

Explanation of Significant Differences

Groundwater – Anoka County Park

Naval Industrial Reserve Ordnance Plant Fridley, Minnesota



Southern Division Naval Facilities Engineering Command

Contract Number N62467-94-D-0888

Contract Task Order 0003

May 2000



TETRA TECH NUS, INC.

EXPLANATION OF SIGNIFICANT DIFFERENCES

**GROUNDWATER –
ANOKA COUNTY PARK**

**NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT
FRIDLEY, MINNESOTA**

**COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT**

**Submitted to:
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Naval Facilities Engineering Command
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**CONTRACT NUMBER N62467-94-D-0888
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MAY 2000

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TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE NO.</u>
1.0 INTRODUCTION TO THE SITE AND STATEMENT OF PURPOSE.....	1
2.0 SITE HISTORY AND CONTAMINATION.....	1
3.0 SELECTED REMEDY.....	2
4.0 BASIS FOR THE DOCUMENT.....	3
5.0 DESCRIPTION OF SIGNIFICANT DIFFERENCES.....	4
6.0 SUPPORT AGENCY COMMENTS.....	4
7.0 STATUTORY DETERMINATIONS.....	4
8.0 PUBLIC PARTICIPATION COMPLIANCE.....	4
9.0 AUTHORIZING SIGNATURES.....	5

FIGURES

NUMBER

2-1	Site Location Map
2-2	Site Features
2-3	TCE Concentrations ($\mu\text{g/l}$), Shallow Monitored Interval
2-4	TCE Concentrations ($\mu\text{g/l}$), Intermediate Monitored Interval

1.0 INTRODUCTION TO THE SITE AND STATEMENT OF PURPOSE

This Explanation of Significant Differences (ESD) addresses groundwater at the Naval Industrial Reserve Ordnance Plant (NIROP) Fridley. NIROP Fridley is located in the northern portion of the Minneapolis/St. Paul metropolitan area within the city limits of Fridley, Minnesota.

The ESD documents a change to the Record of Decision (ROD) for groundwater remediation at NIROP Fridley. The ROD was signed on September 28, 1990 by members of the Department of the Navy (Navy), the United States Environmental Protection Agency, Region V (USEPA), and the Minnesota Pollution Control Agency (MPCA). The selected remedy included a groundwater recovery and treatment system for the purpose of groundwater containment. System operation began in September 1992. However, the system was not specifically designed to collect and treat contaminated groundwater at Anoka County Park. It was anticipated that this groundwater contamination would naturally attenuate over time. After the Remedial Investigation (RI) was conducted in 1999, the Navy, USEPA, and MPCA agreed that groundwater contamination at the park should be addressed with some form of active treatment. Enhanced bioremediation was ultimately selected as the most appropriate treatment technology. This ESD documents the intention to implement enhanced bioremediation of groundwater at Anoka County Park.

The ESD was developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 117(c) and the National Contingency Plan (NCP) Section 300.435(c)(2)(i). The lead agency is the Southern Division Naval Facilities Engineering Command (NAVFAC). The supporting agencies are the USEPA and the MPCA. As promulgated under NCP Section 300.825(a)(2), the ESD will become part of the administrative record file for NIROP Fridley. The file is located at the NIROP facility on East River Road in Minneapolis, Minnesota.

2.0 SITE HISTORY AND CONTAMINATION

Figure 2-1 depicts the location of NIROP Fridley, which is situated approximately ¼ mile east of the Mississippi River and less than 1 mile south of Interstate 694. Figure 2-2 presents a site map depicting the property boundaries and plant building at NIROP Fridley.

NIROP Fridley was constructed in 1940 to manufacture gun mounts and is currently used to design and manufacture advanced naval weapons systems. Process areas located within the plant building have included painting, foundry, welding, heat treating, plating, machine shop, testing, and shipping and receiving.

In 1990, volatile organic compounds (VOCs) were detected in the upper and lower portions of the Quaternary aquifer zone at NIROP Fridley. TCE accounted for over ninety percent of the total VOCs and was detected at levels exceeding the Federal Maximum Contaminant Level (MCL). The TCE plume originated in the vicinity of the NIROP building and migrated in a southwesterly direction across Anoka County Park and towards the Mississippi River. A groundwater recovery well system was installed to contain the contaminated groundwater as it migrated downgradient. Figure 2-2 presents the location of the existing recovery wells and on-site treatment plant.

The TCE contamination was further defined during the RI in 1999 (Tetra Tech NUS, Inc. [TtNUS], 1999) and the 1999 Annual Monitoring Report (TtNUS, 2000). Figures 2-3 and 2-4 depict the most recent isocontours for TCE contamination in the shallow and intermediate portions of the Quaternary aquifer zone. As shown, there is a portion of the TCE contaminated plume, located in Anoka County Park between East River Road and the Mississippi River, that is not entirely collected by the existing recovery wells. This contamination has not significantly attenuated over time and could potentially migrate into the Mississippi River if it is not actively addressed. Potential receptors include a water supply intake for the City of Minneapolis that is located less than one mile downstream from the park.

3.0 SELECTED REMEDY

As specified in the ROD (USEPA, 1990), the selected remedy included a groundwater recovery and treatment system. The objective was to address the principal threat posed by the site by providing hydraulic containment to prevent further migration of contaminated groundwater off the NIROP and by recovering, to the extent feasible, contaminated groundwater beneath the Anoka County Park. A secondary goal was to restore groundwater quality at the site to MCLs.

The selected remedy was designed to be implemented in two phases, which included the following components:

Phase I

- Installation and operation of five groundwater recovery wells at a combined design flow rate of up to 650 gallons per minute (gpm).
- Discharge of groundwater to the local sanitary sewer for treatment.
- Testing and design of a pretreatment system located at the NIROP.

Phase II

- Construction and operation of a groundwater treatment system, with discharge of treated groundwater through an NPDES-permitted outfall to the Mississippi River.
- Long-term monitoring of groundwater quality changes and capture effectiveness.

A portion of the contamination within the Anoka County Park closest to the Mississippi River did not fall within the zone of capture of the groundwater recovery system. However, contaminants in the uncaptured portions of the aquifer were expected to dissipate by natural means over time to levels protective of human health and the environment.

The groundwater recovery and treatment system began operation in September 1992. Although the ROD initially specified five wells, only four were installed. The system was later upgraded with two additional wells in 1995. Figure 2-2 presents the location of existing recovery wells and the on-site treatment plant. A more detailed description of the system is presented in the Annual Monitoring Report (TtNUS, 2000).

4.0 BASIS FOR THE DOCUMENT

The existing recovery well system is located upgradient of Anoka County Park. However, the system was not designed to capture contaminated groundwater in the park. Although the system is capturing a portion of the park contamination, the majority of the contamination remains unaffected. It was originally believed that the park contamination would naturally attenuate over time (USEPA, 1990). However, results of the RI (TtNUS, 1999) and 1999 Annual Monitoring Report (TtNUS, 2000) indicate that elevated TCE concentrations still exist.

Based on the most recent sampling event, the maximum TCE concentration in the shallow Quaternary aquifer monitored interval was 18,000 ug/l. The maximum TCE concentration in the intermediate Quaternary aquifer monitored interval was 1,600 ug/l. The contamination exists in an area where a groundwater mound is present (see Figure 2-3). The center of the contamination flows outward in a radial direction towards the west (Mississippi River), south, and east. Potential receptors include a water supply intake for the City of Minneapolis that is located less than one mile downstream from the park. Based on this information, the Navy, USEPA, and MPCA agreed to pursue active treatment, in the form of enhanced bioremediation, to address the park contamination.

Enhanced bioremediation was selected after a comprehensive screening of potentially applicable technologies for Anoka County Park. Bioremediation involves the use of microorganisms to break down hazardous organic contaminants into non-toxic or less toxic forms. Enhanced bioremediation attempts to accelerate subsurface biodegradation processes by providing nutrients, electron acceptors, competent degrading microorganisms, and/or substrates for existing microorganisms that may otherwise be limiting the rapid conversion of contaminants. Chlorinated organics like TCE primarily degrade through anaerobic processes, which occur in an oxygen-deficient environment. Anaerobic bacteria may use nitrate, sulfate, salts of iron III, or carbon dioxide as electron acceptors. However, chlorinated organics may also degrade

through aerobic processes, which occur in an oxygen-sufficient environment. Aerobic processes involve the fortuitous degradation of a contaminant by a microorganism growing on a primary substrate.

5.0 DESCRIPTION OF SIGNIFICANT DIFFERENCES

This ESD presents two significant differences between the modified groundwater remedy and the remedy proposed in the ROD (USEPA, 1990). The first difference is that the modified remedy will address contamination that was not previously addressed under the existing recovery and treatment system. The second difference is that the modified remedy introduces a treatment technology (enhanced bioremediation) that differs from the technology implemented under the ROD (groundwater recovery and treatment). However, the introduction of this new technology does not affect the operation or effectiveness of the existing technology. The new technology merely addresses an area of contamination that was not addressed before and could migrate to unprotected receptors.

6.0 SUPPORT AGENCY COMMENTS

The Navy concurs with the regulatory comments received and has incorporated these comments into the ESD.

7.0 STATUTORY DETERMINATIONS

The modified remedy satisfies the statutory requirements of CERCLA Section 121 and to the extent practicable, the NCP. The modified remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. The modified remedy also satisfies the statutory preference for treatment as a principal element.

Because the modified remedy will result in contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted once every five years. This review will ensure that the remedy continues to provide adequate protection of human health and the environment over time.

8.0 PUBLIC PARTICIPATION COMPLIANCE

The public participation requirements established under NCP Section 300.435(c)(2)(i) have been met. The administrative record file for this site is available for review at the NIROP facility on East River Road in Minneapolis, Minnesota. In addition, the Navy has published a notice describing the ESD and the availability of the administrative record file in a local newspaper.

9.0 AUTHORIZING SIGNATURES

Joel Sanders, US Navy, Southern Division (SOUTHNAVFACENGCOM)

Date

Concurrence:

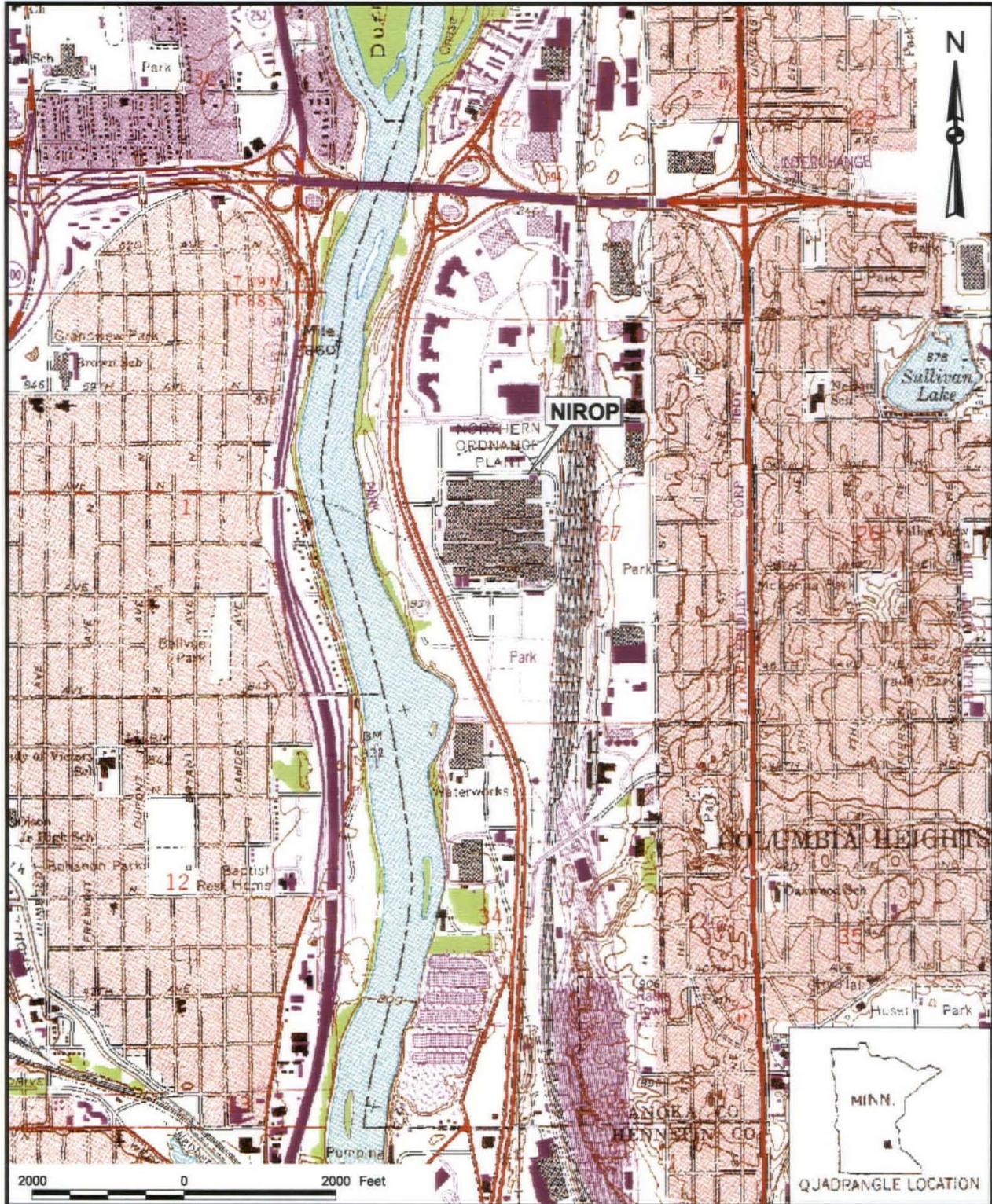
Tom Bloom, United States Environmental Protection Agency

Date

David Douglas, Minnesota Pollution Control Agency

Date

SOURCE: MAP FROM MINNEAPOLIS NORTH, MINNESOTA, 7.5 MINUTE USGS QUADRANGLE, 1983 (O45093a3.1f)

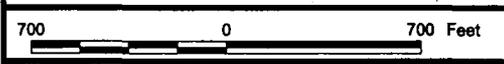
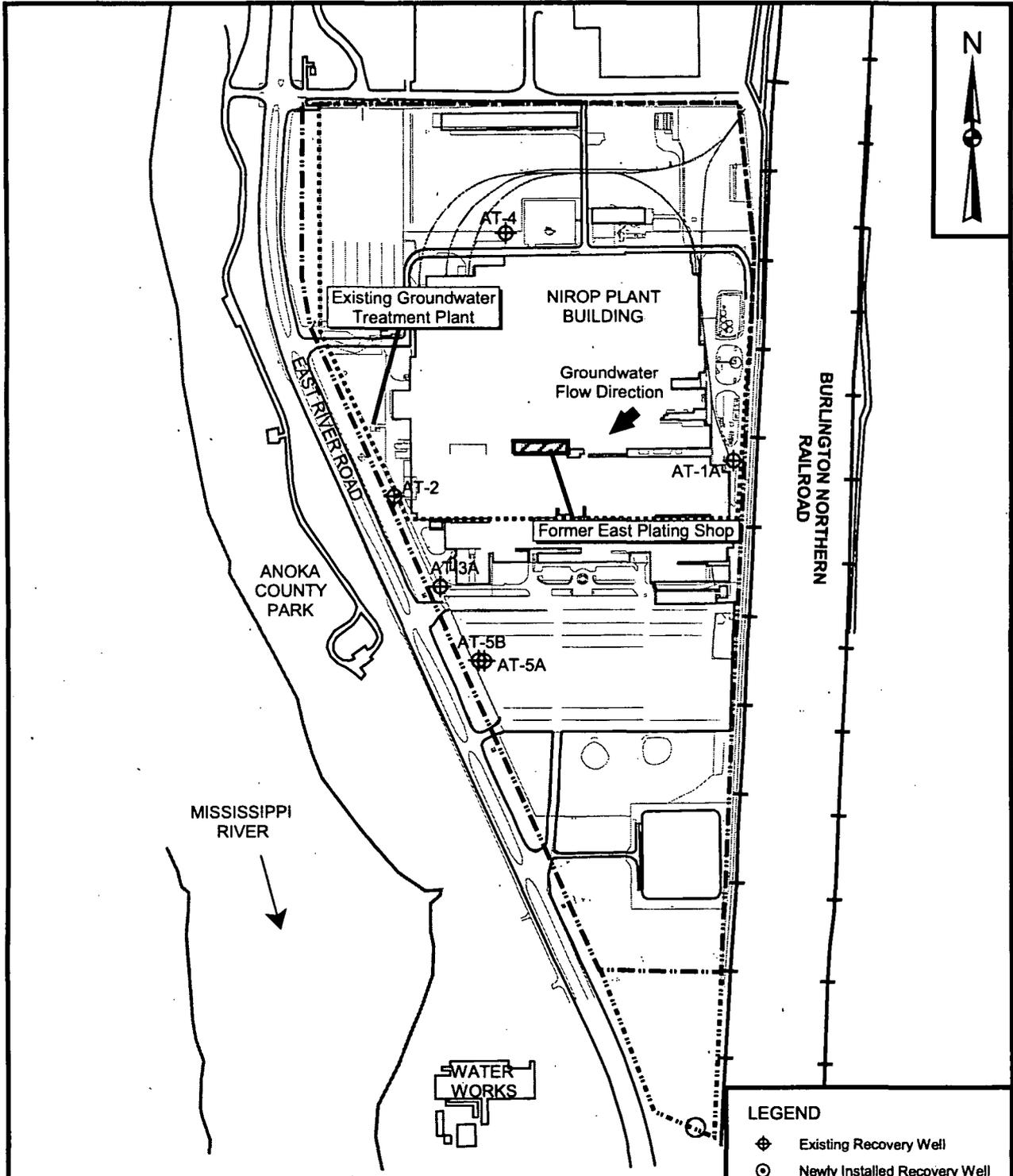


DRAWN BY D. PERRY	DATE 12-AUG-98
CHECKED BY	DATE
COST/SCHEDULE-AREA	
SCALE AS NOTED	



SITE LOCATION MAP
NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT
FRIDLEY, MINNESOTA

CONTRACT NUMBER	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 2-1	REV 0



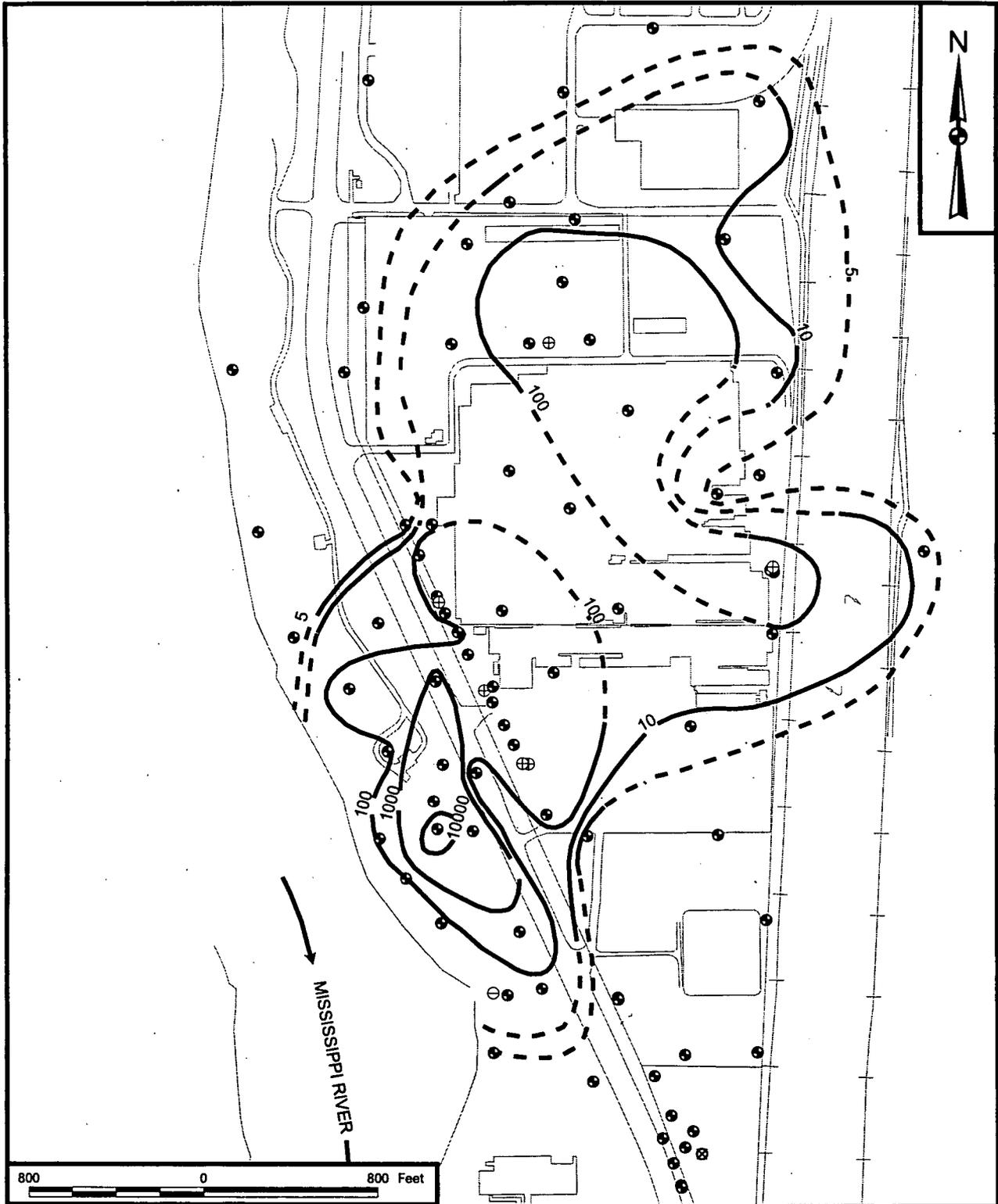
LEGEND	
	Existing Recovery Well
	Newly Installed Recovery Well
	Former East Plating Shop

DRAWN BY	DATE
T. BECKMAN	5-15-00
CHECKED BY	DATE
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	



SITE FEATURES
NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT
FRIDLEY, MINNESOTA

CONTRACT NUMBER	
6966	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO.	REV
FIGURE 2-2	0

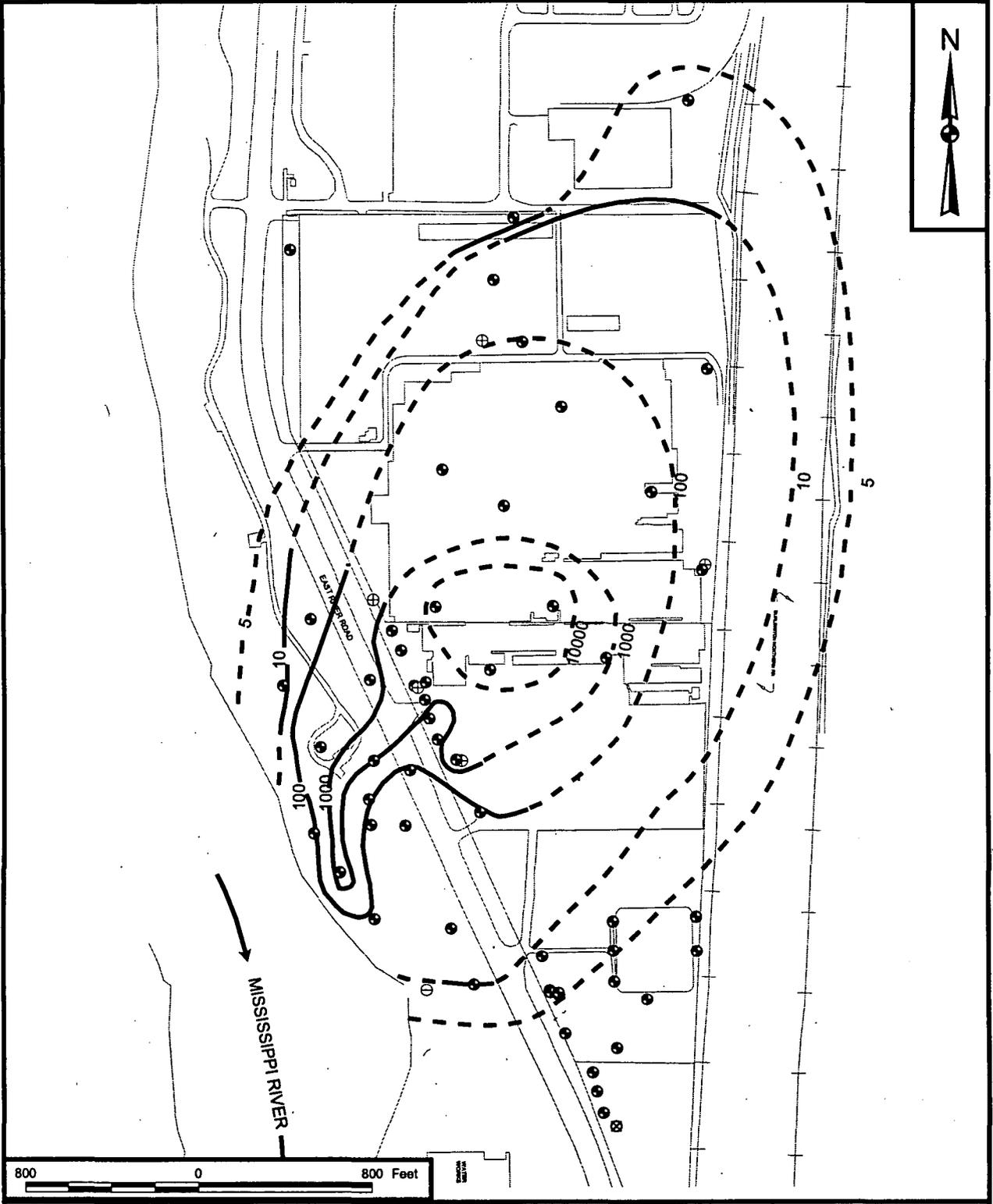


DRAWN BY T. BECKMAN	DATE 5-17-00
CHECKED BY	DATE
COST/SCHEDULE-AREA	
SCALE AS NOTED	



TCE CONCENTRATIONS (ug/l)
 SHALLOW MONITORED INTERVAL
 NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT
 FRIDLEY, MINNESOTA

CONTRACT NUMBER 6966	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 2-3	REV 0



DRAWN BY T. BECKMAN	DATE 5-17-00
CHECKED BY	DATE
COST/SCHEDULE-AREA	
SCALE AS NOTED	



TCE CONCENTRATIONS (ug/l)
INTERMEDIATE MONITORED INTERVAL
NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT
FRIDLEY, MINNESOTA

CONTRACT NUMBER 6966	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 2-4	REV 0