SECTION 3
EXISTING ENVIRONMENT

3.0 EXISTING ENVIRONMENT

3.1 PHYSICAL ENVIRONMENT

3.1.1 CLIMATE

The Project Area has a warm temperature, subtropical climate, characterized by dry winters and hot, humid summers. The area is largely dominated by tropical maritime air masses from the Gulf of Mexico, but does not possess a truly maritime climate. Tropical maritime air masses are dominant during the spring, summer and fall, but modified polar air masses frequently affect the area during winter.

Average annual precipitation is approximately 26 inches per year, with the wettest months typically occurring in May, August, and September. The average daily maximum temperature ranges from 70.9 degrees Farenheight (F) in January to an average daily maximum of 96.7 degrees F during August. Average daily minimum temperatures range from 49.8 degrees F in January to 73.8 degrees F in July.

3.1.2 TOPOGRAPHY AND GEOLOGY

The Project lies on the flat coastal plain of Texas, within the floodplain of the Rio Grande River. Shallow Pleistocene deposits of the area are comprised of alternating layers of sands, silts, and clays of alluvial and deltaic origin that dip gently toward the Gulf of Mexico. Younger Holocene deposits make up the recent alluvial deposits of the floodplain. Abandoned river courses (or old meander belts) of the Rio Grande River are common features found within the floodplain. The horseshoe-shaped lake (the Morales Banco, see Figure 1) is an example of a former meander channel of the Rio Grande, immediately adjacent to the Project route.

3.1.3 SOIL TYPES AND CHARACTERISTICS

A description of the route's soil characteristics was obtained from the *Soil Survey of Cameron County, Texas* (May 1977), prepared by the U.S. Department of Agriculture – Soil Conservation Service (SCS). The soil survey identified one soil series, the Rio Grande Series, which contains two mapping units over the route of the transmission line. The mapping units are the Rio Grande silt loam (RR) and the Rio Grande-Urban land complex (RU). A delineation of the mapping units is

shown on Figure 4. In general, Rio Grande Series soils consist of deep, well-drained, calcareous soils that are nearly level to gently sloping. Table 3-1 lists the two mapping units, soil descriptions, and approximate extent of each soil unit as a percentage of the transmission line route. There are no farmlands located along the proposed transmission line route.

TABLE 3-1
SOIL CLASSIFICATIONS

Soil Unit and Description	Survey Symbol	%
Rio Grande silt loam, slopes < 1%, moderate permeability, runoff is slow, used for irrigated crops and pasture. Perched water table is common after heavy irrigation or rainfall.	RR	93
Rio Grande-Urban land complex, slopes 0-3%, moderate permeability, mapping unit is in the built-up areas of Brownsville.	RU	7

3.1.4 WATER RESOURCES

3.1.4.1 SURFACE WATER

The Project is located within the Rio Grande River drainage basin. Two major reservoirs are located on the Rio Grande in South Texas: the International Amistad Reservoir (approximately 325 miles to the northwest) and the International Falcon Reservoir (approximately 120 miles to the northwest). The Rio Grande River empties into the Gulf of Mexico approximately 24 miles east of the Project.

Historically, the river and its tributaries have experienced significant flooding associated with heavy rains and tropical storms/hurricanes. Construction of the Amistad and Falcon reservoirs has minimized the effects of some potential flooding events, with the possible exception of intense tropical storms and hurricanes. Therefore, inundation of areas within the levees maintained by the IBWC could still occur during such heavy precipitation events. The IBWC has established a design flood elevation of 41 feet (msl) at the Project location. The IBWC maintains its jurisdictional levee (levee crown equals 45.0 feet) as shown in Figures 3 and 5.

Table 3-2 shows Rio Grande River water flows for 1998 and 1999 at the USGS/IBWC gauging station located 11 kilometers downstream from the Gateway Bridge, Brownsville, Texas. This is the closest gauging station to the Project Area.

TABLE 3-2
RIO GRANDE RIVER FLOW RATES
1998-1999

	Minimum Flow (cubic meters/sec)		Maximum Flow (cubic meters/sec)		Average Flow (cubic meters/sec)	
	1998	**1999**	**1998**	**1999**	**1998**	**1999**
January	0.11	0.09	6.97	5.80	1.58	1.43
February	0.46	0.12	7.55	1.60	4.36	0.69
March	0.02	0.07	2.40	9.13	0.96	1.07
April	0.06	0.05	6.33	8.43	1.91	1.54
May	1.70	0.03	8.45	5.51	3.76	1.44
June	0.24	0.34	5.97	4.73	2.61	1.63
July	1.23	0.85	6.00	4.13	2.77	2.16
August	0.33	0.21	3.47	5.79	1.78	1.88
September	0.72	0.68	31.5	4.88	6.03	2.29
October	1.86	0.05	66.1	7.26	10.44	1.47
November	0.63	0.18	6.24	5.71	2.38	2.08
December	0.28	0.31	2.34	6.07	1.02	2.79
Annual Value	**0.02**[(1)]	**0.05** [(1)]	**66.10**[(2)]	**9.13** [(2)]	**3.30** [(3)]	**1.71** [(3)]

[(1)] Lowest value for the year.
[(2)] Highest value for the year.
[(3)] Average value for the year.
Source: International Boundary Water Commission (http://www.obwc.state.gov/wad/ddqbrown.htm) United States Geological Survey Gauging Station, located 11 kilometers downstream from the Gateway Bridge, Brownsville, Texas

The proposed crossing of the Rio Grande is located within the lower portion of Rio Grand River Segment 2302 (designated as from Falcon Dam to a point 6.7 miles downstream of the International Bridge in Cameron County). Segment 2302 is classified for contact recreation use by the Texas Natural Resource Conservation Commission (TNRCC), although this portion of the segment has been indicated by the TNRCC to have bacterial levels that sometimes exceed the criterion established to assure the safety of contact recreation. Segment 2302 is also classified as a high quality habitat for aquatic life and is used as a public water supply. The area in the immediate vicinity of the Project is not directly accessible by the public.

The Federal Emergency Management Agency (FEMA) has conducted floodplain analysis for Cameron County. The proposed route traverses the following FEMA Flood Insurance Rate Maps: Community-Panel Number 4801030025B (City of Brownsville, dated December 1, 1978) and numbers 4801010325B and 4801010350B (Cameron County, both dated September 15, 1983). These panels have been spliced into a single map and are shown as Figure 5. The maps delineate the areas of the 100-year flood plan, designated as Zone A on Figure 5. Zone C is designated as an area of minimal flooding. The proposed route and the

Silas Ray Power Plant substation have been superimposed onto Figure 5. Beginning from the Silas Ray Power Plant substation, approximately 7 percent of the route will fall within Flood Zone C (areas of minimal flooding) and the remaining 93 percent of the route (ending at the Rio Grande River) will fall within Flood Zone A (within the 100-year floodplain). The jurisdictional boundary of the IBWC levee is labeled on the figure, showing that the area between the levee and the Rio Grande River as Zone A.

3.1.4.2 GROUNDWATER

Groundwater underlying the Project Area primarily consists of the Lower Rio Grande Aquifer, consisting of undifferentiated water-bearing sands of the Goliad Formation, Lissie Formation, Beaumont Clay, and overlying Holocene alluvial deposits. The Rio Grande River serves as the primary recharge for this aquifer within the vicinity of the proposed route.

3.1.5 VEGETATION AND WILDLIFE

The vegetation and wildlife in the area of the proposed Project has been described in the report *"Environmental Survey for Endangered, Threatened and Candidate Species for Brownsville Public Utilities Board Proposed Electric Transmission Line from Silas Ray Power Plant to Mexico"* (the Field Survey) dated November 1, 2000, prepared for BPUB by Mr. Benito Trevino Jr. The terrestrial vegetation and wildlife and the aquatic ecology of the Rio Grande near the proposed Project are summarized in the following sections.

3.1.5.1 TERRESTRIAL VEGETATION

There are a number of typical vegetation types in the vicinity of the proposed Project. Most by far are cultivated agricultural crops. The field margins and the area adjacent to roadways are dominated by a combination of grasslands and scrub brush. Common grasses that occur regionally include silver bluestem, silky bluestem and buffelgrass. Common regional brush species include Roosevelt weed, honey mesquite, retama, spring hackberry, and desert sumac with the advent of black willow, sugar hackberry and anacua in riparian areas. The proposed route is adjacent to existing gravel roadways on the U.S. side of the river. A field survey of the proposed transmission line route was conducted on August 28, September 2, September 30, and October 30, 2000 (see Appendix E). The field surveys indicate that the area between proposed Structure No. 2 to proposed Structure No. 5 consists of a canopy dominated mainly by sugar hackberry (*Celtis laevigata*) and sabal palm (*Sabal mexicana*). The area between just east of proposed Structure No. 5 to proposed Structure No. 10 consists primarily of Bermuda grass which is kept short by mowing. The area between proposed Structure No. 2 to proposed Structure No. 5 contains approximately 48 individual sabal palms, ranging in height from approximately three feet to 28 feet. The lower story and ground cover in this area consists of a mixture of woody plants and grasses, with the most prevalent plants being Turk's cap (*Malvaviscus*

arboreus), guinea grass (*Panicum maximum*), (*Chloris sp*), and buffelgrass (*Cenchrus ciliaris*).

The U.S. Fish and Wildlife Service (USFWS) has mapped wetlands in the vicinity of the proposed Project. Wetlands mapped by USFWS are indicated in Figure 6. The Project will not disturb any wetlands.

There are a number of plants listed by state and federal agencies as threatened or endangered species in Texas (see Appendix C). A few of these are known to occur in Cameron County, as noted in Appendix B, Texas Parks and Wildlife Department memorandum. None of the endangered, threatened or candidate plant species were found during the Field Survey. A list of plant species encountered during the Field Survey may be found in Appendix E.

3.1.5.2 TERRESTRIAL WILDLIFE

Most of the wildlife species in Cameron County are associated with natural vegetation types or have acclimated to the agricultural land uses. The thorn scrub woodland community of the Tamaulipan Biotic Province of Texas is the dominant natural plant community. It supports a variety of fauna as an interface for temperate and neotropical species. Several neotropical species are found in the U.S. only in the Lower Rio Grande Valley including Cameron County. However, no species is considered endemic to the Project Area.

The Project Area has a reliable source of water in the Rio Grande and is an interfacial region for upland and neotropical species. As a result, there are numerous amphibian, reptile and mammal species known from the area, although the density of populations may be low. Both the jaguarundi (*Felis yaguarondi*) and the ocelot (*Felis pardalis*) are listed as endangered species for Cameron County. The Field Survey indicates that based on the lack of suitable habitat, the amount of human activity, and existing fencing in the area, the probability of the felines existing in the proposed area would be very low. There are a large number of bird species known from the area since resident communities are supplemented by migration species particularly during the winter months. A list of bird species encountered during the Field Survey may be found in Appendix E.

There are several wildlife species that are important from a recreational or ecological standpoint. White-winged dove and white-tailed deer are the principal hunted game species. Other upland birds and waterfowl are also hunted, as are javelina. The abundance of birds attracts tourist birdwatchers as well.

Numerous species that may occur locally have been listed by Texas or the USFWS as endangered, threatened or rare. Most of these species are migratory birds or raptors, as shown in Appendix B. None of the endangered, threatened or candidate wildlife species were found during the Field Survey.

3.1.6 AQUATIC BIOLOGICAL RESOURCES

The quantity and quality of water in the river affect the aquatic biology of the Rio Grande. Both have decreased substantially as the human population in the Rio Grande Valley has developed. The freshwater plankton, invertebrate and fish communities of the Rio Grande in the Project Area are likely restricted based on high temperature and dissolved solids and low flows. It is possible that limited populations of sunfish provide some recreational fishing, and individuals representing some of the listed endangered or threatened species may be present.

3.2 SOCIOECONOMICS

3.2.1 CHARACTERISTICS

Economic and demographic characteristics for Cameron County and the City of Brownsville were determined through a literature survey. Literature sources included publications from the Texas Workforce Commission, Texas State Data Center, and Texas Water Development Board.

The Project will be located west of the City of Brownsville in Cameron County on the U.S./Mexico border. Cameron County has the same geographical boundaries as the Brownsville-Harlingen Metropolitan Statistical Area (MSA) and the Cameron County Workforce Development Area (WDA).

Population data for the City of Brownsville, Cameron County, and the State of Texas are shown in Table 3-3.

TABLE 3-3
POPULATION TRENDS AND PROJECTIONS

Place	Population for Selected Years			Average Annual Percent Change		
Historical Data[1]						
	1980	**1990**	**1998[4]**	**1980-1990**	**1990-1998**	**1980-1998**
City of Brownsville	84,997	98,962	140,445	1.5%	4.5%	2.8%
Cameron County[2]	209,727	260,120	317,240	2.2%	2.5%	2.3%
State of Texas	14,229,191	16,986,335	19,759,614	1.8%	1.9%	1.8%
Projections[3]						
	2000	**2010**	**2020**	**1990-2000**	**2000-2010**	**2010-2020**
City of Brownsville	147,305	172,894	201,684	1.6%	1.9%	1.8%
Cameron County[2]	337,689	405,463	476,992	1.8%	2.1%	1.9%
State of Texas	20,866,717	24,539,168	28,794,473	1.6%	2.0%	1.8%

[1]Source: Texas State Data Center.
[2]Cameron County has the same geographical boundaries as the Brownsville-Harlingen MSA and Cameron County WDA.
[3]Source: Texas Water Development Board.
[4]As of July 1, 1998.

Brownsville is the largest city in Cameron County and is also the County seat. Based on the data in Table 3-4, the populations of the City of Brownsville and Cameron County have historically increased at a faster rate than the population of Texas. The average annual historical rates of population increase in the City of

Brownsville and Cameron County since 1980 have been 2.8 percent and 2.3 percent, respectively. In comparison, the State of Texas' population has increased at an average annual rate of 1.8 percent.

Estimates developed by the Texas Water Development Board project that the population of the City of Brownsville will increase at approximately the same rate as the State of Texas' population through the year 2020. The rate of population increase in Cameron County will be slightly higher.

TABLE 3-4
LABOR FORCE, EMPLOYMENT, AND UNEMPLOYMENT INFORMATION[1]

					Percent Change		
	1996	1997	1998	1999	1996-1997	1997-1998	1998-1999
Cameron County							
Labor Force	123,531	125,917	127,038	126,602	1.9%	0.9%	-0.3%
Employed	108,031	110,123	111,068	114,139	1.9%	0.9%	2.8%
Unemployed	15,500	15,794	15,970	12,463	1.9%	1.1%	-22.0%
% Unempl.	12.5%	12.5%	12.6%	9.8%	NA	NA	NA
State of Texas							
Labor Force	9,674,460	9,838,951	10,081,605	10,206,043	1.7%	2.5%	1.2%
Employed	9129,997	9,309,966	9,596,501	9,734,413	2.0%	3.1%	1.4%
Unemployed	544,463	528,985	485,104	471,630	-2.8%	-8.3%	-2.8%
% Unempl.	5.6%	5.4%	4.8%	4.6%	NA	NA	NA

[1]Source: Texas Workforce Commission.

Cameron County has a civilian labor force of approximately 127,000. The unemployment rate in Cameron County has ranged from 9.8 percent to 12.6 percent over the last few years. The unemployment rate in Cameron County has historically been higher than for the State of Texas, but the number of unemployed in Cameron County significantly decreased between 1998 and 1999.

TABLE 3-5
EMPLOYMENT BY SECTOR

	4th Quarter Covered Employment[1]			Percent of Total Employment			Percent Change	
	1996	1997	1998	1996	1997	1998	1996-1997	1997-1998
Cameron County								
Agriculture	1686	1441	1423	1.8%	1.5%	1.4%	-14.5%	-1.2%
Mining	-	-	-	-	-	-	-	-
Construction	3031	3081	3415	3.2%	3.2%	3.4%	1.6%	10.8%
Manufacturing	13127	12388	12566	13.8%	12.7%	12.5%	-5.6%	1.4%
Transportation	4032	4350	4613	4.2%	4.5%	4.6%	7.9%	6.0%
Trade	23316	23489	24165	24.4%	24.1%	24.0%	0.7%	2.9%
Finance, Insurance, and Real Estate	3503	3498	3562	3.7%	3.6%	3.5%	-0.1%	1.8%
Service	24295	26028	27317	25.5%	26.7%	27.1%	7.1%	5.0%
Federal/State/ Local Government	22415	23091	23740	23.5%	23.7%	23.6%	3.0%	2.8%
Total	95405	97366	100801	100.0%	100.0%	100.0%	2.1%	3.5%
State of Texas								
Agriculture	106761	111340	112122	1.3%	1.3%	1.2%	4.3%	0.7%
Mining	149943	171311	161825	1.8%	2.0%	1.8%	14.3%	-5.5%
Construction	441511	471321	510140	5.4%	5.4%	5.7%	6.8%	8.2%
Manufacturing	1044522	1096033	1112130	12.7%	12.6%	12.4%	4.9%	1.5%
Transportation	475249	513861	540570	5.8%	5.9%	6.0%	8.1%	5.2%
Trade	2017763	2100790	2158875	24.5%	24.2%	24.0%	4.1%	2.8%
Finance, Insurance, and Real Estate	435556	464989	492374	5.3%	5.4%	5.5%	6.8%	5.9%
Service	2121570	2245483	2359868	25.7%	25.9%	26.3%	5.8%	5.1%
Federal/State/ Local Government	1453701	1491868	1520962	17.6%	17.2%	16.9%	2.6%	2.0%
Total	8247930	8677968	8981754	100.0%	100.0%	100.0%	5.2%	3.5%

[1]Source: Texas Workforce Commission. Totals for State do not add.

The largest employment sectors in Cameron County include trade, service, and government. Cameron County is the home of several tourist attractions including South Padre Island. Agricultural employment has been declining, while employment in other sectors has primarily been increasing.

The 1995 median household income in Cameron County was estimated to be $21,928 as compared to the State of Texas' median household income of $31,488.

3.3 LAND USE, AESTHETICS AND RECREATION

3.3.1 LAND USE

The proposed route is located at the southwestern edge of Brownsville. Approximately 7 percent of the route is within the city limits of the City of Brownsville, with the remaining portion within unincorporated Cameron County. The proposed route is completely located on land owned by the BPUB. Starting at the Silas Ray Power Plant substation, the proposed route crosses the corporate boundary of the City of Brownsville, immediately before the northerly turn of the route from the substation. From this turn, the proposed route follows the elevated road (also, the IBWC jurisdictional levee) that is used to access BPUB facilities, turning west at the southeast corner of the BPUB's filtration plant holding pond. From this point, the route follows a slightly elevated road to the proposed crossing with the Rio Grande River. The width of the lands between the filtration holding plant ponds and the Morales Banco pond is approximately 200 feet. There is no current land use of the proposed route other than access to BPUB facilities.

Land use within a one-half mile radius of the Project is mixed rural/urban including commercial/industrial (BPUB's Silas Ray Power Plant, the BPUB's Pumping Station and Filtration Plant, and the Missouri-Pacific Railroad); residential to the east and south; and agricultural (on privately-owned land) south of the east-west portion of the proposed route. All the aforementioned features are evident on Figure 1. There are no schools, hospitals, recreational facilities or public parks within 0.5 mile of the proposed route, with the exception of a small outside basketball court/playground located approximately 1,300 feet southeast of the Silas Ray Power Plant substation. The nearest residence is located at the west end of Rio Vista Avenue, approximately 700 feet northeast of the beginning point of the proposed route (i.e., the Silas Ray Power Plant substation.

3.3.2 AESTHETICS

The proposed transmission route shown in Figures 1 and 2 traverses property owned by the BPUB and parallels an existing BPUB access road used for BPUB's water supply filtration plant. The existing Silas Ray Power Plant, an existing 69-

kV transmission line, existing railroad tracks and existing tree vegetation along the railroad tracks generally buffer visual views of the route from public view.

As shown in Figure 3, on the Mexico side of the interconnection, the proposed transmission line route traverses agricultural fields before interconnecting to the existing CFE transmission line. In this area the line may be visible from one farm located approximately 200 feet south of the route.

Photos 1 through 10 (see Appendix A) provide views from various locations in the vicinity of the route. The line crossing is visible from the Rio Grande River in the immediate vicinity of the crossing. However, due to the generally low relief in the Project Area, the lack of public access to the river and the extent of clearing of native, and riparian vegetation, the aesthetic qualities of this area are considered low to moderate value.

3.3.3 RECREATION

One small outside basketball court/playground is located approximately 1,300 feet southeast of the Silas Ray Power Plant substation. No other recreational facilities are located within a half-mile of the route location. Recreation along the Rio Grande is restricted in the immediate vicinity of the Project and no public access is available in the vicinity of the Project.

3.3.4 AVIATION

The nearest airport to the Project is the Brownsville/South Padre Island International Airport, approximately six miles east of the Project Area. Primary runway alignment is northwest-southeast, with a secondary runway north-south.

3.4 CULTURAL RESOURCES

3.4.1 CULTURAL SETTING

Early evidence of man in the Americas is represented by the Paleo-Indian stage, and is generally accepted as being representative of materials that predate 5000 to 6000 B.C. A nomadic way of life emphasizing a hunting culture characterizes the Paleo-Indian stage. The Archaic Stage, from 5000 B.C to about 1000 A.D. was primarily based on small-game hunting, fishing, and gathering plant foods and shellfish. Following the Archaic, the Late Prehistoric Stage and the Historic Stage characterized the Native American presence through the mid-nineteenth century. While it is possible that remains of Native American artifacts are present in the vicinity of the proposed route, the historical dynamic environment of the Rio Grande River, with numerous periods of meander cut and fill, channel abandonment, and dynamic relocation of the river within the floodplain, is not conducive to preservation of archeological artifacts. The proposed route has been

further complicated with fill materials deposited along the levees. There are no known Native American artifacts along the proposed route.