

Environmental Restoration Program

**OPERABLE UNIT 9,  
SITE SCOPING REPORT  
VOLUME 6 - PHOTO HISTORY REPORT**

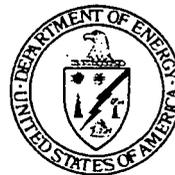
**MOUND PLANT  
MIAMISBURG, OHIO**

February 1992

**FINAL**

**Department of Energy  
Albuquerque Field Office**

Environmental Restoration Program  
Technical Support Office  
Los Alamos National Laboratory



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VOLUME 6 - PHOTO HISTORY REPORT**

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LOS ALAMOS NATIONAL LABORATORY**

**FINAL**

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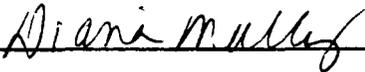
Signature Page

This report is Volume 6 of a multiple-volume Site Scoping Report providing the background information pertinent to the remedial investigation/feasibility study (RI/FS) of the Mound Plant. Under the terms of the Federal Facility Agreement between DOE and US EPA, this report is submitted to US EPA for approval.

This report is approved by US EPA only for the purposes of scoping the RI/FS, and approval does not imply concurrence with the interpretations presented herein. It is recognized that additional information will be collected during the RI/FS and may supersede information contained in this report.

APPROVED:

Diana Mally  
Remedial Project Manager  
U.S. Environmental Protection Agency  
Region V

  
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## **ACKNOWLEDGEMENTS**

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## CONTENTS

1. INTRODUCTION .....	1-1
2. SCOPE OF PHOTO HISTORY REPORT .....	2-1
3. METHODS .....	3-1
4. PHOTOINTERPRETATIVE DESCRIPTIONS OF WASTE DISPOSAL AREAS .....	4-1
4.1. NORTH PARKING LOT AREA .....	4-1
4.2. UPPER VALLEY AREA .....	4-6
4.3. LANDFILL AREA .....	4-12
4.4. LOWER VALLEY AREA .....	4-19
5. CORRELATION OF HISTORICAL ACTIVITIES TO THE ER PROGRAM .....	5-1
5.1. NORTH PARKING LOT AREA .....	5-1
5.2. UPPER VALLEY AREA .....	5-4
5.3. LANDFILL AREA .....	5-8
5.4. LOWER VALLEY AREA .....	5-12
6. REFERENCES .....	6-1

### APPENDIX A AERIAL PHOTOGRAPHS

## FIGURES

2.1. Base map locations at the Northern and Southern Study Areas .....	2-3
3.1. Legend of map units for aerial photograph interpretive mapping .....	3-3
4.1. Locations of north parking lot and upper valley area in Northern Study Area and lower valley and landfill areas in Southern Study Area .....	4-2
4.2. Interpretive map of Northern Study Area - 1959 .....	4-3
4.3. Interpretive map of Northern Study Area - 1964 .....	4-4
4.4. Interpretive map of Northern Study Area - 1968 .....	4-5
4.5. Interpretive map of Northern Study Area - 1973 .....	4-7
4.6. Interpretive map of Northern Study Area - 1975 .....	4-9
4.7. Interpretive map of Northern Study Area - 1979 .....	4-10
4.8. Interpretive map of Northern Study Area - 1981 .....	4-11
4.9. Interpretive map of Southern Study Area - 1959 .....	4-13
4.10. Interpretive map of Southern Study Area - 1964 .....	4-14
4.11. Interpretive map of Southern Study Area - 1968 .....	4-16
4.12. Interpretive map of Southern Study Area - 1973 .....	4-17
4.13. Interpretive map of Southern Study Area - 1975 .....	4-18
4.14. Interpretive map of Southern Study Area - 1979 .....	4-20
4.15. Interpretive map of Southern Study Area - 1981 .....	4-23
5.1. Areas of interest to the ER Program in the Northern Study Area .....	5-2
5.2. Areas of interest to the ER Program in the Southern Study Area .....	5-9
5.3. Map showing area of data gaps identified at Area B .....	5-13

## TABLES

II.1.	Chronology of Mound Plant Aerial Photography .....	2-2
V.1.	Features in North Parking Lot Area.....	5-3
V.2.	Features in Upper Valley Area.....	5-5
V.3.	Features in Landfill Area .....	5-10
V.4.	Features in Lower Valley Area.....	5-14

## ACRONYMS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration (Program)
FFA	Federal Facilities Agreement
NPL	National Priorities List
PCB	polychlorinated biphenyl
RI/FS	Remedial Investigation/Feasibility Study



## 1. INTRODUCTION

The U.S. Department of Energy (DOE) Mound Plant, Miamisburg, Ohio, was placed on the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA - also known as Superfund) National Priorities List (NPL) on November 21, 1989 (54 Federal Register 48184). Pursuant to its NPL status, DOE signed a CERCLA Section 120 Federal Facilities Agreement (FFA) with the U.S. Environmental Protection Agency (EPA) that became effective October 11, 1990. Negotiations between the DOE and the Ohio EPA are currently in progress to amend the agreement to include Ohio. The terms of the FFA require that DOE develop and implement Remedial Investigations and Feasibility Studies (RI/FS) and conduct Interim Remedial Actions in order to ensure that environmental impacts associated with past and present activities at the site are thoroughly investigated and appropriate action is taken to protect the public health, welfare and the environment.

In 1984, the DOE Albuquerque Operations Office established the Environmental Restoration (ER) Program to collect and evaluate environmental data in order to develop a conceptual site model to assess both the nature and extent of contamination and to identify potential exposure pathways and potential human and environmental receptors. These activities have been conducted under DOE policy for all facilities to comply with applicable environmental regulations. In order to provide EPA with sufficient information and data gathered during these previous investigations, a multi-volume scoping report providing background information has been prepared. The Site Scoping Report provides descriptions and summaries of the current conditions and characteristics of Mound Plant and consists of the following volumes:

1. Groundwater Data: February 1987 - July 1990
2. Geologic Log and Well Information Report
3. Radiologic Survey Report
4. Engineering Map Series
5. Topographic Map Series
6. Photo History Report
7. Waste Management Report
8. Environmental Monitoring Data
9. Bibliography



## 2. SCOPE OF PHOTO HISTORY REPORT

This report presents a series of interpretive maps compiled from historical aerial photographs of Mound Plant. Aerial photographs covering the Mound Plant were collected on 13 different dates and, of these, seven were deemed appropriate in terms of scale and degree of coverage for interpretation of waste disposal activities. The historical aerial photographs span the years 1952 to 1988 (Table II.1). The aerial photographs chosen for this study include the years 1959, 1964, 1968, 1973, 1975, 1979 and 1981. This historical sequence provides coverage of the plant site at two- to five-year intervals at scales that allow the identification of such features as small pits and trenches, structures, and container storage areas. The objective of this study is to document the changes in morphology and terrain elevation. The photo sequence chosen provides sufficient geographic evidence of the locations of historical activities and the evolution of the areas into their modern configurations. Other areas of the plant were not included as they are not known to have experienced large-scale waste disposal, as evidenced by previous investigations (DOE 1986) and visual inspections of the photographs. The changes in other areas of the plant may be largely attributed to construction and expansion of building facilities. On the whole, there are no significant morphologic changes in plant areas outside the two study areas chosen for this investigation.

Two areas of the plant in the upper and lower reaches of the plant drainage ditch were selected for photo interpretation purposes as they encompass the areas known to have been used for waste disposal. These areas are termed the Northern and Southern Study Areas and their locations are shown in Figure 2.1. Photointerpretation of four known or suspected waste disposal areas within the Northern and Southern Study Areas was performed to identify and locate any indications of activity within these areas that is associated with waste disposal. Such indications include pits, trenches, disturbed areas, burn sites, excavation, and fill locations.

**Table II.1. Chronology of Mound Plant Aerial Photography**

Date	Source	Scale	Format	Frame Numbers
9/16/52 <sup>a</sup>	AMS	1"=5750'	B&W	VV AJ M 1164,1165,1166
1959	ODT	1"=800'	B&W	1355-20-705,1355-20-706
9/21/62 <sup>a</sup>	USAF	1"=2104'	B&W	B2210-10-03-0037 FR 39,40,41
4/15/64	USGS	1"=2000'	B&W	GS-VAYB FR FR 1-159, 1-160, 1-161 1-133, 1-34
3/30/68	ODT	1"=1000'	B&W	3854-17-967,3854-17-966
4/14/73	ODT	1"=1000'	B&W	5234-4-219,5234-4-220
3/23/75	HAS	1"=400'	B&W	75-18 FR 1-1,1-2,1-3,1-4 75-18 FR 1R-5, 1R-6, 1R-7,1R-8
5/6/79	HAS	1"=400'	B&W	2R-28,29,30,31 3R-36,37,38,39 1-1,1-2,1-3,1-4,1-4,1-6
4/15/81	HAS	1"-400'	B&W	1-1,1-2,1-3,1-4,1-5,1-6
3/29/82 <sup>a</sup>	HAS	1"-400'	B&W	1-1,1-2, 2-3,2-4
3/9/85 <sup>a</sup>	NHAP	1"-6667'	B&W	398414 150-27 HAP83 398414 150-28 HAP83 398414 150-29 HAP83
3/9/85 <sup>a</sup>	NHAP	1"-4833'	CIR	398414 221-39 HAP83 398414 221-40 HAP83 398414 221-41-HAP83
4/8/88 <sup>a</sup>	NAPP	1"-333'	CIR	NAPP 37-030 NAPP 37-031 NAPP 37-032

<sup>a</sup>Not used for this photointerpretation  
 B&W = Black and white photography  
 CIR = Color infrared photography  
 AMS = Army Mapping Service  
 ODT = Ohio Department of Transportation  
 USAF = United States Air Force  
 USGS = United States Geological Survey  
 HAS = Henderson Aerial Surveys  
 NHAP = National High Altitude Photography Program  
 NAPP = National Aerial Photography Program

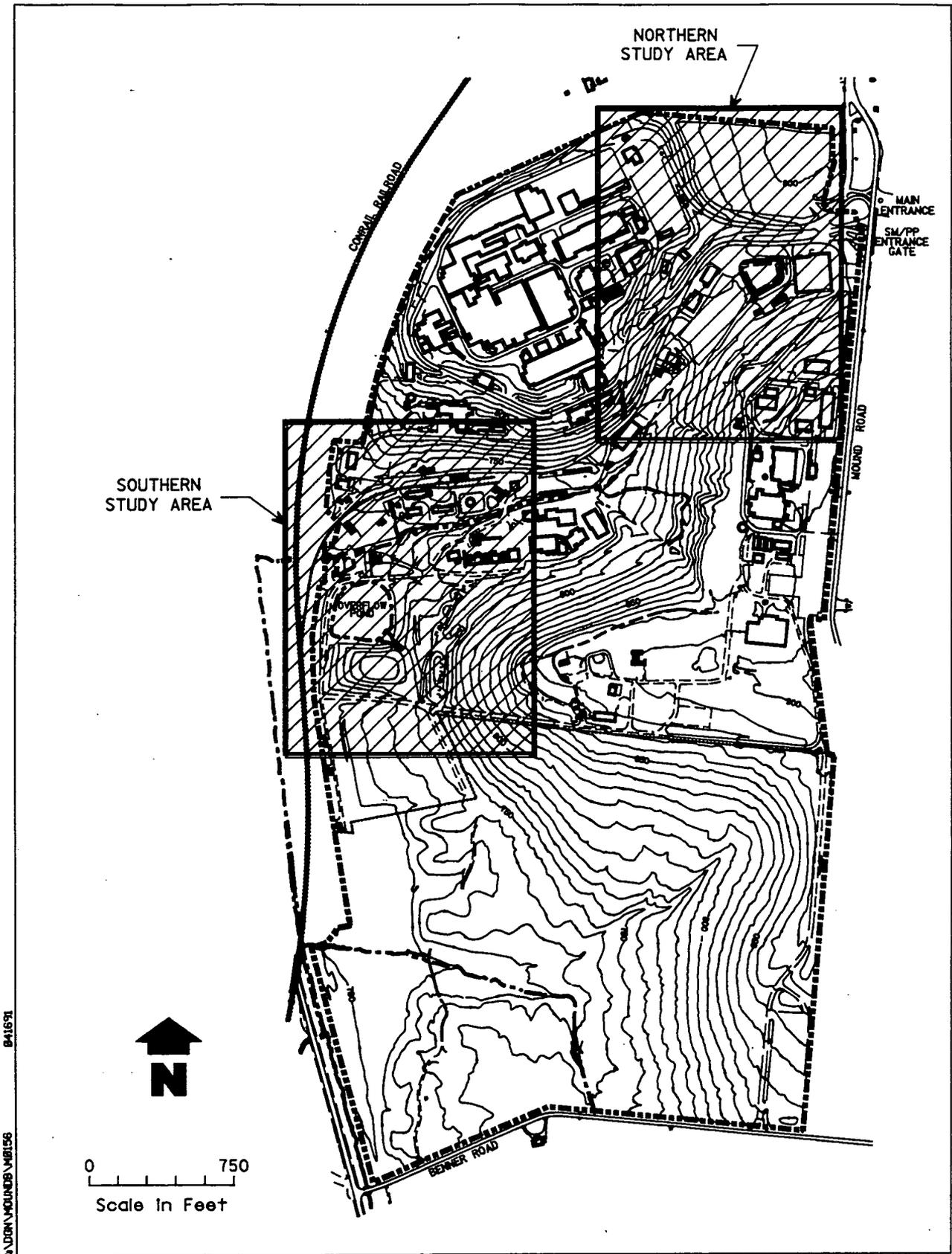


Figure 2.1. Basemap locations at the Northern and Southern Study Areas.



### 3. METHODS

Large-scale aerial photographs have been previously employed for estimating solid waste characteristics and for the identification of waste generating sources (Garofalo and Wobber 1974), as well as in assessing the existence of landfills and documenting their location and nature (Erb et al. 1981). Effective procedures for identifying hazardous waste sites throughout a region with medium-scale aerial photography are also currently in use (Bagheri and Hordon 1988). Historical aerial photographs at scales of 1"=1000 and 1:1500 have been applied to the detection of particular features such as ponds or the paths of movement of leachate or surface runoff (Lyon 1987).

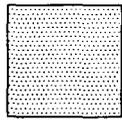
Aerial photointerpretation was performed in two areas of known waste disposal to identify past waste disposal activities, including the locations of pits, trenches, surface debris and disturbed soil. These four areas were covered by seven dates of sequential historical black-and-white aerial photography of the Mound Plant site.

Photography obtained for photointerpretation of the Mound Plant site ranges in scale from 1:4800 (1"=400') to 1:24000 (1"=2000'). To facilitate the photointerpretation process, which includes the outlining of small features onto photo overlays, the relevant portions of the 1959, 1964, 1968 and 1973 photos were enlarged by copy photography to a scale approximating that of the later photos (1"=400'). Copies of the photographs used in the interpretations are presented in Appendix A. Photos were covered with a clear acetate overlay and photointerpreted features were drafted onto the overlay. Photointerpretation utilized a tracking mirror stereoscope with a 3X magnifying eye piece.

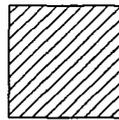
Identification of waste disposal activities relied on identification of areas with distinctive shape, texture, tone (in this case level of gray tone in a black-and-white photograph), and context of features. Elevational cues such as shadows were also relied upon to indicate depressions and elevated features. Light tones were interpreted as indicating areas devoid of vegetation; these are noted as cleared areas on base map overlays. Disturbed areas appear mottled in tone (both dark and light) resulting in a broken texture in contrast to the smooth texture of cleared areas. Piles of materials appear uniform in tone and texture, usually casting a shadow which denotes elevational differences with the surrounding terrain. Debris piles and debris may be indicated by the shadows of small objects and piles in the context of a disturbed area; they are uneven in tone and texture. Excavated areas, trenches, pits, and berms all exhibit elevational differences with surrounding terrain and are usually uniform in tone and texture with characteristic elongated or circular shapes in the cases of trenches, pits and berms. The sequential nature of the interpreted photos also facilitated identification of previously cleared, re-vegetated areas exhibiting a dark tone and smooth texture which corresponds to cleared areas in previous years. Storage areas exhibit the characteristics of cleared areas but include evidence of storage drums or other containers and materials.

Figure 3.1 is a legend explaining the meaning of map symbols on overlay maps. Photointerpreted features were symbolized with selected line styles and hatchure patterns. Overlay maps were then produced separately for the Northern and Southern Study Areas. Base maps for the overlays were produced from the digital data base file. The data file, including topography, structures, water wells and other surface features, is universally used for mapping purposes in the Mound Plant ER Program (DOE 1990a, 1991f).

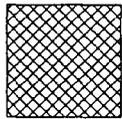
# LEGEND



Cleared Area



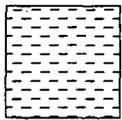
Pile



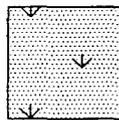
Disturbed Area



Debris Piles/  
Debris



Excavated Area



Cleared and  
Revegetated



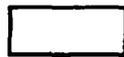
Drainage



Fence Line



Road



Structure

SA = Storage Area

Trenches, berms, pits, and burn areas are labeled.

Figure 3.1. Legend of map units for aerial photograph interpretive mapping.



#### **4. PHOTOINTERPRETATIVE DESCRIPTIONS OF WASTE DISPOSAL AREAS**

For ease of description, the Northern and Southern Study Areas include the north parking lot and upper valley areas. The Southern Study Area includes the landfill and lower valley areas (Figure 4.1). The four areas of interest are described in the subsections that follow.

##### **4.1. NORTH PARKING LOT AREA**

The north parking lot area is located in the northeastern corner of the Mound Plant site. The north parking lot area is currently comprised of a small paved parking lot near the guard house and a large parking area north of the main entrance into the Mound Plant.

In the 1959 photos of this area (Figure 4.2), several small areas of disturbed soil bordering the northern and southeastern corners of the small parking lot are evident. The area east of the road leading to this small paved parking lot contains a large circular depression encircled by a dirt road. The western portion of this depression exhibits evidence of a foundation of a preexisting structure backed on the west by a steep excavation in the form of a retaining wall or berm. Trenching is evident to the southeast of this feature along both sides of the dirt road. To the immediate northeast of the depression is a disturbed area, roughly circular in outline. A trench bordered by excavation dirt is situated in the far northeastern portion of this area.

The small paved parking lot identified in the 1959 photograph was extended to the south in unpaved form by 1964, resulting in regrading of the hilltop surface and extensive areas of disturbance bordering the new lot (Figure 4.3). In the parking area to the east, this circular depression becomes a paved, three-tiered parking lot and access road. Areas of disturbance border the parking lot on the north and south. Leading from the southeast corner of the lowest tier of the parking lot is a linear trench oriented northeast to southwest. Areas of disturbance bordering the 1959 trench to the northeast are smaller but still evident in the 1964 photograph.

The small paved parking lot near the guard house (Figure 4.4) had been paved by 1968. The hillslopes east and south of this parking lot have been regraded. All previous evidence of surface disturbance have been obscured. This parking lot continues in use with no major changes in 1973, 1975, 1979, and 1981.

By 1968, the tiered parking lot is considerably expanded to the north and east extending to the limits shown on the base map. The area to the south of the access road shown in the 1964 photograph has been completely regraded (Figure 4.4). These activities obscure all previous evidence of surface disturbance. The expanded parking lot continues in use in 1973, 1975, 1979, and 1981.

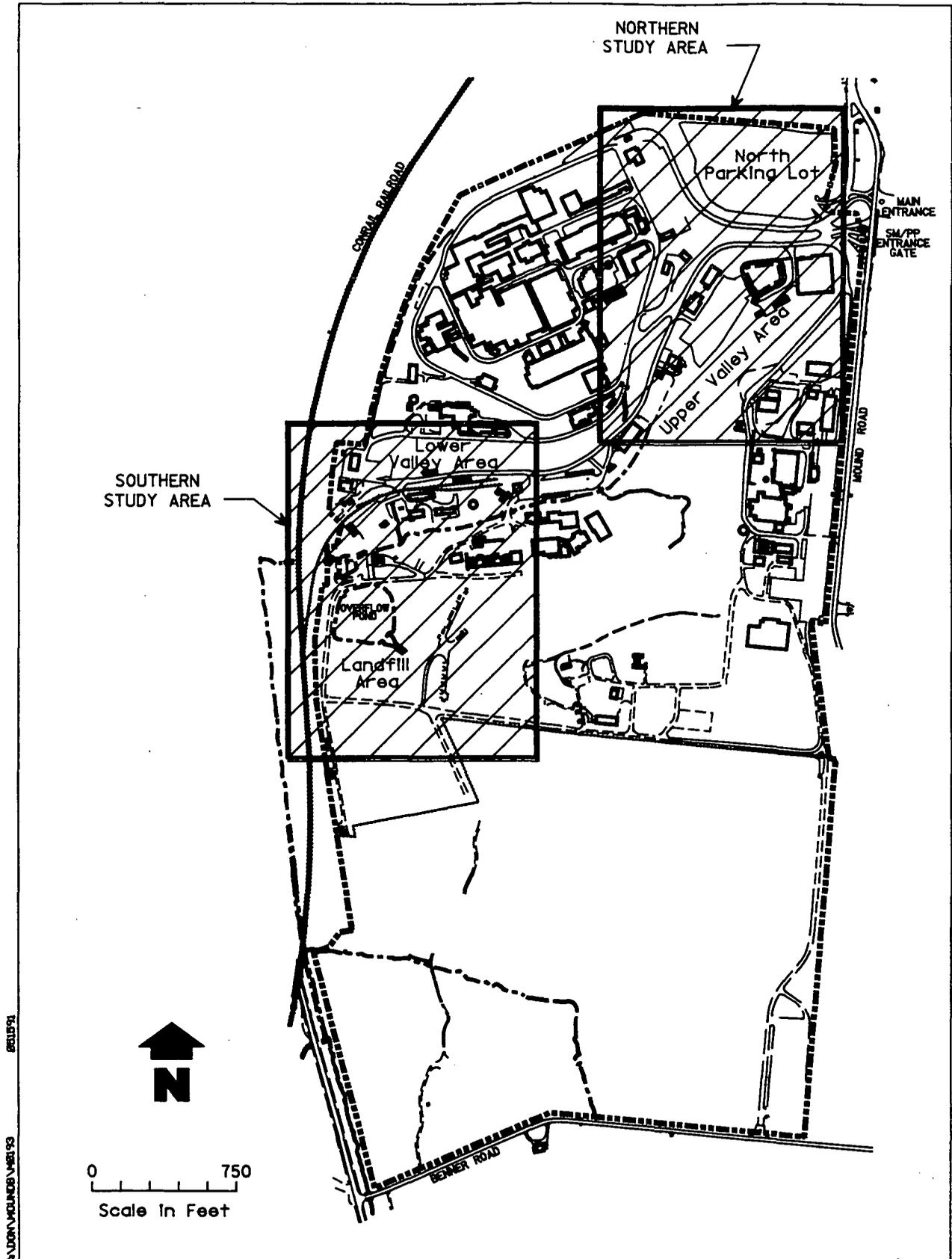


Figure 4.1. Locations of north parking lot and upper valley area in Northern Study Area, and lower valley and landfill areas in Southern Study Area.

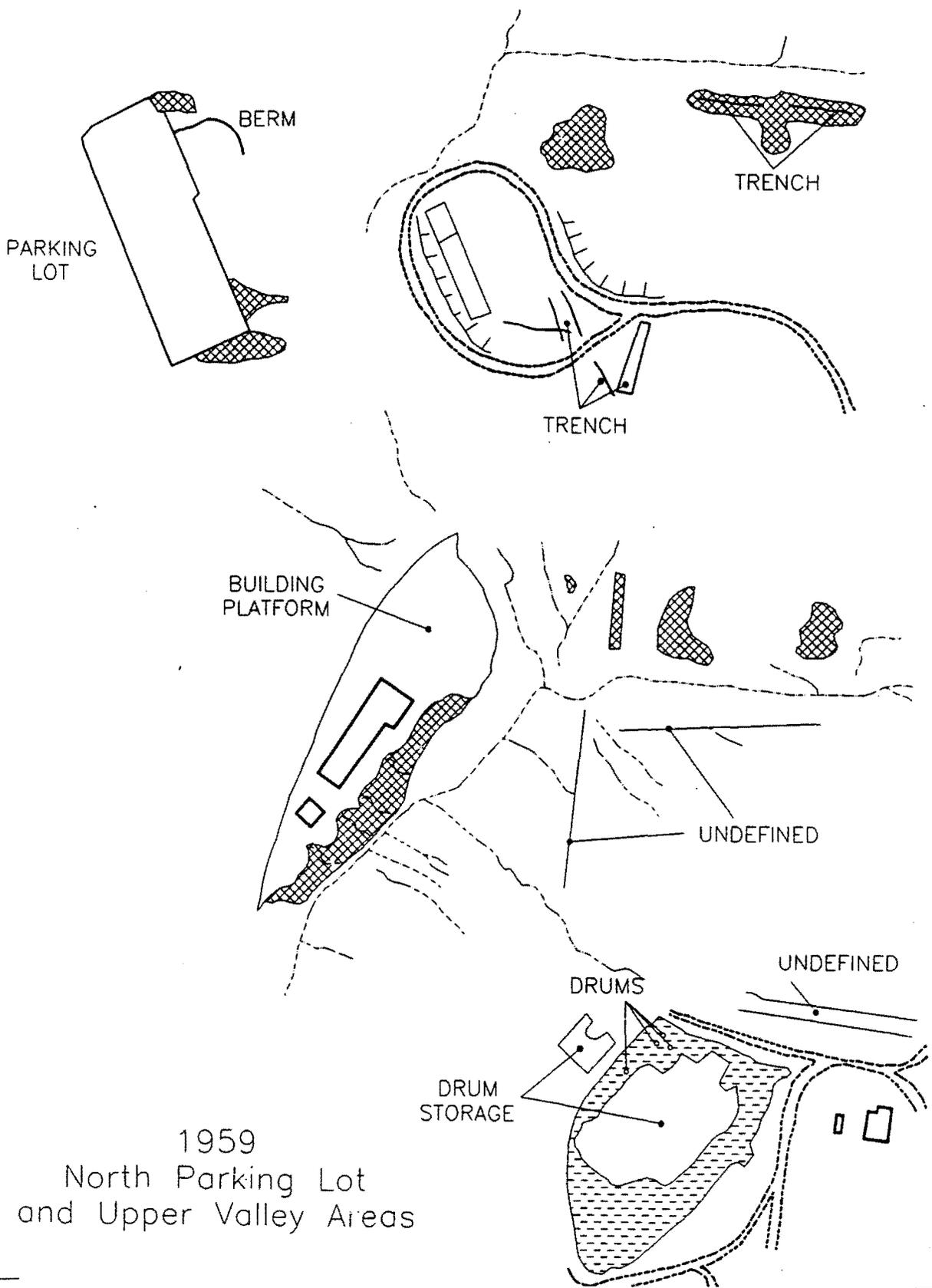


Figure 4.2. Interpretive map of Northern Study Area - 1959.



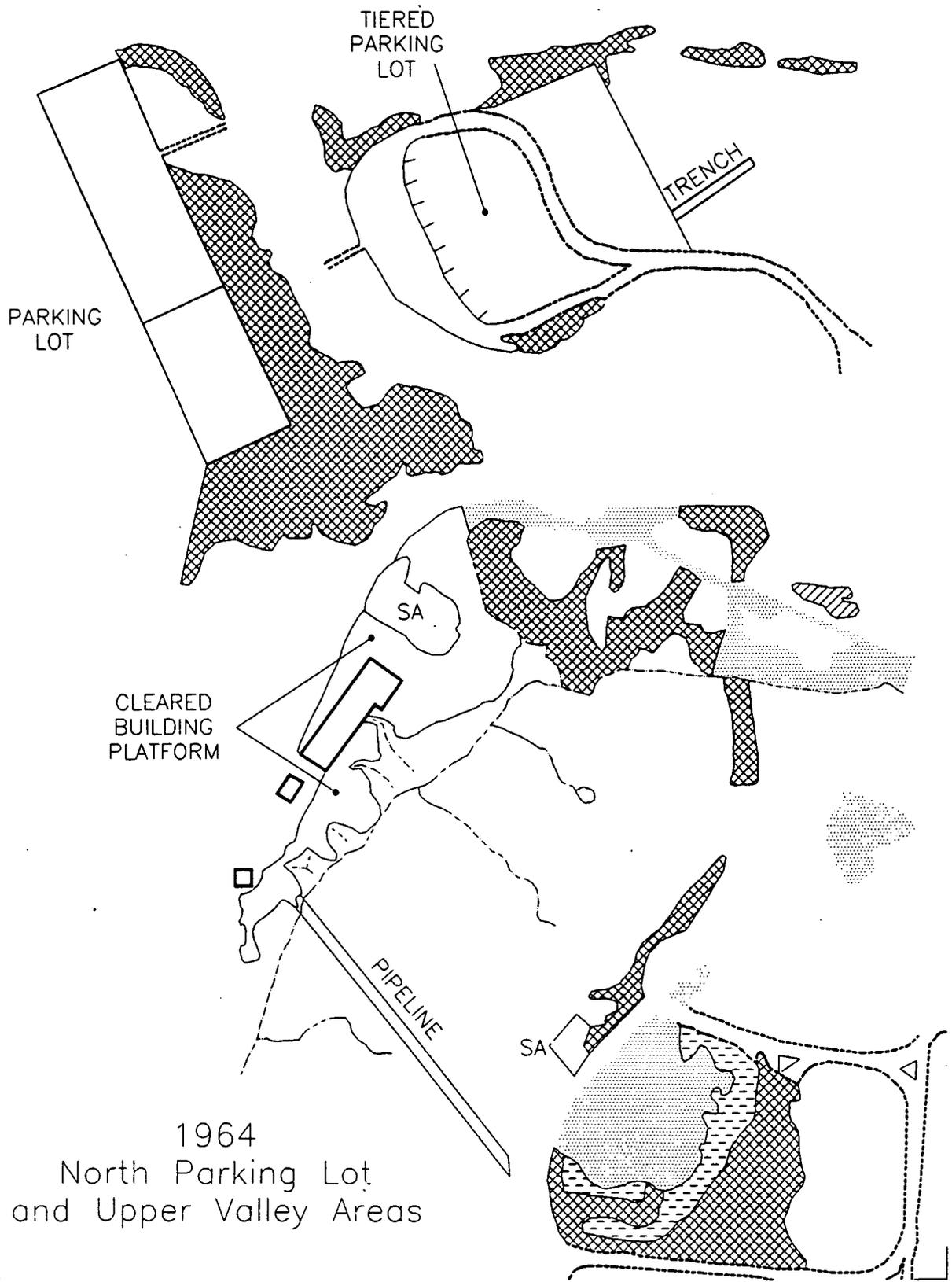
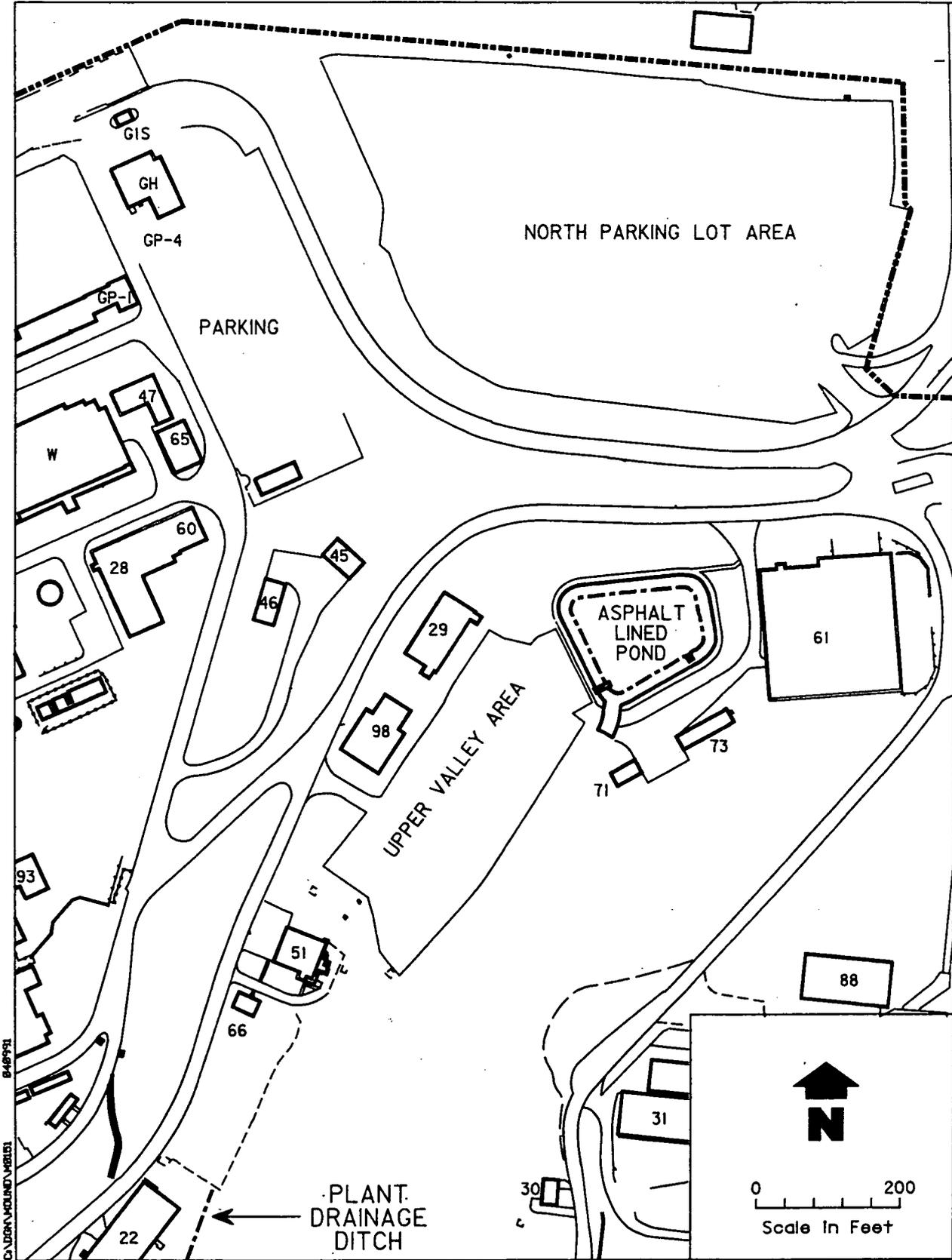


Figure 4.3. Interpretive map of Northern Study Area - 1964.



948991  
CALIFORNIA POLICE (MIRI)

NORTH PARKING LOT AREA

PARKING

UPPER VALLEY AREA

ASPHALT LINED POND

PLANT DRAINAGE DITCH



0 200  
Scale In Feet

1968  
 North Parking Lot  
 and Upper Valley Areas

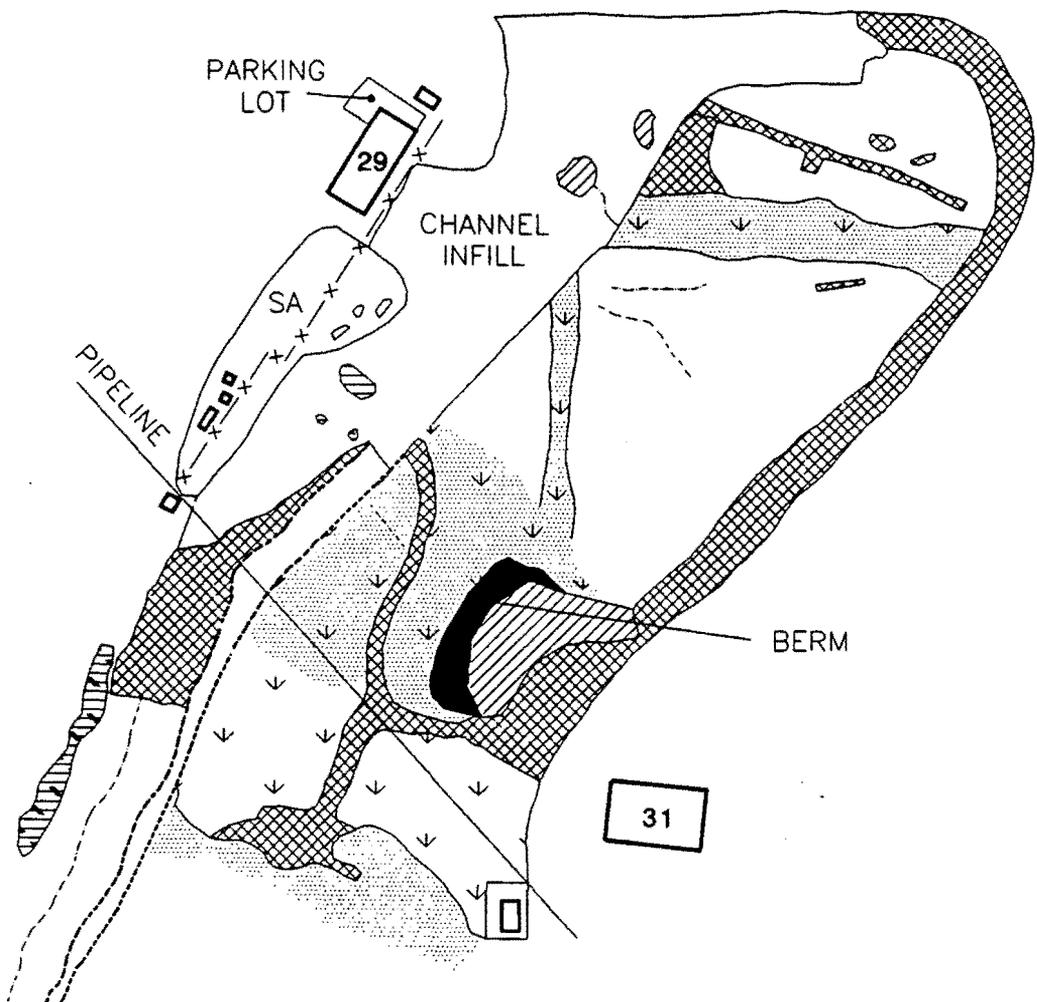
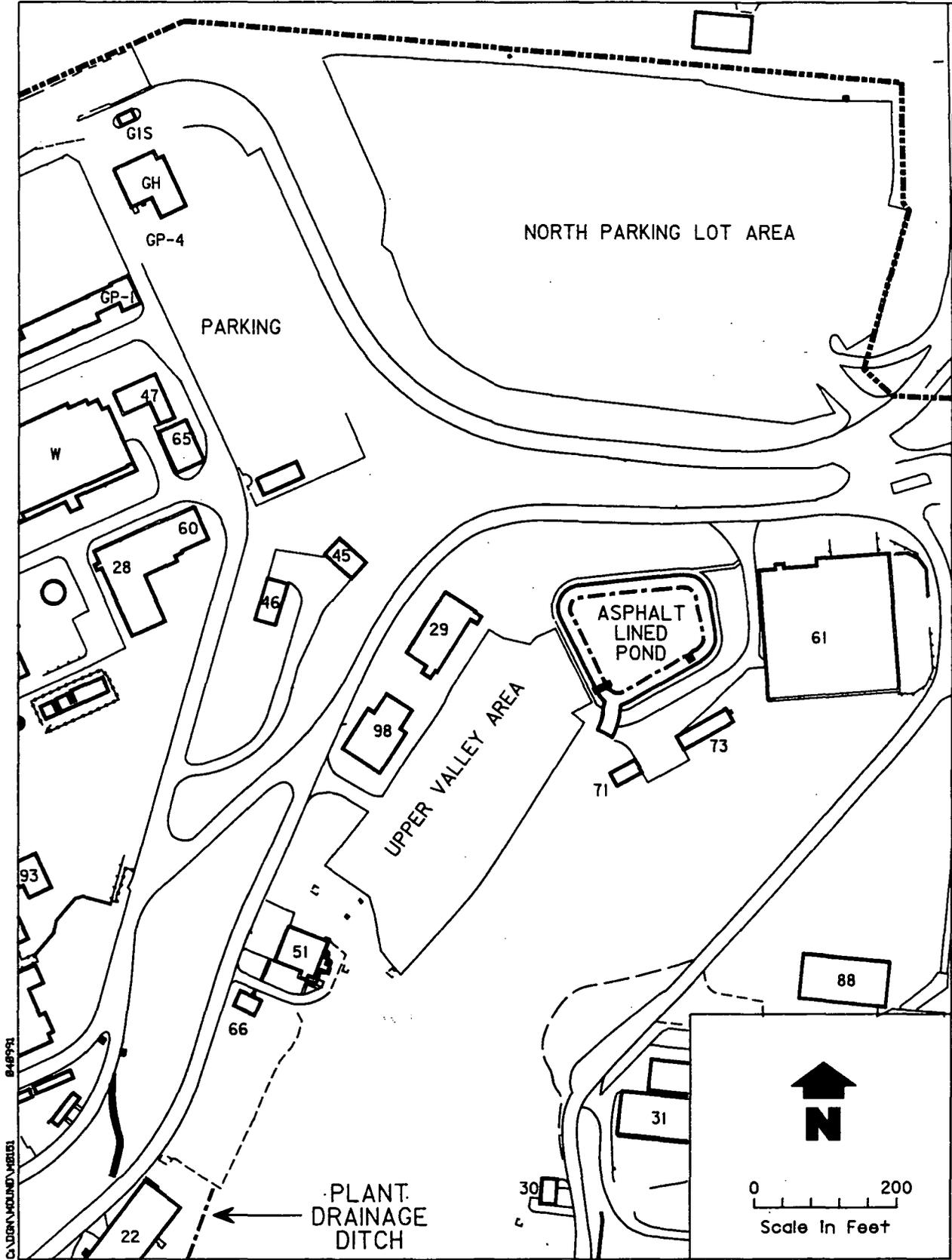


Figure 4.4. Interpretive map of Northern Study Area - 1968.



## 4.2. UPPER VALLEY AREA

The upper valley area is located in the northeastern portion of the Mound Plant site, south of the north parking lot area. Currently, the area of interest is largely comprised of a series of paved parking lots and an asphalt-lined pond built on fill materials. The integrity of the original drainage channel is maintained in 1959 (Figure 4.2). West- and southeast-trending tributaries meet to form the main southwest-flowing channel. Small disturbed areas lie to the north of the eastern tributary, and buildings are situated on a cleared platform to the west. Disturbed soils cut by drainages flowing east from the platform may indicate material dumping along this edge of the platform. There is clear evidence of a large number of drums stored on the upland in the southeast portion of the base map area. Lines of drums are also evident in a smaller area to the northeast of the large drum stack. In 1959, small dirt roads bordered all sides of the large drum storage area. Several undefined linearities, possibly abandoned roads, lie to the north.

The building platform extends to the southeast in the 1964 photograph with resultant in-filling to the drainage channel (Figure 4.3). However, most of the drainage remains intact. An extensive, irregular pattern of surface disturbance, including cleared and disturbed areas, occurs to the north of the drainage. A smaller linear pattern of disturbed soil also projects from here to the south. The surface of the large drum storage area visible in 1959 is completely cleared in the 1964 photograph. The cleared surface of the smaller drum storage area in the 1959 photograph is still evident in 1964. The road configuration around the location of the 1959 drum storage area has been slightly altered with the easternmost road extended to near the limits of the plant site. A northwest-southeast oriented pipeline crosses the southern end of the entire area and remains through 1981.

By 1968, channel in-filling has proceeded to the extent that an extensive building platform has been constructed to the west of the old drainage course, partially obscuring the drainage (Figure 4.4). The buildings on the 1964 platform have been replaced, with Building 29 situated farther to the north in an area identified as a storage area in 1964. Storage of materials is evident south of this building along the platform and some piles of material are present on the channel in-fill platform. An area of disturbed soil lies north of the remaining intact drainage, which is bordered on the west by an area of debris. The eastern portion of the North Valley Area is crossed by linear patterns of disturbed or cleared and re-vegetated areas. The site of the smaller drum storage area in 1959 has now been completely graded, resulting in a large pile of dirt lying just north of the road. Downslope from this feature and bordering it on the northeast is a C-shaped earthen berm the width of the dirt pile. Across the road, Building 31 has been constructed on a site that had been used for drum storage in 1959.

The 1973 photograph reveals continued channel in-filling to the south with the course of the original drainage completely obscured above Building 22 (Figure 4.5). Building 51 is constructed south of the

1973  
North Parking Lot  
and Upper Valley Areas

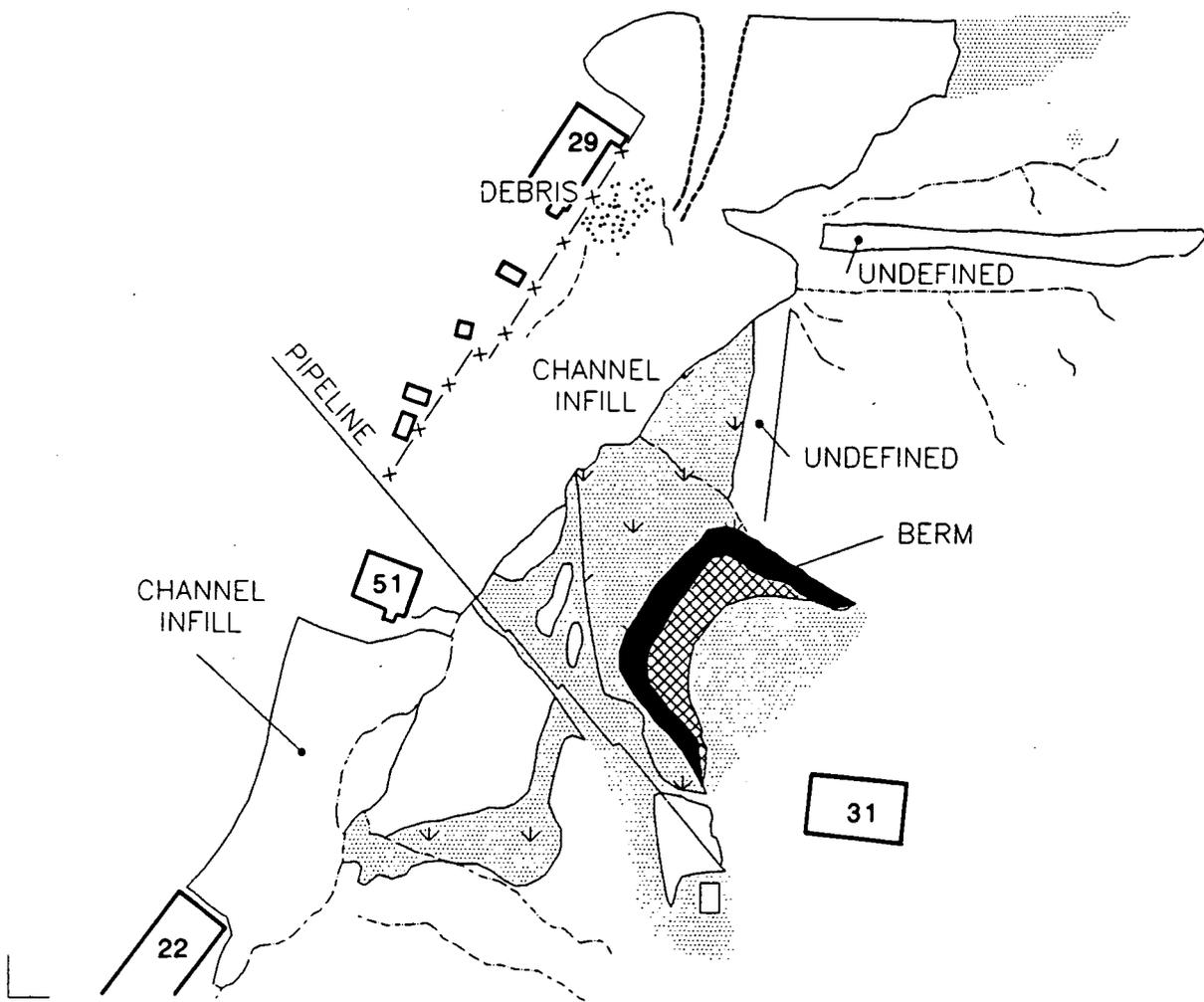
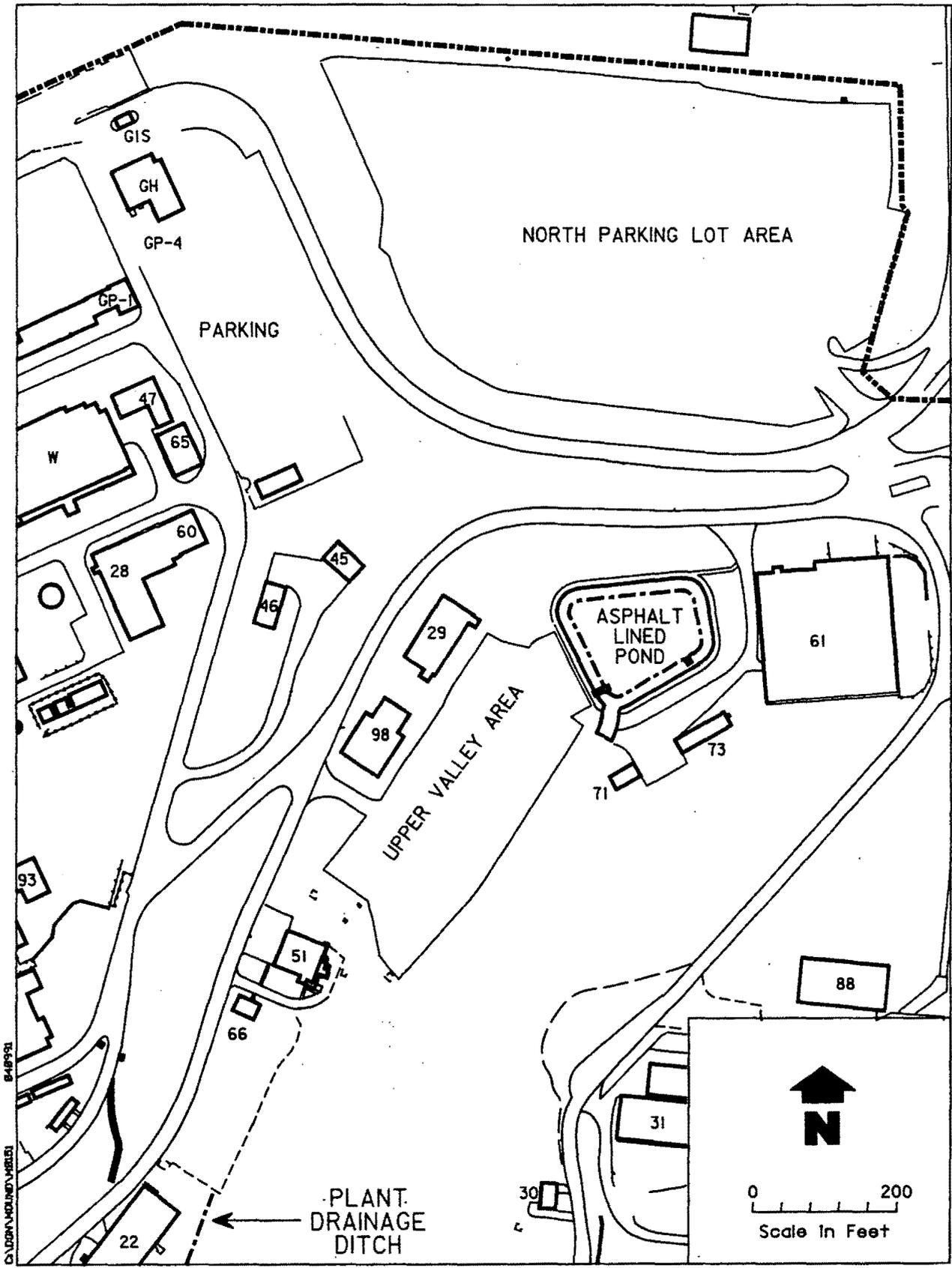


Figure 4.5. Interpretive map of Northern Study Area - 1973.



pipeline. Debris is evident on the channel in-fill surface behind the buildings and a new road enters the area on the north where none existed in 1968. The large dirt pile northeast of Building 31 in 1968 has been leveled resulting in a platform and disturbed slope which continue to be bordered by a large earthen berm. Re-vegetated and cleared linearities remain evident to the east of the old drainage course, and shallow drainages flow to the northwest and west down this slope.

Large portions of the platform formed by channel in-fill are re-vegetated by 1975 (Figure 4.6), but the central valley area behind the buildings still appears cleared. The drainage channel appears to have reestablished itself north of Building 22 and a berm now exists north of Building 51 that forms the southern edge of a drainage impoundment. In-filling continues near Building 22. A large cleared surface now exists between Buildings 51 and 22. Two large cleared areas are situated at the top and bottom of the eastern side of the North Valley Area. Numerous small drainages flow to the north and west down this slope. A new road "turnout" is in use along the main road at the northern end of the area. Two undefined channels are situated downslope from the berm on the east.

Construction of the asphalt-lined pond and surrounding utilities trenches is evident in 1979 (Figure 4.7). The installation of a sanitary sewerline is evident as four small pits are situated in the excavation area along with a larger U-shaped pit in the southwestern corner of this area. One linear and one L-shaped trench are also evident. Bordering the pits and trenches are ten piles of excavated fill and one linear debris pile along the southern edge of the road leading to Building 29. Lines of pipe, or the impressions left behind by these objects on the ground, occur on the eastern edge of the excavation area and on the northern edge of the bermed platform to the south. A large, semi-circular, excavated depression is evident that appears to be the origins of the asphalt-lined pond. Smaller disturbed areas lie to the east and one undefined linearity borders the area of main excavation activity on the southeast. Small west-flowing drainages cut the slope to the southeast of the excavation area. Much of the remaining in-fill platform has been heavily re-vegetated, although some cleared areas can be seen on the central and southern portions of the platform. The drainage impoundment and berm are still evident north of Building 51. Between Buildings 51 and 22, the in-fill platform is disturbed with a trench and associated dirt pile at its northern end. The re-established drainage cuts through this disturbed area and flows to the southwest. Several areas that have been cleared of heavy vegetation occur to the south and southeast of Building 51.

By 1981, the asphalt-lined pond has been constructed within the former excavation area and a new building constructed to the east (Figure 4.8). Building 61 was subsequently enlarged to its present configuration in the mid-1980s. A disturbed area occurs to the southwest of the pond and is bisected by a narrow, undefined linear feature. Two other undefined linear features lie to the east, as does a larger, east-west oriented, linear-shaped feature. A formal parking lot is established south of Building 29 at the previous site of a cleared building platform in 1979. In all years after 1959, small structures were present in

1975  
North Parking Lot  
and Upper Valley Areas

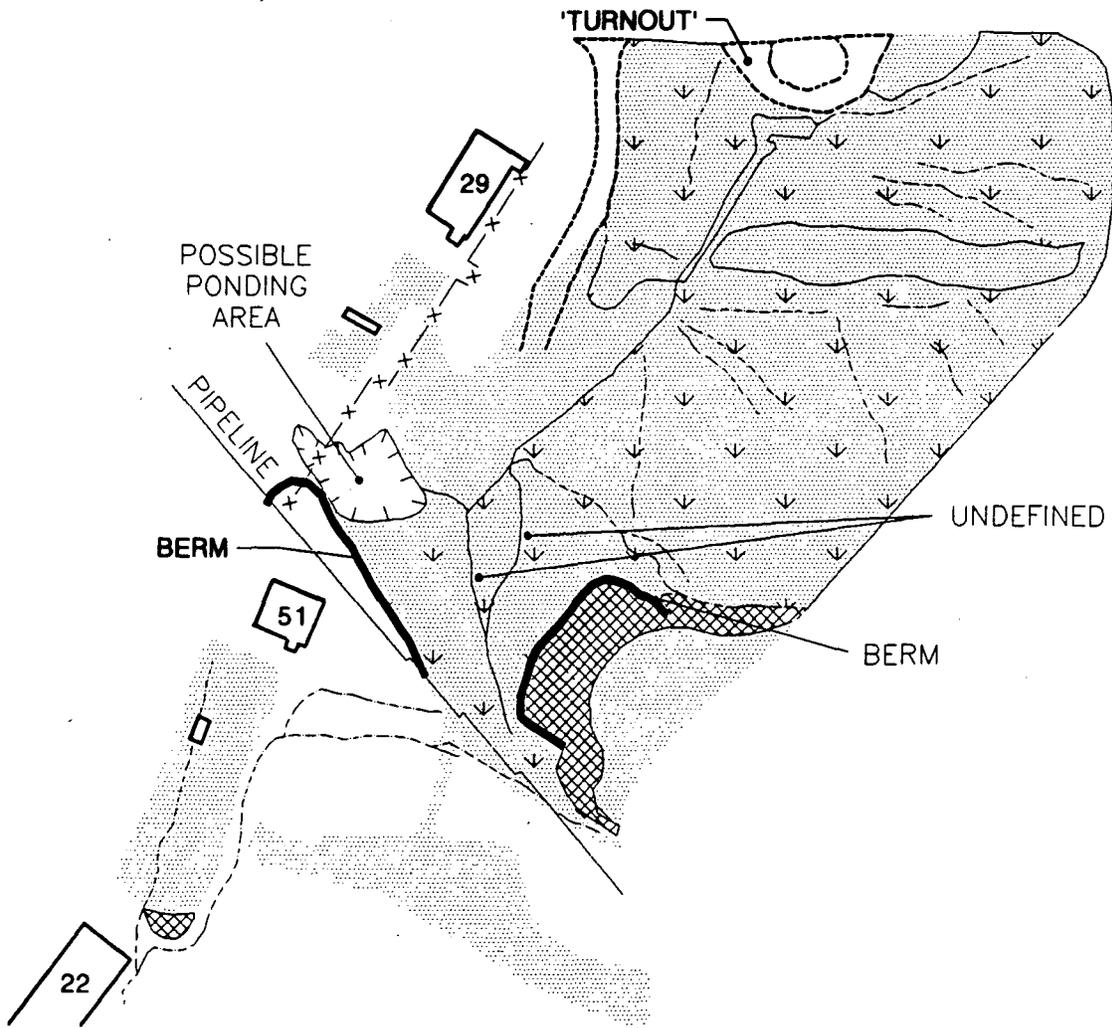
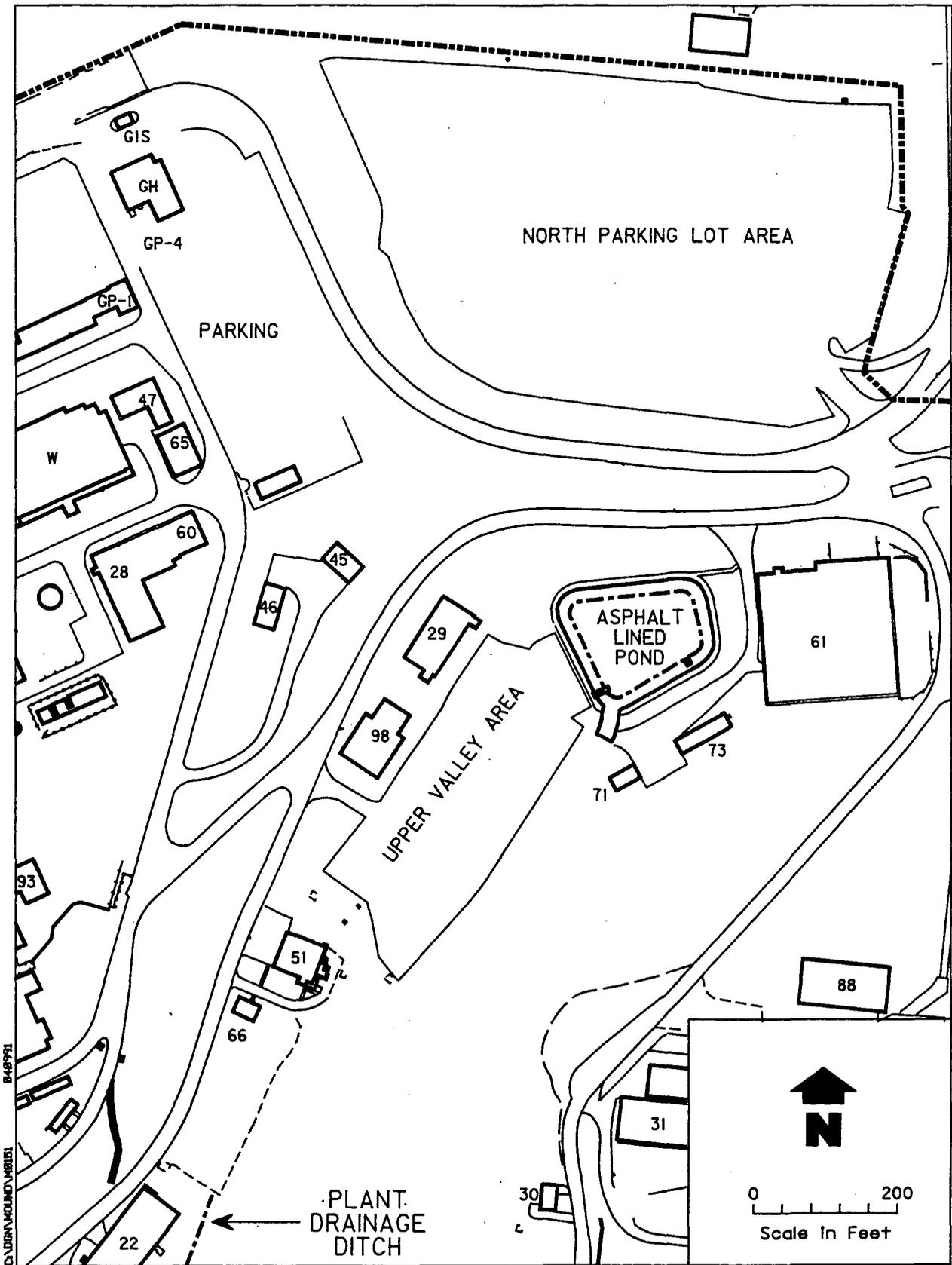


Figure 4.6. Interpretive map of Northern Study Area - 1975.



1979  
 North Parking Lot  
 and Upper Valley Areas

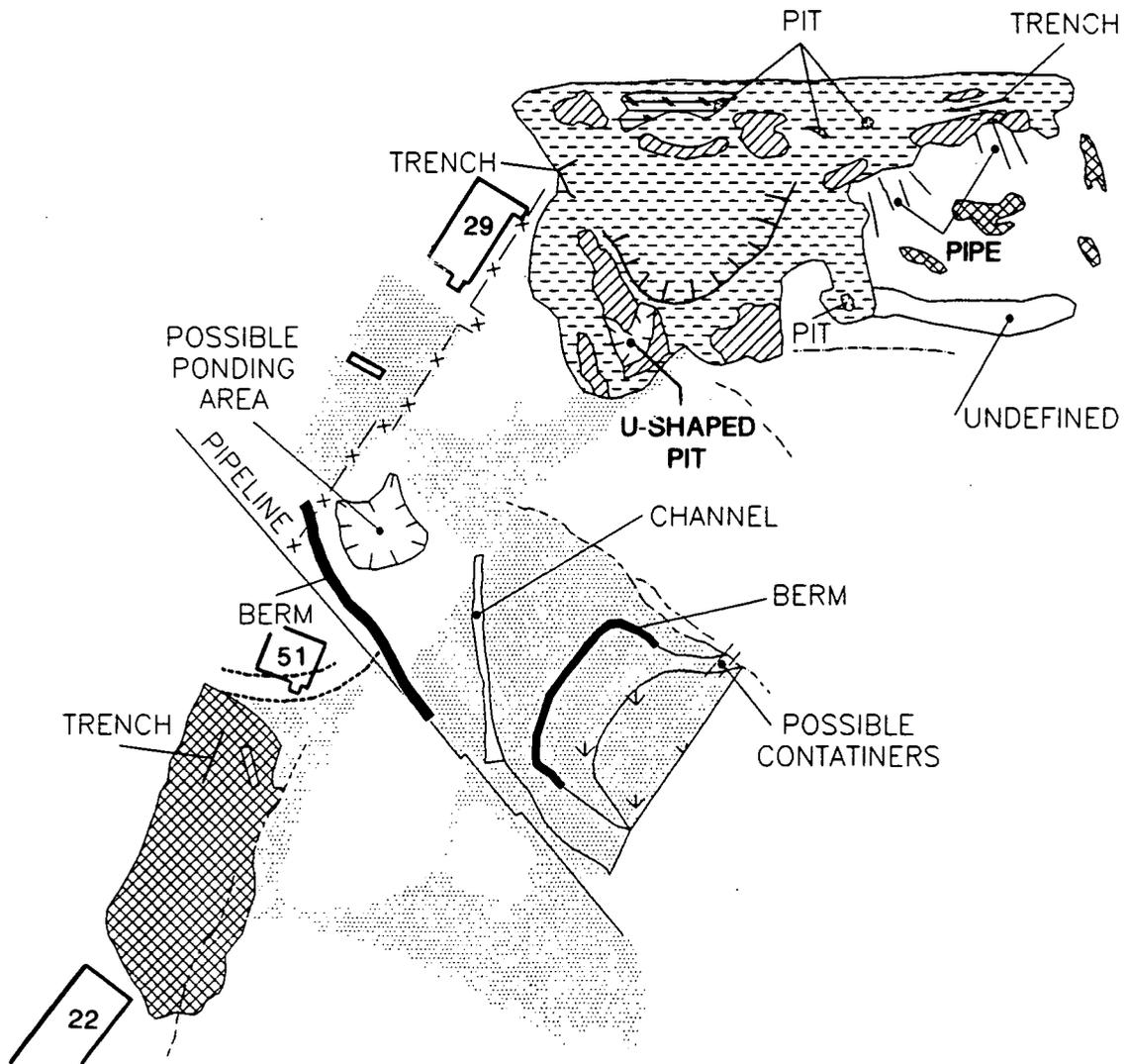
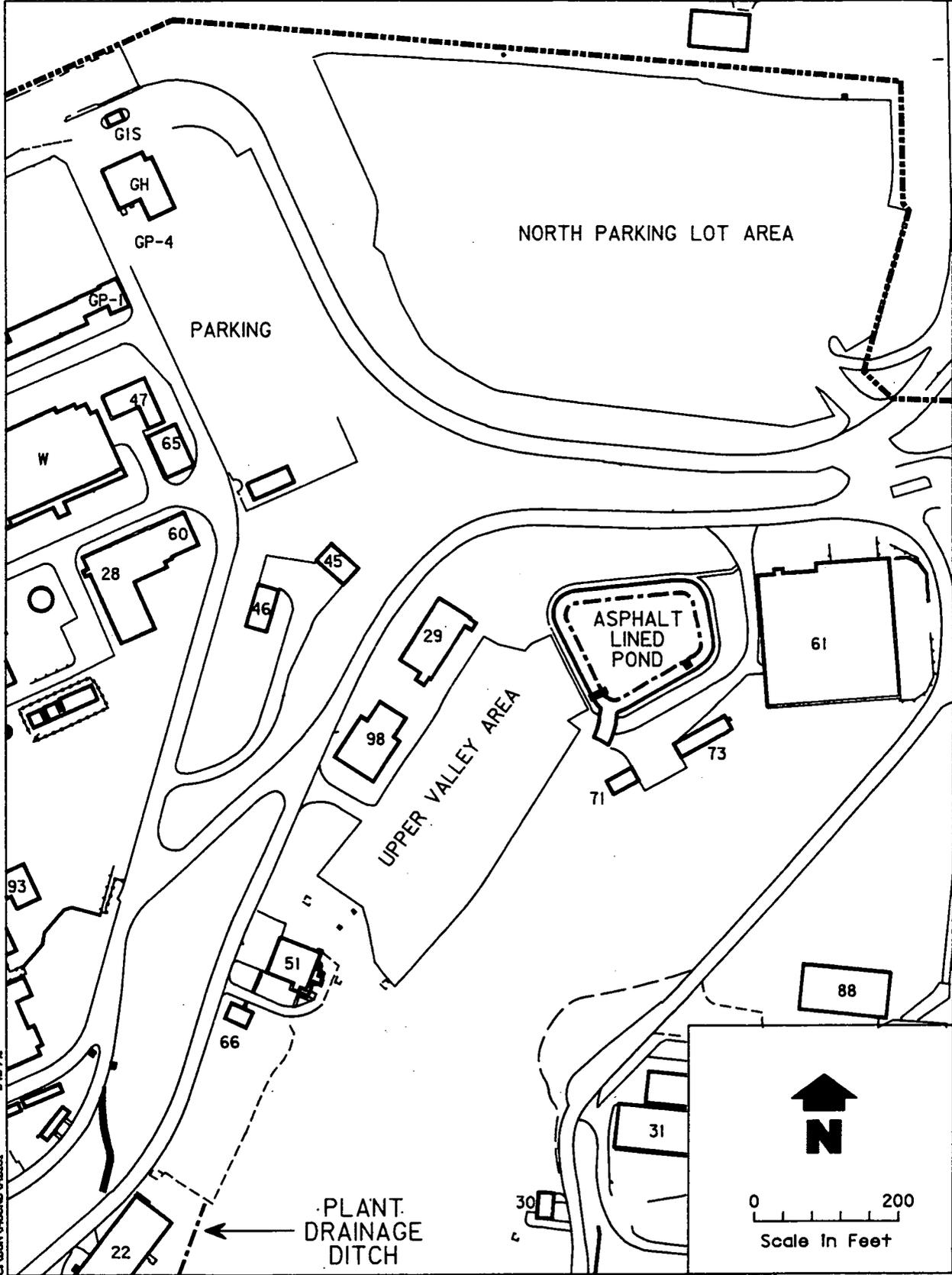


Figure 4.7. Interpretive map of Northern Study Area - 1979.



NORTH PARKING LOT AREA

PARKING

UPPER VALLEY AREA

ASPHALT LINED POND

PLANT DRAINAGE DITCH



0 200  
Scale In Feet

CALIFORNIA VOLUNTARY WATER

1981  
North Parking Lot  
and Upper Valley Areas

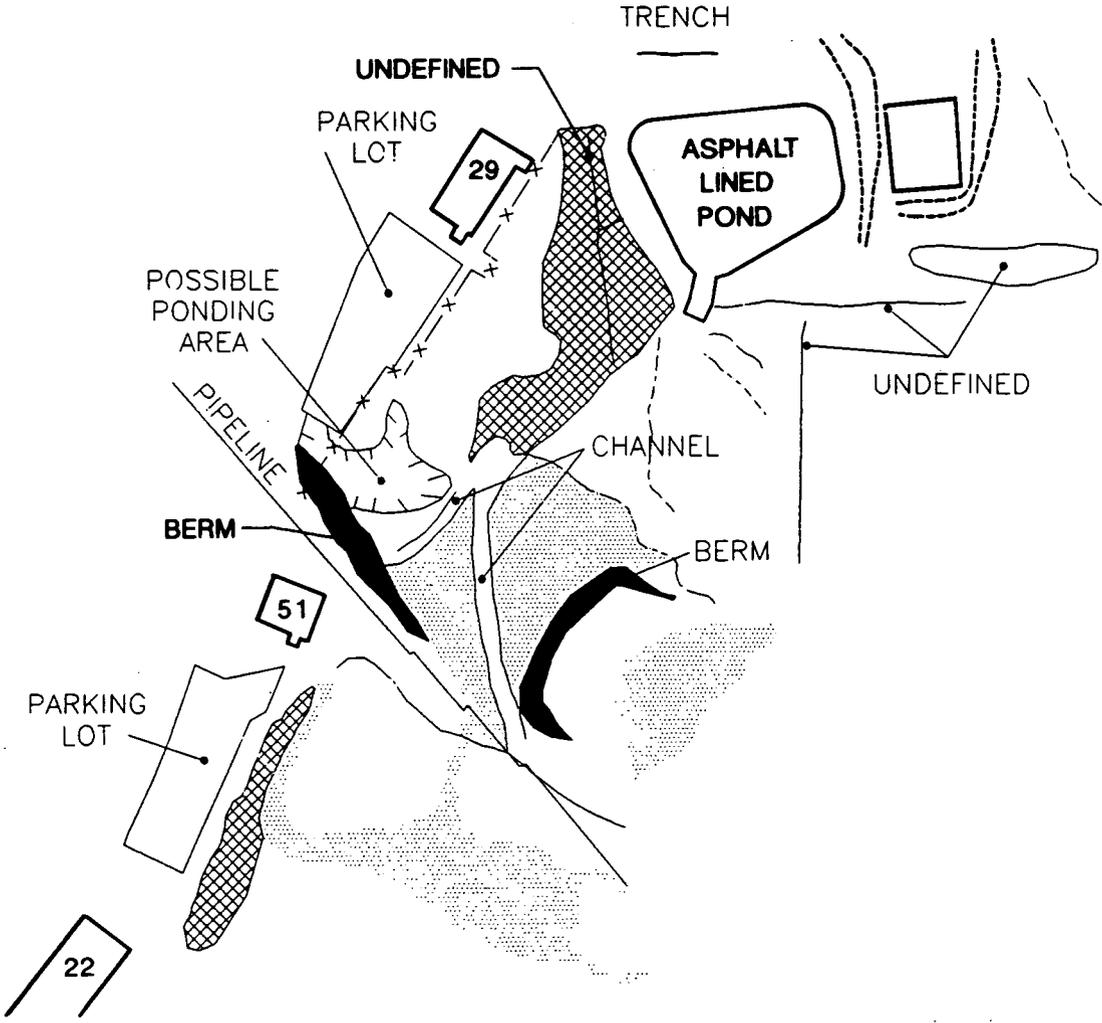
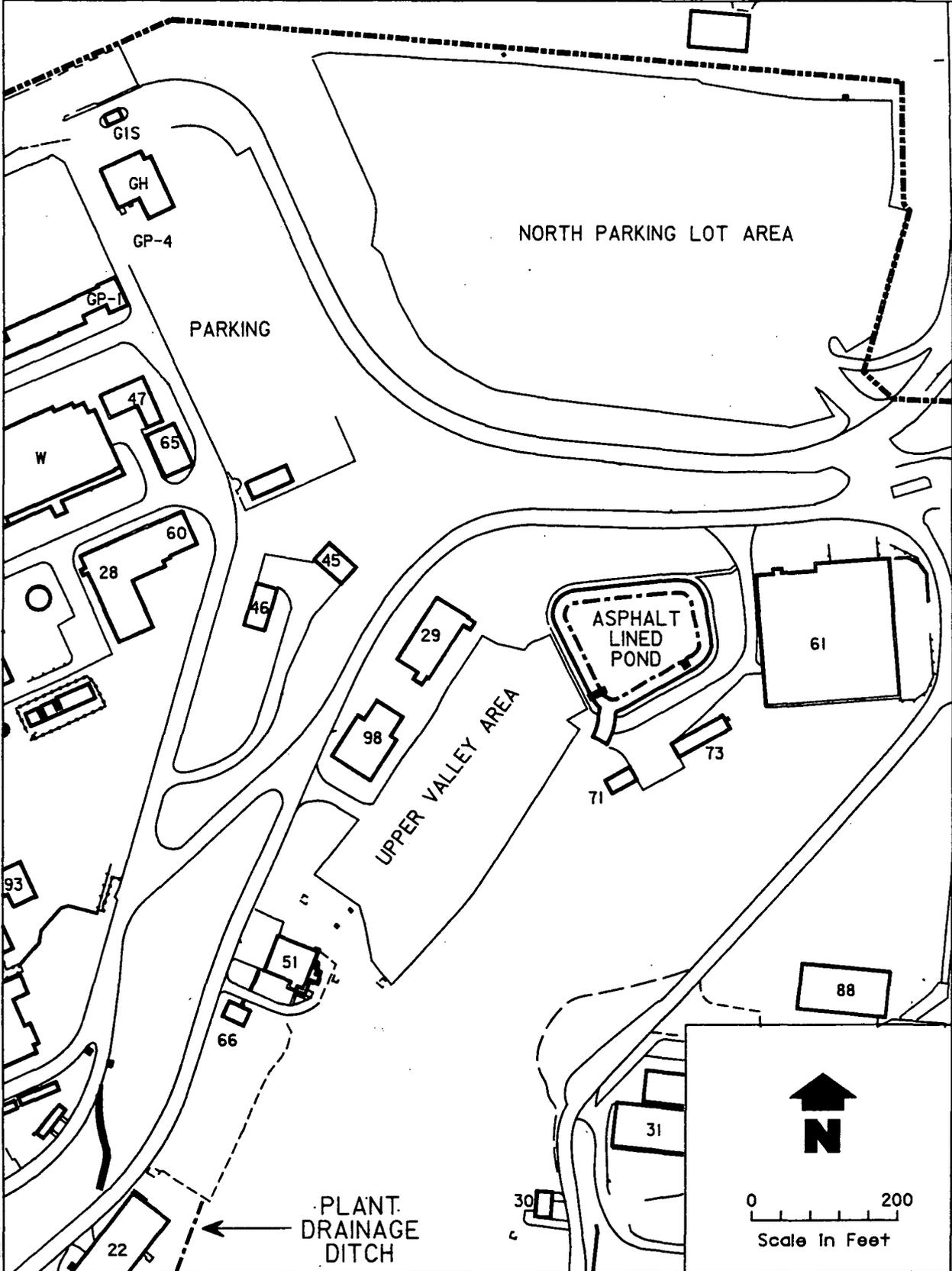


Figure 4.8. Interpretive map of Northern Study Area - 1981.



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CALDWAY/BLUND/MBLEI

this area, and the area was used for materials storage in 1968. Another parking lot is established between Buildings 51 and 22. The berm and impoundment area north of Building 51 are still in place, although the shape of the impoundment area has been somewhat altered. Cleared areas and undefined linear channels occur to the southeast.

### **4.3. LANDFILL AREA**

The landfill area is located in the southern half of the Southern Study Area in the west-central portion of Mount Plant (Figure 2.1). The landfill area is currently comprised of the overflow pond and the site sanitary landfill that overlies the historic landfill. Landfill activity (Figure 4.9) in the 1959 photograph appears to include two parallel trenches. The easternmost trench appears as an obscured linear feature with a small cleared area on its western side. With the exception of this cleared area, there is no evidence of recent surface disturbance. The western trench appears as a sharply defined, slightly irregular linear feature. An irregularly-shaped excavated area occurs at the northern end of this trench, and it is bordered on the west by a disturbed slope that appears to be the landfill access road. At the top of the slope is the landfill entrance and a cleared surface containing a single container or small structure. Several piles and a pit occur within the disturbed area and smoke appears to be rising. Drainage into the 1959 landfill is from the east. At the southwestern corner of the Landfill Area between the road and the drainage ravine is another cleared area bordering the road. To the north of this cleared area and to the south of the drainage, in what may be a natural trough, the slope has been disturbed and appears to contain debris. A large part of the hill top in the northeastern portion of the landfill area has been cleared and contains an elongate dirt pile and smaller associated pile. A small trench outline with an associated disturbed area lies to the south. Other smaller disturbed areas lie along the southern border of the hill and to the north along the road. A fence line and S-shaped road bed border the landfill area on the east. Excavated material from the construction of the firing range appears to border opposite sides of this road to the south.

In the 1964 photograph, although on a much smaller scale, a long clearing has been exposed immediately west and parallel to the 1959 fence line (Figure 4.10). A large cleared surface extends across the location of the excavated firing range materials and the 1959 S-shaped road. Cleared areas in the landfill are expanded, possibly by excavation. They border the western and southern edges of the landfill and extend over the current southwest junction of the road as shown on the base map (Figure 4.10). Container storage is evident along the western edge of the road, and debris or debris piles are present in cleared areas to the east of the roadway. Regrading of the entire 1959 landfill area is evident by 1964 as the eastern trench and western trench identified in the 1959 photograph are no longer evident. A large elongated pile of materials in the central portion of the landfill is surrounded by clearings. A broad east-west trench appears to the northeast of the cleared areas. Smoke is evident in the area.

1959  
Lower Valley and  
Landfill Areas

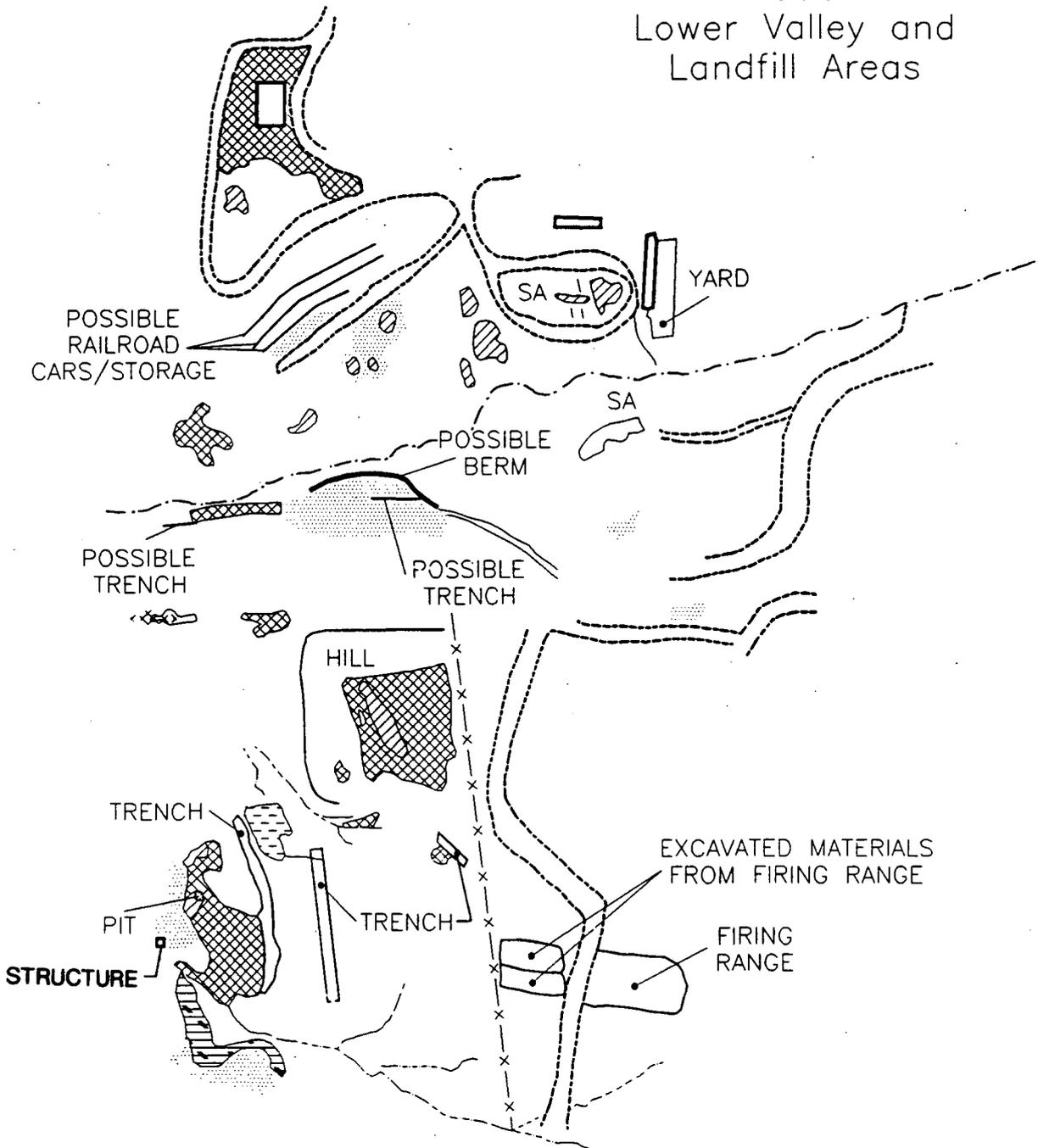
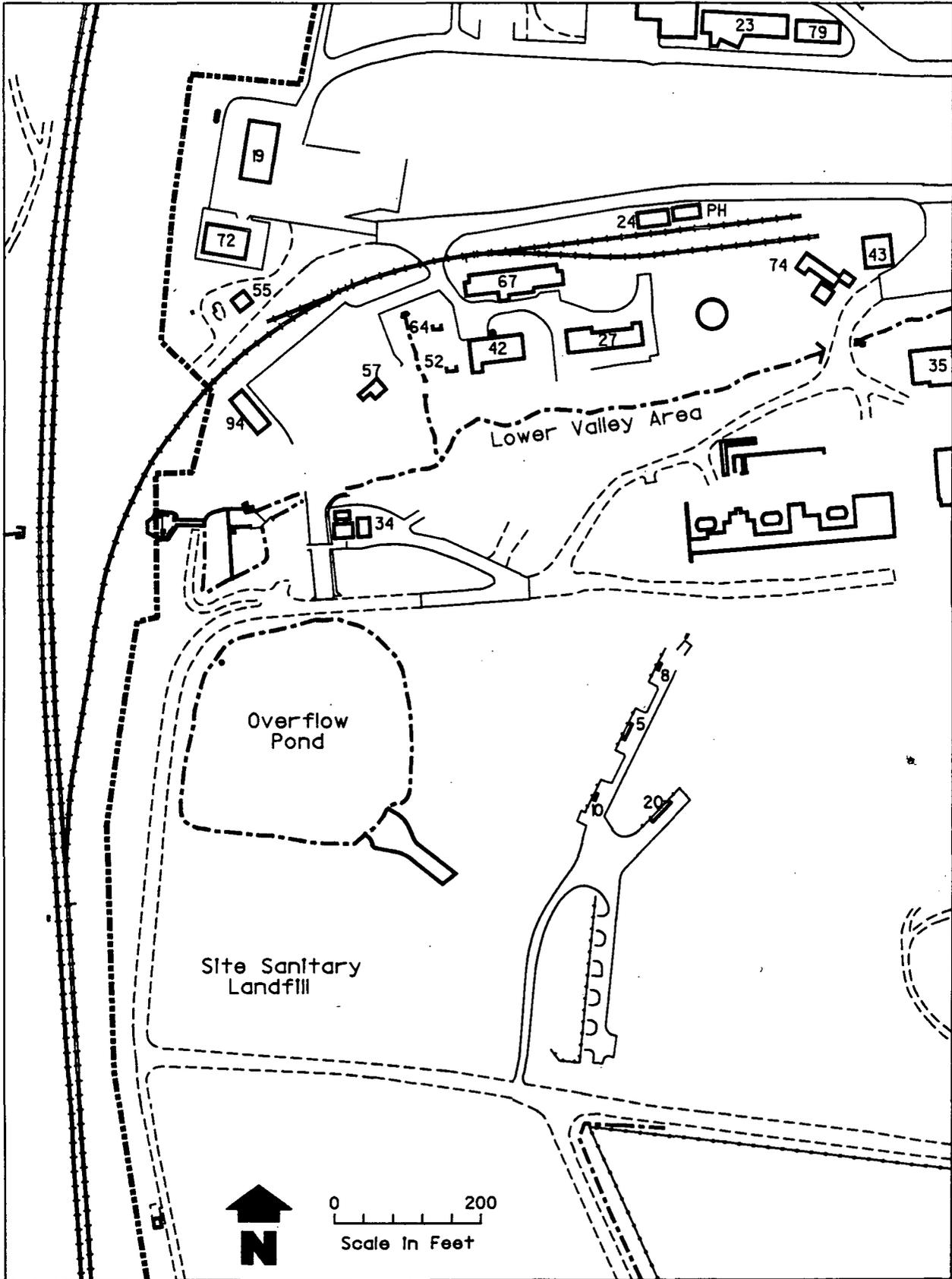


Figure 4.9. Interpretive map of Southern Study Area - 1959.

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1964  
Lower Valley and  
Landfill Areas

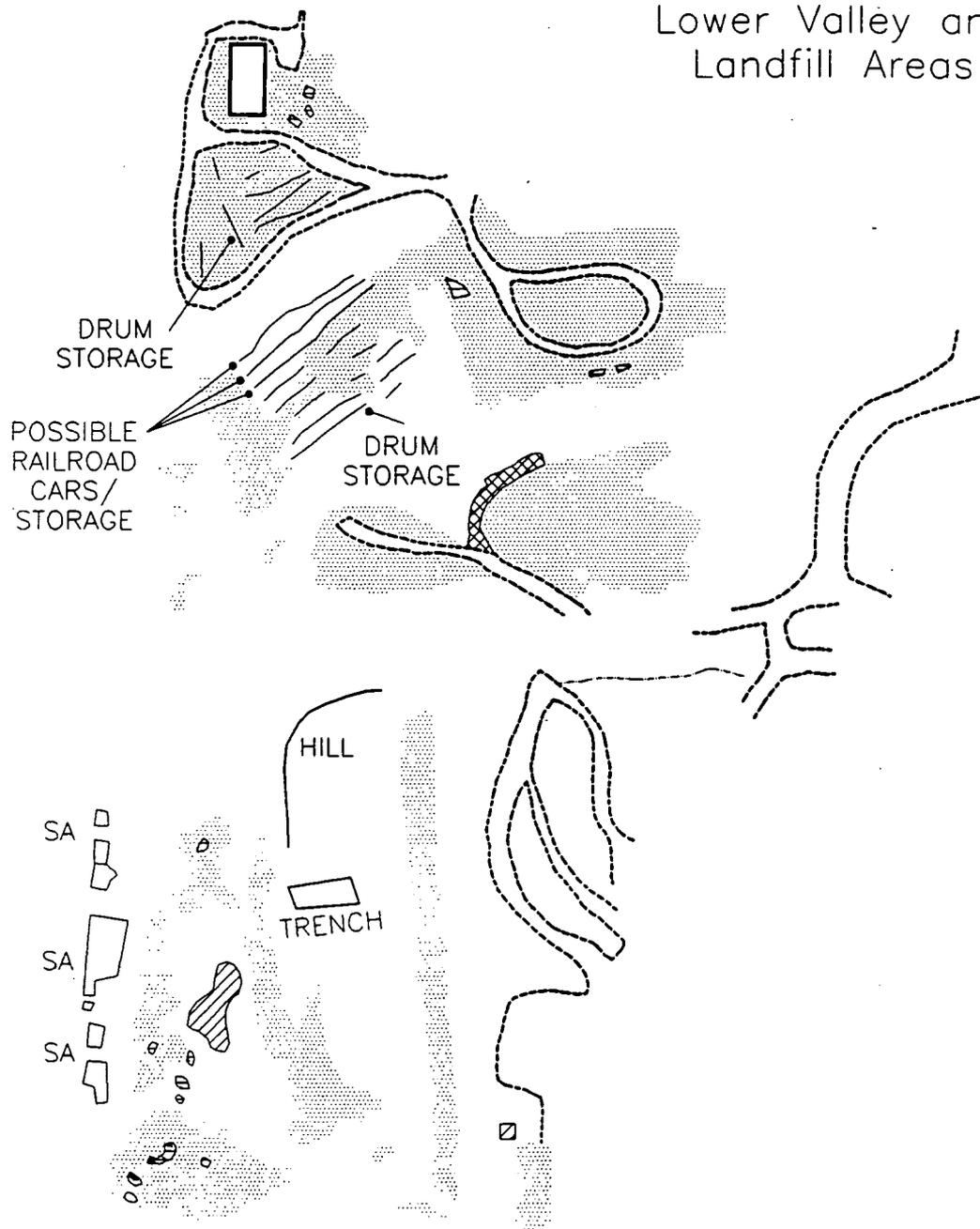
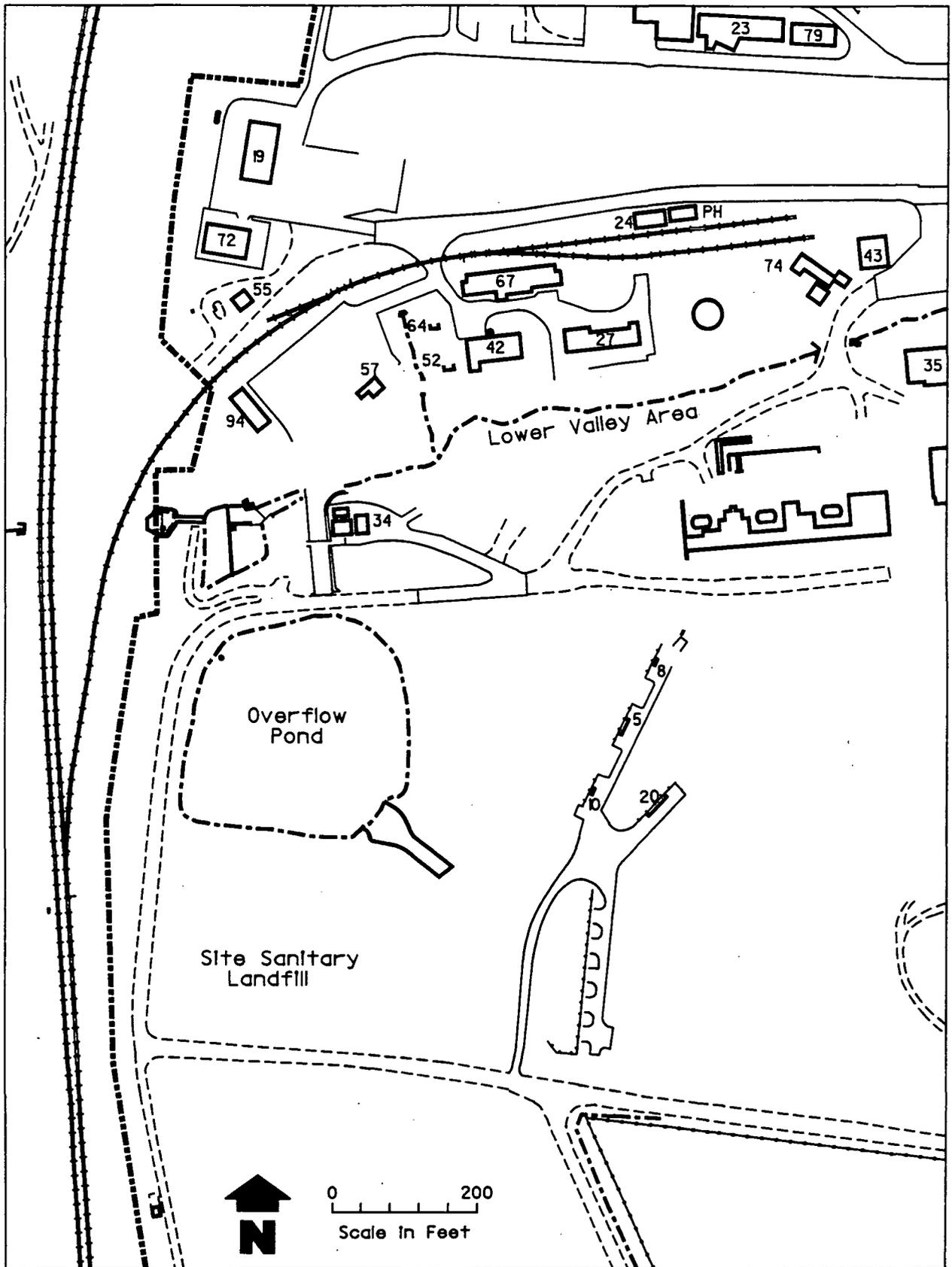


Figure 4.10. Interpretive map of Southern Study Area - 1964.

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Activities visible in the 1968 photograph are extensive and varied (Figure 4.11). A new access road extends north on the hillside to meet the main road. Bordering the western edge of the new access road in the northern part of the landfill is a disturbed hill top surface containing unidentified circular areas. This road provides access to a large cleared surface in the central portion of the landfill. Drainage is evident across this surface to the south, and a massive pile of fill is situated on the southern end of this cleared area. The cleared area is bordered on the west by another new road, which provides access from the south. This new road continues north around the northwestern rim of a pool of standing water and then trends to the northwest to meet the main roadway along the western edge of the landfill. West of this access road and pool is an extensive disturbed surface that includes debris piles and piles of fill. Storage areas containing debris and storage drums are located between the fence line and landfill area. Surface debris, possibly in the form of drums, is contained in the storage areas and in debris piles in the landfill. The old S-shaped road on the east appears to be re-established, and additional fill from the firing range can be seen near the southern end. Drainage from the east slopes continues to flow into the center of the landfill.

Formal trenching in the landfill is evident in the 1973 photograph (Figure 4.12). Two trenches bordered on the north and south by three berms have been excavated. Massive piles of fill occur along the eastern edge of the upper level of the landfill, and piles of fill border a southern ramp. The access road established from the north (evident in the 1968 photograph) continues to provide access to the upper level of the landfill on the east. Three roads, one of which appears to be a constructed ramp, provide access to the western lower level of the landfill. The pile of material present on the southern end of the cleared surface in the 1968 photograph remains on the southern edge of the landfill. Cleared surfaces extend north of the main excavation area onto the hill and slope. Debris piles are located on the hilltop. Storage continues between the road and the fence line in the form of drums or other containers. Drums or other containers are also visible in an area of debris between the two northernmost landfill access roads on the west. Southeast of the landfill cells is an undefined pattern of multiple small circles that may be other storage containers. An undefined linear feature intersects the hillslope above the landfill from the west.

By 1975, three landfill cells have been established (Figure 4.13), and the northernmost cell has been partial filled. Berms separate all three cells and an additional C-shaped berm is located at the western end of the lower (southernmost) cell. A roadway extends into this lower cell. Remnants of the southern access ramp are still visible. Piles of debris are located along the western edge of the landfill and standing drums are visible in storage areas along the access road to the lower cell. A large pile of fill with a pit excavated into its western end borders the access ramp on the north. Flooding on the western end of this ramp appears to have breached the southwestern junction of the main road. Storage of containers and materials is still

1968  
Lower Valley and  
Landfill Areas

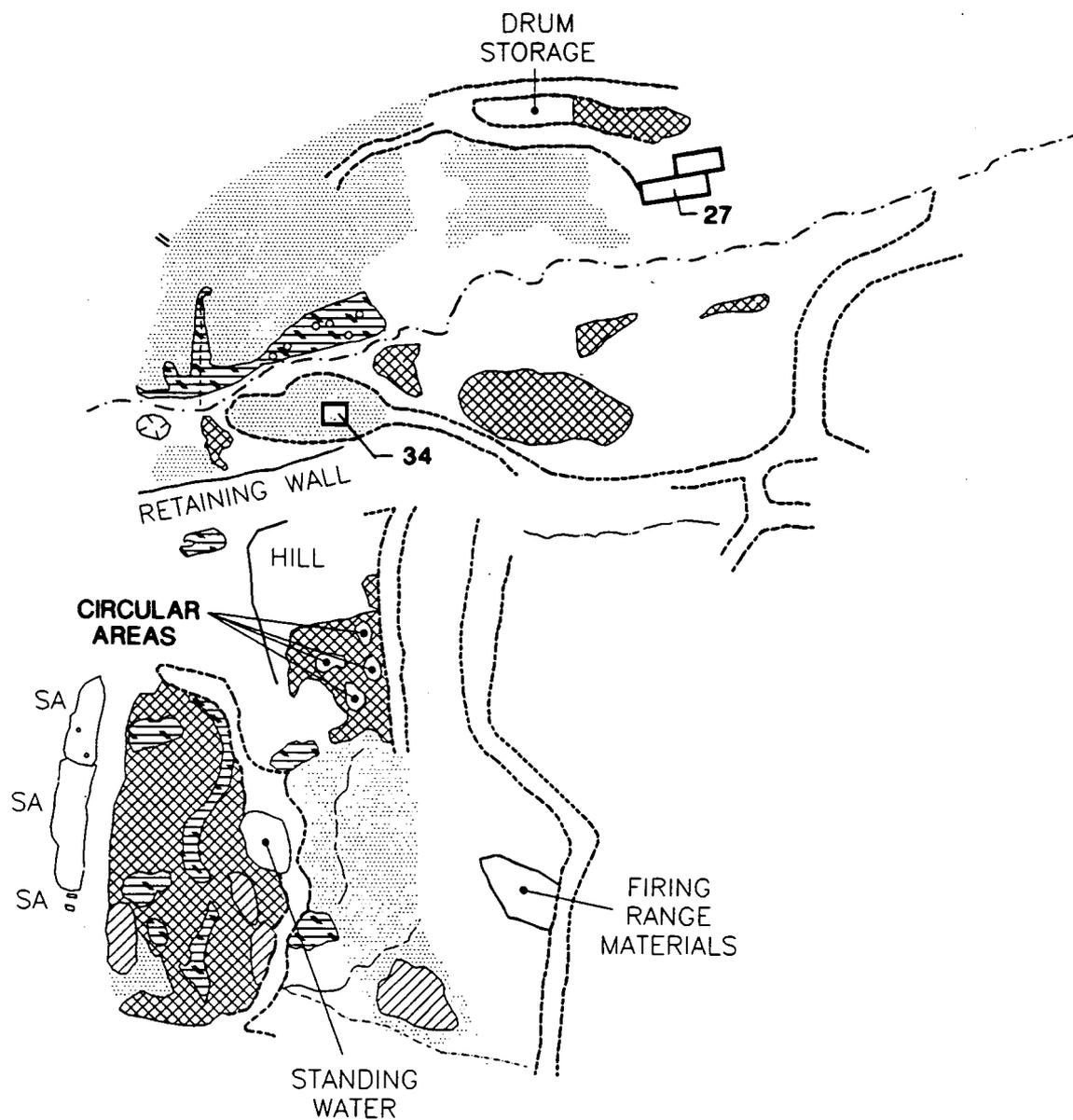
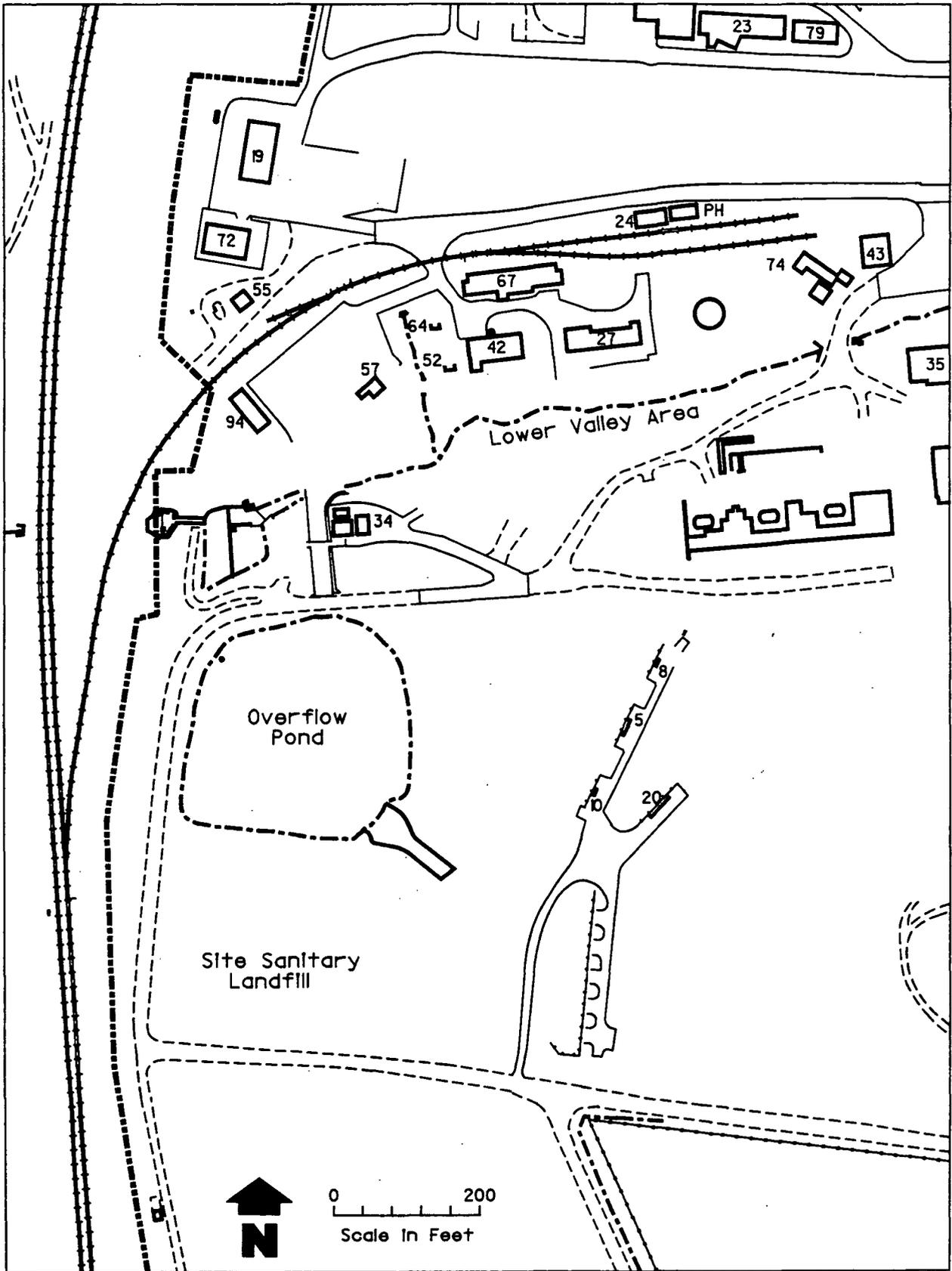


Figure 4.11. Interpretive map of Southern Study Area - 1968.



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1973  
Lower Valley and  
Landfill Areas

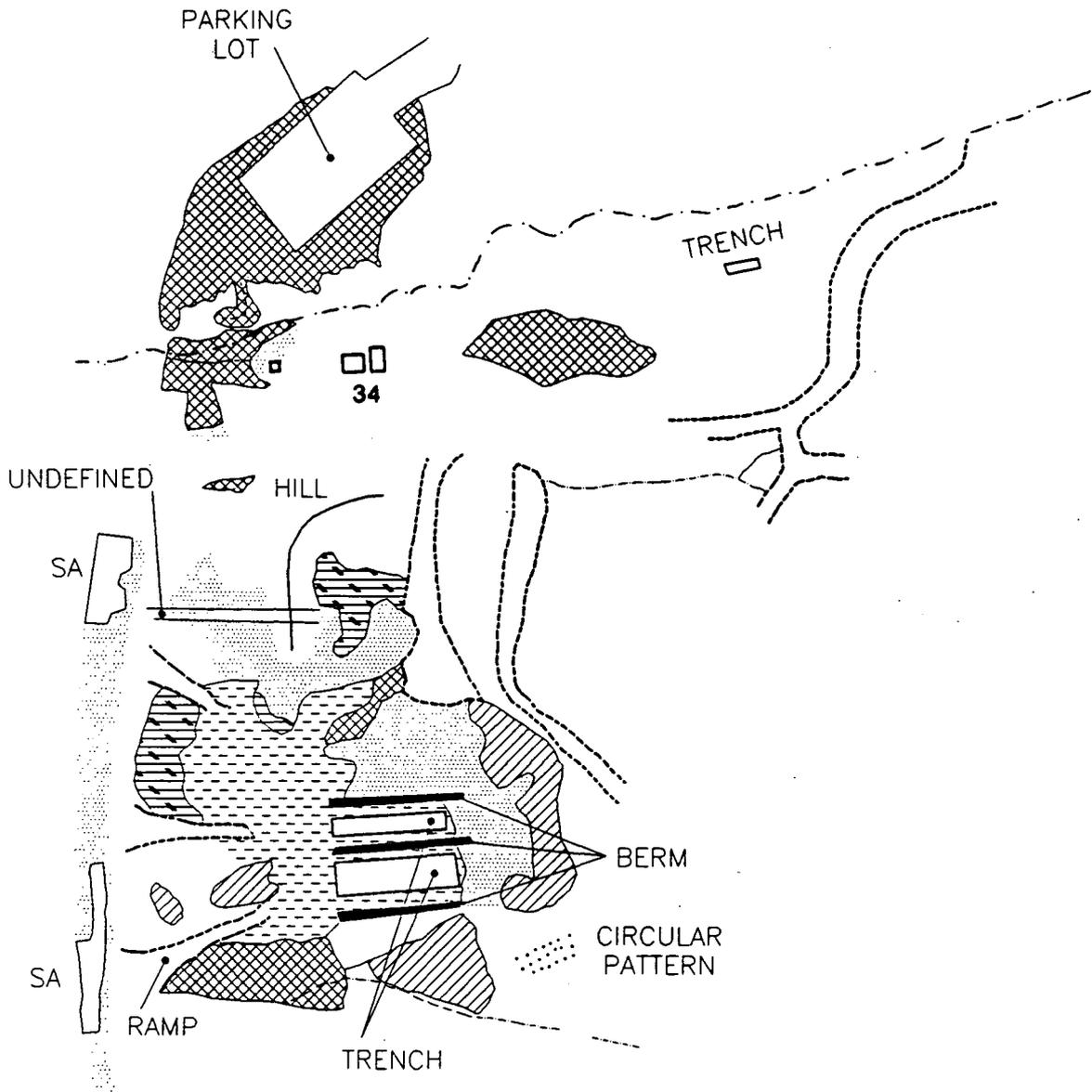
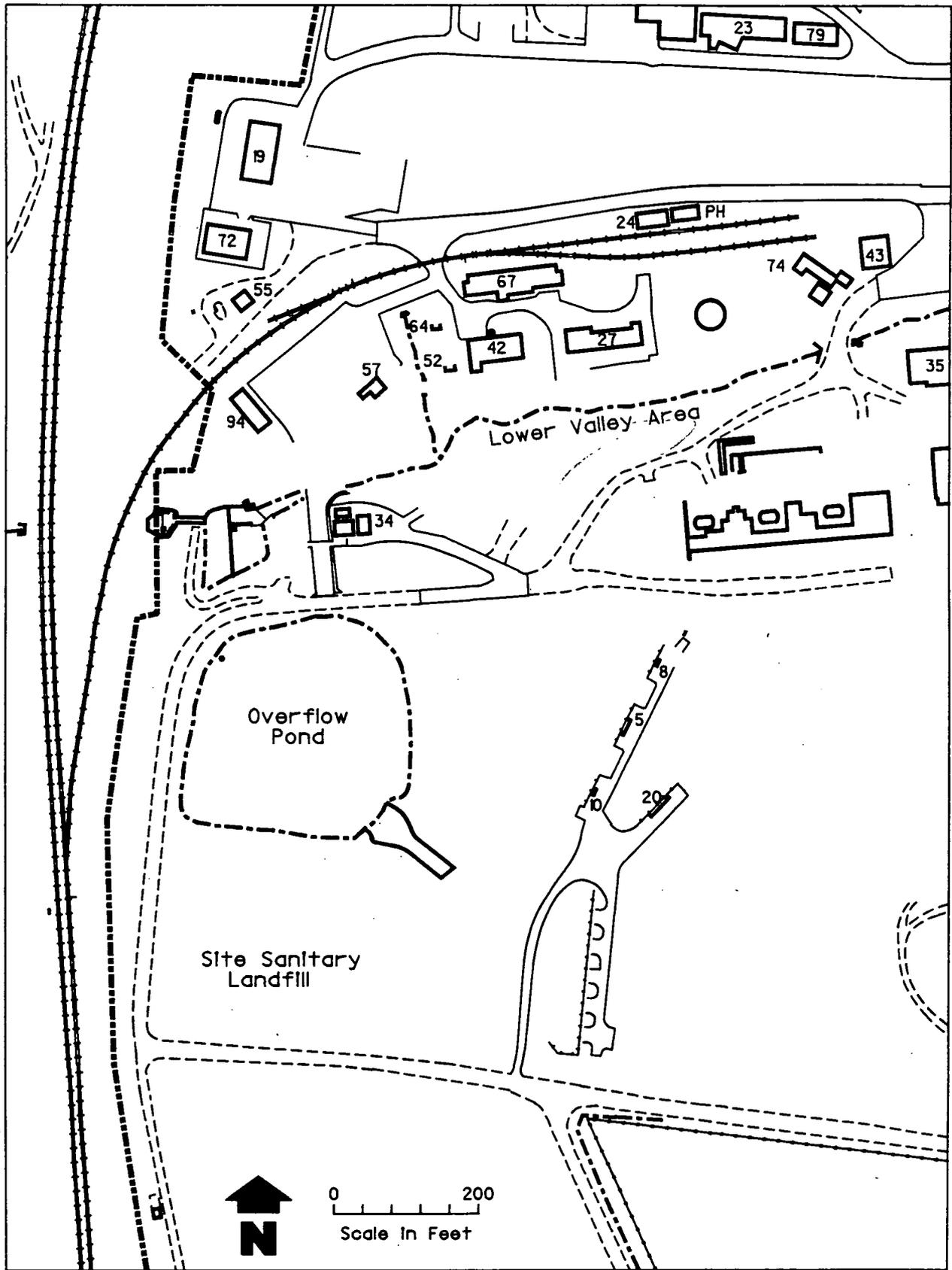


Figure 4.12. Interpretive map of Southern Study Area - 1973.

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1975  
Lower Valley and  
Landfill Areas

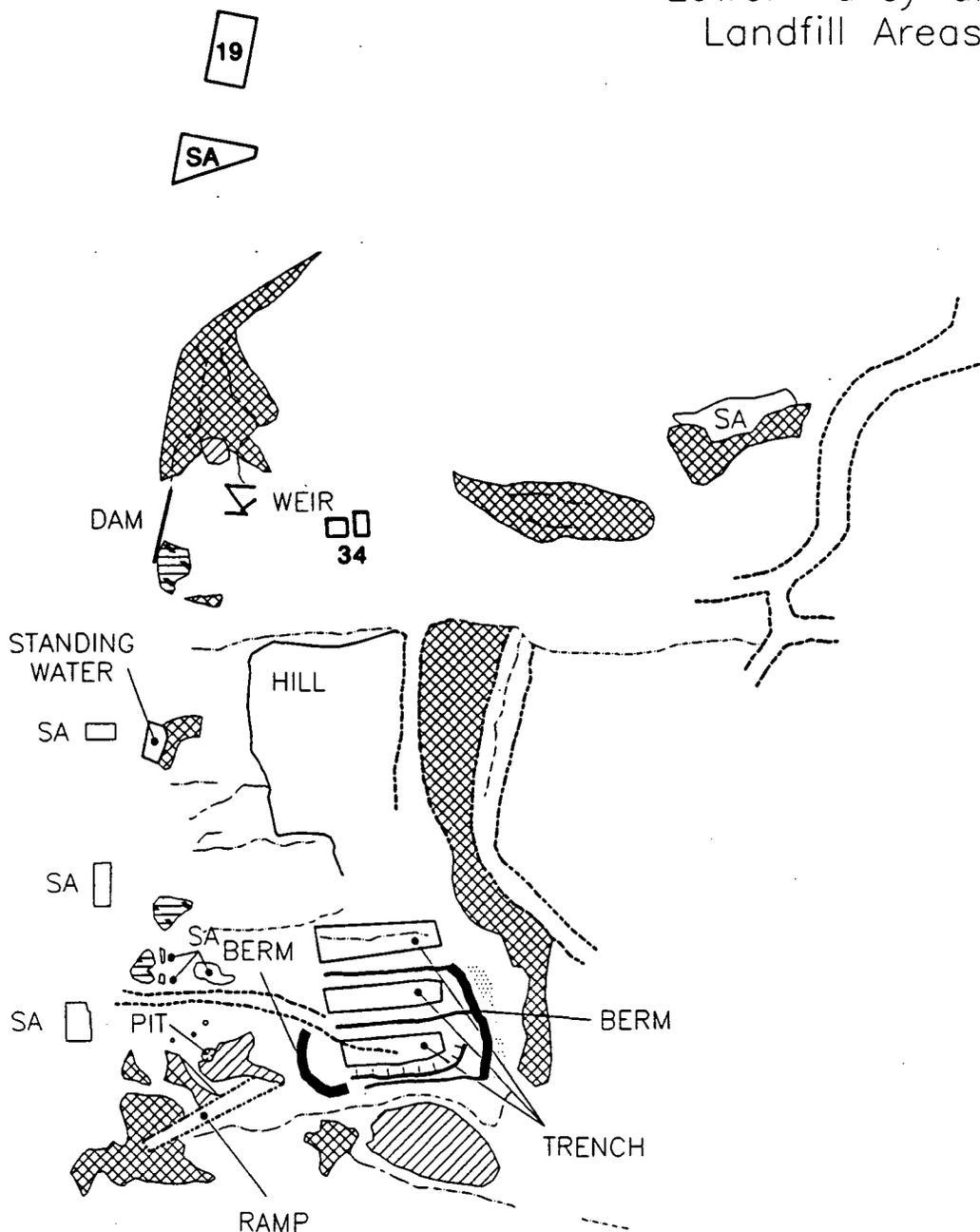
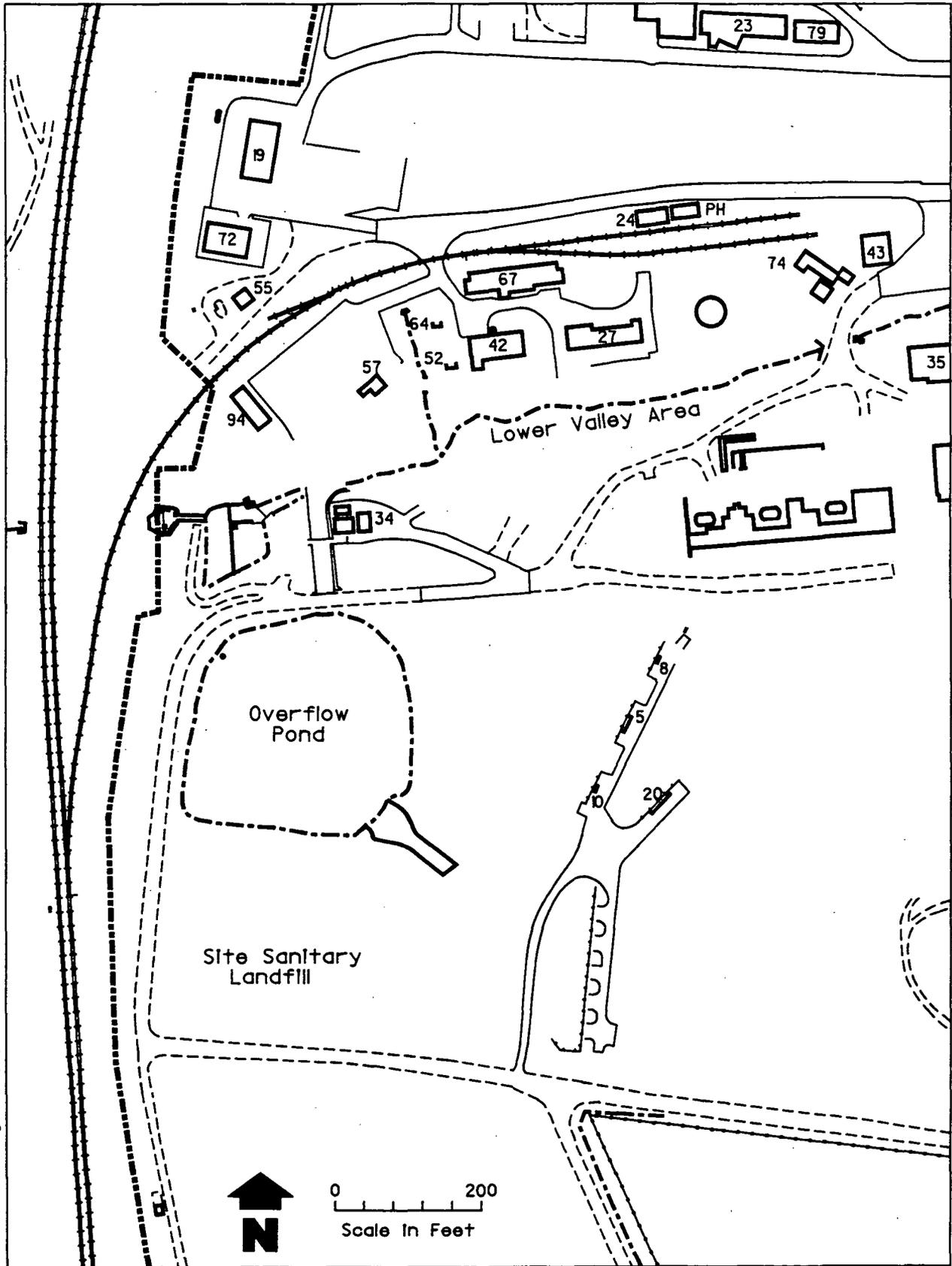


Figure 4.13. Interpretive map of Southern Study Area - 1975.



021491  
021491

evident on the western side of the main road east of the fence line. Ponding occurs, possibly in a small excavation that borders the main road in the northeast.

By 1979, the construction of the overflow pond and site sanitary landfill are complete (Figure 4.14). The overflow pond receives excess storm water flow from the plant drainage ditch via an overflow channel from the north. Surface water runoff from the hillslope to the east flows directly into the overflow by a drainage channel east of the site sanitary landfill. The landfill area assumed its present configuration by 1979, with the exception of a lined flume later installed at the southeast corner at the overflow pond to control erosion.

#### **4.4. LOWER VALLEY AREA**

The lower valley area is located in the northern half of the Southern Study Area in the west-central portion of Mound Plant (Figure 2.1). The Lower Valley Area is comprised of the lower reach of the plant drainage ditch and the adjacent land surfaces. Off-plant discharge from the plant drainage ditch occurs to the west of the plant fence line.

A clearing is situated north of the main road and south of the main plant drainage ditch in 1959 (Figure 4.9). This clearing consists of a leveled surface which may be bermed along its northern perimeter and includes a drainage channel or a trench along its center. A smaller clearing exhibiting a disturbed surface extends from the western end of the large clearing, its southern half obscured in shadow. The westernmost edge of the small clearing may be intersected by a short, narrow trench. Little or no evidence remains of the cultural features that predated Mound Plant in this area (DOE 1991f). To the north of the drainage is an area encircled by a road with visible stored materials. Multiple piles of material lie to the southwest of this storage area. To the west of the storage area and south of the railroad tracks, a road leads to a small cleared surface, north of which are three strings of very large containers, possibly railroad cars.

In 1964, the large clearing south of the drainage ditch is still visible (Figure 4.10) with a road or trail leading across it to the west. The small clearing is no longer sharply defined, but there are three small disturbed areas in its former location. Lying to the east and upslope from the large clearing is another large cleared surface. Disturbed soil borders it on a northwest-facing slope. To the north of the drainage, the 1959 storage area has been cleared of materials and the area around the encircling road has been cleared. Some debris is present to the south of this road. South of the railroad, to the west of the former storage area, are multiple lines of storage containers on a cleared surface. Storage containers are also evident in a storage area north of the railroad.

1979  
Lower Valley and  
Landfill Areas

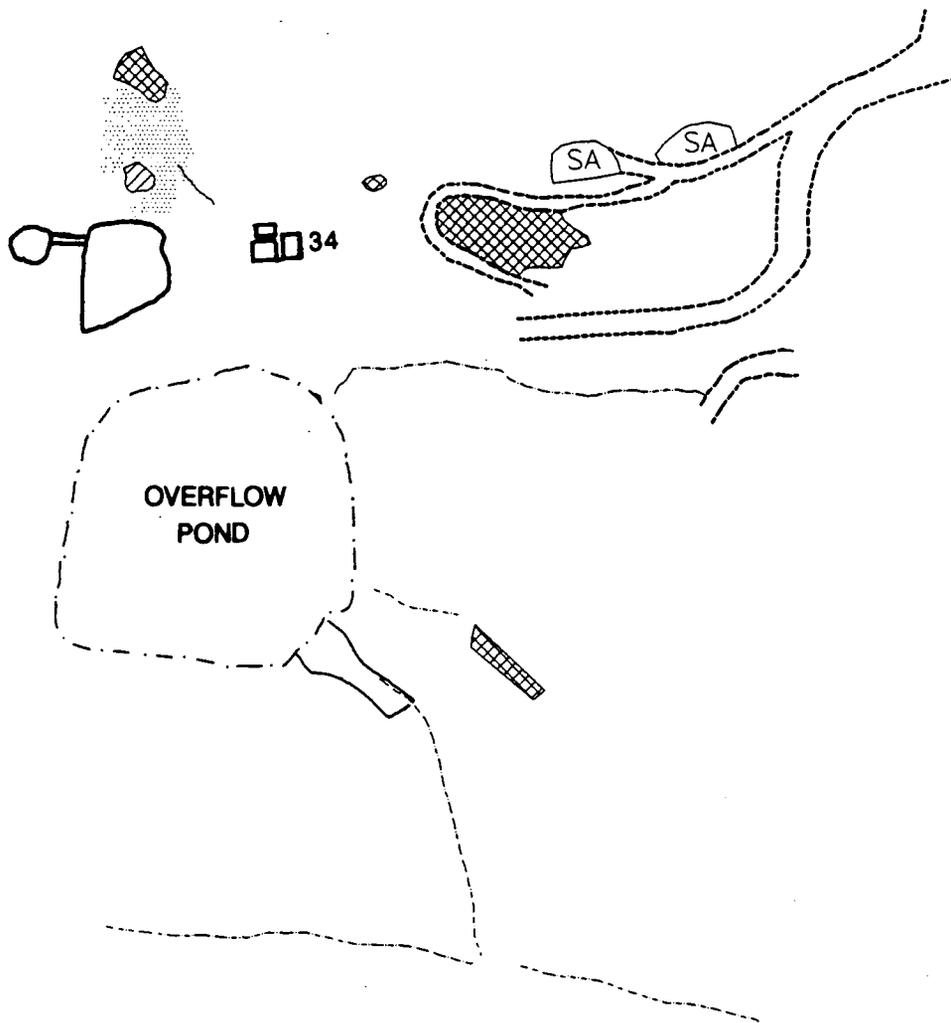
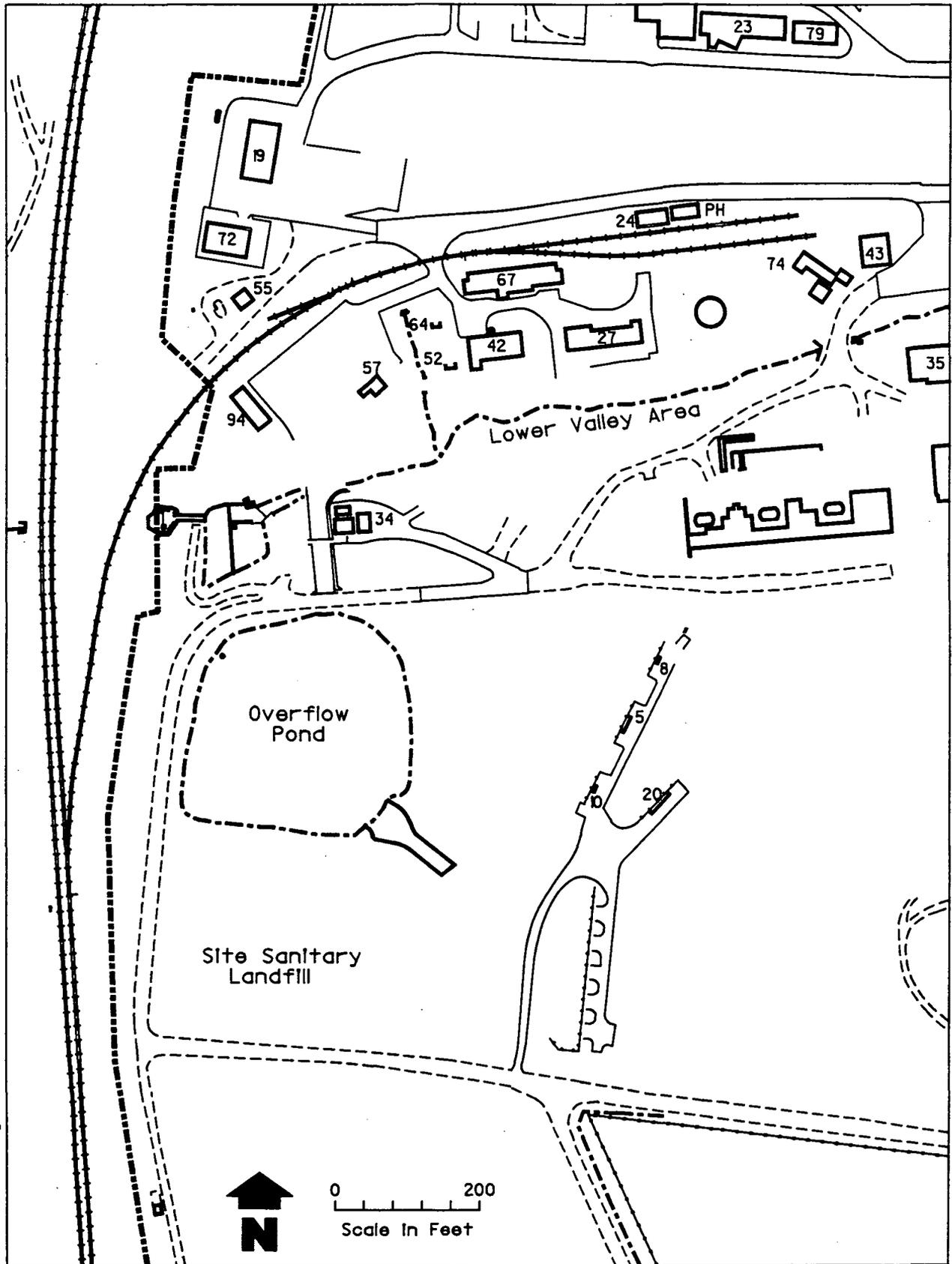


Figure 4.14. Interpretive map of Southern Study Area - 1979.

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0 200  
Scale In Feet

Building 34 is established in the clearing south of the drainage in the 1968 photograph (Figure 4.11). The large cleared surface to the east in the 1964 photograph now appears smaller in areal extent and includes areas of disturbance or vegetation near the center. Farther to the west of the cleared surface holding Building 34 is an area of disturbed soil, possibly on a slope, bordering a small, semi-circular, flat, cleared surface. The straight, upslope edge of the semicircle is backed by a linear east-west excavation, possibly in the form of a retaining wall. A small circular depression is visible on the northwestern edge of this cleared surface. Three areas of disturbed soil lie to the north of the main road (Figure 4.11). Former storage areas to the north of the drainage ditch appear to be cleared. Building 27 is established by 1968. A new drum storage area is located to the northwest of Building 27 at a road intersection. The large drum storage area evident in the 1964 aerial photograph south of the railroad, is cleared and its surface expanded. No containers are evident. It is bordered on the south by a disturbed surface and slope and is cut on the west by a short drainage channel.

In 1973, a second building is present to the east of Building 34 (Figure 4.12). The western end of the surface has been cleared and contains some stored material or possibly a small structure. Farther to the west, the area that appeared as a small, flat, cleared surface in the 1968 photograph is heavily vegetated and may have been sloped to meet the retaining wall, which is no longer visible. The clearing on the slope to the east of Building 34 shows major disturbance and possible debris. To the northwest of this feature is a short trench lying just off the road. North of the drainage ditch, a formal parking lot has been established on the site of the large drum storage area evident in the 1964 photograph. This lot is bordered by a cleared, disturbed surface.

In the 1975 photograph, a weir and dam or outfall structures on the lower reach of the plant drainage ditch are evident (Figure 4.13). The clearing that includes Building 34 appears formally established. Two smaller clearings to the west of the Building 34 complex and east of the dam, contain disturbed surfaces with the lower of the two containing some debris. A larger disturbed area to the east of Building 34 shows surface discoloration and a linear pattern that may indicate initial incision of west-flowing drainages. A storage area bordered on the south by a disturbed surface is evident south of Building 27 and the plant drainage ditch. North of the drainage ditch, tributary drainages appear to have been established that flow south of the disturbed surface bordering the parking lot south of the railroad tracks. A debris pile is situated at the southern edge of this surface. Building 18 was constructed by 1975. Some type of storage area is apparent south of Building 19.

By 1979, retention basins have been constructed on the lower reach of the drainage ditch (Figure 4.14). The cleared area to the east of Building 34 is heavily vegetated but does show evidence of former disturbance. It is now bordered on three sides by a dirt road. Two storage areas are located to the northeast of this cleared area (south of the Building 27 and the drainage ditch). Drums and other materials

are evident. North of the drainage ditch, the cleared surface southwest of the parking lot in the 1975 photograph is still present, as is the pile of materials visible in the 1975 photograph on its southern edge. Short drainages flow south from this surface. Disturbed soils are evident near the present location of Building 94, possibly in preparation for construction. Considerable construction that is not mapped has taken place north of the drainage ditch (Figure 4.14).

In 1981 photographs, the area of the hillslope east of Building 34 has been graded and planted, or naturally re-vegetated (Figure 4.15). A small area of former disturbance is still evident here. Storage areas (south of Building 27 and the drainage ditch) are still in active use. The cleared surface and pile north of the drainage ditch remain evident.

1981  
Lower Valley and  
Landfill Areas

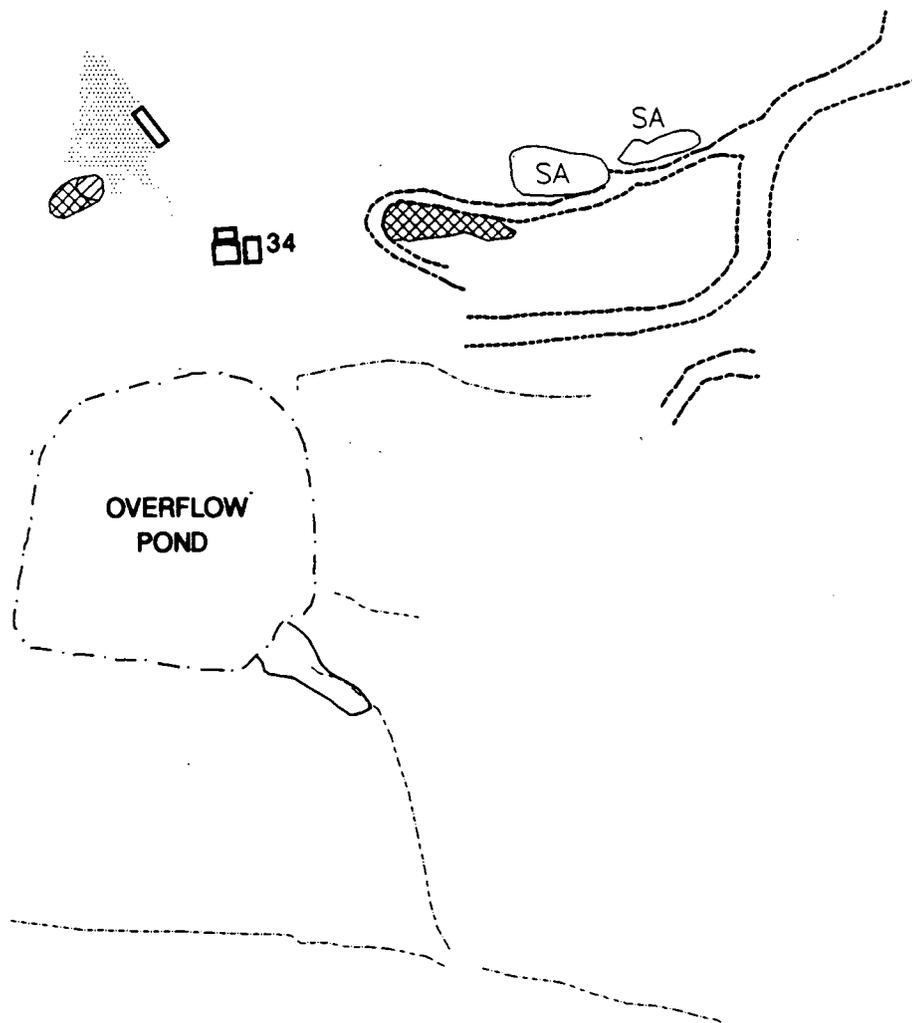
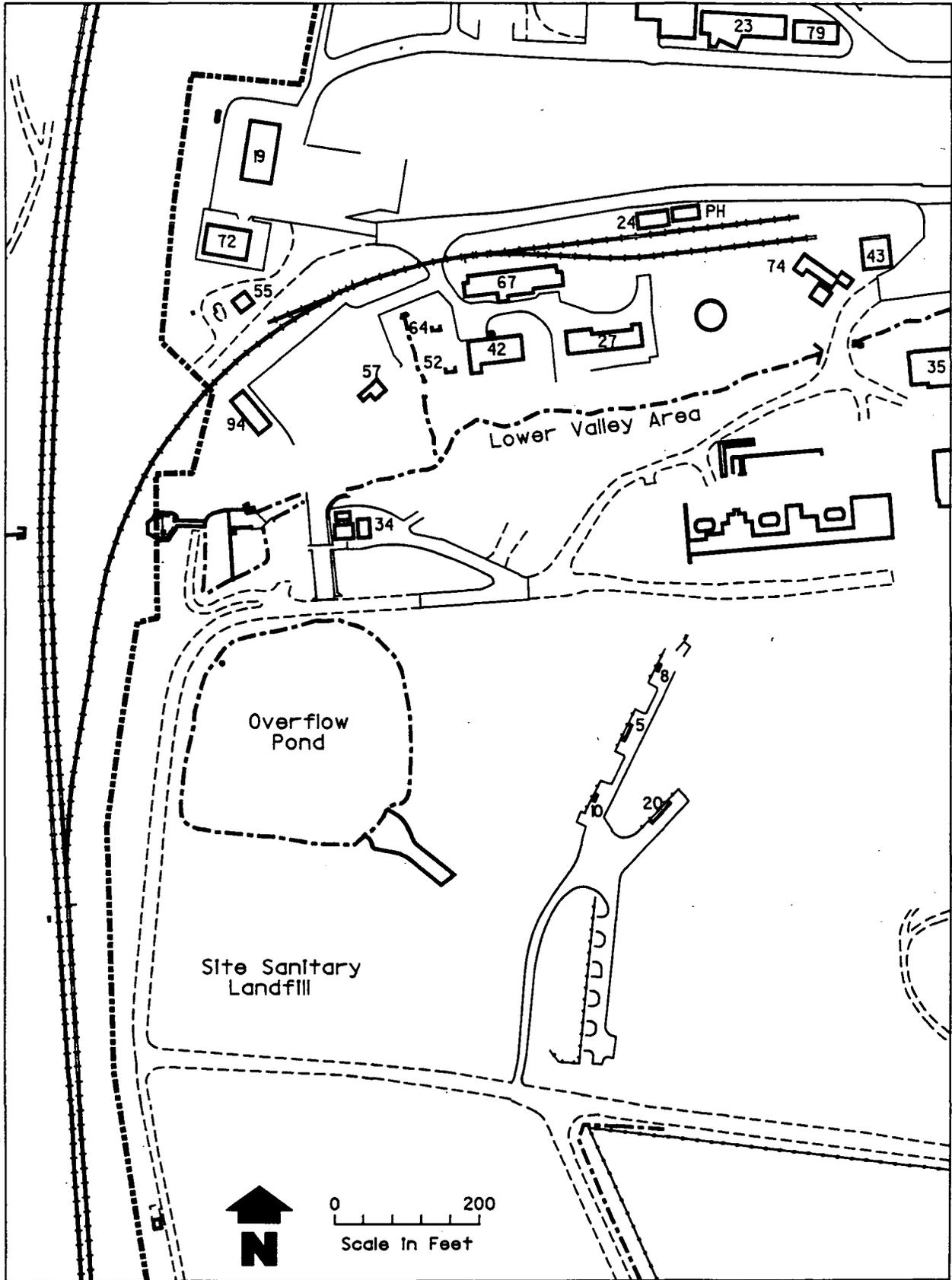


Figure 4.15. Interpretive map of Southern Study Area - 1981.

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surface water discharge from the plant. A Parshall flume was installed in 1973 and was later replaced by the low-flow retention basins in 1976. The trenches and berms near the 1959 ditch observed by this study may have been related to sediment or water control at that time, or may be related to the cultural features that pre-dated Mound Plant. Most of the cultural structures that pre-dated Mound Plant were located along the lower reaches of the drainage ditch (DOE 1991f).

The large area of drum storage around the curve of the railroad tracks is known to be related to the thorium drum repackaging project. During the period December 10 through 27, 1954, Mound Plant received about 5,900 55-gallon drums of thorium ore and sludge that had been shipped in box cars. The thorium in the drums consisted of hydroxide and oxalate sludges, a few drums of thorium oxide and a small quantity of mixed sludges. From 1954 to 1966, the thorium sludges were stored and redrummed in various locations of the plant. The location in the lower valley area near the curve of the tracks is now known as Area 3 (DOE 1991c). The box cars observed in this investigation may be related to the thorium project. The area near the tracks is reported to have been scraped of thorium contamination and backfilled with clean soil in 1965 (DOE 1991c).

Building 34 was constructed in 1965 to serve as a center for training emergency personnel. The area around it contains fuel tanks and pits for fire fighter training. The pits would typically be flushed with aviation fuel and ignited. An additional oil burn structure was added in the early 1970s and was used for testing drums for fire susceptibility by ignition. These sites are currently scheduled for investigation by the ER Program (DOE 1991e). The aviation fuel tank was removed in November 1990 (DOE 1991e).

The exact location of Area C is not known, but has been described as a stagnant water area about 150 feet in diameter. Metal containers containing lithium residues were reported to have been disposed of in the area and some fill added (DOE 1986). The disturbed area east of Building 34 (Figures 4.13 and 4.14) has been referred to as Area C by the ER Program and has undergone several episodes of investigation (DOE 1990a). It appears unlikely that the disturbed area immediately east of Building 34 is actually the location where the treatment and disposal activities described as Area C (DOE 1986) actually took place. This investigation indicates that this area has been an area of relatively high topography since at least 1959 and was unlikely to have ever been an area of standing water.

This investigation does indicate, however, that the drum storage areas south of Building 27 and the drainage channel were active from at least 1975 to 1981. These drum storage areas are currently addressed by the ER Program (DOE 1991e), but the lateral extent of the storage areas may be somewhat greater than that investigation allows. The storage areas are known to have been used for hazardous chemical wastes prior to offsite disposal (DOE 1991e).

## 5. CORRELATION OF HISTORICAL ACTIVITIES TO THE ER PROGRAM

The previous sections of this report provide descriptive interpretations of the aerial photography of the selected Northern and Southern Study Areas. These areas were known to require some type of remedial investigation by the ER Program. This investigation focuses on the changes in configuration of the plant drainage ditch from the 1950s to the early 1980s. The north parking area was included because minor disposal activities are reported to have occurred there; these reports are generally not confirmed by this investigation. The upper valley area has experienced significant changes in configuration over the years and the area is known to be locally contaminated by radionuclides (DOE 1991c). Within the Southern Study Area, the historic landfill is known to be locally contaminated with hazardous chemicals that may be affecting local water supply wells (DOE 1991d).

This section interprets the descriptive evolution of each of the four areas of interest within the context of the ER Program. This section will not provide a comprehensive description of each area, but will attempt to interpret the pictorial information in the context of identification of lateral extent, limitations of the durations of use and tentative identifications of previously unknown areas. References where additional information may be obtained are provided. Descriptive data provided will in some cases require some type of verification or substantiation--perhaps by additional interviews with Mound Plant personnel or environmental sampling. No recommendations for either are provided.

### 5.1. NORTH PARKING LOT AREA

The north parking area includes two parking lots that date back to the beginnings of the plant. Minor disposal activities are known to have occurred in the smaller lot to the west (Figure 5.1), but not in the larger lot to the east. During plant construction in the mid to late 1940s, wooden office buildings in the larger lot to the east were used as construction headquarters. These buildings were later used for a brief period of time as administration buildings for the plant (DOE 1986). The large circular feature in the 1959 through 1964 photo sequence is the remnant of the parking lot and circular drive around the buildings. The buildings were razed in the mid-1950s. The east-west trending trench in the far northeast portion of the larger parking lot is known to be a drainage control structure that even today shows remnants of its position. It was constructed simply to alleviate surface water runoff to the private properties to the north of the sloped catchment area now occupied by the large parking lot. No knowledge exists about the smaller trenches that appear around the circular drive in the 1959 through 1964 photo sequences.

The smaller parking lot in the northwest portion of the study area has had some history of waste disposal (Table V.1). It was reported that in 1963 110 gallons of chromium plating bath was dumped in a trench in the area now covered by the small parking lot (DOE 1986). The trench is now known as Area F. No

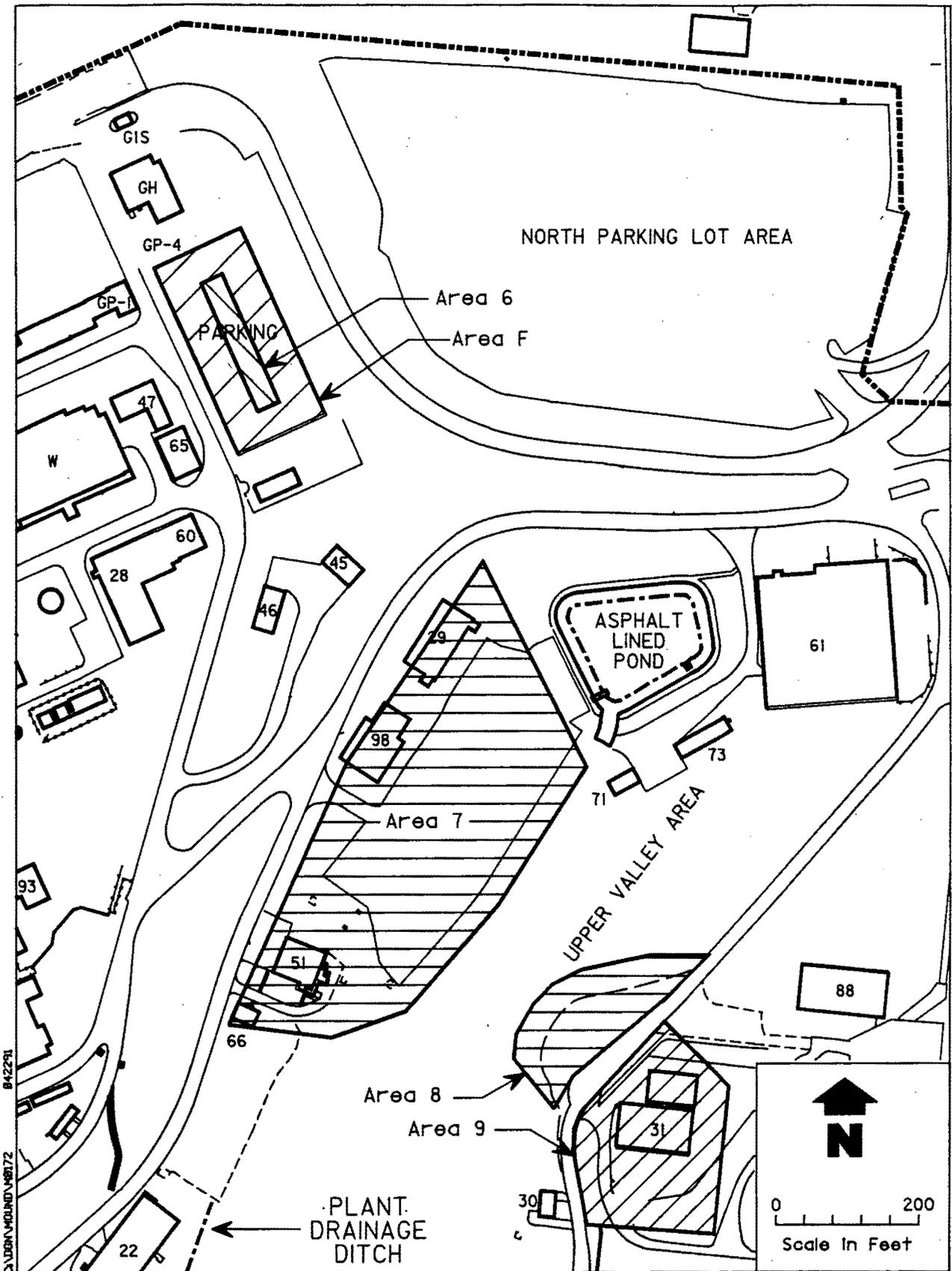


Figure 5.1. Areas of interest to the ER Program in the Northern Study Area.

Table V.1. Features in North Parking Lot Area

Date	Major Photointerpreted Feature	Historical Interest to ER Program
1959	<ul style="list-style-type: none"> <li>- Small parking lot near Guard House is lot established in the northwest corner of Northern Study Area.</li> <li>- Circular depression present in area to north and east with trenching activities.</li> <li>- Area of disturbed soil to NE of circular depression.</li> <li>- East-west trending trench in NE corner of plant property.</li> </ul>	<ul style="list-style-type: none"> <li>- None</li> <li>- Remnant of circular drive around old administrative building.</li> <li>- Unknown</li> <li>- Drainage diversion.</li> </ul>
1964	<ul style="list-style-type: none"> <li>- Northwest parking lot near Guard House is enlarged.</li> <li>- Northeast circular depression now paved parking lot.</li> <li>- Broad NE-SW trending trench in NE corner of area.</li> <li>- Tiered parking lot established to cover North Parking Lot Area.</li> </ul>	<ul style="list-style-type: none"> <li>- May include polonium-210 contaminated sand.</li> <li>- Unknown.</li> <li>- Unknown.</li> <li>- Unknown.</li> </ul>
1968-1981	<ul style="list-style-type: none"> <li>- No changes.</li> </ul>	

indications of the location of the trench was found during this investigation. In 1964 sand contaminated with polonium-210 was reportedly disposed of in the area of the parking lot. This sandblasting waste is now known as Area 6. Unless the sand was incorporated into the fill material used to enlarge the small parking lot, no indications of its disposal can be documented by this investigation.

## 5.2. UPPER VALLEY AREA

The upper valley area has undergone numerous changes to accommodate plant growth and has a long history of debris disposal. The 1959 photograph defines the original trace of the plant drainage channel in its upper reach. The upper reach of the plant drainage channel has been in-filled and engineered from its original configuration to accommodate building expansion and general plant growth over the years. Drainage of surface water and sediment is currently directed and controlled through the asphalt-lined pond. The in-filled part of the upper reach of the plant drainage channel is now referred to as Area 7 (Figure 5.1). Areas 8 and 9 lie to the southeast of Area 7 on the adjacent hillside and hilltop, respectively.

Area 7 has a long history of debris disposal (Table V.2). Much of the disposal appears to have been by materials being dumped over the sides of the western slopes so that the debris probably progrades easterly into the drainage channel. In the early 1950s a contaminated flatbed truck was reportedly buried and must lie under the westernmost parts of Area 7. Liquid wastes containing radioisotopes of radium-226, actinium-227 and thorium-228 were placed in a septic tank behind what is now Building 29 (DOE 1991c). No indications of the septic tank were evident in this investigation.

By 1968, in-filling of the upper reach of the stream channel is evident. Several thousand crushed, empty, thorium drums from the thorium repackaging project were reportedly disposed of in Area 7 from 1954 to 1966. This investigation indicates that at least through 1964, the drums would have been part of the hillside disposals, and perhaps in 1966 may have been part of the filling of the stream channel. The latter may be supported by the results of the Site Survey Project that outlines the extent of thorium contamination. The Site Scoping Report: Volume 3 - Radiological Survey Report (DOE 1991c) reports that the extent of contamination appears to be limited to the upper and thickest parts of the Area 7 channel fill. Plate 4, Estimation of Fill Materials from the Site Scoping Report: Volume 5 (DOE 1991f), depicts the extent of channel fill and supports the photo descriptions presented here. Fill appears to be a maximum of about 30 ft in the upper parts. In 1975, a berm across the southern part of the channel appears north of Building 51. The upper part of the channel fill, defined by the berm appears to have assumed its presently terraced configuration about this time, but was not paved until sometime before 1981.

The hill in the southeast part of the upper valley area was used for storage of thorium drums, at least in 1959. Some redrumming operations may have also occurred there (DOE 1991a, 1991c). This investigation

Table V.2. Features in Upper Valley Area

Date	Major Photointerpreted Feature	Historical Interest to ER Program
1959	<ul style="list-style-type: none"> <li>- Stream bed visible.</li> <li>- Platform with buildings present in NW.</li> <li>- Indications of possible material dumping along drainage SE of buildings.</li> <li>- Drum Storage on hill in SE part of Area.</li> </ul>	<ul style="list-style-type: none"> <li>- Definition of original location of drainage.</li> <li>- Historical warehouses built on some fill.</li> <li>- Waste or debris disposal which may include crushed thorium drums, soil contaminated with RA, Ac-227, Th-228, Po-210; contaminated ventilation system; contaminated dump truck.</li> <li>- Thorium drum storage area.</li> </ul>
1964	<ul style="list-style-type: none"> <li>- Building platform extended to SE.</li> <li>- Storage area present to N of building on fill platform above drainage ditch.</li> <li>- Extensive surface disturbance at head of drainage ditch.</li> <li>- Excavated soils on hill in SE and platform enlarged.</li> </ul>	<ul style="list-style-type: none"> <li>- Continued fill activity in area now known as Area 7.</li> <li>- Storage area of unknown materials at present location of Building 29.</li> <li>- Unknown, perhaps heavy equipment staging activities.</li> <li>- Possible removal of the Th-contaminated soils now known as Area 9.</li> </ul>
1968	<ul style="list-style-type: none"> <li>- Channel extensively filled and platform enlarged.</li> <li>- Material storage on fill platform.</li> </ul>	<ul style="list-style-type: none"> <li>- Continued infilling of Area 7.</li> <li>- Unknown.</li> </ul>

Table V.2. (page 2 of 3)

Date	Major Photointerpreted Feature	Historical Interest to ER Program
1973	<ul style="list-style-type: none"> <li>- Old building removed and present Building 29 constructed.</li> <li>- Hillside in SE area extended and regraded with construction of earthen berm.</li> <li>- Original drainage obscured by continued infilling.</li> <li>- Infilling S &amp; E within drainage ditch.</li> <li>- Building 51 constructed.</li> <li>- Debris piles east of present location of Building 29.</li> <li>- Additional material added to hillside and berm enlarged in SE part of area.</li> </ul>	<ul style="list-style-type: none"> <li>- None.</li> <li>- Disposal activities now known as Area 8.</li> <li>- Continued infilling of Area 7.</li> <li>- Continued infilling of Area 7.</li> <li>- Waste incinerator (Building 51) constructed in 1972.</li> <li>- Unknown.</li> <li>- Now know as Area 8.</li> </ul>
1975	<ul style="list-style-type: none"> <li>- Portions of drainage ditch infill re-vegetated.</li> <li>- Disturbed area NE of Building 22.</li> <li>- Infilling near Building 22.</li> </ul>	<ul style="list-style-type: none"> <li>- None.</li> <li>- Unknown.</li> <li>- Unknown.</li> </ul>

Table V.2. (page 3 of 3)

Date	Major Photointerpreted Feature	Historical Interest to ER Program
1979	<ul style="list-style-type: none"> <li>- Upper portion of channel hill platform terraced and bermed, some local ponding of water.</li> <li>- Excavation and massive regrading in the north portion of the Upper Valley Area; multiple pits, piles and debris on excavation surface.</li> </ul>	<ul style="list-style-type: none"> <li>- Unknown.</li> <li>- Excavation and regrading in area of asphalt lined pond.</li> </ul>
1981	<ul style="list-style-type: none"> <li>- Trench between Buildings 51 &amp; 22.</li> <li>- Asphalt lined pond in place.</li> <li>- New building east of asphalt lined pond.</li> <li>- Parking lot on south side of Building 29.</li> </ul>	<ul style="list-style-type: none"> <li>- Unknown.</li> <li>- None.</li> <li>- Part of Building 61?</li> <li>- Paved over Area 7.</li> </ul>

indicates that the drums were removed and the hilltop partially excavated by 1964. Some of the excavated materials may have been disposed of over the hillside. The hillside and hilltop areas are now known as Areas 8 and 9, respectively. From 1968 to 1975 the berm defining the extent of the hillslope disposal appears to enlarge, suggesting that materials may have been added over this time. This disposal material appears to prograde westward into the drainage ravine. After 1975, the berm appears to have been unmaintained and generally degrades until 1981. Little or no activity appears on the hilltop after 1964. Building 31 appeared sometime before 1968.

Building 51, the waste incinerator, was constructed in 1972, and appears to have been built on the lower channel fill terrace. This incinerator and the area surrounding it appear to have been relatively undisturbed until 1979. The activities involved with the disturbances between 1979 and 1981 are currently unknown, but may be related simply to regrading and construction at sewer and drain lines installed beneath the paved parking lots.

The area near the current asphalt-lined pond is reported to have been used for heavy equipment staging. Much of the disturbance observed from 1959 to 1968 may be related to such activity. The pits and trenches surrounding the pond in 1979 are probably the utility lines installed prior to and accompanying the construction of the pond. These pits and trenches correlate well with the locations and trends of the storm and sanitary sewer systems in the area as depicted in plant utility drawings (DOE in preparation). The sewer lines appear to have been installed within the channel fill and run the entire length of fill southward past Building 51.

The storage areas in the area that now underlies Buildings 29 and 98 in the 1964 and 1968 photographs have not been previously described. The types of materials stored and the containers used are presently unknown.

### **5.3. LANDFILL AREA**

The landfill area includes the location of the historic and site sanitary landfills and the overflow pond. These sites are now collectively known as Area B (Figure 5.2). The historic landfill was used for waste disposal by Mound Plant from 1948 to 1977 (Table V.3). A comprehensive description of the use and history is contained in the Area B, Operable Unit 1, Technical Memorandum: History of Area B (DOE 1991b). Administrative and laboratory wastes including paper, glass, wood, plastics, kitchen garbage, bottled urine samples, as well as possibly chemicals including beryllium, mercury, trichloroethene, carbon tetrachloride, evacuated nickel carbonyl gas cylinders, photoprocessing solutions, plating wastes and small quantities of polychlorinated biphenyls (PCB) oils were dumped and burned almost weekly. This investigation indicates that from 1959 to 1968 most of the open burning and general dumping took place in the southwestern

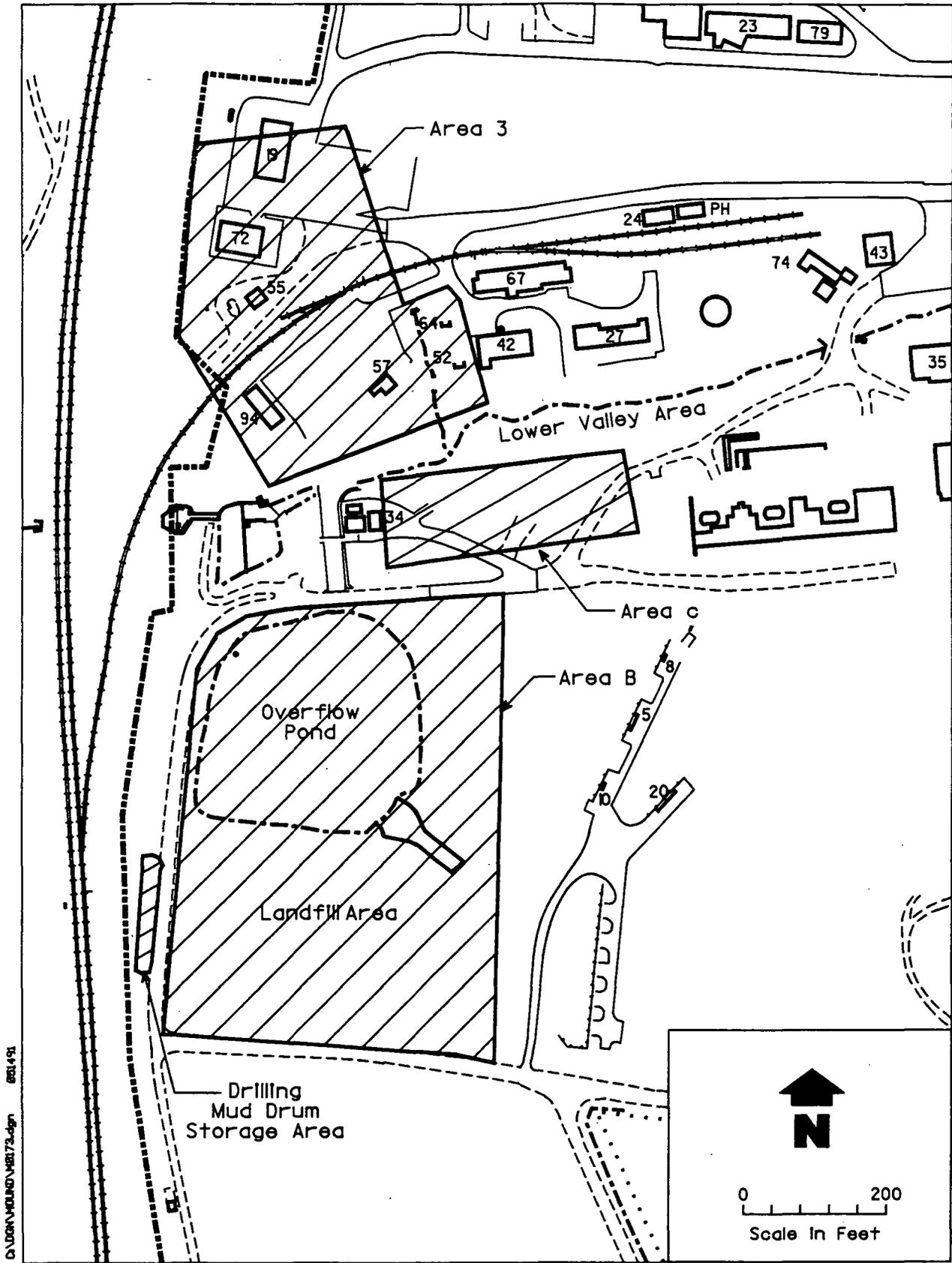


Figure 5.2. Areas of interest to the ER Program in the Southern Study Area.

Table V.3. Features in Landfill Area

Date	Major Photointerpreted Feature	Historical Interest to ER Program
1959	<ul style="list-style-type: none"> <li>- Parallel trenches east and south of main road.</li> <li>- Cleared and disturbed areas in SW bordered by debris piles.</li> <li>- Hill in northeast; cleared, with debris piles.</li> <li>- Excavated materials from the firing range to the east.</li> <li>- Smoke evident over the area.</li> </ul>	<ul style="list-style-type: none"> <li>- Historical landfill activities.</li> <li>- Historical landfill activities.</li> <li>- Unknown.</li> <li>- None.</li> <li>- Open burning of wastes.</li> </ul>
1964	<ul style="list-style-type: none"> <li>- Storage areas west of main road.</li> <li>- Broad E-W trench NE of present landfill.</li> <li>- Cleared surfaces &amp; debris pile in SW.</li> <li>- Disturbed material breach road at SW corner.</li> <li>- Smoke evident over area.</li> </ul>	<ul style="list-style-type: none"> <li>- Possible waste storage area.</li> <li>- Unknown.</li> <li>- Historical landfill activities.</li> <li>- Unknown.</li> <li>- Open waste burning.</li> </ul>
1968	<ul style="list-style-type: none"> <li>- Standing water in landfill.</li> <li>- Disturbed areas, debris piles west of standing water.</li> </ul>	<ul style="list-style-type: none"> <li>- Runoff.</li> <li>- Historical landfill activities.</li> </ul>

Table V.3. (page 2 of 2)

Date	Major Photointerpreted Feature	Historical Interest to ER Program
1973	<ul style="list-style-type: none"> <li>- New road cut through center of landfill.</li> <li>- Unknown circular areas on hilltop.</li> <li>- Debris and storage west of road.</li> <li>- Two E-W parallel trenches in center of landfill with berms between.</li> <li>- Excavated area present west of trenches.</li> <li>- Drum storage areas west of road.</li> <li>- Circular areas SE of landfill.</li> <li>- Undefined linear feature.</li> </ul>	<ul style="list-style-type: none"> <li>- None.</li> <li>- Unknown.</li> <li>- Possible drum storage area.</li> <li>- Construction of disposal cells.</li> <li>- Continued landfill activities.</li> <li>- Unknown drum storage areas.</li> <li>- Unknown.</li> <li>- Unknown.</li> </ul>
1975	<ul style="list-style-type: none"> <li>- Three parallel E-W trenches present and surrounded by earthen berms.</li> <li>- Roadway to disposal trenches present.</li> <li>- Ponding/excavation in NW.</li> <li>- Disturbed areas breach the SW road junction.</li> <li>- Storage areas west of road.</li> </ul>	<ul style="list-style-type: none"> <li>- Disposal cells.</li> <li>- Continued disposal activities.</li> <li>- Possible runoff and landfill activities.</li> <li>- Unknown.</li> <li>- Unknown storage area.</li> </ul>
1979	<ul style="list-style-type: none"> <li>- Overflow pond constructed.</li> <li>- Sanitary landfill constructed.</li> </ul>	<ul style="list-style-type: none"> <li>- Built to retain stormflows &amp; sediments.</li> <li>- Waste in historic landill area moved here.</li> </ul>
1981	<ul style="list-style-type: none"> <li>- No changes.</li> </ul>	<ul style="list-style-type: none"> <li>- Present configuration.</li> </ul>

portion of the landfill area, north and east of the existing roads. In fact, the 1959 photographs indicate that excavation activities extended into the present road intersection. By 1964 the roadway was backfilled enough to permit through traffic, but was subjected to periodic flooding from the east. The burial of many thousands of crushed, empty, thorium ore drums probably extended under the current road intersection (DOE 1991b, 1991c). This investigation indicates that the activities of open burning and general waste and burned trash burial during the period prior to 1968 were limited to central and southwestern portions of Area B. Figure 5.3 presents an updated interpretation of the geometry at Area B from evidence presented in this report.

The north-trending trench (1959) in the middle of the historic landfill may have been filled with trash when it was covered over by 1968. No other indications of this trench appear to exist other than the photo record. The east-west trending landfill cells (trenches) that appear in 1973 are described in the History of Area B (DOE 1991b) and resulted from a ban on open burning imposed by the State of Ohio in 1969. This investigation indicates that the landfill cells installed in 1973 were placed in an area that had not been previously used for trash disposal. Some of the disturbed areas near the southernmost cell were, in previous years, possibly gravel pit extractions, as the area provided some gravel resources.

The area west of the landfill area and west of the north-south access road to the landfill appears to have a long history of drum and other container storage. More recently this area was used for storage of drums containing drilling mud in 1987 and is referred to as the Drilling Mud Drum Storage Area (DOE 1991a). This investigation indicates that at least from 1964 to 1975 the stretch of area west of the access road to the landfill was used for staging or storage of drums and containers of currently unknown type or contents.

In 1976 the site sanitary landfill and overflow pond were constructed on the site of the historic landfill. The overflow pond was constructed to complement the low-flow retention basins on the lower reach of the plant drainage ditch. During excavation for the pond, the materials that had been buried in the landfill cells were removed to the site sanitary landfill, built concurrently to the south of the pond. During construction of the sanitary landfill, most of the burned material that had been disposed of or buried in the historic landfill was not excavated. Details of the overflow pond and site sanitary landfill construction are contained in the History of Area B (DOE 1991b).

#### **5.4. LOWER VALLEY AREA**

The lower valley area (Table V.4) includes numerous sites that are known to have been used for storage or staging radioactive and hazardous materials. Disposal activities have been suspected in Area C (Figure 5.2), but the exact location of Area C has not been corroborated by this investigation. The lower reach of the plant drainage ditch has undergone extensive local engineering since the plant was built to control

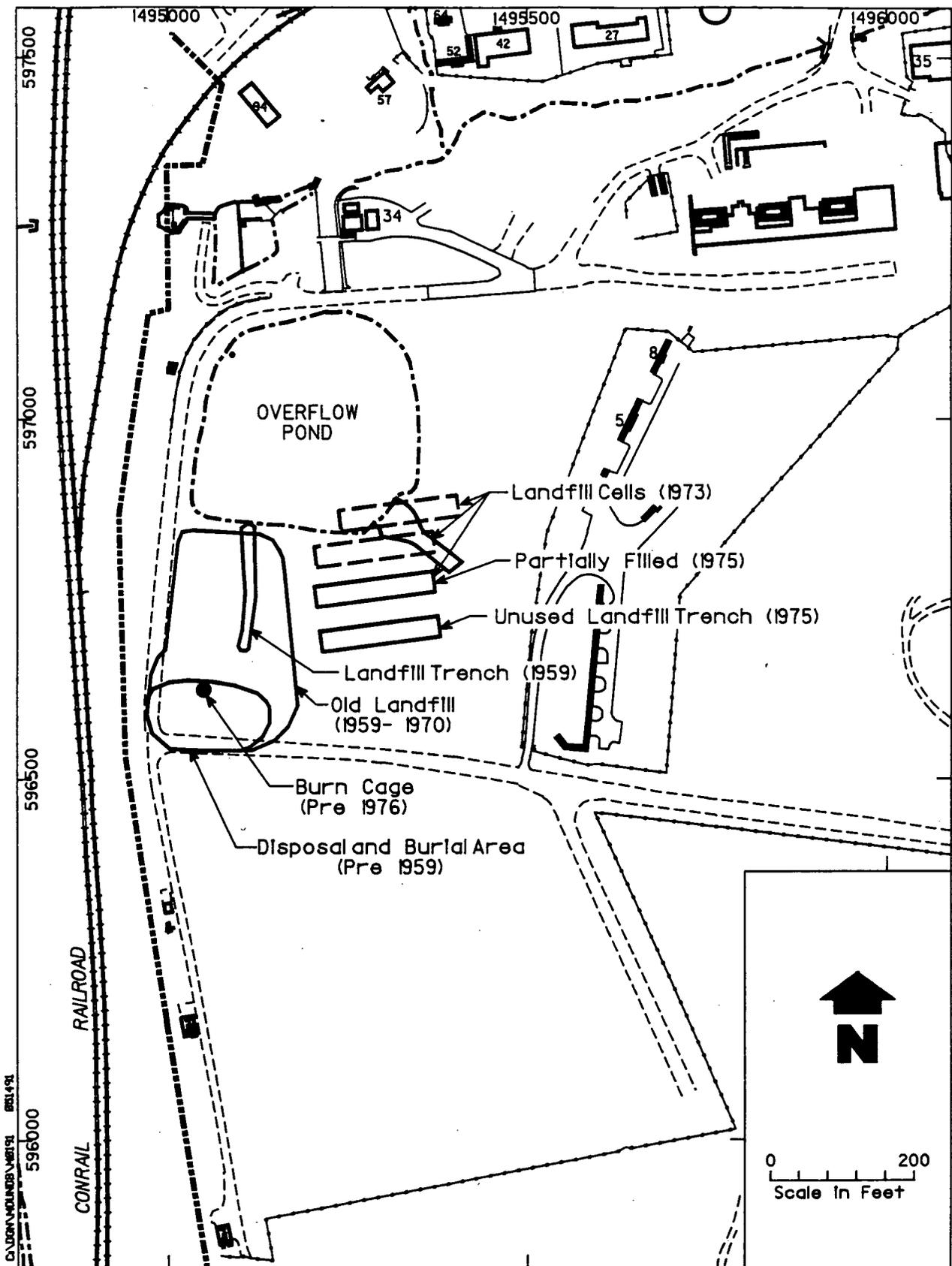


Figure 5.3. Photo interpretation of geometry and extent of historical site sanitary landfill areas.

Table V.4. Features in Lower Valley Area

Date	Major Photointerpreted Feature	Historical Interest to ER Program
1959	<ul style="list-style-type: none"> <li>- Clearing with berm along drainage ditch.</li> <li>- Possible trench near center of drainage.</li> <li>- Possible trench to west of berm.</li> <li>- Storage area north of railroad tracks; possible railroad cars, south and parallel to tracks.</li> </ul>	<ul style="list-style-type: none"> <li>- Unknown.</li> <li>- Unknown, perhaps drainage control.</li> <li>- Unknown.</li> <li>- Thorium drum storage and re-drumming area, now known as Area 3.</li> </ul>
1964	<ul style="list-style-type: none"> <li>- Drum storage to NW.</li> <li>- Possible railroad cars and drum storage south and parallel to railroad tracks.</li> </ul>	<ul style="list-style-type: none"> <li>- Possible thorium drum storage and re-drumming area. Now known as Area 3.</li> <li>- Possible thorium drum storage and re-drumming area. Now known as Area 3.</li> </ul>
1968	<ul style="list-style-type: none"> <li>- Building 34 constructed in clearing.</li> <li>- Level clearing evident west of Building 34 with E-W trending retaining wall or berm.</li> <li>- Drum storage south of railroad tracks.</li> <li>- Building 27 constructed.</li> </ul>	<ul style="list-style-type: none"> <li>- Unknown.</li> <li>- Unknown.</li> <li>- Unknown drum storage area.</li> <li>- Unknown.</li> </ul>
1973	<ul style="list-style-type: none"> <li>- Parking lot established south of railroad tracks.</li> </ul>	<ul style="list-style-type: none"> <li>- Unknown.</li> </ul>

Table V.4. (Concluded)

Date	Major Photointerpreted Feature	Historical Interest to ER Program
1975	<ul style="list-style-type: none"> <li>- Disturbed soils around parking lot.</li> <li>- Small trench south of drainage ditch in east part of lower valley area.</li> <li>- Disturbed soils east of Building 34.</li> <li>- Weir and dam in place.</li> <li>- Smaller disturbed area west of Building 34.</li> <li>- Disturbed area east of Building 34.</li> <li>- Storage area south of drainage ditch in the area of older trench.</li> </ul>	<ul style="list-style-type: none"> <li>- Re-grading of area of previous railroad storage.</li> <li>- Unknown.</li> <li>- Unknown.</li> <li>- Parsall flume that preceded retention basin construction.</li> <li>- Unknown activity.</li> <li>- Unknown.</li> <li>- Unknown storage activity.</li> </ul>
1979	<ul style="list-style-type: none"> <li>- Retention basin completed.</li> <li>- Smaller disturbed area near present location of Building 94.</li> </ul>	<ul style="list-style-type: none"> <li>- Completion of weir and retention basin.</li> <li>- Unknown; perhaps related to the building of Building 94.</li> </ul>
1981	<ul style="list-style-type: none"> <li>- Storage areas added to the south of the drainage ditch; possibly drum storage.</li> <li>- Storage areas still active.</li> <li>- Area east of Building 34 re-graded and re-vegetated.</li> </ul>	<ul style="list-style-type: none"> <li>- Unknown storage areas.</li> <li>- Unknown.</li> <li>- Unknown activities.</li> </ul>



## 6. REFERENCES

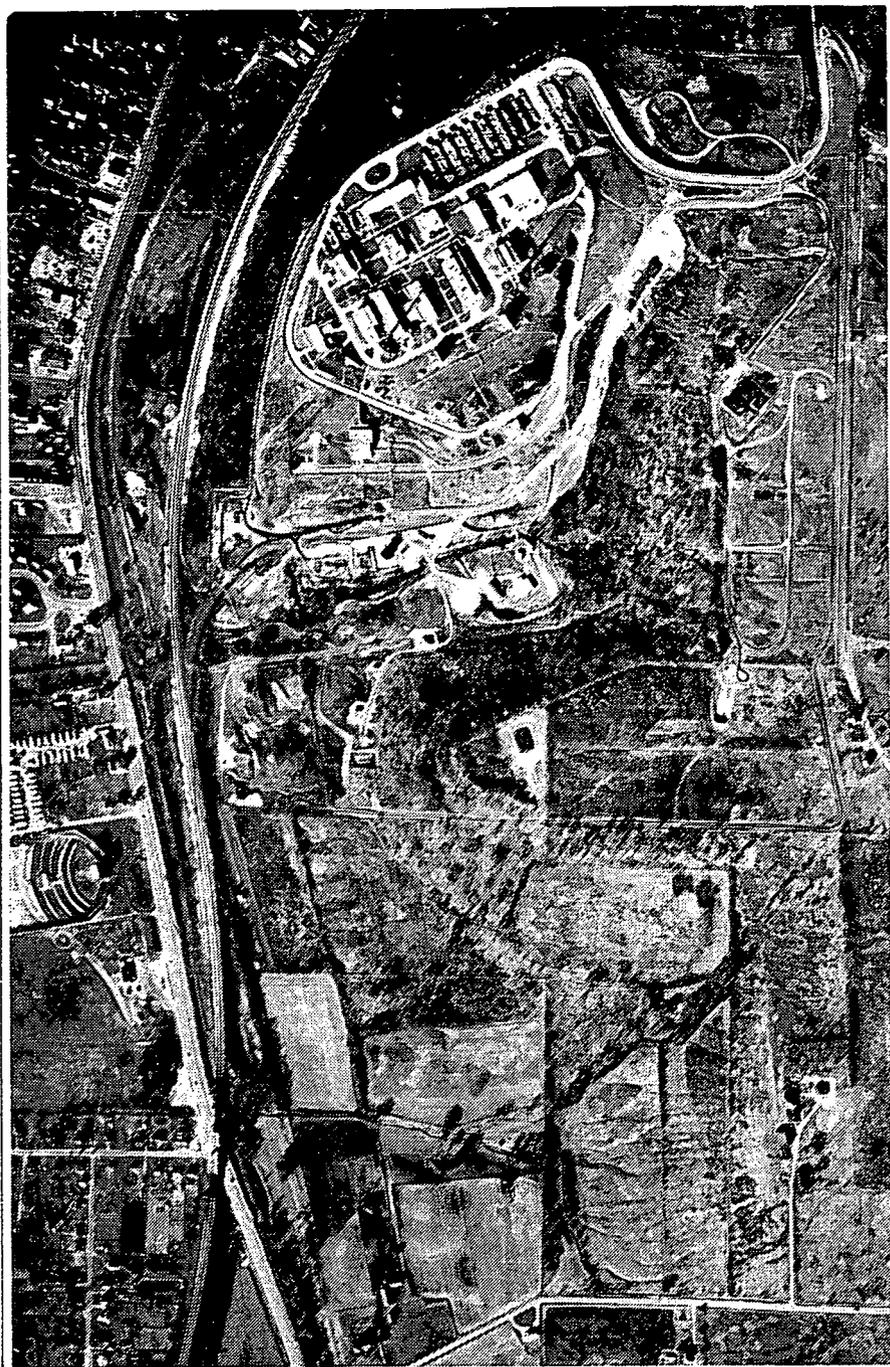
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**APPENDIX A**

**AERIAL PHOTOGRAPHS**

851491  
CLADDON MOUND N 48163



0 800  
Scale In Feet

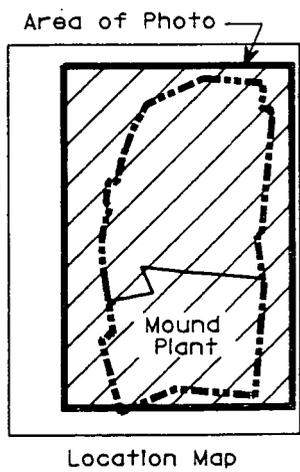


Figure A.1. Aerial photograph of Mound Plant in 1959.

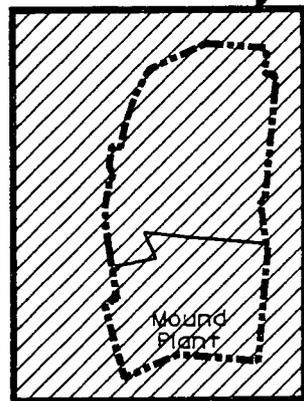


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Scale In Feet

Area of Photo



Location Map

Figure A.2. Aerial photograph of Mound Plant - 1964.



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Scale In Feet

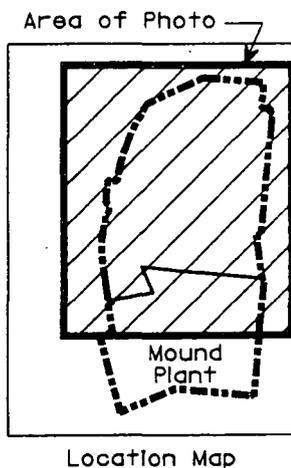


Figure A.3. Aerial photograph of Mound Plant in 1968.

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Scale In Feet

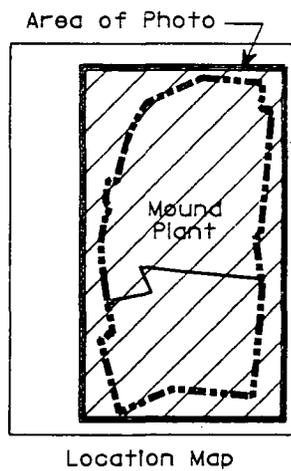


Figure A.4. Aerial photograph of Mound Plant - 1973.

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Scale In Feet

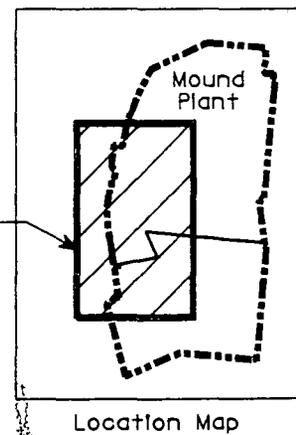
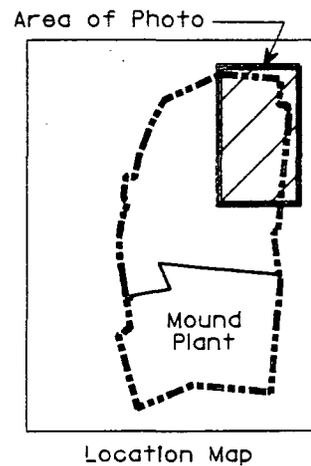
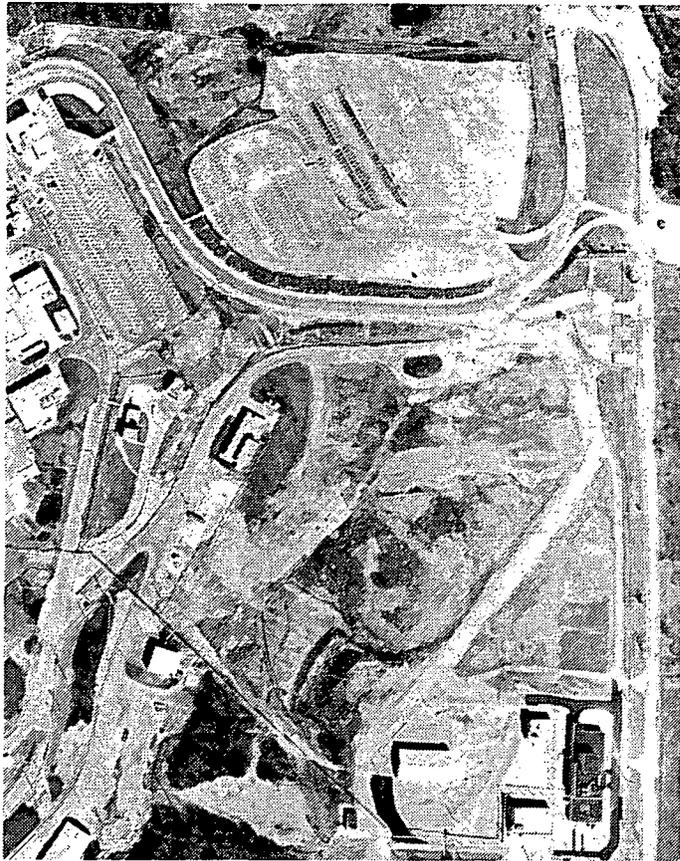


Figure A.5. Aerial photograph of Southern Study Area - 1975.

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Scale In Feet

Figure A.6. Aerial photograph of the Northern Study Area in 1975.

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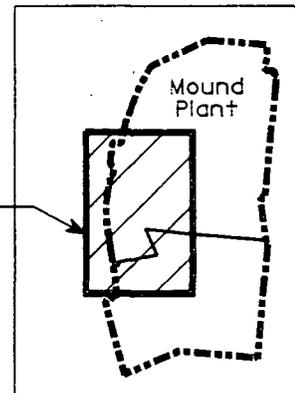
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Scale In Feet

Area of Photo



Location Map

Figure A.7. Aerial photograph of the southern Study Area in 1979.



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Scale In Feet

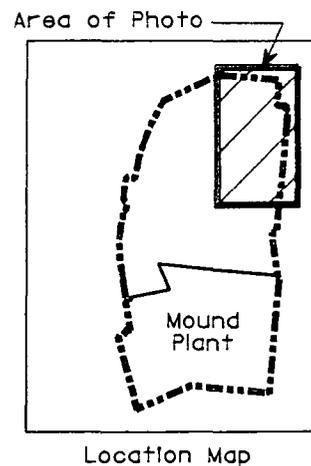


Figure A.8. Aerial photograph of the Northern Study Area in 1979.

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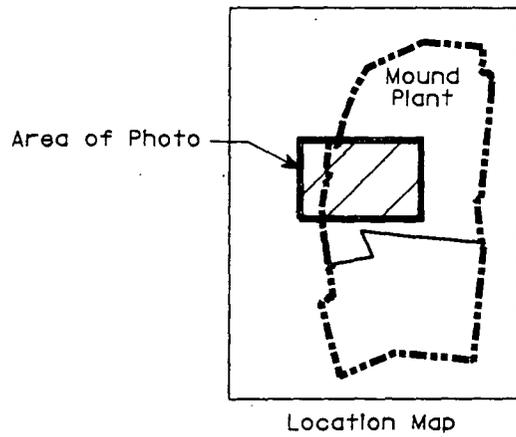
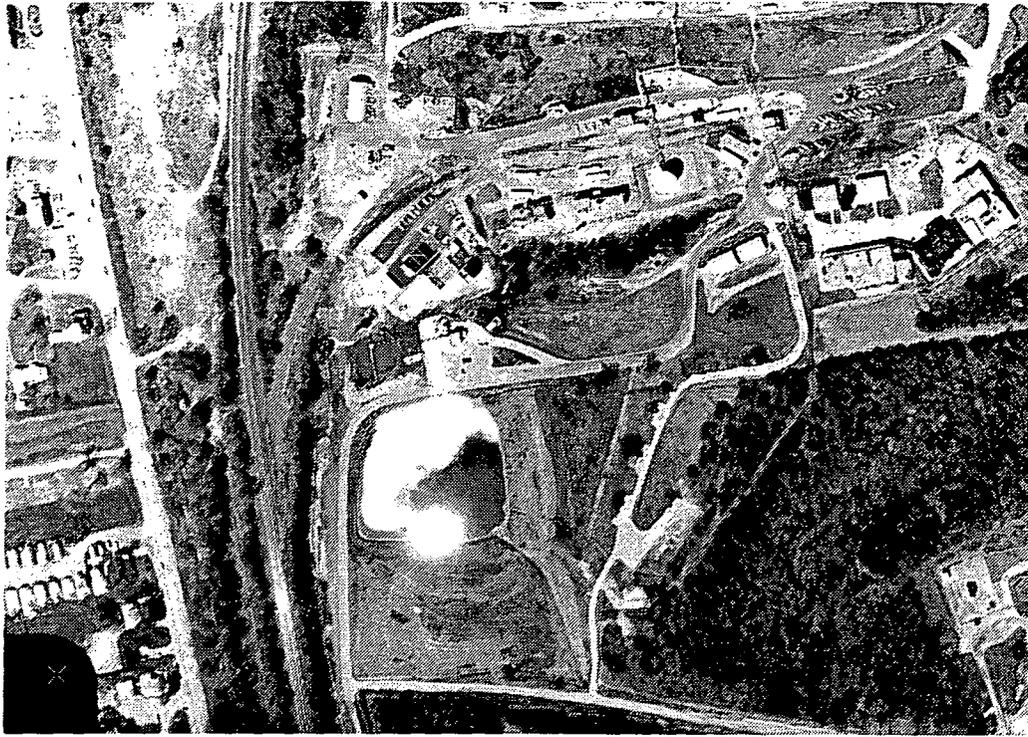
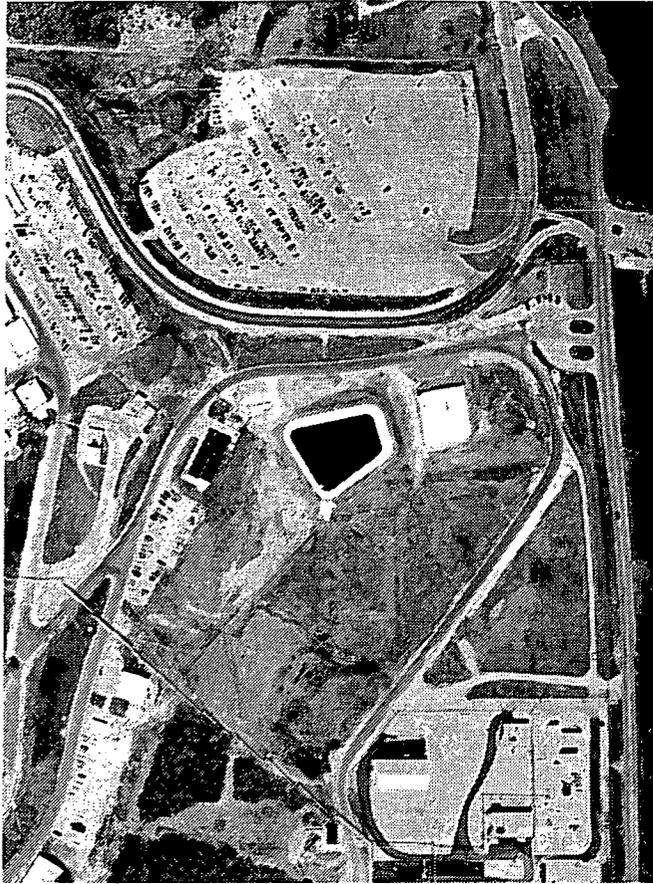


Figure A.9. Aerial phototgraph of Southern Study Area - 1981.

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Scale In Feet

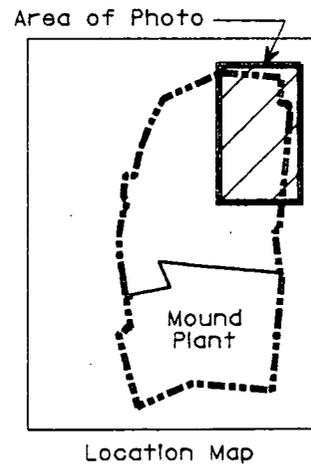


Figure A.10. Aerial photograph of the Northern Study Area in 1981.

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