

Minnesota Pollution Control Agency

January 21, 1994

Mr. Dick Berg
Winona County Highway Department
171 West Third Street
Winona, Minnesota 55987

RE: Completion of Land Treatment Soil Monitoring Requirements
Leaksite: Winona County Highway Department, 5300 West Highway 61, Winona
Site ID#: LEAK00004383

Dear Mr. Berg:

On October 31, 1991, the Minnesota Pollution Control Agency (MPCA) issued a letter of approval for land treatment of petroleum contaminated soil excavated from the site referenced above. The approval letter specified that additional follow-up monitoring of the land treated soil is required at the land treatment site.

The MPCA staff has received and reviewed the monitoring results for soil samples collected at the land treatment site. The results indicate that the soil has been adequately treated. Therefore, no further follow-up soil monitoring and tillage are required for this soil.

Please contact me at 507/285-7343, if you have any questions.

Sincerely,


Jehi Abdella

Pollution Control Specialist
Rochester Regional Office

JA/ml

cc: Dennis Flanagan - Wilson Twp. Chairman, Winona
Jon Penheiter - Winona Cty. Solid Waste Dept.
Paul Meeier - DPRA, St. Paul

**REMEDIAL INVESTIGATION REPORT
MPCA LEAK NO. 4383**

**Winona County Highway Department
Goodview, Minnesota**

Prepared for:

**Winona County Highway Department
5300 Highway 61 West
Winona, Minnesota 55987**

Prepared by:

**DPRA Incorporated
E-1500 First National Bank Building
332 Minnesota Street
St. Paul, Minnesota 55101**

July 1992

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1.0 INTRODUCTION

DPRA Incorporated (DPRA) was retained by the Winona County Highway Department in July, 1991 to perform environmental monitoring during the underground storage tank (UST) removal at the Highway Department's headquarters located in Goodview, Minnesota. Following the UST removal, a remedial investigation was performed. The Minnesota Pollution Control Agency (MPCA) assigned LEAK No. 4383 to this site.

1.1 Purpose

The purpose of this investigation was to identify the extent of soil and groundwater contamination which was observed during the tank excavation, to identify the actual or potential impacts of the release and to recommend further action based on the findings.

1.2 Scope of Service

The scope of services performed by DPRA between June 1991 and June 1992 at this site include the following activities:

- Observed the removal of four USTs and documented the condition of the USTs, surrounding soils and groundwater. Selected water and soil samples were collected and submitted to PACE Laboratories, Inc. (PACE) for chemical analysis.
- Coordinated the land spreading of the petroleum contaminated soils.
- Directed the drilling of three standard penetration soil borings ranging in depth from 22 to 24 feet and completed the borings as monitoring wells.
- Collected soil and groundwater samples from the soil borings and monitoring wells and submitted these to PACE for chemical analysis.
- Performed a slug test on monitoring well MW-2 to determine the hydraulic conductivity of the aquifer.

- Prepared a Remedial Investigation (RI) Report which satisfies the MPCA's requirements.

2.0 BACKGROUND INFORMATION

2.1 Site Location

The Winona County Highway Department's Winona Shop is situated at 5300 Highway 61 West in Goodview, Minnesota. It is located in the northwest ¼ of the southeast ¼ of the southeast ¼ of the southwest ¼ of Section 18, Township 107 North (T107N), Range 7 West (R7W) at approximately 44°03'55" Latitude and 91°42'45" Longitude in Winona County (Figure 1).

2.2 Site Ownership

The Winona County Highway Department operates the site as its headquarters. On-site facilities include office space, garages for the repair and storage of County vehicles and lots for bulk storage of sand and salt. The contact person at the Highway Department is:

Dick Berg
Winona County Highway Department
5300 Highway 61 West
Winona, MN 55987-1398
(507) 454-3673

2.3 Site Description

The site occupies approximately 4.0 acres and is bounded to the east by Good Year Tire Company & Automotive Repair, to the south by Highway 61, to the west by 54th Avenue and to the north by residential housing. Beyond Highway 61, south of the site is a swampy area; west of 54th Avenue are State Highway Department offices. A map of the current site activities and all known utilities is presented in Figure 2.

2.4 Underground Storage Tank Information

Four USTs were installed at this site in 1962. The tank and product lines were asphalt-coated steel and contained between 1,000 and 10,000 gallons. The tanks were removed between August 13 and 15, 1991. Three STI-P₃ USTs were installed between December, 1991 and January, 1992. Tank content and capacity information is summarized on Table 1. MPCA Tank Notification Forms and Tank Information Sheets are presented in Appendix A.

2.5 Petroleum Release Information

Prior to the UST excavation no known incident of a petroleum release was reported at this site.

2.6 Underground Tank System Integrity Testing

Hale Companies performed three Petro-Tite tank system integrity tests on Tanks 1 and 2. On October 17, 1990, the first integrity tests were performed on both tanks and associated product lines. Both tank systems tested tight. On July 9, 1991, Tanks 1 and 2 and the product lines were again tested. Tank 1 failed the tightness test; the Tank 2 results were determined to be inconclusive due to entrapped air vapor. Following this, the product lines were isolated from the tanks and on July 12, 1991, the tanks alone were integrity tested. At that time both tanks tested tight. Copies of the Petro-Tite test results are included in Appendix B.

3.0 EXCAVATION RESULTS

Between August 13 and 15, 1991, four USTs were excavated and removed from the site by Renk Trucking of Minnesota City, Minnesota. A DPRA representative was on site to observe and document the removal and condition of the USTs and surrounding soil. Data observed and collected during the excavation of the USTs is presented on the MPCA form, "Excavation Report for Petroleum Release Sites," and is attached as Appendix C. Soil contamination was observed and the MPCA was notified of a release on August 13, 1991.

3.1 Tank Conditions

All tanks were observed to be in fair condition. The gasoline and diesel tanks (Tanks 1 and 2) were observed to be rusted with some pitting. The corrosion was more pronounced over the lower quarter of the tanks. At the time of excavation, both tanks were in contact with the water table. Tanks 3 and 4 were in slightly better condition though some pitting and bubbling were noted. No holes were observed in the four tanks. The former tank locations are shown on Figure 3.

3.2 Soil Conditions

In the Tank 1 and Tank 2 excavations, the native soil consisted of sand with a little silt to six feet below grade then sand with gravel to the bottom of the excavation. In the Tank 3 and Tank 4 excavation the native soil consisted of sand with silt and organics to six feet below grade, then sand with gravel to ten feet. At the bottom of the excavation, a layer of multicolored cobbles was noted. The original backfill material in all excavations was sand with a little gravel.

3.2.1 Soil Screening

As the USTs were excavated, soil samples were collected and screened with an HNU Model 101 photoionization detector (PID) equipped with a 10.2 eV lamp and calibrated for direct readings in parts per million (ppm) of benzene. The PID readings from samples collected within the excavations are presented on the MPCA's Excavation Report in Appendix C. Approximately 100 cubic yards of contaminated soils were stockpiled on site awaiting land spreading.

3.2.2 Analytical Results

Eighteen soil samples were collected from the three tank excavations: two from the bottom of each excavation and one from the extent of the north, south, east and west walls of the excavations. Additionally, three stockpile samples were collected, two from the diesel tank excavation and one from the waste oil/fuel oil tanks excavation. Figure 4 locates the soil samples.

All samples were analyzed for benzene, ethylbenzene, toluene, xylenes (BETX), total hydrocarbons (TH) as gasoline and TH as fuel oil. No hydrocarbon contamination was detected in samples collected from the bottoms or sidewalls of the excavations. Stockpile samples collected from the diesel tank excavation indicated 400 to 440 ppm TH as fuel oil and 1.9 ppm TH as gasoline. In the waste oil stockpile sample 170 ppm TH as fuel oil was detected. The results of the analysis are summarized in Table 2.

In addition, soil samples collected from beneath the waste oil tank and from the waste oil contaminated soil stockpile were analyzed for lead, chromium, cadmium, volatile organic compounds (VOCs) and polychlorinated biphenyls (PCBs). These analyses indicated 11 ppm lead, 14 to 18 ppm chromium, no detectable cadmium, 0.14 to 0.15 ppm methylene chloride and no detectible PCBs. The laboratory reported that methylene chloride was also present in the method blank indicating the possibility that laboratory contamination caused the

methylene chloride concentrations detected in the samples. A copy of the analytical report is presented in Appendix D.

3.3 Groundwater

Groundwater was noted in the Tank 1 and Tank 2 basins at an approximate depth of 15 feet below grade. At the time of excavation, groundwater was in contact with the bottom of both tanks. Field observations indicated the presence of foam on the water surface; no petroleum sheen was observed.

A sand point well screened into the surficial aquifer is used by the Highway Department for washing vehicles and equipment. The location of the well is shown on Figure 2. The well is a driven well and is screened approximately 20 to 25 feet below grade. On August 14, 1992, two water samples were collected from the well. The first sample was taken at 8:00 a.m. before the well water had been used; the second sample was collected at 3:00 p.m. after the well water had been used to wash Highway Department vehicles.

3.3.1 Analytical Results

One water sample was collected from each tank basin. The sample collected from the gasoline basin was analyzed for BETX and TH as gasoline. Laboratory analysis indicated no detectible BETX constituents and 0.054 ppm TH as gasoline. The diesel tank basin sample was analyzed for TH as fuel oil, and indicated 0.87 ppm.

The water samples collected from the sand point well were analyzed for BETX, TH as gasoline and TH as fuel oil. Laboratory analysis indicated no detectible concentrations of these constituents.

3.4 Soil Treatment/Disposal

Approximately 100 cubic yards of contaminated soils were hauled by the Winona County Highway Department to the Winona County Sanitary Landfill for land spreading. These soils consisted primarily of sand. Approval for land spreading was granted by the MPCA in a letter dated October 31, 1991; the date of land application was May 6, 1992. The land treatment site is scheduled to be sampled in August 1992. Copies of the MPCA letter granting land spreading approval and the Notification of Land Application of Petroleum Contaminated Soil are included in Appendix A.

4.0 REMEDIAL INVESTIGATION RESULTS

4.1 Project Activities

Between August 13 and August 15, 1991, four USTs were excavated and disposed by Renk Trucking. Soils were screened with a PID and 100 cubic yards of contaminated soil was stockpiled on site. Soil samples were collected and submitted for chemical analysis.

On August 13, 1991, two water samples were collected from an on-site water well. The samples were submitted for chemical analysis.

In a letter sent August 29, 1991, the MPCA assigned LEAK No. 4383 to this site.

In a letter dated October 31, 1991, the MPCA granted approval for land application of the petroleum-contaminated soils at the Winona County Sanitary Landfill.

On January 6 and 7, 1992, three soil borings were advanced to depths ranging from 22 to 24 feet by Exploration Technology, Inc. (ETI) under the direction of DPRA. The soil borings were completed as monitoring wells. Soil samples were collected and submitted for chemical analysis.

On January 8, 1992, the monitoring wells were developed and surveyed; static groundwater levels were recorded and groundwater quality samples were collected and submitted for chemical analysis.

On April 10, 1992, a slug test was performed at monitoring well MW-2 to determine the hydraulic conductivity of the aquifer. Static water levels were recorded and groundwater quality samples were collected and submitted for chemical analysis.

On May 6, 1992, 100 cubic yards of petroleum-contaminated soil was land applied at the Winona County Sanitary Landfill. The soils were spread over 0.3 acres of land at a depth of approximately three inches.

On July 9, 1990, static water levels were recorded.

Appendix E details the field methods and procedures used by DPR A personnel when performing the above-referenced site investigation activities.

4.2 Regional Geology and Hydrogeology

According to the Geologic Atlas for Winona County, Minnesota, the regional lithology consists of glacial outwash terraces of gravel and sand, with little or no loess cover, overlying the Eau Claire and Mt. Simon Formations.

The MGS records indicate 12 water wells located within a one-mile radius of the site. Well logs for all 12 wells were on file. The information contained in the well logs is summarized in Table 3 and the well logs are located on Figure 7. Copies of the well logs are included in Appendix A.

Two well logs (Unique Well Nos. 219170 and 112210) located north and east of the site are complete to 235 and 455 feet, respectively. The well logs indicate a sand and gravel layer extending 135 to 148 feet below grade, underlain by a 10 to 40 foot layer of Eau Claire Formation and underlain by Mt. Simon Sandstone to an undetermined depth.

Surface water is a common feature in the site vicinity. A swampy area is located across Highway 61, 500 feet south of the site. Lake Goodview is situated 700 feet west of the site. Several other lakes and swampy areas are found within a one-half mile radius to the north, west, and south. The Mississippi River, located 1.5 miles north of the site, strongly influences the surface water and groundwater hydrology in the region.

On April 10, 1992, two slug tests were performed at monitoring well MW-2 to determine the hydraulic conductivity of the impacted aquifer. An average hydraulic conductivity of 0.5 feet/minute was observed in the tests. A discussion of test methodology and the results of each slug test are presented in Appendix F.

A summary of the hydrogeologic setting is provided on the MPCA form entitled "Hydrogeologic Setting and Groundwater Contamination for Petroleum Release Sites" and is attached in Appendix F.

4.3 Soil Borings

On January 6 and 7, 1992, Exploration Technology, Inc. (ETI), under the direction of DPR, advanced three soil borings, which were installed as monitoring wells. The borings ranged in depth from 22 to 24 feet below ground surface. A review of the soil boring logs indicates sand and sand with gravel to 15 feet overlying multi-colored gravel to the end of the borings. The boring logs and MDH well records are attached as Appendix G.

4.3.1 Screening for Contaminants

As the soil borings were advanced, split-spoon samples were collected at two and one-half foot intervals and screened with an HNU Model 101 PID equipped with a 10.2 eV lamp. The HNU was calibrated for direct readings in ppm of benzene. No elevated benzene concentrations were detected with the PID. Readings are presented on the boring logs in Appendix G.

4.3.2. Analytical Laboratory Results

One soil sample, collected just above the water table in each soil boring, was submitted for chemical analysis. The samples were analyzed for BETX, MTBE, TH as gasoline and TH as fuel oil.

The analytical results indicated that hydrocarbon contamination was below method detection limits (MDLs) in all soil borings. The analytical results are summarized in Table 4; the laboratory reports and chain-of-custody forms are attached in Appendix D.

4.4 Monitoring Wells

On January 6 and 7, 1992, three at-grade groundwater monitoring wells were installed. Monitoring well MW-1 was completed at 21.14 feet below grade, MW-2 at 22.25 feet below grade and MW-3 at 23.36 feet below grade. Table 5 summarizes monitoring well construction data.

On January 8, April 10 and July 9, 1992, static water elevations were measured at each monitoring well. Groundwater elevation data collected on January 8 and July 9 indicated a northerly flow direction, while data collected on April 10 indicated an easterly groundwater flow direction. Most likely the shifting groundwater flow directions on site is a response to changes in the water level in the Mississippi River. Groundwater data is summarized in Table 6. Figure 5 presents an inferred groundwater flow map for January 8, 1992 and Figure 6 presents a flow map for April 10, 1992.

4.4.1 Analytical Laboratory Results

On January 8, 1992, each monitoring well was developed and groundwater samples were collected. The samples were analyzed for VOCs, MTBE, TH as gasoline, TH as fuel oil and lead. Laboratory results indicated hydrocarbon concentrations below MDLs for all analyzed constituents.

On April 10, 1992, groundwater samples were collected from all monitoring wells. These were submitted for chemical analysis of BETX, MTBE, TH as gasoline and TH as fuel oil. Laboratory results again indicated hydrocarbon concentrations below MDLs at all monitoring

wells. The laboratory results for all sampling events are summarized in Table 7 and the analytical reports are included in Appendix D.

4.5 Vapor Risk Assessment

A vapor survey is not necessary at this site. Laboratory analysis of soil samples collected from the bottom and sidewalls of the tank excavations and from the three soil borings indicate no detectible hydrocarbon contamination in the soils. Additionally, chemical analysis of the groundwater samples collected from on-site wells indicates no groundwater contamination. Because the sources of petroleum vapors have been removed from the site, there is minimal risk of petroleum vapors impacting basements or utilities.

4.6 Groundwater Receptor Survey

According to Greg Volkart, Water Superintendent for the City of Goodview, the City began the installation of its water supply in 1962. Presently, commercial, industrial and residential areas north, east and south of the site are served by the municipal supply. In the future the city plans to expand the municipal supply by locating and installing an additional well on the northwest side of the city. No date has been set to begin this work.

The locations of commercial, public and private wells known to exist within a one-mile radius are shown on Figure 7. Copies of the water well logs obtained from the Minnesota Geologic Survey (MGS) are attached as Appendix H. Well records obtained from MGS locate 12 wells complete to depths ranging from 115 to 515 feet below grade within a one-mile radius of the site. Two of these wells (Unique Well Nos. 112210 and 219171) are located in the downgradient flow direction approximately 4,000 feet from the site. The information contained in the well logs on file at MGS is presented in Table 3.

The Winona County Community Health Services and the City of Goodview were contacted for additional well information. These sources indicated that it is probable there are several unrecorded sand point wells in the site vicinity. Areas developed prior to the municipal water supply installation would have sand point wells. According to Ross Dunsmoor, a Sanitarian for Winona County, most of the sand point wells were capped or used for yard watering once the properties were connected to a piped water supply. The advancement of driven sand point wells has not been permitted in the county since 1986.

Two wells (Unique Well Nos. 478044 and 483157) not on file with MGS were located within one mile of the site. The new wells were installed 4,000 to 4,500 feet northwest of the site, just west of the Winona Municipal Airfield and were screened approximately 70 feet below grade. Well logs were obtained from Winona County Community Health Services and are included in Appendix H.

The following people were contacted between April 30 and May 4, 1992, to obtain the information included in this Groundwater Receptor Survey:

- Greg Volkart, Goodview Water Superintendent, (507) 452-1630
- Ross Dunsmoor, Winona County Sanitarian, (507) 457-6400
- Bob Keiper, Winona Water Superintendent, (507) 457-6350

5.0 DISCUSSION

A hydrocarbon release has occurred at this site. The groundwater aquifer impacted by the release is perched in surficial glacial outwash deposits. According to the Geologic Atlas for Winona County and MDH well records, the glacial outwash terrace extends to a depth of 150 feet. The source of the hydrocarbon release appears to be from minor spillage and from overfilling the tanks.

The horizontal and vertical extent of soil and groundwater contamination has been defined and appears to have been confined to the former UST basin. Analytical results of soil samples collected from the bottom and sidewalls of the excavation, and of groundwater samples taken from the monitoring wells indicate no detectible hydrocarbons remaining on site.

Low concentrations of TH as gasoline and TH as fuel oil were detected in groundwater samples collected from the tank basins during excavation. Following this, two quarters of groundwater samples collected from monitoring wells situated around the tank basins have indicated no detectible hydrocarbon contamination. It appears that the groundwater contamination observed during the tank removal was limited to the area adjacent to the gasoline and diesel tanks.

The groundwater flow direction is currently to the northeast. Well logs obtained from MGS indicate two drinking water wells, Unique Well Nos. 219170 and 112210, approximately 4,000 feet downgradient of the site. The wells are screened into the Eau Claire Formation and Mt. Simon Sandstones and vertically separated from the surficial groundwater aquifer by 140 feet. The absence of detectible contamination in the soil samples and in the groundwater samples collected from on-site monitoring wells indicates little risk of cross-contamination with the drinking water aquifer or with nearby surface waters.

A vapor survey was not conducted. Analytical data indicates that the sources of petroleum vapors have been removed from the site and that there is minimal risk of vapors impacting adjacent basements or utility lines.

6.0 CONCLUSIONS

Based on the data obtained during this subsurface assessment, the following conclusions were made:

1. A hydrocarbon release has occurred at the site and impacted the soil and groundwater.
2. The horizontal and vertical extent of contamination has been defined and appears to have been limited to the area within the former UST basin.
3. With the excavation of the former USTs and the surrounding contaminated soil, the source of the hydrocarbon release was removed. No known contaminated soil remains in the former UST basin.
4. The source of hydrocarbon release appears to be from spillage and overfilling the USTs.
5. Concentrations of VOCs at all monitoring wells were below method detection limits during two quarters of groundwater sampling.
6. The excavation of contaminated soils removed the source of hydrocarbon vapors and eliminated the potential for vapor migration.
7. The removal of all known contaminated soils and the absence of hydrocarbon contamination in groundwater collected during two quarters of sampling indicate this petroleum release poses minimal threat to the public health and welfare or the environment.

7.0 RECOMMENDATIONS

DPRR recommends site closure for the following reasons:

- Two quarters of groundwater sampling indicate no detectible hydrocarbon contamination in groundwater. All analyzed constituents are below the Minnesota Department of Health Recommended Allowable Limits.
- Soil analytical results indicate no known hydrocarbon contaminated soils remaining on site.
- All known sources of contamination (tanks, product lines and contaminated soils) have been removed from the site.

8.0 STANDARD OF CARE

The recommendations contained in this report represent our professional opinions. These opinions were arrived at in accordance with currently accepted geologic, hydrogeologic and engineering practices at this time and location. Other than this, no warranty is implied or intended.

Prepared by: Mary Rooney
Mary Rooney
Project Civil Engineer

Reviewed by: Paul M. Meier
Paul M. Meier
Project Environmental Geologist

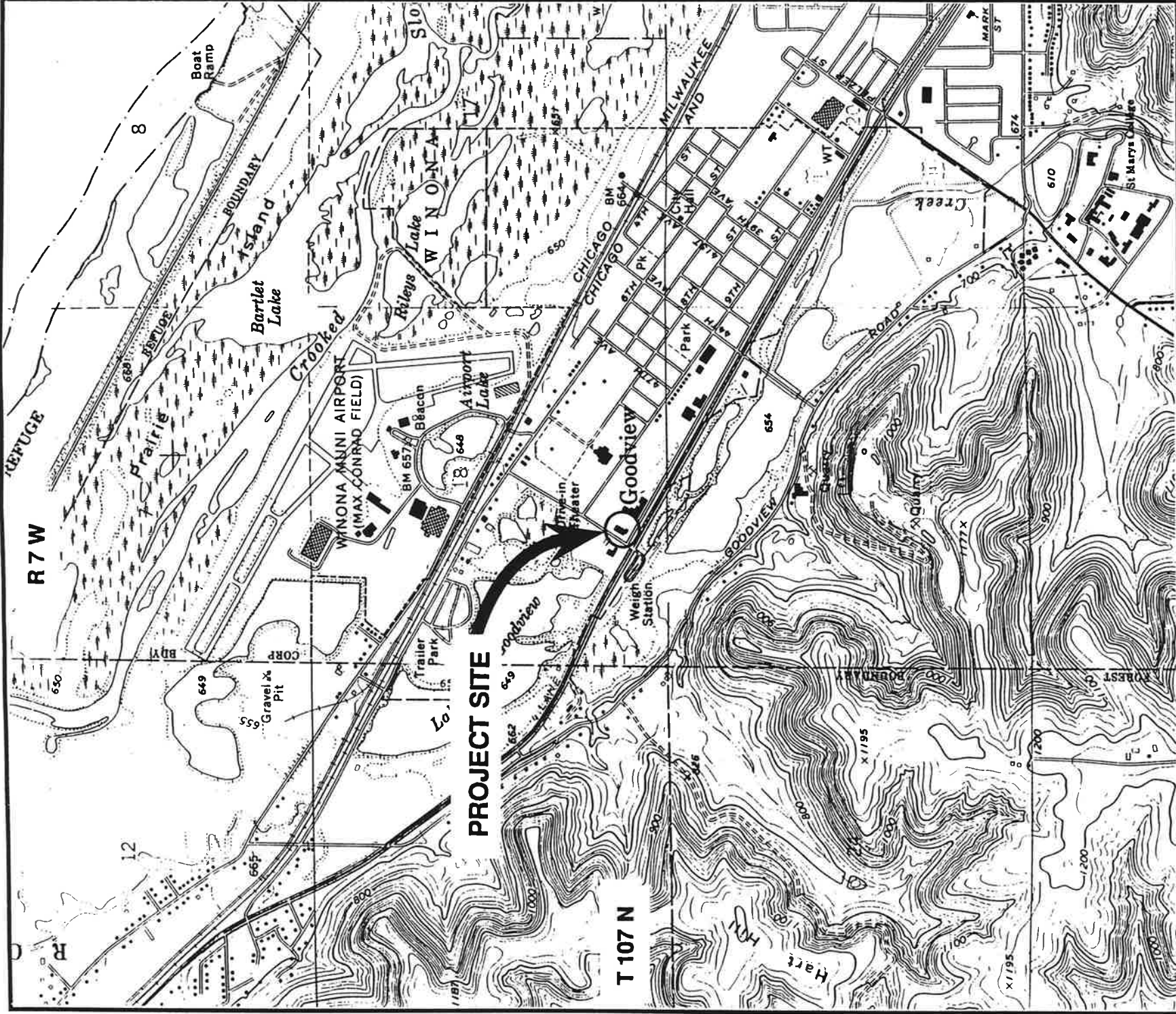
and

Martin D. Bonnell
Martin D. Bonnell, P.E.
Director, Remedial Services

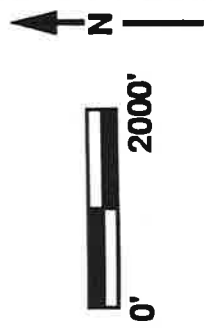
Dated: 7/24/92

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- FIGURE 6 - INFERRED GROUNDWATER FLOW MAP (04/10/92)**
- FIGURE 7 - WATER WELL LOCATION MAP**



PROJECT SITE



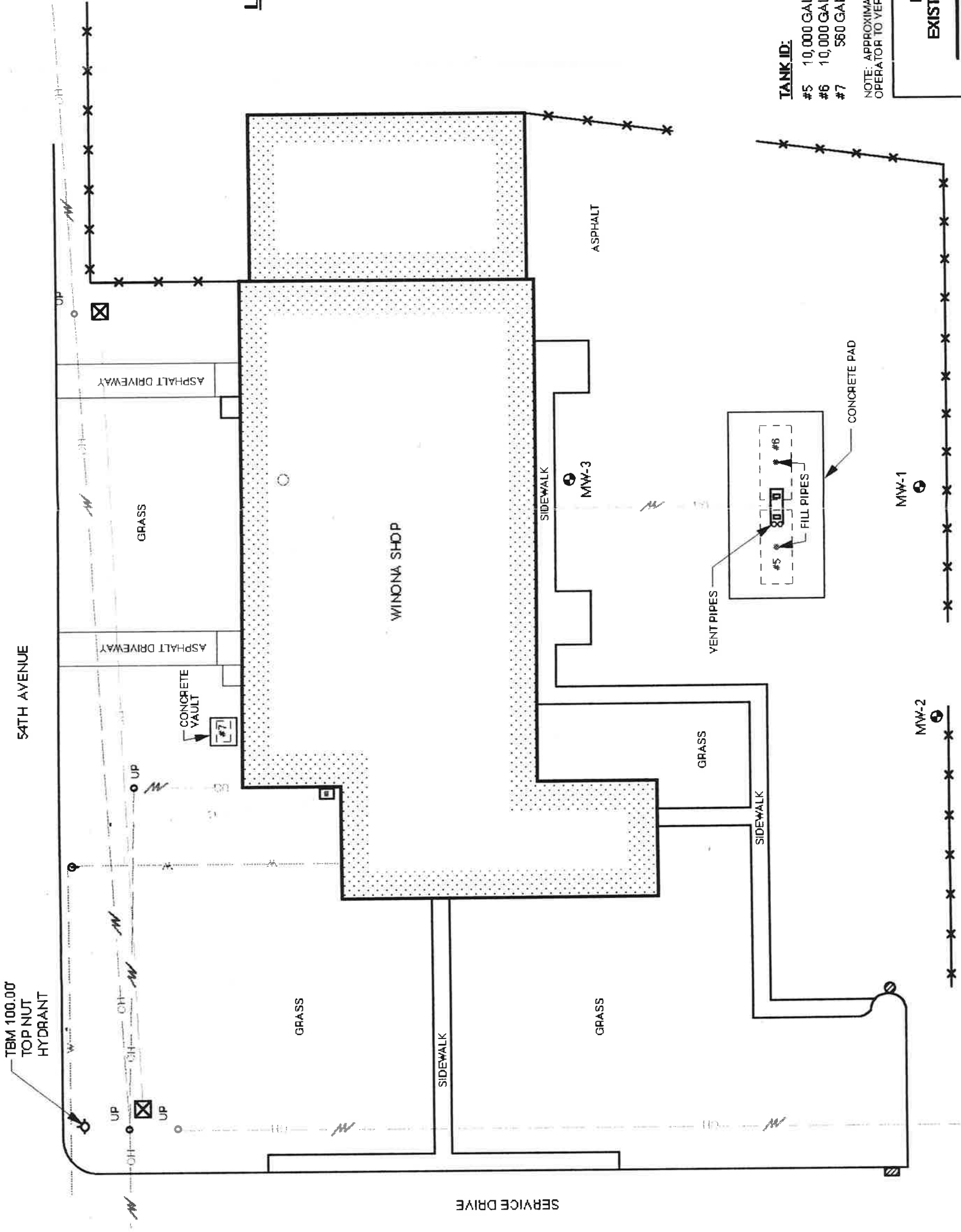
QUADRANGLE LOCATION
WINONA WEST, MINNESOTA

**FIGURE 1
SITE LOCATION MAP**

WINONA COUNTY HIGHWAY DEPT.
5300 HWY. 61 WEST
WINONA, MINNESOTA



PROJECT NO. 5257.003



LEGEND

- UP ○ UTILITY POLE
- HYDRANT
- ⊕ MONITORING WELL
- SAND POINT WELL
- GAS METER
- ▭ PUMP ISLAND
- φ WATER SHUTOFF
- ELECTRIC
- GAS
- TELEPHONE
- OHUG OVERHEAD/UNDERGROUND UTILITIES
- UNDERGROUND STORAGE TANKS

TANK ID:

- #5 10,000 GALLON UNLEADED
- #6 10,000 GALLON DIESEL
- #7 560 GALLON WASTE OIL

NOTE: APPROXIMATE BUILDING AND UTILITY LOCATIONS. CALL LOCAL UTILITY OPERATOR TO VERIFY UTILITIES BEFORE STARTING ANY SUBSURFACE WORK.

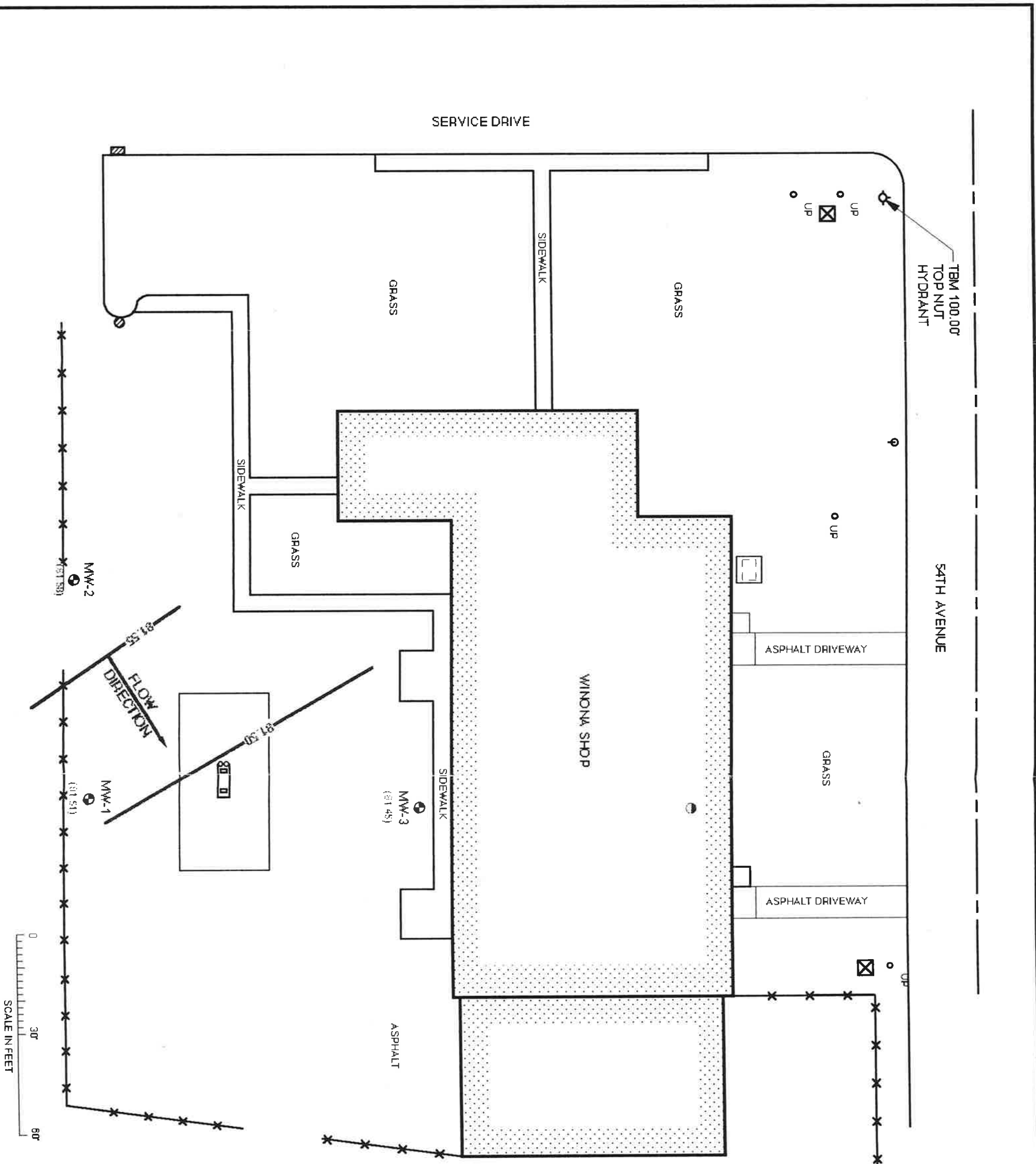
**FIGURE 2
EXISTING SITEMAP**

WINONA COUNTY HWY. DEPT.
5300 HWY. 61 WEST
WINONA, MINNESOTA



PROJECT NO. 5257.003





- LEGEND**
- UP UTILITY POLE
 - ⊕ HYDRANT
 - ⊙ MONITORING WELL
 - ⊙ SAND POINT WELL
 - ⊙ GAS METER
 - ⊙ PUMP ISLAND
 - ⊙ WATER SHUTOFF
 - 81.55 — INFERRED GROUNDWATER CONTOUR
 - (81.58) GROUNDWATER ELEVATION
 - UNDERGROUND STORAGE TANKS

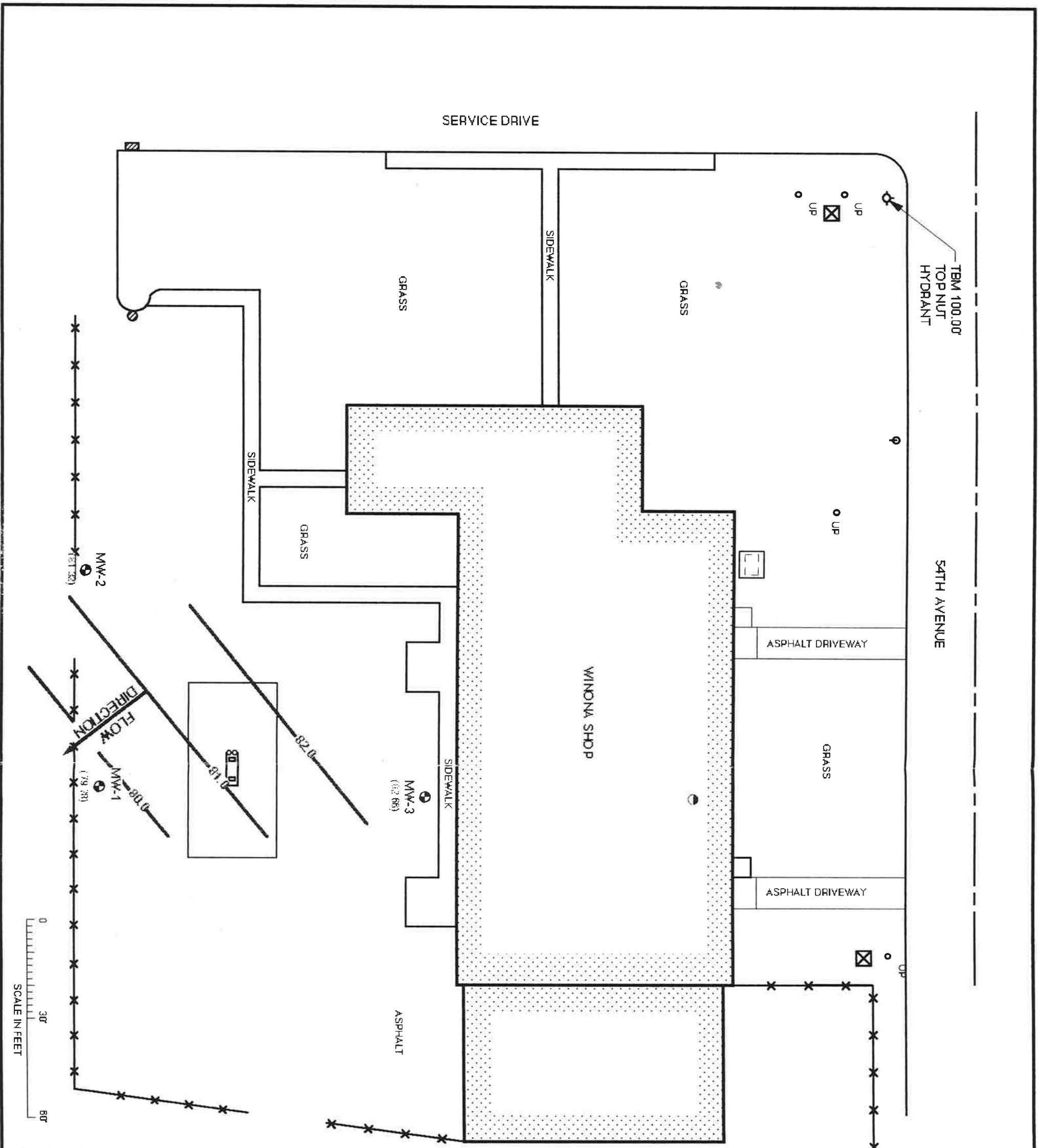
NOTE: APPROXIMATE BUILDING AND UTILITY LOCATIONS. CALL LOCAL UTILITY OPERATOR TO VERIFY UTILITIES BEFORE STARTING ANY SUBSURFACE WORK.

FIGURE 5
INFERRED GROUNDWATER FLOW MAP (01/08/92)

WINDONA COUNTY HWY. DEPT.
 5300 HWY. 61 WEST
 WINDONA, MINNESOTA

OPRA

PROJECT NO. 5257.003



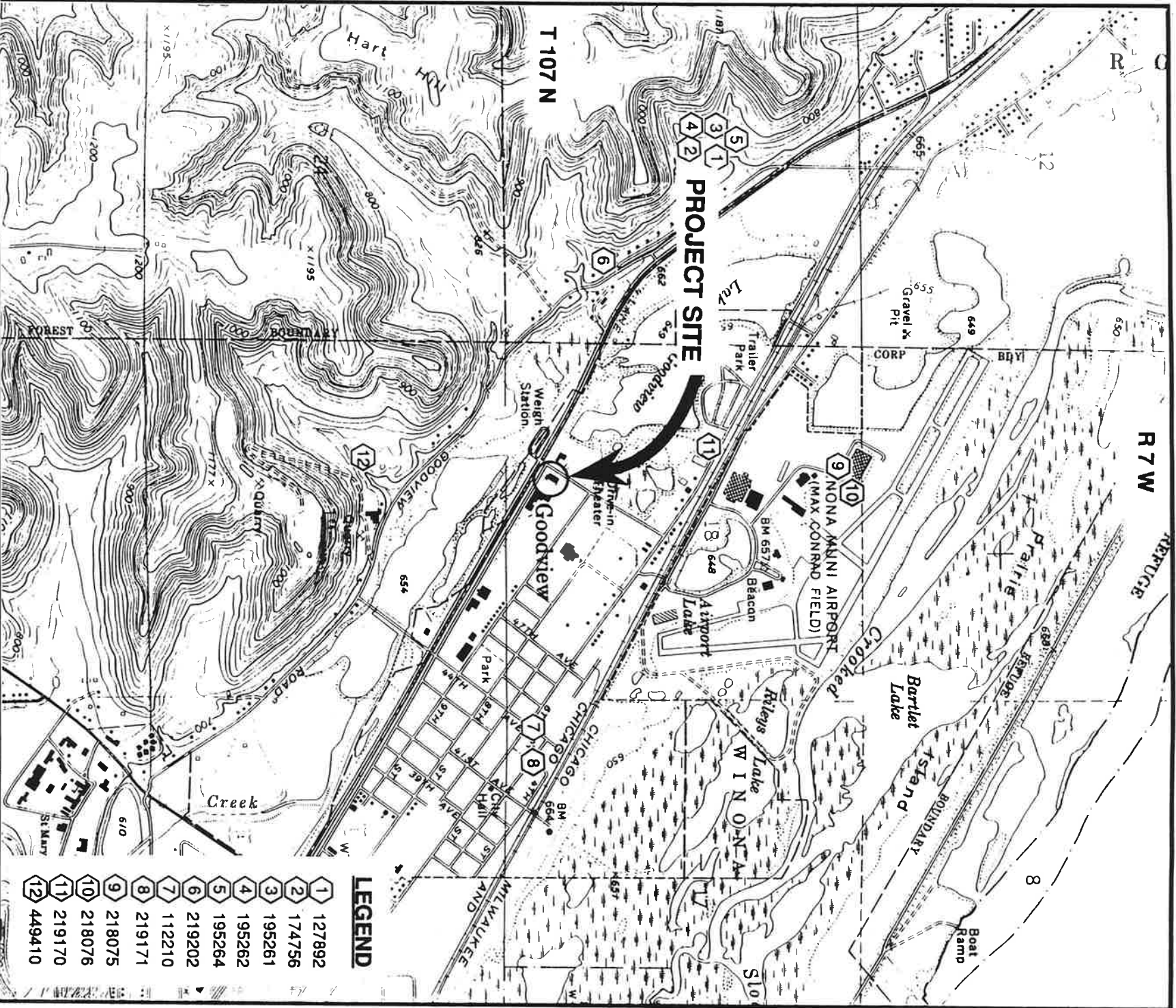
- LEGEND**
- UP UTILITY POLE
 - ⊕ HYDRANT
 - ⊙ MONITORING WELL
 - ⊙ SAND POINT WELL
 - ⊠ GAS METER
 - ⊠ PUMP ISLAND
 - ⊠ WATER SHUTOFF
 - 82.0— INFERRERD GROUNDWATER CONTOUR
 - (82.89) GROUNDWATER ELEVATION
 - ⊠ UNDERGROUND STORAGE TANKS

NOTE: APPROXIMATE BUILDING AND UTILITY LOCATIONS. CALL LOCAL UTILITY OPERATOR TO VERIFY UTILITIES BEFORE STARTING ANY SUBSURFACE WORK.

FIGURE 6
INFERRERD GROUNDWATER FLOW MAP (41092)
 WINONA COUNTY HWY. DEPT.
 5300 HWY. 61 WEST
 WINONA, MINNESOTA

OPRA

PROJECT NO. 5257.003



PROJECT SITE

T 107 N

R 7 W

LEGEND

- 1 127892
- 2 174756
- 3 195261
- 4 195262
- 5 195264
- 6 219202
- 7 112210
- 8 219171
- 9 218075
- 10 218076
- 11 219170
- 12 449410



FIGURE 7
WELL LOCATION MAP

WINONA COUNTY HIGHWAY DEPT.
5300 HWY. 61 WEST
WINONA, MINNESOTA



PROJECT NO. 5257.003

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TABLE 1

UNDERGROUND STORAGE TANK INFORMATION

Winona County Highway Department
5300 Highway 61 West
Winona, Minnesota

<u>Tank No.</u>	<u>Capacity (gallons)</u>	<u>Contents</u>	<u>Installation Date</u>	<u>Current Status</u>
1	10,000	Unleaded Gasoline	1962	Removed
2	10,000	Diesel	1962	Removed
3	1,000	Unleaded Gasoline/ Fuel Oil	1962	Removed
4	1,500	Waste Oil	1962	Removed
5	10,000	Unleaded Gasoline	12/20/91	Active
6	10,000	Diesel	12/20/91	Active
7	560	Waste Oil	01/03/92	Active

TABLE 2

NONAQUEOUS ANALYTICAL RESULTS

Winona County Highway Department
5300 Highway 61 West
Winona, Minnesota

Sample	Date Sampled	Depth feet	Benzene mg/kg	Ethyl-benzene mg/kg	Toluene mg/kg	Xylenes mg/kg	TH as Gasoline mg/kg	TH as Fuel Oil mg/kg
SS-1	08/13/91	18	ND	ND	ND	ND	ND	ND
SS-2	08/13/91	18	ND	ND	ND	ND	ND	ND
SS-3	08/13/91	16	ND	ND	ND	ND	ND	ND
SS-4	08/13/91	11	ND	ND	ND	ND	ND	ND
SS-6	08/13/91	16	ND	ND	ND	ND	ND	ND
SS-7	08/13/91	16	ND	ND	ND	ND	ND	ND
SS-8	08/13/91	Stockpile	ND	ND	ND	ND	.0019	400
SS-9	08/13/91	Stockpile	ND	ND	ND	ND	ND	440
SS-11	08/14/91	15	ND	ND	ND	ND	ND	ND
SS-12	08/14/91	15	ND	ND	ND	ND	ND	ND
SS-13	08/14/91	11	ND	ND	ND	ND	ND	ND
SS-14	08/14/91	11	ND	ND	ND	ND	ND	ND
SS-16	08/14/91	11	ND	ND	ND	ND	ND	ND
SS-17	08/14/91	15	ND	ND	ND	ND	ND	ND
SS-18	08/14/91	10	ND	ND	ND	ND	ND	ND
SS-21	08/14/91	10	ND	ND	ND	ND	ND	ND
SS-25	08/14/91	3	ND	ND	ND	ND	ND	ND
SS-26	08/14/91	3	ND	ND	ND	ND	ND	ND
SS-27	08/14/91	3	ND	ND	ND	ND	ND	ND
SS-28	08/14/91	10	ND	ND	ND	ND	ND	ND
SS-29	08/14/91	Stockpile	ND	ND	ND	ND	ND	170

TH = Total Hydrocarbons

mg/kg = Milligrams per kilogram which is equivalent to parts per million (ppm)

ND = Analyzed but not detected above method detection limits

TABLE 3

WATER WELL LOG DATA

Winona County Highway Department
5300 Highway 61 West
Winona, Minnesota

<u>Minnesota Unique Well No.</u>	<u>Ground Surface Elevation</u>	<u>Base of Well Elevation</u>	<u>Base of Casing Elevation</u>	<u>Water Level Elevation</u>	<u>Aquifer</u>	<u>User</u>
127892	725	557	589	683 -40	Eau Claire	Domestic
174756	770	636	660	677 -100	Ironton-Galesville	Domestic
195261	780	640	686	679	Ironton-Galesville	Domestic
195262	735	600	643	643	Ironton-Galesville	Domestic
195264	740	620	650	673	Ironton-Galesville	Domestic
219202	730	615	708	657	Ironton-Galesville	Domestic
112210	665	210	460	649 -16'	Mt. Simon	Public Supply
219171	660	260	461	612 -48	Eau Claire-Mt. Simon	Public Supply
218075	665	158	505	*	Eau Claire-Mt. Simon	Industrial
218076	650	150	485	650 7'	Eau Claire-Mt. Simon	Industrial
219170	652	417	507	Artesian	Eau Claire-Mt. Simon	Industrial
449410	710	195	442	657 53	Mr. Simon	Public Supply

* Information not contained in well log.

TABLE 4

NONAQUEOUS ANALYTICAL RESULTS

Winona County Highway Department
 5300 Highway 61 West
 Winona, Minnesota

<u>Sample</u>	<u>Date Sampled</u>	<u>Depth</u> <u>feet</u>	<u>Benzene</u> <u>mg/kg</u>	<u>Ethyl-</u> <u>benzene</u> <u>mg/kg</u>	<u>Toluene</u> <u>mg/kg</u>	<u>Xylenes</u> <u>mg/kg</u>	<u>MTBE</u> <u>mg/kg</u>	<u>TH as</u> <u>Gasoline</u> <u>mg/kg</u>	<u>TH as</u> <u>Fuel Oil</u> <u>mg/kg</u>
MW-1	01/06/92	12.5 - 14.5	ND	ND	ND	ND	ND	ND	ND
MW-2	01/07/92	12.5 - 14.5	ND	ND	ND	ND	ND	ND	ND
MW-3	01/06/92	15 - 17	ND	ND	ND	ND	ND	ND	ND

MTBE = Methyl Tertiary Butyl Ether

TH = Total Hydrocarbons

mg/kg = Milligrams per kilogram which is equivalent to parts per million (ppm)

ND = Analyzed but not detected above method detection limits

TABLE 5

MONITORING WELL CONSTRUCTION SUMMARY

Winona County Highway Department
 5300 Highway 61 West
 Winona, Minnesota

Monitoring Well	Date Installed	Top of Casing (feet)	Ground Surface (feet)	Top of Seal (feet)	Top of Filter Pack (feet)	Top of Well Screen (feet)	Bottom of Well Screen (feet)	Bottom of Well (feet)
MW-1	01/06/92	96.62	96.60	89.7	87.4	85.6	75.46	75.46
MW-2	01/07/92	96.40	96.36	88.9	86.4	84.2	74.11	74.11
MW-3	01/06/92	98.03	98.00	89.5	87.0	84.7	74.64	74.64

* Referenced to benchmark elevation of 100.00 feet on top of metal casing of 12-inch well located 35 feet southeast of County building.

TABLE 6

GROUNDWATER ELEVATIONS

Winona County Highway Department
 5300 Highway 61 West
 Winona, Minnesota

<u>Well</u>	<u>Date Measured</u>	<u>Top of Casing Elevation⁽¹⁾ (feet)</u>	<u>Depth to Groundwater⁽²⁾ (feet)</u>	<u>Groundwater Elevation (feet)</u>
MW-1	01/08/92	96.62	15.11	81.51
	04/10/92		16.84	79.78
	07/09/92		16.26	80.14
MW-2	01/08/92	96.40	14.82	81.58
	04/10/92		15.08	81.32
	07/09/92		16.54	80.08
MW-3	01/08/92	98.03	16.58	81.45
	04/10/92		15.37	82.66
	07/09/92		17.99	86.04

⁽¹⁾ Referenced to benchmark elevation of 100.00 feet on top of metal casing of 12-inch well located 35 feet southeast of Highway Department building.

⁽²⁾ Measured from top of well casing.

TABLE 7

AQUEOUS ANALYTICAL RESULTS

Winona County Highway Department
 5300 Highway 61 West
 Winona, Minnesota

Sample	Date Sampled	Benzene mg/l	Ethyl- benzene mg/l	Toluene mg/l	Xylenes mg/l	MTBE mg/l	TH as Gasoline mg/l	TH as Fuel Oil mg/l	Lead mg/l
MW-1	01/08/92	ND	ND	ND	ND	ND	ND	ND	ND
	04/10/92	ND	ND	ND	ND	ND	ND	ND	---
MW-2	01/08/92	ND	ND	ND	ND	ND	ND	ND	ND
	04/10/92	ND	ND	ND	ND	ND	ND	ND	---
MW-3	01/08/92	ND	ND	ND	ND	ND	ND	ND	ND
	04/10/92	ND	ND	ND	ND	ND	ND	ND	---

MTBE = Methyl Tertiary Butyl Ether

TH = Total Hydrocarbons

mg/l = Milligrams per liter which is equivalent to parts per million (ppm)

ND = Analyzed but not detected above method detection limits

--- = Not analyzed