Wetland Delineation Report

El Nuevo Comandante
Canóvanas, Puerto Rico

LAND DEVELOPMENT ASSOCIATES, S.E. (LDA)
SAN JUAN, PUERTO RICO

October 6, 2006

CMA ARCHITECTS & ENGINEERS LLP
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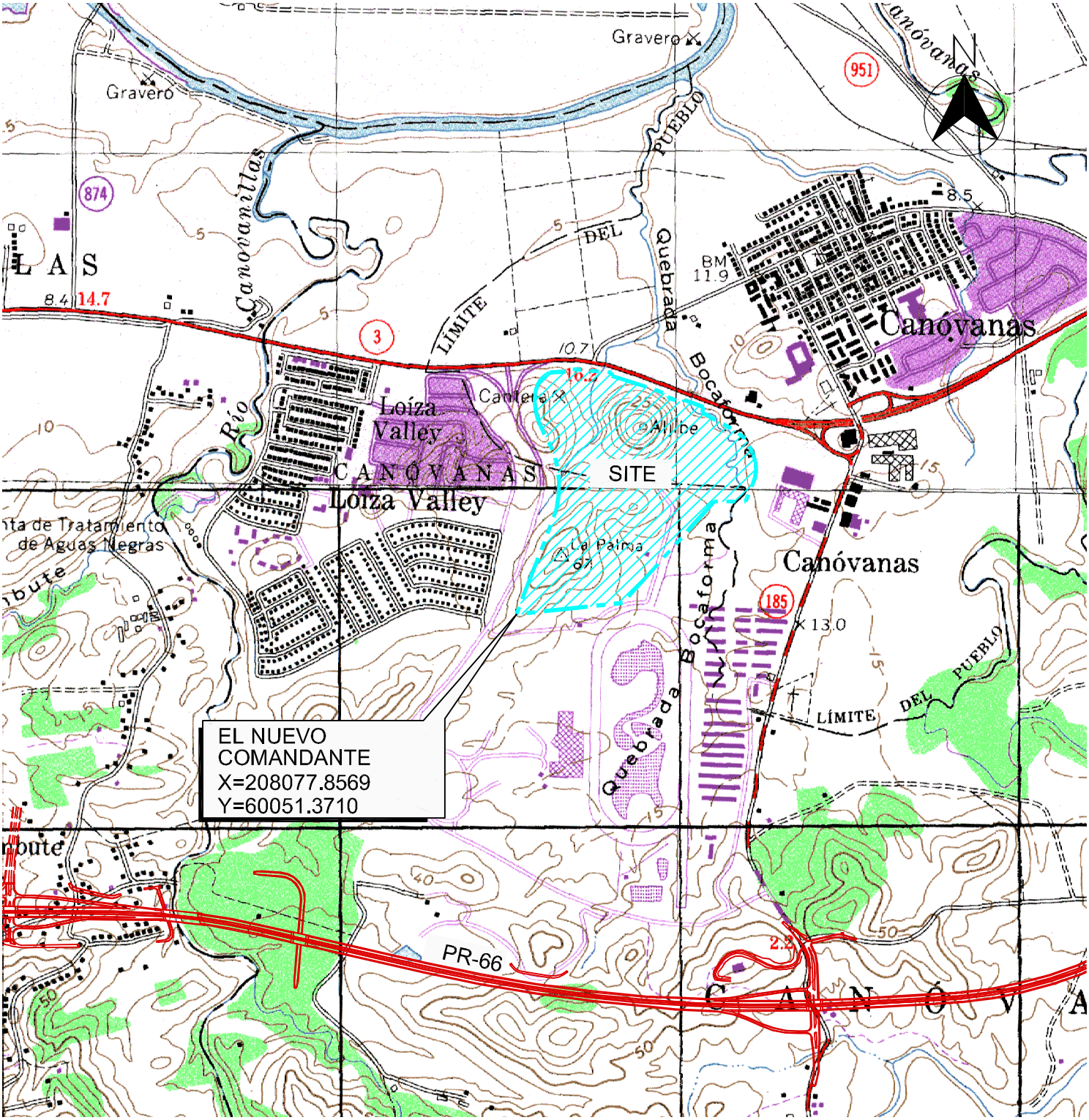
1.0 INTRODUCTION

The purpose of this report is to identify the U.S. Jurisdictional Areas, including wetlands at the proposed site. Land Development Associates, S.E. (LDA) has retained CMA Architects & Engineers LLP (CMA) to perform a wetland delineation at the site located at PR-3 km. 16.2 in the Municipality of Canóvanas. The area evaluated covered approximately 79.21 "cuerdas". See Figure No.1, Location Plan and Figure No. 2, Aerial Photo.

To achieve this objective, literature review and aerial photo evaluation of the area was done. Also, during the months of April, August and September 2006, site visits to the area under study were carried out by CMA biologists. The wetland delineation included in this report consisted in a merge of the literature information available and the vegetation, soils, and hydrology observations gathered at the site. Therefore, this determination of USACE jurisdictional areas, including wetland, is preliminary and requires the approval of the USACE prior to any development in the area that could impact USACE Jurisdictional Areas.



SOURCE:
CAROLINA AND GUARABO QUADRANGLE
USGS GEOLOGICAL MAP
REVISED:1982
(PR–66 ADDED)

PURPOSE:
WETLAND DELINEATION

LOCATION MAP

PROJECT:
EL NUEVO COMANDANTE

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CANOVANAS PUERTO RICO
FIGURE 01 OCT 2, 2006

PURPOSE:
WETLAND DELINEATION

AERIAL PHOTO (2005)

PROJECT:
EL NUEVO COMANDANTE

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FIGURE 02 OCT 2, 2006

2.0 DESCRIPTION OF THE STUDY AREA

2.1 Methodology

The wetland delineation of USACE jurisdictional areas was conducted following the procedures specified in Section IV.B (Method, Preliminary Data gathering, and Synthesis) of the 1987 U.S. Corps of Engineers Wetland Delineation Manual. This procedure involves simple, rapidly applied methods that result in sufficient qualitative data for making a preliminary determination of USACE potential jurisdictional areas. Although, the determination of potential wetland areas is preliminary and additional research for their delineation is required it is adequate for planning purposes.

The literature investigation consisted of the revision of the soil surveys, national wetlands inventory, historical aerial photographs, and the USDA hydric soil list. Based on this information, potential jurisdictional wetland[1] areas and non-wetland areas were initially determined. In order to confirm this initial determination, onsite observations were done. General on-site observations of the vegetation, soil and hydrology were performed.

For the vegetation component, readily recognized plant species were field identified. Specimens that were more difficult to identify were collected, pressed, and later classified using the pertinent scientific keys and literature.

[1] Potential jurisdictional wetland is an area that exhibits one or more of the three wetland criteria: hydrophytic vegetation, hydric soil , and wetland hydrology.

Information of soil types, and drainage characteristics were obtained from USDA Soil Surveys Map. Field check with the Munsell Soil Color Charts (Munsell Color, 2000 Edition) was used for color, value and chroma.

To assess the hydrology present within the study area, different sites were inspected for signs of flood markings, proximity of the areas to the stream and any other observable indicator of wetland hydrology. The high water mark was determined by observing the line of scum along the shore, other physical markings, and vegetation lines.

2.2 Vegetation

According to Ewel & Whitmore, The Ecological Life Zones of Puerto Rico and the U.S. Virgin Islands, 1973, the study area lies within the Subtropical Moist Forest Zone. This report indicates that "*Most of the Subtropical Moist Forest Zone in the study region has been deforested at one time or another, primarily because the climatic conditions which define its boundaries also encompass good conditions for a wide variety of crops.*"

Our evaluation reveals that the area topography changes according to the quarry activities. Most of the Upland vegetation was modified.

2.2.1 Summary of Dominant Vegetation:

Table 1 shows the dominant plant species observed at the study area.

Table No. 1 Dominant plant species present at the study area

Scientific Name	Common Name	Stratum	Plant Community	Indicator
Albizia procera	Albizia	TREE	Upland Vegetation	UPL
Urochloa maxima	Guinea grass	HERB	Upland Vegetation	FACU
Brachiaria purpurascens		HERB	Wetland vegetation	FACW
Sesbania sericea	Sesbania	HERB	Wetland/ upland vegetation	FACW
Leucaena leucocephala	Wild Tamarind	TREE	Upland Vegetation	FAC

2.3 Soils Description

According to the Natural Resources and Conservation Service (NRCS), formerly Soil Conservation Service (SCS), the soil types of the area are (CbF2) Caguabo Clay Loam, 20 to 60 percent slopes, eroded, (MaB) Mabí clay, 0 to 5 percent slopes, (MaD2) Mabí clay, 12 to 20 percent slopes, eroded and (MaC2) Mabí clay, 5 to 12 percent slopes, eroded. The Soil Map for the area under study is presented in Figure 3, Soils Map.

The Mabi series (isohyperthermic Aquic Hapluderts) consists of very deep, somewhat poorly drained, slowly permeable soils on alluvial fans and terraces of the Humid Coastal Plains. They formed in sediments of mixed origin. Its typical pedon is:

Ap--0 to 7 inches- very dark grayish brown (10YR 3/2) clay; weak fine granular structure; hard, very firm; slightly sticky, slightly plastic; common fine roots; few fine fragments of volcanic rock; common fine manganese nodules; few fine prominent yellowish brown (10YR 5/6) masses of iron accumulation and red (2.5YR 4/6) coatings along root channels.

Bss1--7 to 15 inches- dark yellowish brown (10YR 4/4) clay; weak fine and medium angular blocky structure; hard, very firm; slightly sticky, slightly plastic; common fine roots; many pressure faces on surface of peds; few intersecting slickensides having polished and grooved surfaces; few fine fragments of volcanic rock; few fine manganese nodules; common medium distinct yellowish brown

(10YR 5/6) masses of iron accumulation and few fine prominent gray (10YR 5/1) areas of iron depletions.

Bss2--15 to 24 inches- yellowish brown (10YR 5/6) clay; weak fine and medium angular blocky structure; very hard, very firm; slightly sticky, slightly plastic; few fine roots; many pressure faces on surface of peds; many distinct intersecting slickensides having polished and grooved surfaces; few fine fragments of volcanic rock; few fine manganese nodules; many medium prominent gray (10YR 5/1) areas of iron depletions and coatings along root channels.

The Caguabo series (isohyperthermic Lithic Eutrudepts) consists of shallow, well drained, moderately permeable soils on side slopes of strongly dissected uplands. They formed in material that weathered from basalt. Most areas of this soil are used for pasture. A few small areas are planted to woodland. Vegetation consists of native and introduced grasses, shrubs, and trees. Its typical pedon is:

Ap--0 to 4 inches- dark grayish brown (10YR 4/2) clay loam; weak fine granular structure; friable, slightly sticky, slightly plastic; about 10 percent, by volume, igneous rock fragments; common fine roots; slightly acid; clear smooth boundary. (2 to 5 inches thick)

Bw--4 to 10 inches- brown (10YR 4/3) very gravelly clay loam; weak fine subangular blocky structure parting to weak fine granular; friable, slightly sticky, slightly plastic; about 60 percent, by volume, igneous rock fragments; few fine roots.

C--10 to 16 inches- mixture of weathered and partially weathered basalt rock fragments and saprolite that can be penetrated with the spade.

R--16+ inches; consolidated basalt rock.

2.3.1 Hydric Soils

Hydric soils are defined as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, July 13, 1994).

According to the Hydric Soils of the Caribbean Area prepared by the Natural Resources and Conservation Service (NRCS), formerly Soil Conservation Service (SCS), in cooperation with the National Technical Committee for Hydric Soils, the soil types of the area , CbF2, MaC2, MaD2 are not listed on the September 2001 Hydric Soil list for the Caribbean . However, due to the conditions of the area, principally the hydrology, the soil type MaB, area is acting as hydric soils on the areas identified as wetland areas.

Soil observations using an auger show that the soils in the wetland area are frequently flooded or ponded for long or very long period of time. Primarily gray or low-chroma colors were commonly hydric soil indicators observed in this area. On the other hand, hydric soil indicators were not observed in the Upland Ecosystem. On the detention pond of Observation Point No. 1 hydric soil indicators was observed. This pond was created by excavating from dry land and used exclusively as a settling basins, or detention pond.

2.4 Hydrology

According to the National Wetlands Inventory (NWI) Maps, Carolina Quadrangle, the area under study has been classified as follows:

UPLAND	Upland areas
PEM1C	Palustrine, Emergent, Persistent, Seasonally Flooded

See Figure 5, NWI Wetlands Map, for the location of the wetland classifications.

The NWI maps for the area was prepared in 1983 using aerial photographs in which the composition of the flora, visible hydrology and geography were identified. Based on the information obtained, the areas were classified according to the Classification of Wetlands and Deepwater Habitats of the United States (FWS/OBS - 79/31. December 1979). The classification on some areas may vary due to the changes that have taken place during the last years.

Observations using an auger show the presence of hydrology primary indicator at the wetland area. This area was inundated or saturated in the upper 12 inches. Also, secondary indicators such as oxidized root channel in upper the 12 inches, were found in the transition upland / wetland fringe. However, hydrology indicators were not found in the Upland Ecosystem. The area receives run off water from adjacent upland areas and also receives water from nearby properties at the east. Also, according to the FEMA Flood Map, the area s located on zone X in which is was determined to be outside the 0.2% annual chance floodplain. See Figure No. 6, Flood Map.

2.5 Historical Aerial Photos

Aerial photos taken on years 1936 and 1962 aerial photos present agricultural activities within and outside of the proposed project area. Also, aerial photoof year 1962 shows the new state road PR-3 at the north side of the property, including the drainage streams relocation for road crossing.

By the year 1971, the quarry activities are evident. There were many trees along the dirt roads and drainages within the property area. Landscape areas at the west side of the parcel were modified due to the construction activities of Loiza Valley.

On year 1981, the construction of El Comandante Race Track modified the southern section of the Bocaforma stream. The quarry activities at the parcel are more intense and by year 1991 more than 90% of the parcel was modified by the earth movement activities. The years 2005 and 2006 aerial photos depict the same area modified by the earth movement activities. Also, some detention ponds were constructed on the parcel for the sedimentation control.

Figure 3 Topographic Plan

PURPOSE:
WETLAND DELINEATION

TOPOGRAPHIC PLAN

PROJECT:
EL NUEVO COMANDANTE

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FIGURE 03 OCT 2, 2006

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