DOE/EA-0702

ENVIRONMENTAL ASSESSMENT FOR CENTRAL POWER AND LIGHT COMPANY'S PROPOSED MILITARY HIGHWAY-CFE TIE 138/69-KV TRANSMISSION LINE PROJECT BROWNSVILLE, CAMERON COUNTY, TEXAS

U.S. Department of Energy
Washington, D.C.

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1.1 SCOPE OF PROJECT

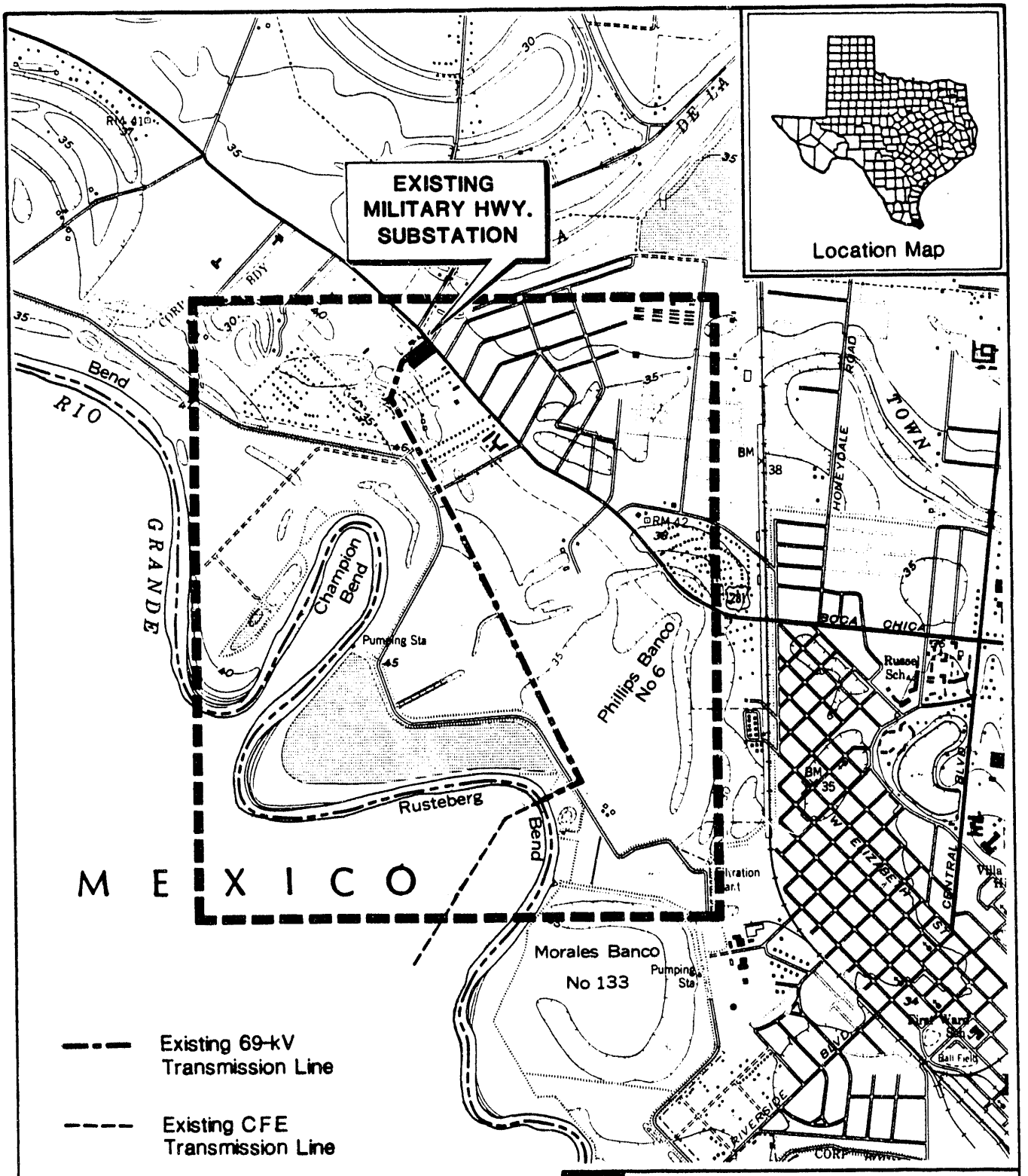
Central Power and Light Company (CPL)intends to upgrade its existing transmission line ties with the Comision Federal de Electricidad (CFE) system in Mexico. CPL currently has a single 69-kilovolt (kV) transmission line in the Brownsville area which connects CPL's system with the system of CFE. This existing line runs between the Brownsville Switching Station, located on Laredo Road in Brownsville, Cameron County, Texas, and an existing CFE 69-kV line at the Rusteberg Bend of the Rio Grande in Cameron County (Figure 1-1).

Under current conditions of need (see Section 1.2 below), the existing 69-kV line does not possess sufficient capability to engage in appropriate power exchanges. Therefore, CPL is proposing to build a new line to link up with CFE. This proposed line would be a double-circuit line, which would (1) continue (on a slightly relocated route) the existing 69-kV tie from CPL's Brownsville Switching Station to CFE's facilities, and (2) add a 138-kV tie from the Military Highway Substation, located on Military Highway (U.S. Highway (U.S.) 281), to CFE's facilities. The proposed 138/69-kV line, which will be constructed and operated by CPL, will be built primarily on steel single-pole structures within an average 60-foot (ft) wide right-of-way (ROW). It will be approximately 6,900-9,200 ft (1.3-1.7 miles) in length, depending on the alternative route constructed.

1.2 PURPOSE AND NEED FOR PROJECT

1.2.1 Introduction

The addition of a 138-kV line from CPL's Military Highway Substation to CFE's Matamoros Substation is needed to increase the capability to exchange power between CPL and CFE. CPL has four ties with CFE along the Rio Grande. Prior to the mid-1970s, these ties were normally closed such that a portion of the CFE system operated in synchronism with the Texas Interconnected System (predecessor to Energy Reliability Council of Texas (ERCOT)). As each



Base Map: USGS 7.5' Quadrangle, West Brownsville, Texas

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Figure 1-1

STUDY AREA MAP
MILITARY HWY. TO CFE TIE
138/69-KV PROJECT

of the systems grew and CFE integrated its northern system with the rest of the electric system of Mexico, it was necessary to open the ties because the two systems could not operate in synchronism. The ties have remained, however, as an important method of exchanging power between the two systems. This is accomplished by switching load from one system to the other by closing a particular tie line and opening a switch or switches in one or the other of the systems such that substations are effectively transferred over to the other synchronous system. Of the four ties which can be operated between CPL and CFE in this fashion, the tie between CPL's Brownsville Switching Station and CFE's Matamoros Substation is the only 69-kV tie and is the line with the lowest power-carrying capability. However, the Matamoros area and CPL's Rio Grande Valley area represent substantial load centers in each of the systems and present the greatest opportunity for the exchange of power for enhanced reliability and economics.

1.2.2 Emergency Exchange

In August of 1989, CPL and CFE signed an Emergency Assistance Agreement providing for the transfer of load to each other's system in times of emergency. The Emergency Agreement with CFE is a reciprocal type arrangement, and the 138-kV tie will be used to meet CPL's obligation to provide emergency power to CFE according to the terms of the Agreement. The existing Brownsville to Matamoros tie, at 69 kV, represents a limitation to each of CPL and CFE in making exchanges of emergency power under the Agreement. Other ties with CFE are at 138 kV and are generally capable of greater transfers. This project will increase the amount of power which can be exchanged when the need arises. Emergency exchanges may be made during times of overall generation deficiency in the CPL system or the entire ERCOT system. Emergency exchanges may also be made during transmission contingencies which would impede the ability to deliver power to the Rio Grande Valley in general and to the Brownsville area in particular.

CPL plans its system to ensure the reliable delivery of electric power even during certain failures of equipment on the transmission and generation system. However, adverse weather conditions, extreme circumstances, long-term equipment outages or major catastrophes may cause conditions more severe on the CPL electrical system than are practical and economical to plan for; thus, emergency exchange capability is a valuable addition to CPL's backup resources.

For example, in December 1989 ERCOT implemented the emergency electric curtailment plan because of extremely high loads and a shortage of generation. The existing tie with CFE at Matamoros was used to transfer approximately 20 megawatts (MW) of CPL load to CFE. This helped to relieve the ERCOT system and this relief could have been even greater if a 138-kV tie had been in place. This would have resulted in less load having to be interrupted during the generation shortage. The ability to transfer greater amounts of load to the CFE system would enable CPL to maintain electric service to a greater number of its customers even under stress conditions. Reliability will also be enhanced for co-participant Public Utilities Board (PUB) of the City of Brownsville since PUB will also be capable of transferring part of its load to CFE under extreme conditions.

1.2.3 Economy/Firm Purchases and Sales

In addition to emergency transfers between CPL and CFE, the 138-kV tie will be available for transfers made for economy reasons or for firm purchases and sales. CPL has a long history of power exchanges with CFE. Both CPL and CFE see this 138-kV tie as a valuable addition to increase the reliability to their customers in a cost-effective manner. CPL is currently negotiating with CFE to provide approximately 100 MW of power at Matamoros. The 138-kV tie will be used to make this sale.

1.2.4 Conclusion

CPL has designed this project to provide maximum flexibility at minimal cost for transferring load over to the CFE system in times of emergency. This will allow CPL to accommodate more adverse operating conditions without undue construction of system facilities. Economy and firm sales to Mexico will reduce revenue requirements for CPL's other customers without compromising reliability to CPL's customers. CPL may also have the opportunity to purchase power from CFE on an economy or short-term basis which could reduce fuel expenses or capacity needs in the future. The Military Highway to Matamoros 138-kV tie is an important addition to the CPL system. CPL's customers stand to benefit in the ways described above both in the near term and well into the future.

1.3 DESCRIPTION OF PROPOSED CONSTRUCTION

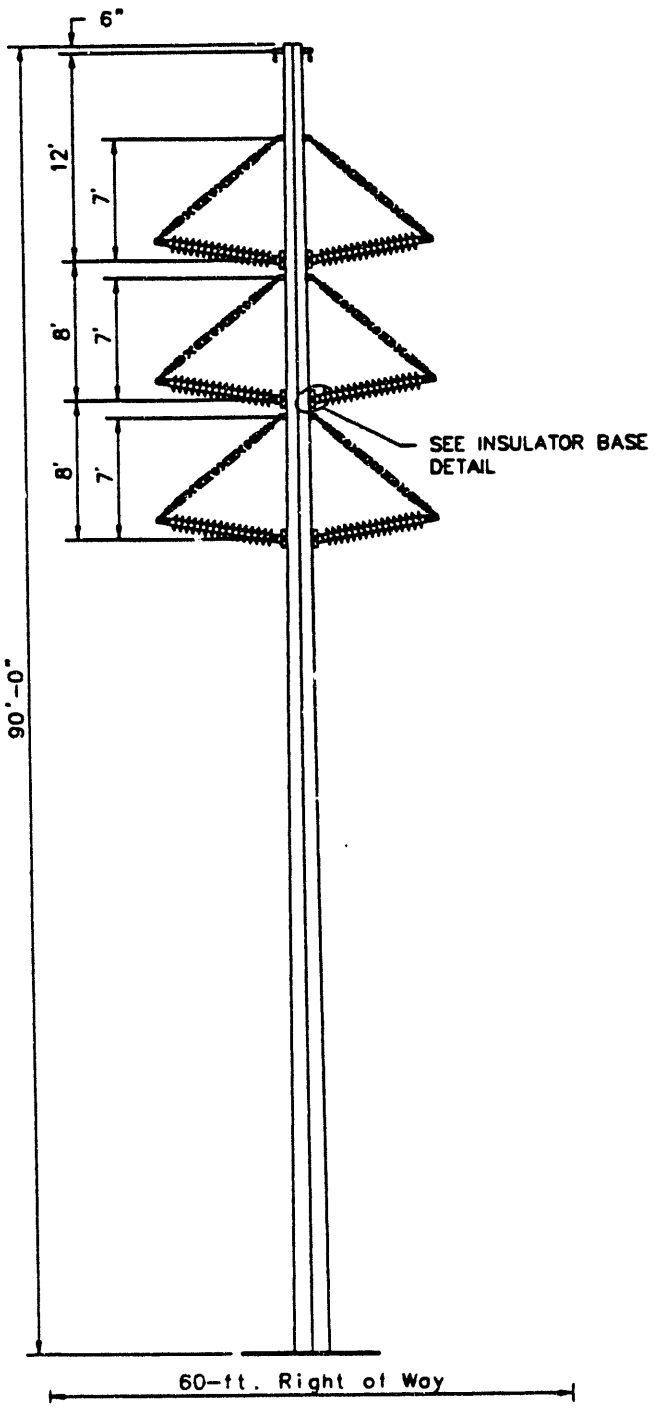
The proposed transmission line will be a double-circuit 138/69-kV line, i.e., one 138-kV circuit and one 69-kV circuit constructed on common structures. The conductor to be used on each circuit will be 795 kcmil 26/7 strand ACSR, "Drake", shielded by one 7 No. 10 alumoweld shield wire. The structures will be designed to withstand a hurricane force wind.

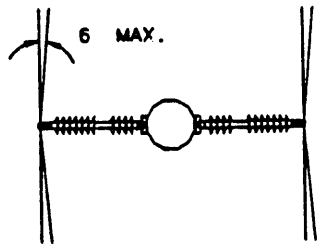
The design of the structures proposed for this project considered minimizing the number of ground contacts while keeping the ROW width as narrow as possible. An economic evaluation of the alternatives of wood poles versus steel poles indicated that the steel-pole design would allow for minimal ground contacts while offering only a slight increase in cost for the ROW. The cost associated with fewer structures compensates for the additional ROW requirement. Use of single-pole structures (Figure 1-2) for tangent structures versus a two-pole design narrows the ROW width.

Self-supporting lattice steel towers (Figure 1-3) were chosen for angles and deadends to eliminate the need for guy wires. Horizontal line post insulators were chosen for their properties of reduced radio interference (RI) and television interference (TVI), for the lack of insulator "swing", and for their characteristics of line compaction. Polymer insulators will be used because of their cost savings, light weight and reliability. Design of the foundations will be drilled shafts.

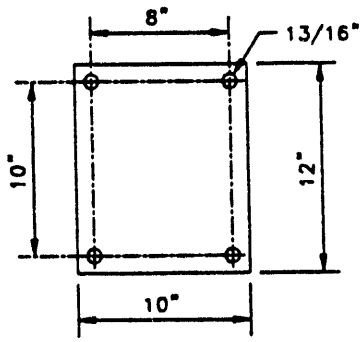
The structure proposed for the Rio Grande crossing will be designed such that a cascading failure of structures on the Mexico side of the border will not cause any failures on the U.S. side. The transmission line will be marked with aerial markers above the river.

The existing transmission line was constructed to satisfy a minimum clearance of 24 ft over the river, 35 ft over the International Boundary and Water Commission (IBWC) levee and no ground contacts within 35 ft of the toe of the levee. The proposed transmission line will be constructed to meet or exceed these minima.





TOP VIEW



INSULATOR BASE DETAIL

Source: CPL

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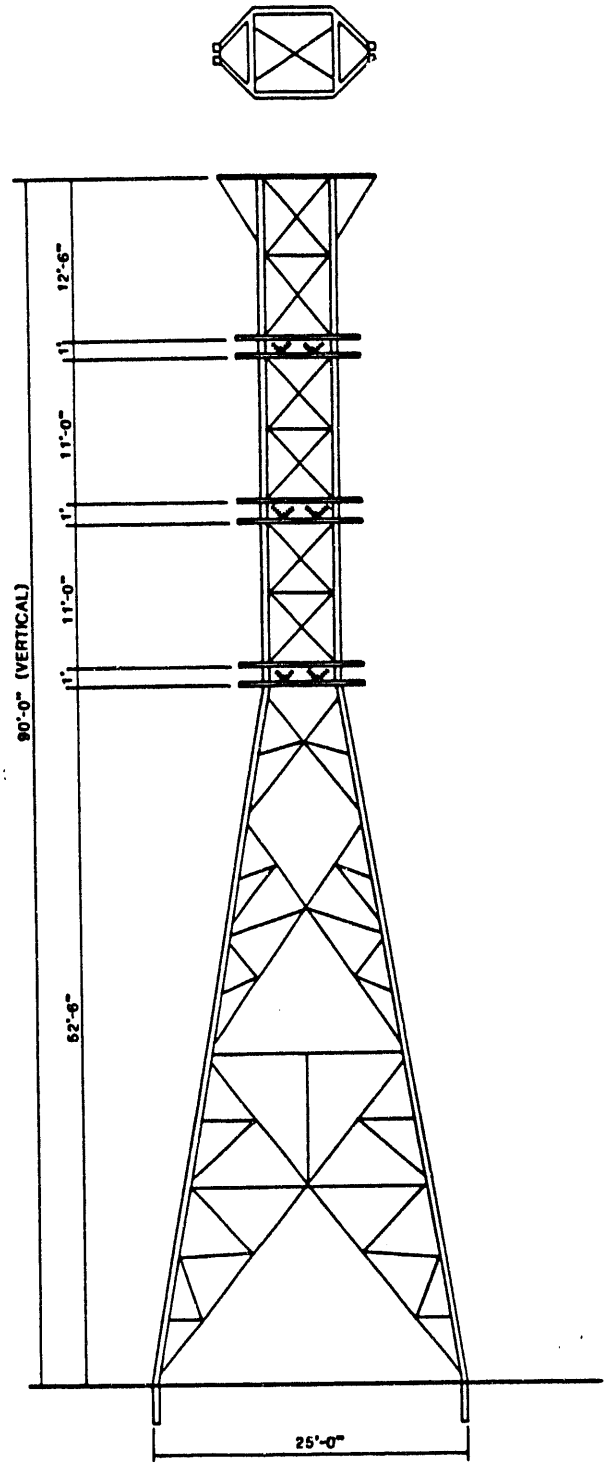
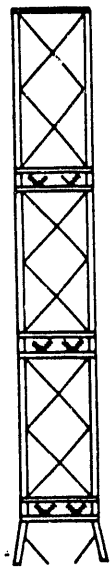
Figure 1-2

TYPICAL DOUBLE-CIRCUIT
STEEL SINGLE-POLE STRUCTURE
MILITARY HWY. TO CFE TIE
138/69-KV PROJECT



TRANSVERSE FACE



LONGITUDINAL FACE

Remainder of Tower same as Transverse Face

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Figure 1-3

TYPICAL DOUBLE-CIRCUIT
LATTICE STEEL TOWER
MILITARY HWY. - CFE TIE PROJECT

Construction of the proposed transmission line is scheduled to begin in April 1992 and be complete in June 1992. When the proposed circuits are completed and energized, the existing wood-pole 69-kV transmission line will be removed and the ROWs abandoned. The steel poles and polymer insulators proposed for this line will minimize the required maintenance.

1.4 AGENCY ACTIONS

1.4.1 U.S. Army Corps of Engineers

The construction of the transmission line across the Rio Grande will be subject to Section 10 of the River and Harbors Act. A permit for the crossing will be obtained from the U.S. Army Corps of Engineers (USCE) prior to construction of the crossing. Section 10 permits are required for any activity conducted in, over or under a navigable water of the United States. The Rio Grande has been determined, by the USCE, to be navigable for approximately 275 miles inland from its mouth at the Gulf of Mexico. In addition, if any fill material is placed into the Rio Grande or other "waters of the United States" along the proposed route, the project will also be subject to Section 404 of the Clean Water Act. Section 404 is also administered by the USCE and requires a permit prior to the discharge of any dredged or fill material.

Since the proposed transmission line crosses an international border, additional permitting requirements come into play relative to the USCE permit. The USCE regulations at 33 CFR 322.5(h) state that the construction and maintenance of electric power transmission lines across the border of the United States with a foreign country must be authorized by the President, the Secretary of State, or the appropriate delegated official. The USCE regulations further state that an application for approval must be submitted to the Secretary of Energy. The USCE regulations reference Executive Order (EO) 10485, EO 12038 and 18 CFR 32.

1.4.2 Department of Energy

An amendment to an existing Presidential Permit must be obtained for the proposed crossing pursuant to 10 CFR 205. This application is to be submitted to the Department of Energy

(DOE). The application will contain information regarding the applicant, information describing the transmission lines to be covered by the permit, information describing the environmental impacts of the proposed route, and alternative routes and a description of all practical alternatives to the proposed action.

1.4.3 International Boundary and Water Commission

A license from the IBWC is required for the construction of the proposed transmission line crossing IBWC-controlled lands. The IBWC has established requirements regarding height clearances and distances of structures from the levee and river; however, the IBWC has no formalized application form. CPL will submit a letter requesting permission to construct the transmission line to the IBWC through its Mercedes, Texas, field office. The letter will be accompanied by sufficient drawings and plans to adequately describe the proposed project. The submittal will also include environmental assessment information which describes the potential environmental impacts. The IBWC has no environmental rules at this time; however, formal rules are being prepared. A formal environmental assessment and coordination with other state and federal agencies may be required depending upon the nature of the proposed project. However, a preliminary review of CPL's proposed project by the IBWC's Mercedes, Texas, office indicated no problems with the project (Breiten, 1991).

1.4.4 Public Utility Commission of Texas

The proposed project will require a Certificate of Convenience and Necessity (CCN) from the Public Utility Commission of Texas (PUC). As required by the Public Utility Regulatory Act (PURA), CPL will submit an application for a CCN and receive PUC approval prior to construction.

Section 54(c) of PURA delineates consideration of such factors as potential impacts on community values, recreational and park areas, historical and aesthetic values and environmental integrity. With this document and other material, CPL intends to address these factors and provide supporting information for the CCN application.

2.0 STUDY PROCESS IN SELECTION AND EVALUATION OF ALTERNATIVE TRANSMISSION LINE ROUTES

The objective of this study was to select and assess environmentally sound and acceptable alternative routes for CPL's proposed 138/69-kV CFE Tie transmission line project that were also feasible from economic and engineering standpoints, and ultimately to select a preferred route. Espey, Huston & Associates, Inc. (EH&A) made its recommendation of a preferred route based only upon environmental considerations; CPL also took into consideration cost and engineering factors in its evaluation and selection of its preferred route. The proposed 138/69-kV line, as described in Section 1.0, would be approximately 6,900-9,200 ft (1.3-1.7 miles) in length, depending on the alternative route constructed.

The delineation of alternative routes was performed by CPL, with assistance from EH&A, as discussed below. EH&A evaluated three primary alternative transmission line routes delineated by CPL for the project. The following sections provide a description of the methodology used in the route evaluation process, which followed similar procedures previously used by EH&A to evaluate alternative transmission line routes. The methodology consisted of data collection, alternative route delineation and evaluation, cost analysis, and preferred route selection, and included contributions by CPL.

2.1 DATA COLLECTION

Data used in the delineation and evaluation of alternative routes were drawn from a variety of sources, including published literature (documents, maps, aerial photography, etc.) and contacts with local, state and federal agencies. Recent aerial photography, various scale U.S. Geological Survey (USGS) topographic maps, State Department of Highways and Public Transportation (SDHPT) county highway maps, National Wetlands Inventory maps, and ground reconnaissance surveys were used throughout the selection and evaluation of alternative routes. Ground reconnaissance of the study area by several members of EH&A's and CPL's staff in May and August 1991 was utilized for refinement and evaluation of the alternative routes.

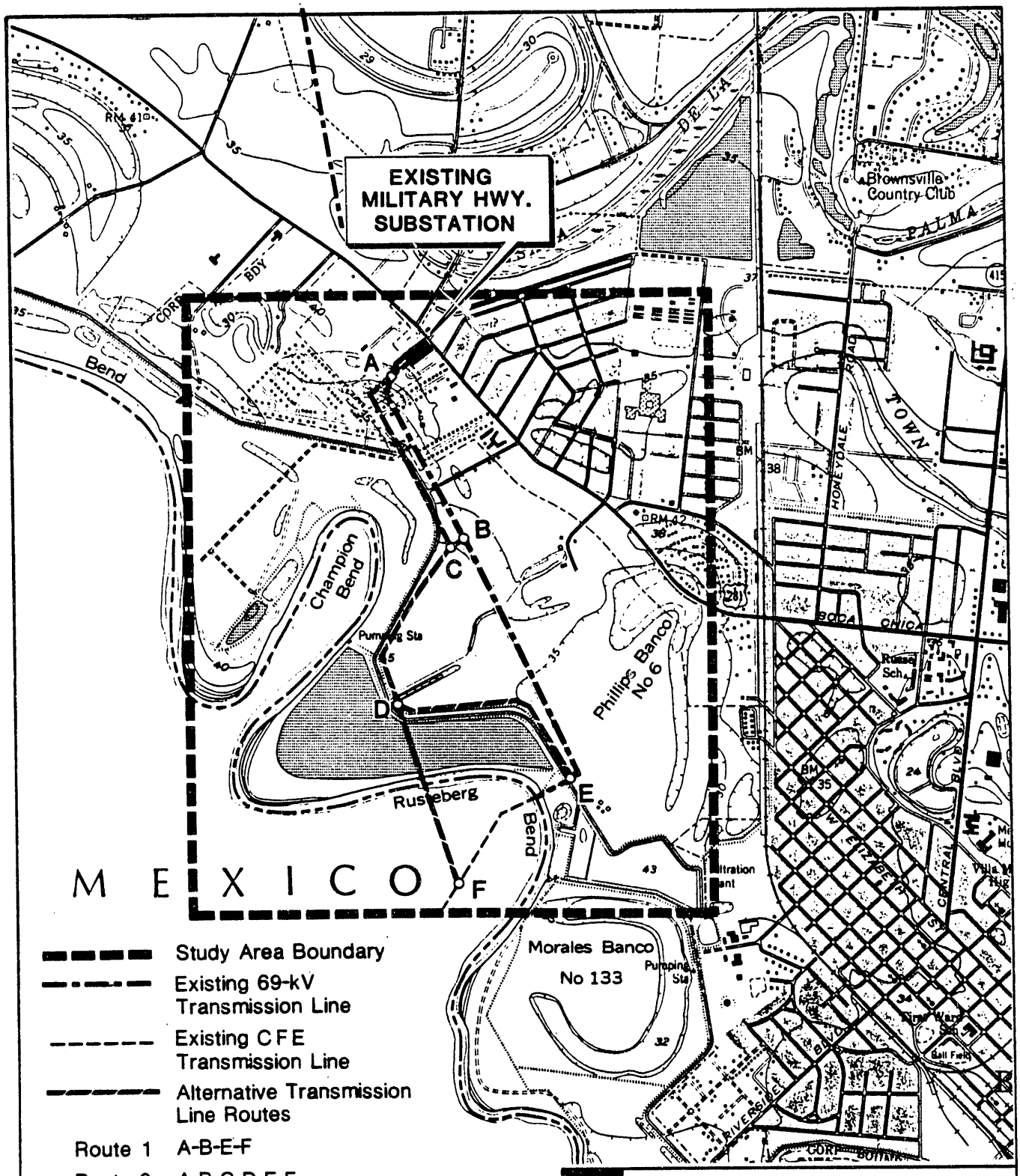
2.2 ALTERNATIVE ROUTE SELECTION AND EVALUATION

The first step in the selection of alternative routes was to establish a study area within which the alternative routes would be located. This was performed by CPL. The boundaries of the study area encompass both termination points for the line (the Military Highway Substation and the CFE tie at Rusteberg Bend on the Rio Grande) and include an area large enough to assess potential impacts as well as to allow for possible alternatives to the existing alignment. Figure 1-1 illustrates the study area delineated by CPL. It is a rectangular-shaped area approximately 8,700 x 7,300 ft and encompasses approximately 1,460 acres (ac) (2.28 square miles). Evaluation and analysis addressed the U.S. side of the Rio Grande.

Following the delineation of study area boundaries, EH&A initiated a preliminary environmental constraints analysis. Through a preliminary review of published literature, topographic maps, aerial photographs, initial site visits, and some agency contacts, features or areas that might present some degree of constraint in locating the proposed electric transmission facilities were identified. A preliminary draft report of these efforts was provided to CPL for use as a guide in delineating alternative routes. Because of the congestion along U.S. 281, exiting Military Highway Substation along the street was ruled out in preliminary route studies. After discussions with the U.S. Fish and Wildlife Service (FWS) and other federal agencies, CPL ultimately delineated three alternative routes for detailed environmental analysis. These three routes are shown in Figure 2-1. The routes, which start at the Military Highway Substation and exit south to Node A, are as follows (node-to-node):

Route 1: A-B-E-F
Route 2: A-B-C-D-E-F
Route 3: A-C-D-F

Alternative Route 1 is CPL's existing 69-kV line. Under this alternative, the 69-kV line would be rebuilt as 138/69-kV within the existing ROW. Alternative Route 2 would utilize CPL's existing ROW to Node B. From Node B, Route 2 would turn southwest along cropland edge to Node C where it would follow the eastern edge of the IBWC levee to Node E, where it would join



Base Map: USGS 7.5' Quadrangle, West Brownsville, Texas

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Figure 2-1

ALTERNATIVE
TRANSMISSION LINE ROUTES
MILITARY HWY. TO CFE TIE
138/69-KV PROJECT

CPL's existing 69-kV line at Rusteberg Bend. Sections B-C-D-E would require new ROW. Alternative Route 3 would require all new ROW. The line would proceed in a southeasterly direction, cross the IBWC levee and then follow the western edge of the levee to Node C where it would follow the eastern edge of the IBWC levee to Node D. Alternative Route 3 would then cross cropland and the Rio Grande and tie in with CFE's existing transmission line at Node F.

The alternative routes were evaluated from an environmental viewpoint based upon the amount of existing and/or new ROW that would be required, general amount of disturbance, proximity to residences and businesses, amounts of wooded areas to be cleared, potential aesthetic impacts, proximity to endangered and threatened species habitat, extent of wetlands potentially impacted, and other factors shown in Table 2-1.

2.3 COST ANALYSIS

Cost estimates for constructing the proposed 138/69-kV transmission line were prepared by CPL for each of the three alternative routes. Cost factors included in the estimate for each route were materials (including angle structures), labor, engineering, survey, ROW purchase, ROW clearing, interest, and construction overhead. Table 2-2 presents the cost estimate for the construction of each alternative transmission line route.

2.4 NO ACTION ALTERNATIVE

Under the No Action Alternative, CPL would not construct or operate the proposed 138-kV transmission line. Any potential impacts related to the project, short-term or long-term, would not occur. The existing CPL 69-kV transmission line that crosses land proposed to be purchased and managed as a portion of the Lower Rio Grande Valley National Wildlife Refuge would not be removed under the No Action Alternative. Thus, the benefits to the refuge that would result from the line removal would not be realized, and the portion of the refuge crossed by the existing line would have to be managed with the line in place.

TABLE 2-1

ENVIRONMENTAL CRITERIA USED IN
ALTERNATIVE ROUTE EVALUATION
MILITARY HIGHWAY-CFE TIE 138/69-KV PROJECT

1	Length of transmission line
2	Length of existing cleared ROW
3	Length of new ROW required
4	Number of habitable structures* within 200 ft of ROW centerline
5	Number of habitable structures potentially removed by ROW
6	Number of non-habitable structures potentially removed by ROW
7	Number of commercial AM radio transmitters within 10,000 ft of ROW centerline
8	Number of FM radio transmitters, microwave towers, etc. within 2,000 ft of ROW centerline
9	Number of FAA-registered airstrips within 10,000 ft of ROW centerline
10	Length of ROW through cropland
11	Length of ROW through pastureland
12	Length of ROW through cropland or pastureland with mobile irrigation systems
13	Length of ROW through important/prime farmland
14	Length of ROW through brushland
15	Length of ROW through potential wetlands (including bottomland/riparian woodland)
16	Length of ROW across 100-year floodplain
17	Length of ROW across open water (rivers, ponds)
18	Number of stream crossings
19	Number of river crossings
20	Length of ROW through parks and/or recreational areas
21	Number of parks and/or recreational areas within 1,000 ft of ROW centerline
22	Length of ROW visible from parks and/or recreational areas
23	Length of ROW through areas of potential high aesthetic value
24	Length of ROW through known/designated habitat of endangered or threatened species
25	Number of U.S. and State highway crossings
26	Number of FM road crossings
27	Number of minor road crossings
28	Number of recorded historic and prehistoric sites crossed
29	Number of recorded historic and prehistoric sites within 1,000 ft of ROW centerline
30	Number of NRHP-listed or -eligible sites crossed
31	Number of NRHP-listed or -eligible sites within 1,000 ft of ROW centerline
32	Length of ROW through areas of high archaeological/historical site potential

* Residences, businesses, schools, churches, cemeteries, hospitals, nursing homes, or other habitable structures

TABLE 2-2

ALTERNATIVE ROUTE COST ESTIMATES

MILITARY HIGHWAY-CFE TIE 138/69-KV PROJECT

Alternative Route	Approximate Route Length in ft (miles)	Cost* Estimate($)
1	7,220 (1.4)	616,900
2	9,235 (1.7)	709,500
3	6,870 (1.3)	571,500

Source: CPL

*Includes costs for materials, labor, engineering, survey, ROW, etc.

The No Action Alternative would also preclude an increase in the allowable rate of transmission because the existing 69-kV facilities would not have sufficient electrical capacity, especially during emergency situations. The No Action Alternative would reduce CPL's ability to accommodate Comision Federal de Electricidad (CFE) in times of emergency, and could result in increased costs to CPL customers by reducing revenue produced by the sale of excess electric power to CFE.

2.5 PREFERRED ROUTE SELECTION

The selection of a preferred route for the proposed Military Highway - CFE Tie 138/69-kV transmission line project involved environmental, cost and engineering evaluations of the alternative routes. A final preferred route was selected based upon a combination of these evaluations. As mentioned previously, EH&A made its selection based only upon environmental considerations; CPL also took into consideration cost and engineering factors in its evaluation. The results of the overall environmental evaluation of the alternative routes and selection of the preferred alternative route are presented in Section 6.0.

3.0 EXISTING ENVIRONMENT

3.1 PHYSIOGRAPHY AND GEOLOGY

The study area, which is located in the southern portion of Cameron County just southwest of the City of Brownsville, lies within the Rio Grande Plain physiographic region (Bureau of Economic Geology (BEG), 1970, 1977) (Figure 3-1). The study area includes a portion of the Rio Grande with Champion Bend and Rusteberg Bend situated in the west central and southern central portions of the study area, respectively. A portion of Mexico is also included.

The study area is a part of the low-lying, delta portion of the Rio Grande floodplain where the land surface is typically flat to gently rolling and gradually slopes toward the coast and the river. Abandoned river courses once followed by the Rio Grande cover the delta area. Meander scars are also very common features found in the deltaic alluvial materials. These unconnected, low-lying areas are subjected to frequent flooding events. Geologic units of the late Tertiary and early Quaternary include Goliad Sands, which make up a major portion of the study area, along with the Lissie Formation, the Beaumont Clays and various recent alluvial deposits. All of these units are very similar, therefore boundaries between them are difficult to discern. This whole sequence of rocks is made up of clay, silt, sand and gravel, mainly of fluvial or deltaic origin (Preston, 1983). Some small amounts of shallow marine clays may be locally present within the Lissie Formation and the Beaumont Clay. These deposits are several thousand feet thick and are loosely consolidated to unconsolidated material.

The interbedded deposits of clay, silt, sand and gravel dip gently to the east toward the Gulf of Mexico. The deposition of fine sediments increases to the east and the bedding planes or interbedded intervals thicken to the east. This causes a steepening of dip of these beds toward the Gulf (Preston, 1983).

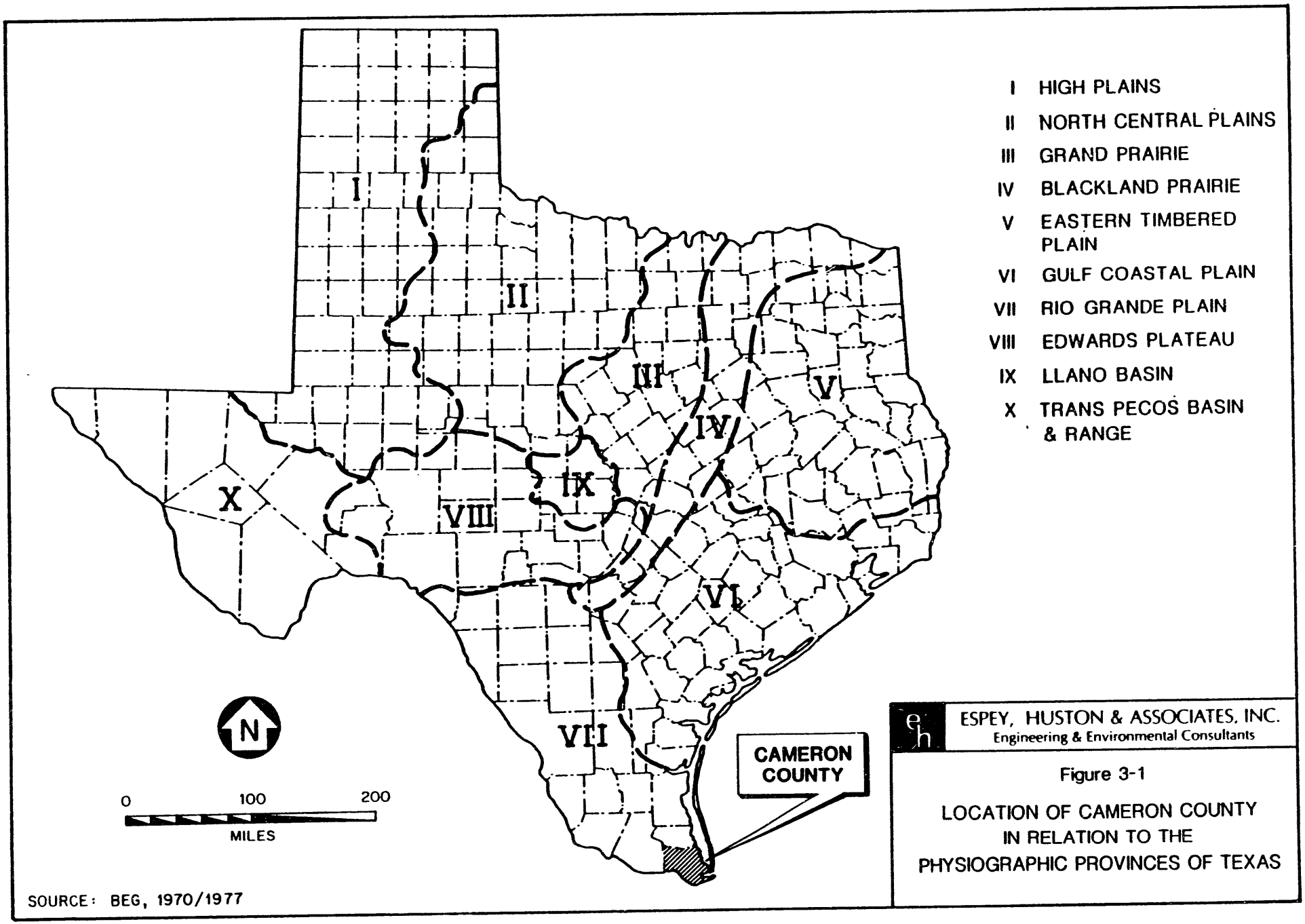

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Figure 3-1

LOCATION OF CAMERON COUNTY IN RELATION TO THE PHYSIOGRAPHIC PROVINCES OF TEXAS

3.2 WATER RESOURCES

3.2.1 Surface Water

The study area is located within the lower Rio Grande Basin of south Texas. The headwaters of the Rio Grande originate in southern Colorado, proceed across New Mexico in a southerly direction and enter Texas where the river forms the international boundary between the United States and Mexico from El Paso to the Gulf of Mexico. Four major reservoirs, San Esteban Lake, International Amistad Reservoir, Casa Blanca Lake and International Falcon Reservoir, are present along the mainstem of the Rio Grande. Devils River, Pecos River and Almito Creek are the major Texas-side contributors to International Amistad Reservoir in Val Verde County. Major Texas tributaries along the river basin between International Amistad and International Falcon include Chacon Creek, Los Olmos Creek, Eight Mile Creek, La Joga Creek and Sycamore Creek (Texas Department of Water Resources (TDWR), 1984).

Historically, the river mainstem and local tributaries have experienced severe flooding problems associated with heavy rains, inadequate drainage and hurricanes. The completion of Amistad and Falcon reservoirs on the Rio Grande upstream of the study area and construction of the North Floodway diversion channel west of Brownsville have lessened floodwaters and created a more uniform flow through the Lower Rio Grande Valley area. However, inundation from this source could occur during periods of activity generated by the passage of intense tropical storms or hurricanes over the area. The Rio Grande is a riverine-estuarine system that has a limited influence on the waters of the Lower Laguna Madre and Gulf of Mexico.

The study area lies entirely within the hydrographic boundaries of the Rio Grande. The topography at the study site is relatively flat, any relief having been provided by fill material brought in for purposes of elevating the road levees. Drainage in the study area is toward the river channel, but no clearly defined drainage patterns exist in most of the area. During periods of significant rainfall, ponding conditions may be apparent throughout a large portion of the site. A large "horseshoe-bend" impoundment, Morales Banco No. 133, appears to be hydraulically connected to a manmade canal system associated with a filtration plant located at the southeastern

corner of the study area. This lake appears to be used for storage purposes in operation of the plant. Phillips Banco No. 6, a smaller oxbow lake, is situated adjacent to and south of U.S. 281 where this road enters the east-central portion of the study area.

The meteorological disturbances that produce precipitation within the lower Rio Grande Basin are highly variable in space and time. Because of the study area's proximity to the Gulf of Mexico, frequent intrusions of moisture-laden air occur during the year. Most of the precipitation falls from convective showers. Excessive short-duration rains from thunderstorms occur most frequently from April through October. Rains of longer duration are normally associated with dissipating tropical weather systems during summer or fall. Winter-time rains come mainly from frontal activity and low stratus clouds, which produce slow, steady rains. Annual rainfall in the region, taken from the precipitation records at the Brownsville National Weather Service Station, amounts to an average of 26.5 inches over a 5-year period (National Oceanic and Atmospheric Administration (NOAA), 1985-1989). Monthly means range from 0.9 inch during February to almost 4.5 inches during September.

The Texas Water Commission (TWC) has developed water quality standards for waters in Texas from criteria developed to protect designated uses. A standard is the legal limit for a particular reach of water. A water quality criterion is the level of a constituent which corresponds to an environmental effect. Water quality criteria have been designed to insure long term protection of desired water uses. Water uses dependent on water quality in the study area and vicinity include commercial fishing, recreation, water for industrial processes, and dilution of wastewater and stormwater runoff. Continued productivity and balance for ecosystem diversity, whether freshwater, estuarine or marine, is dependent upon the maintenance of acceptable water quality. The portion of the river that flows through the study area is within Segment 2302 of the Rio Grande Basin and includes the Rio Grande from a point approximately 6.7 miles upstream of the International Bridge in Brownsville, Cameron County, to the Falcon Dam in Starr County (TWC, 1988). According to the TWC, Segment 2302 is classified as "Effluent Limited". Appropriate uses in the area of the proposed project include the following: contact recreation, high quality aquatic habitat for the propagation of fish and wildlife; and domestic raw water supply. The proposed transmission line will cross the Rio Grande at Rusteberg Bend.

The records of the USGS and the TWC were reviewed in order to locate continuous recording streamflow gages or water quality monitoring stations in the study area or its vicinity. While no long-term streamflow gages maintained by the USGS or TWC water-quality monitoring stations are present within the study area, bimonthly streamflow and water quality data are recorded by the USGS on the Rio Grande at Station 08475000 downstream of the project site. This station is located at the IBWC gaging station, 1,000 ft downstream from the El Jardin pumping plant, approximately 6.8 miles below the International Bridge between Brownsville and Matamoros, Tamaulipas, Mexico (USGS, 1990). Quarterly physico-chemical measurements and fecal coliform counts are also taken at this station (Station 2302.0025) by the TWC.

A detailed floodplain analysis was conducted for Cameron County by the Federal Emergency Management Agency (FEMA) in 1983, and the resulting Flood Insurance Rate Map (Panel 325 of 400) was used to quantify the 100-year floodplain at the proposed site. Delineation of the 100-year floodplain relative to the study area on the U.S. side of the Rio Grande is presented in Figure 3-2. Based on the FEMA study, the area between the IBWC levee and the Rio Grande is inundated during the 100-year flood event (FEMA, 1983). The IBWC estimates that, in the Brownsville area, flows of approximately 15,000 cubic feet per second (cfs) would cause the Rio Grande to overflow its normal riverbank, and that the probability of this event is approximately once in every eight years. Privately maintained levees along the Rio Grande may mitigate the effects of flooding in some locations.

3.2.2 Groundwater

Groundwater provides only limited amounts of water to the supplies of the lower Rio Grande Valley. Over 90% of the water needs are supplied by surface water from the Rio Grande, groundwater being utilized primarily when surface water is in short supply during drought periods (Brown et al., 1980).

Three subsurface aquifers provide most of the groundwater resources for the Lower Rio Grande area. These are (1) the Lower Rio Grande Aquifer, consisting of undifferentiated water-bearing material of the Goliad Formation, Lissie Formation, Beaumont Clay, and overlying

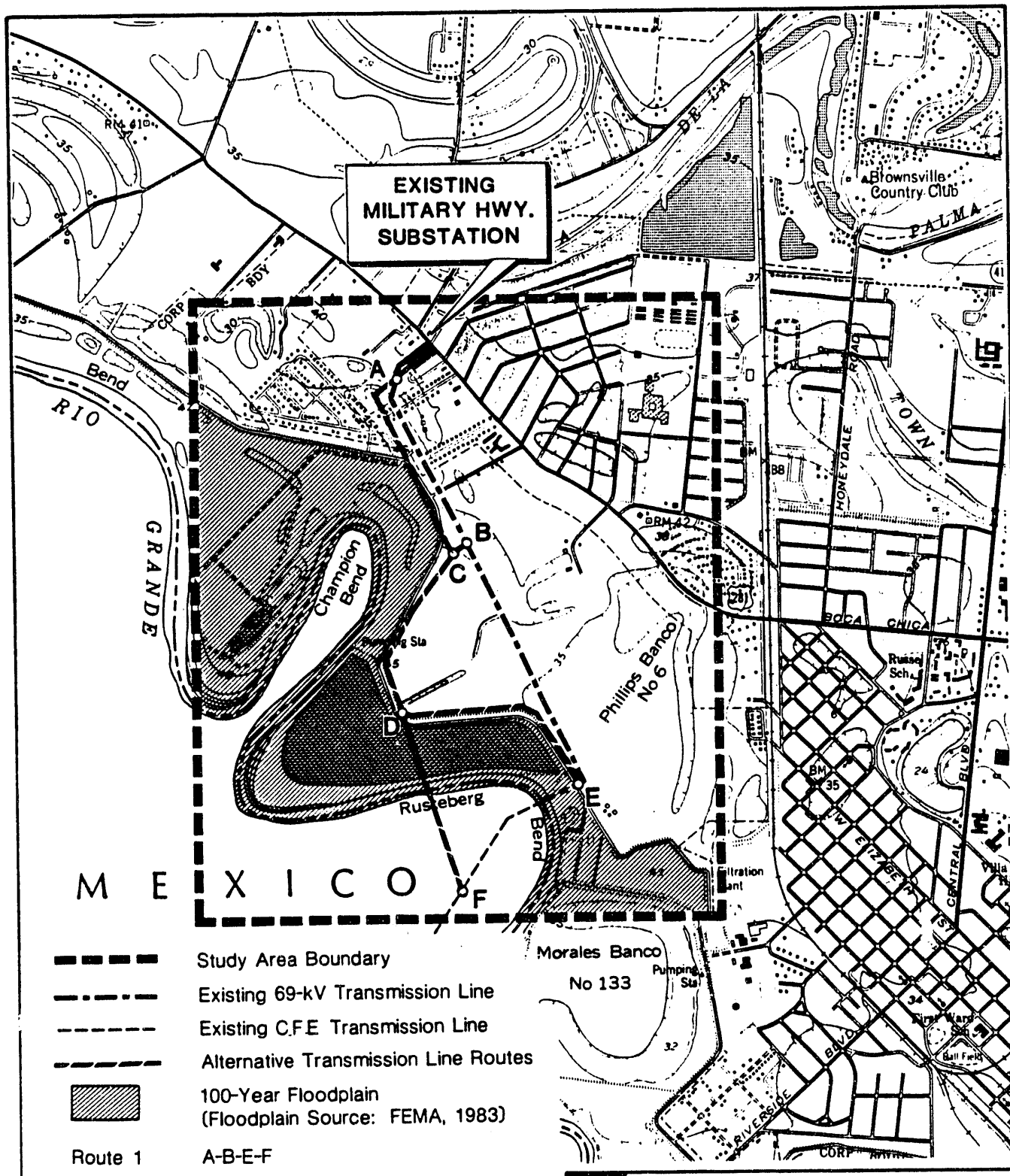

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Figure 3-2

100-YEAR FLOODPLAIN MAP
MILITARY HWY. TO CFE TIE
138/69-KV PROJECT

alluvium deposits, extends 40 to 250 ft deep, obtaining its recharge from the Rio Grande; (2) the Mercedes-Sebastian Aquifer, a shallow permeable deposit of the Beaumont Formation less than 100 ft below the land surface in northwestern Cameron and southeastern Hidalgo counties; and (3) the Goliad Sand, a Pliocene deposit which provides irrigation water in Kenedy and Willacy counties (Baker and Dale, 1964; Brown et al., 1980).

3.3 SOILS

3.3.1 Soil Associations

Two soil associations occur in the study area, the Laredo-Olmito and the Rio Grande-Matamoros. Both of these associations are nearly level to gently sloping soils with moderate to slow permeability (Soil Conservation Service (SCS), 1977). The Laredo-Olmito soils are primarily silty clay loams and silty clays which generally follow the pattern of the old resacas on the low terraces of the Rio Grande. The Laredo soils occupy the higher, well-drained areas adjacent to the resacas while the Olmito soils are found on the level to slightly concave areas away from but parallel to the resacas (SCS, 1977). These soils are used mainly for irrigated crops with a high potential for most major crop production. The Laredo soils are also well suited to the growth of citrus trees.

Silt loams and silty clays form the Rio Grand-Matamoros Association. These geologically young soils may be found in a narrow band less than two miles wide adjacent to the Rio Grande, with the Rio Grande soils found in the higher, well-drained areas adjacent to the river or old oxbows, and the Matamoros soils in the nearly level, slack-water areas. The soils in this association are also used for irrigated crops with a high potential for the production of most of the major crops grown in the county.

3.3.2 Prime Farmland

Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fibre or oilseed (Secretary of Agriculture

in 7 CFR 657, Federal Register Vol. 43, No. 21). The SCS has estimated that 43.6 percent of the soils in Cameron County can be classified as prime farmland (SCS, 1979).

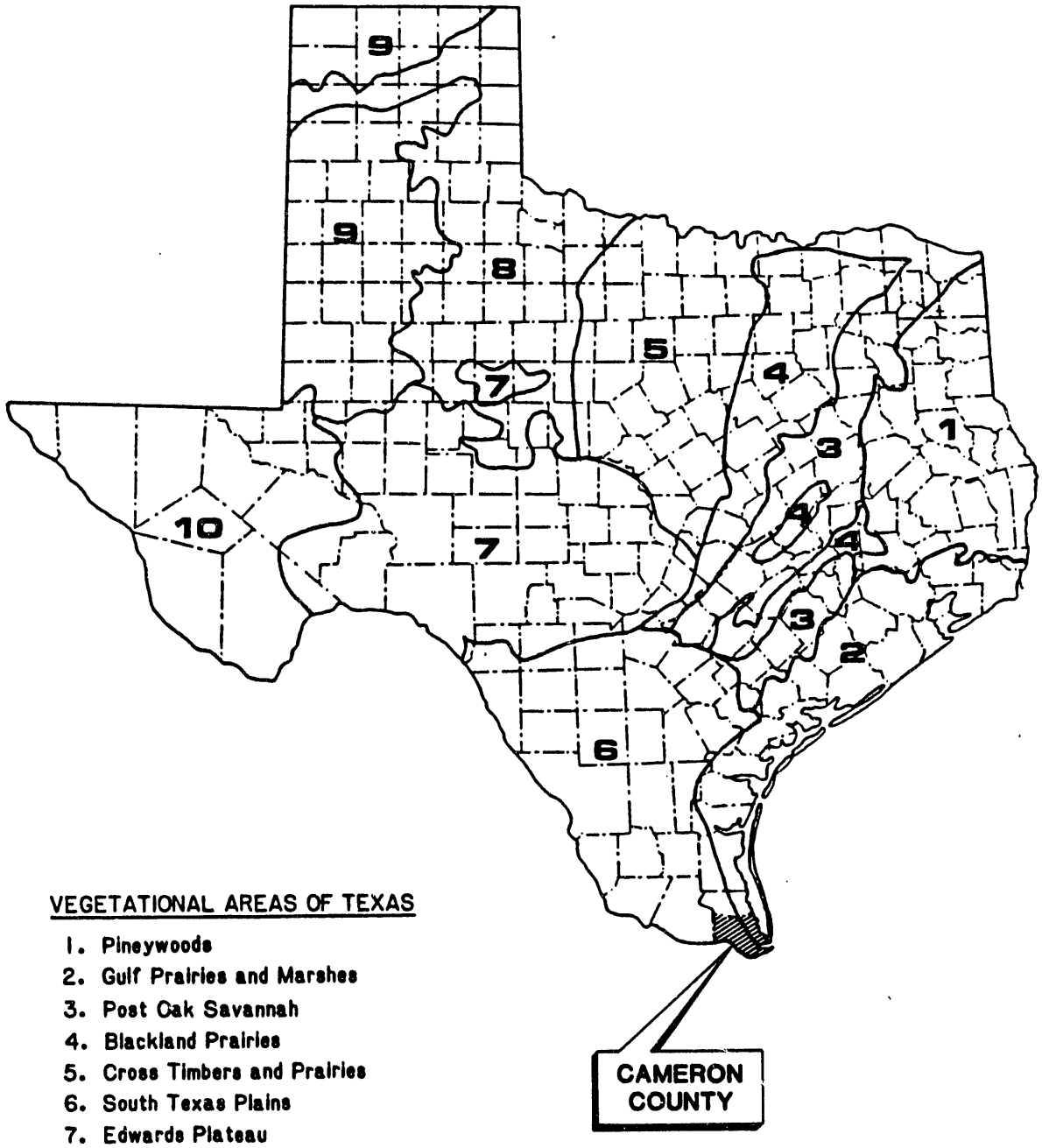
Within the study area, the soils that remain undeveloped are potential prime farmland. The few, small areas not considered prime farmland are classified as either "unique farmland" or "additional farmland of statewide importance" (SCS, 1981). The Matamoros silty clays and the Matamoros-Rio Grande complex are Class II capability soils. These soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices. These soils are not suited to orchard crops. The Rio Grande silt loams and the Rio Grande silty clay loams also cover a fair portion of the undeveloped soils of the study area and these soils are in Capability Class I. These soils have few limitations that restrict their use. The Rio Grande silt loams are in Orchard suitability Group C, which makes them suited to citrus crops, however, peaches and avocados are not suited to the higher content of calcium in the soil.

3.4 VEGETATION

3.4.1 Regional Vegetation

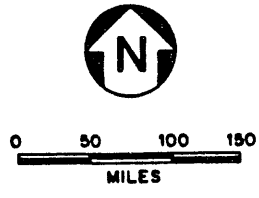
The study area lies at the extreme southern edge of the South Texas Plains vegetation area as delineated by Gould (1975) and shown in Figure 3-3. The South Texas Plains includes approximately 20,000,000 ac of level to rolling land dissected by streams flowing to the Gulf of Mexico (Thomas, 1975). Elevations range from 1,000 ft above mean sea level (MSL) to sea level. Precipitation ranges from 16 to 35 inches annually, and mostly occurs in the spring and fall. Average annual rainfall tends to increase along a gradient from west to east. Summers are often characterized by drought conditions, which are frequently of sufficient duration to depress crop growth.

The South Texas Plains approximates the Tamaulipan Biotic Province of Texas (Blair, 1950; see Section 3.5). Blair treats the lower Rio Grande Valley, including Cameron County, as a distinct biotic district (the Matamoran) within the Tamaulipan Biotic Province. Thorny brush is the dominant Matamoran District native vegetation type with retama (*Parkinsonia aculeata*),



VEGETATIONAL AREAS OF TEXAS

1. Pineywoods
2. Gulf Prairies and Marshes
3. Post Oak Savannah
4. Blackland Prairies
5. Cross Timbers and Prairies
6. South Texas Plains
7. Edwards Plateau
8. Rolling Plains
9. High Plains
10. Trans-Pecos, Mountains and Basins



Source: Gould, 1975

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Figure 3-3

LOCATION OF CAMERON COUNTY
IN RELATION TO THE
VEGETATIONAL REGIONS OF TEXAS

Texas ebony (*Pithecellobium flexicaule*), anacahuita (*Cordia boissieri*) and anacua (*Ehretia anacua*) as characteristic woody species.

The FWS further delimits the vegetation of the region, identifying brush-woodland community types. The floodplain of the Rio Grande from western Hidalgo County to Brownsville, Texas (the study area is located near the southeastern limit of this region) is included in the mid-Valley Riparian Woodland Community type (FWS, 1988). The potential climax plant community is bottomland hardwood forest with cedar elm (*Ulmus crassifolia*), sugar hackberry (*Celtis laevigeta*), and Mexican ash (*Fraxinus berlandieri*) as canopy dominants, and honey mesquite (*Prosopis glandulosa*) and spiny hackberry or granjeno (*Celtis pallida*) in the mid-story.

3.4.2 Vegetation Community Types in the Study Area

The vegetation in the study area consists largely of agricultural crops, with cotton and sorghum being of primary importance. Grasslands, variously invaded by brush, occur to the east and west of Champion Bend. Isolated patches of grassland/brushland also occur southeast of U.S. 281 and just west of the existing transmission line ROW. Remnant patches of riparian brushland/woodland are distributed around Champion Bend and in narrow riparian corridors of Rusteberg Bend of the Rio Grande and a nearby resaca. The grassland/brushlands and woodlands in the study area are of small extent.

Common grasses identified in the study area during May and August 1991 field surveys include silver bluestem (*Bothriochla saccharioides*), silky bluestem (*Dichanthium sericeum*) and buffelgrass (*Cenchrus ciliaris*). Silver bluestem is a mid-successional species on dry sandy soils, while silky bluestem and buffelgrass are introduced drought-tolerant species now ubiquitous in grazingland through much of south Texas. Roosevelt weed (*Baccharis neglecta*) is a common invasive brush species in grazingland throughout the study area. Honey mesquite, retama, spiny hackberry, lotebush (*Zizyphus obtusifolia*), and desert sumac (*Rhus microphylla*) were also identified in brush patches. Black willow (*Salix nigra*), sugar hackberry and anacua, among other species, were present on riparian sites.

Soil map units found in the study area that are rated as good for shrub and tree production, and therefore could potentially support a thorn-scrub or riparian woodland climax community, are Rio Grande-Urban land complex, Rio Grande silty clay loam, Rio Grande silt loam, Camargo silty clay loam, and Camargo silt loam (SCS, 1977). These are the map units generally associated with the Rio Grande floodplain in the study area. The remaining map units in the study area include Matamoros silty clay, Matamoros-Rio Grande complex, Olmito-Urban land complex, Grulla, and Zalla loamy fine sand which are rated as fair to poor for shrub and tree production.

Wetlands in the study area and vicinity have not been mapped by the FWS in their National Wetlands Inventory. However, some wetlands do occur in the study area. An area adjacent to the Rio Grande on the west side of Champion Bend, while dry during EH&A's site visit on 28 and 29 May 1991, contains a few willows and thus probably holds standing water at certain times of the year. The tip of the peninsula between Champion Bend and Rusteberg Bend of the Rio Grande did contain standing water during both the May and August field visits. This area, dominated by willows (*Salix* spp.) and the cattail (*Typha domingensis*), likely has standing water for most of the year. A small pond occurs along the west side of U.S. 281, and a holding pond and oxbow resaca occur south of Rusteberg Bend.

3.4.3 Important Species

The study area lies in the Lower Rio Grande Valley of Texas, one of the state's major crop-producing regions. Agriculture in Cameron County is of major importance with cotton, grain sorghum, corn, cool-season vegetables and citrus being the most important crops (Texas Agricultural Statistics Service (TASS), 1985). Bell peppers, tomatoes, melons, and cucumbers are also produced. The main crops noted during field surveys of the study area were cotton and grain sorghum.

None of the soil map units present in the study area is classified as native range sites, but most are potentially suitable for pastureland or hay crops. Varieties of bermudagrass and introduced bluestems are the usual forage crops on grazingland in Cameron County (SCS, 1977).

Several shrub and tree species provide browse and cover for wildlife and domestic livestock. Texas kidneywood (*Eysenhardtia texana*) and vine ephedra (*Ephedra antisyphilitica*) are among woody plants eaten by cattle and white-tailed deer (*Odocoileus virginianus*). Anacua, huisache (*Acacia smallii*), Texas ebony, brasil (*Condalia hookeri*) and spiny hackberry are planted to provide nesting habitat for the white-winged dove (*Zenaida asiatica*) (George, 1991).

The Texas Natural Heritage Program (TNHP) was contacted for information concerning the location of state- and federally listed plant species in the vicinity of the study area. The official state list of endangered and threatened plant species promulgated by the TPWD includes the same species listed by the FWS as endangered or threatened. Information received from TNHP regarding federally listed and candidate species is included in the following paragraphs.

Currently, 21 plant species are listed by the FWS as threatened or endangered in Texas (FWS, 1990a; McDonald, 1991). No endangered or threatened plants have been identified in Cameron County; however, of the approximately 154 plant species in Texas currently considered by the FWS as candidates for future proposal for listing as endangered or threatened, nine have been recorded in Cameron County and may, therefore, potentially occur in the study area. Although these candidate species are considered in environmental impact analyses, they have no official status and have limited protection by the law.

South Texas ragweed (*Ambrosia cheiranthifolia*) is a federal category 1 species, indicating that sufficient data are available to propose this species for listing as endangered or threatened and that listing is probable in the near future. Eight plant species of potential occurrence in the study area are listed as federal category 2 candidates, which indicates that substantial data are not currently available to support listing the species as endangered or threatened, and that additional biological research is required before such a proposal would occur. These species are Wright's yellowshow (*Amoreuxia wrightii*), lila de los llanos (*Anthericum chandleri*), Texas ayenia (*Ayenia limitaris*), short-fruited spikerush (*Eleocharis brachycarpa*), Runyon's water-willow (*Justicia runyonii*), Runyon's huaco (*Manfreda longiflora*), Bailey ballmoss (*Tillandsia baileyi*), and Runyon's ortiguilla (*Urtica chamaedryoides* var. *runyonii*). While no known locations of any federally listed or candidate plant species occur in the study area, Runyon's water

willow has been confirmed as occurring in the vicinity of Resaca de la Palma at a location approximately 3.2 miles northwest of the study area. In addition, south Texas ragweed, lila de los llanos, and Texas ayenia are known to generally occur in the Brownsville area.

In addition to federal candidate species, seven additional plant species, classified as rare or imperiled by TNHP or the Texas Organization for Endangered Species (TOES) are of potential occurrence in the study area. These include Vasey's adelia (*Adelia vaseyi*), Runyon's cory cactus (*Coryphantha macromeris* var. *runyonii*), Berlander jopoy (*Esenbeckia berlandieri*), plains gumweed (*Grindelia oolepis*), whorled green violet (*Hybanthus verticillatus* var. *platyphyllus*), Texas palmetto (*Sabal mexicana*), and Montezuma baldcypress (*Taxodium mucronatum*). Table 3-1 summarizes the current status, habitat and distribution of the above plant species.

3.4.4 Ecologically Sensitive Areas

Approximately 95 percent of the original native brushland in the Lower Rio Grande Valley has been converted to agricultural or urban use since the 1920s, and more than 90% of the riparian woodland on the U.S. side has been cleared (Jahrsdoerfer and Leslie, 1988). Remnant patches of native brushland and mid-valley riparian woodland are found within the study area, and should be considered sensitive due to their rarity, unique character (these communities are found nowhere else in the U.S.), and potential for providing habitat for many endangered, threatened or rare plant and animal species.

3.5 WILDLIFE

The study area lies within the subtropical, semi-arid Tamaulipan Biotic Province of Texas as illustrated in Figure 3-4. Thorn scrub woodland is the dominant natural plant community type within this province (Blair, 1950); however, less than 5% of the mid-delta thorn scrub component of the Tampaulipan Biotic Province remains (Jahrsdoerfer and Leslie, 1988). Within this province, Blair designates the Lower Rio Grande Basin (Cameron, Willacy, Hidalgo, and Starr counties) as the Matamoran District in contrast to the Nuecian District to the north, based on

RARE, ENDANGERED OR THREATENED PLANT SPECIES
OF POTENTIAL OCCURRENCE IN THE STUDY AREA

Scientific Name[1]	Common Name[2]	Status[3]			Habitat[4]	Counties of Known Distribution[4]
		FWS	TNHP	TOES		
Adelia vaseyi	Vasey's adelia	---	S2	---	In brush on loamy soils	Cameron and Hidalgo counties; Tamaulipas, Mexico
Ambrosia cheiranthifolia	South Texas ragweed	C1	S1	---	In open clay prairies	Cameron, Jim Wells, Kleberg and Nueces counties; Tamaulipas, Mexico
Amoreuxia wrightii	Wright's yellowshow	C2	S3	V	In silty flats on limestone soils	General in Rio Grande Plains west to the Edwards Plateau and adjacent Mexico
Anthericum chandleri	Lila de los llanos	C2	S2	---	In clay soil in chapparal, thickets and prairies	Cameron, Kleberg and Nueces counties
Ayenia limitaris	Texas ayenia	C2	S1	---	In thickets and on edge of chaparral on clay soils	Cameron and Hidalgo counties; Coahuila and Tamaulipas, Mexico
Coryphantha macromeris var. *runyonii*	Runyon's cory cactus	---	S2	---	In partial shade on gravelly hillsides overlooking Rio Grande	Cameron and Starr counties
Eleocharis brachycarpa	short-fruited spikerush	C2	SH	---	In Rio Grande Valley, last collected in 1834 with no habitat information reported	South coastal Texas and Tamaulipas, Mexico
Esenbeckia berlandieri	Berlander jopoy	---	S1	---	Known only as a cultivated plant at residences. Formerly occurred at Los Fresnos, Cameron County	Cameron County
Grindelia oolepis	plains gumweed	3C	S2	V	On black clay soils in grasslands of the Coastal Bend and southern Rio Grande plains	Bee, Cameron, Jim Wells, Nueces, Refugio, and San Patricio counties; Tamaulipas, Mexico
Hybanthus verticillatus var. *platyphyllus*	whorled green violet	---	S1	---	In chapparal, thickets and grassy banks	Cameron County

Scientific Name[1]	Common Name[2]	Status[3] FWS	TNHP	TOES	Habitat[4]	Counties of Known Distribution[4]
Justicia runyonii	Runyon's water-willow	C2	S2	---	In brush margins	Brazoria, Cameron, Goliad and Hidalgo counties; Tamaulipas, Mexico
Manfreda longiflora	Runyon's huaco	C2	S2	---	Open areas in Rio Grande Valley	Cameron, Hidalgo and Starr counties
Sabal mexicana	Texas palmetto	---	S1	IV	In riverine wetlands associated with the Rio Grande River in Texas	Cameron and Willacy counties; Tamaulipas, Mexico
Taxodium mucronatum	Montezuma baldcypress	---	---	III	In Rio Grande floodplain and associated alluvial areas	Cameron and Hidalgo counties; Mexico
Tillandsia baileyi	Bailey ballmoss	C2	S2	V	Epiphytic on live oak and other trees	Brooks, Cameron, Hidalgo, Jim Wells, Kennedy, Kleberg, and Willacy counties; Mexico
Urtica chamaedryoides var. *runyonii*	Runyon's ortiguilla	C2	S2	---	In humus of woodlands, shell mounds and rocky slopes	Cameron County

1 According to Texas Natural Heritage Program (TNHP, 1991a)

2 According to Gould (1975), TNHP (1991a).

3 Status according to FWS (1990b); (TNHP, 1991a); TOES (1987)

- E Federally listed Endangered Species
- C1 Federal Candidate Species - Data indicates enough information available to propose for listing as endangered or threatened
- C2 Federal Candidate Species - Data indicates the probable appropriateness of listing as endangered or threatened, but sufficient information is not presently available to biologically support a proposed rule
- 3C Taxa no longer being considered for listing as threatened or endangered that have proven to be more abundant or widespread than previously believed or no longer subject to any identifiable threat
- S1 Critically imperiled in Texas; less than 6 occurrences known in the state
- S2 Imperiled in the state; 6-20 known occurrences in Texas
- S3 Rare or uncommon in Texas; 21-100 known occurrences in the state
- SH Historical in Texas, no verified occurrences in the past 20 years but suspected to be extant
- III "State endangered species" which includes any species presently threatened with extirpation in Texas
- IV "State threatened species" which includes any species which is likely to become a state endangered species within the foreseeable future
- V "TOES Watch List" which includes any species with either a low population or restricted range in Texas which requires attention to ensure that the species does not become endangered or threatened (state or federal)

4 According to TNHP (1991a), TOES (1987), Correll and Johnston (1979), and Vines (1976).

Note: *Manfreda longiflora* was previously known as *Polianthes runyonii*.

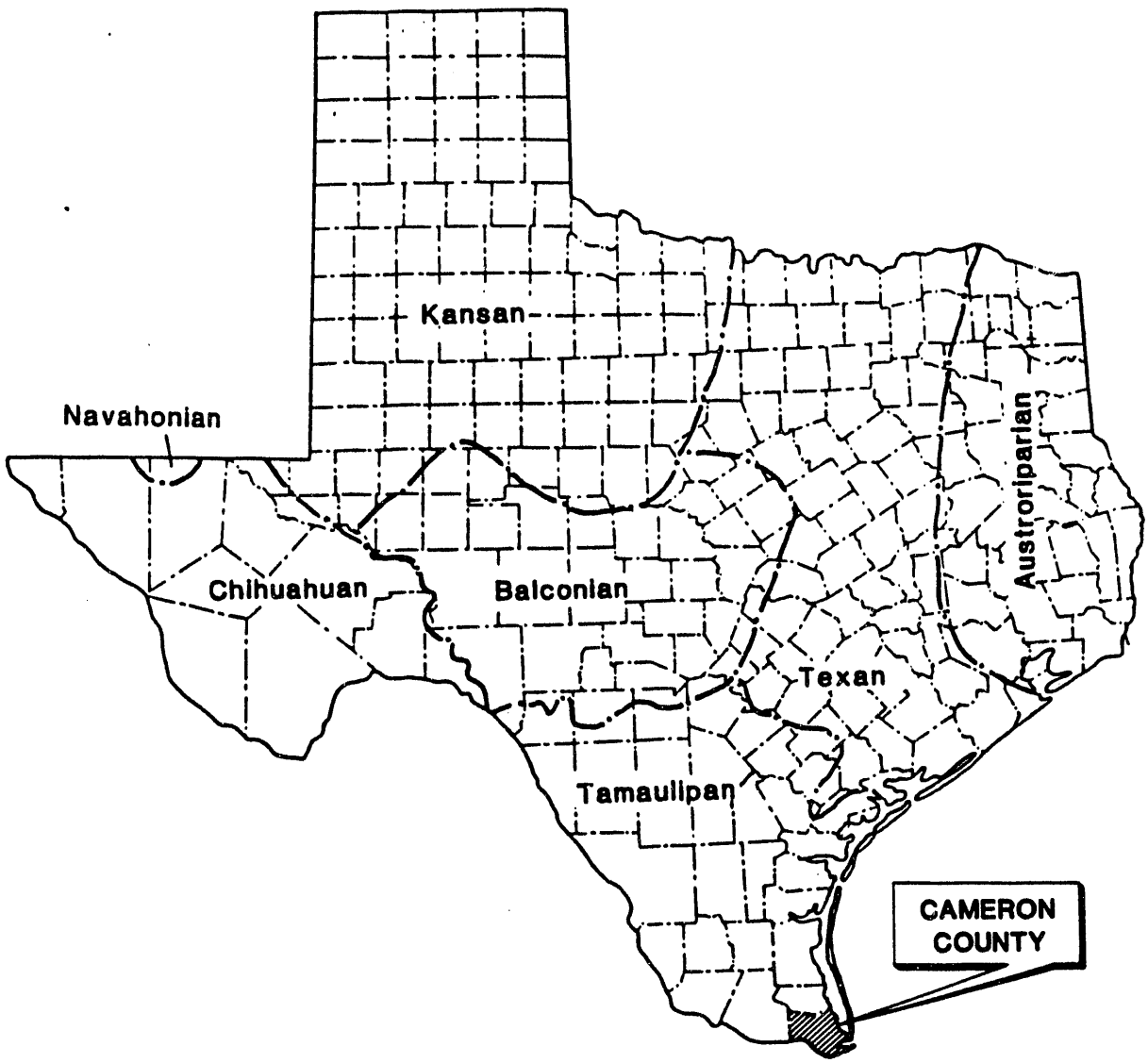

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Figure 3-4

LOCATION OF CAMERON COUNTY
IN RELATION TO THE
BIOTIC PROVINCES OF TEXAS

Source: Blair, 1950

drainage, floral and, to some extent, faunal differences (Blair, 1950, 1952). The eastern coastal areas of the Tamaulipan province are within the Gulf Prairies and Marshes vegetational area. The regional fauna contains coastal as well as typical inland species.

In addition to a few species ranging into eastern North America, the fauna of the Tamaulipan province includes numerous neotropical species, numerous grassland species which also range north of the province, and a small number of Chihuahuan species from the west (Blair, 1950, 1952). Numerous neotropical invertebrates and vertebrates are limited in their U.S. distributions to the Tamaulipan province, and many are found only in the Lower Rio Grande Valley.

3.5.1 Wildlife Habitats and Species

The wildlife habitat types in the study area largely correspond to vegetation types described in Section 3.4. These habitat types include grassland (including pasture and cropland), brushland, riparian, hydric and aquatic areas, and residential.

The study area is predominantly agricultural land, much of it intensively farmed, so wildlife inhabiting the study area generally consists of species adapted to fields, field margins and pastureland. In general, the wildlife observed or expected to occur in the study area is typical for the general area. No species of wildlife is considered endemic to the study area. Characteristic species of the area are discussed below.

3.5.1.1 Amphibians

According to Blair (1950), the Tamaulipan Biotic Province supports three urodele (salamander) species, only one of which, the black-spotted newt (*Notophthalmus meridionalis*) is endemic to the region. The other two species are the Rio Grande lesser siren (*Siren intermedia texana*) and the barred tiger salamander (*Ambystoma tigrinum tigrinum*). At least 19 anuran species (frogs and toads) occur in the Tamaulipan Biotic Province (Blair, 1950), 16 of which have been recorded from Cameron County (Dixon, 1987). Several genera are represented including

spadefoot toads (*Scaphiopus* spp.), chorus frogs (*Pseudacris* spp.), true toads (*Bufo* spp.), and true frogs (*Rana* spp.).

3.5.1.2 Reptiles

Six freshwater/terrestrial turtle species have been recorded for Cameron County (Dixon, 1987). These are the yellow mud turtle (*Kinosternon flavescens flavescens*), Zug's river cooter (*Pseudemys concinna gorzugi*), red-eared slider (*Trachemys scripta elegans*), spiny softshell turtle (*Trionyx spiniferus*), ornate box turtle (*Terrapene ornata ornata*), and Texas tortoise (*Gopherus berlandieri*). Several of these species may occur in the study area. The American alligator (*Alligator mississippiensis*) also occurs in Cameron County.

At least 19 species of lizards and 36 species of snakes occur in the Tamaulipan Biotic Province (Blair, 1950); 16 lizard and 29 snake species have been recorded from Cameron County (Dixon, 1987). Common lizards include whiptails (*Cnemidophorus* spp.), skinks (*Eumeces* spp.), the green anole (*Anolis carolinensis*) and Mediterranean gecko (*Hemidactylus turcicus*); snakes include rat snakes (*Elaphe* spp.) and water snakes (*Nerodia* spp.), and venemous species such as the western diamondback rattlesnake (*Crotalus atrox*) and Texas coral snake (*Micrurus fulvius tener*).

3.5.1.3 Birds

The study area and vicinity support an abundant and diverse avifauna. Species most likely to occur in the study area are those adapted to cultivated fields and grassland. Avian species observed in the study area during field visits on 28 and 29 May and 22 and 23 August 1991 include such year-round residents as the great blue heron (*Ardea herodias*), green-backed heron (*Butorides striatus*), black-shouldered kite (*Elanus caeruleus*), northern bobwhite (*Colinus virginianus*), American coot (*Fulica americana*), killdeer (*Charadrius vociferus*), rock dove (*Columba livia*), mourning dove (*Zenaida macroura*), inca dove (*Columbina inca*), white-tipped dove (*Leptotila verreauxi*), groove-billed ani (*Crotophaga ani*), golden-fronted woodpecker (*Melanerpes aurifrons*), brown-crested flycatcher (*Myiarchus tyrannulus*), great kiskadee (*Pitangus sulphuratus*), Carolina wren (*Thryothorus ludovicianus*), red-winged blackbird (*Agelaius phoeniceus*), great-tailed grackle (*Quiscalus mexicanus*), brown-headed cowbird (*Molothrus ater*), and house sparrow (*Passer*

domesticus). Summer residents observed include the white-winged dove (*Zenaida asiatica*), yellow-billed cuckoo (*Coccyzus americanus*), common nighthawk (*Chordeiles minor*), buff-bellied hummingbird (*Amazilia yucatanensis*), and barn swallow (*Hirundo rustica*). Winter residents such as northern flicker (*Colaptes auratus*), ruby-crowned kinglet (*Regulus satrapa*), orange-crowned warbler (*Vermivora celata*), yellow-rumped warbler (*Dendroica coronata*), savannah sparrow (*Passerculus sandwichensis*), blue-winged teal (*Anas discors*), and northern shoveler (*Anas clypeata*) would be common in the study area. The Rio Grande Valley, particularly coastal areas and native brushland along the Rio Grande, supports high populations of a very diverse avifauna during migration and in the winter. However, the study area is not located in these prime coastal areas (e.g., the Laguna Madre) or unique native brushlands (e.g., Bentsen-Rio Grande Valley State Park or Santa Anna NWR).

3.5.1.4 Mammals

At least 61 mammalian species occur or have occurred within recent times in the Tamaulipan Biotic Province (Blair, 1950). Mammals occurring in the study area are likely to include those tolerant of human activity such as the coyote (*Canis latrans*), raccoon (*Procyon lotor*) and striped skunk (*Mephitis mephitis*). The black-tailed jackrabbit (*Lepus californicus*) and hispid cotton rat (*Sigmodon hispidus*) may also occur. Raccoon and coyote tracks and scat, and javelina (*Tayassu tajacu*) tracks were observed in the study area during the May and August field trips. Cattle were observed grazing in the study area in some of the grassland/brushland areas along the U.S. side of the Rio Grande.

3.5.2 Important Species

A species is considered important if one or more of the following criteria applies: a) the species is recreationally or commercially valuable; b) the species is endangered or threatened; c) the species affects the well-being of some important species within criterion a) or b); and d) the species is critical to the structure and function of the ecological system or is a biological indicator.

3.5.2.1 Recreationally and Commercially Important Species

Game species annually support a multi-million dollar recreation industry in the Rio Grande Valley (Collins, 1984). The major species of economic importance in this region are the white-winged dove and white-tailed deer. Other game species include waterfowl, northern bobwhite, mourning dove, plain chachalaca (*Ortalis vetula*), and javelina. The white-winged dove, mourning dove and northern bobwhite were observed in the study area during site visits in May and August 1991; fresh javelina tracks were observed during the August 1991 site visits.

Tourism is also a major industry in the region and birdwatching is a favorite pastime of many visitors (FWS, 1987). Many of the birds found in the Rio Grande Valley are found nowhere else in the U.S. and serve as a major attraction for birdwatchers from around the world.

3.5.2.2 Endangered and Threatened Species

Table 3-2 lists wildlife taxa that have a geographic range including Cameron County and that are considered by FWS, TPWD, or TOES to be endangered, threatened or rare. Numerous sources were reviewed to develop the list, including FWS (1988, 1989, 1990a), TPWD (1987, 1988a, 1988b), TOES (1988), and TNHP (1991b, 1991c). It should be noted that inclusion on the list does not imply that a species is known to occur in the study area, but only acknowledges the potential for occurrence. In fact, most species are unlikely to be present. The following paragraphs present distributional data concerning each federally listed or state-listed species, along with a brief evaluation of the potential for the species to occur within the study area. No endangered or threatened species were observed during the May and August 1991 field trips.

Nine taxa listed in Table 3-2 are considered by both the FWS and TPWD as endangered. These are the brown pelican (*Pelecanus occidentalis*), bald eagle (*Haliaeetus leucocephalus*), northern aplomado falcon (*Falco femoralis septentrionalis*), Eskimo curlew (*Numenius borealis*), interior least tern (*Sterna antillarum athalassos*), black-capped vireo (*Vireo*

TABLE 3-2

ENDANGERED, THREATENED OR RARE WILDLIFE OF
POTENTIAL OCCURRENCE IN THE MILITARY HIGHWAY-CFE TIE STUDY AREA[1]

Common Name[2]	Scientific Name[2]	Status[3]		
		FWS	TPWD	TOES
AMPHIBIANS				
Black-spotted newt	*Notophthalmus meridionalis*	C2	E	E
Rio Grande lesser siren	*Siren intermedia texana*	C2	E	E
White-lipped frog	*Leptodactylus fragilis*	–	E	E
Mexican tree frog	*Smilisca baudinii*	–	T	T
Sheep frog	*Hypopachus variolosus*	–	T	T
REPTILES				
Texas tortoise	*Gopherus berlandieri*	—	T	T
Reticulate collared lizard	*Crotophytus reticulatus*	C2	T	T
Texas horned lizard	*Phrynosoma cornutum*	C2	T	T
Texas scarlet snake	*Cemophora coccinea lineri*	—	T	—
Black-striped snake	*Coniophanes imperialis imperialis*	—	T	WL
Texas indigo snake	*Drymarchon corais erebennus*	—	T	WL
Speckled racer	*Drymobius margaritiferus*	—	E	WL
Northern cat-eyed snake	*Leptodeira septentrionalis septentrionalis*	—	E	T
BIRDS				
Brown pelican	*Pelecanus occidentalis*	E	E	E
Reddish egret	*Egretta rufescens*	C2	T	—
White-faced ibis	*Plegadis chihi*	C2	T	T
Wood stork	*Mycteria americana*	—	T	T
American swallow-tailed kite	*Elanoides forficatus*	3C	T	T
Bald eagle	*Haliaeetus leucocephalus*	E	E	E
Northern aplomado falcon	*Falco femoralis septentrionalis*	E	E	E
Arctic peregrine falcon	*Falco peregrinus tundrius*	T	T	T
Common black-hawk	*Buteogallus anthracinus*	—	T	T
Northern gray hawk	*Buteo nitidis*	—	T	T
White-tailed hawk	*Buteo albicaudatus*	—	T	T
Zone-tailed hawk	*Buteo albonotatus*	—	T	T
Piping plover	*Charadrius melodus*	T	T	T
Eskimo curlew	*Numenius borealis*	E	E	E
Interior least tern	*Sterna antillarum athalassos*	E	E	E
Sooty tern	*Sterna fuscata*	—	T	WL
Red-billed pigeon	*Columba flavirostris*	C2	—	—
Ferruginous pygmy-owl	*Glaucidium brasilianum*	—	T	WL
Northern beardless-tyrannulet	*Camptostoma imberbe*	—	T	WL
Rose-throated becard	*Pachyramphus aglaiae*	—	T	WL
Black-capped vireo	*Vireo atricapillus*	E	E	T
Tropical parula	*Parula pitiayumi*	—	T	T
Golden-cheeked warbler	*Dendroica chrysoparia*	E	E	T
Botteri's sparrow	*Aimophila botterii*	C2	—	—

TABLE 3-2 (Concluded)

Common Name[2]	Scientific Name[2]	Status[3] FWS	TPWD	TOES
MAMMALS				
Southern yellow bat	*Lasiurus ega*	---	T	WL
Coues' rice rat	*Oryzomys couesi*	---	T	T
Coati	*Nasua nasua*	---	E	WL
Ocelot	*Felis pardalis*	E	E	E
Jaguarundi	*Felis yagouaroundi*	E	E	E

[1] According to Peterson (1963, 1980), Raun and Gehlbach (1972), Oberholser (1974), Davis (1974), Conant (1975), Burt and Grossenheider (1976), Smith (1978), Smith and Brodie (1982), Scott (1987), Robbins et al. (1983), Tennant (1984, 1985), TOS (1984), Dixon (1987), FWS (1988, 1989, 1990a), TPWD (1987, 1988a, 1988b), TOES (1988), and TNHP (1991b, 1991c)

[2] Nomenclature follows AOU (1983, 1985, 1987), Jones et al. (1986) and Collins (1990)

[3]
- FWS - U.S. Fish and Wildlife Service
- TPWD - Texas Parks and Wildlife Department
- TOES - Texas Organization for Endangered Species
- E - Endangered; in danger of extinction
- T - Threatened; severely depleted or impacted by man
- C1 - FWS category 1. Substantial information is available to support the biological appropriateness of proposing to list as endangered or threatened.
- C2 - FWS category 2. Listing is possibly appropriate, but more information on biological vulnerability is required.
- 3A - FWS subcategory 3A. No longer under consideration for listing, having persuasive evidence of extinction.
- 3C - FWS subcategory 3C. No longer under consideration for listing, being more abundant or widespread than previously thought.
- WL - Watch list
- --- - Not listed

atricapillus), golden-cheeked warbler (*Dendroica chrysoparia*), ocelot (*Felis pardalis*), and jaguarundi (*Felis yagouaroundi*).

Brown pelican breeding populations in Texas are concentrated on the central and upper Texas coasts. No breeding pairs have been recorded on the lower coast, including Cameron County, in recent years (TPWD, 1990). Most brown pelicans seen along the lower coast are juveniles or non-breeding adults. The brown pelican is usually found near seashores, rarely wandering either seaward or inland. It does not normally occur on freshwater (Oberholser, 1974). Brown pelicans may rarely visit the study vicinity area during storms, but should not be expected regularly.

The bald eagle is generally found in coastal areas around large bodies of water. No bald eagle nests are known to occur in Cameron County, and bald eagles have not been reported during mid-winter surveys (Mabie, 1990). However, the study area is within the general distribution pattern of the bald eagle, and occasional visitors to the Rio Grande and associated resacas are possible.

Typical northern apolmado falcon habitat is open rangeland and tropical savannah (Hector, 1983). This species is evidently extirpated as a breeding bird within Texas and the U.S. The last breeding record was for Deming, New Mexico, in 1952 (Oberholser, 1974). However, since 1985, 20 aplomado falcons have been released at Laguna Atascosa National Wildlife Refuge (NWR) in an effort to reintroduce the species (Hector, 1991). These birds are hatched in California, reared in black boxes (hacked), and fed periodically following fledging. Hacked birds are not fully protected under the endangered species act. The study area and vicinity probably do not include sufficient savannah-like habitat to attract aplomado falcons. This species is extremely unlikely to occur in the study area.

The Eskimo curlew is an extremely rare spring migrant through the central U.S., including Texas. The last confirmed sighting in Texas was of one bird at Rockport on 30 April 1968. A probable sighting of 23 Eskimo curlews occurred on Atkinson Island in Galveston Bay on 7 May 1981 (Blankinship and King, 1984). The last verified Eskimo curlew sighting in the

continental U.S. was in Nebraska in 1987 (FWS, 1990c). Cameron County is within the historic distribution pattern of the Eskimo curlew, but this species is extremely unlikely to occur even in coastal Cameron County in its preferred coastal grassland habitat. It should not be expected in the study area.

The three subspecies of least tern in the U.S. are indistinguishable morphologically, and are presently distinguished only by their breeding ranges (Burleigh and Lowery, 1942; Massey, 1976; Boyd, 1983; Whitman, 1988). Least terns found nesting along Texas rivers, including the Pecos and Rio Grande, are probably interior least terns (*Sterna antillarum athalassos*). Coastal-nesting species are probably coastal least terns (*Sterna antillarum antillarum*). At present the interior least tern nests along the Rio Grande at least as far south as the Amistad and Falcon reservoirs (Whitman, 1988). Any least terns occupying sand bars along the Rio Grande, including the study area vicinity, may be interior least terns. If suitable nesting substrate is available, this endangered subspecies may occur in the study area or vicinity.

While both the black-capped vireo and golden-cheeked warbler have been recorded from Cameron County (TPWD, 1988b), south Texas is outside the breeding range and usual migratory pathway for these species (Oberholser, 1974; TOS 1984). Individuals may occasionally wander to the study area vicinity during migration, but should not occur on a regular basis even as migrating visitors.

The ocelot and jaguarundi prefer dense, native brushland thickets near streams. Both are nocturnal and seldom seen. Ocelots occur on the Laguna Atascosa NWR some 20 miles northeast of the proposed project (Prieto, 1990) and their presence elsewhere in south Texas has been adequately documented through field studies (Navarro, 1985; Tewes, 1986, 1987; Rice, 1987). Several recent accounts exist of both ocelots and jaguarundis in south Texas, including several on Laguna Atascosa NWR (Tewes and Everett, 1987; Prieto, 1990). The nearest confirmed sightings of either species is of two jaguarundi sightings in the early 1980s at the Resaca de la Palma State Park, approximately 3.5 miles northwest of the study area; no sightings of jaguarundis or ocelots are known for the study area itself (Tewes, 1991).

Based upon field reconnaissances by EH&A, it is unlikely that sufficient brushland presently occurs in the study area to provide sufficient habitat for a pair of resident ocelots or jaguarundis even if they occur in the vicinity. In addition, disturbance in the general area of the proposed project lowers the probability of either ocelot or jaguarundi occurrence. However, patches of brushland, particularly any riparian habitat along the Rio Grande, including giant cane (*Arundo donax*), could provide protective cover for any dispersing ocelots/jaguarundis, because ocelots, and possibly jaguarundis, are known to utilize resacas and other strips of dense brush as travel corridors (Bishop and Tewes, 1989; Tewes, 1991).

The arctic peregrine falcon (*Falco peregrinus tundrius*) and piping plover (*Charadrius melodus*) are listed by both the FWS and TPWD as threatened. The arctic peregrine falcon is a statewide migrant in Texas (TOS, 1984; FWS, 1988), and thus could occur in the study are during spring and fall migrations. Padre Island is the most important known staging area for migrants of this species in the western hemisphere (Morizot and Maechtle, 1987). Since South Padre Island is approximately 28 miles northeast of the study area, and habitat similar to that occurring on Padre Island is also present along the coast east of the study area, it is possible that arctic peregrine falcons visit the study area seasonally. However, the coastal grasslands and beaches preferred by this species are not present in the study area; consequently, arctic peregrine falcon occurrence in the study area is probably very rare.

The piping plover is a winter resident and migrant in eastern Cameron County, but is seldom found far from coastal beaches and sand flats (Oberholser, 1974; TOS 1984). It may occur as a casual visitor to the study area, but should not be expected to occur regularly.

The remaining taxa in Table 3-2 are not listed or proposed for listing by the FWS, but are considered by TPWD and/or TOES to be rare, threatened or endangered, or are federal candidate species. In addition to those mentioned above, TPWD considers the black-spotted newt (*Notophthalmus meridionalis*), Rio Grande lesser siren (*Siren intermedia texana*), white-lipped frog (*Leptodactylus fragilis*), speckled racer (*Drymobius magaritiferus*), northern cat-eyed snake (*Leptodeira septentrionalis septentrionalis*), and coati (*Nasua nasua*) as endangered and the following species as threatened: Mexican tree frog (*Smilisca baudinii*), sheep frog (*Hypopachus variolosus*),

Texas tortoise (*Gopherus berlandieri*), reticulate collared lizard (*Crotophytus reticulatus*), Texas horned lizard (*Phrynosoma cornutum*), Texas scarlet snake (*Cemophora coccinea lineri*), black-striped snake (*Coniophanes imperialis imperialis*), Texas indigo snake (*Drymarchon corais erebennus*), reddish egret (*Egretta rufescens*), white-faced ibis (*Plegadis chihi*), wood stork (*Mycteria americana*), American swallow-tailed kite (*Elanoides forficatus*), common black-hawk (*Buteogallus anthracinus*), northern gray hawk (*Buteo nitidis*), white-tailed hawk (*Buteo albicaudatus*), zone-tailed hawk (*Buteo albonotatus*), sooty tern (*Sterna fuscata*), ferruginous pygmy-owl (*Glaucidium brasilianum*), northern beardless-tyrannulet (*Camptostoma imberbe*), rose-throated becard (*Pachyramphus aglaiae*), tropical parula (*Parula pitiayumi*), southern yellow bat (*Lasiurus ega*), and Coues' rice rat (*Oryzomys couesi*). All these taxa have recent occurrence records from Cameron County or adjacent counties, or the historic range of the taxa includes Cameron County.

The black-spotted newt inhabits heavily vegetated, shallow-water lagoons, streams, ditches and swamps (Garrett and Barker, 1987). This species potentially occurs at wetland sites within the study area. The Rio Grande lesser siren is also possible in the study area in habitats similar to those occupied by the black-spotted newt. However, the siren requires year-round open water since it can not aestivate in dry ground like the newt (TNHP, 1991c). Apart from their endangered status with TPWD, these two species are also federal category 2 candidate species. Category 2 comprises taxa for which listing as endangered or threatened may be appropriate, but for which conclusive data on biological vulnerability and threat are not currently available to support such an action.

The white-lipped frog inhabits irrigated fields and irrigation ditches, low grasslands and runoff areas; the Mexican tree frog is found in resacas and roadside ditches, and the sheep frog uses the moist burrows of subterranean mammals as well as pond edges and irrigation ditches (Garrett and Barker, 1987). These species are possible in the study area where suitable aquatic habitat is present.

The Texas tortoise is possible, though unlikely, in the study area if suitable areas of well-drained, sandy soil supporting low, sparse vegetation are available (Garrett and Barker, 1987).

In coastal areas, the Texas tortoise occurs primarily on lomas, which serve as habitat islands (Bury and Smith, 1986).

The Texas horned lizard is found throughout the state on upland baregrounds and in bunch-grass pastureland. It is possible in appropriate habitat within the study area. The reticulate collared lizard inhabits riverine brushland and banks of arroyos. Verified occurrence records of the species exist for counties just west of Cameron County, but the known range does not extend eastward to include the study area vicinity (Garrett and Barker, 1987; Dixon, 1987; TNHP, 1991c) and it is unlikely to be present. The Texas tortoise and Texas horned lizard are federal category 2 candidates as well as being state-listed as threatened.

The black-striped snake is primarily nocturnal, spending the daytime burrowed into sandy soil or hiding under cacti or palm fronds. It is also sometimes found around buildings under trash and construction debris. The northern cat-eyed snake inhabits brushland bordering ponds and streams; the Texas indigo snake is most common in thorn brush woodland in riparian corridors and in mesquite savannah; the speckled racer occupies dense thickets with a heavily littered plant debris substrate near water and also sabal palm groves; and the Texas scarlet snake is found in thickets on sandy substrate mostly near the Gulf Coast (Tennant, 1985). Any of these species may occur in the study area in remnant woodland patches along the Rio Grande, but the speckled racer and Texas scarlet snake, which have highly restricted habitat requirements, are less likely to be present than the other species.

State-threatened bird species associated with the Texas coastline, including the bays and estuaries of eastern Cameron County, include the white-faced ibis, wood stork, reddish egret, and sooty tern (Oberholser, 1974; TOS, 1984). Because the study area is located within 25 miles of coastal bays and estuaries, these coastal species may visit the study area occasionally, especially following the breeding season. The white-faced ibis and wood stork primarily inhabit marshlands along the Texas coast. Post-nesting individuals should occasionally be expected in the study area during the late summer and fall if suitable wetland habitat, such as around resacas or along the Rio Grande, are available for foraging. The reddish egret, usually an inhabitant of salt bays and marshes, may also make post-breeding visits to the study area. The sooty tern has been recently

recorded as occurring in Cameron County (TPWD, 1988b). In Texas, sooty terns are uncommon on spoil banks and islands along the central Texas coast where they may nest. They are occasional visitors to the lower Texas coast and may be seen inland during tropical storms (Oberholser, 1974). The sooty tern may occasionally visit the study area vicinity, primarily in response to weather conditions. None of these species is likely to breed in the study area or its immediate vicinity.

Five state-threatened, rare raptors could potentially occur in the study area; they include the American swallow-tailed kite, common black-hawk, northern gray hawk, white-tailed hawk, and zone-tailed hawk (TPWD, 1988b). The American swallow-tailed kite nests in wooded wetlands with adjacent prairie in the southeastern U.S. and rarely in east Texas (Oberholser, 1974). Increased numbers of recent sightings along the Sabine River in southeast Texas during the spring and summer have prompted the TPWD to initiate a study of this species (Boone, 1990). It is a rare migrant in south Texas, however, and should not be expected in the study area.

The major portion of the common black-hawk's range is south of the U.S. (Schnell et al., 1988) and is described as very rare in south Texas (Scott, 1987). The common black-hawk is an obligate riparian nester, dependent on mature, relatively undisturbed habitat supported by a permanent flowing stream (Schnell et al., 1988). Prior to 1970, the last confirmed nesting of this species in Texas occurred in Cameron County in 1937 (Oberholser, 1974). However, 4 to 8 pairs nested in Jeff Davis County during the late 1970s and early 1980s (Schnell et al., 1988). Breeding birds formerly occurred in willow groves along the Rio Grande floodplain in southern Starr, Cameron and Hidalgo counties. Recent sightings have generally been in the Laguna Madre vicinity on coastal prairie. The common black-hawk may occur as a rare visitor to the study area vicinity.

The northern gray hawk formerly shared riparian willow grove habitat with the common black-hawk in south Texas. The gray hawk, however, preys mainly on lizards and small snakes while the common black-hawk consumes mostly fish and crabs. Nearly all nesting of this species in the U.S. occurs in Arizona, although on rare occasions it will breed in southwestern New Mexico and along the Rio Grande and selected tributaries in Texas (Glinski, 1988). Recent sightings of gray hawks in Cameron County are mostly of non-breeding birds in winter (Oberholser, 1974). Gray hawks may occasionally visit wooded riparian habitat in the study area.

The white-tailed hawk is usually found in savannah-like, grassland habitats (Oberholser, 1974). The current breeding range is restricted to the Texas Gulf Coast area from the Galveston Bay region south to the Rio Grande Valley (Kopeny, 1988b). While the white-tailed hawk has been observed recently in the coastal area of Cameron County (EH&A, 1987), the preferred habitat type is restricted within the study area and white-tailed hawks probably occur only as infrequent visitors.

The zone-tailed hawk is a neotropical raptor with approximately 5% of its range in the southern U.S. (Snyder and Glinski, 1988). It is a rare to uncommon breeding bird in the Trans-Pecos and Edwards Plateau regions of Texas (Oberholser, 1974). TPWD (1988b) cites recent observations of zone-tailed hawks in Cameron County, but breeding records are unverified (Oberholser, 1974). The zone-tailed hawk, a mesa- and canyon-inhabiting species, is unlikely to occur in the study area.

One rare owl, the ferruginous pygmy-owl, has a range in the U.S. restricted to a narrow stretch in southern Arizona and New Mexico and in southwest Texas (Karalus and Eckert, 1987). In Texas, it is a denizen of mesquite-ebony thorn scrub ranging from the lower Rio Grande Valley north into Kenedy County (Oberholser, 1974; TOS, 1984). Ferruginous pygmy-owls may occur in the study area if suitable brushland habitat is present.

Several rare bird species listed for Cameron County are usually found in riparian woodland habitats associated with the Rio Grande floodplain. These include the red-billed pigeon (*Columba flavirostris*), a highly arboreal pigeon fairly common in eastern Mexico; the northern beardless tyrannulet (*Campostoma imberbe*), a small flycatcher found mostly in riverine thickets; the rose-throated becard (*Pachyramphus aglaiae*), a medium-sized flycatcher usually found frequenting groves of large trees (especially Montezuma baldcypress and black willow); and the tropical parula (*Parula pitiayumi*), which nests in bottomland forests, selecting sites where spanish moss (*Tillandsia usneoides*) and the gray-green lichen (*Usnea* sp.) are epiphytic on oaks and other trees. Tropical parula nests are usually constructed from spanish moss or gray-green lichen (Oberholser, 1974; TOS, 1984). All of these species prefer riparian woodland habitat; however,

this habitat in the study area is restricted to small patches of brush with few large trees and is probably insufficient in extent to support breeding populations of any of these species.

Botteri's sparrow, a federal category 2 candidate, is largely restricted to bunch-grass prairie within 20 miles of the Gulf coast in Texas (Oberholser, 1974). It is a fairly common nesting bird in Cameron County but should not be expected outside coastal, grassland habitat and should not occur in the study area on a regular basis.

Confirmed recent records for three rare mammals exist for Cameron County (TPWD, 1988b). These species are the coati, southern yellow bat and Coues' rice rat. Davis (1974) includes south Texas within the distribution of the coati and cites reports of this species in riparian woodlands. Coatis are possible within the Rio Grande floodplain in southern Cameron County but probably require more contiguous wooded acreage than exists in the study area.

The southern yellow bat is widespread in Mexico and South America. In Texas it has been collected southeast of Brownsville and at Corpus Christi in Nueces County (Baker et al., 1971; Spencer et al., 1988). Southern yellow bats roost in trees during the day and Texas specimens have all been collected in palm groves or isolated palm trees. This species may occur in the study area if suitable roost sites are available.

Coues' rice rat is a little-known Mexican species. Its range reaches into south Texas where it occurs in Cameron and Hidalgo counties (Davis, 1974). Its life history and habitat requirements are poorly delineated but probably similar to the northern rice rat (*Oryzomys palustris*) which is widespread in wet grasslands. It may occur in the study area.

3.6 AQUATIC RESOURCES

3.6.1 Aquatic Habitats and Species

As noted above, the study area lies in the Tamaulipan Biotic Province. Although the various biotic provinces were originally separated on the basis of terrestrial animal distributions,

Hubbs (1957) has shown that the distribution of freshwater fishes within the state generally coincides with the terrestrial-vertebrate province boundaries, although northeast Texas and the coastal zone show a number of departures from this general rule.

As previously discussed in Section 3.2.1, natural flow in the Rio Grande has been greatly altered by upstream impoundments and diversionary floodways leading to the coastline. Flow in the river is mainly composed of rainfall from local rains, irrigation runoff and effluent from upstream municipalities in both Texas and Mexico (Breur, 1970).

The aquatic biota together comprise the living portion of the aquatic ecosystem, interacting through their preferred habitats and positions in the food web. Analysis of aquatic systems is usually approached through the better-understood elements phytoplankton (and/or periphyton), zooplankton, benthos and fish.

Phytoplankton are the microscopic aquatic primary producers suspended in the water column, using sunlight as an energy source. They are complemented by attached algae or periphyton in the littoral and benthic zones. Together, phytoplankton and periphyton form the base of the aquatic food chain. Zooplankton are those microscopic animals that feed on algae, bacteria and detritus and thereby form an important link between the primary producer trophic levels and higher trophic levels occupied by fish. Differences in flow rates as well as the drainage areas and sizes of the habitats probably account for most of the differences in the number of taxa present, absolute densities and the relative abundance of the major groups. Species composition and densities are typically highly variable even among adjacent pools in the same stream or river channel. The most commonly encountered phytoplankton groups include the Chlorophyta (green algae), the Euglenophyta, the Cyanobacteria (blue-green algae) and the Bacillariophyta (diatoms). The zooplankton communities within the Rio Grande are probably dominated by the rotifers.

Macroinvertebrates inhabit a variety of substrates in streams and rivers, including bottom sediments (silt, gravel, stones) and vegetation or debris piles along stream margins or in pools. Different macroinvertebrate assemblages are likely to occur in pool and riffle segments of streams due to differences in current velocity, substrate and food availability. Temperature and

water quality are other important factors that affect the distrbution of macroinvertebrates (Hynes, 1970). Macroinvertebrate populations are generally small where streambeds are dominated by grit-sand and sand-gravel. These substrate types are probably unfavorable to benthic organisms due to their instability, i.e., they shift about with changing currents, causing organisms to be scoured and redeposited, or simply buried. Rocks in shallow pool and riffle areas usually provide a more suitable substrate. Although individuals of most of the major insect groups may be found in these areas, the dominant forms are larval chironomids, odonates and mayflies, and adults of aquatic species of Coleoptera and Hemiptera. All these forms are found primarily in association with accumulations of terrestrial plant debris. Where riffle areas or stands of aquatic vegetation occur, macroinvertebrate populations tend to be both more dense and more diverse. These areas tend to be dominated by species of the insect orders Odonata (dragonflies), Ephemeroptera (mayflies) and Trichoptera (caddisflies) in which the larval or nymphal stages are aquatic. Soft sediments generally contain relatively larger populations of larval diptera and oligochaetes. Species of Oligochaeta and Diptera typical of fine-grained stable sediments containing substantial amounts of organic matter generally constitute an important portion of the macroinvertebrate community and an extremely important food source for fish in the higher trophic levels.

Most of the area of this coastal plain has few connections to the gulf. Major connections include the Rio Grande and the Brazos Island Harbor Channel (BIHC). The fish fauna is an admixture of freshwater, estuarine and marine species. This basin, in the vicinity of the study area, maintains a freshwater character because the area is so distantly connected to saltwater areas but strongly influenced near the coast by estuarine species. Seasonally, the lower reach of the Rio Grande is utilized by penaeid shrimp and juvenile marine fishes. The freshwater fishes are generally characteristic of the Tamaulipan Biotic Province; however, the population assemblages may also contain a mixture of species present in other regions.

Based on fish distribution data available for the Rio Grande, 149 species have been recorded from this drainage between Lake Amistad and the Gulf of Mexico (EH&A, 1988). Of this total, 82 species for the most part are likely to frequent fresh water. Flowing aquatic systems of the area appear to be restricted to the Rio Grande. The freshwater fauna is probably composed largely of small forage fish assemblages such as the Tamaulipas shiner (*Notropis braytoni*), red

shiner (*Notropis lutrensis*), inland silverside (*Menidia beryllina*), sheepshead minnow (*Cyprinodon variegatus*), mosquitofish (*Gambusia affinis*), sailfin molly (*Poecilia latipinna*), threadfin shad (*Dorosoma petenense*), and gizzard shad (*Dorosoma cepedianum*). Other commonly encountered species would include catfishes (Ictaluridae), carp (*Cyprinus carpio*), buffalo (*Ictiobus* spp.), striped mullet (*Mugil cephalus*), the Mexican tetra (*Astyanax mexicanus*) and sunfishes (Centrarchidae).

3.6.2 Important Species

3.6.2.1 Recreationally and Commercially Important Species

No commercial fishing occurs on the U.S. side of the study area although activity by Mexican fishermen on the Mexico side of the river may occur. Commercial fishing takes place in the Laguna Madre and the Gulf of Mexico.

Sunfish, which are common in the Rio Grande, offer limited recreational potential. Seven species of sunfish may occur, including the warmouth (*Lepomis gulosus*), green sunfish (*Lepomis cyanellus*), bluegill (*Lepomis macrochirus*) and longear sunfish (*Lepomis megalotis*). The largemouth bass (*Micropterus salmoides*) and white crappie (*Pomoxis annularis*) are known from the area, as well as five species of catfish. Only two of the catfish species are considered desirable by fisherman; they include the channel catfish (*Ictalurus punctatus*) and flathead catfish (*Pylodictis olivaris*).

Important saltwater fishing areas are available in the southern portion of Lower Laguna Madre and the gulf waters.

3.6.2.2 Endangered and Threatened Species

According to the latest federal listings (FWS, 1990a), no species of fish, freshwater mussels, snails or crustaceans classified as endangered or threatened are known to occur in the study area. Currently, four species of fish that have been classified by TPWD as endangered or threatened could potentially occur in the study area (TPWD, 1988b). The blackfin goby

(*Gobionellus atripinnis*) and the phantom shiner (*Notropis orca*) are listed as endangered. The river goby (*Awaous tajasica*) and the opposum pipefish (*Oostethus brachyurus*) are listed as threatened.

3.7 SOCIOECONOMICS

This section provides a baseline summary of demographic and economic characteristics for Cameron County and the City of Brownsville. Baseline data were compiled through a literature survey and interviews with knowledgeable individuals in the Lower Rio Grande Valley area. Literature sources reviewed include publications from the U.S. Bureau of the Census, the Rio Grande Chamber of Commerce, the Brownsville Economic Development Council, the Lower Rio Grande Valley Development Council, the Texas Comptroller of Public Accounts, and the Texas Department of Commerce.

3.7.1 Regional Social and Economic Characteristics

3.7.1.1 Population Trends

The study area is located west of the City of Brownsville in Cameron County on the U.S./Mexico border (Rio Grande) and straddles the Champion and Rusteberg bends of the Rio Grande. Slightly more than one-half of the 1,460-ac study area is located in the City of Brownsville's jurisdiction, with the remainder lying in Brownsville's 3.5-mile extra-territorial jurisdiction (ETJ). Although approximately one-fifth of the study area is in Mexico, this document does not address the Mexican side of the Rio Grande. To provide a comparison summary of existing demographic and economic characteristics, Bureau of the Census population figures for Brownsville and Cameron County are provided in Table 3-3.

Over the last twenty years (1970-1990) population growth in Cameron County has exceeded the state average by approximately 30% (Bureau of the Census, 1991). Population expansion in Cameron County was explosive during the 1970s, but since 1980, although still growing rapidly, has decelerated. Bureau of the Census counts for 1990 of 260,120 persons in Cameron County represent a strong 24% increase over the 1980 population of 209,727. Yet this

TABLE 3-3

POPULATION GROWTH

CAMERON COUNTY AND THE CITY OF BROWNSVILLE

Population	1970	1980	Percent Change 1970-80	1990	Percent Change 1980-90
Cameron Co.	140,368	209,727	49.4	260,120	24.0
Brownsville	52,522	84,997	61.8	98,962	16.4
Texas	11,198,655	14,229,191	27.1	16,986,510	19.4

Source: Bureau of the Census (1991)

push in population is relatively minor when compared to the 1970s population expansion of almost 70,000 people, representing a 49% increase over the 10-year period.

Over the 20-year period, the City of Brownsville population has been almost twice as large as the population of the next largest city in the county, Harlingen. With one exception of approximately 20,000 people, other city populations in the county do not exceed 4,500. Population trends in Brownsville have mirrored that of Cameron County, as growth in the 1980s leveled off after dramatic increases in the 1970s. Bureau of the Census counts for 1990 place the Brownsville population at 98,962, a rise of slightly more than 16% over the 1980 count of 84,997. Although the city's population growth was strong in the 1980s, the gain is slight when compared to the 62% surge during the 1970s.

These population counts do not incorporate the seasonal population increase that occurs during the months of October through March, when upper mid-west residents (mostly retired) migrate to the Rio Grande Valley to wait-out the cold winters of the northern U.S. These people, known colloquially as "winter Texans", are estimated at 100,000 - 125,000 annually (Rio Grande Valley Chamber of Commerce, 1991). Approximately one-third of these winter Texans are estimated to reside in the Brownsville/Harlingen area (De los Santos, 1991).

In addition to not counting the winter Texans, local consensus is that Valley populations (including Cameron County) were undercounted by the Bureau of the Census by as much as 10 to 15% (Rio Grande Valley Chamber of Commerce, 1991).

3.7.1.2 Economic Trends

The Cameron County economy expanded in every year of the 1980s except 1983 when the massive peso devaluation of 1982 severely damaged the local economy and proved disastrous to the area's retail sector. The Brownsville-Harlingen economy is closely tied to agriculture, retail trade, and tourism. Recent growth of the maquiladora, or twin plant, industry in Mexico has spurred related growth in the county's manufacturing, transportation, trade and service industries (Texas Comptroller of Public Accounts (TCPA), 1991). Under this system, manufacturers divide

production functions between plants on both sides of the border to take advantage of U.S. Customs policies which allow them to transport U.S.-built components to Mexico where they are assembled for export back to the U.S.

Over the 10-year period, jobs in Cameron County rose by almost 30%, from 71,859 in 1980 to 92,532 in 1990 (Table 3-4). When compared to the steady 10% rise in jobs during the first five years of the 1980s, decadel gains were sharpest during the late 1980s (1985-1990) when jobs jumped by 17%. Over the decade, Cameron County unemployment rates have dropped annually since the peak in 1986 of 15.8, and over the last two years (1989 and 1990) have leveled at 11.8 and 11.7, respectively (Table 3-5).

Major employers in the county are trade and service industries and state and local government (Table 3-6). Fourth quarter 1990 Texas Employment Commission (TEC) employment figures show a 5.8% increase over job levels for the same period in 1980. Trade accounted for slightly more than one-fourth of the workforce, with service and government employment each accounting for slightly more than one-fifth of county jobs. The single largest job gain occurred in manufacturing, which over the ten-year period gained 1,493 jobs, an increase of 13.8% over 1980 levels. Service employment also experienced a strong push with an 8.4% increase or 1,344 additional jobs over that in 1980. Slight job losses occurred in agriculture; mining; finance, insurance, and real estate (FIRE); and state government employment.

Agriculture employment slipped by 2.3% over the 10-year period from 1,798 in 1980 to 1,756 in 1990. Years 1987 and 1989 were profitable for producers of most commodities, particularly citrus fruit, vegetables and cotton. However, drought and a hard freeze in 1989 drove Cameron County farm receipts down. Conditions improved in 1990 and total agricultural receipts rose by 7.9%, from $104.6 million in 1989 to $112.9 million in 1990 (TCPA, 1991).

3.7.2 Community Values

The term "community values" is included as a factor for the consideration of transmission line certification under Section 54(c) of the Public Utility Regulatory Act. Although

TABLE 3-4

EMPLOYMENT AND UNEMPLOYMENT TRENDS,
CAMERON COUNTY, TEXAS

Employment Cameron Co.	1980	1985	Percent Change 1980-85	1990	Percent Change 1985-90	Percent Change 1980-90
CLF	79,792	92,468	15.9	104,812	13.3	31.4
Employment	71,859	79,092	10.1	92,532	17.0	28.8
Unemployment	7,933	13,376	68.6	12,280	-8.2	54.8
Rate	9.9	14.5	46.5	11.7	-19.3	18.2

Source: Texas Employment Commission (1980, 1990).

TABLE 3-5

CAMERON COUNTY UNEMPLOYMENT RATE

Year	Rate	Percent Change
1980	9.9	*
1981	9.7	-2.0
1982	12.3	26.8
1983	15.6	26.8
1984	13.6	-12.8
1985	14.5	6.6
1986	15.8	9.0
1987	14.3	-9.5
1988	13.3	-7.0
1989	11.8	-11.3
1990	11.7	-0.8

Source: Texas Employment Commision (1990)

TABLE 3-6

EMPLOYMENT BY INDUSTRY

CAMERON COUNTY, FOURTH QUARTER

Employment Sector	1980	Percent Total Employment	1990	Percent Total Employment	Percent Change	Actual Change
Agriculture	1,798	2.5	1,756	2.3	-2.3	-42
Mining	18	0.0	12	0.0	-33.3	-6
Construction	2,230	3.0	2,420	3.1	8.5	190
Manufacturing	10,806	14.7	12,299	15.9	13.8	1493
Transportation	3,030	4.1	3,247	4.2	7.2	217
Trade	19,890	27.1	20,668	26.7	3.9	778
FIRE*	3,473	4.7	3,409	4.4	-1.8	-64
Service	16,077	21.9	17,421	22.5	8.4	1344
State Government	2,210	3.0	2,156	2.8	-2.4	-54
Local Government	13,770	18.8	14,150	18.2	2.8	380
Total	73,302	100.0	77,538	100.0	5.8	4236

Source: Texas Employment Commission (1990).
*FIRE: finance, insurance and real estate.

the term has not been specifically defined for regulatory purposes, the PUC requests information concerning the following items on the CCN application, under the general heading "Community Values".

- Approvals or permits required from other governmental agencies (Section 1.4)
- General description of the area (Section 3.0)
- Residences, businesses, schools, churches, cemeteries, hospitals, nursing homes, or other habitable structures within 200 ft of the centerline of the proposed project (Section 4.6.1)
- FAA-registered airstrips located in the area (sections 3.8.4 and 4.6.4)
- Irrigated pasture or croplands utilizing center-pivot or other traveling irrigation systems (Table 6-1, no. 12)

Each of these items, insofar as it may affect community values, is addressed in the appropriate section of this document.

For the purpose of evaluation, EH&A has defined the term community values as a "shared appreciation of an area or other natural or human resource by a national, regional or local community". Adverse effects upon community values are defined as aspects of the proposed project which would significantly and negatively alter the use, enjoyment or intrinsic value attached to an important area or resource by a community. This definition assumes that community concerns are identified with the location and specific characteristics of the proposed transmission line and do not include possible objections to electric transmission lines per se.

3.8 LAND USE, AESTHETICS AND RECREATION

3.8.1 Land Use

Land use within the study area is mixed urban; predominantly residential with commercial/industrial uses spread along U.S. 281. Residential areas are primarily single-family housing, and include some mobile homes. Two public schools occur within the study area

boundaries; these are Garden Park Elementary, located on the south side of U.S. 281, and Pace High School, located north of the highway on Los Ebanos Boulevard. The City of Brownsville's water treatment plant is located near the southeast corner of the study area. The intake on the Rio Grande is located approximately 400 ft south of the existing CPL/CFE 69-kV river crossing.

Virtually all of the land outside the Brownsville city limits is currently used for agricultural purposes. The majority of this use is for irrigated farming, with cotton and grain sorghum being the main crops. Some cattle are grazed on overgrown fields along the Rio Grande, within the IBWC flood-control levee.

The FWS, however, has plans to acquire much of the agricultural land within the study area as part of the Lower Rio Grande Valley NWR. This refuge, unlike most other NWRs, consists of numerous, separate tracts, spread over a wide area of the Rio Grande Valley, with plans to eventually protect a "wildlife corridor" along the Rio Grande. The FWS would like to acquire all lands generally between the IBWC levee and the Rio Grande, from the Gulf of Mexico to Falcon Dam (Ditto, 1991a). Within the study area, several tracts of land have either already been purchased or are under negotiation for purchase by the FWS (Blankinship, 1991; Ditto, 1991b) for inclusion in the refuge. These tracts include parcels crossed by CPL's existing 69-kV transmission line, both within and outside of the levee (Ditto and Blankinship, 1991).

Although the TPWD is acquiring additional tracts for the Las Palomas Wildlife Management Area, currently consisting of 17 separate tracts totalling approximately 4,000 acres, at various locations in south Texas, according to John Williams of the Land Acquisition Department at TPWD (Williams, 1991), TPWD has no present and no known future purchases in the study area.

The Land Use Plan for the City of Brownsville (City of Brownsville (COB), 1975), a component of the Comprehensive Plan, lays out proposed land uses for the city and its ETJ. Within the study area, the plan recommends three basic uses: agriculture, suburban-rural, and public (including semi-public, institutional and park uses). Basically, the plan indicates that all land within the IBWC levee, as well as the area west of CPL's existing transmission line ROW, should

remain agricultural. The suburban-rural category covers approximately the portion of the study area already within the city limits, which is primarily residential. The remainder of the land in the study area, bounded by the city limits, U.S. 281, and CPL's existing ROW, and including an agricultural area around several resacas north of the city's water treatment facilities, is designated as proposed public parkland.

The Recommended Transportation Plan (COB, 1982), another component of Brownsville's Comprehensive Plan, proposes only one major new transportation project within the study area. This project is the proposed extension of FM 802 (Coffee Port Road) south of U.S. 281, west of Champion Bend, and across the Rio Grande via a new international bridge. This project is not currently funded or designed.

3.8.2 Aesthetics

Potential aesthetic impacts is an area of increasing concern to both the public and government bodies dealing with siting and approving electric transmission facilities. Aesthetics is included as a factor for consideration in the evaluation of transmission facilities in Section 54(c) of the Public Utility Regulatory Act. Consideration of the visual environment includes a determination of aesthetic values (where the major potential effect of the project on the resource is considered aesthetic) and recreational values (where the location of a transmission line could affect the scenic enjoyment of a recreation area). Aesthetic values considered in this analysis include:

- Form (topographical variation, mountains, valleys),
- Line/Pattern (ridges, rivers/cropland)
- Color/Contrast (brightness, diversity, juxtaposition of elements)
- Texture (vegetation, smooth or rough surface, other visual characteristics)

EH&A's aesthetic analysis dealt primarily with potential visual impacts to the public. Viewsheds or scenic areas visible from roads, highways or publicly owned or accessible lands (parks or privately owned recreation areas open to the public, for example) were analyzed. A number

of factors are taken into consideration when attempting to define the sensitivity, or potential impact, to a scenic resource from the construction of electric transmission facilities. Among these are the following:

- Uniqueness of the landscape in relation to region as whole
- Whether the scenic area is a foreground, middleground, or background view
- Focus of the view
- Scale of elements in the scene
- Number of potential viewers
- Duration of the view
- Amount of previous modification or disturbance to the landscape

Generally, the study area exhibits a low to moderate level of aesthetic quality, whether in the developed and urbanized areas within the Brownsville city limits or the predominately agricultural lands along the Rio Grande. Landscapes with water as a major element, such as the Rio Grande, are generally considered to present strong aesthetic values. However, due to the generally low relief of the study area, the lack of public access to the river and the degree to which the native, riparian vegetation has been altered or cleared along the banks, the Rio Grande is not considered as an area of high aesthetic value in this case. In the agricultural portions of the study area, wooded areas, although scarce, provide variety and contrast in the visual environment, especially where adjacent to fields and pasture. Generally, the overall aesthetic quality of this area is typical of that in other developed portions of the region.

The SDHPT has mapped 10 separate "Travel Trails" throughout Texas to provide travel routes through different areas of the state, highlighting natural, cultural and scenic attractions. These routes are described in pamphlets distributed by SDHPT offices and tourist information centers and marked by special signs along the designated highways. In addition, Texas Monthly magazine has been reproducing the information from the pamphlets one at a time in recent issues. The "Tropical Trail" connects Corpus Christi, Brownsville and Laredo and uses a portion of U.S. 281 within the study area as part of the overall route. However, no specific attractions are noted within the study area.

In summary, although portions of the study area are aesthetically pleasing, little distinguishes its visual character from that of other adjacent areas within the region. The landscape exhibits a high level of impact from human development, including existing electric transmission lines. No designated scenic views or unique and outstanding aesthetic resources were identified from the Brownsville Land Use Plan or from field reconnaissance of the study area.

3.8.3 Recreation

Parks or other recreational resources are limited within the study area. A portion of Joe and Tony Oliveira Park is located in the northeast corner of the study area. This park includes sports fields, playgrounds, picnic sites, a swimming pool and gymnasium. TPWD's Texas Outdoor Recreation Plan (TORP) (TPWD, 1985) lists the Rio Grande as a permanently floatable waterway, but no public access occurs in the vicinity of the study area. TORP also mentions the potential for a hike and bike trail system along the Rio Grande in Brownsville. The Rio Grande in Cameron County is not part of the National Wild and Scenic Rivers System, nor has it been proposed for inclusion in a state Natural Rivers System. If the FWS is successful in its efforts to obtain land within the study area as part of the Lower Rio Grande Valley NWR, significant recreational opportunities could be available in this area in the future.

3.8.4 Aviation

The nearest public or military airfield is the Brownsville/South Padre Island International Airport, located approximately 5.7 miles (29,900 ft) east of the study area (NOAA, 1990). The main runway (13R-31L) is 7,400 ft long and oriented northwest-southeast. Although no regularly scheduled commercial air service currently exists at this facility, it does support both cargo and general aviation operations.

3.9 CULTURAL RESOURCES

3.9.1 Cultural Setting

The prehistory of the study area is not well documented. The earliest evidence of man comes from the Paleo-Indian stage, and includes materials predating 5000 to 6000 B.C. A nomadic lifeway with emphasis on the hunting of now extinct mega-fauna characterizes this stage. No Paleo-Indian sites have been found in the study area.

As the climate changed and big game animals died out, a transition into the Archaic Stage occurred. The Archaic economy was based on hunting small game, fishing, and gathering plant foods and shellfish. Hall et al. (1987:16) credit Sayles (1935) and MacNeish (1947) for introducing the concept of Archaic and Late Prehistoric cultural components. From data obtained from a general reconnaissance of site data from Texas, Sayles (1935) defined two artifact assemblages for the study area, the Coahuiltecan Branch and the Brownsville Phase of the Tamaulipan Branch. According to Sayles (1935:117), the Coahuiltecans were basically hunters, while fishing represented the dominant subsistence pattern for the Brownsville Phase.

Investigations conducted by MacNeish (1947) in Tamaulipas, Mexico, identified the Repelo and Abasolo archaeological complexes. Both complexes are Archaic manifestations. Three triangular point types (only one with a stem) characterize the lithic inventory of the Abasolo complex. Stratigraphically, the Abasolo complex overlies the Repelo and underlies the later Brownsville complex in the Rio Grande delta, but in inland Tamaulipas, the two complexes are contemporaneous (MacNeish, 1947:10).

The Late Prehistoric stage (Hester and Parker, 1970), termed Neo-American by Suhm et al. (1954), follows the Archaic at approximately A.D. 1000 in the Lower Rio Grande Valley. Dart points were replaced by arrowpoints, which were used with a new invention, the bow and arrow. In many areas of Texas, ceramics appear on archaeological sites during this stage.

Brownsville Phase sites occur almost exclusively in Cameron County, Texas. Pierced whole conch shells, small snail shell beads, conical pumice pipes, bivalve beads, Marginella beads, conch shell fishhooks, *Cameron* projectile points, chipped, pin-like drills, shell plugs with rectangular cross sections, and columella gouges are diagnostic of this complex (MacNeish, 1958).

Brownsville Phase burials have been found at the Floyd Morris site (Collins et al., 1969) in Cameron County and at the Ayala site in Hidalgo County (Campbell and Frizzell, 1949). They are characteristically flexed, bundled, or cremated, and sometimes covered with red ocher. Large amounts of grave goods, including bone and shell beads, shell tinklers, perforated canine teeth, and altered human bones, often occur.

Sites from the Historic stage are distinguished by the presence of European and nonaboriginal American trade goods that date from the 16th through mid-19th centuries. Debris on Historic Indian sites indicates a continuing nomadic hunting and gathering existence. An important site from this time period is the Garcia's Pasture Site, 41CF8, north of the study area. This site is on the National Register of Historic Places (NRHP). The best account of the native peoples of south Texas comes from the chronicle of Alvar Nunez Cabeza de Vaca, a survivor of a Spanish shipwreck in 1528 (Covey, 1972). The names and locations of some historic Coahuiltecan groups are listed by Campbell in the Handbook of Texas, Volume III (Webb, 1976). By the 1850s, a combination of European-introduced diseases and tribal wars stimulated by Europeans had decimated the Indians of the Lower Texas Coast (Campbell, 1958).

Cameron County was created in 1848 and named for Ewen Cameron, a cattleman turned soldier who was killed in 1843 after being taken prisoner by the Mexicans during the 1842 Mier Expedition. This expedition was the last of the punitive expeditions from Texas into the area south of the Nueces River during the days of the Republic of Texas. Brownsville became the county seat in 1848 and it was incorporated in 1850. It was a principal port for shipment of supplies during the Civil War (Webb, 1952).

3.9.2 Previous Investigations

The earliest and most extensive cultural resources work in the area is that of A.E. Anderson. From 1908 to 1940, Anderson collected and kept accurate records on data from almost 400 sites in Cameron County and adjacent parts of Tamaulipas, Mexico. He published a brief description of his artifacts from the Brownsville area (Anderson, 1932). Artifacts from his collection are typical of cultural material found on the Rio Grande Delta. His collection reflects the predominance of a shellworking industry that has frequently been called the outstanding characteristic of the area by later investigators. Many early professional archaeologists relied heavily on the Anderson Collection as a supplement to their own survey data in making interregional comparisons and in establishing chronological schemes (Sayles, 1935; Jackson, 1940; Campbell, 1947; MacNeish, 1947).

South of the study area, pertinent information, including a chronology for the Archaic in Tamaulipas, was published by MacNeish (1958) after three seasons of survey and excavation. He considered diagnostic artifacts and geographic distributions in defining three Archaic complexes and phases for Northern Tamaulipas. They are, from earliest to latest, the Nogales, Repelo, and Abasolo complexes, and span the time period from 5000 B.C. to A.D. 100. He made comparisons to Archaic materials from the Falcon Reservoir where the Archaic Falcon focus was defined with an estimated temporal span of approximately 5000 B.C. to A.D. 1000 (Suhm et al., 1954).

Recent unpublished work in south Texas, north of the study area, includes the excavation of a large Archaic cemetery named Loma Sandia, 41LK28, in Live Oak county (Taylor and Highley, n.d.). Dart points, stone pipes, shell ornaments, and deer antlers are among the grave goods found with some of these burials. At Choke Canyon Reservoir, testing and excavation of many Archaic and Late Prehistoric sites is continuing. Sites such as 41LK31-32, where buried Archaic occupations with dates of 2400 B.C. and 3300 B.C. have been uncovered, should provide the initial data on the Archaic of interior south Texas (Hester, 1980).

Survey work in Willacy and Hidalgo counties, west and north of Cameron County, has yielded dart points which may be of Archaic age (Mallouf et al., 1977). However, work at the

Falcon Reservoir showed that some of these types continue into the Late Prehistoric (Suhm and Jelks, 1962). Other survey work, some of which has occurred near the study area, has predicted locations where archaeological materials including those of Archaic age may be found (Prewitt, 1974). Prewitt states that sites are frequently located on 1) clay dunes, particularly where these face lagunas and inland lakes; 2) on resacas; and 3) on the barrier islands.

Recent testing completed by EH&A on two lomas (clay dunes) located adjacent to the Brownsville Ship Channel east of Brownsville revealed scant evidence for cultural materials (EH&A 1990). From four sites tested, only lithic debitage (the waste material from stone tool manufacture) and two possible prehistoric hearths were recorded. Possible loma accretion rates were suggested for Loma Potrero del Cercado and Loma Ochoa.

3.9.3 Results of the Literature/Records Review

A search of literature and records regarding cultural resources in Cameron County was conducted in connection with this project. This search included the archaeological site records on file at the Texas Archaeological Research Laboratory (TARL) in Austin, the guide to properties listed on the NRHP and the Guide to Official Texas Historical Markers (Texas Historical Commission (THC), 1975, 1981). The results indicate that no archaeological sites, NRHP properties or historical markers have been reported from the study area. The absence of recorded sites may, however, reflect a lack of thorough field investigations in the study area rather than an actual absence of cultural resource sites.

4.0 ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION AND ALTERNATIVES

4.1 IMPACTS ON PHYSIOGRAPHY/GEOLOGY/SOILS

No economically valuable energy or mineral resources are located within the study area (BEG, 1976); therefore no impacts with a potential loss of resources would be experienced. The initial construction and erection of the power line structures would require some disturbance and removal of small amounts of near-surface material, but no major impacts on either geologic or physiographic features are anticipated.

The soils of the study area would also be minimally impacted. The major impact would occur with the construction phase of the project. An increased potential for erosion and soil compaction would occur as large equipment is used to install the power line. Clearing of the ROW, if necessary, would decrease vegetative cover and increase erosional factors, while extended and continued use of large equipment would compact the soil. At least 50% of the land that will be crossed by the transmission line is cropland, with much of the rest being other types of grassland. This would reduce the use of heavy equipment for clearing, thus limiting the potential for soil compaction. Natural revegetation would occur in areas that have been disturbed by construction efforts.

Although a majority of the study area is composed of prime farmland, minimal impact to these soils is expected. Only construction-related erosion and compaction would occur and only small areas directly beneath the structures would permanently remove the soils from crop production. This would constitute a very small portion of the prime farmlands within the study area as discussed below.

CPL would construct four structures within two tracts currently being farmed, which would consist of two single-pole structures and two lattice towers. One of the lattice towers and one of the single pole structures would be located in turn-rows, which are not cultivated. The second lattice tower would be located in an area not cultivated near the river. One single-pole

structure would be located in an area currently being cultivated. The surface area of soil to be removed from crop production would be the area taken up by the structure (6 ft diameter foundation) which is approximately 28.3 sq.ft. It is assumed an additional 50% of this area would be removed from crop production due to limited access of farm equipment, for a total of approximately 42.4 sq.ft. of farmland being removed from production.

4.2 IMPACTS ON WATER RESOURCES

4.2.1 Surface Water

If the proposed Military Highway to CFE transmission line project is implemented, the surface water regime of the project area should remain almost unchanged from existing conditions; few impacts, if any, are anticipated. Storm runoff, flow duration, low flow, and water quality characteristics should not experience any significant alterations. All alternative transmission line corridors must cross the Rio Grande. Additionally, all alternatives would cross irrigation laterals.

The main potential impact on surface waters from any major construction project is pollution resulting from erosion, and spillage of petroleum or other chemicals. Vegetation removal is expected to be minimal, but could result in increased erosion potential of the affected areas, so that slightly higher-than-normal sediment yields may be delivered to the Rio Grande during a heavy rainfall. However, these short-term effects should be minor as a result of the relatively small area to be disturbed at any particular time and the short duration of the construction activities.

If it becomes necessary to locate transmission line structures within floodplains, they would be designed and constructed so as not to impede the flow of any waterway or create any hazard during flooding. Construction activity in floodplains could result in erosion and sedimentation impacts, especially if flooding occurred during the construction period. Support structures and maintenance access routes in the floodplain should not significantly affect flooding if not located in obvious flood channels. Some scour could occur around structures if flood-flow depths and velocities become great enough. Careful siting of structures, however, should eliminate the possibility of significant scour. None of the alternatives should have significant impacts on the function of the floodplains, but the longer floodplain crossing of Route 3 may slightly increase the

risk of flood damage to the project during construction. No adverse effects from flooding to adjacent or downstream property owners are anticipated.

4.2.2 Groundwater

The major potential impact on groundwater from construction activities associated with the project is possible contamination from spillage of petroleum products. Care would be exercised in the storage and handling of petroleum products, especially near waterways.

4.3 IMPACTS ON TERRESTRIAL ECOSYSTEMS

4.3.1 Vegetation

The primary impact to vegetation resulting from site preparation and construction of the proposed transmission line would be the removal of existing woody vegetation or danger trees from the areas required for the ROW. Table 6-1 presents the linear extent of some of the vegetation community types crossed by the ROW. The greatest amount of clearing of vegetation would be required in woodland/brushland and riparian woodland, while minimal clearing is necessary in cropland or grazingland.

Alternative Route 1 follows the same route as CPL's existing 69-kV line once it has exited from the substation. Routine maintenance procedures have generally kept this ROW clear of woody vegetation. Additional clearing may be required if the existing line is rebuilt as 138/69 kV within the existing ROW; vegetation removal would be minimal and limited to a linear distance of approximately 530 ft.

Alternative Route 2 crosses the same wooded sites as Alternative Route 1 (i.e., utilizing the existing ROW) before diverging to follow the IBWC levee. Consequently, this route would impact the same linear distance of woodland, 530 ft. No additional woodland areas are located along this alternative route.

Alternative Route 3 would involve completely new ROW and would cross approximately 325 ft of brushland. This includes approximately 200 ft of a wooded site

immediately southwest of Node A. It is probable, considering the linear distance involved, that this wooded site could be spanned, thereby minimizing disturbance of existing vegetation. No other sites dominated by brush or tree species are crossed by Alternative Route 3.

Alternative routes 1 and 2 are both projected to cross the Rio Grande at the same site along the existing ROW; therefore, little or no additional impact to riparian vegetation is anticipated from selection of either of these options. Riparian areas potentially impacted by Alternative Route 3 are limited to a narrow strip paralleling the Rio Grande. The site is low-lying, dominated by giant cane and bisected by a dirt road. This area is early successional, and damage to the existing plant community from clearing and construction is expected to be short-term. In any case, this site could be spanned, thereby possibly avoiding even minimal disturbance to the existing community.

None of the alternative routes crosses potential regulatory wetlands; therefore, no impacts to wetlands are anticipated.

4.3.2 Endangered and Threatened Plant Species

No endangered or threatened plant species are known to occur in the study area vicinity, or in Cameron County; therefore, none are expected to occur along any of the alternative transmission line routes. Nine federal category species, including a federal category 1 candidate species (discussed in Section 3.4.3), may occur in the study area vicinity, and are possible within the alternative routes where suitable habitat may occur. These candidate species, however, have no legal federal protection under the Endangered Species Act.

From a vegetation standpoint, in general, the preferred route would be the one involving clearing the least amount of vegetation, particularly bottomland/riparian vegetation, and potential wetlands. In many cases, this would be utilizing existing transmission line ROW. For the Military Highway-CFE project, however, Alternative Route 3 crosses less brushland than the other two routes and its construction would probably involve less clearing of brushland. It is also the shortest route and crosses less cropland. In addition, the line parallels the IBWC levee for

part of its length along the edge of cropland as opposed to crossing open areas of cropland, potentially resulting in less cropland loss. Thus, from a vegetation standpoint, Alternative Route 3 is the preferred route.

4.3.3 Wildlife

The wildlife habitats and species potentially occurring along the alternative transmission line routes have been described in Section 3.5. The greatest diversity of species probably occurs in the grassland/brushland and riparian habitat types. Areas of brushland and vegetated riparian corridors occurring within the alternative routes are quite small and may be spanned, thereby minimizing potential impacts on wildlife habitat.

The impacts of transmission line construction on wildlife can be divided into short-term effects resulting from physical disturbance during construction and long-term effects resulting from habitat modification. The net effect of these two classes of impacts on local fauna is not expected to be severe. A general discussion of the impacts of transmission line construction and operation on terrestrial wildlife ecology is presented below.

In general, clearing and construction may directly and/or indirectly affect most animals which reside or wander within the proposed transmission line ROW. Some small, low-mobility forms may be adversely impacted by the heavy machinery. These include several species of amphibians, reptiles, mammals and, if construction occurs during the breeding season, the young of many species including nestling and fledgling birds. Fossorial animals (i.e., those that live underground) such as mice and shrews may similarly be negatively impacted as a result of soil compaction caused by heavy machinery. Larger, more-mobile species, such as birds, javelinas, raccoons and coyotes may avoid the initial clearing and construction activities and move into adjacent areas outside the proposed ROW. Maintenance clearing activities during the breeding season may impact some nests and broods. Little vegetation clearing is anticipated, however, for any of the alternative routes. Thus, impacts from clearing should be minimal.

The increased noise and activity levels during construction could potentially disturb breeding or other activities of species inhabiting the areas adjacent to the proposed ROW. These impacts are expected, in most cases to be temporary. Thus, although the normal behavior of many wildlife species may be disturbed during construction, little permanent damage to populations is expected.

The transmission line (both structures and wires) may present a hazard to flying birds, particularly migrants. During a workshop on the impacts of transmission lines on birds in flight, it was concluded that mitigation may best be accomplished by the initial siting of transmission line routes (Avery, 1978). Because small birds such as passerines tend to migrate at lower altitudes than large birds (Tucker, 1975, cited by Gauthreaux, 1978), their potential for collisions should be greater. However, most migrant species, including passerines, should be minimally affected during migration since their normal flying altitudes are greater than the heights of the proposed transmission structures (Willard, 1978; Gauthreaux, 1978). Collisions tend to increase in frequency during the fall when migrating flocks are denser and flight altitudes are lower in association with cold air masses, fog and inclement weather. The greatest danger of mortality exists during periods of low ceiling, poor visibility and drizzle, when birds are flying low (perhaps commencing or terminating a flight) and may have difficulty seeing obstructions. For resident birds or for birds during periods of non-migration, those most prone to collision are often the largest and most common in a given area (Rusz et al., 1986). Resident birds, or those in an area for an extended period, learn the location of power lines and become less susceptible to wire strikes (Avery, 1978). Waterfowl are among the birds most susceptible to wire strikes (Faanes, 1987) and yet, despite these hazards, it has been estimated that wire strikes, including distribution lines, account for less than 0.1% of waterfowl mortality, compared to 88% from diseases and poisoning and 7.4% due to the weather (Stout and Cronwell, 1976). In some areas, hunting affects 20 to 30% of waterfowl populations (Thompson, 1978). Construction of the proposed transmission line is not expected to threaten the populations or continued existence of any avian species.

The danger of electrocution to birds would be insignificant since the distance between conductor and structure or ground wire is usually greater than the wingspan of any bird in the area

(i.e., greater than 8 ft). Overall, the proposed transmission line would likely have a minimal impact on both resident and migrant birds.

4.3.4 Endangered and Threatened Wildlife

No impacts to any of the endangered, threatened and candidate avian species mentioned in Section 3.5.2.2 are anticipated. Many are unlikely to occur in the study area except rarely as migrants or occasional visitors. Those that do have a breeding range that includes the study area vicinity, such as the northern beardless-tyrannulet and ferruginous pygmy-owl, generally require large tracts of dense thorn scrub or good quality riparian woodland for nesting. These habitat types are not present to any extent along any of the proposed routes.

The Texas tortoise, Texas horned lizard, black-striped snake and Coues' rice rat are typical of low-mobility forms that may be impacted during the initial clearing and construction phases of the project. However, the likelihood of impact is minimal and short-term and, if they occur in the study area, the project would not constitute a serious threat to any populations of these species.

The patches of brushland/woodland habitat in the study area may provide temporary refuge for ocelots, and perhaps jaguarundis, dispersing between the few large tracts of native woodland still extant along the Rio Grande. During construction of the line, any ocelots or jaguarundis in the vicinity would likely avoid the areas of construction. Brush habitat of potential temporary refuge for ocelots and jaguarundis along alternative routes 1 and 2 is limited to approximately 6.5 ac of brush located just north of Node B. A 1.3-ac brush patch just southwest of Node A is the only site approximating closed-canopy brush along Alternative Route 3. It is likely that brush removal at these sites will be minimal since much of the brushland can be spanned, and no long-term or permanent impact to either of these species is anticipated.

The alternative route impacting the least amount of woodland/brushland, particularly bottomland/riparian areas, and wetlands would be considered the preferred alternative with regard to potential impacts on wildlife. Alternative Route 3 would potentially involve clearing the least

amount of brushland (approximately 0.4 ac) as it crosses only 325 ft of this vegetation type. Most of this brushland area could be spanned and thus may require little/no brushland clearing. Alternative routes 1 and 2, utilizing the existing 69-kV transmission line ROW through the brushland areas, cross approximately 530 ft of brushland, thus potentially requiring approximately 0.7 ac to be cleared. Since much of the brushland area can be spanned or has already been cleared, actual clearing would be much less. None of the alternative routes crosses any wetland areas. Alternative Route 3 is also the shortest of the three routes, thus decreasing the possibility of avian mortality through wire strikes.

In summary, Alternative Route 3 is the most preferable from a wildlife standpoint because it is the shortest and potentially impacts less brushland. Alternative Route 1, the existing route, is the second-best choice from a wildlife standpoint.

4.4 IMPACTS ON AQUATIC ECOSYSTEMS

Impact on aquatic flora and fauna is expected to be very slight. No significant impact on fish or other aquatic organisms in the Rio Grande or ponds, as a result of the proposed action, is anticipated, since these aquatic environments will generally be avoided or spanned. Impacts to be expected at the river crossing are primarily those associated with temporary erosion and turbidity. Erosion results in siltation which negatively affects many aquatic organisms that require relatively clear water for feeding and reproduction. With appropriate erosion-control measures utilized during construction, these short-term effects should be minor as a result of the relatively small area to be disturbed at any particular time and the short duration of the construction activities.

No herbicides or other chemicals would be used in association with the project which might enter the river ecosystem and cause significant adverse impacts to the aquatic communities therein.

4.5 SOCIOECONOMIC IMPACTS

4.5.1 Social and Economic Factors

Construction and operation of the proposed transmission line would beneficially impact Cameron County and communities that lie within the CPL service area. The proposed transmission line would ensure a continued level of reliability of electric service to utility customers and ensure that adequate power is available to developing areas in the future.

Since CPL may use local contractors to augment their existing work force for construction, some short-term local employment may be generated by this project. A portion of project-generated wages would find its way into the local economy through purchases such as fuel, food and possibly building materials. If a new ROW is required, easement payments will be made to individual landowners based on the appraised land value, resulting in increased income. Since CPL is a private utility, it is required to pay sales tax on purchases and local property tax on land or improvements, resulting in beneficial impacts on local tax revenues.

4.5.2 Impacts on Community Values

For the purposes of evaluating the effects of the proposed transmission line, EH&A has generally defined the term community values as a "shared appreciation of an area or other natural or human resource by a national, regional or local community." Adverse effects upon community values are defined as aspects of the proposed project which would significantly and negatively alter the use, enjoyment or intrinsic value attached to an important area or resource by a community. This definition assumes that community concerns are identified with the location and specific characteristics of the proposed transmission line and do not include possible objections to electric transmission lines per se.

Impacts on community values can be classified into two areas: (1) direct effects, or those effects which would occur if the location and construction of a transmission line results in the removal of, or loss of public access to, a valued resource; and (2) indirect effects, or those

effects which would occur due to a loss in the enjoyment or use of a resource due to the characteristics (primarily aesthetic) of the proposed line, structures or ROW. Impacts on community values, whether direct or indirect, can be more accurately gauged as they effect land use, recreational areas or resources and the visual environment of an area (aesthetics). Impacts in these areas are discussed in detail in sections 4.6.1 to 4.6.4 of this report.

4.6 IMPACTS ON LAND USE, AESTHETICS AND RECREATION

4.6.1 Impacts on Land Use

Land use impacts are determined by the amount of land, of whatever use, displaced by the transmission line ROW and by the compatibility of the electric transmission line ROW with adjacent land uses. During construction, temporary impacts to land uses within the ROW, especially in residential areas, could occur due to the movement of workers and materials through the area. Construction noise and dust, as well as temporary disruption of traffic flow on local roads, may also temporarily effect residents and businesses in the area immediately adjacent to the ROW. Coordination between CPL and landowners regarding access to the ROW and construction scheduling should minimize any such disruptions.

Due to the nature of urban development in the northern portion of the study area, the greatest potential for land use impacts will be to residential and commercial land uses in this area. Criteria considered to measure these impacts include the amount of existing ROW used or paralleled, the length of each route, and the number of habitable structures (i.e., residences, businesses, schools, churches, cemeteries, hospitals, nursing homes, etc.) within 200 ft of the centerline of each route. The number of habitable structures along a route and the length of that route are among the most important indicators of potential land use impacts.

Among the alternatives, Route 1 would essentially involve rebuilding the existing CPL 69-kV line, and thus would use most of the existing route, while routes 2 and 3 would require approximately 6,015 ft and 6,870 ft of new ROW, respectively. Overall route length can also be used as an indicator of potential land use impacts, shorter routes potentially impacting less land.

In this regard, Route 3 is the shortest alternative (6,870 ft), while Route 2 is the longest (9,235 ft). One important criterion, however, is the number of habitable structures in close proximity to the route. Route 3, with 22 structures within 200 ft of the centerline is clearly preferable to routes 1 and 2, which each have 33 structures in this same category. In addition, Route 3 would not cross Garden Park Elementary School property.

The Brownsville Land Use Plan (COB, 1975) proposes the following three basic land use types within the study area: agriculture, suburban-rural residential, and public. All three alternatives would miss the area designated as public and be located primarily in areas proposed as agriculture. Since the ROW for this project will not be fenced or otherwise separated from adjacent lands, no long-term displacement of farming or grazing activities will occur. Most existing land uses may be resumed following construction. The only land lost from production in agricultural areas will be the small area immediately surrounding the str[illegible]e base. All three routes would also cross the suburban-rural area in the vicinity of the Military Highway Substation, (where CPL's existing transmission line is located), but Route 3 is located near fewer residences in this area than alternatives 1 and 2. The only place electrical lines are mentioned in the Land Use Plan is under transportation policies, goals and objectives, where the following statement is found:

> "The transportation and power distribution systems should be coordinated so that high voltage overhead lines may be located in major street rights-of-way or utilize abandoned railroad rights-of-way."

However, given the location of CPL's existing line and the necessary connection with the CFE system across the Rio Grande, no such existing ROWs exist within the study area that could be utilized by the proposed transmission line.

4.6.2 Impacts on Aesthetics

Aesthetic impacts, or impacts upon visual resources, exist when the ROW, lines and/or structures of a transmission line system create an intrusion into, or substantially alter the character of, an existing scenic view. The significance of the impact is directly related to the quality of the view, in the case of natural scenic areas, or to the importance of the existing setting in the use and/or enjoyment of an area, in the case of valued community resources and recreational areas.

In order to evaluate aesthetic impacts, field surveys were conducted in May and August 1991 to determine the degree to which the proposed transmission line would be visible from selected areas. These areas included those of potential community value, residential areas, parks and recreational areas, particular scenic vistas encountered during the field survey, and U.S. and State highways which traverse the study area. Measurements were also made to estimate the length of the corridor that would fall within recreational foreground visual zones (0.25 mile). The determination of the visibility of the transmission line from various points was first calculated from USGS maps and aerial photographs and then completed during the field surveys, considering structure heights at varying distances and the screening of the route by trees and/or topography.

Construction of the proposed 138/69-kV transmission line could have both temporary and permanent aesthetic effects. Temporary effects would include views of the actual construction (assembly and erection of the structures) and clearing the ROW. Where clearing is required in wooded areas, the brush and wood debris could have a temporary negative impact on the local visual environment. However, very little clearing of wooded areas is anticipated. Permanent impacts from the project would be the views of the structures and lines themselves as well as views of cleared ROW. The existing CPL transmission line, however, represents an existing visual impact. Therefore, possible permanent aesthetic impacts of the proposed project are to be evaluated relative to the existing condition. The proposed project would present less of an aesthetic impact than the existing line.

The study area exhibits a low to moderate level of aesthetic quality in an area that presents a relatively high level of development and modification. Although several long vistas from

area roadway exist, no designated scenic views or areas of high scenic value were identified by EH&A during field surveys in May and August 1991. Although U.S. 281 is part of the SDHPT's "Tropical Trail", no designated scenic or cultural resources exist within the study area (SDHPT, n.d.). Several areas occur along U.S. 281 with foreground views of the existing CPL transmission line, but these are limited and of short duration. Selection of either alternative route 2 or 3 would remove the line from highway foreground views and further reduce any potential aesthetic impact. The relatively flat terrain and the general absence of woodlands throughout much of the area creates a landscape with a low level of visual closure; that is, prominent features to frame any particular view are lacking.

Overall, no major visual impact to the public would result from the construction of this transmission line. The lack of significant recreational or other public areas within the study area, plus the existence of the current CPL 69-kV line mean that any aesthetic impact would be minor, and qualitative, not quantitative, in nature.

4.6.3 Impacts on Recreation

None of the three alternative routes will cross or directly impact any existing public park or recreation area within the study area. If the FWS is successful in purchasing tracts of land within the study area for the Lower Rio Grande Valley NWR, selection of routes 2 or 3 would result in the removal of the existing CPL line from the middle of a large tract, presumably creating fewer problems with proposed revegetation plans and other FWS management activities. Likewise, if the City of Brownsville eventually implements the goals of its Land Use Plan and purchases lands north of the water treatment plant for use as public, institutional, or parkland, selection of routes 2 or 3 would have the effect of removing the existing 69-kV line from the vicinity of these lands and reconstructing it parallel to the levee.

4.6.4 Impacts on Aviation

The proposed transmission line facilities would have a minimal effect on aviation operations in the vicinity. Structure heights will average 95 ft, while the minimum ground

clearance for wires, conductors and cables will be between 18.5 and 20.5 ft. According to Federal Aviation Administration (FAA) Regulations, Part 77 (FAA, 1975), notification of the construction of a proposed transmission line is required if structure heights exceed the height of an imaginary surface extending outward and upward at a slope of 100 to 1 for a horizontal distance of 20,000 ft from the nearest point of the nearest runway of a public or military airport having at least one runway longer than 3,200 ft. The Brownsville/South Padre Island International Airport is the nearest public or military airport to any of the alternative routes. It is not, however, within 20,000 ft and, thus, no FAA notification will be required. No adverse impacts to aviation activity in the area are anticipated.

4.7 IMPACTS ON CULTURAL RESOURCES

Construction of a transmission line may create potential adverse impacts to cultural resources sites through changes in the quality of the historical, architectural, archaeological, or cultural characteristics of that site. As presented in 36 CFR 800.9(a), these impacts may occur when an undertaking alters characteristics of the property that may contribute to its significance. Impacts may be direct or indirect. Direct impacts are caused by the undertaking and occur at the same time and place. Indirect impacts include those caused by the undertaking that occur later in time or are further removed in distance but are reasonably foreseeable. These impacts may include alterations in the pattern of land use, changes in population density, or accelerated growth rate, all of which may have an impact on properties of historical, architectural, archaeological or cultural significance.

As discussed in 36 CFR 800.9(b), adverse impacts on National Register or eligible properties may occur under conditions which include, but are not limited to the following:

1. destruction or alteration of all or part of a property;
2. isolation from or alteration of the property's surrounding environment (setting); or
3. introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting.

4.7.1 Direct Impacts

This section documents each proposed alternative route with respect to known cultural resources and high probability areas for cultural resources. A search of records at the THC and TARL suggests that none of the proposed alternatives has been subjected to a cultural resources survey. No cultural resources have been recorded within 1,000 ft of the proposed centerline of any of the alternatives. However, the possibility exists that such resources may occur within and adjacent to the three proposed alignments.

Route 1. This alternative does not cross any previously recorded cultural resources and none is reported within 1,000 ft of the proposed centerline. This alternative would utilize the the existing 69-kV transmission line corridor. Only the immediate bankline of the Rio Grande is thought to have a high probability for the occurrence of cultural resources. An approximately 400-ft area upslope from the bank has been subjected to levee and transmission line construction which likely would have impacted any unrecorded resources in the area. The remainder of this route is characterized by flat terrain interspersed with shallow, natural depressions which are not conducive to prolonged cultural settlement or activity. Recent study by EH&A along the north bank of the Rio Grande east of Brownsville has shown that historically the Rio Grande has meandered considerably from its present banks (Gearhart and Moore, 1987). As a result, the possibility exists that some of the area crossed by Route 1 contains soils which are not of sufficient age to contain prehistoric archaeological materials.

Route 2. This alternative does not cross any previously recorded cultural resources and none is reported within 1,000 ft of the proposed centerline. Only the northern and southern portions of this alternative would utilize the existing 69-kV line; however, the central portion of the alternative would be adjacent to a modern levee. Like Route 1, only the Rio Grande bankline of Route 2 is considered to have a high probability for cultural resource occurrence, and even that area may have been disturbed by previous levee and electric transmission line construction. The remainder of this alternative is characterized by flat terrain which has likely been impacted by levee and electric transmission line construction. The possibility for unrecorded cultural resources is

considered low and, if present, they are likely to have been affected by the past construction activities. Some Route 2 soils may also not be of sufficient age to contain prehistoric materials.

Route 3. This alternative does not cross any previously recorded cultural resources and none is reported within 1,000 ft of the proposed centerline. Like routes 1 and 2, Route 3 transects flat terrain interspersed by shallow, natural depressions. The central portion of this alternative would be adjacent to a modern levee, the construction of which would likely have affected any potential cultural resources. The area between the Rio Grande bankline and the levee to the north (about 800 ft) is thought to have a high probability for cultural resources. Unlike alternatives 1 and 2, no levees, electric transmission line or roads occur in this area; however, the point bar which Route 3 crosses in this area is heavily cultivated, and, if present, cultural resources may have been affected. It is possible that the present point bar soils may be too recent to contain prehistoric archaeological deposits. It is also possible that cultural resource materials may be deeply buried by modern point bar soils.

4.7.2 Indirect Impacts (All Alternative Routes)

Construction of the proposed transmission line could cause indirect impacts to unrecorded cultural resources sites located along or near any of the alternative routes through increased vehicular and pedestrian traffic in the area during the construction phase of the project. This traffic could lead to damage or vandalism of these sites. Additionally, the integrity of the character of any unrecorded, significant historic structures could also be visually impacted by the construction of this line.

The indirect impacts of the construction of the proposed transmission line on cultural resources discovered in the future, regardless of which alternative route is selected, could potentially be adverse. Prehistoric sites located along the route might become more accessible to vandals, but would otherwise be unaffected. However, the integrity of any potential historical sites and landscapes might be adversely impacted by the visibility of the proposed transmission line. The probable presence of such cultural remains on any of the alternate routes is relatively low.

Further, the integrity of any sites which might be present was likely compromised by the extensive use of mechanical agriculture and the extensive levee construction which dominates the area.

4.7.3 Mitigation (All Alternative Routes)

The preferred form of mitigation of transmission line impacts on cultural resources, regardless of which alternative is selected, is avoidance. An alternative form of mitigation of direct impacts can be developed for archaeological and historical sites with the implementation of a program of detailed data retrieval. Additionally, relocation may be possible for some historic structures. Indirect impacts on historical properties and landscapes can be somewhat lessened through careful route selection, design considerations and landscaping.

4.7.4 Summary of Cultural Resource Impacts

Analysis of the available data indicates that the preferred alternative with regard to cultural resources is Route 1. Except for the immediate Rio Grande bankline, this route crosses no areas of high probability for cultural resources occurrence. As a result, few, if any, unrecorded cultural resources are anticipated. Route 3 has a greater area of high probability and both routes 2 and 3 are longer. Consequently, Route 1, if selected, would possibly affect fewer potentially unrecorded cultural resources.

The Deputy State Historic Preservation Officer (SHPO) in a July 29, 1991 letter from the Texas Historical Commission (Appendix) has reviewed the project and has recommended that an archaeological survey of the project area be conducted. On selection of a final route alignment an archaeological survey will be conducted and a report of investigations prepared in conformance with the Secretary of Interior's Guidelines: Archaeology and Historic Preservation.

4.8 AIR QUALITY, NOISE, AND ELECTRIC AND MAGNETIC FIELDS

4.8.1 Effects on Air Quality

The only air quality impacts expected will occur during the construction phase of the project. Fugitive dust and some exhaust emissions from heavy machinery will temporarily and minimally affect local air quality in the immediate vicinity of construction activity.

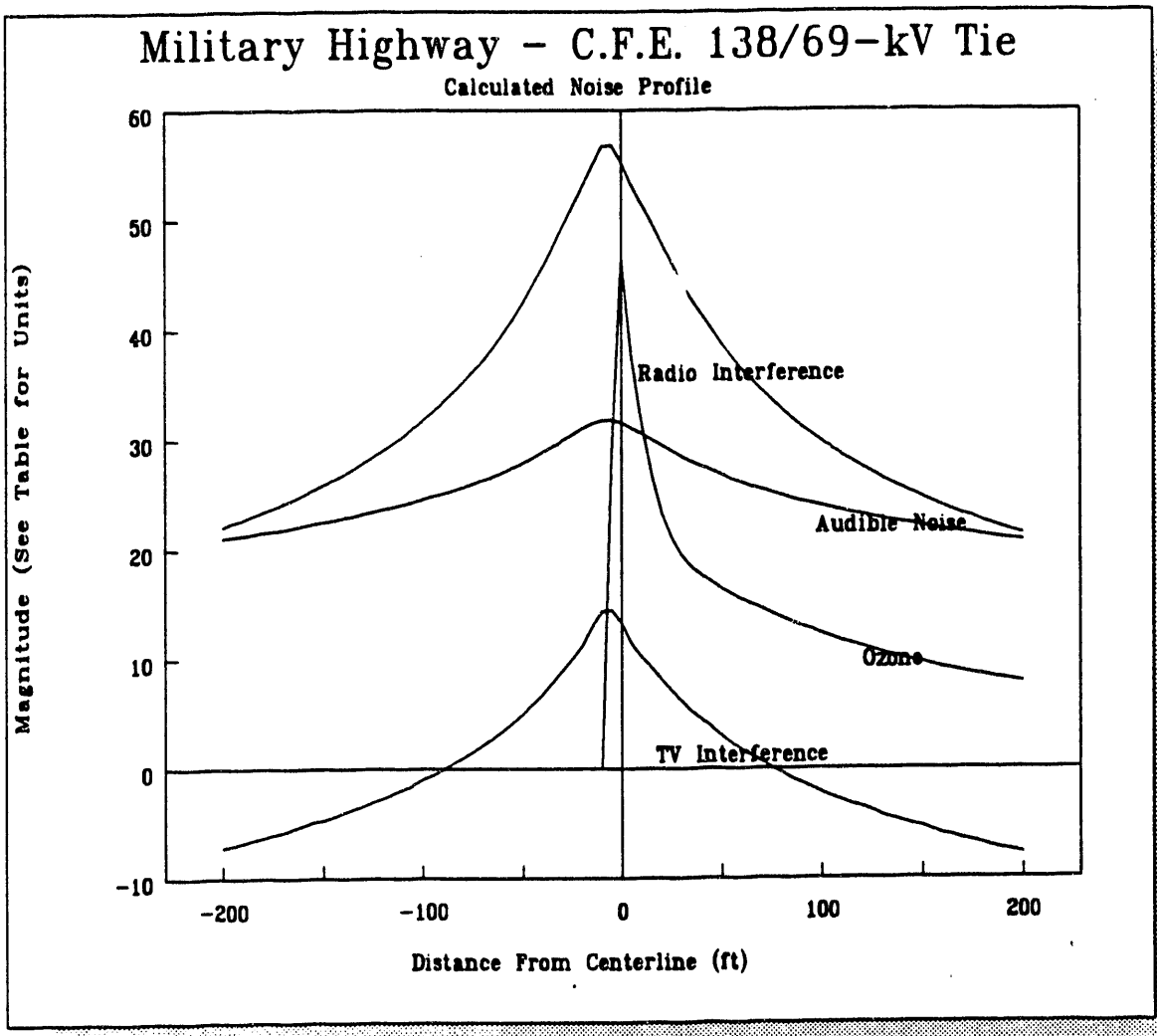
4.8.2 Effects of Noise Pollution

Temporary noise impacts will result from the use of heavy machinery and tools in the construction phase. These noises are transient since work will largely be performed during the day and the location of clearing and construction will move along the ROW.

Noise from operating transmission lines consists of coronal crackling caused when the electrical field intensity on the conductor surface exceeds the breakdown strength of air. Using calculations based on the proposed design for the 138-kV and 69-kV circuits, the line should not produce noise levels above 32 db in the ROW during rainy conditions (Figure 4-1 amd Table 4-1). This sound level is within EPA noise guidelines. During dry weather conditions, the line would produce noise levels of approximately 7 db in the ROW. For comparison, Table 4-2 presents some typical background noise levels. Due to the design of the proposed line, corona effects should be small. The use of single-piece insulators tends to decrease the concentrated electric field around the insulator and, thus, reduces corona. Corona effects would be least during dry weather and greatest during wet weather. Audible noise associated with corona discharge will be greatest during heavy rain but would, to a large extent, be masked by the noise of the rain.

4.8.3 Effects of Ozone Production, Electrical Interference and Induced Current

Efforts to reduce corona discharge (e.g., ensuring tight, unscratched hardware) should result in insignificant ozone production and, thus, no effects are expected (Figure 4-1 and Table 4-1).



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Engineering & Environmental Consultants

Figure 4-1

CALCULATED NOISE PROFILE
MILITARY HWY. - CFE TIE PROJECT

Source: CPL

TABLE 4-1

NOISE LEVELS

MILITARY HIGHWAY-CFE TIE 138/69-KV PROJECT

	LATERAL DIST FROM REFERENCE (FEET)	AUDIBLE NOISE (RAIN) L50 DBA	AUDIBLE NOISE (FAIR) L50 DBA	RADIO INTERFERENCE (RAIN) L50 DBUV/M	RADIO INTERFERENCE (FAIR) L50 DBUV/M	TVI TOTAL RAIN DBUV/M	OZONE FOR RAIN RATE OF .10 IN/HR AT .0 FT.LEVEL PPB	ELECTRIC FIELD KV/M	MAGNETIC FIELD GAUSS
	-200	21.1	-3.9	22.1	5.1	-7.2	0.00000	0.017	0.00107
	-195	21.2	-3.8	22.4	5.4	-7.0	0.00000	0.018	0.00113
	-190	21.3	-3.7	22.8	5.8	-6.8	0.00000	0.018	0.00119
	-185	21.5	-3.5	23.1	6.1	-6.5	0.00000	0.019	0.00126
	-180	21.6	-3.4	23.4	6.4	-6.3	0.00000	0.020	0.00133
	-175	21.7	-3.3	23.8	6.8	-6.0	0.00000	0.022	0.00141
	-170	21.9	-3.1	24.2	7.2	-5.8	0.00000	0.023	0.00149
	-165	22.0	-3.0	24.6	7.6	-5.5	0.00000	0.024	0.00159
	-160	22.2	-2.8	25.0	8.0	-5.2	0.00000	0.026	0.00169
	-155	22.3	-2.7	25.4	8.4	-4.9	0.00000	0.027	0.00180
	-150	22.5	-2.5	25.9	8.9	-4.7	0.00000	0.029	0.00192
	-145	22.7	-2.3	26.3	9.3	-4.4	0.00000	0.031	0.00206
	-140	22.9	-2.1	26.8	9.8	-4.0	0.00000	0.033	0.00221
	-135	23.0	-2.0	27.3	10.3	-3.7	0.00000	0.035	0.00238
	-130	23.2	-1.8	27.8	10.8	-3.4	0.00000	0.037	0.00257
	-125	23.4	-1.6	28.4	11.4	-3.0	0.00000	0.040	0.00278
	-120	23.6	-1.4	29.0	12.0	-2.7	0.00000	0.043	0.00302
	-115	23.9	-1.1	29.6	12.6	-2.3	0.00000	0.046	0.00328
	-110	24.1	-0.9	30.3	13.3	-1.9	0.00000	0.049	0.00359
	-105	24.3	-0.7	31.0	14.0	-1.5	0.00000	0.053	0.00394
	-100	24.5	-0.5	31.7	14.7	-1.0	0.00000	0.057	0.00433
	-95	24.8	-0.2	32.5	15.5	-0.6	0.00000	0.061	0.00480
	-90	25.1	0.1	33.3	16.3	-0.1	0.00000	0.065	0.00533
	-85	25.4	0.4	34.2	17.2	0.4	0.00000	0.069	0.00596
	-80	25.7	0.7	35.2	18.2	1.0	0.00000	0.074	0.00670
	-75	26.0	1.0	36.2	19.2	1.5	0.00000	0.077	0.00758
	-70	26.3	1.3	37.2	20.2	2.1	0.00000	0.080	0.00864
	-65	26.7	1.7	38.4	21.4	2.8	0.00000	0.081	0.00992
	-60	27.0	2.0	39.7	22.7	3.5	0.00000	0.078	0.01148
	-55	27.4	2.4	41.0	24.0	4.2	0.00000	0.071	0.01340
	-50	27.9	2.9	42.4	25.4	5.0	0.00000	0.059	0.01579
	-45	28.3	3.3	44.0	27.0	5.9	0.00000	0.057	0.01879
	-40	28.8	3.8	45.7	28.7	6.8	0.00000	0.115	0.02259
	-35	29.3	4.3	47.4	30.4	7.8	0.00000	0.233	0.02739
P	-30	29.9	4.9	49.2	32.2	8.9	0.00000	0.428	0.03344
R	-25	30.4	5.4	51.1	34.1	10.0	0.00000	0.721	0.04086
O	-20	31.0	6.0	52.8	35.8	11.1	0.00000	1.114	0.04941
P	-15	31.4	6.4	54.8	37.8	12.9	0.00000	1.540	0.05793
O	-10	31.7	6.7	56.6	39.6	14.3	0.00000	1.825	0.06392
S	-5	31.8	6.8	56.8	39.8	14.5	0.02863	1.781	0.06461
E	0	31.5	6.5	55.2	38.2	13.3	0.04662	1.453	0.05965
D	5	31.1	6.1	53.2	36.2	11.5	0.03782	1.126	0.05149
	10	30.6	5.6	51.6	34.6	10.3	0.03184	0.921	0.04284
	15	30.0	5.0	49.8	32.8	9.2	0.02675	0.716	0.03514
R.	20	29.5	4.5	47.9	30.9	8.1	0.02329	0.494	0.02879
O.	25	28.9	3.9	46.1	29.1	7.1	0.02100	0.305	0.02371
W.	30	28.4	3.4	44.4	27.4	6.1	0.01948	0.172	0.01970
	35	28.0	3.0	42.9	25.9	5.3	0.01841	0.092	0.01651
	40	27.5	2.5	41.4	24.4	4.4	0.01761	0.061	0.01398
	45	27.1	2.1	40.0	23.0	3.7	0.01697	0.062	0.01195
	50	26.8	1.8	38.7	21.7	3.0	0.01641	0.067	0.01031

Source: CPL

TABLE 4-1 (Concluded)

LATERAL DIST FROM REFERENCE (FEET)	AUDIBLE NOISE (RAIN) L50 DBA	AUDIBLE NOISE (FAIR) L50 DBA	RADIO INTERFERENCE (RAIN) L50 DBUV/M	RADIO INTERFERENCE (FAIR) L50 DBUV/M	TVI TOTAL RAIN DBUV/M	OZONE FOR RAIN RATE OF 10 IN/HR AT .0 FT.LEVEL PPB	ELECTRIC FIELD KV/M	MAGNETIC FIELD GAUSS
55	26.4	1.4	37.6	20.6	2.3	0.01590	0.070	0.00896
60	26.1	1.1	36.5	19.5	1.7	0.01543	0.070	0.00785
65	25.7	0.7	35.4	18.4	1.1	0.01498	0.068	0.00693
70	25.4	0.4	34.5	17.5	0.6	0.01454	0.065	0.00615
75	25.1	0.1	33.6	16.6	0.0	0.01413	0.061	0.00550
80	24.9	-0.1	32.7	15.7	-0.4	0.01373	0.058	0.00494
85	24.6	-0.4	31.9	14.9	-0.9	0.01334	0.054	0.00446
90	24.4	-0.6	31.2	14.2	-1.3	0.01298	0.050	0.00404
95	24.1	-0.9	30.5	13.5	-1.8	0.01262	0.047	0.00368
100	23.9	-1.1	29.8	12.8	-2.2	0.01228	0.044	0.00336
105	23.7	-1.3	29.2	12.2	-2.6	0.01196	0.041	0.00309
110	23.5	-1.5	28.6	11.6	-2.9	0.01165	0.038	0.00284
115	23.3	-1.7	28.0	11.0	-3.3	0.01135	0.036	0.00262
120	23.1	-1.9	27.5	10.5	-3.6	0.01107	0.034	0.00243
125	22.9	-2.1	26.9	9.9	-3.9	0.01080	0.032	0.00226
130	22.7	-2.3	26.5	9.5	-4.3	0.01054	0.030	0.00210
135	22.6	-2.4	26.0	9.0	-4.6	0.01029	0.028	0.00196
140	22.4	-2.6	25.5	8.5	-4.9	0.01005	0.026	0.00183
145	22.2	-2.8	25.1	8.1	-5.2	0.00982	0.025	0.00172
150	22.1	-2.9	24.7	7.7	-5.4	0.00961	0.023	0.00161
155	21.9	-3.1	24.3	7.3	-5.7	0.00940	0.022	0.00152
160	21.8	-3.2	23.9	6.9	-6.0	0.00920	0.021	0.00143
165	21.6	-3.4	23.5	6.5	-6.2	0.00901	0.020	0.00135
170	21.5	-3.5	23.2	6.2	-6.5	0.00882	0.019	0.00128
175	21.4	-3.6	22.8	5.8	-6.7	0.00864	0.018	0.00121
180	21.2	-3.8	22.5	5.5	-6.9	0.00847	0.017	0.00115
185	21.1	-3.9	22.2	5.2	-7.2	0.00831	0.016	0.00109
190	21.0	-4.0	21.9	4.9	-7.4	0.00815	0.015	0.00104
195	20.8	-4.2	21.6	4.6	-7.6	0.00800	0.015	0.00099
200	20.7	-4.3	21.3	4.3	-7.8	0.00786	0.014	0.00094

Source: CPL

Footnote:

DBA - Decibels Audible
DBUV/M - Decibels microvolts per meter
PPB - Parts per Billion
KV/M - Kilovolts per Meter

To obtain milligauss values rather than Gauss, multiply the values shown by 1000.

The readings are projected at 3 ft above ground at the point of maximum conductor sag.

TABLE 4-2

TYPICAL BACKGROUND NOISES

Decibels		
140	Shotgun blast, jet 100 ft away at takeoff	Pain
	Motor test chamber	Human ear pain threshold
130		
	Firecrackers	
120	Severe thunder, pneumatic jackhammer	
	Hockey crowd	
	Amplified rock music	Uncomfortably loud
110		
	Textile loom	
100	Subway train, elevated train, farm tractor	
	Power lawn mower, newspaper press	
	Heavy city traffic, noisy factory	Loud
90		
	Diesel truck 40 mph 50 ft away	
80	Crowded restaurant, garbage disposal	
	Average factory, vacuum cleaner	
	Passenger car 50 mph 50 ft away	Moderately loud
70		
	Quiet typewriter	
60	Singing birds, window air-conditioner	
	Quiet automobile	
	Normal conversation, average office	Quiet
50		
	Household refrigerator	
	Quiet office	Very quiet
40		
	Average home	
30	Dripping faucet	
	Whisper 5 ft away	
20	Light rainfall, rustle of leaves	
		Average person's threshold of hearing
	Whisper	Just audible
10		
0		Threshold for acute hearing

Source: World Book, Rand McNally Atlas of the Human Body, Encyclopedia Americana, "Industrial Noise and Hearing Conversation" by J.B. Olishifski and E.R. Harford (Researched by N. Jane Hunt and published in the Chicago Tribune in an illustrated graphic by Tom Heinz).

Radio and television interference may result from corona discharges. The level of AM radio and television interference depends upon a number of factors including voltage, conductor diameter, number of conductors per phase, phase spacing, conductor height, conductor surface factor, relative air density, and wind speed. Of greatest significance are conductor diameter and configuration and conductor surface factor. Hardware will be designed to reduce radio noise. Excessive AM radio interference is uncommon from 138-kV lines. However, should radio interference become a problem due to equipment defects, such defects will be eliminated. Television interference (in the low VHF bands) may occur, especially if the signal is weak and the antenna is directional and too close to the transmission line. All complaints will be checked and problems corrected if determined to be caused by the transmission line.

Any noticeable voltage induced in fences, gates, and other metal objects beneath the line is not anticipated. None of the agricultural lands crossed by the alternative transmission line routes were observed to use either fixed or portable irrigation systems. Voltages induced in conducting bodies adjacent to transmission lines are proportional to line voltage, distance, and conductor length.

4.8.4 Electric and Magnetic Fields

In technical terms, the word "field" is used to describe an area of space where an influence exists. For example, the warm area surrounding an illuminated light bulb is known as a temperature field. Electric and magnetic fields (EMF) are similar: they are created by the presence of electricity.

Electric fields are associated with the voltage of an electrical source. The units commonly used to describe an electric field are volts per meter (V/m) or kilovolts per meter (kV/m). Magnetic fields are associated with the flow of electric current, which is measured in amperes. The most common unit used by engineers to describe magnetic fields is the Gauss (G). Often a smaller unit, the milligauss (mG) is used. One Gauss equals one thousand milligauss.

The strength of electric fields and magnetic fields decreases rapidly with distance from their respective sources. In addition, electric field strengths are weakened or eliminated by shielding from such objects as trees, buildings, or other conducting material.

Electric and magnetic fields occur in the natural environment. The earth itself has a static or steady-state (O Hertz) magnetic field that varies, depending on location, but is generally in the range of 500 mG. The earth also produces a natural electric field of approximately 0.1 kV/m between the ground and the upper atmosphere. This natural electric field may increase to 5 kV/m or higher during thunderstorm activity (EPRI, 1989).

In addition to these naturally occurring fields, electric and magnetic fields are also found wherever electricity is being used. Virtually all of the electricity used in this country alternates at a frequency of 60 cycles per second or 60 Hertz, and is referred to as alternating current or AC electricity. Electricity that alternates at 60 Hertz produces electric and magnetic fields that also alternate at 60 Hertz.

Sources of 60 Hertz fields include household appliances, electric tools and other electrical equipment, the electrical wiring in residences and other buildings, distribution lines and transmission lines. In our modern society, virtually everyone is exposed to 60 Hertz electric and magnetic fields on a regular basis (OTA, 1989).

Studies have been conducted to determine the levels of electric and magnetic fields that people experience in everyday life. Table 4-3 reports the electric field levels measured in the center of various rooms in a typical home. Table 4-4 reports the results of a study that measured typical electric field levels associated with usage of certain appliances. The electric fields measured in residences have been found to result primarily form internal sources (e.g., house wiring and electrical appliances) rather than external sources such as electric power lines (Bracken, 1988).

Table 4-5 reports the measurements of representative magnetic field levels associated with electrical appliances, including the "typical range" of field levels measured at distances where the appliances are typically used and "maximum values" of magnetic field levels immediately

TABLE 4-3

60-HZ ELECTRIC FIELD LEVELS AT THE
CENTER OF VARIOUS ROOMS IN A TYPICAL U.S. HOME

Location	Electric Field Level (V/m)
Laundry Room	0.8
Dining Room	0.9
Bathroom	1.2-1.5
Kitchen	2.6
Bedroom	2.4-7.8
Living Room	3.3
Hallway	13.0

Source: WHO, 1984

TABLE 4-4

TYPICAL 60-HZ ELECTRIC FIELD LEVELS AT
30-CM FROM 115-V HOME APPLIANCES

Appliance	Electric Field Level (V/m)
Electric Blanket	250
Broiler	130
Stereo	90
Refrigerator	60
Electric Iron	60
Hand Mixer	50
Toaster	40
Hair Dryer	40
Color TV	30
Coffee Pot	30
Vacuum Cleaner	16
Incandescent Bulb	2

Source: WHO, 1984

TABLE 4-5

REPRESENTATIVE MAGNETIC FIELDS FROM DOMESTIC ELECTRICAL APPLIANCES

Appliance	Body Location	Magnetic Field Level (mG)	
		Typical Range	Maximum Value
Range	Belt	1 - 80	175 - 625
Refrigerator	Chest	1 - 8	12 - 187
Microwave Oven	Belt	3 - 40	65 - 812
Can Opener	Belt	30 - 225	288 - 2750
Oven	Belt	1 - 8	14 - 67
Toaster	Belt	2 - 6	9
Coffee Maker	Chest	1 - 2	4 - 25
Freezer	Head	1 - 3	4 - 6
Mixer	Belt	2 - 11	16 - 387
Clothes Dryer	Belt	1 - 24	45 - 93
Dishwasher	Belt	1 - 15	28 - 712
Garbage Disposal	Belt	1 - 5	8 - 33
Ceiling Fan	Head	1 - 11	125
Electric Blanket	Belt	3 - 50	65
Waterbed Heater	Belt	1 - 9	20 - 27
Blow Dryer	Head	1 - 75	112 - 2125
Computer	Belt	1 - 25	49 - 1875
Typewriter	Belt	1 - 23	38
Make-Up Mirror	Chest	1 - 29	44 - 125
Shaver	Head	50 - 300	500 - 6875
Aquarium	Belt	1 - 40	50 - 2000
Sewing Machine	Chest	1 - 23	26 - 1125
Electric Drill	Chest	56 - 194	300 - 1500
Circular Saw	Belt	19 - 48	84 - 562

Sources: Llaurado, 1974; Silva, 1988

(Note: "Typical Range" represents field levels at "Body Locations" in relationship to where appliances are typically used, and "Maximum Value" represents field levels immediately adjacent to the appliance source.)

adjacent to the appliance source. Away from appliances, residential background magnetic fields have been found to range from 0.5-10 mG (EPRI, 1989).

The electric and magnetic fields associated with transmission lines are a function of line voltage (electric fields), the loading on the line (magnetic fields), conductor spacing and phasing, conductor height above ground, and distance from the line. Transmission line edge of right-of-way electric field levels generally are in the range of 0.3 kV/m - 2.0 kV/m (NYPLP, 1987). Transmission line edge of right-of-way magnetic field levels typically range from 10-300 mG, depending on the loading and other factors (NYPLP, 1987).

Over the past 20 years, extensive research has been conducted to assess whether 60 Hertz electric and/or magnetic fields cause adverse human health effects. This research has examined a broad range of possible effects, including effects on reproduction, growth and development, and possible effects that could lead to the development of cancer. The studies of EMF generally consist of epidemiologic (i.e., health survey) studies, laboratory studies on whole animals, and experiments at the cellular and molecular levels.

This body of EMF research has been examined by a number of independent scientific panels, governmental bodies and other organizations. These include the National Academy of Sciences (1977), the World Health Organization (1984, 1987, 1989), the American Institute of Biological Sciences (1985), the Florida Electric and Magnetic Fields Science Advisory Commission (1985, 1987), the New York State Power Lines Project Scientific Advisory Panel (1987), the Ontario Ministry of Health (1987), the U.S. Congress Office of Technology Assessment (1989), the California Department of Health Services (1989, 1990), the International Radiation Protection Association (1990), the National Cancer Institute (1990, 1991), the Virginia Department of Health (1990, 1991), the New South Wales Government (1991), the Environmental Protection Agency's Science Advisory Board (1991), and the U.S. Committee on Interagency Radiation Research and Policy Coordination (1991).

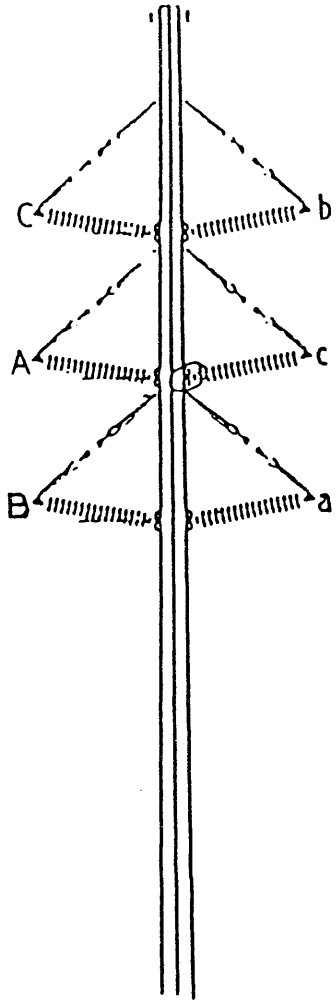
To date, none of the independent scientific panels, governmental bodies and other organizations which have reviewed the EMF research have determined that there is a scientific

basis to conclude that environmental exposure to 60 Hertz electric and/or magnetic fields (from transmission lines or other sources) causes any adverse human health effects. Nor have they found that the EMF research to date provides a scientifically sound basis for the development of any health-based exposure limits. As stated in a 1989 Background Paper prepared by the U.S. Congress Office of Technology Assessment, the available health research on EMF "does not provide a basis for asserting that there is a significant risk" (OTA, 1989).

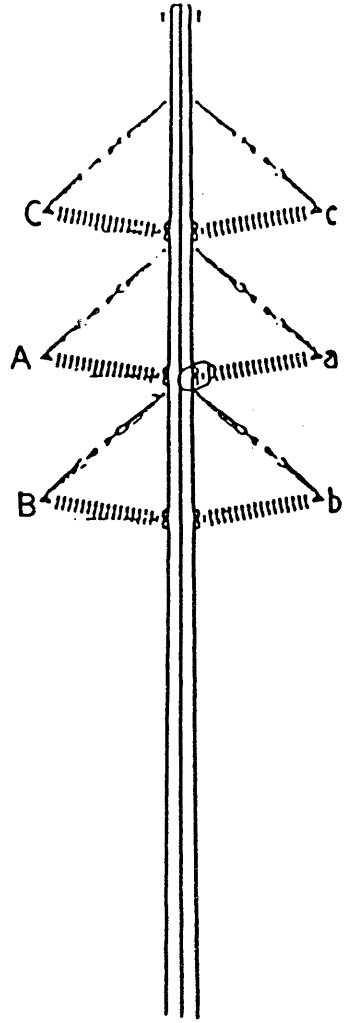
There are no federal standards or regulations governing the electric and/or magnetic fields or field levels associated with transmission lines. Nor are there any such standards in the State of Texas.

CPL studied a number of line designs for the proposed line. The configurations considered included: (1) a wooden H-Frame structure with horizontal conductor configuration; (2) a single steel-pole structure with the conductor phases aligned vertically and symmetrically ("like phasing"); and (3) a single steel-pole structure with the conductor phases aligned vertically and unsymmetrically ("unlike phasing"). These three alternative configurations are shown in Figure 4-2. As explained above, among the many factors that were considered by CPL in selecting the proposed design for the Military Highway-CFE Tie transmission line were: (1) compliance with the National Electrical Safety Code; (2) minimization of the number of ground contacts; (3) minimization of right-of-way width; (4) minimization of radio and television interference; (5) the number of structures; and (6) the costs of utilizing wood poles versus steel poles. In addition to these factors, CPL also considered the electric and magnetic field levels associated with alternative line and conductor configurations. The configuration selected by CPL was a single steel-pole structure with the conductor phases aligned vertically and unsymmetrically (unlike phasing). This configuration results in lower electric and magnetic field levels at the edge of the right-of-way and beyond than the other configurations that were considered.

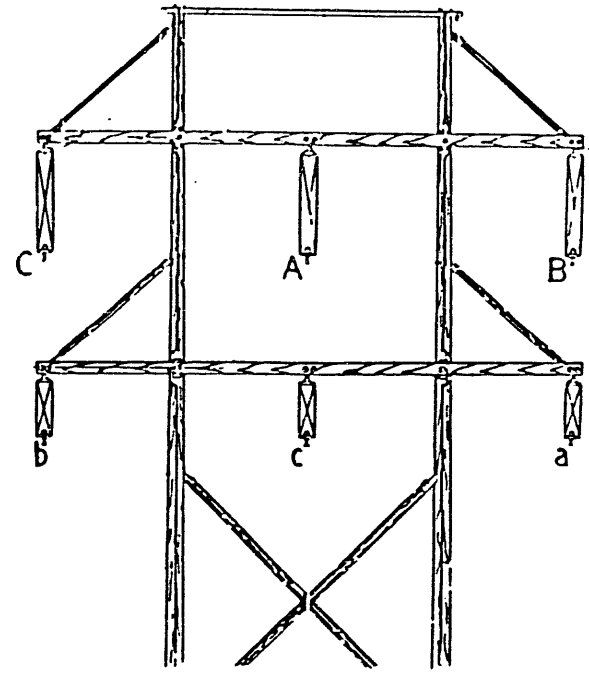
Electric and magnetic field levels were calculated for the three alternative configurations. The electric field calculations assumed a 5% overvoltage condition for each of the circuits because it is common for transmission voltages to operate in excess of their nominal



Proposed Configuration



Like Phasing



H-Frame

A=138/kV A-Phase
B=138/kV B-Phase
C=138/kV C-Phase

a = 69/kV a-Phase
b = 69/kV b-Phase
c = 69/kV c-Phase

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Figure 4-2

ALTERNATIVE
TRANSMISSION LINE CONFIGURATIONS
MILITARY HWY. - CFE TIE PROJECT

Source: CPL

voltage. In addition, electric and magnetic field levels were calculated for the following load conditions:

Normal Operation -
The lower Rio Grande Valley at its maximum loading, and export on the 138-kV tie to CFE loaded to its maximum.

Emergency Purchases -
The lower Rio Grande Valley at its maximum loading, and the ties to CFE loaded to their maximum.

These load conditions were selected because they represent a range of load and operating conditions. The "Normal Operation" condition refers to the current and voltage level that will exist normally on a day-to-day basis. Because the 69-kV line normally would not be energized, in the Normal Operation mode there is no voltage or current carried on the 69 kV line. The "Emergency Purchases" load condition represents the extreme worst-case loading and voltage scenario for the line. If this extreme load condition were to occur at all, it might occur for a period of about two hours, once every ten years. In this operating mode, both lines are energized and carry current.

Superimposed lateral profiles of the electric and magnetic field levels calculated for the line and conductor configurations considered by CPL under the above load/operating conditions are shown in figures 4-3, 4-4, 4-5 and 4-6. These figures show the calculated electric and magnetic field levels out to a distance of 100 feet from the centerline. The vertical lines appearing at a distance of 30 feet from the centerline depict the edges of the right-of-way.

Tables 4-6, 4-7, 4-8 and 4-9 report the calculated electric and magnetic field levels for each configuration and operating condition at distances of 30 feet and 100 feet on either side of the centerline of the right-of-way. Tables 4-6 and 4-7 report the calculated electric and magnetic fields for the Normal Operation mode. Tables 4-8 and 4-9 report the calculated electric and magnetic field levels for the Emergency Purchases worst-case operating scenario.

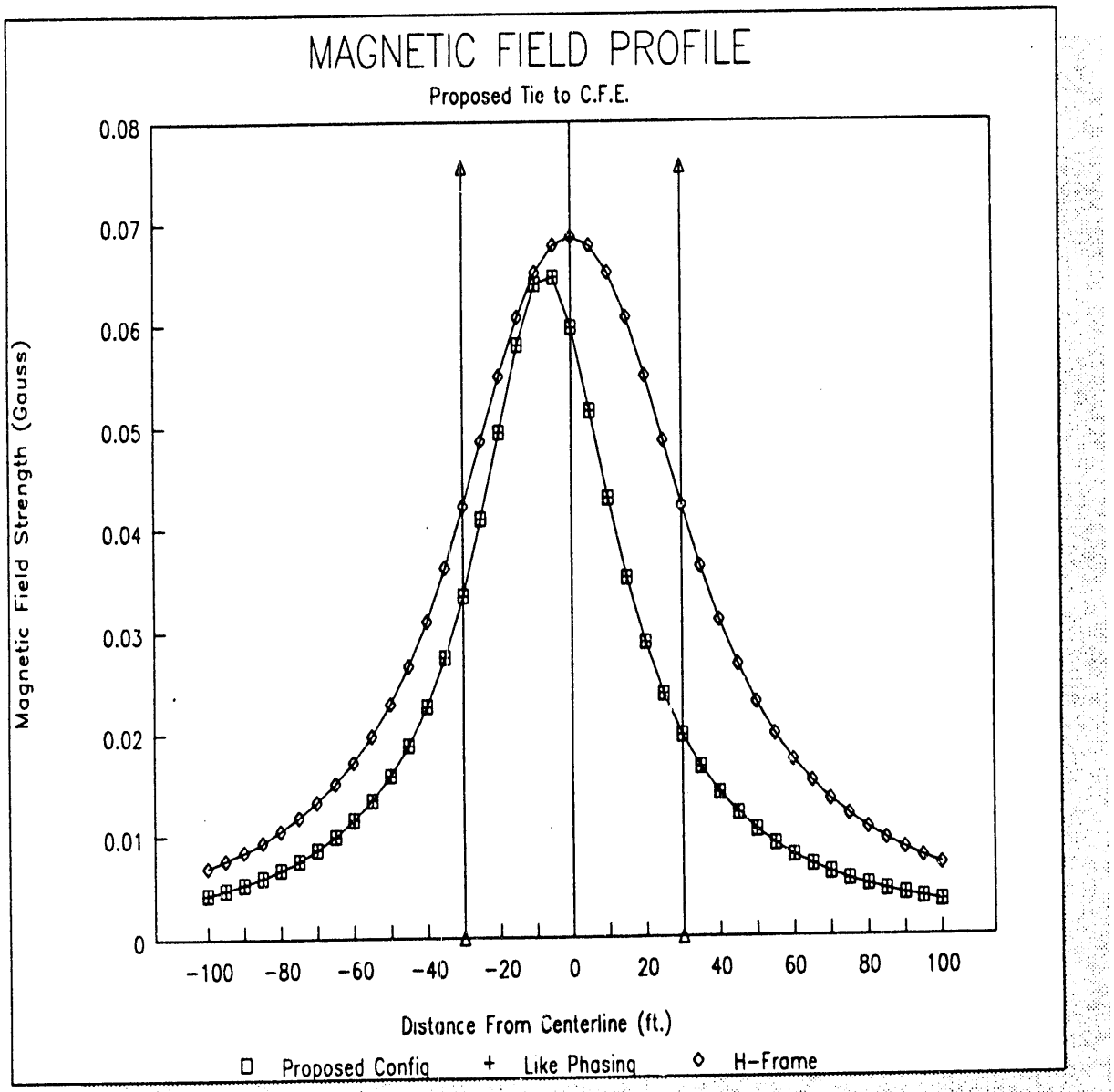

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Figure 4-3

CALCULATED MAGNETIC FIELD LEVELS FOR NORMAL OPERATION MODE MILITARY HWY. - CFE TIE PROJECT

Source: CPL

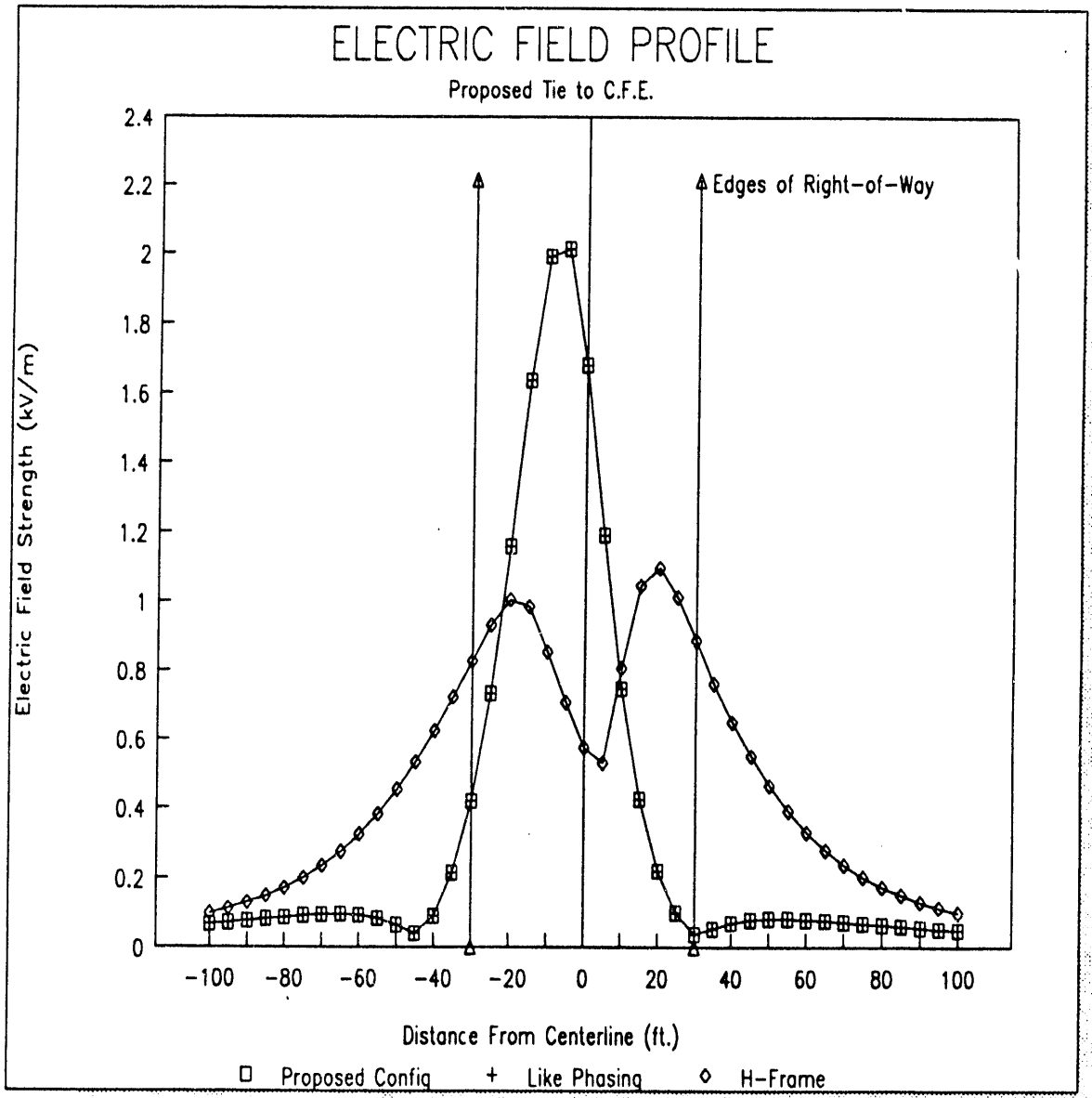

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Figure 4-4

CALCULATED
ELECTRIC FIELD LEVELS
FOR NORMAL OPERATION MODE
MILITARY HWY. - CFE TIE PROJECT

Source: CPL

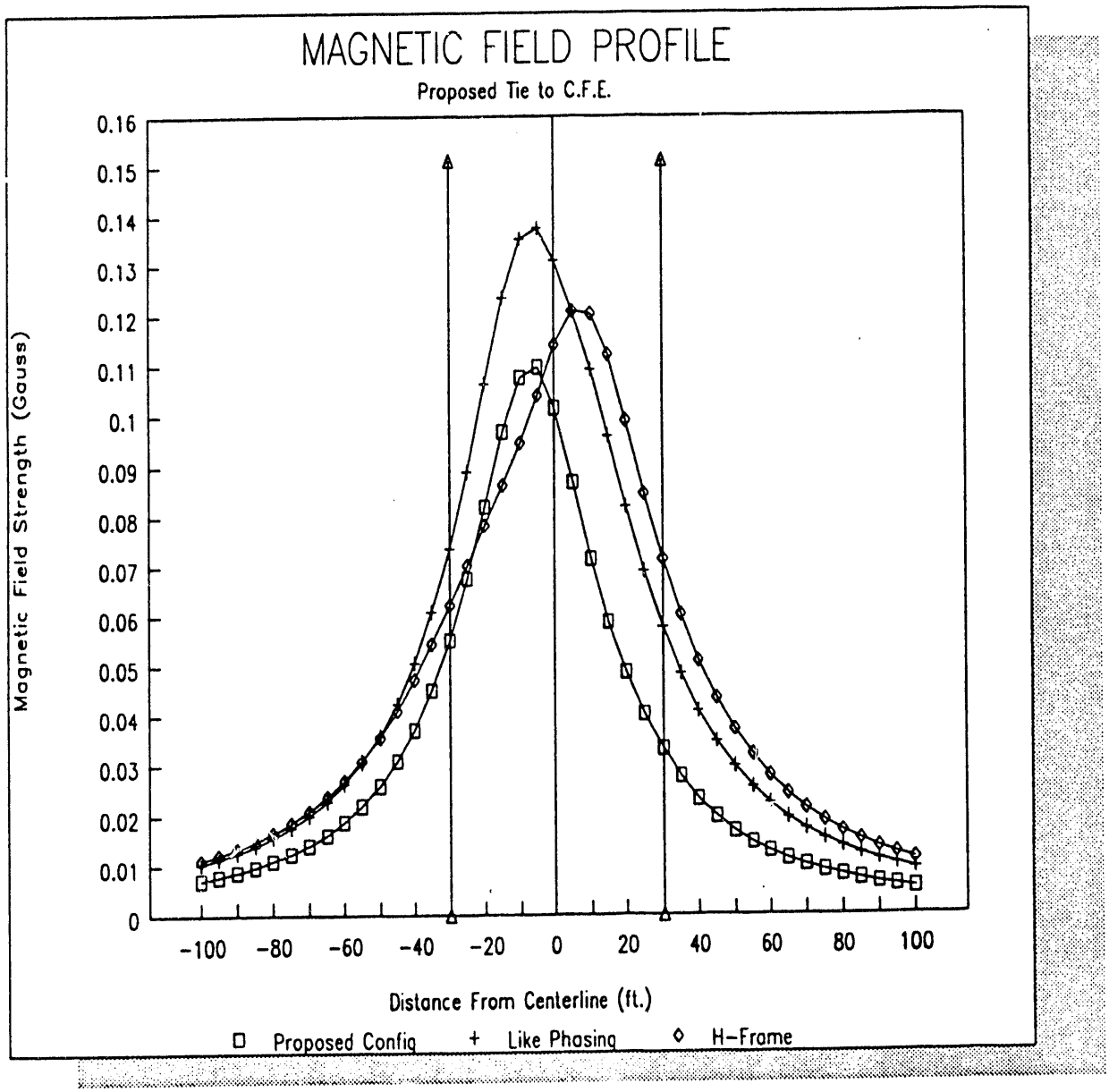

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Figure 4-5

CALCULATED MAGNETIC FIELD LEVELS
FOR EMERGENCY PURCHASES
OPERATING MODE
MILITARY HWY. - CFE TIE PROJECT

Source: CPL

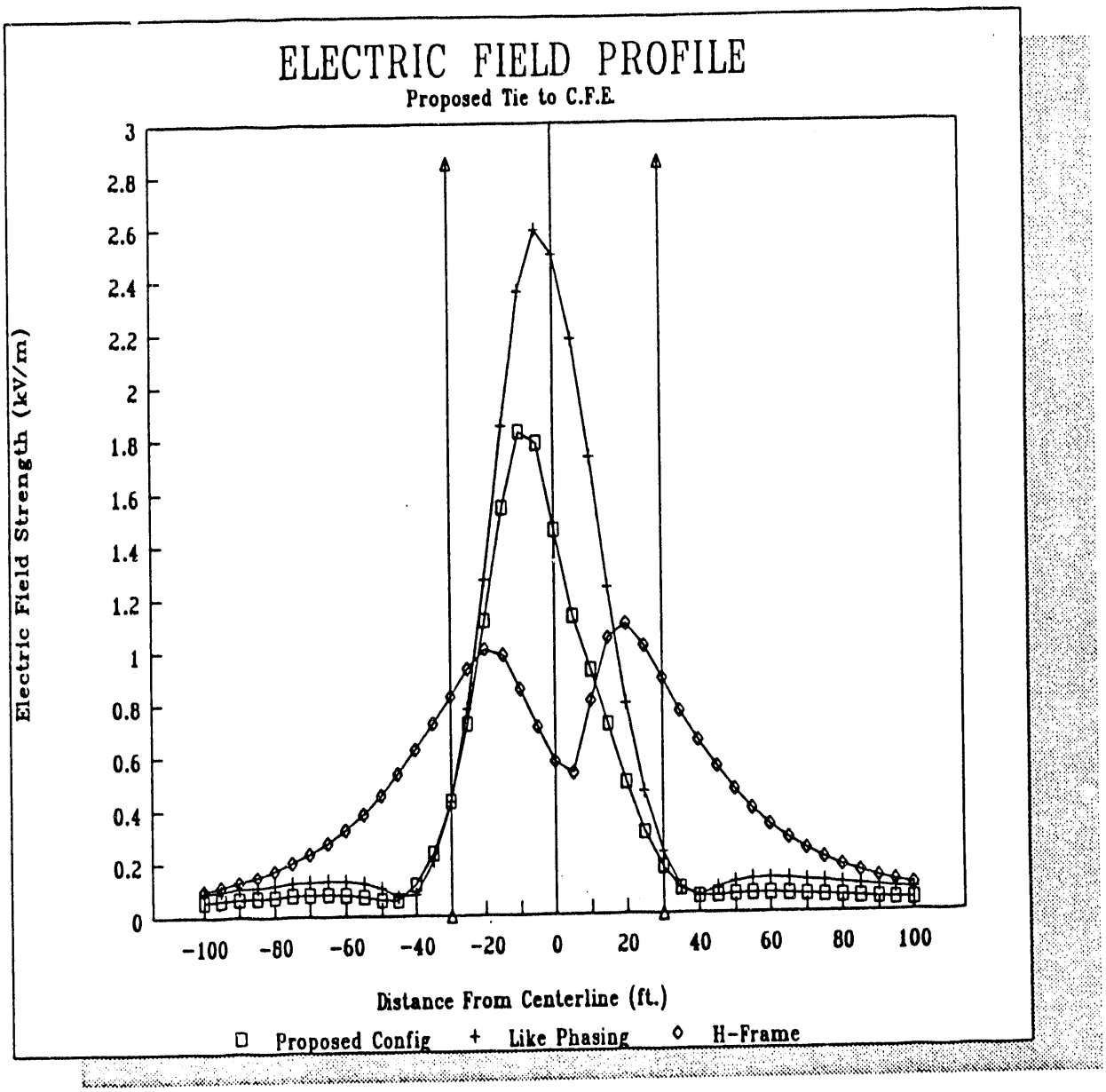

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Figure 4-6

CALCULATED ELECTRIC FIELD LEVELS
FOR EMERGENCY PURCHASES
OPERATING MODE
MILITARY HWY. - CFE TIE PROJECT

Source: CPL

Table 4-6

NORMAL OPERATION

Magnetic Field (Gauss)

Configuration	Distance From Centerline (ft)			
	-100	-30	30	100
Proposed Config	0.00433	0.03344	0.01970	0.00336
Like Phasing	0.00433	0.03344	0.01970	0.00336
H-Frame	0.00695	0.04210	0.04210	0.00695

Source: CPL

Table 4-7

NORMAL OPERATION

Electric Field (kV/m)

Configuration	Distance From Centerline (ft)			
	-100	-30	30	100
Proposed Config	0.066	0.419	0.036	0.048
Like Phasing	0.066	0.419	0.036	0.048
H-Frame	0.098	0.826	0.886	0.099

Source: CPL

Table 4-8

EMERGENCY OPERATION

Magnetic Field (Gauss)

Configuration	Distance From Centerline (ft)			
	-100	-30	30	100
Proposed Config	0.00703	0.05506	0.03310	0.00535
Like Phasing	0.01025	0.07348	0.05761	0.00915
H-Frame	0.01105	0.06211	0.07128	0.01112

Source: CPL

Table 4-9

EMERGENCY OPERATION

Electric Field (kV/m)

Configuration	Distance From Centerline (ft)			
	-100	-30	30	100
Proposed Config	0.057	0.428	0.172	0.044
Like Phasing	0.089	0.430	0.231	0.082
H-Frame	0.098	0.826	0.886	0.099

Source: CPL

While the design of the proposed line was based primarily on factors other than electric and magnetic field levels, the data shows that the configuration selected by CPL (i.e., a double-circuit single steel-pole structure with conductors arranged in a vertical and unlike phasing configuration) also results in lower electric and magnetic field levels at the edge of the right-of-way and beyond than the other configurations that were considered. In addition, the field levels associated with the selected configuration are comparable to the field levels associated with other existing transmission lines.

Summary

- 60 Hertz electric and magnetic fields are found wherever electricity is being used. Virtually everyone is exposed to 60 Hertz fields on a regular basis.

- There is nothing unique or unusual about the 60 Hertz fields associated with the Military Highway - CFE Tie transmission line. The electric and magnetic field levels associated with the line are comparable to the field levels from other transmission lines and are within the range of field levels that people experience in everyday life.

- None of the independent scientific panels, governmental bodies and other organizations which have reviewed the research on EMF have determined that there is a scientific basis to conclude that environmental exposure to 60 hertz electric and/or magnetic fields (from transmission lines or other sources) causes any adverse human health effects.

- There are no federal standards or standards in the State of Texas governing transmission line fields, nor is there a sound scientific basis on which to develop health-based standards.

- The selected configuration for the Military Highway - CFE Tie transmission line results in lower electric and magnetic field levels compared to other configurations that were considered by CPL.

4.9 IMPACTS FROM THE REMOVAL OF THE EXISTING 69-KV TRANSMISSION LINE

4.9.1 Proposed Activity

Construction of Central Power and Light's (CPL) proposed 138/69-kilovolt (kV) transmission line from the Military Highway Substation, located on Military Highway (U.S. Highway (U.S.) 281), and Mexico's Comision Federal de Electricidad (CFE) system at the border with Mexico, would involve the removal, on the U.S. side, of approximately 6,900 feet (ft) (1.3 miles) of existing 69-kV transmission line and structures (Figure 4-7). All work in areas inaccessible from public, improved roadways (e.g., in fields or brushy rangeland) would be accomplished with rubber-tired vehicles. CPL crews, working from bucket trucks, would initially remove all hardware, crossarms and conductor. Mobile cranes would then be used to lift the wooden poles from the ground and load them on flatbed trucks for removal from the site. All materials would be returned to CPL's service center for proper handling and/or disposal in an approved manner. CPL estimates that approximately one to two months, weather permitting, would be required to remove the existing 69-kV line after the proposed lines have been constructed and energized.

4.9.2 Impacts

Noise and activity during the removal may temporarily cause wildlife to avoid the area. Fugitive dust settling on vegetation could possibly make the immediate vicinity temporarily less attractive to wildlife. Some temporary inconvenience may be experienced by local residents due to the movement of men and machinery through the area. Removal of the existing 69-kV line would have no impact on endangered or threatened species (see sections 4.3.2 and 4.3.4) or wetlands (see Section 4.3.1). In addition, removal of the existing 69-kV line, as requested by the

Base Map: USGS 7.5' Quadrangle, West Brownsville, Texas

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Figure 4-7

EXISTING
CPL 69-kV TRANSMISSION LINE
TO BE REMOVED

FWS, would have a positive impact on the planned Lower Rio Grande Valley National Wildlife Refuge. A large portion of the land currently crossed by this line is proposed to be purchased and managed as a portion of this refuge and the removal of the existing line and ROW would make it easier to revegetate and manage these lands as wildlife habitat.

4.9.3 Cleanup/Restoration

Following the removal of the existing line, all construction debris would be collected and removed from the site. Construction sites, storage areas, etc. would be restored to their original or natural condition. After the poles are removed, the holes would be filled with an appropriate soil. The soil would be compacted and the site smoothed and graded to the original contours. All disturbed areas would be allowed to revegetate with native grasses or, at the request of the landowner, CPL would revegetate with other specified grasses. All work in agricultural fields would be conducted in dry weather with the appropriate erosion/sedimentation controls in place. Any unavoidable crop loss would be compensated for by CPL.

4.10 ADDITIONAL NEPA INFORMATION

The following information addresses concerns regarding potential environmental impacts of the proposed facilities stated in 10 CFR 205.322(c)(1):

- The proposed facilities would cross approximately 1,960 ft of Federal Emergency Management Agency (FEMA)-designated 100-year floodplain of the Rio Grande. This floodplain is generally all of the area between the IBWC levee and the river, as indicated on Figure 3-2. According to information from the IBWC, this area is likely to flood once in every eight years. Where structures are required to be located within the 100-year floodplain, they would be designed and constructed so as not to impede the flow of any waterway or the function of the floodplain. All structures to be located within the floodplain would be a single steel pole design and would create no hazard (i.e.,

snagging flood debris) during flooding. This project is expected to create minimal adverse effects from flooding to adjacent or downstream property owners.

- The proposed facilities would not cross any known wetlands (with the exception of the Rio Grande). Although the FWS has not mapped wetlands within the study area under their National Wetlands Inventory Program, EH&A ecologists found no potential jurisdictional wetlands along CPL's proposed route during field surveys in May and August of 1991.

- The proposed facilities would not cross any FWS-designated critical wildlife habitat. For a more complete discussion of wildlife species and habitat within the study area, as well as potential impacts, see sections 3.5.1 and 4.3.3. Construction of this project is not expected to significantly impact any state-or federally-listed endangered or threatened species. CPL has agreed to mark the proposed line at the Rio Grande crossing to reduce the possibility of avian-powerline collisions.

- The proposed facilities would cross one navigable waterway, the Rio Grande, and thus would require a Section 10 permit under the Rivers and Harbors Act, from the U.S. Army Corps of Engineers. This permit application is currently being processed.

- The proposed facilities would not cross any Indian Reservations or other lands owned by Native American Groups.

- The proposed facilities would not impact any known historic sites. EH&A conducted a search of literature and records at the Texas Archaeological Research Laboratory (TARL) in Austin at the University of Texas, reviewed the guide to properties listed on the National Register of Historic Places (NRHP) and the Guide to Official Texas Historical Markers at the Texas

Historical Commission (THC). The results indicated that there were no known archaeological sites, NRHP properties or historical markers located within the study area. In addition, an EH&A archaeologist conducted a cultural resources survey of the total length of the proposed route (Route 3) in August, 1991. No cultural resources were identified and cultural resource clearance for the project was recommended. Details of this study can be found in a Summary Report provided to CPL by EH&A in August 1991 titled "Summary Report, A Cultural Resoures Survey of the Military Highway - CFE Tie Project (Project No. 9-712), Cameron County, Texas" (EH&A Document No. 910431).

5.0 AGENCIES AND PERSONS CONSULTED

The following federal, state and local agencies/offices were contacted by EH&A by letter in July 1991 to solicit comments, concerns and any additional information pertaining to permits or approvals regarding the construction of a 138/69-kV transmission line within the Military Highway-CFE Tie study area. A map of the study area showing the approximate location of the alternative transmission line routes was included with each letter.

- Texas Natural Heritage Program (TNHP)
- Texas Historical Commission (THC)
- Federal Emergency Management Agency (FEMA)
- U.S. Environmental Protection Agency (EPA)
- Texas Parks and Wildlife Department (TPWD)
- Soil Conservation Service (SCS)
- National Park Service (NPS), U.S. Dept. of the Interior
- Federal Aviation Administration (FAA)
- U.S. Army Corps of Engineers (USCE), Galveston District

Written replies were received from 5 of the agencies/offices contacted. Copies of all agency responses are included in the Appendix.

The TNHP reported that a search of its information system revealed the possible occurrence of special species or natural communities in the vicinity of the proposed project including the federally endangered ocelot (*Felis pardalis*) and jaguarundi (*Felis yagouaroundi*). The TNHP also enclosed TPWD's endangered/threatened species data file for Cameron County. Information provided by TNHP has been incorporated into this document.

The THC stated that an archaeological survey of the project area would be appropriate because the general region contains many known archaeological sites, many of which are potentially eligible for the NRHP. The THC would continue to review the project upon receipt of the results of the archaeological survey.

The FEMA noted that most of the project falls within the 100-year floodplain and suggested contacting the floodplain administrator for the area to solicit his comments. They further noted that if a floodway has been designated in the project area, proper precautions must be taken with regard to development within a floodway.

The EPA had no specific comments regarding the project, but enclosed a general packet of information summarizing pertinent federal regulations regarding environmental issues. A copy of this information is included in the Appendix.

The TPWD suggested that the proposed line should be adjacent to existing lines within established ROWs to have the least impact on fish and wildlife resources in the area; using pole designs that include protected perches for raptors; avoiding identified wetland areas; undertaking construction during dry periods; minimizing the amount of flora and fauna disturbed; upgrading facilities in existing ROWs where possible; retention of mature trees and trimming rather than clearing shrubs and trees; burying the lines when practical; and preserving the aesthetics of the area.

The SCS noted that while some prime farmland soils may be present in the study area, the proposed project will have no significant adverse impacts on prime farmland. They further noted that no unique farmlands, important rangeland or protected forest lands occur within the study area.

The NPS stated that the proposed transmission line will not impact NPS program concerns.

As of 5 November 1991, EH&A had not received a reply from the other two agencies/offices contacted. In addition to those agencies/offices contacted by EH&A, CPL contacted the FWS, IBWC and DOE.

The FWS noted that the preferred Route 3 would impact only a very minimal amount of existing brush habitat; would minimize impacts to the tract of land currently being acquired by the Texas Nature Conservancy and FWS for native brush habitat creation and management; and

anticipated no potential adverse impacts to the endangered or threatened species as a result of the proposed project. They advised that further consultation with regards to endangered species would be required if new species are listed that may be affected by the project or if new information becomes available which reveals impacts not considered in their consultation. Based upon their evaluation of the draft September 1991 Environmental Assessment for this project, FWS recommended that (1) Route 3 should be utilized if possible; (2) any clearing of riparian vegetation along the Rio Grande should be minimized to the extent practicable; (3) the existing 69-kV line should be removed; and (4) the line should be marked with optic yellow aviation balls where it crosses the Rio Grande in order to avoid avian-powerline collisions.

6.0 PREFERRED ROUTE SELECTION

The selection of a preferred route for CPL's proposed Military Highway-CFE Tie 138/69-kV transmission line project involved environmental, cost, and engineering evaluations of the alternative routes. A final preferred route was selected based upon a combination of these evaluations. EH&A made its recommendation based only upon environmental criteria; CPL also took into consideration cost and engineering factors in its evaluation and selection.

6.1 SUMMARY OF ENVIRONMENTAL EVALUATION

EH&A professionals with expertise in different environmental disciplines (terrestrial and aquatic ecology, land use/socioeconomics, geology, and archaeology) evaluated three alternative routes based upon the environmental conditions present along each route, and verified where possible during field inspections of the routes. Each person independently analyzed the routes and the environmental criteria presented in Table 6-1. The evaluators discussed their results among themselves and ranked the alternative routes from a strictly environmental viewpoint. While the environmental analysis and discussions resulted in a definite ranking of the three alternative routes, EH&A believes that all three primary alternative routes are environmentally acceptable alternatives for this project.

The differences in the amount/number of each environmental criterion present along each alternative route and the potential environmental impacts associated with the alternative routes are discussed in detail in Section 4.0. A summary of the data used in the overall environmental evaluation of alternative routes is presented in Table 6-1. Advantages and disadvantages of the three routes are presented below.

TABLE 6-1

ENVIRONMENTAL DATA USED IN ALTERNATIVE ROUTE EVALUATION

MILITARY HIGHWAY-CFE TIE 138/69-KV PROJECT

Criterion No.	Criterion	Route 1	Route 2	Route 3
1	Length* of transmission line	7,220	9,235	6,870
2	Length of existing cleared ROW	6,970	3,220	0
3	Length of new ROW required	250	6,015	6,870
4	Number of habitable structures** within 200 ft of ROW centerline	33	33	22
5	Number of habitable structures potentially removed by ROW	0	0	0
6	Number of non-habitable structures potentially removed by ROW	0	0	0
7	Number of commercial AM radio transmitters within 10,000 ft of ROW centerline	0	0	0
8	Number of FM radio transmitters, microwave towers, etc. within 2,000 ft of ROW centerline	1	1	1
9	Number of FAA-registered airstrips within 10,000 ft of ROW centerline	0	0	0
10	Length of ROW through cropland	3,810	5,825	3,445
11	Length of ROW through pastureland	0	0	0
12	Length of ROW through cropland or pastureland with mobile irrigation systems	0	0	0
13	Length of ROW through important/prime farmland	5,055	7,070	5,075
14	Length of ROW through brushland	530	530	325
15	Length of ROW through potential wetlands (including bottomland/riparian woodland)	0	0	0
16	Length of ROW across 100-year floodplain	455	455	1,960
17	Length of ROW across open water (rivers, ponds)	55	55	60
18	Number of stream crossings	0	0	0
19	Number of river crossings	1	1	1
20	Length of ROW through parks and/or recreational areas	0	0	C
21	Number of parks and/or recreational areas within 1,000 ft of ROW centerline	0	0	0
22	Length of ROW visible from parks and/or recreational areas	0	0	0
23	Length of ROW through areas of potential high aesthetic value	0	0	0
24	Length of ROW through known/designated habitat of endangered or threatened species	0	0	0

TABLE 6-1 (Concluded)

Criterion No.	Criterion	Route 1	Route 2	Route 3
25	Number of U.S. and State highway crossings	0	0	0
26	Number of FM road crossings	0	0	0
27	Number of minor road crossings	5	5	5
28	Number of recorded historic and prehistoric sites crossed	0	0	0
29	Number of recorded historic and prehistoric sites within 1,000 ft of ROW centerline	0	0	0
30	Number of NRHP-listed or -eligible sites crossed	0	0	0
31	Number of NRHP-listed or -eligible sites within 1,000 ft of ROW centerline	0	0	0
32	Length of ROW through areas of high archaeological/historical site potential	50	50	800

* Unless otherwise noted, all length measurements in feet

** Residences, businesses, schools, churches, cemeteries, hospitals, nursing homes, or other habitable structures.

Advantages of Route 1 (existing line)

- least amount of new ROW
- least length across 100-year floodplain (tied with Route 2)
- least length through important/prime farmland
- least length through areas of high archaeological/historical site potential (tied with Route 2)

Disadvantages of Route 1

- greatest number of habitable structures (33) identified within 200 ft of ROW centerline (tied with Route 2)
- crosses Garden Park Elementary School property
- greatest length across brushland (tied with Route 2)
- greatest visibility from major highways

Advantages of Route 2

- least length across 100-year floodplain (tied with Route 1)
- least length through areas of high archaeological/historical site potential (tied with Route 1)

Disadvantages of Route 2

- greatest number of habitable structures (33) identified within 200 ft of ROW centerline (tied with Route 1)
- crosses Garden Park Elementary School property
- longest alternative route
- greatest length across cropland
- greatest length across important/prime farmland
- greatest length across brushland (tied with Route 1)

Advantages of Route 3

- fewest habitable structures (22) identified within 200 ft of ROW centerline
- does not cross Garden Park Elementary School property
- shortest route
- least length across brushland
- least length across cropland
- least visibility from major highways

Disadvantages of Route 3

- most new ROW
- greatest length across 100-year floodplain
- greatest length through areas of high archaeological/historical site potential

Of the environmental criteria analyzed for the project, the following were considered to be the most important:

- proximity to habitable structures (within 200 ft)
- proximity to Garden Park Elementary School
- length of line
- potential impacts to native brushland
- potential impacts to agricultural operations (i.e., preference for paralleling field edges)

For this project and study area, it was agreed that potential impacts to cultural resources (relative to other environmental criteria) would not be a significant factor in the environmental comparison of the three alternative routes, due to the lack of known sites and the highly disturbed nature of the area. The recommendation by the THC to conduct a cultural resources survey of the preferred route will be followed.

Finally, a consensus was reached that Route 3 would be EH&A's recommendation for the preferred route. Route 1, the existing line, is considered the second choice, and Route 2 the third choice. As stated above, all three of these alternative routes are considered environmentally acceptable.

6.2 CPL'S PREFERRED ROUTE SELECTION

Following receipt of EH&A's recommendation, CPL reviewed EH&A's alternative route analysis. After a review of engineering, ROW and cost factors and discussion among CPL and EH&A staff, CPL concurred with EH&A's recommendation of Route 3 as the preferred route, as presented in Figure 6-1 (map pocket). Route 3 was the most favorable from an overall environmental standpoint of the alternative routes evaluated. In addition, Route 3 is the route preferred by landowners, would be the least expensive, and its construction would not be restricted by existing facilities as would construction of routes 1 and 2. Habitable structures and other land use features in the vicinity of Route 3 are presented in Table 6-2.

A cultural resources pedestrian survey of Route 3 conducted by EH&A revealed no cultural resources along the route. Cultural resource clearance was recommended. For further details, see the attached cultural resources report (Bond, 1991).

According to PUC requirements, CPL notified all landowners/property owners within 200 ft of the preferred route of their intention to apply for a certificate of convenience and necessity for this proposed transmission line. Copies of the letters sent as well as copies of notices placed in local newspapers, can be found at the end of Appendix A.

TABLE 6-2

HABITABLE STRUCTURES AND OTHER LAND USE
FEATURES IN THE VICINITY OF CPL'S
MILITARY HIGHWAY-CFE TIE PROJECT

Map Number[1]	Type of Feature	Approximate Distance from ROW Centerline
1	Single-family Residence	160 ft
2	Business	95 ft
3	Single-family Residence	95 ft
4	Single-family Residence	170 ft
5	Single-family Residence	195 ft
6	Single-family Residence	200 ft
7	Single-family Residence	190 ft
8	Single-family Residence	175 ft
9	Single-family Residence	145 ft
10	Single-family Residence	165 ft
11	Single-family Residence	135 ft
12	Single-family Residence	145 ft
13	Mobile Home	105 ft
14	Mobile Home	110 ft
15	Single-family Residence	105 ft
16	Single-family Residence	105 ft
17	Single-family Residence	55 ft
18	Single-family Residence	190 ft
19	Single-family Residence	165 ft
20	Single-family Residence	125 ft
21	Single-family Residence	100 ft
22	Mobile Home w/attached building	65 ft
23	Radio Tower	1,770 ft

[1] Figure 6-1 (map pocket)

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TEXAS
PARKS AND WILDLIFE DEPARTMENT
4200 Smith School Road • Austin, Texas 78744 • 512-389-4800

COMMISSIONERS

ANDREW SANSOM
Executive Director

July 24, 1991

Rob R. Reid
Espey, Huston & Associates, Inc.
P.O. Box 519
Austin, Texas 78767

RE: EH&A # 13370

Dear Mr. Reid:

In response to your July 23, 1991 request for information on sensitive species and natural communities within or near the CPL proposed transmission line project area in Cameron County, we offer the following comments. A search of the Texas Natural Heritage Program Information System revealed special species or natural communities possibly occurring in the vicinity of the proposed project. Following is a list of species known from the Brownsville area.

Federal and State Endangered--

Felis pardalis (Ocelot) G2? S1

Felis yagouaroundi (Jaguarundi) G4 S1

Both cats use areas of brush for cover and could occur in this area. For information on these cats contact Dr. Mike Tewes at 512/595-3922 or Caesar Kleberg Wildlife Research Institute, Texas A & I University, Campus Box 218, Kingsville, Texas 78363.

Federal Category 1--

Ambrosia cheiranthifolia (South Texas ragweed) G1 S1 - open prairies and various shrublands on deep clay soils, mostly of Beaumont Series; flowering July-November

Federal Category 2 and State Endangered--

Notophthalmus meridionalis (Black-spotted Newt) G1 S1

Siren intermedia texana (Rio Grande Lesser Siren) G5T2 S2

Both the Siren and the Newt can be found in wet or sometimes wet areas; such as arroyos, canals, ditches, and even shallow depressions. The Newt aestivates in the ground during dry periods; whereas the Siren requires some moisture to remain.

State Endangered--

Drymobius margaritiferus (Speckled Racer) G5 S1 - extreme south Texas; dense thickets near water; Texas palm groves, riparian woodlands; eggs laid April-August and hatch in about 6 weeks

Leptodeira septentrionalis septentrionalis (Northern Cat-eyed Snake) G5T5 S2 - Gulf Coastal Plain south of Nueces River; thornbrush woodland; dense thickets bordering ponds and streams; semi-arboreal

State Threatened--

Coniophanes imperialis (Black-striped Snake) G4G5 S2 - extreme south Texas; semi-arid coastal plain, warm, moist micro-habitats and sandy soils; proficient burrower; eggs laid April-June

Hypopachus variolosus (Sheep Frog) G5 S2 - predominantly grassland and savanna; moist sites in arid areas

Smilisca baudinii (Mexican Treefrog) G5 S3 - subtropical region of extreme southern Texas; breeds May-October coinciding with rainfall, eggs laid in temporary rain pools.

Federal Category 2--

Justicia runyonii (Runyon's water-willow) G2 S2 - brush margins; on calcareous silt loam, silty clay, or clay in openings in subtropical woodlands on active or former floodplains; flowering (July-) September-November

Tillandsia baileyi (Bailey's ballmoss) G2 S2 - epiphytic on various trees and shrubs; flowering February-May

Ayenia limitaris (Texas ayenia) G2 S1 - brush; in woodlands on alluvial deposits on floodplains and terraces along the Rio Grande; flowering throughout the year with sufficient rainfall

Anthericum chandleri (lila de los llanos) G3 S3 - grasslands and openings in subtropical woodlands and brush on clay soils; common in windblown saline clay on lomas near mouth of Rio Grande; flowering (May?) September-December; fruiting October-December

Manfreda longiflora (Runyon's huaco) G2 S2 - endemic; various soils (clays and loams with various concentrations of salt, caliche, sand, and gravel) in openings or amongst shrubs in thorny shrublands; on Catahoula and Frio formations, and also on Rio Grande floodplain alluvial deposits; flowering in September

Eleocharis brachycarpa (short-fruited spikerush) G1 SH

Other Rare Species--

Hybanthus verticillatus var. platyphyllus (whorled green violet) G4T1 S1 - endemic; shrublands and subtropical woodlands and openings, probably on silty alluvial soils; flowering March-July

Adelia vaseyi (Vasey's adelia) G2 S2 - brush, can also be found along roadsides; subtropical woodlands in lower Rio Grande valley; flowering January-June

Coryphantha macromeris var. runyonii (Runyon's cory cactus) G3T2 S2 - endemic; low hills and flats on gravelly soils in Tamaulipan shrub communities along the Rio Grande

Grindelia oolepis (plains gumweed) G2 S2 - endemic; prairies and grasslands on black clay soils; may occur along railroad rights-of-way and in urban areas; flowering May-December

Sabal mexicana (Texas palmetto) G5 S1 - flatlands along rivers and resacas along lower Rio Grande

Natural Communities--
Texas Ebony-Anacua Series G2 S1
Texas Ebony-Snake-eyes Series G2 S2

The Heritage Program information included here is based on the best data currently available to the state regarding threatened, endangered, or otherwise sensitive species. However, these data do not provide a definite statement as to the presence or absence of special species or natural communities within your project area, nor can these data substitute for an evaluation by qualified biologists. This information is intended to assist you in avoiding harm to species that occur on your site.

This letter does not constitute a review of fish and wildlife impacts that might result from the activity for which this information is provided. Should you need an impact review from the Texas Parks and Wildlife Department, contact the Environmental Assessment Branch of the Resource Protection Division, attention Mr. Bob Spain, or contact him at 512/389-4725. All requests for reviews must be in writing.

Please contact the Texas Parks and Wildlife Department's Heritage Program before publishing or otherwise disseminating any specific locality information. Thank you for contacting us. Please feel free to call me at 512/448-4311 if you have questions.

Sincerely,

Dorinda Sullivan

Dorinda Sullivan, Data Manager
Texas Natural Heritage Program
Resource Protection Division

Enclosure

DLS:ds

COUNTY: **Cameron**

ENDANGERED SPECIES

***OCELOT (*Felis pardalis*)
***COATI (*Nasua nasua*)
***JAGUARUNDI (*Felis yagouaroundi*)
*WHALE, BLUE (*Balaenoptera musculus*)
*WHALE, FIN (*Balaenoptera physalus*)
*WHALE, RIGHT, BLACK (*Balaena glacialis*)
*WHALE, SPERM (*Physeter macrocephalus*)
***PELICAN, BROWN (*Pelecanus occidentalis*)
***EAGLE, BALD (*Haliaeetus leucocephalus*)
***FALCON, APLOMADO (*Falco femoralis*)
***VIREO, BLACK-CAPPED (*Vireo atricapillus*)
**TERN, LEAST, INTERIOR (*Sterna antillarum athalassos*)
*CURLEW, ESKIMO (*Numenius borealis*)
***RACER, SPECKLED (*Drymobius margaritiferus*)
***RIDLEY, ATLANTIC (*Lepidochelys kempi*)
***LOGGERHEAD (*Caretta caretta*)
***SNAKE, CAT-EYED, NORTHERN (*Leptodeira s. septentrionalis*)
**HAWKSBILL, ATLANTIC (*Eretmochelys imbricata imbricata*)
*LEATHERBACK (*Dermochelys coriacea*)
***FROG, WHITE-LIPPED (*Leptodactylus fragilis*)
***NEWT, BLACK-SPOTTED (*Notophthalmus meridionalis*)
***SIREN, LESSER, RIO GRANDE (*Siren intermedia texana*)
***BLACKFIN GOBY (*Gobionellus atripinnis*)
*PHANTOM SHINER (*Notropis orca*)

THREATENED SPECIES

***BAT, YELLOW, SOUTHERN (*Lasiurus ega*)
***RAT, RICE, COUES' (*Oryzomys couesi*)
*DOLPHIN, ROUGH-TOOTHED (*Steno bredanensis*)
*DOLPHIN, SPOTTED, ATLANTIC (*Stenella plagiodon*)
*WHALE, SPERM, DWARF (*Kogia simus*)
*WHALE, KILLER, FALSE (*Pseudorca crassidens*)
*WHALE, GOOSE-BEAKED (*Ziphius cavirostris*)
*WHALE, BEAKED, GERVAIS' (*Mesoplodon europaeus*)
*WHALE, KILLER (*Orcinus orca*)
*WHALE, PILOT, SHORT-FINNED (*Globicephala macrorhynchus*)
*WHALE, KILLER, PYGMY (*Feresa attenuata*)
*WHALE, SPERM, PYGMY (*Kogia breviceps*)
***EGRET, REDDISH (*Egretta rufescens*)
***HAWK, BLACK-, COMMON (*Buteogallus anthracinus*)
***HAWK, GRAY (*Buteo nitidus*)
***HAWK, ZONE-TAILED (*Buteo albonotatus*)
***IBIS, WHITE-FACED (*Plegadis chihi*)
***KITE, SWALLOW-TAILED, AMERICAN (*Elanoides forficatus*)
***STORK, WOOD (*Mycteria americana*)
***WARBLER, GOLDEN-CHEEKED (*Dendroica chrysoparia*)
***BECARD, ROSE-THROATED (*Pachyramphus aglaiae*)

COUNTY: Cameron, (continued)

***PARULA, TROPICAL (*Parula pitiayumi*)
***PLOVER, PIPING (*Charadrius melodus*)
***SPARROW, BOTTERI'S (*Aimophila botterii*)
***TERN, SOOTY (*Sterna fuscata*)
***TYRANNULET, BEARDLESS-, NORTHERN (*Camptostoma imberbe*)
***HAWK, WHITE-TAILED (*Buteo albicaudatus*)
***FALCON, PEREGRINE, ARCTIC (*Falco peregrinus tundrius*)
***OWL, PYGMY-, FERRUGINOUS (*Glaucidium brasilianum*)
***TORTOISE, TEXAS (*Gopherus berlandieri*)
***LIZARD, HORNED, TEXAS (*Phrynosoma cornutum*)
***SNAKE, BLACK-STRIPED (*Coniophanes imperialis imperialis*)
***SNAKE, INDIGO, TEXAS (*Drymarchon corais erebennus*)
**TURTLE, GREEN, ATLANTIC (*Chelonia mydas mydas*)
**SNAKE, SCARLET, TEXAS (*Cemophora coccinea lineri*)
*LIZARD, COLLARED, RETICULATE (*Crotaphytus reticulatus*)
***TREEFROG, MEXICAN (*Smilisca baudinii*)
***FROG, SHEEP (*Hypopachus variolosus*)
***RIVER, GOBY (*Awaous tajasica*)
***OPOSSUM PIPEFISH (*Oostethus brachyurus*)

***Confirmed species - verified recent occurrence
**Probable species - unconfirmed, but within general distribution pattern of the species
*Possible species - unconfirmed, but at periphery of known distribution of the species

THE STATE OF TEXAS
CURTIS TUNNELL
EXECUTIVE DIRECTOR

TEXAS HISTORICAL COMMISSION
P.O. BOX 12276 AUSTIN, TEXAS 78711 (512)463-6100

July 29, 1991

Rob R Reid
Espey, Huston and Associates, Inc.
P.O. Box 519
Austin, TX 78767

Re: Central Power and Light Company
Construct 1.8 Miles of Transmission Line
(FERC, A4, B4)

Dear Mr. Reid:

Thank you for providing the information on the above referenced project. A review of available information suggests that an archeological survey of the project area would be appropriate. The general region contains many known archeological sites. Many sites are potentially eligible for the National Register of Historic Places, ranging in date from as long ago as 8,000 years to the present, and ranging in activities from small camps to Indian villages to cemeteries.

An archeological survey undertaken by a qualified professional should be conducted in the proposed development areas. Field examination should include shovel testing to identify subsurface cultural deposits. Collection of materials present in these tests is required. A report of investigation should be produced in conformance with the Secretary of Interior's Guidelines: Archeology and Historic Preservation. We will continue review of the project upon receipt of this documentation.

The State Historic Preservation Office does not recommend contractors or consultants. The Council of Texas Archeologists, a professional statewide organization, has prepared a list of professionals who wish to be considered for contracting. If you would like a copy of the list, please contact this office.

Sincerely,

James E. Bruseth

James E. Bruseth, Ph.D.
Deputy State Historic Preservation Officer
JB/SI

Federal Emergency Management Agency

Region VI, Federal Center, 800 North Loop 288
Denton, Texas 76201-3698

NTH

August 14, 1991

Mr. Rob R. Reid
Project Manager
Espey, Huston & Associates, Inc.
P. O. Box 519
Austin, Texas 78767

RE: Cameron County, Texas, Transmission Line - Central Power and Light
EH&A Project No. 13370

Dear Mr. Reid:

Thank you for providing us with the opportunity to comment on the proposed project for constructing transmission lines for the area which runs between the Military Highway Substation in Brownsville, Texas and the existing Comision Federal de Electricidad at the Rusteberg Bend of the Rio Grande.

It appears from the information provided in your letter of July 23, 1991, that most (if not all) of the project falls within the 100-year flood as delineated on the Flood Insurance Rate Map (FIRM) dated March 18, 1991. We suggest, if you have not already done so, that you obtain comments and/or any necessary permits with regard to floodplain management from Mr. Joe Martinez, Cameron County Courthouse, 964 E. Harrison, Brownsville, Texas 78520 (512) 544-0814, who is the community's floodplain administrator. If the alteration to the flood area is significant, or if it merits, the community may wish to develop and submit to FEMA a request for a Letter of Map Revision to the community's flood map.

Further, if a floodway has been designated in the area of the project, proper precautions must be taken with regard to development within a floodway. Those provisions are outlined in Section 60.3(d) of the National Flood Insurance Program Regulations. No encroachments must occur within the designated floodway unless it is proven by an engineer's report that the water surface elevation nas not been increased any within the designated floodway.

If we can be of further assistance, please feel free to contact this office by writing to the address above, or calling (817) 898-5136.

Sincerely,

Diane L. Leatherwood
Natural Hazards
Program Specialist

cc: Mr. Joe Martinez
Cameron County Courthouse

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
[illegible]
[illegible]
DALLAS, TEXAS 75202-2733

AUG 19 1991

Mr. Rob R. Reid
Project Manager
Espey, Huston & Associates, Inc.
P.O. Box 519
Austin, Texas 78767

Dear Mr. Reid:

This is in response to your July 23, 1991, letter informing us of your plans to prepare an Environmental Assessment on Central Power and Light Company's proposal to construct approximately 1.8 miles of 69/138-kV double circuit transmission line in Cameron County, Texas.

We have reviewed your preliminary project data and location maps, and offer no substantive comments at this time. However, we appreciate your efforts to identify issues early in the planning stage. To assist you in your task of consulting with various agencies and assessing environmental impacts relating to your project activities, we are enclosing comment packets that relate to our responsibilities that you might find helpful.

Thank you for the opportunity to provide comments at this time.

Sincerely yours,

for Norm Thomas
Chief
Federal Activities Branch (6E-F)

Enclosures

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI

EPA's "309 REVIEW" PROCESS

Section 309 of the Clean Air Act states:

"(a) The Administrator shall review and comment in writing on the environmental impact of any matter relating to duties and responsibilities granted pursuant to this chapter or other provisions of the authority of the Administrator, contained in any (1) legislation proposed by any Federal department or agency, (2) newly authorized Federal projects for construction and any major Federal Agency action (other than a project for construction) to which Section 4332(2)(C) of this title applies, and (3) proposed regulations published by any department or agency of the Federal Government. Such written comment shall be made public at the conclusion of any such review.

(b) In the event the Administrator determines that any such legislation, action, or regulation is unsatisfactory from the standpoint of public health or welfare or environmental quality, he shall publish his determination and the matter shall be referred to the Council on Environmental Quality."

This section was added to the Clean Air Act in 1970, at the time the National Environmental Policy Act (NEPA) was passed and the Environmental Protection Agency (EPA) was formed. The rationale was that the EISs that Federal agencies would be developing under NEPA should have an independent review and that the newly formed EPA should perform it.

EPA developed implementing procedures in 1971 to carry out this responsibility and, in conjunction with the Council on Environmental Quality (CEQ), has refined those procedures since then. Operating procedures are contained in the manual, "Policies and Procedures for the Review of Federal Actions Impacting the Environment" (revised in 1984).

According to these operating procedures, EPA reviews, comments, and makes those comments available to the public, on all Federal draft and final EISs, proposed environmental regulations, and other proposed major actions we consider to have significant environmental effects. EPA has reviewed all of the approximately 14,000 draft and final EISs produced since the passage of NEPA.

The major elements of the 309 review process include the following:

- EPA reviews and comments on both the adequacy of the analysis and the environmental impacts of the proposed action itself.
- EPA comments on issues related to our "duties and responsibilities," which include all environmental media (i.e., air, water, etc.), methodologies related to media-impact assessment, and areas related to our regulatory responsibilities.

GENERAL INFORMATION PACKET

I. EPA Federal programs and authorities include:

A. Water Quality Management Program - Sections 106, 205, 208 and 303 of the Clean Water Act.

B. Drinking Water Programs - Surface Public Water Supply and Underground Water Source Protection Programs--Safe Drinking Water Act.

C. Section 404 Permit Program Coordination - Section 404 of the Clean Water Act.

D. Environmental Impact Statement (EIS) Coordination - EIS Preparation and Review Programs - National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act.

E. Executive Orders 11988 (Floodplain Management) and 11990 (Wetland Protection).

F. Section 7 of the Endangered Species Act - Protection of rare or endangered species of flora or fauna.

G. 36 CFR, Part 800 of the Historic Preservation Act - Protection of archeological or historical elements eligible for nomination to the National Register.

II. Description and requirements of these programs:

A. The Environmental Protection Agency (EPA) established the Water Quality Management (WQM) Program under the authority of Sections 106, 205, 208 and 303 of the Clean Water Act to develop and implement programs to control point and nonpoint source of water pollution programs; assigning the responsibility for problem solving to State and local agencies; and then coordinating with these agencies in developing and implementing solutions to the problems. The State agencies establish their water quality goals and standards, and develop programs to meet these goals. To establish water quality standards, States designate uses for stream segments, and set numerical and general water quality criteria to attain these uses.

G. 36 CFR, Part 800 of the Historic Preservation Act requires Federal agencies to identify and determine the effect of the action on any district, site, building, structure, or object listed in or eligible for listing in the National Register of Historic Places.

III. Special Environmental Concerns

To assist you in preparing environmental documents for the proposed action, we offer the following suggestions that apply to the previously mentioned EPA requirements:

a) In presenting a general description of the environment, (in regard to the proposed project area and its immediate vicinity), include an up-to-date map of the area with the boundary of the project area delineated.

b) Section 404 concerns should be addressed. This includes discussion and documentation of coordination with the appropriate Corps District to determine any jurisdictional authority regarding wetlands to be affected. If a Section 404 permit is required, it should be enclosed or the status of the Corps review explained in detail.

c) Any significant adverse environmental impacts must be discussed in detail (e.g., displacement of residents, significant water quality degradation, significant air quality degradation) in association with planned mitigation or monitoring programs. Alternatives to the proposed action should be presented with justification for the selected alternative.

d) Affects on the floodplain should be discussed. This includes using maps prepared by the Federal Insurance Administration and other appropriate agencies to determine whether the proposed action is located in or will likely affect a floodplain. If affected, the applicant should discuss these impacts and also describe the alternatives considered.

e) Endangered species concerns: Coordination with the Fish and Wildlife Service to identify, determine the effect and take measures to eliminate any adverse effects.

f) Coordinate with the State Historical Preservation Officer. If adverse impacts are identified, the Federal agency should request formal consultation with the Advisory Council on Historic Preservation (36 CFR, Part 800). Compliance with EO 11593 is required.

TEXAS
PARKS AND WILDLIFE DEPARTMENT
4200 Smith School Road • Austin, Texas 78744 • 512-389-4800

ANDREW SANSOM
Executive Director

COMMISSIONERS

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WALTER UMPHREY
Beaumont

August 29, 1991

Mr. Rob R. Reid
Project Manager
Espey, Huston & Associates, Inc.
Post Office Box 519
Austin, Texas 78767

Re: Proposed Electrical Transmission Line Routing, Military Highway to Comision Federal de Electricidad, Cameron County, Texas

Dear Mr. Reid:

Material concerning the above referenced project has been reviewed by Department staff and the following comments are provided.

Information concerning threatened, endangered, or sensitive species has been previously provided by Ms. Dorinda Sullivan of this Department in a letter dated July 24, 1991.

Impacts to fish, wildlife and plant resources can be reduced by following recommendations on the attached sheet.

With regard to the proposed route alternatives for this project, routing the new lines adjacent to existing lines within established rights-of-way would provide least impacts to fish and wildlife resources and is preferred.

I appreciate your coordination on this project.

Sincerely,

Larry D. McKinney, Ph.D.
Director, Resource Protection Division

LDMcK:RGF:wja

Attachment

Guidelines for Construction of Electrical Transmission Lines

Construction of the line should be performed to avoid adverse environmental impact and to restore or enhance environmental quality to the greatest extent practical. In order to minimize the possible project effects upon wildlife, the following measures are recommended:

1. Use wood or non-conducting crossarms to minimize the possibility of electrical contact with perching birds.

2. When possible, install electrical equipment on the bottom crossarm to allow top crossarm for perching.

3. To protect raptors, procedures should be followed as outlined in: "Suggested Practices for Raptor Protection on Power Lines", distributed by the Raptor Research Foundation, Incorporated, for Edison Electric Institute. REA Bulletin 61-10, "Protection of Bald and Golden Eaglesfrom Power Lines". USDI-EPA report entitled "Impacts of Transmission Lines on Birds in Flight", (FWS/OBS-78/48).

4. Construction should avoid identified wetland areas. Coordination with appropriate agencies should be accomplished to ensure regulatory compliance. Construction should occur during dry periods.

5. Construction should attempt to minimize the amount of flora and fauna disturbed. Reclamation of construction sites should emphasize replanting with native grasses and leguminous forbs.

6. Existing rights-of-way should be used to upgrade facilities, where possible.

7. Because forest and woody areas provide food and cover for wildlife, these cover types should be preserved. Mature trees, particularly those which produce nuts or acorns, should be retained. Shrubs and trees should be trimmed rather than cleared.

8. Lines should be buried, when practical.

9. All pole design should be single phase (without arms), where possible, to preserve the aesthetics of the area.

United States Department of Agriculture

Soil Conservation Service

101 South Main Street
Temple, Texas
76501-7682

September 9, 1991

Mr. Rob R. Reid
Project Manager
Espey, Huston & Associates, Inc.
P. O. Box 519
Austin, TX 78767

Dear Mr. Reid:

We have reviewed Central Power and Light Company's EH&A, Project No. 13370 (proposed transmission line in Cameron County, Texas). Soils information for the area of interest indicates some prime farmland soils may be present. However, it is our opinion the proposed project activities will have no significant adverse impacts on prime farmland.

If you need site specific soils information, you may contact the Soil Conservation Service office at the following address:

Soil Conservation Service
2315 W. Highway 83
Room 103
San Benito, TX 78586-4666

There are no unique farmlands, important rangeland, or protected forest lands within the project area.

If we may be of further assistance, please let us know.

Sincerely,

HARRY W. ONETH
State Conservationist

cc: Pete Wright, AC, SCS, Alice
Wil Fontenot, Natl. Envir. Coord., SCS, Washington, DC

United States Department of the Interior
NATIONAL PARK SERVICE
SOUTHWEST REGION
P.O. BOX 728
SANTA FE, NEW MEXICO 87504-0728

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

L7619(SWR-REC)

Mr. Rob R. Reid
Project Manager
Espey, Huston & Associates, Inc.
Post Office Box 519
Austin, Texas 78767

Dear Mr. Reid:

This responds to your request for our review of project information concerning a proposed transmission line in Cameron County, Texas. On a technical assistance basis, we find that the proposal will not impact National Park Service program concerns.

For future reference, "Mr. Eldon Reyer, Associate Regional Director, Planning and Resources Management" has been replaced by "Mr. Richard B. Smith, Associate Regional Director, Resources Management."

We appreciate the opportunity to review this proposal.

Sincerely,

Associate Regional Director,
Resources Management,
Southwest Region

NATIONAL PARK SERVICE 75 1916 - 1991 TM

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
c/o CCSU, Campus Box 338
6300 Ocean Drive
Corpus Christi, Texas 78412

October 28, 1991

Mr. Ray Allen
Environmental Coordinator
Central Power and Light Company
P.O. Box 2121
Corpus Christi, TX 78403

Consultation No. 2-11-92-I-003

Dear Mr. Allen:

The Fish and Wildlife Service (Service) has received your September 10, 1991 letter requesting the Service review a proposed 138 kv aerial transmission line project to be located in Cameron County, Texas. You also forwarded a draft copy of the Environmental Assessment for the proposed project to our office for review. Specifically, you are requesting comments concerning the potential risk to federally listed or species proposed for listing as threatened or endangered which may occur in the project area. In addition to endangered species concerns, the entire project route was evaluated with respect to the occurrence of wetlands or other important fish and wildlife habitat in the area.

According to the information you provided, CP&L's preferred proposed route, identified as Route 3 in your Biological Assessment would involve constructing a new 138 kv aerial transmission line between the Military Highway Substation located on U.S. Highway 281, proceed south, and terminate in Mexico. The preferred proposed route would originate at the Military Highway Substation, proceed in a southeasterly direction, cross an existing International Boundary and Water Commission (IBWC) levee, parallel the levee, then cross cropland and the Rio Grande at a point south of the IBWC levee. The purpose of the project is to increase the capacity to exchange power between CP&L located in Cameron County and the Comision Federal de Electricidad (CFE) located in Mexico. The new transmission line would tie in with CFE's existing transmission line located in Mexico.

After discussions with you, the Service is of the understanding that an existing 69 kv aerial transmission line initiating at the Military Highway Substation, following a southeasterly direction, and terminating at the IBWC levee located adjacent to Rusteberg Bend, would no longer be utilized and would therefore be removed in its entirety. A large portion of the existing 69 kv powerline is situated in a tract of land which is currently being acquired by the Texas Nature Conservancy (TNC). This tract, which will be managed by the Service, will be planted with native vegetation in order to provide natural brush habitat for the endangered ocelot (Felis pardalis) and jaguarundi (Felis yagouaroundi).

If CP&L selects the "preferred route 3" as described earlier, and if the proposed 138 kv aerial transmission line parallels the existing IBWC levee, then a very minimal amount of existing brush habitat would be impacted. This route would also minimize impacts to the tract of land currently being acquired by the TNC and Service for native brush habitat creation and management.

At this time, no potential adverse impacts to threatened or endangered species as a result of the proposed project is anticipated. However, please be advised

that further consultation with regards to endangered species will be required if:

1. New species are listed which may be affected by the project.

2. New information becomes available which reveals impacts not considered in this consultation.

Therefore, based upon the September 1991 Environmental Assessment document and discussions with you, the Service makes the following recommendations regarding CP&L's proposed Military Highway project:

1) "Route 3" should be utilized if possible. This route selection would minimize impacts to existing native brush in the area. Additionally, this route would result in minimal encroachment into the tract of land currently being acquired by the TNC and the Service.

2) Any clearing of riparian vegetation along the Rio Grande should be minimized to the extent practicable.

3) The existing 69 kv aerial transmission line, which would be defunct, should be removed in its entirety.

4) To avoid avian-powerline collisions, that portion of the proposed 138 kv aerial transmission line which will traverse the Rio Grande, should be marked with appropriate visual marking devices. Specifically, the conductors and static lines should be marked with optic yellow aviation balls. These marking devices should be approximately 9" in diameter on the static wire and 24" in diameter on the conductors. The balls should contain a black vertical stripe to increase effectiveness. The aviation balls should be situated on conductor and static wires in an alternating fashion. These aviation balls should be installed at 240 foot intervals on each conductor and 160 foot intervals on each static wire.

Sincerely,

THOMAS E. GRAHL
Acting Field Supervisor

cc:
Regional Director, U.S. Fish & Wildlife Service, Albuquerque, NM (FWE/SE)
Manager, Lower Rio Grande Valley Refuge Complex, McAllen, Tx.

CENTRAL POWER AND LIGHT COMPANY Home Office P O Box 2121, Corpus Christi, Texas 78403 512-881-5300

November 11, 1991

Dear :

Central Power and Light Company (CPL) proposes to construct a 138kV and 69kV double circuit transmission line between the Military Highway substation and the Mexican border. CPL also proposes simultaneously to remove an older line near CPL's proposed new line.

The proposed line will begin at the Military Highway substation located on U.S. Highway 281. The line will go southwest parallel and approximately 500 feet west of Cela Avenue through an open field. The line will then turn southeast through the undeveloped corridor parallel to and slightly southwest of CPL's existing line. The line will then run parallel with the International Boundary and Water Commission (IBWC) levee, crossing it several times. The line will stop paralleling the levee and cross the Rio Grande in the Rusteburg Bend area. The estimated cost of the project (the new line and substation construction costs) is $1.285 million.

In order for CPL to build this line, CPL must apply to the Public Utility Commission of Texas (Commission) for an amendment to its Certificate of Convenience and Necessity. CPL is required to provide notice to you under the Commission's Procedural Rules because CPL will require an easement from you in order to construct the proposed transmission line. As you will recall, CPL has already negotiated with you for an easement. We therefore believe that you have consented to having the proposed line on your property. If you have any questions regarding this project, please contact me at (512) 881-5775.

If you wish to intervene in the Commission proceeding or wish to comment on the project, you may contact the Commission at 7800 Shoal Creek Boulevard, Austin, Texas 78757 or call the Public Utility Commission Public Information Office at (512) 458-0256 or (512) 458-0221 for the telecommunications device for the deaf. The deadline for intervention in the proceeding at the Commission will be 60 days after publication of the public notice in area

newspapers is completed. Publication of the notice is occurring at this time and will be completed by November 30.

CPL looks forward to the completion of this project since it will enhance electric service reliability both in the United States and in Mexico. I welcome your comments and inquiries on this project.

Sincerely,

Doug Hill
Transmission & Distribution
Engineering Department
Central Power and Light Company

enc

Owners of Habitable Structures within 200' of the Centerline of the Proposed Line from whom we have (sought) an easement.

Frank Crixell, Sr. 3
118 McFadden Hut
Bronwnsville, TX 78520

Juana G. Cantu 5
75 Sunnyside Lane
Brownsville, TX 78520

Owners From whom we have (sought) an easement but w/out a Habitable Structure on Property.

City of Brownsville 1
Engr- Attn: Oscar Martinez

Brownsville, TX 78520

Loyd Sharp 2
1165 Military Highway
Brownsville, TX 78520

Catholic Diocese of 4
Brownsville
1910 E. Elizabeth
Brownsville, TX 78520

Charles Champion 6
1 Forest Glen
Huntsville, TX 77430

Emily C. Colins
1313 Pauline Drive
Pasadena, TX 77502

Frank Champion
7529 Leafy Hollow
Live Oak, TX 78233

Mary Stella Collins
P. O. Box 26
Cressey, CA 95312

Sylvia Amy Champion Pierantini
13111 Forest Shower
San Antonio, TX 78233

Josephine Ursoy
6306 Saddler Lane
Austin, TX 78724

Joe Champion
3214 East 19th
Brownsville, TX 78520

Alexander Werbiski Champion, Jr.
3214 East 19th
Brownsville, TX 78520

Richard Mouser 7
HCR 32, Box 190B
Uvalde, TX 78801

Clarence W. Stuermer,et ux.
9
P.O. Box 3050
Brownsville, TX 78520

Antonio Pena 10
165 Calle Reyna
Brownsville, Tx 78520

Simona Pena 11
4406 Bernandina
Corpus Christi, TX 78416

Hermino S. Garcia, et ux.
12
113 Garden St
Brownsville, TX 78520

Jesus Pena 14
Rt. 2 Box 723
Corpus Christi, TX 78416

Esequiel Tello, et ux. 15
P. O. Box 313
Olmito, TX 78575

Antonio & Doroteo Amaya 16
4438 Ramona
Corpus Christi, TX 78416

Margarito P. Medina 17
439 Willy Court
Gilroy, CA 95020

Tenneco Realty Inc 18
Attn: Keith Chunn, Jr.
P. O. Box 2511
Houston, TX 77252-2511

Robert R. Mathers & 19
Mrs. James B Hollan
600 Riverside
Brownsville, TX 78520

CENTRAL POWER AND LIGHT COMPANY Home Office P O Box 2121, Corpus Christi, Texas 78403 512-881-5300

November 11, 1991

Dear :

Central Power and Light Company (CPL) proposes to construct a 138kV and 69kV double circuit transmission line between the Military Highway substation and the Mexican border. CPL also proposes simultaneously to remove an older line near CPL's proposed new line.

The proposed line will begin at the Military Highway substation located on U.S. Highway 281. The line will go southwest parallel and approximately 500 feet west of Cela Avenue through an open field. The line will then turn southeast through the undeveloped corridor parallel to and slightly southwest of CPL's existing line. The line will then run parallel with the International Boundary and Water Commission (IBWC) levee, crossing it several times. The line will stop paralleling the levee and cross the Rio Grande in the Rusteburg Bend area. The estimated cost of the project (the new line and substation construction costs) is $1.285 million.

In order for CPL to build this line, CPL must apply to the Public Utility Commission of Texas (Commission) for an amendment to its Certificate of Convenience and Necessity. Even though CPL will not be seeking an easement across your property, CPL is required to provide notice to you. This is because the Commission's rules consider you to be "affected" by CPL's proposal since you own a habitable structure within 200 feet of the location of the new line. If you have any questions regarding this project, please contact me at (512) 881-5775.

If you wish to intervene in the Commission proceeding or wish to comment on the project, you may contact the Commission at 7800 Shoal Creek Boulevard, Austin, Texas 78757 or call the Public Utility Commission Public Information Office at (512) 458-0256 or (512) 458-0221 for the telecommunications device for the deaf. The deadline for intervention in the proceeding at the Commission will be 60 days after publication of the public notice in area newspapers is completed. Publication of the notice is occurring at this time and will be completed by November 30.

CPL looks forward to the completion of this project since it will enhance electric service reliability both in the United States and in Mexico. I welcome your comments and inquiries on this project.

Sincerely,

Doug Hill
Transmission and Distribution
Engineering Department
Central Power and Light Company

enc

Other Owners of Habitable Structures within 200' of the Centerline of the Proposed Line.

Evaristo G. Ramos, et al. 1
38 Cela Ave.
Brownsville, TX 78520

Domingo E. Ramirez, et al.5
334 Joanne Lane
Brownsville, TX 78520

Hector A. Padilla, et ux. 6
614 Florence Lane
Brownsville, TX 78520

Hector T. Sanchez, et ux. 7
P.O. Box 785
Brownsville, TX 78520

Ester Gutierrez, et al. 8
574 Florence Lane
Brownsville, TX 78520

Vincente A. Ornelas 9
564 Florence Lane
Brownsville, TX 78520

Anthony P. Garcia 10
554 Florence Lane
Brownsville, TX 78520

Maria Del Rosario Avila 11
7600 W. Military, apt #111
San Antonio, TX 78227

Juan Yanez, et ux. 12
534 Florence Lane
Brownsville, TX 78520

Norma Cecilia Rivera 13
224 E. 3rd St.
Brownsville, TX 78520

Jose G. Perez, et ux. 14
514 Florence Lane
Brownsville, TX 78520

Eduardo Castillo, et ux. 15
434 Joanne Lane
Brownsville, TX 78520

Ramon Lopez
and Socorro Lopez 16
444 Joanne Lane
Brownsville, TX 78520

Estaquio A. Castro, et ux. 17
504 Florence Lane
Brownsville, Texas 78520

Jose Garza, et ux. 18
445 Joanne Lane
Brownsville, TX 78520

Oscar Gonzalez, et ux. 19
435 Joanne Lane
Brownsville, TX 78520

Elijio Martinez, et ux. 20
425 Joanne Lane
Brownsville, TX 78520

David Tovar, et ux. 21
415 Joanne Lane
Brownsville, TX 78520

Eufemia Lopez 22
4940 Southmost Rd.
Brownsville, TX 78520

CENTRAL POWER AND LIGHT COMPANY

Notice of filing with the Public Utility Commission of Texas

To Build a Transmission Line

Pursuant to Section 21.24 (c) of the Procedural Rules of the Public Utility Commission of Texas, Central Power and Light Company (CPL) herewith serves notice of the filing with the Public Utility Commission of Texas of an application for a Certificate of Convenience and Necessity for the proposed construction of a 138 kV and 69 kV double-circuit transmission line. The proposed line is to enhance the reliability of the southern portion of CPL's transmission system in emergency conditions and to sell energy to the Comisión Federal Electricidad de Mexico (CFE).

The proposed line will begin at CPL's portion of the Military Highway Substation located on U.S. Highway 281 (Military Highway) near the intersection with Farm to Market Road 802 west of Brownsville, Cameron County, Texas.

Thence, in a southwesterly direction parallel with and approximately 500 feet west of Cela Avenue for a distance of approximately 725 feet.

Thence, in a southeasterly direction crossing Jo Anne Lane and twice crossing the International Boundary and Water Commission levee a distance of approximately 2,600 feet.

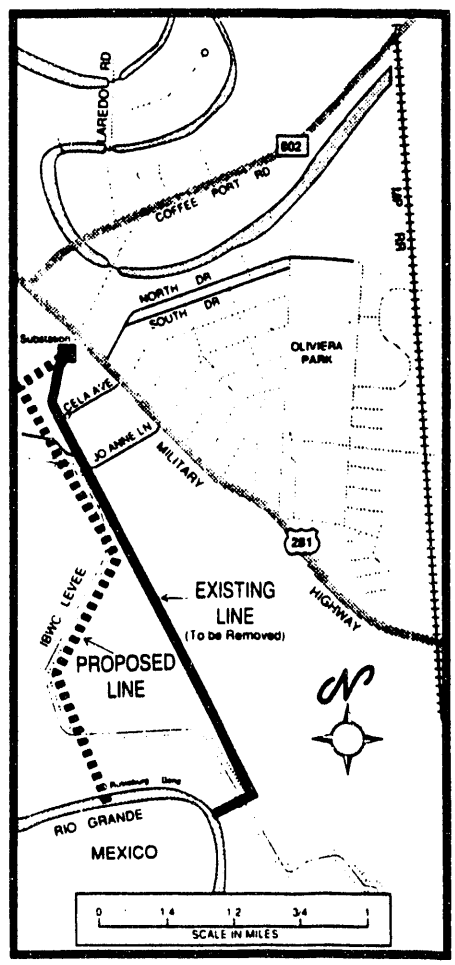
Thence, parallel with and approximately 100 feet from the levee in a southwesterly direction a distance of approximately 1,900 feet.

Thence, in a southeasterly direction, continuing to parallel the levee, a distance of approximately 850 feet.

Thence, in a continued line a distance of approximately 1,000 feet to the Rio Grande.

The estimated cost of the proposed transmission line and associated substation equipment is $1.308 million.

Persons with questions about this project should call Ray Elledge at CPL at 512/943-5444. Persons who wish to intervene in the proceeding or comment upon action sought, should contact the Public Utility Commission of Texas at 7800 Shoal Creek Boulevard, Austin, TX 78757, or call the Public Utility Commission Public Information Office at 512-458-0256 or 512-458-0221 for the telecommunications device for the deaf. The deadline for intervention in the proceedings at the Commission will be 60 days after publication of the notice is completed.



CENTRAL POWER AND LIGHT COMPANY

Aviso de Archivamiento de aplicación

Con La Comisión de Utilidades Públicas de Texas La Construcción de una Línea de Transmission de Energía

De acuerdo con la Seccion 21.24 (c) de las Reglas de Procedimientos de la Comisión Utilidades Públicas de Texas, la Compañía Central Power and Light (CPL), por medio de la presente dá la noticia de que está registrando con la Comisión de Utilidades Públicas de Texas una aplicación para un Certificado de Conveniencia y Necesidad para la propuesta construcción de una línea de transmisión 138 kV y 69 kV de doble circuito. La línea propuesta servirá para mejorar y tener un sistema de transmisión más digno de confianza/seguro en la porción sureste de CPL durante condiciones de emergencia y para la venta de energía a la Comisión Federal de Electricidad de Mexico (CFE).

La propuesta línea comenzará en la porción de CPL en la Subestacion de Military Highway situada en la Carretera U.S. 281 (Military Highway) cerca de la intersección con Farm y la carretera Market 802, al oeste de Brownsville, Condado de Camerón, Estado de Texas.

De ahí, continuará en dirección sureste paralela con y aproximadamente a 500 pies al oeste de la Avenida Cela por una distancia de aproximadamente 725 pies.

De ahí, seguirá en dirección sureste cruzando el Jo Anne Lane y cruzando dos veces el Linde Internacional del dique de la Comisión de Agua a una distancia de aproximadamente 2,600 pies.

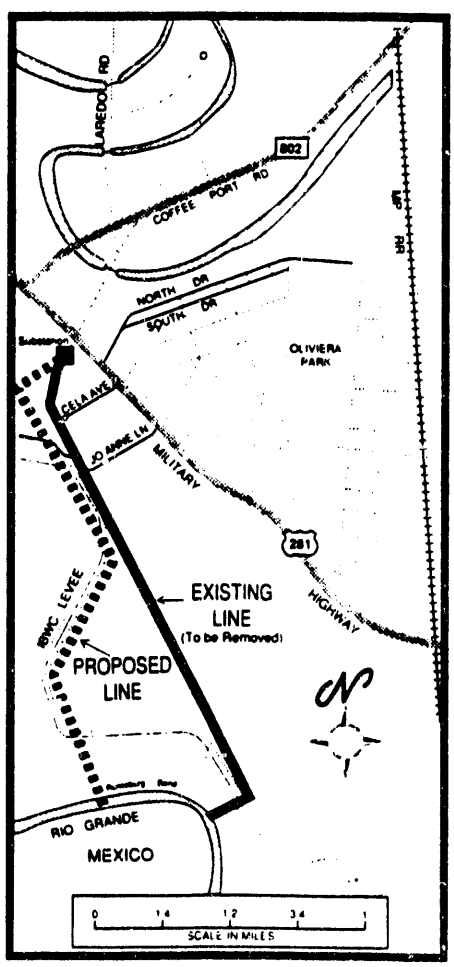
De ahí, continuará paralela con y aproximadamente a 100 pies del dique en dirección sureste por una distancia de aproximadamente 1,900 pies.

De ahí, seguirá en dirección sureste, continuando paralela con el dique, una distancia de aproximadamente 850 pies.

De ahí, continuará en una línea continua una distancia de aproximadamente 1,000 pies hacia el Rio Grande.

El costo estimado de la propuesta línea de transmisión y equipo asociado de subestación es $1.308 Millones.

Personas con preguntas acerca de este projecto pueden llamar a Ray Elledge en CPL al 512/943-5444. Personas que deseen interveir en el procedimiento o hacer comentario sobre esta acción solicitada, pueden ponerse en contacto con la Comisión de Utilidades Públicas de Texas, 7800 Shoal Creek Boulevard, Austin, Texas 78757, o llamar a la Oficina de Información de la Comisión de Utilidades Públicas de Texas al telephóno 512-458-0256 o al 512-458-0221 para conectar con el equipo con divisa de telecomunicaciones para sordo-mudos. La Fecha de cierre para la intervención en los procedimientos ante la Comisión será de 60 dias a partir de la fecha de publicación de la noticia.



APPENDIX B
COLOR PHOTOGRAPHS OF THE STUDY AREA

The following section presents a series of color photographs of the study area, the existing CPL 69-kV transmission line, various alternative routes, as well as CPL's proposed route. The photographs and their subjects are as follows:

Figure 1 - Color Aerial Photographs of the Study Area taken January 15, 1991, Showing Ground PhotoLocations.

Figure 2(a) - Representative View of Cropland in the Study Area.

Figure 2(b) - Representative View of Grazingland in the Study Area.

Figure 3(a) - View of Existing CPL 69-kV Line (Alternative Route 1) in Cropland, Looking Southeast from IBWC Levee.

Figure 3(b) - View of Existing CPL 69-kV Line (alternative routes 1 and 2) in Residential Area Looking Northwest from IBWC Levee.

Figure 4(a) - View of Existing CPL 69-kV Line (Alternative Route 1) in Cropland, Looking Southeast from IBWC Levee.

Figure 4(b) - View of existing CPL 69-kV Line (alternative routes 1 and 2) in Mesquite Brushland, looking Southeast from IBWC Levee.

Figure 5(a) - View of CPL's Proposed Route (Alternative Route 3) Looking Northwest along IBWC Levee.

Figure 5(b) - View of CPL's Proposed Route (Alternative Route 3) Looking South at Rio Grande Crossing Point.

Figure 1. Color Aerial Photographs of the Study Area taken January 15, 1991, Illustrating Ground Photo Locations.

Figure 2 (a)- Representative View of Cropland in the Study Area.

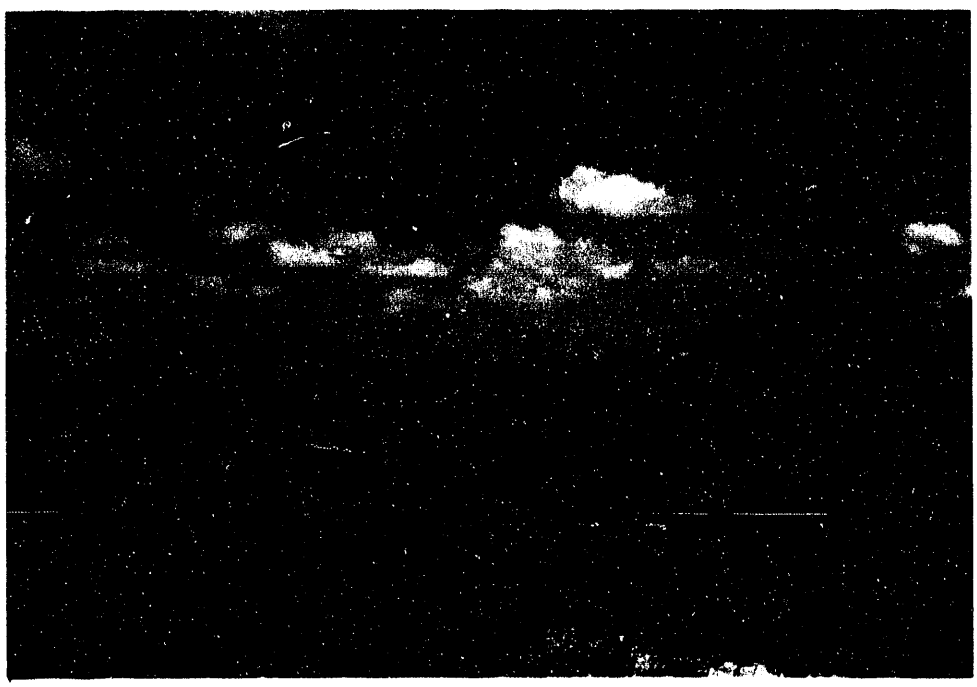


Figure 2(b) - Representative View of Grazingland in the Study Area.

Figure 3(a) - View of Existing CPL 69-kV Line (Alternative Route 1) in Cropland, Looking Southeast from IBWC Levee.

Figure 3(b) - View of Existing CPL 69-kV Line (alternative routes 1 and 2) in Residential Area Looking Northwest from IBWC Levee.

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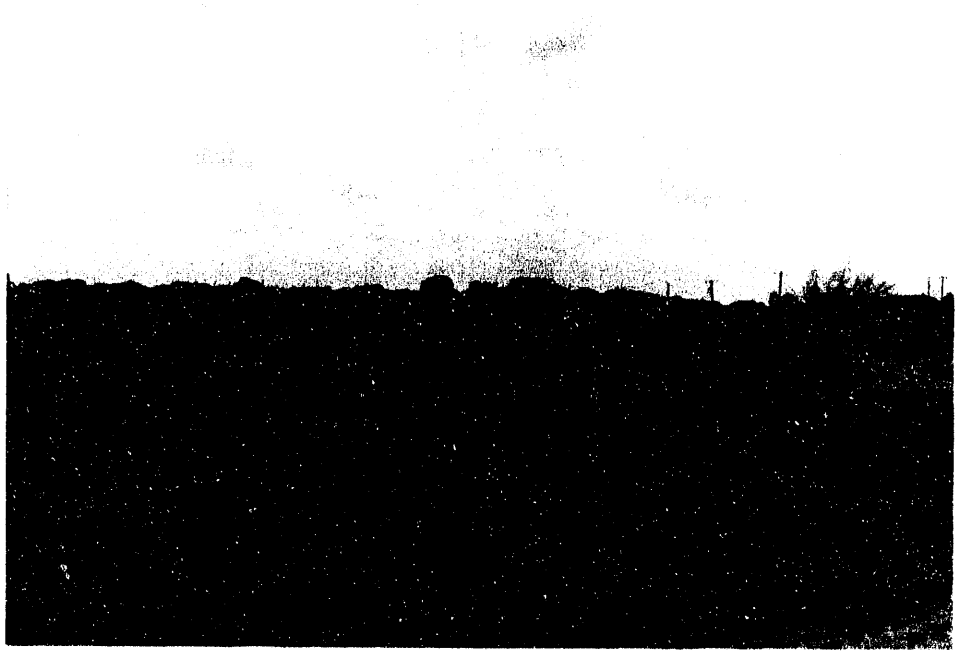


Figure 5(a) - View of CPL's Proposed Route (Alternative Route 3) Looking Northwest along IBWC Levee.

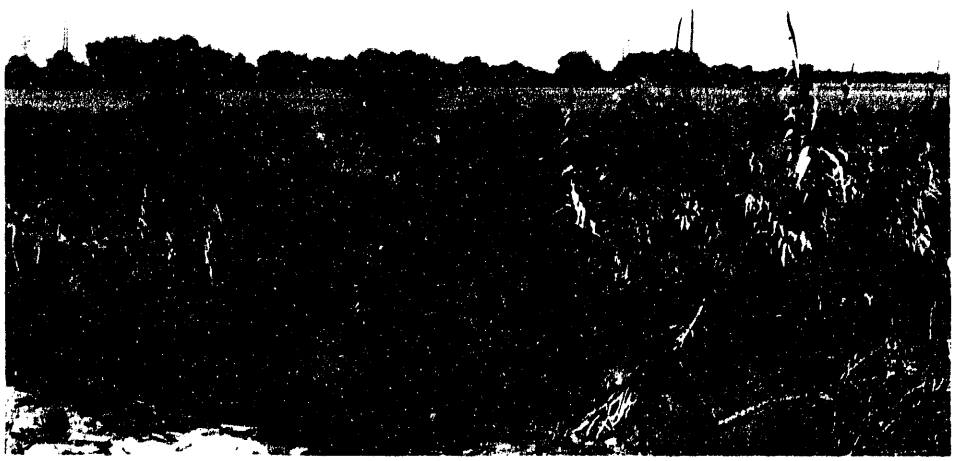
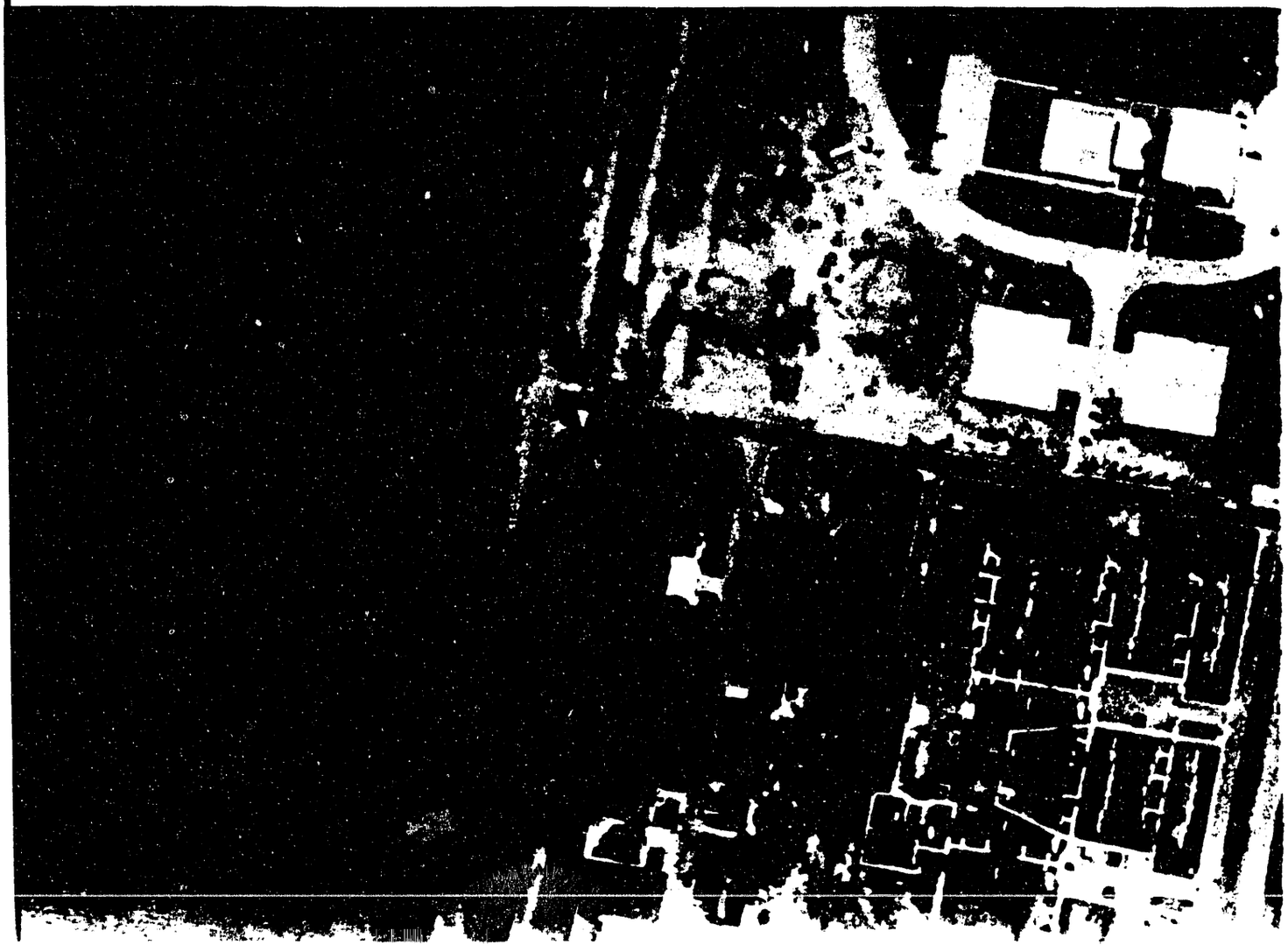


Figure 5(b) - View of CPL's Proposed Route (Alternative Route 3) Looking South at Rio Grande Crossing Point.

FIGURE 6-1

ESPEY, HUSTON & ASSOC

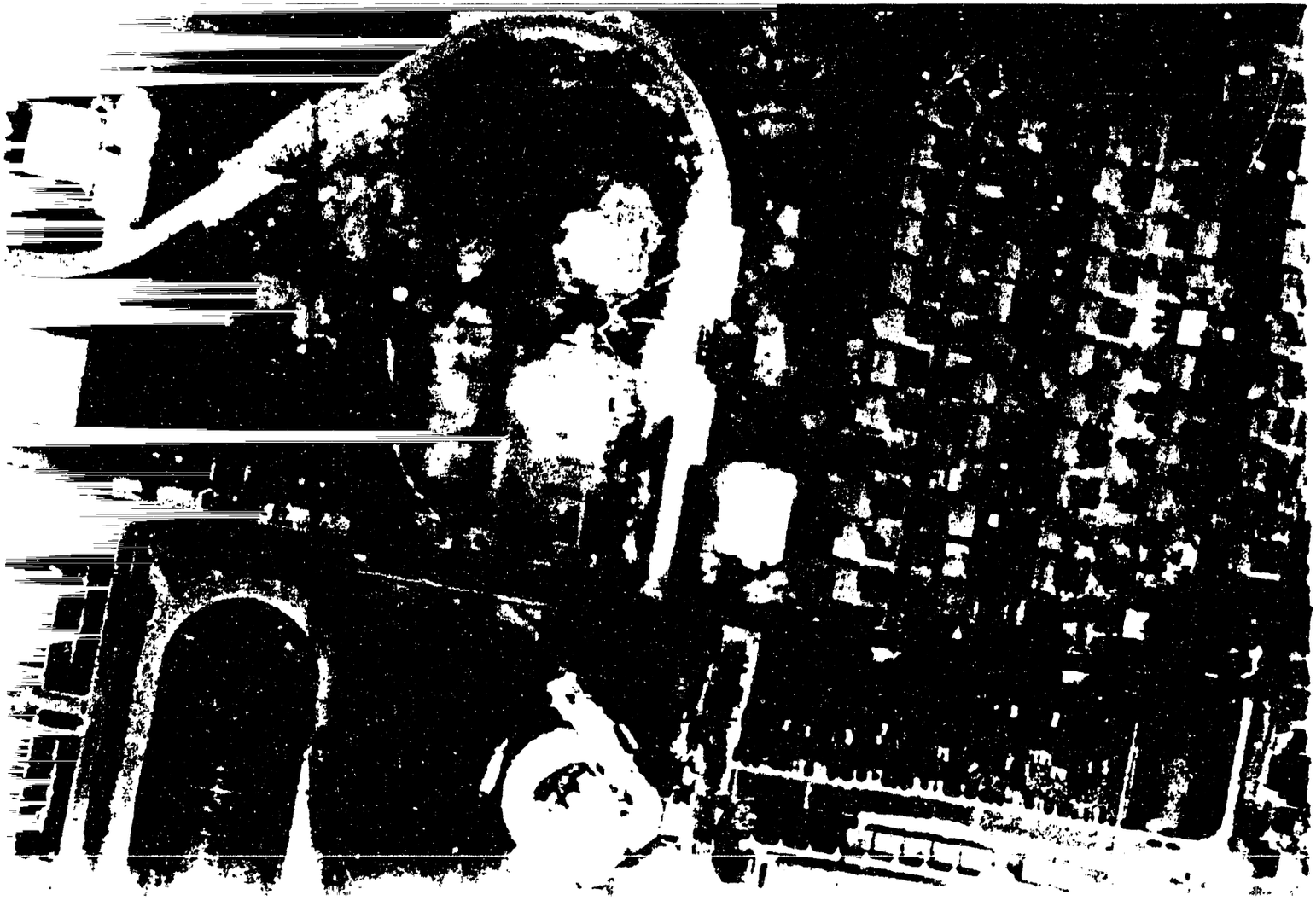
Engineering & Environmental Cor



i

SOCIATES, INC.

I Consultants



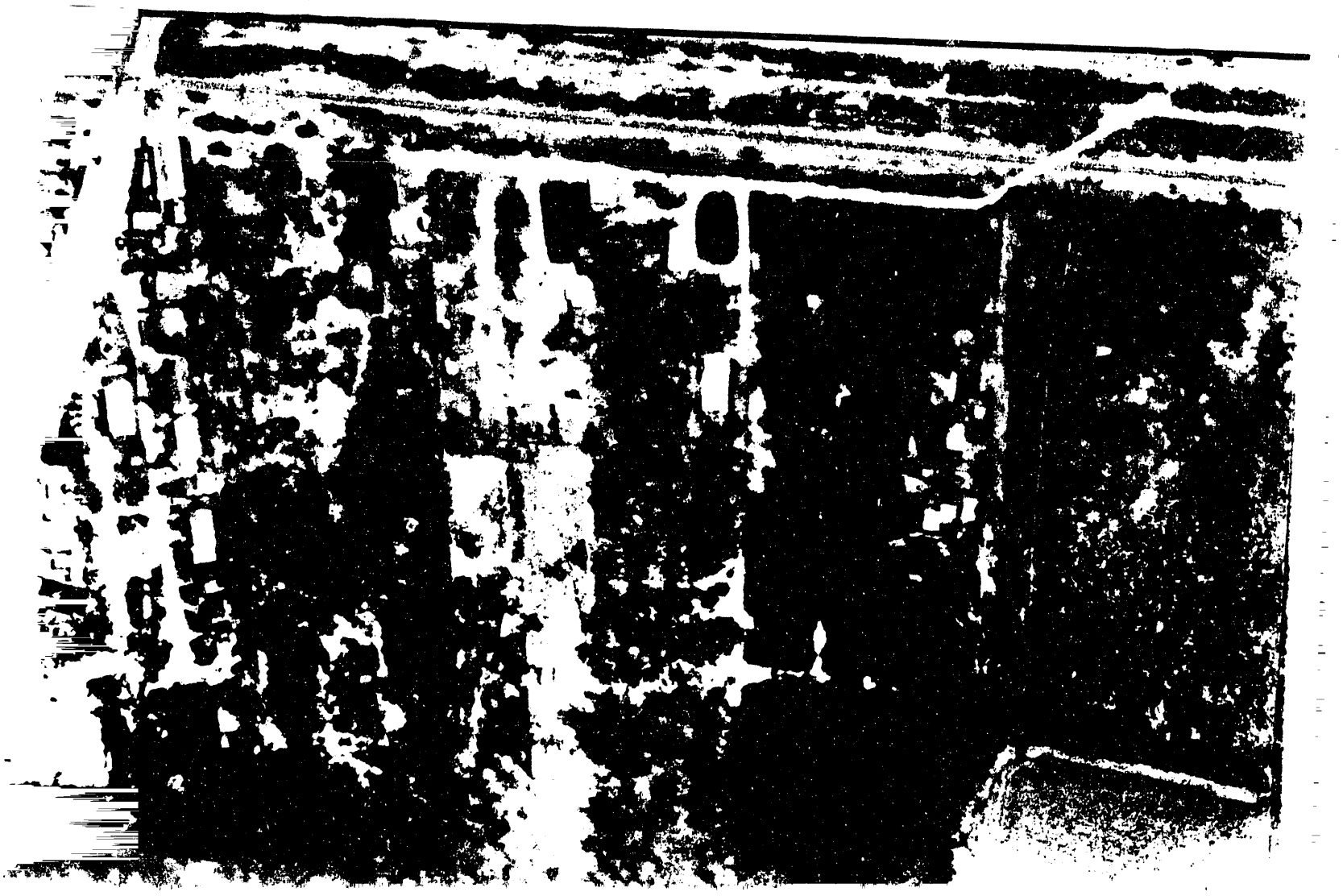
ALONG CPL'S
PROPOSED MILITARY

LAND USE FEATURES

:PL'S PREFERRED AND ALTERNATI

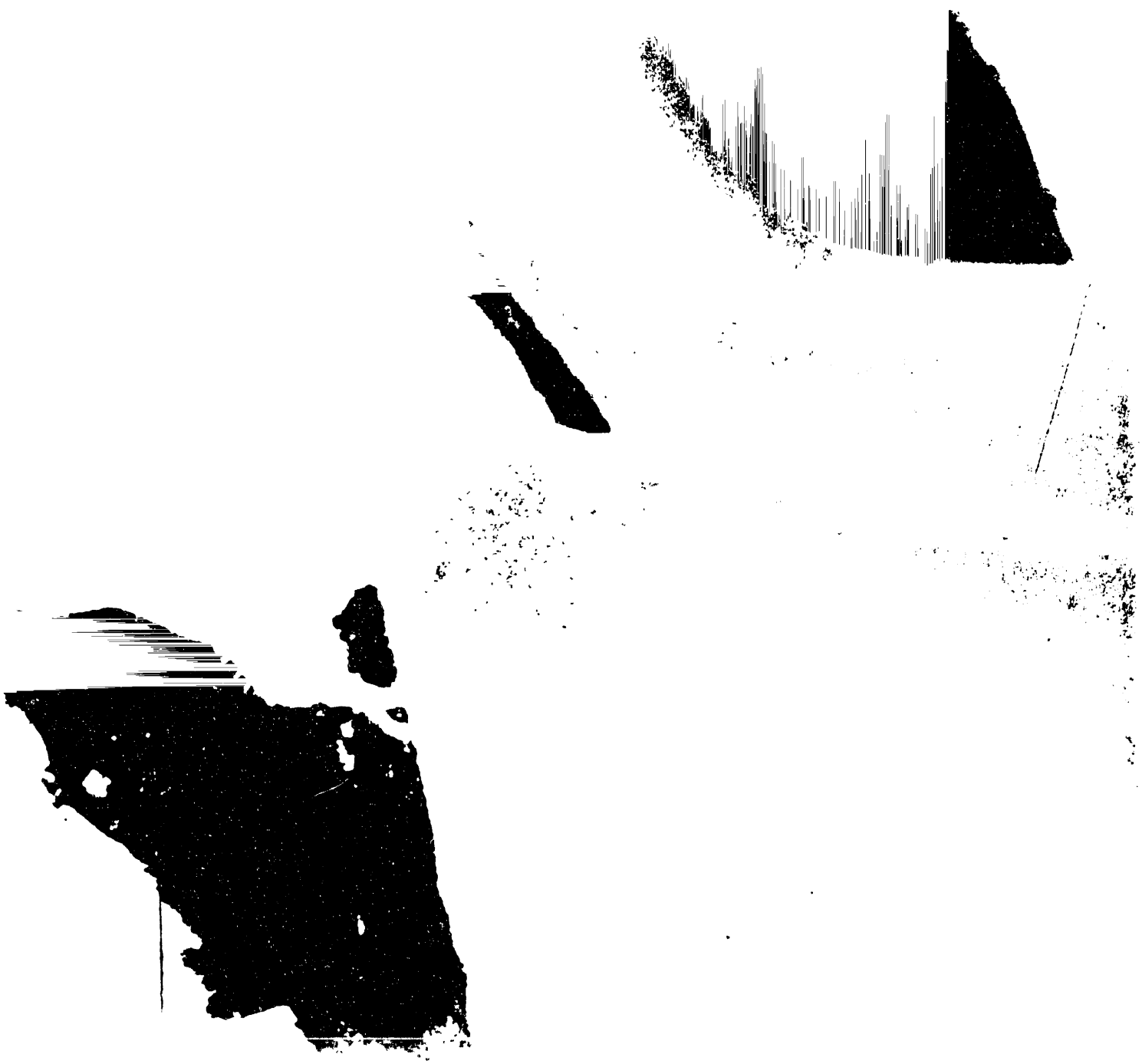
ITARY HIGHWAY - CFE TIE 138/(

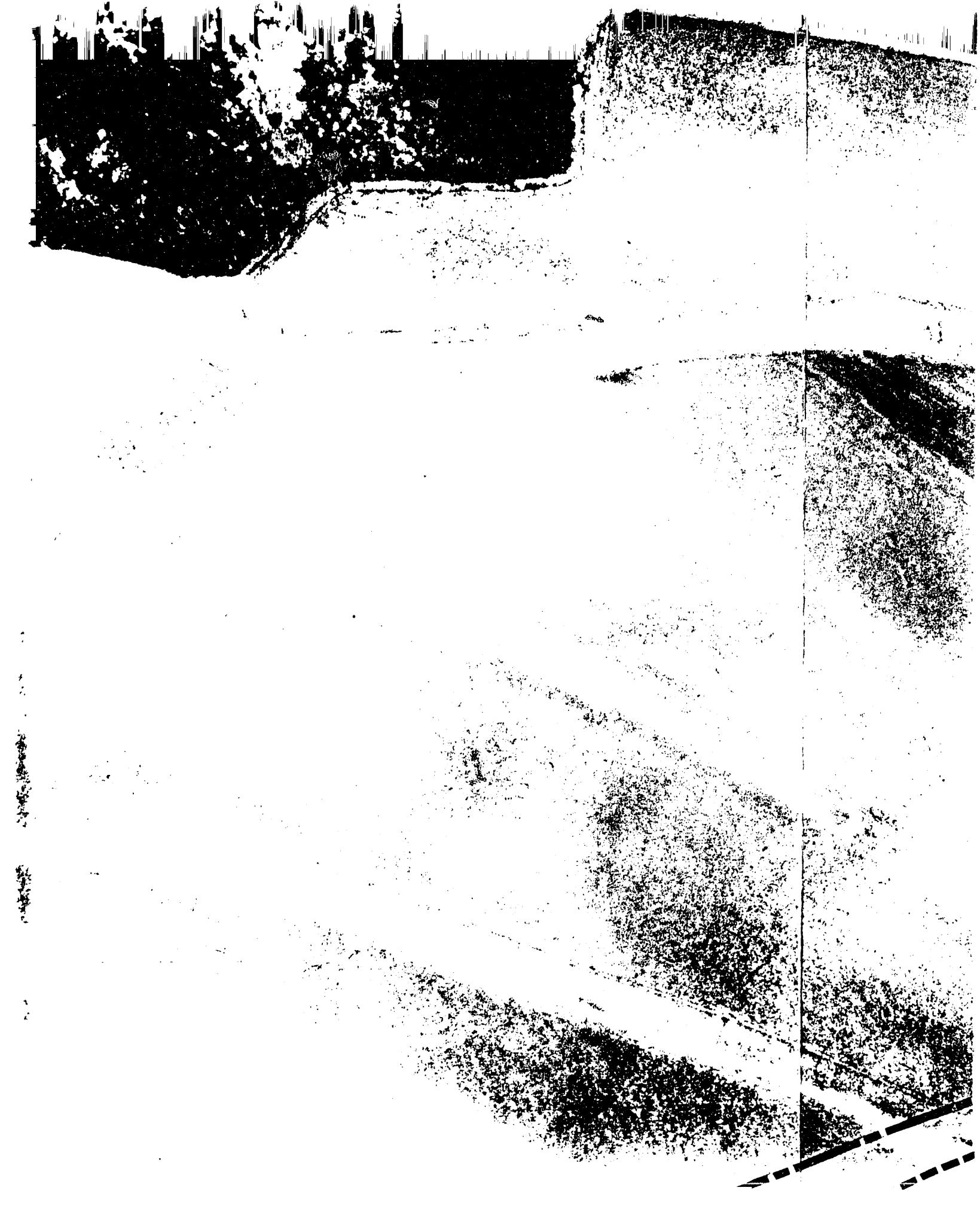
NATIVE ROUTES
138/69-KV PROJECT

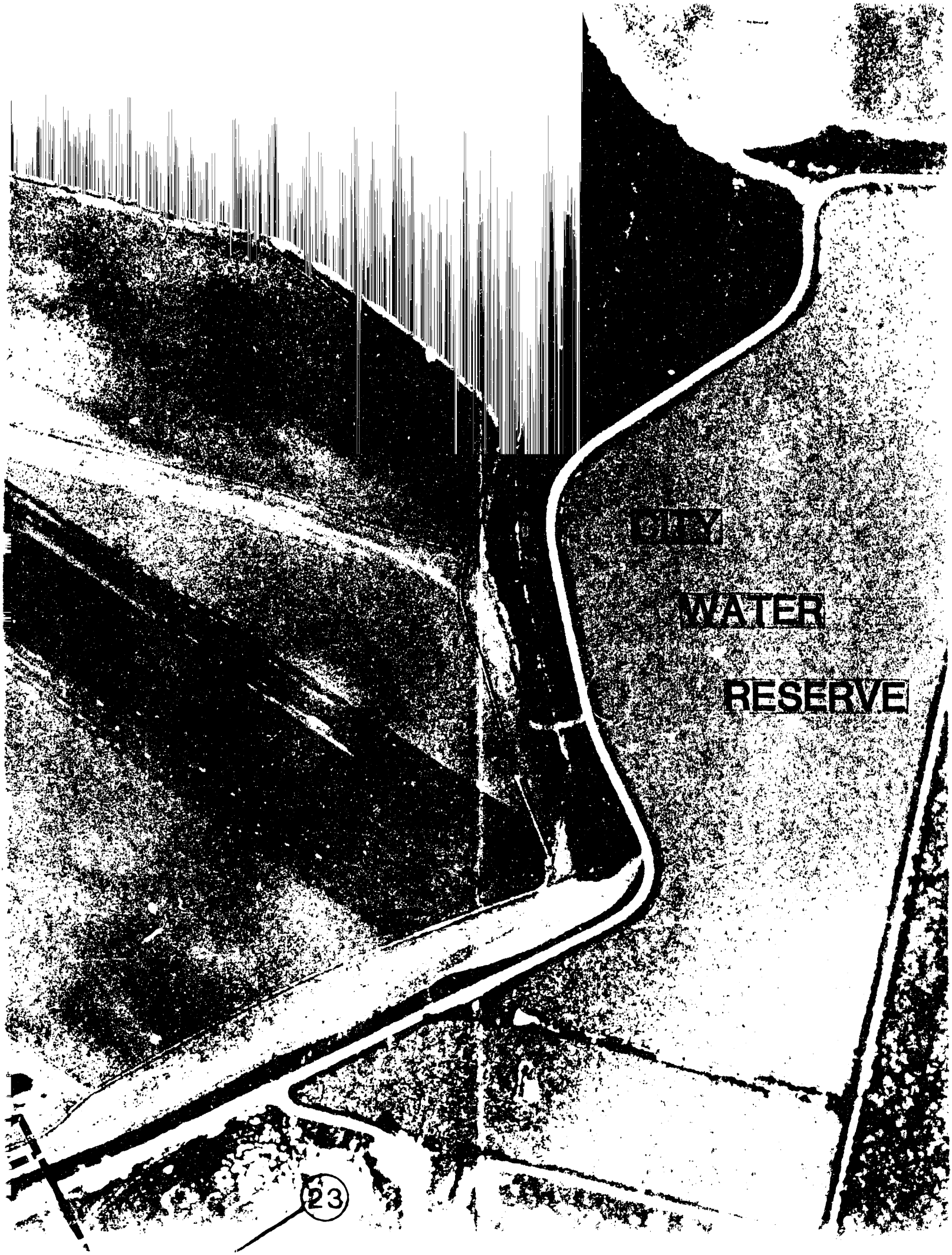



WATER FILTRATIO
PLANT NO. 1


MILITARY






CITY
WATER
RESERVE
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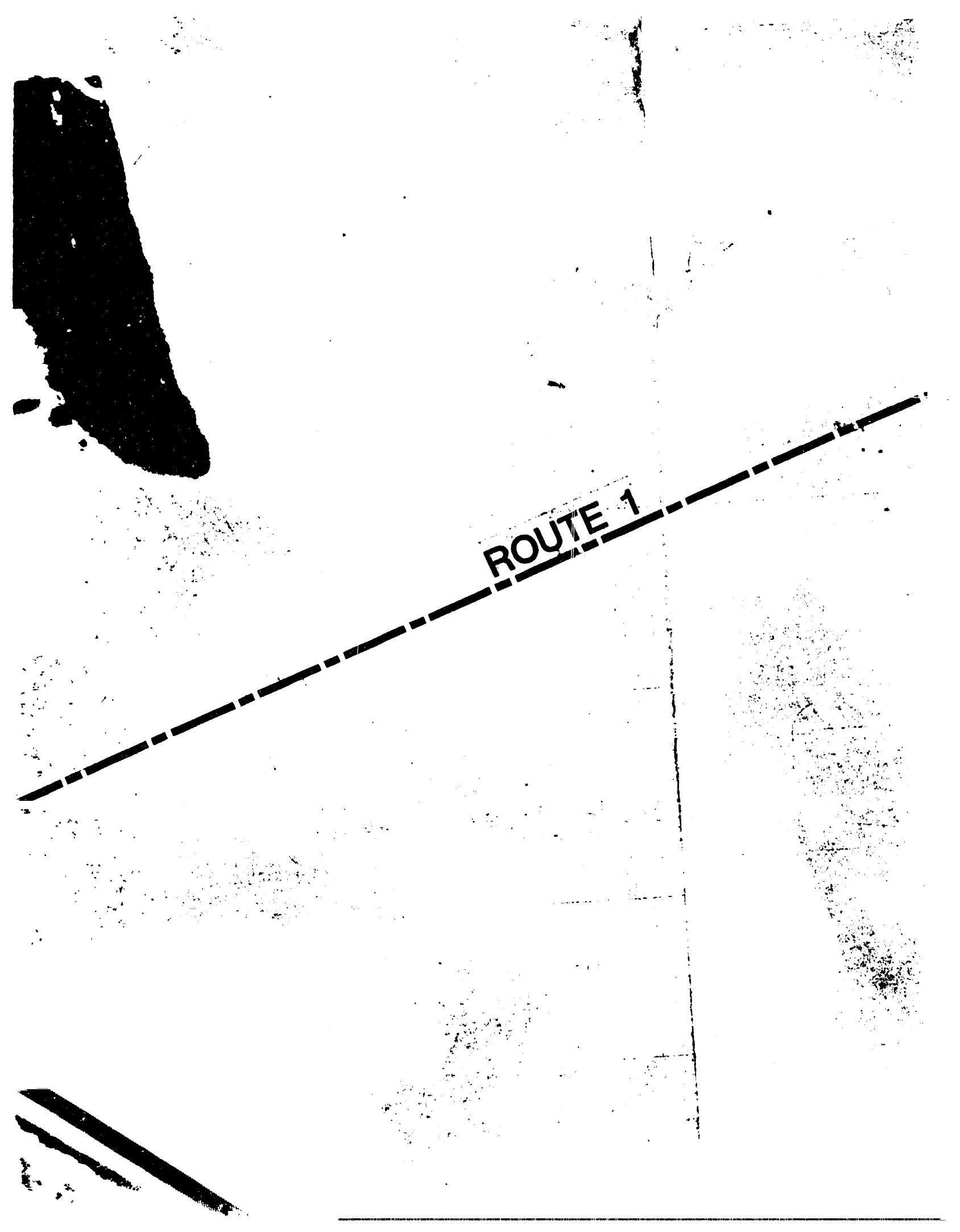
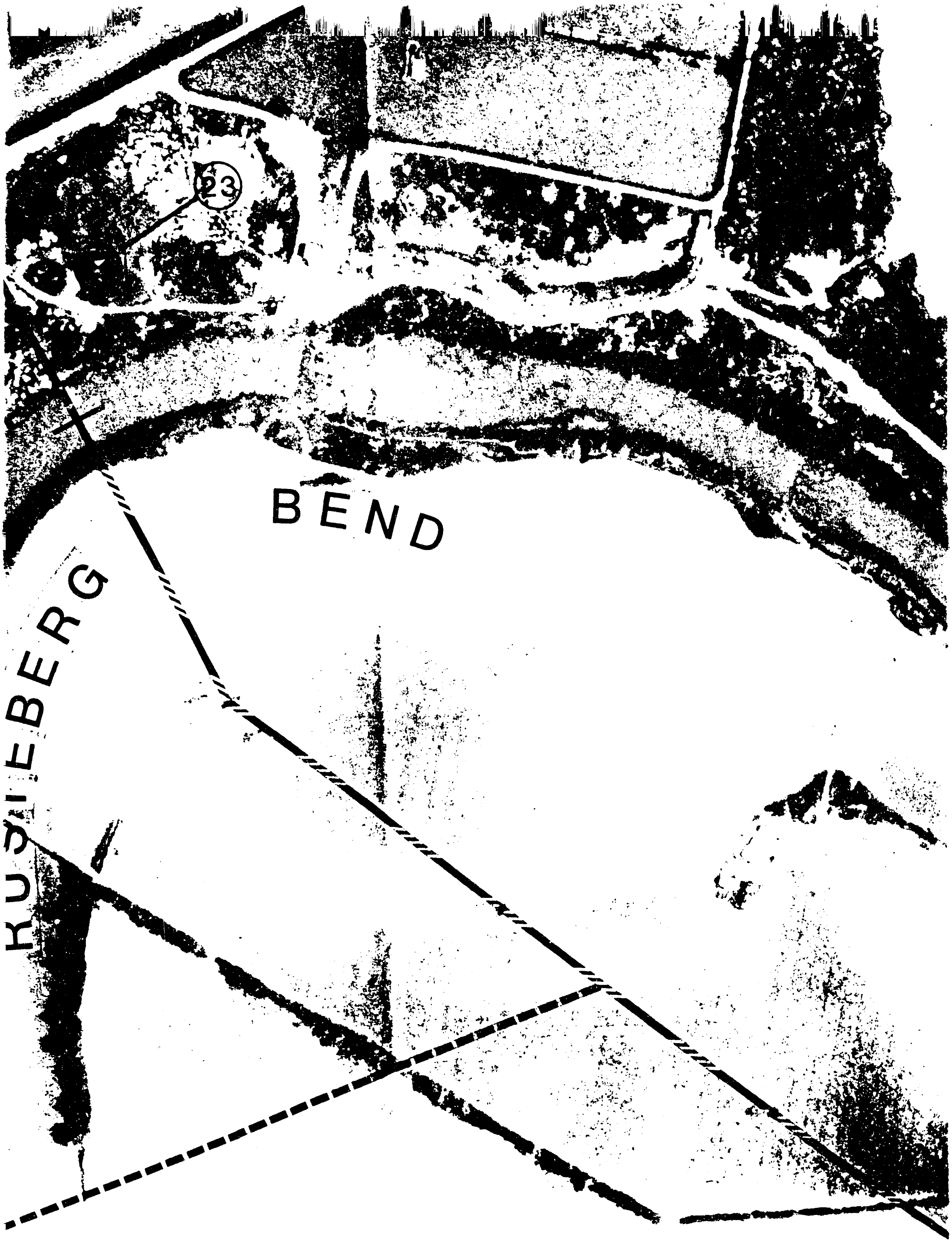

ROUTE 1


RIO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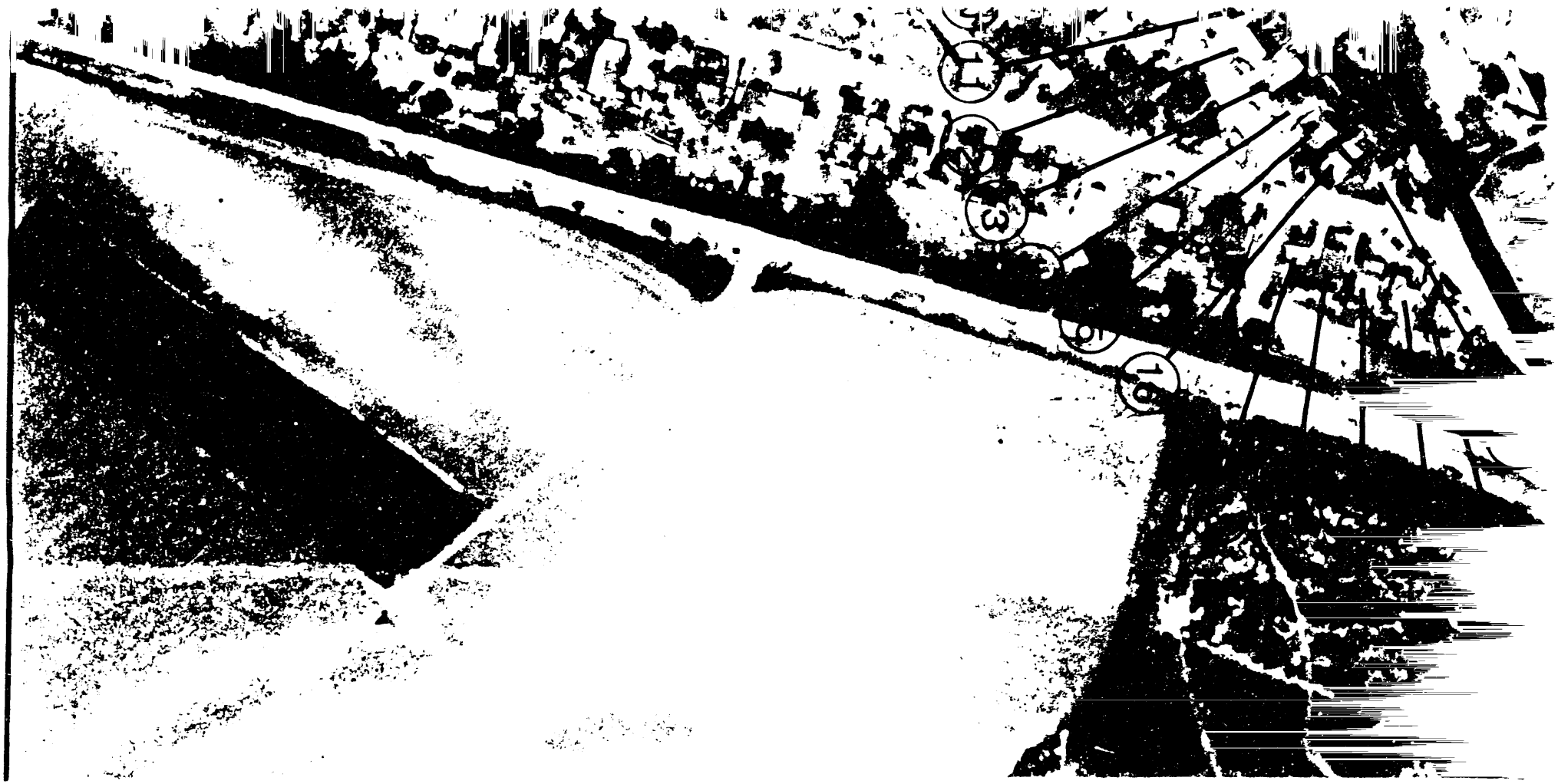
BEND


RIO GRANDE


RIO GRANDE
MEXICO


HIGHWAY 281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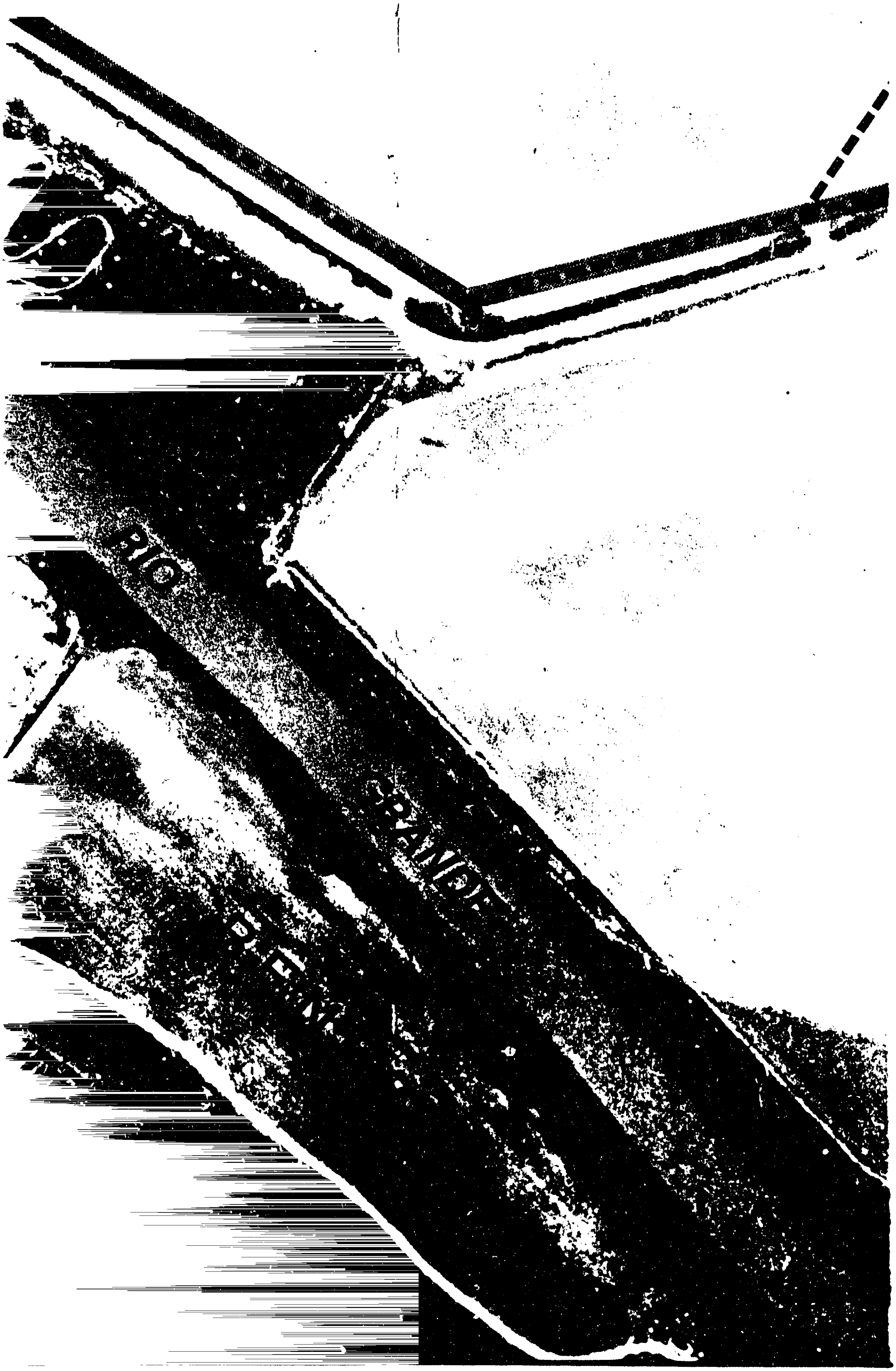
CHA
RIO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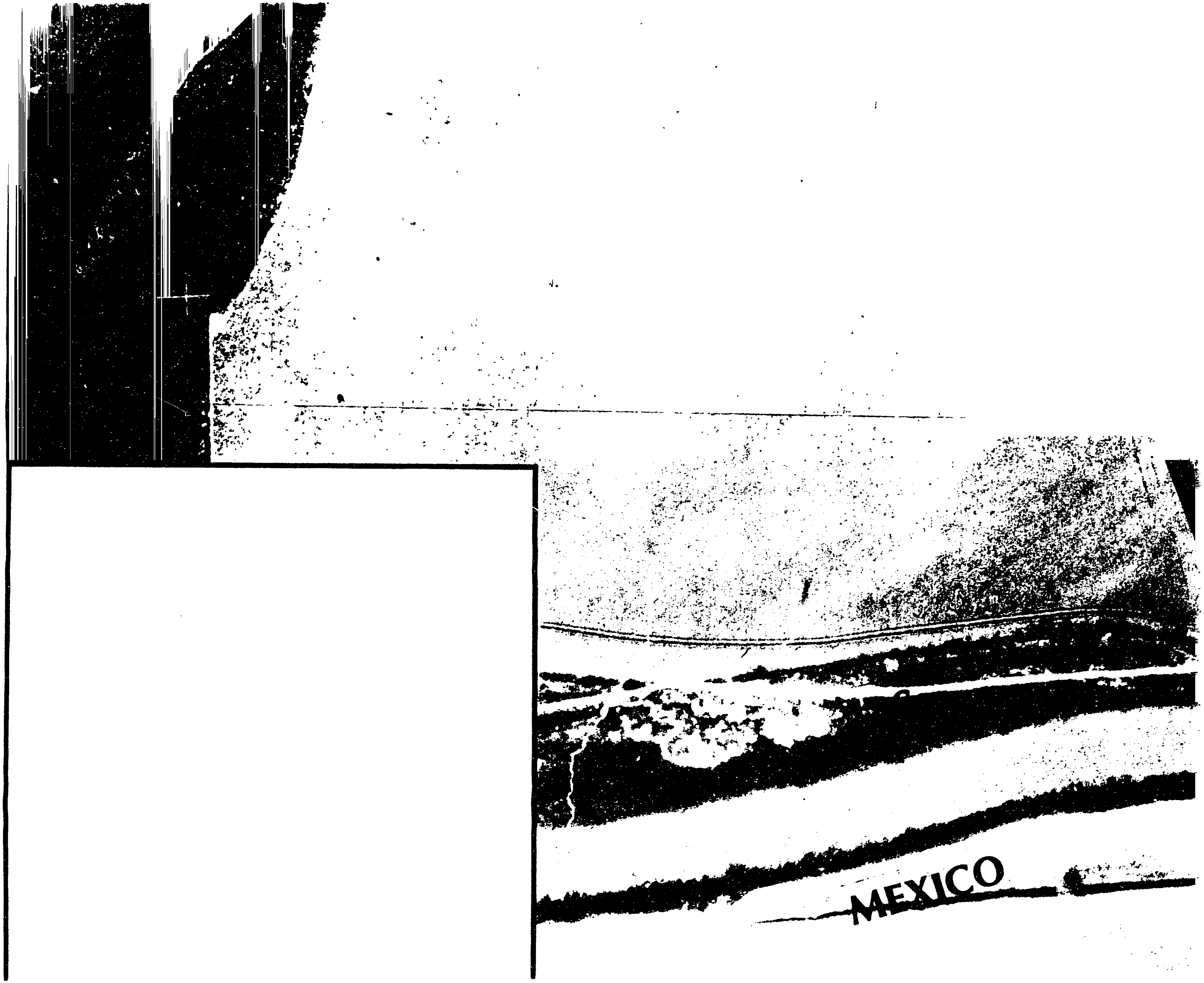
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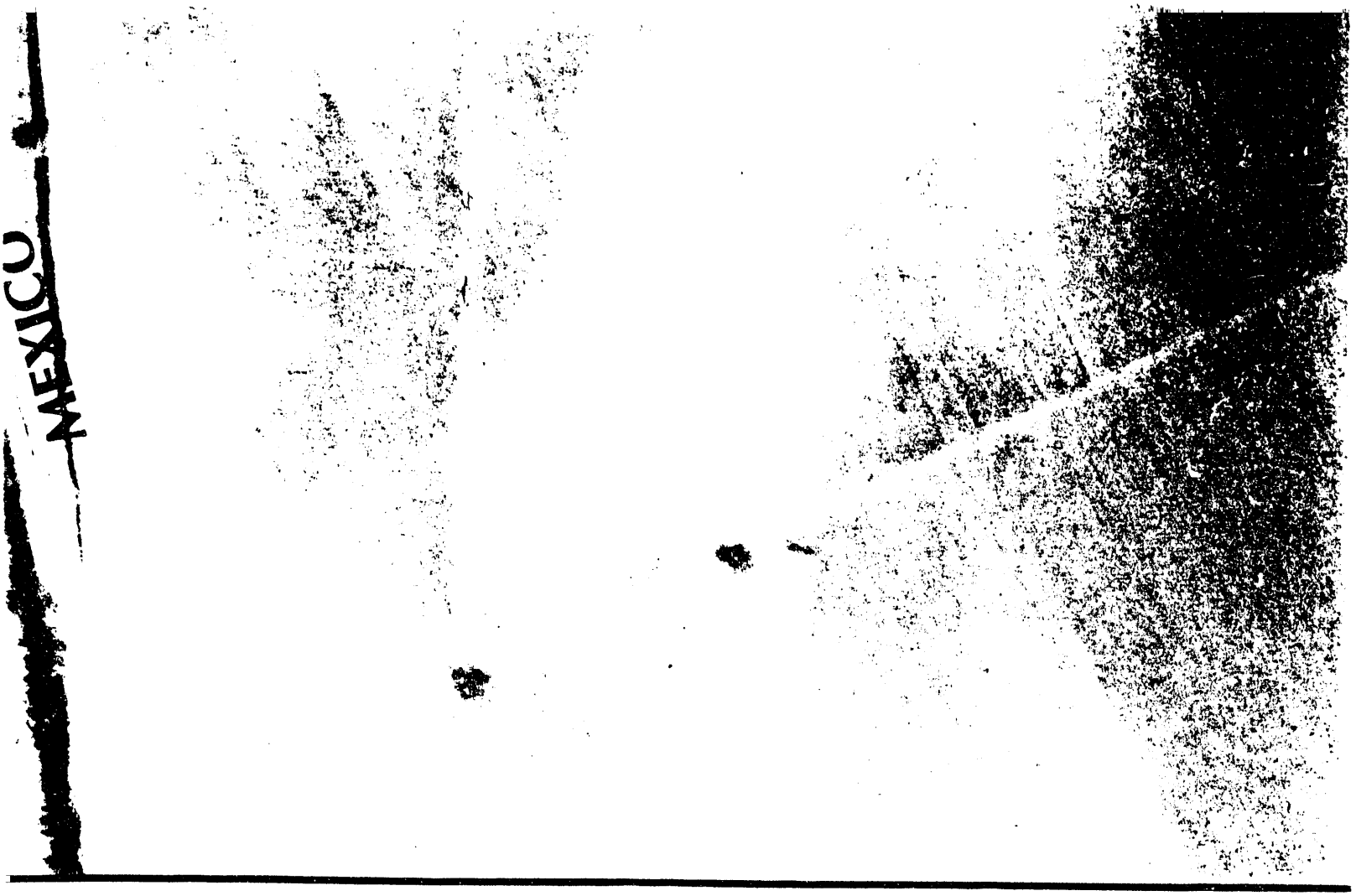
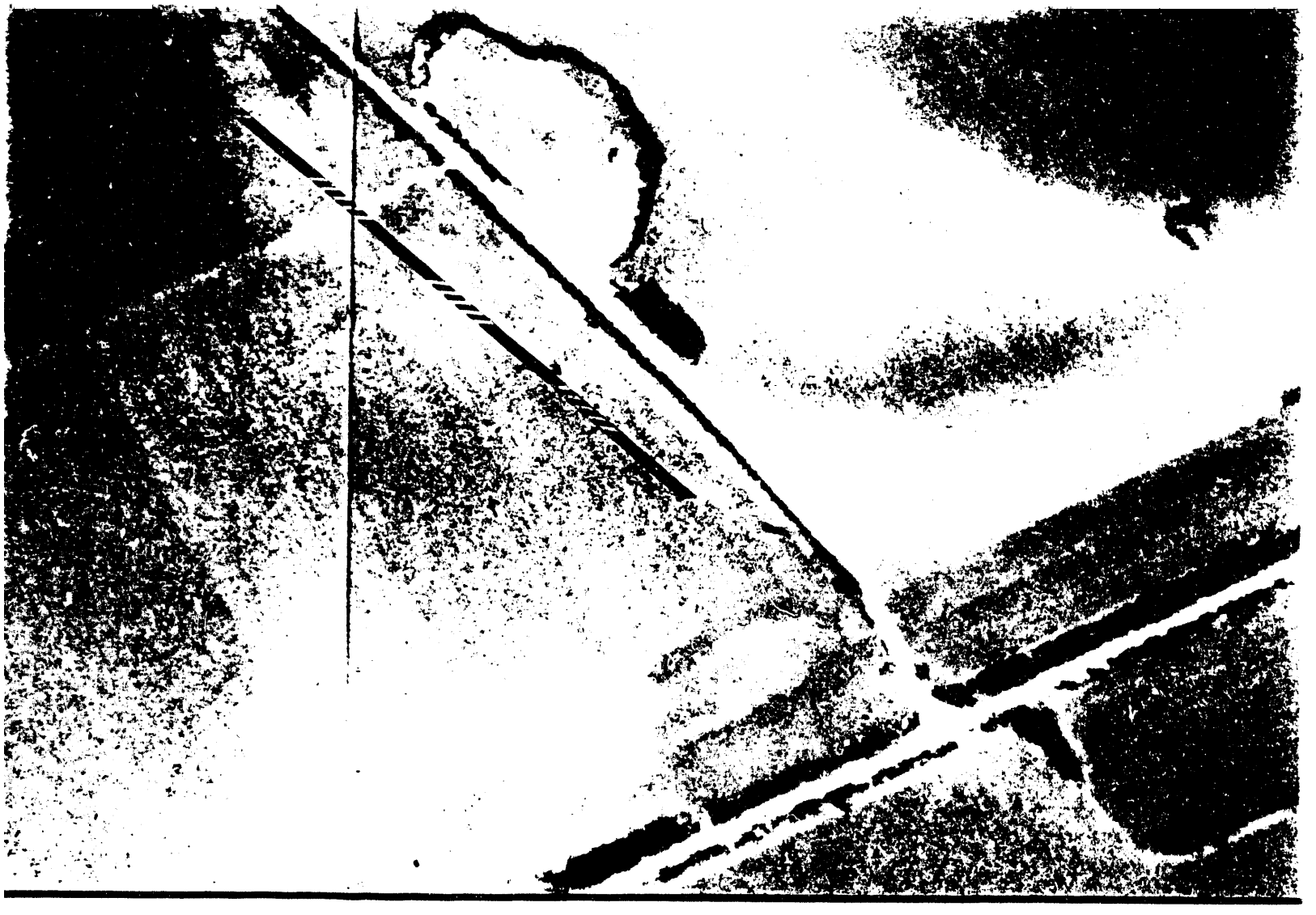


EXISTING CPL 69-K

EXISTING CFE 69-K

ALTERNATIVE ROUT

PREFERRED ROUTE

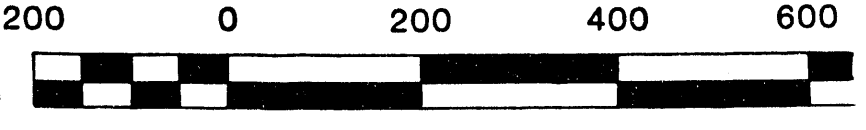


69-KV LINE

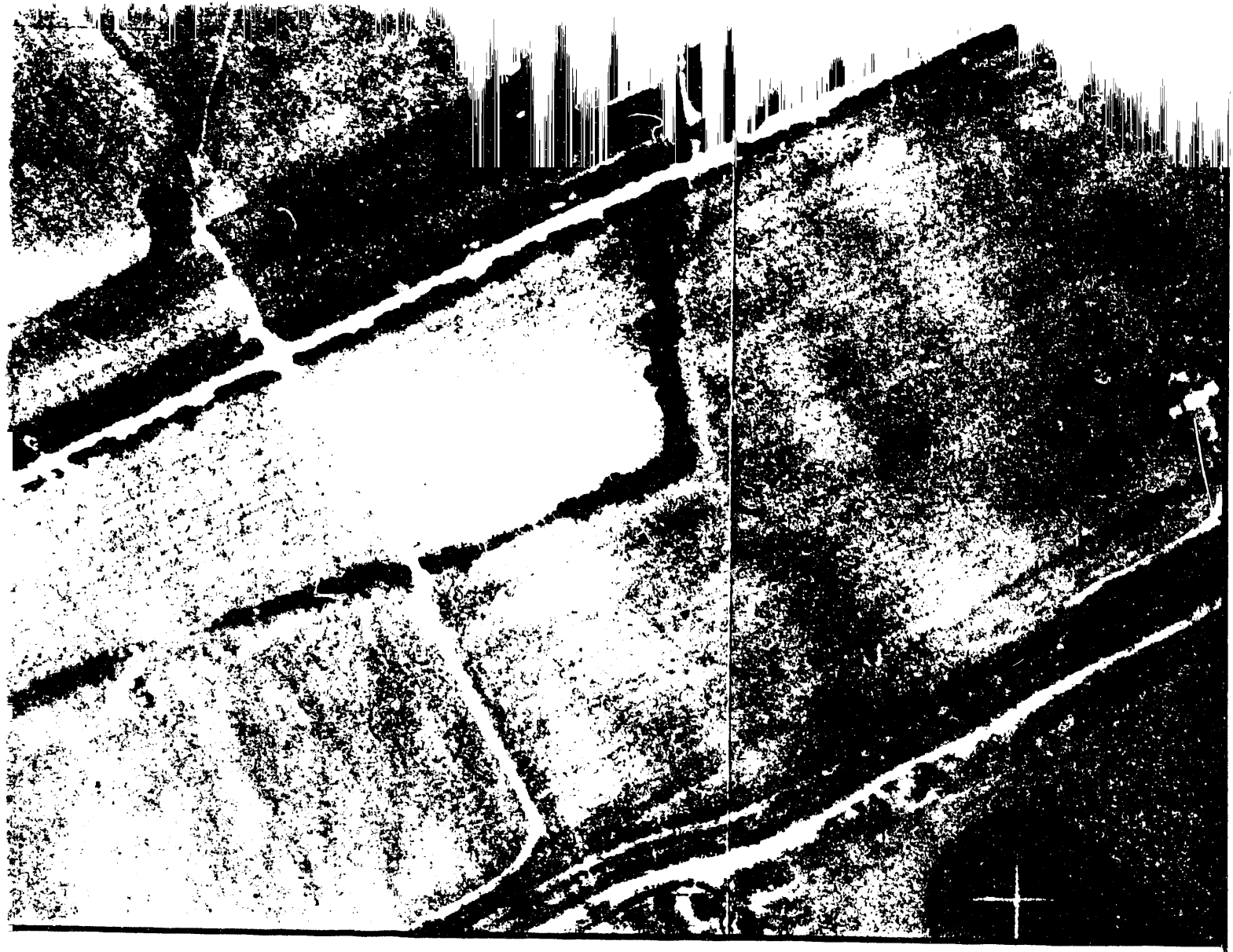
69-KV LINE

ROUTE

OUTE



PHOTOGRAPHY:



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PHOTOGRAPHY: TOBIN RESEARCH, 1-15-91

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