. Use of fences, lighting, cameras have been proven as effective tools to assist in security and policing activities. The proposed action covers an area approximately 20 linear miles, within the city limits of El Paso.

In keeping with international conventions and agreements, IBWC-U.S. Section has created a levee system on the American side of the Rio Grande River. The American Canal Extension project, has altered the landscape and maintains a relatively constant distance to the Rio Grande center channel. The continuous maintenance of the center channel, the floodplain, and the canal has created a disturbed natural environment for the entire project area. The Proposed Action only introduces increased operations and safety measures to this already disturbed condition.

The fencing under the Proposed Action would essentially mirror the existing (being completed Winter/Spring 1999) IBWC fencing. The other features of the Proposed Action relate to increasing the ability of the El Paso Sector of the BP to enhance its enforcement activities, and provide safety to BP agents.

III. AFFECTED ENVIRONMENT

This section briefly describes the Project Area. The development and maintenance of a levee system has considerably disturbed the Project Area. Field observations, personal contacts, and reference materials including the two previously cited environmental documents were used to assemble appropriate descriptions. In accordance with NEPA and the regulations adopted by the Council on Environmental Quality, only sufficient information as is necessary to determine significance of impacts is presented herein; furthermore, by tiering this document to the broader 1994 PEIS, this EA concentrates on the issues specifically relevant to the Proposed Action.

A. SITE CHARACTERISTICS

1. Topography

The Project Area is located in the Rio Grande alluvial valley south of the Franklin Mountains. The elevation ranges from about 3,730 feet at the American Dam (northern end of the project) and drops to about 3,665 feet at the Riverside Canal (southern end). The entire project is within the city limits of El Paso, TX, and within the natural floodplain of the Rio Grande. The floodplain is confined by flood control levees on both the U.S. and Mexican sides of the river. (A cross-section of the levees is shown as Figure 3.) Dams exist in several locations, and have contributed to significant changes in the Rio Grande river valley features. (See Figure 1.) On the American side, for example, two former river meanders have been converted into parks for the city and county of El Paso.

In 1964, the American-Mexican Chamizal Convention Act was signed (Public Law 88-300, 78 Stat. 184, 22 U.S.C. 277d-17). This Act authorized the relocation of the river channel, replacement of bridges, and various upgrading and maintenance functions of both pilot and floodway channels and canals. The Rio Grande American Canal Extension Act of 1990 (P.L. 101-438) authorized the consolidation and reconstruction of the canal system on the American side.

These Acts defined additional water resource management needs for the Rio Grande, including periodic removal of sediment, land leveling, bank protection, and levee maintenance.

Located in a continental desert, precipitation in the Project Area averages 22 centimeters (8.5 inches) per year. Summer thunderstorms can result in severe flooding. The hottest month is July, with a mean daily temperature of 27.9 degrees Celsius (82.3 degrees Fahrenheit), while January is the coldest month with a mean daily temperature of 6.4 degrees Celsius (43.6 degrees Fahrenheit).

2. Geology/Soils

El Paso is located in an area of variable geologic structure characterized by high desert valleys and mountain ranges. It is known as the Trans Pecos Region of the Basin and Range Province. There is a diversity of exposed surface materials, ranging from rocks, clays and sands, resulting from volcanic activity and various deposits from eroding mountains. The Rio Grande floodplain area basically has loamy or clayey soils (Harkey-Glendale-Saneli).

The levee system has been constructed with suitable local materials, compacted for stability. Slopes of the levees are either vertical (with reinforced concrete) or 1.5:1 or 1:1.

3. Hydrology/Water Quality

Since the early 1900's, public use of the surface and subterranean water supplies has caused declines in water levels. The surface water supply is situated in the Upper Rio Grande basin. Subsurface water in El Paso is generally divided between two aquifers. As noted in the 1994 PEIS, groundwater is the primary source of drinking water in the study area. The sister cities of El Paso and Ciudad Juarez both depend on the aquifers for drinking supplies and irrigation.

Lining and rechannelling the Rio Grande, and diverting water into canals has altered the natural water levels and natural surface activities. Two dams along the northern limits of the project area have also dramatically altered the flow and natural cycles of the Rio Grande. The water flow most concerning the project site is that in the American Canal Extension. With the concrete-liner and with elimination of several diversion canals, the current in the canal is estimated to flow at 42.5 cubic meters per second (1,500 feet per second). This can increase during periods of peak flow, such as after storm events. This flow rate is considered a very swift current.

The Texas Water Commission (TWC) has established various water quality standards for rivers, reservoirs, etc. They also collect water quality samples from 700 statewide sites each year. The IBWC also monitors the water quality of its canals. The major sources of non-attainment of standards in the Rio Grande and the respective canal system continue to be fecal coliform bacteria, organic enrichment/dissolved oxygen, nutrients, salinity/total dissolved solids/chloride and various toxins. The sister cities of El Paso and Ciudad Juarez are major contributors of waste discharges into the Rio Grande.

As noted in the PEIS, efforts between the United States and Mexico to protect and improve the environment of the Border Area were formalized in 1983 (La Paz Agreement). The U.S.-Mexico Border Environmental Agreement was signed in 1989. The Integrated Environmental Plan for the U.S.-Mexican border (IBEP) was released in 1992. In December 1997, the Border XXI Program: Framework Document was published and establishes a strategic plan for a binational effort to sustain and protect human health and manage natural resources in the border region.

4. Biological Resources

a. Aquatic Resources

The American Canal Extension, and other canals and ditches in the area, provide only marginal aquatic habitat. Any species found in the canal are due to migration from the river or irrigation laterals. The channelization of the Rio Grande in the 1930's resulted in a homogeneous, shallow channel devoid of stream and bank cover, subject to high turbidity and extremely variable flows.

b. Terrestrial Resources

Most of the Project Area consists of mixed grass-forblands. The levee system grasses are mowed regularly to ensure suitable design flood features, and to handle maintenance equipment, Border Patrol vehicles and foot traffic. Typical wildlife that could inhabit this cover type include desert cottontail, cotton rat, morning dove, meadowlark, kestrel, burrowing owl and other non-game animals and birds.

Shrublands and herbaceous wetlands are very limited in the project vicinity, due mostly to intensive maintenance activities on the floodway and irrigation systems. The concrete-lined canal does not support wetland functions.

c. Threatened and Endangered Species

A current list of endangered species for El Paso County was obtained from the U.S. Fish and Wildlife Service and the Texas Parks and Wildlife Department.

There are five federally endangered species known to occur in the El Paso area. They are:

| Common Name | Scientific Name | State Status |
|--------------------------------|-----------------------------------------|---------------------|
| PLANTS | | |
| Sneed Pincushion Cactus | <i>Coryphantha sneedii var. sneedii</i> | E |
| BIRDS | | |
| American Peregrine Falcon | <i>Falco peregrinus anatum</i> | E |
| Northern Aplomado Falcon | <i>Falco femoralis septentrionalis</i> | |
| Least Tern | <i>Sterna antillarum</i> | |
| Southwestern Willow Flycatcher | <i>Empidonax traillii extimus</i> | E |

There is also one federally threatened species, the Mexican Spotted Owl (*Strix occidentalis lucida*). This is also a State-listed threatened species.

Additionally, the following species are listed as threatened in El Paso County by the Texas Parks and Wildlife Department, Endangered Resources Branch:

Birds: Zone-Tailed Hawk;
 Arctic Peregrine Falcon
Fishes: Bluntnose Shiner (extirpated)
Reptiles: Texas Horned Lizard
 Mountain Short-horned Lizard
 Texas Lyre Snake

The condition of the Project Area is not conducive for many of these species, and none were observed during field investigations. Specifically, the Sneed Pincushion Cactus grows on limestone ledges at elevations between 3,900 to 7,000 feet. The American Peregrine Falcon generally prefers nesting in high cliffs or mountainous areas, and hunting in meadows or marshes. The Northern Aplomba Falcon, conversely, prefers open terrain with relatively low ground cover; however, no nests have been verified in the United States since 1952. The Least Tern, although preferring nearly bare ground for nesting, has had its habitat severely disturbed by channelization projects and constant traffic associated with urban areas. The Southwestern Willow Flycatcher requires dense riparian vegetation, which does not exist along the canal levee system. Finally, the Mexican Spotted Owl inhabits mountains and canyons with dense pine and fir forests.

Of the State-listed species, the Zone-tailed Hawk inhabits riparian areas with an abundance of cottonwood. The Arctic Peregrine Falcon is a migratory species. The listed fish, Bluntnose Shiner, has been extirpated from El Paso County, nor would it find the concrete-lined levee canal system a suitable habitat. The two listed lizards could be in the Project Area, while the snake is a desert animal, generally preferring mountain areas. The Texas Horned Lizard is found in more remote locations and higher elevations than the El Paso urban area; similarly, the Mountain Short-horned lizard is chiefly a mountain dweller. A long-time biologist for the IBWC has never observed any of the above species along the American Canal or other canals/levee systems in the El Paso area (see *pers. comm.*)

5. Cultural Resources

Federal legislation, including Section 106 of the National Historic Preservation Act of 1966, as amended, requires consideration of means to preserve historic and archaeological resources that might be affected by activities involving Federal funding. A Class I records check and field reconnaissance of the Project Area were conducted for the specific reconstruction of the American Canal Extension (see the 1993 EA) and updated for the Proposed Action (see **Appendix A**). A Class III (100% pedestrian) survey was performed. Test holes were also dug to determine potential previously unidentified archeological remains.

Numerous historical and archeological sites exist in El Paso. Only one property within 1.6 km (1.0 miles) of the proposed project area, the Franklin Canal, was identified as having any historic or prehistoric significance. This conveyance has been nominated to the National Register of Historic Places.

6. Aesthetics

The Project Area is a man-made canal levee system that has altered the natural topography. The sister cities of El Paso and Ciudad Juarez are located north/east and south/west of the Project Area, respectively. Properties adjacent to the levee system are primarily built up, consisting of industrial, commercial and residential development. Route 375, Border Highway, separates the Project Area from the developed areas on the U.S. side. There are no visually sensitive sites, such as parks, historic properties, or natural areas, immediately adjacent to the Project Site. The photos presented as **Figures 5-1 through 5-10** illustrate the existing conditions of the project site.

7. Hazardous Materials

A review of regulatory database information from regulatory state and federal agencies was conducted to identify known hazardous waste sites/incidents. The El Paso/Ciudad Juarez sister city location, as noted in the 1994 PEIS, contains a “high-priority city pair where the transportation, handling, and disposal of hazardous wastes are a cause of public concern.” (PEIS, p. IV-49.) With the influx of manufacturing plants (maquiladora) in Ciudad Juarez, hazardous waste shipments and the potential mishandling of these toxic materials has increased.

There are several known CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act of 1980) and RCRA (Resource Conservation and Recovery Act of 1976) sites listed in El Paso. Similarly, the State of Texas lists leaking underground storage tanks.

A preliminary site assessment along the IBWC levee system of the American Canal Extension showed no evidence of hazardous materials.

B. COMMUNITY AND REGIONAL CHARACTERISTICS

1. Population/Economics/Housing

As noted in the 1994 PEIS, population in El Paso County increased 23 percent during the 1980's. In 1990, the population was 591,610; the estimated 1997 population (the latest available from the U.S. Bureau of the Census) was 701,576, for an increase of nearly 19%. The majority, over 86 %, resides in the city of El Paso. For the El Paso/Ciudad Juarez sister cities, the population is an estimated 1.5 million.

Approximately 69% of the population of El Paso is Hispanic, with non-Hispanic whites making up an additional 26%.

Unemployment in the El Paso area continues to be higher than the national average. In 1991, there was 10.17% unemployment. In 1997, with the total civilian work force

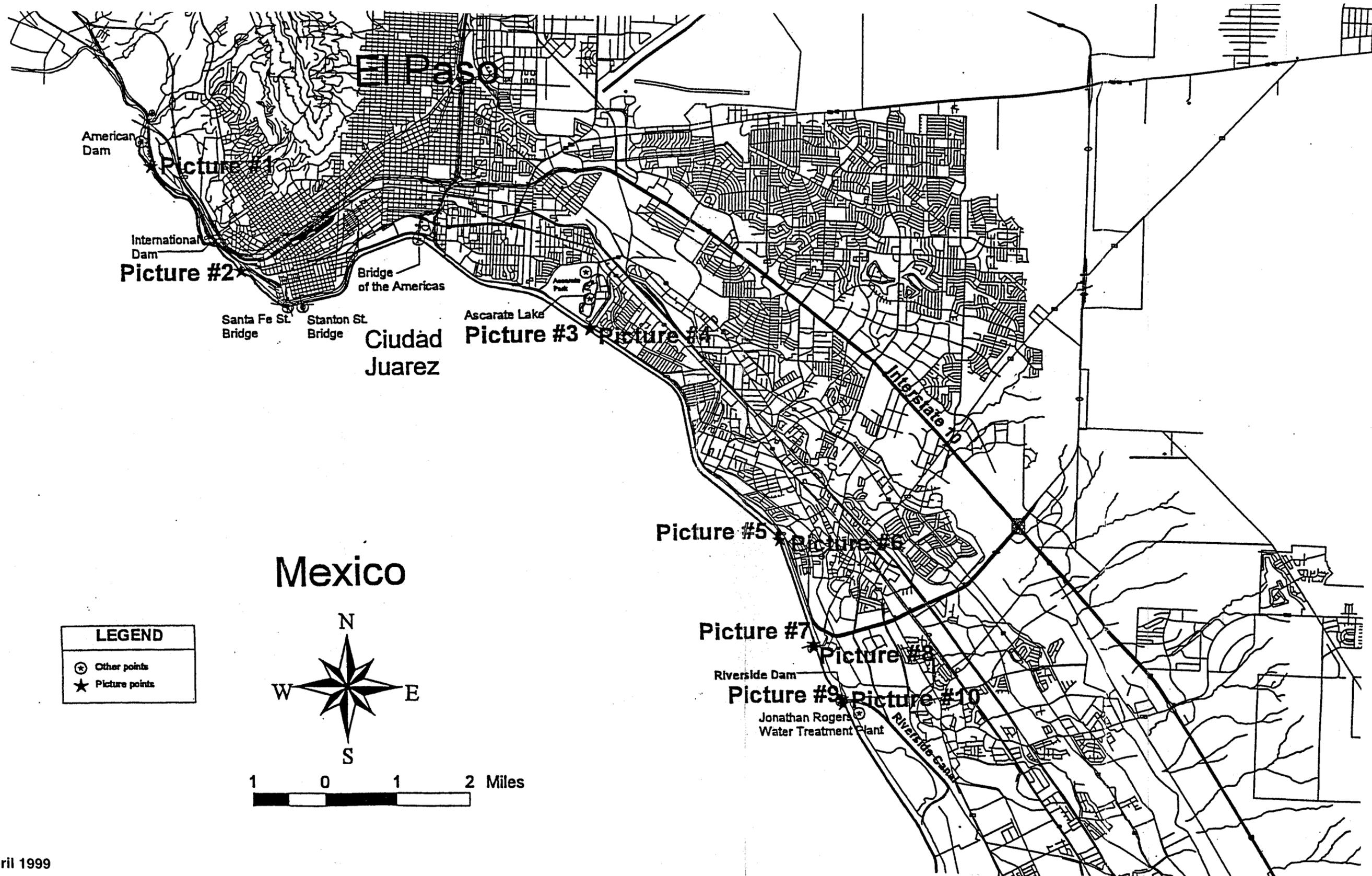


FIGURE 5
KEY MAP

**Environmental Assessment
El Paso - Border Patrol**

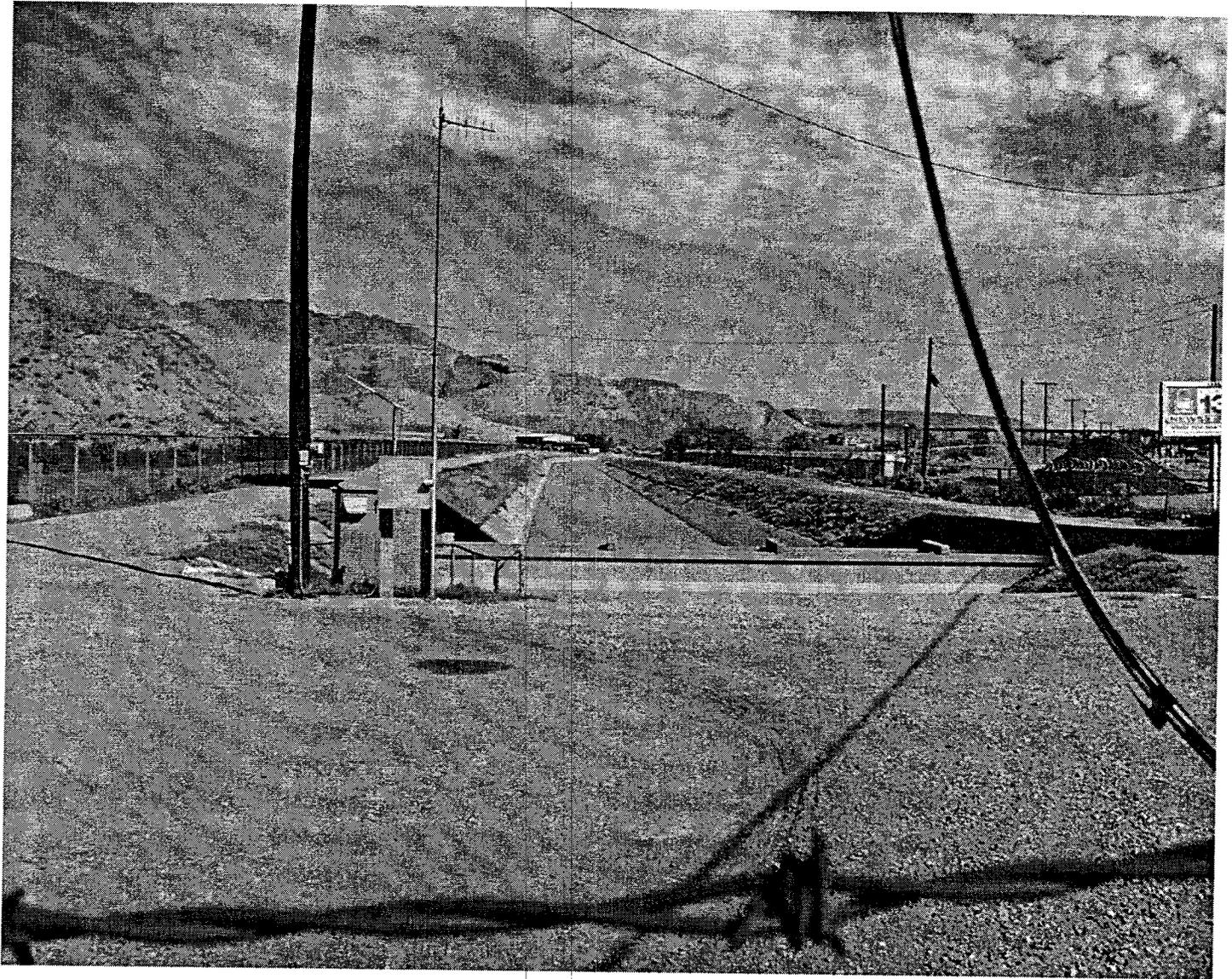


Photo taken 8/98

April 1999

FIGURE 5-1

PHOTO FROM AMERICAN DAM

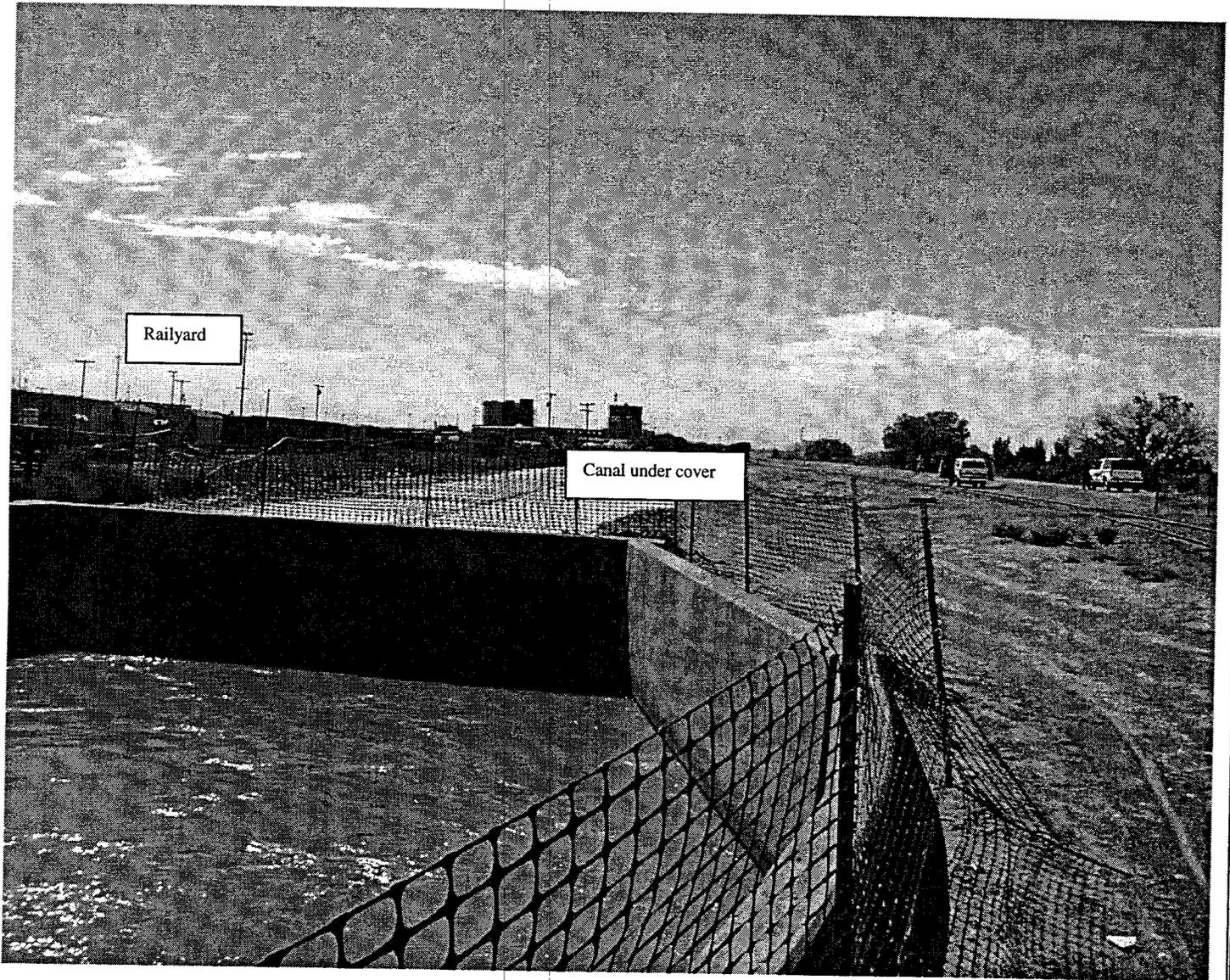


Photo taken 8/98

April 1999

**FIGURE 5-2
PHOTO OF AMERICAN CANAL, SO. SIDE
BETWEEN INTERNATIONAL DAM
AND SANTE FE BRIDGE , LOOKING SOUTH**

**Environmental Assessment
El Paso - Border Patrol**

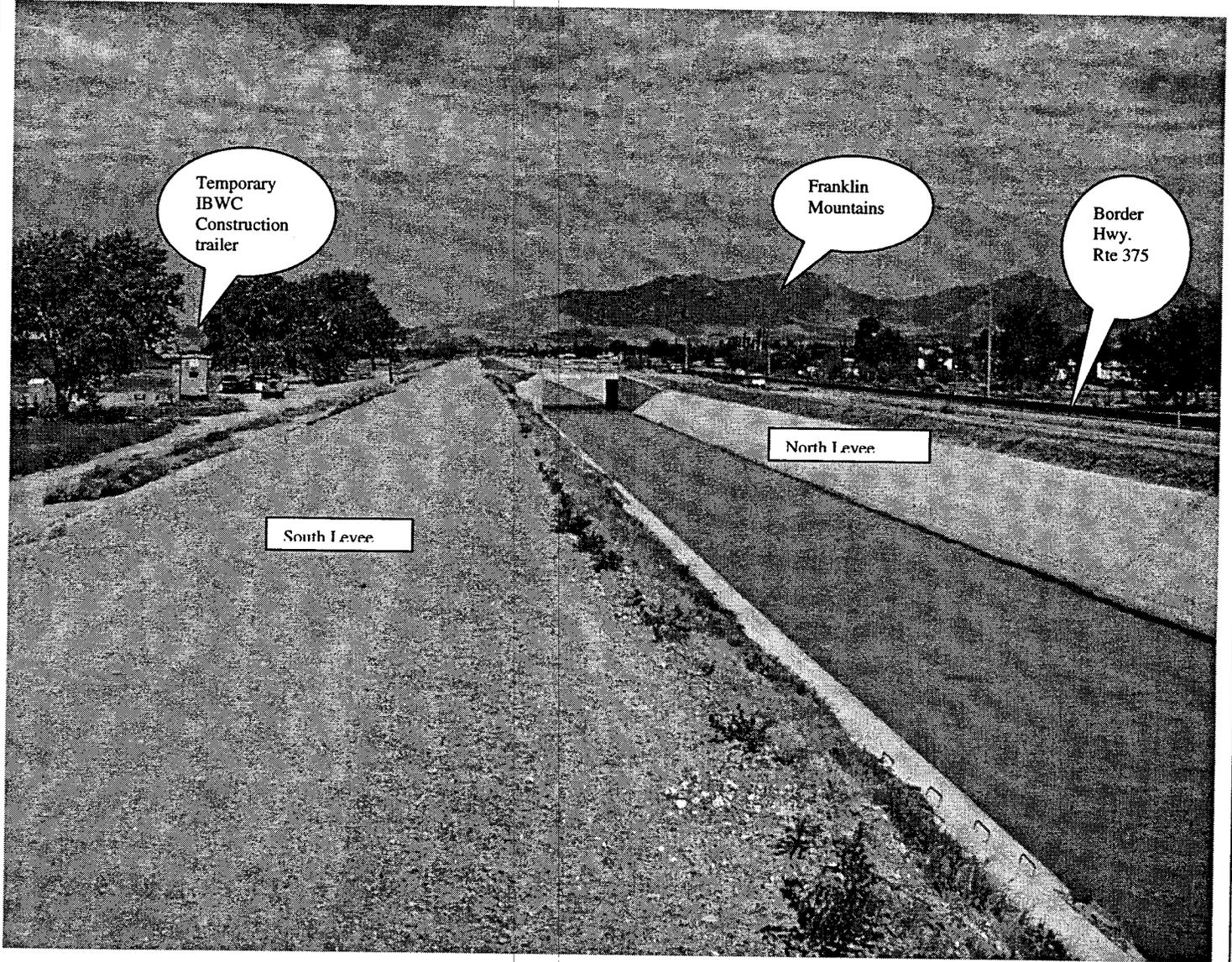


Photo taken 8/98

April 1999

**FIGURE 5-3
PHOTO OF AMERICAN CANAL, SO. SIDE
SOUTH OF ASCARTE PARK
LOOKING NORTH**

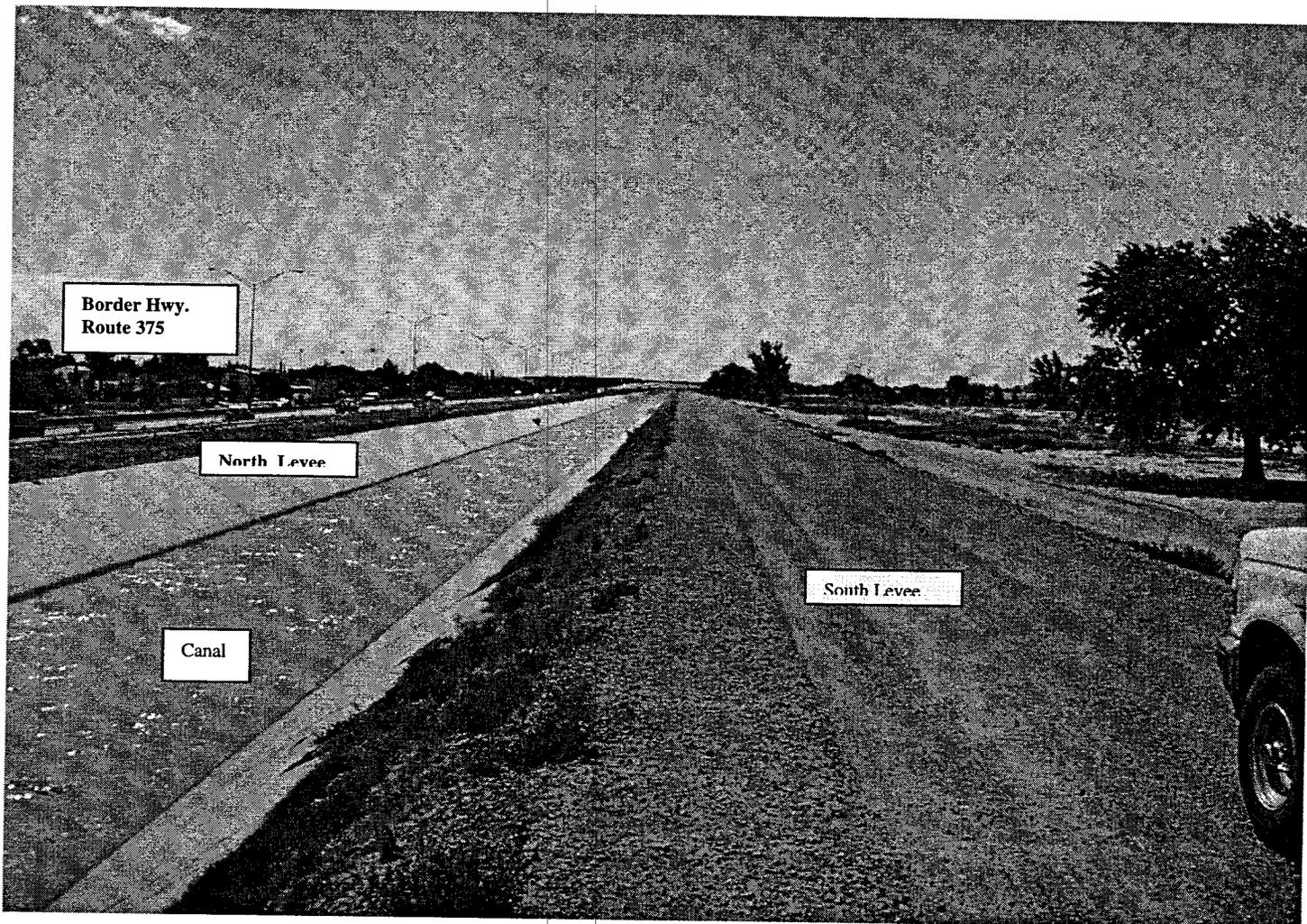


Photo taken 8/98

April 1999

**FIGURE 5-4
PHOTO OF AMERICAN CANAL, SO. SIDE
LOOKING SOUTH OF ASCARTE PARK**

**Environmental Assessment
El Paso - Border Patrol**

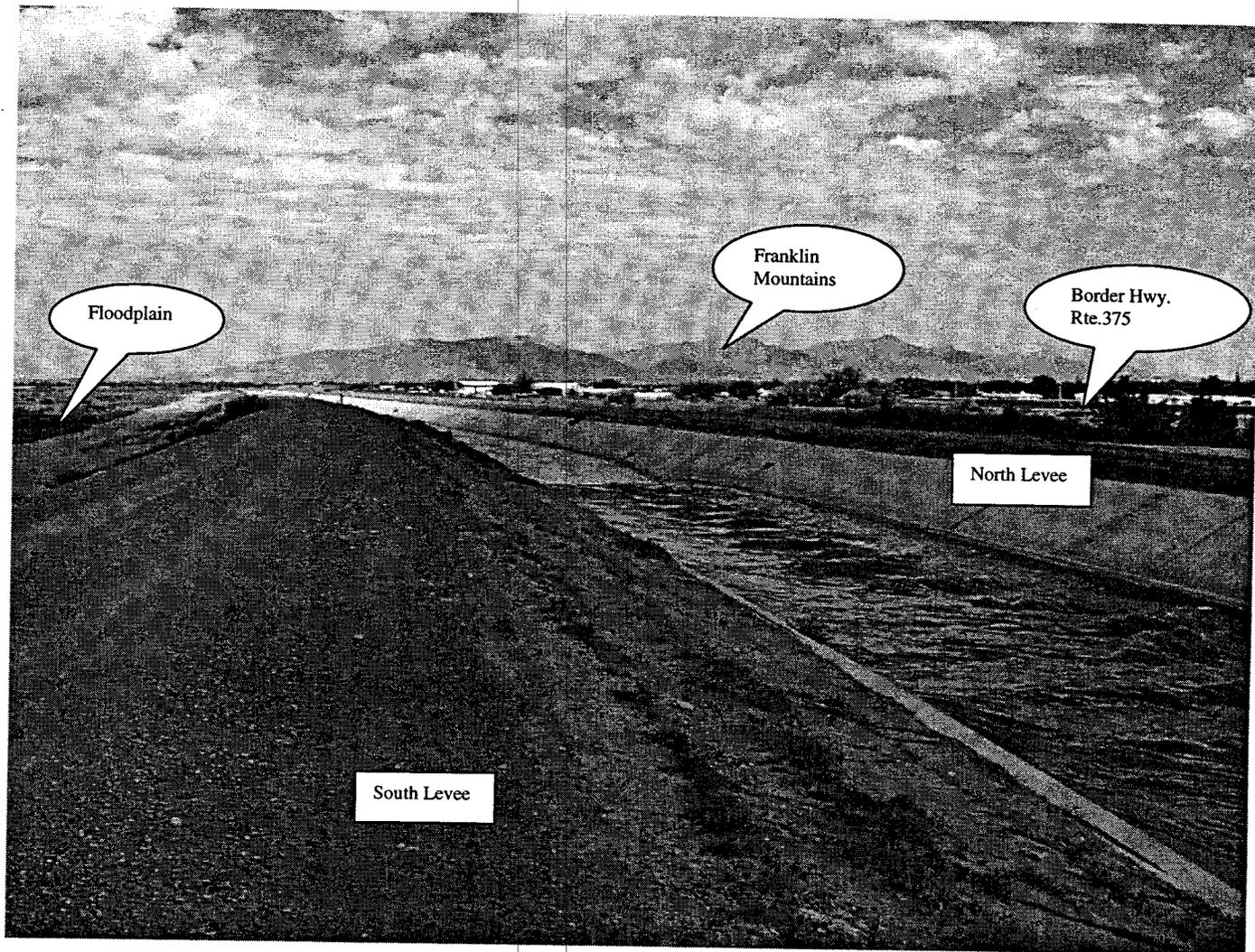


Photo taken 8/98

April 1999

**FIGURE 5-5
PHOTO OF AMERICAN CANAL, SO. SIDE
LOOKING NORTH**

**Environmental Assessment
El Paso - Border Patrol**

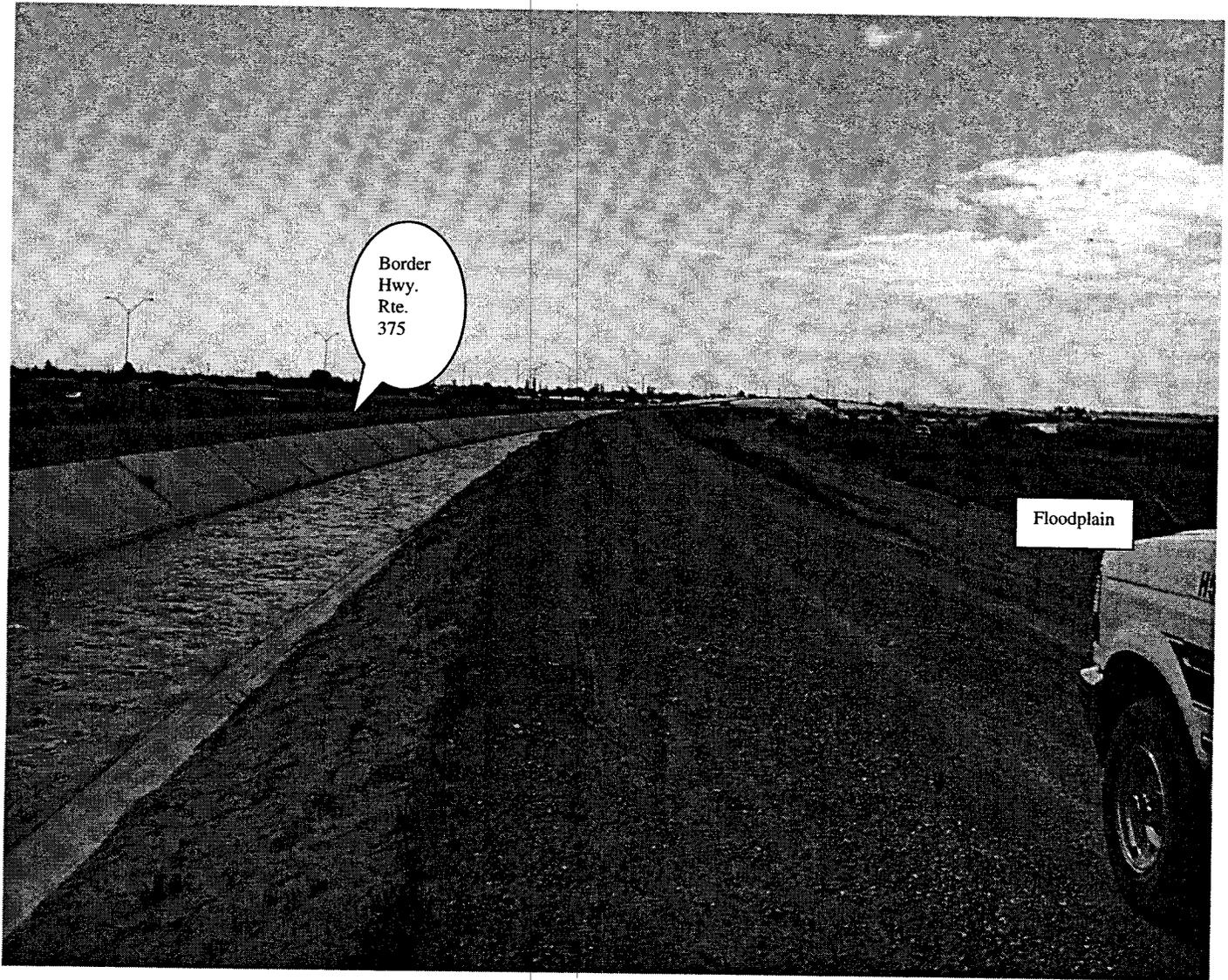


Photo taken 8/98

April 1999

**FIGURE 5-6
PHOTO OF AMERICAN CANAL, SO. SIDE
LOOKING SOUTH**

**Environmental Assessment
El Paso - Border Patrol**

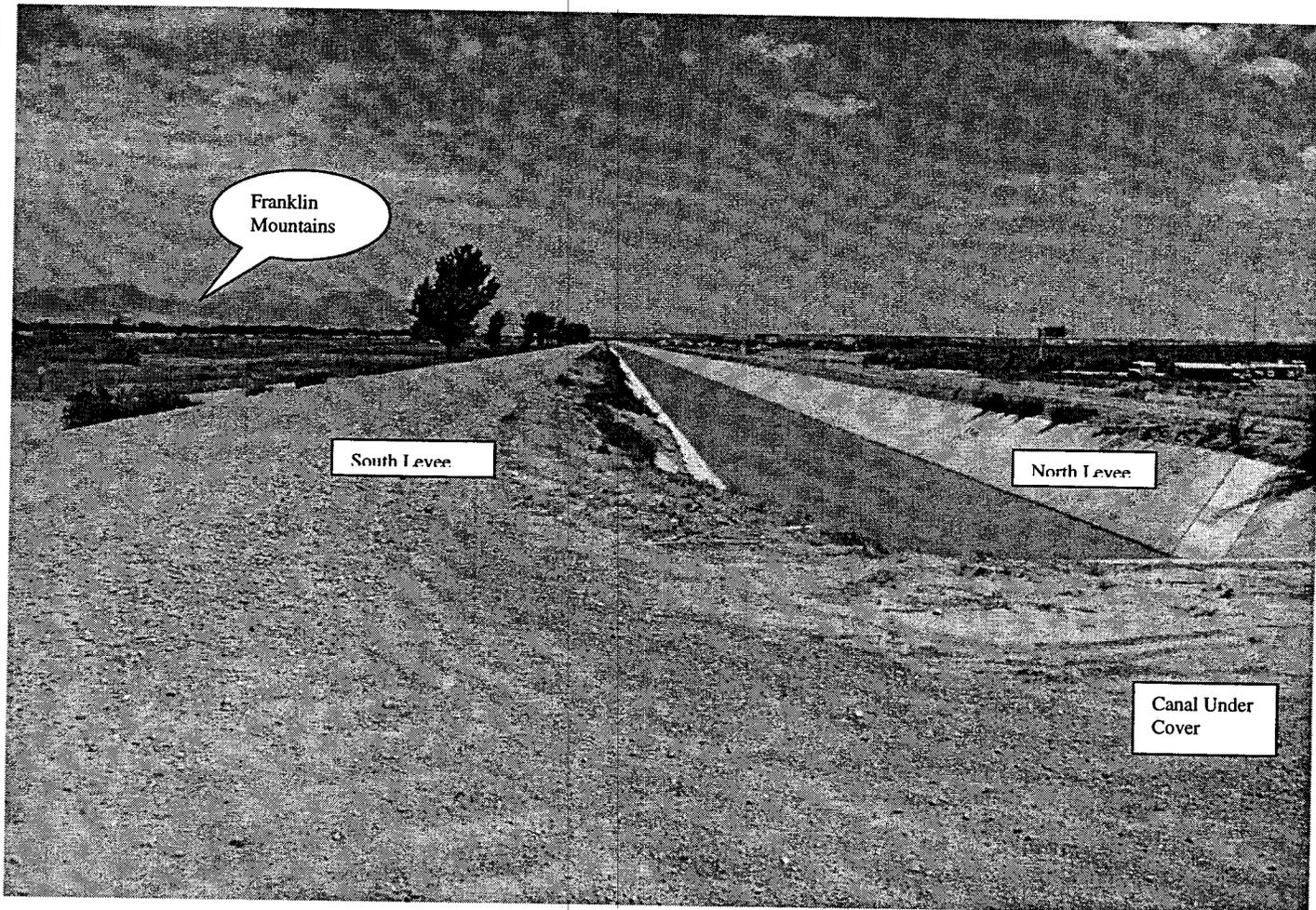


Photo taken 8/98

April 1999

**FIGURE 5-7
PHOTO OF AMERICAN CANAL
NEAR YSLETA-ZARAGOSA BRIDGE,
LOOKING NORTH**

**Environmental Assessment
El Paso - Border Patrol**

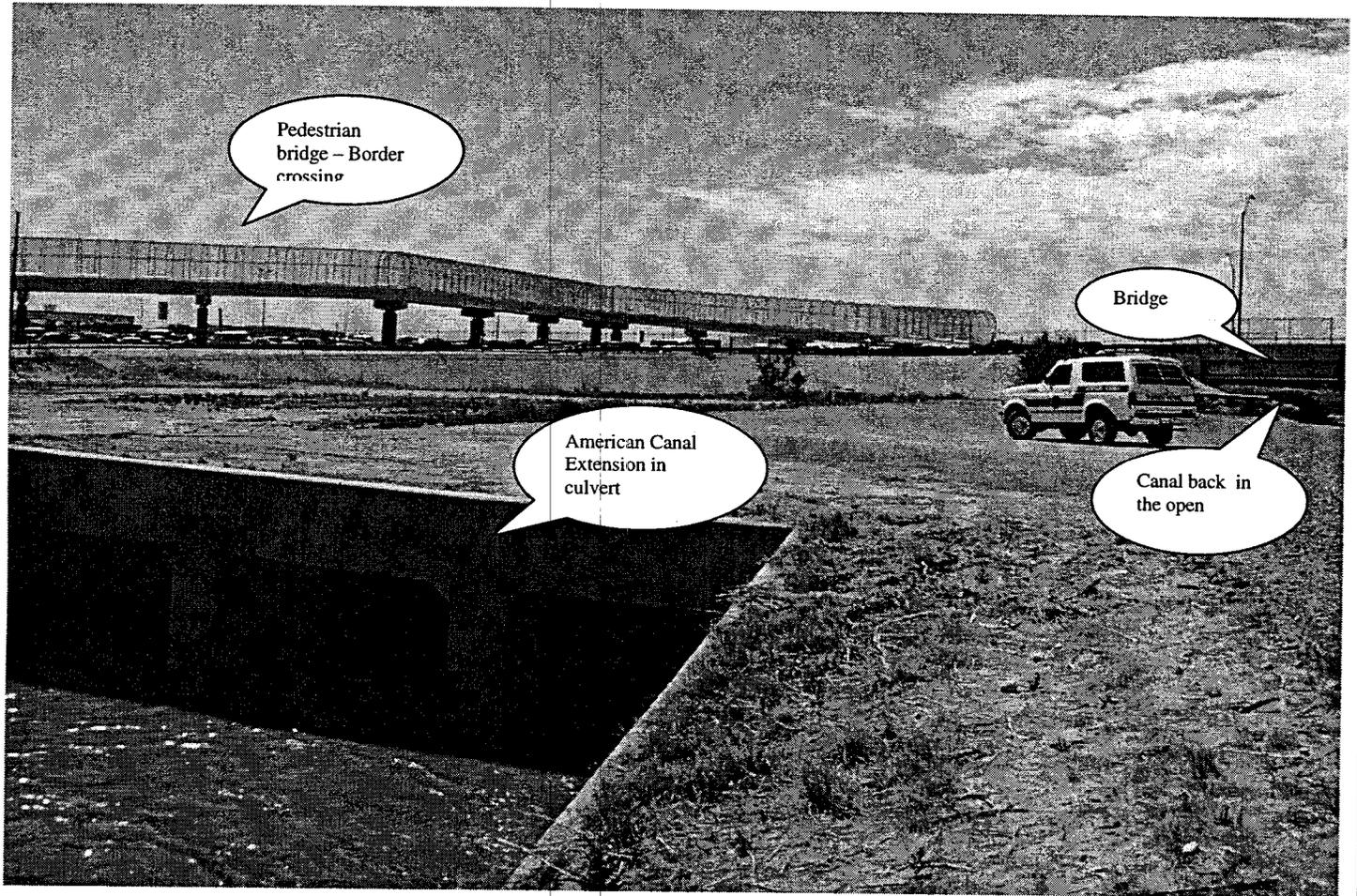


Photo taken 8/98

April 1999

**FIGURE 5-8
PHOTO OF AMERICAN CANAL, SO. SIDE
YSLETA-ZARAGOS BRIDGE IN BACKGROUND,
LOOKING SOUTH**

*Environmental Assessment
El Paso - Border Patrol*

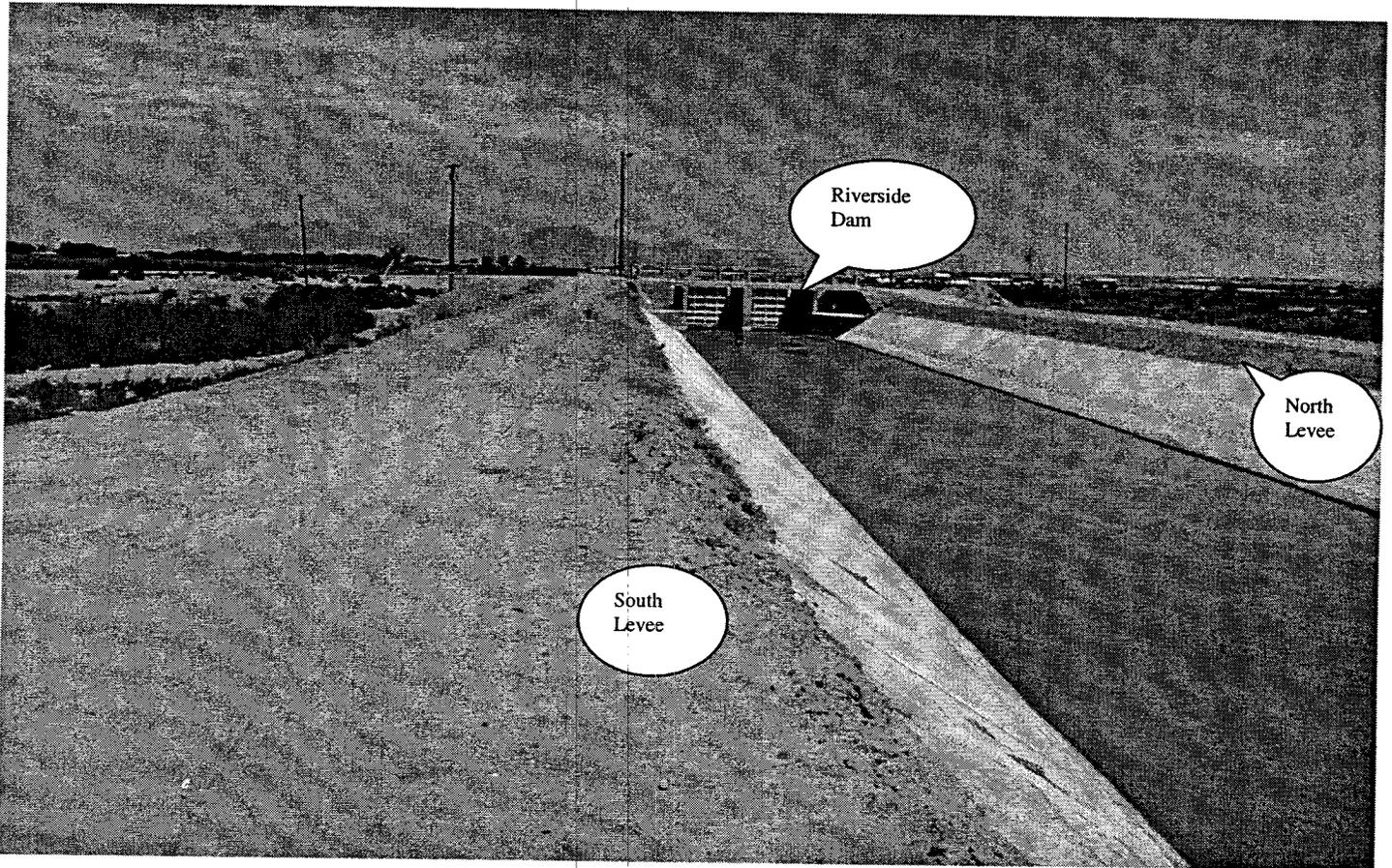
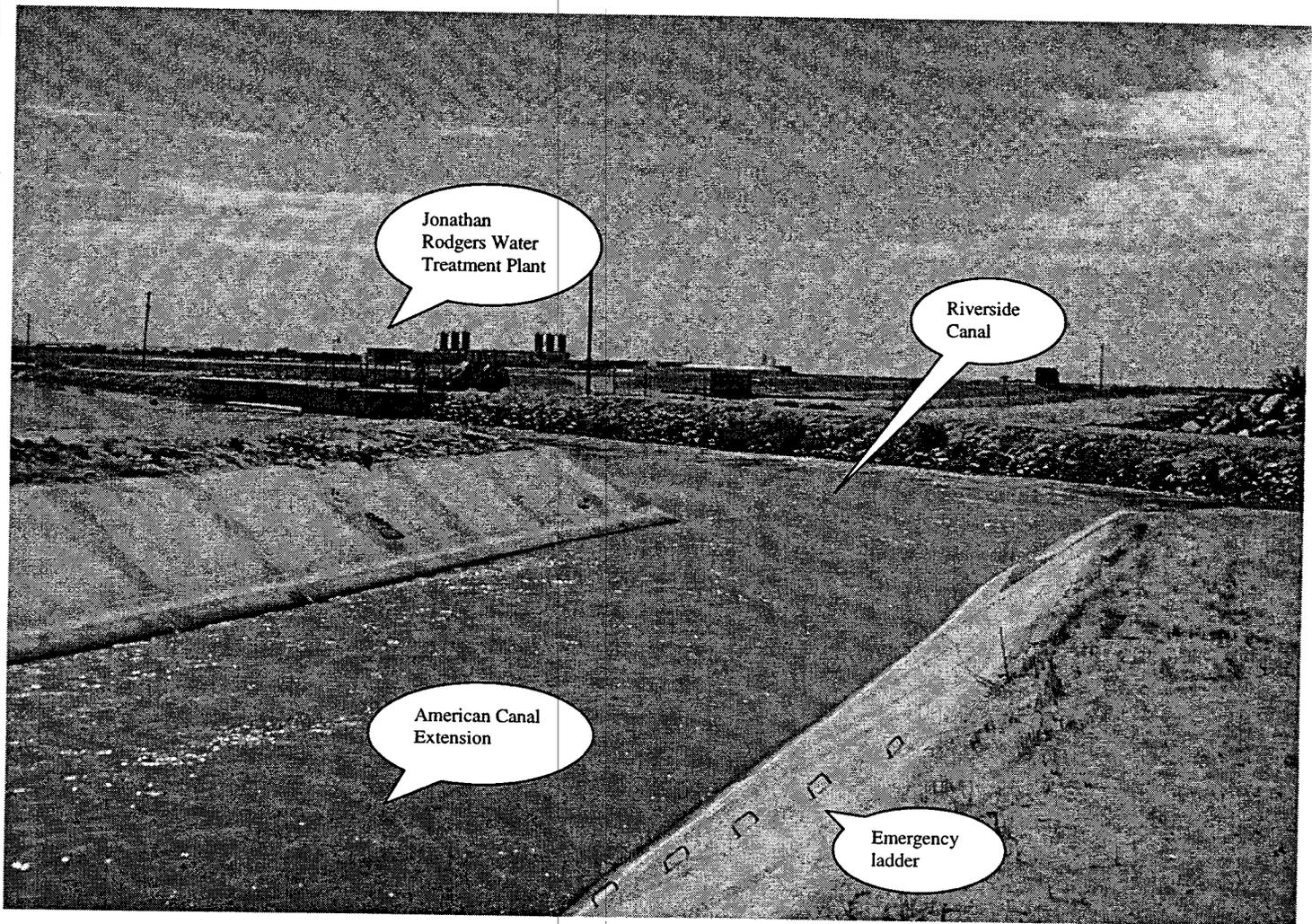


Photo taken 8/98

April 1999

**FIGURE 5-9
PHOTO OF AMERICAN CANAL, SO. SIDE
AT RIVERSIDE DAM,
LOOKING NORTH**



Jonathan
Rodgers Water
Treatment Plant

Riverside
Canal

American Canal
Extension

Emergency
ladder

Photo taken 8/98

April 1999

**FIGURE 5-10
PHOTO OF AMERICAN CANAL, SO. SIDE
START OF RIVERSIDE CANAL,
LOOKING SOUTH**

increasing, the unemployed totaled 11.58%. This compares with total Texas unemployment rates of about 6 % in 1991 and 4.5% in 1997.

Government and manufacturing are the dominant employment sectors in El Paso, at roughly 24 and 16 percent respectively. El Paso is a main gateway for trade with Mexico. Hence, Mexican maquiladora (manufacturing) plants in Ciudad Juarez influence the manufacturing sector. On the Mexican side, Ciudad Juarez has 263 plants, employing more than 150,000 people.

Estimates of people in poverty (1993, U.S. Bureau of the Census) in El Paso County range from 24.9 % to 35.6%.

In 1990, there were 178,366 occupied households in the County. By 1996, this estimate has grown to 207,500. There is an estimated 5% vacancy rate of available housing units.

2. Community Services

A variety of typical urban services exists near the Project Area. Recreational areas, parks, medical facilities, police, water and wastewater, and other civic functions are provided by the city of El Paso. The levee system is a restricted area, i.e. for authorized personnel only.

3. Land Use

The Project Area covers a linear corridor approximately 20 miles in length. The entire project is contained within the city of El Paso, one of the largest urban areas in the state of Texas. Its sister city of Ciudad Juarez is across the Mexican border. North of the project is Smelertown, a highly industrial area. The northern most end of the project is in a heavily industrial area. A large railroad yard covers the American side. Industrial mixed with low-income residential use is on the Mexican side, a few hundred yards to the south/west. In the vicinity of downtown El Paso, the project is near mixed industrial and commercial activities. Texas Highway Route 375 travels adjacent to the American Canal Extension, separating the canal from residential communities and amenities such as the Ascarate Park. The land use along Route 375 is generally light industrial and commercial, with occasional residences. Further south/east, the density for both commercial and residential uses decreases.

From near downtown El Paso, as mentioned previously, the canal is situated approximately 100 meters (300 feet) north/east of the Rio Grande. This area between the levee and the river (boundary) is a floodplain. Access to this floodplain area is not encouraged, as use of the levee and canal system is restricted to authorized personnel.

4. Utilities

El Paso has all necessary urban utilities. The IBWC has some electrical power provided to its gauge stations along the American Canal Extension. Water and sewer lines are near but not on the Project Site.

5. Transportation and Access

El Paso has a transit system, and many major roadways. Interstate 10 is an east-west freeway providing significant opportunity for interstate commerce. U.S. Route 54 also offers a limited access route, in a north-south orientation. Many other major routes service the El Paso area. State Route 375 is a multi-lane facility paralleling the border from downtown to the Zaragosa Toll Bridge, a distance of approximately 11 miles.

There are several border crossing locations offered both for vehicles and pedestrians. They are identified on **Figure 6**.

The El Paso/Ciudad Juarez area is a large manufacturing center, and high volumes of trucks transport supplies and goods across the border. Railroads also offer a major industrial source of transportation. They transport bulk materials and agricultural products.

6. Air Quality

The Federal government, under the Clean Air Act of 1970, as amended, has established air quality standards for the U.S. The U.S. Environmental Protection Agency (EPA) has set six National Ambient Air Quality Standards (NAAQS's) which regulate six pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, sulfur dioxide and particulate matter. Geographic areas have been officially designated by EPA as being in attainment or non-attainment for air quality in relation to the area's compliance with the NAAQS.

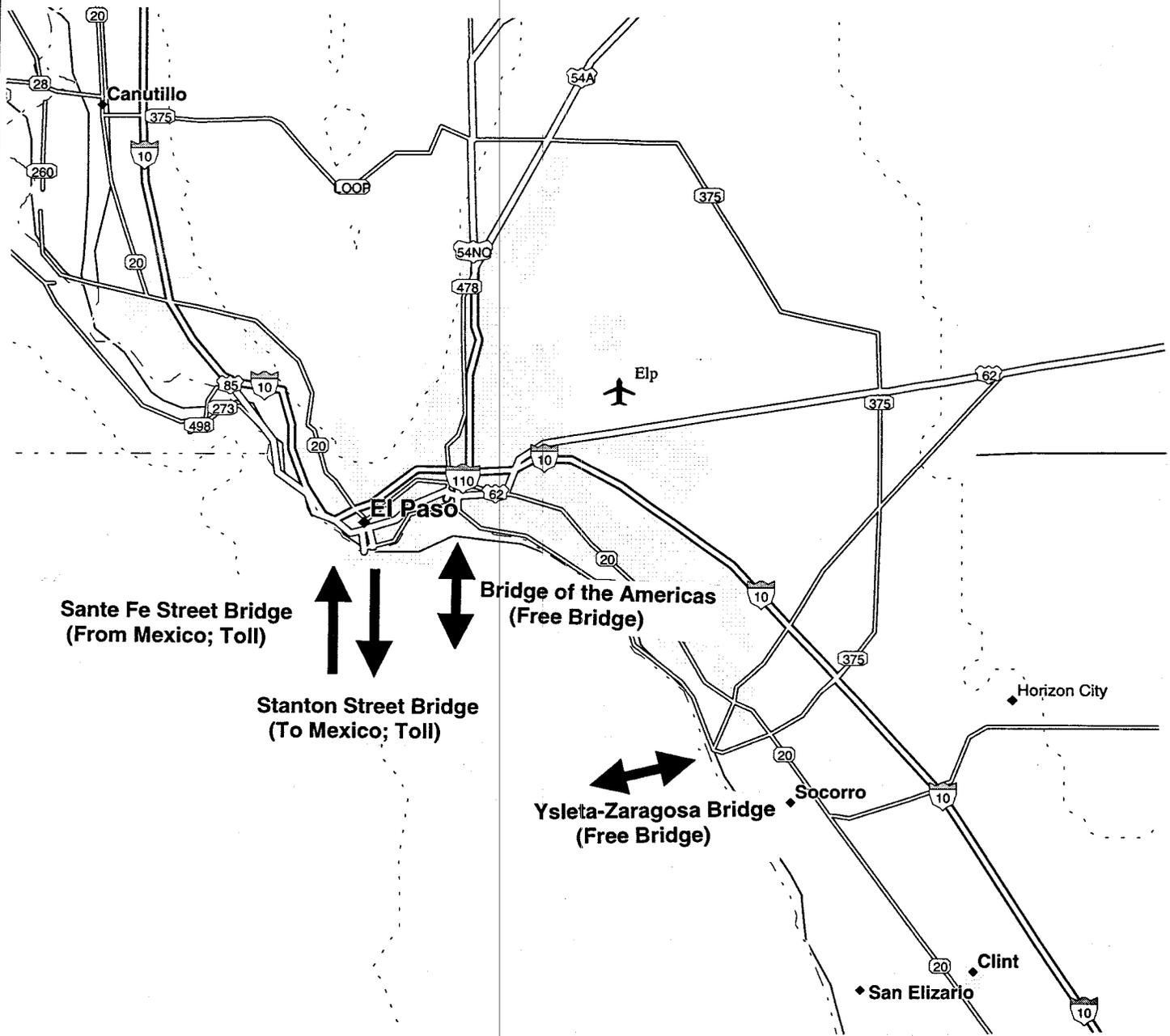
As noted in the PEIS, the El Paso region is designated as a non-attainment area for ozone, carbon monoxide, and particulate matter. El Paso must develop a plan to reduce and attain NAAQS by November 1999. Additionally, formal efforts between Mexico and the United States, such as noted in the Border XXI document, continue to improve air quality and other environmental health conditions jointly for the border areas.

7. Noise

The Project Area is contained within the city of El Paso, which has ambient noise levels common to various urban locations. Noise is unwanted sound. Noise levels can be measured in 24-hour periods and for a peak hour. Noise activities at night are often measured with an added factor, in effect a penalty, to account for the potential disturbance to sleep. Noise levels near highways with heavy volumes of truck traffic will be higher than levels in residential areas. Noise diminishes in distance from its source.

Because the Project offers no activity which introduce noise, or increases noise, no further analysis is necessary.

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**FIGURE 5-6
POINTS OF ENTRY IN EL PASO AREA**

IV. ENVIRONMENTAL CONSEQUENCES

A. SITE CHARACTERISTICS

1. Topography

The Proposed Action will have no impact to the topography of the site. The heights of the manmade levees will remain in tact. The proposed fence will virtually mirror the existing fence of the IBWC. The proposed lights will not introduce illumination to the site, given the ambient urban background and also the existing portable light units employed by the BP.

2. Geology/Soils

The Proposed Action will have no impact to the geology or soils of the site. Limited drilling will occur for placement of posts, which will be embedded in concrete. All construction activity will conform to engineering standards so as to maintain the stability of the levee.

3. Hydrology/Water Quality

The Proposed Action will have no impact to the surface or ground water resources of the area. The chain link fence allows water flow in the event of flood levels. The Proposed Action will provide added protection from introduction of waste materials that might reduce the water quality. None of the Proposed Action activities would cause a significant increase in ground water runoff or create a significant intrusion into the existing floodplain. Construction activity will include implementation of Best Management Practices for sediment and erosion control.

4. Biological Resources

A minimal loss of habitat would occur under the Proposed Action. The project site receives heavy travel by BP and IBWC staff. The levee system is maintained regularly and provides only a disturbed and undesirable environment for natural species. No terrestrial flora or fauna are expected to be disturbed by the Proposed Action. No aquatic impacts are anticipated. Overall habitat loss from fencing the Border area was documented in the PEIS. Potential impact to birds is reduced due to the fabrication techniques: all poles will be set in concrete and would not require guy-wires (i.e. they would be free-standing). Utilities as needed (e.g. electricity) would be brought to the levee by underground trenching.

No wetlands exist on the site; therefore there would be no displacement of wetlands and no impacts from runoff or sedimentation. In accordance with Executive Order 11990, *Protection of Wetlands* (May 24, 1997), no additional permitting or mitigation of wetlands is required for the Proposed Action.

Coordination with the U.S. Fish and Wildlife Service (USFWS) is required under Section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.). As noted in the “Affected Environment” chapter, none of the threatened or endangered species are expected to inhabit the Project Area.

5. Cultural Resources

The Texas Historical Commission has concurred in a finding of No Effect on National Register eligible or listed or State Archeological Landmarks. (See **Appendix A.**) This completes the Section 106 process.

6. Aesthetics

Adding any new element to the natural or built environment can alter the visual context of the surroundings. However, all of the Project Area has been substantially disturbed by man-made activity and facilities. Many areas along the canal are already fenced on one side. Portable units already light many areas. Much of the Project Site is located adjacent to heavy industrial or commercial areas. State Highway Route 375 is situated between the Project Site and the locales of commercial and some residential use. Route 375 is a four-lane facility with permanent light fixtures.

The Proposed Action will not have a significant adverse effect on aesthetics of the area.

7. Hazardous Materials

No impacts to hazardous materials sites are expected.

B. COMMUNITY AND REGIONAL CHARACTERISTICS

1. Population/Economics/Housing

No significant adverse impacts are expected to demographics. The Proposed Action will require no displacement of residences or businesses. It will not alter the population characteristics of El Paso. Because of the lack of impacts, no additional evaluation of minority or under-privileged individuals is necessary. In accordance with Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations*, February 11, 1994, the purpose of considering environmental justice is to ensure that highly disproportionate and adverse impacts do not occur to the disadvantaged populations/residents.

Where the American Canal Extension is under cover (in conduit) and the proposed fencing will cross it above ground, the communities in the vicinity would benefit from greater personal safety due to reduced potential for undocumented aliens attempting to transit these locations.

2. Community Services

There will be no change in community services as a result of the Proposed Action.

3. Land Use

There will be no change in or conflicts with land use as a result of the Proposed Action.

4. Utilities

The only impact on utilities is the anticipated connections to electrical power sources for providing electricity to the lights, cameras and sensors. Connections will occur after proper coordination and utility company authorization.

5. Transportation Issues and Access

The levee system is for authorized personnel, and does not provide access for the general public. Border crossing stations are specifically designated. The Proposed Action will not alter those crossing locations.

Access to the Project Site for the construction personnel will be provided. A designated construction staging area will assist in centralizing this activity as much as possible. It is expected that the Proposed Action will aid in reducing the transit of undocumented immigrants across the floodplain and canal. Several authorized border crossings exist in the area for properly passing between the U.S. and Mexico.

6. Air Quality

This document is being submitted to the U.S. Environmental Protection Agency for review and concurrence that the Proposed Action does not affect air quality attainment status. Pollutant emissions from construction vehicles are expected, but would not be significant. They were addressed in the PEIS. Construction of the proposed facilities will also have minimal temporary impact to air quality in the form of fugitive dust problems. These minor construction impacts will be mitigated through appropriate measures described in Section IV, C.

The movement of the BP vehicles in patrolling the IBWC levee area will not be significantly altered.

7. Noise

The Proposed Action will have no adverse effect on noise. No increase in vehicular traffic, except during construction, is expected from the Proposed Action. Current practices by the Border Patrol for using portable lights powered by generator units will continue, but will not in the locations to receive lighting under this project.

C. SUMMARY OF ANY SIGNIFICANT IMPACTS AND REQUIRED MITIGATION

The Proposed Action is not expected to incur any significant environmental impacts. The law enforcement activities of the Border Patrol will be increased; the safety of the agents of the Border Patrol will be increased; the safety of unauthorized intruders into the canal will be increased. There is no unique natural habitat along the Project corridor. No impacts to air quality, noise, land use, or social factors will occur due to the Proposed Action.

Specific actions which the BP shall employ to further **minimize potential impacts** are:

1. In order to allow the IBWC to engage in their maintenance functions and emergency operations, all poles (for lights, for sensors, or for cameras) to be erected under the Proposed Action will be free-standing, and not be secured by guy-wires.
2. All lights shall be directed away from residential areas.

Specific activities to further **minimize the impacts of construction activities** include:

1. Concentration of construction materials to reduce the area of temporary construction impacts.
2. Best Management Practices to the maximum extent practicable to minimize temporary and long-term impacts to the natural, physical or human environment.
3. Construction vehicles accessing urban areas or major transportation routes will be made free of excessive dirt and dust. To the extent practicable, fugitive dust emissions will be reduced during project construction by making the specific site damp.

One specific construction staging area has been identified on IBWC property. It is a site of about 0.7 acres, located approximately near the mid-point in the project, on the north side of the levee. It is on IBWC land, and has been used by the contractor for the recent IBWC fencing project. It is a flat gravel and dirt area, approximately 9 meters (30 feet) from Route 375. Any contractor would be required to restore the area to a clean condition, removing trash and any spilled materials from the site. A license from the Boundary Commission would be required.

Best Management Practices (BMP's) typically include soil erosion and sedimentation control practices and procedures. This is particularly important in areas adjacent to drainage areas and wetlands, where eroded material may increase turbidity levels and sedimentation downstream. Control measures include dikes, sediment basins, straw silt barriers, mulch, fiber mats, netting, temporary and permanent seeding and other methods.

The concern for erosion and sedimentation for the Proposed Action is less for the protection of the natural environment, than for the protection from silting-up the man-made concrete-lined canal. Any construction activity, such as digging of fence postholes, shall include precautions to control erosion and sedimentation into the canal. In areas where there is grass, the contractor will be required to re-establish similar ground cover.

Given the project venue, namely gravel and dirt levee roads along a canal, there will be dust emissions from construction equipment and other contractor vehicles as they travel along to erect the specific facilities. No major earthmoving activity is proposed. During the construction, a water truck for dampening the soil in order to reduce dust will be employed by the contractor as necessary.

D. RELATIONSHIP BETWEEN SHORT-TERM USE OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The proposed action involves the enhancement for improved functional operations of the existing El Paso Sector of the Border Patrol. The various sites and immediate environs of the proposed action would be affected by the construction activities in the short-term. These activities would generate economic productivity in terms of the jobs created, purchase of supplies, equipment and services. These productivity gains would be primarily short-term benefits. Long-term benefits would be realized through the improved overall efficiency of BP operations as described in Chapter 1. In addition, the project which is located almost exclusively on federally-owned land, would be compatible with adjacent uses.

E. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The proposed action would require commitment of nonrenewable resources for both actual construction and long-term operation. These include such resources as water, energy, sand and gravel, metals and fuel. Use of these resources would represent an incremental effect on the regional consumption of these commodities. These incremental commitments of nonrenewable resources are neither unusual nor unexpected, and must therefore be weighed against the benefits of the proposed action. The primary benefit of proposed improvements would be to bring the portions of the El Paso border area into compliance with current INS available technologies, increase the Border Patrol's response capabilities, and provide additional safety to BP agents.

F. CUMULATIVE IMPACTS

Cumulative impacts on environmental resources can result from the relationship of the proposed project to other past, present, and reasonably foreseeable future actions in the area. Cumulative impacts can result from minor, but collectively significant, actions undertaken over a period of time and by various agencies (Federal, state or local) or persons. In accordance with the National Environmental Policy Act (NEPA) of 1969, and the Council on Environmental Quality (CEQ) regulations of 1978, a discussion of cumulative impacts resulting from actions and projects that are proposed, under implementation, or reasonably anticipated to be implemented in the near future is required.

Cumulative environmental impacts are most likely to arise when a relationship exists between a proposed action and other projects expected to occur in similar locations, time period, and/or involving similar actions. Projects in close proximity to the proposed action would be expected to have more potential for a relationship that could result in potential cumulative impacts than those more geographically separated.

This analysis assesses potential impacts associated with the proposed improvements along the reaches of the El Paso Sector of the BP in relation to potential impacts from the developments approved and/or proposed within the vicinity of the project.

The IBWC continues to operate and regulate the water flows of the Rio Grande canal system in accordance with international agreement. The recently completed American Canal Extension project has been documented in this EA; from an environmental perspective, there will be no additional negative impacts generated by the Proposed Action.

Within the INS, studies are being conducted to assess methods to implement increasing the processing and flow of persons, vehicles and goods at authorized Ports of Entry. Examples include introducing 'speed' lanes and other frequent-user identification systems. Implementation of such operations, coupled with the Proposed Action, could provide a cumulative benefit by enabling speedier, legitimate transit of entries.

The City of El Paso has no programmed improvements in the vicinity of the proposed project.

Implementation of the Proposed Action would not result in significant cumulative impacts related to geology/soils/water quality, biological resources, air quality, noise, visual quality, traffic and circulation, hazardous materials/risk of upset, socioeconomics, utilities, and public services, land use, and cultural resources.

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Seiger, Andrew. International Boundary and Water Commission, U.S. Sector - Engineering. Personal communication. February 1999.

Swassa, Lou. El Paso Border Patrol Public Affairs Office. Personal Communication. March 1999.

VI. LIST OF PREPARERS

DOCUMENT REVIEWERS

| | |
|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| <u>U.S. Immigration and Naturalization Service</u> | |
| HQ-ENG 425 I Street NW Washington, DC 20536 Debra Hood -- Environmental Officer | ACDAP 7701 North Stemmons Freeway Dallas TX 75247 Cheryl Aldridge -- Contracting Officer |

DOCUMENT PREPARERS

| FIRM | ROLE | EXPERIENCE |
|--------------------------------------------------------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------|
| <u>HDR Engineering, Inc.</u> 1101 King Street, Suite 400 Alexandria, VA 22314 | | |
| Margaret M. Ballard, A.I.C.P. | Primary Document Preparer | M.S. Urban Planning, 24 Years Environmental Planning |
| Brad McCardell | Geology & Site Assessment | B.S. Geology, 13 Years Environmental Site Assessments |
| Susan T. Anderson | Natural and Social Environmental Data | B.S. Geography, 5 Years Environmental Planning |
| David A. Cheeney, A.I.C.P. | Program Manager; Document Review | M.P.A. Public Admin./Urban Planning, 22 Years Infrastructure Planning |
| <u>TRC Mariah Associates, Inc.</u> 4221-B Balloon Park Road NE Albuquerque, NE 87109 | | |
| Howard C. Higgins, Ph.D. | Principal Investigator for Cultural Resources | Ph.D., M.A. Anthropology, 24 Years Cultural Resources Investigations |
| Jim A. Railey | Investigator for Cultural Resources | M.A. Anthropology, 21 years Cultural Resources Investigations |

VII. AGENCIES AND OFFICIALS FROM WHICH COMMENTS ARE REQUESTED

FEDERAL ELECTED OFFICIALS

The Honorable Kay Bailey Hutchinson
United States Senate
SR-284 Russell Senate Office Building
Washington, DC 20510

The Honorable Phil Gramm
United States Senate
SR-370 Russell Senate Office Building
Washington, DC 20510

The Honorable Silvestre Reyes
514 Cannon House Office Building
Washington, DC 20515

FEDERAL AGENCIES

Advisory Council on Historic Preservation
Western Office of Project Review
Don Klima, Director
12136 West Bayaud Avenue, Suite 330
Lakewood, CO 80226

U.S. Department of Agriculture
James R. Lyons, Assistant Secretary
for Natural Resources and Environment
14th Street and Independence Avenue, S.W.
Washington, D.C. 20250

U.S. Army Corps of Engineers
Southwestern Division
1114 Commerce Street
Dallas, TX 75242

U.S. Environmental Protection Agency,
Region 6 (AK, LA, NM, OK, TX)
1445 Ross Avenue
Suite 1200
Dallas, TX 75202

U.S. Environmental Protection Agency
Dave Otto
Office of the Associate Director for Health
National Health & Environmental Effects
Research Laboratory
Research Triangle Park, NC 27711

U.S. Environmental Protection Agency
Pearl Young Booker
Office of Federal Activities
1200 Pennsylvania Avenue, N.W.
Room 7234
Washington, D.C. 20044

General Services Administration
Anthony E. Costa, Chief
Environmental Policy and Planning Branch
PPLPP Office of Planning
Central Office Building
18th and F Streets N.W. – Room 6037
Washington, D.C. 20405

International Boundary and Water
Commission, U.S. Section
The Commons - Building C
Suite 310
4171 North Mesa Street
El Paso, TX 79902

U.S. Fish & Wildlife Service,
Southwest Region (AZ, NM, TX)
10711 Burnett Road
Suite 200
Austin, TX 78758

U. S. Border Patrol, El Paso Sector
Danois Montoya, Assistant Chief
8901 Montana Avenue
El Paso, TX 79925

STATE OF TEXAS AGENCIES

Texas Historical Commission
108 West 16th Street
P.O. Box 12276
Austin, TX 78701

Texas Parks & Wildlife Department,
El Paso Division
4200 Smith School Road
Austin, TX 78744

Texas Natural Resource Conservation
Commission, El Paso Region.
P.O. Box 13087
Austin, TX 78711

Governor's Office of Budget and Planning
Tom Adams
P.O. Box 12428
Austin, TX 78711

LOCAL GOVERNMENT AGENCIES & OFFICIALS

Mayor
City of El Paso
Two Civic Center Plaza – 10th floor
El Paso, TX 79901

City of El Paso
Department of Planning, Research &
Development
Nat Campos
Two Civic Center Plaza – 8th floor
El Paso, TX 79901

City of El Paso
Department of Engineering
Gonzalo Cedillos
Two Civic Center Plaza – 4th floor
El Paso, TX 79901

LIBRARIES

El Paso Public Library
501 North Oregon Street
El Paso, TX 79901

El Paso Junior College
Learning Resources Center
P.O. Box 20500
El Paso, TX 79968

University of Texas
El Paso Library
El Paso, TX 79968-0582

OTHER PARTIES

Union Pacific Railroad
Rick Eades, Director
Environmental Site Remediation
1416 Dodge Street – Room 930
Omaha, NE 68179

**Concurrence Letter Regarding *No Effect* Determination
From the Texas Historical Commission**



RECEIVED

TRC

7/9/98 D

August 24, 1998

AUG 25 1998

TEXAS HISTORICAL COMMISSION

Texas Historical Commission
108 West 16th Street
P.O. Box 12276
Austin, Texas 78701-2276

Attention: Myles Miller and Lyman Labry

Dear Mr. Miller and Mr. Labry:

As we recently discussed by telephone, in order to provide security, safety, and surveillance capabilities, the INS is proposing to construct certain enhancements along the border with Mexico, near El Paso, Texas. TRC has been contracted to assist with the cultural resources compliance for the Environmental Assessment (EA) being prepared for this project. This letter presents an overview of the proposed action, discusses its lack of effects on properties either listed on, eligible to, or potentially eligible to the National Register of Historic Places (Register), and requests your concurrence with a finding of "No Effect" for the project.

PROPOSED ACTION

The INS is proposing to install fencing, sensors, cameras, lights, and guardrails along the recently completed American Canal (including the American Canal Extension) in El Paso, Texas. As shown in maps 1-8 and composite map, the area of the proposed work commences at Monument One near the American Dam, and extends in a southeasterly direction to the Riverside Dam, where the Riverside Canal segment commences. Security enhancements will be limited to already disturbed portions of the Rio Grande American Canal Extension. The fence line, lights, cameras etc., will be adjacent to the newly lined and constructed concrete channel, where the Border Patrol currently drives its vehicles.

PROJECT EFFECTS ON ELIGIBLE PROPERTIES

In 1992, the U.S. Section of the International Boundary and Water Commission contracted with TRC Mariah Associates (TRC) under the National Historic Preservation Act (Title 16, United States Code, Chapter 1A, Subchapter II), to initiate literature and archival searches, conduct archaeological resource surveys, coordinate with the State Historic Preservation Officer (SHPO) and conduct any and all other activities necessary to bring the proposed American Canal Extension into full compliance. During this 1992 work, TRC conducted a Class I records check for the area within 1.6 km (1.0 miles) of the proposed project area. This check revealed that only one property (the Franklin Canal) nominated to the National Register of Historic Places (Register) was near the proposed ROW. The currently proposed border improvement project will not affect the Franklin Canal. Subsequently TRC performed a Class III (100% pedestrian)

TRC Mariah Associates Inc.
4221-B Balloon Park Road NE • Albuquerque, New Mexico 87109
Telephone 505-761-0099 • Fax 505-761-0208

Customer-Focused Solutions

Myles Miller and Lyman Labry
Texas Historical Commission
August 24, 1998
Page 2

survey of the right-of-way. This survey did not locate any historic or prehistoric sites either listed on, eligible to, or potentially eligible to the Register (Bilsbarrow and Higgins 1993).

Since sediments introduced by fluvial processes could have buried cultural resources in the project area, geoarchaeological testing was conducted in undisturbed segments of the ROW in March 1993. These tests revealed old soil horizons but did not reveal any cultural remains (Frederick and Higgins 1993).

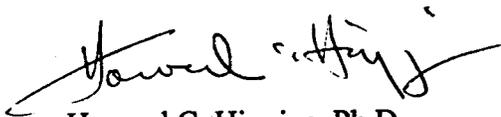
In August 1998, TRC conducted a reconnaissance level inspection of the ROW to determine if potential remained for previously undiscovered cultural resources. This inspection revealed that the American Canal Extension had been constructed, and that the construction activities had disturbed any and all portions of the ROW that might have had any further potential for buried cultural resources. Consequently, this inspection indicated that the ROW no longer had any potential for cultural resources.

REQUEST FOR CONCURRENCE WITH NO EFFECT DETERMINATION

As the project has no potential to affect any archaeological remains, and as the portions of the American Canal that might be affected are newly constructed and not eligible for listing as a historic canal, we request concurrence with a determination of "No Effect" from your office for this project.

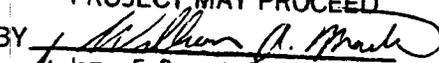
In order to expedite review, two originals of this letter have been provided. Thank you very much for your assistance.

Sincerely,
TRC



Howard C. Higgins, Ph.D.
Principal Investigator

HCH:rg
Enclosures
N:24800\Aug28ltr.doc

| | |
|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| NO EFFECT | |
| On National Register-eligible or listed properties or State Archeological Landmarks | |
| PROJECT MAY PROCEED | |
| BY |  |
| | James E. Bruseth, Ph.D., DSHPO |
| Date | 8/27/98 |

TRC

**Archaeological Assessment for INS
El Paso District Border Enhancements
El Paso County, Texas**

Prepared for

**HDR Engineering, Inc.
Hillcrest Road
Dallas, Texas 75230-2096**

Prepared and Submitted by

**Jim A. Railey
Howard C. Higgins**

**TRC Mariah Associates, Inc.
4221B Balloon Park Road NE
Albuquerque, New Mexico 87109
(505) 761-0099**

TRC Mariah Project 24800

September 1998



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1.0 Introduction

The U.S. Immigration and Naturalization Service (INS) proposed to construct enhancements of border control facilities in and near El Paso, Texas (Figure 1.1), adjacent to the international boundary with Chihuahua, Mexico. Consultation regarding the cultural resources which may be affected by construction is being provided by TRC Mariah Associates, Inc. (TRC), under contract with HDR Engineering, Inc. (HDR). This document provides a cultural resources overview, including previous work conducted in and near the project area and a recommendation for a *No Effect* determination for the project.

1.1 Project Description

The project includes a linear corridor approximately 24.5 km (15.2 mi) along the United States-Mexico (Texas-Chihuahua) border. The planned construction involves a series of border enhancements (i.e., lights and other facilities) along this corridor. Detailed mapping of the project area is presented in Figures 1.2 to 1.8.

1.2 Scope of Work

The scope of work includes a review of previous work conducted within the project area, an on-site reconnaissance to assess its present condition, and the production of a synthetic technical document detailing the results of this assessment.

1.3 Organization of the Document

The document is organized as follows: Section 1.0 is this Introduction. Section 2.0 explains the project setting, including the natural environment, the prehistoric cultural setting, and history of the area. Section 3.0 includes ethnohistory, archaeological studies, historic documentation, and the results of a Class III pedestrian archaeological survey and previous geoarchaeological investigations in this project corridor. Section 4.0 describes the results of an on-site reconnaissance of the project area assessing its present condition. Section 5.0 presents management recommendations. These sections are followed by the References Cited (Section 6.0). Appendix A includes a copy of a *No Effect* concurrence letter from the Texas Historical Commission.

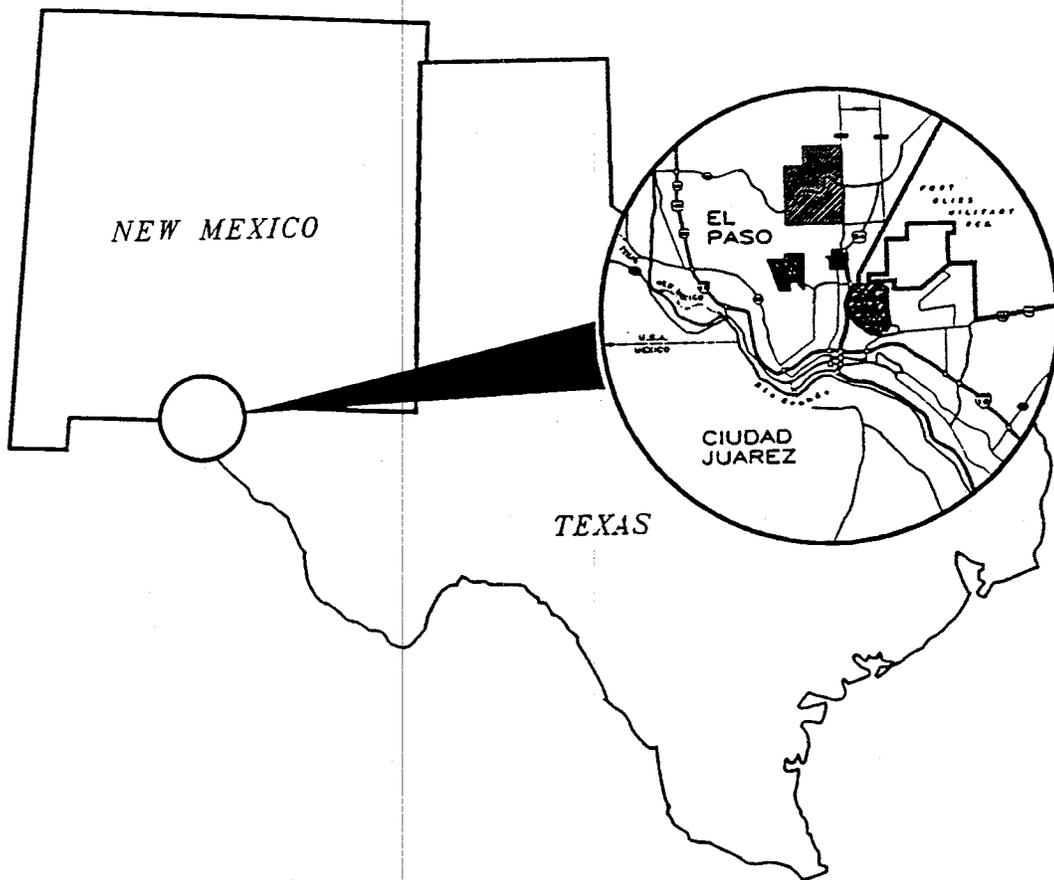


Figure 1.1 Project Location.

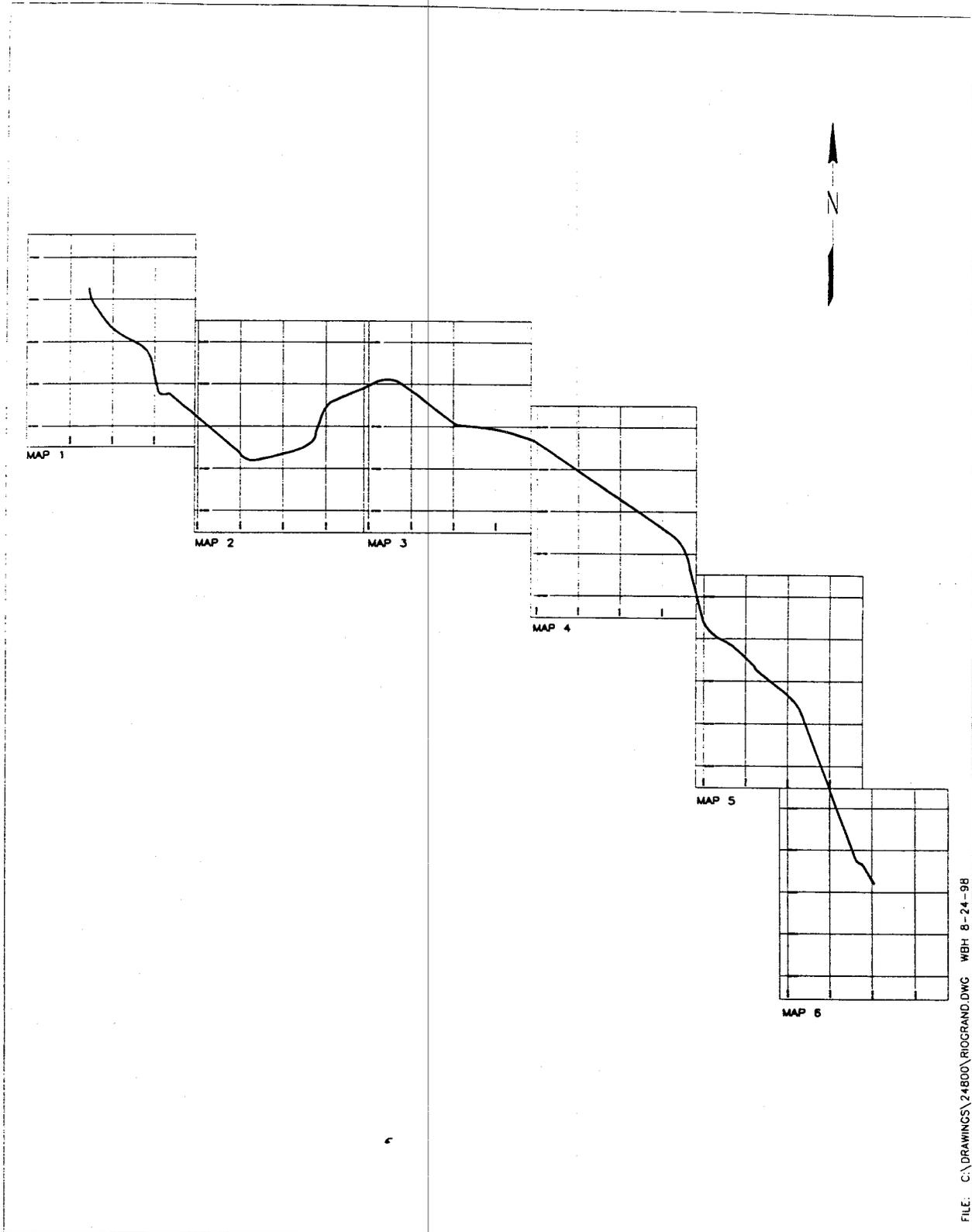


Figure 1.2 Composite of Maps 1 - 6 Showing Project Location.

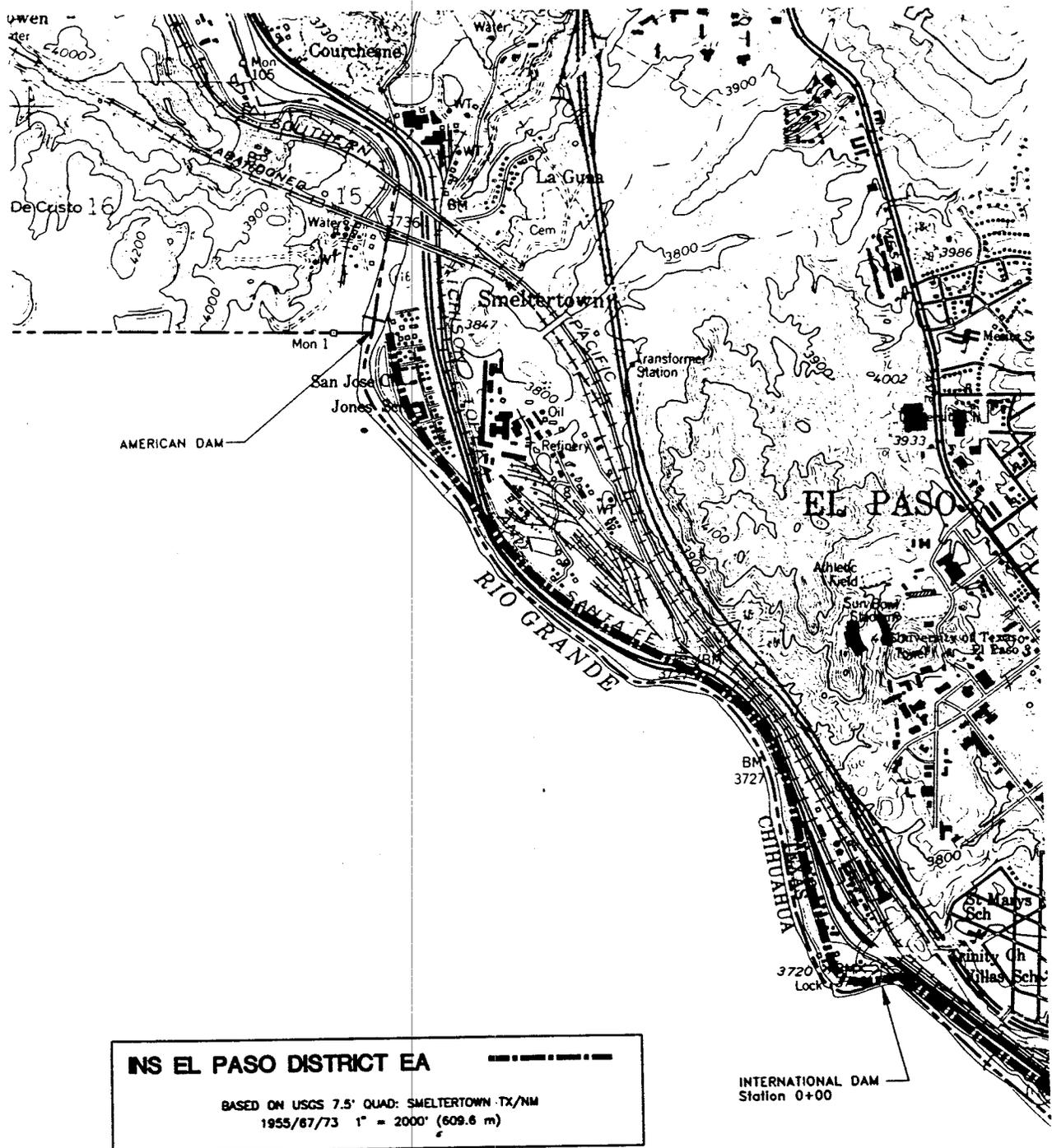
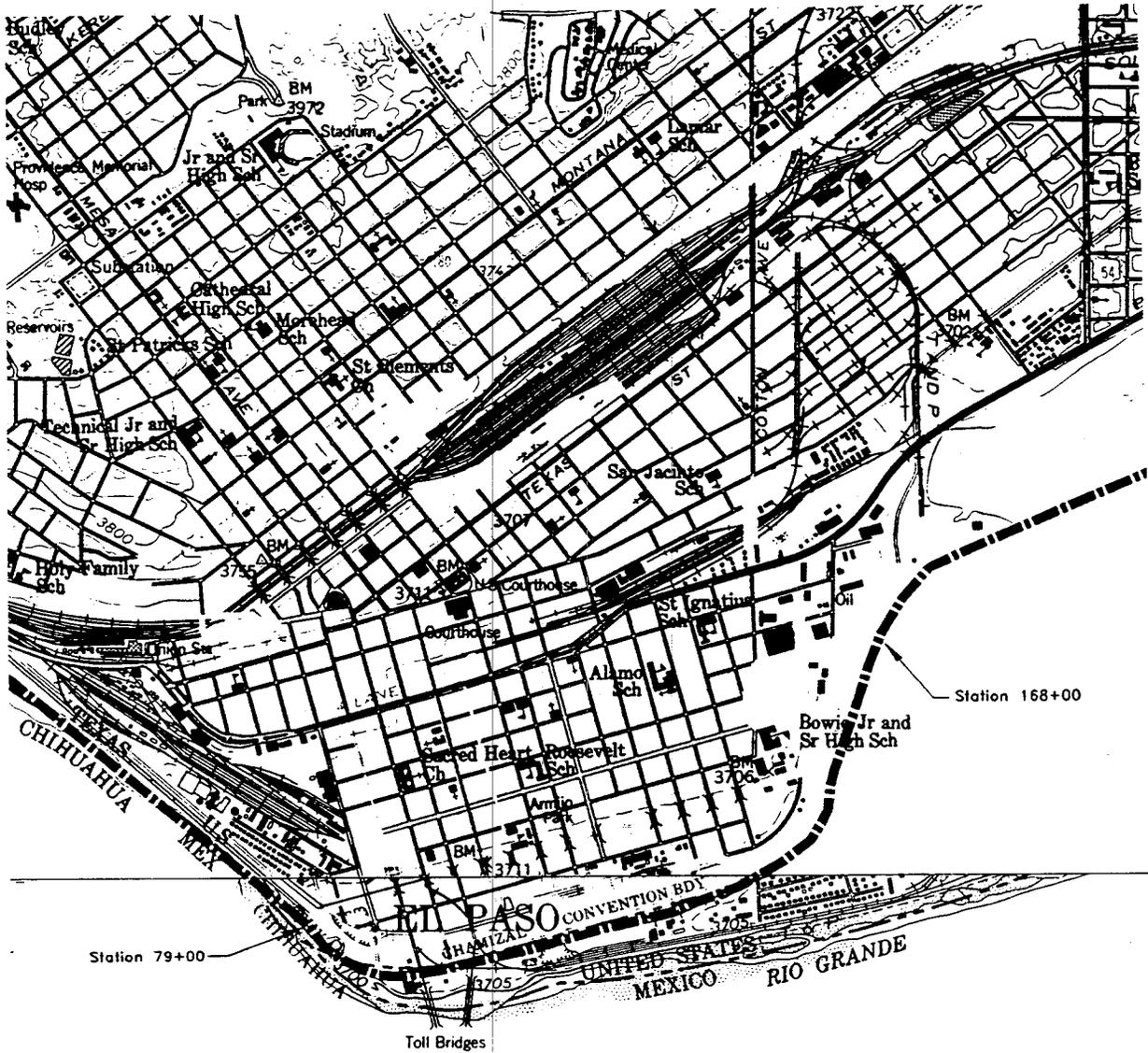


Figure 1.3 Project Location, Detail Map 1.



INS EL PASO DISTRICT EA 

BASED ON USGS 7.5' QUADS: EL PASO & YSLETA NW, TX
1955/67/73 1" = 2000' (609.6 m)

Figure 1.4 Project Location, Detail Map 2.

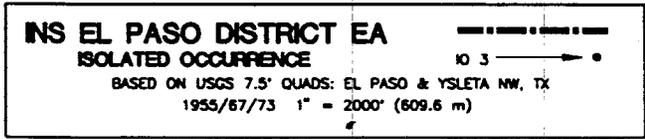
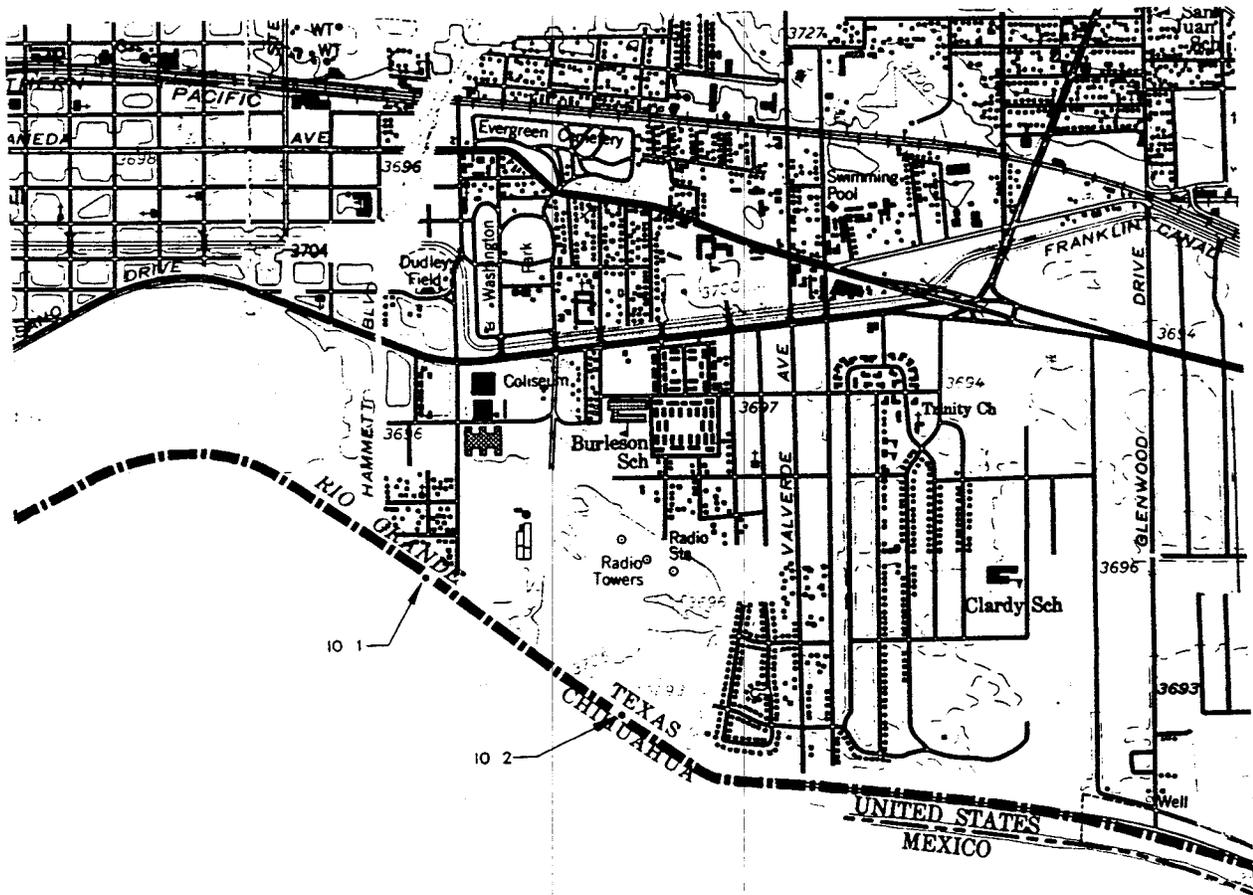


Figure 1.5 Project Location, Detail Map 3.

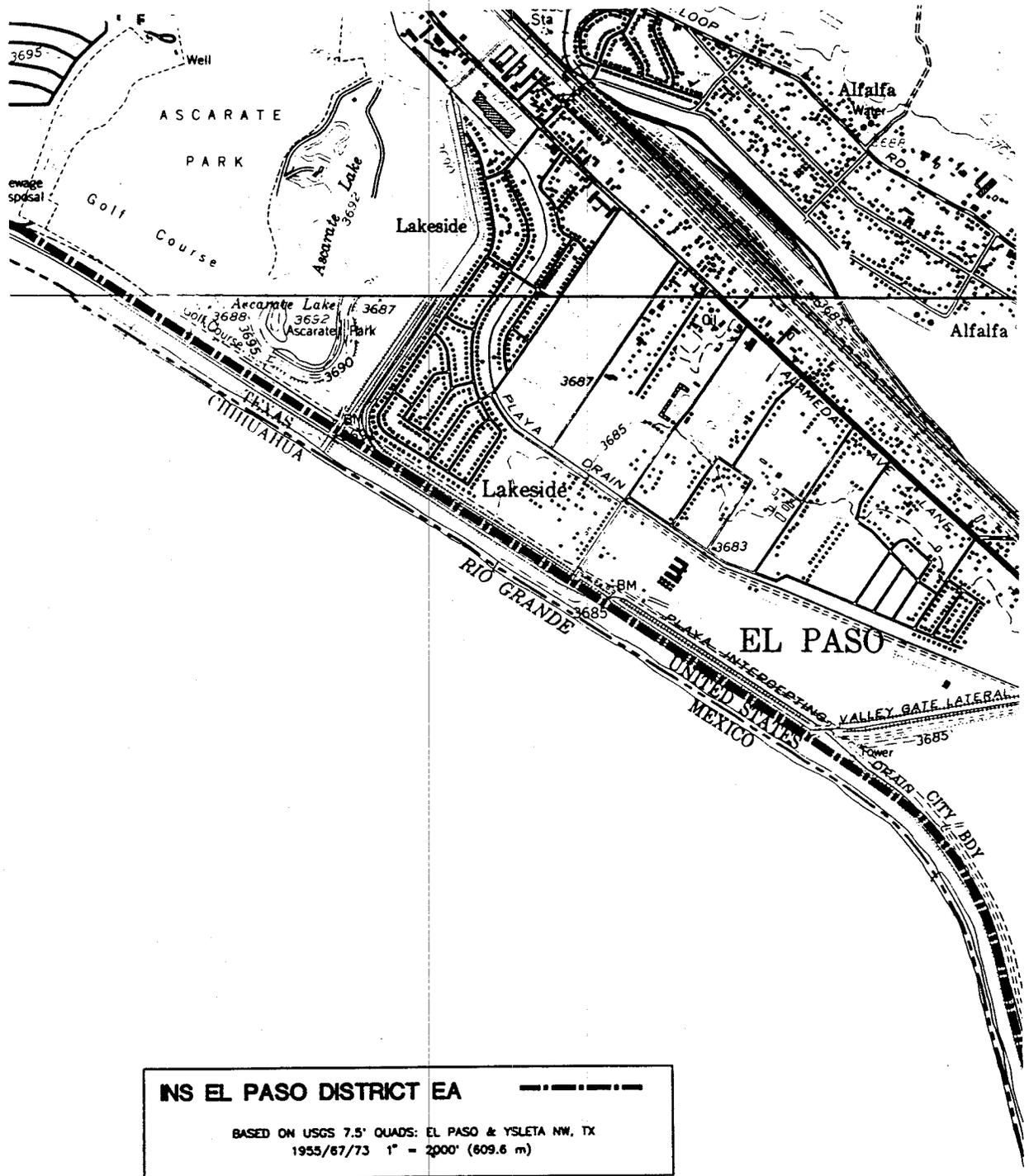


Figure 1.6 Project Location, Detail Map 4.

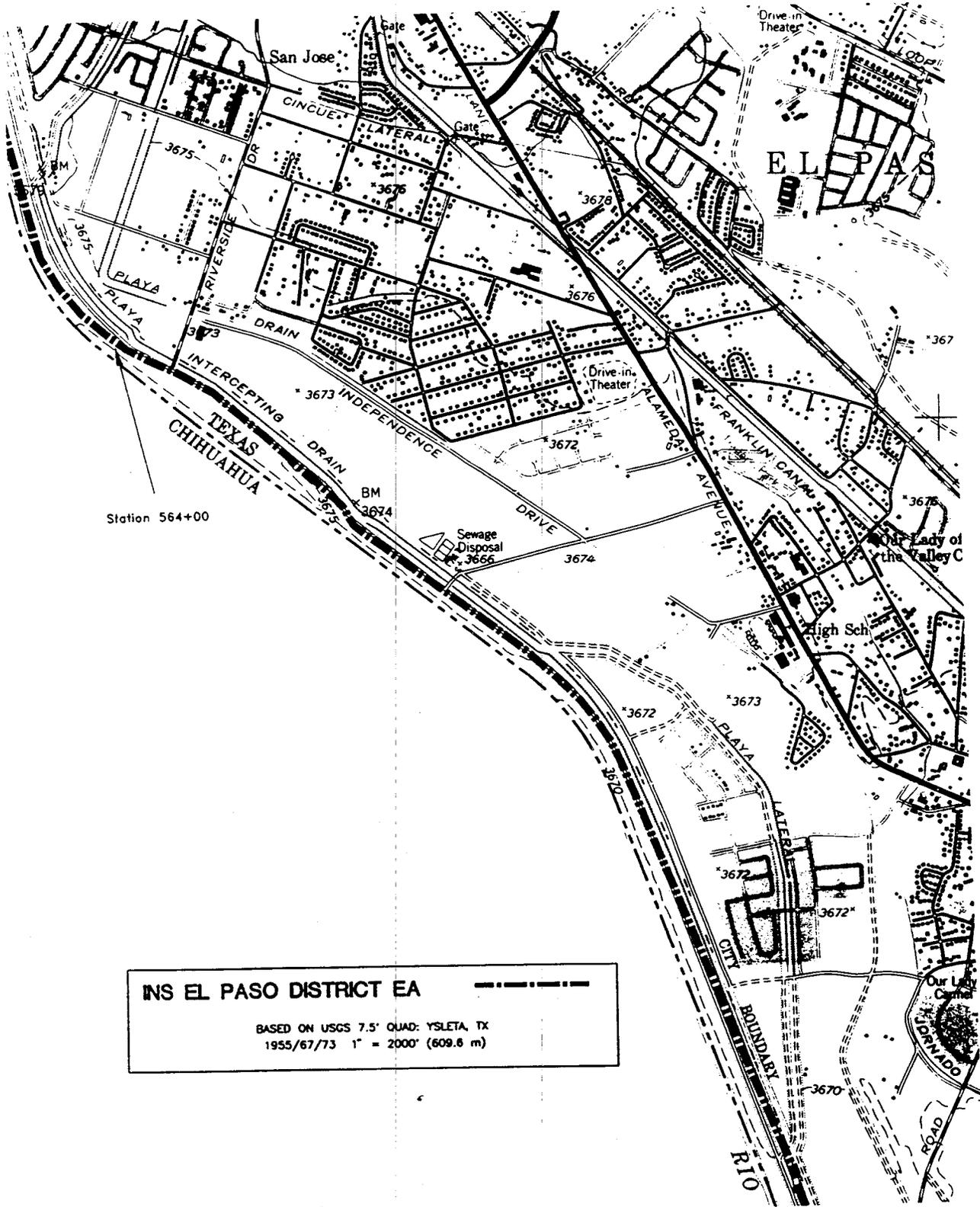


Figure 1.7 Project Location, Detail Map 5.

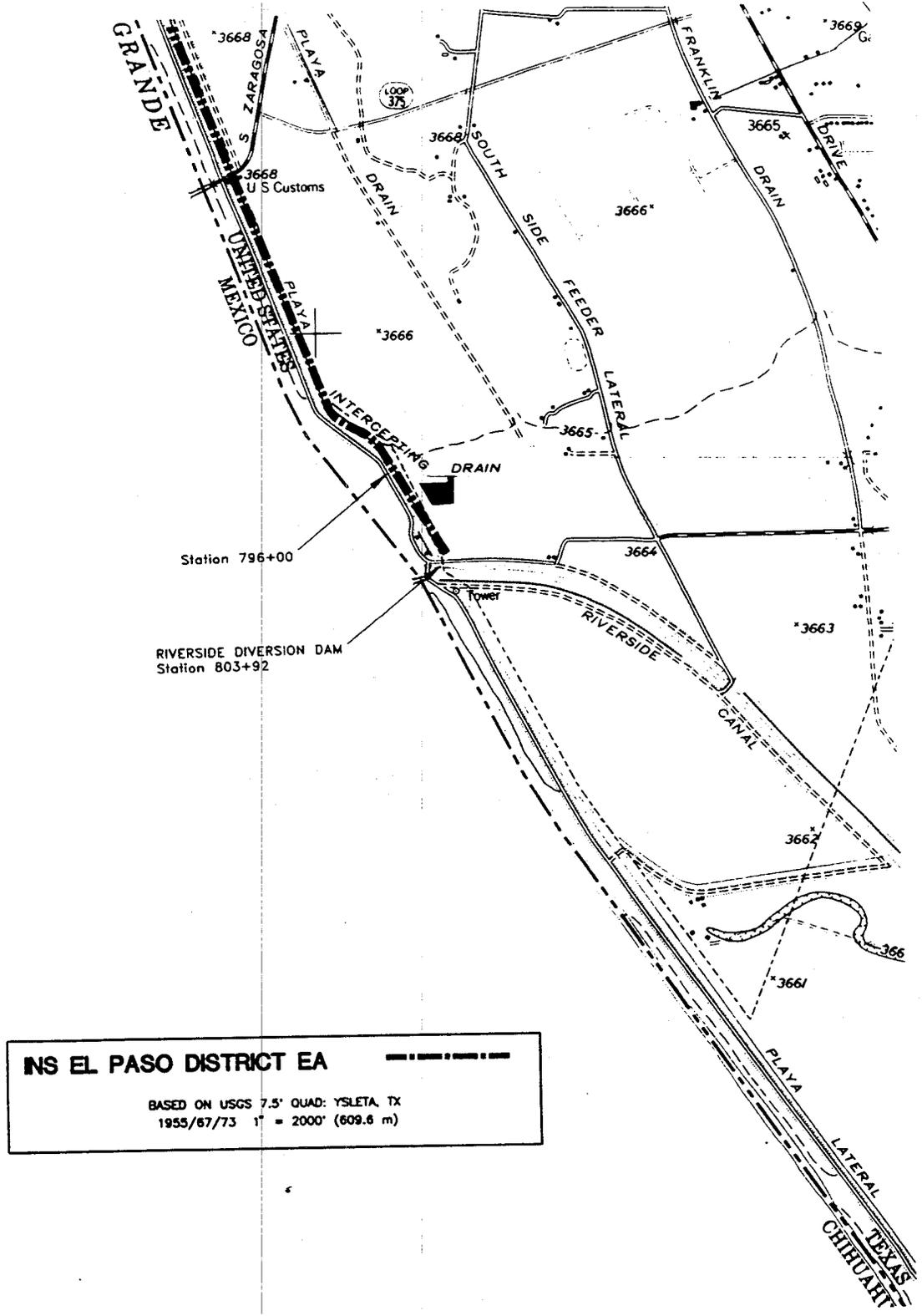


Figure 1.8 Project Location, Detail Map 6.

2.0 Project Setting

This section outlines both the natural and cultural setting applicable to the project. The natural setting portion describes the physical and biotic environments as they exist today. However, over the course of potential human occupancy of the region (approximately the past 10,000 years), considerable changes have taken place. These changes have been addressed by adaptations in the lifeways of the various cultures. The cultural setting is divided into prehistory and history, traditionally used in the presentation of a region's sequence of human occupancy. This dichotomy is validated by radical transformations brought about by Euro-american presence and written records.

2.1 Natural Setting

2.1.1 Physiography and Climate

The project area is located within the Rio Grande alluvial valley, immediately south of the Franklin Mountains. The northern terminus of the project area, in fact, corresponds to a narrow gap between the Franklin Mountains to the east and the Sierra de Juárez to the west. This area is associated with the Mexican Highlands Section of the Basin and Range Physiographic Province. The hallmark of this physiographic province is parallel north-south trending fault block mountain ranges with intervening valleys. Additionally, El Paso is located in the Chihuahuan Desert. The most compelling physical characteristic is its aridity. El Paso receives approximately 20 cm (8 inches) of annual precipitation. This precipitation occurs primarily in the summer months. The mean annual temperature ranges from 14-19°C (58-66°F) (Godfrey et al. 1973).

2.1.2 Geology

Although sedimentary and metamorphic rocks associated with various geologic epochs are exposed in the nearby Franklin Mountains, the project area is entirely within the floodplain of the Rio Grande. Therefore, the alluvial sediments consist of a confused melange of sediments from upstream. According to Jaco (1971), the project area is composed of the "Harkey-Glendale soil association" which can be characterized as ranging in texture from fine sands to silty clay loams.

2.1.3 Flora and Fauna

The natural vegetation in the area belongs to the Chihuahuan Life Zone. Species such as desert willow (*Salix* sp.), snakeweed (*Gutierrezia* sp.), yucca (*Yucca elata*), and cholla (*Opuntia* sp.) are common. In addition, there are exotic species not indigenous to the area such as salt cedar (*Tamarix pentanda*). Cotton plants and pecan trees are the most notable introduced species in the project area and common mammals include coyote (*Canis latrans*), desert cottontail (*Sylvilagus auduboni*), and striped skunk (*Mephitis mephitis*).

2.2 Prehistoric Cultural Setting

A variety of researchers have proposed various cultural sequences for the general area. The most widely accepted, the Jornada Mogollon sequence, was originally proposed in 1948 by Donald Lehmer. This sequence, with the exception of its first stage (the Hueco) dealt with the ceramic tradition. More recently, MacNeish and Beckett (1987) proposed a cultural sequence, the Archaic Chihuahua tradition, for the earlier, pre-ceramic cultural adaptations. The sequence adopted herein is a combination of the cultural sequences proposed by these various scholars.

2.2.1 Paleoindian Period (11,000 - 8,000 B.P.)

The earliest documented occupants of west Texas and southern New Mexico, whose remains date back approximately 11,000 years, are peoples who have been named the Paleoindians. Paleoindian sites are characterized by finely made projectile points and graters. The earliest manifestations include lanceolate projectile points (Clovis) are considered indicative of a specialized hunting adaptation focused upon now extinct megafauna such as mammoth, camel, and bison (*Bison antiquus*). According to Carmichael (1985a:10), two such sites are known from the general area, the Mockingbird Gap site and the Rhodes Canyon site.

Post-dating the Clovis sites are manifestations known as Folsom. These include a finely fluted, distinctive point. The sites, their artifact assemblages, and their distribution suggest a generalized hunting and gathering adaptation. It is suggested the focus was still on hunting megafauna. Sites dating to this phase include both base and logistic camps, as well as kill sites (see Russell 1968, Krone 1975, Carmichael 1986, Eidenbach 1983, Sebastian and Larralde 1989). Carmichael (1985a:11) indicates that logistic sites dating to this period may be found in the canyons and foothills adjacent to the mountain ranges of the area. These include Rhodes Canyon and Fillmore Pass.

Dating approximately 10,000 to 8,000 B.P. are a variety of sites representing a number of disparate lithic traditions which are collectively known as the Plano tradition. These include sites with laterally thinned points (e.g., Midland and Plainview), sites with constricted base points (e.g., Agate Basin and Hell Gap), and sites with points having indented bases (e.g., Firstview and Cody Complex). Other than the projectile point types, these sites have artifact assemblages which are very similar to each other and to Folsom sites. Kauffman documented a late Paleoindian site in southeast El Paso near the project area (Kauffman 1984), so these people undoubtedly exploited the area found within the project.

2.2.2 Archaic Chihuahua Tradition

Subsequent to the Paleoindian cultures, the area was occupied by a sequence of cultures which together form what has been called the Archaic Chihuahua tradition (MacNeish 1993; MacNeish and Beckett 1987). Subsistence during the Archaic appears to have shifted from the earlier focus on large game, to a more diverse hunting and gathering adaptation. While the reasons for such a shift are unclear, the changes may have been due, in part, to progressive desiccation following the last glacial episode. Changes through the Archaic are subtle, and differences have largely been defined upon sequences of dart point styles.

2.2.2.1 Gardner Springs Phase (8,000 to 6,000 B.P.)

The Gardner Springs phase has been poorly defined to date. The sites include a variety of Oshara tradition type projectile points (see Irwin-Williams 1968) including Jay, Bat Cave, Abasolo, and Bajada points. These are associated with flake and core choppers, a variety of scrapers, ground stone and mortar and pestles (MacNeish 1993). Sites have included bones from pronghorn and deer which, in association with the ground stone, suggests a generalized hunting and gathering adaptation. Two of the better-known sites associated with this phase are Todsens Cave and Fresnel Shelter. The former yielded evidence of a spring occupation, and the latter appears to have been a fall habitation (MacNeish 1993:336, 338, 391-394). According to MacNeish and Beckett (1987:25), the complex is represented on Fort Bliss Maneuver Area 3-8 by 18 components. This suggests an exploitation of the project area during this time by a low density population.

2.2.2.2 Keystone Phase (6,000 to 4,500 B.P.)

Again, this phase includes sites with a variety of projectile points - MacNeish and Beckett (1987:12) list Pelona, Armagosa, Todsen, Almagre, and possibly Langtry, Shumla, Trinity, and Bat Cave points. The association of these with half-moon bifacial side blades, mullers and milling stones, ground stone (some bifacial), animal bones, and seeds suggests that the generalized hunting and gathering adaptation continued. Overall, the economy of Keystone phase peoples appears to be more efficient in exploiting variable ecozones than the foragers of the previous Gardner Springs phase (Zeidler et al. 1996). MacNeish and Beckett (1987) suggest that a pithouse at Keystone and three *Cucurbita pepo* (pumpkin) seeds from Todsen Shelter are indicative of limited sedentism and use of domesticates.

Twenty-four Keystone phase components were documented on Fort Bliss Maneuver Area 3-8. These included "task-force occupations" (special activity sites), macroband base camps and microband base camps. MacNeish and Beckett (1987:30) suggest that during the phase the population coalesced into summer macroband camps, and base camps with pithouses began to occur in the bajada ecozones along the Rio Grande.

2.2.2.3 Fresnel Phase (4,500 to 2,900 B.P.)

The Fresnel phase has been well documented by both excavation and survey. Sites from the phase contains Chiricahua stage-like points (see MacNeish and Beckett 1987:12), choppers, manos and metates outnumbering mullers and milling stones, and bone beads associated with flexed burials. Chapalote, proto-Maiz de Ocho and *Cucurbita pepo* have been found. MacNeish and Beckett (1987:30) argue that, based upon the 63 components from Fort Bliss Maneuver Area 3-8, the adaptation included riverine area base camps from which task force groups exploited various ecozones for seasonal resources.

2.2.2.4 Hueco Phase (2,900 to 1,750 B.P.)

The Hueco phase is the last phase commonly accepted as part of the Archaic. This phase was first defined by Lehmer (1948) who grouped all non-ceramic sites into the one phase. MacNeish and Beckett (1987) agree the early descriptions of the phase are still valid. Further, their data provide additional supporting evidence for the earlier described characteristics.

Hueco phase sites include San Pedro, Hatch, Hueco, and Fresnel points associated with manos, trough metates, mortar holes, baskets, woven sandals, and remains of domesticated plants. Domesticated plants represented include corn (*Chapalote*, proto-Maiz de Ocho, Maiz de Ocho, and Pima-Papago), squash, beans, and amaranth, but the subsistence economy may well have continued to include a substantial amount of hunting and foraging (Wills and Huckell 1994:35). MacNeish and Beckett (1987:16) suggest the subsistence depended very little on large animals, and hunting was focused almost exclusively on small mammals.

The 116 components documented for the Hueco phase on Maneuver Areas 3-8 of Fort Bliss included 30 macroband base camps. These may represent year-round settlements. Based on the evidence available for Maneuver Areas 3-8, MacNeish and Beckett (1987:30) conclude that riverain base camps could have been hamlets or pithouse villages. Open sites, such as Keystone Dam 33, often contain pit structures and a relatively large quantity of refuse (Stuart 1997:16). Unfortunately, due to river meanders and other changes during the intervening 1700 years, the probability of undisturbed sites of this type (should they have existed at all) is very low.

2.2.3 Formative Period

The Formative period saw the change from a transhumance adaptation to settlement in permanent year-round villages, and continuing population increase and aggregation. These changes were associated with increased reliance upon horticulture, the manufacture of pottery, the shift from the atlatl to the bow, and ultimately culminated in above-ground pueblos. The three phases defined by Lehmer for the Formative period: the Mesilla phase, the Doña Ana phase, and the El Paso phase have held up through the intervening decades. As noted by Carmichael (1986:13), the only needed changes are modifications to terminology and chronology in line with current literature.

2.2.3.1 Mesilla Phase (1,100 to 900 B.P.)

For the purposes of this study, and in line with Carmichael (1986:13), the Mesilla phase is considered to begin with the first ceramics in the area. While pithouses are the primary residence type throughout the phase, the characteristic cannot be said to be a defining characteristic. Such structures may well have been a preferred residence type during Hueco phase times, prior to the other characteristics of the Mesilla phase. A large amount of data is available on Mesilla phase sites; much of it from work conducted by Mike Whalen (1978, 1980; 1994a; 1994b; see also LeBlanc and Whalen 1980).

As summarized by Carmichael (1986:14), Mesilla phase settlement can be conceptualized as a dispersed system, with a variety of site types in differing environmental zones. These sites were probably centered around agricultural villages or smaller scale playa-based farming communities. Ceramics present at Mesilla phase sites include brown wares and, for the later sites, Mimbres wares.

While food production began in the Archaic, it intensified during the Mesilla phase, coupled with continued population growth. At the Turquoise Ridge site, for example, Whalen (1994a:119) reports nearly four times as much maize from late Mesilla phase structures as from early Mesilla pit houses. At the same time, these structures show a constant rate of use for Chenopods and a decline in sunflowers (Whalen 1994a:118, Table 44). However, Whalen (1994a:119) cautions that "no cultigen appears to have played a major role in the Jornada area's Formative period subsistence," and such an inference is potentially consistent with a settlement pattern that suggests only a semi-sedentary strategy with seasonal mobility. In addition to domesticates, other plant resources were exploited in locally differentiated environmental zones. Mesquite, grasses, cacti, and annuals are collected in the desert basins, (Brethaur 1978; Carmichael 1981, 1985; Eidenbach and Wimberly 1989), while agave and other succulent plants were processed in the foothills and valley of the Rio Grande (O'Laughlin 1979, 1980; Whalen 1978, 1994a). Hunting, too, plays a major role in the economy of the Mesilla phase (O'Laughlin 1977; Way 1977). Small mammals (i.e., jackrabbits and cottontails) make up the majority, and in some cases, 90% of the protein source within the Formative diet (Whalen 1994a:118). Representative sites of this period include Turquoise Ridge, Huesito, Roth, Castner Ridge, and West Mesa (Whalen 1994a, 1994b).

2.2.3.2 Doña Ana Phase (900 to 800 B.P.)

Lehmer (1948:78) presented the Doña Ana phase as a short-lived, transitional development between the Mesilla phase and the subsequent El Paso phase. The Doña Ana phase was hypothesized as the phase during which the residence type changed from pithouses to surface structures composed of adobe. Associated with this shift are both local and intrusive ceramics, like those found on sites from both the earlier Mesilla and the later El Paso phase sites.

Little is known concerning this phase. Some authors dispute its usefulness as a cultural historical unit (Mauldin 1993:41-44; Whalen 1994a:118), while others (Hard et al. 1994) argue that it is a distinguishable phase. Classification of sites to the phase has been sporadic (see Whalen 1977, 1978);

and sites which could have been classified as Doña Ana sites have not always been interpreted in this way (see Way 1979). It is possible that the transition was more a process than a singular phase with definite characteristics at any specific point (but see Beckes 1977; Beckes and Adovasio 1982; Carmichael 1986). Whether definable on its own characteristics and recognizable on the basis of field observations, clearly, the distinguishing characteristics defined to date overlap both the earlier and the later phases, making clear determination of the Doña Ana adaptation difficult

2.2.3.3 El Paso Phase (800 to 600 B.P.)

The El Paso phase is unquestionably the best documented prehistoric cultural manifestation in the area. Carmichael (1986:16) attributes this in large measure to the excavations conducted by the El Paso Archaeological Society (EPAS). The phase is distinctive in its use of above-ground adobe pueblo architecture and the importance of agriculture in the subsistence of the occupants. Carmichael (1986:16) rightly points out that the importance of agriculture can be over stressed; hunting and gathering continued to be an important buffering mechanism throughout.

El Paso phase sites are both larger and more dense than earlier sites. This has been taken to represent an increase in population density (Whalen 1978; Lehmer 1948), with a concomitant increase in socio-political complexity. At the minimum, there was an increase in interaction with other regions. The interaction is well supported by the presence of Casas Grande pottery, as well as other intrusive wares from Arizona and the classic Mimbres area, marine shell from both the Pacific and Gulf coasts, and copper bells from northern Mexico. Whether or not one accepts Wimberley's (1979) contention that these are indicative of a large scale interaction sphere of which the El Paso area was a part, they do clearly argue for participation in a fairly extensive trade network. How such a network was structured and how it functioned in practice is as yet unclear.

2.3 History

The history of the El Paso area can be broken down into three distinct periods: the Spanish Entrada, the Mexican period, and the American period. Crosscutting these periods are four major themes that affected the growth and development of the El Paso area. These themes are:

- 1) Regional and interregional communication;
- 2) El Paso's military roles;
- 3) Native American - Euro-american interaction; and
- 4) Farming and ranching in the Rio Grande River valley.

The El Paso area has always been on major trade and communication routes. The Camino Real, which passes through El Paso connected the Spanish capital of New Mexico to the rest of Mexico. Later, during the American period, El Paso was the connecting point of four major railroads.

Because of its location on major routes and its highly strategic location in the pass of the Franklin Mountains, El Paso has been a military post for 400 years. The Spanish launched the reconquest of the New Mexico pueblos from El Paso. Also, the Americans captured El Paso during the Mexican-American War to prevent reinforcements from Mexico from reaching Santa Fe.

The relationship between the Spanish or American newcomers and the local Native Americans in the El Paso area has always been uneasy. The Spanish sought to control Indian labor and convert them to Christianity. Their presence and policies led to frequent Indian revolts, as well as conflicts with nomadic

Apache raiders. The Spanish, Mexican, and American governments all tried to subdue the Apache with military expeditions and promises of peaceful settlement, although neither was effective or long lasting.

But throughout its history, El Paso has been an agricultural and ranching area. The Spanish introduced European grains and created small irrigation systems. Later, alfalfa was introduced and then cotton. Finally at the start of the twentieth century, the inhabitants of the El Paso area fully harnessed the flow of the Rio Grande with large-scale projects such as the Franklin Canal, International Diversion Dam, and Caballo and Elephant Butte Dams.

Each of these themes is followed through in the three historical periods of occupation in the historical overview of the El Paso area below.

2.3.1 The Spanish Entrada

During the Spanish Entrada period in the American Southwest there were three major stages:

- 1) The initial exploration and missionization,
- 2) The Pueblo Revolt of 1680, and
- 3) The post-revolt agricultural period.

The principal motives of the Coronado expedition of 1540-1541 through what is today called the American Southwest, was the lure of gold and other sources of wealth and the conversion of the Native American population to Christianity. While the American Southwest disappointed the Spanish with its lack of gold, the Spanish were moderately successful in converting the Pueblo Indians, which they considered more civilized than other Indian groups. Thus, the Spanish concentrated their exploration, missionization, and colonization efforts in northern New Mexico, bypassing peripheral areas such as El Paso.

Life at the missions was not easy for the Native Americans. The goal of the Spanish missions was to civilize and convert the Indians; however, the missions also served to control and use Indian labor for various Spanish projects (Griffin 1983:339). The priests were often at odds with the Spanish civil leaders who also demanded Indian labor for mining, ranching, and farming tasks. The priests at the mission also ruthlessly enforced the ban on most native religious dances and rites. In addition, the Spanish had a policy of centralizing dispersed native groups and restricting the group to the immediate area around the mission.

In 1680, after 82 years of Spanish colonization, the Pueblo Indians of northern New Mexico, revolted against Spanish rule. This was the first successful Indian revolution against a European power in the New World. The Indians killed most of the priests and burned the mission buildings and orchards. The surviving Spanish colonists and Indian allies retreated to El Paso. It was 12 years before de Vargas successfully led an expedition from El Paso to Pueblo country and forced the surrender of the Pueblo Indians.

After the reconquest of the Pueblos, the Spanish were less demanding of the Native Americans. The missions were reopened, but the ban on Native ceremonies and dances was not enforced. There is no documentation of the destruction of ceremonial items by the Spanish in the 1700s (Dozier 1983:72). The Spanish also ended their system of entitling Spanish colonists to forced Indian labor.

In fact, the Pueblo Indians and the Spanish settlers had a common enemy. During the 1700s, the Apache, Comanche, and Navajo had access to wild horses and were supplied with guns by the French traders on the plains. They were able to raid Pueblo and Spanish settlements for food and supplies with little warning, and then disappear in the hills. In joint Spanish Pueblo military expeditions to attack the Apaches, the Pueblo Indians shared in the captured wealth and even received titles and privileges from the Spanish (Dozier 1983:78).

2.3.1.1 Spanish Exploration and Missionization

Throughout the Spanish exploration and missionization period, the El Paso area was a gateway to areas to the north. In 1581, the first Spanish expedition, led by Chamuscado and Rodriguez, reached the El Paso area and continued northward up the Rio Grande. The first European to meet the Mansos was probably Cabeza de Vaca who was shipwrecked on the Texas coast and spent eight years wandering across the continent (Beckett 1985:148). Over the next 50 years, several other Spanish expeditions passed through the El Paso area on their way to explore the Pueblo country in northern New Mexico. In 1598, Juan de Oñate led the first colonizing expedition up the Rio Grande eventually settling near San Juan Pueblo. He crossed the river at what he called "El Paso del Rio del Norte," which is where El Paso got its name (O'Leary and Canavan 1989:23).

The Mansos lived along the Rio Grande from just south of modern El Paso to just south of about Hatch, New Mexico. Pedro Rivera reported that the main settlement of the Mansos was located about 80 km (50 mi) upstream of Paso del Norte (Beckett and Corbett 1992a). There were several Native American groups which interacted on a regular basis with and were probably related to the Mansos, in the El Paso area at the time of Spanish contact. These neighboring groups included the Sumas and Jumanos to the south of the Mansos and Janos and Jocomes to the northwest.

Spanish missionary activity among the Mansos began in 1629, when Fray Juan de Perea and a group of priests visited the Mansos' settlement. A year later, Fray Alonso de Benavides recommended that a mission be established for the Mansos. Still it was 30 years later, around 1659, when Fray Garcia de San Francisco, assisted by several converted Piro Indians from Senecú del Norte Pueblo, New Mexico, finally established the Franciscan Mission of Nuestra Señora de Guadalupe de los Mansos at Paso del Norte, which is located in present day Juárez, Mexico. The Mansos were forced from their homes north of El Paso and resettled at the mission and were joined by a group of Suma Indians from the south (Beckett 1985:149). The construction on the church began in 1662. In 1668, the mission was formally dedicated with 400 converted Mansos in attendance. The mission grounds included an acequia and orchard. However, not all Mansos converted to Christianity. Some Mansos fled the mission and hid in the Mesilla Valley under the leadership of Captain Chiquito, possibly a Piro Indian.

During the 1670s, drought and the threat of Apache raids in the Salinas area in New Mexico brought more people to the Mission of Nuestra Señora de Guadalupe. Spanish records indicate that some of the Tompiro and Tiwa Indians from the Salinas area settled at the mission. In 1675, when the Apaches destroyed the Piro Pueblo of Senecú del Norte, in New Mexico, many of the Piros also moved south to the Guadalupe Mission. Sometime between 1659 and 1680, two other missions were established to the south of the Guadalupe Mission for the Sumas and Janos (Calleros 1953).

Throughout Spanish rule, the Mansos and nearby tribes revolted. The first Manso revolt against the Spanish occurred in 1655. Governor Bernardo Lopez Mendizabal sent troops in to rescue the missionaries and put down the revolt. Later, during the construction of the mission and church the Manso and Suma Indians at the mission revolted. They were also joined by the unconverted Mansos, led

by Captain Chiquito, and their Apache allies. But the alcalde of the El Paso area, Captain Andres de Gracia, and his men put down the revolt and executed two Manso leaders.

2.3.1.2 The Refugee Period

In 1680, several of the Pueblo groups in New Mexico successfully revolted against Spanish rule (Dozier 1983:55-63). The revolt forced the surviving Spanish colonists, some 2,000 people, to retreat south (Dozier 1983:59). The Spanish refugees were joined by the Tiwas of Isleta Pueblo, who aided the Spanish during the revolt, and most of the inhabitants of the Piro Pueblos of Senecú, Socorro, Alamillo, and Sevilleta in New Mexico. In all, about 320 Indians retreated with the Spanish (Beckett and Corbett 1992a:4). The refugees were met by a relief column just north of El Paso and later settled in the area. The Pueblo Revolt refugees increased the ethnic diversity and Spanish presence at the Guadalupe Mission and the surrounding area. In 1680, the mission records show that 62 Piros, 17 Sumas, ten Janos, five Apaches, and five Jumanos were baptized at the Mission of Nuestra Señora de Guadalupe de los Mansos (Beckett and Corbett 1992:15).

Two years later, Governor Otermín attempted to reconquer New Mexico, but failed. Returning with him were some 400 Indians who were staying at Isleta del Norte Pueblo, but the records are unclear on whether the Indians were Piros or Tiwas (Beckett and Corbett 1992a:4). Also during that same year, Governor Otermín led an expedition from El Paso into the Organ Mountains to subdue the Mescalero Apaches (Opler 1983:420). However, the Apaches were able to elude him.

After his failed campaign, Governor Otermín established four new pueblos in the El Paso area to hold the refugees. At least one Spanish family lived at each of the pueblos to aid and protect the resident priest (Beckett and Corbett 1992a:4). Later, these pueblos were reorganized and moved closer to El Paso. The Pueblo of Senecú, composed of Piro and Tompiro Indians, was established about 8 km (5 mi) downstream from the Guadalupe Mission. About three to 6 km (4 mi) east of the Senecú Pueblo, a group of Tiwas formed the Pueblo of Corpus Christi de la Isleta (Ysleta). About 14 km (9 mi) downstream of the Ysleta Pueblo, a group of Piros with some Tanos and Jemez Indians formed the Pueblo of Nuestra Señora del Socorro (Beckett and Corbett 1992a:4). Apparently some of the Piro and Tompiro refugees continued southward and settled in the Inde region of Durango, Mexico. Near the Ysleta Pueblo, the Ysleta Mission was built in 1691 and had to be rebuilt between 1740-1744 (Earls and Newton 1988:12). Missions were also established at Socorro and San Elizario between 1681 and 1691. There was no mention of the composition or location of the fourth Pueblo at San Lorenzo, but it was occupied by about 50 Native Americans at the time of the 1730 census (Beckett and Corbett 1992b:9).

Also that year, the Presido of El Paso del Norte was established to shore up Spanish military control of the northern frontier. Several Manso houses, located just west of the Guadalupe Mission, were occupied by the Spanish to be used as the headquarters buildings (Beckett and Corbett 1992b:10).

Because of crowded conditions and lack of food due to the refugee population influx, the Mansos at the Guadalupe Mission revolted and were put down in 1684 (Beckett 1985:149). Some of the survivors fled to join Captain Chiquito's camp about 80 km (50 mi) upstream from the Guadalupe Mission. Governor Cruzate declared war on the Mansos, and with the aid of loyal Manso Indians, he attacked and burned Captain Chiquito's camp. However, the rebel Manso camp had been warned of the Spanish approach and, following a short battle, the rebels were able to cross the Rio Grande and escape. When Governor Cruzate returned to the Guadalupe Mission, he hung all of the captured Manso leaders. Within the year, the Jano and Suma Indians at La Soledad, the Suma Indians at Santa Getrudis and San Francisco de Toma, and the Jcome and Chinarra Indians all revolted, but they were put down by the Spanish. A peaceful settlement with the Mansos did not occur until 1698.

In 1692, Don Diego de Vargas led two expeditions from El Paso into New Mexico to reconquer the pueblos. His second expedition reached Santa Fe during the winter of 1693 and the Pueblo Indians surrendered soon thereafter. During his expeditions, de Vargas also had trouble with the Mescalero Apaches, who raided his supply line for horses, cattle, and food as far south as El Paso (Opler 1983:420).

After the Reconquest, many of the Indian and Spanish refugees choose to remain in the El Paso area. Only some of Tiwa at Ysleta Pueblo returned to their former homes in New Mexico (Dozier 1983:59). Ysleta del Sur Pueblo continued to be occupied into the 1800s.

2.3.1.3 Early Agrarian Settlement

After the Pueblo Revolt, trade resumed and El Paso was located on the Camino Real, a trail which went from the capital of New Mexico, Santa Fe, to Mexico City. The trail also allowed the inhabitants of the El Paso area to bring their agricultural produce to larger markets.

In the 1700s, the El Paso area became an important producer of grapes and related products such as wine, vinegar, brandy, and raisins. Sacramental wine was an important commodity for the church. In 1755, there were some 250,000 vines in the El Paso area (O'Leary and Canavan 1989:26). Other agricultural products from the Socorro and Ysleta area included fruits such as pears, apples, and peaches. Ranching operations with cattle, goats, sheep, and horses stretched from the river to the Hueco Mountains and the edge of the Franklin Mountains.

Mines were opened up in the Chihuahua District, which then included the El Paso area. This was accompanied with an immigration of people and increased economic activity (Griffin 1983:338).

But all was not peaceful; repeated raids by the Apaches led the Spanish to construct a series of forts, including one at San Elizario, south of El Paso. While the forts were used to attack the Apaches, they also helped prevent any local rebellions (O'Leary and Canavan 1989:27). From 1766 to 1776, the Spanish conducted a serious campaign under the direction of Hugo de O'Conner against the Mescalero Apaches, but it failed to subdue or reduce the number of Apache raids. In 1776, O'Conner was replaced by Teodoro de Croix, who was given the title of commander-general. From 1776 to 1783, he pursued the Mescalero Apaches along the Rio Grande and Pecos River valleys, in the Sacramento, Guadalupe, and Organ Mountains, and throughout the Sierra Blanca Range. For the rest of the Spanish Colonial period, the Spanish relied less on a military solution and tried to peacefully settle the Apaches in specific areas. In 1793, a group of Mescalero Apaches settled near Belen, New Mexico. Later, in 1810, the Spanish agreed to a treaty with the Mescalero Apaches which granted them the right to occupy the area from north of El Paso northward to the Sacramento Mountains (Opler 1983:421).

During the 1700s and early 1800s, the Pueblo Indians at Paso del Norte intermixed with their Hispanic neighbors. Only the Indians at the Guadalupe Mission at Paso del Norte continued to maintain their own identity and tribal government (Beckett and Corbett 1992a:6). In 1751, a Spanish land grant was issued to Ysleta Pueblo, for all the land within 4.0 km (2.5 mi) of the Ysleta Mission. As for the Mansos, in 1728, a Spanish traveler noted that at the Guadalupe Mission there were two separate habitation areas for the Indian population. There was one for the Mansos, called Pueblo Arriba, and one for the Piros, called Pueblo Abajo. Each community also had its own governor (Beckett and Corbett 1992b:15). Following an epidemic in 1748 the two communities were merged. By 1760, there were only a handful of Mansos left and they married into other groups.

2.3.2 The Mexican Period

The Mexican period in the El Paso area was very short, from the outbreak of hostilities in the Mexican War for Independence in 1810 to the cessation of hostilities with the United States in 1848. While under

Mexican rule, the only major change was an increase in trade along the Camino Real between Santa Fe and Mexico.

During the Mexican-American War, the Americans sought to secure Santa Fe and the passage to California from the Mexicans. The Americans considered westward expansion their "manifest destiny." To that end, El Paso, which was on the major trade route between Santa Fe and Mexico, was occupied by the Americans to cut off Mexican forces from reaching Santa Fe.

2.3.2.1 Mexican Independence

During the Mexican revolution, which started in 1810, the Spanish soldiers stationed at the San Elizario presidio were sent south to fight. There were no major engagements in the El Paso area during the war. At the end of Mexican War for Independence in 1821, the El Paso area became part of the state of Chihuahua.

Although the Mexican Government renewed the Spanish agreement with Mescalero Apaches to let them occupy the area north of El Paso, reports of Apache raids continued through to the 1840s (Opler 1983:421). The Comanche also raided in the El Paso area in the 1830s and 1840s. During the War for Texas Independence, the Mescalero Apaches aided the Texans. But since the Mexican Government was preoccupied with Texas Independence and growing problems with the United States, few military expeditions were conducted against the Apaches.

In 1822, the Mexican Government reversed the policy of the Spanish Colonial government and allowed American traders to enter Santa Fe. Trade along the Santa Fe trail boomed. The effect on El Paso was an increase in traffic along the Camino Real, going southbound. From 1822 to 1832 about one-fifth of total goods brought to Santa Fe were resold in Mexico. In the next 11 years, from 1833 to 1844, over one half of the total goods were resold in Mexico (Beck 1962:116).

In 1829, there was a major flood in the valley which destroyed many buildings and all of the missions (O'Leary and Canavan 1989:27). Thus, much of the original Spanish period structures were reduced to ruins. The Socorro Mission was rebuilt in 1843 on higher ground, where it stands today.

2.3.2.2 United States/Texas Battles

During the Texan revolt in 1836, the El Paso Valley came under the control of the Texan Republic. An outpost of the Texas Rangers was established near the Ysleta Pueblo. These buildings still stand at 8728 and 8729 Old County Road. There were no major engagements in the El Paso valley at this time.

In March of 1845 the United States annexed Texas, which precipitated the start of the Mexican-American War in the following year. During the war the town of El Paso was occupied twice by American forces. At the start of the war in 1846, Colonel Alexander Doniphan defeated the Mexican Army at the battle of Brazito, just outside the town of El Paso. After the battle the American forces occupied the town, but maintained good relations with the inhabitants. In November of 1847, General Sterling Price stationed his troops in the town. Throughout the war, the Mescalero Apaches actively supported the Americans by raiding Mexican settlements and supplies (Opler 1983:421). In 1848, the Treaty of Guadalupe Hidalgo ended the war and stipulated that the north bank of the Rio Grande was a part of the United States.

2.3.3 The American Period

With the northern part of the Rio Grande valley now under American control, El Paso continued as a militarily strategic point, a transportation corridor, and a fertile agricultural valley. The presence of El Paso on the border with Mexico necessitated the stationing of troops in El Paso. Also, as the Americans settled their newly controlled territory, there were once again hostilities with the Apaches in the El Paso area. The military presence in El Paso continues to this day.

In 1853, the United States completed the Gadsden Purchase with Mexico for the sole reason of obtaining a favorable railroad route through the mountains. Although it took 30 years to build the railroad, when the railroad arrived in El Paso, it dramatically and drastically changed the area. Prior to the railroad, El Paso was a small agriculture and ranching community. With the arrival of the railroad in 1881, El Paso's population doubled in a year and by the end of the decade it had doubled three more times. The leading two industries were the railroads and copper smelting and refining.

After the arrival of the railroads, the Americans were interested in expanding agricultural production now that it could easily be shipped anywhere in the nation. But first, they needed to tame the Rio Grande whose annual floods had wiped out Spanish and Mexican attempts at dams.

2.3.3.1 Early American Control

In the fall of 1849, Major Jefferson Van Horne along with his regimental headquarters and six companies of soldiers arrived in El Paso. In 1854, the post was named for Colonel William Wallace S. Bliss who had a command in the Mexican-American War. From 1849 to 1878 the post was moved around to several different locations in El Paso which the federal government leased. In 1878, the federal government purchased 135 acres of land including Hart's Mill for Fort Bliss. It was situated along the Rio Grande in the strategic pass in the Franklin Mountains. But in 1893, the Southern Pacific and Atcheson, Topeka, and Santa Fe Railroads, together with the Texas state government, obtained a right-of-way (ROW) through the center of the fort for additional tracks into the city. That year the post was relocated to its current location about 8 km (5 mi) north of El Paso.

The provisions of the agreement by which Texas was annexed into the United States had an adverse effect on the Indians in Texas, especially the Mescalero Apaches. According to that agreement, all land in Texas belonged either to private individuals holding valid deeds or to the state. The Indians were considered to be squatters on Texas state land. The removal of the Indians from state land was considered the responsibility of the federal government. The Texas state government argued that the federal government should move them to the Indian territory to the north or launch military expeditions to exterminate them. The federal government could not set up reservations for the Indian groups in Texas because the government did not own any land in Texas. In 1859, the U.S. Army, under the command of Major Robert S. Neighbors, removed the Mescalero Indians to the Indian Territory (Opler 1983:421). "Indian Territory" was land set aside expressly for Indians. It was located in portions of what is now Oklahoma to which eastern Native Americans had been relocated beginning in 1832 (see Spicer 1969:63).

In 1861, Texas seceded from the Union. During the Civil War, a company of California volunteers occupied the old Spanish presidio at San Elizario. No other military events occurred in the El Paso area during the Civil War.

Up through the 1870s, a group of Texas Rangers were stationed in El Paso to attack and defend against the Apache. In 1879, soldiers from Fort Bliss were called out to suppress the Apache raids led by

Victorio in the United States and Mexico. Troops from Fort Bliss were used in the campaign against Geronimo in 1885-1886.

2.3.3.2 The Railroad

While El Paso had been on the Butterfield Overland Stagecoach line since 1858, it was the arrival of the railroad in 1881 that had a profound effect on the city of El Paso as a commercial center (Staski 1984). By 1884, El Paso was connected with cities to the north, south, east, and west by four major rail lines: the Southern Pacific; the Atchison, Topeka, and Santa Fe; the Texas and Pacific; and the Mexican Central.

The major effect of railroad service was the rapid increase in population. Overnight, El Paso became an "Instant City" (Staski 1984). The U.S. census reported that in 1880 the population of El Paso was 740 persons. In 1881, it was estimated at 1,500 persons and by 1890 the U.S. Census reported 10,000 people. With the influx of newcomers, the city also maintained and added to its diverse ethnic makeup. For example, there was a large Chinese community in the city that arrived with the building of the Southern Pacific Railroad in El Paso (Staski 1984:243).

There were several problems with the large influx of newcomers. Municipal works such as sewer, water, and gas lines needed to be created and constantly expanded. There was also widespread prostitution and violence. But, the railroads also brought and created all sorts of jobs, both directly and indirectly.

In fact, the railroad was the largest industry in the area. The construction and maintenance of the railroad lines required many workers. The second biggest industry was mining. The American Smelting and Refining Company set up operations in El Paso just after the railroads connected the city to the surrounding copper mines in Arizona, Sonora, and Chihuahua. The next largest enterprise was the cattle industry. With the railroad, El Paso was soon shipping large quantities of beef to the rest of the country. With the abundance of cheap unskilled labor, in addition to the railroad links, El Paso became a large industrial and commercial center (Staski 1984:243).

2.3.3.3 Historic Irrigation and Agriculture

Prior to 1880, most of the agriculture was done by the Hispanic and Indian segments of the population (O'Leary and Canavan 1989:33). During that time, there were four leading community irrigation systems in use. In 1869, it is estimated that 30,000 to 40,000 acres were irrigated. The use of water from the canals was linked to the amount of work provided for its maintenance and upkeep. Due to the unreliable flow of the Rio Grande, irrigation was not always assured or timely. Alfalfa was introduced to the Rio Grande Valley in 1860 and by 1880 it was the major crop in the area (O'Leary and Canavan 1989:28). By 1920, cotton had replaced alfalfa as the major crop and most of the orchards and vineyards in use since the Spanish Colonial period were destroyed (O'Leary and Canavan 1989:41).

With the arrival of the railroad as a means of exporting products, Anglos took an interest in the agricultural potential of the valley. In 1889, the precursor of IBWC, the International Boundary Commission was established. During the same year, the El Paso Irrigation Company began construction of the Franklin Canal on land leased from the El Paso City Council. When it was finished in 1891 it stretched from El Paso to Fabens. There were several attempts to build a dam to divert water to the canal, but the spring floods repeatedly wiped out the dam. As a result, the Franklin Canal had to draw water directly from the river (Miller 1991). In 1897, the International Diversion Dam was the first successful means of more efficiently drawing irrigation water from the Rio Grande.

Miller (1991) suggests that the success of the Franklin Canal brought a series of protests from the Mexican government because the canals on the Mexican side began receiving less water than normal. In any case, the Treaty of 1906 regulated water conveyance to Mexico from the Rio Grande. The treaty provided Mexico with 60,000 acre feet of water yearly and opened the way for the construction of the Elephant Butte Reservoir in New Mexico, which was completed in 1909. The reservoir greatly reduced the annual flooding of the Rio Grande valley.

The Franklin Canal was sold several times before being bought along with the International Diversion Dam by the Bureau of Reclamation (Miller 1991). The federal government upgraded the canal and constructed several bridges across the canal in the city. To further reduce flooding, the Rio Grande was permanently channeled, in 1935, as part of the Bureau of Reclamation Rio Grande Flood Control Project.

In 1938, the federal government built the American Diversion Dam upstream from the International Diversion Dam. In 1939, the city of El Paso transferred title to the land of the Franklin Canal to the federal government.

2.3.3.4 The Modern Era (post-WW II)

Once El Paso became a large city, it stayed one. Population growth in the modern era is not as severe as that during the period from 1881-1910. In the latter half of the twentieth century, the city has maintained a diverse economy with the mining industry, cattle ranching, agriculture, small manufacturing industries, commerce, and the constant presence of U.S. military bases.

Since 1940, when the Franklin Canal was extensively upgraded, the International Diversion Dam has only been used to divert water to the Mexican side. Up to this day the Franklin Canal gets its water from the American Diversion Dam. In 1960, 2.4 km (1.5 mi) and a half of the Franklin Canal through downtown El Paso was reconstructed (Miller 1991).

In addition, the city has retained and expanded its ethnic diversity. Today there are still residents of El Paso who can trace their ancestry back to Mansos, Sumas, and other related Indian groups that occupied the area during the Spanish period (Beckett and Corbett 1992a:7).

3.0 Previous Investigations in the General Area

There are three types of investigations of the El Paso area:

- 1) Ethnohistorical work of the Spanish explorers and missionaries;
- 2) Archaeological studies of scholars, professional archaeologists, and amateurs archaeologists; and
- 3) Historical accounts written by historians.

This section provides a historical context for the on-going research in the El Paso area.

3.1 Ethnohistory

The earliest written accounts of the Native American groups who lived in the El Paso area, such as the Mansos and Sumas, are Spanish records. There are two types of records kept by the Spanish:

- 1) Travel logs of explorers and various civil inspectors; and
- 2) Records kept by the priests pertaining to the missions and their inhabitants.

3.1.1 Spanish Chronicles

As the Spanish expeditions explored the northern fringe of their empire in search of gold and riches, the expedition's journal describes briefly the terrain and the indigenous population. Several Spanish expeditions passed through the El Paso area, and their records mention groups of Native Americans living in the area. In 1851, Hernan Gallegos reports that Chamuscado and Rodríguez expedition had reached "another nation of friendly people" (Beckett and Corbett 1992b:23). In 1852, Diego Pérez de Luxán of the Espejo expedition also mentions Native Americans living in the El Paso area. But it is Juan de Oñate, on his expedition of 1598, who formally named this group of Native Americans the Mansos, meaning "peaceful ones" (Beckett and Corbett 1992b:24). Later, during the 1700s, inspectors such as Pedro Rivera, who visited the Guadalupe Mission also recorded what they saw.

3.1.2 Mission Records

Another source of information about the Mansos and other groups are the records of the Franciscan Missions. The earliest Spanish mission in the El Paso area is the Mission of Nuestra Señora de Guadalupe de los Mansos, now located in present day Juárez, Mexico. Associated with the Guadalupe Mission were two pueblos, one for the Mansos and other for the Piros. Ysleta, Socorro, and San Elizario Pueblos, built after the Pueblo Revolt of 1680, had their own missions. The records kept by the priests at the missions include baptismal records, accounts of trips by the priests among the Native Americans (i.e., Fray Alonso de Benavides' trip), progress reports on converts, and descriptions of work done on mission. This material is available through the archives of the Archdiocese of Durango, the Archdiocese of Santa Fe, and the Juárez Cathedral.

3.2 Archaeological Studies

Archaeological work in the El Paso area began as early as 1854 with the documentation of local petroglyphs. From 1920 to 1949, there was a flurry of exploratory archaeological research, which established the culture chronology and artifactual styles of the area. Following this early period archaeological work, the El Paso area was mostly ignored by professional archaeologists because it was considered peripheral to the Anasazi and Mogollon core areas to the north and west. Most of the work

from over 400 habitation sites. In 1948, D.J. Lehmer published a cultural chronology for the southern Jornada Mogollon. His findings were based on his excavation at three sites: Los Tules, a Mesilla phase pit house village near Mesilla, New Mexico; La Cueva, a cave site which contained Archaic period as well as Mesilla and Doña Ana phase materials; and the Bradfield site, a 16-room El Paso phase pueblo located in the Organ Mountains near Las Cruces, New Mexico. His work was sponsored by the Arizona State Museum and Museum of New Mexico.

Since the late 1940s, most of the archaeological work in the El Paso area has been carried out by amateur groups or by professionals working under cultural resource management requirements. One exception was the late Dr. Rex Gerald, who significantly contributed to the archaeological knowledge of the area by conducting small survey and excavation projects such as the investigation of the old Socorro Mission (Gerald 1984) and the excavation of a seventeenth century hacienda in Juárez, Mexico (O'Leary and Canavan 1989:56).

3.2.2 Cultural Resource Management (Modern Archaeological Work)

Since 1970, there have been many archaeological projects, both survey and excavation, in the El Paso area. Most of these investigations resulted from military-related cultural resource management and development associated with the growth of El Paso. Discussion of this recent work is divided here into four areas:

- 1) Mesilla Valley to the northwest;
- 2) Southern Tularosa Valley and Hueco Bolson to the northeast;
- 3) To the southeast, the agricultural lands along the river and the nearby hills leading up the Hueco Mountains; and
- 4) Downtown El Paso.

Most of the archaeological work is located in the first three areas on the outskirts of the city.

3.2.2.1 The Mesilla Valley

Several extensive survey projects and excavation projects have been carried out in the Mesilla Valley. Duran (1984) conducted a 718 km (446 mi) linear survey on both sides of the river which located 265 sites ranging from the Archaic to Historic periods. In a survey along the west side of the river, Haecker and Marshall (1987) located several Formative period sites. Also on the west side, O'Laughlin's (1980) survey located 12 sites from the Archaic and Formative periods. He commented that, "few sites would be expected on the floodplain, and the riverine zone is now largely under cultivation or developed" (O'Laughlin 1980:27). On the east side of the river, Duran (1985) conducted a small survey project on the floodplain which did not locate any sites, but recorded three small ceramic and lithic scatters as isolates. O'Leary and Canavan (1989:57) have noted sites on the east side of the river cluster along the base of the Franklin Mountains. In addition, there have been several other survey projects such as Camilli et al. (1988), Gerald (1976), and O'Leary (1987).

There have been several excavation projects conducted in the area which were associated with the construction of Keystone Dam (Carmichael 1985a; Carmichael and Elsasser 1984; Fields and Girard 1983; O'Laughlin 1980; Stuart 1984). In all, five sites dating to the Archaic and Formative periods were systematically excavated. These sites were interpreted as being short-term habitation camps where the inhabitants focused on the processing of leaf succulents, such as agave.

3.2.2.2 The Southern Tularosa Basin

There have been two large survey projects in the southern Tularosa Basin and Hueco Bolson: Whalen's (1978) 215 km² (83 mi²) survey and Carmichael's (1986) 995 km² (384 mi²) survey which located 1,400 and 6,061 sites, respectively. In addition, several smaller survey projects have been carried out, such as Hard (1983), as well as several small excavation projects. This fieldwork has allowed extensive research into settlement and subsistence patterns in the area. However, due the low visibility of Archaic and Paleoindian occupations at multicomponent sites (see Carmichael 1982), most of the sites located in the area can only be dated to the Formative period. In an important synthesis of several small survey projects in the Sacramento Mountains at the northern end of the Tularosa Basin, Spoerl (1985) concludes that temporary occupation of the area above 1,829 m (6,000 ft) started during the Archaic period, and the area saw considerable use during the Formative period.

There have been several excavation projects aimed at defining sites identified on survey as low density artifact scatters and interpreted as temporary camps (Kegley 1982; Scarborough 1986; and Whalen 1981, 1986). In three cases, these types of sites were excavated and revealed Mesilla or Doña Ana phase pit house villages. Whalen (1986) goes on to explore coring as a technique to efficiently identify and map the cultural deposits at this type of site.

More recently, a series of problem-oriented studies have been undertaken in this area, including Church et al. (1996), who studied lithic resources in the region, Faunce (1997) for the historic period of the southern Tularosa Basin, Anschuetz et al. (1990) for the small site distribution and geomorphology for the southern Tularosa Basin, and Miller (1996) for the chronology of Fort Bliss.

Investigations in the Fort Bliss area are summarized in Graves and Turnbow (1998:19-22), whose report also details a major survey at selected locations within this military establishment.

3.2.2.3 The Southeast River Valley and Hills

To the east and southeast of El Paso, there have been a large number of small survey and excavation projects, both on the irrigated floodplain and the hills leading up to the Hueco Mountains; however, an overall synthesis of the area is lacking. The identification of sites in the floodplain has been severely hampered by farming activities. In a survey and testing project adjacent to the Franklin drain, Batcho et al. did not locate a single site and reported that "much of the topsoil has been disturbed by tilling and agricultural pursuits" (1987:5). Furthermore, they concluded that, according to the geomorphic evidence, any occupation prior to the twentieth century had been washed away or deeply buried. This is confirmed by a survey from the river to the Hueco Mountains to the west by Evaskovich and Higgins (1992) which located 12 prehistoric sites, all of which were located in the hills at the base of the Hueco Mountains. Also, Earls and Newton (1988) surveyed several areas at the base of the bluffs and located one site which dated to the Late Archaic and Formative periods. In another survey on the floodplain, O'Leary and Canavan (1989) surveyed the widening of 60.5 km (37.5 mi) of drains which parallels the course of the Rio Grande and located just one prehistoric site. Other small surveys in the southeast valley include Buttigieg-Berman (1977); Gerakd (1981); Sullivan (1984); Tanner and Acklen (1986).

For the most part, the sites identified on the floodplain are historic sites. A survey and testing project for a fiber optics cable did not locate a single site, but did locate historic material in the Ysleta area (Kirkpatrick and Rogge 1986; Sale et al. 1987). Anthony et al. (1992) identified 13 historic sites during a linear survey for the construction of water lines. The cultural material found was related to nearby standing or destroyed historic structures.

4.0 On-Site Reconnaissance

To assess the present condition of the project scope-of-work area, an on-site reconnaissance was carried out on August 12, 1998, by Howard Higgins of TRC and U.S. Border Patrol Officer Robinson. This reconnaissance revealed the following:

- Construction of the American Canal Extension, for which the Class III pedestrian survey and geoarchaeological investigations had been previously carried out, is now complete through the project area reach.
- These construction activities disturbed all areas within the ROW, which might otherwise have had previous potential to contain cultural resources eligible to the National Register.
- The proposed construction by the INS will occur on levy banks and other disturbed areas.
- The surface to be impacted is now a new road base.

5.0 Management Summary and Recommendations

The proposed action to be carried out for the INS will occur along a corridor that has been previously impacted by construction of canals designed to rectify the flow of the Rio Grande, and associated facilities such as levees and access roads. A Class III archaeological survey and geoarchaeological investigations were previously carried out to examine the potential for cultural materials within the impact area of the IBWC's American Canal Extension. These investigations encountered no significant cultural resources, and the geoarchaeological investigations found that sediments within the impact area were probably deposited in the very recent historic past, and that archaeological remains were either absent or deeply buried (below the depth that would be impacted by construction activities). An on-site reconnaissance of the proposed project scope-of-work area found that the American Canal Extension through the impact reach is now complete, and action proposed by the INS will occur on levee banks and other disturbed areas.

Based on these findings, TRC recommends a *No Effect* determination for the action proposed by the INS. This recommendation has already been concurred with by the Texas Historical Commission's Archaeology and Architecture divisions (Appendix A). Thus, cultural resource clearance for the INS action is recommended.

In the unlikely event that cultural materials, evidence of cultural activity, or previously unidentified cultural resources are uncovered during any construction activities carried out anywhere within the project scope-of-work area, all activity in the area should cease pending notification of the SHPO and investigation by a qualified archaeologist.

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