Wisconsin Department of Natural Resources
Superfund Integrated Site Assessment
SAMPLING PLAN

April 30, 2015

Site Name: Aniwa Arsenic Site

U.S. EPA ID#: WIN000505573

Location: Tax Parcel ID#006192400000
SE1/4 of the NW1/4 Section 19, T29N, R11E, Shawano County

Directions to Site: From Green Bay, WI, drive west on State Highway 29 to Wittenberg (approximately 61 miles). Then exit onto Highway 45 North and drive approximately 12 miles north to Marsh Road (between Birnamwood and Aniwa). Turn west onto Marsh Road and drive approximately 0.5 miles to the Site.

Dates of Investigation: May 2015

Project Manager: Tauren Beggs, Hydrogeologist
Remediation & Redevelopment
2984 Shawano Ave
Green Bay, WI 54313
Phone: (920) 662-5178

In cooperation with EPA Removals: Kathy Halbur
Federal On-Scene Coordinator
United States Environmental Protection Agency, Region 5
2984 Shawano Ave
Green Bay, WI 54313
Phone: (920) 662-5424

Reviewed and Approved by: Pat Hamblin, NPL Coordinator, EPA Region 5

Prepared by Kathleen M Sylvester, Hydrogeologist
Bureau for Remediation and Redevelopment
Wisconsin Department of Natural Resources

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FIGURES

I. Introduction

The Wisconsin Department of Natural Resources (WDNR), through a Cooperative Agreement with the United States Environmental Protection Agency (U.S. EPA) Region 5, is tasked to conduct a Integrated Site Assessment to determine if Aniwa Arsenic Site (Site) is eligible for placement on the National Priorities List (NPL) of Superfund sites.

A Preliminary Assessment (PA) was dated March 28, 1984 (Reference 1). A time-critical removal is currently scheduled by the U.S. EPA On-Scene Coordinator (OSC) for Wisconsin (Reference 2).

A. Purpose of this Sampling Plan

The purpose of this sampling plan is to provide written protocols used by WDNR to assess the historical documentation, and to ensure that data of known quality are used to determine if the Site decision from 1984 (Reference 1) to assign a No Further Remedial Action Planned (NFRAP) from the NPL. This sampling plan will be coordinated and executed by the EPA Removals Program. Data received as a result of the time-critical removal will be evaluated and documented in an Integrated Site Assessment Report (ISA). This sampling plan will be sent to U.S. EPA Region 5 in advance of the sampling event; however, verbal approval was received from EPA Site Assessment (telephone discussions with Mr. Pat Hamblin) for WDNR to work with EPA Removals in order to obtain quality data in a timely manner.

B. Objective of Investigation

The objective of this investigation is to collect samples of groundwater, surface water, drinking water, sediment, and soil to establish if hazardous material or waste, attributable to the site, remains in the environment after the time-critical removal. Sampling strategy and data evaluation will determine whether a threat to human health and the environment remains after the removal and mitigation work.

II. Site Description and History

The Aniwa Arsenic Site is a 4.35 acre vacant lot that is heavily vegetated. It is located in a mixed residential and agricultural area between the Towns of Aniwa and Birnamwood in Shawano County, WI (Figure 1). The Site is bordered to the north by a marsh; to the east by farm land; to the south by farm land, woods, and a residence; and to the west by a State Recreation Trail (abandoned Chicago & NW Railroad line), with a residence beyond the trail, approximately 300 yards due west of the Site. The Plover River State Fishery Area, Plover River Woods State Natural Area, and Dells of the Eau Claire River State Natural Area are located within a five mile radius of the Site. All residences in the immediate area have private wells. The Town of Aniwa Clerk estimates the current population of the Town at approximately 582.

The Town of Aniwa purchased the property to use as a storage and distribution location for grasshopper pesticides in the 1930s. Arsenic-based pesticides were distributed by the United States Department of Agriculture and the Wisconsin Department of Agriculture at the time to control grasshopper infestation in potato crops. Records indicate that four types of arsenic pesticides were used during the 1930s. The most common type was sodium arsenite (NaAsO2), a white to grey powder that is highly water soluble. Other arsenic pesticides used at the time include arsenic trioxide (As2O3), copper acetoarsenite (C4H6O6Cu4As6), and lead arsenate (PbHAsO4). It is believed that the pesticides were stored in concentrations between 50%-90% pure. The pesticides

were stored in a wooden shed (approximately 24'x12') at the Site and area farmers picked up a small supply for their use as needed. The farmers mixed the pesticides with molasses or sawdust and spread the mixture along the roadsides to attract grasshoppers from the fields.

The government recalled the arsenic pesticides after World War II; however, the pesticides stored at the Aniwa Site were not returned to the Department of Agriculture. The US Government prohibited the use of arsenic in and around homes in 1967.

In 1975, the remaining pesticide was buried in a pit approximately 8-10 feet below ground surface (bgs) adjacent to the storage shed (Figure 2). It is unknown how much pesticide remained and was buried at that time. The Wisconsin Department of Natural Resources (WDNR) became aware of the Site in January, 1983 and required the Town of Aniwa to conduct an investigation to determine the extent of contamination. In response, the Town hired a consultant (Becher-Hoppe) to assess the impact of the buried drums; relocated the wooden shed structure (shed's concrete foundation with dirt floor remained in place); confirmed the presence of the buried drums with a test trench; and, secured the Site. WDNR then requested EPA assistance. In November, 1983, EPA's Technical Assistance Team (TAT) Contractor, Weston-SPER, conducted a Site Assessment. Soil on the shed's dirt floor contained 39,800 parts per million (ppm) arsenic and soils near the pit contained 50-70 ppm arsenic at depths of 10-12 feet bgs. Naturally-occurring concentrations of arsenic in the area's soils average between 5-10 ppm. Groundwater directly under the shed foundation contained 1.04 milligram per liter (mg/L) arsenic, exceeding the standard for drinking water (0.05 mg/L). The concentration of arsenic detected in off-site wells was less than 0.004 mg/L. In December, 1983, an Action Memo requesting $20,000 to remove and incinerate six-ten drums of sodium arsenite and to excavate and landfill 60 cubic yards of heavily contaminated soil was proposed but not approved.

In May, 1984, WDNR utilized state spill response funding ($25,423) to conduct a limited removal action at the Site. There is not an official report of the removal action and available documents vary regarding the number of drums and the amount of contaminated soil that was excavated and transported for off-site disposal. Potentially up to nineteen drums (metal and wooden) and 60 cubic yards of contaminated soil were removed. In addition to the drum and soil removal, WDNR, with assistance from EPA's Environmental Response Team (ERT), performed an additional extent of contamination study during the May, 1984 mobilization. This included installation of additional groundwater monitoring wells. In March, 1985, WDNR notified the Town of Aniwa of its responsibility to conduct ongoing monitoring of the Site and to record a Deed Restriction. In exchange for these activities, WDNR did not seek cost reimbursement from the Town for the removal costs. The Deed Restriction was filed in February, 1992 and the Consent Order (LMD-88-13) between WDNR and the Town of Aniwa detailing the sampling requirements and long term care plan for the Site was finalized on February 27, 1990. (The Deed Restriction and the Consent Order can be found in the Administrative Record.)

Post-removal soil and groundwater monitoring conducted by the Town of Aniwa as well as an EM-31 Ground Conductivity Study performed by the Wisconsin Geologic and Natural History Survey (WGNHS) indicate that not all of the pesticide was successfully removed. High levels of arsenic are present in the surface and sub-surface soils. The arsenic has impacted the groundwater and contaminated a neighboring drinking water well. The Site is unsecured and there is evidence of regular recreational use of the property by trespassers. In 2011, WDNR required the Town of Aniwa to submit a work plan for remediation of the remaining arsenic contamination at the Site. The Town of Aniwa does not have the financial resources to conduct the necessary clean-up. The

Town has pursued numerous funding options, including contacting Wisconsin Governor Scott Walker (letter available in the Administrative Record), other elected officials, and Brownfields funding. The Town and WDNR also consulted with the Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP) on possible funding options. All funding requests were unsuccessful. In September, 2014, WDNR requested that EPA reconsider conducting a removal action at this Site to abate the risks posed by the buried arsenic pesticides. The removal action has been approved and is scheduled for spring/summer 2015.

III. Site Geology/Hydrogeology

The Site is located in the area between the Plover and Embarrass River Systems on a watershed divide. There are numerous associated creeks and wetlands in this area of glacial outwash. Groundwater flow is difficult to determine. Monitoring wells recharge rapidly all around the Site, particularly to the north and west. There is a direct correlation between arsenic contamination concentrations and groundwater levels; high water levels yield high arsenic concentrations. There is great seasonal variation in the monitoring results.

The northern portion of the Site is a low-lying wetland/marsh, with soils known as the Markey and Cathro mucks (Reference 3). The surface of the Site generally slopes to the south. Soils in the area are predominately silty, clayey sand with some gravel known as the Kennan bouldery fine sandy loam (Reference 3). There are no structures remaining on the property.

The upper geologic unit consists of Quaternary-age glacial deposits of gravels, sands, and clays. Bedrock in the area is identified as the Wolf River Batholith and is composed of gray anorthosite, a coarse-grained plagioclase-rich rock containing interstitial orthopyroxene, clinopyroxene, iron-titanium oxides, and apatite.

IV. Description of Work to be Performed

A. Waste Characteristics and Pathways to be Investigated

This Site has been extensively studied since the completion of the initial removal action in 1984. In the years since the limited removal, additional groundwater monitoring wells have been installed at and around the Site; subsequent locations were determined based on the results of the various sampling events. The Town of Aniwa has primarily used one consultant throughout this time, Warren Hohn, who prepared a Thesis for the University of Wisconsin-Green Bay detailing his findings. A map (Figure 3) was prepared by Mr. Hohn to summarize the 1990 surface soil analytical data for arsenic. Additional soil sampling conducted in 2007 and 2012 and EM-31 conductivity survey completed (Figure 4) in 2011 along with the 1990 data assisted in establishing the locations of the remaining arsenic hotspots and the approximate 40' X 60' area for removal.

The highest total arsenic concentration detected in Site soils is 8,360 ppm, 2-4' bgs, from a boring collected in 2012. This was in an area south of the shed foundation and the burial pit (SB3, Figure 3). Surface soil total arsenic detections have been as high as 1,410 ppm. This was in an area west of the former shed location (SB6, Figure 2). On September 23, 2014, EPA FIELDS, OSC Halbur, and representatives from WDNR, the Wisconsin Department of Health Services (WDHS), and the Shawano-Menominee Counties Health Department conducted an XRF study at the Site to confirm contamination identified by the Town. Arsenic in the surface soils was readily and consistently measured at concentrations exceeding EPA's Removal Management Level (RML) for residential soils (67 ppm) across the Site (exceedances detected: 164 ppm, 227 ppm, 589 ppm, and 715 ppm).

The Site is unsecured and there is a recreational path thru the vegetation across the center of the Site. Many of the XRF readings were taken from this path.

Additionally, the results of the EM-31 Ground Conductivity Study performed by WGNHS in 2011 indicate high conductivity at the Site (Reference 2). The EM-31 measures how well the ground conducts electricity; the higher the number the more conductive the ground is. The remaining arsenic pesticides in the Site soils result in ions in the water and higher conductivity. This study further confirms that arsenic pesticides remain at the Site around and south of the old shed.

Groundwater monitoring indicates the contamination is migrating. In 2011, arsenic concentrations in monitoring well B13 (under the shed foundation) were 72 mg/L (compared to 1.04 mg/L in groundwater under the shed in 1983). Figure 5 shows the private wells in the area surrounding the Site. The closest well, at the residence immediately west of the Site, consistently has detections of dissolved arsenic in the water. The highest concentration detected to date was 9.20 microgram per liter (µg/L) dissolved arsenic. The WDNR Enforcement Standard (ES) and the EPA Maximum Contaminant Level for arsenic is 10 µg/L. EPA's MCL Goal (MCLG) for arsenic in drinking water is 0 parts per million.

In summary, current impacts to the Site include groundwater and soil. Nearby private wells are at risk and one is known to be contaminated with arsenic above the drinking water standards. Because the property is vacant and there is evidence of people accessing the property, the contaminated soils pose a significant risk to human health and continue to impact groundwater in the area.

B. Sampling Rationale

Sample collection for all media by the U.S. EPA Removals contractors is intended to document and confirm removal/decrease of the arsenic and lead-contamination. Figures 2 and 2A show the proposed sample locations. An XRF field screening will be conducted during the removal to assess the soil to remain. Ten to fifteen soil samples (SS-1 to SS-15) will be collected for confirmation of the extent of the excavation. Groundwater will be assessed pre- and post-excavation. Nine monitoring wells will be sampled pre-excavation. As a result of the excavation work, some wells will be removed. The remaining monitoring wells will be resampled approximately two to three months after the removal. The total number of monitoring wells sampled will range from 13 to 18 based on how many are permanently removed during the excavation. Up to two samples of surface water (SW-1, SW-2) and sediment (SD-1, SD-2) will be collected in the marsh area north of the source area. Background samples of soil (SS-19), surface water (SW-19), and sediment (SD-19) will be collected northeast outside the extent of contamination. Drinking water assessed at the adjacent residence (W19150 Marsh Rd) to the west was impacted. An additional drinking water sample will be collected after the point of entry system is installed to confirm it is functioning properly to remove the arsenic.

TABLE 1
Sampling Rationale Summary

Sample Matrix	Sample Location Description	Sample ID Numbers	Analyses	Rationale for Sampling
Soil	On-site: within excavation limits	SS-1 to SS-15	TAL Inorganics - Metals	Soil attribution: post-excavation confirmation to determine if any contamination remains
	On-site: outside limits of contaminated area	SS-# (ID number depends on when it's collected)	TAL Inorganics – Metals	Background for soil
Groundwater	On-site Up/Down/Side gradient monitoring wells (some will be removed)	B-10, B-12, B-13, B-13A, B-18, B-19, B-20, B-21	TAL Inorganics - Metals	Groundwater attribution: pre- and post-excavation
	On-site monitoring wells	B-13, B-19	TAL Inorganics - Nitrate	Groundwater attribution: confirmation
	On-site monitoring well	B-11	TAL Inorganics - Metals	Background for groundwater
Surface Water	On-site ponding	SW-1, SW-2	TAL Inorganics - Metals	Surface water impacts evaluation
	On-site ponding	SW-# (ID number depends on when it's collected)	TAL Inorganics - Metals	Background for surface water
Sediment	On-site	SD-1, SD-2	TAL Inorganics – Metals	Sediment attribution
	On-site	SD-# (ID number depends on when it's collected)	TAL Inorganics - Metals	Background for sediment
Drinking Water	Timm-Burkart W19150 Marsh Rd	TIMM-MMYY (Month, year)	TAL Inorganics - Metals	Collected after installation of treatment system to confirm its functioning properly

V. Sampling Procedures

All samples will be taken by the U.S. EPA Removals contractor. Their procedures will follow a standard preparation and shipping of all samples and quality control requirements.

Per the U.S. EPA Action Memo (Reference 2), the removal action will be conducted in a manner not inconsistent with the NCP. The OSC has initiated planning for provision of post-removal Site control consistent with the provisions of Section 300.415(l) of the NCP.

All hazardous substances, pollutants, or contaminants removed off-site pursuant to this removal action for treatment, storage, and disposal shall be treated, stored, or disposed of at a facility in compliance, as determined by EPA, with the EPA Off-Site Rule, 40 C.F.R. § 300.440.

VI. Field Support Group Assignments

Since the U.S. EPA Removals contractor will be performing the sampling activities, the WDNR project manager and sample custodian will assist as needed or requested by the OSC.

TABLE 2
Work Assignments

Name	Media	Duties
Tauren Beggs Kathy Sylvester	All	WDNR Project Manager to assist as requested by U.S. EPA OSC.

VII. Sampling Report

The U.S. EPA OSC will provide the WDNR with the analytical results and associated documentation from the removal action. WDNR will develop an Integrated Site Assessment Report that will document the activities and if necessary, provide recommendations for further work.

REFERENCES

1. Preliminary Assessment Summary, WDNR/USEPA, March 28, 1984.
2. U.S. EPA Action Memo: Request for Approval and Funding for a Time-Critical Removal Action at the Aniwa Arsenic Site, Marsh Road, Aniwa, Shawano County, Wisconsin (Site ID #C53Z), dated February 6, 2015.*
3. Soil Survey of Shawano County, U.S. Department of Agriculture, Soil Conservation Service, issued October 1982.*

* References too voluminous to attach; the Administrative Records for case file BRRTS #02-59-000198 can be reviewed at Wisconsin Department of Natural Resources-Northeast Region Headquarters.

REI
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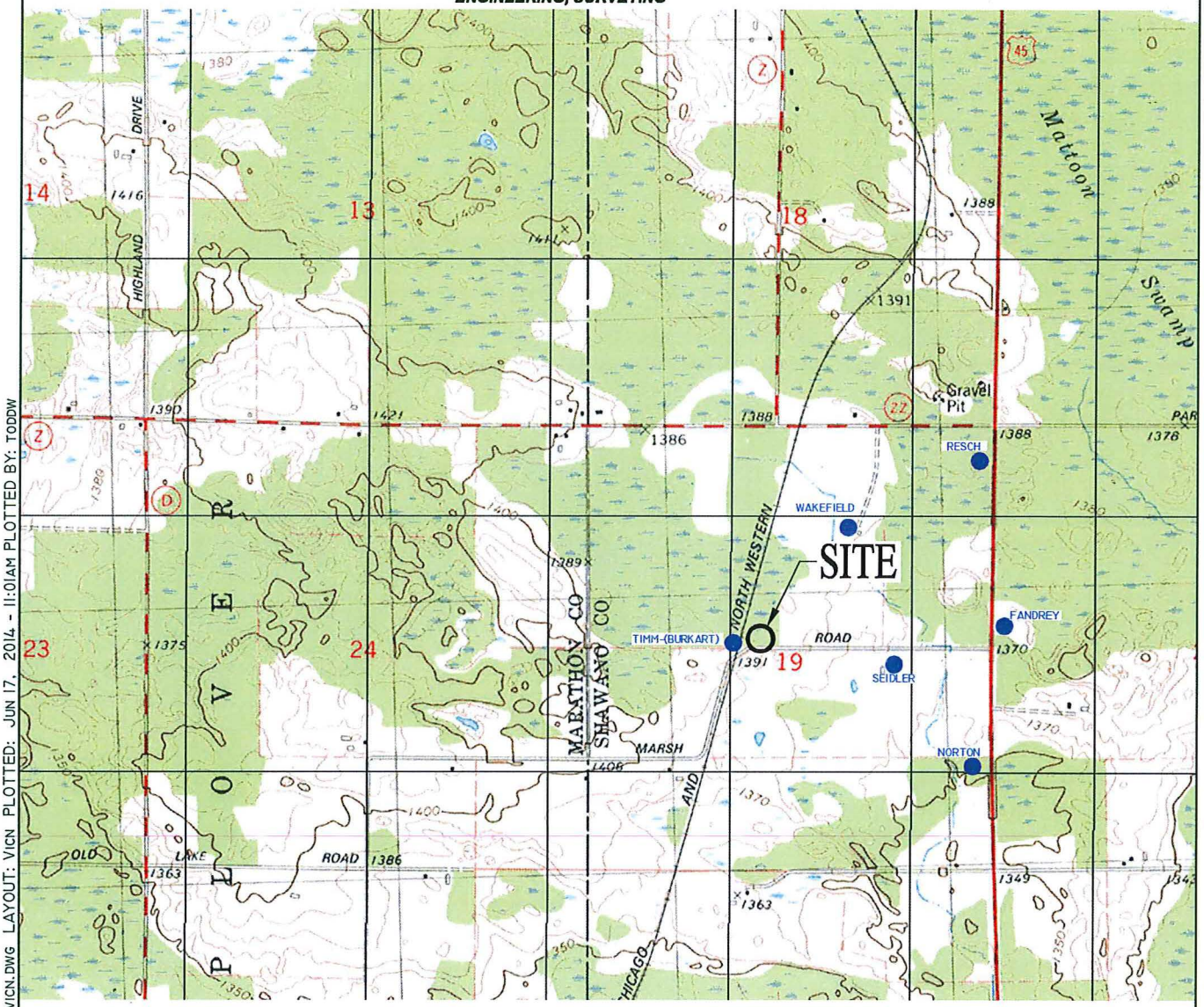
ENGINEERING, SURVEYING



SCALE 1:24 000

1 0 1 MILE

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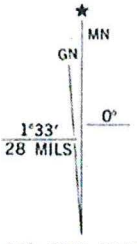
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929



UTM GRID AND 1982 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

QUADRANGLE LOCATION

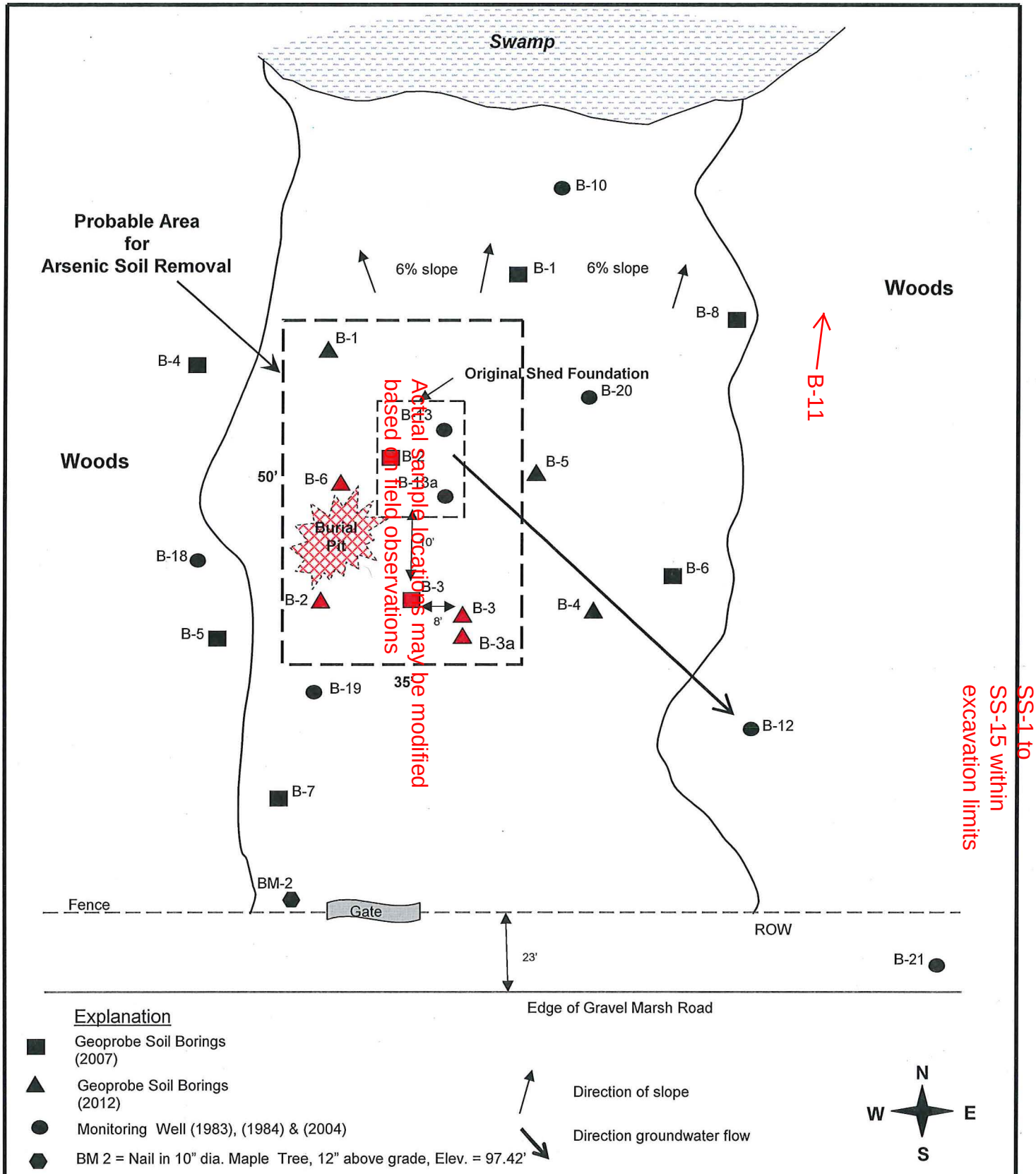
● PRIVATE WELL

BIRNAMWOOD, WIS.
NW/4 WITTENBERG 15' QUADRANGLE
N4452.5–W8907.5/7.5

1982
REI Engineering, INC.

TOWN OF ANIWA DISPOSAL SITE MARSH ROAD NEAR CHICAGO & NW RAILROAD TOWN OF ANIWA, SHAWANO COUNTY, WI	FIGURE 1 LOCATION MAP		
	PROJECT NO. 6663	DRAWN BY: TAW	DATE: 6/16/2014

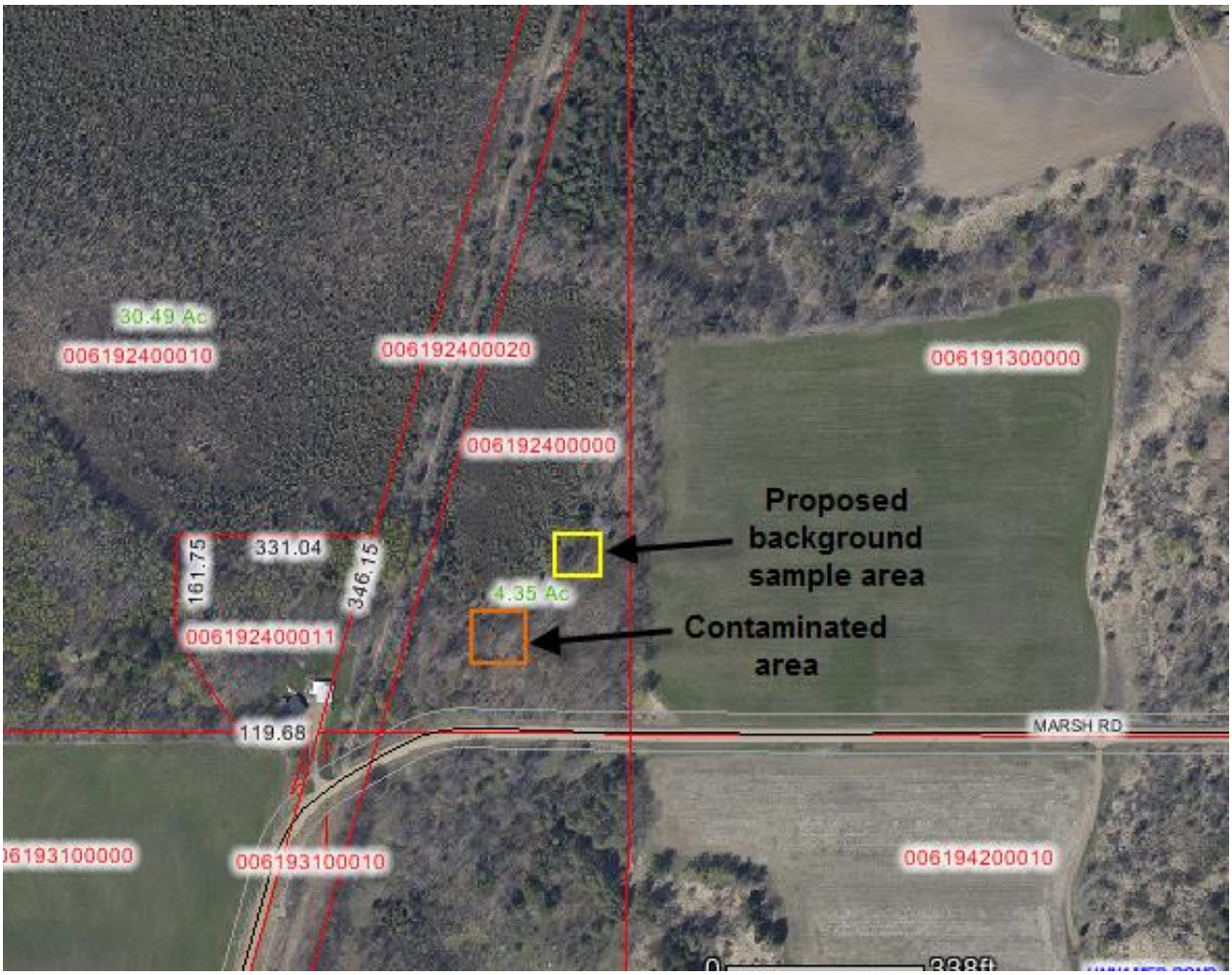
DRAWING FILE: P:\6600-6699\6663-TOWN OF ANIWA - ARSENIC SITE\DWG\6663-VICN.DWG LAYOUT: VICN PLOTTED: JUN 17, 2014 - 11:01AM PLOTTED BY: TODDW



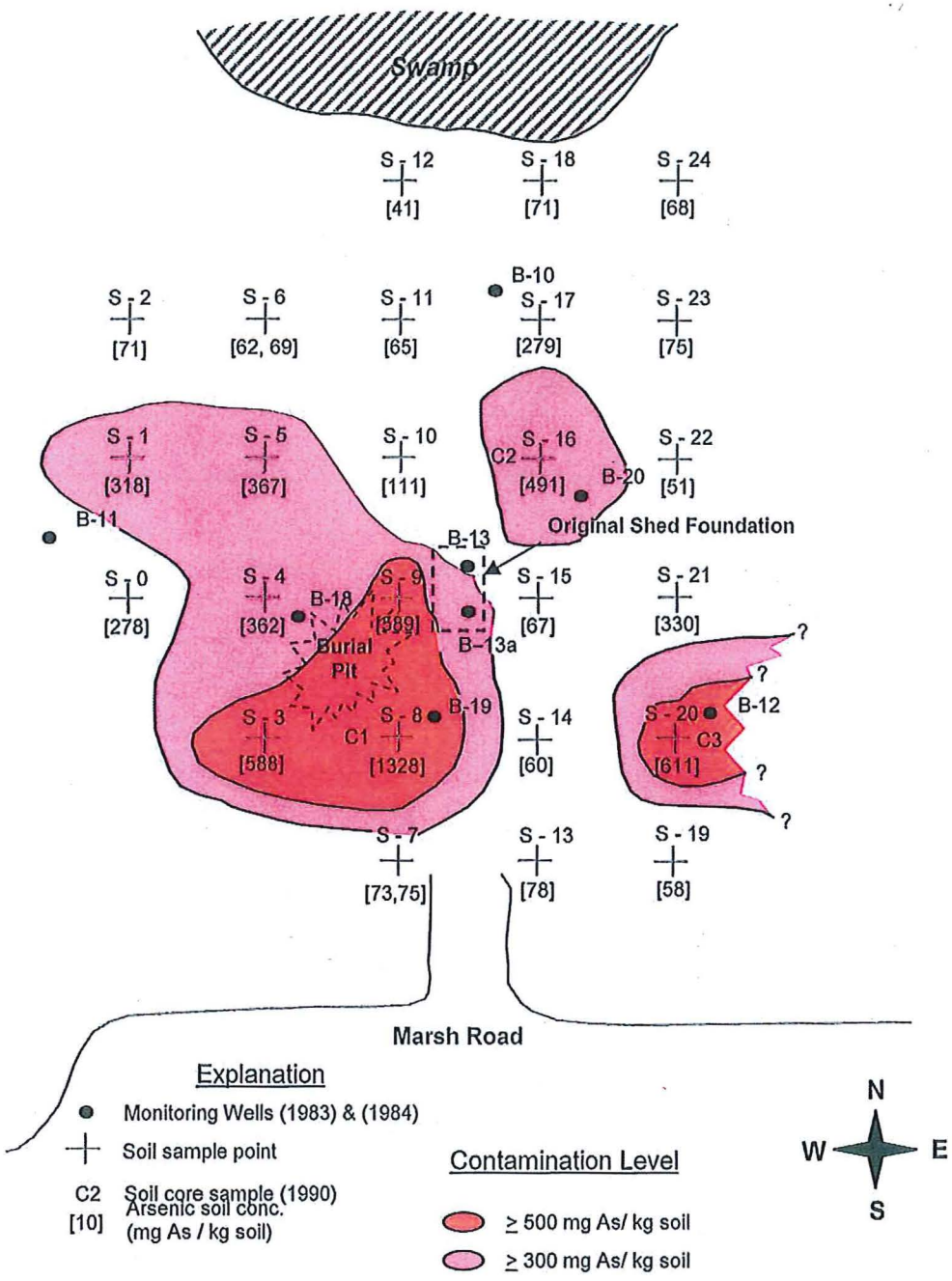
Client: **W. Hohn Soil Testing**	Project: **Town of Aniwa Disposal Site**	Location: **Shawano Co. Wisconsin**
Cartographic Services cartographic_services@hotmail.com	**Geoprobe Soil Borings & Monitoring Well locations with groundwater flow direction completed in 2007 & 2012**	Figure 2

6/4/2015

Figure 2A
Proposed Background Sample Location Area



04-2015



Client: **W. Hohn Soil Testing**	Project: **Town of Aniwa Disposal Site**	Location: **Shawano Co. Wisconsin**
Cartographic Services, cartographic.services@hotmail.com	**Composite and core arsenic soil sampling results done on 6 June 1990.** Not to scale	Figure 3

Figure 20

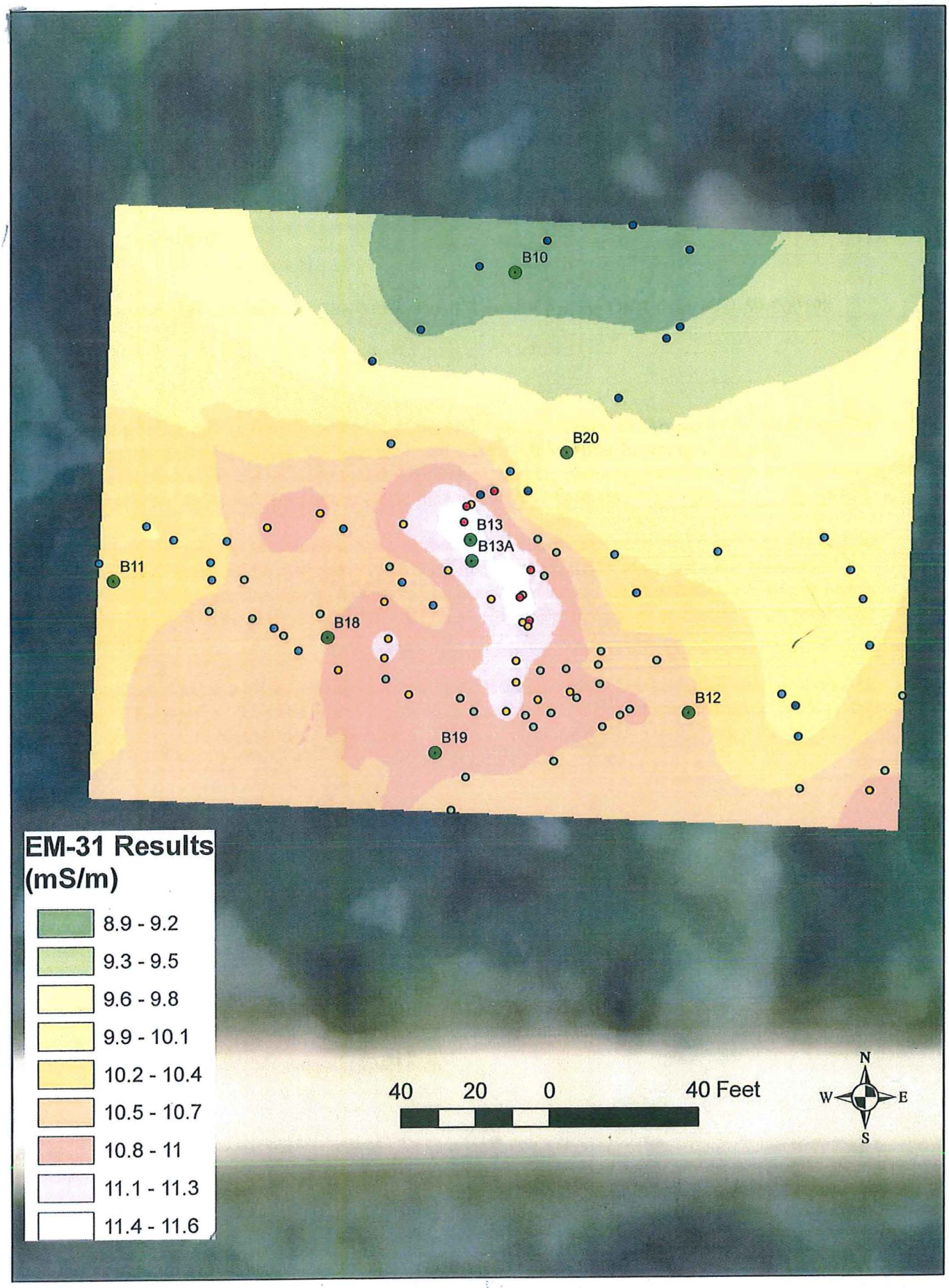

B10
B20
B13
B13A
B11
B18
B12
B19
EM-31 Results
(mS/m)
8.9 - 9.2
9.3 - 9.5
9.6 - 9.8
9.9 - 10.1
10.2 - 10.4
10.5 - 10.7
10.8 - 11
11.1 - 11.3
11.4 - 11.6
40 20 0 40 Feet
N
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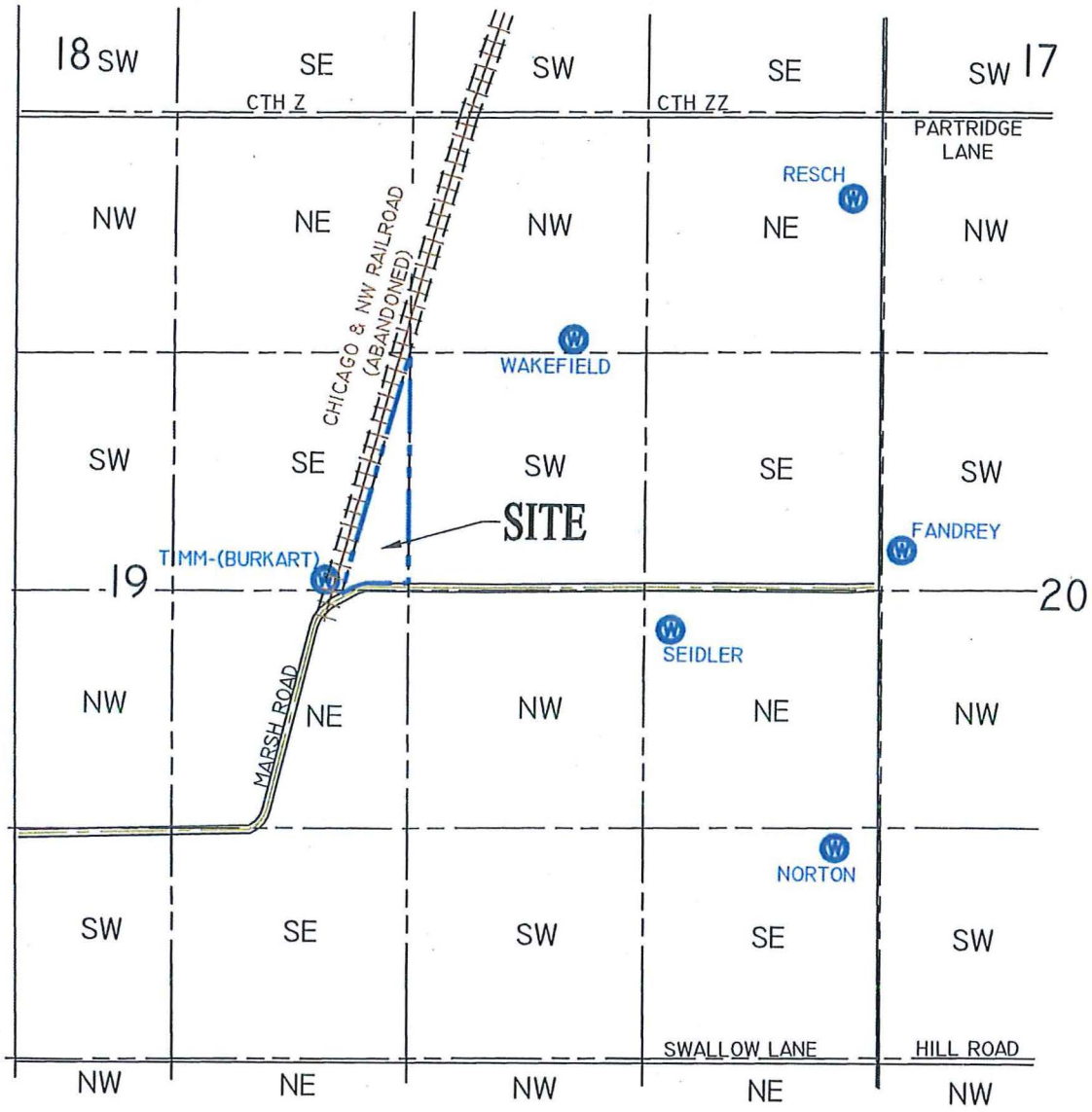
FIGURE 4

REI
CIVIL & ENVIRONMENTAL ENGINEERING, SURVEYING



LEGEND

0 100

SCALE: 1" = 100'

PRIVATE WELL

N

DRAWING FILE: P:\6600-6699\6663-TOWN OF ANIWA - ARSENIC SITE\DWG\6663-PLAT.DWG LAYOUT: PLAT PLOTTED: JUL 03, 2014 - 11:15AM PLOTTED BY: NATHANP

REI Engineering, INC.

TOWN OF ANIWA DISPOSAL SITE
MARSH ROAD NEAR CHICAGO & NW RAILROAD
TOWN OF ANIWA, SHAWANO COUNTY, WI

FIGURE 5 POTABLE WELLS MAP (KMS)

PROJECT NO.	DRAWN BY:	DATE:
6663	TAW	7/2/2014

3/29/87

REFERENCE 1

PRELIMINARY ASSESSMENT SUMMARY

TN. OF ANIWA (Arsenic Burial Site) WI/ (not assigned)
SE¼, SE¼, NW¼, of Sec. 19, T29N - R11E

Background & Site Description: In the early 1930's the federal government purchased arsenic and with the help of the Department of Agriculture, distributed it to counties and townships for a grasshopper control program. The liquid and powdered arsenic was then mixed with molasses, bran, sawdust or whey and spread around fields and along roads to attract the grasshoppers. The Town of Aniwa constructed a 12'x15' shed on a parcel of land in 1937 for storage of the arsenic. After the grasshopper control program came to an end, the State of Wisconsin recalled the pesticide in the late 1940's. Unfortunately, the arsenic at Aniwa was not collected and later in 1975 it was buried outside of the shed.

Area Description: This site, owned by the Town of Aniwa, is located in a rural area. Silty-clayey sands are found to a depth of 13.5 feet. There is a 8-10% slope north of the shed to the wetland. Groundwater flows to the south.

Site Priority: (High) Since the soil here is severly contaminated and groundwater monitoring has shown arsenic concentrations above the drinking water standard, it is ranked a high priority. Clean-up and remedial action will be implemented in the spring of 1984. EPA "technical assistance" will provide further information regarding the spread of contamination.

Comments: Contamination is found at high concentration in surface soils and has migrated vertically in the area below the shed. The drums appear to lie immediately above or at the water table. It is likely the arsenic is being transported by the groundwater from the shed and adjacent pit area. The most contaminated soils, the first 1-2 feet of shed soils and soils around and below the drums, will be removed, replaced with clean soils and capped with clay. This is the immediate plan. The long-term remedial action will be to install more borings, piezometers and monitoring wells. All groundwater monitoring should be performed quarterly for a year to evaluate the movement of arsenic in the groundwater and the effect if any on down gradient groundwater users.

Site Inspection Contact Persons: Doug Rossberg - DNR/LMD (414)497-4047 and Jim Reyburn - DNR/LMD (414)497-4327

DNR District's Role on Site Inspection: Assigned staff will provide site briefing, access to files and accompany F.I.T. on-site inspection.

Prepared by: Mary Feenstra - DNR/LMD (414)497-3228

REFERENCE 2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 W. JACKSON BLVD
CHICAGO, IL 60604

MEMORANDUM

SUBJECT: Request for Approval and Funding for a Time-Critical Removal Action at the Aniwa Arsenic Site, Marsh Road, Aniwa, Shawano County, Wisconsin (Site ID #C53Z)

FROM: Kathy Halbur, On-Scene Coordinator
Emergency Response Branch I, Removal Section 1

THRU: Jason H. El-Zein, Chief
Emergency Response Branch I

TO: Richard C. Karl, Director
Superfund Division

I. PURPOSE

The purpose of this memorandum is to request and document your approval to expend up to $534,236 to conduct a time-critical removal action at the Aniwa Arsenic Site, (or the Site) located between the towns of Aniwa and Birnamwood in Shawano County, Wisconsin 50448. The response actions proposed herein are necessary to mitigate threats to public health, welfare, and the environment posed by the presence of uncontrolled hazardous substances at the Site. The Site contains high concentrations of arsenic in the surface and sub-surface soils as well as in the groundwater, threatening a nearby residential well.

This Action Memorandum would serve as approval for expenditures by EPA, as lead technical agency, to take actions described herein to abate the imminent and substantial endangerment posed by hazardous substances at the Site. The proposed removal of hazardous substances would be taken pursuant to Section 104(a)(1) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9604(a)(1), and 40 C.F.R. § 300.415 of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

The uncontrolled conditions of the hazardous substances present at the Site, and the potential threats they present require that this action be classified as a time-critical

REFERENCE 3

United States
Department of
Agriculture

Soil
Conservation
Service

In Cooperation with the
Research Division of the
College of Agricultural
and Life Sciences
University of Wisconsin

Soil Survey of Shawano County, Wisconsin