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REMEDIAL INVESTIGATION WORK PLAN NAVAL INSTALLATION RESTORATION
PROGRAM NTC ORLANDO FL
4/1/1988
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NAVAL FACILITIES ENGINEERING COMMAND

Southern Division

Charleston, South Carolina

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Ground-Water Consultants

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Work Plan

REMEDIAL INVESTIGATION
NAVAL INSTALLATION
RESTORATION PROGRAM
NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Prepared for

NAVAL FACILITIES ENGINEERING COMMAND
Southern Division
Charleston, South Carolina

Contract No. N62467-87-C-0026

G&M Project No. TF02900L02

April 1988

Prepared by

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100243



April 8, 1988

Mr. Ted Campbell, Code 114311
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
P.O. Box 10068
Charleston, SC 29411-0068

Dear Ted:

Enclosed please find 20 copies of the final Work Plan for the Remedial Investigation at the Naval Training Center-Orlando. Also enclosed is a copy of the review comments sheet with Geraghty & Miller, Inc., (G&M) review actions noted. The QA/QC plan is being modified to show changes in the analytical scheme and final copies will be sent to you no later than Monday, April 18, 1988.

If you have any questions, do not hesitate to call.

Sincerely,

GERAGHTY & MILLER, INC.

Debra E. Brown
Staff Scientist

Fred A. Seguiti
Associate

DEB:FES/jf
Enclosures
cc: Bill Raspet
TF02900L02
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INTRODUCTION

This Work Plan was prepared by Geraghty & Miller, Inc., (G&M) to describe the work to be performed during the Remedial Investigation (RI) of the Naval Installation Restoration Program (NIRP) at the Naval Training Center (NTC) in Orlando, Florida. Prior to the NIRP, the Navy performed environmental contamination assessment studies under the Naval Assessment Control of Installation Pollutants (NACIP) program.

The NACIP program consisted of three phases to evaluate and, if necessary, remediate environmental contamination resulting from past waste-handling practices. The three phases were: (1) the Initial Assessment Study (IAS), which was performed in 1985; (2) the Confirmation Study; and (3) Remedial Measures. The Characterization Phase was a two-step process which included the Verification Phase and the Characterization Phase. The results of the first step, the Verification Phase, were reported by G&M in a document entitled "Verification Study, Assessment of Potential Soil and Ground-Water Contamination at the Naval Training Center, Orlando, Florida, December 1986." The RI of the NIRP replaces the previous Characterization Phase of the NACIP.

The findings of the Verification Phase investigation prompted recommendations for further hydrogeological

evaluation at four of the six sites studied. The four sites shown in Figures 1 and 2 recommended for the Characterization Phase include:

- o Site No. 1 - the NTC North Landfill;
- o Site No. 3 - the McCoy Annex Landfill;
- o Site No. 8 - the Old NTC Pesticide Building;
and
- o Site No. 10 - the McCoy Annex Waste-water
Treatment Facility

The proposed scope of work for the RI described in the draft Work Plan included the recommendations presented in Table 5 of the Verification Phase report. These recommendations were reviewed and approved (via correspondence) by the Environmental Protection Agency (EPA) and the Florida Department of Environmental Regulation (FDER) on February 12, 1987, and March 11, 1987, respectively. This final Work Plan incorporates comments by EPA and FDER on the draft Work Plan. These comments were given to the Navy by EPA and FDER in correspondence dated October 11, 1987, and November 2, 1987, respectively.

At the request of the Southern Division, the current monitor-well systems at the NTC-Orlando have been renumbered to be consistent with the "Specifications for Ground-Water Monitoring Well Installation and Sampling" guide dated November 1986. Table 1 shows a correlation between the old

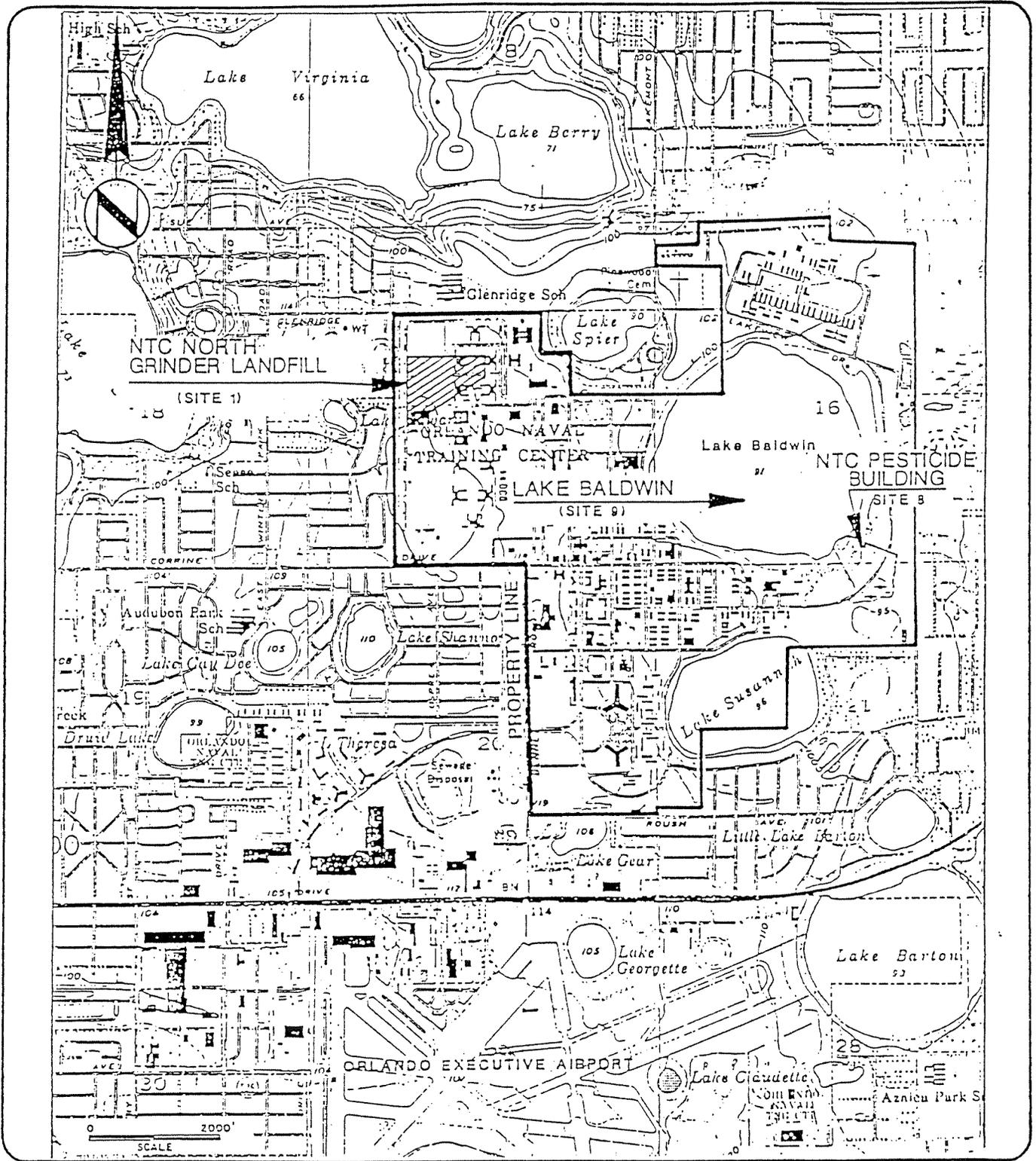



 Figure 1.
 Location of Sites Recommended by the IAS for Further Investigation at the NTC-North.

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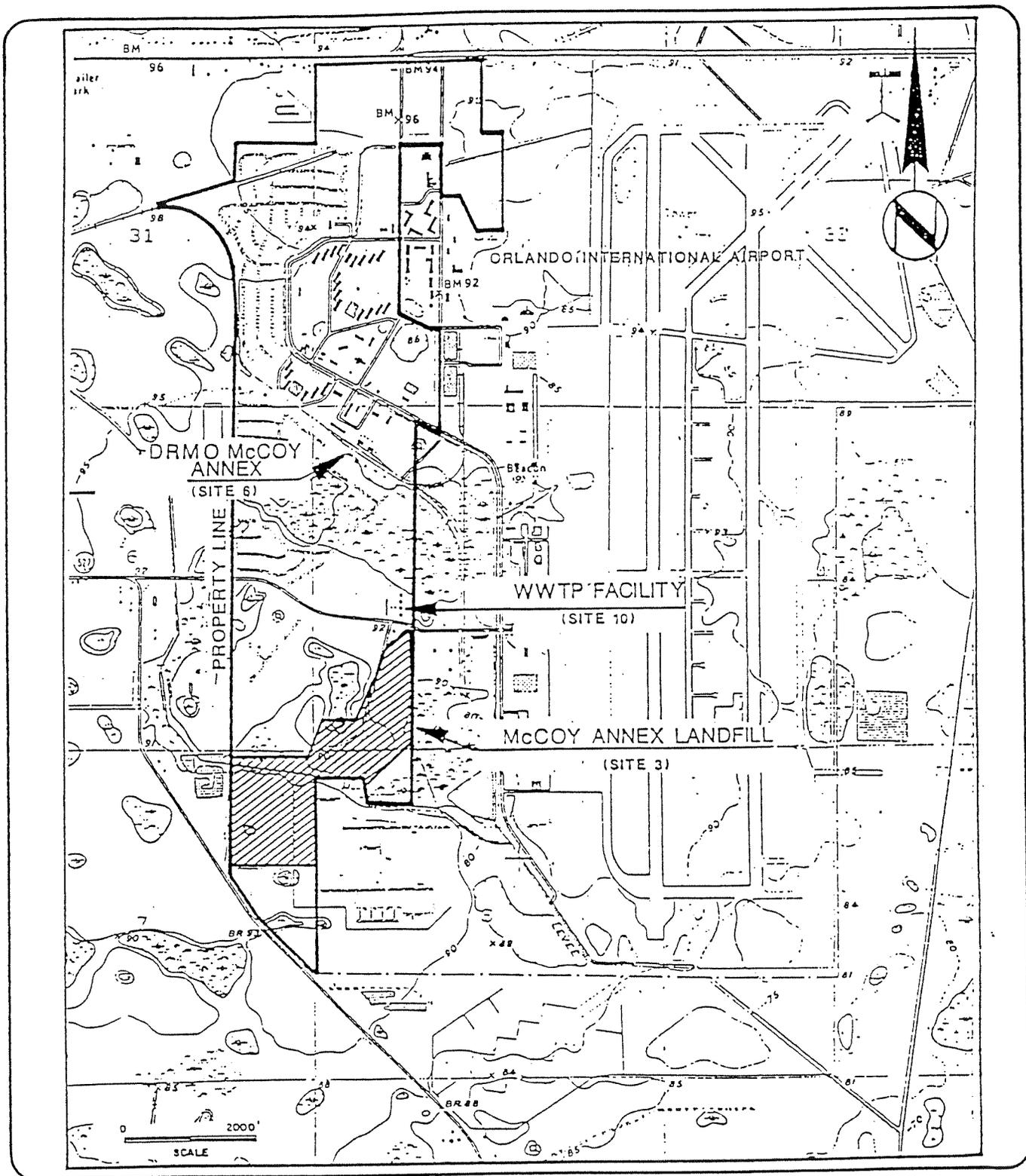


Figure 2.

Location of Sites Recommended by the IAS for Further Investigation at the McCoy Annex.

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numbering system (Verification Phase) and the new numbering system for the RI and subsequent activities.

surface to the total depth of the borehole. The total depth and screen setting of each well were established based on the site-specific geologic characteristics. Upon completion of soil sampling to the desired depth, the well casing, consisting of 2-inch-diameter PVC pipe with attached 5 ft of well screen (0.01-inch slot size), will be inserted into the borehole. A graded silica sand will then be installed from the bottom of the well screen to 2 ft above the top of the well screen. The remaining annular space between the borehole and well casing will be filled with a neat cement grout to land surface to prevent any surface-water infiltration. The monitor well will then be completed with a locking above-ground protective casing (Figure 6). The well will be developed for approximately one to two hours to assure a sand-free discharge. Upon completion of the monitor-well installation, a site survey will be conducted to reference the water-level measuring point of the new well (top of PVC well casing) to the same datum as the others, mean sea level (msl).

McCoy Annex Wastewater Treatment Facility (Site No. 10)

The McCoy Annex Wastewater Treatment Plant (WWTP), shown in Figure 5, was not included in the IAS but has been included in this Work Plan as a site recommended for further evaluation. The 1.2-mgd (million gallons per day) facility discharges effluent into three treatment lagoons for nitrogen removal. Under Florida Administrative Code, Chapter 17-4,

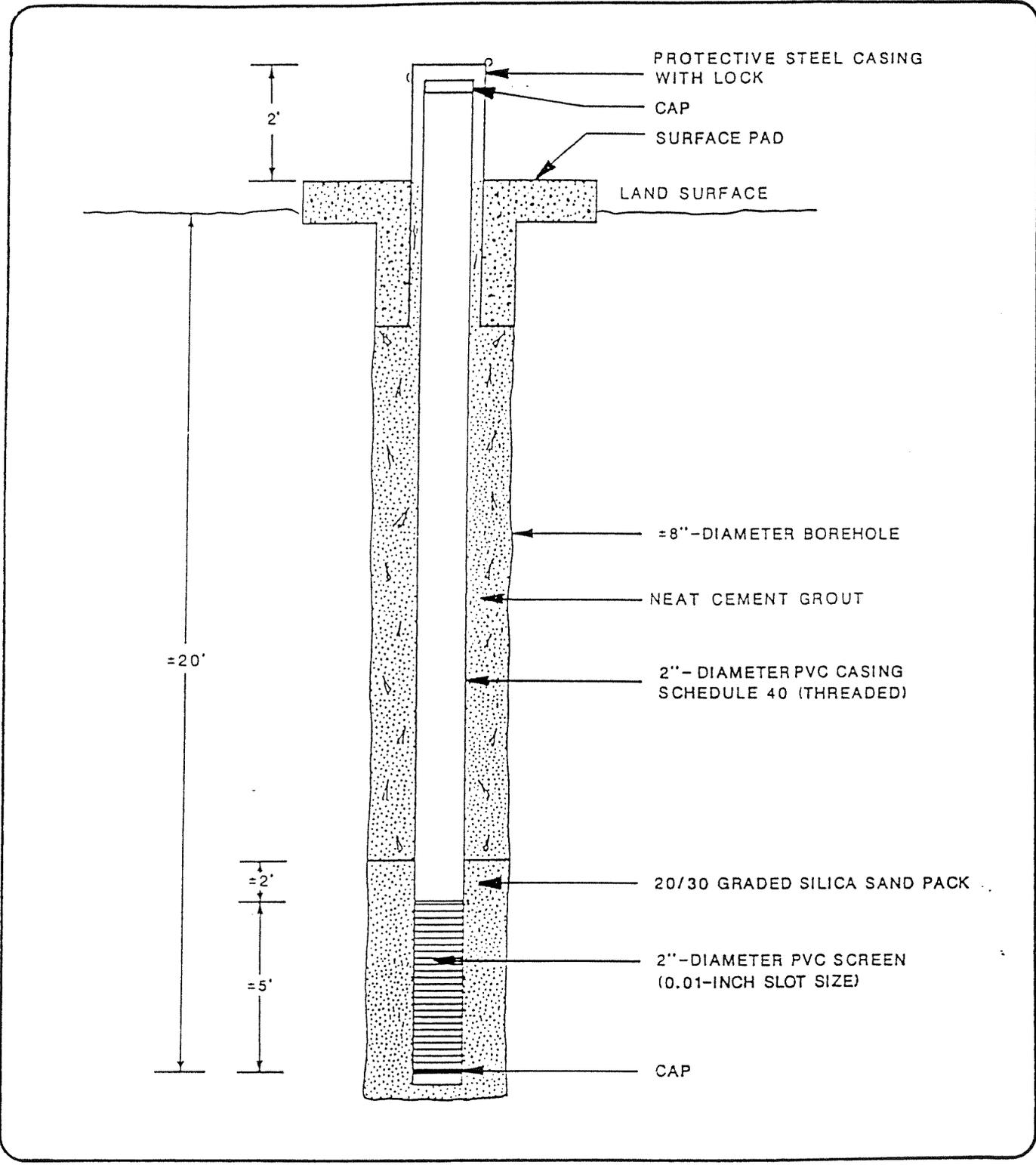


Figure 6.

Typical Monitor-Well Construction.

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included volatile organic compounds (VOCs), acid extractable and base neutral compounds, pesticides, polychlorinated biphenyls (PCBs), metals, cyanide, Gross Alpha and Gross Beta (RADs), and Florida Secondary Drinking-Water (SDW) parameters. This sampling event identified a concentration of arsenic at 0.068 milligrams per liter (mg/L) in well OLD-1-3, methylene chloride at 15 parts per billion (ppb) in monitor well OLD-1-4, and iron at 1.5 mg/L in well OLD-1-1. Elevated levels (compared to the Primary Drinking Water Standards [PDWS]) of RADs were detected in the ground water from all four monitor wells.

The RI will include a one-year monitoring program consisting of quarterly water-quality sampling and water-level measurements from all of the wells. Samples will be analyzed for EPA priority pollutant metals, VOCs, total nitrates, and RADs. Samples collected for RADs will be analyzed for both total and dissolved RADs for the first 2 quarters. The dissolved RADs samples will be filtered first using a 0.45-micron filter to remove suspended solids prior to sample preservation and analyses. It is expected that filtration of the water-quality samples will provide more representative results for the dissolved radiological compounds moving in the shallow ground-water system. Suspended sediments entrained in the water during sampling procedures may produce elevated concentrations of RADs due to interferences in the analytical method and therefore may not be representative of the actual ground-water quality. Also,

if gross alpha is detected in excess of 5 pci/L (picocuries per liter), then Radium 226 and 228 also will be analyzed from the sample matrix. After 2 quarters, results of the RAD analyses will be evaluated and a determination made as to discontinuing one sampling technique on analyses for the last 2 quarters. Table 2 outlines the proposed sampling program for the RI.

McCoy Annex Landfill (Site No. 3)

The McCoy Annex Landfill, shown in Figure 4, was operated from around 1960 to 1972 in the western portion and from 1972 to 1978 in the eastern portion. The landfill was constructed of large trenches reportedly 100 to 200 ft long, 20 to 25 ft wide, and 10 to 15 ft deep and covered over 99 acres. In 1981, a golf course was constructed over much of the original landfill area. Wastes reportedly disposed of in the McCoy Annex Landfill include unknown quantities of paint and paint thinner, asbestos, transformers, hospital wastes, low-level radiological waste, automobile batteries, steel cable, airplane parts, waste oil, and yard wastes.

Five monitor wells were installed by G&M during the Verification Study Phase. Ground-water samples from the five wells and two wells previously installed by Conklin, Porter, and Holmes in 1983 (Figure 4) were analyzed for SDW, EPA priority pollutants, and RADs. Additionally, four surface-water and sediment samples were collected at stations shown in Figure 4 and analyzed for EPA priority pollutants

Table 2. Proposed Water-Quality Sampling Program
During Characterization Phase Study

Site/ Number	Ground-Water ^{1/} Samples	Surface-Water Samples	Analysis
NTC North Landfill (Site 1)	4/Quarter		EPA priority pollutant metals, ^{2/} VOCs, ^{3/} nitrate, and RADS ^{4/}
McCoy Annex Landfill (Site 3)	7/Quarter	4/Quarter	EPA priority pollutant metals, VOCs, base-neutral, phenols, and RADS
Old NTC Pesticide Building (Site 8)	4/Quarter		VOCs, acid and base-neutral extractables, pesticides by EPA 608
McCoy Annex WWTD (Site 10)	2/Quarter		FDER primary and secondary drinking- water parameters ^{5/}

^{1/} Field measurements of pH, temperature, and specific conductance will be made at the time of sampling.

^{2/} Priority pollutant metals include antimony, arsenic, beryllium, cadmium, chromium, lead, mercury, nickel, selenium, silver, thallium, and zinc.

^{3/} Volatile Organic Compounds by EPA Method 624.

^{4/} RADs - Gross Alpha and Gross Beta (total and dissolved for first 2 quarters).

^{5/} Primary Drinking-Water Parameters per Chapter 17-22.04 (FAC) and Secondary Drinking-Water Standards, chloride, copper, iron, manganese, pH, sulfate, and TDS.

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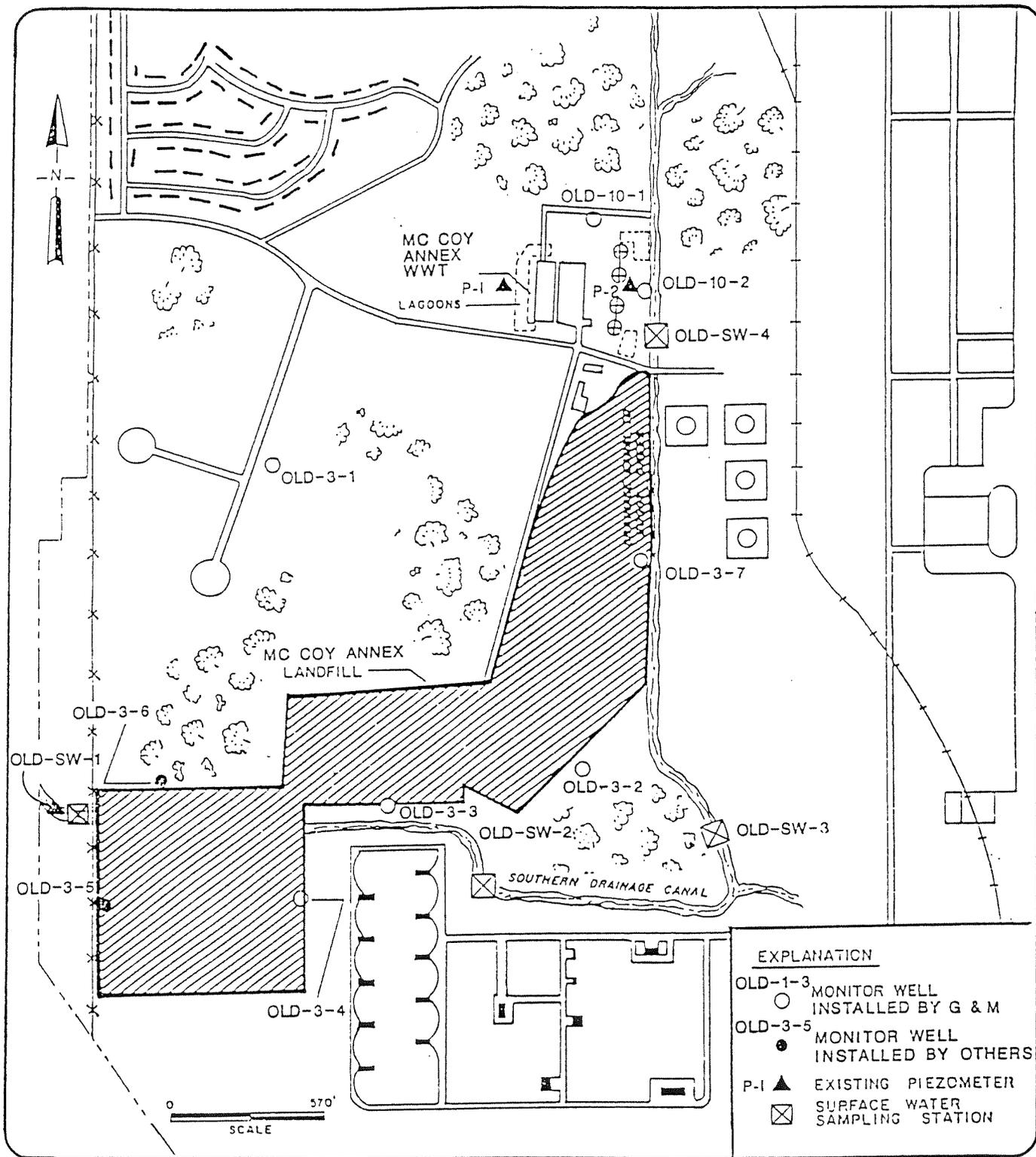


Figure 4.

Site 3 - The McCoy Annex Landfill and Site 10 - the McCoy Annex WWT.

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(surface water) and metals (sediment samples) by Extraction Procedure (EP) toxicity. The results of this sampling indicate elevated levels (compared to the PDWS) of iron and RADs in all seven wells and elevated levels of manganese in wells OLD-3-5 and OLM 3-6. Four VOCs (benzene at 31 ppb, chlorobenzene at 36 ppb, ethylbenzene at 10 ppb, 1,4-dichlorobenzene at 8.3 ppb) and naphthalene (16 ppb) were detected in well OLD-3-6. Surface-water and sediment samples collected along the drainage canal indicated elevated levels of phenols at all four surface-water sampling locations ranging from 1.0 to 3.4 ppm.

Recommendations for the RI includes a one-year monitoring program of quarterly sampling of all seven wells and four surface-water sites. Water-level measurements will also be collected at the time of sampling. These samples will be analyzed for VOCs, EPA priority pollutant metals, and RADs (See Table 2). As discussed previously, the RAD sampling and analyses will be the same as described earlier.

Old NTC Pesticide Building (Site No. 8

This building, shown on Figure 5, was used from the early 1950s to 1972 as a storage, mixing, and cleaning area for all pest control operations at NTC North. The building, which measured 15 ft wide and 30 ft long, was demolished and covered with sandy soil in 1981. The pesticides were mixed in containers on the ground and spills reportedly may have

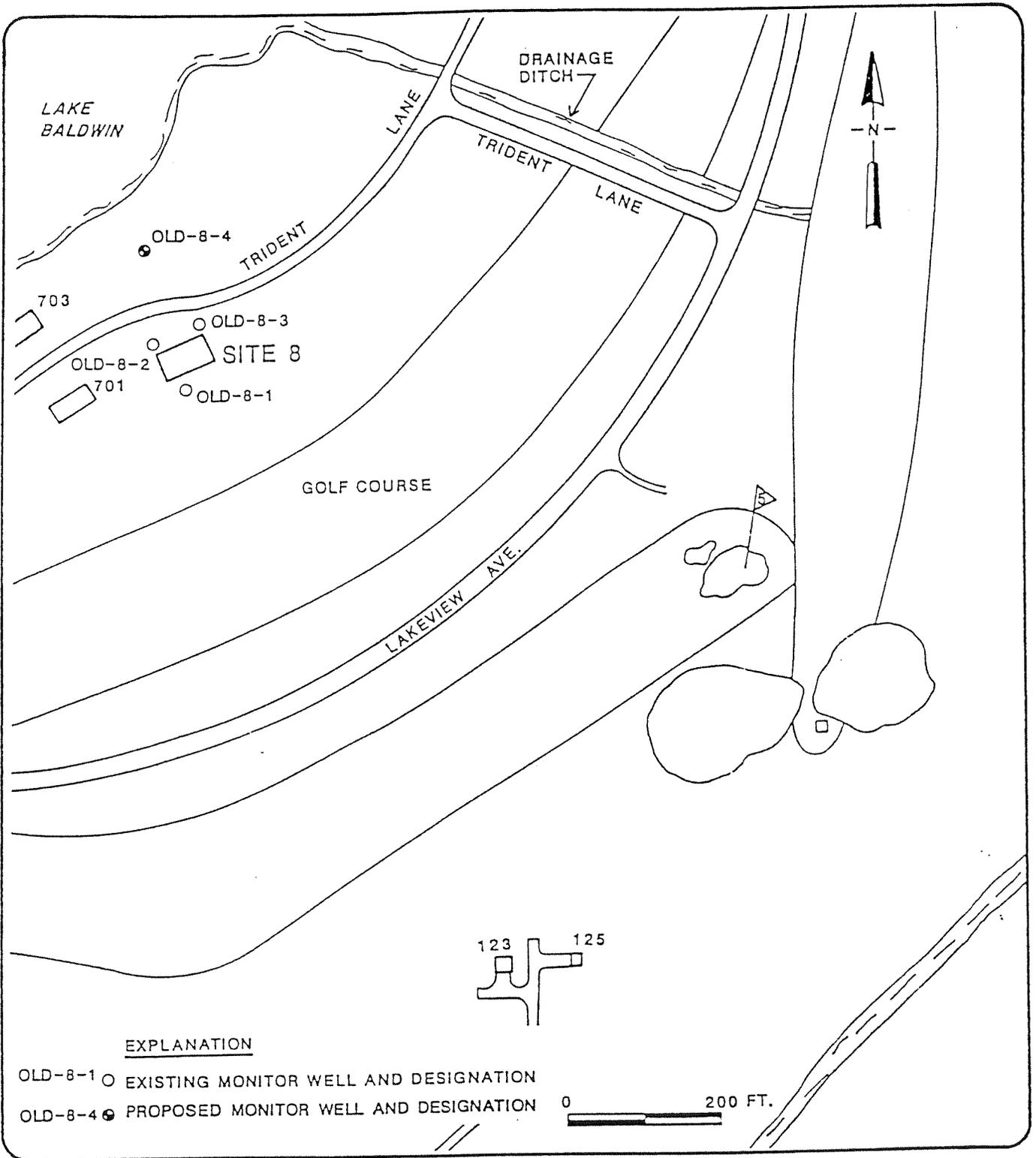


Figure 5.

Site 8 - The Old NTC Pesticide Building.

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the bottom of the well :
well screen. The rem:
borehole and well casing will be filled with a
grout to land surface to prevent any surface-water
infiltration. The monitor well will then be completed with a
locking above-ground protective casing (Figure 6). The well
will be developed for approximately one to two hours to
assure a sand-free discharge. Upon completion of the
monitor-well installation, a site survey will be conducted to
reference the water-level measuring point of the new well
(top of PVC well casing) to the same datum as the others,
mean sea level (msl).

McCoy Annex Wastewater Treatment Facility (Site No. 10)

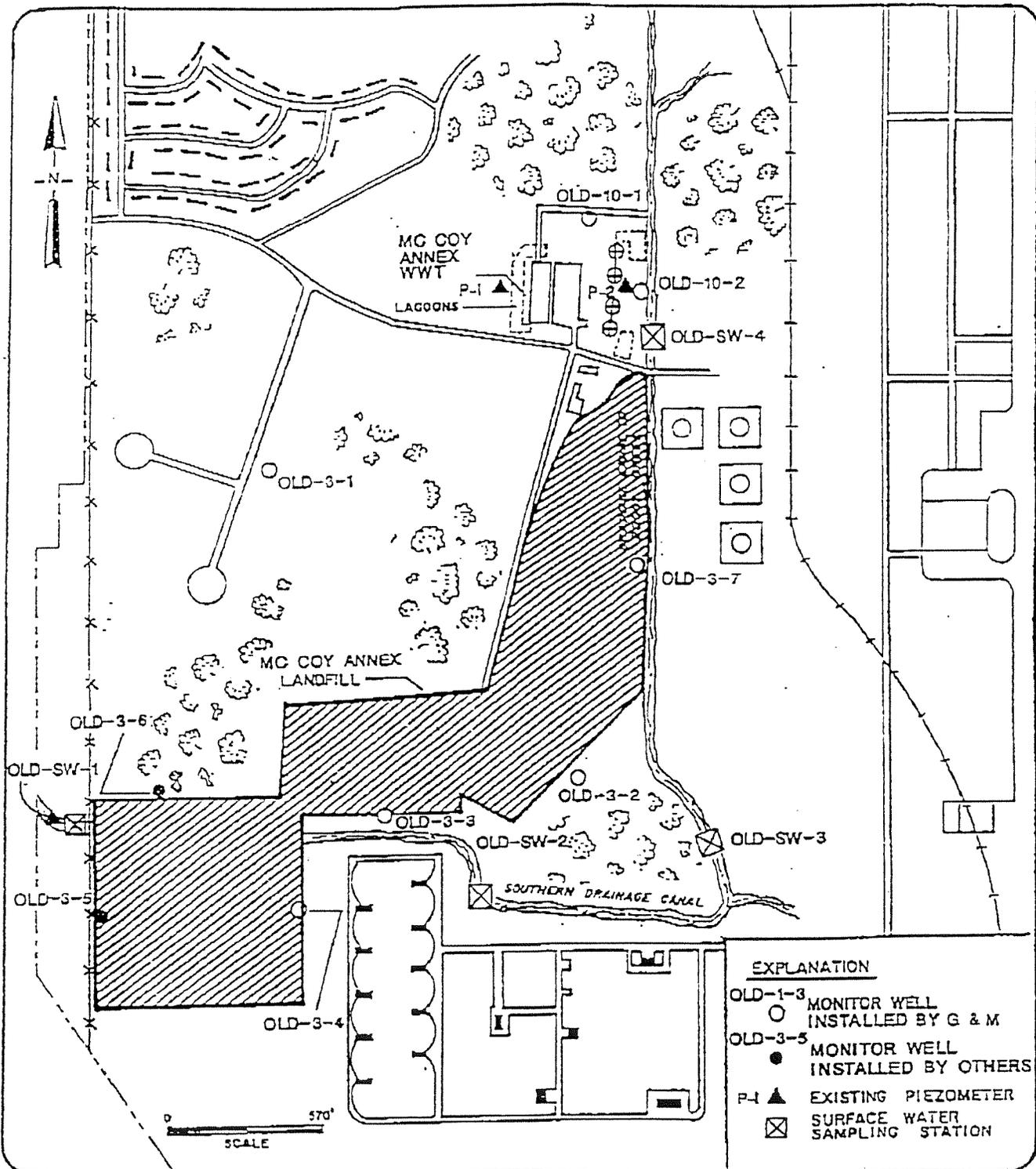
The McCoy Annex Wastewater Treatment Plant (WWTP), shown in Figure 5, was not included in the IAS but has been included in this Work Plan as a site recommended for further evaluation. The 1.2-mgd (million gallons per day) facility discharges effluent into three treatment lagoons for nitrogen removal. Under Florida Administrative Code, Chapter 17-4, Section 17-4.245 (6)(d), ground-water monitoring is required for these surface lagoons.

During the Verification Phase Study, two shallow monitor wells were installed (Figure 5). Ground-water samples were analyzed for PDW parameters, SDW, VOCs, and phenol. The

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analytical results of ground-water sampling at the WWTP indicated levels of iron in OLD-10-1 at 4.8 mg/L and in OLD-10-2 at 0.08 mg/L. Also, the laboratory results from OLD-10-2 showed elevated levels of manganese (0.17 mg/L), TDS (1,100 mg/L), sulfate (340 mg/L), and nitrate (32 mg/L). Since this is an active facility, additional monitoring is required in accordance with Chapter 17-4 FAC. Therefore, it is recommended that samples be collected quarterly for one year and analyzed for FDER's primary and secondary drinking-water constituents (Table 2) during the RI.

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Figure 4.
Site 3 - The McCoy Annex Landfill
and Site 10 - the McCoy Annex WWT.

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occurred. Additionally, it is estimated that pesticides may have been in the building when it was demolished.

During the Verification Phase Study, three shallow wells (OLD-8-1, OLD-8-2, and OLD-8-3) were installed as shown in Figure 5. Ground-water samples were analyzed for SDW and EPA priority pollutants. Analytical results of the ground-water samples identified trace levels (6 ppb) of Bis (2-ethylhexyl) phthalate (base/neutral compound) in OLD-8-2 and 13 ppb of ethylbenzene (VOC), 7 ppb (estimated) of phenol, 7 ppb (estimated) of 2-chlorophenol, 33 ppb of 2,4-dichlorophenol (acid extractables), and 7 ppb of chlorodane (pesticide) in samples from OLD-8-3.

During the RI, one additional monitor well (OLD-8-4) will be installed hydraulically downgradient of Site No. 8 between it and Lake Baldwin. A one-year sampling program will be implemented by collecting quarterly samples from all the wells. The samples will be analyzed for VOCs, acid and base-neutral extractables, and pesticides (Table 2). Water levels will be collected at the time of sampling to evaluate the shallow ground-water flow rate and direction.

Monitor well OLD-8-4 will be constructed similar to those installed by G&M during the Verification Phase Study. Initially, a soil boring will be drilled with hollow-stem augers to determine the surficial geology. Continuous sediment samples (split-spoon) will be collected from land

Section 17-4.245 (6)(d), ground-water monitoring is required for these surface lagoons.

During the Verification Phase Study, two shallow monitor wells were installed (Figure 5). Ground-water samples were analyzed for PDW parameters, SDW, VOCs, and phenol. The analytical results of ground-water sampling at the WWTP indicated levels of iron in OLD-10-1 at 4.8 mg/L and in OLD-10-2 at 0.08 mg/L. Also, the laboratory results from OLD-10-2 showed elevated levels of manganese (0.17 mg/L), TDS (1,100 mg/L), sulfate (340 mg/L), and nitrate (32 mg/L). Since this is an active facility, additional monitoring is required in accordance with Chapter 17-4 FAC. Therefore, it is recommended that samples be collected quarterly for one year and analyzed for FDER's primary and secondary drinking-water constituents (Table 2) during the RI.

DATA ANALYSIS AND REPORT PREPARATION

The data collected during each quarterly sampling event will be reviewed by the G&M Project Manager and Quality Assurance Officer. After 3 quarters of sampling and analysis one well at each site will be chosen for a complete Appendix IX characterization during sampling and analysis in the last quarter. Three interim status reports will be prepared following the first three sampling events. These interim reports will consist of a cursory discussion and presentation of the analytical findings to date. A draft RI report will be prepared for review by the Southern Division upon receipt of the last quarterly sampling event which will describe in detail the results of the study and appropriate recommendations for further actions consistent with applicable federal and state regulations. Upon receipt of comments concerning the draft report, G&M will prepare a final RI report for submission to the EPA and FDER.

PROJECT STAFFING

The project team will consist of staff members from G&M's Tampa office who will be assisted, as needed, by senior advisors from G&M's other offices. Mr. Fred A. Seguiti, an Associate in the Tampa office, will be responsible for the overall execution of the project. Ms. Debra E. Brown, a Staff Scientist in the Tampa office, will be Project Manager and will be responsible for the day-to-day project execution. Dr. Ralph E. Moon and Mr. Charles W. Ankerberg will serve as project Health and Safety Officers and Quality Assurance Officers, respectively. The field operations will be supervised by experienced staff hydrogeologists, who will be present to oversee all drilling operations. All field sampling will be performed by G&M's Tampa office sampling personnel.