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Technical Memorandum

DATE: **August 1, 2005**

TO: **Sue Ray, P.E. SFWMD**

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SUBJECT: **Documentation of Existing Information, Site Conditions and Site History**
C-44 Reservoir/Stormwater Treatment Area (STA) Porject
CN040918, Work Order 6, Task 1, P507.5.1.2.6.1

1.0 PURPOSE

The purpose of this report is to provide a summary of the site history and site conditions for the approximately 12,000 acres of property associated with the C-44 Reservoir/Stormwater Treatment Area Project (C-44 Project). The site is located approximately midway between Lake Okeechobee and the Atlantic Ocean as shown on Figure 1.0. The C-44 Project is part of the Indian River Lagoon-South (IRL-S) Project Implementation Report (PIR)/ Environmental Impact Statement (EIS) (March 2004) under the Comprehensive Everglades Restoration Plan (CERP). The C-44 Project was formulated to support specific performance measures of the IRL-South Project. Similarly, the IRL-South Project was formulated to support the performance measures of the CERP. The C-44 Project will assist, along with the other projects within the IRL-South, in achieving the performance measures and targets to regulate the timing of water delivered to the IRL and reduce nutrient inputs to sensitive receiving ecosystems such as the St. Lucie Estuary (SLE).

This report provides a summary of existing site information based on a site reconnaissance, review of existing historical information including maps, survey information, geologic reports, previous site investigations, and a previously prepared Phase I and Phase II Environmental Site Assessment (ESA). The phase I/II ESA was provided by Camp, Dresser, & Mckee (CDM).

2.0 SITE RECONNAISSANCE

The C-44 Project site consists of approximately 12,000 acres of active citrus groves, including citrus trees, drainage ditches, and unpaved access roads. The current property configuration includes 32 onsite pump stations to facilitate grove irrigation located on the major north-south irrigation canals, each equipped with a diesel-driven motor. A maintenance and office compound (existing maintenance area) is located on a northwestern portion of the site. According to the grove manager, Mr. Wynn Randall, the irrigation and drainage ditches on site range in depth from approximately 8 feet to over 10 feet deep. A detailed survey of the onsite ditches will be performed under Work Order 8, Survey. A Florida Power and Light (FP&L) easement runs through the center of the site generally in a north-south direction and another FP&L easement is located along the north end of the western boundary. Figure 2.0 is an aerial photograph showing the major site features. Photographs of the site and surrounding area are included in Appendix A.

3.0 REVIEW OF EXISTING INFORMATION

This section provides a review of Project site conditions that have been documented as of 2004.

3.1 Historical Information

A series of aerial photographs, dated 1940, 1952, 1958, 1970, 1981, and 1999 were obtained from the U.S. Geological Survey (USGS), U.S. Army Corps of Engineers (USACOE), and the U.S Department of Agriculture. The following is a review of the available historical aerial photographs which include coverage of the Project site:

1940 – The site appears undeveloped and covered with numerous wetlands. The 1940 aerial photograph, which includes a major portion of the site, is included as Figure 3.0. The C-44 Canal is visible to the south of the site.

1952 – Numerous wetland areas are present across the site. Some row crop farming practices are present on the central and southern portions of the site. The C-44 Canal is visible to the south of the site, and the town of Indiantown is present to the southwest of the site. The 1952 aerial photograph is included as Figure 4.0.

1958 – The site appears much the same as in the 1952 aerial photograph with the exception of further development (ditches/canals and roads) on the west-central portion of the site. The C-44 Canal is visible to the south of the site. The 1958 aerial photograph is included as Figure 5.0.

1970 – As shown on Figure 6.0, the numerous wetland/muck areas which appeared on the 1952 and 1958 aerial photographs are no longer visible on the 1970 aerial. Roads and ditches/canals are apparent across the entire site. The site appears to have been drained and occupied primarily by citrus groves. A set of buildings is evident on the west central portion of the site in a location believed to be the "existing maintenance area" and also there appears to be a building to the south of the "existing maintenance area". This building is referred to by CDM in the Phase I/II ESA report as the former Pole Barn area. The existing FP&L transmission line easement appears to be present. Citrus Boulevard and the C-44 Canal are visible to the south of the site.

1981 – The site appears much the same as in the 1970 aerial photograph. A structure or structures appear to be visible in the east-central portion of the site in the approximate location referred to in the previously referenced Phase I/II ESA report the "former Coca-Cola maintenance shop or area". The 1981 aerial photograph is presented as Figure 7.0.

1999 – The site appears much the same as in the 1981 aerial photograph. However, the structure or structures which appeared in the approximate location of the "former Coca-cola maintenance area" on the 1981 aerial photograph are no longer visible. The 1999 aerial photograph is presented as Figure 8.0.

The review of historical aerial photographs indicates that the Project area was occupied by numerous wetland features prior to the development as farmland. Based on the aerial review, it

appears that the site was undeveloped until at least 1952, and occupied by numerous wetland features. Sometime between 1952 and 1970, the site was drained by ditching, and citrus operations began. Former site conditions having the potential to affect the reservoir design and construction are the areas of former wetlands where peat or 'muck' deposits may exist. These deposits would represent the former bottom sediments of the historic wetland features. The presence of these deposits will be confirmed during the *Geotechnical and Hydrogeological Site Characterization* being performed under Work Order No.6.

3.2 Review of USGS Quadrangle Map

The USGS Indiantown Quadrangle 7.5 Minute Series (Topographic) Map (1953, and photo revised in 1983) was reviewed. A copy of a portion of the topographic map is included as Figure 9.0. As shown on the map, the entire Project site is occupied by citrus groves. Swamp or marshland is illustrated adjacent to the north, east of the northern portion of the site and further to the south of the site. No topographic contours are shown on the 12,000 acre Project site. The topography of the areas surrounding the site is generally flat with several closed depressions representing wetland areas. The town of Indiantown is present to the southwest of the site. The Circle T Ranch Airport is present immediately to the west of the southern portion of the site.

3.3 Survey Information

Existing survey information indicates that the proposed C-44 Reservoir/STA Site is approximately 12,000 acres and is comprised of tracts of land owned by Running W (Tract No. JE100-030), Tesoro Groves (Tract No. JE100-031) and Aquacalma (Tract No. JE100-032) (Figure 10.0).

FP&L owns a parcel of land along the south boundary of the proposed C-44 Reservoir/STA Site for a power substation. An FP&L easement extends across the site in a northerly direction from the power substation. Another easement for FP&L transmission lines is located along the west property boundary of the proposed C-44 Reservoir/STA site (Figure 2.0).

Five easements, as shown on Figure 10.0, are granted along the south boundary of the site. Two of the easements convey water to the site for irrigation (Easements 1 and 5), and two drain water from the current citrus grove (Easements 3 and 4). Easement 2 is a drainage easement that does not currently drain to the C-44 Canal.

Troup-Indiantown Water Control District (TIWCD) has jurisdiction over the primary irrigation canal system where water is pumped from the C-44 Canal at Easement 5 and back to the C-44 Canal at Easement 3. The land tracts, easements and site drainage under TIWCD jurisdiction are depicted on Figure 10.0.

3.4 Geologic and Geotechnical Conditions

3.4.1 Geology/Hydrogeology

A review of geologic/geotechnical literature including USGS and South Florida Water Management District (SFWMD) reports, and the initial field investigation reports by CDM (2004) and Ardaman and Associates (December 2003). Previous field investigations consisted of soil borings, monitoring well installation, aquifer performance testing, and laboratory testing of soils. This summary of the site subsurface conditions is primarily based on the information provided by Ardaman and CDM.

The C-44 Project Area (Martin County, Florida) is underlain by up to 16,000 feet of shallow marine sedimentary deposits. Deposition of these sediments was the result of changes in paleoclimate and tectonic events that caused sea level fluctuations of various magnitudes. These sea level fluctuations also caused the current land surface topography to be formed.

The upper 100 to 150 feet of sediment is relevant to the design of the C-44 Project. These sediments range in age from Pleistocene to Pliocene, or from about 120,000 to 4.2 million years. The late Pleistocene sands of the Palmico Sand occur at the top of the section, and are underlain by quartz sand, shell, and a few minor limestones within the late Pleistocene Fort Thompson Formation. Marls, shell and sand deposits within the Caloosahatchee Formation underlie the Fort Thompson. Below the Caloosahatchee is the Pliocene age Tamiami Formation, which consists of clayey sands, sandy clays, shell beds, and some limestone. The surficial aquifer system occurs within this shallow stratigraphic section. Clayey sediments of the Peace River Formation of the Hawthorne Group form the base of the surficial aquifer system (CDM, 2004).

Martin County, including the project area, is underlain by two aquifer systems, the Surficial Aquifer System (SAS) and the Florida Aquifer System (FAS). The literature indicates that the SAS in Martin County generally consists of a sand/soil zone (thickness ~20-50 feet) of low to medium permeability, underlain by a producing zone (thickness ~40 to 50 feet) capable of providing relatively large quantities of water (Butler and Padget, 1995; Adams, 1992). The producing zone is underlain by a slightly lower permeability layer of calcareous mud, mudstone, sandstone and some limestone (thickness ~30 to 60 feet). The hydraulic conductivity of the upper sand/soil zone ranges from approximately 10 to 20 ft/d in western Martin County, and the hydraulic conductivity of the producing zone range from approximately 30 to 90 ft/d (Butler and Padget, 1995; Adams, 1992).

Karst Activity in Martin County and the Project Area

Generally, Martin County is located in an area where sinkholes are few, shallow, of small diameter, and dominated by cover subsidence sinkholes (Sinclair and Stewart 1985). Sinkholes develop by subsidence in areas where the limestone is covered by materials that are relatively incohesive and permeable. In areas where the sand cover is 50 to 100 feet thick, as in the case of the C-44 project site, few sinkholes generally occur. Subsidence sinkholes form when rainwater percolates through the incohesive sediments to underlying limestone, which dissolves. Under

these conditions, individual grains of sand move downward in sequence replacing limestone that has dissolved. Since the sand is replacing the limestone in sequence, cavities in the limestone cannot develop to appreciable size, thus the sinkholes are generally of small diameter (Sinclair, et al, 1985).

A site geotechnical investigation is being performed by HDR Engineering (Consultant) to help determine if any anomalous subsurface features exist at the site. Further discussion of the site specific conditions will be included in the Site Characterization Report being prepared under Work Order No. 6.

3.4.2 Previous Geotechnical Investigations

The *Preliminary Subsurface Investigations and Geotechnical Analyses, C-44 Water Management Project,* prepared by CDM (April 2004) was reviewed. The report presents the preliminary subsurface investigations and geotechnical analyses performed by Ardaman & Associates, Inc. (Ardaman) and CDM for the C-44 Reservoir/STA Project and provides recommendations for proceeding to the design phase of the project.

3.4.2.1 Field Investigations

The Ardaman subsurface investigation was conducted in the Fall of 2003 and consisted of the following:

- Forty-One (41) Standard Penetration Test (SPT) borings were drilled and sampled and include the following:
    - Eight (8) test borings drilled to a depth of 100 feet;
    - Thirty-three (33) test borings drilled to a depth of 45 feet.
- Sixty-eight (68) solid stem auger borings were drilled to a depth of 10 feet. The auger borings were performed in a grid pattern across the site to evaluate the suitability and extent of borrow materials;
- Sixteen (16) monitoring wells were also installed in clusters of 3 to 4 wells. The wells were installed with 5 foot screens at depths ranging from 2.8-7.8 feet below the land surface to 75-80 feet below the land surface. Groundwater levels in monitoring wells installed at the site were measured at depths ranging from approximately 5 to 11 feet below the ground surface in November of 2003.
- Field variable and constant head hydraulic conductivity tests were performed in the wells.

The CDM supplemental subsurface investigation was conducted from January through April of 2004 to identify the thickness of the surficial aquifer (i.e. depth to the Hawthorn Confining Zone), to further develop the hydraulic conductivity parameters of the subsurface strata and to investigate potential borrow materials. The CDM supplemental subsurface investigation consisted of the following:

- Four (4) deep SPT borings – Two of the borings were drilled to a depth of 100 feet and split spoon samples with SPTs were collected at five-foot intervals from 100 feet to a

depth ranging from 140 to 150 feet. The remaining two borings split spoon samples were collected by SPT continuously from the ground surface to a depth of 10 feet and at five-foot intervals from 10 feet to the depth of boring ranging from 135 to 140 feet. Furthermore, six (6) Shelby Tube samples were collected in the clayey sand layer at 2 to 9 feet below the existing grade and in the fine sand above the clayey sand a 1 to 4 feet below existing grade. The testing of the split spoon and undisturbed soil samples from the CDM investigation consisted of grain-size analysis, unit weight, specific gravity, Atterberg Limits, moisture content, organic content, hydraulic conductivity, consolidated –undrained triaxial tests and soil classification by the Unified Soil Classification System (USCS).

- The installation of three (3) 4-inch diameter aquifer performance test wells constructed with 100 foot screens. The bottom of the screened interval depth ranged from 130 to 136 feet below the ground surface. The aquifer performance tests were conducted by pumping each fully penetrating aquifer performance test for approximately 24 hours and measuring the drawdown level in the companion 2-inch monitoring well. The drawdown was measured by a well probe installed in the 2-inch monitoring well and connected to a data logger. The drawdown data from each fully penetrating monitoring well was analyzed using the Neuman method. Each well was pumped at a maximum rate without pumping air. Based upon the results, the calculated transmissivity ranged from 19,100 to 26,000 gpd/ft. The average horizontal conductivity ranged from 20 to 28 feet per day and the average vertical conductivity ranged from 0.35 to1 foot per day.

- The installation of eleven (11) 2-inch diameter monitoring wells by mud-rotary method. Three of the monitoring wells were constructed using a 100 foot screen with the bottom of the screen interval depth ranging from 135 to 137.5 feet below the ground surface.

- Performing twenty-three (23) test pits ranging in depth from 10 to 16 feet below the ground surface. The strata thickness and approximate depth to groundwater (at the time of the test pit activity) were noted. Two grab soil samples were collected from each strata layer and submitted for soil laboratory testing which consisted of grain-size analysis, specific gravity, Atterberg limits, moisture content, organic content, hydraulic conductivity, consolidated-undrained triaxial tests, and USCS classification.

The subsurface investigation also included field hydraulic tests in the well clusters to measure the in-situ hydraulic conductivity of various soil layers and the hydraulic conductivity properties of the surficial aquifer. The hydraulic testing consisted of variable head hydraulic conductivity tests and slug tests in discrete soil layers. In general, the hydraulic conductivity ranged from 64 to 124 feet per day in the deep wells and 12 to 43 feet per day in the shallow wells.

3.4.2.2 Previous Field Investigation Results

Information obtained during previous field investigations of the site indicate that the site is underlain by approximately 2 to 8 feet of fine sand to silty fine sand, which is underlain by 0 to 10 feet of slightly clayey to clayey fine sand. This clayey sand layer was characterized as

sufficient for the construction of a clayey core within the reservoir embankment for seepage control (CDM, 2004). The clayey sand layer may also serves as a semi-confining unit, retarding the vertical movement of seepage. Further investigation of the extent and characteristics of the clayey sand layer will be evaluated by the Consultant during the Basis of Design Report (BODR) under Work Order 5. The clayey sand layer is underlain by alternating layers of fine sand, silty fine sand, shell, and cemented fragments. Olive-gray slightly clayey, silty fine sand with phosphate is present at a depth of approximately 128 to 139 feet below ground surface, and represents the Hawthorne Group confining layer, which separates the SAS from the Upper Florida Aquifer.

CDM concluded that the surficial sand layer encountered across the site is suitable for use as embankment fill material. Due to the amount of fines (mostly silt) and fine sand present in the material, a laboratory testing program will be required to determine its suitability for use in the soil-cement mix for the soil-cement slope protection. The clayey to slightly clayey sand layer, encountered beneath the surficial sand layer is suitable for use as the embankment dam core and key trench materials. In general, excavation activities for borrow materials shall be performed at least 200 feet from the nearest embankment or internal berm.

Seepage analyses were performed by CDM for the embankment, STA, and the perimeter canal in accordance with engineering manual USACOE EM-1110-2-1901. The seepage analysis indicated that the clayey sand, assumed to be continuous throughout the reservoir/STA and surrounding agricultural areas, does not totally prevent significant seepage into the lower, more pervious sands. However, the seepage modeling did demonstrate that insignificant water table changes would occur beyond the perimeter canal, for the baseline case. The analysis also indicated that a perimeter canal designed to breach the clayey sand would acts as an effective groundwater drain reducing groundwater seepage from the reservoir/STA complex from migrating past the perimeter canal.

The stability analyses indicated that the embankments are stable with adequate bearing capacity. The settlement analyses indicate that the total and differential settlement for the embankment should be within acceptable limits.

CDM stated that the above recommendations and conclusions are based upon the information available at the time of the geotechnical report submittal (April, 2004).

3.4.3 SFWMD Comments to Proposed C-44 Reservoir Design in *Preliminary Subsurface Investigations and Geotechnical Analyses, C-44 Water Management Project C-44, CDM (April 2004).*

The following comments related to the project design were provided by SFWMD in response to the CDM report.

- SFWMD questions how the clayey sand core will be constructed using onsite material as it may be plastic and wet when excavated.

- SFWMD mentioned that the use of calcium-rich sands may not be a good idea based on the acidity of the groundwater. SFWMD is concerned that groundwater will react with the calcium and be carried in solution and deposit. SFWMD suggested using non-reactive sands like granite fines as was used for the Tampa Bay regional reservoir.

- SFWMD asked about a source of riprap in the vicinity. SFWMD recommended rip-rap instead of using soil-cement due to known settlement cracking and associated maintenance.

- SFWMD suggested use of impermeable liner followed by a seepage barrier to the clay layer should be considered.

- SFWMD suggested looking into allowing overtopping and therefore it would be necessary to perform a risk analysis.

- SFWMD questions the design reservoir crest width of 16 feet.

These questions and comments will be addressed in the Basis of Design Report to be prepared by the Consultant.

3.5 Water Resources Analysis

The *Water Resources Analysis for the C-44 Water Management Project* (April, 2004) prepared by CDM was reviewed. The water resources analysis included collection and evaluation of data, development of an annual hydrologic mass balance for the site and C-44 Canal, and the development of surface and groundwater models and evaluation tools to evaluate hydrology, hydraulics, and water quality to size design features and identify ranges of operation for the facility. The groundwater models indicated that seepage and associated potential groundwater mounding can be controlled along the site perimeter with the seepage control system as detailed in the CDM geotechnical report and the conceptual design features as listed in the report. The results of the analyses demonstrated that the proposed C-44 Reservoir/STA site is feasible from a water resources perspective. The proposed location is considered well-suited to capture appreciable flow from the C-44 Canal for attenuation and treatment. Rainfall patterns, soils, topography, land use, hydraulics, and water quality are all conducive for the intended site use as a reservoir and STA.

3.6 Additional Subsurface Investigations for Basis of Design Report

Additional subsurface investigation will be performed at the site during the BODR phase of the Project to provide additional information on the site stratigraphy, specifically the depth, thickness, and extent of shallow clayey sand unit, the geotechnical properties of the shallow soils that will be used for borrow material, the performance of the embankment foundation, and the soil cement mixing properties of the shallow soils. A seepage analysis and numerical modeling will be performed to evaluate seepage from the reservoir and STAs to adjacent canals and off-site properties. Geophysical techniques will be utilized to help map the shallow stratigraphy and

the clayey sand unit. A site characterization report will be prepared that will summarize the geologic and geotechnical site conditions.

3.7 Environmental Site Assessments

The *Phase I/II Environmental Site Assessment* report (dated, December, 2004) prepared by CDM includes the current proposed property configuration comprised of Township 39 South, Range 39 East (Figure 1.0). The purpose of the Phase I environmental assessments were to identify any "recognized environmental conditions" (RECs) at the site, which is defined in ASTM E1527-00 as "the presence or likely presence of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property." The Phase I identified eleven (11) REC areas for further investigation (Figure 11.0).

An initial Phase II ESA investigation was conducted in the REC areas in December of 2003. Based on the results of the initial Phase II ESA investigation, additional sampling was required to address constituents of potential concern and to allow application of the SFWMD, the United States Fish and Wildlife Service (FWS) and the Florida Department of Environmental Protection (FDEP) protocols for evaluating properties with current and/or historical agricultural activities (with reported significant agrochemical use) that eventually will be inundated or partially inundated, either as components of regional water attenuation reservoirs, STAs, or restored wetlands.

Laboratory analyses from soil and groundwater samples collected from the site were compared to applicable criteria. Applicable criteria include the following human health and ecological numerical criteria:

- The FDEP sediment quality assessment guidelines (SQAGs) threshold effect concentrations (TECs) and probable effects concentrations (PECs) for protection of sediment-dwelling organisms (D.D. MacDonald, C.G. Ingersoll, D.E. Smorong, R.A. Lindskoog, G. Sloane, and T. Biernacki, *Development and Evaluation of Numerical Sediment Quality Assessment Guidelines for Florida Inland Waters*, Technical Report, Florida Department of Environmental Protection, January 2003);

- Soil cleanup target levels (SCTLs) and groundwater cleanup target levels (GCTLs) established in Chapter 62-777 F.A.C.;

- The provisional risk-based value for copper developed by the FWS for protection of the Snail Kite. This criterion of 85 mg/kg copper effectively supersedes the SQAG PEC and TEC; and

- Site-specific risk-based criteria for parameters with no accepted numerical criteria (Paraquat and 2, 4-D) developed as part of the Screening Level Ecological Risk Assessment (SLERA) by Environmental Consulting & Technology, Inc. (ECT) under contract to CDM.

The following sections discuss the findings in each of the RECs that were identified on the site in the Phase I/II ESA report by CDM. The results of the Phase I/II ESA are summarized in Table 1.0 and the locations of the RECs are shown on Figure 11.0.

3.7.1 REC #1 Cultivated Area (Site-wide application of chemicals)

This REC is associated with the application of pesticides, insecticides, fungicides, herbicides and fertilizers during the historical cultivation of row crops and the existing citrus grove. Copper, arsenic, and silver were detected in soil samples obtained in REC 1. The maximum detected concentrations of arsenic, copper, and silver exceed either the applicable SQAG and/or SCTL. The sample locations for this REC are depicted on Figure 12.0

CDM stated in the Phase I/II ESA report that remedial action to address ecological risks prior to inundation will be necessary for this REC. Possible remediation methods mentioned in the CDM report are soil inversion technology or using the soil containing metal concentrations in exceedance of the PECs for berm construction. CDM recommended soil inversion as a remedial technology for the REC. The recommended areas of soil remediation related to this REC are depicted on Figure 13.0.

3.7.2 REC #2 Former Coca-cola Maintenance Shop

The former Coca-cola maintenance shop was reportedly used as a repair facility constructed between 1958 and 1971 and taken out of service between 1986 and 1990. The shop was reportedly destroyed in 1990 and the former shop location is currently cultivated with orange grove. The former location of the shop is the southeast corner of the northeast one-quarter of Section 22. The approximate location of the former Coca-cola maintenance shop is shown on Figure 11.0.

Copper was detected in all of the soil samples collected from this area. Seven sample results exceeded the TEC and the concentration of one (1) sample exceeded the Snail Kite PEC. CDM recommended remedial action to address the copper concentrations reported in the soil related to this REC. The area of recommended soil remediation is depicted on Figure 14.0

3.7.3 REC #3 Irrigation Pump Stations

Grove irrigation is facilitated by 32 onsite pump stations each equipped with a diesel-driven motor. Diesel fuel supply for the motors is stored in double-walled 1,000 gallon steel aboveground storage tanks (ASTs) located adjacent to each pump house. In the 1990s, these double-walled ASTs replaced single-walled steel ASTs that were formerly located on skids outside of each pump station. Thirty-two pump stations are located on the site. The approximate pump station locations are depicted on Figure 15.0.

Results of the Phase II ESA indicate that petroleum contamination exists at six of the pump stations (806, 822, 808, 818, 816 and Gardinier G1) in concentrations that exceed the PECs and TECs for specific Polyaromatic Hydrocarbons (PAH) analytes. The investigation also

determined that groundwater contamination (petroleum constituents) was present at pump station 806 located near the northwest corner of the site.

CDM stated that the ASTs should be abandoned in accordance with FDEP requirements specified in Chapter 62-761, F.A.C. and that since all of the ASTs were installed with secondary containment, closure assessments would not be required. CDM recommended additional testing at the time of the removal of the ASTs and associated pumps.

CDM recommended soil removal as a remediation technology for this REC.

3.7.4 REC #4 Concrete Wash/Mixing Pads

According to the Phase I/II ESA report by CDM, four concrete pads were observed on a southeastern portion of the site which have been used for equipment washing and/or chemical mixing areas. The locations of the concrete wash/mixing pads are depicted on Figure 11.0 (REC Location Map). The concrete wash/mixing pad soil and sediment sample locations are depicted on Figure 16.0.

Copper was measured in all 16 samples from this REC. Eight of the samples exceed the TEC and 6 samples exceed the *Snail Kite* PEC. Zinc was measured in 14 of the 16 samples collected from this REC. Two of the samples exceed the TEC and none exceed the PEC. 4, 4-DDE was measured in 2 of the 14 samples collected from this REC. The measured 4, 4-DDE concentrations in these samples exceed the TEC. According to CDM, the measured 4, 4-DDE concentrations did not exceed the PEC.

CDM recommended soil removal to address copper, zinc, and 4,4-DDE concentrations in the soil samples. The recommended areas of soil remediation related to this REC are depicted on Figure 17.0.

3.7.5 REC #5 Former Via Tropical Maintenance Facility

The Former Via Tropical Maintenance Facility is situated in the eastern portion of the southeast quarter of Section 24 as shown on Figure 11. The maintenance facility includes two buildings which historically and/or currently were used to store and maintain equipment and vehicles. It was also reported that gasoline and diesel fuel were stored in this area

The sample locations associated with the Former Via Tropical Maintenance Facility are depicted on Figure 18.0. Copper was measured in all eighteen (18) of the soil samples related to this REC. According to CDM, 11 results exceed the TEC and 4 of the results exceed the *Snail Kite* PEC. Zinc was measured in all 18 of the soil samples related to this REC. Zinc concentrations in 5 of the soil samples exceed the TEC. Chlordane was measure in 2 of the soil samples related to this REC. The chlordane concentrations in each of the samples exceed the TEC and PEC.

CDM recommended soil removal as a remedial action to address the copper, zinc, and chlordane concentrations measured in the soil samples related to this REC. The recommended remediation areas are depicted on Figure 18.0.

3.7.6 REC # 6 Former Pole Barn

The pole barn, formerly located on the west side of the northwest one-quarter of Section 16 was utilized for equipment storage. The pole barn was apparently present from the late 1960s until the mid 1980s and is currently cultivated with an orange grove. The general location of the Former Pole Barn is depicted on Figure 11.0.

The soil sample locations for this REC are shown on Figure 19.0. Only copper was detected at a concentration that exceeds applicable criteria. Copper was detected in all soil samples collected from this area and all results exceed the TEC. One (1) of the soil samples exceeded the Snail Kite PEC of 85 mg/kg.

Soil inversion was recommended as a remediation strategy to address the measured copper concentrations in the soil related to this REC. The area of recommended soil remediation is depicted on Figure 19.0.

3.7.7 REC #7 and #10 Burn/Mix/Load Areas

Citrus tree waste, consisting generally of dead and/or replaced citrus trees and pruned limbs, is burned onsite. A small amount of diesel fuel is reportedly spread over the tree debris to start the burn pile fires. Mixing operations are performed at temporary stations that are established in the specific area where chemicals are going to be applied. These areas are generally located on grove roads adjacent to canals or in designated ramp areas. Reportedly, the designated mixing locations were moved frequently to avoid creating impacts. The general locations of the burn/mix/load areas are depicted on Figure 11.0.

The sample locations for this REC are depicted on Figure 20.0. Copper was measured in all of the soil samples collected for this REC, with some exceeding the TEC and the Snail Kite PEC. Total Recoverable Petroleum Hydrocarbons (TRPH) were measured in 44% of the soil samples and exceeded the residential SCTL. Soil inversion was recommended as a remedial action to address the copper and TRPH concentrations in the soil samples related to this REC.

3.7.8 REC #8 Existing Maintenance Area

The existing maintenance area is utilized to maintain vehicles and equipment, and has been active since the early 1960s. The location of the maintenance area is shown on Figure 11.0. The maintenance area has also reportedly been used for the storage of pesticide, fertilizer and other chemicals used in support of citrus cultivation and facility operations. Furthermore, diesel fuel, gasoline and various oils have historically and/or currently been stored and dispensed in the existing maintenance area.

Based on laboratory analysis of soil samples collected from the existing maintenance area, CDM recommended remedial action to address the TRPH, lead, cadmium, zinc, 4,4-DDE, and copper concentrations measured in the soil samples related to this REC. Petroleum related hydrocarbons were also detected in groundwater at this REC. Soil inversion and soil removal (for TRPH contamination) were recommended as remedial actions for this REC. Groundwater remediation consisting of excavating to groundwater level for atmospheric exposure was recommended for this REC. The recommended soil remediation areas related to this REC are depicted on Figure 21.0.

3.7.9 REC #9 Former Nursery Area

A large building (greenhouse nursery) was formerly located on the west side of the southwest one-quarter of Section 9. Although there are no current facilities located in this area there was a 20,000 gallon AST located northwest of the former location of the greenhouse in the mid to late 1980's. This former nursery location has subsequently been cultivated with citrus crops. The general location of the former nursery area is depicted on Figure 11.0.

Only the concentration of copper exceeds any of the applicable criteria; However, the copper concentration is below the *Snail Kite* PEC. CDM did not recommend remediation to address the copper concentrations measured in the soil samples related to this REC.

3.7.10 REC #11 Runway Staging Area

Based on interviews with employees, CDM stated that a grove road on the site was used as a make-shift airstrip to facilitate the aircraft used in the citrus crop chemical application process. Reportedly, the north and south ends of the road are the primary areas used for staging of equipment and supplies in support of the loading of aircraft in preparation of aerial chemical spraying. ASTs were also associated with the runway staging area to store chemicals applied to the grove.

Based on the Phase II ESA investigation, CDM recommended soil remediation due to the elevated concentrations of copper, zinc, DDE and endosulfan measured in soil samples analyzed from the runway staging area. CDM recommended remediation by soil removal (DDE and endosulfan contamination) and soil inversion (copper and zinc contamination). Soil sample locations and remediation areas are shown on Figures 22.0 and 23.0.

3.7.11 Canals and Ditches

The CDM Phase I/II ESA Report stated that soil sediment samples were collected from canals and ditches that received runoff from row crop areas or were associated with maintenance areas or pump stations. Samples were reportedly collected from the terminus of the ditch nearest the selected pump station or near the discharge points of the ditches that drain the areas where sediment was observed to be accumulating. The canal and ditch sample locations are depicted on Figure 24.0.

Analytical results for the canal and ditch sediment sampling show that barium exceeded the TEC value at Sample CD-13 and copper exceeded the TEC value Sample CD-9 and CD-14). Remedial action was recommended in these areas to address ecological risks prior to inundation.

4.0 SITE HISTORY AND SITE CONDITIONS SUMMARY

Based on a review of available historical aerial photography, the site was undeveloped and covered with numerous wetlands in 1940. On the 1952 aerial photograph, some man-made drainage features and roads appeared across the site. Some row cropping was evident at this time. Further progression of additional man-made features was evident on the 1958 aerial photograph. On the 1970 aerial photograph the site appeared to have been drained as the numerous wetlands were no longer present. The site appeared to be primarily occupied by a citrus grove with some structures first evident. The site appeared much the same in the 1981 through the 1999 aerial photographs with the exception of the presence or absence of various structures through time.

Existing survey information indicates that the proposed C-44 Reservoir/STA Site is approximately 12,000 acres and is comprised of tracts of land owned by Running W, Tesoro Groves and Aquacalma. Geologically, the C-44 Project Area (Martin County, Florida) is underlain by up to 16,000 feet of shallow marine sedimentary deposits. The upper 100 to 150 feet of sediment is relevant to the design of the C-44 Project. The SAS occurs within this shallow stratigraphic section. The literature indicates that the SAS in Martin County generally consists of a sand/soil zone (thickness ~20-50 feet) of low to medium permeability, underlain by a producing zone (thickness ~40 to 50 feet) capable of providing relatively large quantities of water.

An initial subsurface investigation was conducted by Ardaman in the fall of 2003 which consisted of SPT borings, auger borings, monitoring well installation, field hydraulic conductivity tests and laboratory testing. A subsequent geotechnical investigation performed by CDM in January to April 2004 consisted of SPT borings, test pits, monitoring well installation, aquifer performance well installation, field hydraulic conductivity testing and laboratory testing. Based on the geotechnical investigation, CDM concluded that the C-44 Reservoir/STA site is adequate for the construction of the proposed project.

The water resources analyses previously performed at the site included collection and evaluation of data, development of an annual hydrologic mass balance for the site and C-44 Canal, and the development of surface and groundwater models and evaluation tools to evaluate hydrology, hydraulics, and water quality to size water resources design features and identify ranges of operation for the facility. The results of the analyses demonstrated that the proposed C-44 Reservoir/STA Site is feasible from a water resources perspective.

The Phase I/II ESA prepared by CDM identified recognized environmental conditions at areas throughout the site. Remediation of the identified RECs will be required prior to or during construction, depending on the agreed upon methodology. Additional subsurface investigations will are being performed at the C-44 site for the Basis of Design, and additional work will likely be performed for 30% Design phases of the project.

5.0 REFERENCES

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U. S. Department of Agriculture – Agricultural Stabilization and Conservation Service, 1952, 1958 and 1970 aerial photographs.

U.S. Geological Survey. 1953 (photorevised 1983), Indiantown Quadrangle 7.5 Minute Series (Topographic) Map.

U. S. Geological Survey, 1999 aerial photograph.

TABLES

Table 1.0

C-44 Reservoir/STA Project
Summary of Contaminants Detected in REC Areas

Contaminant	Significance	TEC	PEC	REC Affected	Exceeds TEC	Remedial Action	Remediation Suggested
Copper (Cu)	Strongly attaches to organic matter and minerals in soils. Travels easily in surface waters. Copper rich soils limit the number of plants surviving. Copper can disrupt activity of microorganisms and earthworms in soil.	32 mg/kg	150 mg/kg 85 mg/kg *	1 2 3 4 5 6 7 8 9 10 11 Canals & Ditches	Y Y N Y Y Y Y Y Y Y Y Y	Recommended Recommended Not Recommended Recommended Recommended Recommended Recommended Recommended Not Recommended Recommended Necessary Recommended	Soil Inversion Technology OR Use contaminated soil in berm construction
Arsenic	Inorganic arsenic can cause genetic alterations in the fish of the surface waters. Birds die from eating contaminated fish. Human exposure to inorganic arsenic can cause various health effects from stomach and intestine irritation to damage of DNA.	9.8 mg/kg	33 mg/kg	1 5 7 8 10 11	N N N N N N	Not Recommended Not Recommended Not Recommended Not Recommended Not Recommended Not Recommended	Soil Inversion Technology OR Use contaminated soil in berm construction
Zinc	Fish accumulating zinc in their bodies it is able to bio magnify up the food chain. Water-soluble zinc can contaminate groundwater. Zinc rich soils have limited plant survival and negatively effect microorganisms and earthworms in the soil.	120 mg/kg	460 mg/kg	2 4 5 8 11	Y Y Y Y Y	Combined w/ Cu Remediation Recommended Recommended Recommended Recommended	Soil Inversion Technology OR Use contaminated soil in berm construction
Barium	water-soluble barium may cause breathing difficulties, increased blood pressures, heart rhythm changes, stomach irritation, swelling of brain and liver, or kidney and heart damage.	20 mg/kg	60 mg/kg	7 8 10 Canals & Ditches	Y Y Y Y	Not Recommended Not Recommended Not Recommended Not Recommended	Soil Inversion Technology OR Use contaminated soil in berm construction
Cadmium	Causes various human health concerns and negative effects on earthworms at low concentrations.	1 mg/kg	5 mg/kg	8	Y	Recommended	Soil Inversion Technology OR Use contaminated soil in berm construction
Lead	Lead poisoning of water and soil organisms, effecting the health of the entire system. Negative human	36 mg/kg	130 mg/kg	8	Y	Recommended	
Silver	Numerous human health damages possible.	1 mg/kg	2.2 mg/kg	1	N	Not Recommended	
Acenaphthene Napthalene 1-methylnapthalene o-Xylene 1,2,4 Trimethylbenzene 1,3,5 Trimethylbenzene m&p Xylenes TRPH	liver nasal nasal neurological none specified none specified neurological multiple endpoints - mixed contaminants	GWLC=2100 mg/kg GWLC=1700 mg/kg GWLC=2200 mg/kg GWLC=200 mg/kg GWLC=300 mg/kg GWLC=300 mg/kg GWLC=200 mg/kg GWLC=340 mg/kg	FWLC=700 mg/kg FWLC=2,200 mg/kg FWLC=10,000 mg/kg FWLC=3900 mg/kg FWLC=7200 mg/kg FWLC=6700 mg/kg FWLC=3900 mg/kg FWLC=340 mg/kg	8 (R8-S1, R8-S6, R8-S12, R8-S18, R8-S19, R8-S22)	GWLC or FWLC exceeded	Recommended	Soil Removal
Acenaphthene (in GW) Anthracene (in GW) Naphthalene (in GW) 1-Methylnaphthalene (in GW) 1,2,4 Trimethylbenzene (in G m&p Xylenes (in GW)	liver none specified nasal nasal none specified neurological	GWC=20 ug/L GWC=2100 ug/L GWC=14 ug/L GWC=28 ug/L GWC=10 ug/L GWC=20 ug/L	SWC=3 ug/L SWC=0.3 ug/L SWC=26 ug/L SWC=95 ug/L SWC=220 ug/L SWC=370 ug/L	8	GWC exceeded GWC exceeded GWC exceeded GWC exceeded GWC exceeded GWC exceeded	Recommended at R8-MW1 & R8-MW8	Excavate to GW level for atmospheric exposure

Table 1.0

C-44 Reservoir/STA Project
Summary of Contaminants Detected in REC Areas

Contaminant	Significance	TEC	PEC	REC Affected	Exceeds TEC	Remedial Action	Remediation Suggested
Anthracene Fluoranthene Chrysene Fluorene Phenanthrene Pyrene	none specified blood-kidney-liver carcinogen blood-kidney-liver kidney liver	GWLC=2500 mg/kg GWLC=1200 mg/kg GWLC=77 mg/kg GWLC=160 mg/kg GWLC=250 mg/kg GWLC=880 mg/kg	FWLC=0.4 FWLC=1.3 mg/kg NS FWLC=17 mg/kg NS FWLC=1.3 mg/kg	3 (PS 808, PS 816, PS 818, PS 822 & Gardinier PS-1)	FWLC exceeded	Recommended	Soil Removal
Chlordane	carcinogen - liver	3.2 µg/kg	18 µg/kg	5	Y	Recommended	Excavation and Off-site disposal
Anthracene (in GW)	none specified	GWC=2100 ug/L	SWC=0.3 ug/L	3 (PS 806)	GWC exceeded	No Recommendation stated	No recommendation stated
TRPH	multiple endpoints - mixed contaminants	GWLC 340 mg/kg TEC not established	FWLC 340 mg/kg	5 (R5-S14) 7 10	GWLC exceeded GWLC exceeded GWLC exceeded	No recommendation stated Recommended Recommended	No recommendation stated Excavation and Off-site disposal
Naphthalene	nasal	180 ug/kg FWLC 2200 µg/kg	560 ug/kg GWLC 1200 µg/kg	2 (R2-S1 & R2-S8)	Y	No recommendation stated	No recommendation stated
Endosulfan II	cardiovascular - kidney	FWLC 5 µg/kg	GWLC 3800 µg/kg	4	GWLC exceeded	Recommended at R4-S2	Excavation and Off-site disposal
4,4-DDE	carcinogen	3.2 µg/kg (sum DDE)	31 µg/kg (sum DDE)	4 8	Y Y	Recommended at REC4D Recommended	Excavation and Off-site disposal

Notes:

TEC- Theshold Effect Concentration (Table 5.1 Sediment Quality Assessment Guidelines for the Protection of Sediment Dwelling Organisms in Florida) *Development and Evaluation of Numerical Sediment Quality Assessment Guidelines for Florida Inland Waters* (MacDonald Environmental Sciences, LTD. and USGS, 2003)

PEC- Probable Effect Concentration (Table 5.1 Sediment Quality Assessment Guidelines for the Protection of Sediment Dwelling Organisms in Florida) *Development and Evaluation of Numerical Sediment Quality Assessment Guidelines for Florida Inland Waters* (MacDonald Environmental Sciences, LTD. and USGS, 2003)

FWLC- Freshwater Leachability Criteria (FAC Chapter 62-777 Table II Soil Cleanup Target Levels)

GWLC- Groundwater Leachability Criteria (FAC Chapter 6-777 Table II Soil Cleanup Target Levels)

REC- Recognized Environmental Conditions

PS- Pump Station

SWC- Surface Water Criteria (Florida Administrative Code Chapter 62-777 Table I Groundwater and Surface Water Cleanup Target Levels)

GWC- Groundwater Criteria (Florida Administrative Code Chapter 62-777 Table I Groundwater and Surface Water Cleanup Target Levels)

GW- Groundwater

PAH - Polynuclear Aromatic Hydrocarbons

TRPH - Total Recoverable Petroleum Hydrocarbons

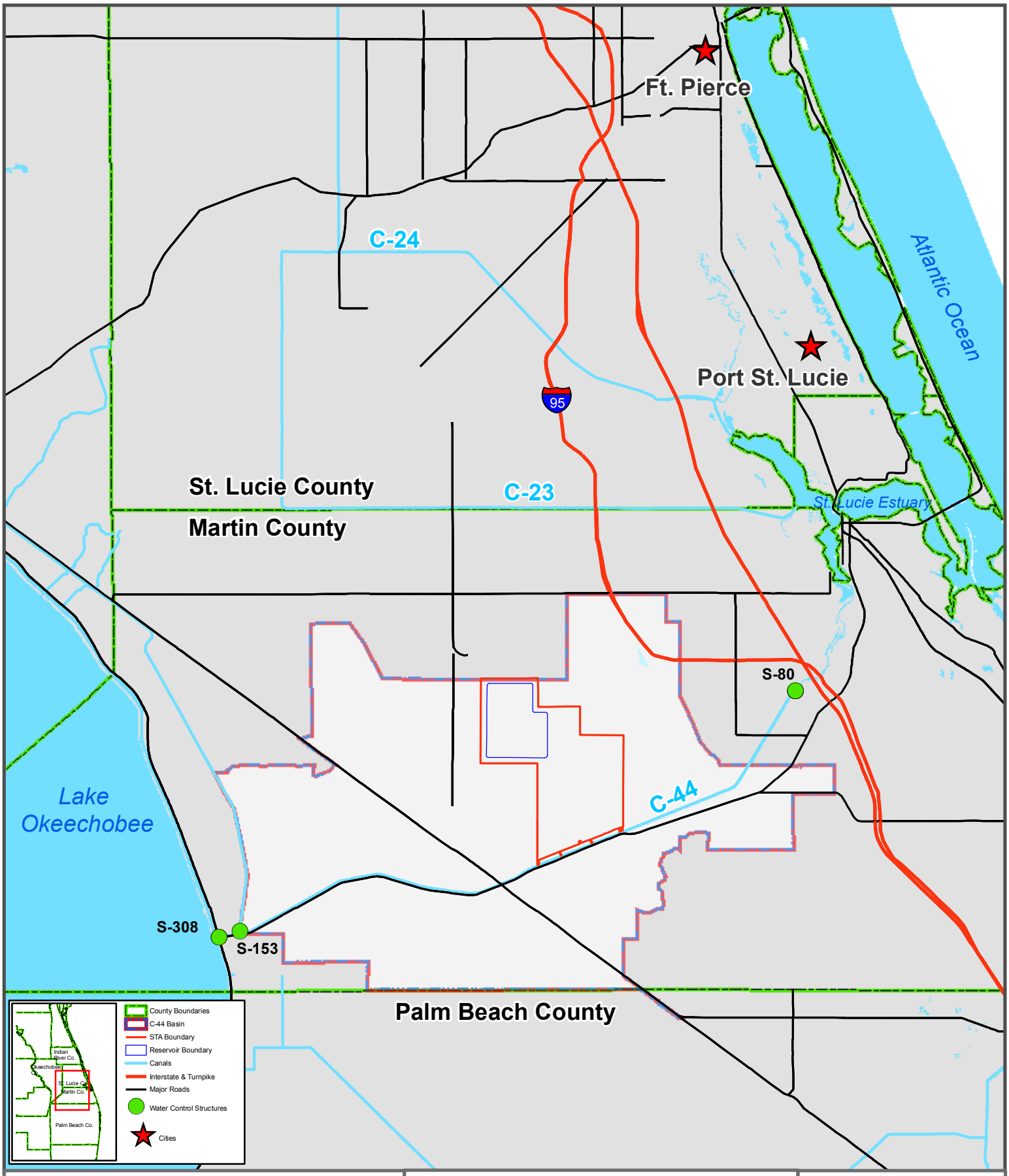
Significance information provided by www.lenntech.com and Table II (Soil Cleanup Target Levels) of Chapter 62-777 of the Florida Administrative Code

* U.S. Fish and Wildlife Service (FWS) provisional risk-based concentration level for protection of the Snail Kite

NS- No standard established

This table is generated from conclusions and recommendations provided in Phase I/II Environmental Site Assessment report (2004) prepared by CDM

FIGURES



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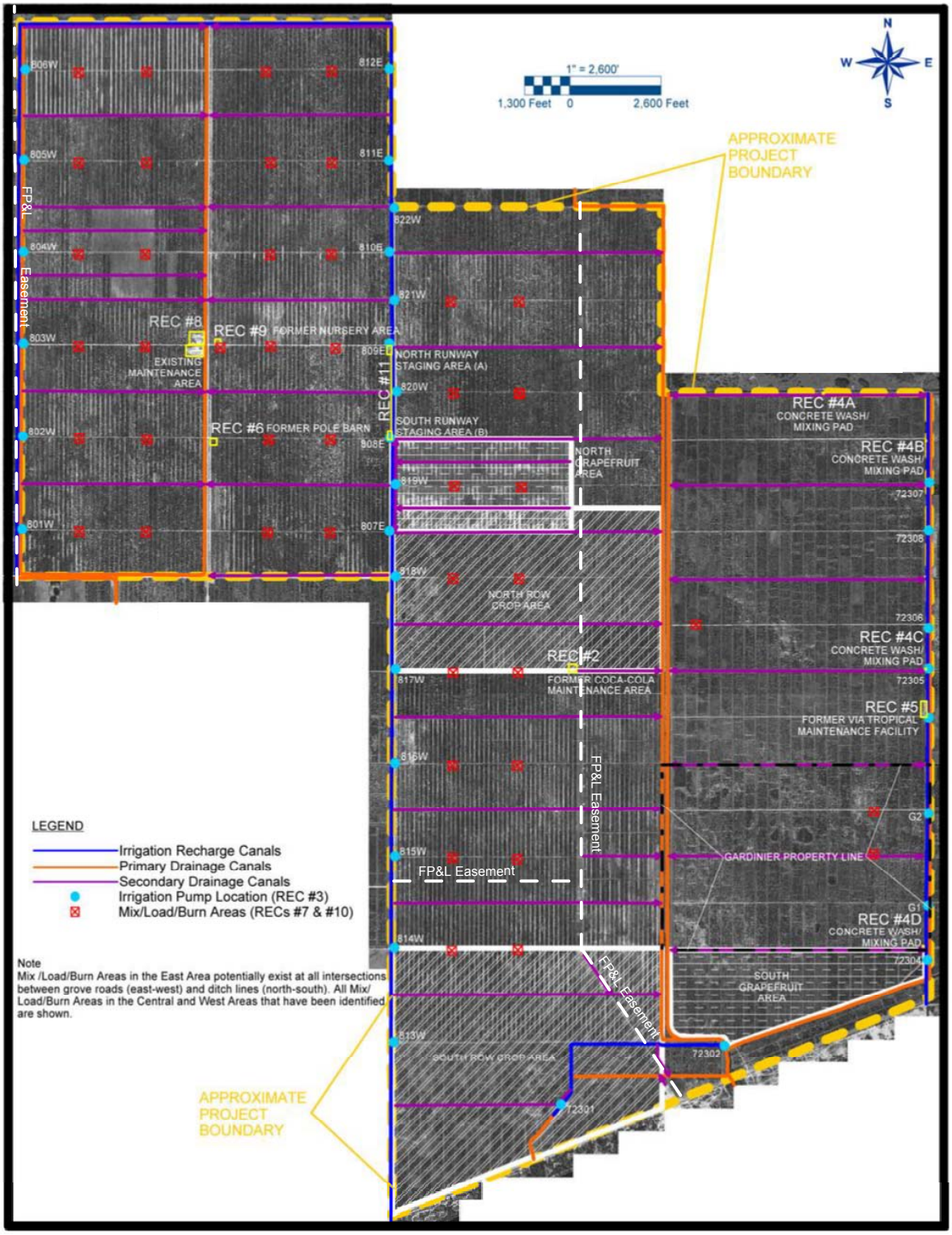
HDR ENGINEERING, INC.
2202 N. WEST SHORE BLVD.
SUITE 250
TAMPA, FL 33607

C44 Reservoir/STA Project Location Map

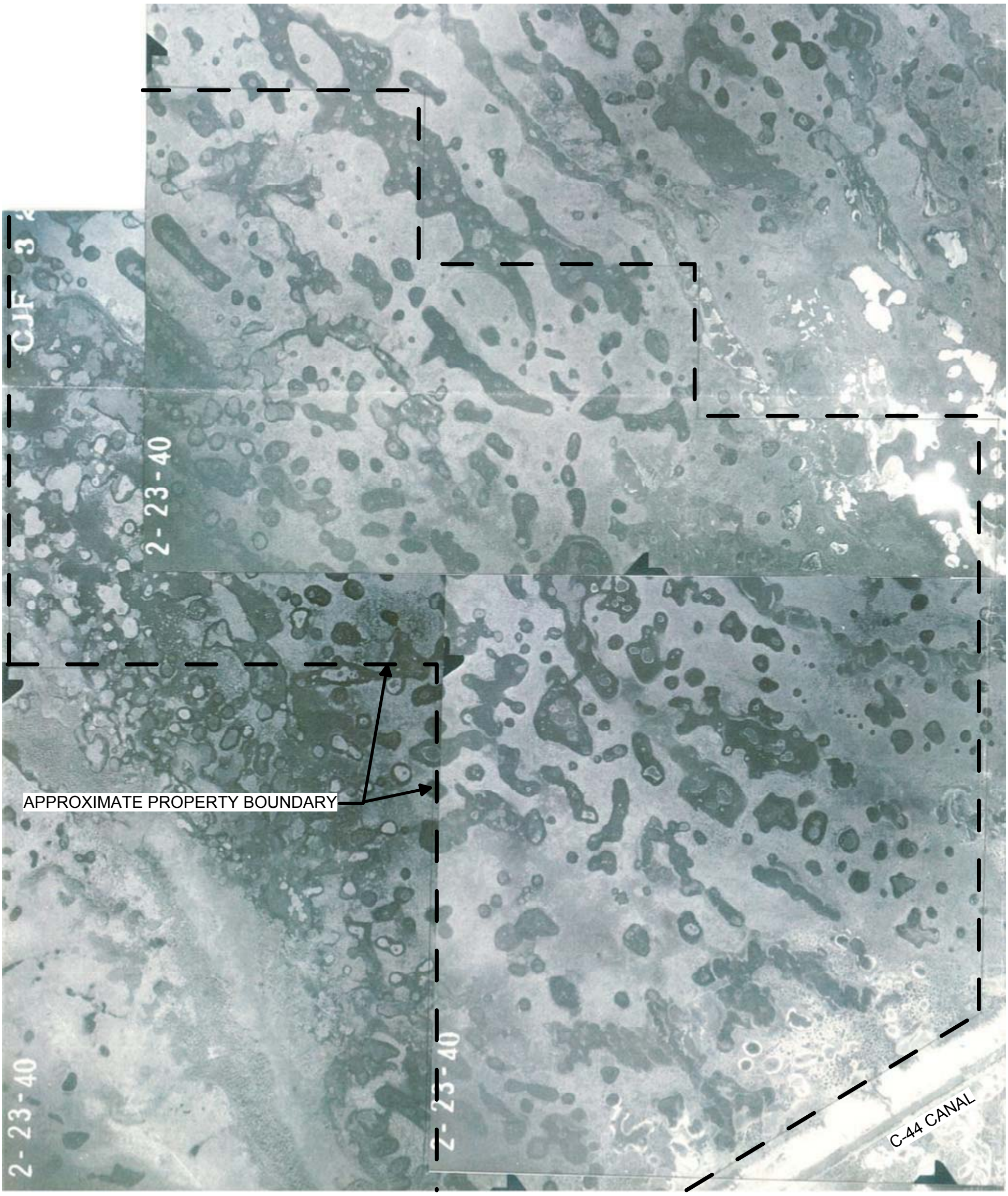
DATE
06/14/05

FIGURE
1.0



Ref: CDM Phase I/II ESA, December 2004

	HDR ENGINEERING, INC. 2202 N. WEST SHORE BLVD. SUITE 250 TAMPA, FL 33607 CA 4213	**Site Aerial and Site Features** **C-44 Reservoir/STA Project**	DATE 06/16/05 FIGURE **2.0**



Source: U. S. Army Corps of Engineers

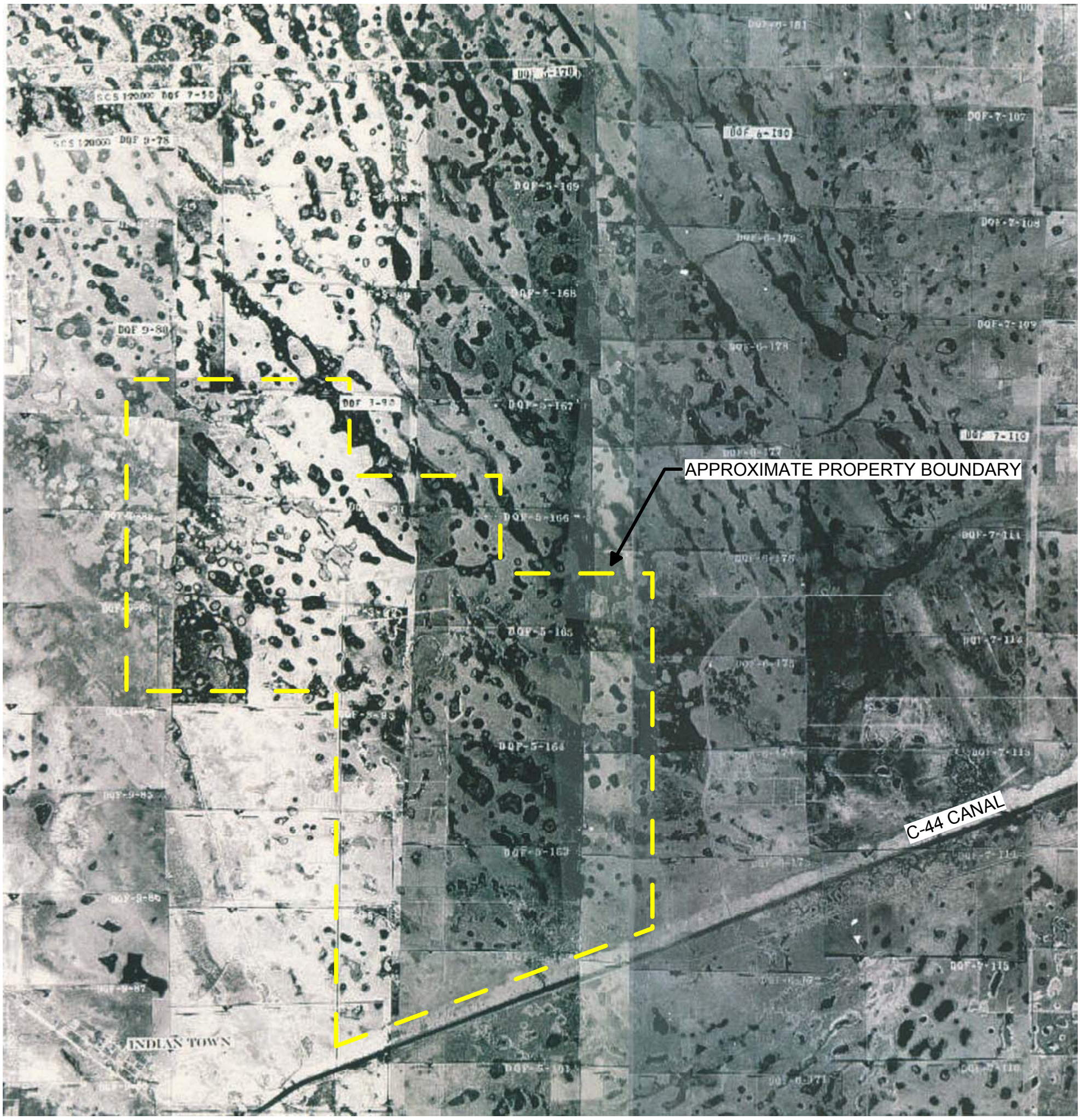
N

HDR ENGINEERING, INC.
2202 N. WEST SHORE BLVD.
SUITE 250
TAMPA, FL 33607
CA 4213

1940 Aerial Photograph
C-44 Reservoir/STA Project

DATE
04/25/05

FIGURE
3.0



Source: U.S. Department of Agriculture - Soil Conservation Service

N

sfwmd.gov ACCELER8 evergladesnow.org	HDR ENGINEERING, INC. 2202 N. WEST SHORE BLVD. SUITE 250 TAMPA, FL 33607 CA 4213	**1952 Aerial Photograph** **C-44 Reservoir/STA Project**	DATE 06/16/05 FIGURE **4.0**

Source: U.S. Department of Agriculture - Commodity Stabilization Service

N

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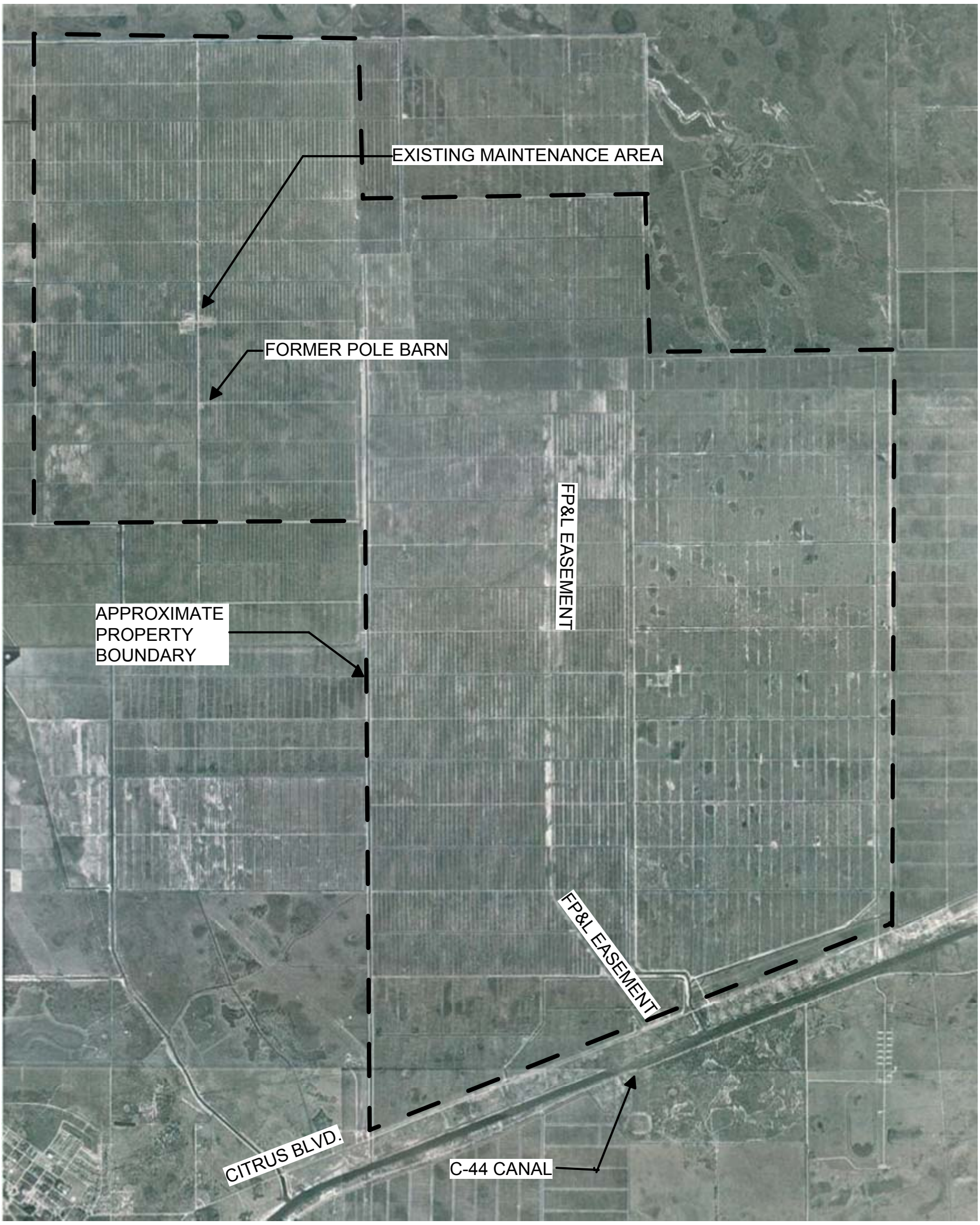
HDR ENGINEERING, INC.
2202 N. WEST SHORE BLVD.
SUITE 250
TAMPA, FL 33607
CA 4213

1958 Aerial Photograph
C-44 Reservoir/STA Project

DATE
06/16/05

FIGURE
5.0



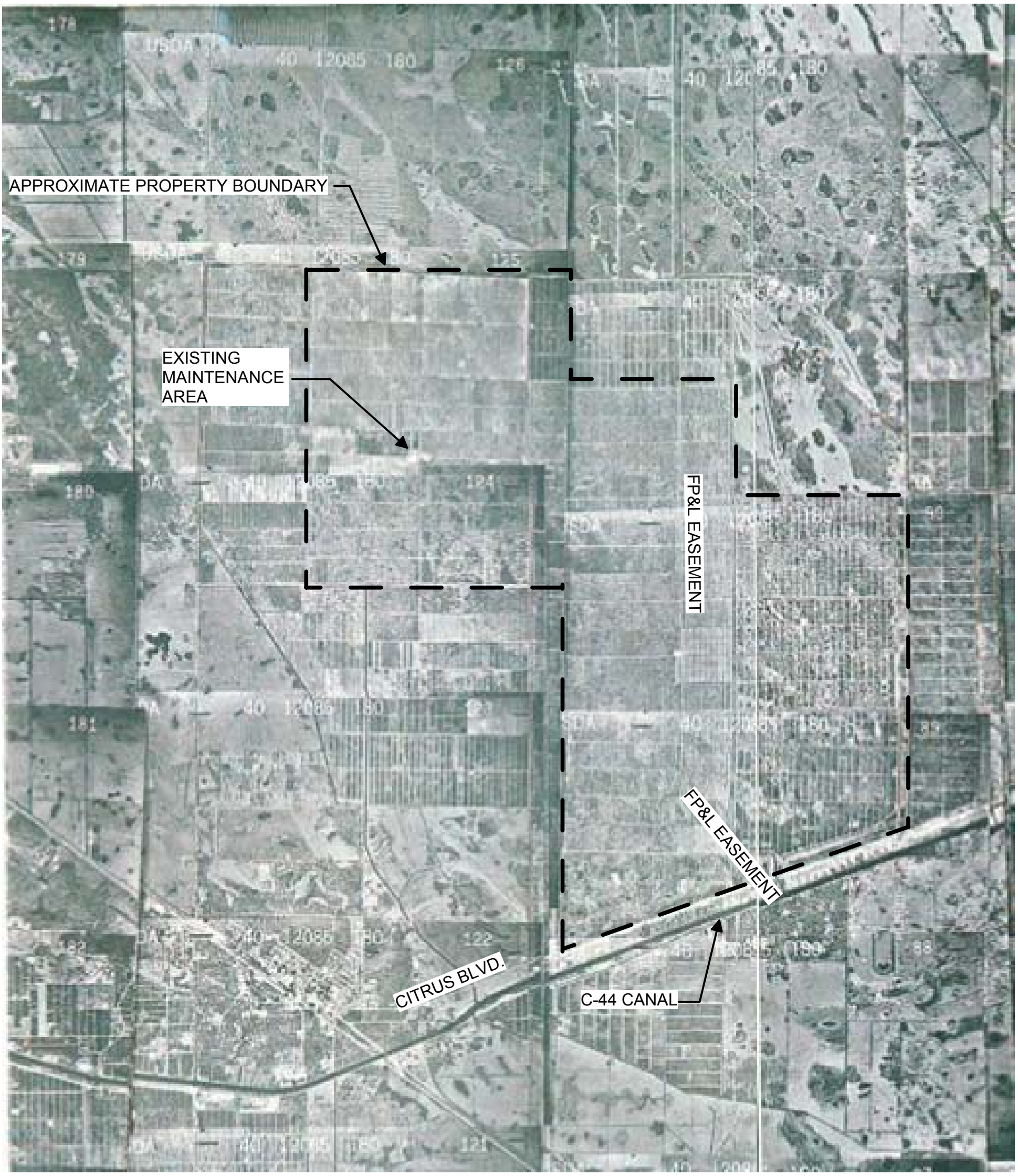
Source: Aerial photograph obtained from the State University System of Florida PALMM Project

HDR ENGINEERING, INC.
2202 N. WEST SHORE BLVD.
SUITE 250
TAMPA, FL 33607
CA 4213

1970 Aerial Photograph
C-44 Reservoir/STA Project

DATE
06/15/05

FIGURE
6.0



Source: Aerial photograph obtained from the State University System of Florida PALMM Project

N

HDR ENGINEERING, INC.
2202 N. WEST SHORE BLVD.
SUITE 250
TAMPA, FL 33607
CA 4213

1981 Aerial Photograph
C-44 Reservoir/STA Project

DATE
06/16/05

FIGURE
7.0

Source: Aerial photograph obtained from the State University System of Florida PALMM Project

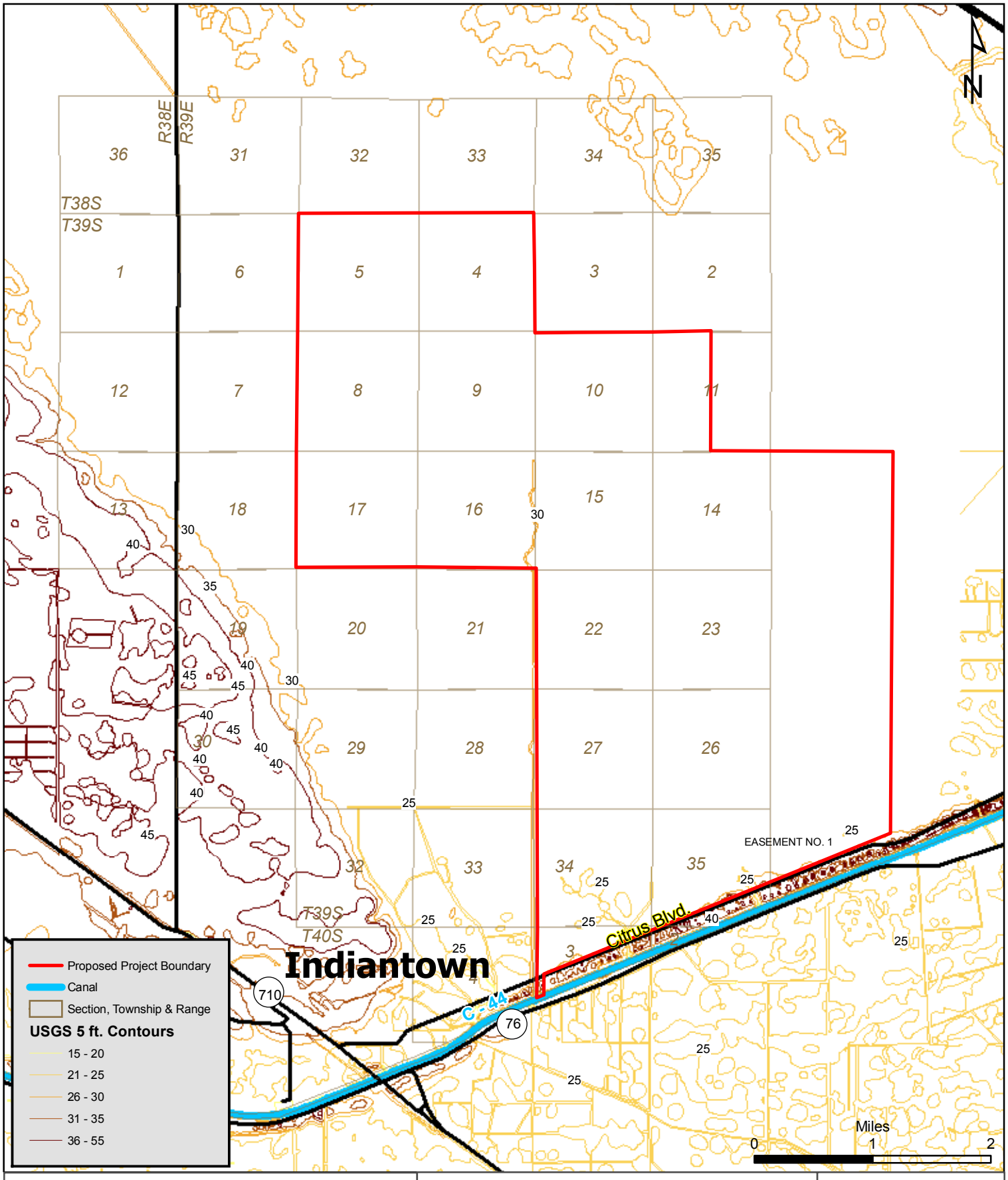
N

HDR ENGINEERING, INC.
2202 N. WEST SHORE BLVD.
SUITE 250
TAMPA, FL 33607
CA 4213

1999 Aerial Photograph
C-44 Reservior/STA Project

DATE
06/16/05

FIGURE
8.0



Map Document: (H:\C44\MXD\map_a_p_quads.mxd)8/3/2005 -- 11:51:25 AM

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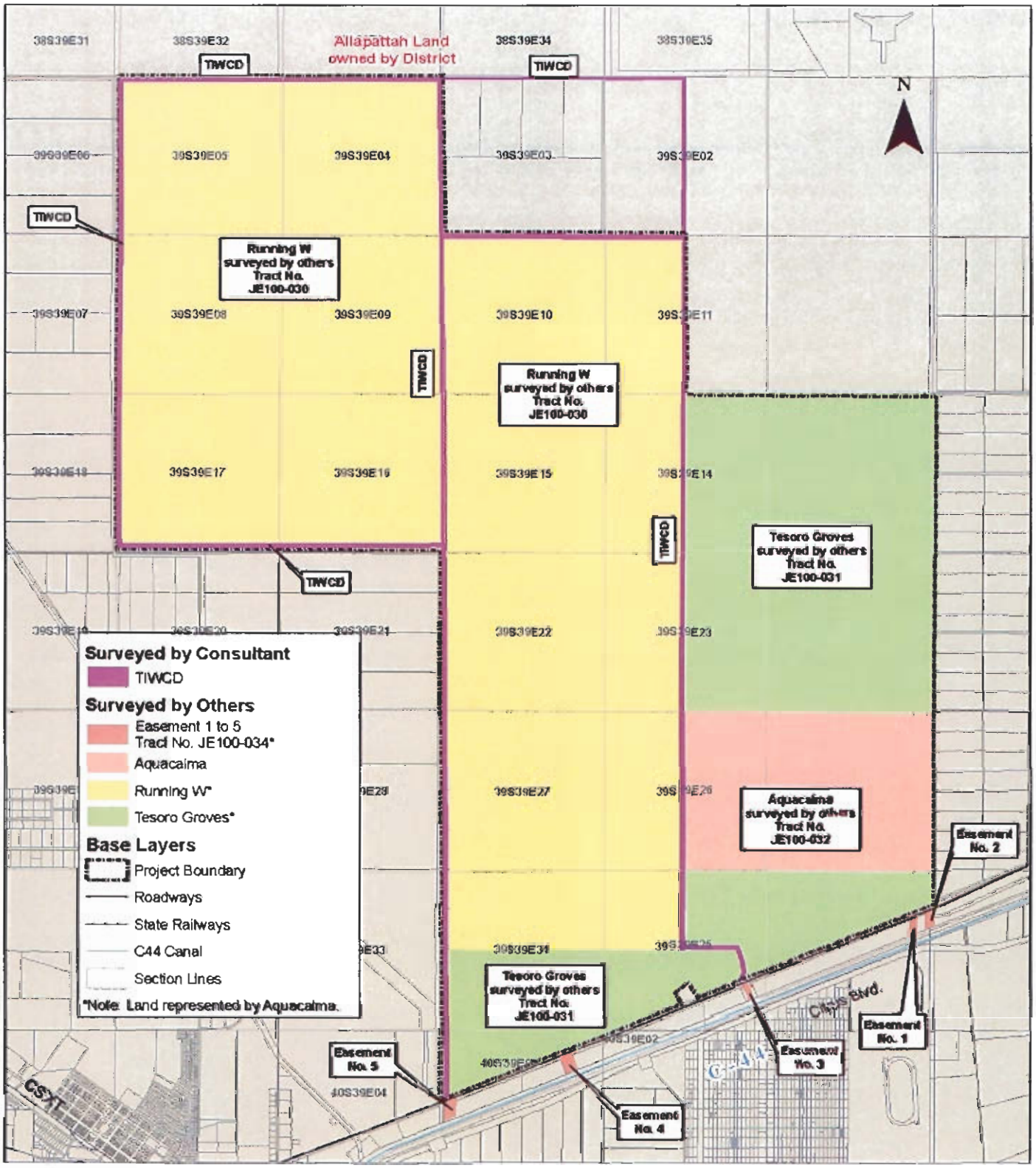
HDR ENGINEERING, INC.
2202 N. WEST SHORE BLVD.
SUITE 250
TAMPA, FL 33607

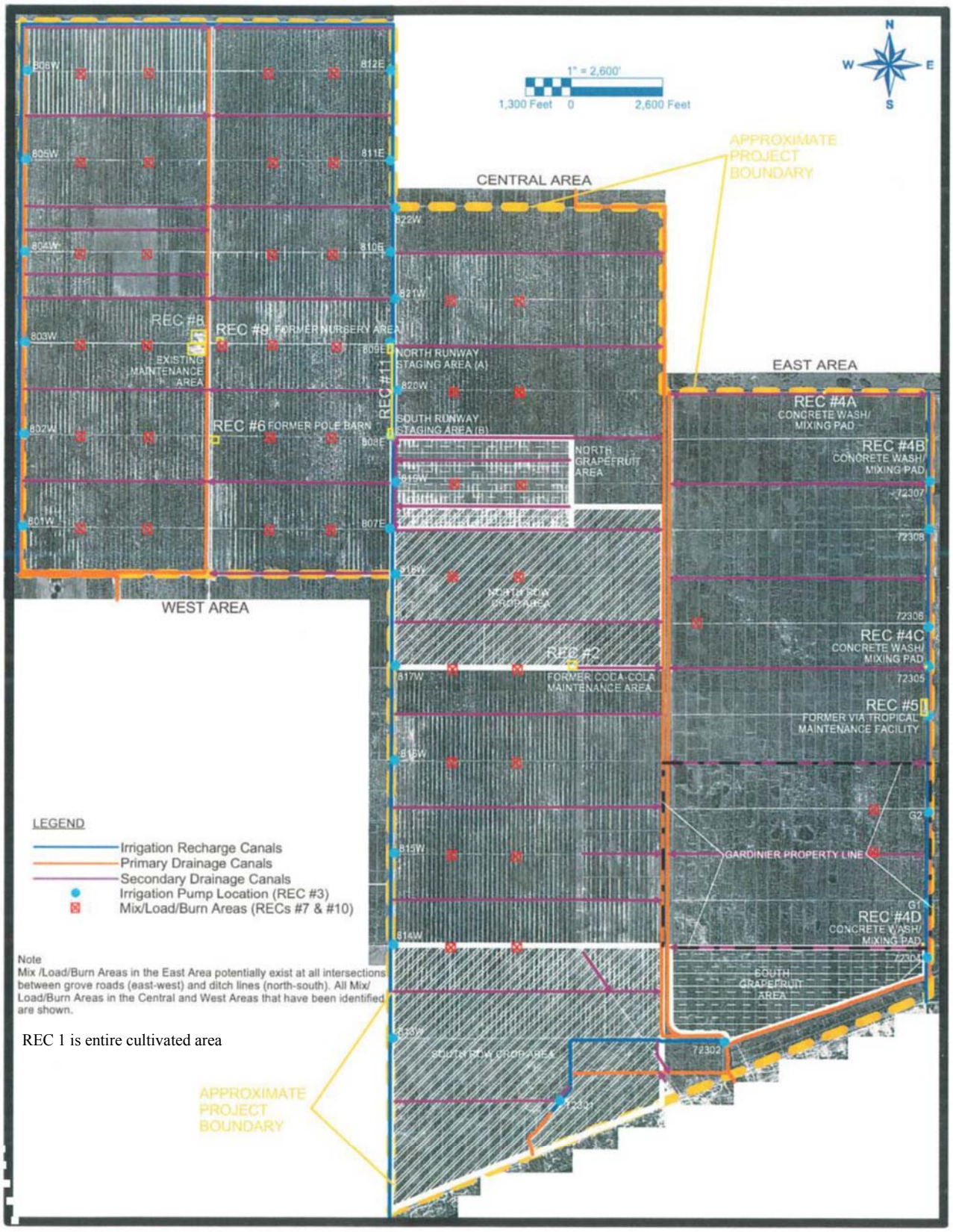
C-44 Reservoir/STA Project
USGS 1:24,000 Topographic Map

DATE
08/05/05

FIGURE
9.0

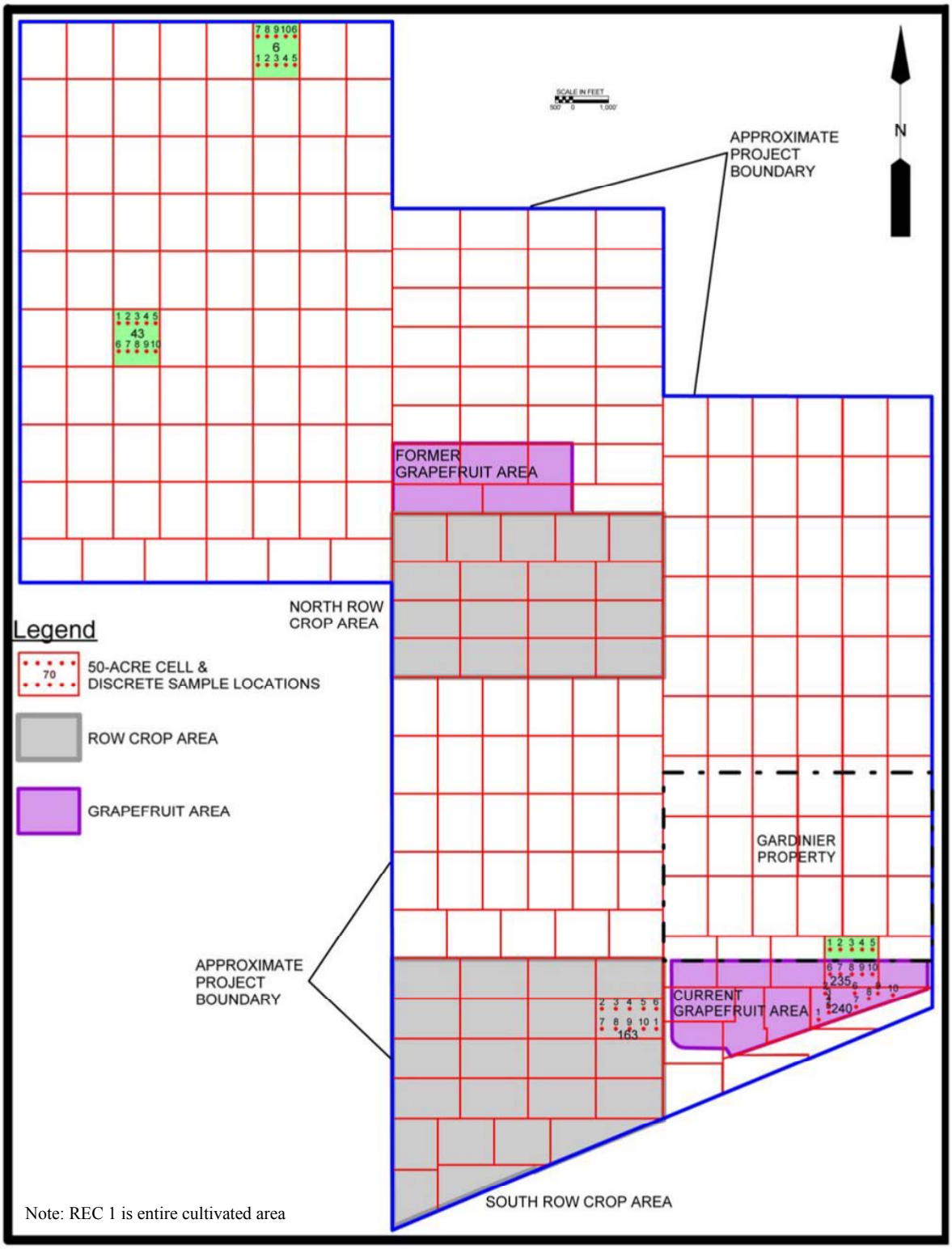


ACCELER8 everglades now.org sfwmd.gov	HDR Engineering, Inc. 2202 N. West Shore Blvd Suite 350 Tampa, FL 33607 CA 4213	**C-44 RESERVOIR/STA PROJECT LAND TO BE SURVEYED**	DATE 06/17/05 FIGURE **10.0**



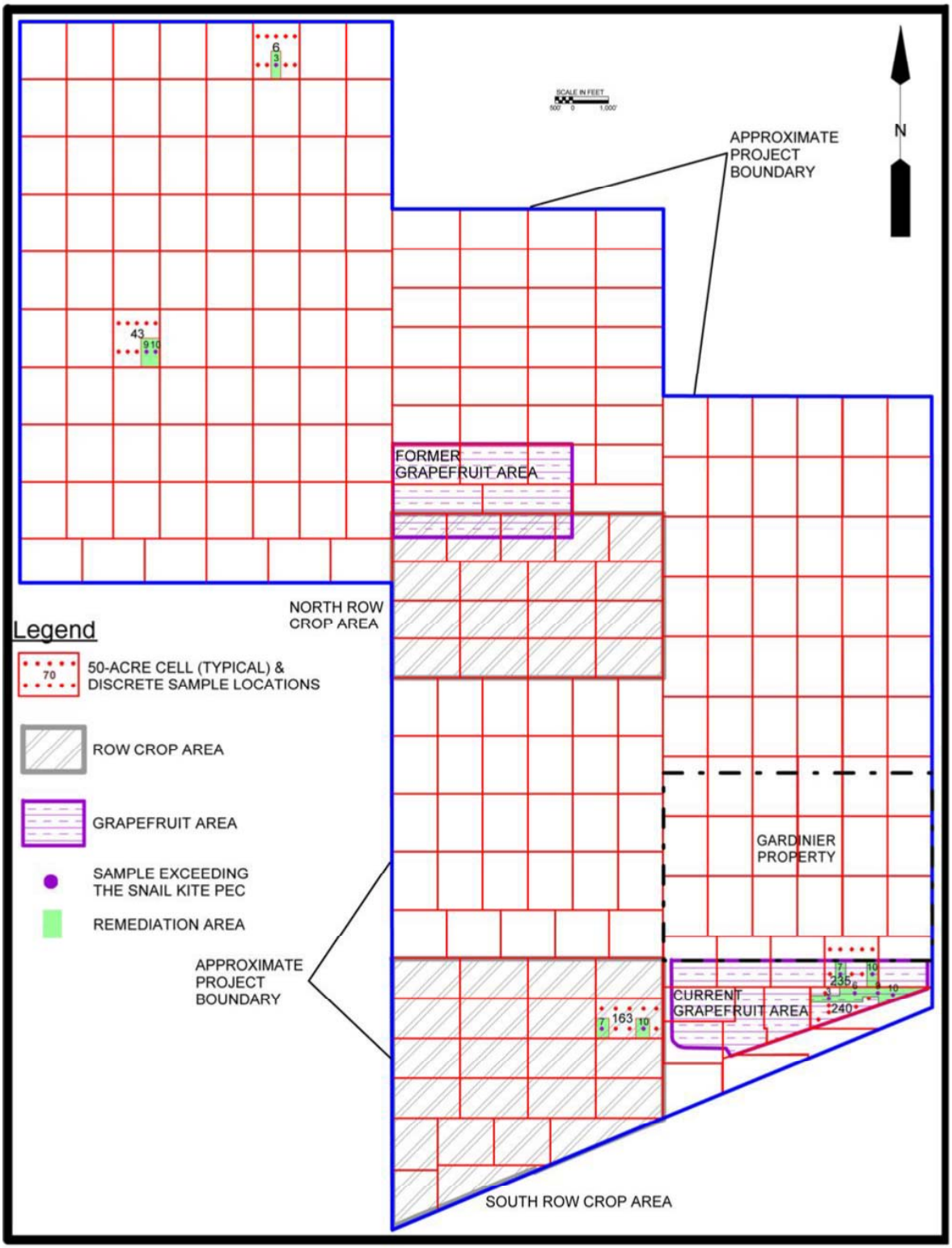
Ref: CDM Phase I/II ESA, December 2004

	HDR ENGINEERING, INC. 2202 N. WEST SHORE BLVD. SUITE 250 TAMPA, FL 33607 CA 4213	**Recognized Environmental Condition (REC) Locations C-44 Reservoir/STA Project**	DATE 04/25/05 FIGURE **11.0**



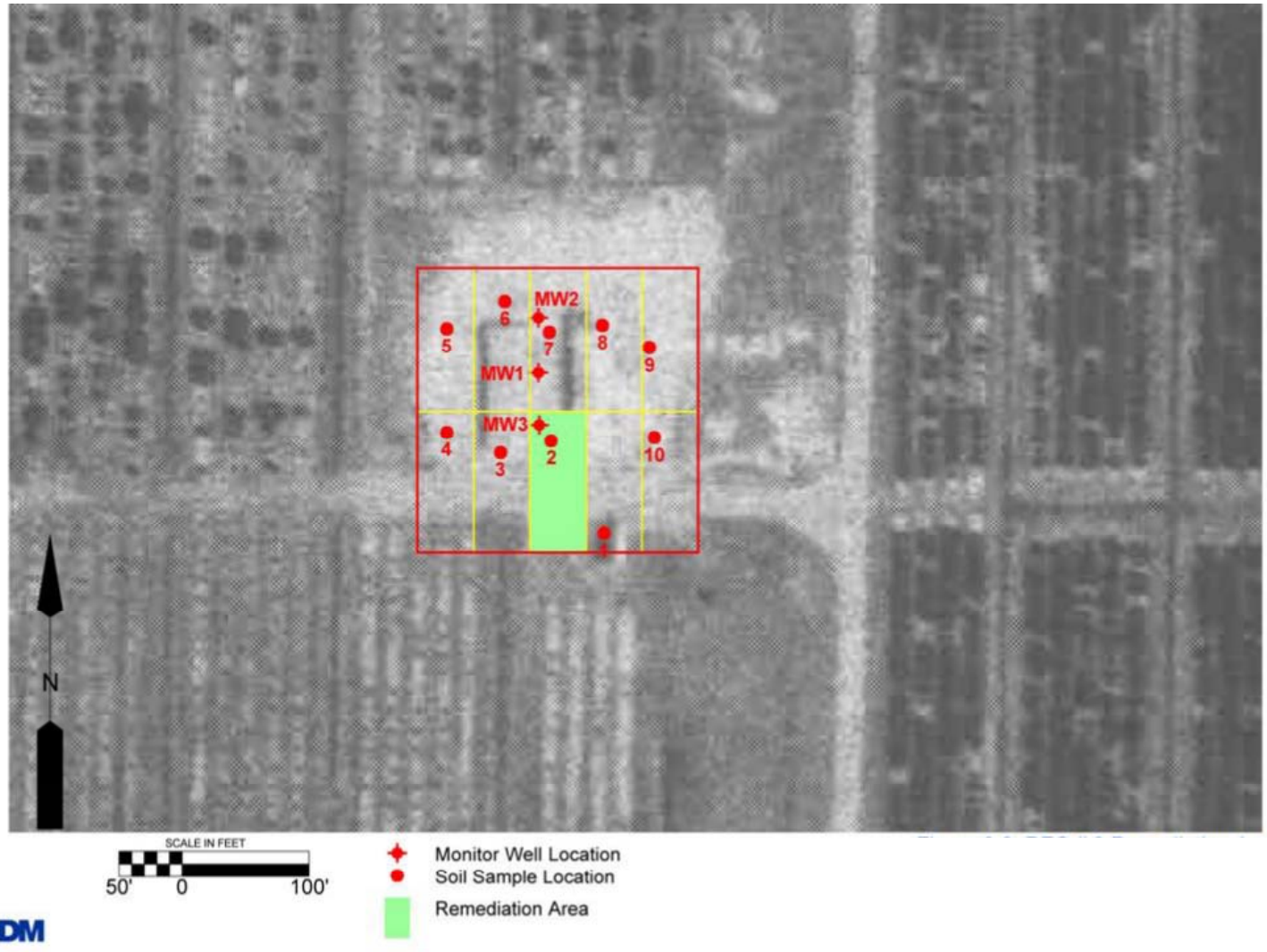
Ref: CDM Phase I/II ESA, December, 2004

	HDR ENGINEERING, INC. 2202 N. WEST SHORE BLVD. SUITE 250 TAMPA, FL 33607 CA 4213	**REC #1 Sample Locations C-44 Reservoir/STA Project**	DATE 06/16/05 FIGURE **12.0**



Ref: CDM Phase I/II ESA, December, 2004

	HDR ENGINEERING, INC. 2202 N. WEST SHORE BLVD. SUITE 250 TAMPA, FL 33607 CA 4213	**REC #1 Cultivated Area - Remediation Areas C-44 Reservoir/STA Project**	DATE 06/16/05 FIGURE **13.0**



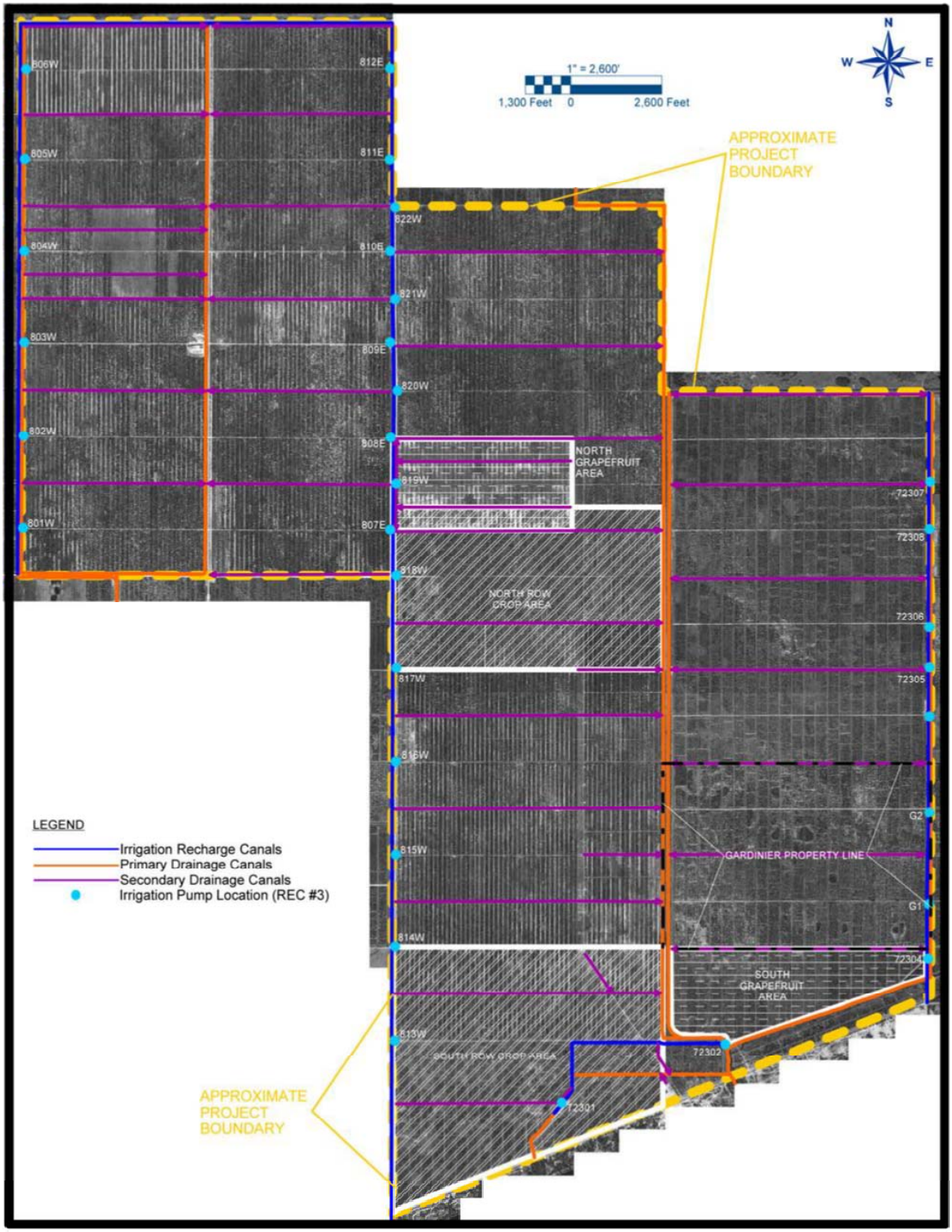
Ref: CDM Phase I/II ESA, December, 2004

HDR ENGINEERING, INC.
2202 N. WEST SHORE BLVD.
SUITE 250
TAMPA, FL 33607
CA 4213

REC #2 Former Coca-Cola Maintenance Shop - Remediation Area
C-44 Reservoir/STA Project

DATE
06/16/05

FIGURE
14.0



Ref: CDM Phase I/II ESA, December, 2004

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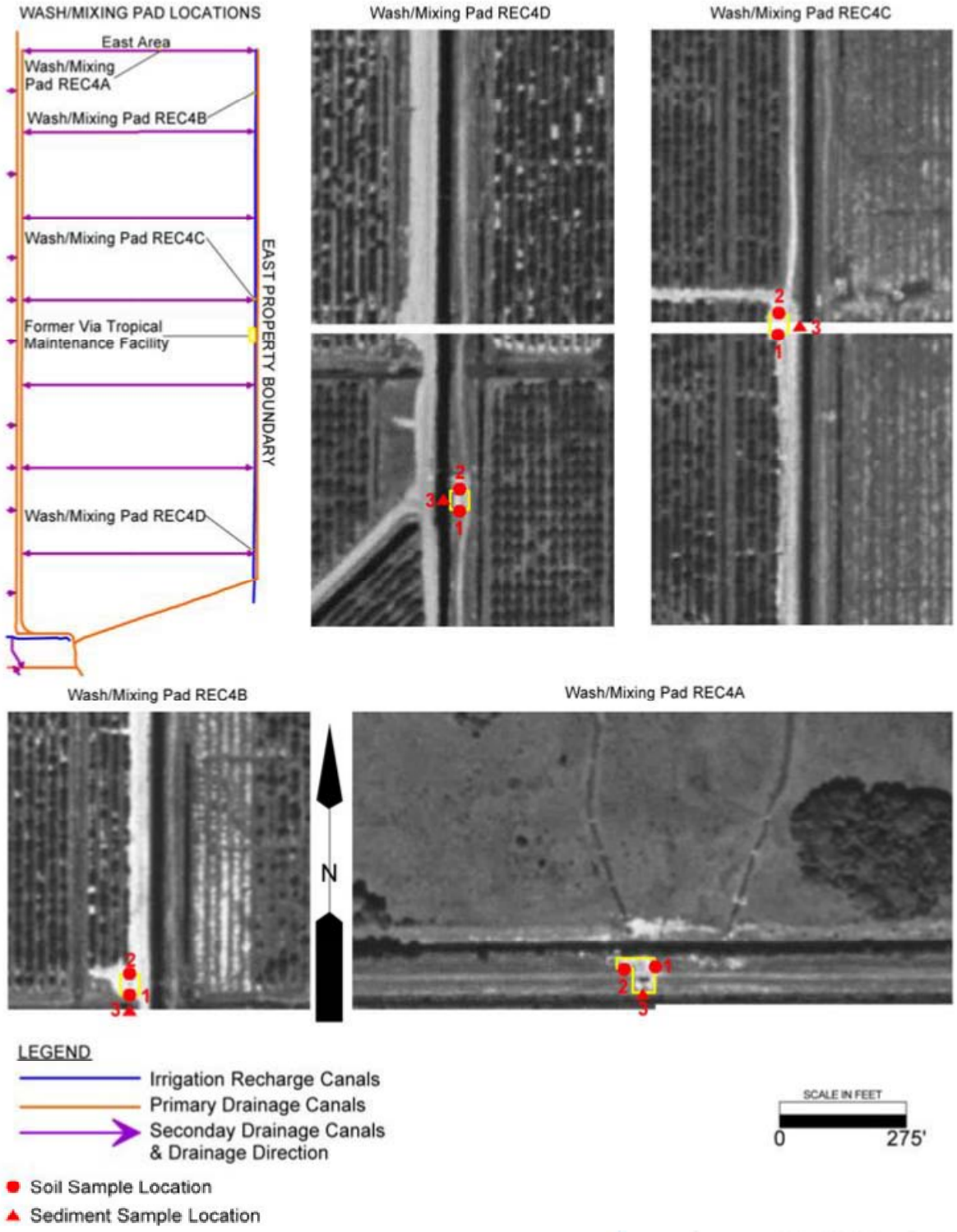
HDR ENGINEERING, INC.
2202 N. WEST SHORE BLVD.
SUITE 250
TAMPA, FL 33607
CA 4213

REC #3 Irrigation Pump Stations-Remediation Areas C-44 Reservoir/STA Project

DATE
06/16/05

FIGURE
15.0



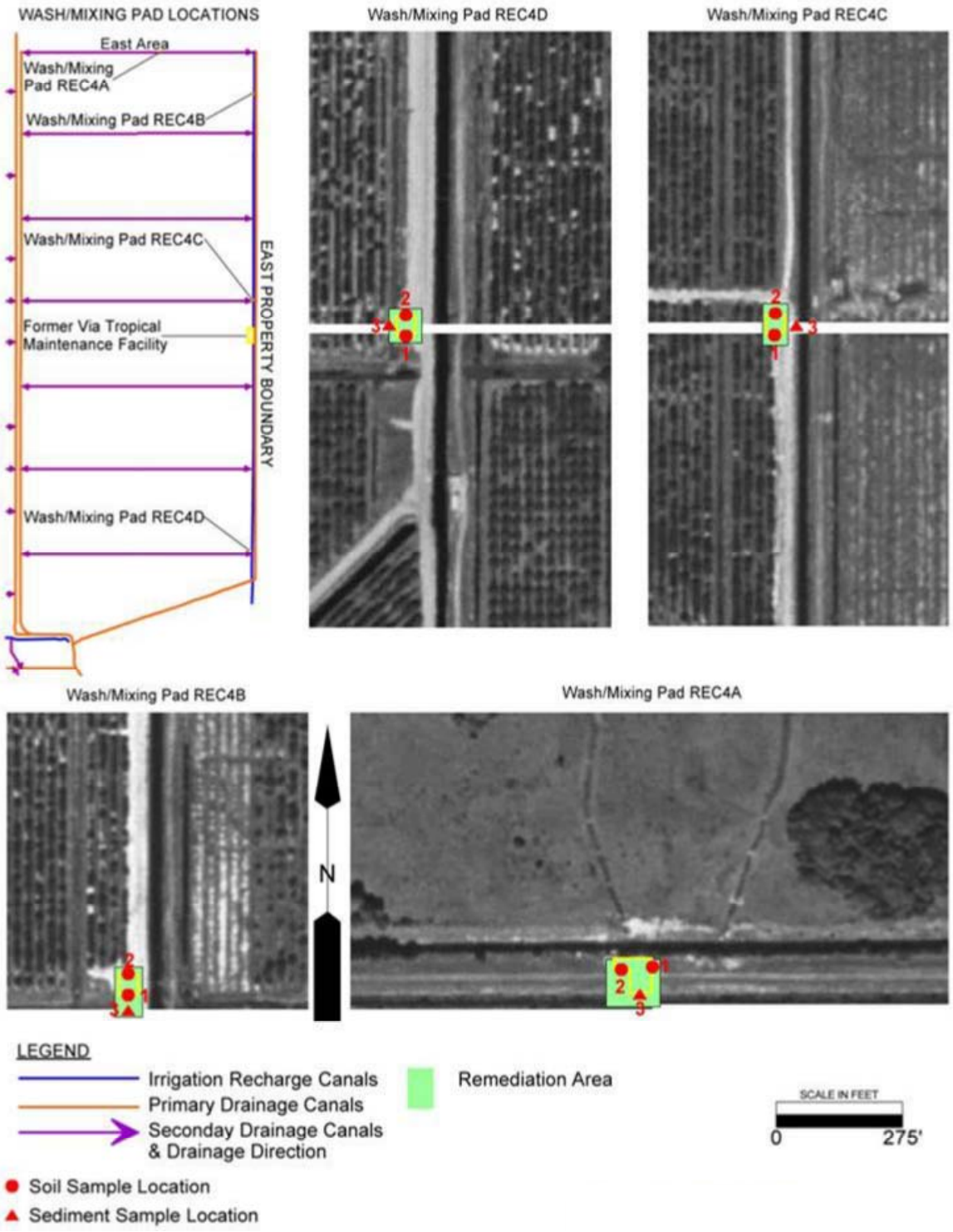
Ref: CDM Phase I/II ESA, December, 2004

HDR ENGINEERING, INC.
2202 N. WEST SHORE BLVD.
SUITE 250
TAMPA, FL 33607
CA 4213

REC #4
Concrete Wash/Mixing Pads - Sample Locations
C-44 Reservoir/STA Project

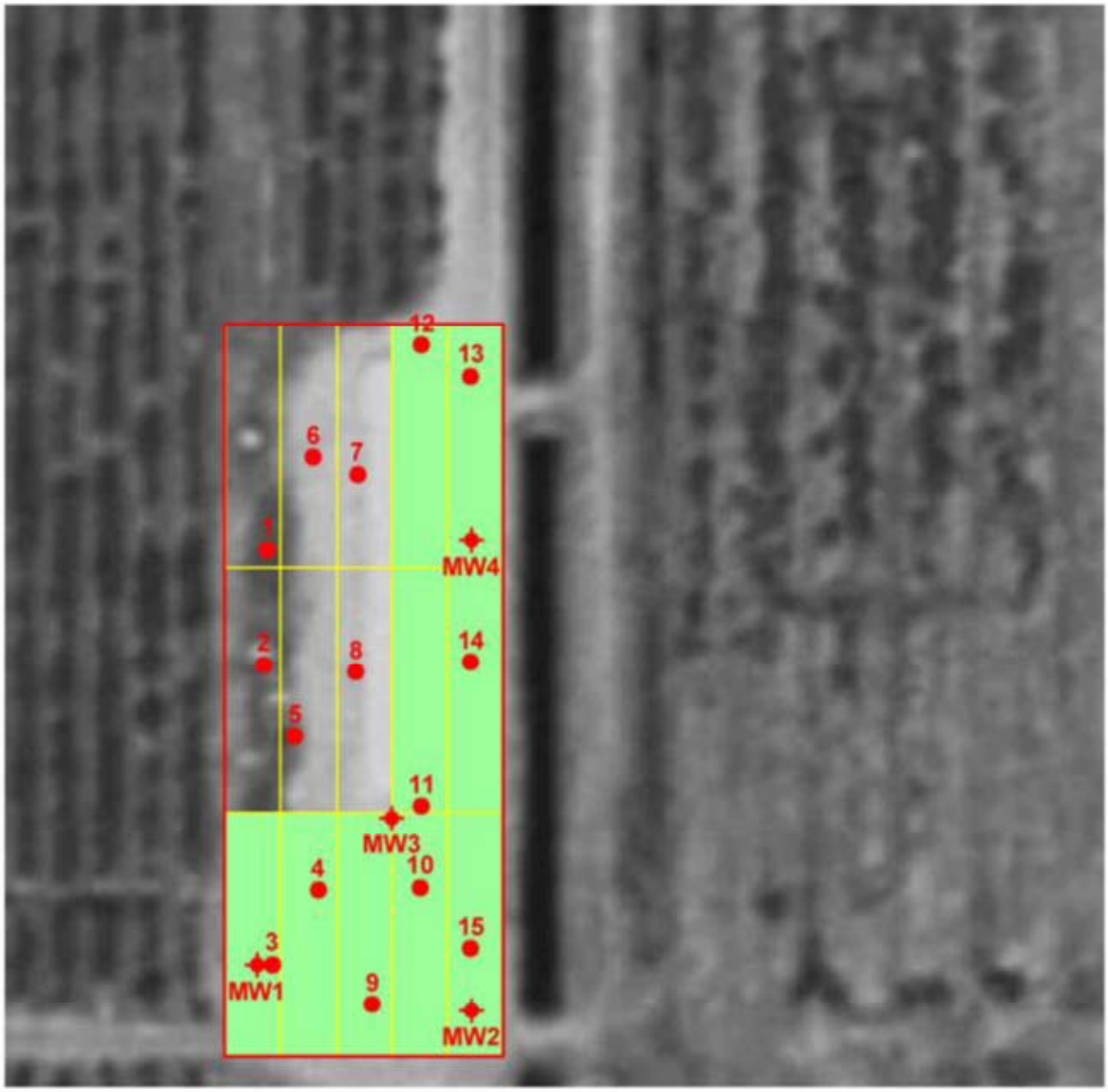
DATE
06/16/05

FIGURE
16.0



Ref: CDM Phase I/II ESA, December, 2004

	HDR ENGINEERING, INC. 2202 N. WEST SHORE BLVD. SUITE 250 TAMPA, FL 33607 CA 4213	**REC #4 Concrete Wash/Mixing Pads - Remediation Areas C-44 Reservoir/STA Project**	DATE 06/16/05 FIGURE **17.0**



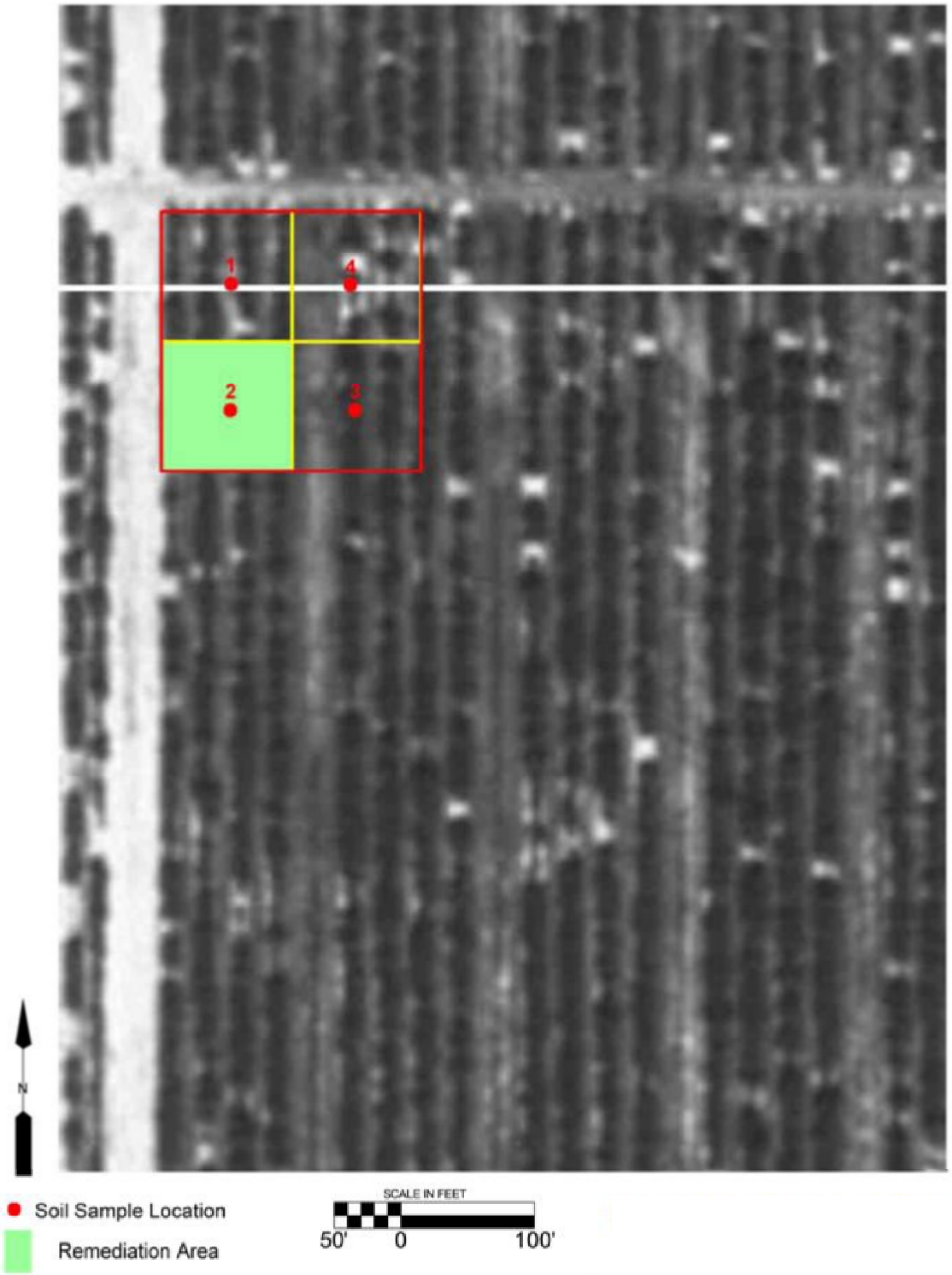
Ref: CDM Phase I/II ESA, December, 2004

HDR ENGINEERING, INC.
2202 N. WEST SHORE BLVD.
SUITE 250
TAMPA, FL 33607
CA 4213

REC #5 Former Via Tropical Maintenance Facility - Remediation Area C-44 reservoir/STA Project

DATE
06/16/05

FIGURE
18.0



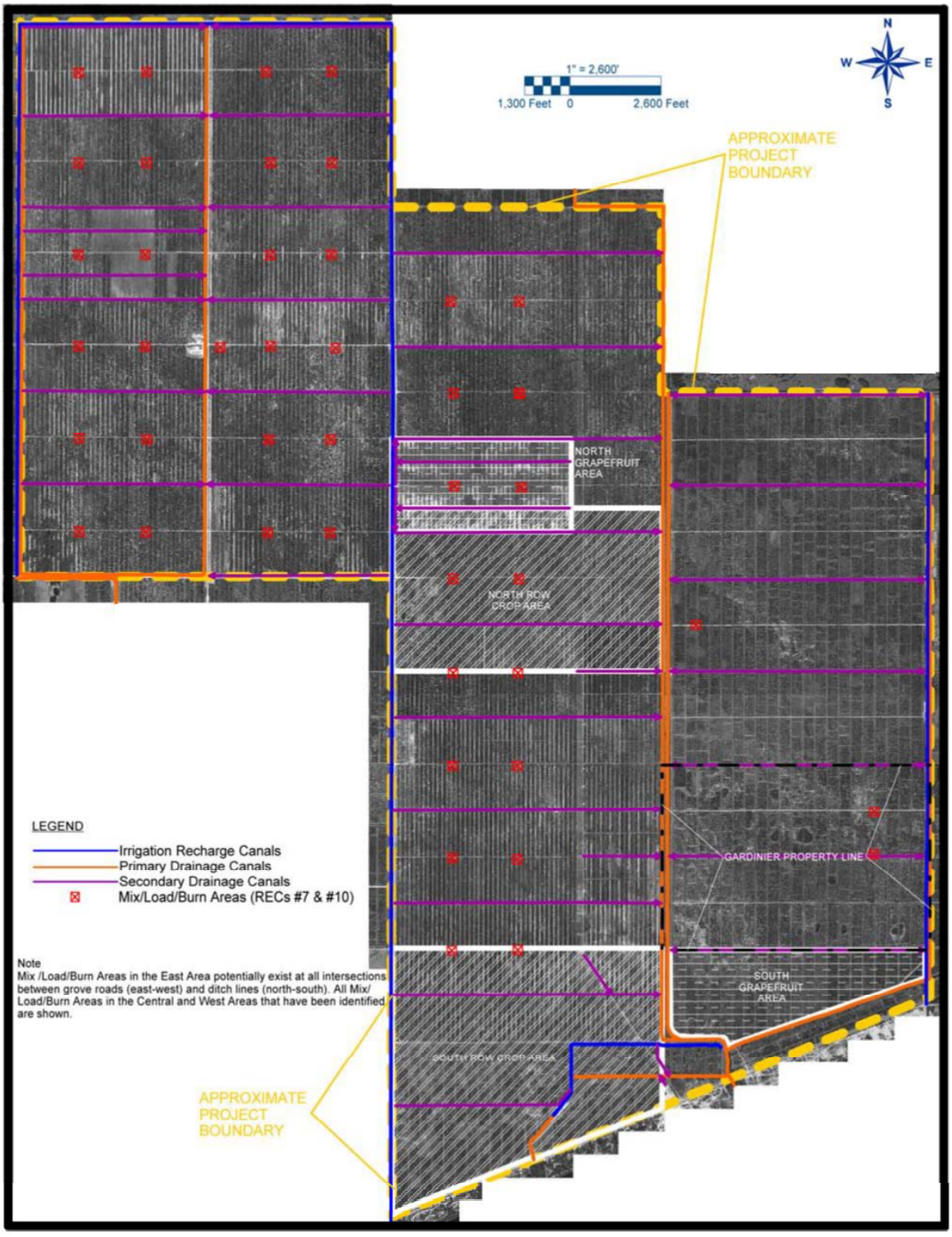
Ref: CDM Phase I/II ESA, December, 2004

HDR ENGINEERING, INC.
2202 N. WEST SHORE BLVD.
SUITE 250
TAMPA, FL 33607
CA 4213

REC #6 Former Pole Barn - Remediation Area
C-44 Reservoir/STA Project

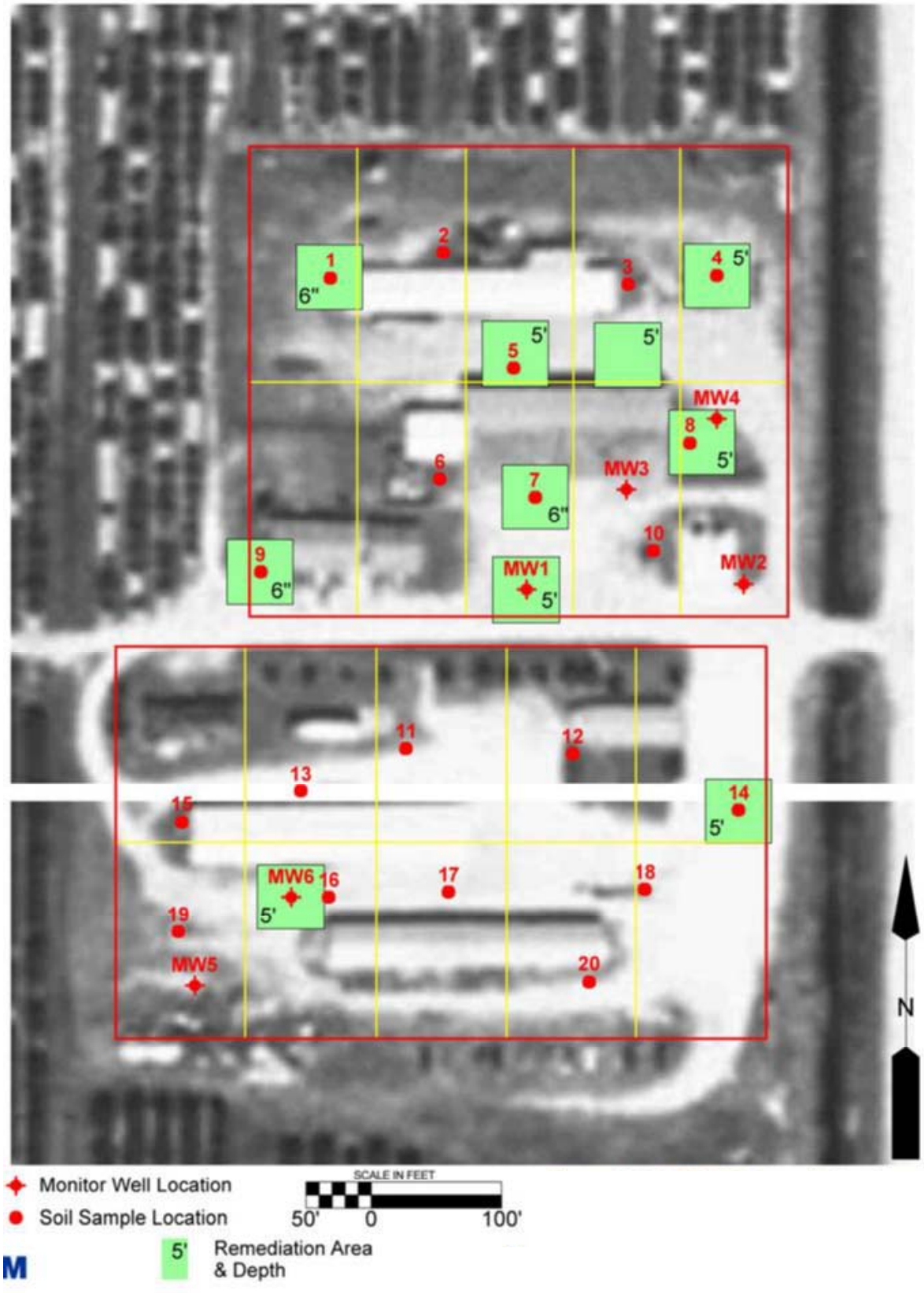
DATE
06/16/05

FIGURE
19.0



Ref: CDM Phase I/II ESA, December, 2004

sfwmd.gov ACCELER8 everglades**now**.org	HDR ENGINEERING, INC. 2202 N. WEST SHORE BLVD. SUITE 250 TAMPA, FL 33607 CA 4213	**RECs #7 & #10 Mix/Load/Burn Areas - Sample Locations C-44 Reservoir/STA Project**	DATE 06/16/05 FIGURE **20.0**



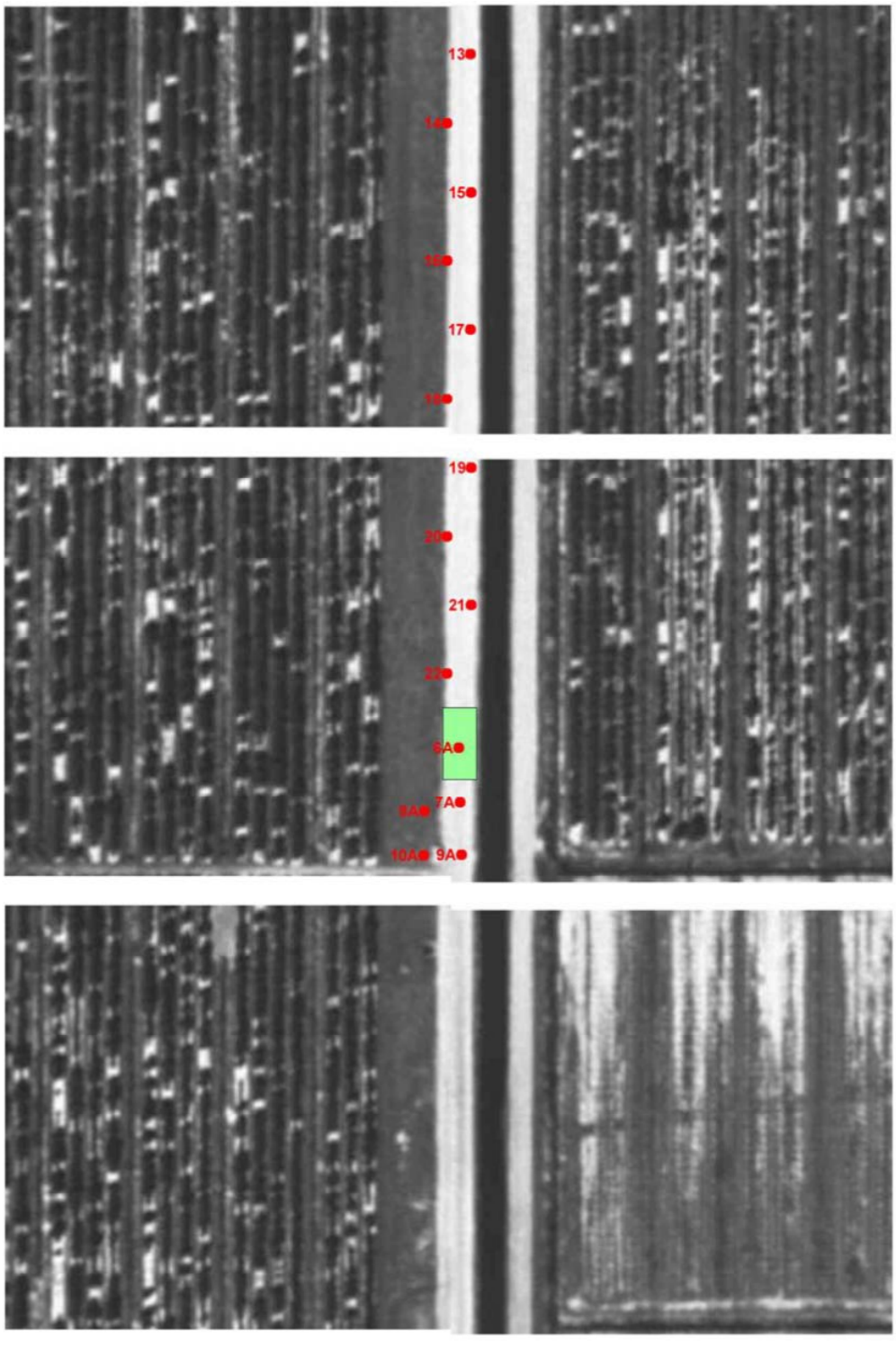
Ref: CDM Phase I/II ESA, December, 2004

HDR ENGINEERING, INC.
2202 N. WEST SHORE BLVD.
SUITE 250
TAMPA, FL 33607
CA 4213

REC #8
Existing Maintenance Area - Remediation Areas
C-44 Reservoir/STA Project

DATE
06/16/05

FIGURE
21.0



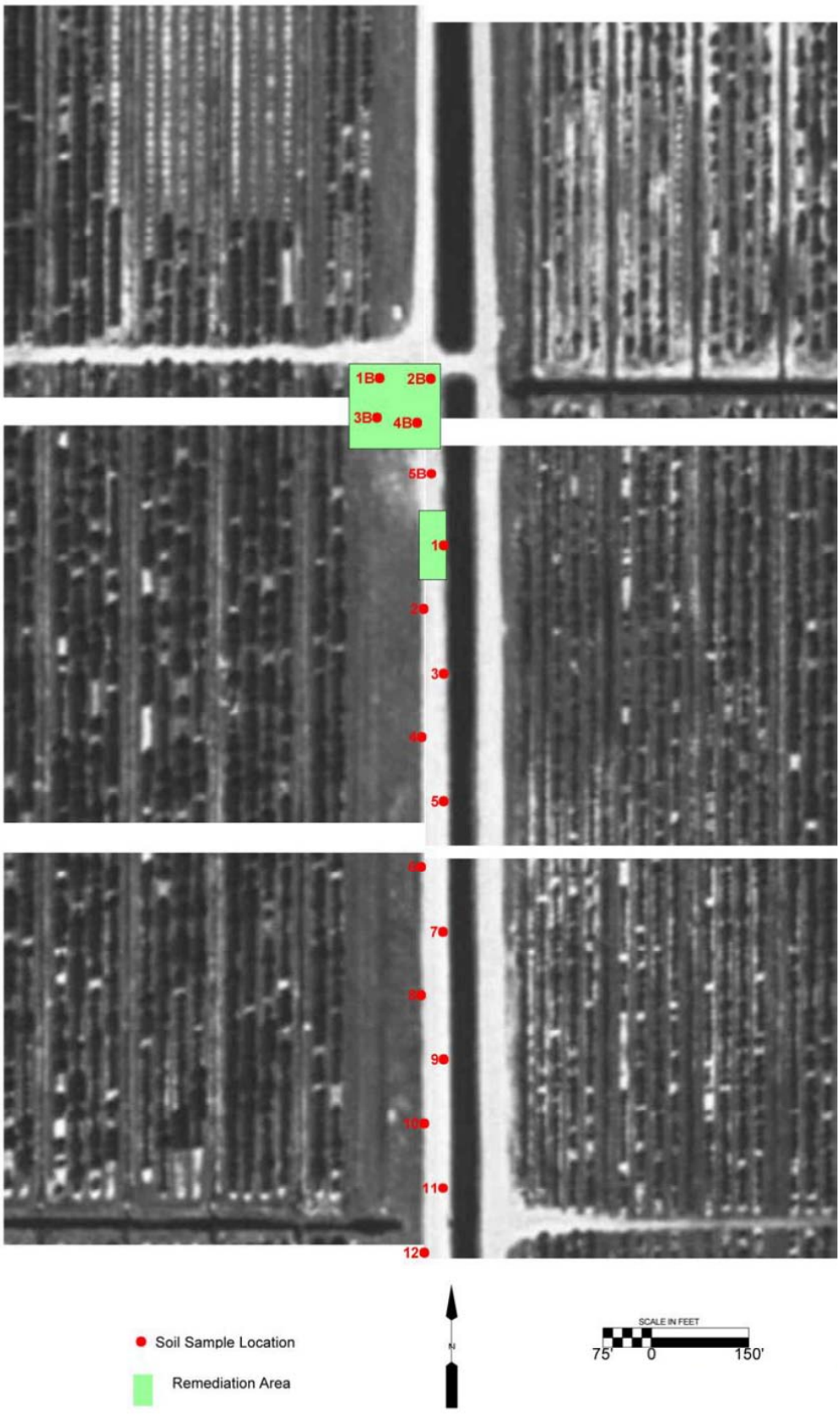
Ref: CDM Phase I/II ESA, December, 2004

HDR ENGINEERING, INC.
2202 N. WEST SHORE BLVD.
SUITE 250
TAMPA, FL 33607
CA 4213

REC #11 Runway Staging Area - North Remediation Area C-44 Reservoir/STA Project

DATE
06/16/05

FIGURE
22.0



Ref: CDM Phase I/II ESA, December, 2004

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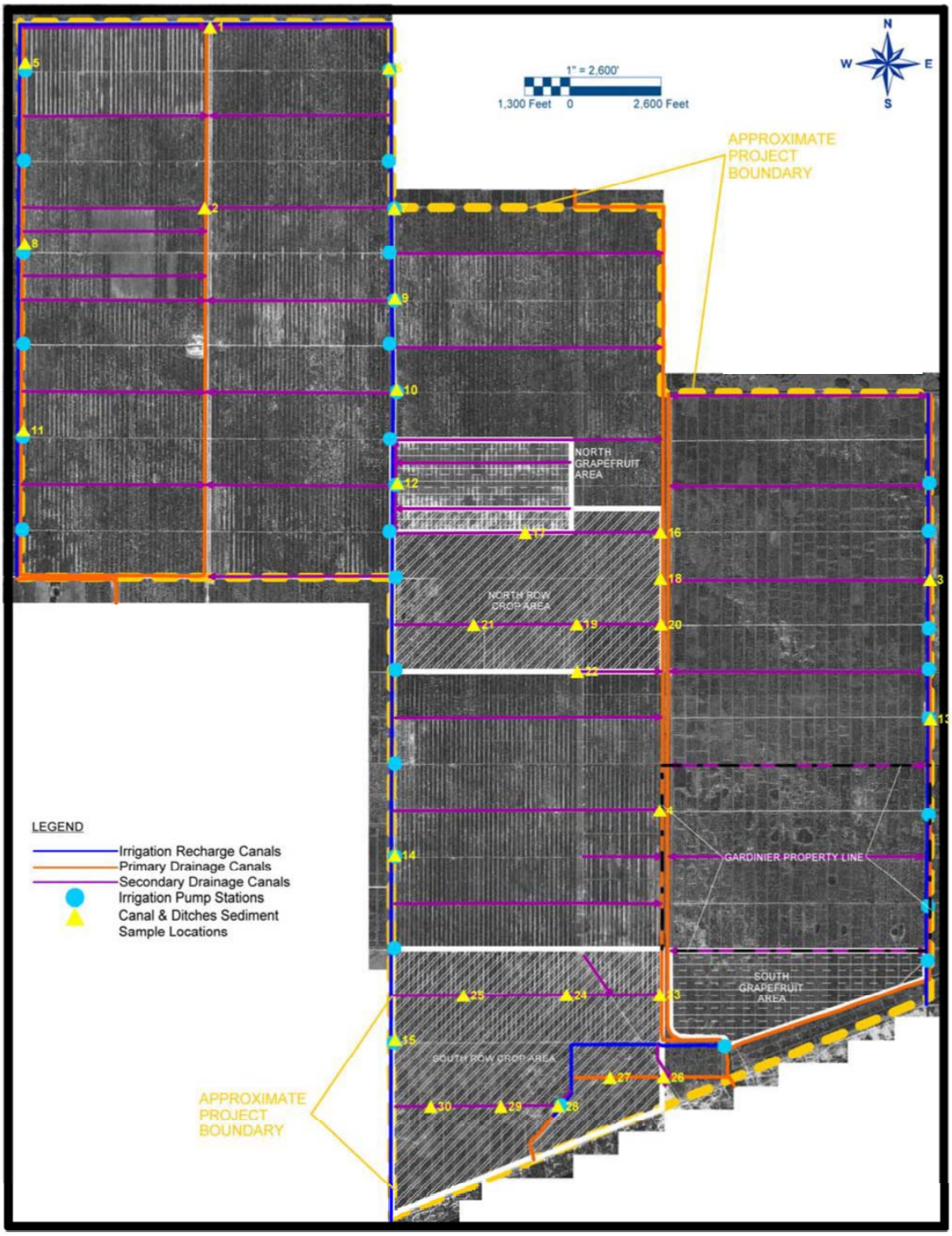

Ref: CDM Phase I/II ESA, December, 2004

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Canal & Ditch Sample Locations C-44 Reservoir/STA Project

DATE
06/16/05

FIGURE
24.0

APPENDIX A
PHOTOGRAPHS

View of the FP&L Easement that traverses the central portion of the site in a north-south direction (from north of the Proposed C-44 Reservoir/STA Site facing south).

View of the FP&L Easement located along the west boundary of the Proposed C-44 Reservoir/STA Site (from the northwest corner of the site facing south).

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View of the southern portion of the existing citrus grove (Proposed C-44 Reservoir/STA Site) from just south of the Canal at the main irrigation canal. Existing pump station is visible.

View of the north end of the existing citrus grove (Proposed C-44 Reservoir/STA Site) (facing south). The existing maintenance area for the citrus grove is visible to the left and rear of the photograph.

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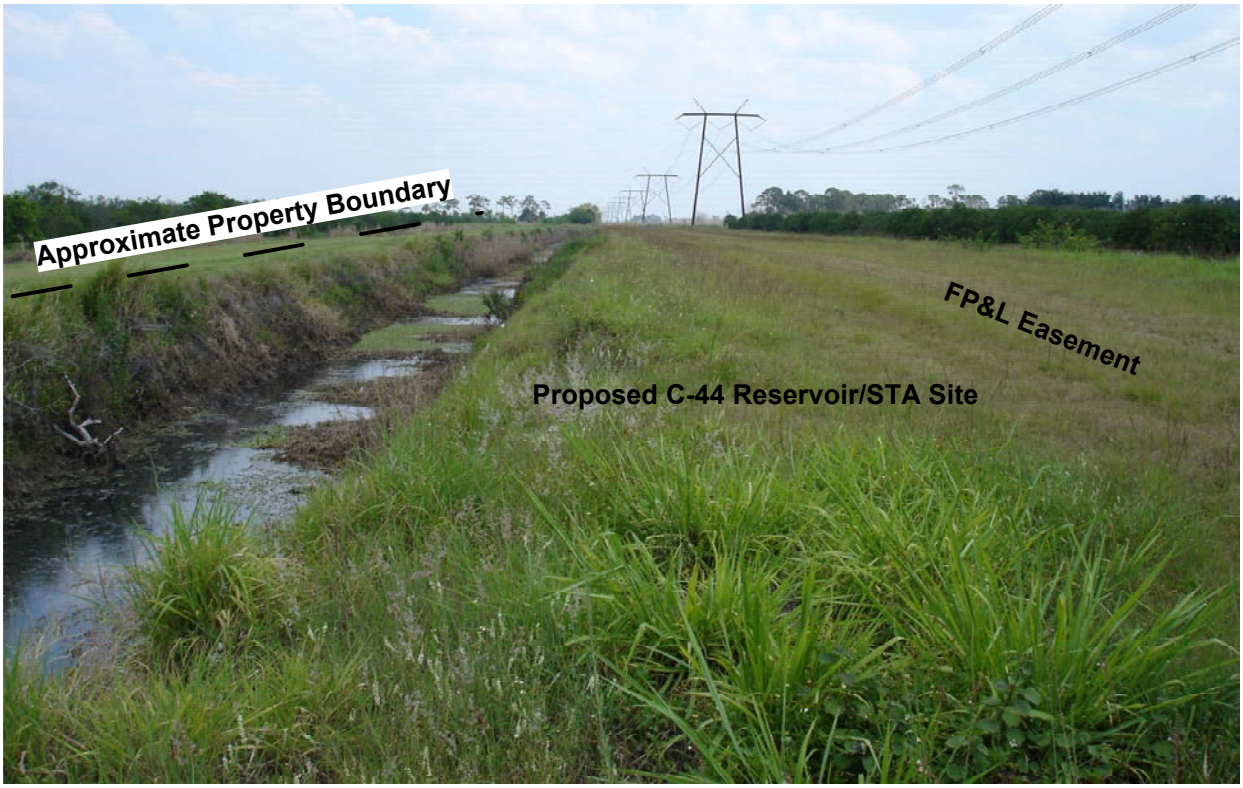

View of the FP&L transmission line easement which traverses the Proposed C-44 Reservoir/STA Site in a north-south direction along the west property boundary (facing north). An adjacent drainage canal is also visible in the photograph.

View of Minute Maid Road from the approximate location of the Proposed C-44 Reservoir/STA Site pump station (facing west).

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View of the irrigation canal at Citrus Boulevard located south of the southwest corner of the Proposed C-44 Reservoir/STA Site (facing south) (Easement No.5).

View of the drainage canal located on the citrus grove (Proposed C-44 Reservoir/STA Site) at Easement No. 4 (facing north from Citrus Boulevard).

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View of the C-44 Canal located south of the Proposed C-44 Reservoir/STA Site (facing southwest).

View of the pump station which transfers water from the C-44 Canal to an existing citrus grove irrigation canal located on the Proposed C-44 Reservoir/STA Site. The pump station is located along the north bank of the C-44 Canal at the location of the proposed intake canal (facing northwest) (Easement No. 5).

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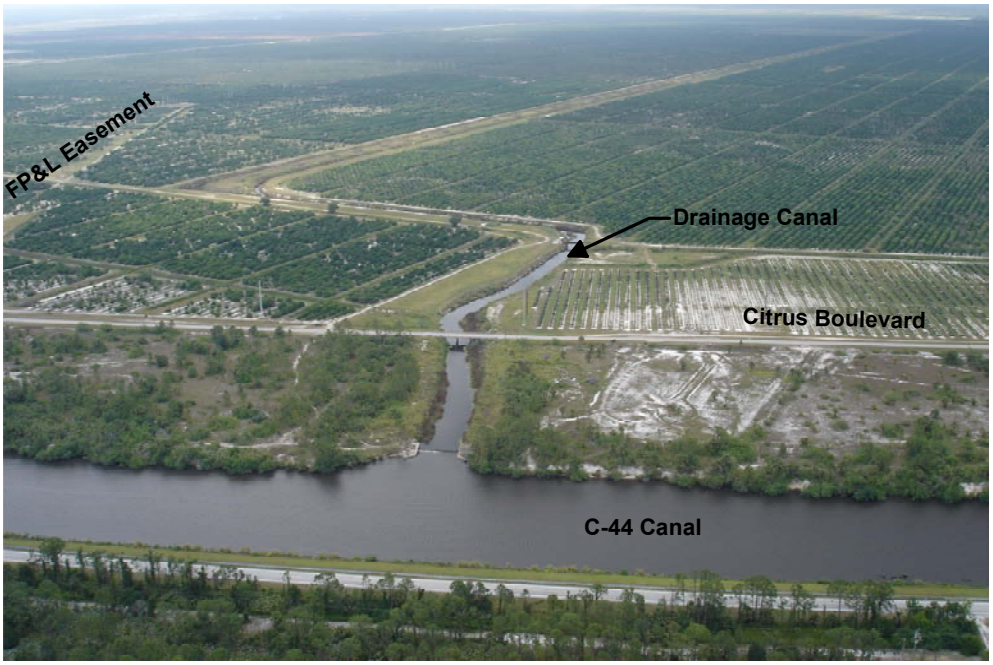
View of the existing pump station which transfers water from the C-44 Canal to the citrus grove (Proposed C-44 Reservoir/STA Site). The existing pump station is located along the north bank of the C-44 Canal (Easement No. 5).



View of the C-44 Canal and the current citrus grove (Proposed C-44 Reservoir/STA Site) drainage canal (facing north)(Easement No. 3). The Proposed C-44 Reservoir/STA site and the FP&L easement are visible in the background of the photograph.

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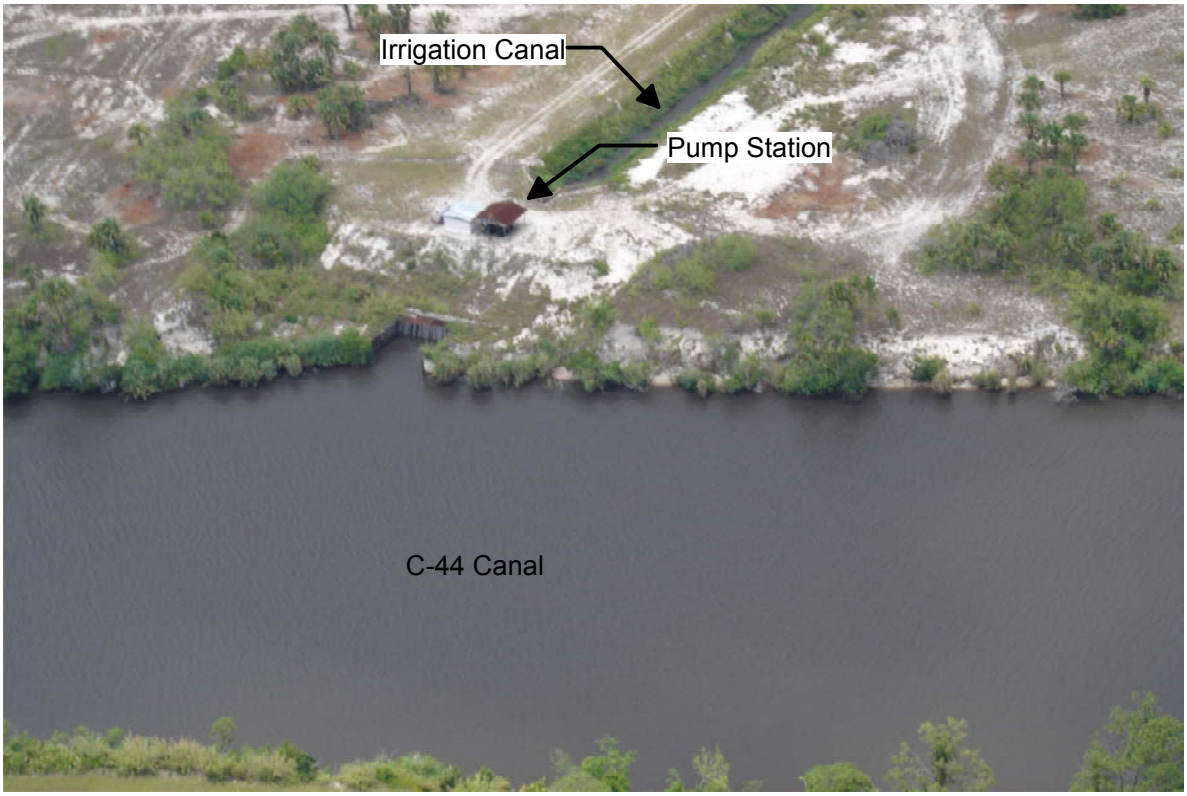
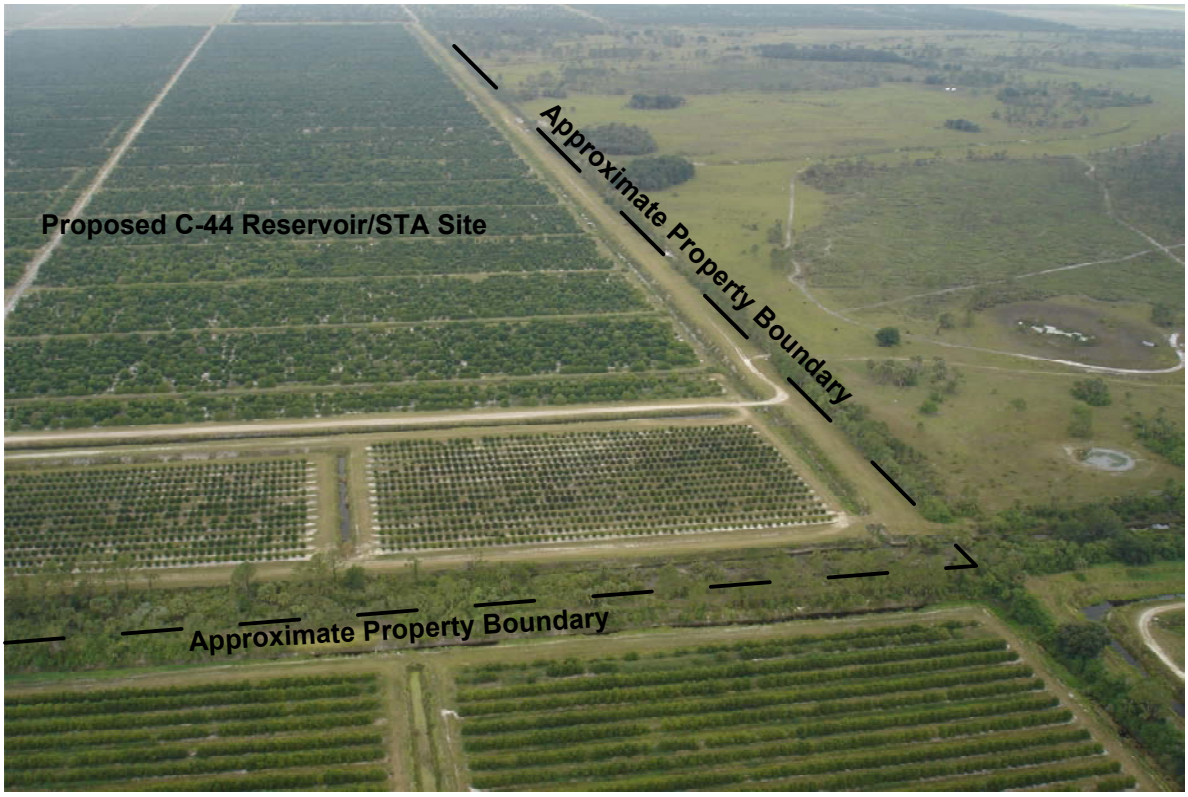


View of the C-44 Canal and an existing citrus grove irrigation canal and pump station located at the southeast corner of the Proposed C-44 Reservoir/STA Site (facing northwest) (Easement No. 1).



View of the north end of the existing citrus grove (Proposed C-44 Reservoir/STA Site) from near the northeast corner (facing west).

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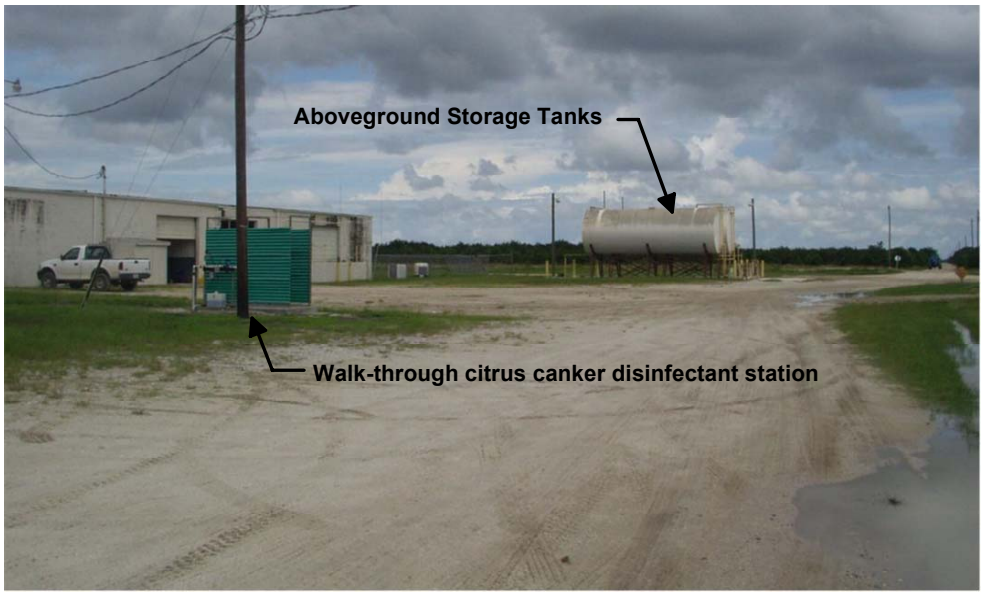
View of the existing maintenance area (for the citrus grove) located on the Proposed C-44 Reservoir/STA Site (facing southeast).



View of the existing maintenance area (for the citrus grove) located on the Proposed C-44 Reservoir/STA Site (facing east).

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