United States
Environmental Protection
Agency

Environmental
Sciences Division
P.O. Box 93478
Las Vegas, NV 89193-3478

TS-PIC-20105579S
July 2001

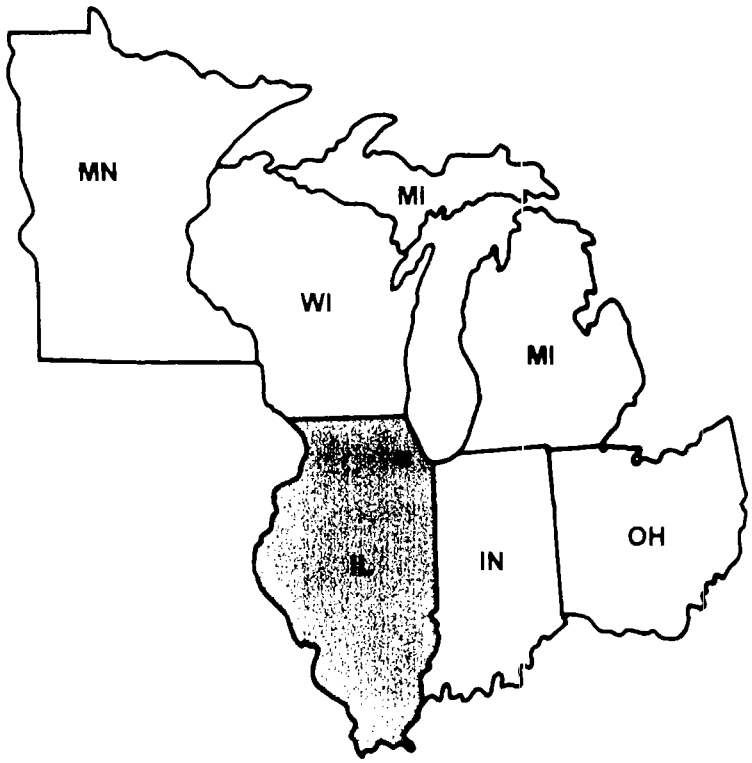
Research and Development

EPA

HISTORICAL AERIAL PHOTOGRAPHIC ANALYSIS LOCKFORMER SITE

Lisle, Illinois

EPA Region 5



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NATIONAL EXPOSURE RESEARCH LABORATORY
ENVIRONMENTAL PHOTOGRAPHIC INTERPRETATION CENTER
12201 SUNRISE VALLEY DRIVE • 555 NATIONAL CENTER • RESTON, VA 20192

July 30, 2001

OFFICE OF
RESEARCH AND DEVELOPMENT

MEMORANDUM

SUBJECT: Lockformer Site, Lisle, Illinois

FROM: Joan Bozik, CSR
Environmental Photographic Interpretation Center
Landscape Ecology Branch

TO: Steven Faryan, OSC (SE-5J)
Environmental Scientist
Region 5

Per your request, attached are three additional copies of the historical aerial photographic analysis of the Lockformer Site, Lisle, Illinois.

If you have any questions or comments, or if I can be of further assistance, please contact me at (703) 648-4288 or email bozik.joan@epa.gov.

Attachments

TS-PIC-20105579S
July 2001

HISTORICAL AERIAL PHOTOGRAPHIC ANALYSIS LOCKFORMER SITE

Lisle, Illinois

by

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Environmental Services
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Las Vegas, Nevada 89119

Contract No. 68-D-00-267

Work Assignment Manager

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Landscape Ecology Branch
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Las Vegas, Nevada 89193-3478

ENVIRONMENTAL SCIENCES DIVISION
NATIONAL EXPOSURE RESEARCH LABORATORY
OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY
LAS VEGAS, NEVADA 89193-3478

NOTICE

This document has undergone a technical and quality control/assurance review and has been approved for publication by personnel of the U.S. Environmental Protection Agency, Office of Research and Development, Environmental Sciences Division, Landscape Ecology Branch at Las Vegas, Nevada. It is for internal Agency use and distribution only.

ABSTRACT

This report presents the findings from a historical aerial photographic analysis of the Lockformer site (CERCLIS ID# ILN000508147) located in Lisle, DuPage County, Illinois. Eight selected years of photographs from 1967 to 1998 were reproduced for this report. The purpose of this analysis is to document landscape morphology, patterns of hazardous waste disposal, and other observable conditions of environmental significance on the 9.25 hectare (23-acre) site. This report provides operational remote sensing in support of removal actions under the Comprehensive, Environmental Response, Compensation, and Liability Act (CERCLA).

Collateral information supplied by U. S. Environmental Protection Agency Region 5 states that the Lockformer Company owned and operated the Lisle facility for metal fabrication and manufacturing. The Lockformer Company was not present on the site in 1967, but was operational in 1970 and a horizontal structure and a vertical structure were visible on the roof of the building. These structures were confirmed to be storage tanks in 1977. The horizontal tank was removed by 1992, but the vertical storage tank remained throughout the analysis period. Two prominent drainage ditches and associated possible outfalls were also identified in 1970. These ditches carried liquid toward the southern portion of the site where, for several of the analysis years, the soil appeared saturated. A large, excavated pit containing possible standing liquid was identified on site in 1981. By 1986 the eastern ditch had become channelized, while the western ditch and possible outfall were more difficult to discern due to mounds of material deposition in the western portion of the site and in the area south of the site building. In the same year a retention basin was constructed in the southern portion of the site, but standing liquid was not identified within the basin at any time.

The U.S. Environmental Protection Agency (EPA), Environmental Sciences Division, Landscape Ecology Branch in Las Vegas, Nevada, prepared this report for the EPA Region 5 Superfund Division in Chicago, Illinois, and the EPA Office of Emergency and Remedial Response in Washington, D.C.

CONTENTS

FIGURES

INTRODUCTION

This report presents the findings from a historical aerial photographic analysis of the Lockformer site (CERCLIS ID# ILN000508147, SSID# B5Y5). The site is located in Lisle, DuPage County, Illinois (Figures 1 and 2). Black-and-white aerial photographs were obtained to cover the period from 1956 through 1999. Fourteen years of historical photographs were analyzed, of which eight years from 1967 through 1998 were reproduced and included in this report. The purpose of this analysis is to document landscape morphology, patterns of hazardous waste disposal, and other observable conditions of environmental significance at the site. This analysis and report provides operational remote sensing in support of removal actions conducted by Region 5 offices of the U.S. Environmental Protection Agency under the Comprehensive, Environmental Response, Compensation, and Liability Act (CERCLA).

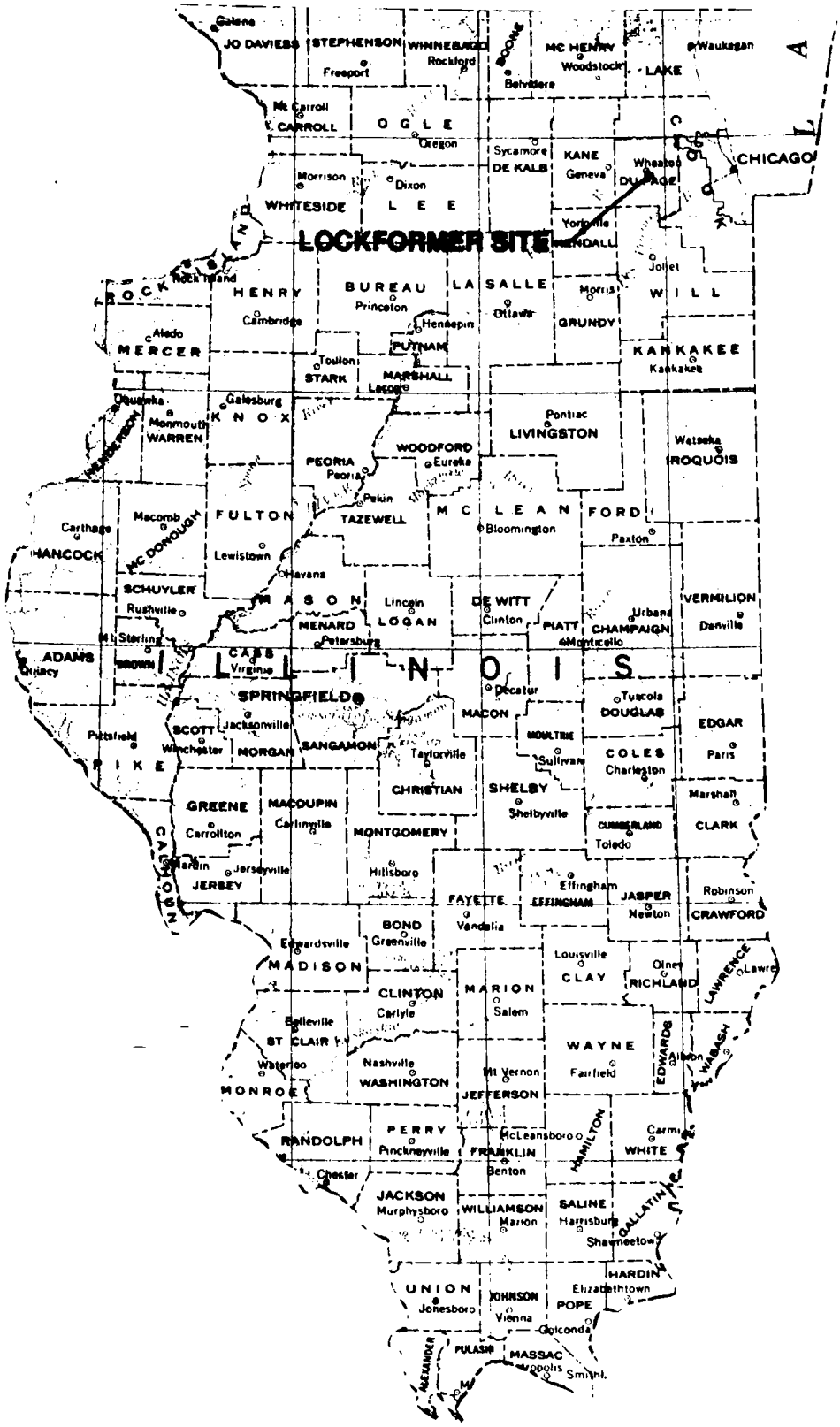
The Lockformer site is located at 711 Ogden Avenue in Lisle, Illinois. The site covers an area of approximately 9.25 hectares (23 acres) and is bounded by Ogden Avenue on the north side, a railroad to the south, and residential and commercial properties to the east and west. Site boundaries used in this analysis were determined from observations made on aerial photographs and do not necessarily denote legal property lines or ownership. The area surrounding the Lockformer site is composed of mixed land use.

Collateral information supplied by EPA Region 5 states that the Lockformer Company owned, operated, and engaged in the metal fabrication and manufacturing business. As part of productions, metal degreasing operations using chlorinated solvents took place in a pitted vapor degreaser located approximately 12 feet below ground surface within the facility building. The solvents, including trichloroethylene (TCE), were stored in a 500-gallon rooftop tank along the west side of the building. Spillage from the rooftop tank and releases from internal operations are alleged. TCE is a known human carcinogen, and tests conducted on soil and groundwater in the vicinity indicated the presence of high levels of the substance.

In 1967 the Lockformer facility had not yet been constructed. However, an excavated pit was observed in 1960 and 1963 (photographs not included in this report) in the field to the west of the site; the pit was filled by 1967. To the east of the site, an impoundment containing standing liquid and an expansive area of disturbed ground was visible. By 1970 the facility was operational and continued in operation throughout the analysis period. One vertical and one horizontal structure were observed on the roof of the building. Two prominent ditches and possible outfalls were noted. One drainage ditch extended off-site, passing close to several residential homes. Liquids appeared to pool in a field in the southern portion of the site and were observed through 1977. In 1973 four dark, rectangular-shaped objects were noted in the parking area. The two structures on the roof and the drainage ditches and possible outfalls appeared unchanged. In 1975 possible stains were observed where the rectangular-shaped objects had previously been seen. These stains were visible throughout the analysis period.

In the 1977 photograph the two structures on the roof were confirmed to be storage tanks. In 1981 an excavated pit containing light-toned material was visible in the western portion of the site, and the possible tanks remained on the roof of the building. Two large mounds, formed by material deposits, and a retention basin were identified on-site as early as 1983 (photograph not included in this report due to poor resolution) and remained throughout the analysis period. By 1986, a drainage ditch, which had carried liquids close to several residential homes, was re-routed and now channeled liquids away from the residential area and toward a new retention basin. In 1992 (photograph not included in this report), the possible rooftop horizontal storage tank was no longer visible. In 1998 numerous trails and small areas of disturbed ground were identified on the western mound.

A Glossary, defining features or conditions identified in this report, follows the Photographic Analysis section. Sources for all maps, aerial photographs, and collateral data used in the production of this report are listed in the References section. A list of all aerial photographs that were identified and evaluated for potential application to this study can be obtained by contacting the EPA Work Assignment Manager. Historical aerial photographs used in the analysis of this site have been digitally scanned and printed for use in this report. A transparent overlay with interpretative data



1. Study area location map, Illinois (USGS, 1972). Approximate scale 1:2,800,000.

is affixed to each of the digital prints. See the Methodology section for a discussion of the scanning and printing procedures.

The U.S. Environmental Protection Agency (EPA), Environmental Sciences Division, Landscape Ecology Branch in Las Vegas, Nevada, prepared this report for the EPA Region 5 Superfund Division in Chicago, Illinois, and the EPA Office of Emergency and Remedial Response in Washington, D.C.

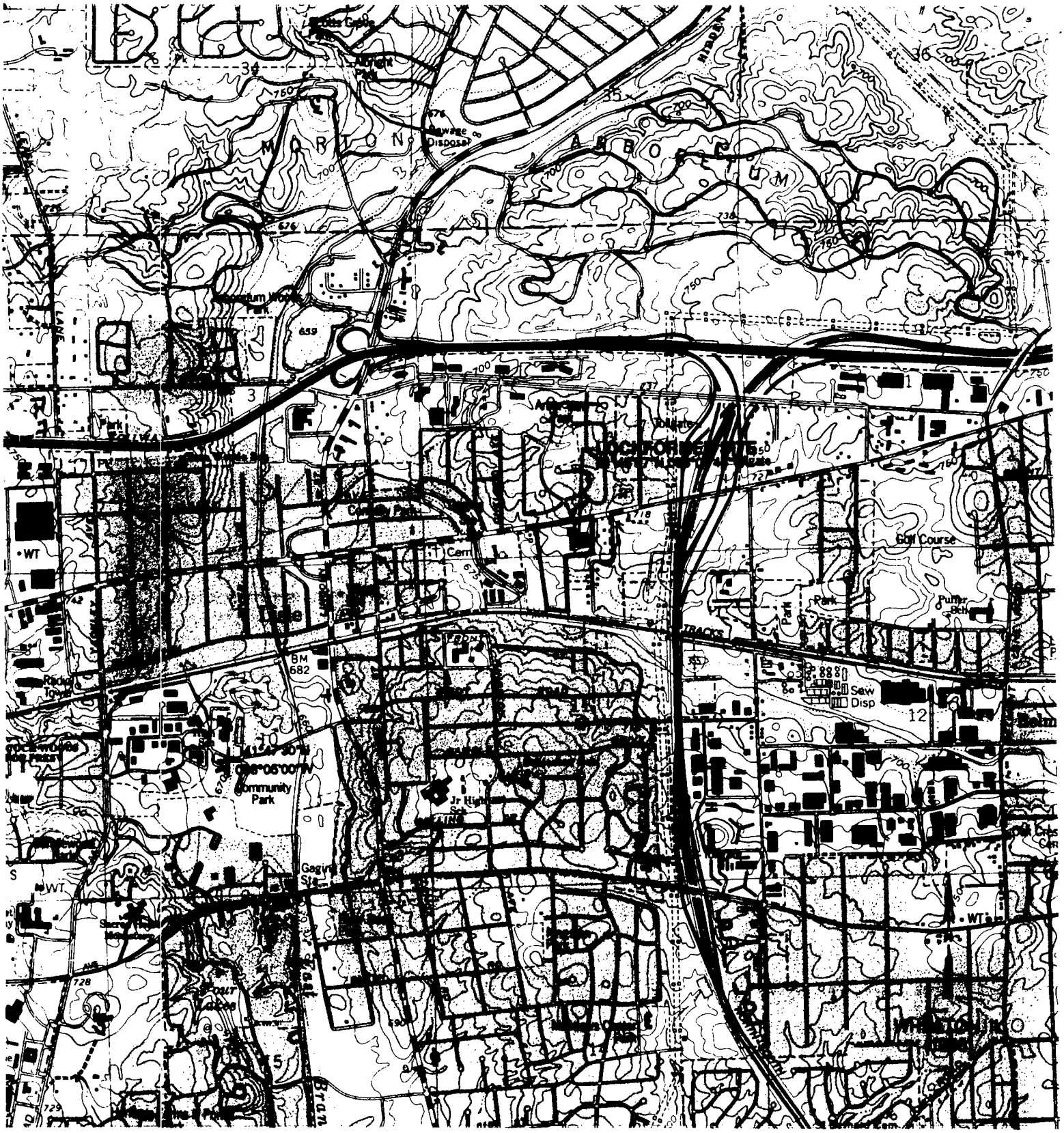


Figure 2. Local study area location map, Wheaton, Illinois (USGS, 1993). Approximate scale 1:24,000.

METHODOLOGY

This report was prepared using a standard methodology that includes the following steps:

- data identification and acquisition,
- photographic analysis and interpretation, and
- graphics and text preparation.

These steps are described below. Subsections also address details related to specific kinds of analyses that may be required to identify environmental features such as surface drainage and wetlands. All operational steps and processes used to perform this work (including data identification and acquisition, photographic analysis and interpretation, and graphics and text preparation) adhere to strict QA/QC guidelines and standard operating procedures (SOPs). These guidelines and procedures are documented in the Master Quality Assurance Project Plan (QAPP) prepared for Remote Sensing Support Services Contract No. 68-D-00-267 (LMS, 2001).

Data identification and acquisition included a search of government and commercial sources of historical aerial film for the study area. Photographs with optimal spatial and temporal resolution and image quality were identified for acquisition. In addition, U.S. Geological Survey (USGS) topographic maps were obtained to show the study area location and to provide geographic and topographic context.

Tc conduct this analysis, the analyst examined diapositives (transparencies) of historical aerial photographs showing the study area. Diapositives are most often used for analysis instead of prints because the diapositives have superior photographic resolution. They show minute details of significant environmental features that may not be discernible on a paper print.

A photographic analyst uses a stereoscope to view adjacent, overlapping pairs of diapositives on a backlit light table. In most cases, the stereoscope

is capable of various magnifications up to 60 power. Stereoscopic viewing involves using the principle of parallax (observing a feature from slightly different positions) to observe a three-dimensional representation of the area of interest. The stereoscope enhances the photo interpretation process by allowing the analyst to observe vertical as well as horizontal spatial relationships of natural and cultural features.

The process of photographic analysis involves the visual examination and comparison of many components of the photographic image. These components include shadow, tone, color, texture, shape, size, pattern, and landscape context of individual elements of a photograph. The photo analyst identifies objects, features, and "signatures" associated with specific environmental conditions or events. The term "signature" refers to a combination of components or characteristics that indicate a specific object, condition, or pattern of environmental significance. The academic and professional training, photo interpretation experience gained through repetitive observations of similar features or activities, and deductive logic of the analyst as well as background information from collateral sources (e.g., site maps, geologic reports, soil surveys) are critical factors employed in the photographic analysis.

The analyst records the results of the analysis by using a standard set of annotations and terminology to identify objects and features observed on the diapositives. Significant findings are annotated on overlays attached to the photographic or computer-reproduced prints in the report and discussed in the accompanying text. Annotations that are self-explanatory may not be discussed in the text. The annotations are defined in the legend that accompanies each print and in the text when first used.

Objects and features are identified in the graphics and text according to the analyst's degree of confidence in the evidence. A distinction is made between certain, probable, and possible identifications. When the analyst believes the identification is unmistakable (certain), no qualifier is used. Probable is used when a limited number of discernible characteristics allow the analyst to be reasonably sure of a particular identification. Possible is used when only a few characteristics are discernible, and the analyst can only infer an identification.

The prints in this report have been reproduced, either by photographic or computer methods, from the original film. Reproductions are made from the original film and may be either contact (the same size) prints or enlargements, depending on the scale of the original film. Any computer-produced prints used in this report are generated from scans of the film at approximately 1,300 dots per inch (dpi) and printed at 720 dpi. Although the reproductions allow effective display of the interpretive annotations, they may have less photographic resolution than the original film. Therefore, some of the objects and features identified in the original image and described in the text may not be as clearly discernible on the prints in this report.

Study area boundaries shown in this report were determined from aerial photographs or collateral data and do not denote legal property lines or ownership.

Surface Drainage

The surface drainage analysis produced for this report identifies the direction and potential path that a liquid spill or surface runoff would follow based on the topography of the terrain and the presence of discernible obstacles to surface flow. The analyst determines the direction of surface drainage by stereoscopic analysis of the aerial photographs and by examining USGS topographic maps. Site-specific surface drainage patterns are annotated on the map or photo overlay. Where the direction of subtle drainage cannot be determined, an indeterminate drainage line symbol is used. Regional surface flow is ascertained from the USGS topographic maps.

PHOTOGRAPHIC ANALYSIS

The Lockformer site is located in the village of Lisle, DuPage County, Illinois. The site covers approximately 9.25 hectares (23 acres) west of Interstate 355, about 37 kilometers (23 miles) due west of Chicago, Illinois. Elevations range from 219 meters (720 feet) near the central access road at Ogden Avenue to 206 meters (675 feet) adjacent to the railroad at the southern boundary of the site (USGS 1993). Surface runoff typically flows to the south. Runoff from the slopes of the elevated railroad line, which comprises the southern boundary of the site, appears to migrate north. This runoff appears to pool in a field in the south-central portion of the site. An unnamed tributary of the East Branch DuPage River parallels the railroad line on the south side. It could not be determined if site runoff enters this tributary.

Significant features or changes to the areas surrounding the site will be mentioned; however, these off-site findings will not be discussed in detail in this report.

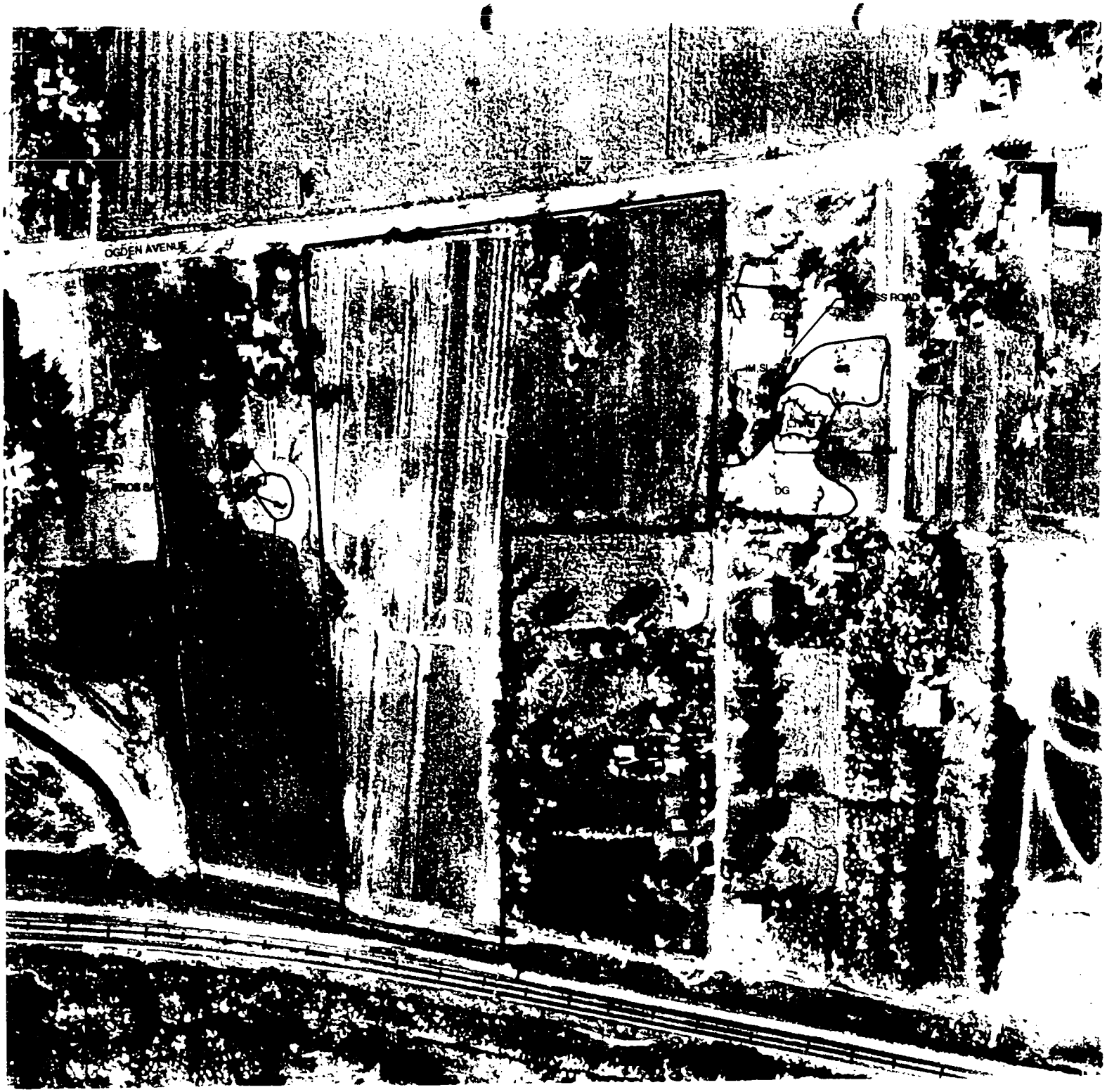
Fourteen years of historical aerial photographs were analyzed and imagery from eight years has been reproduced and included in this report. Information from the 1960 and 1963 aerial photographs has been annotated on the overlay for the 1967 image, and information from 1988, 1992, and 1995 has been applied to the 1998 image overlay.

OCTOBER 19, 1967 (FIGURE 3)

The Lockformer site has not been developed, and a private residence (RES) is established on the grounds. Agricultural (AG) practices are visible on- and off-site.

Just to the west of the site is an area of fill (FL) covered with vegetation (VEG). Near the center of this area, the soil is probably saturated as this appears to be the lowest point of elevation in the vicinity. In both 1960 and 1963 an excavated pit was visible in this location. In 1960 dark-toned material (DTM) was observed in several places within the pit. In 1963 a much deeper, internal or secondary excavated pit and light-toned material (LTM) was observed. This location is accessed via a road from the residence to the north.

A probable commercial (COMM) business is located east of the site. An access road leads to an impoundment (IM) containing standing liquid (SL) and an expansive area of disturbed ground (DG), probably the result of earth-moving activity. Light-toned mounded material (LTMM; probably soil scraped from the surface) is located east of the impoundment. A swath of dark-toned material, as well as a ground scar (GS) are also visible. Just to the north of the impoundment is a second mound of uniform, light-toned material which was probably excavated from the area.



INTERPRETATION CODE

	SITE BOUNDARY
	DRAINAGE
	FLOW
	VEHICLE ACCESS
	HAILWAY
	EXCAVATION, PIT (EXTENSIVE)
	MOUNDED MATERIAL (EXTENSIVE)
AG	AGRICULTURAL
CA	CLEARED AREA
COMM	COMMERCIAL BUSINESS
CONT	CONTAINERS
CR	CRATES
DB	DEBRIS
DG	DISTURBED GROUND
DT	DARK-TONED
EX	EXCAVATED
FL	FILL
GS	GROUND SCAR
HOR	HORIZONTAL
HT	HORIZONTAL TANK
IM	IMPOUNDMENT
LT	LIGHT-TONED
M	MATERIAL
MM	MOUNDED MATERIAL
OF	OUTFALL
OSA	OPEN STORAGE AREA
RES	RESIDENCE
SL	STANDING LIQUID
ST	STAIN
UO	UNIDENTIFIED OBJECT
VEG	VEGETATION
VERT	VERTICAL
VT	VERTICAL TANK

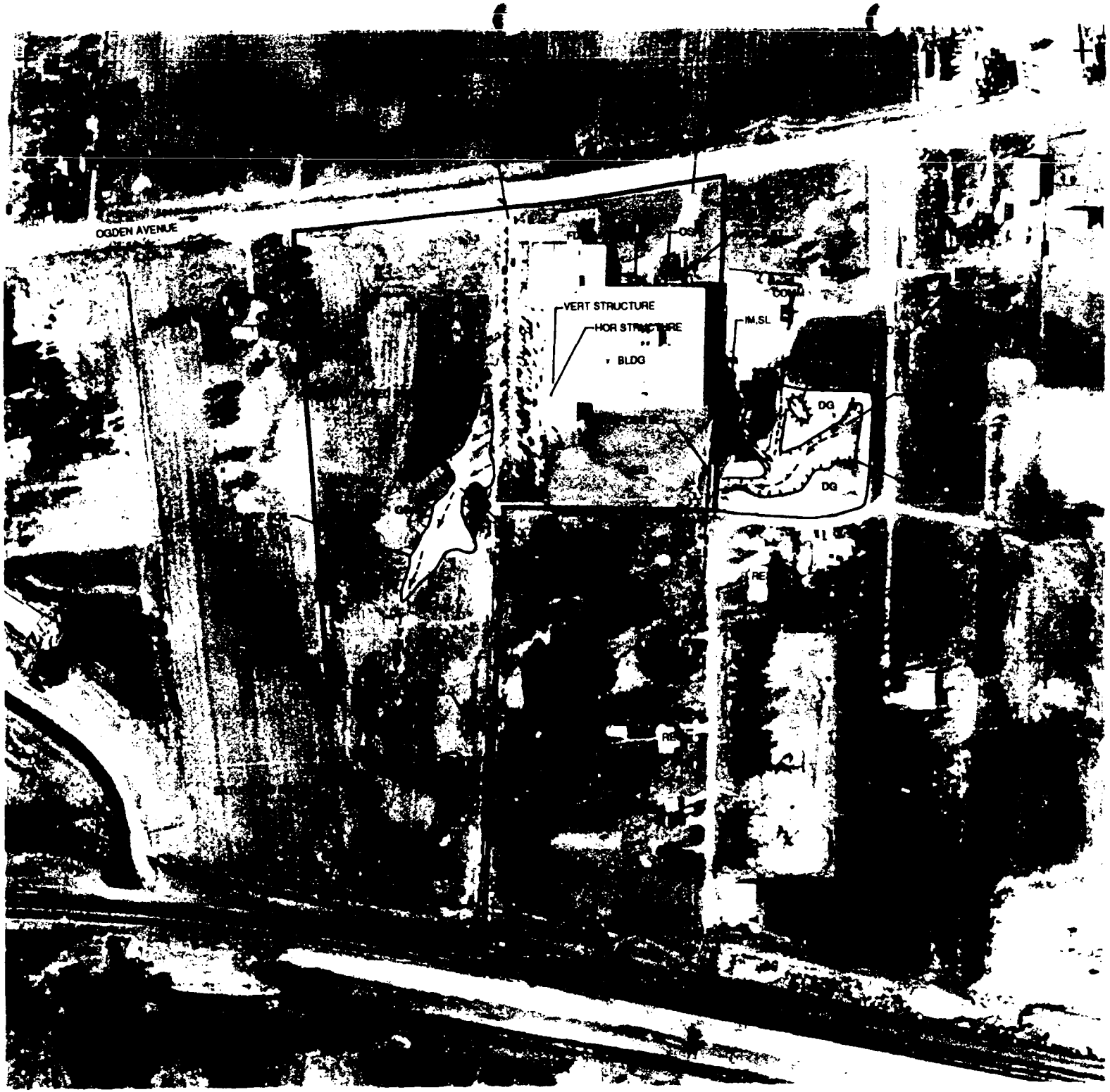
APRIL 9, 1970 (FIGURE 4)

The Lockformer site is active as numerous cars (not annotated) are present in the parking lot (not annotated) on the west side of the building. Two access roads lead onto the site; the western road extends to the parking facilities, and the eastern access road terminates at the north side of the building. The presence of an open storage area (OSA), possible stains (ST), and a flow path along the north wall of the building suggests this area is involved with shipping and receiving of materials. Located on the roof of the building, near the southwestern corner are a vertical (VERT) structure and a horizontal (HOR) structure.

Southwest of the parking lot, in an open field (not annotated) which extends from Ogden Avenue to the railroad line (north and south boundaries of the site), there is a cleared area (CA) comprised of bare soil and numerous erosion gullies. Smaller erosion gullies are visible extending southwest from the parking lot. In addition, disturbed ground, saturated soil, and ground scars are visible near the cleared area. These features are likely the result of previous earth-moving activities associated with construction practices.

Two well-defined drainage ditches and associated possible outfalls (OF) are visible on the site. The first is located to the southeast of the building; the second is evident south of the parking lot. Liquid draining into the easternmost ditch flows south and then southwest toward residential homes. Liquid in the westernmost ditch flows south, and may collect in the southern section of the site as evidenced by the areas of saturated soil. In addition, runoff from the agricultural land to the west migrates and settles in this field. Light-toned mounded material is noted alongside the smaller of the two areas of saturated soil. It is not clear, however, if liquid within this saturated area moves south toward the railroad or if runoff from the slopes of the elevated railroad flows north to the field.

Off-site, a possible burn area is observed south of the Lockformer building near several residential structures. To the southeast of the building, an impoundment containing standing liquid, an excavated (EX) area, disturbed ground, probable fill, and saturated soil are visible. Liquids from the impoundment and the excavated area are able to flow toward and join the eastern ditch. An access road connects this area to a commercial site just to the north.



INTERPRETATION CODE

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←———	FLOW
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	MOUNDED MATERIAL (EXTENSIVE)
AG	AGRICULTURAL
CA	CLEARED AREA
COMM	COMMERCIAL BUSINESS
CONT	CONTAINERS
CR	CRATES
DB	DEBRIS
DG	DISTURBED GROUND
DT	DARK-TONED
EX	EXCAVATED
FL	FILL
GS	GROUND SCAR
HOR	HORIZONTAL
HT	HORIZONTAL TANK
IM	IMPOUNDMENT
LT	LIGHT-TONED
M	MATERIAL
MM	MOUNDED MATERIAL
OF	OUTFALL
OSA	OPEN STORAGE AREA
RES	RESIDENCE
SL	STANDING LIQUID
ST	STAIN
UO	UNIDENTIFIED OBJECT
VEG	VEGETATION
VERT	VERTICAL
VT	VERTICAL TANK

APRIL 23, 1973 (FIGURE 5)

The Lockformer site remains active as numerous cars (not annotated) are present in the parking lot (not annotated) on the west side of the building. On the north side of the building, a stain extends northward from a loading dock, and possible containers (CONT) are observed in the open storage area. Located on the roof of the building near the southwestern corner are the vertical and horizontal structures, and a new, taller, horizontal structure. A possible stain is seen on the ground surface of the parking lot below these structures.

In the southern section of the parking lot are four dark, rectangular-shaped objects. These objects are flat and vary in size; two are approximately 5.5 meters (18 feet) long by 3 meters (10 feet) wide, the other two are about the same length, but are only about 2 meters (6 feet) wide. A possible stain and an adjoining, small drainage gully (annotated by the drainage arrow) are observed just to the southeast of these rectangular objects. In the vegetated field west of these objects, there is a small patch of dark-toned material and disturbed ground. In addition, the area of bare soil which contains numerous erosion gullies, and the two large ground scars remain visible. Smaller erosion gullies are also seen extending southwest from the parking lot. A smaller ground scar, perhaps associated with the forces of overland runoff, and the mounded material, possibly covered with vegetation are noted in the southern portion of the field.

The two well-defined drainage ditches and possible outfalls remain visible on site. The easternmost ditch joins an off-site drainage network to the south. A small ground scar is visible just west of the possible outfall. This ditch carries liquid southwest in close proximity to residential homes. Liquid from this ditch appears to pool in the probably saturated southern section of the vegetated field where runoff from the westernmost ditch and the agricultural land to the west also appears to collect. It is still not possible to determine which direction runoff from the railroad flows.

A large area of disturbed ground is visible along the western site boundary and extends off-site. This area of disturbed ground is probably associated with the residential home to the north. To the east of the site, and south of the commercial establishment, construction is in progress. The impoundment is no longer present and fill has been placed in the former location of the excavated area seen in 1970. However, more excavation activity is visible and the ground surface in many places remains disturbed. Within this new excavated area, saturated soil and standing liquid are evident. A pathway is present which allows this liquid to flow westward out of the excavated area and into the easternmost drainage ditch.

INTERPRETATION CODE

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◄	FLOW
	VEHICLE ACCESS
+ + + +	RAILWAY
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	MOUNDED MATERIAL (EXTENSIVE)
AG	AGRICULTURAL
CA	CLEARED AREA
COMM	COMMERCIAL BUSINESS
CONT	CONTAINERS
CR	CRATES
DB	DEBRIS
DG	DISTURBED GROUND
DT	DARK TONED
EX	EXCAVATED
FL	FILL
GS	GROUND SCAR
HOR	HORIZONTAL
HT	HORIZONTAL TANK
IM	IMPOUNDMENT
LT	LIGHT TONED
M	MATERIAL
MM	MOUNDED MATERIAL
OF	OUTFALL
OSA	OPEN STORAGE AREA
RES	RESIDENCE
SL	STANDING LIQUID
ST	STAIN
UO	UNIDENTIFIED OBJECT
VEG	VEGETATION
VERT	VERTICAL
VT	VERTICAL TANK

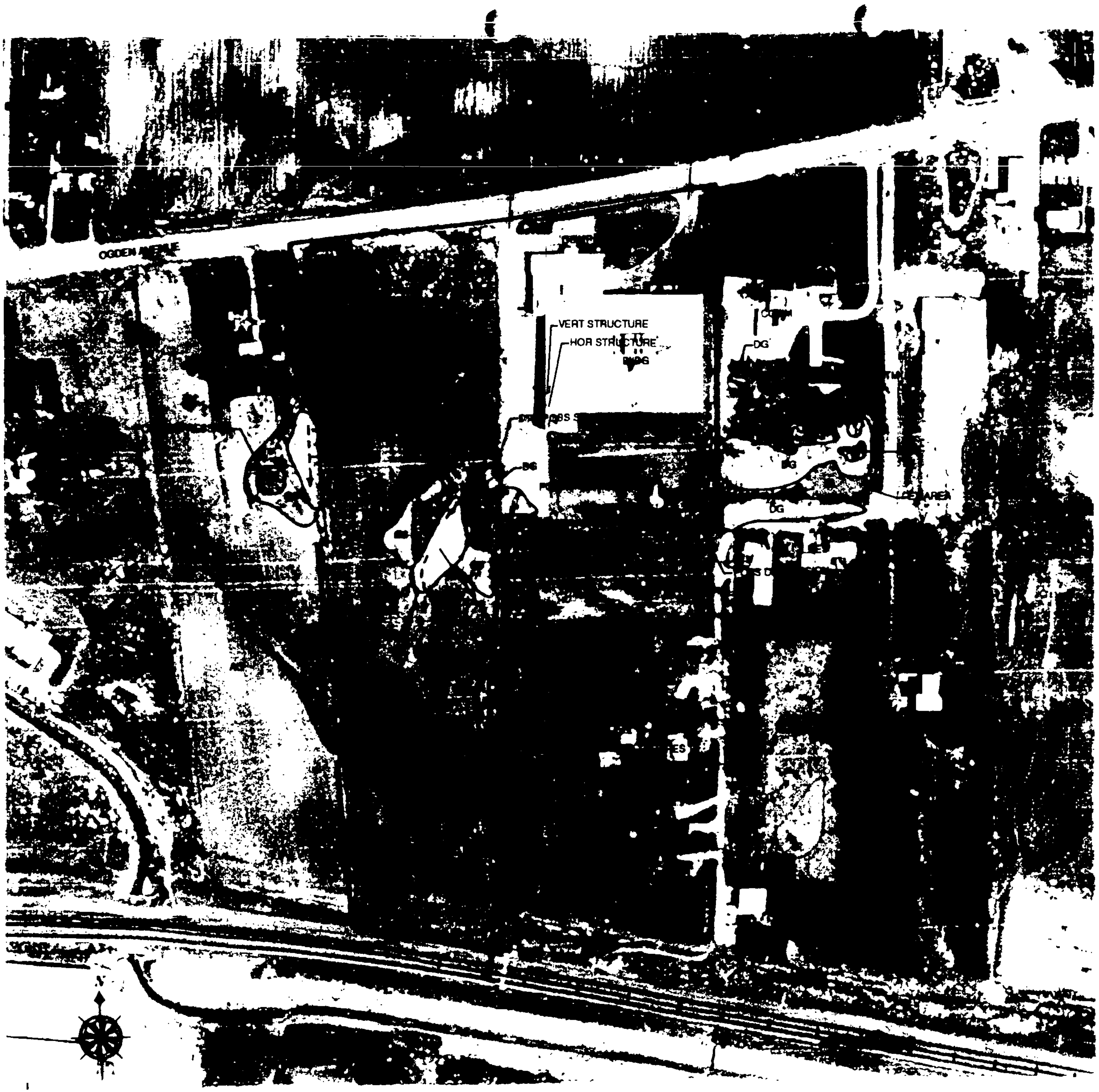
APRIL 26, 1975 (FIGURE 6)

No vehicles are present at the Lockformer site (Saturday overflight) but the facility appears operational. On the north side of the building, a stain extends northward from the loading dock, and possible containers are observed in the open storage area. Located on the roof of the building near the southwestern corner are the vertical and horizontal structures, but the taller horizontal structure observed in 1973 is no longer present. South of the building are two areas of disturbed ground; the first area of disturbed ground abuts the southwestern corner of the building, and the second area is located to the southeast. In close proximity to this second area of disturbed ground are a possible shallow depression and a long, thin, possible mound of material covered with vegetation. Direct access to the area from the building, via trail or road, is not discernible on this image.

In the southern section of the parking lot (not annotated) is an area of possible staining and a dark flow path. In 1973 four dark, rectangular-shaped objects were visible at this location. In the northern section of the vegetated field to the west of the parking lot is an area of probable saturated soil. To the south, the small patch of dark-toned material, possibly stained ground, and the area of disturbed ground that were seen in 1973 remain visible. In addition, the area of bare soil which contains numerous erosion gullies and the two large ground scars remains apparent. To the southeast the small, elongated ground scar, possibly associated with the forces of overland runoff, and the mounded material covered with vegetation are again observed.

The second, more expansive area of probable saturated soil remains prominent in the southern section of the site. This southern area of probable saturated soil appears to be the result of pooling liquids, which flow from the two well-defined drainage ditches and possible outfalls and agricultural fields. It is still not possible to determine which direction runoff from the railroad flows.

A large area of disturbed ground and ground scaring is visible abutting the western site boundary. Within the ground scar is a possible shallow depression. The shallow depression is in the same location where, in both 1960 and 1963, an excavated pit was observed. A drainage ditch is also visible transecting the area of disturbed ground, and it funnels liquid southward to the saturated part of the field located on-site. Access to this area from the site is not discernible on this image; these features are probably associated with the residential home to the north. Off-site and to the southeast of the building, the excavated area and standing liquid observed in 1973 remain visible. Liquid from this area drains to the west and joins the easternmost drainage ditch. The ground surface surrounding the excavation remains disturbed and four distinct areas of dark-toned material are now present. These four areas may be the result of pooling liquid. A smaller area of disturbed ground is located to the north.



INTERPRETATION CODE

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←———	FLOW
— — — —	VEHICLE ACCESS
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(symbol)	MOUNDED MATERIAL (EXTENSIVE)
AG	AGRICULTURAL
CA	CLEARED AREA
COMM	COMMERCIAL BUSINESS
CONT	CONTAINERS
CR	CRATES
DB	DEBRIS
DG	DISTURBED GROUND
DT	DARK-TONED
EX	EXCAVATED
FL	FILL
GS	GROUND SCAR
HOR	HORIZONTAL
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IM	IMPOUNDMENT
LT	LIGHT-TONED
M	MATERIAL
MM	MOUNDED MATERIAL
OF	OUTFALL
OSA	OPEN STORAGE AREA
RES	RESIDENCE
SL	STANDING LIQUID
ST	STAIN
UO	UNIDENTIFIED OBJECT
VEG	VEGETATION
VERT	VERTICAL
VT	VERTICAL TANK

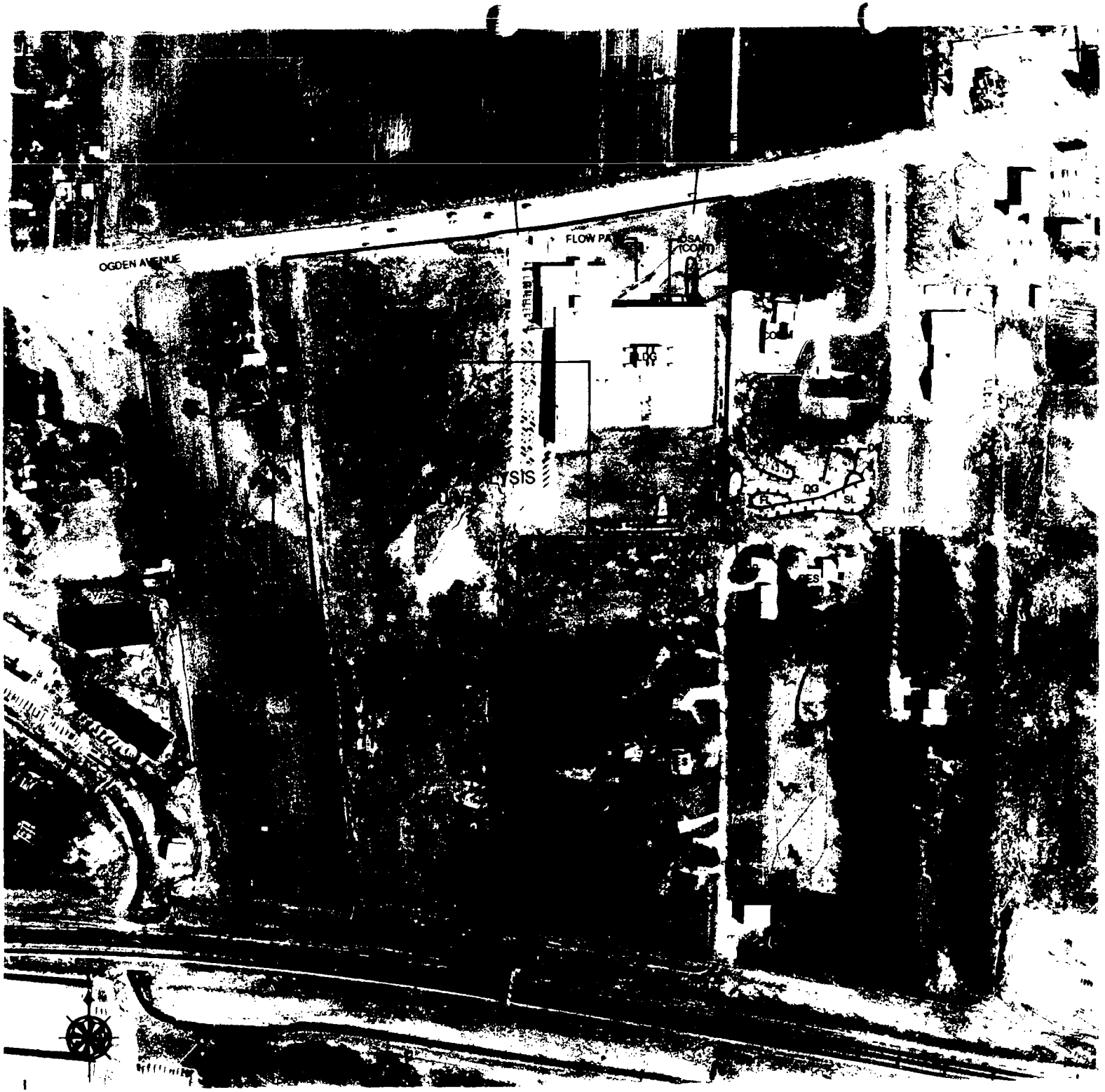
APRIL 6, 1977 (FIGURE 7)

The imagery available for 1977 has excellent resolution which allows more detailed examination of the features and enlargement of the area in the western portion of the site where there is significant disturbance. This image will be discussed in two parts. The entire site is shown in Figure 7, with text describing the features in the north, northeast, and south. The western/central portion of the site is shown and discussed in Figure 8.

The Lockformer site is active, and numerous cars (not annotated) are visible within the parking lot (not annotated) along the west side of the building. On the north side of the building, a ground stain extends northward from the loading dock, and containers remain in the open storage area. Just to the west of the open storage area, a dark flow path is again visible.

South of the building is seen the small area of disturbed ground and mounded material covered with vegetation. To the east, a concrete culvert and the drainage ditch are visible. Liquid that is discharged into this ditch continues to flow to the southwest in close proximity to several residential homes. This channel joins a second drainage channel near the southeastern site boundary, where the liquid collects in the saturated, southern part of the on-site, vegetated field. Several possible brush piles are also observed in this field. West of the saturated soil is an elongated pile of mounded material (possible debris [DB] and vegetation). This mound may obstruct the flow of migrating liquid from the agricultural land to the west.

Off-site, and to the southeast of the building, the disturbed ground, excavated area, and standing liquid remain visible. The western part of the excavated area has been filled, trapping the liquid in the eastern section. A large dump truck is actively filling in this excavated area from the pile of debris (probably concrete) located nearby. Well-defined tire tracks (not annotated) extend from the debris pile near the eastern site boundary to the eastern part of the excavated area. Two large mounds of fill (probable soil) are also located in the vicinity.



INTERPRETATION CODE

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←———	FLOW
— — — —	VEHICLE ACCESS
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	EXCAVATION, PIT (EXTENSIVE)
	MOUNDED MATERIAL (EXTENSIVE)
AG	AGRICULTURAL
CA	CLEARED AREA
COMM	COMMERCIAL BUSINESS
CONT	CONTAINERS
CR	CRATES
DB	DEBRIS
DG	DISTURBED GROUND
DT	DARK-TONED
EX	EXCAVATED
FL	FILL
GS	GROUND SCAR
HOR	HORIZONTAL
HT	HORIZONTAL TANK
IM	IMPOUNDMENT
LT	LIGHT-TONED
M	MATERIAL
MM	MOUNDED MATERIAL
OF	OUTFALL
OSA	OPEN STORAGE AREA
RES	RESIDENCE
SL	STANDING LIQUID
ST	STAIN
UO	UNIDENTIFIED OBJECT
VEG	VEGETATION
VERT	VERTICAL
VT	VERTICAL TANK

APRIL 6, 1977 (FIGURE 8)

This image is an enlarged sub-area of Figure 7.

The two structures located on the southwestern corner of the building roof are clearly seen to be a vertical storage tank (VT) and a horizontal storage tank (HT). Two possible stains are also observed on the roof of the building; the first is located by the vertical tank and the second is located near the southwestern corner. A ground scar abuts the south wall of the building and the western part of the vegetated mounded material is discernible to the south.

In the southern part of the parking lot (not annotated) is a large stain. Several distinct rectangular-shaped outlines (not annotated) are visible within the stain. These outlines represent the shapes of the dark, rectangular objects that were observed in 1973. This location may serve to finish or wash products manufactured at the facility. South of the stain is seen a mixture of possible debris and vegetation. Just north of the stain, a dark flow path crosses the parking area and terminates at a small, probably stained section of the ground surface. More probable staining and disturbed ground are visible in the vegetated field west of the parking lot stain. These features may be associated with the activities on the parking lot.

Saturated soil, ground scars, bare soil, and numerous erosion gullies remain discernible in the vegetated field west and southwest of the parking lot. South of the parking lot, near the site boundary, is a concrete culvert and the westernmost drainage ditch. Liquids drained by this ditch flow southward and probably collect in the field to the west (see Figure 7). Mounded material (possible debris and vegetation), a pile of probable debris, a possible crate (CR) and possible crate lid, and possible brush piles are also noted in the field. A ground scar (annotated as disturbed ground on previous images) and drainage ditch are visible along the western site boundary. Direct access via road or trail from the site building to the ground scar is not discernible on this image. These features are probably associated with the residential home to the north.

INTERPRETATION CODE

	SITE BOUNDARY
	DRAINAGE
	FLOW
	VEHICLE ACCESS
	RAILWAY
	EXCAVATION, PIT (EXTENSIVE)
	MOUNDED MATERIAL (EXTENSIVE)
AG	AGRICULTURAL
CA	CLEARED AREA
COMM	COMMERCIAL BUSINESS
CONT	CONTAINERS
CR	CRATES
DB	DEBRIS
DG	DISTURBED GROUND
DT	DARK-TONED
EX	EXCAVATED
FL	FILL
GS	GROUND SCAR
HOR	HORIZONTAL
HT	HORIZONTAL TANK
IM	IMPOUNDMENT
LT	LIGHT-TONED
M	MATERIAL
MM	MOUNDED MATERIAL
OF	OUTFALL
OSA	OPEN STORAGE AREA
RES	RESIDENCE
SL	STANDING LIQUID
ST	STAIN
UO	UNIDENTIFIED OBJECT
VEG	VEGETATION
VERT	VERTICAL
VT	VERTICAL TANK

MARCH 24, 1981 (FIGURE 9)

The Lockformer site remains active and the parking lot (not annotated) has been expanded adjacent to Ogden Avenue. Numerous cars (not annotated) are observed in the parking lot west of the building. On the north side of the building, a stain extends from the loading dock northward almost to Ogden Avenue. West of the loading dock, the open storage area observed in 1977 has been enclosed (not annotated). On the southwestern corner of the building roof are a possible vertical storage tank and a possible horizontal storage tank. An area of dark-toned material is also noted on the roof.

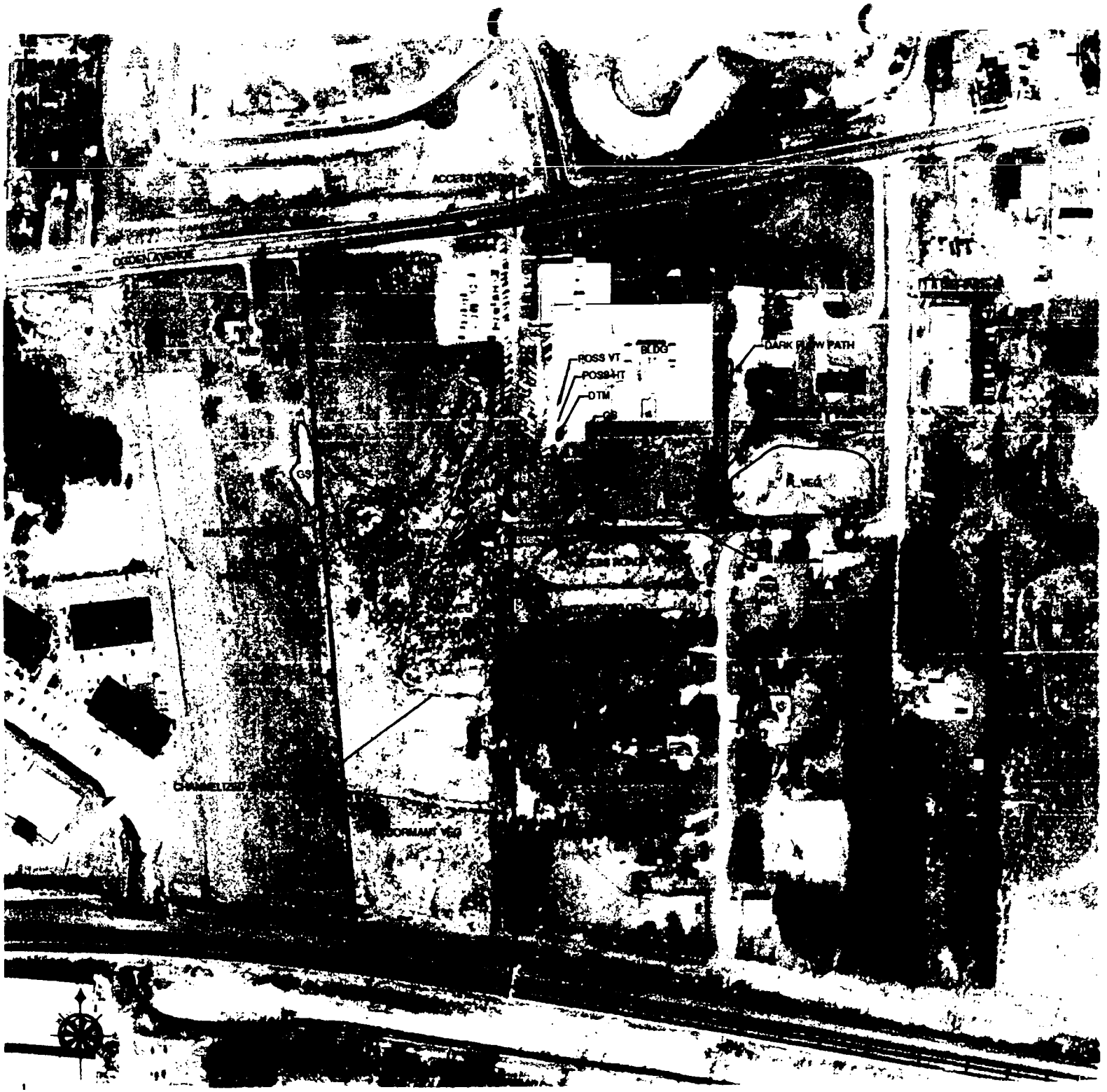
South of the building are two ground scars; the one closest to the building is new, but the scar adjacent to the vegetated mounded material has been observed since 1975, when it was described as disturbed ground. Direct access to these areas via a road or trail from the building is not visible on this image.

In the southern section of the parking lot is a possible stain. This is the same location where in 1977, staining was observed, and in 1973, dark-toned objects were identified. Just to the northwest is a ground scar.

In the vegetated field west of the parking lot, numerous erosion gullies (annotated by the arrows) remain visible. Just south of the parking lot extension, one such gully leads to a slightly depressed ground scar where the collection of liquid is likely, although none is present. To the southwest, a large pit containing light-toned material (possible standing liquid) has been excavated adjacent to the western site boundary. A well-defined drainage network allows liquid to enter the pit from the northeast. On the northern and western sides of the pit is the excavated soil (mounded material and possible vegetation). A second mound of material (possible soil) is located southeast of the pit. The top of this mound is flat and compacted and the sides are steep, indicating it was formed using earth-moving equipment (not visible on this image). The ground in the central portion of the field remains disturbed, and in places numerous small mounds (possible fill deposits) covered with sparse vegetation are observed. Also located in the central portion of the field is a second depression. The bottom is covered with a light-toned material (possible standing liquid) very similar to the material in the pit.

In the southern section of the field, two manmade drainage channels have been dug, apparently in an effort to allow pooling liquid to migrate east and away from the site. These channels join the existing drainage network (westernmost ditch) formed by discharged liquids from the possible outfall. The easternmost ditch and possible outfall are also visible and direct liquid to the southwest near existing residential homes, and then west into the field. Vegetation in the southern portion of the field is taller than surrounding vegetation and appears dormant, but a small patch of this field may consist of possible saturated soil.

A ground scar remains visible just outside the western site boundary. There is no discernible access to this location from the building, and this feature is probably associated with the residential home to the north. Off site tc the east, fill has been placed in the excavated area observed in 1977. This area has been graded and now supports sparse vegetation. A small, dark flow path is visible just east of the facility building. North of the site, the agricultural fields noted through 1977 have been cleared, and the infrastructure for a new housing development (not annotated) can be seen.



INTERPRETATION CODE

———	SITE BOUNDARY
←– – –	DRAINAGE
←———	FLOW
– – – –	VEHICLE ACCESS
+++++	RAILWAY
	EXCAVATION, PIT (EXTENSIVE)
	MOUNDED MATERIAL (EXTENSIVE)
AG	AGRICULTURAL
CA	CLEARED AREA
COMM	COMMERCIAL BUSINESS
CONT	CONTAINERS
CR	CRATES
DB	DEBRIS
DG	DISTURBED GROUND
DT	DARK-TONED
EX	EXCAVATED
FL	FILL
GS	GROUND SCAR
HOR	HORIZONTAL
HT	HORIZONTAL TANK
IM	IMPOUNDMENT
LT	LIGHT-TONED
M	MATERIAL
MM	MOUNDED MATERIAL
OF	OUTFALL
OSA	OPEN STORAGE AREA
RES	RESIDENCE
SL	STANDING LIQUID
ST	STAIN
UO	UNIDENTIFIED OBJECT
VEG	VEGETATION
VERT	VERTICAL
VT	VERTICAL TANK

MARCH 24, 1986 (FIGURE 10)

The Lockformer site remains active and numerous cars (not annotated) are visible on the parking lot (not annotated). On the north side of the building, a stain extends from the loading dock northward almost to Ogden Avenue, and a flow path is visible. On the southwestern corner of the building roof, the possible vertical storage tank, possible horizontal storage tank, and the area of dark-toned material (possible stain) are again observed. At the southern end of the parking lot a possible stain is observed. A new access road connects the southern end of the parking lot to a residential road to the east. A second access road from Ogden Avenue is visible at the northwest corner of the site.

Material deposits (not annotated) have been placed directly south of the building and in the field west of the parking lot. These deposits have substantially raised the elevation of both areas and have produced two extensive mounds. Both mounds are covered with vegetation, with the exception of the partially vegetated ground scar south of the building. A retention basin is also visible in the southern section of the site adjacent to the railroad. The gently inward-sloping top of the western mound channels runoff to the south and into this basin. A distinct erosion gully has been formed at the south end of this mound. On the western slope of this mound is an area of dark-toned soil. Both mounds and the retention basin were visible on the 1983 image which was not included in this report due to poor photographic resolution.

Only the easternmost ditch, and associated possible outfall, remains visible. This ditch is not as well-defined as in previous images and has been modified to divert liquids away from the residential homes located to the south. Liquids are channeled westward, where they are combined with runoff being funneled along the east side of the western mound. The liquids are then directed into the retention basin to the south, but no liquid is observed in the basin proper.

Two ground scars are visible in the agricultural land west of the site. The smaller ground scar is located in close proximity to an excavated pit that was visible on the 1960 and 1963 photographs (not included in this report). An access road (not annotated) extends from this ground scar to the residential home to the north. The southernmost ground scar is directly west of the area of dark-toned soil observed on the western slope of the on-site mound. To the east of the site, disturbed ground and light-toned mounded material are visible. North of the site, several new homes and foundations (not annotated) for future housing development are apparent.

INTERPRETATION CODE

———	SITE BOUNDARY
←– – –	DRAINAGE
←———	FLOW
– – – –	VEHICLE ACCESS
+–+–+–+	RAILWAY
	EXCAVATION, PIT (EXTENSIVE)
	MOUNDED MATERIAL (EXTENSIVE)
AG	AGRICULTURAL
CA	CLEARED AREA
COMM	COMMERCIAL BUSINESS
CONT	CONTAINERS
CR	CRATES
DB	DEBRIS
DG	DISTURBED GROUND
DT	DARK-TONED
EX	EXCAVATED
FL	FILL
GS	GROUND SCAR
HOR	HORIZONTAL
HT	HORIZONTAL TANK
IM	IMPOUNDMENT
LT	LIGHT-TONED
M	MATERIAL
MM	MOUNDED MATERIAL
OF	OUTFALL
OSA	OPEN STORAGE AREA
RES	RESIDENCE
SL	STANDING LIQUID
ST	STAIN
UO	UNIDENTIFIED OBJECT
VEG	VEGETATION
VERT	VERTICAL
VT	VERTICAL TANK

MARCH 24, 1998 (FIGURE 11)

The overlay for this image also includes the analysis of film representing 1988, 1992, and 1995. Reproductions of these years of historical aerial photographs are not included in this report. The years in which a feature was observed (including the current [1998] year) are indicated within the parentheses.

The Lockformer site remains active and numerous cars (not annotated) are visible on the parking lot (not annotated). On the north side of the building, a stain (1988, 1992, 1995, and 1998) extends from the loading dock northward almost to Ogden Avenue, and a flow path (1995 and 1998) is visible. On the southwestern corner of the building roof, are the possible vertical storage tank (1988, 1992, 1995, and 1998) and the dark-toned material (1988, 1992, 1995, and 1998). The possible horizontal storage tank was last observed in 1988. At the southern end of the parking lot, a possible stain (1988, 1992, 1995, and 1998) and a small patch of light-toned mounded material (1998) are observed. To the east of the possible stain is a possible refuse container (1998).

The mound (1988, 1992, 1995, and 1998) and vegetated cover remain visible south of the building. An area of disturbed ground (1998) is visible on the top of the mound. On the north side of the mound by the building is a compact, rectangular-shaped object, and on the south side of this mound is possible seepage (1998). A ground scar was observed at this location in 1988.

The mound (1988, 1992, 1995, and 1998) and vegetated cover remains on the western portion of the site. In the northern section of the mound, adjacent to the parking lot, a small ground scar was observed in 1988. Numerous areas of disturbed ground were identified on the mound in 1995 and 1998; one of these areas located near the western slope appeared to be a probable pit. South of this mound is an area of light-toned material (1998) and the retention basin (1988, 1992, 1995, and 1998). In 1995 an unidentified object (UO) and dark-toned material were observed within this basin. Runoff from the site continues to be channeled toward this basin, but no liquid is observed. Southeast of the basin near the railroad is an area of disturbed ground and possible dark-toned material (1998). Numerous trails (1995 and 1998) and an access road (1992, 1995, and 1998) traverse the western mound and retention basin.

A ground scar (1988, 1992, 1995, and 1998) is visible on the agricultural land west of the site. To the east of the site, disturbed ground was seen in 1988 and a ground scar was visible in 1998. Possible standing liquid was observed in 1992, 1995, and 1998. Dark flow paths were discernible in 1998; one of these connected to the possible standing liquid. The area north of the site has been completely developed.

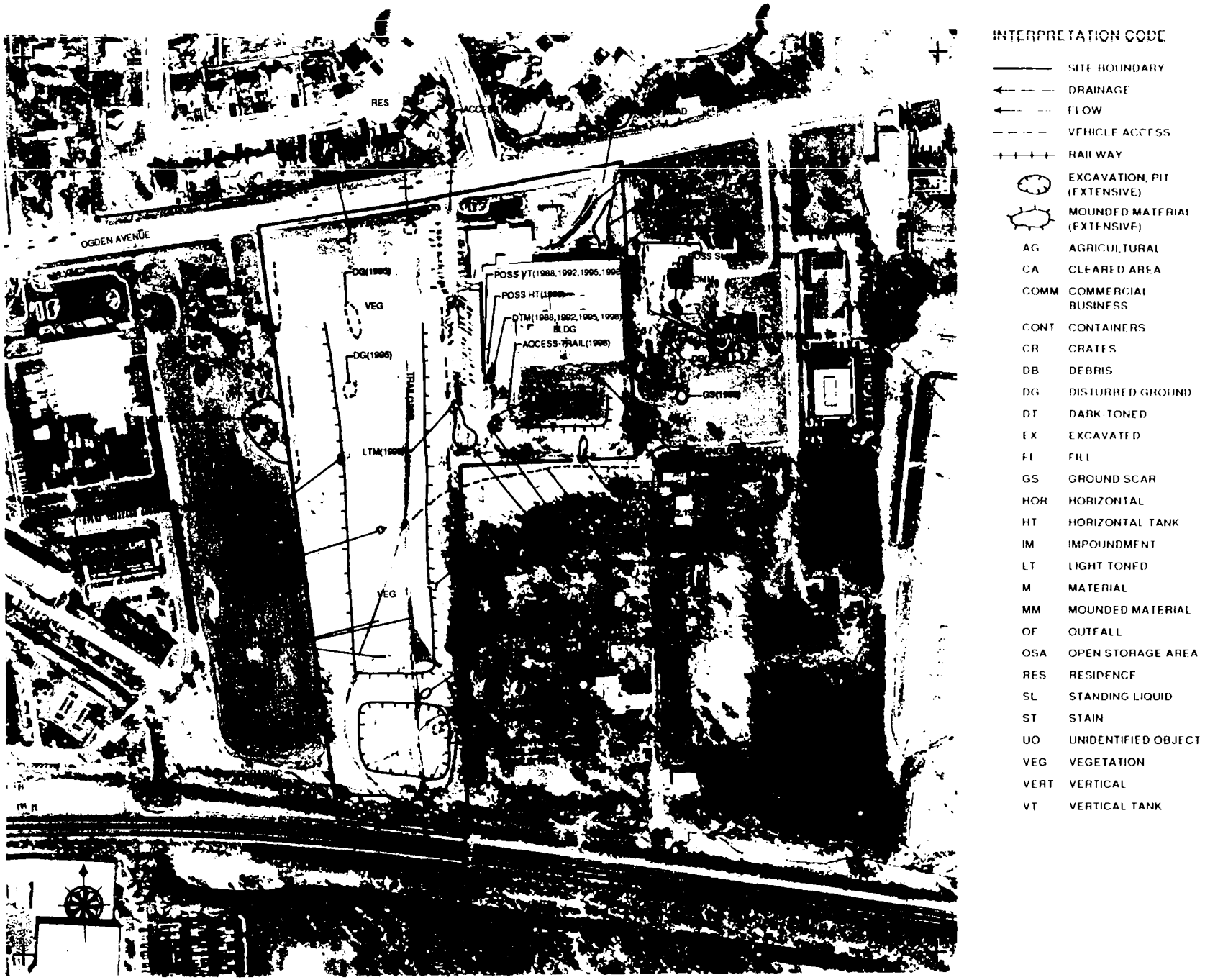


Figure 11. Lockformer site, March 24, 1998. Approximate scale 1:2,890.

GLOSSARY

Access Road - A paved or unpaved route of vehicular access.

Building - A relatively permanent, essentially boxlike construction having a roof.

Cleared Area (CA) - An area from which man has removed trees, shrubs, or other natural vegetative cover.

Container (CONT) - Any portable device in which material is stored, transported, handled, or disposed.

Dark-, Medium-, or Light-Toned - Tones of features in question are compared with the darkest and lightest tones of gray (if using B&W photography) on the print.

Debris (DB) - The remains of anything that can be identified as being broken down, destroyed, demolished, or dismantled.

Disturbed Ground (DG) - A rough area where the ground surface has been dug up or overturned.

Ditch - A long narrow excavation, as for draining or irrigating land.

Excavation Area - An area where earth or other material is being removed in order to alter the ground level (e.g., building construction).

Fill (FL) - Earth, stones, or other material that is used to build up the level of an area of ground.

Ground Scar - An area of bare soil, apparently the result of human activity.

Impoundment (IM) - A liquid containment area that appears to be related to activity on a site but does not appear to be used for waste storage, disposal and/or treatment.

Material (M) - Raw or waste materials on or in the vicinity of the site.

Mounded Material (MM) - Piles of raw or waste materials on or in the vicinity of the site.

Open Storage Area - An area of open-air (outdoor) storage of containerized, raw or waste materials, within industrial or manufacturing sites.

Outfall (OF) - The place where an effluent is discharged into the environment.

Pit - A steep-sided hole in the ground surface.

Stain (ST) - A residue or discoloration resulting from a spill, discharge, or removed/dispersed materials.

Standing Liquid (SL) - A small, shallow, temporary collection of liquid, not necessarily waste. Not to include liquid contained in impoundments, trenches, pits, etc.

Tanks - Vertical tanks (VT), horizontal tanks (HT), pressure tanks (PT), tank farms, and solid waste management units. A large receptacle, container, or structure for holding liquid or gas.

REFERENCES

MAPS

Source[a]	Figure	Name	Scale	Date
USGS	1	United States	1:2,500,000	1972
USGS	2	Wheaton, IL	1:24,000	1993

COLLATERAL INFORMATION

EPA. 2001. Collateral Information attached to the Remote Sensing Support Request Form.

LMS (Lockheed Martin Services). 2000. Master Quality Assurance Project Plan. Prepared for EPA Environmental Sciences Division. Contract 68-D-00-267. Las Vegas, Nevada.

AERIAL PHOTOGRAPHS

Photo source[a]	Figure	Date of acquisition	Original scale	Film type[b]	Mission I.D.	Source frame #
ASCS	3	10-19-67	1:20,000	B&W	BWS	271,272
CAPS	4	04-09-70	1:24,000	B&W	70100	37,38
SIDWELL	5	04-23-73	1:24,000	B&W		1157,1158,1159
CAPS	6	04-26-75	1:24,000	B&W	75100	37,38
SIDWELL	7,8	04-06-77	1:6,000	B&W		134,135,136
CAPS	9	03-24-81	1:24,000	B&W	81200	37,38
CAPS	10	03-24-86	1:24,000	B&W	85100	39,40
CAPS	11	03-24-98	1:24,000	B&W	98100	42,43,44