Site Review And Update

SOUTH ANDOVER SITE

ANDOVER, ANOKA COUNTY, MINNESOTA

CERCLIS NO. MND980609614

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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Site Review and Update: A Note of Explanation

The purpose of the Site Review and Update is to discuss the current status of a hazardous waste site and to identify future ATSDR activities planned for the site. The SRU is generally reserved to update activities for those sites for which public health assessments have been previously prepared (it is not intended to be an addendum to a public health assessment). The SRU, in conjunction with the ATSDR Site Ranking Scheme, will be used to determine relative priorities for future ATSDR public health actions.

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Prepared By:

The Minnesota Department of Health
in Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

INTRODUCTION

The Minnesota Department of Health (MDH) prepared a Health Assessment for the Agency for Toxic Substances and Disease Registry (ATSDR) for the South Andover Salvage Yards Site (the Site) in April 1989. The Health Assessment reviewed existing data for the Site. However, since its preparation, additional work has taken place at the Site. This Site Review and Update document will briefly review information contained in the Health Assessment (ATSDR 1989) and update that document with an evaluation of new information which reflects current conditions.

The 1989 ATSDR health assessment concluded that the principal identifiable concerns were the elevated levels of lead and PCBs in soil and the contaminated groundwater that may be used for drinking. Additional work to characterize any contamination of soil (which was covered by debris and tires at that time), air, and biota was recommended to better understand potential exposure pathways and determine if health risks were possible.

In early 1993, a group of PRPs settled with EPA in a Consent Agreement and hired a consultant to perform the necessary studies and to remediate the Site (CRA 1993a). Recent efforts funded by the PRPs further defined the areas requiring soil clean up. Remaining drums and all the stockpiled tires have been removed from the Site. Excavation and removal of contaminated soil from the Site is expected to be completed this Fall (1994).

SUMMARY OF BACKGROUND AND HISTORY

The information presented in this Site Review and Update was obtained from files maintained by the Minnesota Pollution Control Agency (MPCA). Additional information was gathered through a site visit and from discussions with MPCA staff.

Location and Physical Description

The Site is in the southern part of Andover, Anoka County, roughly 16 miles north-northwest of Minneapolis and three miles northeast of the City of Anoka. It is situated east of Crooked Lake and Coon Creek, south of Bunker Lake Boulevard and west of Hanson Boulevard. Jay Street is about 500 feet east of the Site. The Site's location is shown in Figures 1 and 2 (all Figures are included in Appendix A).

The irregularly shaped Site covers roughly 50 acres comprised of several parcels of privately owned land. The northern boundary is Bunker Lake Boulevard (see Figure 2). To the south, east, and west, the Site is bordered by private property. Small businesses and residential properties are in the immediate vicinity. Nearby development for residential and commercial uses is ongoing. Auto salvage, repair, and sales enterprises are active both on, and adjacent to, the Site. Several residences are located directly on the Site. A fence encloses areas of the Site not covered by businesses or residences.

About 3,000 feet to the north of the Site is another Superfund site; the WDE Landfill, also known as the Roth Landfill. The WDE site was a licensed landfill that placed hazardous

wastes in a lined pit. It is no longer active and was closed according to State regulations. The WDE Landfill is also shown on Figure 2.

For the sake of consistency, terms used in previous documents to designate specific areas or features of the Site will also be used in this report. Land parcels comprising the Site are designated as A through F (Figure 3). Wetlands have been labelled as 1 through 4 (Figure 4). Areas of past soil contamination are designated 1 through 10 (Figure 5). See Appendix B for additional explanation of soil contamination areas.

Operational History

Historical information indicates that a variety of wastes were handled (stored and disposed of) at the Site from the mid-1950s to the late-1970s. These wastes included ink, paint sludges, adhesives, solvents, scrap metal, junked automobiles, and large quantities of tires. Operations at the Site included auto salvage and repair, incineration, metal smelting, open pit dumping, solvent recovery, and electric transformer salvaging. Several auto salvage, repair, and sales enterprises continue to operate at the Site.

Industrial waste handling reportedly began at the Site in 1954 with storage of solvents and inks at the Cecil Heidelberger property (known as the Musket Ranch and Trading Post (Figure 6). For roughly a decade (1966-1976), Heidelberger recycled solvents by filtering and decanting drummed solvents. Excess sludge and liquid from this operation were reportedly disposed on the ground. The wastes taken by C. Heidelberger were obtained from several area factories, and for a period, these were also sold to recyclers. Disposal of wastes at the Heidelberger property is thought to have begun in or around 1965. Wastes were burned on the Batson property as early as 1970. The Mistelske property was used for storage of chemical wastes beginning in 1973.

The Heidelbergers ceased processing chemical wastes in 1977 and discontinued accepting these wastes in 1978, when they sold a portion of their property to Parmak/International Tire Recycling. The history of other waste handling operations at the Site is equally, or more, obscure.

In 1983, a tire shredding/chipping operation began at the Site through a contract with Mr. Heidelberger. Several different tire recyclers were involved in the shredding of the vast store of tires at the Site. Two large fires at the Site burned stockpiled tires and possibly other wastes. The first fire happened in July,1988 in the northeastern portion of C. Heidelberger's property and was followed by a much larger fire over three to five acres in February, 1989.

The parcels (see Figure 6) comprising the Site were used by their owners for varied disposal activities. The following activities were reported in Site documents for the respective areas designated by ownership:

- Heidelberger property -- Areas were used for storage and disposal (dumping, sale

of decantable liquids, and possible burning) of drummed chemical wastes, junk auto and scrap storage, and stockpiling of an estimated 3 million tires. A smelter was formerly located on the portion of property purchased by Kline.

- Batson property -- Portions were used for open pit burning of thousands of barrels of solvents and inks. A wetland on the western portion of the parcel was allegedly used for dumping liquids before it was filled.

- Mistelske property -- This property was used for storage of thousands of gallons of paints, grease, and adhesives in containers.

- Meyer (formerly S. and D. Heidelberger) property -- Drums of chemical wastes stored and spilled along the northern side of the parcel.

- Klar (formerly Link) property -- This property was used for drummed waste storage, salvage material storage, transformer and electrical equipment storage, and was the location of a smelter.

Geology and Hydrogeology

The Site is located on the Anoka Sand Plain, a virtually continuous unit of outwash sand generally 20 to 60 feet in thickness which covers an area of several hundred square miles in east-central Minnesota. Distinct layers of glacial drift lie below the Anoka Sand Plain. There is little topographic relief in the area--approximately 20 feet across the Site (CH2M Hill 1985). Filling of Site wetlands over recent decades has modified the topography somewhat.

Three major geologic units make up the unconsolidated material beneath the Site. In descending order, these are: 1) the Upper Sand (surficial) aquifer, which is 20-50 feet thick and comprised primarily of the Anoka Sand Plain materials; 2) an intermediate till and lacustrine aquitard of laminated silt and clay roughly 50-70 feet thick; and 3) the Lower Sand aquifer which is greater than 35 feet thick. The middle aquitard is mainly composed of lake sediments with discontinuous units of till. Each of these main units are thought to be continuous and extend laterally off Site. A clay till layer also underlies the Lower Sand aquifer under parts of the Site, but its continuity is not known. Above the natural deposits, almost all areas of the Site, except the south-central portion, contain fill to roughly three foot depths or greater; borings encountered sand, wood, metal, cement, tire wire, and rubber debris from 2-10 foot depths (Donohue 1991a).

The unconsolidated units are underlain by bedrock (sandstone and shale) aquifers. The uppermost bedrock beneath the Site is composed of the St. Lawrence and Franconia Formations. The St. Lawrence is considered a confining bed which retards groundwater movement into lower depths. There is approximately 100 feet of relief on the subcropping bedrock under the Site with deepening toward the west. The Franconia formation also functions as an aquifer. Major bedrock features in the area are a deep southwest-trending

buried valley west of the Site and a bedrock high under the northwest part of the Site (CH2M Hill 1988). It is thought that a tributary to the buried valley extends beneath the Site (Donohue 1990a).

The water table (uppermost surface of groundwater) is very shallow in the Site's vicinity (MPCA 1975, RMT 1981). On a regional basis, the depth to water is generally from 5 to 15 feet below the surface (Donohue 1990a); however, groundwater was encountered at 0.5 to 14 foot depths in borings at the Site (Donohue 1991a). Groundwater moves within the two sand aquifers and can be pumped from them. In contrast, its movement is slowed or prevented by the low-permeability fine-grained silt and clay of the aquitard. Groundwater movement in the Upper Sand Aquifer is mainly downward and radial to the west-southwest following a regional gradient of flow toward Coon Creek. In the Lower Sand unit, the groundwater moves in a southwesterly direction (EPA 1992). Water level measurement data from nested wells indicated a strong downward component of flow in the surficial sand aquifer and the middle aquitard unit. Groundwater flow in the underlying bedrock is generally to the southeast (Donohue 1990a).

There are several surface water bodies in the Site's vicinity. Crooked Lake is roughly one mile to the west, and Bunker Lake about one and one-quarter mile east. Coon Creek, which meanders through the county, flows southerly about 1 mile west of the Site en route to joining the Mississippi River at about six miles distant. Four wetland areas are on or adjacent to the Site; these are situated to the north, west, south, and in the middle of the Site (See Figure 4). Portions of the on-Site wetlands have been filled during Site use. Surface drainage in the area of the Site is to surface water bodies and wetland depressions. The Site is situated within the Coon Creek watershed.

Regulatory Actions and Site Investigation/Remediation

In 1973, the County and State began attempts to compel C. Heidelberger (then owner of the Musket Ranch portion of the Site) to remove and dispose of drummed wastes stockpiled at the Site. Citizen complaints of suspected well contamination led MPCA to begin investigations at the Site in 1975. In 1976, the MPCA inspected the Site, collected soil boring samples, and sampled water from two private wells nearby in an attempt to determine the source of contaminants found in a neighbor's well. Samples from both media yielded solvent odors and evidence of groundwater contamination. A Citation of Violation was issued to Mr. Heidelberger and his wife in 1976, whereupon MPCA requests for further study of the groundwater situation were refused and access to the Site for sampling purposes was denied.

In 1979, a group of Andover residents raised concerns about the Site and the MPCA renewed its enforcement efforts and requested EPA assistance. Several inspections by the MPCA that year revealed Heidelberger was moving barrels around on the property, resulting in spillage of drummed wastes. The Agency ordered Heidelberger to clean up spilled material and contaminated soil, but instead he continued to move barrels about the property with additional releases of the wastes. MPCA and EPA inspectors also noted that barrels containing liquids

and other unlabeled wastes on both the Heidelberger and the Parmak parcels were in poor condition (e.g. bulging, rusting, and leaking). Both parties were notified that the situation should be brought into compliance. Legal haggling over responsibility for barrels on the property acquired by Parmak complicated negotiations for their removal. Despite State and County efforts to compel the operator to address the barrel situation, no adequate response was forwarded.

Since 1980, the MPCA and U.S. EPA have conducted several investigations of the Site. These included two Remedial Investigation/Feasibility Studies and a Design Investigation Study. Hydrogeologic investigations revealed inorganic and organic contamination of shallow groundwater in localized areas of the surficial aquifer under the Site. Several hundred soil samples revealed a sporadic "hot spot" distribution of contaminated soil. Halogenated volatile organic compounds, semivolatile organic compounds (polychlorinated biphenyls (PCBs), pesticides, polyaromatic hydrocarbons (PAHs), phenols, phthalates) and metals were found; these were generally limited to surface or shallow soils.

Due to the lengthy time span of these and subsequent regulatory actions, complexity of the many proceedings, and the number of different entities involved, a more detailed description of these and other investigative/regulatory activities is enclosed in Appendix C.

The Site has been investigated and is being addressed in phases which concentrate on separate, yet related, media. These are termed operable units (OUs) in Site documents. The first unit (OU1) is the contaminated groundwater. The second unit (OU2) is the surface soil and surface water. Clean up activities have been designed to deal with each of these two OUs.

At the present time, the groundwater is being addressed through continued monitoring. The contaminated soil that poses potential risks to health will be removed from the Site and replaced with clean materials.

CURRENT SITE CONDITIONS

On June 14, 1994, David Jones and Rich Soule of MDH, visited the Site. The Site property and the surrounding neighborhoods were viewed. The following conditions were observed:

- Active auto salvage and repair businesses currently operate on the Site's north, east (on either side of Jay Street), and west sides. Large numbers of vehicles and parts from these operations are present in parts of the Site.

- A large open portion of the Site (denoted as State of Minnesota ownership in Figure 6) has been fenced to restrict access. Warning signs are posted on portions of this fence. Gates on the fences are chained and locked.

- Some of the active business areas of the Site (especially along Jay Street and Bunker

Lake Boulevard) are also enclosed within various types of fences, however, the operations on the western side are not fenced.

- A few shredded tires, drums, steel belts, scrap metal, and various pieces of debris are scattered across inactive portions of the Site.

- Standing water is visible on, and adjacent to, the Site's southern side. Standing water was also visible immediately west of the Site's southwest corner.

- There are private residences on the northern and western sides of the Site. These are generally not fenced and may be accessible to residents, visitors, or trespassers. A large vegetable garden was noted near Bunker Lake Boulevard, in front of one of the homes.

- A sizeable residential neighborhood exists north of the Site across Bunker Lake Boulevard and extending west. Another large development of homes is south and southeast of the Site approaching its southwest border. New homes are being built toward the Site from the southeast.

- A new paved road is being built approaching along the southern border of the Site. This road ends where it meets the Site fence.

The Site is located near a large metropolitan area which includes Minneapolis (population 368,559), Anoka (population 17,409), and Andover (population 16,887); population estimates are from 1992 census figures.

CURRENT ISSUES

The following address remaining issues (contamination and exposure pathways) of potential public health importance. These are organized according to media.

Soil

Low level VOC (low part-per-billion concentrations) contamination exists in isolated areas (soil and groundwater) of the Site. The concentrations of VOCs found, however, do not pose significant health risks. Semivolatile compounds, mainly PAHs, were found in soils in Areas A, C, and E. Those of greatest concern are carcinogenic PAHs, due to their potential contribution to cancer risks. Another semivolatile compound, bis(2-ethylhexyl)phthalate, was found in soil and groundwater over most of the Site. Low levels of PCBs were found in surface soils across most of the Site, most concentrated near the former transformer salvaging areas. Areas B and E also contain elevated levels (compared to background concentrations) of antimony and lead associated with fill materials at the surface.

The most contaminated areas of the Site's soil were characterized through various sampling studies. Those areas identified for clean up are shown in Figure 7. The amended Record of Decision (ROD) for the soil operable unit will require removal of all contaminated material above risk-based action levels followed by backfilling with clean soil obtained from off-site (CRA 1994c). This clean up activity is proposed to begin in late 1994. It includes excavation of contaminated soil, followed by removal for off-site disposal or treatment as determined by the type of contamination.

A tarry substance was identified near wetland 1 (see Figure 4) on-Site. Plans are to remove this material from the Site along with other contaminated soils in the Fall of 1994.

Access to the Site properties is only partially controlled because fences are incomplete and can be easily climbed in areas. Children have been observed on the Site by Donohue staff (Donohue July 1991). There is also a history of large holes being cut into the fences for vehicular access and gates being left open, suggesting trespassing may be a problem and access is not adequately controlled. If an individual were exposed to contaminated areas of the Site on a frequent basis, it could constitute a significant, complete exposure pathway. However, the frequency of exposure to contaminated areas by individuals is not currently known. Therefore exposure by this pathway can not be evaluated at this time.

Surface Water

Past sampling identified low level contamination in the waters and sediments of wetlands on and near the Site. These wetlands are not used for recreational purposes (e.g. fishing, boating, swimming) or food production, but they may be used periodically by youngsters for play. If children play in these waters, they may be exposed to contaminants. Frequency and extent of any such exposure, however, are not known and depend upon the activities involved. Although some exposure to wetland contaminants might occur, the EPA Baseline Risk Assessment (Donohue 1991b), concluded that the low levels of contaminants in the wetlands should not pose human health risks.

Tar-like material adjacent to and in Wetland 1 will be removed and disposed of properly. Other soil contamination extending into Wetlands 1 and 4 requires excavation into these areas (CRA 1994c). The most contaminated wetlands were those on the Site and it is not possible to know if the contaminants in off-site areas are related to past Site operations or to other sources.

Groundwater

Groundwater from both the Upper and Lower Sand aquifers contains low levels of VOC and semi-volatile organic compounds. Results from the first Remedial Investigation showed concentrations of vinyl chloride, methylene chloride, acetone, trans-1,2-dichloroethylene, trichloroethylene, 1,1,2-trichloroethylene, tetrachloroethylene, toluene and bis(2-ethylhexyl)phthalate above Maximum Contaminant Levels (MCLs), State health-based

guidelines (Recommended Allowable Limits (RALs)), or State standards (Health Risk Limits (HRLs)). However, none of these were found above regulatory levels in samples collected in the 1990 Design Investigation (DI) sampling (Donohue 1992). Also, no PAH contamination of groundwater was noted during the DI.

Cadmium, vanadium, and nickel were found above RALs or MCLs in monitoring well samples from the Upper Sand Aquifer (CH2M Hill 1985-1987). Such exceedences were not confirmed in 1990 samples. However, arsenic, beryllium, lead, selenium, thallium, zinc and manganese were detected above either MCLs or RALs in the 1990 samples.

The Baseline Risk Assessment found no health risks associated with the groundwater pathway, with one possible exception. During the DI, arsenic was found in one shallow on-Site monitoring well (21B) at 78.4 micrograms per liter (µg/l), which is above past MDH guidelines for private wells (RALs) and also above the Federal MCL. Other detections of arsenic--15.3 µg/l in a second shallow monitoring well and a range of 2.6 to 7.2 µg/l in four Lower Sand monitoring wells-- were also reported for 1990 sampling (Donohue 1992); however, no individual source was found to account for the elevated arsenic. Most of the arsenic was found near the southwestern portion of the Site.

Although past sampling of residential wells (1980 and 1986) detected organic chemicals in private wells on site, all residential wells sampled in 1990 were free of Site-related contaminants. Still, manganese exceeded the MCL and HRL in RW01. The majority of area residents (new homes) are supplied by municipal water, although there are still some older homes on and near the Site that use wells (Donohue 1991b). Most wells in the Site's vicinity obtain water from the uncontaminated uppermost bedrock aquifer (EPA 1991a). Currently, it is believed that three residential wells remain at the Site and may be used for household purposes.

Semi-annual monitoring will include groundwater sampling from ten monitoring wells and one residential well listed below (CRA 1993a). Each will be tested for 18 inorganics (metals) and 11 VOCs. These are shown in Figure 8.

W16A	W21B	W21C	W21A
W17A	W23AR	W23C	W1CR
W19A	W23B	RW6	

There does not appear to be any formal plan to provide ongoing testing of any other private wells at or near the Site. Because it is currently unclear from available Site documents how many private wells remain in use at or downgradient from the Site, it is unknown if scheduled remedial actions will be adequately protective of groundwater. Therefore additional data regarding the number of wells currently in use and the extent of contamination in the drinking water aquifer need to be collected to better assess potential exposure and resolve this uncertainty.

Air

The only known air-quality measurements made at the Site were during a 1983 inspection. No measurements were recorded above ambient background using an HNU photoionization detector; however, strong winds were reported for the sampling period (CH2M Hill 1988). No odors were noted during a 1994 visit to the Site by MDH staff. Nevertheless, the air pathway has not been adequately investigated to rule out exposure to contaminants, in dusts or vapors, at the Site.

During the upcoming contaminated soil removal, airborne particulates and fugitive dusts will be minimized by application of water to keep excavated material moist (CRA 1994d).

Food-Chain

There is no data on any edible biota or produce that could be affected by Site related contamination, although at least one vegetable garden is known to exist at a residence on the Site's north side. Ingestion of produce contaminated by bioaccumulation or deposition of particulates was not evaluated in the 1991 EPA Baseline Risk Assessment due to uncertainty and a lack of appropriate data for risk calculations (Donohue 1991b). Therefore, the food ingestion pathway remains a potential route of exposure that has not been adequately investigated.

Discussion

The data used for estimating risks from potential exposure to contaminated soil and for planning clean up actions showed a discontinuous "hot spot" distribution of contaminants in soil. These data are consistent with past waste handling (leakage of stored containers) and disposal (dumping) in localized areas throughout the Site. However, the directed sampling at the Site may have missed some areas or depths that could also be contaminated. The Baseline Risk Assessment (Donohue 1991b) notes that risks are also possible for contaminated areas that were not sampled and identified, if any such areas were missed in the sampling efforts.

No samples from the Site were tested for polychlorinated dibenzofurans or polychlorinated dibenzodioxins which might have been released or formed during waste handling (especially burning) or resulted from chemicals in the tire fires. Therefore, it is unknown if these compounds are present and it is not currently possible to assess their potential risks.

Sampling, such as that performed at the Site from the top several inches of soil should not be designated as surface soil or used to rule out human exposure based upon concentration-based risk estimates. Such samples can underestimate the concentration of contaminants to which people may be exposed, especially if the contaminants bind tightly to the upper organic layer (top centimeters) of soil (e.g. lead, PCBs, or PAHs).

The 1988 tire fire may have formed and deposited PAHs and other aromatic hydrocarbons at the Site's surface. Tire fire residue may still be buried at the Site because sand was used to extinguish the second fire in 1989. Such material could pose health risks in the future. If it is not removed, future Site activities may allow a completed exposure pathway to be created.

Arsenic in groundwater was identified as a potential health risk that could be significant if users were exposed regularly (e.g. through drinking water use) to the levels found in groundwater under some portions of the Site (Donohue 1991b, 1991c). Although data suggest there may be a source of arsenic at the Site, none could be identified. Nevertheless, the levels of arsenic in groundwater below the Site exceed health-based guidelines for drinking water use and pose a health risk if people are exposed to such levels for long periods of time.

Several detections of manganese (61.1 to 1,030 µg/l) in 1990 groundwater sampling exceeded the MCL and the current HRL for manganese (MDH 1994). However, these were not judged to be of regulatory concern in the 1991 Baseline Risk Assessment because the calculated intake of manganese from groundwater would be less than the Recommended Daily Intake for manganese (Donohue 1991b). Despite that rationale, MDH health-based rules require restricting potable use of any well water which consistently yields greater than 100 µg/l manganese. This HRL is designed to protect regular water users from nervous system effects attributed to manganese exposure.

Physical hazards also exist in portions of the Site. These include scrap automobiles and other heavy equipment, unstable objects, or sharp items remaining at the Site's surface. The presence of such physical hazards pose a threat of injury to any trespasser, resident, or worker in these areas.

Community Concerns

The largest concern registered in the surrounding community involves the possible decline in property values as a result of Site activities. A fact sheet was distributed to the public by MPCA in April, 1994 describing changes being proposed to the soil cleanup (see "Soil" section above). MPCA continues to make regular efforts to update the community regarding Site status and upcoming activities.

CONCLUSIONS

1. The Site is the location of past and ongoing scrapyard operations. Several individuals also have lived, and continue to reside, at the Site.

2. Several investigations demonstrated that surficial soils and shallow groundwater at the Site are contaminated with several different contaminants. The distribution of soil and groundwater contamination is, however, spatially discontinuous and appears to be localized. Soil contamination which was determined to pose a potential health risk if people were

exposed regularly to it will be removed from the Site. However, at the present time there are contaminants of potential health concern remaining in on-Site soils.

3. Access to the Site is only partially controlled because fences are incomplete and can be easily climbed in areas. Children have been observed on the Site by Donohue staff (Donohue July 1991). There is also a history of large holes being cut into the fences for vehicular access and of gates being left open. This suggests that trespassing may be a problem and that access is not adequately controlled.

4. Past findings of contamination in residential wells on-Site resulted in the owners being advised not to use their wells. It is unknown, however, if the advice is being followed or even how many wells may actually be in use at or near the Site. One private well at the Site will be monitored regularly by the MPCA. The possibility of issuing a Well Drilling Advisory needs to be further investigated. Due to these uncertainties, additional data regarding the number of wells currently in use and the extent of contamination in the drinking water aquifer should be collected.

5. The groundwater data collected in 1990 showed that groundwater contamination was generally below regulatory standards. The Baseline Risk Assessment completed for the RI/FS Operable Unit II found no potential health risks associated with the groundwater pathway, with the possible exception of arsenic. Consequently, the 1988 ROD for groundwater was amended to include only continued monitoring.

6. The remedy chosen (1991 ROD) for the contaminated soil included excavation and on-site biological treatment or excavation and removal to an approved facility. This ROD is being amended to require removal of contaminated soil to an off-site location. It is expected that soil cleanup will also reduce or eliminate future contamination of area groundwater.

RECOMMENDATIONS

The following are recommended by MDH based upon the information reviewed for this report and the conclusions above:

1. Because there is a history of barrels of waste showing up on the Site, holes in the fence, and trespassing, and because contamination remains in soil, access to the Site property should be controlled.

2. The planned groundwater monitoring is supported by MDH. Unused monitoring wells and any remaining private wells that are not being used should be properly abandoned according to the MDH Well Code. Additional information regarding the number of private wells in use in the Site area should be collected to better assess potential exposure pathways.

3. Any private wells used for drinking water or household supplies at or near the Site should be monitored regularly. Future installation of any such wells into contaminated aquifers

should be prohibited. The need for a Well Drilling Advisory will be investigated by MDH. If an advisory is deemed to be appropriate, one will be issued.

4. Appropriate safety precautions and personal protection should be used by all Site workers involved in the Remedial Actions at the Site. Measures should be taken, during the remediation, to prevent people in on- and off-site areas from being exposed to vapors or contaminated airborne particulates. In particular, fugitive dusts should be controlled for remediation work near residences or business operations.

5. Site residents, workers, and the local population should be kept informed about the Site's status, especially about any hazards identified in areas where access is not controlled. The public should also be encouraged to respect the fences and signage by staying off the Site and be educated regarding potential hazards at the Site.

6. As any additional data on Site use activities or contamination (including post-remedial data) becomes available, MDH will review its conclusions and recommendations for any necessary changes that may be of public health importance.

Health Activities Recommendation Panel Recommendations:

The data and information developed in the Site Review and Update have been evaluated to determine if follow-up actions may be indicated. No further follwo-up actions are indicated at this time.

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Preparer of the document:

David B. Jones, M.S.
Research Scientist

Betsy Gerbec, PhD
SAC Unit Leader

Daniel Symonik, M.S.
Research Scientist

Site Assessment and Consultation Unit
Minnesota Department of Health

Appendix A.

Figures 1 through 8

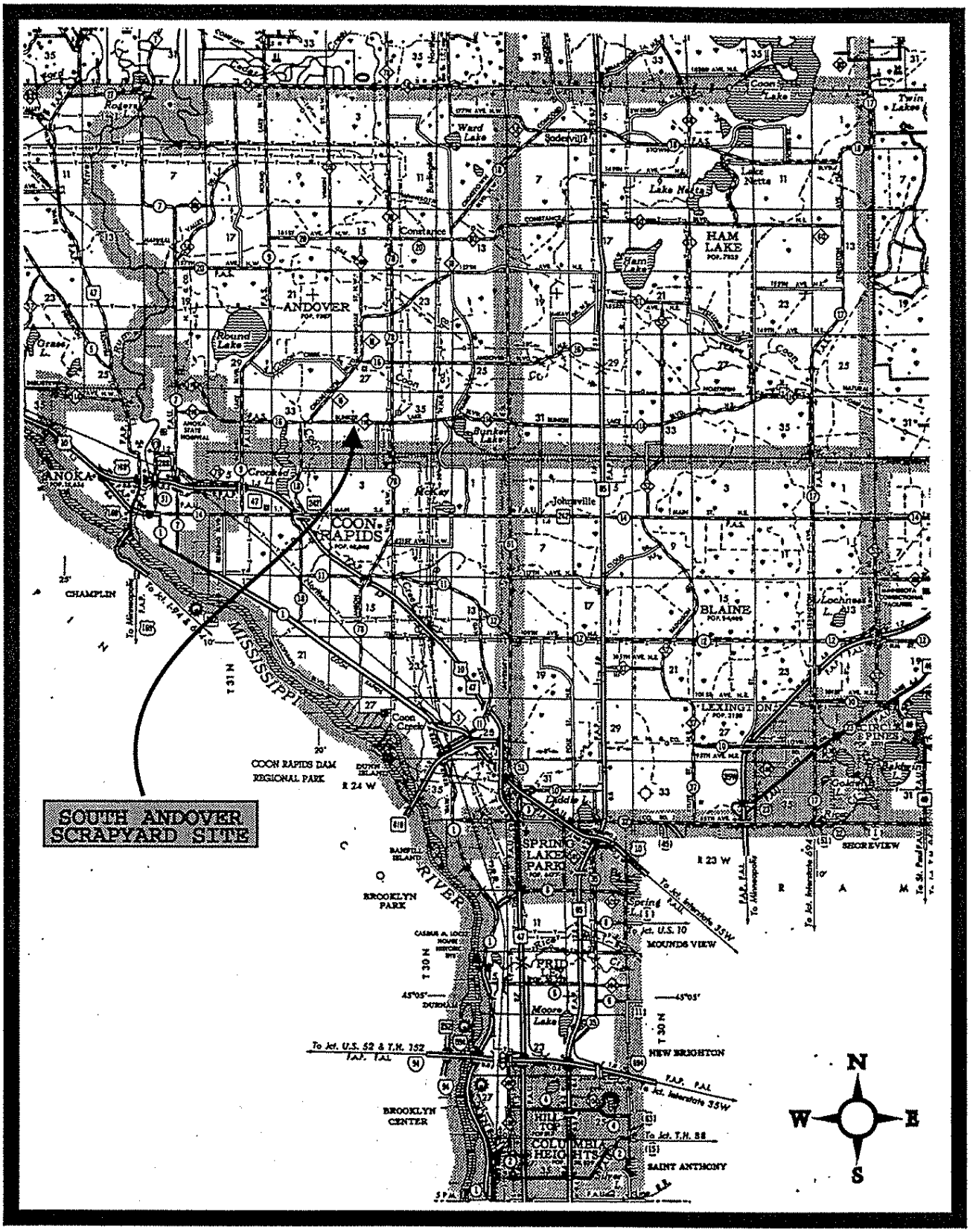

Figure 1. Site location in southern Anoka County

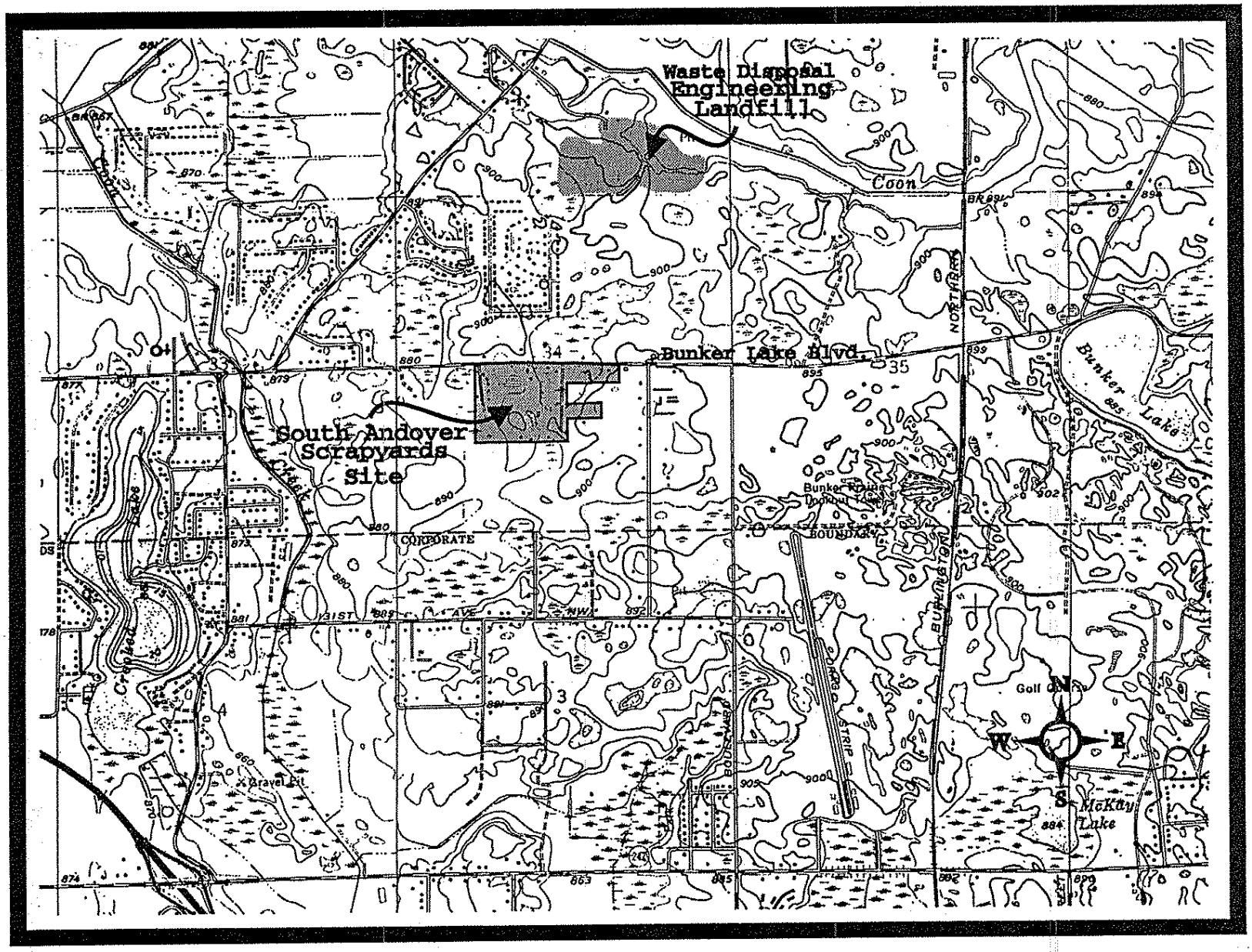

Figure 2. Site location map and surroundings

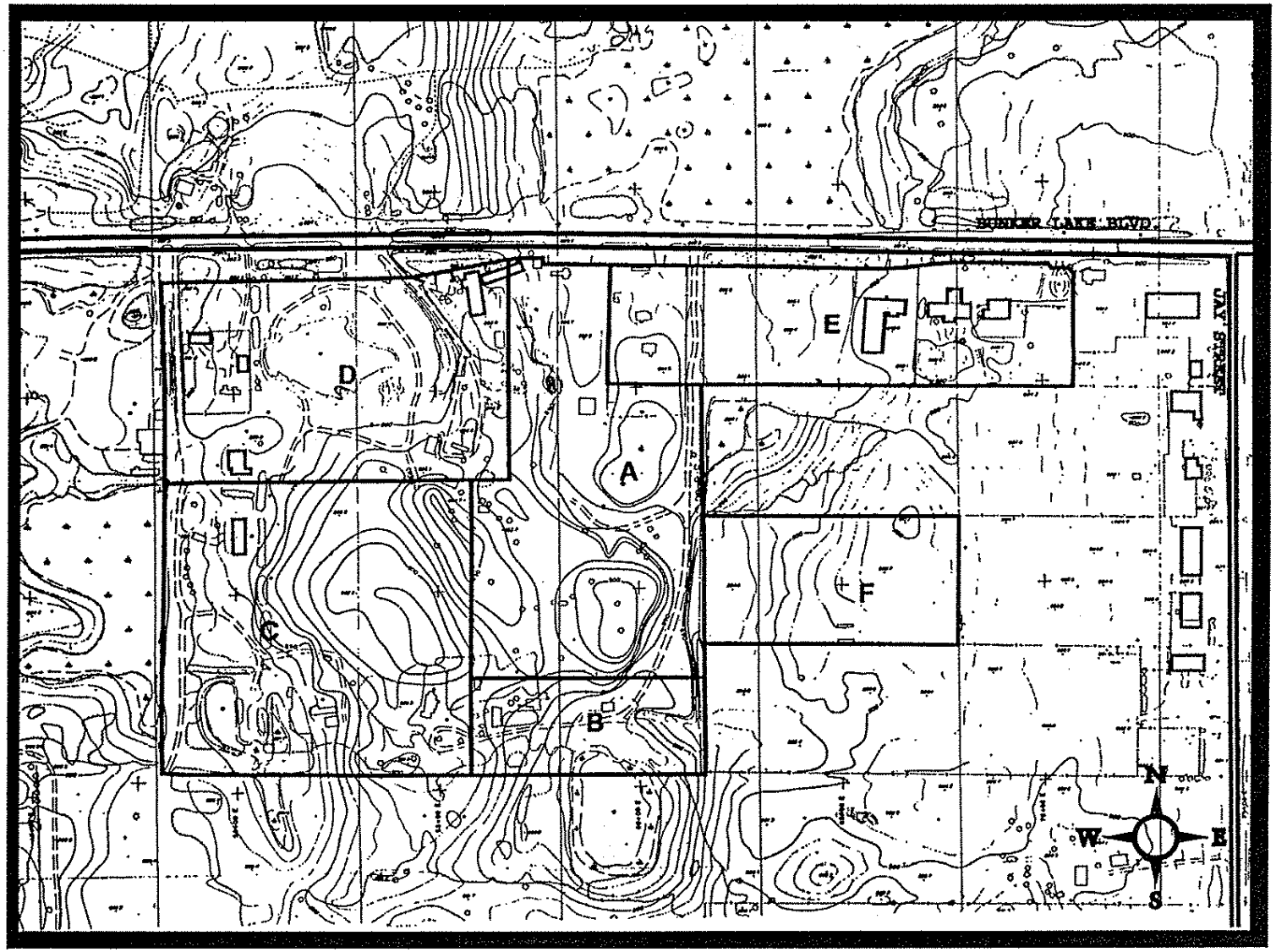

Figure 3. Site parcels A,B,C,D,E, and F

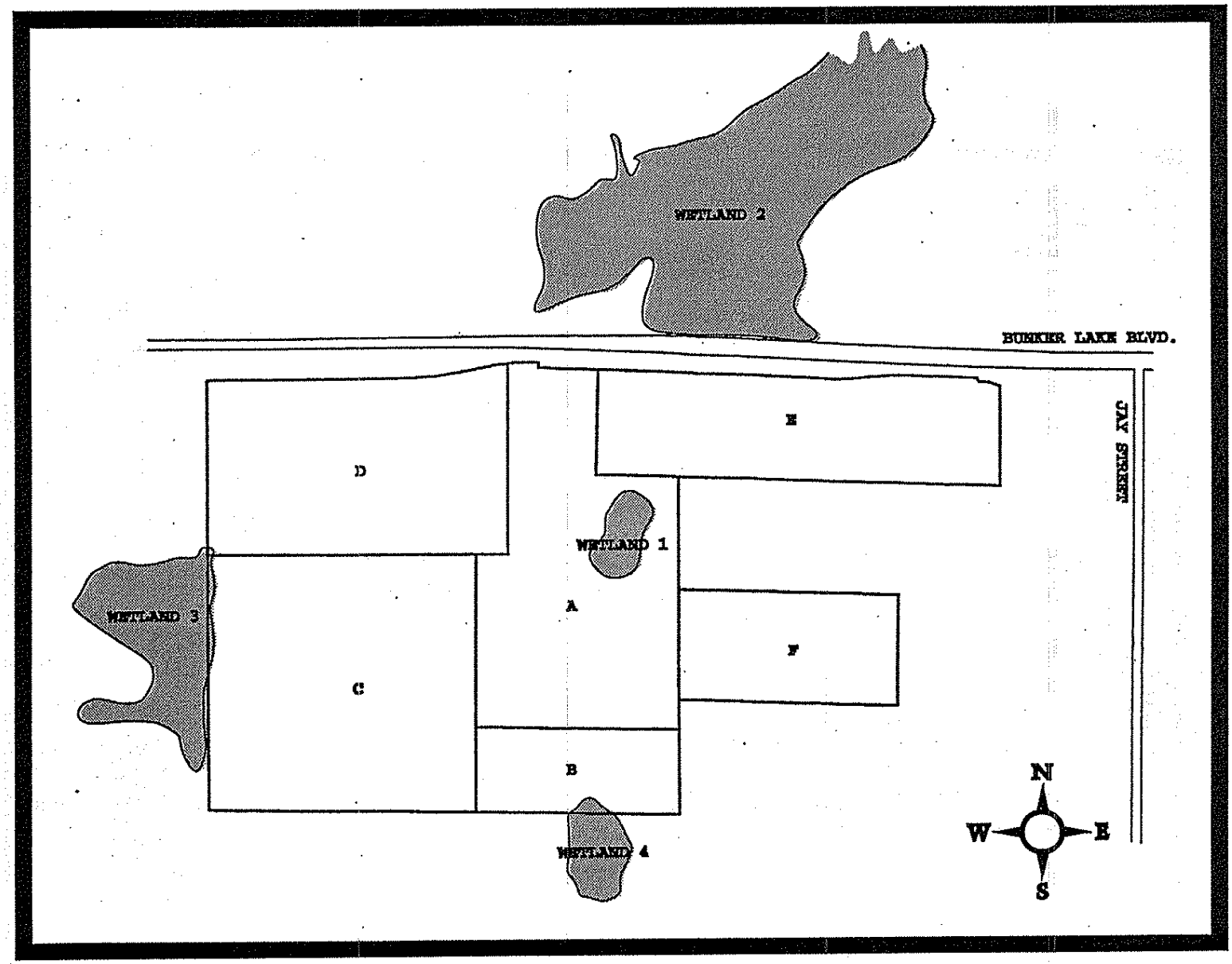

Figure 4. Wetland areas 1,2,3, and 4

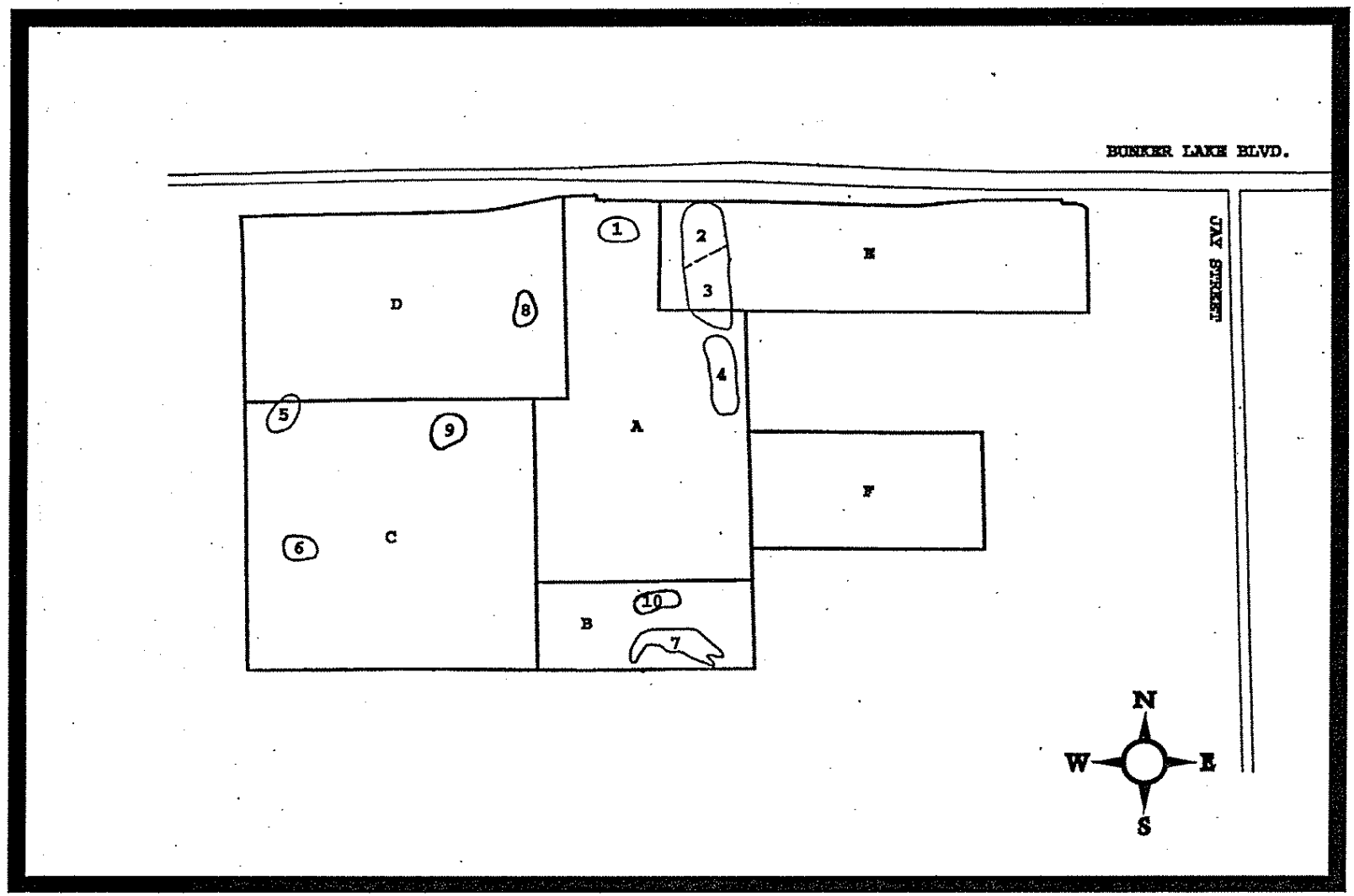

Figure 5. Areas of impacted soil (1 through 10)

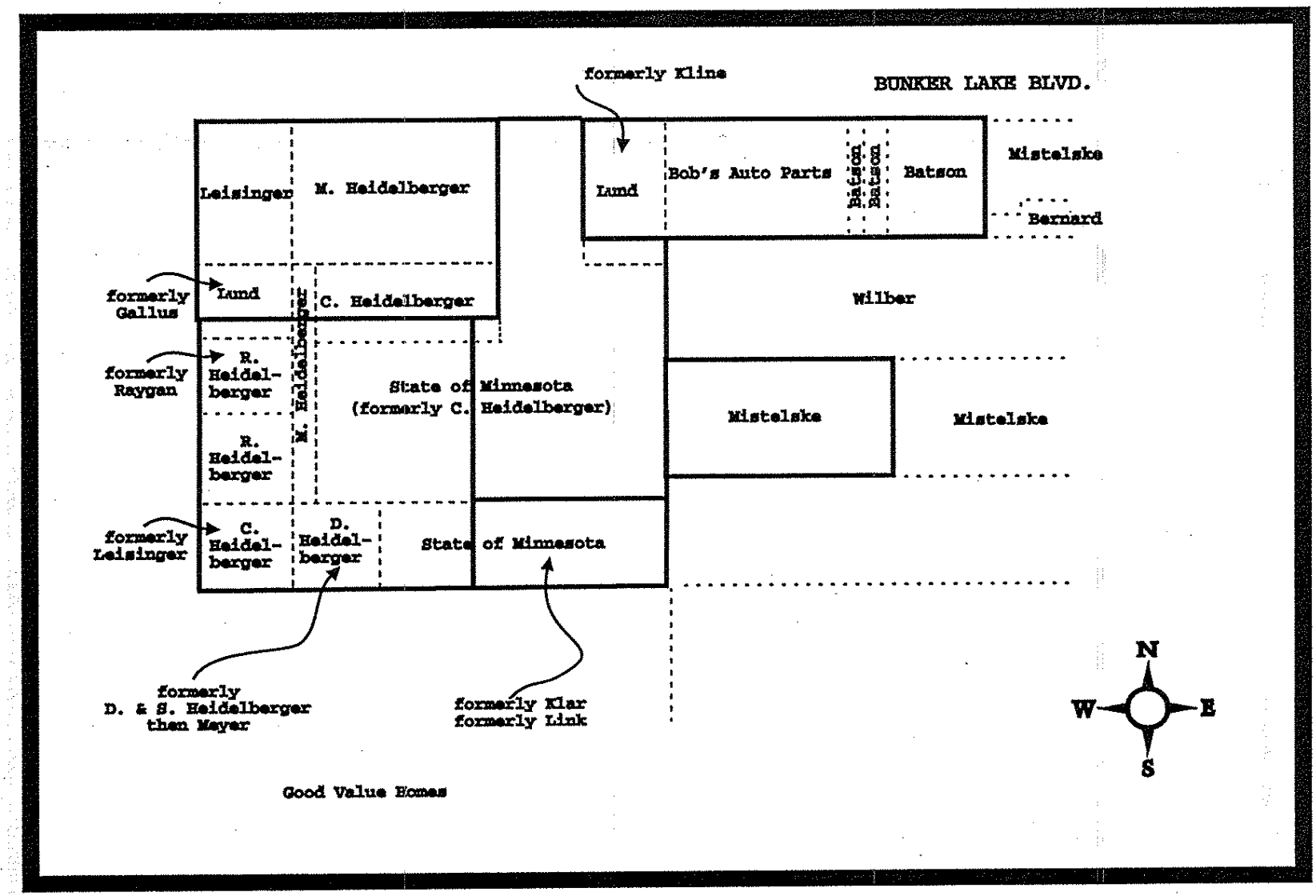

Figure 6. Property Ownership (past and present as given in site file documents)

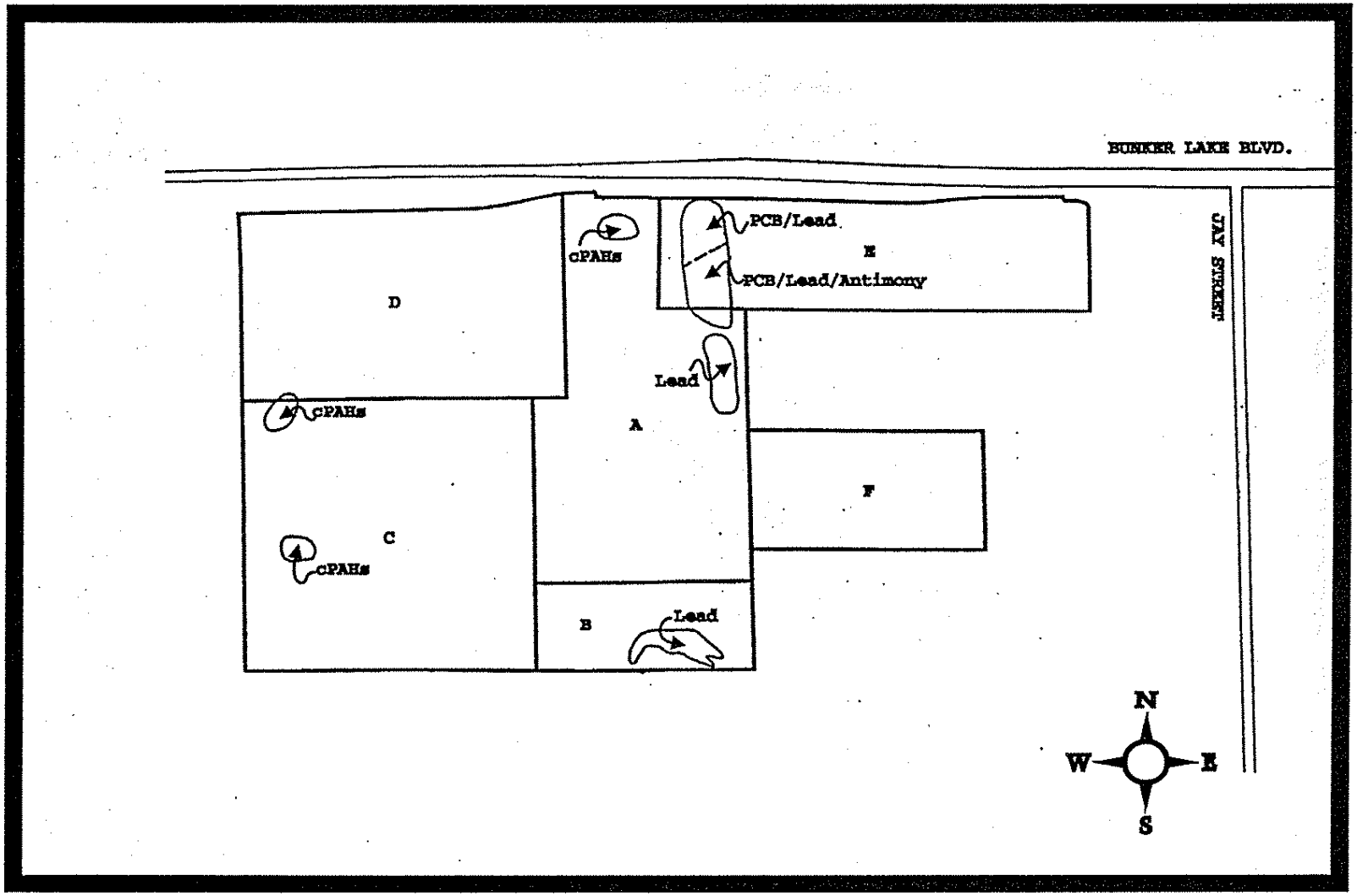

Figure 7. Soil clean up areas

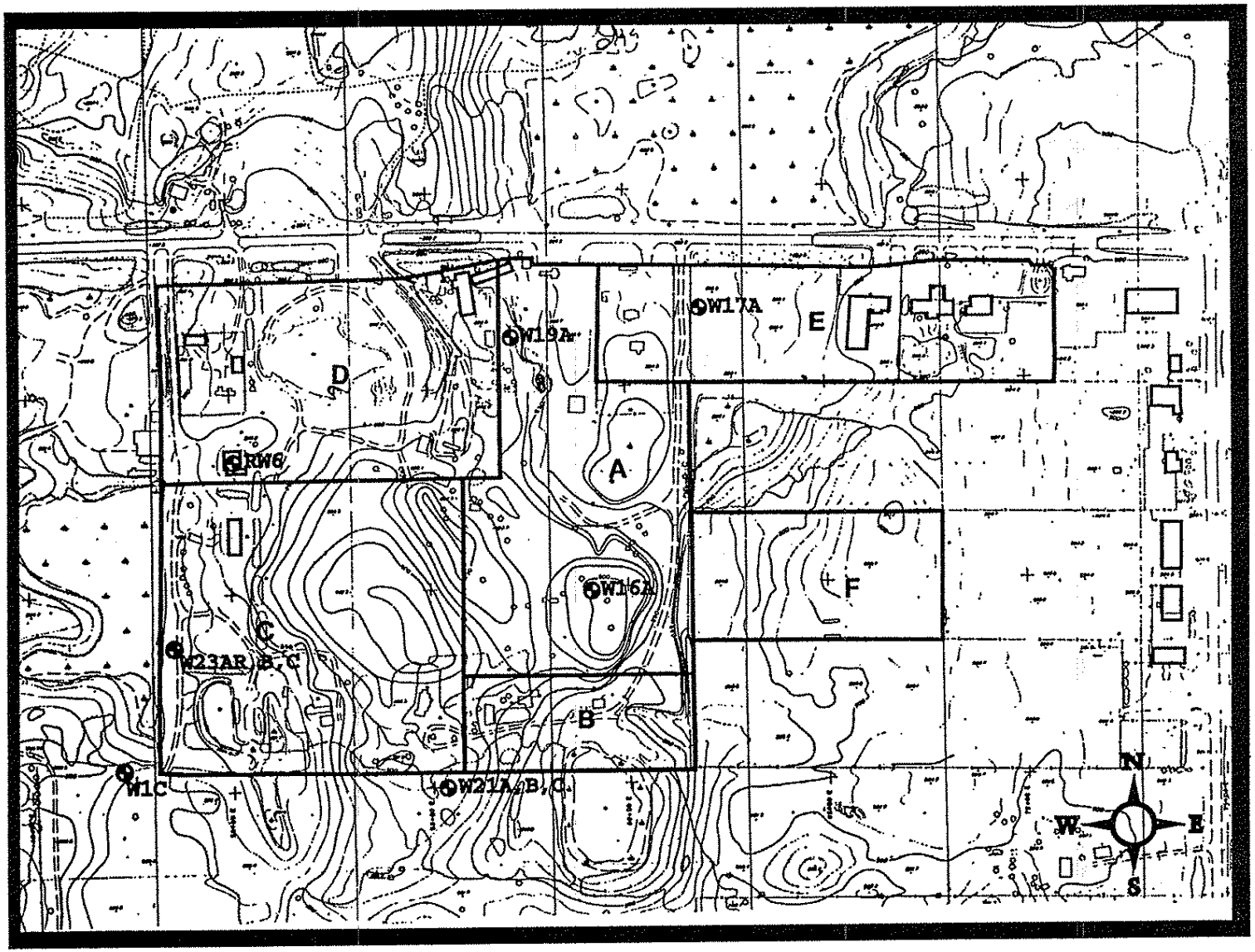

Figure 8. Groundwater sampling locations

Appendix B.

Soil Impact Areas (1 through 10)

Areas identified by EPA as containing residual contamination, based upon past sampling results and Site history, are shown in Figure 5. These were proposed in the 1990 RI/FS, described in the Final Alternatives Array Document Second Operable Unit (Donohue 1991a), and pictured in the revised Draft FS (Donohue 1991c). The following is a key to the areas shown in the Figure.

Area #1 is a circular area located at a point where drums were stored.

Area #2 is near the site of a former smelter.

Area #3 is immediately south of, and contiguous with, Area # 2. Wetland #1 is on the southern border.

Area #4 is on the east shore of Wetland #1 in the middle of the Site. Also south of Areas 2 and 3.

Area #5 is another former drum storage area on the western edge of the Site.

Area #6 is delineated by a building foundation.

Area #7 is on the northern shore of Wetland #2.

Area # 8 is a an area of stained soil.

Area #9 is a circular area with soil contamination estimated to be 16 feet in depth.

Area #10 is another former drum storage area and the site of another former smelter.

Appendix C.

Details of Regulatory Actions and Site Investigation/Remediation

A geotechnical boring investigation conducted by Subterranean Engineering for the International Tire Recycling Corporation revealed oil-soaked soil, peat and fill materials in a former wetland near the Site's main (north) entrance. The chemical nature and degree of contamination were not quantified in this effort.

Beginning in 1979, a Preliminary Investigation was done for EPA by Residual Management Technologies (RMT) and PEDCo Environmental which included a preliminary hydrogeologic investigation, surficial (1 to 4.5 feet deep) soil sampling at eight locations, and a water quality survey of six surface-water bodies in the area of the Site. Soil samples indicated oil, phenols, and metals contaminating surface soil in several portions of the Site and selected metals were above normal background levels in localized areas. In the surface water and sediments, no pesticides or VOCs were found, phenol phthalates and benzoic acid and elevated levels of several inorganic compounds were detected, and naphthalene was measured in one sample.

In 1980, the MPCA sampled the contents of 44 drums from different parts of the Site. Contents were found to be solvent mixtures, ink and ink sludge, paint and paint sludge, containing various volatile organic compounds. Other drum inventories were conducted by PACE Laboratories working for a group of potentially responsible parties. Various residues were identified in drummed wastes and soil that may have been impacted by waste handling/spillage.

Attempts by MPCA to regulate other waste handling at the Site followed in 1980 with issuance of Notices of Violation for improper waste disposal to S. Heidelberger, C. Link, and C. Mistelske.

A second evaluation by RMT/PEDCo in 1981 included installation of 24 monitoring wells (nested in 10 locations). Sampling results showed extensive contamination of the surficial sand aquifer by inorganics, VOCs and PAHs. A number of the sampled wells had very high levels of cyanide, lead, mercury or selenium. All four well samples tested for organic chemicals yielded positive results. Contamination was also found in the deeper samples taken from below the aquitard.

In 1981, the Site was proposed for inclusion on the federal Superfund National Priorities List (NPL). Sixteen additional monitoring wells were installed for an expanded groundwater investigation that year. In addition, one potentially responsible party had Pace Laboratories test groundwater from the RMT/PEDCo monitoring wells for a limited set of five chemicals which they had used. Three samples collected in that effort revealed detectable levels of the chemicals of interest. Observations during sampling also showed unusual color, odor, or a hydrocarbon film present in the shallow water from several wells.

A field investigation team (FIT) expanded groundwater investigation by Ecology & Environment, Inc. sampled soils in 1981 and installed 26 wells (14 well nests) and 22 piezometers at greater distance around the Site than the area covered by RMT/PEDCo wells. A total of 52 samples were collected from these new, and the existing, monitoring wells. The most contaminated well was near the southern side of C. Heidelberger's property. No contaminants were found in the new wells, except arsenic (17 ppb) at one well south of the Link property. Although deep contamination with VOCs was suggested by samples from 10 borings (which showed the presence of several organics chemicals but only at fairly low levels in the subsurface soil); however, the significance of soil data produced by this effort was never clear. High concentrations of PAHs, metals, and organic/inorganic contamination were also found in shallow soil at several on-site locations. In contrast to earlier sampling results, organic compounds were determined to be within normal background levels. The most significant groundwater impacts identified were high levels of PAHs in on-Site wells.

In 1983, Environmental Engineering & Management, Ltd (EEM) initiated design of a remedial program at the Site. This involved two Site inspections, another drum inventory (because many drums had been moved and drained since the 1981 inventory), and an assessment of soil contamination. A total of 214 drums containing wastes were located--others were buried under tires or other obstructions and could not be counted. Areas of visible soil contamination were limited to those places associated with drum leaking or spillage (EEM 1983).

In 1981, Heidelberger turned over approximately 700 of his remaining drummed wastes to an oil recycler, which mixed the liquids into recycled oil. The mixture was sold to an asphalt company and incinerated. Both the oil recycler and the asphalt company claimed to not know that the wastes they received and burned were hazardous. Following this drum removal, it was reported that approximately 300 more drums remained at the property.

From 1980 to 1984, MPCA and Anoka County sampled private wells in the vicinity of the Site to investigate the potential for groundwater contamination related to the hazardous waste landfill north of the South Andover Site. In May 1980, the MPCA found contaminants in local private wells on the south side of the Site that were similar to chemicals in drums at the Site.

Volatile organic compounds (VOCs) were found in two private wells located on the Site--these were the S. Heidelberger and C. Link wells. Methylene chloride and tetrachloroethylene were found above U.S. EPA water quality criteria in both the wells. The users of these wells were advised to stop drinking from their on-Site shallow wells due to the levels of contaminants detected.

Tire removal from the Heidelberger property in 1984 exposed two areas of drum burial. Bay West was contracted by a potentially responsible party (PRP) to excavate the buried barrels and remove contaminated soils from the excavated areas (CH2M Hill 1985). A group of four potentially responsible parties hired PACE Laboratories, Inc, (PACE) to coordinate the

removal of drums and visually-contaminated soil. PACE tested and inventoried wastes in nearly 600 barrels in late 1984 (PACE 1985a, PACE 1985b).

In 1985, The EPA notified a group of 21 PRPs that it intended to perform a RI/FS unless they offered to perform the work. Because the group failed to offer the requested activities, CH2M Hill was enlisted by EPA to conduct the studies. During planning for Site activities, the remedy was divided into two separate actions called "operable units." The first operable unit covers groundwater contamination of the surficial aquifer, and the second concerns contaminated soil and surface water. These were described by separate Remedial Investigations.

In 1985, some 900 drums were removed from the Site and disposed. In 1986, a group of PRPs arranged for the removal of an additional 500 drums.

From 1985 to 1987, CH2M Hill performed the first Remedial Investigation/Feasibility Study (RI/FS). From 1985 to 1986, 19 monitoring wells were installed, soil sampling pits were excavated, and groundwater (50 monitoring wells), surface water and sediments (from six ponds located on, or adjacent to, the Site) were sampled. A total of 33 potential source areas were identified and 30 composited (average 3-foot depths) soil samples were collected. Soil from several pilot borings was also tested. In addition, eight residential wells on or near the Site were also tested to determine if any had been impacted.

- Results from sampling efforts by CH2M Hill generally supported the findings of earlier studies. Data indicated on-site surface water and sediment contained PAHs and a few semivolatile organic compounds. Selected metals were also found above background levels in surface water sediment samples. Field GC screening of shallow groundwater samples near the surface water bodies revealed detectable trichloroethylene and tetrachloroethylene, suggesting their possible presence in the surface waters (CH2M Hill 1988).

- Shallow soil from suspected source areas where debris were not present revealed PCBs, PAHs, low levels of two VOCs, and above-background levels of metals. The principal concern identified was lead in a small number of the samples. Overall, however, soil contamination for much of the Site could not be adequately characterized due to large volumes of tires and junked vehicles on the surface.

- Contamination of shallow aquifers by a few metals and volatile organic compounds (VOCs) was also confirmed. The contamination found exceeded state and federal guidelines or standards for chemicals in drinking water in some of the monitoring wells, although the amounts were not greatly above the appropriate standards. Discrete zones of contamination were found in localized areas, rather than a continuous plume of contamination. Soil boring samples from the middle aquitard also revealed VOC contamination at depth. Only methylene chloride was detected in

the lower sand aquifer, and in only a single well.

- Several VOCs and one phthalate were detected in one of the residential wells (RW8) situated in the southwestern part of the Site and screened in the Upper Sand aquifer during the initial RI. High concentrations of four metals were also reported for this and two other residential wells, but this may have been due to poor sampling method (insufficient purging of the well). Although contamination was limited, in early 1986, MDH determined that the two contaminated private wells were unsafe for long-term consumption.

A Feasibility Study (FS), also completed in 1988 by CH2M Hill, evaluated alternatives for dealing with contaminated groundwater. This was thought to be necessary because several contaminants in the surficial aquifer exceeded health-based standards and a downward gradient was observed for the surficial aquifer and the intervening aquitard, suggesting that the Lower Sand Aquifer could become contaminated in the future. This original remedy calling for construction of a groundwater extraction system and supplying municipal water to selected nearby residences was documented in the Record of Decision (ROD) published in March 1988. The MPCA concurred with this plan in March of 1991.

A Design Investigation (DI) was begun in 1990 to obtain additional information needed to design a groundwater pump-and-treat system for the above remedy and resolve discrepancies between RI and subsequent groundwater results. An additional six soil borings and monitoring wells were placed at the Site. Soil was sampled during boring placement and groundwater was sampled from new and existing monitoring wells (22 total) and 4 residential wells located on and near the Site. Results showed the highest concentrations and frequency of VOCs in two well clusters southwest of the Site, bis(2-ethylhexyl)phthalate in five wells, elevated levels of manganese in several shallow and two middle aquitard wells and arsenic in two shallow and four deep monitoring wells. However, none of the contaminants were judged to be of regulatory concern based on the results of the baseline risk assessment computed during the RI for Operable Unit II. Data also indicated that contaminated groundwater didn't exist as a discrete plume, but rather that random detections of compounds below regulatory concern were the general rule. Because the levels of contaminants did not pose a risk to health, the groundwater remedy was amended to consist only of continued monitoring and abandonment of non-essential wells (EPA 1992).

In the fall of 1989, portions of the Site were fenced to restrict public access and the remaining tires were completely removed. That same year, the MPCA conducted a second inventory of drums in areas A, B, and C of the Site. A total of 612 drums were identified and their contents crudely characterized. Close to 200 of these, containing debris or empty, were removed from area B after the inventory.

A second RI/FS was completed by Donohue in 1991 (Operable Unit II) after the tire removal to address soil and surface water contamination and to evaluate the Lower Sand Aquifer. Field activities included a 20-acre geophysical survey, shallow borings, 22 trench samples, 15

deep borings, and surface water and sediment sample collection from 4 pond/wetland locations. Physical impacts to the Site, tire waste, fill, stained and odorous materials, and tar-like substances were encountered in widespread areas. Sampling results showed contamination of various discontinuous areas of the Site where liquids were disposed, transformers had been handled, automobiles were salvaged, or where drums had leaked. Ten separate areas of the Site were identified (Donohue 1991b) as being contaminated to an extent that poses "potentially unacceptable" health risks if people were exposed to them regularly as defined in the accompanying baseline risk assessment--these areas are identified in Appendix A. The risk assessment identified polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and metals (lead and antimony) as chemicals of concern for Site soils. Most of the soil contamination was confined to the upper layers not extending greatly below the ground surface (maximum depth of six feet).

Surface water and sediment sampled during the second RI yielded only low levels of a few VOCs, metals, and two pesticides in sediments. However none of the chemicals identified were measured at concentrations judged to pose risks to human health (EPA 1991a) according to the results of the Baseline Risk Assessment.

The remedy chosen for the contaminated soil incorporated excavation and on-site biological treatment of 2,100 cubic yards of soil. An additional 9,300 cubic yards of contaminated soil were to be excavated and removed from the Site to an approved facility. A ROD for the soil and surface water contamination (OU2) was issued in December 1991.

In late 1992, about 20 remaining drums were removed and disposed. Following that removal, another 87 drums were discovered by EPA along the eastern boundary of the Site property. Four of these were sampled. In response to the finding of additional drums, a group of Responsible Parties authorized a detailed inventory of drums. All properties except parcel F, where the owner refused to grant access, were reviewed by CRA. As many as 461 drums were identified in the partial inventory although some were not counted.

In 1992, Conestoga Rovers & Associates (CRA), for a group of PRPs, sampled in and near seven of the ten areas (see Appendix A) identified by EPA as containing contaminated soil. Samples were collected from the top six inches or from a depth of two feet near and around the previously identified locations (CRA 1993b). Results of this effort indicated that the vertical extent of soil contamination was more shallow (although samples were limited to two-foot depths) than indicated in the FS report by Donohue (CRA 1994b).

In February 1993, a group of potentially responsible parties entered a Consent Agreement with EPA to perform additional activities and studies to clean up the Site. This was to include removal of all drums containing hazardous wastes.

Additional soil samples were collected by CRA to better define the extent of soil contamination in 1993. Results of this sampling and the 1992 effort showed that the estimated volume of soil requiring action due to contamination by carcinogenic PAHs was

significantly less than originally estimated. As a result of this new volume estimate, CRA conducted a Focussed Feasibility Study (FFS) to reevaluate the most effective treatment for the soils. The FFS recommended that off-site thermal treatment of the smaller volume of soil was most effective, instead of biological treatment on-Site (CRA 1994a). Consequently, the ROD for the soil operable unit is being amended to include a thermal treatment component in place of the biological technology (CRA 1994b).