



FINAL WORK PLAN

FOR

LONG-TERM MONITORING
LANDFILL NOs. 3 AND 4

CANNON AIR FORCE BASE
Clovis, New Mexico

Contract Number DACW45-94-D-0031
Project Number 95-321

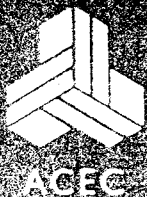
Prepared for

*U.S. Army Corps of Engineers
Omaha District*

Prepared by

*Foothill Engineering Consultants, Inc.
350 Indiana Street, Suite 415
Golden, Colorado 80401
(303) 278-0622*

February 1996



FINAL WORK PLAN
FOR
LONG-TERM MONITORING
LANDFILL NOs. 3 AND 4

CANNON AIR FORCE BASE
Clovis, New Mexico

Document I of III
Final Field Sampling Plan

Document II of III
Final Quality Assurance Project Plan

Document III of III
Final Site Safety & Health Plan

Appendix A
Standard Operating Procedures

Appendix B
Example Report Formats

FINAL FIELD SAMPLING PLAN

FOR

**LONG-TERM MONITORING
LANDFILL NOs. 3 AND 4**

**CANNON AIR FORCE BASE
Clovis, New Mexico**

Document I of III

TABLE OF CONTENTS

	<u>PAGE</u>
1.0 INTRODUCTION.....	1-1
1.1 SCOPE OF WORK	1-1
1.2 SITE BACKGROUND	1-4
1.3 WORK PLAN ORGANIZATION.....	1-5
2.0 TASK ACTIVITIES	2-1
2.1 GROUNDWATER SAMPLING	2-1
2.2 REPORTING REQUIREMENTS.....	2-4
2.2.1 Monthly Progress Reports.....	2-4
2.2.2 A-E Daily Quality Control Reports	2-5
2.2.3 NMED Quarterly Monitoring Reports.....	2-5
2.2.4 NMED Annual Report.....	2-5
2.2.5 Evaluation Report	2-5
2.3 SCHEDULE.....	2-5
3.0 REFERENCES	3-1

LIST OF FIGURES

<u>FIGURE</u>		<u>PAGE</u>
1-1	Site Location Map	1-2
1-2	Monitoring Well Location Map	1-3

LIST OF TABLES

<u>TABLE</u>		<u>PAGE</u>
2-1	Monitoring Wells O and N. Groundwater Samples Per Quarterly Event.....	2-2
2-2	Required Sample Containers, Preservation, and Holding Times	2-3

SECTION 1.0
INTRODUCTION

1.0 INTRODUCTION

Foothill Engineering Consultants, Inc. (FEC) has prepared this Work Plan to serve as a guidance document for the quarterly groundwater sampling at Cannon Air Force Base (CAFB) near Clovis, New Mexico (Figure 1-1). This Work Plan consists of this Field Sampling Plan (FSP), the Quality Assurance Project Plan (QAPP), and the Site Safety and Health Plan (SSHP).

Purpose

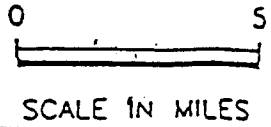
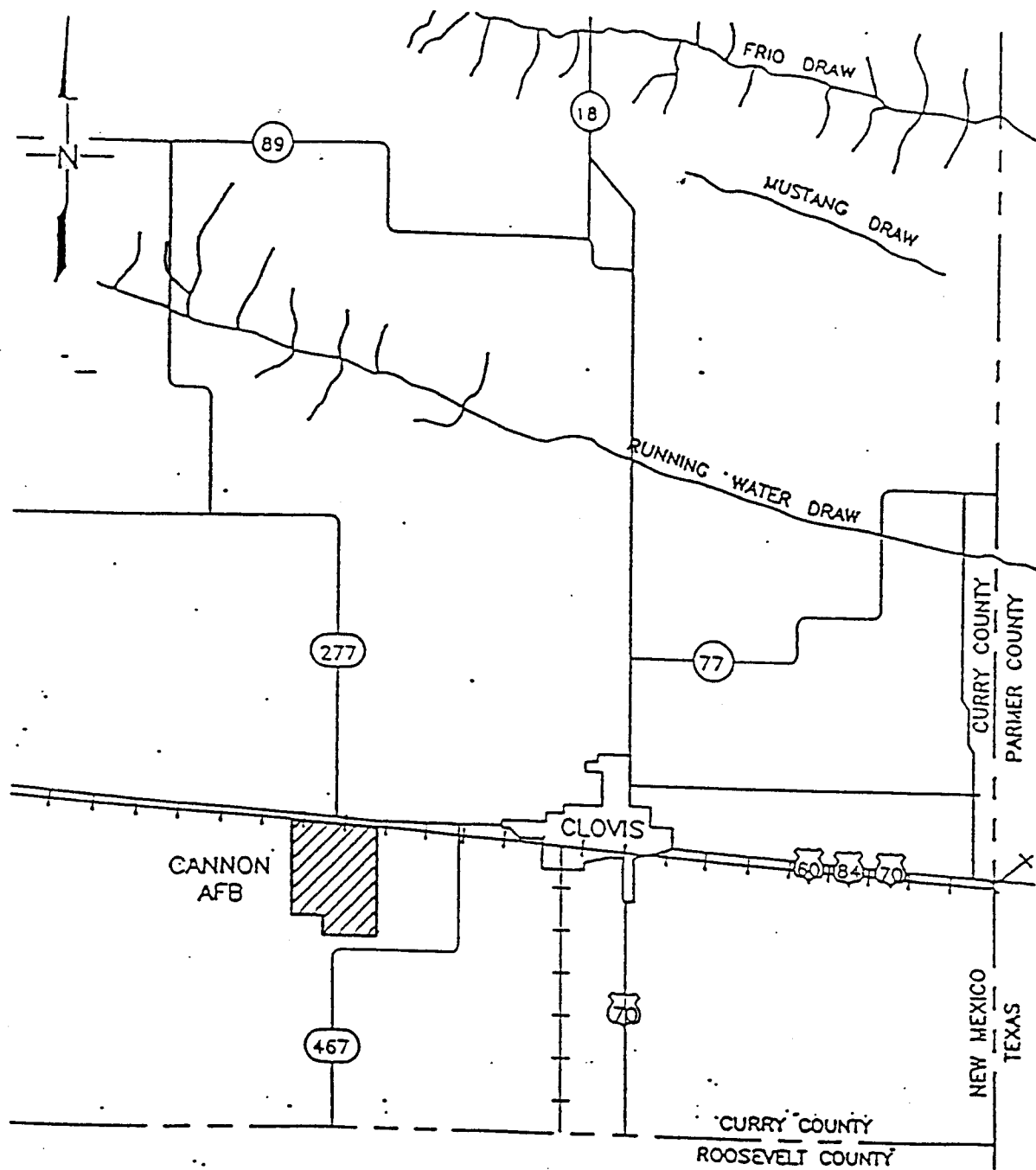
FEC will perform the activities described in this Work Plan under contract to the U.S. Army Corps of Engineers (USACE). The Scope of Services for General Contract Number DACW 45-94-D-0031 includes the quarterly monitoring for Wells O and N located at Landfills 3 and 4, respectively, within CAFB (Figure 1-2).

Quarterly groundwater sampling is necessary to meet the New Mexico Environmental Department's (NMED's) Assessment Monitoring program requirements for Solid Waste Management Units (SWMUs) located in the State of New Mexico. The purpose for performing quarterly monitoring at wells O and N is to assess the potential of the associated SWMUs to leak hazardous wastes or constituents. Quarterly reports will be prepared for the NMED, USACE and the Environmental Protection Agency (EPA) to present the results of the groundwater analyses. These results will be used to develop a scope of work for an action decision. The recommendation may be for a Corrective Measures Study, a Compliance Monitoring Program, an Interim Corrective Action, or a decision for no further action.

1.1 SCOPE OF WORK

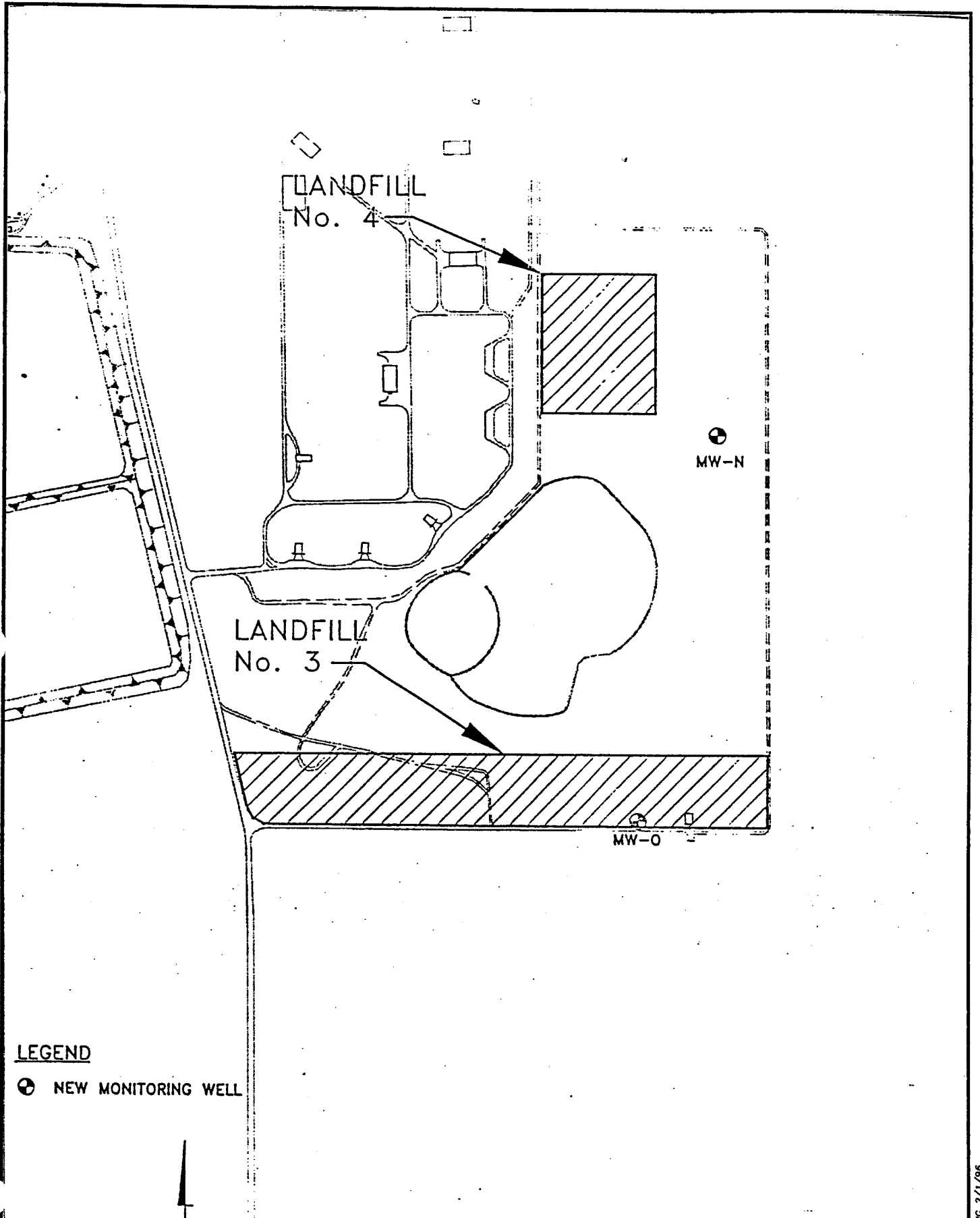
FEC will perform the following tasks to complete the scope of work:

- Perform quarterly groundwater-level measurements at Monitoring Wells N and O.
- Perform sampling and analysis of Monitoring Wells N and O, and report results.
- Prepare Assessment Monitoring Quarterly Reports as required by the NMED, for the NMED and the EPA.



 FEC FOOTHILL ENGINEERING CONSULTANTS, INC.	FIGURE 1-1 SITE LOCATION MAP CANNON AIR FORCE BASE			DATE: 2/96	SCALE: SHOWN	DRAWN BY: -
---	---	--	--	---------------	-----------------	----------------

95-321\FG1-1.DWG 2/1/96



LEGEND

⊕ NEW MONITORING WELL

- Prepare an Annual Summary Report For Assessment Monitoring as required by NMED for the EPA and the NMED.

The scope of work is based on the "Site-Specific Scope of Services, Long-Term Monitoring, Landfill Nos. 3, 4, and 25," dated November 22, 1995, and the "Scope of Services for Quarterly Monitoring Wells K/N/O at LFS 3/4/25," November 1995. As directed by the USACE-TM, this work effort will involve groundwater sampling at Landfills 3 and 4 only. Monitoring Well K, at Landfill 25, has been omitted from this long-term monitoring program due to the low productivity of Well K.

1.2 SITE BACKGROUND

SWMU 105 (Landfill No. 3)

Landfill 3 at CAFB is located in the east-central portion of the base (Figure 1-2). It is a rectangular area, approximately, 1,960 feet by 300 feet (13.3 acres). The site is bounded on the north by the road leading to the transmitter tower, on the south and east by barbed wire fences and agricultural fields, and on the west by Perimeter Road. At the present time, it gives the appearance of an open field covered with native vegetation. The topography at the site is gently sloped toward the north and the playa lake. Depressions observed at the surface are probably a remnant of the locations of former disposal trenches in which settlement has occurred.

Landfill 3 was active between 1959 and 1967. Domestic solid wastes, waste oils, solvents, paints, paint thinners and strippers, pesticide containers, and various empty cans and drums were burned in trenches and then buried each following day. As trenches were filled, new trenches were excavated in adjacent areas.

SWMU 104 (Landfill No. 4)

Landfill 4 at CAFB is located in the east-central portion of the base. It is a rectangular area, approximately 573 feet by 479 feet (6.3 acres). The site is bounded on the north by an unused portion of Perimeter Road, on the west by a barbed wire fence, on the east by a vacant field, and on the south by the playa lake seen in Figure 1-2. At the present

time, it gives the appearance of an open field covered with native vegetation. The topography at the site is gently sloped toward the south and the playa lake. Depressions observed at the surface are probably a remnant of the locations of former disposal trenches in which settlement has occurred.

Landfill 4 was active in 1967 and 1968. Domestic solid wastes, waste oils, solvents, paints, paint thinners and strippers, pesticide containers, and various empty cans and drums were burned in trenches and buried each following day. As trenches filled, new trenches were excavated in adjacent areas.

1.3 WORK PLAN ORGANIZATION

This Work Plan is presented as three documents; the FSP represents Document I, while the QAPP and SSHP represent Documents II and III, respectively. Appendices A and B contain Standard Operating Procedures (SOPs) and example report formats, respectively. The remainder of the FSP is organized as follows:

- Section 1 — Introduction and Site History
- Section 2 — Task Activities
- Section 3 — References

SECTION 2.0
TASK ACTIVITIES

2.0 TASK ACTIVITIES

This section presents FEC's plan for field activities, reporting, and project scheduling. Field activities include quarterly groundwater sampling of monitoring wells O and N at landfills 3 and 4, respectively. Field activities will be performed in accordance with the Standard Operating Procedures (SOPs) presented in Appendix A. Table 2-1 presents the planned sampling activities for each quarterly event.

2.1 GROUNDWATER SAMPLING

Wells O and N will be sampled for the constituents listed in Appendix IX of 40 CFR Part 264 and additional water quality indicators (see Table 2-1). The required sample containers, sample preservation, and holding times are presented in Table 2-2. The sampling events will occur quarterly for a period of one year. Sampling is planned for March, June, September, and December of 1996.

Prior to sampling, the depth to groundwater will be measured in each well. Water level measurements will be obtained consistent with the procedures presented in Appendix A (SOP 1, Water Level Survey). The water levels will be recorded on Groundwater Level Measurement Sheets (SOP 1, Appendix A). In addition, each well will be measured for the potential presence of nonaqueous-phase liquids (NAPLs) prior to sampling.

Each well will be purged and sampled via its dedicated Bennett piston pump (to be installed prior to the first sampling event) to remove at least three casing volumes of groundwater. Field measurements of temperature, pH, conductivity, redox potential (Eh), and dissolved oxygen will be measured in a flow-through cell as presented in Appendix A (SOP 2, Field Measurement of Water Quality Parameters). The field equipment will be properly calibrated prior to use according to the procedures presented in Appendix A (SOP 3, Field Equipment Calibration and Maintenance). These parameters will be recorded during purging on Well Purge Data Sheets presented in Appendix A (Figure 4-1, SOP 4, Groundwater Sampling). In addition, turbidity will be measured and will be no greater than 5.0 nephelometric turbidity units (NTU) at the completion of purging. These

Table 2-1 - Monitoring Wells O and N. Groundwater Samples Per Quarterly Event

Matrix Parameter	Quality Control (A-E) Samples					Quality Assurance (MRD) Samples			
	# of Field Samples	# of Dups/Splits	# of Sampler Rinsates	# of Trip Blanks	Total AE Samples	QA Dups/Splits	QA Sampler Rinsates	QA Trip Blanks	Total QA Samples
App. IX VOCs	3	1	0	1	5	1	0	1	2
App. IX SVOCs	3	1	0	0	4	1	0	0	1
App. IX Pesticides/PCBs	3	1	0	0	4	1	0	0	1
App. IX Metals	3	1	0	0	4	1	0	0	1
App. IX PAHs	3	1	0	0	4	1	0	0	1
Dioxin - 2, 3, 7, 8 - TCDD	3	1	0	0	4	1	0	0	1
Cyanide	3	1	0	0	4	1	0	0	1
Sulfide	3	1	0	0	4	1	0	0	1
TOC	3	1	0	0	4	1	0	0	0
TOX	3	1	0	0	4	1	0	0	0

NOTE: The parameters of pH and conductivity will be measured in the field using appropriate field instruments.

Table 2-2 - Required Sample Containers, Preservation, and Holding Times

Analysis	No. of Containers	Container Type	Sample Preservation	Sample Holding Time
App. IX VOCs	3	40-mL Vials	pH<2, HCl Cool to 4°C	14 days
App. IX SVOCs	2	1-L Amber Glass	Cool to 4°C	7 days to extract 40 days to analyze
App. IX PAHs	2	1-L Amber Glass	Cool to 4°C	7 days to extract 40 days to analyze
App. IX Pesticides/PCBs	2	1-L Amber Glass	Cool to 4°C	7 days to extract 40 days to analyze
Dioxin - 2, 3, 7, 8 - TCDD	3	1-L Amber Glass	None	7 days to extract 40 days to analyze
App. IX Metals	1	16 oz Polyethylene bottle	pH<2, HNO ₃ Cool to 4°C	180 days
Cyanide	1	1-L Polyethylene bottle	pH>9, NaOH Cool to 4°C	28 days
Sulfide	1	1-L Polyethylene bottle	pH>9, NaOH Cool to 4°C	7 days
TOC	1	500 mL Amber Glass	pH<2, H ₂ SO ₄ Cool to 4°C	28 days
TOX	1	500 mL Amber Glass	pH<2, H ₂ SO ₄ Cool to 4°C	7 days

parameters will be measured at the beginning of purging and twice per casing volume removed. Purging will continue beyond three casing volumes until the parameters have stabilized.

Sampling of the groundwater monitoring wells will occur directly from the discharge tubes of the dedicated Bennett pumps. The sampling procedures will be consistent with those presented in Appendix A (SOP 4).

Sample handling procedures will be consistent with those presented in Appendix A (SOP 5, Sample Handling).

Any non-dedicated sampling equipment will be properly decontaminated between each use as described in Appendix A (SOP 6, Equipment Decontamination).

Purge water from the quarterly groundwater sampling activities will be contained in storage tanks located at each well site. The purge water will be discharged to the ground surface by CAFB personnel upon receipt and review of laboratory results.

2.2 REPORTING REQUIREMENTS

Throughout the course of the project, FEC will submit a variety of reports. These reports are described below in the following subsections.

2.2.1 Monthly Progress Reports

Monthly progress reports indicate the title of the project, the contract and delivery order numbers, date, project point of contacts, progress of the project, the tasks completed in that particular month and/or percentage completion of a particular project task, and the upcoming events to be worked in the next payment period. This report will be provided directly to the USACE-TM, CAFB, and to the Headquarters, Air Combat Command. A report including cost expenditures (including billing information described per task) will be provided exclusively to the USACE-TM. The Monthly Progress Reports shall be submitted approximately two weeks prior to the payments estimate submittal. An updated schedule will be attached to every Monthly Report, even when no activity occurs in a month.

2.2.2 A-E Daily Quality Control Reports

A-E Daily Quality Control Reports (DQCRs), will be submitted to the USACE at the completion of each quarterly sampling event. A copy of the A-E DQCRs will be compiled and delivered to the USACE-TM by regular mail at the end of every work week. A copy will also be hand-delivered to the Cannon AFB CE/CEV Office on the morning after each reported workday. An example DQCR is presented in Appendix B.

2.2.3 NMED Quarterly Monitoring Reports

NMED Quarterly Monitoring Reports will be submitted to the USACE, CAFB, Headquarters, Air Combat Command (ACC), EPA and NMED. These reports will be submitted in draft status to USACE, ACC, and CAFB, and in final status to the full distribution. An example Quarterly Monitoring Report is presented in Appendix B.

In addition, FEC will prepare one copy of each draft and final quarterly report with all new data and a data validation summary for one groundwater sample from that quarter's event. This additional quarterly report will be submitted to CAFB.

2.2.4 NMED Annual Report

An NMED Annual Report will be submitted to USACE, CAFB, ACC, EPA and NMED. These reports will be submitted in draft status to USACE, ACC, and CAFB, and in final status to the full distribution. An example NMED Annual Report is presented in Appendix B.

2.2.5 Evaluation Report

The Evaluation Report will be submitted as a separate report which includes a description of the base, sites, sampling program, QA/QC practices, analytical results, and conclusions and recommendations for future activities at the sites. This report will be submitted in pre-draft status to USACE, CAFB, and ACC. This report will be submitted in draft, and final status to USACE, CAFB, Headquarters, ACC, EPA, and NMED.

2.3 SCHEDULE

The proposed schedule for completion of project activities is presented in Attachment 1.

SECTION 3.0

REFERENCES

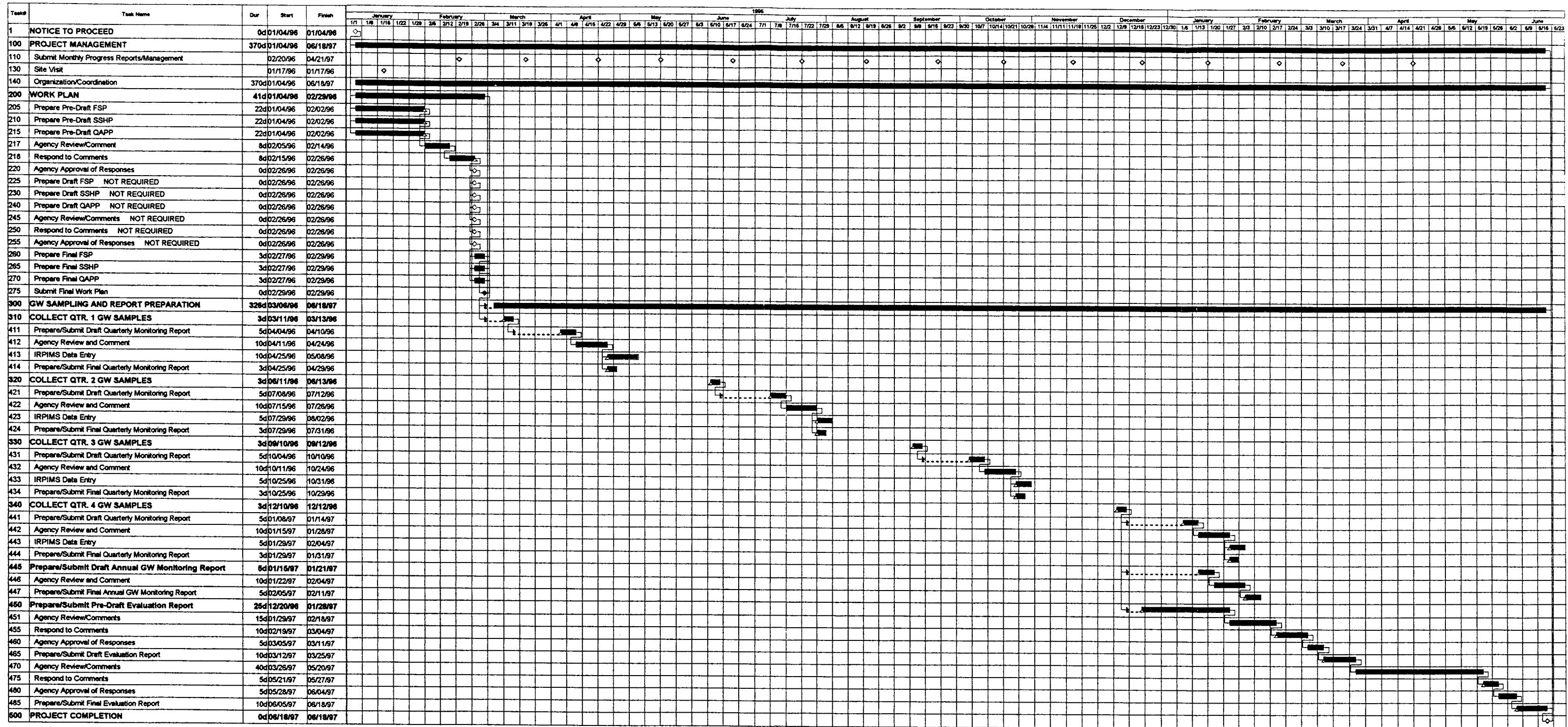
3.0 REFERENCES

U.S. Geological Survey Water Resources Division. 1995. *Cannon Air Force Base, New Mexico, ground-water monitoring at landfill 5, RCRA monitoring well sampling data report for February 22-23, 1995 sampling*. Prepared for U.S. Air Force Air Combat Command, Cannon Air Force Base, April.

Woodward Clyde. 1995. *Draft Cannon Air Force Base landfill no. 5 phase 1 RFI work plan*.

ATTACHMENT 1
PROJECT SCHEDULE

Cannon AFB Long-Term Monitoring Program-Revised Schedule



Note: Schedule is tentative and subject to change.