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DELINEATION OF THE WATERS OF UNITED STATES

PALACIOS DE HUMACAO
BUENA VISTA WARD, HUMACAO, PR

PREPARED FOR:

VRM ENTERPRISES
PO BOX 20868
SAN JUAN, PR 00928

AUGUST 2009

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DELINEATION OF JURISDICTIONAL AREAS

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INTRODUCTION

The purpose of this study is to identify and delineate the wetland and/or waters of the United States present within the project area. The area is located in State Highway PR-928, Km. 1.5, Buena Vista Ward in the Municipality of Humacao, Puerto Rico and encompasses approximately 176 acres.

The terms waters of the United States is defined in 33 CFR 328.3 and includes a variety of water bodies such as lakes, rivers, streams (including intermittent streams) mud flats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, beaches, lakes, and natural ponds. Wetlands are subset of the waters of the United States. Pursuant to Section 404 of the Clean Water Act of the US Army Corps of Engineers defines wetlands in 33 CFR 328.3b as those areas that are inundated or saturated surface or ground waters at a frequency and duration sufficient to support and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

The wetland study including the soils samplings were conducted in February 2007. A plan view of the jurisdictional areas delimited was included in the Joint Permit Application for review. However the wetland identification data sheets was not part of the JPA and for this, we are submitting the Delineation of Water of the United States for review.

The U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers issued guidance on June 5, 2007, regarding Clean Water Act (CWA) jurisdiction following the U.S.

Supreme Court's decision in the consolidated cases Rapanos V. United States and Carabell v. United States ("Rapanos"). The agencies issued the guidance to ensure the jurisdictional, administrative enforcement actions, and other relevant agency actions being conducted under the CWA are consistent with the Rapanos decision.

As part of this JD we have included the Approved Jurisdictional Determination Form for your revision and approval.

METHODS

The wetland study was conducted following the technical standards and procedures recommended in the Corps of Engineers Wetland Delineation Manual.

The project area was located in Soil Conservation Service (SCS) Soil Survey of Humacao Area of Eastern Puerto Rico (1977) Sheet Number 34.

The field inspections were conducted as follow:

Soil observation points were established within the boundaries of the study area. At each observation point an approximately 18 inches deep hole was excavated if soil conditions permitted. A slice from the edge of the hole was taken and the soil profile characteristics recorded and compared to the profile described by SCS (1977) for the area.

The area around each observation point was inspected for wetland hydrology (Table 2) and the dominant plant species within the study area were recorded. Species dominance was utilized to determine the indicator status of the dominant species within Buena Vista Ward. Table 1 details the definitions used for each National Wetland Plant List indicator category. Under these indicator categories and under normal circumstances, areas dominated by Facultative Wetland Plant (FACW) are wetland and Obligated Upland Plant (UPL) species are not wetlands. Areas that are dominated by species in the Facultative Plant (FAC) indicator category are normally considered the transition zone and can be either wetlands or non-wetlands. At those sited where the soil hydrology criteria were met, the site was declared wetlands if more than 50 percent of the dominant species in each community were FAC, FACW, or OBL. Dominance by UPL and FAC species was utilized as back up to the soils and to establish the limits of the wetland delineation.

The data gathered was recorded on field data sheets.

RESULTS:

Vegetation:

The dominant vegetation for the upland and wetland areas is detailed as follows:

a. Upland vegetation: *Panicum maximum; Mimosa casta; Albizia lebbeck*

b. Wetland vegetation: *Mimosa pigra; Typha domingensis; Brachiria purpurascens; Sesbania sericea.*

Soils:

SCS (1977) identifies five soils mapping units within the study area and/or its immediate vicinity: Coloso Silty Clay (Cr); Candelero Loam 2 to 5% (CdB); Candelero Loam 5 to 12% (CdC2); Maunabo Clay (Me) and; Teja Gravelly Sandy Loam (TeE).

1. Candelero Loam 2 to 5% (CdB) – This soil is on terraces and alluvial fans. Its profile is similar to the one described as representative of the series, but the surface layer is 2 to 4 inches thicker.
2. Candelero Loam 5 to 12% (CdC2) – This soil is on alluvial fans and foot slopes. It has the profile describe as representative of the Candelero Series.

   The Candelero series consists of deep soils that are somewhat poorly drained and slowly permeable. These soils formed in moderately fine textured sediment derived from granitic rocks. The climate is humid tropical. The average annual precipitation is 87"; the average annual temperature is 77°F. In a representative profile, the surface layer is dark grayish brown, extremely acid loam about 7 inches thick. The next layer is gray and yellowish brown, mottle, very firm sandy clay loam 8 inches thick. Below that is greenish gray and light greenish gray, very firm sandy clay loam 19 inches thick. These soils have a moderate available water capacity and shrink swell potential. Runoff is medium.

Ap – 0 to 7 inches, dark grayish brown (10 YR 4/2) loam; weak, fine, granular structure, very friable, slightly plastic; few, fine roots; few, fine black mineral grains.

B1 to 7 – inches – gray (10 YR 6/1) and yellowish brown (10 YR 5/8) sandy clay loam; fine purplish mottles; weak, coarse, subangular blocky structure; very firm, slightly sticky and plastic; few roots; thin, discontinuous, gray (10 YR 6/1) films.

B21t – 11 to 15 inches – gray (10 YR 6/1) and yellowish brown (10 YR 5/6) sandy clay loam; weak, medium, subangular blocky structure; very firm slightly sticky and plastic; few roots; thin, discontinuous gray (10 YR 6/1) films on ped surfaces.

B22tg – 15 to 24 inches – greenish gray (5 GY 6/1) sandy clay loam; common, medium, distinct, brownish yellow (10 YR 6/6) mottles and few, fine, distinct reddish brown mottles.

3. Coloso Silty Clay (Cr) – This nearly level soil is on flood plains. Its profile is similar to the one described as representative of t he series, but it lies at a higher elevation and is less subject to flooding. The Coloso series consists of deep soils that are somewhat poorly drained and slowly permeable. These soils formed in moderately fine textured sediment of mixed origin. The climate is humid tropical. The average annual temperature is 78°F. In a representative profile, the surface layer is dark-brown, slightly acid clay loam 9 inches thick. The next layer is dark grayish –brown, mottled silty clay loam 10 inches thick. These soils have a high available water capacity, moderate shrink – swell potential and high natural fertility.

Ap-0 to 9" - dark brown (10 YR 4/3) silty clay loam; common, medium, faint, dark grayish brown mottles; weak fine subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common fine roots; common krotovinas; few fine dark concretions; common residue of burned sugarcane; slightly acid, abrupt, smooth boundary.

B-9 to 19 inches – dark grayish brown (10 YR 4/2) silty clay loam; common, fine, distinct, strong brown (7.5 YR 5/8) mottles and common, medium, distinct, dark yellowish brown (10 YR 4/4) mottles.

C1-19 to 27 inches, gray (10 YR 5/1) silty clay loam; common, medium, distinct, dark yellowish brown (10 YR 4/4) mottles and few, fine, prominent, red (2.5 YR 4/6) mottles.

4. Maunabo Clay (Mc) – This nearly level soil is on flood plains of the Maunabo and Guayanés Rivers. The Maunabo series consists of deep soils that are poorly drained and slowly permeable. These soils formed in fine textured sediment derived form granitic rocks. The climate is humid tropical. The average annual precipitation is 87 inches, and the average temperature is 79°F. In a representative profile, the surface layer is light brownish gray, mottled, strongly acid clay in the upper 4 inches and grayish brown, mottled, very firm clay in the lower 6 inches.

Ap – 0 to 4 inches – light brownish gray (10 YR 6/2) clay; few, fine, faint, strong, brown (7.5 YR 5/6) mottles; massive very firm, slightly sticky and plastic; common roots; few fine quartz grains.

A12 – 4 to 10 inches – grayish brown (10 YR 5/2) clay; common, medium, distinct, strong brown (7.5 YR 5/6) mottles; massive; very firm, slightly sticky and plastic; common roots.

A1g – 10 to 15 inches – gray (5Y 5/1) clay; common, medium, distinct, yellowish red (5YR 5/8) mottles; weak, medium, subangular blocky structure; very firm, slightly sticky and plastic; common fine roots.

B2g – 15 to 22 inches – gray (5Y 6/1) clay; common, medium, yellowish brown (10 YR 5/8) mottles; weak, coarse, subangular blocky structure; very firm, slightly sticky and plastic.

5. Teja Gravelly Sandy Loam (TcE) – This soil is on side slopes and ridetops. The Teja series consists of shallow soils that are well drained and rapidly permeable. These soils formed in gravelly residuum derived from granitic rocks. They are on mountain side slopes and ridetops. The climate is humid tropical. The average annual precipitation is 80 to 90 inches and the average annual temperature is 78°F. In a representative profile, the surface layer is dark brown, very strongly acid gravelly sandy loam about 6 inches thick. Below the layer is dark brown and yellowish brown, loose gravelly sandy loam 8 inches thick. These soils have a low available water capacity and are somewhat difficult to work. Runoff is medium to rapid.

   A1 – 0 to 6 inches – dark brown (10 YR 3/3) gravelly sandy loam; weak, fine, granular structure; very friable, non-sticky and non-plastic; common fine roots and many fine quartz grains; very strongly acid; clear, smooth boundary.

   C-6 to 14 inches – dark brown (10 YR 4/3) and yellowish brown (10 YR 5/4) gravelly sandy loam, single grained; loose, non-sticky and non-plastic; few fine roots; about 40% by volume, angular rock fragments; very strongly acid; abrupt, smooth boundary.

   R-14 to 20 inches, hard, coarse-grained plutonic rock.

Hydrology:

The hydrology of the property is influence by three water channel that's maintains runoff and/or storm water events allowing the establishment of wetland areas. The waters flow from the West to the East side of the property until reaching the Humacao River.

CONCLUSION:

According to the section 404 of the Clean Water Act, the jurisdictional areas present in the property are limited. The study revealed that through out the property exists, upland and wetland areas. According to the National Wetland Inventory of the Fish and Wildlife Services, the wetlands present in the property are identified as Freshwater Emergent Wetland classifies as "Palustrine Emergent Persistent Temporarily Flooded" area, which complies with the criteria's: hydrology, vegetation and soil. The areas are delimited in the map enclosed.

LITERATURE CITED

Environmental Laboratory. 1987. "*Corps of Engineers Wetland Delineation Manual*", Technical report Y-87-1, US Army Engineer Waterways Experiment Station, Vicksburg, Miss.
Reed, Porter B., Jr. 1988. *National List of Plant Species That Occur in Wetlands*. 1988. U. S. Fish and Wildlife.

Soil Conservation Service. 1977. *Soil Survey of Humacao Area of Puerto Rico.*

TABLE 1

FIELD INDICATORS FOR HYDRIC SOILS

1. Organic Soils

   A soil is an organic soil when: (1) More than 50% (by volume) of the upper 32 inches of soil is composed of organic material; or (2) organic soil material of any thickness rests on bedrock.

2. Histic Epipedons

   A histic epipedon is an 8 to 16 inch layer at or near the surface of a mineral hydric soil that is saturated with water for 30 consecutive days or more in most years and contains a minimum of 20% organic matter when no clay is present or minimum of 30% organic mater when clay content is 60% or grater.

3. Sulfidic Materials

   When mineral soils emit an odor of rotten eggs, hydrogen sulfide is present. Such odors are only detected in waterlogged soils that are permanently saturated and have sulfidic material within a few centimeters of the soil surface.

4. Aquic or Peraquic Moisture Regime

   An aquic moisture regime is a reducing one: I.e., it is virtually free of dissolved oxygen because the soils are saturated by the presence of ground water always at or near the soil surface.

5. Direct Observation of Reducing Soil Conditions

   Soil saturated for long or very long duration will usually exhibit reducing conditions. Under such conditions, ions of iron are transformed from a ferric valence state to a ferrous valence state. This condition can be detected in the field by ferrous iron test.

6. Soil Colors

   The colors of various soil components are often the most diagnostic indicator of hydric soils. Colors of these components are influenced by the frequency and duration of soil saturation, which leads gleyed (gray colors) or will have bright mottles (rust colored spots) and/or low matrix chrome. The soil matrix is the portion of the soil that has the predominant color.

TABLE 1
(Continuation)
FIELD INDICATORS FOR HYDRIC SOILS

7. Soil Appearing on Hydric Soils List

   Using the National Technical Committee on Hydric Soils (NTCHS) criteria for hydric soils the NTCHS has developed a list of hydric soils. Listed soils have reducing soil conditions for a significant portion of the growing season in major portion of the root zone and are frequently saturated within 12 inches of the soil surface.

8. Iron and Manganese Concretions

   During the oxidation-reduction process, iron and manganese in suspension are sometimes segregated as oxides into concretions or soft masses. These accumulations are usually black or dark brown. Concretions >2 mm in diameter occurring whiting 7.5 cm of surface are evidence that the soil is saturated for long periods near the surface.

9. Indicators of Coarse-textured or Sandy Hydric soils

   a. High Organic Matter Content in the Surface Horizon

   b. Dark Vertical Streaking of Subsurface Horizon

   c. Wet spodosols

   d. New Sandbars

TABLE 2

FIELD INDICATOR FOR WETLAND HYDROLOGY

A. Primary Indicators

1. Visual observation of inundation
2. Soil saturation within 12 inches of the soil surface
3. Water marks
4. Drift line
5. Sediment deposits
6. Drainage patterns in wetlands

B. Secondary indicators (At least two secondary indicators required)

1. Oxidized root channel (rhizopheres) surrounding living roots within the upper 12 inches of the soil.
2. Water-stained leaves.
3. Local soil survey data.
4. Fac-neutral test

FIELD DATA SHEETS

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Palacios de Humacao	Date:	Febrero 2007
Applicant/Owner:	Empresas VRM	County:	Humacao
Investigator:	José A. Torres / JAT Wetland Research Inc.	State:	Puerto Rico
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	1

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Panicum maximum	G	FACU	9.		
2. Mimosa pigra	SH	FACW	10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 50%

Remarks: SH- Shrubs

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☒ Inundated
- ☐ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): CdB

Drainage Class: pd

Field Observations Confirm Mapped Type? ☒Yes ☐No

Taxonomy (Subgroup): Tropaquepts

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-6		10 YR 4/1			
6-18		10 YR 6/1			

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moistupe Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☒ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks: Hydric on depresions

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ☒Yes ☐No (Check)

Wetland Hydrology Present? ☒Yes ☐No

Hydric Soils Present? ☒Yes ☐No

(Check)

Is this Sampling Point Within a Wetland? ☒Yes ☐No

Remarks

Approved by HQUSACE 3/92

Forms version 1/02

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Palacios de Humacao	Date:	Febrero 2007
Applicant/Owner:	Empresas VRM	County:	Humacao
Investigator:	José A. Torres / JAT Wetland Research Inc.	State:	Puerto Rico
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	2

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Typha domingensis	G	OBL	9.		
2. Colocasia esculenta	G	OBL	10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100%

Remarks:

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☒ Inundated
- ☐ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Me

Drainage Class: pd

Field Observations

Taxonomy (Subgroup): Tropaquepts

Confirm Mapped Type? ☒ Yes ☐ No

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-18		10 YR 5/2	7.5 YR 5/6		

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☒ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks: Meet saturation criteria

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ☒ Yes ☐ No (Check)

Wetland Hydrology Present? ☒ Yes ☐ No

Hydric Soils Present? ☒ Yes ☐ No

(Check)

Is this Sampling Point Within a Wetland? ☒ Yes ☐ No

Remarks

Approved by HQUSACE 3/92

Forms version 1/02

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Palacios de Humacao	Date:	Febrero 2007
Applicant/Owner:	Empresas VRM	County:	Humacao
Investigator:	José A. Torres / JAT Wetland Research Inc.	State:	Puerto Rico
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	3

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Panicum maximun	G	FACU	9.		
2. Mimosa casta	G	NI	10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0%

Remarks:

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks: N/A

SOILS

Map Unit Name (Series and Phase): Me

Drainage Class: pd

Field Observations Confirm Mapped Type? ☒Yes ☐ No

Taxonomy (Subgroup): Tropaquepts

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-6		10 YR 6/2	7.5 YR 5/6		
6-18		5 Y 5/1	5 Y 5/8		

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☒ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks: Hydric soils

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☐Yes ☒No (Check)		(Check)
Wetland Hydrology Present?	☐Yes ☒No		
Hydric Soils Present?	☒Yes ☐No	Is this Sampling Point Within a Wetland?	☐Yes ☒No

Remarks

Approved by HQUSACE 3/92

Forms version 1/02

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Palacios de Humacao	Date:	Febrero 2007
Applicant/Owner:	Empresas VRM	County:	Humacao
Investigator:	José A. Torres / JAT Wetland Research Inc.	State:	Puerto Rico
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	4

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Panicum maximum	G	FACU	9.		
2.			10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 0%

Remarks:

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks: N/A

SOILS

Map Unit Name (Series and Phase): Me

Drainage Class: pd

Field Observations Confirm Mapped Type? ☒ Yes ☐ No

Taxonomy (Subgroup): Tropaquepts

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-6		10 YR 6/2	7.5 YR 5/6		
6-18		5 Y 5/1	5 Y 5/8		

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☒ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks: Hydric soils

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☐ Yes ☒ No (Check)		(Check)
Wetland Hydrology Present?	☐ Yes ☒ No		
Hydric Soils Present?	☒ Yes ☐ No	Is this Sampling Point Within a Wetland?	☐ Yes ☒ No

Remarks

Approved by HQUSACE 3/92

Forms version 1/02

SOILS

Map Unit Name (Series and Phase): Me

Drainage Class: pd

Field Observations Confirm Mapped Type? ☒Yes ☐No

Taxonomy (Subgroup): Tropaquepts

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-6		10 YR 6/2	7.5 YR 5/6		
6-18		5 Y 5/1	5 Y 5/8		

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☒ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks: meets saturation criteria

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☒Yes ☐No	(Check)
Wetland Hydrology Present?	☒Yes ☐No	
Hydric Soils Present?	☒Yes ☐No	

(Check)

Is this Sampling Point Within a Wetland? ☒Yes ☐No

Remarks

Approved by HQUSACE 3/92

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DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Palacios de Humacao	Date:	Febrero 2007
Applicant/Owner:	Empresas VRM	County:	Humacao
Investigator:	José A. Torres / JAT Wetland Research Inc.	State:	Puerto Rico
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	6

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Leersia hexandra	G	OBL	9.		
2. Brachiaria purpurascens	G	FACW	10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☒ Inundated
- ☐ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Me

Drainage Class: pd

Field Observations Confirm Mapped Type? ☒Yes ☐No

Taxonomy (Subgroup): Tropaquepts

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-6		10 YR 6/2	7.5 YR 5/6		
6-18		5 Y 5/1	5 Y 5/6		

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☒ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☒Yes ☐No (Check)	
Wetland Hydrology Present?	☒Yes ☐No	
Hydric Soils Present?	☒Yes ☐No	
		(Check)
Is this Sampling Point Within a Wetland?		☒Yes ☐No

Remarks

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DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Palacios de Humacao	Date:	Febrero 2007
Applicant/Owner:	Empresas VRM	County:	Humacao
Investigator:	José A. Torres / JAT Wetland Research Inc.	State:	Puerto Rico
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	7

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Paspalum virgatum	G	FACW	9.		
2.			10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100%

Remarks:

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☒ Inundated
- ☐ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): CdB

Drainage Class: pd

Field Observations

Taxonomy (Subgroup): Tropaquepts

Confirm Mapped Type? ☒ Yes ☐ No

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-6		10 YR 4/2			
6-18		10 YR 6/1			

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☒ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ☒ Yes ☐ No (Check)

Wetland Hydrology Present? ☒ Yes ☐ No

Hydric Soils Present? ☒ Yes ☐ No

(Check)

Is this Sampling Point Within a Wetland? ☒ Yes ☐ No

Remarks

Approved by HQUSACE 3/92

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DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Palacios de Humacao	Date:	Febrero 2007
Applicant/Owner:	Empresas VRM	County:	Humacao
Investigator:	José A. Torres / JAT Wetland Research Inc.	State:	Puerto Rico
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	8

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Brachiaria purpurances	G	FACW	9.		
2. Paspalum virgatum	G	FACW	10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100%

Remarks:

HYDROLOGY

☐ Recorded Data (Describe In Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☒ Inundated
- ☐ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels In Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Mo

Drainage Class: pd

Field Observations Confirm Mapped Type? ☒Yes ☐No

Taxonomy (Subgroup): Tropaquepts

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-6		10 YR 4/1			
6-18		5 Y 5/1	5 Y 5/8		

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☒ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ☒Yes ☐No (Check)

Wetland Hydrology Present? ☒Yes ☐No

Hydric Soils Present? ☒Yes ☐No

(Check)

Is this Sampling Point Within a Wetland? ☒Yes ☐No

Remarks

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Palacios de Humacao	Date:	Febrero 2007
Applicant/Owner:	Empresas VRM	County:	Humacao
Investigator:	José A. Torres / JAT Wetland Research Inc.	State:	Puerto Rico
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	9

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Panicum maximun	G	FACU	9.		
2. Mimosa casta	G	Ni	10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0%

Remarks:

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks: N/A

SOILS

Map Unit Name (Series and Phase): Mc

Drainage Class: pd

Field Observations Confirm Mapped Type? ☒Yes ☐No

Taxonomy (Subgroup): Tropaquepts

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-6		10 YR 6/2	7.5 YR 5/6		
6-18		5 Y 5/1	5 Y 5/8		

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☒ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☐Yes ☒No (Check)		(Check)
Wetland Hydrology Present?	☐Yes ☒No		
Hydric Soils Present?	☒Yes ☐No	Is this Sampling Point Within a Wetland?	☐Yes ☒No

Remarks

Approved by HQUSACE 3/92

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DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Palacios de Humacao	Date:	Febrero 2007
Applicant/Owner:	Empresas VRM	County:	Humacao
Investigator:	José A. Torres / JAT Wetland Research Inc.	State:	Puerto Rico
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	10

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Panicum maximum	G	FACU	9.		
2. Mimosa casta	G	NI	10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0%

Remarks:

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks: N/A

SOILS

Map Unit Name (Series and Phase): Me

Drainage Class: pd

Field Observations Confirm Mapped Type? ☒Yes ☐No

Taxonomy (Subgroup): Tropaquepts

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-6		10 YR 6/2	7.5 YR 5/6		
6-18		5 Y 5/1	5 Y 5/8		

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☒ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☐Yes ☒No (Check)		(Check)
Wetland Hydrology Present?	☐Yes ☒No		
Hydric Soils Present?	☒Yes ☐No	Is this Sampling Point Within a Wetland?	☐Yes ☒No

Remarks

Approved by HQUSACE 3/92

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DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Palacios de Humacao	Date:	Febrero 2007
Applicant/Owner:	Empresas VRM	County:	Humacao
Investigator:	José A. Torres / JAT Wetland Research Inc.	State:	Puerto Rico
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	11

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Panicum maximum	G	FACU	9.		
2. Mimosa casta	G	Ni	10.		
3. Albizia lebbeck	T	Ni	11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 0%

Remarks:

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks: N/A

SOILS

Map Unit Name (Series and Phase): Me

Drainage Class: pd

Field Observations Confirm Mapped Type? ☒Yes ☐ No

Taxonomy (Subgroup): Tropaquepts

Profile Descriptions:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-6		10 YR 6/2	7.5 YR 5/6		
6-18		5 Y 5/1	5 Y 5/8		

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☒ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☐Yes ☒No (Check)		(Check)
Wetland Hydrology Present?	☐Yes ☒No		
Hydric Soils Present?	☒Yes ☐No	Is this Sampling Point Within a Wetland?	☐Yes ☒No

Remarks

Approved by HQUSACE 3/92

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DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Palacios de Humacao	Date:	Febrero 2007
Applicant/Owner:	Empresas VRM	County:	Humacao
Investigator:	José A. Torres / JAT Wetland Research Inc.	State:	Puerto Rico
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	12

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Mimosa casta	G	Ni	9.		
2. Panicum maximum	G	FACU	10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0%

Remarks:

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water. _____ (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks: N/A

SOILS

Map Unit Name (Series and Phase): Cr

Drainage Class: pd

Field Observations Confirm Mapped Type? ☒Yes ☐No

Taxonomy (Subgroup): Fluvaquents

Profile Descriptions.

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-6		10 YR4/3			
6-18		10 YR 4/2	7.5 YR 5/8		

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☒ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ☐Yes ☒No (Check)

Wetland Hydrology Present? ☐Yes ☒No

Hydric Soils Present? ☒Yes ☐No

(Check)

Is this Sampling Point Within a Wetland? ☐Yes ☒No

Remarks

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Palacios de Humacao	Date:	Febrero 2007
Applicant/Owner:	Empresas VRM	County:	Humacao
Investigator:	José A. Torres / JAT Wetland Research Inc.	State:	Puerto Rico
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	13

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Sesbania sericea	SH	OBL	9.		
2. Paspalum virgatum	G	FACW	10.		
3. Ludwigia octovalvis	G	OBL	11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100%

Remarks: SH - Shrubs / G -Grass

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☒ Inundated
- ☐ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Me

Drainage Class: pd

Field Observations Confirm Mapped Type? ☒Yes ☐No

Taxonomy (Subgroup): Tropaquepts

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-6		10 YR 6/2	7.5 YR 5/6		
6-18		5 Y 5/1	5 Y 5/8		

Hydric Soil Indicators.

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☒ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☒Yes ☐No	(Check)
Wetland Hydrology Present?	☒Yes ☐No	
Hydric Soils Present?	☒Yes ☐No	

(Check)

Is this Sampling Point Within a Wetland? ☒Yes ☐No

Remarks

Approved by HQUSACE 3/92

Forms version 1/02

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Palacios de Humacao	Date:	Febrero 2007
Applicant/Owner:	Empresas VRM	County:	Humacao
Investigator:	José A. Torres / JAT Wetland Research Inc.	State:	Puerto Rico
Do Normal Circumstances exist on the site?	☒Yes ☐No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?	☐Yes ☒No	Transect ID:	
Is the area a potential Problem Area? (If needed, explain on reverse.)	☐Yes ☒No	Plot ID:	14

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Panicum maximum	G	FACU	9.		
2.			10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 0%

Remarks:

HYDROLOGY

☐ Recorded Data (Describe in Remarks):
- ☐ Stream, Lake, or Tide Gauge
- ☐ Aerial Photographs
- ☐ Other

☐ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: _____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ☐ Inundated
- ☐ Saturated in Upper 12 Inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ☐ Oxidized Root Channels in Upper 12 Inches
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Remarks: N/A

SOILS

Map Unit Name (Series and Phase): Me

Drainage Class: pd

Field Observations Confirm Mapped Type? ☒Yes ☐No

Taxonomy (Subgroup): Tropaquepts

Profile Descriptions:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-6		10 YR 6/2	7.5 YR 5/6		
6-18		5 Y 5/1	5 Y 5/8		

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☒ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (Explain in Remarks)

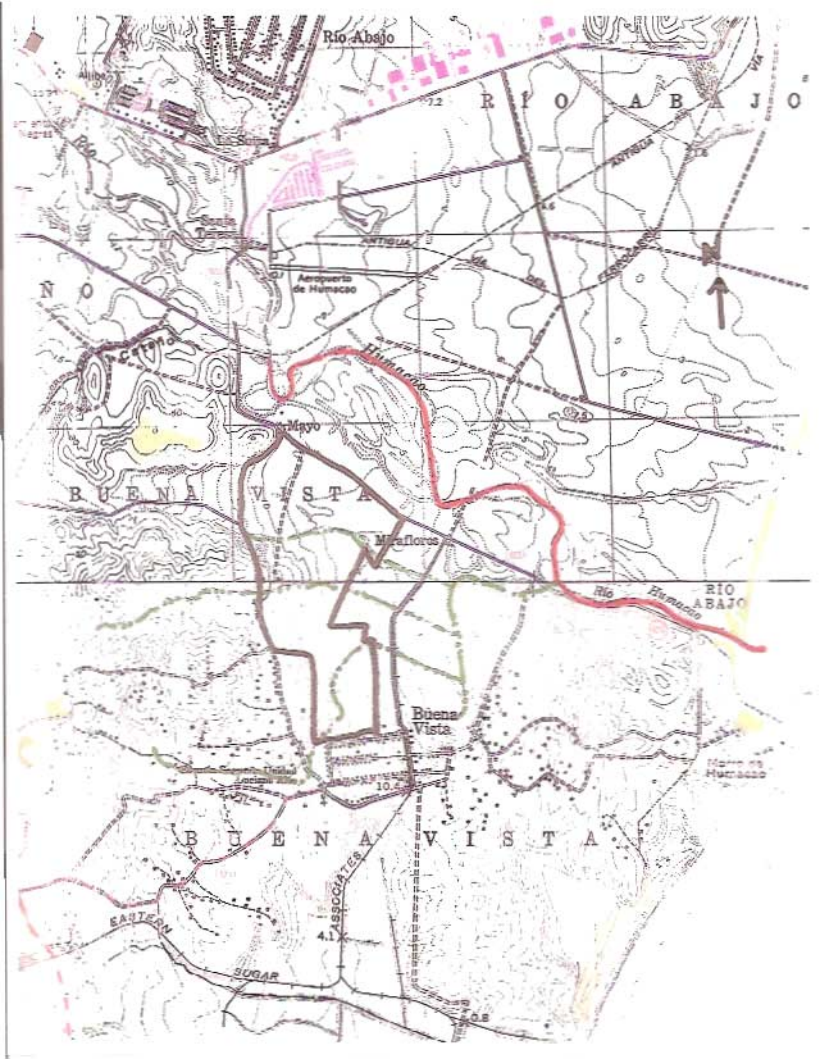
Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	☐Yes ☒No (Check)		(Check)
Wetland Hydrology Present?	☐Yes ☒No		
Hydric Soils Present?	☒Yes ☐No	Is this Sampling Point Within a Wetland?	☐Yes ☒No

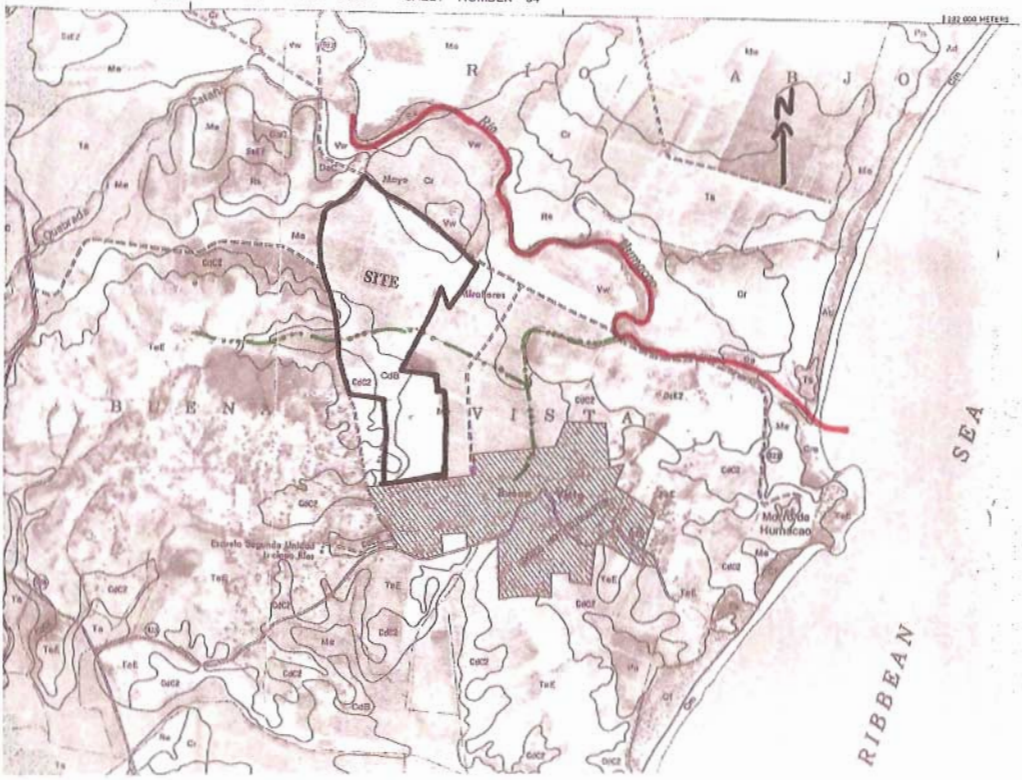
Remarks

LOCATION MAP


Río Abajo
R I O A B A J O
Aeropuerto de Humacao
Mayo
B U E N A V I S T A
Miraflores
Río Humacao
RIO ABAJO
Buena Vista
B U E N A V I S T A
ASOCIATES
EASTERN
SUGAR

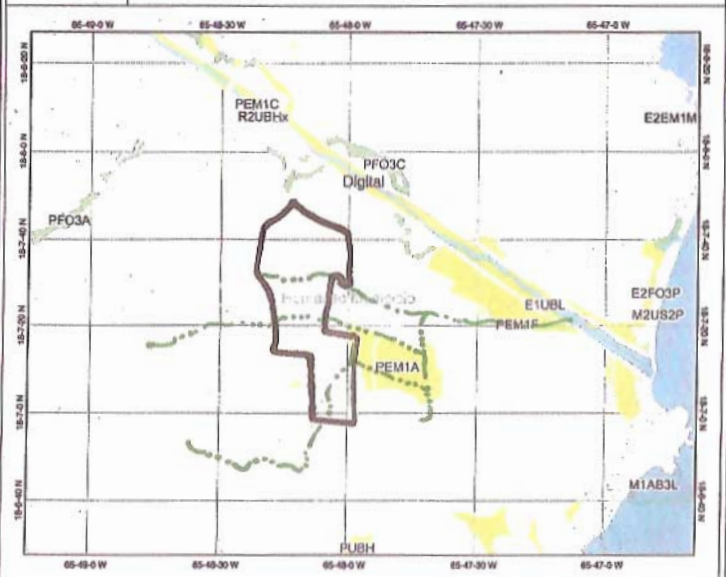
SOIL SURVEY MAP

HUMACAO AREA, PUERTO RICO – SHEET NUMBER 34



FWS WETLAND INVENTORY MAP

Proyecto de Humacao



Map center: 18° 7' 27" N, 65° 47' 57" W

Legend

Major Roads

- Other Road
- Interstate
- State Highway
- US Highway

Roads

- PRVI Cities

PRVI Wetland Polygons

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

PRVI Available Wetland Data

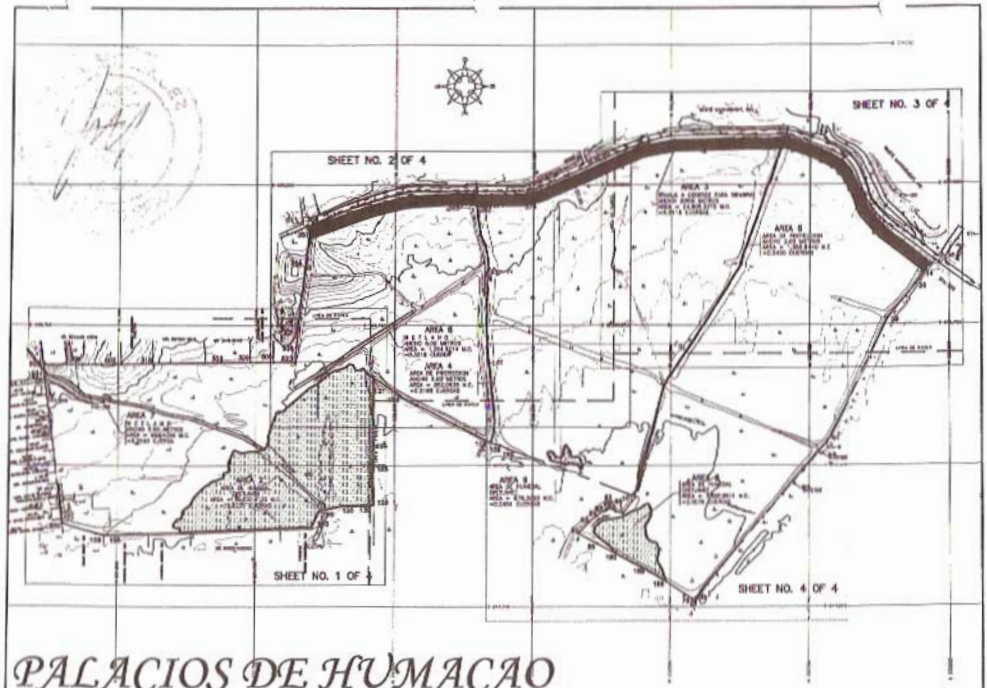
- Non-Digital
- Digital
- No Data
- Scan

- Waterbodies 2M
- Streams 2M
- PRVI Counties 2M

Scale: 1:34,493

This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

DETERMINATION OF JURISDICTIONAL AREAS



PALACIOS DE HUMACAO

KEY PLAN

AREAS JURISDICCIONALES

APPROVED JURISDICTIONAL DETERMINATION FORM

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): 2007

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: **Jacksonville District**, Puerto Rico Office; Palacios de Humacao; SAJ-2007-4681 (IP-CGR)

C. PROJECT LOCATION AND BACKGROUND INFORMATION:

State: PR County/parish/borough: Humacao City: Humacao

Center coordinates of site (lat/long in degree decimal format): Lat. 18o 07' 20.81'' N, Long. 65o 47' 12.15'' ° W.

Universal Transverse Mercator:

Name of nearest waterbody: Humacao River

Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows:

Name of watershed or Hydrologic Unit Code (HUC): 2101005 Eastern Puerto Rico

☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.

☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☒ Office (Desk) Determination. Date: February 2007

☒ Field Determination. Date(s): February 2007

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** *"navigable waters of the U.S."* within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

☐ Waters subject to the ebb and flow of the tide.

☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain:

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are** *"waters of the U.S."* within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**

   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]

   ☐ TNWs, including territorial seas
   ☐ Wetlands adjacent to TNWs
   ☒ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
   ☐ Non-RPWs that flow directly or indirectly into TNWs
   ☒ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
   ☒ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
   ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
   ☐ Impoundments of jurisdictional waters
   ☒ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
   Non-wetland waters: linear feet: 7.5 width (ft) and/or 0.54 acres.
   Wetlands: 17.29 acres.

   c. **Limits (boundaries) of jurisdiction** based on: **1987 Delineation Manual**
   Elevation of established OHWM (if known):

2. **Non-regulated waters/wetlands (check if applicable):**[3]

   ☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain:

---

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.

[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).

[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. **TNW**
   Identify TNW:

   Summarize rationale supporting determination:

2. **Wetland adjacent to TNW**
   Summarize rationale supporting conclusion that wetland is "adjacent":

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. **Characteristics of non-TNWs that flow directly or indirectly into TNW**

   (i) **General Area Conditions:**
   Watershed size: **Pick List**
   Drainage area: **Pick List**
   Average annual rainfall: inches
   Average annual snowfall: inches

   (ii) **Physical Characteristics:**
   (a) Relationship with TNW:
   ☐ Tributary flows directly into TNW.
   ☒ Tributary flows through **2** tributaries before entering TNW.

   Project waters are **Pick List** river miles from TNW.
   Project waters are **Pick List** river miles from RPW.
   Project waters are **Pick List** aerial (straight) miles from TNW.
   Project waters are **Pick List** aerial (straight) miles from RPW.
   Project waters cross or serve as state boundaries. Explain:

   Identify flow route to TNW[5]:
   Tributary stream order, if known:

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is: ☒ Natural
☐ Artificial (man-made). Explain:
☐ Manipulated (man-altered). Explain:

Tributary properties with respect to top of bank (estimate):
Average width: feet
Average depth: feet
Average side slopes: **Pick List.**

Primary tributary substrate composition (check all that apply):
☐ Silts ☐ Sands ☐ Concrete
☐ Cobbles ☐ Gravel ☐ Muck
☐ Bedrock ☐ Vegetation. Type/% cover:
☐ Other. Explain:

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain:
Presence of run/riffle/pool complexes. Explain:
Tributary geometry: **Pick List**
Tributary gradient (approximate average slope): %

(c) Flow:
Tributary provides for: **Seasonal flow**
Estimate average number of flow events in review area/year: **Pick List**
Describe flow regime:
Other information on duration and volume:

Surface flow is: **Pick List.** Characteristics:

Subsurface flow: **Pick List.** Explain findings:
☐ Dye (or other) test performed:

Tributary has (check all that apply):
☒ Bed and banks
☒ OHWM[6] (check all indicators that apply):
☐ clear, natural line impressed on the bank
☐ changes in the character of soil
☐ shelving
☒ vegetation matted down, bent, or absent
☐ leaf litter disturbed or washed away
☐ sediment deposition
☐ water staining
☐ other (list):
☐ the presence of litter and debris
☐ destruction of terrestrial vegetation
☐ the presence of wrack line
☐ sediment sorting
☐ scour
☐ multiple observed or predicted flow events
☐ abrupt change in plant community

☐ Discontinuous OHWM.[7] Explain:

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
☐ High Tide Line indicated by:
☐ oil or scum line along shore objects
☐ fine shell or debris deposits (foreshore)
☐ physical markings/characteristics
☐ tidal gauges
☐ other (list):
☐ Mean High Water Mark indicated by:
☐ survey to available datum;
☐ physical markings;
☐ vegetation lines/changes in vegetation types.

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain:
Identify specific pollutants, if known:

---

[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]Ibid.

(iv) **Biological Characteristics. Channel supports (check all that apply):**
- ☐ Riparian corridor. Characteristics (type, average width):
- ☐ Wetland fringe. Characteristics:
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings:
  - ☐ Fish/spawn areas. Explain findings:
  - ☐ Other environmentally-sensitive species. Explain findings:
  - ☐ Aquatic/wildlife diversity. Explain findings:

2. **Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW**

(i) **Physical Characteristics:**

(a) General Wetland Characteristics:
Properties:
Wetland size: 14.78 acres
Wetland type. Explain: herbaceous.
Wetland quality. Explain:
Project wetlands cross or serve as state boundaries. Explain:

(b) General Flow Relationship with Non-TNW:
Flow is: **Intermittent flow**. Explain:

Surface flow is: **Pick List**
Characteristics:

Subsurface flow: **Pick List**. Explain findings:
- ☐ Dye (or other) test performed:

(c) Wetland Adjacency Determination with Non-TNW:
- ☒ Directly abutting
- ☐ Not directly abutting
  - ☐ Discrete wetland hydrologic connection. Explain:
  - ☐ Ecological connection. Explain:
  - ☐ Separated by berm/barrier. Explain:

(d) Proximity (Relationship) to TNW
Project wetlands are **Pick List** river miles from TNW.
Project waters are **Pick List** aerial (straight) miles from TNW.
Flow is from: **Pick List.**
Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) **Chemical Characteristics:**
Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain:
Identify specific pollutants, if known:

(iii) **Biological Characteristics. Wetland supports (check all that apply):**
- ☐ Riparian buffer. Characteristics (type, average width):
- ☒ Vegetation type/percent cover. Explain:
- ☒ Habitat for:
  - ☐ Federally Listed species. Explain findings:
  - ☐ Fish/spawn areas. Explain findings:
  - ☐ Other environmentally-sensitive species. Explain findings:
  - ☒ Aquatic/wildlife diversity. Explain findings:

3. **Characteristics of all wetlands adjacent to the tributary (if any)**
All wetland(s) being considered in the cumulative analysis: **Pick List**
Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed: .

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial:
   - ☒ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
  - Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   - ☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):
- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
  - Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☒ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
     - ☒ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: 17.29 acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
   - ☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
   As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
   - ☐ Demonstrate that impoundment was created from "waters of the U.S.," or
   - ☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
   - ☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. **ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]**
- ☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
- ☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
- ☐ which are or could be used for industrial purposes by industries in interstate commerce.
- ☐ Interstate isolated waters. Explain: .
- ☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

---

[8]See Footnote # 3
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] **Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos*.**

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
☐ Other: (explain, if not covered above): .

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: .
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☐ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study: .
☒ U.S. Geological Survey Hydrologic Atlas: .
☐ USGS NHD data.
☒ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name: .
☒ USDA Natural Resources Conservation Service Soil Survey. Citation: .
☒ National wetlands inventory map(s). Cite name: .
☐ State/Local wetland inventory map(s): .
☒ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☐ Photographs: ☐ Aerial (Name & Date): .
or ☐ Other (Name & Date): .
☐ Previous determination(s). File no. and date of response letter: .
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☒ Other information (please specify):Field inspections.

B. ADDITIONAL COMMENTS TO SUPPORT JD: .

ATTACHMENT

US ARMY CORPS OF ENGINEERS
2009 OCT 21 P 12: 33
ANNEX/STRUCTURE CENTER RECEIVED

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PRELIMINARY JURISDICTIONAL DETERMINATION (JD): October 13, 2009

B. NAME AND ADDRESS OF PERSON REQUESTING PRELIMINARY JD: Jose Valdez, Empresas VRM, PO Box 20868

C. DISTRICT OFFICE, FILE NAME, AND NUMBER:Jacksonville, Palacios de Humacao, SAJ-2007-04681(PJD-CGR)

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION: State Road PR-923 Km. 1.5, Buena Vista Ward
(USE THE ATTACHED TABLE TO DOCUMENT MULTIPLE WATERBODIES AT DIFFERENT SITES)

State:Puerto Rico County/parish/borough: City: Humacao
Center coordinates of site (lat/long in degree decimal format): Lat. 18° N, Long. -65° W.

Universal Transverse Mercator:

Name of nearest waterbody: Candelero River

Identify (estimate) amount of waters in the review area:
Non-wetland waters: linear feet: width (ft) and/or 3.35 acres.
Cowardin Class: Riverine
Stream Flow: Intermittent
Wetlands: 17.29 acres.
Cowardin Class: Emergent

Name of any water bodies on the site that have been identified as Section 10 waters:

Tidal:

Non-Tidal:

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☒ Office (Desk) Determination. Date: October 8, 2009
☐ Field Determination. Date(s):

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party

who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable. This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

SUPPORTING DATA. Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):

☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:Figures 1-5 .

☐ Data sheets prepared/submitted by or on behalf of the applicant/consultant.

- ☐ Office concurs with data sheets/delineation report.
- ☐ Office does not concur with data sheets/delineation report.

☐ Data sheets prepared by the Corps: .

☐ Corps navigable waters' study: .

☐ U.S. Geological Survey Hydrologic Atlas: .

- ☐ USGS NHD data.
- ☐ USGS 8 and 12 digit HUC maps.

☒ U.S. Geological Survey map(s). Cite scale & quad name:1:20,000 .

☒ USDA Natural Resources Conservation Service Soil Survey. Citation:Sheet 34, Humacao.

☒ National wetlands inventory map(s). Cite name:Humacao.

☐ State/Local wetland inventory map(s): .

☐ FEMA/FIRM maps: .

☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)

☐ Photographs: ☐ Aerial (Name & Date): .
or ☐ Other (Name & Date): .

☐ Previous determination(s). File no. and date of response letter: .

☐ Other information (please specify): .

<u>IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.</u>

Carmen L Roman 10/13/2009
Signature and date of
Regulatory Project Manager
(REQUIRED)

Signature and date of
person requesting preliminary JD
(REQUIRED, unless obtaining
the signature is impracticable)

WETLAND RESEARCH, INC.

P. O. Box 371209 Cayey, P. R. 00737
Tel. 787-263-7588 / Fax: 787-738-3689
Email: jwrl@prtc.net

MITIGATION PLAN PROPOSAL

PALACIOS DE HUMACAO
PR-923, K.M. 1.5
BUENA VISTA WARD
HUMACAO, PR

PREPARED FOR:

VRM ENTERPRISES
BOX 20868
SAN JUAN, PR 00928

SEPTEMBER 2009

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PALACIOS DE HUMACAO
HUMACAO PUERTO RICO
MITIGATION PLAN PROPOSAL

I. BASELINE INFORMATION

a. Location of the impacts

The Project impacts are proposed at the PR-923, Km. 1.5, Buena Vista Ward, Municipality of Humacao, Puerto Rico which is located at W 65° 48' 11.66", N 18° 7' 32.27". (Enclose # 1, Site location map)

After redesigning and minimized the project it is contemplated to cause an impact in approximately 3,263.9380 square meters of wetlands areas (0.80 acres) inside the project and 217.6340 square meters of water of the United States (0.0537 acres). (Appendix A)

b. Location of the mitigation area

1. It is proposed to compensate the inevitable impacts of the proposed project trough out the creations of 4.3562 acres of wetland areas. Also it is proposed the enhancement of 16.4080 acres of existing wetland areas with the planting of trees. The mitigation areas proposed are located *in-situ* at the PR-923, Km. 1.5, Buena Vista Ward, Municipality of Humacao, Puerto Rico. (Enclose # 2, Mitigation location map)

II. GOAL AND OBJECTIVES FOR THE MITIGATION AREA

1. Goal – That the mitigation area be ecologically sustainable, with values and functions that exceed the existing prior the creation of the mitigation area.

   Objectives:

   a. Increase the flora by establishing native, endemic, and desired wetland plant species.
   b. Increase the fauna providing a valuable habitat to support several endangered and threatened bird species.
   c. Improve the water quality

III. SELECTION OF THE AREA

After careful consideration of the cost, benefits and project implementation logistics, it was decided to conduct the mitigation process inside the property in order to provide an adequate mitigation to compensate the proposed impacts.

a. Consideration of the divider lines - The area chosen for the compensatory mitigation project is found in the divider lines of the water body impacted, guaranteeing its hydrology and by means of the topography modifications enlarged the values and original functions and at the same time, will guarantee an increase in the biodiversity of the water body located in the divider lines.
b. Viability - Accessibility to machineries, lands, mitigation and species to be sown.
c. Ownership status – The project and mitigation will be property of VRM Enterprises.
   1. Provide written authorization for Corps personnel to enter the mitigation site.
      1. The requested written authorization is included in Appendix B. Our personnel are also available to escort and guide any

government regulatory agency employee through the mitigation site at your request.

IV. SITE PROTECTION

a. Mitigation protection - After the construction of the mitigation areas are concluded, the same will be conserved in perpetuity by the legal document Conservation Easement. Subsequently, a draft conservation easement, including a legal description and survey, will be submitted to the USACE for review.

V. MITIGATION BASELINE INFORMATION

a. Functions and uses proposed

1. Project – The purpose of this project is help to diminish the dwelling needs in the Municipality of Humacao especially of social interest for persons with low income and for moderated prices for the average class people.
2. Mitigations Areas – The construction of the proposed mitigations areas will serves to increase the biological functions of the existing and remaining wetlands areas inside the property as; production of the food chain, habitat, nesting, a place of rest for the aquatic and terrestrial species, increasing the biodiversity of the area. Also, it would serve as a deposit area of rain and flood to ensure the water quality.

b. Past, present and proposed used of the mitigation area.

1. In the past, these lands were used for sugar cane production.
2. At the present the lands in question are solitary, vacant and uncultivated.
3. Proposed used – As it was mentioned the mitigations areas after the construction, planting, maintenance and monitoring are concluded; it will be conserved in perpetuity by Conservation Easement.

b. Acreage of wetland to be created

1. It is proposed the creation 4.3562 acres of wetland area inside the property distributed adjacent to the two existing wetland areas inside the property. One of the mitigation areas will count of 2.8221 acres and the other one of 1.5335 acres.

2. As part of the minimization process it was decided to maintain in its natural state three drainage channel thats flows through the property including a minimum of 5 meter of buffer zone in both sides of the channels. The areas have the following width (1) Area # 1 – channel 10.00 meters plus 5 meter of buffer is a total of 20.00 meter for conservation; (2) Area # 4 – channel 9.760 meters plus 5 meter of buffer is a total of 19.76 meters for conservation; and (3) Area # 5 – channel 7.50 meters plus 5 meter of buffer is a total 17.50 meters for conservation (See Cross-sections A-A, B-B and D-D). This will lead to a conservation area of 13,283.5189 square meters (3.2823 acres) plus the buffer zone.

3. Also it is proposed the enhancement of 16.4080 acres of existing wetlands areas which is more than 92% of the total wetland area of the property. (See Plan View)

B. Ground Elevations at the mitigation site

0 to 2%

C. Soils conditions (Me) - The Maunabo series consist of deep soils that are poorly drained and slowly permeable. These soils formed in fine-textured sediment derived from granitic rocks. They are on the river flood plains. Slopes are 0 to 2 percent. The climate is humid tropical. The average annual precipitation is 87 inches, and the average temperature is 79 °F. In a representative profile, the surface layer is light brownish-gray, mottled, strongly acid clay in the upper 4 inches and grayish-brown, mottled, very firm clay in the lower 6 inches. Below that is gray and greenish-gray, mottled clay and silty clay 29 inches thick. The

underlying material is greenish-gray, very friable sandy loam that extends to a depth of 48 inches. These soils are fertile and have a high available water capacity. Runoff is slow. The soils are difficult to work, and they have been in pasture and sugarcane for many years.

D. Existing hydrology

Through the property flow several drainage channels. All of three channels will be maintain in its natural state to avoid impacts to these ecological areas and to maintain the hydrology of the mitigation areas proposed.

E. Identify topsoil requirements

Topsoil requirements should be minimal as the site is being enhance and the mitigation areas are adjacent to the existing wetlands. Since much of the mitigation area will be graded to appropriate planting elevations, topsoil will be reused in areas where is needed. If it is necessary to obtain topsoil, it will be obtained either from the mitigation site itself or from a clean fill source. No contaminated or altered soil will be used at the mitigation site.

F. Type of aquatic resource and functions of the proposed area for the mitigation.

The mitigation area will be created as forest and herbaceous wetland. According to the wetland classification system is proposed the creation of a scrub/shrub wetland, Palustrine (Cowarding, 1979), which will include a mix of herbaceous and wetland trees. Among the species that will be planted are: *Pterocarpus officinalis, Annona glabra, Sthalia monosperma, Canna glauca, Cyperus spp, Sagittaria lancifolia*, among others. This area will serve for the natural biological functions as: production of the food chain, create news habitat for the terrestrial and aquatic species, which at the same time creates an increase in the biodiversity of the area.

The enhancement of the existing wetland areas includes the planting of wetland trees species to increase the ecological values of theses areas. Among the species that will be planted are: *Pterocarpus officinalis, Annona glabra, Sthalia monosperma, Enallagma latifolia, and Erythrina fusca.*

VI. FUNCTIONS & VALUES

a. Impacted areas

Functions & Values of the Impacted Areas

The results of the jurisdictional determination study indicate that the project site includes both uplands and wetland areas.

This table was created as an aid to the wetland determination that is considered to carry out important functions by the public interest. The punctuation given to each criterion is based on the available information and the observation in the field

Wetland identified as AREA # 2 in the PLAN VIEW PROVIDED. This area located at southwest of the property. (SEE Sheet No. 1 of 5)

Type of vegetation: Herbaceous wetland of 14.7839 acres (0.3256 acres of impact)
Wetland hydrology indicator: drainage channel
Type of soil: Mc (Maunabo Clay) & CdB (Candelero Loam)
Soil hydric: Mc (YES) & CdB (YES)
Criteria of hydric soil: Mc (Saturation) & CdB (Saturation and ponding)
Data obtained: SCS 1977

1. Wetlands that serve significantly for the natural biological functions, including production of the alimentary chain, general habitat and nesting, breeding areas and a place to rest the terrestrial and aquatic species;

1-5 4

2. Wetlands separated for the study of the aquatic environment or as sanctuary or refuge;

1-5 2

3. Wetlands whose destruction or alteration would affect the natural characteristics of drainage, sedimentation or other environmental characteristics;

1-5 3

4. Wetlands that is significant in the production of areas for the action of the waves, erosion and the damage by storms. These wetlands are associates with beach barriers, islands, and banks;

1-5 1

5. Wetlands that serve like valuable areas of water rain deposit and floods;

1-5 4

6. Wetlands that are for the recharge of subterranean water in areas that maintain a most minimum flow of base, value for the aquatic resources and those are primaries in the natural recharge of the areas;

1-5 2

7. Wetlands that have important functions in the water purification;

1-5 2

8. Wetlands those are unique in its nature or rare in quantity in the region or local area;

1-5 1

Total: 19 (Most maximum of 40)

Legend:

0-15 Low Value

16-29 Medium Value

30-40 High Value

Wetland identified as AREA # 3 in the PLAN VIEW PROVIDED. This area located at the west side of the property. (SEE Sheet No. 2 of 5)

Type of vegetation: Herbaceous wetland of 0.3125 acres (0.2396 acres of impact)

Wetland hydrology indicator: drainage channel

Type of soil: CdB (Candelero loam)

Soil hydric: YES

Criteria of hydric soil: Saturation and ponding

Data obtained: SCS 1977

1. Wetlands that serve significantly for the natural biological functions, including production of the alimentary chain, general habitat and nesting, breeding areas and a place to rest the terrestrial and aquatic species;

1-5 2

2. Wetlands separated for the study of the aquatic environment or as sanctuary or refuge;

1-5 1

3. Wetlands whose destruction or alteration would affect the natural characteristics of drainage, sedimentation or other environmental characteristics;

1-5 2

4. Wetlands that is significant in the production of areas for the action of the waves, erosion and the damage by storms. These wetlands are associates with beach barriers, islands, and banks;

1-5 1

5. Wetlands that serve like valuable areas of water rain deposit and floods;

1-5 1

6. Wetlands that are for the recharge of subterranean water in areas that maintain a most minimum flow of base, value for the aquatic resources and those are primaries in the natural recharge of the areas;

1-5 1

7. Wetlands that have important functions in the water purification;

1-5 2

8. Wetlands those are unique in its nature or rare in quantity in the region or local area;

1-5 1

Total: 11 (Most maximum of 40)

Legend:

0-15 Low Value

16-29 Medium Value

30-40 High Value

Wetland identified as AREA # 6 in the PLAN VIEW PROVIDED. This area located at the east of the property. (SEE Sheet No. 4 of 5)

Type of vegetation: Herbaceous wetland of 0.2412 acres (0.2412 acres of impact)
Wetland hydrology indicator: water saturation
Type of soil: Me (Maunabo clay)
Soil hydric: YES
Criteria of hydric soil: Saturation
Data obtained: SCS 1977

1. Wetlands that serve significantly for the natural biological functions, including production of the alimentary chain, general habitat and nesting, breeding areas and a place to rest the terrestrial and aquatic species;

1-5 3

2. Wetlands separated for the study of the aquatic environment or as sanctuary or refuge;

1-5 1

3. Wetlands whose destruction or alteration would affect the natural characteristics of drainage, sedimentation or other environmental characteristics;

1-5 2

4. Wetlands that is significant in the production of areas for the action of the waves, erosion and the damage by storms. These wetlands are associates with beach barriers, islands, and banks;

1-5 1

5. Wetlands that serve like valuable areas of water rain deposit and floods;

1-5 3

6. Wetlands that are for the recharge of subterranean water in areas that maintain a most minimum flow of base, value for the aquatic resources and those are primaries in the natural recharge of the areas;

1-5 2

7. Wetlands that have important functions in the water purification;

1-5 2

8. Wetlands those are unique in its nature or rare in quantity in the region or local area;

1-5 1

Total: 15 (Most maximum of 40)

Legend:

0-15 Low Value

16-29 Medium Value

30-40 High Value

b. Mitigation areas

Wetland construction identified as Mitigation Area (A) is located adjacent to an existing wetland at the northeast of the property. (SEE Sheet No. 5 of 5)

Functions & Values Estimated for the Mitigation Area (A) and Enhancement area

Type of vegetation: Herbaceous and forested wetland

Wetland hydrology indicator: existing drainage channel

Type of soil: Me (Manuabo clay)

Soil hydric: YES

Criteria of hydric soil: Saturation

Data obtained: SCS 1977

1. Wetlands that serve **significantly** for the natural biological functions, including production of the alimentary chain, general habitat and nesting, breeding areas and a place to rest the terrestrial and aquatic species;

1-5 5

2. Wetlands separated for the study of the aquatic environment or as sanctuary or refuge;

1.5 3

·3. Wetlands whose destruction or alteration would affect the natural characteristics of drainage, sedimentation or other environmental characteristics;

1-5 5

4. Wetlands that is significant in the production of areas for the action of the waves, erosion and the damage by storms. These wetlands are associates with beach barriers, islands, and banks;

1-5 1

5. Wetlands that serve like valuable areas of water rain deposit and floods;

1-5 5

6. Wetlands that are for the recharge of subterranean water in areas that maintain a most minimum flow of base, value for the aquatic resources and those are primaries in the natural recharge of the areas;

1-5 2

7. Wetlands that have important functions in the water purification;

1-5 5

8. Wetlands those are unique in its nature or rare in quantity in the region or local area;

1-5 4

Total: 30 (Most maximum of 40)

Legend:
0-15 Low Value
16-29 Medium Value
30-40 High Value

This table was created as an aid to the wetland determination that is considered to carry out important functions by the public interest. The punctuation given to each parted is based on the available information and what expects for the mitigation area that is going to be created. The value was determined given our experience in mitigations construction after 5 years of sown and/or built the area.

Wetland construction adjacent to an existing wetland area located at the southeast of the property. (SEE Sheet No. 1 of 5)

Functions & Values Estimated for the Mitigation Area ID (B, C, & D) & Enhancement area ID Area # 2.

Type of vegetation: Herbaceous and forested wetland

Wetland hydrology indicator: existing drainage channel

Type of soil: Me (Manuabo clay)

Soil hydric: YES

Criteria of hydric soil: Saturation

Data obtained: SCS 1977

1. Wetlands that serve **significantly** for the natural biological functions, including production of the alimentary chain, general habitat and nesting, breeding areas and a place to rest the terrestrial and aquatic species;

1-5 5

2. Wetlands separated for the study of the aquatic environment or as sanctuary or refuge;

1-5 2

3. Wetlands whose destruction or alteration would affect the natural characteristics of drainage, sedimentation or other environmental characteristics;

·1-5 5

4. Wetlands that is significant in the production of areas for the action of the waves, erosion and the damage by storms. These wetlands are associates with beach barriers, islands, and banks;

1-5 1

5. Wetlands that serve like valuable areas of water rain deposit and floods;

1-5 5

6. Wetlands that are for the recharge of subterraneun water in areas that maintain a most minimum flow of base, value for the aquatic resources and those are primaries in the natural recharge of the areas;

1-5 3

7. Wetlands that have important functions in the water purification;

1-5 5

8. Wetlands those are unique in its nature or rare in quantity in the region or local area;

1-5 3

Total: 29 (Most maximum of 40)

Legend:

0-15 Low Value
16-29 Medium Value
30-40 High Value

This table was created as an aid to the wetland determination that is considered to carry out important functions by the public interest. The punctuation given to each parted is based on the available information and what expects for the mitigation area that is going to be created. The value was determined given our experience in mitigations construction after 5 years of sown and/or built the area.

Wetland Enhancement

It is proposed the enhancement of 16.4080 acres of existing wetlands areas located at the southeast and northeast of the property. In these areas no grading will be implemented, and the enhancement will be achieved through the supplemental planting of wetland trees

VII. MITIGATION PLAN JOB

a. Pre-construction

Prior to the delivery of any equipment, tools, machinery, work crews or other materials to be used in the construction of the new mitigation areas; the following requirements must be met.

1. Preserve/Conservation Area(s) Delineation

   The boundaries of all areas of the Site to be retained in their existing condition will be surveyed and clearly fenced to eliminate inadvertent incursions by machinery, construction and/or personnel. The fence will be located in the surveyed line and shall be six (6 feet) minimum height.

2. Equipment and/or any machinery storage areas will be identified and means to prevent the accidental spill and escape of toxic and/or hazardous substances.

3. If petroleum products (Diesel) are to be stored in the Site during the constructions activities, these areas will be identified and a spill prevention, containment and cleanup plan will be maintained in the site.

4. If nuisance species biomass that has been removed from the site is to be stockpiled, a designated are for storage of these materials is going to be established. To insure that the maintenance material does not find its way back into the mitigations areas, it is to be located remote from soils that may be used for such purposes.

5. Erosion control – During the construction phase, all the jurisdictional areas will be protected by the implementations of methods of erosion control as (staked hay bales, silt fences, turbidity barriers, etc) prior to the earthwork startup. To these controls, it will be given the appropriate maintenance, including the cleaning of the material that has been placed in the lower areas and the reinstatement if it is necessary to avoid if an extraordinary event occur, be dragged toward water bodies or other areas. The silt fence and the turbidity barrier will be removed when according to the inspection carried out by a specialist, it is determinate that is no longer necessary; confirming that the area has been stabilized.

6. Security fencing and signs – Fencing required restricting pedestrian and vehicular traffic not associated with the construction of the site will be installed prior the initiation of construction.

b. Earth Movement / Construction Phase

1. Weather Conditions – Construction are to be conducted under favorable weather conditions and it will be paid attention to the integrity and effectiveness of all erosion and sediment control devices.

2. Care and Maintenance of construction machinery – It is the permittee responsibility to insure the performance and reliability of all machinery used on the site. Equipment found to be leaking fluids (oils, greases, or other contaminants) will be removed form the Site and repaired within the designated areas for such purposes. Spills or discharges of contaminants within the Site are to be immediately controlled, cleaned up, and contaminated material removed from the Site and disposed of in accordance with all Federal and Local regulations.

3. Excess Material removed from the site will be disposed in the area designated for this purposes. Removal and distribution of excess material from the site will be in accordance with all Federal, and local regulations.

c. Planting

1. It is proposed the establishment of 4.3562 acres mitigation wetland area and the enhancement of 16.4080 existing wetland areas. (See enclose – Location Map of the proposed area) (See enclose – Mitigation Plan) (See enclose - Cross-section of the Mitigation creation area)

2. Methods of construction, time and sequence.
   - 1. Mitigation Timing

     Remove of the fill material – 60 days

     Planting phase – 120 days

   ** Approximately duration of 180 days = 6 months**

3. Equipment (If applies)

   Transportation vehicle for the transporting of the plants and trees

   Digger (extra-size) to remove the fill material

   Excavator

   Truck

4. Source that will provide hydrology to the mitigation area

   The mitigations areas will be adjacent to two (2) existing wetland areas inside the property. It is proposed to maintain the three water channel

inside the property for which two of them will provide the hydrology for the two mitigation and enhancement area. It is expected to maintain a water level of approximately 6" to guarantee the saturation and inundation for the mitigation area. Since both of the mitigation area are adjacent to the existing wetland areas they will kept the same hydrology source as the present.

Also, in the mitigation area it will be installed a weather gauge to document the precipitation data during the monitoring process.

5. Describe how the proposed wetland will be connected to navigable water of the U.S., or a tributary system to navigable water.

   The mitigations areas proposed will be adjacent to two existing wetland areas inside the property. Because of this, both of them will maintain the connection to a tributary system that later on joined the Humacao River which is a navigable water because if its inherent nature and connection to the Caribbean Sea.

6. Elevations and slopes of the mitigation area

   It will be established a mitigation area with a grading that will range from -18, -9, -6, 0. It is expected that the lower section of this area will be flooded during different seasons through the year. The up-land section will serve as a berm that will ensure that the water flow trough the mitigation site and not for the project. The elevations were determined based upon the water/flooding requirements of each species proposed for planting.

   The applicant is aware that State permits are required for the grading and/or excavation of the soil or to obtain topsoil in Puerto Rico. Theses permits should be accomplished prior the commencement of any activities of earth movement.

7. Vegetation to be planted in the mitigation area

Mitigation A (11,423.5443 square meters)

Trees

(1,270)

Pterocarous officinalis
Annona glabra
Bontia daphnoides
Stahlia monosperma
Enallagma latifolia
Erythrina fusca
Other wetland species

Herbaceous

(10,160)

Canna glauca
Cyperus haspan
Eleocharis spp.
Nymphoides indica
Cyperus giganteous
Sagittaria lancifolia
Scirpus validus
Other wetland species

Mitigation B, C & D (6,206.0866 square meters)

Trees

(690)

Pterocarous officinalis
Annona glabra
Bontia daphnoides
Stahlia monosperma
Enallagma latifolia
Erythrina fusca
Other wetland species

Herbaceous

(5,520)

Canna glauca
Cyperus haspan
Eleocharis spp.
Nympholdes indica
Cyperus giganteous
Sagittaria lancifolia
Scirpus validus
Other wetland species

Enhancement Wetlands
(4,500)
Pterocarpus officinalis
Annona glabra
Sihalia monosperma
Enallagma latifolia
Erythrina fusca.

8. The initial sows process will be:
   a. Trees at three (3) meters of the center in the mitigation area.
   b. Trees at five (5) meters of the center in the enhancement area.
   c. Herbaceous at one (1) feet of the center

9. The trees to be sown should have a minimum height from 3 to 6 feet and it can not be branched. It should have a straight growth, and there can not be infections (plague) (See enclose – Planting guides)

10. Concessions for the natural regeneration of an existing bank of seeds or to sow.

    a. Species to be planted should comply with the hydrology regions.
    b. Ideal Ph
    c. Guarantee the soil conditions so that the growth is effective.

11. Plans for the harmful species control

a. If during the period between the mitigation grading is finished and the planting begins, the area becomes infested with nuisance vegetation species, the nuisance vegetation will be removed prior the planting. This removal will be by hand to insure that roots and rhizomes are completely eliminated from the area. If the infestation is extensive, then herbicide treatment is going to be employed with subsequent removal of all biomass. Herbicide application methodology is at the contractor's discretion. It is the contractor's responsibility to make sure that herbicide application does not adversely impact previously planted mitigation areas. All herbicides are to be applied by an approved licensed applicator.

12.-Measurement for the erosion control

a. During the construction phase, all the jurisdictional areas will be protected by the implementations of methods of erosion control as (staked hay bales, silt fences, turbidity barriers, etc) prior to the earthwork startup. To the silt fence, it will be given an appropriate maintenance, including the cleaning of the material that has been placed in the lower areas and the reinstatement if it is necessary to avoid if an extraordinary event occur, be dragged toward water bodies or other areas. The silt fence and the turbidity barrier will be removed when according to the inspection carried out by a specialist, it is determinate that is no longer necessary; confirming that the area has been stabilized.

VIII. NUISANCE SPECIES CONTROL AND MAINTENANCE

a. Materials and methods

1. Following are maintenance methodologies that may be used solely or in combination to effect nuisance/exotic species control:

    1. Manual removal

    2. Chemical/herbicide application. The use of approved herbicides will be the most common nuisance species control methodology. All applications are to be in accordance with the manufacturer's recommendations and under appropriate weather conditions and applied by approved and licensed herbicide applicators.

b. Construction maintenance

1. Throughout the construction of the mitigation, it is necessary to controlled nuisance/exotic vegetation within the property boundaries of the site. Routine, monthly inspections of the site will be conducted to detect the presence and quantity of nuisance/exotic species. Control procedures are to be initiated when the levels of nuisance/exotic species reach a point that they potentially pose a treat or their spread is likely to pose a threat to mitigation area.

c. Post-Planting maintenance

1. Inspections of planted areas will be conducted to determine the presence of nuisance species. This nuisance species levels should be less than

10% for which is very important to vigorously initiate and maintained activities to reduce their cover in the fastest reasonable time should their cover approach 5% in any area. If the percent cover of the total of these species rises to 5% of the area, nuisance species control will be instigated in the area within the following 30 days (or at the first instance of suitable conditions after this 30 day period, if conditions are not suitable during the period).

2. Each inspection and/or corrective action will be documented to be included in the Monitoring Reports to be prepared for the Corps of Engineers. These reports will include findings, recommendations, and corrective actions planned and implemented.

d. - Site emergency procedures

1. All site emergencies, whether man induced or "Acts of Nature" (including but not limited to drought, hurricane, fire, earthquake, etc.) are to be immediately documented.

IX. PERFORMANCE STANDARDS

Taking in considerations the area, vegetation, hydrology, and other aspects that compose the mitigation area, we have established some standards of effectiveness.

1. Thirty days - The caduceus trees should have a growth in their sprouts of ¼ to ½ inches. The herbaceous plants should be producing new sprouts and/or leaves. It is natural to observe lost of leaves in the trees and/or effects in the plants caused by the transplant.
2. Three months - The herbaceous plants should possess from six to twelve stems and/or additional leaves and the ones that have an individual growth should have from four to six leaves and have a cover range of

15% by square meter. The trees should have a growth of six inches in its sprouts. During this adaptation period of the plants it is peculiar to observe associated growth and/or harmful species.

3. Six months - The herbaceous plants should have an approximate growth from 75 to 100% of their natural size, to guarantee their establishment in the area. Besides, the area should possess a 25% of plants cover such as associated species, in this way is guarantees the biodiversity, including the fauna, which should show the efficiency of the mitigation as habitat and nesting of the terrestrial species. The trees should have a growth approximately nine to ten inches in its sprouts and have a size of approximately of 6 feet.
4. (1) Year - The herbaceous plants should have their natural height average. It can be observe a 50% cover of the species and an increase in the fauna. The growing of the trees is slower than the herbaceous species but they should have a caliper of 1.5 to 2.0 inches of caliper and a height of 6.5 feet.
5. (2) Year – The herbaceous plants will maintain their height average, besides producing new sprouts and/or seeds to guarantee the 75% of cover of the place. The tree should have a caliper from 2.5 or 3.0 inches, and a height of approximately 7 feet.
6. (3) Years - The trees should have a caliper from 3 to 5 inches, with ramifications and an average height of 7.5 feet. The growth of the herbaceous plants will be maintained constant, that is to say, its height will be similar or equal to the previous year, for which will be more notable the growth of the stems or leaves.
7. (4) Years - The same as the previous year, the trees should have a caliper from 3 to 4 inches with 3 to 5 ramifications and have a height average of 8 feet. The growth of the herbaceous plants will be maintained constant and should have a range cover from an 80% of the area.

8. (5) Years - The plants should have a range cover of a 90% or more in the area and the trees should have reached an average height of 9-10 feet.

**** These standards are subject to change on account of extraordinary events out of our reach such as: hurricanes, floods or droughts, etc.**

X. MONITORING:

a. Delineated plan for the management and assessment of the mitigation area.

1. The monitoring process will be carried out every three (3) months for the first and second year; then every six (6) months for the third and annually for the fourth and fifth years. The purpose of this monitoring process is to:
    1. Verify the soil conditions to guarantee the growth of the species.
    2. Control of the harmful species.
    3. If an extraordinary event occur (hurricanes, floods, or droughts) an emergency inspection will be carry on to determinate the Action Plan and to remediate the event effects.
    4. Make the correspondence assessment to determinate the achievement of every one of the performance standards established and/or identify any remedial action to be considers to make possible the mitigation success. (SEE below)

b. Mitigation Success

1. The mitigation will be considered successful if in a period of five (5) years a 90% or more of cover it is achieved, to guarantee that the environment is one ecologically sustainable with values and functions that exceed the existing prior the creation of the mitigation area, providing a biodiversity in the area, with efficient aquatic habitat, to guarantee an adequate place for nesting, breeding and rest for the aquatic and terrestrial species.

MONITORING TIMING & SEQUENCE

c. The initial inspection will be carried out after 30 to 60 days of the planting process to submit to the Corps of Engineers a Compensatory Mitigation Post Construction Assessment. Such inspection is with the purpose to observe:

1. Presence of nuisance or exotic species
2. Health and vigor of planted species, including evidence of water stress
3. Physical disturbances of the site caused by humans, animals, or natural causes such as high water or wind.
4. Hardness
5. Possible plague that can affect the trees or the plants.
6. The loss of leaves in the trees that was caused by the transplant
7. If it is necessary, a remedial action will be taken applying chemical or organic plant food and establishment of pH of the soil.
8. If there is not an effective adaptation or does not have any growth after 3 months of sown, it will be replace the species by another type that can adapt better to the specific existing conditions in the area. (pH, hydrology).

NOTE: When sows are seen to be affected by a plague, but this does not cause the death of the plant, no action will be taken, since these contribute in the alimentary chain. In the case that the death occurs, (degradation), a product will be utilized approved by EPA for special aquatics areas. ***Under no concept will be able to utilize biological controls.***

9. Provide a summary of the original mitigations goals and objectives, and a discussion of the level of attainment of these goals.
10. Provide a summary of the results of a functions and values assessment of the mitigation site.
11. Provide As-built drawings including a survey preformed by a professional surveyor, showing the wetland boundaries, elevations, vegetation planted.
12. Provide photographs of the mitigation area

d. In the case of presence of harmful species, it will be initiated a control management as previously describe in Section VIII of this plan.

e. Monitoring Reports will due every six months for the first and second year; and annually for the third, forth and fifth year.

1. The monitoring inspections are with the purpose of observing and document all the parameters mentioned in point B of this section. Also in order to determinate the achievement of the performance standards mentioned in Section IX of this Mitigation Plan it will be carried out the following monitoring procedures:

ii. Design, mark and locate 10 M X 10 M quadrants in both of the mitigation and enhancement areas.

iii. The quadrant to be established should represent at least 5% of the total area of the mitigation and enhancement area.

iv. These quadrants will be used to gained technical data to be included in the monitoring reports.

v. Parameters to be observed: coverage percent; identify and quantify trees and estimate their height; identify noxious or exotic species; identify disease in plants; and identify any wildlife present at the mitigation area.

vi. Also to verify compliance with performance standards mentioned in section IX.

f. After the mitigation area has reached the five year of construction, it will be carried out a field inspection to identify not only the cover of the planted species but also identify the fauna species that uses the mitigation for nesting, reproduction, migratory and other uses. Also, it is recommended to make a simple water analysis after the 5 year to corroborate that in fact the wetland constructed serves as filter of nutrients or pollutants to help the water quality of the area. This determination can help the Agency in evaluate the functions of the wetlands and its guarantee that is in process to be an established area.

Monitoring reports will update the USACE on the status and progress of the mitigation. These will include discussion of any problems encountered and solutions undertaken, anticipated work or remedial activity, status of enhancement, plantings, status of nuisance and/or exotic species eradication and any other relevant information.

XI. CONTINGENCY PLAN AND LONG-TERM MANAGEMENT.

CONTINGENCY PLAN

a. The parties responsible to deal with any extraordinary event (hurricanes, floods or droughts) it have not been established. To ours knowledge the responsibilities go to the place owner until this is transmitted to a second or third party.

LONG-TERM MANAGEMENT

It is expected that when the mitigations areas reach the five year of maintenance and monitoring period the wetlands areas will be capable of performing its natural and ecological functions to sustained by its own. Also as part of the construction procedures the areas will be designed that from the beginning only natural process are carried out in the wetland to be constructed and enhanced. At the moment no structure are being proposed to maintain the hydrology of these areas since both of the mitigations and enhancement areas are adjacent to existing water bodies that at the present is providing the hydrology to the wetlands present at the site.

XII. ADAPTIVE MANAGEMENT PLAN

a. If in the mitigation area occur some damage, occasionally by extraordinary events (hurricanes, floods or droughts), the affected area will be inspected immediately, whenever the time conditions permits it. After thirty days (30) it will be determined the damages by erosion, sedimentation, or any another effect. After repairing these damages, it will be determined the quantities of affected plants and trees to begin the planting process.

b. During the construction of the mitigation area it will place any sedimentation and/or erosion control (silt fence) to avoid any material gain access to the wetland area. These controls will be removed when all the slopes or transitory areas are established with grass to guarantee that when rain events occur the slopes will remain and no erosion will affect the mitigation.

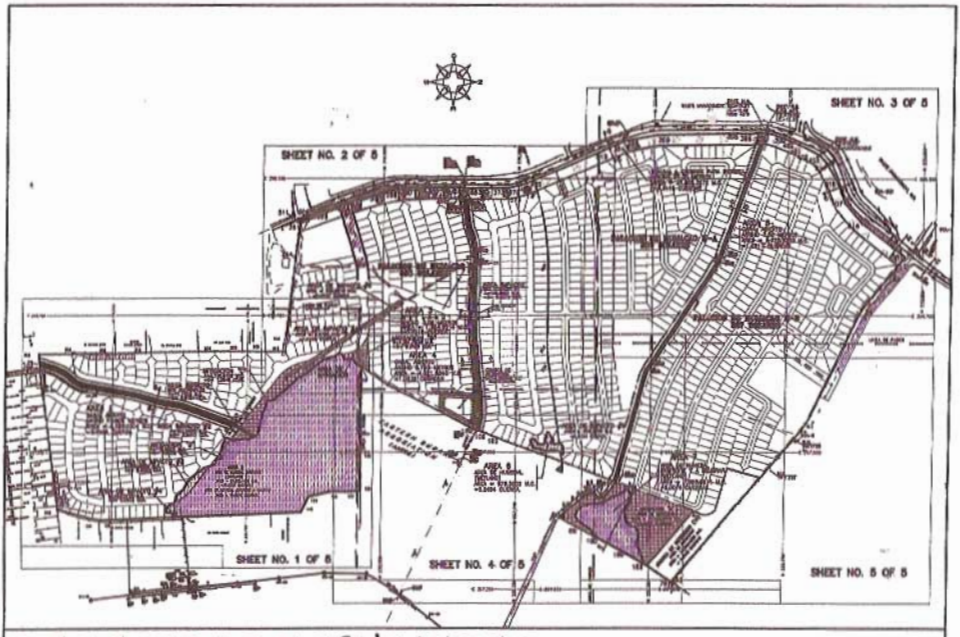
XIII. FINANCIAL GUARANTEES

a. The permittee (VRM Enterprises) is the party responsible for providing and managing any financial assurances and contingency funds set aside for remedial measures to ensure the mitigation success.

This Mitigation Plan has been prepared to comply with the Guidelines 404 (b) (1), of the 404 Permit Applications to the United States Corps of Engineer, under the Clean Water Act, in accordance with the New Mitigation Rule of June 2008.

ENCLOSE # 1

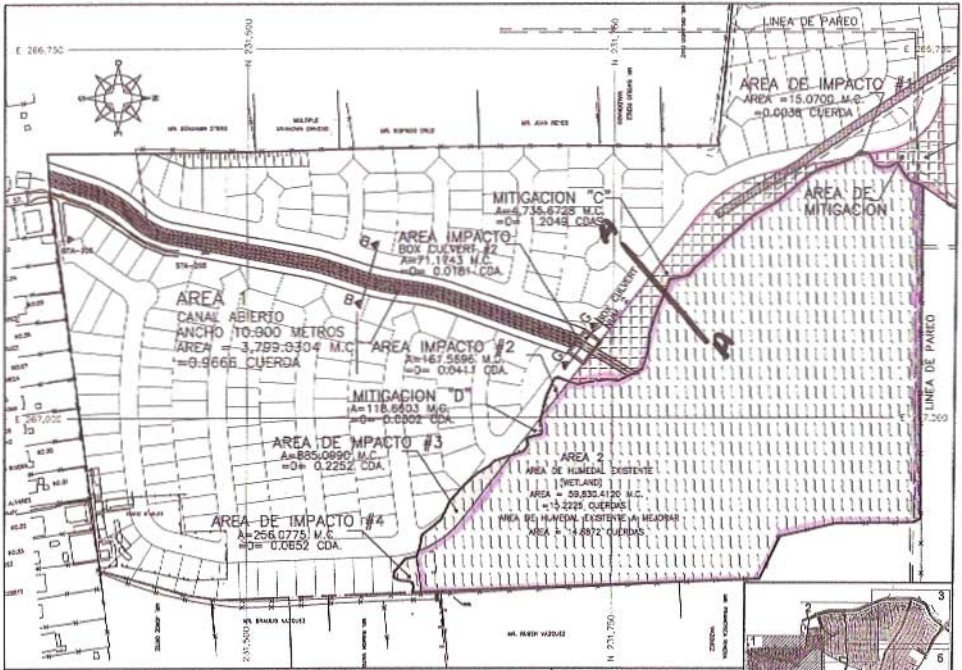
MITIGATION LOCATION MAP



PALACIOS DE HUMACAO

KEY PLAN

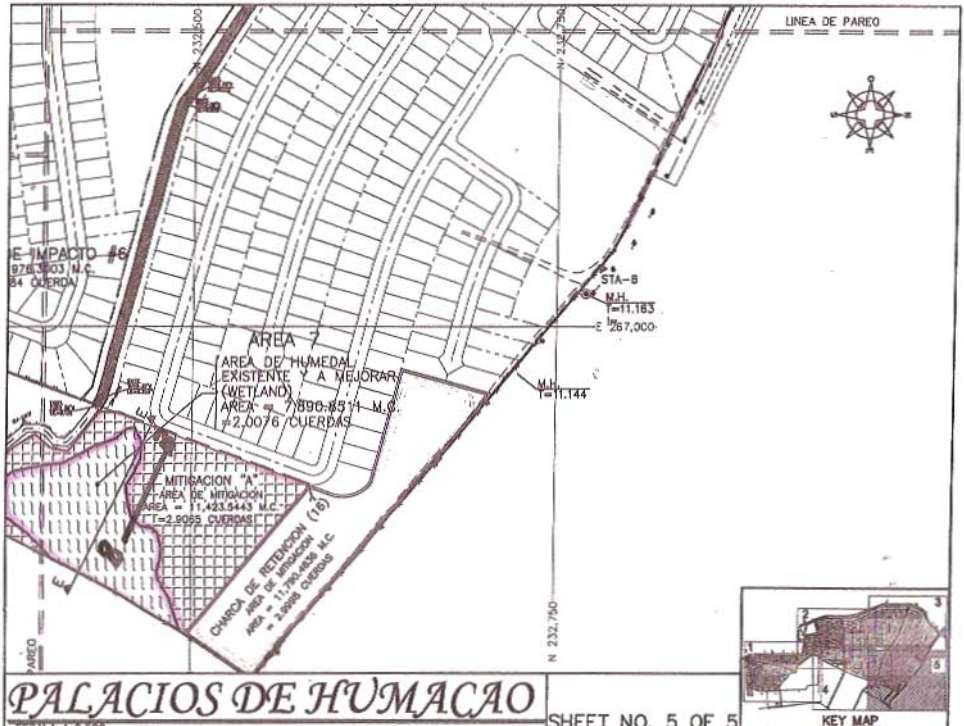
REDISEÑO DEL PROYECTO



PALACIOS DE HUMACAO

ESCALA 1:2,500

SHEET NO. 1 OF 5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N 232,750
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84 CUERDAS
STA-8
M.H.
I=11.183
E 267,000
M.H.
I=11.144
AREA 7
AREA DE HUMEDAL
EXISTENTE Y A MEJORAR
(WETLAND)
AREA = 7,890.8511 M.C.
=2.0076 CUERDAS
MITIGACION "A"
AREA DE MITIGACION
AREA = 11,423.9443 M.C.
=2.9055 CUERDAS
CHARCA DE RETENCION (16)
AREA DE MITIGACION
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= 2.9998 CUERDAS
PAREO
PALACIOS DE HUMACAO
ESCALA 1:2,500
SHEET NO. 5 OF 5
KEY MAP

ANEJO 5

C O N S U L T I N G A R C H A E O L O G I S T

ANTONIO DAUBON VIDAL
1702 CUERNAVACA ST.
VENUS GARDENS,
RIO PIEDRAS, PUERTO RICO
00926
(787-755-3774)
(CEL 787-316-2135)

FASE IA-IB

ESTUDIO RECURSOS CULTURALES

PROYECTO

PALACIOS DE HUMACAO

CARRETERA ESTATAL P.R. 923 Km. 2.5
Bo. Buena Vista
Humacao, Puerto Rico

SOMETIDO A

EMPRESAS VRM
BOX 20808
San Juan, Puerto Rico
00928-0868

INVESTIGADOR PRINCIPAL

7 de octubre de 2007

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INTRODUCCION

El presente estudio arqueológico para el proyecto **Palacios de Humacao** en Humacao, (fases IA-IB), fue realizado en el Archivo General de San Juan, la oficina de Monumentos Históricos del Instituto de Cultura Puertorriqueña; la Oficina del Consejo de Arqueología Terrestre adscrita al Instituto de Cultura Puertorriqueña, la Biblioteca de la Universidad de Puerto Rico, Sección de Manuscritos y Documentos, y la oficina de Fotogrametría Aérea de la Junta de Planificación de Puerto Rico.

Dicho estudio fuédiseñado de forma que cumpliera con las regulaciones existentes del Departamento del Interior de los Estados Unidos tales como el "Archaeological Resources Protection Act.-16-U.S.C-470", el Protection of Historic and Cultural Properties 36 CFR Part 800, y con la LEY NUM 112 del Estado Libre Asociado de Puerto Rico, referente a la PROTECCION Y CONSERVACION DE LOS RECURSOS ARQUEOLOGICOS TERRESTRES EN PUERTO RICO.

La fase IB del presente estudio tiene como propósito el detectar sobre y bajo la superficie del proyecto **Palacios de Humacao,** la presencia o ausencia de cualquier tipo de material histórico o prehistórico de naturaleza indígena o colonial.

El proyecto **Palacios de Humacao** está localizado en el barrio Buena Vista del municipio de Humacao. **(ver Figura 1.01,y hoja 1/1 para Desarrollo Conceptual del proyecto y foto GOOGLE para ubicación área proyecto con el pueblo de Humacao).**

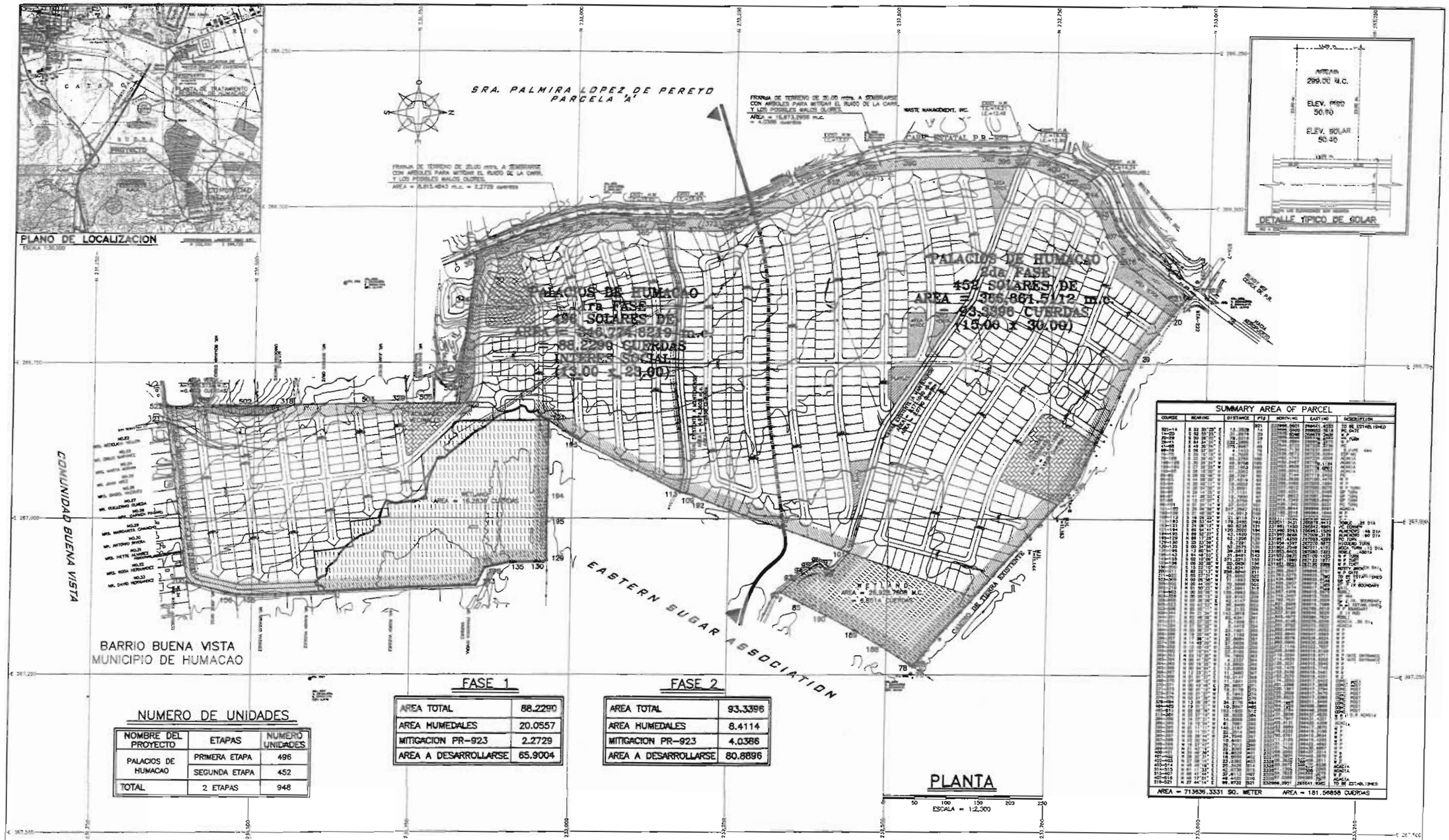
Dentro del área del proyecto **Palacios de Humacao,** no se localizó ninguna estructura histórica o residuo arqueológico listado en el Registro Nacional de Lugares

Santa Teresa
ANTIGUA VIA DEL FERROCARRIL
Aeropuerto de Humacao
Cataño
Humacao
AREA PROYECTO
Mayo
E N A V I S T A
Miraflores
Río Humacao
RIO ABAJO
Buena Vista
Escuela Segunda Unidad Luciano Rios
Morro de Humacao
VABM 12.1
Cayo Batata
B U E N A V I S T A
ASOCIA
ESTER
LUGAR
A B A J O
Punta Candelero

FIGURA 1.01

Santa Teresa
ANTIGUA
VIA DEL FERROCARRIL
Aeropuerto de Humacao
Cataño
Humacao
AREA PROYECTO
Mayo
E N A V I S T A
Miraflores
Río Humacao
RIO ABAJO
Buena Vista
Escuela Segunda Unidad Luciano Rios
Morro de Humacao
VABM 12.19
Cayo Batata
B U E N A V I S T A
SUGAR
A B A J O
Punta Candelero

FIGURA 1.01



NUMERO DE UNIDADES

NOMBRE DEL PROYECTO	ETAPAS	NUMERO UNIDADES
PALACIOS DE HUMACAO	PRIMERA ETAPA	496
	SEGUNDA ETAPA	452
TOTAL	2 ETAPAS	948

FASE 1

AREA TOTAL	88.2290
AREA HUMEDALES	20.0557
MITIGACION PR-923	2.2729
AREA A DESARROLLARSE	65.9004

FASE 2

AREA TOTAL	93.3396
AREA HUMEDALES	8.4114
MITIGACION PR-923	4.0386
AREA A DESARROLLARSE	80.8896

DIBUJADO POR: R.R.L.	REVISIONS	DATE
CORREGIDO POR: J.A.M.		

DE DIEGO AVE. #117
SAN FRANCISCO DEV.
SAN JUAN, PR 00927

PROYECTO: PALACIOS DE HUMACAO (1ra. y 2da FASES)

DUEÑO:

TITULO DE HOJA: ESQUEMA CONCEPTUAL

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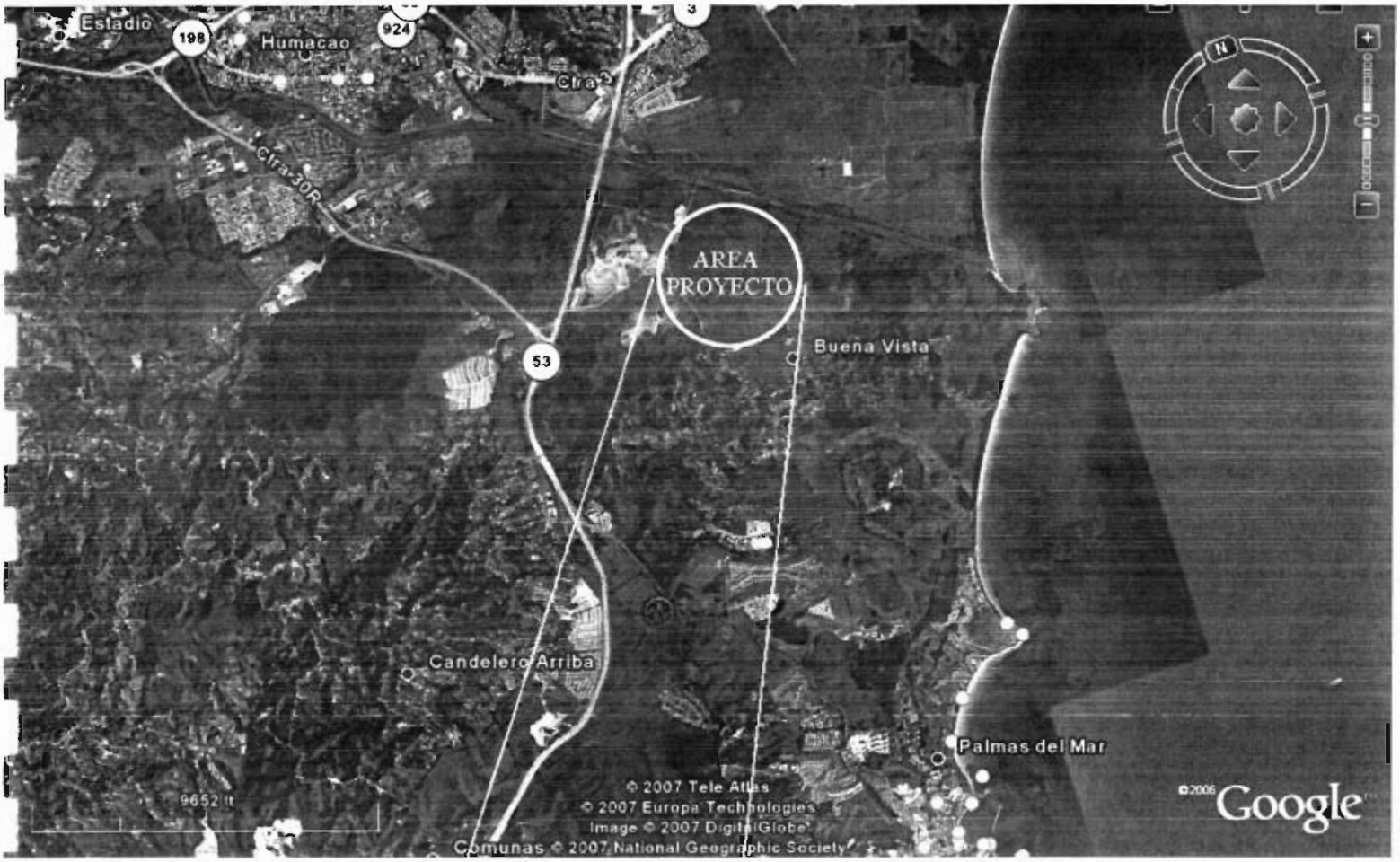
NUMERO HOJA	1
TOTAL DE HOJAS	1


Estadio
198
Humacao
924
3
Ctra 2
Ctra 30R
AREA PROYECTO
Buena Vista
53
Candelero Arriba
Palmas del Mar
9652 ft
© 2007 Tele Atlas
© 2007 Europa Technologies
Image © 2007 DigitalGlobe
Comunas © 2007 National Geographic Society
Google

Puerto Rico 53
AREA PROYECTO
Ctra 923
Buena Vista
Camino El Mangual
Calle 8
Calle 4
Calle 3
923
Camino Los Jaime
2629 ft
© 2007 Tele Atlas
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Google

Históricos según los Archivos de la Oficina de Preservación Historica Estatal de San Juan o el Instituto de Cultura Puertorriqueña.

El municipio de Humacao está localizado en la latitud N18:09':10"; Longitud W65:51:40", en los llanos costeros del Este de la isla de Puerto Rico. El pueblo de Humacao colinda con el municipio de Naguabo por el norte; Yabucoa por el sur; el Mar Caribe por el este y San Lorenzo por el oeste.

El municipio está constituido por el barrio urbano del Pueblo y los barrios rurales de Antón Ruíz, Buena Vista, Candelero Abajo, Candelero Arriba, Cataño, Mabu y Tejas. El Censo de los Estados Unidos de 2000 reportó una población total de 46,8346 personas distribuidas sobre una superficie de 44.8 millas cuadradas.

Para propósito del presente estudio arqueológico se han establecido dos áreas Sensitivas de estudio.

1. Area de Estudio de Literatura: Barrio Buena Vista.
2. Area de Impacto: Estructuras o recursos culturales localizados dentro del área del proyecto.

Un área de Estudio de Literatura se considera como aquella área de planificación inmediata del proyecto de construcción siendo en este caso el área del barrio Buena Vista, y sus recursos culturales existentes dentro del perimetro del barrio.

Un área de Impacto es aquella área de desarrollo inmediato de construcción, en este caso las **181.5** cuerdas del proyecto y las cuales podrían revelar la existencia de posibles recursos culturales dentro del desarrollo del proyecto.

El propósito y producto final del siguiente estudio arqueológico Fase IA es recopilar información histórica de modo que nos ayude a reconstruir el trasfondo histórico y prehistórico del municipio de Humacao en relación al proyecto Palacios de Humacao y como este proyecto podría afectar a los mismos.

DESCRIPCION DEL PROYECTO PALACIOS DE HUMACAO

La Empresa VRM tiene propuesto bajo consulta de ubicación en la Junta de Planificación un proyecto para la construcción de 948 unidades de vivienda en solares que varían de 250 m2 hasta 600 m2 en una finca de 181.5 cuerdas situada en el Barrio Buena Vista del Municipio de Humacao.

Dicha finca colinda por el norte con terrenos de la Sucesión Roig; por el sur con terrenos de Basilio Pérez Maldonado y varios solares de la Comunidad Buena Vista; por el este con terrenos de la Eastern Sugar Corp, y solares de Basilia Rivera, Ruben Vázquez, Ramón Vázquez, Braulio Vázquez y Jorge Ortíz; por el oeste con la carretera P.R. 923 y solares de Basilio Pérez Maldonado, Juan Reyes, Sigrego Cruz y Benjamín Otero.

La primera fase en la porción sur del proyecto constará de 496 unidades de interes social en solares de 250 m2 que ocuparán 88.22 cuerdas de la finca y la segunda fase tendra 452 unidades en solares básicos de 450 m2 en la porción norte de la finca en una parcela de 93.33 cuerdas. En el proyecto se reservan como humedales 28.46 cuerdas y para mitigación a lo largo de la carretera P.R. 923 un área de 6.30 cuerdas.

TRASFONDO HISTORICO DE HUMACAO

Humacao, ciudad en el sudeste de Puerto Rico que tomó su nombre del Casique

Macáo, quien con el con el casique Daguao fueron los últimos en resistir, en la parte oriental de la isla, a los españoles.

Para fines del siglo 17, el territorio eclesiastico del Valle de Caguas comprendía una sola iglesia, la del Piñal, y cuatro ermitas: la de San Sebastian del Barrero, la de La Concepción del Hato Grande de Las Piedras; la de San Miguel de Hato Grande, y la del Dulce Nombre en la Ribera de Jumacao,(Humacao).

Cuando Fray Iñigo Abbad visitó el este de la Isla (1776), describio a Humacao de la siguiente manera: "en la ribera del río Jumacao a una legua distante del mar, esta la iglesia de Jumacao, que es de ayuda de parroquia, junto a la cual se ven ruinas de un pueblo, que quizas demolierón los Caribes o los piratas".

El corto numero de vecinos de esta parroquia poseía todo el territorio que mediaba desde Fajardo hasta Guayama. Esta aldea de Jumacao fué aumentando en población y en importancia y para el 1790 se solicita su segregación de Las Piedras.

La declaración de pueblo y fundación de la parróquia independientemente, se llevo a cabo en diciembre de 1793. El 7 de septiembre de 1881 se le concede a Humacao el titulo de Villa, y el 23 de enero de 1894, el titulo de Ciudad.

Segun las estadisticas realizadas por Fray Iñigo Abbad al villorio de "Jumacao" en 1776, este generó el siguiente censo poblacional.

	Hombres	Mujeres	Niños	Niñas
Blancos	105	87	198	193
Pardos	142	115	225	239

Negros libres	7	4	12	12
Agregadas	141	116	---	---
Esclavos	27	100	---	---

Don Pedro Tomas de Cordova, Secretario del Gobierno Español en la Isla,(1823), visitó el pueblo de Humacao para la décadade 1820, y en su "Memoria", lo describió de la siguiente manera: "Este pueblo esta situado en la costa este de la Isla, a una legua distante de la costa. Se fundó en 1793, aunque algunos le dan la antiguedad de 50 años.

Corren por la jurisdicción los ríos de Humacao o Candelero, y el de Antón Ruíz, que desagua al mar y las quebradas Mulas, Ranchos Viejos, la Zanja, Buena Vista, Obispo, Palmarejo, Guanabanal, Collores, Cataño, Mariana e Iglesias, todas permanentes y cuyas aguas descargan en los referidos ríos.

En 1824 tenía de población 4,673 almas, y en 1828 llego el censo a 4,713, de ellas 1,738 blancos, 1,695 pardos, 350 morenos, 515 agregados, y 415 esclavos. Varones 2,432 y hembras 2,281.

En 1830 nacierón 302, murierón 186 y hubo 28 matrimonios; 2 ahogados, 2 heridos y 1 temblor. Entre los vecinos había 49 artesanos, 119 emigrados, 39 extrangeros, 2 medicos y 1 interprete. Una escuela, 145 casas y 26 bohíos en el pueblo; 148 casas y 150 bohíos en el campo; y 27 tiendas y 20 ventorrillos.

La estadistica formada en 1828 presentó el siguiente cuadro: 35 trapiches de madera, 6 de hierro, 9 alambiques, 148 cuerdas de caña, 210 id. de platanos, 178 id. de arróz, 142 id. de maíz, 12 id. de tabaco, 11 id. de yuca y 72 id. de batatas.

Para finales del 19, (1878) Humacao se había convertido en un pueblo próspero y de gran importancia. Esto se debió en gran medida al puerto habilitado para el comercio general de importación y exportación.Era ademas cabecéra de los departamentos civil y militar y del distrito judicial de su nombre.

Cuenta este territorio con 13,407 almas (1878). El siguiente estado demuestra el numero de casas, bohíos, familias, escuelas y establecimientos comerciales de cada barrio.

BARRIO	CASAS	BOHIOS	FAMILIAS	ESCUELAS	VENTORRILLOS
MABU	38	99	137	--	--
COLLORES	62	100	162	1	--
MAMBICHE	58	98	156	--	--
ANTON RUIZ	100	217	317	--	2
PLAYA	63	100	163	1	4
RIO ABAJO	100	156	256	--	5
BUENA VISTA	101	211	312	--	1
CATAÑO	35	99	134	--	2
CANDELERO A.	37	63	100	1	3
CANDELARO AR	63	102	165	--	3
MARIANA	135	200	335	--	4
TEJAS	40	100	140	1	1

(FUENTE: M. Uberda y Delgado p268).

Se cultiva la caña de azucar, de que existen diez haciendas con maquina de vapor y cuatro con trapiches de bueyes, poca cantidad de café y frutos menores.

Hay en el pueblo una escuela superior y una particular de varones, una completa y una particular de niñas. Existen en el mismo los siguientes establecimientos comerciales: cinco bodegones, tres boticas, seís mercerías y treinta y una pulperías.

Cuenta una hermosa plaza, que es una de los mejores de la Isla, once calles (las principales Santa Rosa y Rosario), una travesía y los edificios públicos siguientes:

Iglesia: Disputa el primer lugar entre las de la Isla, se terminó en 1877, e importó 48,000 pesos; el altar mayor es elegantisimo, todo de marmol, y costo unos 5,000. Seis altares, que hay ademas, son todos ricos y de mucho gusto, asi como los ornamentos.

Cementerio: De mampostería; no existen antecedentes ni se recuerda la fecha de su fundación. Es un cuadrado de 42 metros, y tiene 30 mausoleos y 50 panteones de familia; habiendose ensanchado despues.

Consorcio y Carcel: Se termino su construcción en 1849 e importó 26,470 pesos, es de mampostería, de dos cuerpos, el anterior de dos pisos y el posterior de uno. Este edificio esta ocupado por las oficinas del Ayuntamiento, juzgado de paz, carcel y cuerpo de guardia de la misma.

Casa cuartel: Hermoso edificio de mampostería, de un solo piso, ocupado en su mitad por el destacamento de infanteria y el resto por el puesto de orden público y escuela elemental de varones, fue construido en 1882 e importó 30,000 pesos.

Hospital de San Vicente de Paul: Fabricado en 1867 e importó 5,600 pesos: es de mampostería, de un solo piso, con dos salones de doce metros de longitud por seis de ancho, colocados a derecha e izquierda de la entrada y que estan destinados uno para hombres y otro para mujeres: tiene ademas habitación de conserje, cocina y dependencias consiguientes.

Hospital de variólogos: De madera, medio alto, en buen estado y con local para 24

enfermos.

Teatro: De madera, mide 25 metros de frente por 15 de fondo.

Carnicería: Fué construida en 1866, importo 5,000 pesos, es de mampostería y se encuentrta en buen estado.

Matadero: De madera, en estado regular.

Cuartel de Guardia Civil: Ocupa una casa de propiedad particular en la calle de la Carrera.

Las vías de comunicación de este pueblo son: la carretera de primer orden, en plan, a Naguabo (unos 10 kilometros);el camino vecinal de carros a Yabucoa (14 kilometros), y la carretera a Piedras de 6 kilometros próximamente. Este pueblo sufrio extraordinariamente en el huracán de 1825. (Ubeda y Delgado p270-271).

EL CATASTRO DE FINCAS RUSTICAS DE HUMACAO

Antes que se estableciera el Registro de la Propiedad en Puerto Rico, existían los llamados Catastros de Fincas Rusticas y Urbanas, donde se registraban tanto las propiedades rusticas como las urbanas. En el renglón de las "rusticas" encontramos todas las fincas fuera del nucleo urbano del pueblo, mientras que las urbanas listaban las estructuras propiamente del casco del pueblo, que incluian los edificios de la municipalidad, la iglesia, y casas de particulares.

La data histórica que nos proporcionán los Catastros de Fincas Rusticas de Humacao, año 1890, clarifican y depúran aún más la data histórica en cuanto al poblamiento colonial de Humacao y en particular el del barrio Buena Vista.. De la data anterior pudimos observar que para 1890, en el barrio Buena Vista existían 39 casas y

237 bohíos . Cada una de estas estructuras hay que considerarlas como pequeños "focos" donde se generan recursos culturales, cada uno con sus respectivos "basureros".

Principalmente, la investigación histórica levantada de los "Catastros", estuvo dirigida hacia el barrio **Buena Vista** , donde se deseaba identificar la habitación humana colonial distribuida dentro del barrio y que pudiesen arrojar alguna luz sobre los propietarios de la fincas y el tipo de estructura que allí existí a, si alguna. En otras palabras, los recursos culturales existentes dentro del perimetro del barrio.

No solo los Catastros de Fincas Rusticas nos ofrecen el nombre del propietario de ésta, sino tambien, el numero de cuerdas que ésteposée, el tipo de cultivo, y si existe o no una estructura dentro de la finca, descrita esta como una casa, bohío o rancho. A continuación la data histórica levantada del Catastro de Fincas Rusticas de Humacao , #143. (A.G.P.R.).

CATASTRO DE FINCAS RUSTICAS DE HUMACAO-BARRIO BUENA VISTA

FOLIO	TOTAL DE CUERDAS	CLASE DE CULTIVO	PROPIETARIO	OBSERVACIONES
24	24	frutos menores	Dolores Wolkiers	2 bohios
126	3	pastos	Blas Cruz	------
153	3/4	frutos menores/pasto	Julian Cruz Tirado	------
154	2	frutos menores/pasto	D. Jose Cuadras	------
155	1 ½	pastos	Julian Castro	------
156	96	frutos menores/pasto	Jesus Carrasquillo	------
157	3 3/4	frutos menores/pastos	Roque Carrasquillo	——
158	1	pastos	Estela Castro	------
159	2 ½	pastos	Mascimo Castro	------
160	6	frutos menores/pasto	Juana Castro	------
161	2 ½	pastos	Leocadio Cruz	------
231	2	frutos menores/pastos	Julia Diaz	------
232	1 ½	frutos menores/pastos	Miguel Diaz	1 bohio
233	5	frutos menores/pasto	Juan Diaz	------
234	8	pastos	Pedro Davila	1 bohio

235	2 3/4	frutos menores/pasto	Felipe Diaz	------
236	10	frutos menores/pasto	Domingo Diaz	------
237	1 ½	frutos menores/pasto	Ramon Diaz	------
238	1	pastos	Maria Diaz	1 bohio
265	4	frutos menores/pasto	Eleuterio Felix	------
309	143	pastos	Jose A. Guzman	------
318	32	pastos/otros	Amalia G. De la Torre	------
319	132	frutos menores/pasto	Suc. Domingo Guzman	3 bohios
320	2	frutos menores/pasto	Andrea Gonzalez	------
321	2	pastos	Carmen Gonzales	1 bohio
322	1 1/4	pastos	Monica Garcia	------
323	18	frutos menores/pasto	Inocencio Guzman	------
324	1	pastos	Candido Guevara	1 bohio
325	3/4	pastos	Julian Generi	------
326	7	frutos menores/pasto	Tomas Gonzalez	------
327	2	pastos	Maria C. Gonzalez	1 bohio
362	4	25 palmas de coco	Juan Domingo de Jesus	------
363	4	frutos menores/pasto	Lorenzo Torres	------
364	1	frutos menores/pasto	Nicolasa Torres	------
401	130	pastos	Pedro R, Lopez	1 rancho
403	65	pastos	Pedro R. Lopez	------
408	3	frutos menores/pasto	Victoriano Lopez	------
409	50	frutos menores/pasto	Victoriano Lopez	------
410	3/4	pastos	Leocadio Lopez	------
411	2 ½	frutos menores/pasto	Manuel Lopez	------
412	½	frutos menores/pasto	Toribio Lopez	------
413	2	frutos menores/pasto	Benedicto Lopez	------
414	1	frutos menores/pasto	Andres Lopez	------
415	1	frutos menores/pasto	Manuel Lozada	------
416	3 ½	frutos menores/pasto	Ocacio de Leon	------
417	4	frutos menores/pasto	Ceferina Liznaris	1 bohio
418	5	frutos menores/pasto	Juan Lopez	------
419	2	pastos	Carmen D. Lopez	------
423	12	caña/pastos	Amalia Rios	------
474	2 ½	frutos menores/pasto	Maria R. Monterosa	1 bohio
475	11 ½	caña/frutos menores	Juan Monterosas	------
476	21/2	frutos menores/pasto	Maria A. Muñoz	1 bohio
477	4 3/4	pastos	Climaco Monterosa	------
478	4 ½	frutos menores/pasto	Ysidro Monterosa	------
479	122	pastos	Maria Jose Morales	------
480	21	frutos menores/pasto	Gregorio Montañez	------
520	2 1/4	frutos menores/pasto	Sandalo Ortiz	------
548	3	frutos menores/pasto	Martinas Pou	------
575	½	frutos menores/pasto	Marcos Quinteros	------
576	2 3/4	frutos menores/pasto	Catalina Quinteros	------
577	10	frutos menores/pasto	Manuel Guillas	------
651	8 ½	frutos menores/pasto	Rosa R. Guadalupe	------
652	½	pastos	Felicita Roman	------
653	2 ½	frutos menores/pasto	Francisco Ruiz	------
654	7	frutos menores/pasto	Gabino Robledos	------
655	24 3/4	frutos menores/pasto	Justo Robledo	------

656	3 1/4	frutos menores/pasto	Alafont Rodriguez	------
657	1 ½	frutos menores/pasto	Jesus Rios	------
658	2	frutos menores/pasto	Bibiana Rivera	------
659	6	frutos menores/pasto	Geronimo Rivara	1 bohio
660	9	frutos menores/pasto	Maria Jose Rodriguez	------
661	2 1/4	frutos menores/pasto	Dorotea Rodriguez	------
662	1 ½	frutos menores/pasto	Inocencio Rios	------
663	5 ½	frutos menores/pasto	Manuel Rios	------
664	6	cañas	Casidos Rodriguez	------
665	20	pastos	Paula Rivera de Mas	------
668	11	pastos	Jose Rodriguez	------
762	1	pastos	Nicolas Sierra	1 bohio
763	2	frutos menores/pasto	Petrona de Santiago	------
764	2 ½	frutos menores/pasto	Maria V. Surillo	------
765	2	frutos menores/pasto	Tomas Santana	------
766	18	frutos menores/pasto	Eduviges de Santiago	------
767	60	pastos	Vidal Sanchez	3 bohios
799	1 ½	frutos menores/pasto	Saturnino Tolentino	1 bohio
839	3	frutos menores/pasto	Paula Vazquez	------
840	8	frutos menores/pasto	Jose Vazquez	------
841	1 ½	frutos menores/pasto	Juan Vazquez	------
842	3/4	frutos menores/pasto	Juan Vazquez	------
843	1 ½	pastos	Felipa Vellon	1 bohio
844	4	frutos menores/pasto	Concepcion Villanueva	1 bohio
845	1 ½	pastos	Miguel Vellon	------
846	1 ½	pastos	Dionicia Vellon	------
847	1 ½	pastos	Juan Vazquez	------
848	30	frutos menores/pasto	Pablo Vellon	------
849	27	caña/frutos menores	Gregorio Vazquez	------
850	1 ½	pastos	Candida Vellon	------
851	45	pastos	Agustin Vazquez	2 casas
852	6 ½	pastos	Agustin Vazquez	1 casa
853	7 3/4	caña/pastos	Eladio Vazquez	------
854	29	frutos menores/pasto	Juana Valles	1 bohio
855	6 1/4	pastos	Alejandro Vazquez	------
865	900	caña/pastos frutos	Sres Latimer & Co.	Hacienda *
868	210	pastos	Avelina Rios	1 casa

FUENTE: Archivo General de Puerto Rico, Fondo Obras Publicas Catatro de Fincas Rusticas de Humacao # 143- 1890.

Del estudio efectuado al Catastro, se pudo constatar que se registrarón un total de 103 fincas rusticas, donde se listaron 5 fincas cultivando caña de azucar y el resto cultivaba frutos menores y pastos. Se registraron 4 casas, 27 bohí os, 1 rancho, y una Hacienda azucarera de nombre Buena Vista y Santo Olaya, propiedad de los Sres. Latimer

& Compañia. De las 900 cuerdas que poseía esta hacienda, solamente se sembraban de caña unas 50cuerdas. Entre los edificios existentes de la hacienda se registran una casa para maquinas, hornallas, pulgueros, 2 ranchos bagaceros, tonelerí a y 4 bohios.(folio 865).(ver hoja **CATASTRO FOLIO 865).**

Como se observa en el tamaño relativamente pequeño de las fincas, estas se podrí an catalogar principalmente del tipo de "subsistencia", y la gran cantidad de "pastos" cultivados y registrados nos indican la existencia del desarrollo de la posible ganadería sobre el barrio Buena Vista.

El numero reducido de estructuras habitacionales, eg, casas, bohíos ,ranchos, demuestran una deposición limitada de los recursos culturales tipo "basurero" que podríamos encontrar dentro del perimetro del barrio, y/o dentro de la finca bajo estrudio

DESARROLLOS TEORICOS DE LAS CULTURAS ABORIGENES EN PUERTO RICO

Los desarrollos teóricos de las culturas aborígenes en Puerto Rico han sido ampliamente documentados y modificados por Chanlatte y Narganes en su publicación sobre el "Proceso y Desarrollo de los Primeros Pobladores de Puerto Rico y las Antillas.

Según Chanlatte y Narganes (1986), en los comienzos de la décadade los cuarenta, el Dr. Irving Rouse, antropólogo de la Universidad de Yale, confecciona un esquema de tiempo y espacio para explicar, según su criterio, los diferentes desarrollos aborigenes antillanos, basándose en la tipología cerámica de los primeros pobladores insulares. Con

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Clase de la finca.	Su nombre.	Barrio en que radica.	CLASE DE CULTIVO.	CABIDA TOTAL. En cuerdas.	CABIDA TOTAL. En hectáreas.	LINDEROS.	NOMBRE DEL PROPIETARIO Ó POSEEDOR.
Secano	Bna Vista	Buena	Caña	50	20'39'99	Por el Norte con Gregorio Martinez, Gregorio Vazquez, Roque Carrillo, Nicolas Mena, Isidro Robledo, Eleuterio Sosta, y Juan Gendy, camino real que la separa de Sra Catalina Miranda y Sra Santos y por el Oeste con la Sra Santos y D. Indalecio Lopez D. Pedro R. Lopez, D. José A. Guzman, Sra Clotilde Ricardo y D. Juan Padillas por el Sur con el mar y Santos Cofresí y por el Este con el mar.	Sres Latimer y Cia en dacion
	Sta Playa	Vista	Frutas menores	10	4'07'97		
			Otros cultivos	15	6'11'95		
			Pastos	500	203'98'94		
			Otros aprovechamientos	25	10'19'93		
			Terrenos baldios	300	122'39'36		
				900	367'78'04		

TRASLACIONES POSTERIORES DE DOMINIO DE ESTA FINCA

Dia.	Mes.	Año.	CLASE DEL ACTO Ó CONTRATO.	NOTARIO QUE LO AUTORIZA.	NOMBRE DEL ADQUIRENTE.

autoridad el Dr. Froelich Rainey, de la misma universidad, propúso una clasificación apoyada en las diferencias dietéticas, observadas en los grupos aborigenes que el estudió en depósitos residuales del Bo. Canas, Ponce; en Coto, Isabela y en Monserrate, Luquillo. Al que considero más antiguo, por hallarse en los estratos inferiores con cerámica pintada y muchas evidencias de restos de "jueyes", los denominó "cultura del cangrejo" y a la más tardía, una cerámica incisa, por la abundante presencia de caracoles marinos y riberenos, le llamó "cultura de la concha".

El Dr. Rouse presenta en su esquema dos grandes etapas culturales: una arcaica y otra agrícola-alfarera, representada por los Igneris o Saladoides, la cual subdivide en cuatro períodos y varios estilos cerámicos. Rouse considera que de esa única migración agroalfarera, procedente de Saladero en el Bajo Orinoco, Venezuela se produce una evolución unilinial, que da origen a los posteriores desarrollos culturales ostiones y taínos. (Chanlatte/Narganes 1986.)

Durante casi cuarenta años, este esquema fue la base fundamental para todas las investigaciones arqueológicas antillanas. Hasta que en el 1981 los arqueólogos del Centro de Investigaciones arqueológicas de la Universidad de Puerto Rico, comienzan a postular nuevos esquemas culturales, como resultado de sus programas investigativos, sustentando con evidencias arqueológicas, la presencia en Las Antillas de dos migraciones agroalfareras y varios desarrollos locales.

Los esquemas introducidos por los arqueólogos del Centro de Investigaciones Arqueológicas, presentan como población inicial antillana, una migración arcaica cuya

procedencia aun es una incógnita, seguida por dos agroalfareras a las que denominan AGRO-I o Complejo Cultural La Hueca y AGRO-II o Igneri (saladoide). (Chanlatte/Narganes 1986).

Estos esquemas teóricos también contemplan la transformación cultural de los arcaicos en agroalfareros, o AGRO-III, etapa del período ceramoagrícola donde se producen los primeros desarrollos locales antillanos (ostionoides, elenoides, maillacoides y otros) mediante la constante interrelación con los dos primeros pobladores agroalfareros. Otros investigadores como el Dr. Ricardo Alegría, consideran que los ostionoides o AGRO-III, son el resultado de una migración suramericana posterior a los igneris. (Chanlatte/Narganes)

En su etapa tardía de desarrollo, los AGRO-I forman parte de lo que hoy conocemos como fase taína o AGRO-IV, conjuntamente con las etapas más tardías de los grupos AGRO-III.

Del desarrollo posterior de los AGRO-II no hay evidencias arqueológicas muy claras, lo que hace suponer que posiblemente se diluyeron en el tiempo o fueron absorbidos culturalmente, en el suroeste y el oeste de Puerto Rico y en el este de la República Dominicana, como una consecuencia de la explosión demoráfica AGRO-III en estas áreas.

PERIODO ARCAICO

Los primeros pobladores de las Antillas, cuyo origen aún se desconoce con certeza, aparecen alrededor del año 5,500 al 3,190 antes de Cristo en Cuba, y 2,600 al

2,000 antes de Cristo en la República Dominicana. En Puerto Rico se han descubierto depósitos con materiales arqueológicos arcaicos, en Cayo Cofresi, Salinas, 325 antes de Cristo y en la Cueva María de la Cruz, Lioza, 30 años después de Cristo. (Chanlatte/Narganes).

Según las ultimas investigaciones arqueológicas en Puerto Rico relacionadas con este Periodo Arcaico, han demostrado la presencia de este grupo aborigen tan temprano como 4,010 años antes de Cristo en Angostura, Barceloneta, en Puerto Rico Ferro, Vieques, con una antiguedad de 1,060 años antes de Cristo.

Algunos estudios señalan que el poblamiento arcaico antillano procede de América del Sur, usando la ruta de las Antillas Menores, mientras que otros sostienen que llegaron de Centro o de Norte América, via Yucatan o Florida.

Estos aborigenes, a veces llamados preceramicos, mesoindios, ciboneyes y guanahabateyes, vivían en pequeños grupos familiares organizados en bandas seminómadas y probablemente, en algunos casos, relativamente sedentarios. Las evidencias arqeológicas obtenidas en los depósitos residuales arcaicos (concheros) señalan que utilizaron intensamente los recursos naturales costeros, particularmente las áreas de manglares por su rica fauna. La economía estaba basada en la pesca, recolección y caza. La explotación de estos recursos naturales, probablemente fue cíclico o de temporada y estación. En las áreas o zonas de mayor riqueza en fuentes alimenticias, fáciles de obtener, estas bandas pudieron haberse sedentarizado. (Chanlatte/Narganes 1986).

El posible origen de la cultura huecoide (AGRO-I) se traza desde los Andes

suramericano, considerándose como puntos de procedencia dos yacimientos de gran antiguedad: tutishcaino (2000-16000 antes de Cristo) que se encuentra en las estribaciones orientales de los Andes específicamente en Bolivia y Puerto Hormigas (3000 a 2500 antes de Cristo) que está localizado en la costa norte de Colombia. (chanlatte/Narganes).

El yacimiento AGRO-I más representativo del desarrollo cultural huecoide, fue descubierto en el suroeste de la isla de Vieques, en terrenos de la finca Sorce, Bo. La Hueca. Su cronología es de 5 a 1540 después de Cristo (Chanlatte/Narganes). Recientemente se ha descubierto otro yacimiento huecoide en Punta Candelero, Humacao trabajado por Rodríguez con una cronología que se extiende desde el año 170 antes de Cristo al 245 después de Cristo (Rouse/Alegría p57, 1990).

Los establecimientos poblacionales AGRO-I, se localizan cercanos a ríos y relativamente próximos a la costa. En Vieques la aldea huecoide está compuesta por siete depósitos residuales de viviendas, distribuidas en un semicírculo con la abertura del arco en dirección al río Urbano, que circunda el area arqueológica de Sorce y la Hueca.

LOS AGRO II

(Saladoides-Igneris)

La tradición cultural saladoide se origina en el Río Orinoco, de Venezuela. Se considera a Saladero, localidad ubicada en el Bajo Orinoco, como el yacimiento cabecero con fechas radio-carbónicas de 1,050 antes de Cristo a 350 después de Cristo. Actualmente se halla en revisión. Otros yacimientos importantes de tradición saladoide se encuentran en las ribieras del Medio Orinoco, estos son: Ronquín con 355 D>C. y

la Gruta con 2,000 A.C. y 655 D.C. En la costa oriental de Venezuela se encuentran otros yacimientos saladoides, tales como El Mayal con 100 D.C., entre otros (Chanlatte/Narganses).

Los depósitos residuales AGRO II en la isla de Vieques, Puerto Rico, se han localizado tanto en el area sur, como en el noroeste. El yacimiento de más relevancia en esta isla se conoce como Sorcé y tiene fechas radiocarbónicas de 35 D.C. a 835 D.C.

En la isla de Puerto Rico los asentamientos AGRO II usualmente se localizan en la zona sur y noroeste. Entre los más destacados se encuentran Tecla, Guayanilla con 1 D.C. a 540 D.C.; Hacienda Grande, Loiza con 120 D.C. y Canas, Ponce (sin fecha).

La economía es de subsistencia, basada principalmente en la agricultura de la Yuca amarga, donde probablemente se utilizarían otros tubérculosy posiblemente el maíz.

LOS AGRO III

(Sub-Tainos, ostiones y otros)

Los asentamientos poblacionales antillanos identificados como AGRO III, representan los desarrollos culturales locales. Esto es: las poblaciones arcaicas existentes en las islas, no desaparecieron cuando estas fueron ocupadas por los primeros grupos Agroalfareros procedentes de Suramérica (Chanlatte/Narganes).

A medida que las poblaciones arcaicas establecen contacto con los grupos agroalfareros, se inicia un lento proceso de interrelación posiblemente de orden socioeconómico, mediante el cual los arcaicos adoptan algunas características de los patrones culturales que identifican a los nuevos habitantes.

Inicialmente y en términos generales, la dieta Agro III estuvo basada en la recolección de moluscos, la pesca y en menor grado la caza, complementada por raíces, frutos, vegetales, recolección de semillas y la incipiente producción agrícola, recién incorporada a los medios de subsistencia arcaica (Chanlatte/Narganes).

su instrumentalidad principal fue elaborada en concha y en piedra, condición de tradición arcaica que se mantiene inalterable. Luego todo el bagaje cultural restante; alfarería, adornos corporales, instrumentos de trabajo y otros, que los eleva al nivel de los pobladores de la primera etapa del periodo agroalfarero, pertenece a los Agro I y a los Agro II.

LOS AGRO-IV

(Fase Taína)

Los Taín os o Agro IV es la última y más avanzada de las culturas aborígenes antillanas. Representan la etapa cultural más tardía de los desarrollos locales que integran los Agro III y de las primeras migraciones agroalfareras (Agro I y Agro II) ya adaptados convenientemente al medio-ambiente antillano.

En Puerto Rico los asentamientos de los Agro IV han sido poco estudiados en los últimos veinte años, dándole mayor énfasis a la investigación de los Agro II o igneri. Entre los pocos asentamientos fechados se encuentran Capa, Utuado (1270 D.C.) y Cayito, Santa Isabel (1250 D.C.). (Chanlatte/Narganes).

Consideramos de interés señalar que las numerosas evidencias arqueológicas obtenidas indican que los Taínos no representan una raza aborigen antillana específica,

sino un momento cultural, resultado de las interrelaciones humanas de grupos con origen etno-linguísticos diferentes que coinciden en tiempo y espacio durante más de un milenio en las islas antillanas. (Chanlatte/Narganes).

Los asentamientos típicos Agro IV o Taínos, hasta el presente se encuentran en las zonas costeras de la isla, con excepción de Capa, Utuado. Sus aldeas también están localizadas cerca de ríos, quebradas u otro tipo de fuente de agua potable. (Chanlatte/Narganes).

HISTORIA NATURAL

TOPOGRAFIA:

El área de impacto del proyecto Palacios de Humacao, se encuentra localizada en la zona de vida ecológica conocida como Bosques Húmedos Subtropical, según el sistema de Holdridge de clasificación. Todo su relieve es llano con elevaciones que fluctúan entre 11 y 24 metros sobre el nivel del mar.

CLIMA:

El promedio de temperatura en el area del proyecto se encuentra entre los 75 y 82 grados F. La precipitación promedio anual es de 75 pulgadas.

SUELOS:

El tipo de suelo que predomina dentro del área del proyecto es de la serie Maunabo(Me). La serie Maunabo consiste de suelos profundos de poco drenaje y baja fertilidad. Estos suelos poséenuna limitación severa para cultivarlos debído a condiciones

de pobre drenaje. Se necesita un sistema de drenaje complejo para ser utilizados.En un perfil representativo, estos suelos presentan la siguiente estratigrafía.

0-4 pulgadas. Barro gris marrón claro 10YR 6/2.

4-10 pulgadas: Barro gris marrón 10 YR 5/2.

10-15 pulgadas: Barro gris 5Y 5/1.

15-22 pulgadas: barro gris 5Y 6/1.

22-39 pulgadas: barro gris verdoso 5G 6/1.

39-48 pulgadas: lomico arenoso gris verdoso, 5BG 5/1.

(Soil Survey of Humacao Area of Eastern Puerto Rico: p30).

RECURSOS CULTURALES DE HUMACAO

Los lugares históricos y prehistóricos reportados para el pueblo de Humacao incluyen residuarios de concha y cerámica indígena, depósitos históricos de cerámicas, porcelanas y estructuras históricas en ladrillo pertenecientes al siglo pasado.

La Oficina del Consejo de Arqueología Terrestre adscrita al Instituto de Cultura contiene un total de diez lugares prehistóricos y ocho lugares históricos reportados para el pueblo de Humacao. Los más proximos al área del proyecto se describen a continuación.

CÓDIGO	NOMBRE	TIPO
H-F	Punta Icacos	residuario/conchas/ceramica aborigen
Y-A	Punta Icacos	residuario/conchas/ceramica aborigen
H-E*	Punta Candelero	residuario/conchas/ceramica aborigen

H-D	Punta Candelero	residuario/conchas/ceramica aborigen
P-1	Morro de Humacao	cerámica elenoide
P-2	Buena Vista	ceramica elenooide/conchas
P-3	Rio Abajo	cerámica elenoide/conchas
P-4	Rio Abajo	ceramica Elenoide/conchas

Yacimientos Historicos:

H-1	Central El Ejemplo	Central azucarera siglo xx.
H-2	Central Pasto Viejo	Central azucarera siglo xx.
H-3	Hda. Buena Vista	Hacienda azucarera siglo 19.
H-4	Colonia Mayo	Colonia Hda azucarera.
H-5	Colonia Santa Terasa	Colonia Hda. Azucarera siglo 19.
H-6	La Suiza	Hda azucarera siglo 19.
H-7	Iglesia	Iglesia Parroquial siglo 19.
H-8	Colonia El Cometa	Colonia Hda. Azucarera siglo 19.

Otros yacimientos reportados por M.Rodriguez (abril 1990), para el pueblo de Humacao lo son el HG y el HH, depositos en la zona urbana de Humacao. El primero es un deposito de cerámica superficial, y el segundo es un deposito de cerámica y litica precolombina asociada a monticulo. Igualmente en Punta Icaco, Rodriguez reportó los depositos precolombinos HF y YA.

El deposito precolombino más importante de la zona de Humacao los es **Punta**

Candelero, e identificado en los archivos del I.C.P. como **"HE".** Este deposito se encuentra localizado al sur-este del área del proyecto. Este deposito ha sido trabajado sistematicamente por el arqueólogo Miguel Rodriguez desde 1986 al 1989. En el mismo, Rodriguez identificó dos componentes culturales asociados , uno al Complejo Cultural La Hueca, y el segundo al estilo Cuevas. En la hoja**PUNTA CANDELERO 1990** se puede observar el área del yacimiento Punta Candelero y el área que fue trabajada por Rodriguez. En el insertado "AREA DE MONTICULOS" se pude apreciar la localización de las excavaciones extensivas realizadas por Rodriguez dentro de la peninsula de Punta Candelero. La topografía en el plano muestra la concentración de los depositos Huecoides y Cuevas.

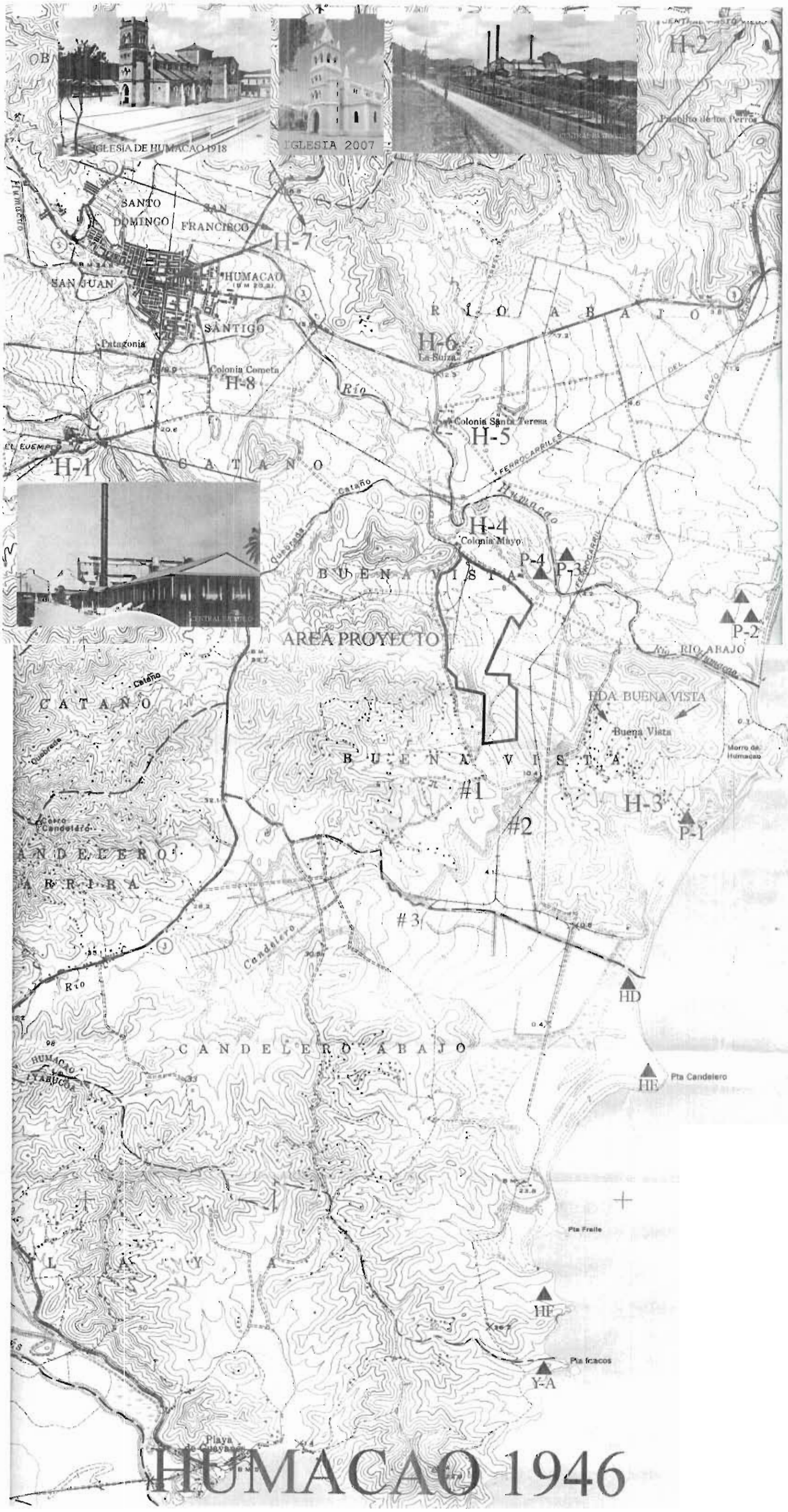
La fotografía de 1936 muestra el área de Punta Candeleros previo a los desarrollos urbanos sobre el área.. Ver hoja **HUMACAO 1946** para observar la distribución de los recursos culturales próximos al área del proyecto.

ESTUDIOS ARQUEOLOGICOS PROXIMOS AL AREA DEL PROYECTO

Tres informes arqueológicos fueron identificados conteniendo desarrollos urbanos próximos al área del proyecto Palacios de Humacao.El primero fué realizado por Eduardo Questell (2003), para el proyecto "Lago Buena Vista". Los resultados de éste informe fueron negativos en cuanto a la presencia de recursos culturales. (Ver hoja Humacao 1946 circulo amarillo #1 para ubicación estudio arqueológico de Questell).

El segundo informe fué realizado por Marlene Ramos (2006), para el proyecto Parcela PP-9 Palmas del Mar. En este informe se identificaron materiales modernos, eg,

PUNTA CANDELERO 1936
AREA MONTICULOS
ARQ MIGUEL RODRIGUEZ
excavaciones
almacen
HE
PUNTA CANDELERO 1990


IGLESIA DE HUMACAO 1918
IGLESIA 2007
SANTO DOMINGO
SAN FRANCISCO
SAN JUAN
HUMACAO
SANTIGO
Patagonia
Colonia Cometa
Colonia Santa Teresa
Colonia Mayo
La Suiza
Río
Cataño
Quebrada
Humacao
Río Abajo
Buena Vista
Hda Buena Vista
Morro de Humacao
Cerro Candelero
Candelero
Río Humacao
Pta Candelero
Pta Fraile
Pta Icacos
Playa de Cuevas
H-1
H-2
H-3
H-4
H-5
H-6
H-7
H-8
P-1
P-2
P-3
P-4
HD
HE
HF
Y-A
#1
#2
#3
AREA PROYECTO
CATAÑO
BUENA VISTA
CANDELERO ARRIBA
CANDELERO ABAJO
LAS YAYAS
HUMACAO 1946

vidrios, metales, y varios fragmentos de cerámica aborigen y algunos caracoles. (Ver área #2 amarilla, en hoja HUMACAO 1946 para ubicación proyecto).

El tercer informe fuérealizado por el autor (A Daubón), en 1999 para el proyecto Palmas Plantation. Los resultados de este informe fueron negativos en cuanto a la presencia de recursos culturales. (Ver área amarilla #3 en hoja HUMACAO 1946 para ubicación área proyecto. Todos estos desarrollos se encuentran al sur del proyecto Palacios de Humacao.

En adición a los recursos listados, se pudo identificar que la vía del ferrocarril de la caña, asociada a las Centrales azucareras El Ejemplo y Pasto Viejo transitaba por dentro de los terrenos del área del proyecto. Hoy día dichas vías no existen y fueron removidas durante la década de los 1960.

ESTUDIO DEL AREA DEL PROYECTO MEDIANTE EL USO DE FOTOGRAFIAS AEREAS ANTIGUAS

Previo a realizar el estudio de campo al área del proyecto, la parcela fuéestudiada mediante el uso de un estereoscopio Wild ST-4, y un par de fotografias aereas de los años 1936 y 1962, con la finalidad de identificar estructuras antiguas que pudiesen pertenecer a alguna hacienda antigua no detectada en los Catastros de Fincas Rusticas consultados.

En la hoja **HUMACAO 1936** que presentamos a continuación se puede observar el área del proyecto(perimetro en blanco), durante ese momento histórico. Basicamente se observa en primer plano que toda el área esta bajo cultivo posiblemente de la caña de azucar considerando las dos grandes centrales azucareras existentes en el municipio. Una

HUMACAO 1936

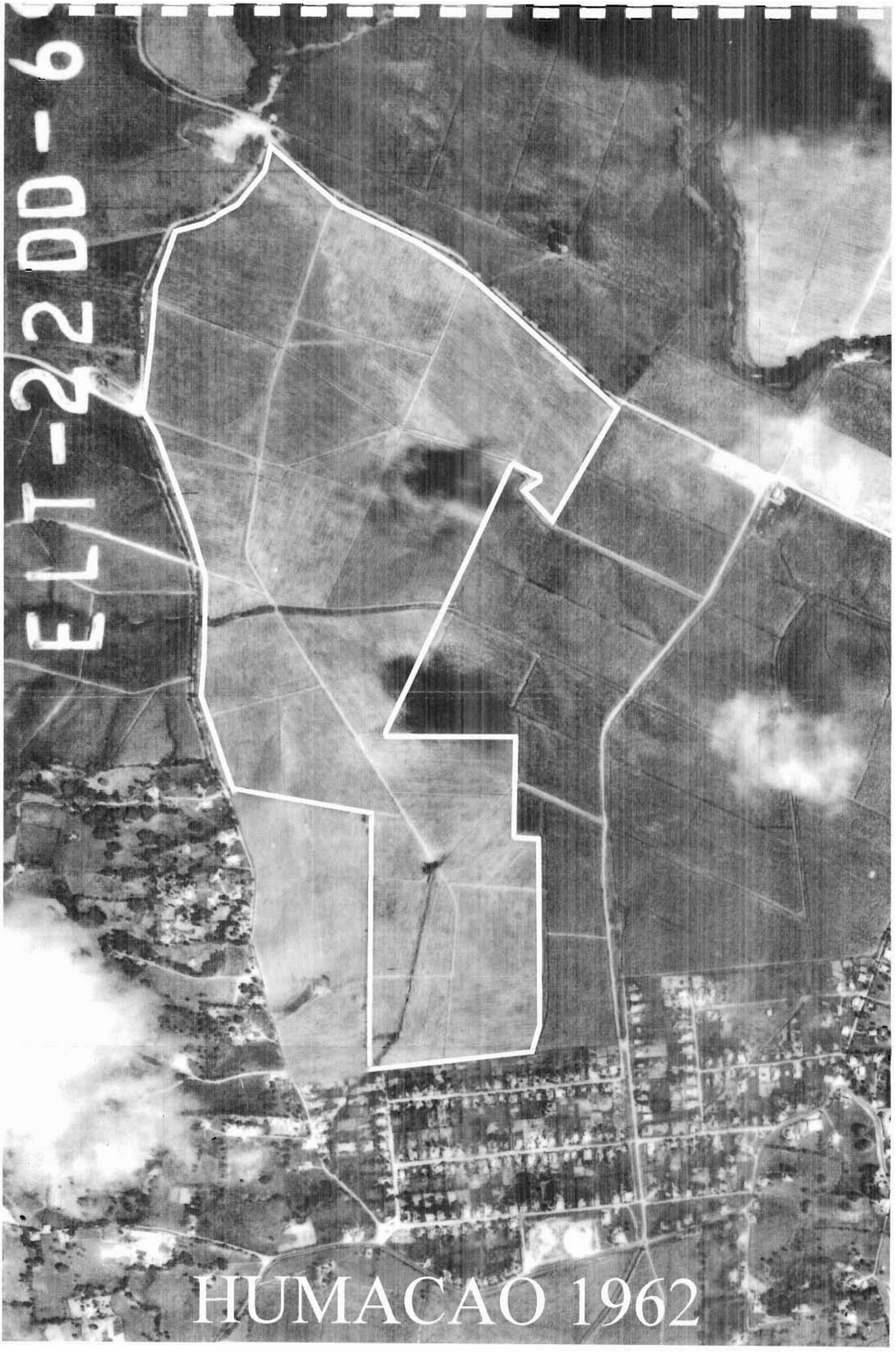
a/c foto k-141336-marzo 8 1936

sección de la vía del ferrocarril que conduce las cañas a la Central El Ejemplo se observa en el perimetro nor-oeste de la parcela. No se observan estructuras dentro de la finca, por lo que tenemos la contención de que estas fueron destruidas (de haber existido), para la utilización total de los terrenos para la caña. La vegetacion de bosques que reportan los cronistas del siglo 18 y 19, fueron substituidos por el monocultivo la caña de azucar.

Tambien se observarón gran cantidad de canales artificiales establecidos para "drenar" el área del proyecto de las lluvias e inundaciones de los montes aledaños a la parcela. Estos montes se encuentran mayormente al Oeste de la parcela, y toda la escorrentía baja hacia la parcela inundandola, unido todo esto a la naturaleza de los suelos descritos como de "permeabilidad lenta". Hoy dia estos canales se encuentran "sellados" ya sea por deposición de suelos y/o vegetación, lo que ha creado hoy dia los "humedales" que observamos en el plano preparado por el agrimensor del proyecto.Estos humedales son de creacion reciente.

La fotografía **HUMACAO 1962** que presentamos a continuación, muestra el área del proyecto en pleno proceso de "arado" de los terrenos. La antigua vía del ferrocarril detectada en la fotografía de 1936 habia sido removida, y el sistema de canales artificiales se observa con más claridad. No se observaron estructuras de ningun tipo sobre la parcela, y la única vegetación existente ha sido un arbol que ha crecido en el perimetro sur de la parcela. Al sur de la parcela se observa el crecimiento urbano de la comunidad Buena Vista.

La fotografia satelital **"GOOGLE 2006"**, muestra el área del proyecto en las


ELT-22DD-6
HUMACAO 1962

Cemex
AREA PROYECTO
Ctra 923
CANAL
CANAL
CANAL
Camino El Mangoal
Buena Vista
Calle 8
Calle 4
Calle 3
Calle 5
el Valle
Pez
Camino Escuela Ruciano
Ctra 923
1147 ft
© 2007 Europa Technologies
© 2007 National Geographic Society
© 2007 Tele Atlas
Google

GOOGLE 2006

condiciones existentes del 2006, observándose el sistema de canales previamente citados.

Las dos casas que se incluyerón dentro de la fotografía GOOGLE 2006, aunque fuera del área del proyecto se registraron por su valor arquitectónico, en adición a que las mismas sirvieron como puntos de referencia durante los trabajos de campo.

INSPECCION DE CAMPO FASE IB

El plano utilizado en el proyecto **Palacios de Humacao,** fué preparado por la firma **Jose A. Melendez & Asociados.** Se utilizó la **hoja 1/1,** escala 1:2500, para realizar el estudio de campo IB, con la finalidad de establecer los trabajos arqueológicos dentro de la parcela propuesta. Esta parcela de181.5 **cuerdas** posée una topografía de contornos llanos compuestas de suelos de barros arenosos de color marrón, marrón gris, y marrón oscuro.

La inspección de campo fase IB al proyecto **Palacios de Humacao** se limito a un reconocimiento visual a todo lo largo y ancho de la parcela, unido este trabajo a un sondeo con pozos de pruebas a travéz de toda la extención del área del proyecto.

El trabajo de campo realizado sobre el área del proyecto se efectuó mediante el uso de técnicas generales en agrimensura. El mismo se llevó a cabo mediante el uso de una Estación Total Nikon Modelo C-100, y prisma sensilla.

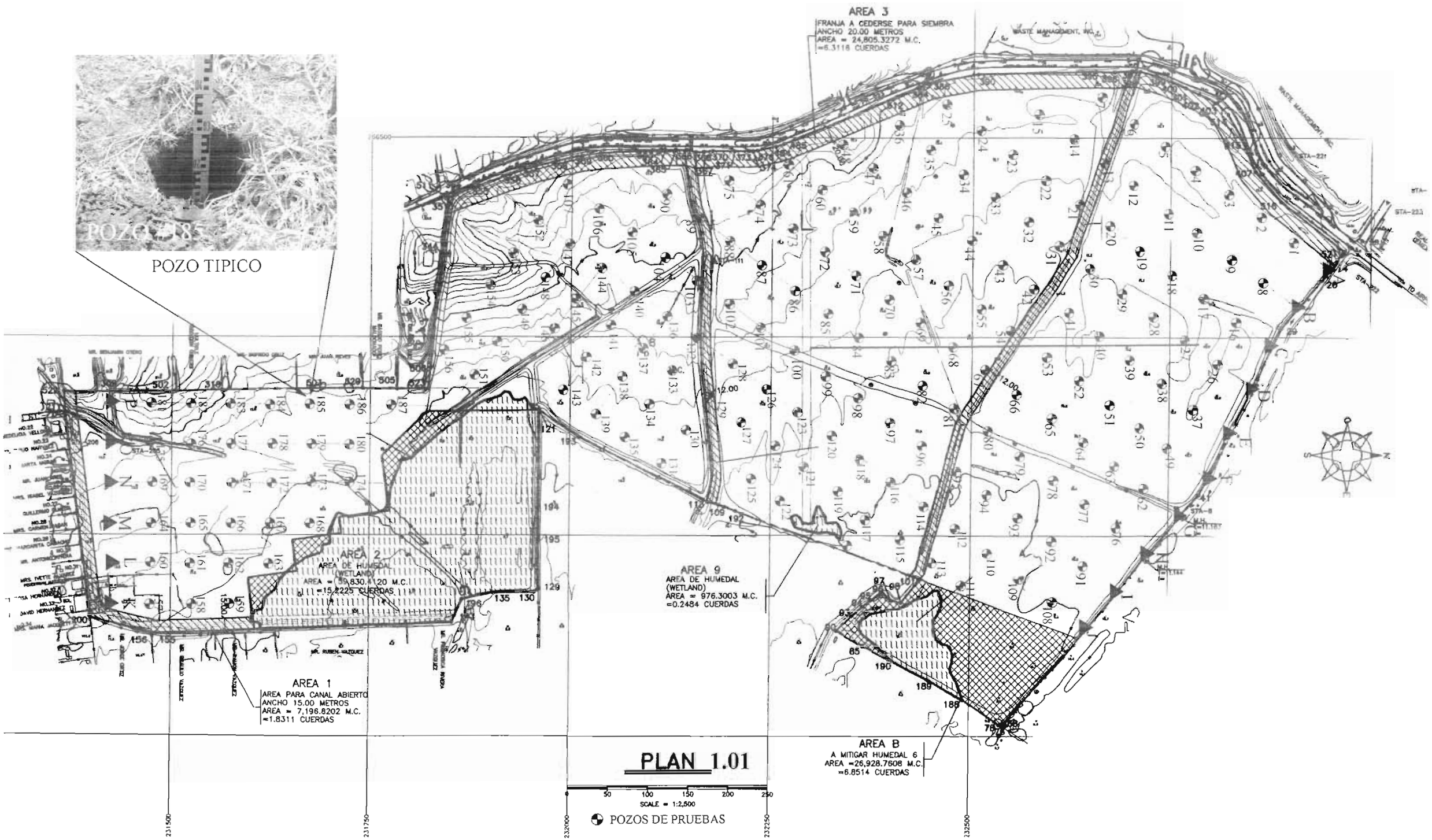
Los pozos de pruebas efectuados sobre el área del proyecto se realizarón a intérvalos de **50 metros** y los mismos se "amarrarón" a la Estacion "A" establecida a lo largo de un camino existente ubicado en el perimetro norte de la parcela. (Estaciones A a la J). Las estaciones K a la P se establecieron tambien a 50 metros de separacion

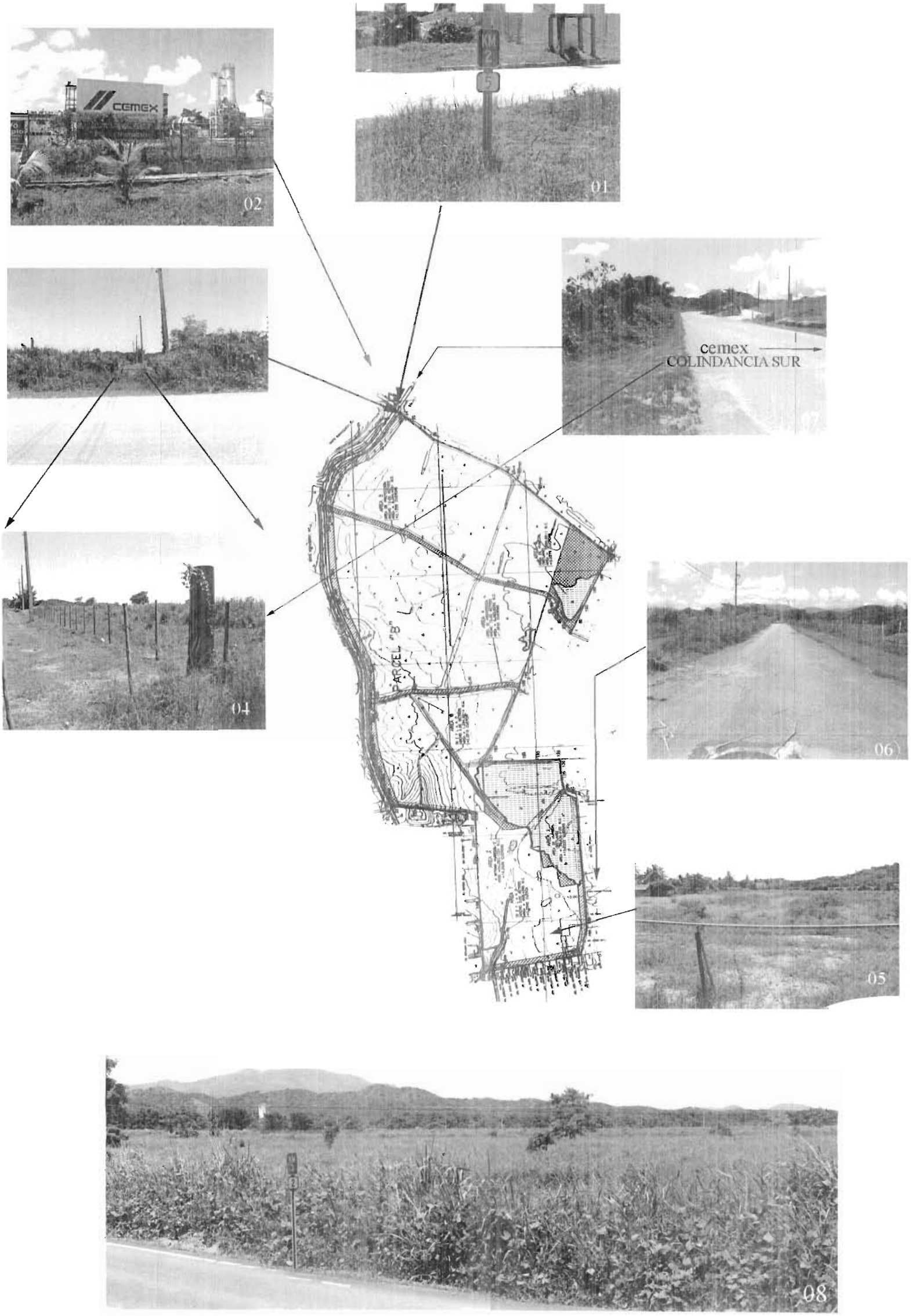
ubicadas estas en el perimetro sur de la parcela. Igualmente los transectos se realizarón a una separación espacial de 50 metros cada uno.(**ver Hoja PLAN 1.01** para localización de los pozos de pruebas realizados, foto insertada para pozo típico, y APENDICE I para REGISTRO POZOS DE PRUEBAS).

Los pozos de pruebas se realizarón manualmente utilizando un "Post Hole Digger", o pala de corte doble con la finalidad de perforar el subsuelo y detectar la presencia o ausencia de cualquier tipo de material cultural.Todo el material excavado,(suelo), fuéexaminado sobre un cernidor geológico de 1/4 de pulgada. El suelo excavado se clasifico como barro arenoso y lomico arenoso de color marrón, marrón gris,y marrón oscuro. En la hoja **ILUSTRACION 1.01** que presentamos a continuación se pueden observar los puntos más salientes de la parcela bajo estudio. En la fotografía 01 muestra el kilometro donde se encuentra el camino que forma la colindancia norte del proyecto, y área de la concretera CEMEX (foto 02) próxima a la entrada. Las fotografías 03 y 04 muestran el camino de tierra que forma la colindancia norte y área donde se establecio la linea base norte. La fotografí a 05 muestra el área de la linea base sur y condiciones existente del terreno cubierto de yerbas de baja altura. La fotografía 06 muestra otro camino muy próximo a la colindancia Este de la parcela utilizado para establecer la linea base sur. La fotografía 08 muestra una vista panorámica de gran parte de los terrenos ubicada ésta en el kilometro 3.2 de la carretera estatal 923.

RECOMENDACIONES

Luego de analizar los datos pertinentes de la investigación de campo,(fase IB), los


POZO #185
POZO TIPICO
AREA 3
FRANJA A CEDERSE PARA SIEMBRA
ANCHO 20.00 METROS
AREA = 24,805.3272 M.C.
=6.3118 CUERDAS
AREA 2
AREA DE HUMEDAL
(WETLAND)
AREA = 59,830.6120 M.C.
=15.2225 CUERDAS
AREA 9
AREA DE HUMEDAL
(WETLAND)
AREA = 976.3003 M.C.
=0.2484 CUERDAS
AREA 1
AREA PARA CANAL ABIERTO
ANCHO 15.00 METROS
AREA = 7,196.8202 M.C.
=1.8311 CUERDAS
AREA B
A MITIGAR HUMEDAL 6
AREA =26,928.7608 M.C.
=6.8514 CUERDAS
PLAN 1.01
SCALE = 1:2,500
POZOS DE PRUEBAS
WASTE MANAGEMENT, INC.
231500
231750
232000
232250
232500



ILUSTRACION 1.01

cuales no demostrarón la presencia de algun deposito cultural precolombino y/o historico sobre y/o bajo el área del proyecto en forma estratificada o disperso en superficie, recomendamos se procéda con el proyecto según lo planificado.

Si cualquier recurso cultural fuese encontrado durante la construcción, eg. entre los pozos de pruebas, el constructor deberá notificar de inmediato al **Instituto de Cultura Puertorriqueña** de manera que se planifiquen nuevas pruebas arqueológicas en el área.

De tener fondos y/o garantias Federales el desarrollo de dicho proyecto, todo recurso cultural encontrado durante la construcción estará protegido por el **Código de Regulación Federal 36 CFR Parte 800.**

Considerando que no se localizó ninguna propiedad histórica listada en el Registro Nacional de Lugares Históricos dentro del área del proyecto, y por lo tanto, ninguna será afectada,recomendamos se prosiga con el mismo segun planificado.

Se recomienda que como medida para proteger cualquier recurso cultural que se encuentre en áreas no estudiadas, eg. áreas entre los pozos de pruebas, se notifique al arqueólogo de este estudio para realizar inspecciones periódicas durante la remoción de la capa vegetal del mismo, donde aplique.

Aunque la prospección del subsuelo resulto negativa, varios recursos culturales fueron identificados sobre superficie a lo largo y/o próximos a los pozos de pruebas. El grueso de estos materiales son de origen moderno, siglo xx. La siguiente tabla lista los recursos culturales identificados.

RECURSO	UBICACION
herradura de caballo	entre el pozo 1 y 2
pedazo alambre de pua	a 2 metros del pozo 7
canéca de ron	a 1 metro del pozo 10
fragmento de ladrillo	a 2 metros del pozo 14
fragmento de loza blanca	a ½ metro del pozo 18
fragmento de vidrio verde	a 1 metro del pozo 19
fragmento de loza azul	entre el pozo 22 y 23
lata de cerveza	a 1 metro del pozo 39
fragmento de loza blanca	entre el pozo 41 y 42
clavo de vía de ferrocarril	entre el pozo 44 y 45
fragmento de metal	½ metro del pozo 70
fragmento vidrio ambar	1 metro del pozo 86
botella de cerveza	2 metros del pozo 96
fragmento vidrio blanco	entre el pozo 101 y 102
fragmento de madera	a 1 metro del pozo 130
fragmento de metal	entre el pozo 140 y 141
clavo vía de ferrocarril	a 1 metro del pozo 152
fragmento loza blanca	a ½ metro del pozo 166
5 clavos de acero	a 1 metro del pozo 170
fragmento de madera	a ½ metro del pozo 174

APENDICE I

REGISTRO POZOS DE PRUEBAS

REGISTRO DE PRUEBAS

POZOS	SUELO	PROFUNDIDAD	RESULTADO
1	barro marrón oscuro (10YR3/6)	0-44cm	negativo
	lómico arenoso gris (10YR 6/2)	44-69cm	negativo
2	barro marrón oscuro (10YR3/6)	0-41cm	negativo
	lómico arenoso gris (10YR 6/3)	41-71cm	negativo
3	barro marrón oscuro (10YR3/5)	0-39cm	negativo
	lómico arenoso gris (10YR 6/3)	39-74cm	negativo
4	barro marrón oscuro (10YR3/5)	0-45cm	negativo
	lómico arenoso gris (10YR 6/3)	45-68cm	negativo
5	barro marrón oscuro (10YR3/6)	0-46cm	negativo
	lómico arenoso gris (10YR 6/2)	46-73cm	negativo
6	barro marrón oscuro (10YR3/5)	0-45cm	negativo
	lómico arenoso gris (10YR 6/3)	45-70cm	negativo
7	barro marrón oscuro (10YR3/5)	0-39cm	negativo
	lómico arenoso gris (10YR 6/2)	39-67cm	negativo
8	barro marrón oscuro (10YR3/6)	0-38cm	negativo
	lómico arenoso gris (10YR 6/3)	38-69cm	negativo
9	barro marrón oscuro (10YR3/5)	0-42cm	negativo
	lómico arenoso gris (10YR 6/2)	42-76cm	negativo
10	barro marrón oscuro (10YR3/6)	0-40cm	negativo
	lómico arenoso gris (10YR 6/3)	40-69cm	negativo
11	barro marrón oscuro (10YR3/5)	0-39cm	negativo
	lómico arenoso gris (10YR 6/4)	39-74cm	negativo
12	barro marrón oscuro (10YR3/5)	0-45cm	negativo
	lómico arenoso gris (10YR 6/4)	45-81cm	negativo
13	barro marrón oscuro (10YR3/5)	0-48cm	negativo
	lómico arenoso gris (10YR 6/4)	48-73cm	negativo
14	barro marrón oscuro (10YR3/6)	0-46cm	negativo
	lómico arenoso gris (10YR 6/4)	46-74cm	negativo

REGISTRO DE PRUEBAS

POZOS	SUELO	PROFUNDIDAD	RESULTADO
15	barro marrón oscuro (10YR3/4)	0-54cm	negativo
	lómico arenoso gris (10YR 6/4)	54-72cm	negativo
16	barro marrón oscuro (10YR3/4)	0-52cm	negativo
	lómico arenoso gris (10YR 6/3)	52-69cm	negativo
17	barro marrón oscuro (10YR3/4)	0-45cm	negativo
	lómico arenoso gris (10YR 6/2)	45-73cm	negativo
18	barro marrón oscuro (10YR3/4)	0-53cm	negativo
	lómico arenoso gris (10YR 6/3)	53-73cm	negativo
19	barro marrón oscuro (10YR3/5)	0-55cm	negativo
	lómico arenoso gris (10YR 6/3)	55-83cm	negativo
20	barro marrón oscuro (10YR3/4)	0-47cm	negativo
	lómico arenoso gris (10YR 6/3)	47-76cm	negativo
21	barro marrón oscuro (10YR3/4)	0-52cm	negativo
	lómico arenoso gris (10YR 6/3)	52-70cm	negativo
22	barro marrón oscuro (10YR3/5)	0-50cm	negativo
	lómico arenoso gris (10YR 6/3)	50-73cm	negativo
23	barro marrón oscuro (10YR3/5)	0-47cm	negativo
	lómico arenoso gris (10YR 6/2)	47-72cm	negativo
24	barro marrón oscuro (10YR3/6)	0-43cm	negativo
	lómico arenoso gris (10YR 6/3)	43-70cm	negativo
25	barro marrón oscuro (10YR3/5)	0-45cm	negativo
	lómico arenoso gris (10YR 6/3)	45-69cm	negativo
26	barro marrón oscuro (10YR3/6)	0-35cm	negativo
	lómico arenoso gris (10YR 6/3)	35-69cm	negativo
27	barro marrón oscuro (10YR3/5)	0-38cm	negativo
	lómico arenoso gris (10YR 6/3)	38-70cm	negativo
28	barro marrón oscuro (10YR3/5)	0-44cm	negativo
	lómico arenoso gris (10YR 6/3)	44-69cm	negativo

REGISTRO DE PRUEBAS

POZOS	SUELO	PROFUNDIDAD	RESULTADO
29	barro marrón oscuro (10YR3/5)	0-49cm	negativo
	lómico arenoso gris (10YR 6/4)	49-69cm	negativo
30	barro marrón oscuro (10YR3/6)	0-40cm	negativo
	lómico arenoso gris (10YR 6/4)	40-64cm	negativo
31	barro marrón oscuro (10YR3/6)	0-44cm	negativo
	lómico arenoso gris (10YR 6/4)	44-73cm	negativo
32	barro marrón oscuro (10YR3/5)	0-43cm	negativo
	lómico arenoso gris (10YR 6/2)	43-68cm	negativo
33	barro marrón oscuro (10YR3/6)	0-39cm	negativo
	lómico arenoso gris (10YR 6/3)	39-68cm	negativo
34	barro marrón oscuro (10YR3/5)	0-43cm	negativo
	lómico arenoso gris (10YR 6/4)	43-72cm	negativo
35	barro marrón oscuro (10YR3/6)	0-39cm	negativo
	lómico arenoso gris (10YR 6/4)	39-68cm	negativo
36	barro marrón oscuro (10YR3/5)	0-41cm	negativo
	lómico arenoso gris (10YR 6/2)	41-70cm	negativo
37	barro marrón oscuro (10YR3/6)	0-46cm	negativo
	lómico arenoso gris (10YR 6/3)	46-66cm	negativo
38	barro marrón oscuro (10YR3/5)	0-39cm	negativo
	lómico arenoso gris (10YR 6/3)	39-69cm	negativo
39	barro marrón oscuro (10YR3/5)	0-40cm	negativo
	lómico arenoso gris (10YR 6/2)	40-74cm	negativo
40	barro marrón oscuro (10YR3/6)	0-39cm	negativo
	lómico arenoso gris (10YR 6/2)	39-61cm	negativo
41	barro marrón oscuro (10YR3/5)	0-38cm	negativo
	lómico arenoso gris (10YR 6/4)	38-66cm	negativo
42	barro marrón oscuro (10YR3/6)	0-41cm	negativo
	lómico arenoso gris (10YR 6/4)	41-65cm	negativo

REGISTRO DE PRUEBAS

POZOS	SUELO	PROFUNDIDAD	RESULTADO
43	barro marrón oscuro (10YR3/6)	0-44cm	negativo
	lómico arenoso gris (10YR 6/2)	44-65cm	negativo
44	barro marrón oscuro (10YR3/5)	0-37cm	negativo
	lómico arenoso gris (10YR 6/2)	37-61cm	negativo
45	barro marrón oscuro (10YR3/6)	0-38cm	negativo
	lómico arenoso gris (10YR 6/3)	38-68cm	negativo
46	barro marrón oscuro (10YR3/5)	0-43cm	negativo
	lómico arenoso gris (10YR 6/3)	43-68cm	negativo
47	barro marrón oscuro (10YR3/6)	0-39cm	negativo
	lómico arenoso gris (10YR 6/2)	39-70cm	negativo
48	barro marrón oscuro (10YR3/5)	0-43cm	negativo
	lómico arenoso gris (10YR 6/3)	43-68cm	negativo
49	barro marrón oscuro (10YR3/6)	0-39cm	negativo
	lómico arenoso gris (10YR 6/3)	39-71cm	negativo
50	barro marrón oscuro (10YR3/5)	0-44cm	negativo
	lómico arenoso gris (10YR 6/2)	44-69cm	negativo
51	barro marrón oscuro (10YR3/6)	0-42cm	negativo
	lómico arenoso gris (10YR 6/4)	42-76cm	negativo
52	barro marrón oscuro (10YR3/5)	0-40cm	negativo
	lómico arenoso gris (10YR 6/4)	40-69cm	negativo
53	barro marrón oscuro (10YR3/6)	0-43cm	negativo
	lómico arenoso gris (10YR 6/4)	43-74cm	negativo
54	barro marrón oscuro (10YR3/5)	0-45cm	negativo
	lómico arenoso gris (10YR 6/4)	45-69cm	negativo
55	barro marrón oscuro (10YR3/5)	0-48cm	negativo
	lómico arenoso gris (10YR 6/2)	48-71cm	negativo
56	barro marrón oscuro (10YR3/5)	0-43cm	negativo
	lómico arenoso gris (10YR 6/4)	43-75cm	negativo

REGISTRO DE PRUEBAS

POZOS	SUELO	PROFUNDIDAD	RESULTADO
57	barro marrón oscuro (10YR3/5)	0-39cm	negativo
	lómico arenoso gris (10YR 6/3)	39-64cm	negativo
58	barro marrón oscuro (10YR3/6)	0-37cm	negativo
	lómico arenoso gris (10YR 6/3)	37-63cm	negativo
59	barro marrón oscuro (10YR3/6)	0-45cm	negativo
	lómico arenoso gris (10YR 6/3)	45-70cm	negativo
60	barro marrón oscuro (10YR3/6)	0-47cm	negativo
	lómico arenoso gris (10YR 6/2)	47-72cm	negativo
61	barro marrón oscuro (10YR3/6)	0-45cm	negativo
	lómico arenoso gris (10YR 6/2)	45-77cm	negativo
62	barro marrón oscuro (10YR3/5)	0-42cm	negativo
	lómico arenoso gris (10YR 6/4)	42-70cm	negativo
63	barro marrón oscuro (10YR3/5)	0-39cm	negativo
	lómico arenoso gris (10YR 6/4)	39-74cm	negativo
64	barro marrón oscuro (10YR3/5)	0-44cm	negativo
	lómico arenoso gris (10YR 6/4)	44-72cm	negativo
65	barro marrón oscuro (10YR3/6)	0-48cm	negativo
	lómico arenoso gris (10YR 6/4)	48-76cm	negativo
66	barro marrón oscuro (10YR3/6)	0-39cm	negativo
	lómico arenoso gris (10YR 6/2)	39-69cm	negativo
67	barro marrón oscuro (10YR3/5)	0-43cm	negativo
	lómico arenoso gris (10YR 6/4)	43-81cm	negativo
68	barro marrón oscuro (10YR3/5)	0-39cm	negativo
	lómico arenoso gris (10YR 6/2)	39-71cm	negativo
69	barro marrón oscuro (10YR3/6)	0-38cm	negativo
	lómico arenoso gris (10YR 6/4)	38-83cm	negativo
70	barro marrón oscuro (10YR3/6)	0-43cm	negativo
	lómico arenoso gris (10YR 6/4)	43-74cm	negativo

REGISTRO DE PRUEBAS

POZOS	SUELO	PROFUNDIDAD	RESULTADO
71	barro marrón oscuro (10YR3/6)	0-48cm	negativo
	lómico arenoso gris (10YR 6/4)	48-70cm	negativo
72	barro marrón oscuro (10YR3/6)	0-42cm	negativo
	lómico arenoso gris (10YR 6/4)	42-72cm	negativo
73	barro marrón oscuro (10YR3/6)	0-39cm	negativo
	lómico arenoso gris (10YR 6/2)	39-75cm	negativo
74	barro marrón oscuro (10YR3/5)	0-46cm	negativo
	lómico arenoso gris (10YR 6/4)	46-74cm	negativo
75	barro marrón oscuro (10YR3/5)	0-37cm	negativo
	lómico arenoso gris (10YR 6/2)	37-69cm	negativo
76	barro marrón oscuro (10YR3/5)	0-39cm	negativo
	lómico arenoso gris (10YR 6/4)	39-80cm	negativo
77	barro marrón oscuro (10YR3/5)	0-46cm	negativo
	lómico arenoso gris (10YR 6/2)	46-77cm	negativo
78	barro marrón oscuro (10YR3/6)	0-44cm	negativo
	lómico arenoso gris (10YR 6/3)	44-70cm	negativo
79	barro marrón oscuro (10YR3/6)	0-39cm	negativo
	lómico arenoso gris (10YR 6/2)	39-76cm	negativo
80	barro marrón oscuro (10YR3/5)	0-45cm	negativo
	lómico arenoso gris (10YR 6/3)	45-72cm	negativo
81	barro marrón oscuro (10YR3/5)	0-43cm	negativo
	lómico arenoso gris (10YR 6/3)	43-74cm	negativo
82	barro marrón oscuro (10YR3/6)	0-38cm	negativo
	lómico arenoso gris (10YR 6/2)	38-81cm	negativo
83	barro marrón oscuro (10YR3/5)	0-47cm	negativo
	lómico arenoso gris (10YR 6/3)	47-80cm	negativo
84	barro marrón oscuro (10YR3/5)	0-74cm	negativo
	lómico arenoso gris (10YR 6/2)	74-69cm	negativo

REGISTRO DE PRUEBAS

POZOS	SUELO	PROFUNDIDAD	RESULTADO
85	barro marrón oscuro (10YR3/6)	0-38cm	negativo
	lómico arenoso gris (10YR 6/3)	38-67cm	negativo
86	barro marrón oscuro (10YR3/6)	0-37cm	negativo
	lómico arenoso gris (10YR 6/3)	37-80cm	negativo
87	barro marrón oscuro (10YR3/6)	0-45cm	negativo
	lómico arenoso gris (10YR 6/2)	45-77cm	negativo
88	barro marrón oscuro (10YR3/6)	0-43cm	negativo
	lómico arenoso gris (10YR 6/4)	43-73cm	negativo
89	barro marrón oscuro (10YR3/6)	0-39cm	negativo
	lómico arenoso gris (10YR 6/4)	39-63cm	negativo
90	barro marrón oscuro (10YR3/5)	0-43cm	negativo
	lómico arenoso gris (10YR 6/4)	43-80cm	negativo
91	barro marrón oscuro (10YR3/5)	0-39cm	negativo
	lómico arenoso gris (10YR 6/2)	39-73cm	negativo
92	barro marrón oscuro (10YR3/5)	0-39cm	negativo
	lómico arenoso gris (10YR 6/4)	39-73cm	negativo
93	barro marrón oscuro (10YR3/6)	0-42cm	negativo
	lómico arenoso gris (10YR 6/4)	42-76cm	negativo
94	barro marrón oscuro (10YR3/5)	0-40cm	negativo
	lómico arenoso gris (10YR 6/4)	40-69cm	negativo
95	barro marrón oscuro (10YR3/6)	0-45cm	negativo
	lómico arenoso gris (10YR 6/2)	45-80cm	negativo
96	barro marrón oscuro (10YR3/5)	0-41cm	negativo
	lómico arenoso gris (10YR 6/4)	41-69cm	negativo
97	barro marrón oscuro (10YR3/6)	0-38cm	negativo
	lómico arenoso gris (10YR 6/3)	38-80cm	negativo
98	barro marrón oscuro (10YR3/5)	0-39cm	negativo
	lómico arenoso gris (10YR 6/2)	39-77cm	negativo

REGISTRO DE PRUEBAS

POZOS	SUELO	PROFUNDIDAD	RESULTADO
99	barro marrón oscuro (10YR3/5)	0-48cm	negativo
	lómico arenoso gris (10YR 6/2)	48-69cm	negativo
100	barro marrón oscuro (10YR3/5)	0-47cm	negativo
	lómico arenoso gris (10YR 6/2)	47-81cm	negativo
101	barro marrón oscuro (10YR3/6)	0-45cm	negativo
	lómico arenoso gris (10YR 6/2)	45-73cm	negativo
102	barro marrón oscuro (10YR3/5)	0-46cm	negativo
	lómico arenoso gris (10YR 6/3)	46-68cm	negativo
103	barro marrón oscuro (10YR3/6)	0-35cm	negativo
	lómico arenoso gris (10YR 6/3)	35-83cm	negativo
104	barro marrón oscuro (10YR3/5)	0-39cm	negativo
	lómico arenoso gris (10YR 6/3)	39-80cm	negativo
105	barro marrón oscuro (10YR3/5)	0-39cm	negativo
	lómico arenoso gris (10YR 6/2)	39-72cm	negativo
106	barro marrón oscuro (10YR3/6)	0-43cm	negativo
	lómico arenoso gris (10YR 6/4)	43-72cm	negativo
107	barro marrón oscuro (10YR3/5)	0-42cm	negativo
	lómico arenoso gris (10YR 6/4)	42-74cm	negativo
108	barro marrón oscuro (10YR3/5)	0-40cm	negativo
	lómico arenoso gris (10YR 6/4)	40-72cm	negativo
109	barro marrón oscuro (10YR3/5)	0-53cm	negativo
	lómico arenoso gris (10YR 6/2)	53-84cm	negativo
110	barro marrón oscuro (10YR3/5)	0-55cm	negativo
	lómico arenoso gris (10YR 6/4)	55-71cm	negativo
111	barro marrón oscuro (10YR3/6)	0-48cm	negativo
	lómico arenoso gris (10YR 6/4)	48-77cm	negativo
112	barro marrón oscuro (10YR3/6)	0-47cm	negativo
	lómico arenoso gris (10YR 6/3)	47-69cm	negativo

REGISTRO DE PRUEBAS

POZOS	SUELO	PROFUNDIDAD	RESULTADO
113	barro marrón oscuro (10YR3/4)	0-51cm	negativo
	lómico arenoso gris (10YR 6/3)	51-68cm	negativo
114	barro marrón oscuro (10YR3/4)	0-49cm	negativo
	lómico arenoso gris (10YR 6/2)	49-71cm	negativo
115	barro marrón oscuro (10YR3/4)	0-45cm	negativo
	lómico arenoso gris (10YR 6/3)	45-70cm	negativo
116	barro marrón oscuro (10YR3/4)	0-39cm	negativo
	lómico arenoso gris (10YR 6/3)	39-68cm	negativo
117	barro marrón oscuro (10YR3/6)	0-42cm	negativo
	lómico arenoso gris (10YR 6/3)	42-80cm	negativo
118	barro marrón oscuro (10YR3/5)	0-53cm	negativo
	lómico arenoso gris (10YR 6/3)	53-80cm	negativo
119	barro marrón oscuro (10YR3/5)	0-51cm	negativo
	lómico arenoso gris (10YR 6/3)	51-77cm	negativo
120	barro marrón oscuro (10YR3/5)	0-49cm	negativo
	lómico arenoso gris (10YR 6/3)	49-79cm	negativo
121	barro marrón oscuro (10YR3/6)	0-47cm	negativo
	lómico arenoso gris (10YR 6/2)	47-76cm	negativo
122	barro marrón oscuro (10YR3/4)	0-51cm	negativo
	lómico arenoso gris (10YR 6/2)	51-73cm	negativo
123	barro marrón oscuro (10YR3/4)	0-53cm	negativo
	lómico arenoso gris (10YR 6/2)	53-74cm	negativo
124	barro marrón oscuro (10YR3/4)	0-45cm	negativo
	lómico arenoso gris (10YR 6/4)	45-68cm	negativo
125	barro marrón oscuro (10YR3/4)	0-52cm	negativo
	lómico arenoso gris (10YR 6/4)	52-69cm	negativo
126	barro marrón oscuro (10YR3/4)	0-50cm	negativo
	lómico arenoso gris (10YR 6/4)	50-69cm	negativo

REGISTRO DE PRUEBAS

POZOS	SUELO	PROFUNDIDAD	RESULTADO
127	barro marrón oscuro (10YR3/4)	0-54cm	negativo
	lómico arenoso gris (10YR 6/2)	54-72cm	negativo
128	barro marrón oscuro (10YR3/4)	0-49cm	negativo
	lómico arenoso gris (10YR 6/2)	49-74cm	negativo
129	barro marrón oscuro (10YR3/4)	0-45cm	negativo
	lómico arenoso gris (10YR 6/3)	45-73cm	negativo
130	barro marrón oscuro (10YR3/4)	0-43cm	negativo
	lómico arenoso gris (10YR 6/3)	43-72cm	negativo
131	barro marrón oscuro (10YR3/5)	0-51cm	negativo
	lómico arenoso gris (10YR 6/2)	51-83cm	negativo
132	barro marrón oscuro (10YR3/5)	0-53cm	negativo
	lómico arenoso gris (10YR 6/3)	53-70cm	negativo
133	barro marrón oscuro (10YR3/5)	0-39cm	negativo
	lómico arenoso gris (10YR 6/2)	39-72cm	negativo
134	barro marrón oscuro (10YR3/5)	0-44cm	negativo
	lómico arenoso gris (10YR 6/3)	44-76cm	negativo
135	barro marrón oscuro (10YR3/5)	0-52cm	negativo
	lómico arenoso gris (10YR 6/2)	52-76cm	negativo
136	barro marrón oscuro (10YR3/5)	0-50cm	negativo
	lómico arenoso gris (10YR 6/2)	50-73cm	negativo
137	barro marrón oscuro (10YR3/5)	0-49cm	negativo
	lómico arenoso gris (10YR 6/4)	49-74cm	negativo
138	barro marrón oscuro (10YR3/5)	0-45cm	negativo
	lómico arenoso gris (10YR 6/4)	45-81cm	negativo
139	barro marrón oscuro (10YR3/5)	0-53cm	negativo
	lómico arenoso gris (10YR 6/3)	53-73cm	negativo
140	barro marrón oscuro (10YR3/5)	0-54cm	negativo
	lómico arenoso gris (10YR 6/3)	54-74cm	negativo

REGISTRO DE PRUEBAS

POZOS	SUELO	PROFUNDIDAD	RESULTADO
141	barro marrón oscuro (10YR3/5)	0-51cm	negativo
	lómico arenoso gris (10YR 6/4)	51-69cm	negativo
142	barro marrón oscuro (10YR3/5)	0-37cm	negativo
	lómico arenoso gris (10YR 6/4)	37-81cm	negativo
143	barro marrón oscuro (10YR3/6)	0-41cm	negativo
	lómico arenoso gris (10YR 6/4)	41-73cm	negativo
144	barro marrón oscuro (10YR3/6)	0-46cm	negativo
	lómico arenoso gris (10YR 6/2)	46-73cm	negativo
145	barro marrón oscuro (10YR3/5)	0-49cm	negativo
	lómico arenoso gris (10YR 6/2)	49-80cm	negativo
146	barro marrón oscuro (10YR3/5)	0-52cm	negativo
	lómico arenoso gris (10YR 6/2)	53-70cm	negativo
147	barro marrón oscuro (10YR3/5)	0-39cm	negativo
	lómico arenoso gris (10YR 6/3)	39-77cm	negativo
148	barro marrón oscuro (10YR3/6)	0-47cm	negativo
	lómico arenoso gris (10YR 6/3)	47-74cm	negativo
149	barro marrón oscuro (10YR3/5)	0-48cm	negativo
	lómico arenoso gris (10YR 6/2)	48-76cm	negativo
150	barro marrón oscuro (10YR3/6)	0-50cm	negativo
	lómico arenoso gris (10YR 6/2)	50-72cm	negativo
151	barro marrón oscuro (10YR3/5)	0-53cm	negativo
	lómico arenoso gris (10YR 6/3)	53-80cm	negativo
152	barro marrón oscuro (10YR3/5)	0-49cm	negativo
	lómico arenoso gris (10YR 6/2)	49-81cm	negativo
155	barro marrón oscuro (10YR3/6)	0-48cm	negativo
	lómico arenoso gris (10YR 6/3)	48-81cm	negativo
154	barro marrón oscuro (10YR3/6)	0-54cm	negativo
	lómico arenoso gris (10YR 6/2)	54-74cm	negativo

REGISTRO DE PRUEBAS

POZOS	SUELO	PROFUNDIDAD	RESULTADO
155	barro marrón oscuro (10YR3/4)	0-44cm	negativo
	lómico arenoso gris (10YR 6/4)	44-67cm	negativo
156	barro marrón oscuro (10YR3/4)	0-47cm	negativo
	lómico arenoso gris (10YR 6/4)	47-77cm	negativo
157	barro marrón oscuro (10YR3/6)	0-45cm	negativo
	lómico arenoso gris (10YR 6/4)	45-77cm	negativo
158	barro marrón oscuro (10YR3/6)	0-48cm	negativo
	lómico arenoso gris (10YR 6/2)	48-78cm	negativo
159	barro marrón oscuro (10YR3/4)	0-45cm	negativo
	lómico arenoso gris (10YR 6/4)	45-73cm	negativo
160	barro marrón oscuro (10YR3/4)	0-53cm	negativo
	lómico arenoso gris (10YR 6/2)	53-80cm	negativo
161	barro marrón oscuro (10YR3/5)	0-54cm	negativo
	lómico arenoso gris (10YR 6/4)	54-72cm	negativo
162	barro marrón oscuro (10YR3/5)	0-44cm	negativo
	lómico arenoso gris (10YR 6/2)	44-73cm	negativo
163	barro marrón oscuro (10YR3/5)	0-54cm	negativo
	lómico arenoso gris (10YR 6/3)	54-76cm	negativo
164	barro marrón oscuro (10YR3/5)	0-56cm	negativo
	lómico arenoso gris (10YR 6/3)	56-79cm	negativo
165	barro marrón oscuro (10YR3/6)	0-52cm	negativo
	lómico arenoso gris (10YR 6/3)	52-73cm	negativo
166	barro marrón oscuro (10YR3/5)	0-45cm	negativo
	lómico arenoso gris (10YR 6/2)	45-81cm	negativo
167	barro marrón oscuro (10YR3/5)	0-54cm	negativo
	lómico arenoso gris (10YR 6/3)	54-73cm	negativo
168	barro marrón oscuro (10YR3/5)	0-46cm	negativo
	lómico arenoso gris (10YR 6/2)	46-68cm	negativo

REGISTRO DE PRUEBAS

POZOS	SUELO	PROFUNDIDAD	RESULTADO
169	barro marrón oscuro (10YR3/5)	0-51cm	negativo
	lómico arenoso gris (10YR 6/3)	51-79cm	negativo
170	barro marrón oscuro (10YR3/5)	0-54cm	negativo
	lómico arenoso gris (10YR 6/3)	54-81cm	negativo
171	barro marrón oscuro (10YR3/5)	0-55cm	negativo
	lómico arenoso gris (10YR 6/3)	55-77cm	negativo
172	barro marrón oscuro (10YR3/6)	0-53cm	negativo
	lómico arenoso gris (10YR 6/3)	53-78cm	negativo
173	barro marrón oscuro (10YR3/5)	0-55cm	negativo
	lómico arenoso gris (10YR 6/2)	55-80cm	negativo
174	barro marrón oscuro (10YR3/6)	0-49cm	negativo
	lómico arenoso gris (10YR 6/2)	49-80cm	negativo
175	barro marrón oscuro (10YR3/5)	0-54cm	negativo
	lómico arenoso gris (10YR 6/3)	54-77cm	negativo
176	barro marrón oscuro (10YR3/5)	0-49cm	negativo
	lómico arenoso gris (10YR 6/2)	49-74cm	negativo
177	barro marrón oscuro (10YR3/6)	0-44cm	negativo
	lómico arenoso gris (10YR 6/3)	44-76cm	negativo
178	barro marrón oscuro (10YR3/5)	0-40cm	negativo
	lómico arenoso gris (10YR 6/3)	40-79cm	negativo
179	barro marrón oscuro (10YR3/5)	0-46cm	negativo
	lómico arenoso gris (10YR 6/2)	46-80cm	negativo
180	barro marrón oscuro (10YR3/6)	0-45cm	negativo
	lómico arenoso gris (10YR 6/3)	45-68cm	negativo
181	barro marrón oscuro (10YR3/6)	0-52cm	negativo
	lómico arenoso gris (10YR 6/3)	52-80cm	negativo
182	barro marrón oscuro (10YR3/5)	0-54cm	negativo
	lómico arenoso gris (10YR 6/2)	54-79cm	negativo

REGISTRO DE PRUEBAS

POZOS	SUELO	PROFUNDIDAD	RESULTADO
183	barro marrón oscuro (10YR3/4)	0-54cm	negativo
	lómico arenoso gris (10YR 6/3)	54-77cm	negativo
184	barro marrón oscuro (10YR3/4)	0-53cm	negativo
	lómico arenoso gris (10YR 6/4)	53-75cm	negativo
185	barro marrón oscuro (10YR3/4)	0-55cm	negativo
	lómico arenoso gris (10YR 6/4)	55-79cm	negativo
187	barro marrón oscuro (10YR3/5)	0-49cm	negativo
	lómico arenoso gris (10YR 6/4)	49-73cm	negativo
187	barro marrón oscuro (10YR3/5)	0-51cm	negativo
	lómico arenoso gris (10YR 6/4)	51-74cm	negativo

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