WETLAND DELINEATION

PROJECT: Monte Claro Housing Development

Monte Grande Ward, Cabo Rojo, Puerto Rico

Cease and Desist Order

USCE No. 200206110 (CD-ML)

Prepared for:

Herminio Hernandez
PO Box 6144
Mayagüez, Puerto Rico 00681
Tel. (787)834-7100

Prepared by:

Héctor E. Quintero Ph.D.
PO Box 5100 # 61
San Germán, PR 00683
Tel. (787)487-5204

November 2002

TABLE OF CONTENTS

	List of Tables	3
	List of Exhibits	3
1.0	Introduction	4
2.0	Methods	5
3.0	Results	7
	3.1 Vegetation	7
	3.2 Soils	8
	3.3 Hydrology	10
4.0	Conclusions	10
5.0	Cited Literature	12
	Appendix A: Exhibits 1, 2, 6	13
	Appendix B: Tables	17
	Appendix C: Field Data Forms	18
	Appendix D: Exhibits 3, 4, 5	Large Format

LIST OF EXHIBITS

Exhibit	Title	Page
1	Location Map	14
2	Copy of Soil Survey Sheets	15
3	Aerial Photo, 2000	Large Format
4	Aerial Photo, 1977	Large Format
5	Topographic Map	Large Format
6	Generalized Hydrology	16

LIST OF TABLES

Table	Title	Page
1	Field Indicators for Hydric Soils	18
2	Wetland Hydrology Indicators	18
3	Plant Indicator Status Categories	19

1.0 INTRODUCTION

The purpose of this study is to identify the waters of the United States present within an approximately 12 acres site. Areas adjacent to the site were also studied to document any possible violation as indicated in the cease and desist order. The study area is located south of PR # 102 road (Km 22.7) in Monte Grande Ward, Cabo Rojo, Puerto Rico (see Exhibit 1). Historic photos of the area indicate that in 1977 the study site was a sugarcane field. A 2000 photo shows a mixture of grasslands and forested patches (possibly *Albizia procera* trees). This JD was performed to answer a Cease and Desist Order (No. 200206110 (CE-ML)) presented by the Antilles Regulatory Section of the Department of the Army Corps of Engineers.

The term "waters of the United States" is defined in 33 CFR328.3 and includes a variety of water bodies such as lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, natural and, in some cases, artificial ponds. Wetlands are a subset of the waters of the United States, pursuant to Section 404 of the Clean Water Act. The U.S. Army Corps of Engineers defines wetlands in 33 CFR328.3b as those areas that are inundated or saturated by surface or groundwater 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 soils conditions.

Wetlands generally include swamps, marshes, bogs, and similar areas. Under current rules, regulations and policies, this definition requires that, under normal circumstances, three criteria be met for the area to be declared a jurisdictional wetland. These criteria are hydrophytic or wetland vegetation, wetland hydrology and hydric soils. If one of the three criteria is, under normal circumstances, not present, then the area is not a jurisdictional wetland. Therefore, the presence of the three criteria need to be present in a site to declare it a wetland.

Section 404 prohibits the discharge of dredged or fill material into the waters of the United States unless previously authorized by a Department of the Army permit. The U.S. Army Corps of Engineers (Corps) administers the Section 404 permit program and in Puerto Rico there is a special arrangement with the Department of Natural Resources to fill a joint application in these cases.

2.0 METHODS

The study was conducted following the technical standards and procedures recommended in the Corps Wetland Delineation Online Manual (Environmental Laboratory, 1987) for the Routine Determination Method and Atypical Situations. First, the project area was located on the United States Geological Survey Mayagüez, Puerto Rico Quadrangles, 7.5 Minutes Series, (topographic) (Exhibit 1) and on the Soil Conservation Service (SCS) Soil Survey of the Mayagüez Area of Western Puerto Rico (1969), sheets 59 and 60 (see Exhibit 2). A small portion of the project lies on sheet 67 and was not included in the figure. The soil survey was used to identify the limits of hydric soils (SCS, 1969) mapped within or in the vicinity of the study area. The field inspection was conducted on October 26 and 27, 2002.

The site has been altered, the vegetation has been removed and soil movements has created an atypical situation as described on page 73 of the Online Manual. Consequently, a routine determination cannot be performed. The following description of the methods was obtained from the Online Manual.

Section F. Atypical Situations

71. Methods described in this section should be used only when a determination has already been made in Section D or E that positive indicators of hydrophytic vegetation, hydric soils, and/or wetland hydrology could not be found due to effects of recent human activities or natural events. This section is applicable to delineations made in the following types of situations:

a. Unauthorized activities. Unauthorized discharges requiring enforcement actions may result in removal or covering of indicators of one or more wetland parameters. Examples include, but are not limited to: (1) alteration or removal of vegetation; (2) placement of dredged or fill material over hydric soils; and/or (3) construction of levees, drainage systems, or dams that significantly alter the area hydrology. NOTE: This section should not be used for activities that have been previously authorized or those that are exempted from CE regulation. For example, this section is not applicable to areas that have been drained under CE authorization or that did not require CE authorization. Some of these areas may still be wetlands, but procedures described in Section D or E must be used in these cases.

b. Natural events. Naturally occurring events may result in either creation or alteration of wetlands. For example, recent beaver dams may impound water, thereby resulting in a shift of hydrology and vegetation to wetlands. However, hydric soil indicators may not have developed due to insufficient time having passed to allow their development. Fire, avalanches, volcanic activity, and changing river courses are other examples. *NOTE: It is necessary to determine whether alterations to an area have resulted in changes that are now the "normal circumstances."* The relative permanence of the change and whether the area is now functioning as a wetland must be considered.

c. Man-induced wetlands. Procedures described in Subsection 4 are for use in delineating wetlands that have been purposely or incidentally created by human activities, but in which wetland indicators of one or more parameters are absent. For example, road construction may have resulted in impoundment of water in an area that previously was nonwetland, thereby effecting hydrophytic vegetation and wetland hydrology in the area. However,

the area may lack hydric soil indicators. *NOTE: Subsection D is not intended to bring into CE jurisdiction those manmade wetlands that are exempted under CE regulations or policy.* It is also important to consider whether the man-induced changes are now the "normal circumstances" for the area. Both the relative permanence of the change and the functioning of the area as a wetland are implied.

72. When any of the three types of situations described in paragraph 71 occurs, application of methods described in Sections D and/or E will lead to the conclusion that the area is not a wetland because positive wetland indicators for at least one of the three parameters will be absent. Therefore, apply procedures described in one of the following subsections (as appropriate) to determine whether positive indicators of hydrophytic vegetation, hydric soils, and/or wetland hydrology existed prior to alteration of the area. Once these procedures have been employed, return to Section D or E to make a wetland determination. Proceed to the appropriate subsection.

3.0 RESULTS

3.1 Vegetation

The field investigation of the site revealed that the study area has been completely altered. There is a construction of a housing project and all the original vegetation has been removed. Two aerial photographs (Exhibits 3 and 4) show the vegetation present in 2000 and 1977, respectively. The following list present the possible plants that were present at the site. This analysis uses the aerial photos and the vegetation in adjacent areas similar to the study site.

Scientific Name	Common Name	Indicator
Albizia procera	Tall Albicia	NL
Petiveria alliacea	Anamú	NL
Ricinus communis	Castor bean	FAC
Stizolobium pruriens	Cow-itch	NL

Scientific Name	Common Name	Indicator
Spathodea canpanulata	African tulip tree	NL
Saccharum officinarum	Sugarcane	NI
Uruchloa maxima	Guinea grass	FACU-

Adjacent and to the East of the study site there is vegetation that is found on wetlands. The species found in this area are:

Scientific Name	Common Name	Indicator
Colocasia esculenta	Elephant ear	OBL
Albizia procera	Tall Albicia	NL
Brachiaria mutica	Para grass	FACW
Paspalum millegrana	Cortadora	FACW
Cupania americana	Guara	NL
Zanthoxylum caribaeum	Espino rubial	NL

At the study site in OP # 3 there is a wet area were water from the adjacent housing development is impounded. This man-induced activity has created a favorable environment for the development of species that are typically found on wetlands. The species found at OP # 3 are:

Scientific Name	Common Name	Indicator
Cyperus polystachyos	Manyspike flatsedge	FACW
Brachiaria mutica	Para grass	FACW-
Sesbania sericea	Silky sesbania	OBL
Urema lobata	Caesar weed	FAC

3.2 Soils

The Soil Conservation Service (1969) manual identifies three soil mapping units in the study area, Lares clay (LaD2), .Mucara clay (MxC), and Montegrande Clay (MvC).

None of the soils is listed as hydric in the Hydric Soils of the Caribbean Area list (SCS,1993) or US Soil Survey website http://soils.usda.gov/soil_use/hydric/states/pr.htm

Lares Series

The Lares series consists of deep, moderately well drained soils that are very strongly acid and moderately permeable. These soils are on old terraces. They formed in material washed from the volcanic hills. In a representative profile the surface layer is dark-brown, very strongly acid silty clay about 9 inches thick. The subsoil to a depth of about 29 inches, is light yellowish-brown and yellowish-brown, strongly acid, firm, slightly sticky and plastic clary.

Montegrande Series

The Montegrande series consists of moderately well drained soils that have moderately slow permeability in the surface layer and subsoil and moderate permeability in the substratum. These soils are on alluvial fans and terraces. They formed in stratified, fine textured to moderately fine textured sediments, which are underlain by strata of gravelly material that washed from the surrounding volcanic hills. In a representative profile the surface layer is dark yellowish-brown and dark grayish-brown, strongly acid clay about 10 inches thick. This layer contains common fine fragments of volcanic rock. The subsoil, to a depth of about 24 inches, is dark yellowish-brown and yellowish-brown, strongly acid, firm, slightly sticky and plastic clay that has many fine yellowish-brown mottles.

Mucara Series

The Mucara series consists of moderately deep, well-drained soils thaht are moderately permeable. These soils formed in residual material weathered from volcanic rock. In a representative profile the surface layer is very dark grayish-brown, medium acid clay about 6 inches thick. The subsoil, to a depth of about 12 inches, is very dark, grayish-brown and brown, slightly acid, firm, slightly sticky and plastic clay. The substratum is highly weathered volcanic rock. The depth to semi-consolidated rock is 22 inches.

3.3 Hydrology

The natural elevation at the site varies from 23 to 31.5 meters above sea level (Exhibit 5). The general drainage movement is from the south and to the east in form of surface discharge. Before the construction activities four 24 inch concrete tubes served as pathways to the surface waters that moved from the adjacent hills. We did not found any evidence of a intermittent stream, stream or river at the site. Adjacent to the site there is a wetland and creek that collects and moves the surface water collected from adjacent hills and the study area. Exhibit 6 shows a map of the area with the catchment basin of waters that flow over the site, the wetland and the creek.

4.0 CONCLUSIONS

Vegetation

Historical photographs from 2000 and 1977 do not show the presence of typical wetland species at the study site. There is a patch of what looks like wetland vegetation outside and to the east of the study site. The wetland vegetation found at OP # 3 is growing due to the accumulation of surface runoff induced by man-made activities. This area cannot be classified as a wetland because the soil (Lares clay) is not classified as a hydric soil.

Soils

One feature common to the three soils found at the site is that they are moderately well drained soils. This condition interfere with the formation of wetlands. The soils were not listed as hydric in the current list of hydric soils (USDA Internet site). Therefore, one of the criteria (hydric soils) needed to determine the presence of wetlands is not present at the site. A wetland east of the site was probably formed when debris from a concrete block manufacturing plant obstructed the natural flow of water.

Hydrology

There is no intermittent creek, creek or river in the study site. Water runoff follows natural depressions along the low-hilly landscape. An interview with a local resident confirms this observation. He indicated that there were no creeks or river at the site before the construction activities. One aspect that should be also consider is the location of the original dirt road that crossed the entire farm. The entrance from the south was located adjacent to the new housing project, it ran to the north and then made a sharp 90° turn to the east. After crossing the site from east to west it made another sharp turn to the north were after two more turns it joined road PR # 102. The location of the road is a very important clue to demonstrate that the wet area found in the site is of recent and a man-induced creation. The 2000 photo shows the road crossing the forested area and the location of the wet area. The 1997 photo shows that the road has the same trajectory. it would be very unlikely that a road passed through a wetland.

General Conclusions

All the evidence found and presented in this report indicates that wetlands subject to Section 404 of the Clean Water Act are not present within the study area.

A portion of wetland east of the study site (Exhibit 6) has been recently impacted. A 12 x 4 meters section of the creek was covered with fill material and a 8 x 45 meters portion of the adjacent wetland was also impacted. This correspond to 48 sq. m and 360 sq. m, respectively, for a total of Waters of the United States impacted of 408 sq. m.

5.0 LITERATURE CITED

Corps of Engineers Wetland Delineation Manual. 1987. (Online Edition) Environmental Laboratory, Department of the Army, Waterways Experimental Station. U.S. Army Corps of Engineers, Washington, D.C. Technical Report Y-87-1. 100pp plus appendices.

Ewel J. J. and J. L. Whitmore. 1973. The Ecological Life Zones of Puerto Rico and the U.S. Virgin Islands. Institute of Tropical Forestry, Río Piedras Puerto Rico, 72pp

Hutchinson, A.S. 1936. Manual of Grasses of the West Indies. US Department of Agriculture, Misc. Pub. No. 243, Washington D.C. 439pp

Puerto Rico Department of Natural Resources et al. 2001. Guide to Identify Common Wetland Plants in the Caribbean Area. University of Puerto Rico Press, Río Piedras. Puerto Rico 268 pg

Reed, Porter B., Jr. 1988. National List of Plant Species That Occur in Wetlands. Caribbean Region C. U.S. Fish and Wildlife Service.

Soil Conservation Service. 1969. Soil Survey of Mayagüez Area of Western Puerto Rico.

Soil Conservation Service. 1991. Hydric Soils of the United States. Second Edition.

Soil Conservation Service. 1993. Hydric Soils of the Caribbean Area. Revised Edition.

APPENDIX A.

EXHIBITS

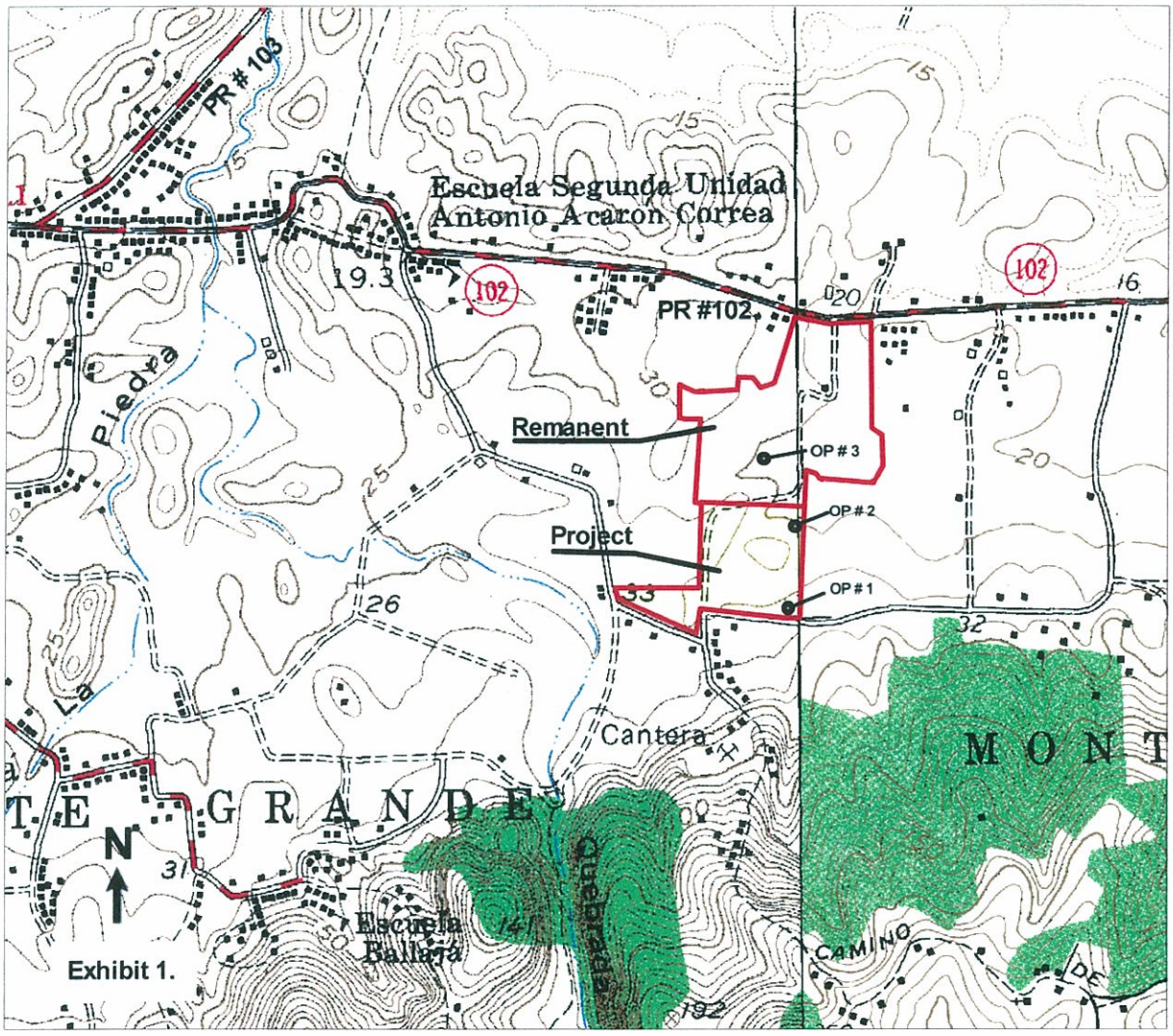

Exhibit 1. Project Location

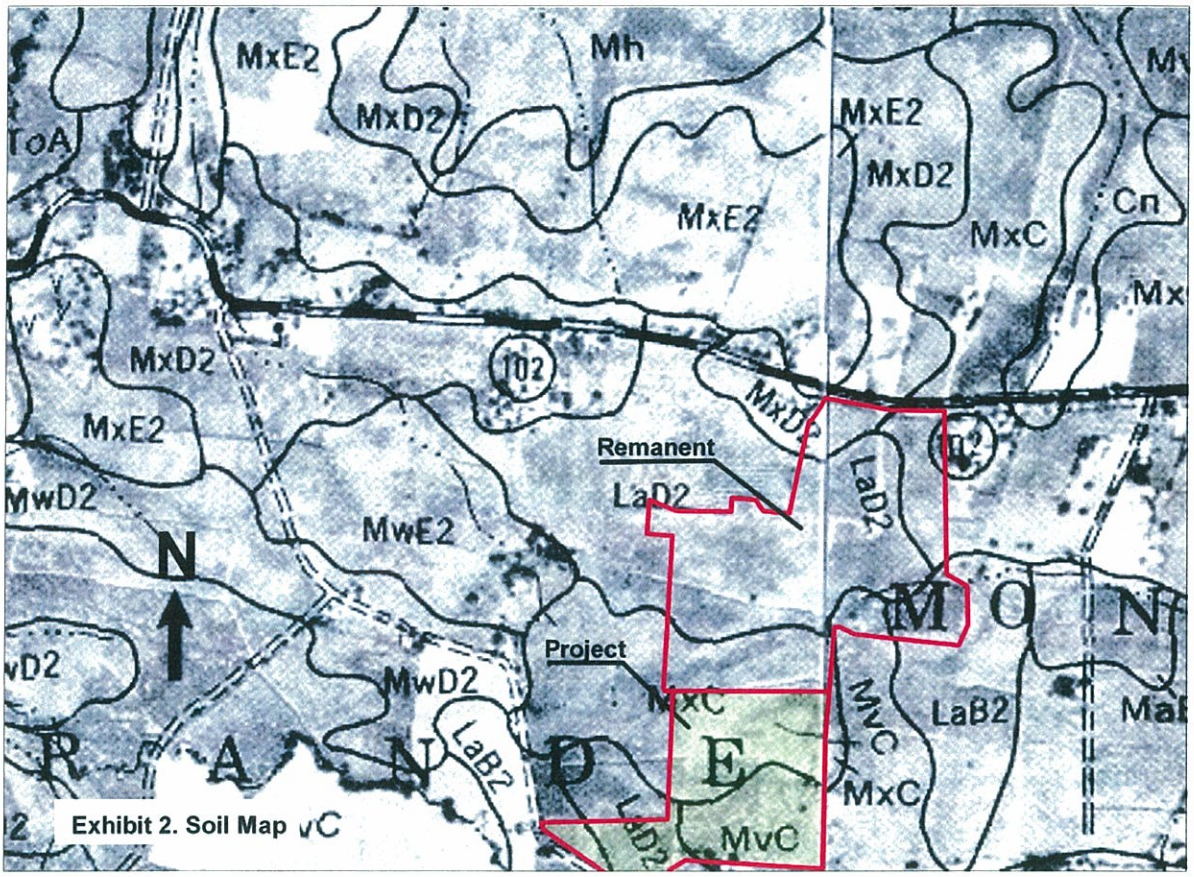

Exhibit 2. Soils Map

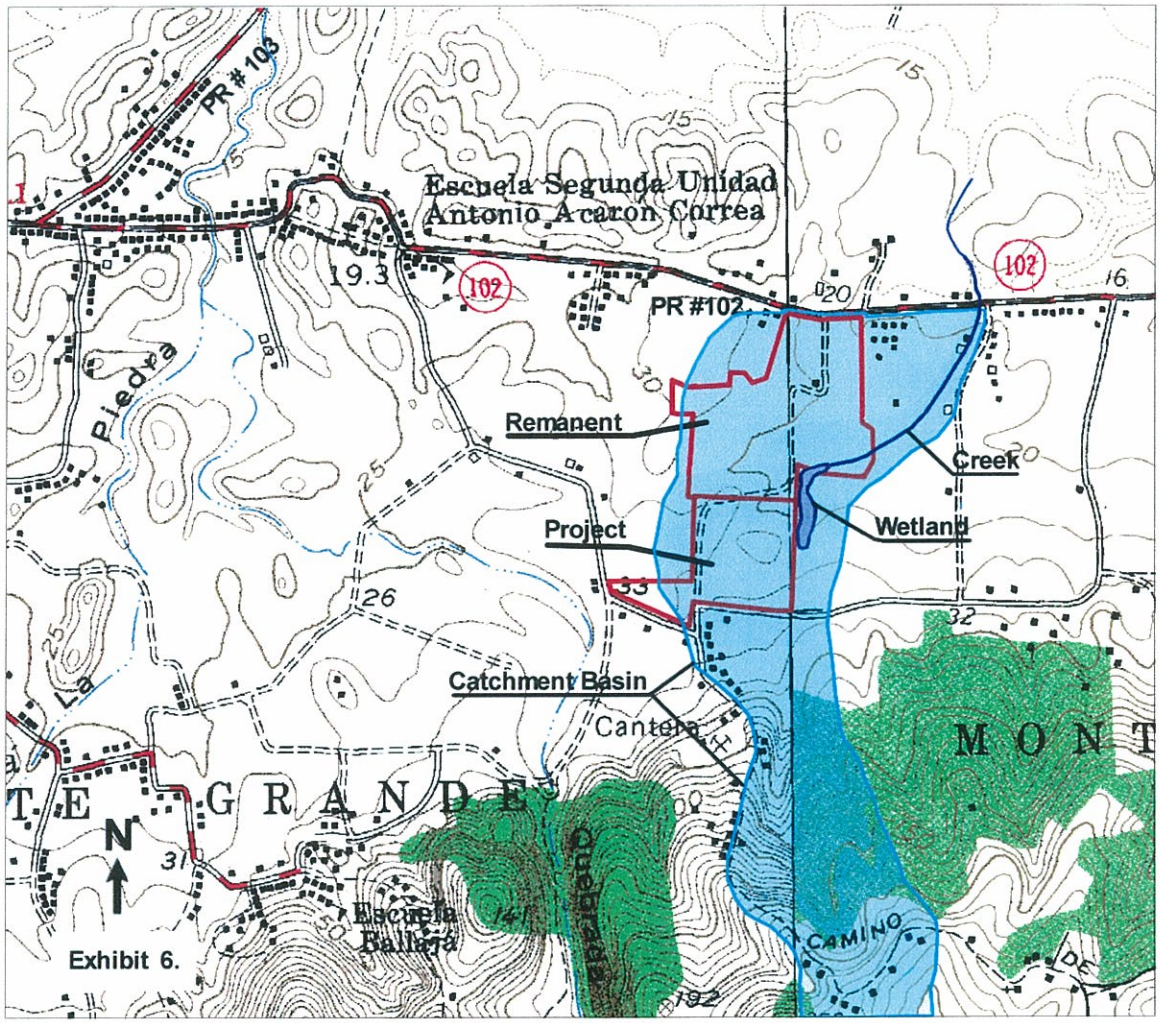

Exhibit 6. Generalized Hydrology

APPENDIX B.

TABLES

TABLE 1

FIELD INDICATORS FOR HYDRIC SOILS

Organic soils

Histic epipedons

Sulfidic materials

Aquatic or periaquatic moisture regime

Direct observations of reducing soil conditions

Gleyed, low croma and low croma – mottled soils

Iron and Manganese concreations

Coarse-textured or sandy hydric soils

- high organic matter content in the surface horizon
- dark vertical streaking of sbsurface horizon by organic matter
- wet spodosols
- new sandbars

TABLE 2

FIELD INDICATORS FOR WETLAND HYDROLOGY

Visual observation of inundation

Visual observation of soil saturation

Oxidized channels (Rhizospheres) associated with living roots and rhizomes

Water marks

Drift lines

Water borne sediment deposits

Surface scoured areas

Wetland drainage patterns

Morphological plant adaptations

TABLE 3

PLANT INDICATOR STATUS CATEGORIES

Indicator Category	Indicator Symbol	Definition
Obligate Wetland Plants	**OBL**	Plants that occur almost always (estimated probability >99%) in wetlands under natural conditions, but which may also occur rarely (estimated probability <1%) in nonwetlands. Examples: *Spartina alterniflora, Taxodium disctichum*
Facultative Wetland Plants	**FACW**	Plants that occur usually (estimated probability 67% to 99%) in wetlands, but also occurring in both wetlands and nonwetlands. Examples: *Fraxinus pensylvanica, Comus stolonifera.*
Facultative Plants	**FAC**	Plants that with similar (estimated probability 33% to 67%) of occurring in both wetlands and nonwetlands. Examples: *Gleditsia triacanthos, Smilas rotundifolia.*
Facultative Upland Plants	**FACU**	Plants that occur sometimes (estimated probability 1% to 33%) in wetlands, but also occur more often (67% to 99%) in nonwetlands. Examples: *Quercus rubra, Potentilla arguta.*
Obligate Upland Plants	**UPL**	Plants that occur rarely (estimated probability <1%) in wetlands, but almost always occur (estimated probability >99%) in nonwetlands under natural conditions. Examples: *Pinus echinata, Bromus moilis.*

APPENDIX C.

FIELD DATA FORMS

DATA FORM 3
ATYPICAL SITUATIONS

Applicant Name: Herminio Hernandez

Application Number: 200206110(CD-ML)

Project Name: Monte Claro Housing

Location: Cabo Rojo, PR

Plot Number: OP # 1

Date October 26, 2002

A:VEGETATION:

1. Type of Alteration: Vegetation totally covered by placement of fill material.

2. Effect on Vegetation: None remaining

3. Previous Vegetation: Grasses, possibly Guinea grass, *Uruchloa maxima* in 2000 and in the 1977 aerial photo show all the area planted with sugarcane, *Saccharum officinarum*

(Attach documentation) Exhibit 3 shows an aerial photo taken on 11-13-00 and Exibit 4 is an aerial photo taken on 1-24-77

4. Hydrophytic Vegt.? Yes _____ No X

B. SOILS

1. Type of Alteration: Original soil covered by approximately 3 feet of fill material

2. Effect on Soils: Original soil buried

3. Previous Soils: According to SCS, 1969 soil survey the soils presents at the site are Montegrande Clay (MvC). Exhibit 2 shows the soil map

(Attach documentation)

4. Hydric Soils? Yes _____ No X

C. HYDROLOGY:

1. Type of Alteration: Approximately 3 feet of fill material placed on original surface

2. Effect on Hydrology The conditions at OP # 1 changed, two 48" tubes were placed to recover the surface waters, these tubes are connected to a main tube that runs under the road south of the site.

3. Previous Hydrology The historical photos (Exhibit 3 & 4) and the topographic map (Exhibit 5) show that a creek or river was not present at the site. The water moved as surface flow and passed under the existing road at three different points.

(Attach documentation)

4. Wetland Hydrology? Yes _____ No X

Characterized by: Héctor E. Quintero Ph.D

DATA FORM 3
ATYPICAL SITUATIONS

Applicant Name: Herminio Hernandez

Application Number: 200206110(CD-ML)

Project Name: Monte Claro Housing

Location: Cabo Rojo, PR

Plot Number: OP # 2

Date October 26, 2002

A:VEGETATION:

1. Type of Alteration: Vegetation totally covered by placement of fill material.

2. Effect on Vegetation: None remaining

3. Previous Vegetation: In the 2000 photo the area at OP # 2 is covered with grasses, possibly Guinea grass, *Uruchloa maxima* and a forest of *Albizia procera*. In the 1977 aerial photo show all the area planted with sugarcane, *Saccharum officinarum*.

(Attach documentation) Exhibit 3 shows an aerial photo taken on 11-13-00 and Exibit 4 is an aerial photo taken on 1-24-77

4. Hydrophytic Vegt.? Yes _____ No X

B. SOILS

1. Type of Alteration: Original soil covered by approximately 2 feet of fill material

2. Effect on Soils: Original soil buried

3. Previous Soils: According to SCS, 1969 soil survey the soils presents at the site are Mucara clay (MxC). Exhibit 2 shows the soil map

(Attach documentation)

4. Hydric Soils? Yes _____ No X

C. HYDROLOGY:

1. Type of Alteration: Approximately 2 feet of fill material placed on original surface

2. Effect on Hydrology The conditions at OP # 2 changed, the new fill material obstructs the natural flow of surface waters.

3. Previous Hydrology The historical photos (Exhibit 3 & 4) and the topographic map (Exhibit 5) show that a creek or river was not present a the site. The water moved as surface flow in a south to north direction.

(Attach documentation)

4. Wetland Hydrology? Yes _____ No X

Characterized by: Héctor E. Quintero Ph.D

DATA FORM 3
ATYPICAL SITUATIONS

Applicant Name: Herminio Hernandez

Application Number: 200206110(CD-ML)

Project Name: Monte Claro Housing

Location: Cabo Rojo, PR

Plot Number: OP # 3

Date October 26, 2002

A:VEGETATION:

1. Type of Alteration: Vegetation partially covered by placement of fill material.

2. Effect on Vegetation: A man-induced wet area has been created at OP # 3. The three dominant species present are: *Cyperus polystachyos* (FACW), *Brachiaria mutica* (FACW-) and *Sesbania sericea* (FACW).

3. Previous Vegetation: In the 2000 photo the area at OP # 3 is covered with *Albizia procera*. In the 1977 aerial photo show all the area planted with sugarcane, *Saccharum officinarum*.

(Attach documentation) Exhibit 3 shows an aerial photo taken on 11-13-00 and Exibit 4 is an aerial photo taken on 1-24-77

4. Hydrophytic Vegt.? Yes * No X

*wetland species found due to incidentally created wet area by man activities.

B. SOILS

1. Type of Alteration: Original soil covered by approximately 2 feet of fill material

2. Effect on Soils: Original soil buried

3. Previous Soils: According to SCS, 1969 soil survey the soils presents at the site are Lares clay (LaD2). Exhibit 2 shows the soil map

(Attach documentation)

4. Hydric Soils? Yes No X

C. HYDROLOGY:

1. Type of Alteration: Approximately 2 feet of fill material placed on original surface

2. Effect on Hydrology The conditions at OP # 3 changed, the new fill material obstructs the natural flow of surface waters. There is man-induced wet area at this OP that retains surface waters from adjacent urbanization to the west of the site.

3. Previous Hydrology The historical photos (Exhibit 3 & 4) and the topographic map (Exhibit 5) show that a creek or river was not present a the site. The water moved as surface flow in a west to east direction.

(Attach documentation)

4. Wetland Hydrology? Yes * No X

*wetland hydrology found due to incidentally created wet area by man activities.

Characterized by: Héctor E. Quintero Ph.D