(2)

INSTALLATION RESTORATION PROGRAM

AD-A238 847

PRELIMINARY ASSESSMENT

106th Civil Engineering Flight

Roslyn Air National Guard Station
New York Air National Guard
Roslyn, New York

February 1991

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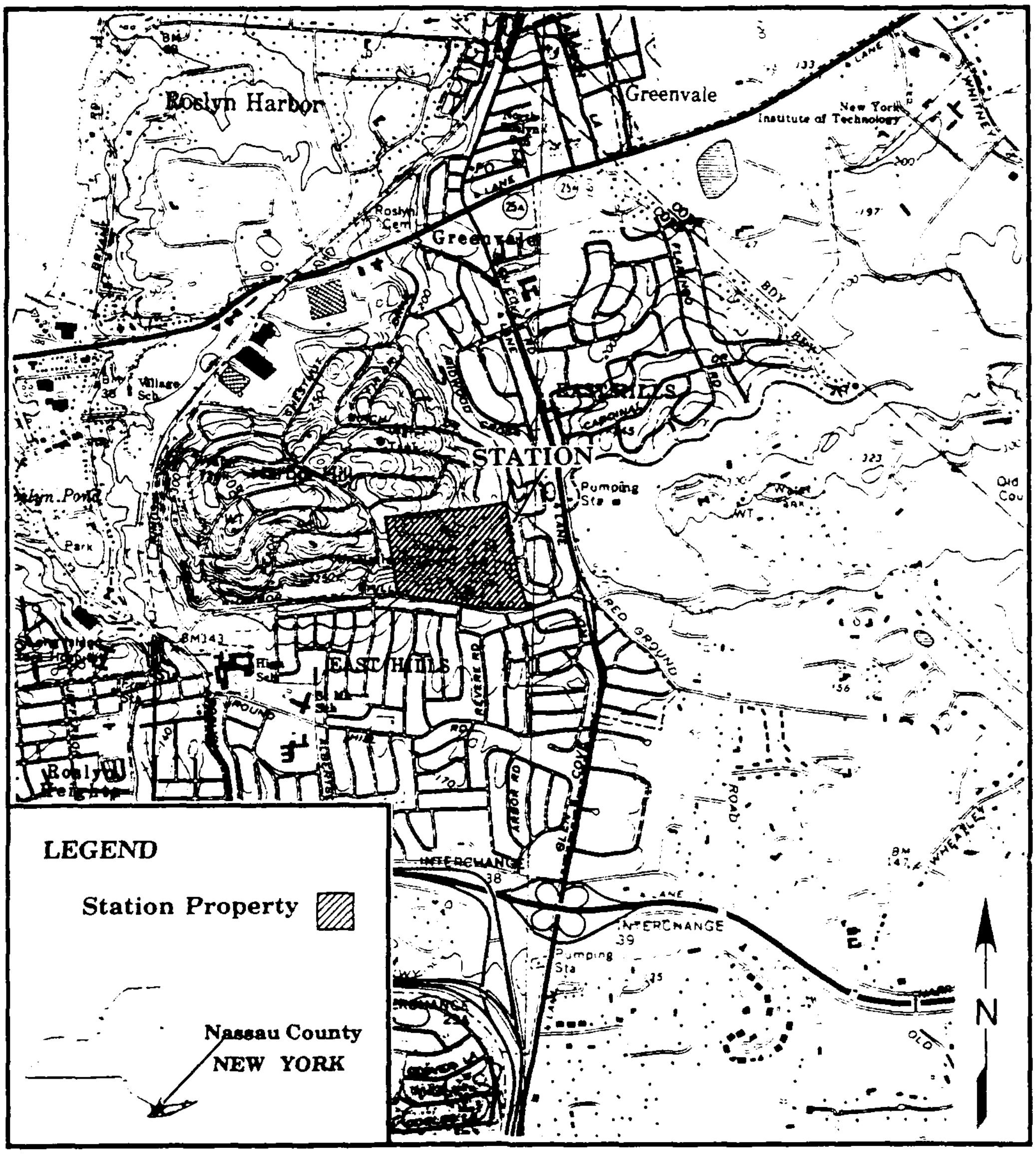

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Preliminary environmental assessment for Rosyln Air National Guard Station, as part of the Installation Restoration Program. The report reflects data gathered from records review, interviews, and a site visit. Three sites were identified as potentially contaminated and recommended for further investigation.

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INSTALLATION RESTORATION PROGRAM
PRELIMINARY ASSESSMENT

106th CIVIL ENGINEERING FLIGHT

213th ENGINEERING INSTALLATION SQUADRON

274th COMBAT COMMUNICATIONS SQUADRON

ROSLYN AIR NATIONAL GUARD STATION
NEW YORK AIR NATIONAL GUARD
ROSLYN, NEW YORK

Prepared for

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ACRONYM LIST

AGE	Aerospace Ground Equipment
AMSL	Above Mean Sea Level
ANG	Air National Guard
BMSL	Below Mean Sea Level
CAP	Civil Air Patrol
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CCS	Combat Communications Squadron
CEF	Civil Engineering Flight
CFR	Code of Federal Regulations
DEQPPM	Defense Environmental Quality Program Policy Memorandum
DoD	Department of Defense
DOT	Department of Transportation
DRMO	Defense Reutilization and Marketing Office
EIS	Engineering Installation Squadron
EO	Executive Order
EPA	Environmental Protection Agency
FR	Federal Register
FS	Feasibility Study
GPM	Gallons Per Minute
HARM	Hazard Assessment Rating Methodology
HAS	Hazard Assessment Score
HAZWRAP	Hazardous Waste Remedial Actions Program
IRP	Installation Restoration Program
JP-4	Jet Fuel
MOGAS	Automotive Gasoline
NGB	National Guard Bureau
OSHA	Occupational Safety and Health Administration
OWS	Oil/Water Separator
PA	Preliminary Assessment
PCB	Polychlorinated Biphenyls
PL	Public Law
POC	Point of Contact
POL	Petroleum, Oil, and Lubricant
RCRA	Resource Conservation and Recovery Act of 1976
R&D	Research and Development
RI	Remedial Investigation
SARA	Superfund Amendments and Reauthorization Act of 1986
SciTek	Science & Technology, Inc.
SI	Site Investigation
USAF	United States Air Force
USC	United States Code
USDA	United States Department of Agriculture
USGS	United States Geological Survey
UST	Underground Storage Tank

EXECUTIVE SUMMARY

A. INTRODUCTION

Science & Technology, Inc. (SciTek) was retained to conduct the Installation Restoration Program (IRP) Preliminary Assessment (PA) of the 106th Civil Engineering Flight (CEF), 213th Engineering Installation Squadron (EIS), and the 274th Combat Communications Squadron (CCS), Roslyn Air National Guard Station [hereinafter referred to as the Station], New York Air National Guard, located in the city of Roslyn, New York. For the purpose of this document, the Station shall include the area licensed to the Air National Guard (ANG) by the Air Force.

The PA included the following activities:

- an on-site visit, including interviews with a total of seven persons familiar with Station operations, and field surveys by SciTek representatives during the week of June 11-14, 1990;
- acquisition and analysis of information on past hazardous materials use, waste generation, and waste disposal at the Station;
- acquisition and analysis of available geological, hydrological, meteorological, and environmental data from federal, state, and local agencies; and
- the identification and assessment of sites on the Station that may have been contaminated with hazardous wastes.

B. MAJOR FINDINGS

The 213th EIS and 274th CCS have used hazardous materials and generated small amounts of wastes in mission-oriented operations and maintenance at the Station since 1959.

Operations that have involved the use of hazardous materials and the disposal of hazardous wastes include vehicle maintenance and aerospace ground equipment (AGE) maintenance. The hazardous wastes disposed of through these operations include varying quantities of petroleum-oil-lubricant (POL) products, acids, paints, thinners, strippers, and solvents.

The field surveys and interviews resulted in the identification of three sites that exhibit the potential for contaminant presence and migration.

C. CONCLUSIONS

It has been concluded there are three sites where a potential for contaminant presence exists.

- Site No. 1 - Access Road to AGE Shop (HAS - 74)
- Site No. 2 - Old Waste Holding Area No. 1 (HAS - 72)
- Site No. 3 - Old Waste Holding Area No. 2 (HAS - 68)

D. RECOMMENDATIONS

Further work under the IRP is recommended for the identified sites to determine the presence or absence of contamination.

I. INTRODUCTION

A. Background

The 106th Civil Engineering Flight (CEF), 213th Engineering Installation Squadron (EIS), and the 274th Combat Communications Squadron (CCS), Roslyn Air National Guard (ANG) Station [hereinafter referred to as the Station] is located at Roslyn, New York. The units have been active at the Station since 1959. Both the past and current operations have involved the use of potentially hazardous materials and the disposal of wastes. Because of the use of these materials and the disposal of resultant wastes, the National Guard Bureau (NGB) has implemented the Installation Restoration Program (IRP).

The IRP is a comprehensive program designed to:

- o Identify and fully evaluate suspected problems associated with past hazardous waste disposal and/or spill sites on Department of Defense (DoD) installations and
- o Control hazards to human health, welfare, and the environment that may have resulted from these past practices.

During June 1980, DoD issued a Defense Environmental Quality Program Policy Memorandum (DEQPPM 80-6) requiring identification of past hazardous waste disposal sites on DoD installations. The policy was issued in response to the Resource Conservation and Recovery Act (RCRA) of 1976 and in anticipation of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, Public Law (PL) 96-510) of 1980, commonly known as "Superfund." In August 1981, the President delegated certain authority specified under CERCLA to the Secretary of Defense via an Executive Order (EO 12316). As a result of EO 12316, DoD revised the IRP by issuing DEQPPM 81-5 (December 11, 1981), which reissued and amplified all previous directives and memoranda.

Although the DoD IRP and the Environmental Protection Agency (EPA) Superfund programs were essentially the same, differences in the definition of program activities and lines of authority resulted in some confusion between DoD and state/federal regulatory agencies. These difficulties were rectified via passage of the Superfund Amendments and Reauthorization Act (SARA, PL-99-499) of 1986. On January 23, 1987, Presidential Executive Order EO 12580 was issued. EO 12580 effectively revoked EO 12316 and implemented the changes promulgated by SARA.

The most important changes effected by SARA included the following:

- Section 120 of SARA provides that federal facilities, including those in DoD, are subject to all provisions of CERCLA/SARA concerning site assessment, evaluation under the National Contingency Plan [40CFR300], listing on the National Priorities List, and removal/remedial actions. DoD must therefore comply with all the procedural and substantive requirements (guidelines, rules, regulations, and criteria) promulgated by the EPA under Superfund authority.

- Section 211 of SARA also provides continuing statutory authority for DoD to conduct its IRP as part of the Defense Environmental Restoration Program. This was accomplished by adding Chapter 160, Sections 2701-2707 to Title 10 United States Code (10 USC 160).

- SARA also stipulated that terminology used to describe or otherwise identify actions carried out under the IRP shall be substantially the same as the terminology of the regulations and guidelines issued by the EPA under their Superfund authority.

As a result of SARA, the operational activities of the IRP are currently defined and described as follows:

- **Preliminary Assessment**

  The Preliminary Assessment (PA) process consists of personnel interviews and a records search designed to identify and evaluate past disposal and/or spill sites that might pose a potential and/or actual hazard to public health, public welfare, or the environment. Previously undocumented information is obtained through the interviews. The records search focuses on obtaining useful information from aerial photographs; Station plans; facility inventory documents; lists of hazardous materials used at the Station; Station subcontractor reports; Station correspondence; Material Safety Data Sheets; federal/state agency scientific reports and statistics; federal administrative documents; federal/state records on endangered species, threatened species, and critical habitats; documents from local government offices; and numerous standard reference sources.

- **Site Inspection/Remedial Investigation/Feasibility Study**

  The Site Inspection consists of field activities designed to confirm the presence or absence of contamination at the potential sites identified in the PA. An expanded Site Inspection has been designed by the Air National Guard as a Site Investigation. The Site Investigation (SI) will include additional field tests and the installation of monitoring wells to provide data from which site-specific decisions regarding remediation actions can be made. The activities undertaken during the SI fall into three distinct categories: screening activities, confirmation and delineation activities, and optional activities. Screening activities are conducted to gather preliminary data on each site. Confirmation and delineation activities include specific media sampling and laboratory analysis to confirm either the presence or the absence of contamination, levels of contamination, and the potential for contaminant migration. Optional activities will be used if additional data is needed to reach a decision point for a site. The general approach for the design of the SI activities is to sequence the field activities so that data are acquired and used as the field investigation progresses. This is done in order to determine the absence or presence of contamination in a relatively short period of time, optimize data collection and data quality, and to keep costs to a minimum.

The Remedial Investigation (RI) consists of field activities designed to quantify and identify the potential contaminant, the extent of the contaminant plume, and the pathways of contaminant migration.

If applicable, a public health evaluation is performed to analyze the collected data. Field tests, which may necessitate the installation of monitoring wells or the collection and analysis of water, soil, and/or sediment samples, are required. Careful documentation and quality control procedures in accordance with CERCLA/SARA guidelines ensure the validity of data. Hydrogeologic studies are conducted to determine the underlying strata, groundwater flow rates, and direction of contaminant migration The findings from these studies result in the selection of one or more of the following options:

1. **No Further Action** - Investigations do not indicate harmful levels of contamination that pose a significant threat to human health or the environment. The site does not warrant further IRP action, and a Decision Document will be prepared to close out the site.

2. **Long-Term Monitoring** - Evaluations do not detect sufficient contamination to justify costly remedial actions. Long-term monitoring may be recommended to detect the possibility of future problems.

3. **Feasibility Study** - Investigation confirms the presence of contamination that may pose a threat to human health and/or the environment, and some sort of remedial action is indicated. The Feasibility Study (FS) is therefore designed and developed to identify and select the most appropriate remedial action. The FS may include individual sites, groups of sites, or all sites on an

installation. Remedial alternatives are chosen according to engineering and cost feasibility, state/federal regulatory requirements, public health effects, and environmental impacts. The end result of the FS is the selection of the most appropriate remedial action with concurrence by state and/or federal regulatory agencies.

- **Remedial Design/Remedial Action**

  The Remedial Design involves formulation and approval of the engineering designs required to implement the selected remedial action. The Remedial Action is the actual implementation of the remedial alternative. It refers to the accomplishment of measures to eliminate the hazard or, at a minimum, reduce it to an acceptable limit. Covering a landfill with an impermeable cap, pumping and treating contaminated groundwater, installing a new water distribution system, and in situ biodegradation of contaminated soils are examples of remedial measures that might be selected. In some cases, after the remedial actions have been completed, a long-term monitoring system may be installed as a precautionary measure to detect any contaminant migration or to document the efficiency of remediation.

- **Research and Development**

  Research and Development (R&D) activities are not always applicable for an IRP site but may be necessary if there is a requirement for additional research and development of control measures. R&D tasks may be initiated for sites that cannot be characterized or controlled through the application of currently available, proven technology. It can also, in some instances, be used for sites deemed suitable for evaluating new technologies.

- **Immediate Action Alternatives**

  At any point, it may be determined that a former waste disposal site poses an immediate threat to public health or the environment, thus necessitating prompt removal of the contaminant. Immediate action, such as limiting access to the site, capping or removing contaminated soils, and/or providing an alternate water supply may suffice as effective control measures. Sites requiring immediate removal action maintain IRP status in order to determine the need for additional remedial planning or long-term monitoring. Removal measures or other appropriate remedial actions may be implemented during any phase of an IRP project.

B. Purpose

The purpose of this IRP PA is to identify and evaluate suspected problems associated with past waste handling procedures, disposal sites, and spill sites associated with Station activities.

The potential for migration of hazardous contaminants was evaluated by visiting the Station, reviewing existing environmental data, analyzing Station records concerning the use of hazardous materials and the generation of hazardous wastes, and conducting interviews with current Station personnel who had knowledge of past waste disposal techniques and handling methods. Pertinent information collected and analyzed as part of the PA included a records search of the history of the Station; the local geological, hydrological, and meteorological conditions that might influence migration of contaminants; and ecological settings that indicate environmentally sensitive conditions.

C. Scope

The scope was limited to the identification of sites at or under primary control of the Station and evaluation of potential receptors. The PA included:

- an on-site visit during the week of June 11-14, 1990;
- acquisition of records and information on hazardous materials use and waste handling practices;
- acquisition of available geological, hydrological, meteorological, land use and zoning, critical habitat, and related data from federal and state agencies;
- a review and analysis of all information obtained; and
- preparation of a summary report to include recommendations for further action.

The subcontractor effort was conducted by the following Science & Technology, Inc. (SciTek) personnel: Mr. Tracy C. Brown, Environmental Analyst; Mr. Charles T. Goodroe, Environmental Protection Specialist; and Mr. Stephen B. Selecman, Geologist/Hydrogeologist. Mr. Michael Minior of the NGB is Project Officer for this Station and participated in the overall assessment during the week of the station visit. Mr. Steven Fleming of the Hazardous Waste Remedial Actions Program (HAZWRAP) also participated in the station visit.

The points of contact (POCs) at the Station were Major James J. Gross (Station Supervisor) and First Lieutenant Larry Johnson (Base Civil Engineer). Colonel Robert L. Healy (Director of Resource Management) and Major Ralph D. Jones (Division of Military and Naval Affairs) were representatives from the New York ANG.

D. Methodology

The PA began with a visit to the Station to identify all operations that may have used hazardous materials or may have generated hazardous wastes. Figure I.1 is a flow chart of the PA methodology.

Seven present Station employees familiar with the various operating procedures were interviewed. These interviews were conducted to determine those areas where waste materials (hazardous or nonhazardous) were used, spilled, stored, disposed of, or released into the environment. The interviewees' knowledge and experience with Station operations averaged 22 years and ranged from 12 to 31 years.

Records contained in the Station files were collected and reviewed to supplement the information obtained from the interviews.

Detailed geological, hydrological, meteorological, and environmental data for the area were obtained from the appropriate federal, state, and local agencies. A listing of agency contacts is included as Appendix A.

After a detailed analysis of all the information obtained, it was concluded that three sites may be potentially contaminated with hazardous wastes. Under the IRP program, when sufficient information is available, sites are numerically scored using the Air Force Hazard Assessment Rating Methodology (HARM). A description of HARM is presented in Appendix B.

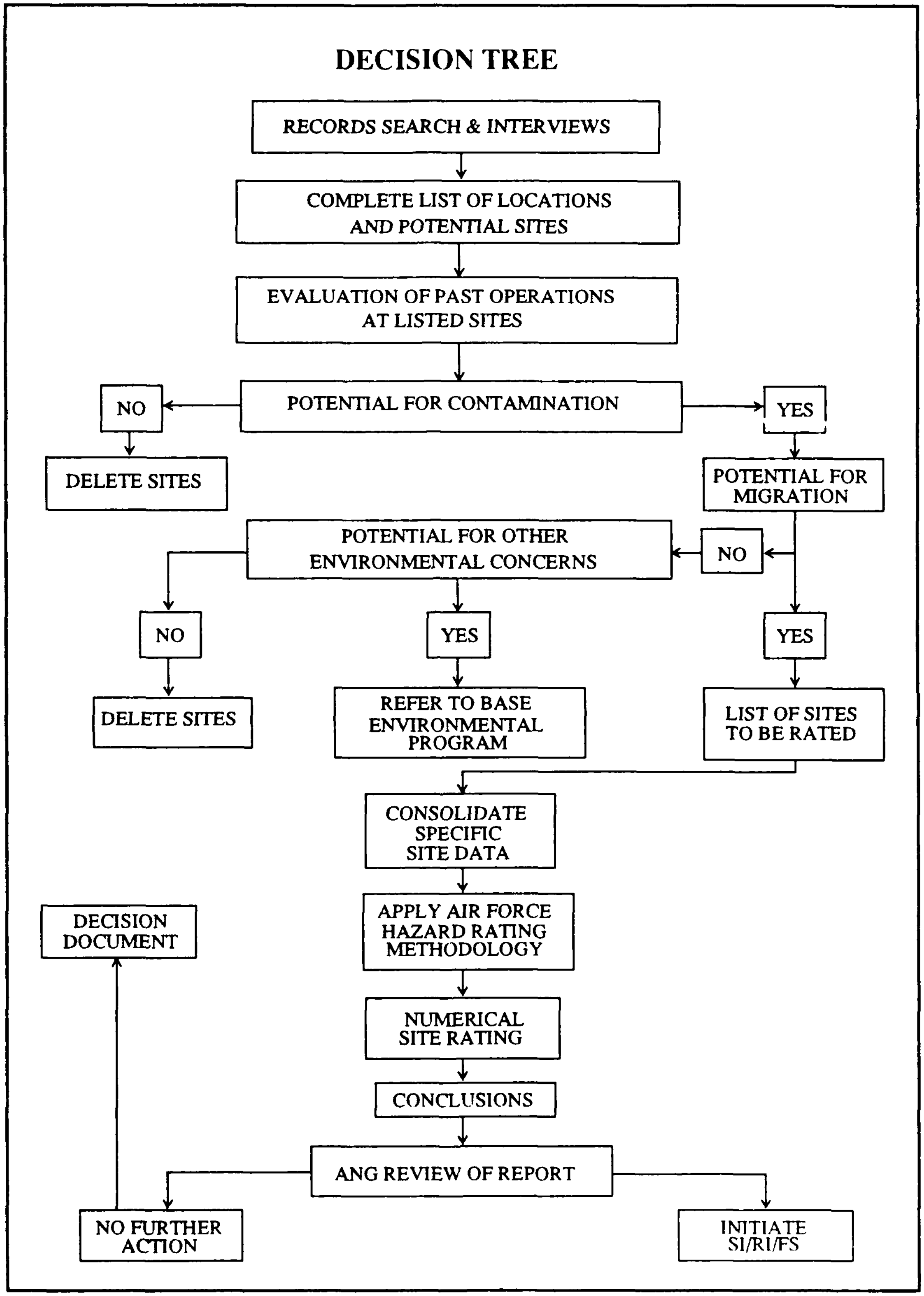


Figure I.1

Preliminary Assessment Methodology Flow Chart

II. INSTALLATION DESCRIPTION

A. Location

The Station is located at 209 Harbor Hill Road in the Village of East Hills, within the city of Roslyn, Long Island, New York. The Station is located on a portion of a former World War II base known as the Roslyn Filter Center, I Fighter Command. Figure II.1 illustrates the location and boundaries of the Station.

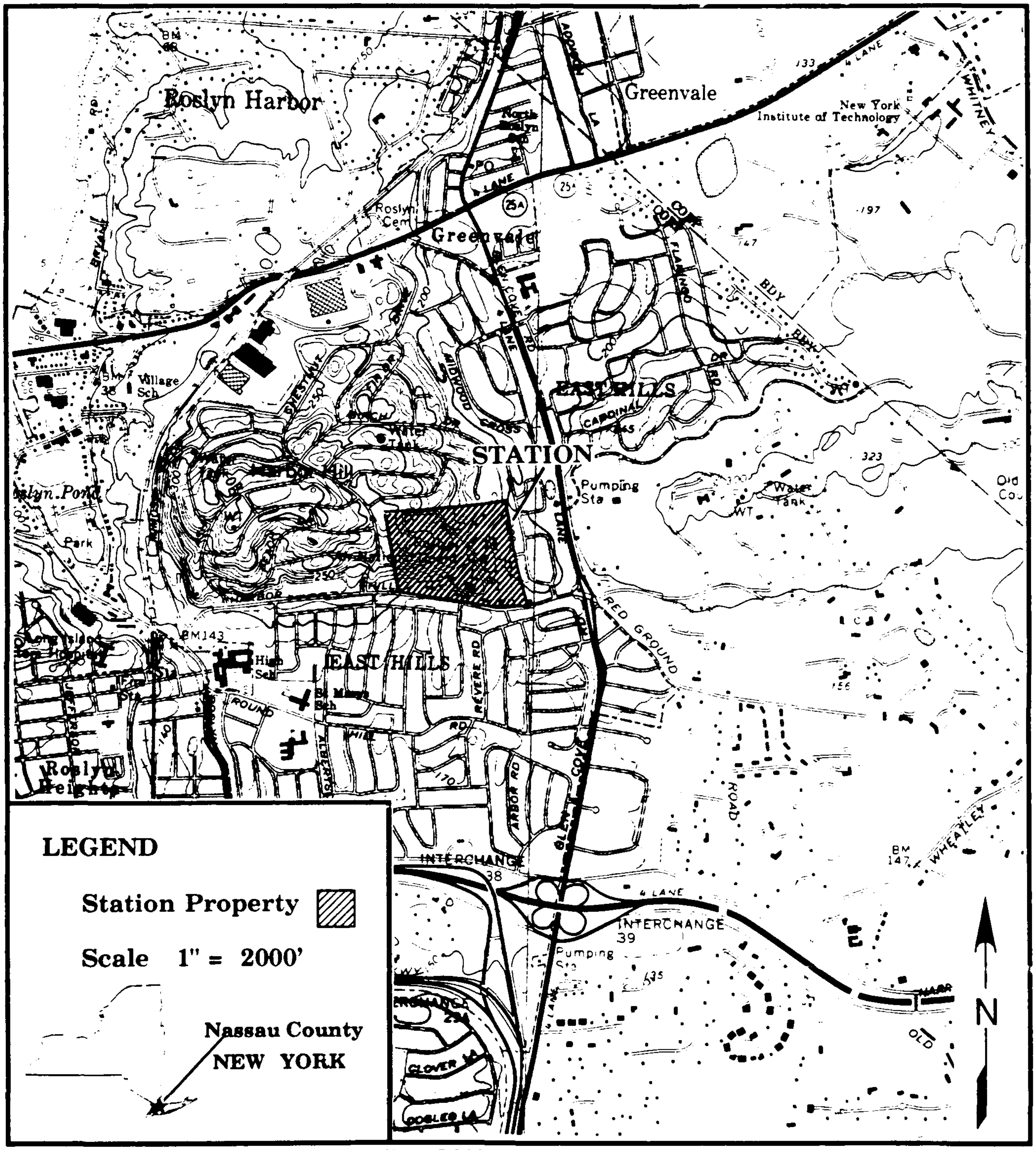
The Station occupies 50.34 acres and is licensed to the ANG by the Air Force. The land the Station occupies was originally leased from Mr. John W. Mackey on July 8, 1943, and was finally purchased by the United States Government in 1953. The Station was used principally by the I Fighter Command and later by the 26th Air Division, United States Air Force (USAF). In 1959, the Roslyn Air Force Station was redesignated the Roslyn Air National Guard Station. The ANG obtained possession of the Station on July 1, 1959, and has remained in residence since that date. The property is fairly level on the southern portion with an upgradient to the north. Station elevations range from 189 to 368 feet above mean sea level (AMSL). The population during the week numbers 66 members. Unit Training Assembly occurs one weekend per month. The Station population during this weekend is 390 members. [These figures do not include approximately 50 individuals attending the weekly meeting of the Civil Air Patrol (CAP).]

B. Organization and History

The Station supports several organizations. The host unit is the 106th CEF which provides day to day operational support to the Station. The two principal tenants at the Station are the 213th EIS and the 274th CCS. There are satellite offices for branches of the federal government, CAP, and the USAF Recruiting Office. These satellite offices produce no hazardous wastes.

The 106th CEF arrived at the Station in 1984. Prior to its arrival, the 152nd Tactical Control Squadron provided the function of the host unit. The mission of the 106th CEF is to provide daily engineering support and host unit functions to the Station. Its military mission is to provide civil engineering service and support on a world wide basis. The 106th CEF does not possess heavy equipment but obtains these assets, as necessary, from its parent organization, the 106th Civil Engineering Squadron, located at West Hampton Beach, New York.

The 213th EIS moved from the state armory in Brooklyn, New York to the Station in 1959. It is one of the original units that formed the Station. It



SOURCE: USGS, Sea Cliff and Hicksville (New York), 7.5 Minute Series Topographic Maps, 1979.

Figure II.1

Location Map of the Roslyn Air National Guard Station

arrived at the Station as the 213th Ground Electronic Engineering Installation Agency. Prior to its present designation as the 213th EIS, the unit underwent several name changes but always retained its numerical designator. The mission of the 213th EIS is to accomplish the engineering, installation, removal, and relocation of ground communications-electronics facilities and to perform serviceability certification and emergency and/or on-site repair and modification of communications equipment. The mission of the unit has remained essentially the same. The 213th EIS has a vehicle maintenance shop.

The 274th CCS was originally organized as the 102nd Communications Squadron in March 1948. It was redesignated as the 274th in 1953. The 274th CCS was also one of the original units to establish the Station. The unit moved from Westchester County Airport, White Plains, New York to the Station in 1959. The mission of the 274th CCS is to maintain, deploy, and operate tactical communications packages in support of Air Force missions worldwide. This includes tactical telephonic services and routine and classified messages for aircraft flights, weather, supplies, maintenance, and intelligence reports. The mission has not changed significantly except for improvements in equipment. The 274th CCS has a vehicle maintenance and an AGE maintenance shop.

The original structures on the property were of World War II vintage. At one time, the Station was capable of providing its own water and electrical requirements; however, these capabilities do not exist today. Over the years, the principal buildings were either renovated or replaced with more permanent ones. The newest addition to the Station is the Base Civil Engineer and 274th CCS Composite Training Complex to be completed in 1990.

Since 1959, the property has supported a maintenance function, including the repair and servicing of motor vehicles and AGE items, and, to a lesser degree, electronic equipment. Little information exists on the use of the property prior to 1959 other than as a radio/communications center. One oil/water separator (OWS) and numerous above ground and underground storage tanks (USTs) for heating oil, diesel oil, JP-4, and MOGAS are on this property.

Materials recognized as hazardous today have always been generated on this property. A common practice of using liquid waste for dust control has taken place in the past. With the awareness of hazardous materials and the recognition of their impact on the environment, acceptable disposable practices and procedures have evolved. The majority of hazardous wastes are now collected and disposed of through contractors and the Defense Reutilization and Marketing Office (DRMO).

III. ENVIRONMENTAL SETTING

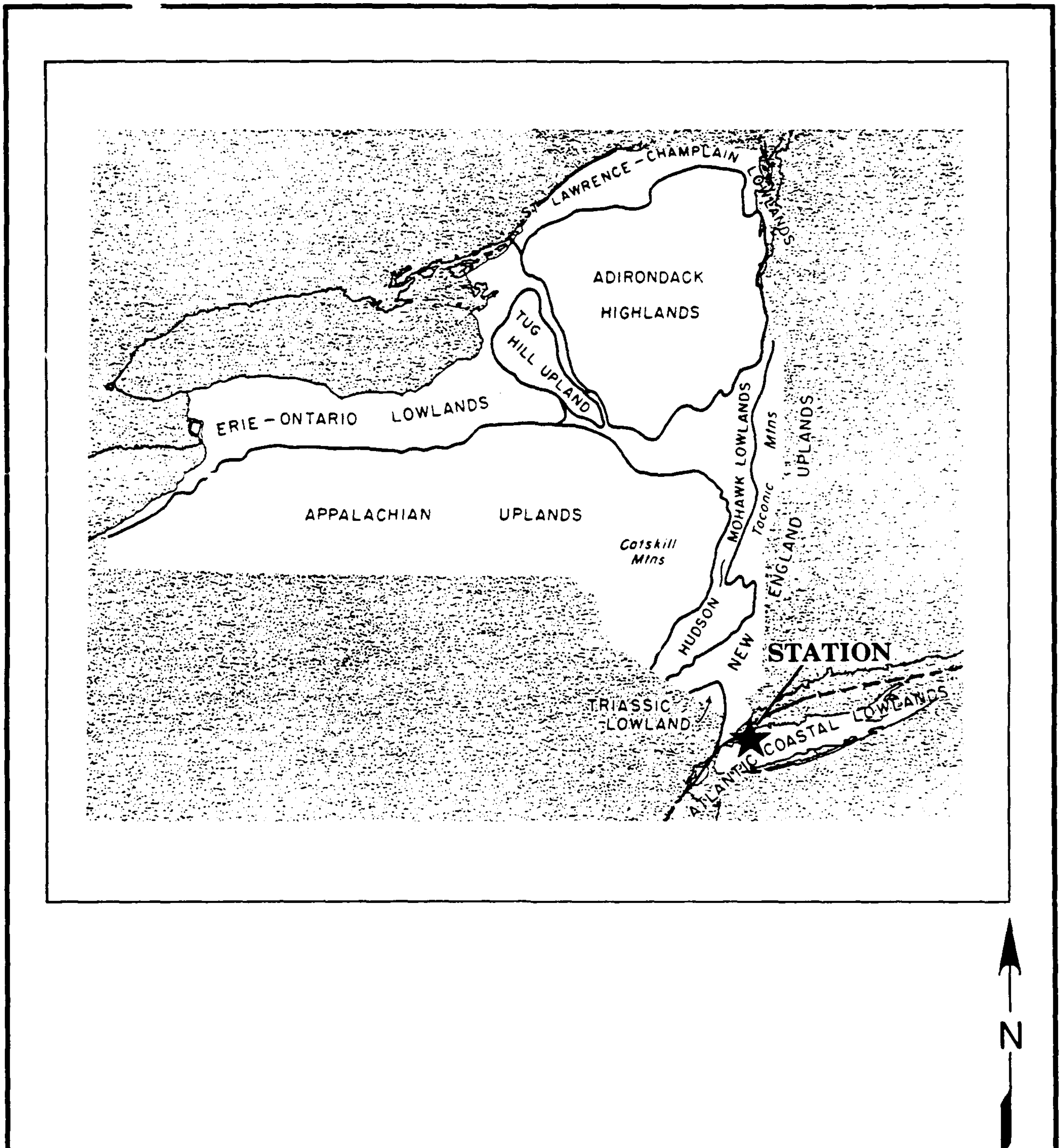
A. Meteorology

The following climatological data are largely derived from the Climatic Atlas of the United States (United States Department of Commerce, National Climatic Center, Ashville, N.C., 1979) and from the Soil Survey of Nassau County, New York (United States Department of Agriculture (USDA): Soil Conservation Service, February, 1987). Nassau County is characterized by a humid climate with relatively cold winters and mild summers. The total average annual precipitation is 42 inches based on a 29-year record from 1951-1980. Rainfall is well distributed throughout the year and ranges from an average monthly high of 4.44 inches in March to an average monthly low of 2.93 inches in June. By calculating net precipitation according to the method outlined in the Federal Regulations CERCLA Pollution Contingency Plan (United States Environmental Protection Agency, 55 FR 8813, Subpart K, March 8, 1990), a net precipitation value of 12 inches is obtained. The 1-year, 24-hour rainfall event for the county is approximately 2.75 inches. Thunderstorms occur on an average of 22 days a year, and the heaviest rainfall was 8.2 inches on August 12, 1955, at Mineola. Snowfall averages 27 inches a year, and approximately 15 days each winter have at least 1 inch of snow cover. The average daily temperature is 52.9°F and ranges from an average daily high of 74.6°F in July to an average daily low of 31.4°F in January. Prevailing winds are from the west-northwest, and the average wind speed is highest in the spring at 14 miles per hour.

B. Geology

Nassau County is located in the western part of Long Island, and it is situated entirely in the Coastal Plain physiographic province (Figure III.1). The Coastal Plain physiographic province is characterized by rolling hills and an undulating landscape in northern Nassau County while the southern part of the county exists as a flat plain that gently slopes south toward the Atlantic Ocean. At the end of the Pleistocene Epoch, two stages of glaciation in Wisconsin glacial stage had a dramatic influence on the landforms of Long Island. Three distinct geomorphologic areas were formed in the vicinity of the Station, within northwestern Nassau County. They exist from north to south as the headlands, the Harbor Hill terminal moraine, and the glacial outwash plain.

The headlands area consists of a relatively uniform undulating land surface which rises abruptly above the north-south oriented bays of Long Island Sound. Located immediately south of the headlands area, the Harbor Hill terminal moraine is composed of a series of irregular hills that form a distinct northeast



SOURCE: Broughton, J. C. et al, Geology of New York: A Short Account, Educational Leaflet No. 20, 1966.

Figure III.1

Physiographic Map of New York

trending ridge. The highest surface elevations on western Long Island are associated with this ridge, and the highest point measures 368 feet AMSL on the crest of Harbor Hill. South from the Harbor Hill terminal moraine, the glacial outwash plain slopes southward at a rate of 20 feet per mile. In northwestern Nassau County, the surface elevations range from 140 feet to 80 feet AMSL in the glacial outwash plain as it extends southward toward the coast (Swarzenski, 1963). Specifically, the Station is located along the southeastern side of Harbor Hill, and it exists partially in the terminal moraine area and in the glacial outwash plain. The northwest one-half of the Station property is located in the terminal moraine, and the southeast one-half exists in the glacial outwash plain. The topographic relief is greatest in the northwest one-half of the property along Harbor Hill, and a flattening of the land surface occurs to the southeast in association with the outwash plain. Surface elevations range from 273 feet AMSL in the northwest to 189 feet AMSL in the southeast corner of the Station property.

The surficial material in northwestern Nassau County is almost entirely composed of Pleistocene glacial deposits. Only on a very localized basis do more recent deposits exist, and they are commonly associated with streams, marshes, and coast lines. Wisconsin glaciation produced two types of glacial drift in the area, and they are known as the Ronkonkoma and Harbor Hill deposits (Figure III.2). Each type of drift is composed of till, which is associated with ground and terminal moraines, and of stratified drift that is attributed to outwash plains.

The Ronkonkoma drift was deposited as the ice sheet advanced south to a point that is represented by the terminal moraine deposits forming a series of discontinuous hills located approximately 2 miles south of the Station. A sequence of stratified drift and till was deposited north of the terminal moraine by the advance of the ice front, and south of the terminal moraine stratified drift was deposited on an outwash plain. The Ronkonkoma ice sheet retreated northward depositing additional amounts of ground moraine and stratified drift in its wake.

The last phase of glaciation occurred subsequent to the Ronkonkoma ice retreat as the Harbor Hill ice sheet advanced southward to a point that is marked by the Harbor Hill terminal moraine and the corresponding discontinuous Harbor Hill ridge. South of the Harbor Hill terminal moraine, a thin layer of stratified drift was deposited in the outwash plain on top of the Ronkonkoma drift. North of the Harbor Hill terminal moraine, the associated drift is much thicker and consists of a sequence of till and stratified drift deposited by the advance and retreat of the ice sheet. The Harbor Hill drift occurs at the surface and blankets the Ronkonkoma drift at almost every location in northern Nassau County, except where the Ronkonkoma exists as terminal moraine.

The two phases of glaciation produced a sequence of nonpermeable till and permeable stratified drift with thicknesses ranging up to 200 or 300 feet in the

System	Geologic Unit	Thickness (feet)	Depth from land surface (feet)	Character of deposits	Water-bearing characteristics
Quaternary	Recent deposits: Artificial fill, salt-marsh deposits, swamp deposits, stream alluvium, etc.	0-50	0	Sand, gravel, silt, and clay; organic mud, peat, loam and shells. Colors are gray, black, and brown.	Permeable zones near the shoreline or in stream valleys may yield small quantities of fresh or brackish water at shallow depths.
	Upper Pleistocene Deposits: Harbor Hill drift	20-200	0-50	Till composed of unsorted clay, sand, and boulders, present in Harbor Hill moraine and, as ground moraine, in area adjacent to north. Outwash deposits of stratified brown sand and gravel, including advance outwash plain and other interglacial deposits.	Till, relatively impermeable, may cause local conditions of perched water and impede downward percolation of water.
	Upper Pleistocene Deposits: Ronkonkoma drift	1-120	20-200	Till composed of unsorted clay, sand and boulders present in Ronkonkoma terminal moraine and, as buried ground moraine, in an area extending northward into Manhasset Neck. Outwash deposits of stratified brown sand and gravel, including proglacial deposits from Ronkonkoma ice sheet.	Outwash deposits of sand and gravel are highly permeable. Wells screened in glacial outwash deposits, generally at depths of less than 130 ft. yield as much as 1400 gpm to wells. Specific capacities of wells range from 5 to 57 gpm per ft. of drawdown. Water is generally fresh and unconfined.
	Unconformity?				
	Gardiners clay	0-200	60-170	Clay and silt, gray-green, some lenses of sand and gravel. May contain shell. Altitude of surface generally between 50 and 80 ft. below mean sea level.	Relatively impermeable. Confines water in underlying Jameco gravel. Lenses of sand and gravel may provide small sources of water supply.
	Unconformity?				
	Jameco gravel and undifferentiated deposits	0-200	120-350	Sand, fine to coarse, gray and brown, and gravel. May contain clay and silt layers. Probably early glacial outwash deposits.	Moderately to highly permeable. Yields as much as 500 gpm to wells. Water is confined under artesian pressure.
	Unconformity				
Cretaceous	Magothy formation	0-400	5-200	Sand, fine to medium, clayey, gray, white, pink, and yellow. Gravel generally in lower 50 -100 ft. of formation.	Moderately to highly permeable. Wells screened in basal zone of formation yield as much as 1400 gpm. Formation is principal source of public supply. Excellent quality water.
	Unconformity				
	Raritan formation: Clay member	0-200	100-500	Clay, solid and silty, gray, white and red. May contain lenses or layers of sand and gravel.	Relatively impermeable. Retards but does not prevent movement of water between the Magothy formation and Lloyd sand member.
	Raritan formation: Lloyd sand member	0-200	350-700	Sand, fine to coarse, white, gray, or yellow, and gravel, commonly in clayey matrix. Contains lenses and and layers of solid or silty clay.	Moderately permeable. Wells yield as much as 1600 gpm. Water is generally of excellent quality but may have high iron content.
	Unconformity				
Precambrian	Bedrock	------	180-900	Crystalline metamorphic and igneous rocks; muscovite-biotite schist, gneiss and granite. Weathered zone at top may be as much as 70 ft. thick.	Relatively impermeable. Contains some water in fractures, but impermeable to develop owing to low permeability.

SOURCE: USGS, Hydrology of Northwestern Nassau and Northeastern Queens Counties Long Island, New York, 1963

Figure III.2

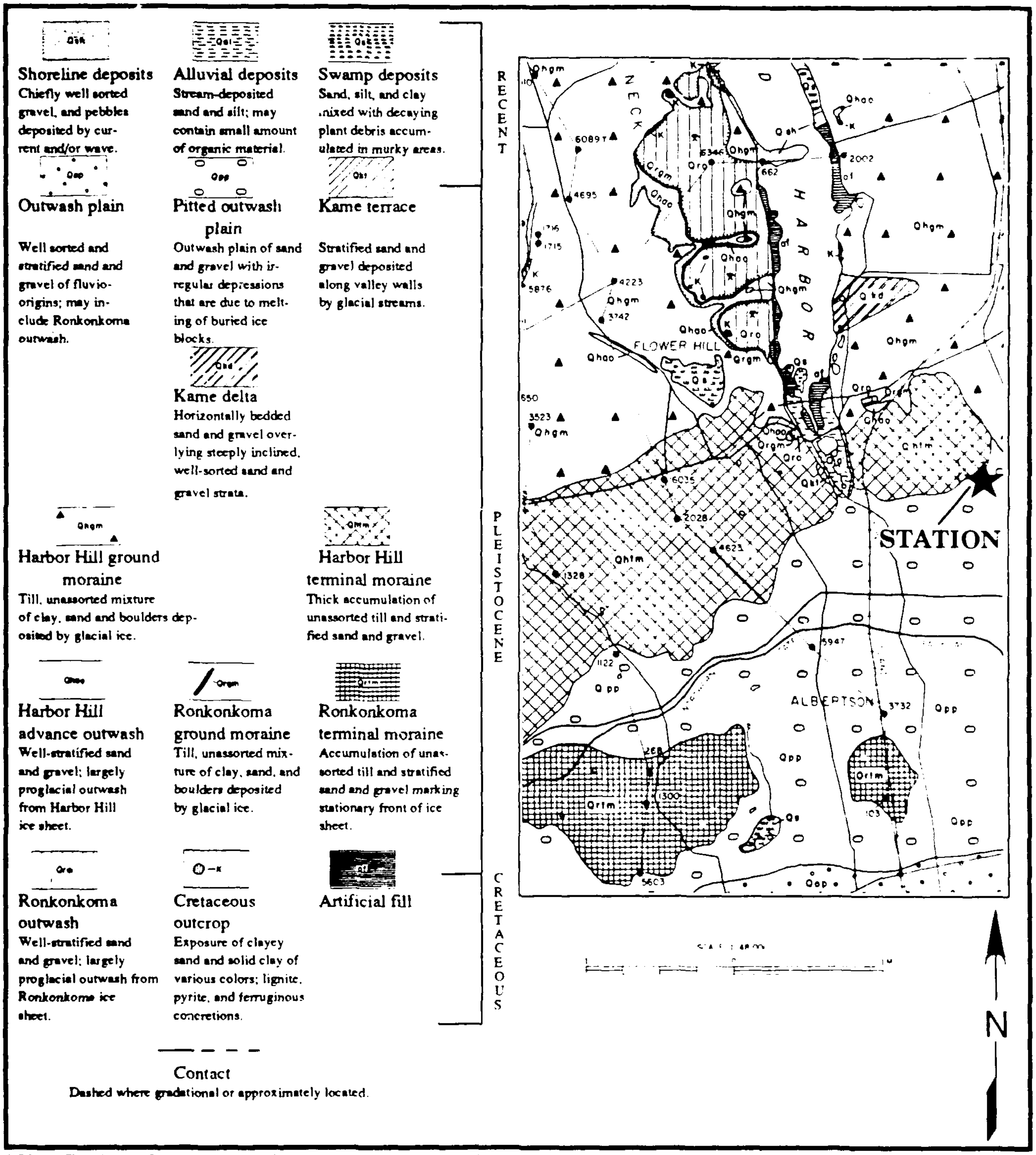
Generalized Stratigraphic Column of the Area

terminal moraine areas. In addition, the more permeable stratified deposits are associated with outwash plains; therefore, a thicker sequence of permeable stratified drift occurs south of the existing terminal moraines (Swarzenski, 1963, and Isbister, 1966). Specifically, the Station is located on the southeast side of the Harbor Hill terminal moraine where it overlaps the contact between the terminal moraine and the outwash plain. Surficial mapping (Swarzenski, 1963) indicates the Station property to be underlain by the Harbor Hill terminal moraine and the pitted outwash plain deposits to the northwest and southeast, respectively (Figure III.3). Based on structure mapping on the top of the Cretaceous surface (Swarzenski, 1963), the thickness of the glacial sequence at the Station location ranges from approximately 140 to 225 feet.

The Pleistocene glacial deposits rest unconformably on top of Upper Cretaceous deposits that are identified as the Magothy Formation and the deeper Raritan Formation (Figure III.4). The Raritan Formation is further subdivided into the upper Clay Member and the lower Lloyd Sand member. The Cretaceous deposits are continental in origin and consist of unconsolidated, interbedded sand, gravel, clay, and silt (Figure III.2). Lithologically, these formations are commonly very lenticular; however, as a whole they are relatively permeable deposits with the exception of the Clay Member of the Raritan Formation. The Magothy Formation is generally more permeable than the Lloyds Sand member and contains a permeable basal gravel member that is of significance from a groundwater standpoint. The thickness of the Cretaceous deposits ranges from zero along northern Long Island to approximately 800 feet in the south part of the island (Figure III.4). In the northern extreme of Long Island, Tertiary erosion and subsequent deposition has removed and replaced the Cretaceous material (Swarzenski, 1963; and Isbister, 1966). From that point southward, the Cretaceous deposits thicken, and their total thickness is estimated at approximately 575 feet at the Station location (Swarzenski, 1963). The thickness of the Cretaceous deposits is likely evenly divided between the Magothy and Raritan Formations.

The Cretaceous age formations were deposited unconformably on top of Precambrian age bedrock. The bedrock consists of impermeable crystalline metamorphic and igneous material that has an upper weathered zone ranging from 5 to 100 feet in thickness (Figure III.2). The bedrock surface generally dips to the southeast and strikes to the northeast. This structural orientation is also reflected upward in the sequence in the overlying younger beds. Valleys have been eroded into the bedrock surface perpendicular to geologic strike and produce local variations in strike and dip. In addition, this results in a local thickening of the overlying Cretaceous material (Isbister, 1966). Structure mapping (Swarzenski, 1963) on top of the bedrock surface indicates it exists approximately 814 to 898 feet below the land surface at the Station location.

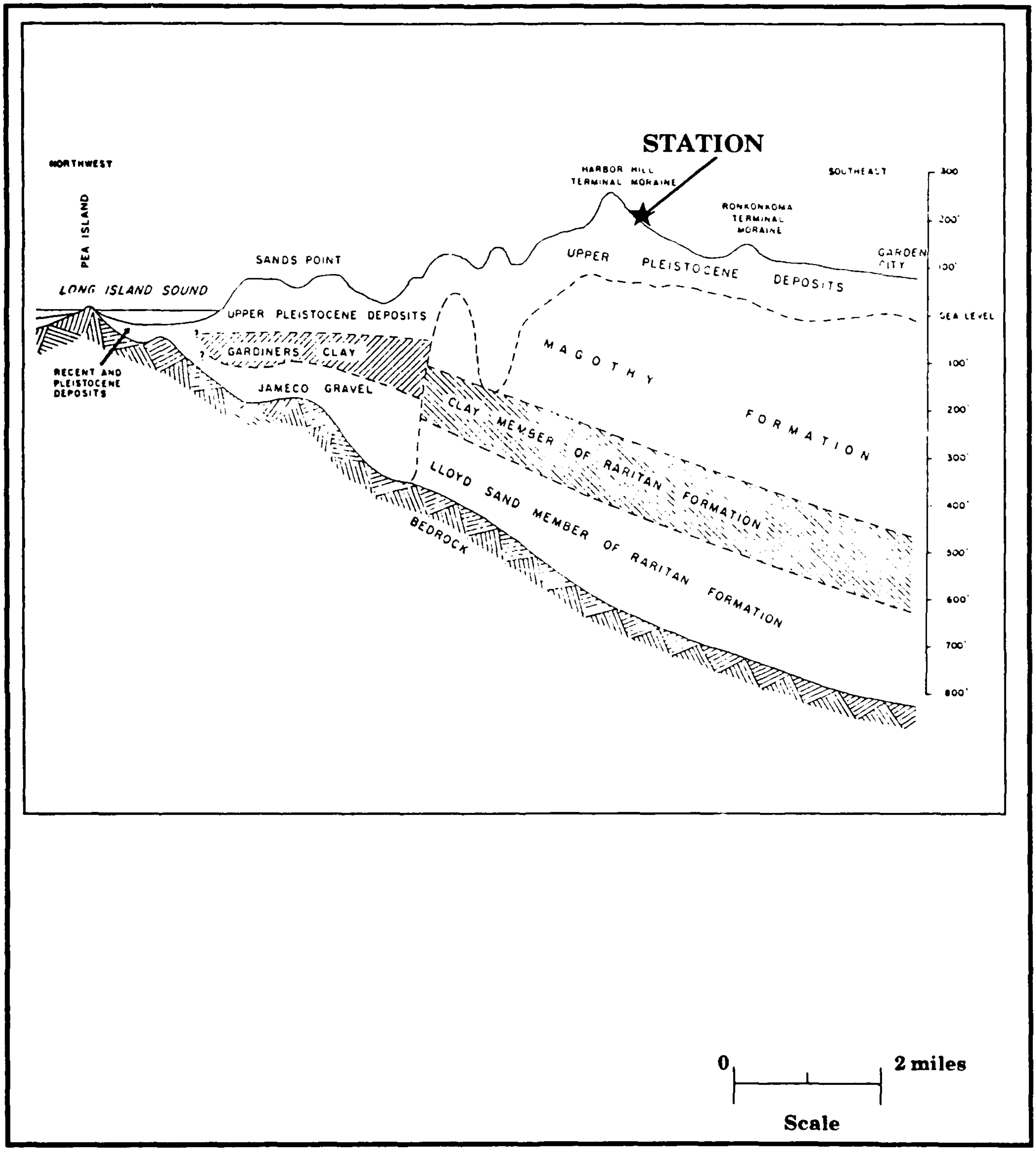
The Station is underlain by soils of the Riverhead, Plymouth, and Enfield series. Riverhead and Plymouth series are very deep, well-drained soils that form in glacial outwash deposits. They occur on the crests and slopes of



SOURCE: USGS, Hydrogeology of Northwestern Nassau and Northwestern Queens Counties Long Island, New York, 1963

Figure III.3

Surficial Geologic Map of the Area



SOURCE: USGS, Hydrogeology of Northwestern Nassau and Northeastern Queens Counties Long Island, New York, 1963

Figure III.4

Generalized Cross Section of the Area

morainic hills and on top of outwash plains. The Enfield series is also composed of deep and well-drained soils that are commonly formed in association with eolian material as it overlies sand and gravel deposits. Enfield soils are generally located on the side slopes and tops of outwash plains.

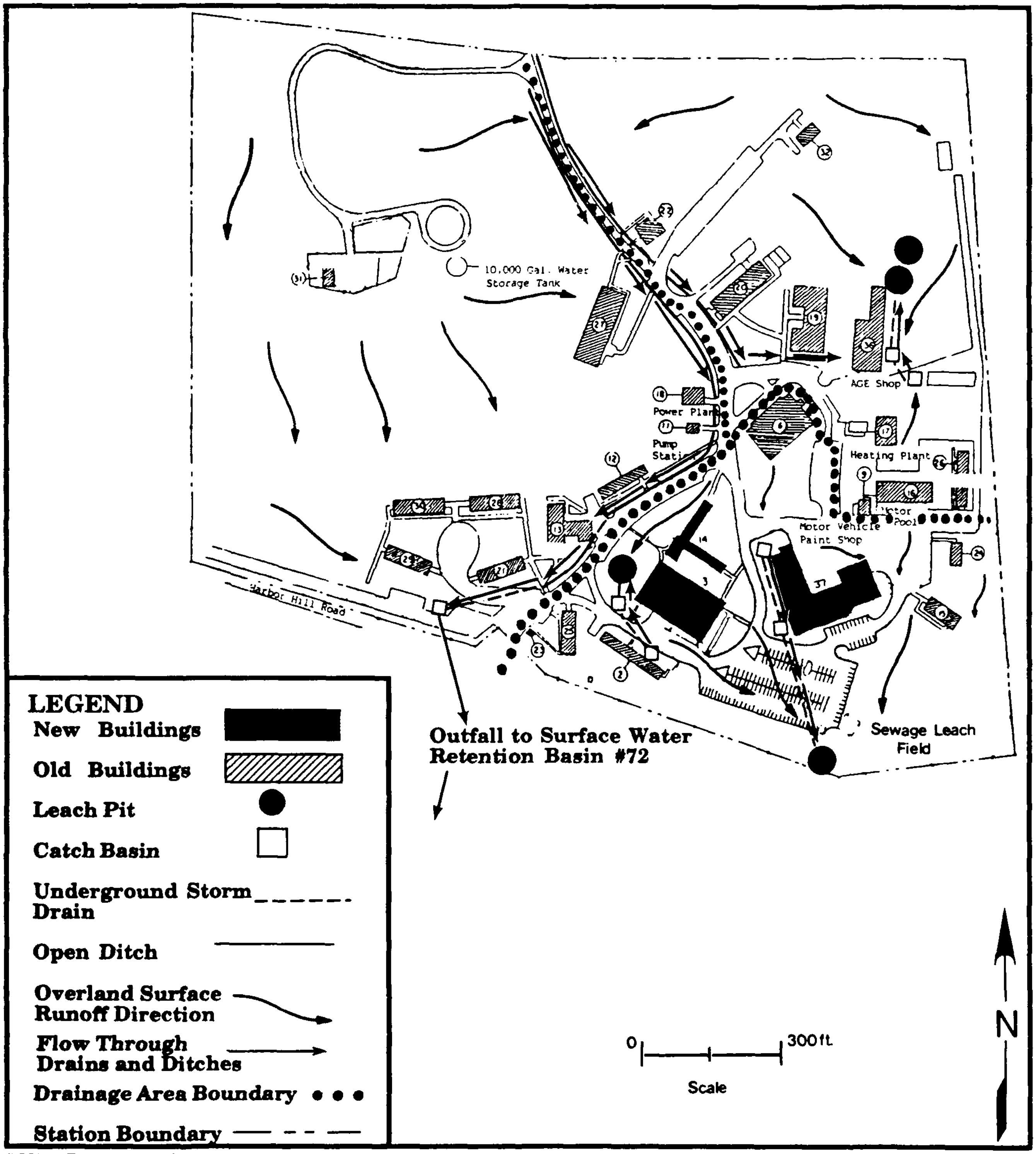
Riverhead and Plymouth soils occupy the northwest one-half of the Station property located on Harbor Hill. The principal soil types in the northwest one-half of the property are the Riverhead sandy loam (RdC), the Plymouth Riverhead complex, and, to a lesser degree, the urban derivatives of the Plymouth soils (UpC and UpB). These soil types are generally composed of sandy loam and loamy sand, respectively, with a gravelly sand substratum occurring in each type. The depth of the typical soil layer is 60 inches with permeabilities ranging from moderately rapid (2.00 to 6.00 inches per hour or 1.41×10^{-3} to 4.24×10^{-3} cm/sec) to very rapid (more than 20.00 inches per hour or more than 1.41×10^{-2} cm/sec) for the group.

Enfield series soils are the most areally extensive soils in the southeast one-half of the Station property because of their location with respect to the outwash plain. The specific soil types are the Enfield silt loam (EnB), the Urban land (Ug), and the Riverhead sandy loam (RdC). The EnB soil occurs to a depth of 60 inches with a very gravelly sand substratum, and the permeability ranges from moderate (0.63 to 2.00 inches pe hour or 4.45×10^{-4} to 1.41×10^{-3} cm/sec) to very rapid (more than 20.00 inches per hour or more than 1.41×10^{-2} cm/sec). A considerable part of the southeast one-half is occupied by the Ug soil type. Ug soils are urban areas where 85 percent of the surface is covered by impermeable building material such as asphalt or concrete. The RdC soils occupy only a small part of this area in the northeast corner of the property. The information pertaining to soils contained in this text was derived from the Soil Survey of Nassau County, New York (United States Department of Agriculture (USDA): Soil Conservation Service, 1987).

C. Hydrology

1. Surface Water

Surface water drainage at the Station can be divided into three basic drainage areas: the west one-half, the southeast one-quarter, and the northeast one-quarter of the property (Figure III.5). Each area functions independent of one another and transports surface runoff to separate destinations. Surface runoff from the west area of the Station property flows overland to the south and east, down the slope of Harbor Hill via natural drainage pathways. Overland runoff that occurs to the east and southeast is collected in an open ditch that parallels the main north-south street. The ditch transports surface water to the southwest along the west side of the street before emptying into a catch basin located immediately west of the main entrance to the Station.



SOURCE: Roslyn ANG Station.

Figure III.5

Drainage Map of the Roslyn Air National Guard Station

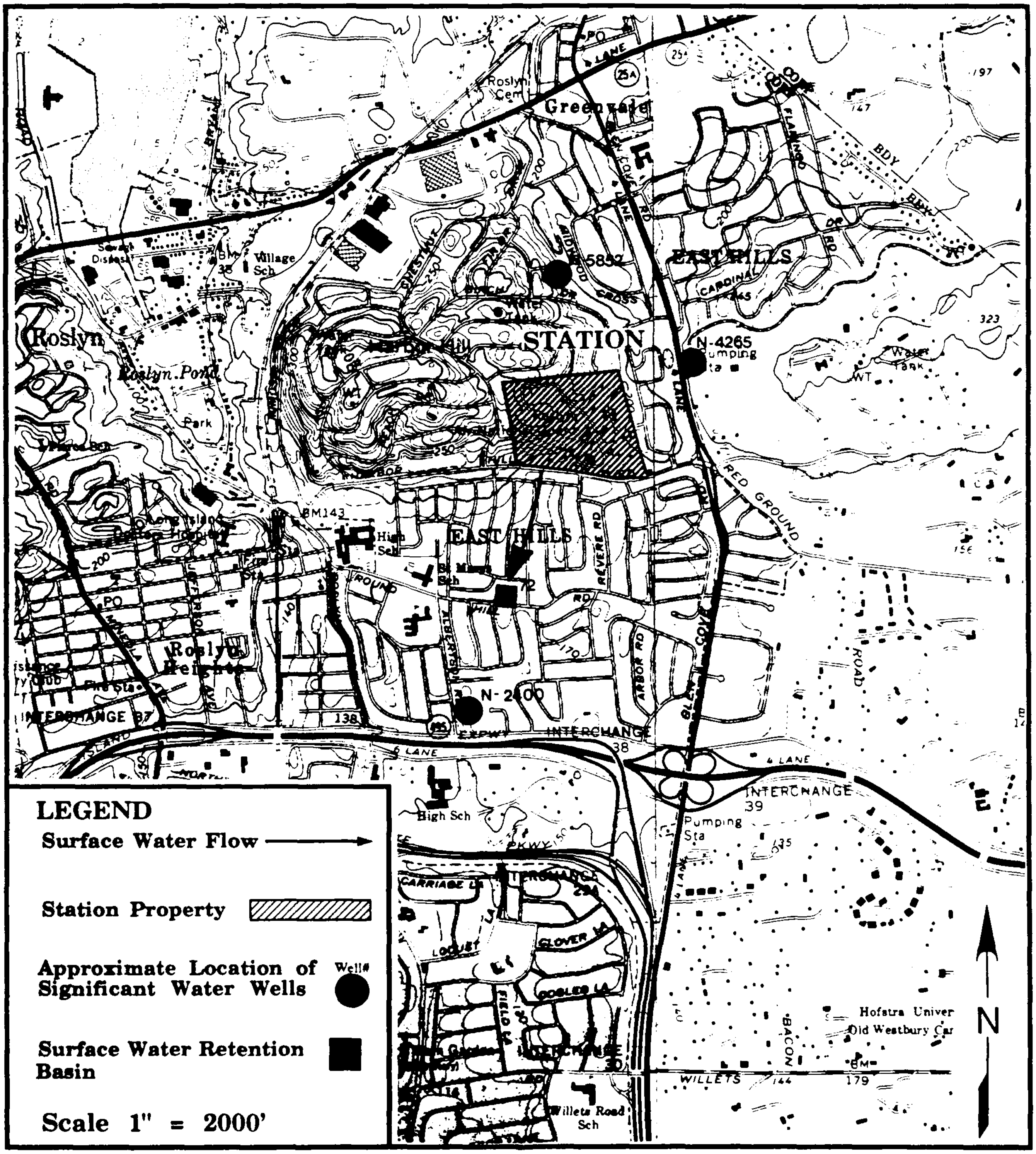
Overland runoff from the western part of the west area is routed east at the base of Harbor Hill along the southwest perimeter road to the catch basin located west of the main entrance. The catch basin collects and transports all surface water runoff from the west area underground to the south approximately 0.35 miles to the Nassau County #72 surface water retention basin (Figure III.6). Surface water does not exit the retention basin except through percolation into the groundwater system.

The northeast area of the Station property is drained primarily by overland runoff (Figure III.5). Surface water from the north and west part of the northeast area is collected in an open ditch paralleling the east side of the northern segment of the main north-south road. The ditch transports water south and east to a point just west of Building #36 where it is emptied onto the ground. Runoff continues to the east from this point where it is ultimately collected in two catch basins located on the southeast corner of Building #36. The two catch basins also collect overland surface runoff from the south and east parts of the northeast area. Surface water collected in the catch basins is transported north along the east side of Building #36 and emptied into two leach pits just northeast of the building. Water entering the leach pits is introduced into the groundwater system through natural seepage.

The southeast area is drained by a combination of overland runoff and buried storm sewers (Figure III.5). Overland runoff is primarily directed toward the south where it is absorbed into the groundwater system in the area of the sewage leach field and through a leach pit that exists along the south boundary of the Station property. Two catch basins, located along the west side of Building #37, collect surface water runoff and transport it underground south to the leach pit located along the southern boundary. The western part of the southeast area is also drained by a leach pit that is located along the west side of Building #3. Surface water in the vicinity of Buildings #2 and #3 is collected in two catch basins and is transported north to the leach pit. The leach pit also receives overland runoff from the north in the vicinity of Building #14. Surface runoff from the southeast area does not outflow the Station property but is introduced into the groundwater system through the leach pits and natural seepage. The Station is not located within the 100-year flood plain (Southard, William, New York State Department of Environmental Conservation, Verbal, 1990).

2. Groundwater

In northwestern Nassau County, three aquifers are identified by Swarzenski, 1963, to comprise the groundwater reservoir. Although the aquifers are identified separately, they are considered to constitute a single hydraulic system. The aquifers are classified as the shallow unconfined, the principal, and the deep confined. In addition to the aquifers, groundwater can also occur in localized perched bodies that form a temporary zone of saturation above



SOURCE: USGS, Sea Cliff and Hicksville (New York) 7.5 Minute Topographic Quads, 1979.

Figure III.6

Surface Runoff Route Map

the water table. With regards to the Station location, each of the three aquifers is present. Perched groundwater exits locally in the Pleistocene glacial deposits above the water table and close to the land surface. Percolating surface water becomes trapped in depressions underlain by impermeable clay rich till. Areas north of the Harbor Hill terminal moraine and within the Harbor Hill and Ronkonkoma terminal moraines commonly have perched bodies of groundwater. Isolated bodies of perched water also occur in the intermorainal area between the Harbor Hill and Ronkonkoma terminal moraines. As a result of the Station's position with respect to the Harbor Hill terminal moraine, it would not be unlikely for perched groundwater to occur at this location. However, perched water is not used as a source of groundwater because of its high susceptibility to surface contamination (Swarzenski, 1963, and Isbister, 1966).

The shallow unconfined aquifer is defined by Swarzenski, 1963, as permeable Pleistocene and Cretaceous deposits that occur below the water table to a point just below mean sea level (BMSL). By this definition, the shallow unconfined aquifer would be approximately the lower most 15 to 20 feet of the Pleistocene deposits and the upper 50 to 60 feet of the Cretaceous Magothy Formation at the Station location. The determination of the shallow unconfined aquifer at the Station location is based on information obtained from mapping on top of the Cretaceous surface (Swarzenski, 1963) in conjunction with potentiometric maps of the water table (Swarzenski, 1963, and Donaldson and Koszalka, 1979). Higher water yields from the shallow unconfined aquifer occur from the permeable sand and gravel deposits associated with the glacial outwash plains that occur in the area south from the Harbor Hill terminal moraine. The Station is located in an area where permeable outwash deposits can be expected to occur; however, the majority of the glacial deposits here likely exist above the water table which precludes them as a probable aquifer. The existence of the permeable glacial deposits above the water table is significant in that their presence enhances the downward movement and flow of groundwater toward the water table (Swarzenski, 1963).

The principal aquifer is defined by Swarzenski, 1963, as being that section of the Magothy Formation that occurs above the Clay Member of the Raritan Formation to approximately 50 feet BMSL. Also included in the principal aquifer are more recent deposits that are associated with channel erosion and subsequent deposition in the upper Magothy Formation. In addition, the entire Magothy Formation is absent north of the Station along the northern reaches of Long Island. Here, the Magothy Formation is replaced by more recent deposits that are in hydraulic communication with the Magothy Formation and rest unconformably on top of the Gardiners Clay (Figure III.4). The depth to the base of the Magothy Formation is projected at approximately 275 feet BMSL at the Station location. Groundwater exists under both unconfined and confined conditions in the principal aquifer. The upper part of the principal aquifer is generally unconfined and in hydraulic communication with the shallow unconfined aquifer. However, artesian conditions commonly exist and become more frequent with increased depth in the principal aquifer. Artesian conditions are related to the lenticular nature of the Magothy Formation along with the high concentration of clay lenses (Swarzenski, 1963, and Isbister, 1966). At the base of the Magothy Formation, the Clay Member of the Raritan Formation serves as a bottom confining aquiclude. The principal aquifer is the major source of water in the Station area, and water yields from wells penetrating the Magothy Formation are highest from the basal zone. Yields as high as 1400 gallons per minute (GPM) have been reported from the basal zone while the upper part rarely yields more than 500 GPM (Isbister, 1966).

The deep confined aquifer consists of the Lloyd Sand member of the Raritan Formation. It is confined at the base by impermeable bedrock and at the top by the Clay Member of the Raritan Formation or locally by the Gardiners Clay where it exists. Although the deep aquifer is considered to be confined (Swarzenski, 1963 and Isbister, 1966), it actually functions as a semi-confined aquifer as a result of the leaking nature of the upper confining unit. At the Station location, the top and bottom of the Lloyds Sand member is projected to occur at approximately 450 feet and 625 feet BMSL, respectively. Like the Magothy Formation, the Raritan Formation has been eroded and replaced by younger deposits north of the Station along the northern reaches of Long Island (Figure III.4). Here, the Lloyd Sand member is eroded and replaced locally by the Jameco gravel; however, they are in hydraulic communication. The deep confined aquifer is a major source of water in the area, and water yields from wells have been reported as high as 1600 GPM (Swarzenski, 1963 and Isbister, 1966).

Recharge of the groundwater system occurs solely from precipitation. The shallow unconfined aquifer is recharged by downward percolating surface water. The principal and deep confined aquifers are similarly recharged by the continued downward movement of groundwater from the shallow unconfined aquifer. Groundwater movement and recharge rates are affected by the permeability of the overlying material. Nonpermeable deposits like glacial till retard groundwater flow while permeable deposits such as those associated with the glacial outwash plains enhance movement. Consequently, recharge of the shallow unconfined aquifer is more rapid in areas underlain by outwash deposits. Recharge of the deep confined aquifer is severely retarded by the overlying Clay Member of the Raritan Formation. Although the Clay Member serves as an aquiclude, groundwater does penetrate the zone and recharges the Lloyd's Sand throughout the area (Isbister, 1966). The potentiometric map on the shallow unconfined aquifer suggests a major recharge area exists east of the Station in eastern Nassau County. In addition, many surface water retention basins exist to enhance local recharge through the collection and induction of surface water runoff into the groundwater system. General groundwater movement is interpreted from the potentiometric maps for each aquifer as being in a general westerly direction at the Station location. The depth to the water table on the Station property in March 1979 was estimated at 215 to 125 feet below the land surface from northwest to southeast, respectively (Donaldson and Koszalka, 1979). Three public supply wells in the Roslyn Water District are significant in that they are located in close proximity to the Station (Figure III.6). Well numbers N-5852 and N-4265 are located approximately 1600 feet north-northwest and 1000 feet northeast from the Station boundary, respectively. Well number N-2400 is located approximately 1800 feet south from the surface water retention basin receiving surface water runoff from the Station property. Each of these wells is screened in the principal aquifer and was drilled to total depths ranging between 439 feet and 490 feet below the land surface. Approved water yield capacities for these wells range from 1000 GPM to 1200 GPM.

The susceptibility of the groundwater to contamination from the Station is considered to be moderately high to high. This conclusion stems primarily from the permeable nature of the glacial outwash deposits which likely exist at the Station location, the permeable character of the soil, and the localized recharge of the groundwater system from precipitation. Furthermore, surface water is locally collected and induced into the groundwater system through the use of leach pits and surface water retention basins. The shallow unconfined aquifer is most susceptible, followed by the principal aquifer, and, to a much lesser degree, the deep confined aquifer. It should be noted that because of the high density of urbanization in the area the shallow aquifer is currently considered to be contaminated and is not used as a source of public water supply.

D. Critical Habitats/Endangered or Threatened Species

According to current records maintained by the New York State Department of Environmental Conservation, no endangered or threatened floral or faunal species have been officially identified within a 1-mile radius of the potential sites at the Station. No significant habitats have been identified within this area.

Under the HARM, the presence of recharge areas must be considered under critical environments (section I.E.). Surface water drainage from the potential sites at the Station is collected in two large, cylindrical leach pits located immediately northeast of the AGE Shop (Building #36). The water collected in these structures directly recharges the groundwater at their locations. For this reason, a Factor Rating of 3 for a "recharge area" is used to calculate the HAS.

IV. SITE EVALUATION

A. Activity Review

A review of Station records and interviews with personnel were used to identify specific operations in which the majority of hazardous materials and/or hazardous wastes are used, stored, processed, and disposed. Table IV.1 provides a history of waste generation and disposal for operations conducted by shops at the Station. If an item is not listed on the table on a best-estimated basis, that activity or operation produces negligible (less than 1 gallon/year) waste requiring disposal.

Potable water for the Station is provided by the Roslyn Water District. Sanitary sewer services are not provided to the Station by a public or private entity. The Station uses septic tanks and a leach field.

B. Disposal/Spill Site Information, Evaluation, and Hazard Assessment

Seven persons were interviewed to identify and locate potential sites that may have been contaminated by hazardous wastes as a result of past Station operations. Three potentially contaminated sites were identified through the interviews. These site identifications were followed up by visual field examinations of the sites.

Each of these sites was rated by application of the USAF HARM (Appendix B), and since the potential for contaminant migration exists at these three sites, each is recommended for further investigation under the IRP program. Copies of completed HARM forms and an explanation of the factor rating criteria used for site scoring are contained in Appendix C.

The potential exists for contaminant migration at each of the three rated sites. Contaminants that may have been released at these sites have the potential to be transported by groundwater and surface water. The seasonal high water table, in the shallow aquifer, which is 125 to 215 feet below the ground surface at the Station, has the highest risk for groundwater contamination. The shallow aquifer is already contaminated and the deeper aquifers could become contaminated by groundwater migration. Released contaminants that are exposed on the ground surface have the potential to be transported by surface water migration into leach pits located on the Station property. These leach pits are part of the Station's storm water sewer system, the purpose of which is to collect and dissipate storm water. Once surface water reaches one of these destinations, it is introduced into the groundwater system.

Table IV.1 Hazardous Materials/Hazardous Wastes Disposal Summary: Roslyn Air National Guard Station, Roslyn, New York.

Shop Name and Location	Possible Hazardous Wastes	Estimated Quantities (Gallons/Year)	Method of Disposal 1959–1980	1990
Vehicle Maintenance (Building 16)	Engine Oil	1200	CONTR*	DRMO
	PD-640 Solvent	25	CONTR*	NLU
	Battery Acid	30	NEUT/SAN	
	Ethylene Glycol	100	GRND	DRMO
	Hydraulic Oil	10	CONTR*	DRMO
	Paint Thinner	25	CONTR*	DRMO
	Brake Fluid	15	DRAIN/TRASH	
	Diesel Fuel	100	CONTR*	DRMO
	MOGAS (Leaded)	50	CONTR*	NLU
	MOGAS (Unleaded)	50	NIU	DRMO
	Aircraft Cleaning Compound	50	GRND/DRAIN	
	Paint	50 Cans	TRASH	
	Safety Kleen	200	NIU	CONTR

KEY:

CONTR - Disposed of through a contractor.
DRAIN - Disposed of through drains connected to sanitary sewer.
DRMO - Disposed of through the Defense Reutilization & Marketing Office. (Prior to 1986, this office was known as the Defense Property Disposal Office (DPDO).)
GRND - Material was disposed on ground.
NEUT - Material neutralized with a chemical agent.
NIU - Material was not in use at this time.
NLU - Material no longer used.
RAGS - Material wiped onto rags.
SAN - Disposed of through the sanitary sewer.
STORM - Disposed of through the storm sewer.
TRASH - Disposed of in trash that goes to city landfill.
UNK - Disposal method is unknown.
* - From 1961 to 1971, a portion of these wastes combined with AGE Shop wastes were disposed of on the ground.

Table IV.1 Hazardous Materials/Hazardous Wastes Disposal Summary: Roslyn Air National Guard Station, Roslyn, New York (continued).

Shop Name and Location	Possible Hazardous Wastes	Estimated Quantities (Gallons/Year)	Method of Disposal 1959 — 1970 — 1980 — 1990
Vehicle Maintenance (Building 16) (continued)	Bearing Grease	20	RAGS/TRASH/CONTR
	GUNK™ (Degreaser)	5	GRND | NLU
	Denatured Alcohol	20	CONTR* | DRMO
Aerospace Ground Equipment (AGE) Maintenance (Building 36)	Engine Oil	200	UNK* | CONTR | DRMO
	Paint Thinner	50	UNK* | CONTR | DRMO
	JP-4	1000	UNK* | CONTR | NLU
	PD-640	25	UNK* | CONTR | NLU
	MOGAS (Leaded)	25	UNK* | CONTR | NLU
	MOGAS (Unleaded)	25	NIU | CONTR | DRMO
	Battery Acid	100	UNK | NEUT/SAN | DRMO
	7808 Oil	500	UNK* | NIU | CONTR | NLU

KEY:

CONTR	- Disposed of through a contractor.
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SAN	- Disposed of through the sanitary sewer.
STORM	- Disposed of through the storm sewer.
TRASH	- Disposed of in trash that goes to city landfill.
UNK	- Disposal method is unknown.
*	- From 1961 to 1971, a portion of these wastes combined with AGE Shop wastes were disposed of on the ground.

Table IV.1 Hazardous Materials/Hazardous Wastes Disposal Summary: Roslyn Air National Guard Station, Roslyn, New York (continued).

Shop Name and Location	Possible Hazardous Wastes	Estimated Quantities (Gallons/Year)	Method of Disposal 1959 – 1970 – 1980 – 1990
Aerospace Ground Equipment (AGE) Maintenance (Building 36) (continued)	Aircraft Cleaning Compound	55	UNK | STORM | SAN | NLU
	Trichloroethylene	50 Cans	UNK | TRASH | NLU
	Toluene	450	UNK | CONTR
	Ethylene Glycol	50	UNK | GRND | DRMO
	Gunk™ (Degreaser)	5	UNK | GRND | SAN/DRMO
	Paint	6 Cans	UNK | TRASH
Facility Maintenance Operations (Building 14)	MOGAS (Unleaded)	15	NIU | UNK | DRMO
	Engine Oil	15	UNK | DRMO

KEY:

- CONTR - Disposed of through a contractor.
- DRAIN - Disposed of through drains connected to sanitary sewer.
- DRMO - Disposed of through the Defense Reutilization & Marketing Office. (Prior to 1986, this office was known as the Defense Property Disposal Office (DPDO).)
- GRND - Material was disposed on ground.
- NEUT - Material neutralized with a chemical agent.
- NIU - Material was not in use at this time.
- NLU - Material no longer used.
- RAGS - Material wiped onto rags.
- SAN - Disposed of through the sanitary sewer.
- STORM - Disposed of through the storm sewer.
- TRASH - Disposed of in trash that goes to city landfill.
- UNK - Disposal method is unknown.
- * - From 1961 to 1971, a portion of these wastes combined with AGE Shop wastes were disposed of on the ground.

Site No. 1 - Access Road to AGE Shop (HAS - 74)

Site No. 1 is a portion of the currently paved access road that extends to the west from the east perimeter road to the front of the AGE Shop and beyond. The potential site extends from about 10 feet west of the east perimeter road to about 10 feet west of the AGE Shop. The site measures approximately 330 feet east-west by 20 feet north-south, and distinct pavement breaks currently delimit its east and west ends (Figure IV.1).

From 1961 to 1971, this portion of the road was unpaved. During this period, waste oil, and possibly PD-640 solvent, paint thinner, diesel fuel, and leaded MOGAS, were poured on the road bed to dispose of these materials and to settle dust.

One 55 gallon drum of liquid waste was used per application, and applications were made up to a maximum of three times per year. Assuming the applications took place over a 10-year period, as many as 1650 gallons of mixed liquid wastes were applied to the road bed.

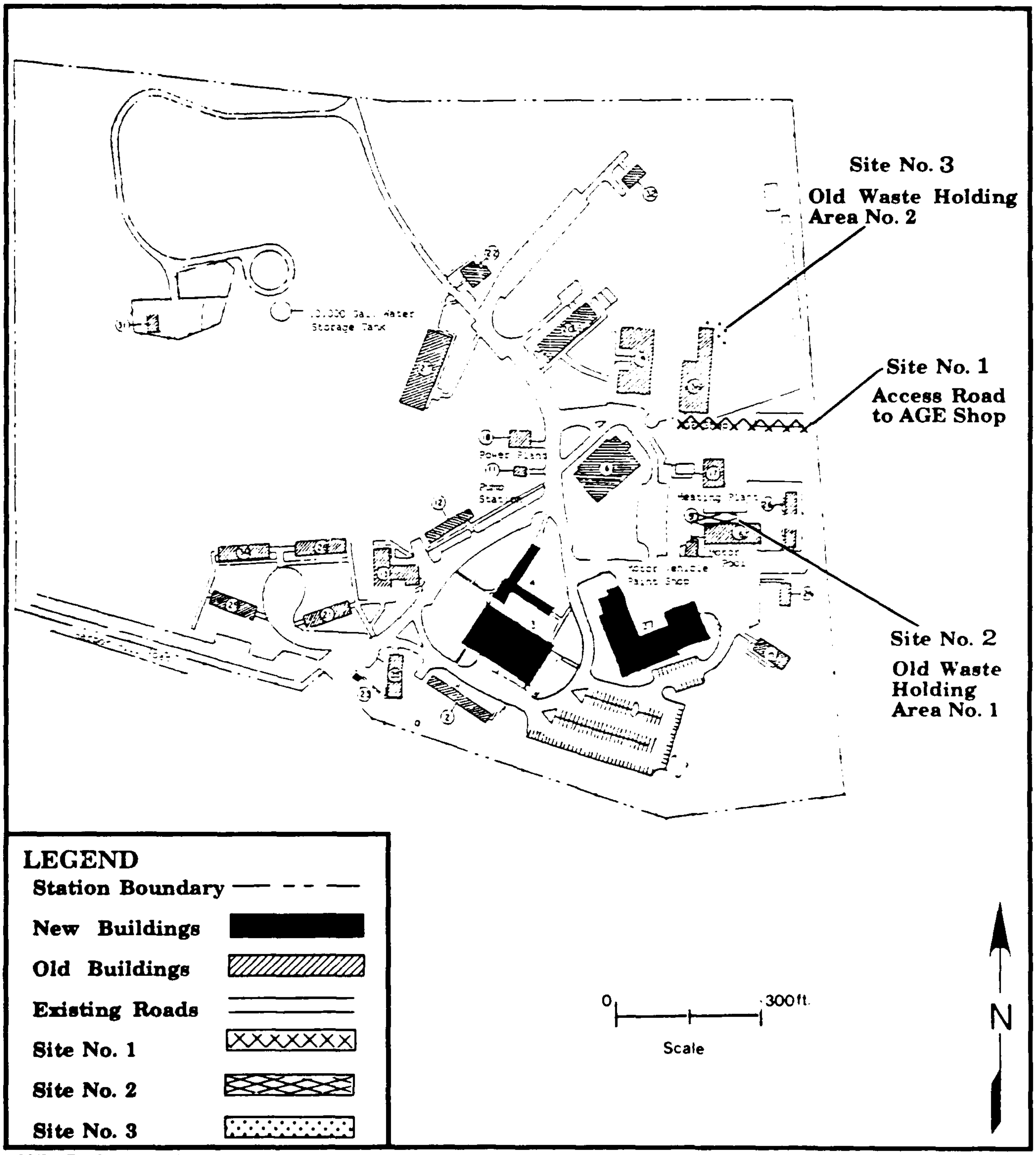
There is a potential for soil and groundwater contamination from the moderate quantity (1155 to 4675 gallons) of wastes released at this potential site. For this reason, a HAS was calculated.

Site No. 2 - Old Waste Holding Area No. 1 (HAS - 72)

Site No. 2 is the old waste holding area for the Vehicle Maintenance Shop. It is located adjacent to the north wall of the Vehicle Maintenance Shop (Building #16). It extends east-west from a point 10 feet east of the shop's back door to a UST, once used for waste oil storage. Beginning at the north wall of the Vehicle Maintenance Shop, the potential site measures approximately 15 feet north-south (Figure IV.1).

Fresh product oil, solvents, and cleaning compounds have been stored at different locations in this area since 1959. Drips and withdrawal overflows from the containing drums have been received by the soil at this potential site throughout its 31-year history. Recent stains from fresh product spills are currently visible at the site.

Waste oil, PD-640 solvent, paint thinner, and leaded MOGAS from the Vehicle Maintenance Shop have been stored for disposal in the site area over a 31-year period. Liquid wastes from the Old AGE Shop, which was in use prior to 1971, were also stored here, and for a brief but unknown period of time, liquid wastes from the new AGE Shop were stored here. With the possible exception of JP-4 and toluene, these wastes were essentially the same as those from the Vehicle Maintenance Shop. Spills often occurred during the filling of containers with liquid wastes. During periods of precipitation, petroleum products were floated out of some containers and onto the soil.



SOURCE: Roslyn ANG Station.

Figure IV.1

Potential Sites at
the Roslyn Air National Guard Station

The quantity of fresh product materials and waste materials spilled at this site over its life is unknown. Since there is a potential for soil and groundwater contamination from these wastes, a HAS was calculated for the site. For calculation purposes, a small quantity (1100 gallons or less) of these wastes is assumed to have been spilled.

Site No. 3 - Old Waste Holding Area No. 2 (HAS - 68)

This site is the old waste holding area for the AGE Shop. It is located along the north wall of the AGE Shop and for approximately 10 feet along the north end of the shop's east wall. The use area probably extended 5 to 10 feet from each wall (Figure IV.1).

Site No. 3 was used as a waste holding area from 1971 to 1989. However, for a brief but unknown time, liquid wastes from the AGE Shop were held in Old Waste Holding Area No. 1 along with those from the Vehicle Maintenance Shop.

Waste oil, paint thinner, JP-4, PD-640, diesel fuel, toluene, and leaded MOGAS were stored for disposal at Site No. 3. Six to eight drums of waste, all stored on wooden pallets, were usually present in this area at one time, and as many as 15 to 20 drums of waste accumulated here during a year.

Petroleum products stored in this area were often floated out onto the soil during periods of precipitation, and at least one drum burst along its seam in 1977. From 1982 to 1989, 25 to 30 gallons of liquid wastes per year may have been spilled to the soil in this area. Petroleum product stains are visually evident within the site's confines. However, the total quantity of liquid wastes spilled at this potential site throughout its total period of use is unknown.

Five or six times during the period of 1982 to 1989, a tractor was used to skim stained soil from the site. The cut was one inch deep across a 15 feet x 15 feet area. On one occasion, the cut was two inches deep. New sand and crushed stone fill were placed in the area of this deeper cut. Throughout this period, all of the skimmed soil was disposed of in the general refuse dumpster.

Since there is a potential for soil and groundwater contamination from the wastes spilled at this potential site, a HAS was calculated for it. Since the amount of wastes spilled at this location is unknown, a small quantity (1100 gallons or less) is used for calculation purposes.

C. Other Pertinent Facts

- Trash and nonhazardous solid wastes from the Station are collected and disposed of by the A-1 Carting Company.

- Several surface dump areas are located on the north side of the Station. One of these is just west of Building #32. The other three are in the northwest corner of the Station. Dumping at these locations began during the Air Force occupation of the Station property and has been continued by the Station until the present time.

  The dump near Building #32 contains waste concrete, scrap lumber, tree cuttings, discarded office furniture, and appliances such as refrigerators and air conditioners. The only chemical materials now suspected of being present are very small quantities of refrigerant and compressor oil associated with the appliances. The other dumps contain waste concrete and asphalt pavement, scrap metal, tree cuttings, and leaves.

  The names and whereabouts of former Air Force personnel who worked on Station property are currently unknown. However, a document provided by the Station indicates that the Air Force initially dumped "... earth fill and surplus natural materials (tree stumps and limbs, building lumber, and concrete)..." on Harbor Hill. Similar materials were later dumped here by the Station. During the course of this PA, no evidence was found that would indicate that significant quantities of hazardous wastes have been disposed of in these dumps.

- Around 1982, the top of a transformer blew off in the Primary Power area near the southeast corner of the Station. An interviewee who observed the transformer after the explosion indicated that it was full of oil but that it had not leaked. Whether or not this oil was contaminated with PCBs is unknown. The Long Island Lighting Company does not have thorough records on PCB contamination of its transformers and cannot provide information on specific items of electrical equipment. After the explosion, the Long Island Lighting Company removed the transformer from the Station.

- Between 1970 and 1980, a batch of used radioactive tubes from radio transmitters and receivers was disposed of in the trash.

- The Station has one OWS. It is located outside of the west wall of Building #36 (AGE Shop). First installed in 1979, this OWS is connected to the sanitary sewer system, which drains to the leach field. On a monthly basis, the OWS holding tank is checked, and the OWS effluent is sampled for water quality monitoring in accordance with the stipulations of the Station's State Pollutant Discharge Elimination System Permit.

- A National Pollutant Discharge Elimination System Permit is not required of the Station.

- Two 5000 gallon JP-4 tanks that once contained heating oil are located on the west side of Building #17. JP-4 was first contained in these tanks in 1978. Just prior to the changeover, the tanks were cleaned. One interviewee noticed severely corroded welds and stress cracks in parent metal at middle and high locations during the cleaning process. Based on this, the interviewee believed that they might have leaked, but there is no firm indication of leakage. These tanks were installed in 1951.

  Two abandoned diesel fuel USTs dating to 1951 are located on the south side of Building #18 (Power House). These tanks have capacities of 8500 and 6000 gallons. One of these tanks still has 1800 gallons of fuel in it. They were abandoned in 1984.

  An abandoned 275 gallon UST once used for waste oil storage is located immediately south of Building #16 (Vehicle Maintenance Shop). This tank was installed about 1978 and abandoned around 1988.

- The Station does not have a Spill Prevention, Controls, and Countermeasures or Spill Prevention and Response Plan.

V. CONCLUSIONS

Information obtained through interviews with Station personnel, reviews of records, and field observations was used to identify possible spill or disposal sites on the Station property. Three potentially contaminated sites were identified.

The following sites exhibit the potential for contaminant migration through surface water, soil, and/or shallow groundwater:

- Site No. 1 - Access Road to AGE Shop (HAS - 74)
- Site No. 2 - Old Waste Holding Area No. 1 (HAS - 72)
- Site No. 3 - Old Waste Holding Area No. 2 (HAS - 68)

VI. RECOMMENDATIONS

The PA identified three potentially contaminated sites. As a result, additional work under the IRP is recommended for these sites to confirm the presence/absence of contamination.

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GLOSSARY OF TERMS

ALLUVIAL - Pertaining to or composed of alluvium, or deposited by a stream of running water.

ALLUVIUM - A general term for detrital deposits made by streams on river beds, flood plains, and alluvial fans. The term applies to stream deposits of recent time.

ANNUAL PRECIPITATION - The total amount of rainfall and snowfall for the year.

ANTICLINE - A fold, generally convex upward, whose core contains the stratigraphically older rocks.

AQUICLUDES - A body of rock that will absorb water slowly but will not transmit it fast enough to supply a well or spring.

AQUIFER - A body of rock that is sufficiently permeable to conduct groundwater and yield economically significant quantities of water to wells and springs.

ARGILLACEOUS - Like or containing clay.

ARTESIAN AQUIFER - A water-bearing bed that contains water under hydrostatic pressure.

BASALT - A dark colored igneous rock, commonly extrusive, composed primarily of calcic plagioclase and pyroxene; the fine grained equivalent of gabbro.

BASIN - (a) A depressed area with no surface outlet; (b) A drainage basin or river basin; (c) A low area in the Earth's crust, of tectonic origin, in which sediments have accumulated.

BAY - A wide, curving open indentation, recess, or inlet of a sea or lake into the land or between two capes or headlands, larger than a cove, and usually smaller than, but of the same general character as a gulf.

BED [stratig] - The smallest formal unit in the hierarchy of lithostratigraphic units. In a stratified sequence of rocks, it is distinguishable from layers above and below. A bed commonly ranges in thickness from a centimeter to a few meters.

BEDDING [stratig] - The arrangement of sedimentary rock in beds or layers of varying thickness and character.

BEDROCK - A general term for the rock, usually solid, that underlies soil or other unconsolidated, superficial material.

BOULDER - A detached rock mass larger than a cobble, having a diameter greater than 256 mm, being somewhat rounded or otherwise distinctly shaped by abrasion in the course of transport.

CALCAREOUS - Containing calcium carbonate.

CLAY [geol] - A rock or mineral fragment or a detrital particle of any composition smaller than a fine silt grain, having a diameter less than 1/256 mm (4 microns).

CLAY [soil] - A rock or mineral particle in the soil having a diameter less than 0.002 mm (2 microns).

COARSE-GRAINED - 1. Said of a crystalline rock, and of its texture, in which the individual minerals are relatively large, e.g. an igneous rock whose particles have an average diameter greater than 5 mm (0.2 inc.) 2. Said of a sedimentary rock, and of its texture, in which the individual constituents are easily seen with the unaided eye, i.e. have an average diameter greater than 2 mm (0.08 in.)

COARSE-TEXTURED - (light textured) SOIL - Sand or loamy sand.

COBBLE - A rock fragment between 64 and 256 mm in diameter, thus larger than a pebble and smaller than a boulder, rounded or otherwise abraded in the course of aqueous, eolian, or glacial transport.

CONE OF DEPRESSION - The depression of heads around a pumping well caused by the withdrawal of water.

CONFINED AQUIFER - An aquifer bounded above and below by impermeable beds, or by beds of distinctly lower permeability than that of the aquifer itself.

CONGLOMERATE - A coarse-grained sedimentary rock, composed of rounded pebbles, cobbles, and boulders, set in a fine-grained matrix of sand or silt, and commonly cemented by calcium carbonate, iron oxide, silica, or hardened clay.

CONSOLIDATION - Any process whereby loosely aggregated, soft, or liquid earth materials become firm and coherent rock; specif. the solidification of a magma to form an igneous rock, or the lithification of loose sediments to form a sedimentary rock.

CONTAMINANT - As defined by Section 101(f)(33) of Superfund Amendments and Reauthorization Act of 1986 (SARA) shall include, but not be limited to any element, substance, compound, or mixture, including disease-causing agents, which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities. cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction), or physical deformation in such organisms or their offspring; except that the term "contaminant" shall not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance under:

(a) any substance designated pursuant to Section 311(b)(2)(A) of the Federal Water Pollution Control Act,

(b) any element, compound, mixture, solution, or substance designated pursuant to Section 102 of this Act,

(c) any hazardous waste having the characteristics identified under or listed pursuant to Section 3001 of the Solid Waste Disposal Act (but not including any waste the regulation of which under the Solid Waste Disposal Act has been suspended by Act of Congress),

(d) any toxic pollutant listed under Section 307(a) of the Federal Water Pollution Control Act,

(e) any hazardous air pollutant listed under Section 112 of the Clean Air Act, and

(f) any imminently hazardous chemical substance or mixture with respect to which the administrator has taken action pursuant to Section 7 of the Toxic Substance Control Act;

and shall not include natural gas, liquefied natural gas, or synthetic gas of pipeline quality (or mixtures of natural gas and such synthetic gas).

CREEK - A term generally applied to any natural stream of water, normally larger than a brook but smaller than a river.

CRITICAL HABITAT - The specific areas within the geographical area occupied by the species on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management consideration or protection.

CUESTA - An asymmetrical ridge, with a long, gentle slope on one side conforming with the dip of the underlying strata, and a steep or clifflike face on the other side formed by the outcrop of the resistant beds.

DEPOSITS - Earth material of any type, either consolidated or unconsolidated, that has accumulated by some natural process or agent.

DIP - The angle that a stratum or any planar feature makes with the horizontal, measured perpendicular to strike and in the vertical plane.

DOLOMITE - A sedimentary rock consisting of calcium magnesium carbonate, $CaMg(Co_3)_2$. Occurs in beds formed by the alteration of limestone.

DRAINAGE CLASS (natural) - Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained - Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained - Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well-drained - Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well-drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained - Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained - Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained - Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough periods during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained - Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients, as for example in "hillpeats" and "climatic moors."

DRAINAGEWAY - A channel or course along which water moves in draining an area.

DRUMLIN - A low, smoothly rounded, elongate hill of compact glacial till, or rarely other kinds of drift, built under the margin of the ice and shaped by its flow, or carved out of an older moraine by readvancing ice; its longer axis is parallel to the direction of movement of the ice.

END MORAINE - A ridgelike accumulation of till that marks a stillstand position of a present or past glacier front.

ENDANGERED SPECIES - Any species which is in danger of extinction throughout all or a significant portion of its range, other than a species of the Class Insecta determined by the secretary to constitute a pest whose protection would present an overwhelming and overriding risk to man.

EROSION - The general process or the group of processes whereby the materials of the Earth's crust are loosened, dissolved, or worn away, and simultaneously moved from one place to another by natural agencies, but usually exclude mass wasting.

ESCARPMENT - A long, more or less continuous cliff or relatively steep slope facing in one general direction, separating two level or gently sloping surfaces, and produced by erosion or faulting.

FAULT - A fracture or fracture zone along which there has been displacement of the sides relative to one another parallel to the fracture.

FELDSPAR - Any of several crystalline minerals made up of aluminum silicates with sodium, potassium, or calcium, usually glassy and moderately hard, found in igneous rocks.

FERRUGINOUS - Pertaining to or containing iron.

FINE-GRAINED - 1. Said of an igneous rock, and its texture, whose particles have an average diameter less than 1 mm (0.04 in.). 2. Said of a sedimentary rock, and of its texture, in which the particles have an average diameter less than 1/16 mm (62 microns, or silt size and smaller).

FINE-TEXTURED (heavy textured) SOIL - Sandy clay, silty clay, and clay.

FLOOD PLAIN - The surface or strip of relatively smooth land adjacent to a river channel, constructed by the present river in its existing regimen and covered with water when the river overflows its banks.

FOLD [geol struc] - A curve or bend of a planar structure such as rock strata, bedding planes, foliation or cleavage.

FORMATION - A lithologically distinctive, mappable body of rock.

FOSSILIFEROUS - Containing fossils.

FRACTURE [struc geol] - A general term for any break in a rock, whether or not it causes displacement, due to mechanical failure by stress. Fracture includes cracks, joints, and faults.

GEOLOGIC TIME - See Figure Gl.1.

GLACIAL - (a) Of or relating to the presence and activities of ice or glaciers, (b) Pertaining to distinctive features and materials produced or derived from glaciers and ice sheets.

GLACIAL DRIFT - A general term for drift transported by glaciers or icebergs and deposited on land or in the sea.

GLACIAL TILL - Unstratified drift, deposited directly by a glacier without reworking by meltwater and consisting of a mixture of clay, silt, sand, gravel, and boulders ranging widely in size and shape.

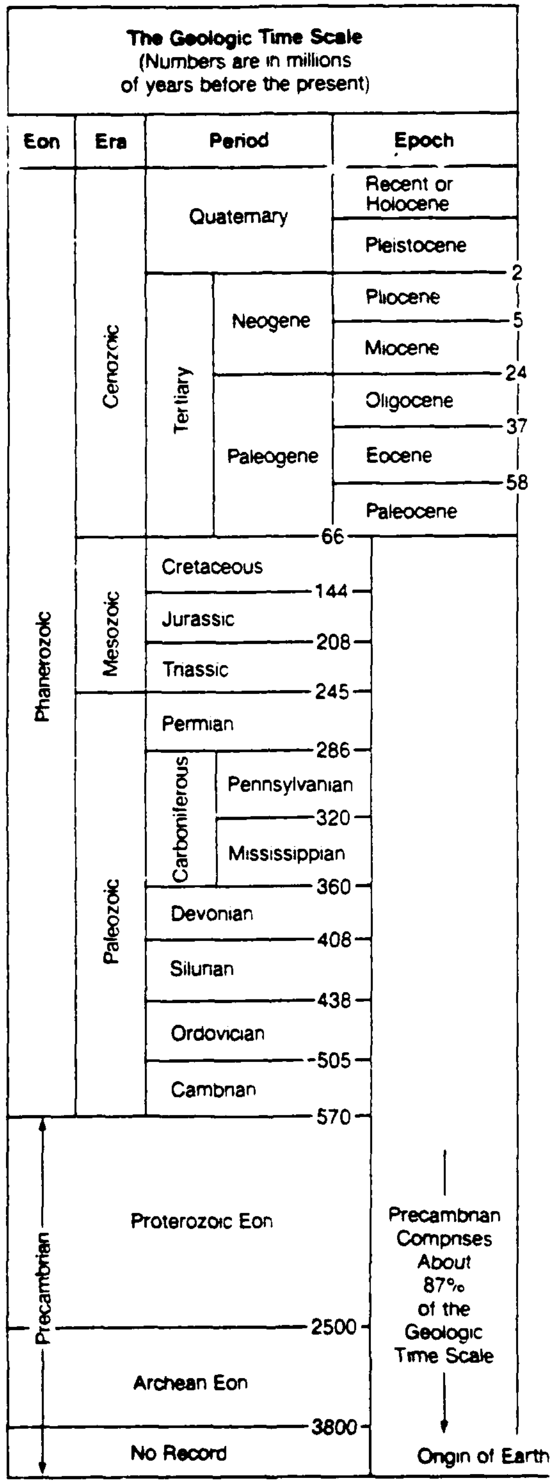

Figure Gl.1

The Geologic Time Scale

GLAUCONITIC SANDSTONE - Greensand, composed of a green mineral, closely related to the micas and essentially a hydrous potassium iron silicate.

GRANITE - Broadly applied, any crystalline, quartz-bearing plutonic rock; also commonly contains feldspar, mica, hornblende, or pyroxene.

GRANODIORITE - A group of coarse-grained plutonic rocks intermediate in composition between quartz diorite and quartz monzonite, containing quartz, plagioclase, and potassium feldspar with biotite, hornblende, or more rarely, pyroxene, as the mafic contents.

GRAVEL - An unconsolidated, natural accumulation of rounded rock fragments resulting from erosion, consisting predominantly of particles larger than sand, such as boulders, cobbles, pebbles, granules or any combination of these fragments.

GROUNDWATER - Refers to the subsurface water that occurs beneath the water table in soils and geologic formations that are fully saturated.

GUNK™ - A trademark for a family of different chemical products manufactured by the Radiator Specialty Company of Charlotte, North Carolina. While these products have specific names, their users may refer to any one of them colloquially by this name.

HARM - Hazard Assessment Rating Methodology - A system adopted and used by the United States Air Force to develop and maintain a priority listing of potentially contaminated sites on installations and facilities for remedial action based on potential hazard to public health, welfare, and environmental impacts. (Reference: DEQPPM 81-5, December 11, 1981.)

HAS - Hazard Assessment Score - The score developed by using the Hazard Assessment Rating Methodology (HARM).

HAZARDOUS MATERIAL - Any substance or mixture of substances having properties capable of producing adverse effects on the health and safety of the human being. Specific regulatory definitions also found in OSHA and DOT rules.

HAZARDOUS WASTE - A solid or liquid waste that, because of its quantity, concentration, or physical, chemical, or infectious characteristics may:

a. cause, or significantly contribute to, an increase in mortality or an increase in serious or incapacitating reversible illness, or

b. pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

HERBICIDE - A weed killer.

HILL - A natural elevation of the land surface, rising rather prominently above the surrounding land, usually of limited extent and having a well-defined outline (rounded) and generally considered to be less than 1000 feet from base to summit.

IGNEOUS ROCKS - Rock or mineral that has solidified from molten or partially molten material, i.e. from magma.

INTERBEDDED - Beds lying between or alternating with others of different character; especially rock material laid down in sequence between other beds.

KAME - A mound, knob, or short irregular ridge, composed of stratified sand and gravel deposited by a subglacial stream as a fan or delta at the margin of a melting glacier; by a superglacial stream in a low place or hole on the surface of the glacier; or as a ponded deposit on the surface or at the margin of stagnant ice.

LACUSTRINE - Pertaining to, produced by, or inhabiting a lake or lakes.

LENTICULAR - 1. Resembling in shape the cross section of a lens. 2. Pertaining to a stratigraphic lens or lentil.

LIMESTONE - A sedimentary rock consisting of the mineral calcite (calcite carbonate, $CaCO_3$) with or without magnesium carbonate.

LIMONITE - A common secondary material, formed by weathering (oxidation) of iron-bearing materials.

LITHOLOGY - (a) The description of rocks. (b) The physical character of a rock.

LOAM - A rich, permeable soil composed of a friable mixture of relatively equal proportions of sand, silt, and clay particles, and usually containing organic matter.

MEAN LAKE EVAPORATION - The total evaporation amount for a particular area; amount based on precipitation and climate (humidity).

MEDIUM-GRAINED - 1. Said of an igneous rock, and of its texture, in which the individual crystals have an average diameter in the range of 1-5 mm (0.04 - 0.2 in.). 2. Said of a sedimentary rock, and of its texture, in which the individual particles have an average diameter in the range of 1/16 to 2 mm (62-2000 microns, or sand size).

METAMORPHIC ROCK - Any rock derived from pre-existing rocks by mineralogical, chemical, and/or structural changes, essentially in solid state, in response to marked changes in temperature, pressure, shearing stress, and chemical environment, generally at depth in the Earth's crust.

MIGRATION (Contaminant) - The movement of contaminants through pathways (groundwater, surface water, soil, and air).

MINERAL - A naturally occurring inorganic element or compound having an orderly internal structure and characteristic chemical composition, crystal form and physical properties.

MORAINE - A mound or ridge of unstratified glacial drift, chiefly till, deposited by direct action of glacier ice.

MORPHOLOGY - The shape of the earth's surface.

NET PRECIPITATION - Precipitation minus evaporation.

NORMAL FAULT - A fault in which the hanging wall appears to have moved downward relative to the footwall. The angle of dip is usually 45° - 90°.

OUTCROP - That part of a geologic formation or structure that appears at the surface of the Earth.

OUTWASH [glac geol] - A stratified detritus (chiefly sand and gravel) removed or "washed out" from a glacier by meltwater streams and deposited in front of or beyond the end moraine or the margin of an active glacier.

OUTWASH PLAIN - a broad, gently sloping sheet of outwash deposited by meltwater streams flowing in front of or beyond a glacier, and formed by coalescing outwash fans.

PERMEABILITY - The capacity of a porous rock, sediment, or soil for transmitting a fluid without impairment of the structure of the medium; it is a measure of the relative ease of fluid flow under unequal pressure.

POND - A natural body of standing fresh water occupying a small surface depression, usually smaller than a lake and larger then a pool.

POROSITY - The ratio of the aggregate volume of interstices in a rock or soil to its total volume.

POTENTIOMETRIC SURFACE - An imaginary surface representing the total head of groundwater and defined by the level to which water will rise in a well. The water table is a particular potentiometric surface.

QUARTZ - A crystalline silica, an important rock forming mineral: SiO_2. Occurs either in transparent hexagonal crystals (colorless or colored by impurities) or in crystalline or cryptocrystalline masses. Forms the major proportion of most sands and has a widespread distribution in igneous, metamorphic and sedimentary rocks.

RECHARGE - The processes involved in the addition of water to the zone of saturation; also, the amount of water added.

RIVER - A general term for a natural freshwater surface stream of considerable volume and a permanent or seasonal flow, moving in a definite channel toward a sea, lake, or another river.

SAND - A rock or mineral particle in the soil, having a diameter in the range 0.52 - 2 mm.

SANDSTONE - A medium-grained fragmented sedimentary rock composed of abundant round or angular fragments of sand, size set in a fine-grained matrix (silt or clay) and more or less firmly united by a cementing material (commonly silica, iron oxide, or calcium carbonate).

SANDY LOAM - A soil containing 43 - 85% sand, 0 - 50% silt, and 0 - 20% clay, or containing at least 52% sand and no more than 20% clay and having the percentage of silt plus twice the percentage of clay exceeding 30% or containing 43 - 52% sand, less than 50% silt, and less than 7% clay.

SCHIST - A medium- or coarse-grained, strongly foliated, crystalline rock; formed by dynamic metamorphism.

SEDIMENTARY ROCK - A rock resulting in the consolidation of loose sediment that has accumulated in layers; e.g., a clastic rock (such as conglomerate or tillite) consisting of mechanically formed fragments of older rock transported from its source and deposited in water or from air or ice; or a chemical rock (such as rock salt or gypsum) formed by precipitation from solution; or an organic rock (such as certain limestones) consisting of the remains or secretions of plants and animals.

SHALE - A fine-grained detrital sedimentary rock, formed by the consolidation (especially by compression) of clay, silt, or mud.

SILT [soil] - (a) A rock or mineral particle in the soil, having a diameter in the range 0.002-0.005 mm; (b) A soil containing more than 80% silt-size particles, less than 12% clay, and less than 20% sand.

SILT LOAM - A soil containing 50 - 88% silt, 0 - 27% clay and 0 - 50% sand.

SILTSTONE - An indurated silt having the texture and composition of shale but lacking its fine lamination or fissility; a massive mudstone in which silt predominates over clay.

SLATE - A compact, fine-grained metamorphic rock that possesses slaty cleavage and hence can be split into slabs and thin plates. Most slate was formed from shale.

SOIL PERMEABILITY - The characteristic of the soil that enables water to move downward through the profile. Permeability is measured as the distance per unit time that water moves downward through the saturated soil.

Terms describing permeability are:

Very Slow - less than 0.06 inches per hour (less than 4.24 x 10^{-5} cm/sec)

Slow - 0.06 to 0.20 inches per hour (4.24 x 10^{-5} to 1.41 x 10^{-4} cm/sec)

Moderately Slow - 0.20 to 0.63 inches per hour (1.41 x 10^{-4} to 4.45 X 10^{-4} cm/sec)

Moderate - 0.63 to 2.00 inches per hour (4.45 x 10^{-4} to 1.41 x 10^{-3} cm/sec)

Moderately Rapid - 2.00 to 6.00 inches per hour (1.41 x 10^{-3} to 4.24 x 10^{-3} cm/sec)

Rapid - 6.00 to 20.00 inches per hour (4.24 x 10^{-3} to 1.41 x 10^{-2} cm/sec)

Very Rapid - more than 20.00 inches per hour (more than 1.41 x 10^{-2} cm/sec)

(Reference: U.S.D.A. Soil Conservation Service)

SOLVENT - A substance, generally a liquid, capable of dissolving other substances.

SORTED - Said of a sediment or detrital rock consisting of uniform size lying within the limits of a single grade.

STRATIFIED - Formed, arranged, or laid down in layers or strata; especially said of any layered sedimentary rock or deposit.

STRATIGRAPHIC UNIT - A body of strata recognized as a unit for description, mapping, or correlation.

STRIKE - The direction taken by a structural surface, e.g., a bedding or fault plane, as it intersects the horizontal.

STRUCTURAL - Of or pertaining to rock deformation or to features that result from it.

SURFACE WATER - All water exposed at the ground surface, including streams, rivers, ponds, and lakes.

SWAMP - An area intermittently or permanently covered with water, having shrubs and trees but essentially without the accumulation of peat.

TECTONIC - Pertaining to the forces involved in, or the resulting structures of, tectonics.

TECTONICS - A branch of geology dealing with the broad architecture of the outer part of the earth, that is, the major structural or deformational features and their relations, origin, and historical evolution.

TERMINAL MORAINE - The outermost end moraine of a glacier or ice sheet, marking the maximum advance of the ice.

TERRACE [geomorph] - Any long, narrow, relatively level or gently inclined surface, generally less broad than a plain, bounded along one edge by a steeper descending slope and along the other by a steeper ascending slope.

THREATENED SPECIES - Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

THRUST FAULT - A fault with a dip of 45° or less over much of its extent, on which the hanging wall appears to have moved upward relative to the footwall. Horizontal compression rather than vertical displacement is its characteristic feature.

TILL - Dominantly unsorted and unstratified drift, generally unconsolidated, deposited directly by and underneath a glacier without subsequent reworking by meltwater, and consisting of a heterogeneous mixture of clay, silt, sand and gravel and boulders ranging widely in size and shape.

TIME [Geologic] - See Figure Gl.1.

TOPOGRAPHY - The general conformation of a land surface, including its relief and the position of its natural and man-made features.

UNCONSOLIDATED - (a) Sediment that is loosely arranged or unstratified, or whose particles are not cemented together, occurring either at the surface or at depth. (b) Soil material that is in a loosely aggregated form.

VALLEY - Any low-lying land bordered by higher ground, especially an elongate, relatively large, gently sloping depression of the earth's surface, commonly situated between two mountains or between ranges of hills and mountains, and often containing a stream or river with an outlet. It is usually developed by stream or river erosion, but can be formed by faulting.

VOLCANIC - Pertaining to the activities, structures, or rock types of a volcano.

WATER TABLE - The upper limit of the portion of the ground that is wholly saturated with water; the surface on which the fluid pressure in the pores of a porous medium is exactly atmospheric.

WETLANDS - Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

WILDERNESS AREA - An area unaffected by anthropogenic activities and deemed worthy of special attention to maintain its natural condition.

Appendix A

Outside Agency Contact List

OUTSIDE AGENCY CONTACT LIST

1) County of Nassau
Department of Public Works
Highways and General Engineering
1 West Street
Mineola, New York 11501
Donald Trusch, P.E.
(516) 535-3165

2) Long Island Lighting Company
1660 Walt Whitman Road
Melville, New York 11747
Dave Berger
(516) 420-6144

3) New York Geological Survey
New York State Museum
Cultural Education Center
Room 3140
Albany, New York 12230
(518) 474-5816

4) New York State Department of Environmental Conservation
SUNY, Building 40
Stony Brook, New York 11794
William Southard
(516) 751-7900 Ext. 290

5) New York State Department of Environmental Conservation
Wildlife
SUNY, Building 40
Stony Brook, New York 11794
Michael S. Scheibel
(516) 751-7900 Ext. 248

6) Roslyn Water District
24 West Shore Road
Roslyn, New York 11576
Carmine Cipriano
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OUTSIDE AGENCY CONTACT LIST (continued)

7) United States Department of Agriculture (USDA)
Soil Conservation Service
1425 Old Country Road, Building J
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8) Village of East Hills
Village Clerk
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Appendix B

USAF Hazard Assessment Rating Methodology

USAF HAZARD ASSESSMENT RATING METHODOLOGY

The DoD has developed a comprehensive program to identify, evaluate, and control hazardous waste disposal practices associated with past waste disposal techniques at DoD facilities. One of the actions required under this program is to:

> Develop and maintain a priority listing of contaminated installations and facilities for remedial action based on potential hazard to public health, welfare, and environmental impacts (Reference: DEQPPM 81-5, December 11, 1981).

Accordingly, the USAF has sought to establish a system to set priorities for taking further action at sites based upon information gathered during the PA phase of the IRP.

PURPOSE

The purpose of the site rating model is to assign a ranking to each site where there is suspected contamination from hazardous substances. This model will assist the ANG in setting priorities for follow-up site investigations.

This rating system is used only after it has been determined that (1) potential for contamination exists (hazardous waste present in sufficient quantity), and (2) potential for migration exists. A site may be deleted from ranking consideration on either basis.

DESCRIPTION OF THE MODEL

Like the other hazardous waste site ranking models, the USAF's site rating model uses a scoring system to rank sites for priority attention. However, in developing this model, the designers incorporated some special features to meet specific DoD needs.

The model uses data readily obtained during the Preliminary Assessment portion of the IRP. Scoring judgment and computations are easily made. In assessing the hazards at a given site, the model develops a score based on the most likely routes of contamination and worst hazards at the site. Sites are given low scores only if there are clearly no hazards. This approach meshes well with the policy for evaluating and setting restrictions on excess DoD properties.

Site scores are developed using the appropriate ranking factors presented in this appendix. The site rating form and the rating factor guidelines are provided at the end of this appendix.

As with the previous model, this model considers four aspects of the hazard posed by a specific site: (1) possible receptors of the contamination, (2) the waste and its characteristics, (3) the potential pathways for contaminant migration, and (4) any effort that was made to contain the waste resulting from a spill.

The receptors category rating is based on four rating factors: (1) the potential for human exposure to the site, (2) the potential for human ingestion of contaminants should underlying aquifers be polluted, (3) the current and anticipated use of the surrounding area, and (4) the potential for adverse effects upon important biological resources and fragile natural settings. The potential for human exposure is evaluated on the basis of the total population within 1000 feet of the site, and the distance between the site and the base boundary. The potential for human ingestion of contaminants is based on the distance between the site and the nearest well, the groundwater use of the uppermost aquifer, and population served by the groundwater supply within 3 miles of the site. The uses of the surrounding area are determined by the zoning within a 1-mile radius. Determination of whether or not critical environments exist within a 1-mile radius of the site predicts the potential for adverse effects from the site upon important biological resources and fragile natural settings. Each rating factor is numerically evaluated (0-3) and increased by a multiplier. The maximum possible score is also computed. The factor score and maximum possible scores are totaled, and the receptors subscore computed as follows: receptors subscore = (100 X factor subtotal/maximum score subtotal).

The waste characteristics category is scored in three steps. First, a point rating is assigned based on an assessment of the waste quantity and the hazard (worst case) associated with the site. The level of confidence in the information is also factored into the assessment. Next, the score is multiplied by a waste persistence factor, which acts to reduce the score if the waste is not very persistent. Finally, the score is further modified by the physical state of the waste. Liquid wastes receive the maximum score while scores for solids are reduced.

The pathways category rating is based on evidence of contaminant migration along one of three pathways: surface water migration, flooding, and groundwater migration. If evidence of contaminant migration exists, the category is given a subscore of 80 to 100 points. For indirect evidence, 80 points are assigned, and for direct evidence, 100 points are assigned. If no evidence is found, the highest score among the three possible routes is used. The three pathways are evaluated and the highest score among all four of the potential scores is used.

The scores for each of the three categories are added together and normalized to a maximum possible score of 100. Then the waste management practice category is scored. Scores for sites with no containment are not reduced. Scores for sites with limited containment can be reduced by 5 percent. If a site is contained and well-managed, its score can be reduced by 90 percent. The final site score is calculated by applying the waste management practices category factor to the sum of the score for the other three categories.

HAZARD ASSESSMENT RATING FORM

NAME OF SITE

LOCATION ______________________________

DATE OF OPERATION OR OCCURRENCE ______________________________

OWNER/OPERATOR ______________________________

COMMENTS/DESCRIPTION ______________________________

SITE RATED BY ______________________________

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1000 ft. of site		4		12
B. Distance to nearest well		10		30
C. Land use-zoning within 1-mile radius		3		9
D. Distance to installation boundary		6		18
E. Critical environments within 1-mile radius of site		10		30
F. Water quality of nearest surface water body		6		18
G. Groundwater use of uppermost aquifier		9		27
H. Population served by surface water supply within 3 miles downstream of site		6		18
I. Population served by groundwater supply within 3 miles of site		6		18

Subtotals ________ 180

Receptors subscore (100 x factor score subtotal/maximum score subtotal)

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) ________
2. Confidence level (C = confirmed, S = suspected) ________
3. Hazard rating (H = high, M = medium, L = low) ________

Factor Subscore A (from 20 to 100 based on factor score matrix)

B. Apply persistence factor
Factor subscore A x Persistence Factor = Subscore B

________ x ________ = ________

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore

________ x ________ =

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists, then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore

B. Rate the migration potential for 3 potential pathways: *Surface water migration, flooding, and groundwater migration.* Select the highest rating, and proceed to C.

1. Surface water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water		8		24
Net precipitation		6		18
Surface erosion		8		24
Surface permeability		6		18
Rainfall intensity		8		24

Subtotals ________ 108

Subscore (100 x factor score subtotal/maximum score subtotal)

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
2. Flooding		1		3

Subscore (100 x factor score/3)

3. Groundwater migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to groundwater		8		24
Net precipitation		6		18
Soil permeability		8		24
Subsurface flows		8		24
Direct access to groundwater		8		24

Subtotals ________ 114

Subscore (100 x factor score subtotal/maximum score subtotal)

C. Highest pathway score

Enter the highest subscore value from A, B-1, B-2, or B-3 above

Pathways subscore

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors
Waste Characteristics
Pathways

Total ________ divided by 3 = ________
Gross Total Score

B. Apply factor for waste containment from waste management practices.

Gross Total Score x Waste Management Practices Factor = Final Score

________ x ________ = [ ]

HAZARD ASSESSMENT RATING METHODOLOGY GUIDELINES

I. RECEPTORS CATEGORY

Rating Factors	Rating Scale Levels 0	1	2	3	Multiplier
A. Population within 1,000 feet (includes on-base facilities)	0	1-25	26-100	Greater than 100	4
B. Distance to nearest water well	Greater than 3 miles	1 to 3 miles	3,001 feet to 1 mile	0 to 3,000 feet	10
C. Land use/zoning (within 1-mile radius)	Completely remote (zoning not applicable)	Agricultural	Commercial or Industrial	Residential	3
D. Distance to installation boundary	Greater than 2 miles	1 to 2 miles	1,001 feet to 1 mile	0 to 1,000 feet	6
E. Critical environments (within 1-mile radius)	Not a critical environment	Natural areas	Pristine natural areas; minor wetlands; preserved areas; presence of economically important natural resources susceptible to contamination	Major habitat of an endangered or threatened species; presence of recharge area; major wetlands	10
F. Water quality/use designation of nearest surface water body	Agricultural or Industrial use	Recreation, propagation and management of fish and wildlife	Shellfish propagation and harvesting	Potable water supplies	6
G. Groundwater use of uppermost aquifer	Not used, other sources readily available	Commercial Industrial, or irrigation, very limited other water sources	Drinking water, municipal water available	Drinking water, no municipal water available, commercial, industrial, or irrigation; no other water source available	9
H. Population served by surface water supplies within 3 miles downstream of site	0	1-50	51-1,000	Greater than 1,000	6
I. Population served by aquifer supplies within 3 miles of site	0	1-50	51-1,000	Greater than 1,000	6

II. WASTE CHARACTERISTICS

A-1 Hazardous Waste Quantity

S = Small quantity (5 tons or 20 drums of liquid)
M = Moderate quantity (5 to 20 tons or 21 to 85 drums of liquid)
L = Large quantity (20 tons or 85 drums of liquid)

A-2 Confidence Level of Information

C = Confirmed confidence level (minimum criteria below)

- o Verbal reports from interviewer (at least 2) or written information from the records
- o Knowledge of types and quantities of wastes generated by shops and other areas on base

S = Suspected confidence level

- o No verbal reports or conflicting verbal reports and no written information from the records
- o Logic based on a knowledge of the types and quantities of hazardous wastes generated at the base, and a history of past waste disposal practices indicate that these wastes were disposed of at a site

A-3 Hazard Rating

Rating Factors	Rating Scale Levels 0	1	2	3
Toxicity	Sax's Level 0	Sax's Level 1	Sax's Level 2	Sax's Level 3
Ignitability	Flash point greater than 200°F	Flash point at 140°F to 200°F	Flash point at 80°F to 140°F	Flash point less than 80°F
Radioactivity	At or below background levels	1 to 3 times background levels	3 to 5 times background levels	Over 5 times background levels

Use the highest individual rating based on toxicity, ignitability, and radioactivity and determine the hazard rating.

Hazard Rating	Points
High (H)	3
Medium (M)	2
Low (L)	1

II. *WASTE CHARACTERISTICS--Continued*

Waste Characteristics Matrix

Point Rating	Hazardous Waste Quantity	Confidence Level of Information	Hazard Rating
100	L	C	H
	L	C	M
80	M	C	H
70	L	S	H
	S	C	H
60	M	C	M
	L	S	M
	L	C	L
50	M	S	H
	S	C	M
	S	S	H
	M	S	M
40	M	C	L
	L	S	L
	S	C	L
30	M	S	L
	S	S	M
20	S	S	L

Notes:
For a site with more than one hazardous waste, the waste quantities may be added using the following rules:
Confidence Level
- o Confirmed confidence levels (C) can be added.
- o Suspected confidence levels (S) can be added.
- o Confirmed confidence levels cannot be added with suspected confidence levels.

Waste Hazard Rating
- o Wastes with the same hazard rating can be added.
- o Wastes with different hazard ratings can only be added in a downgrade mode, e.g., MCM + SCH = LCM if the total quantity is greater than 20 tons.

Example: Several wastes may be present at a site, each having an MCM designation (60 points). By adding the quantities of each waste, the designation may change to LCM (80 points). In this case, the correct point rating for the waste is 80.

B. Persistence Multiplier for Point Rating

Persistence Criteria	Multiply Point Rating From Part A by the Following
Metals, polycyclic compounds, and halogenated hydrocarbons	1.0
Substituted and other ring compounds	0.9
Straight chain hydrocarbons	0.8
Easily biodegradable compounds	0.4

C. Physical State Multiplier

Physical state	Multiply Point Total From Parts A and B by the Following
Liquid	1.0
Sludge	0.75
Solid	0.50

III. PATHWAYS CATEGORY

A. Evidence of Contamination

Direct evidence is obtained from laboratory analyses of hazardous contaminants present above natural background levels in surface water, groundwater, or air. Evidence should confirm that the source of contamination is the site being evaluated.

Indirect evidence might be from visual observation (i.e., leachate), vegetation stress, sludge deposits, presence of taste and odors in drinking water, or reported discharges that cannot be directly confirmed as resulting from the site, but the site is greatly suspected of being a source of contamination.

B-1 Potential for Surface Water Contamination

Rating factors	0	1	2	3	Multiplier
Distance to nearest surface water (includes drainage ditches and storm sewers)	Greater than 1 mile	2,001 feet to a mile	501 feet to 2,000 feet	0 to 500 feet	8
Net precipitation	Less than -10 inches	-10 to +5 inches	+5 to +20 inches	Greater than +20 inches	6
Surface erosion	None	Slight	Moderate	Severe	8
Surface permeability	0% to 15% clay ($>10^{-2}$ cm/sec)	15% to 30% clay (10^{-2} to 10^{-4} cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	Greater than 50% clay ($<10^{-6}$ cm/sec)	6
Rainfall intensity based on 1-year, 24 hour rainfall (thunderstorms)	<1.0 inch 0-5 0	1.0 to 2.0 inches 6-35 30	2.1 to 3.0 inches 36-49 60	>3.0 inches >50 100	8

B-2 Potential for Flooding

Rating factors	0	1	2	3	Multiplier
Floodplain	Beyond 100-year floodplain	In 100-year floodplain	In 10-year floodplain	Floods annually	1

B-3 Potential for Groundwater Contamination

Rating factors	0	1	2	3	Multiplier
Depth to groundwater	Greater than 500 feet	50 to 500 feet	11 to 50 feet	0 to 10 feet	8
Net precipitation	Less than -10 inches	-10 to +5 inches	+5 to +20 inches	Greater than +20 inches	6
Soil permeability	Greater than 50% clay ($<10^{-6}$ cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	15% to 30% clay 10^{-2} to 10^{-4} cm/sec	0% to 15% clay ($>10^{-2}$ cm/sec)	8
Subsurface flows	Bottom of site greater than 5 feet above high groundwater level	Bottom of site occasionally submerged	Bottom of site frequently submerged	Bottom of site located below mean groundwater level	8
Direct access to groundwater (through faults, fractures, faulty well casings, subsidence, fissures, etc.)	No evidence of risk	Low risk	Moderate risk	High risk	8

IV. WASTE MANAGEMENT PRACTICES CATEGORY

A. This category adjusts the total risk as determined from the receptors, pathways, and waste characteristics categories for waste management practices and engineering controls designed to reduce this risk. The total risk is determined by first averaging the receptors, pathways, and waste characteristics subscores.

B. Waste Management Practices Factor

The following multipliers are then applied to the total risk points (from A):

Waste Management Practice	Multiplier
No containment	1.0
Limited containment	0.95
Fully contained and in full compliance	0.10

Guidelines for fully contained:

Landfills:

- o Clay cap or other impermeable cover
- o Leachate collection system
- o Liners in good condition
- o Adequate monitoring wells

Surface Impoundments:

- o Liners in good condition
- o Sound dikes and adequate freeboard
- o Adequate monitoring wells

Spills:

- o Quick spill cleanup action taken
- o *Contaminated soil removed*
- o Soil and/or water samples confirm total cleanup of the spill

Fire Protection Training Areas:

- o Concrete surface and berms
- o *Oil/water separator for pretreatment of runoff*
- o Effluent from oil/water separator to treatment plant

General Note: If data are not available or known to be complete the factor ratings under items I-A through I, III-B-1, or III-B-3, then leave blank for calculation of factor score and maximum possible score.

Appendix C

Site Hazard Assessment Rating Forms and Factor Rating Criteria

HAZARD ASSESSMENT RATING FORM

NAME OF SITE Access Road to AGE Shop (Site No. 1)

LOCATION South and Southeast of AGE Shop (Building 36)

DATE OF OPERATION OR OCCURRENCE 1961-1971

OWNER/OPERATOR Roslyn Air National Guard Station

COMMENTS/DESCRIPTION

SITE RATED BY Science & Technology, Inc.

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1000 ft. of site	3	4	12	12
B. Distance to nearest well	3	10	30	30
C. Land use-zoning within 1-mile radius	3	3	9	9
D. Distance to installation boundary	3	6	18	18
E. Critical environments within 1-mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	0	6	0	18
G. Groundwater use of uppermost aquifier	2	9	18	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by groundwater supply within 3 miles of site	3	6	18	18
		Subtotals	135	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 75

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor subscore A x Persistence Factor = Subscore B

80 x 1.0 = 80

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore

80 x 1.0 = 80

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists, then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

B. Rate the migration potential for 3 potential pathways: Surface water migration, flooding, and groundwater migration. Select the highest rating, and proceed to C.

1. Surface water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	2	8	16	24
Subtotals			66	108

Subscore (100 x factor score subtotal/maximum score subtotal) 61

2. Flooding

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Flooding	0	1	0	3

Subscore (100 x factor score/3) 0

3. Groundwater migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to groundwater	1	8	8	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to groundwater	3	8	24	24
Subtotals			68	114

Subscore (100 x factor score subtotal/maximum score subtotal) 60

C. Highest pathway score

Enter the highest subscore value from A, B-1, B-2, or B-3 above

Pathways subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	75
Waste Characteristics	80
Pathways	80

Total 235 divided by 3 = 78

Gross Total Score

B. Apply factor for waste containment from waste management practices.

Gross Total Score x Waste Management Practices Factor = Final Score

78 x 0.95 = 74

HAZARD ASSESSMENT RATING FORM

NAME OF SITE Old Waste Holding Area No. 1 (Site No. 2)

LOCATION North of the Vehicle Maintenance Shop (Building 16)

DATE OF OPERATION OR OCCURRENCE 1959-1990

OWNER/OPERATOR Roslyn Air National Guard Station

COMMENTS/DESCRIPTION

SITE RATED BY Science & Technology, Inc.

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1000 ft. of site	3	4	12	12
B. Distance to nearest well	3	10	30	30
C. Land use-zoning within 1-mile radius	3	3	9	9
D. Distance to installation boundary	3	6	18	18
E. Critical environments within 1-mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	0	6	0	18
G. Groundwater use of uppermost aquifier	2	9	18	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by groundwater supply within 3 miles of site	3	6	18	18

Subtotals 135 180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 75

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor subscore A x Persistence Factor = Subscore B

60 x 1.0 = 60

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore

60 x 1.0 = 60

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists, then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

B. Rate the migration potential for 3 potential pathways: Surface water migration, flooding, and groundwater migration. Select the highest rating, and proceed to C.

1. Surface water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	2	8	16	24
Subtotals			66	108

Subscore (100 x factor score subtotal/maximum score subtotal) 61

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
2. Flooding	0	1	0	3

Subscore (100 x factor score/3) 0

3. Groundwater migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to groundwater	1	8	8	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to groundwater	3	8	24	24
Subtotals			68	114

Subscore (100 x factor score subtotal/maximum score subtotal) 60

C. Highest pathway score

Enter the highest subscore value from A, B-1, B-2, or B-3 above

Pathways subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	75
Waste Characteristics	60
Pathways	80

Total 215 divided by 3 = 72

Gross Total Score

B. Apply factor for waste containment from waste management practices.

Gross Total Score x Waste Management Practices Factor = Final Score

72 x 1.0 = 72

HAZARD ASSESSMENT RATING FORM

NAME OF SITE Old Waste Holding Area No. 2 (Site No. 3)

LOCATION North Side and Northeast Corner of AGE Shop (Building 36)

DATE OF OPERATION OR OCCURRENCE 1971-1989

OWNER/OPERATOR Roslyn Air National Guard Station

COMMENTS/DESCRIPTION

SITE RATED BY Science & Technology, Inc.

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1000 ft. of site	3	4	12	12
B. Distance to nearest well	3	10	30	30
C. Land use-zoning within 1-mile radius	3	3	9	9
D. Distance to installation boundary	3	6	18	18
E. Critical environments within 1-mile radius of site	3	10	30	30
F. Water quality of nearest surface water body	0	6	0	18
G. Groundwater use of uppermost aquifer	2	9	18	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by groundwater supply within 3 miles of site	3	6	18	18
Subtotals			135	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 75

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor subscore A x Persistence Factor = Subscore B

60 x 1.0 = 60

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore

60 x 1.0 = 60

III. PATHWAYS Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists, then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

B. Rate the migration potential for 3 potential pathways: Surface water migration, flooding, and groundwater migration. Select the highest rating, and proceed to C.

1. Surface water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	2	8	16	24
		Subtotals	66	108

Subscore (100 x factor score subtotal/maximum score subtotal) 61

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
2. Flooding	0	1	0	3

Subscore (100 x factor score/3) 0

3. Groundwater migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to groundwater	1	8	8	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	0	8	0	24
Direct access to groundwater	3	8	24	24
		Subtotals	68	114

Subscore (100 x factor score subtotal/maximum score subtotal) 60

C. Highest pathway score

Enter the highest subscore value from A, B-1, B-2, or B-3 above

Pathways subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	75
Waste Characteristics	60
Pathways	80

Total 215 divided by 3 = 72

Gross Total Score

B. Apply factor for waste containment from waste management practices.

Gross Total Score x Waste Management Practices Factor = Final Score

72 x 0.95 = 68

Roslyn Air National Guard Station
Roslyn, New York

USAF Hazard Assessment Rating Methodology
Factor Rating Criteria

The following is an explanation of the HARM factor rating criteria for the three potential sites identified at the Station:

I. Receptors

A. Population Within 1000 Feet of Site.

Site Nos. 1-3, Factor Rating 3. The population of the Station on Unit Training Assembly weekends is 390 persons. Using a household size of 3.8 individuals, it is estimated that approximately 270 additional persons live in the neighborhood adjacent to the Station and within the 1000-foot radius.

B. Distance to Nearest Well.

Site Nos. 1-3, Factor Rating 3. Site No. 1 is located approximately 900 feet west of the nearest water well. Site Nos. 2 and 3 are approximately 1200 feet from the nearest water well.

C. Land Use - Zoning (within 1-mile radius).

Site Nos. 1-3, Factor Rating 3. The area within a 1-mile radius of Site Nos. 1-3 is predominantly residential.

D. Distance to Installation Boundary.

Site Nos. 1-3, Factor Rating 3. Site No. 1 is 35 feet from the installation boundary. Site No. 2 is 175 feet from it, and Site No. 3 is 200 feet from it.

E. Critical Environments (within 1-mile radius).

Site Nos. 1-3, Factor Rating 3. Surface runoff from Site Nos. 1-3 flows to two leach pits located immediately northeast of the AGE Shop (Building 36). These pits directly recharge the groundwater at their locations.

F. Water Quality/Use Designation of Nearest Surface Water Body.

Site Nos. 1-3, Factor Rating 0. Surface runoff from Site Nos. 1-3 does not flow to a naturally occurring body of surface water. It flows to two leach pits located immediately northeast of the AGE Shop (Building 36).

G. Groundwater Use of Uppermost Aquifer.

Site Nos. 1-3, Factor Rating 2. Well records dating as late as the early 1960s (Swazenski, 1963) indicate that some domestic wells tapped the uppermost, unconfined aquifer. This aquifer is now considered to be too contaminated for use as a source of potable water. Although treated municipal water from deeper aquifers is readily available to the local populace, it is at least conceivable that someone could still be obtaining water from the uppermost aquifer.

H. Population Served by Surface Water Supplies Within 3 Miles Downstream of Site.

Site Nos. 1-3, Factor Rating 0. No one within a 3-mile radius of Site Nos. 1-3 receives potable water from a surface water source.

I. Population Served by Aquifer Supplies Within 3 Miles of Site.

Site Nos. 1-3, Factor Rating 3. The entire population within a 3-mile radius of Site Nos. 1-3 receives potable water from aquifers. This population is estimated at about 14,000 persons.

II. Waste Characteristics

Site No. 1

A-1: Hazardous Waste Quantity - Factor Rating M (Moderate). As many as 1650 gallons of mixed waste oil PD-640 solvent, paint thinner, diesel fuel, leaded MOGAS, and denatured alcohol may have been disposed of at this site.

A-2: Confidence Level - Factor Rating C (Confirmed). This site was confirmed through interviews with Station personnel.

A-3: Hazard Rating - Factor Rating H (High). This site was given a high hazard rating because of the high toxicity of many petroleum products.

Site No. 2

A-1: Hazardous Waste Quantity - Factor Rating S (Small). An unknown quantity of waste oil, PD-640 solvent, paint thinner, diesel fuel, leaded MOGAS, and denatured alcohol was spilled at this site. For calculation purposes, a small quantity is used.

A-2: Confidence Level - Factor Rating C (Confirmed). This site was confirmed through interviews with Station personnel.

A-3: Hazard Rating - Factor Rating H (High). This site was given a high hazard rating because of the high toxicity of many petroleum products.

Site No. 3

A-1: Hazardous Waste Quantity - Factor Rating S (Small). An unknown quantity of waste oil, paint thinner, JP-4, PD-640 solvent, diesel fuel, toluene, and leaded MOGAS was spilled at this site. For calculation purposes, a small quantity is used.

A-2: Confidence Level - Factor Rating C (Confirmed). This site was confirmed through interviews with Station personnel.

A-3: Hazard Rating - Factor Rating H (High). This site was given a high hazard rating because of the high toxicity of many petroleum products such as JP-4.

B. Persistence Multiplier for Point Rating.

Site Nos. 1-3 were assigned a persistence multiplier of 1.0 based on the presence of leaded MOGAS. This material corresponds to the HARM category of "Metals, Polycyclic Compounds, and Halogenated Hydrocarbons."

C. Physical State Multiplier.

A physical state multiplier of 1.0 was applied to Site Nos. 1-3 because the materials spilled or disposed of at these sites were liquids.

III. Pathways Category

A. Evidence of Contamination

Site Nos. 1-3 were given a score of 80 (Indirect Evidence) because they are greatly suspected of being sources of contamination. Although no staining or stressed vegetation is present, interview information indicated that a moderate quantity of mixed wastes were disposed of at Site No. 1. Petroleum product stains are evident at Site Nos. 2 and 3.

B-1. Potential for Surface Water Contamination.

- Distance to Nearest Surface Water: Factor Rating 3. Site Nos. 1-3 are located within 350 feet of a storm sewer line on the Station property.

- Net Precipitation: Factor Rating 2. The average annual net precipitation for Site Nos. 1-3 is 12 inches.

- Surface Erosion: Factor Rating 1. Surface erosion is slight at Site Nos. 1-3.

- Surface Permeability: Factor Rating 1. The surface permeability at Site Nos. 1-3 is 4.45×10^{-4} to 1.41×10^{-3} cm/sec (Moderate).

- Rainfall Intensity Based on 1-Year, 24-Hour Rainfall: Factor Rating 2. The rainfall intensity at Site Nos. 1-3 is 2.75 inches.

B-2. Potential for Flooding.

Factor Rating 0. Site Nos. 1-3 are located beyond the 100-year flood plains of local streams.

B-3. Potential for Groundwater Contamination.

- Depth to Groundwater: Factor Rating 1. The depth to groundwater at Site Nos. 1-3 is 135 feet.

- Net Precipitation: Factor Rating 2. The average annual net precipitation for Site Nos. 1-3 is 12 inches.

- Soil Permeability: Factor Rating 3. The soil permeability at Site Nos. 1-3 is 4.24×10^{-3} to 1.41×10^{-2} cm/sec. (Rapid to Very Rapid).

- Subsurface Flows: Factor Rating 0. The bottoms of Site Nos. 1-3 are greater than 5 feet above high groundwater level.

- Direct Access to Groundwater: Factor Rating 3. Based on the presence of permeable surficial glacial deposits, there is a high risk of groundwater contamination from Site Nos. 1-3.

IV. Waste Management Practices Factor.

Site Nos. 1 and 3 were given scores of 0.95. Site No. 1 is entirely capped by asphalt road pavement. A portion of the potentially contaminated soil at Site No. 3 has been removed. Site No. 2 was given a score of 1.0 because no cleanup or containment measures have been initiated at this location.