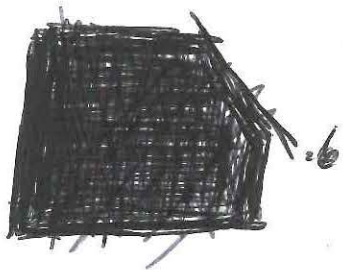
Fraser Shipyards, Inc.

Additional Investigation Work Plan – Monitoring Well MW-5 and AOC #5

Superior, Wisconsin

SEH No. FRASE9401.00

March 1998



421 FRENETTE DRIVE, CHIPPEWA FALLS, WI 54729 715 720-6200 800 472-5881 FAX 715 720-6300
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March 31, 1998

RE: Fraser Shipyards, Inc.
Additional Investigation Work Plan –
Monitoring Well MW-5 and AOC #5
Superior, Wisconsin
SEH No. FRASE9401.00

Mr. Steve LaValley, Hazardous Waste Specialist
Wisconsin Department of Natural Resources
1705 Tower Avenue
Superior, WI 54880

Dear Mr. LaValley:

On behalf of Fraser Shipyards, Inc. (Fraser), Short Elliott Hendrickson Inc. (SEH) is submitting this Additional Investigation Work Plan for the area of existing monitoring well MW-5 (up gradient well) and area of concern (AOC) #5 at the Fraser facility located in Superior, Wisconsin. This work plan describes proposed investigation activities to further identify degree and extent of contamination at these locations.

We respectfully request the Wisconsin Department of Natural Resources (WDNR) to review this document and provide comments. If you have any questions regarding the submittal of Additional Investigation Work Plan – Monitoring Well MW-5 and AOC #5, please call Ron Peterson at (715) 394-7787 or Cy Ingraham at (715) 720-6231.

Sincerely,

Cyrus W. Ingraham, P.E.
Senior Project Manager

JEG/ls/Cwi

Distribution List

No. of Copies	Sent to
2	Steve LaValley, Hazardous Waste Specialist Wisconsin Department of Natural Resources 1705 Tower Avenue Superior, WI 54880
1	Ron Peterson, Superintendent Fraser Shipyards, Inc. Third Street and Clough Avenue Superior, WI 54880

Additional Investigation Work Plan – Monitoring Well MW-5 and AOC #5

Fraser Shipyards, Inc.
Superior, Wisconsin

Prepared for:
Fraser Shipyards, Inc.
Superior, Wisconsin

Prepared by:
Short Elliott Hendrickson Inc.
421 Frenette Drive
Chippewa Falls, WI 54729
(715) 720-6200

I, John E. Guhl, hereby certify that I am a Hydrogeologist as that term is defined in s. NR 712.03(1) Wis. Adm. Code, and that, to the best of my knowledge, all of the information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

John E. Guhl #120 — 3-31-98

John E. Guhl, P.G.
Hydrogeologist

Date

I, Cyrus W. Ingraham, hereby certify that I am a registered professional engineer in the State of Wisconsin, registered in accordance with the requirements of ch. A-E 4, Wis. Adm. Code; that this document has been prepared in accordance with the Rules of Professional Conduct in ch. A-E 8, Wis. Adm. Code; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

Cyrus W. Ingraham #024690 — 3-31-98

Cyrus W. Ingraham, P.E.
Senior Project Manager

P.E. Number

Date

Table of Contents

List of Figures

March 1998

Additional Investigation Work Plan – Monitoring Well MW-5 and AOC #5

Fraser Shipyards, Inc.

Prepared for Fraser Shipyards, Inc.

1.0 Introduction

Fraser Shipyards, Inc. (Fraser) is submitting this Additional Investigation Work Plan for the area around existing monitoring well MW-5 and area of concern (AOC) #5, prepared by Short Elliott Hendrickson Inc. (SEH), to the Wisconsin Department of Natural Resources (WDNR). This work plan was prepared in general accordance with ch. NR 716 Wisconsin Administrative Code. The work plan was prepared in response to WDNR's request for additional investigation as a result of polynuclear aromatic hydrocarbon (PAH) groundwater contamination identified in monitoring well MW-5 and past dissolved lead identified in groundwater samples collected from AOC #5. The tasks outlined in this work plan have been selected to identify degree and extent of PAH groundwater contamination in monitoring well MW-5, and to provide additional lead analytical data from AOC #5.

1.1 Project Contacts

1. Ron Peterson, Superintendent
   Fraser Shipyards, Inc.
   Third Street and Clough Avenue
   Superior, WI 54880
   (715) 394-7787

2. Steve LaValley, Hazardous Waste Specialist
   Wisconsin Department of Natural Resources
   1705 Tower Avenue
   Superior, WI 54880
   (715) 392-7988

3. Cyrus W. Ingraham, P.E., Senior Project Manager
   Short Elliott Hendrickson Inc.
   421 Frenette Drive
   Chippewa Falls, WI 54729
   (715) 720-6231

2.0 Background Information

The Fraser Shipyard facility is located at Third Street and Clough Avenue in Superior, Wisconsin as depicted on Figure 1, "Site Location." The site is located on Howard's Bay in Section 11, T49N, R14W, Douglas County, Wisconsin.

Monitoring well MW-5 was installed at the Fraser Shipyard on August 16, 1996 to provide up gradient data for several AOCs at the facility. PAHs were identified in groundwater samples collected from monitoring well MW-5, including concentrations of benzo-a-pyrene exceeding the ch. NR 140 groundwater quality Enforcement Standards (ES). Consequently, the Wisconsin Department of Natural Resources is requiring additional investigation of the area around MW-5 to define the degree and extent of PAH contamination. The location of monitoring well MW-5 is depicted on Figure 2, "Site Plan."

AOC #5 is one of 14 AOCs identified at the Fraser facility by WDNR in 1993. The AOC #5 area was historically used to temporarily stage waste materials from Fraser's painting operations prior to disposal. The wastes were staged in two portable aboveground containers. The wastes included paint wastes potentially mixed with dirty solvents. The two storage containers have been cleaned up, cut up, and recycled. Paint waste materials are no longer staged in AOC #5. The location of AOC #5 is depicted on Figure 2.

Six soil samples were collected from AOC #5 in January 1994 and were analyzed for volatile organic compounds (VOCs), and total lead, cadmium, chromium, and mercury. No VOCs were detected in the soils samples; however, elevated concentrations of total lead and total chromium were detected. However, toxicity characteristic leaching procedure (TCLP) analysis of the most elevated concentration of total lead and total chromium yielded no detectable concentrations of these two parameters. This indicates the lead and chromium detected in the soil sample is not very leachable.

One groundwater monitoring well (MW-2) was installed on the down gradient side of AOC #5 on August 16, 1996. Two rounds of groundwater samples have been collected and analyzed for concentrations of total dissolved lead and total dissolved chromium. Groundwater analytical results indicate concentrations of dissolved lead which exceed the ES for

lead. Dissolved lead concentrations of 48.8 μg/l to 34.2 μg/l were present in samples collected from well MW-2 in 1996. Chromium was not detected in the groundwater samples collected from well MW-2. The location of AOC #5 is depicted on Figure 2, "Site Plan."

A total of six hydraulic probe borings were used to collect additional groundwater data in the vicinity of AOC #5 in September 1997. Groundwater samples collected from the six hydraulic probe borings as well as from existing monitoring well MW-2 were analyzed for concentrations of total dissolved lead. Lead was not detected in concentrations exceeding ch. NR 140, Preventative Action Limits during this round of sampling.

The WDNR has reviewed this additional groundwater data for AOC #5. Additional investigation of AOC #5, including both dissolved and total lead groundwater analysis at this location is required by WDNR.

3.0 Geology, Hydrogeology, and Topography

3.1 Geology

Preliminary soil survey information was provided by the USDA Soil Conservation Survey located in Ashland, Wisconsin. Soils on the Fraser Shipyard property are classified as Udorthents which form 1 to 6 percent slopes. Udorthents occur in areas where the original soil profile has been altered by the addition or removal of more than about a foot of soil materials.

Soils adjacent to the south side of the property area classified within the Ontonagon-Rudyard complex. This soil type occurs as an intermix of moderately well drained Ontonagon soil and somewhat poorly drained Rudyard soil. Rudyard soils form in clayey lacustrine deposits.

Ontonagon silty clay loams occur adjacent to the southeast corner of the property. These are well drained, highly erodible soils which occur on 6 to 12 percent slopes and form in clayey lacustrine deposits.

Groundwater in the Ontonagon-Rudyard soil series is generally found at depths less than six feet from the surface and can be perched. Depth to groundwater in the Ontonagon silty clay loams is typically greater than six feet from surface.

Underlying the surface soils in the vicinity of the site are glacial till deposits belonging to the Douglas Creek Member of the Miller Creek Formation. The Douglas Creek till is comprised of fine textured glacial till averaging 10 percent sand, 26 percent silt and 64 percent clay in the less-than-2 mm fraction. It is typically reddish-brown in color and averages 54 percent illite in the less-than-2 mm fraction. The Douglas Member is generally the surface unit throughout most of the Lake

Superior bluffs, but in a few places is overlain by fluvial or lacustrine sand and gravel deposits or offshore silt and clay deposits of the Miller Creek Formation or younger fluvial, lacustrine, and organic deposits. Most of the Douglas Member is till deposited by ice of the Superior Lobe.

Subsurface investigation of MW-5 indicates the presence of approximately five feet of earthen fill materials underlain by a three foot thick layer of silty sand. Lean clay soils of the Miller Creek Formation are present beneath the silty sand layer.

Subsurface investigation of AOC #5 indicated the presence of 8.5 feet of fill materials, consisting of layers of sand and clay. A thin layer of organic clay separates the fill materials from the underlying clay soils of the Miller Creek Formation. The underlying Copper Falls Formation, and subsequent bedrock units were not encountered during site investigation.

3.2 Hydrogeology

Two major aquifers are present in the vicinity of Superior; the sand and gravel aquifer and the sandstone aquifer. The sand and gravel aquifer either occurs in recent surficial deposits (e.g., sand deposits on Wisconsin Point), or in buried Pleistocene sand and gravel deposits (e.g., the Copper Falls Formation). The sandstone aquifer is comprised of the Cambrian to Precambrian sandstone and shale deposits of the Bayfield and Oronto groups. Regional direction of groundwater flow in the Superior area is generally to the north (toward Lake Superior).

The shallow groundwater surface occurs at approximately 3.5 feet to 4.5 feet below ground surface in the vicinity of MW-5 and AOC #5. Direction of groundwater flow is generally to the north, with a horizontal hydraulic gradient of approximately 0.006 ft/ft in these areas.

3.3 Topography

The site vicinity lies in the Lake Superior lowland physiographic province, which consists of a glacial lake plain sloping gently to the north. Elevation of the property ranges from approximately 601 to 610 feet mean sea level (MSL). Surface water from the site drains overland to Lake Superior.

4.0 Proposed Additional Investigation Activities

Based on elevated concentrations of benzo-a-pyrene identified in the MW-5 groundwater samples, additional investigation is recommended to identify the degree and extent of groundwater contamination. Because of the presence of the Miller Creek Formation, which limits downward movement of groundwater, SEH will limit the additional investigation to shallow groundwater in the vicinity of MW-5. In addition, groundwater

samples will be collected from MW-2 within AOC #5 to further assess possible lead contamination at this location.

4.1 Hydraulic Probe Sampling

SEH proposes to mobilize a truck-mounted hydraulic probe sampler to the site for collection of groundwater samples in the vicinity of MW-5. The hydraulic probe groundwater samples will be collected from three locations within the saturated fill soils, approximately seven feet below ground surface. The proposed sampling locations are depicted on Figure 2.

The samples will be collected using decontaminated downhole tools and dedicated disposable polyethylene tubing.

The groundwater samples collected from the hydraulic probe borings will be placed in laboratory-clean bottles and chilled to 4 degrees Celsius for shipment by overnight courier. Analysis for concentrations of PAHs (U.S. EPA Method SW846 8310) will be performed by U.S. Filter/Enviroscan (Enviroscan) of Rothschild, Wisconsin (Wisconsin Lab Certification Number 737053130).

4.2 Existing Well MW-5 Sampling

SEH proposes to collect a groundwater sample from existing well MW-5 concurrently with hydraulic probe sampling. A minimum of four well casing volumes of water will be removed from MW-5 prior to sampling. The groundwater sample will be preserved and transported as described in Section 4.1.

4.3 Existing Well MW-2 Sampling

SEH proposes to collect a groundwater sample from existing well MW-2 for analysis of total lead and total dissolved lead. A minimum of four well casing volumes of water will be removed from MW-2 prior to sampling. The total dissolved lead sample will be filtered through a 0.45 micron filter, while the total lead sample will be unfiltered. The samples will be preserved with nitric acid and submitted to Enviroscan for analysis.

4.4 Investigative Wastes

Investigative wastes generated during the additional site investigation are expected to include small volumes of decontamination water, purge water, and disposable personal protective equipment (PPE). The decontamination water and purge water will be disposed onsite unless observable contamination is noted. If observable contamination is noted, the water will be containerized for offsite disposal. Disposable PPE will be disposed as solid waste.

5.0 Documentation and Quality Assurance/Quality Control (QA/QC)

Specific documentation and QA/QC procedures will be followed during the investigative activities at Fraser to ensure that accurate and representative data are collected. This section describes the procedures to be followed during field activities only. The laboratory QA/QC procedures will be performed in accordance with specific method requirements and laboratory standard operating procedures. The following section outlines the field documentation and QA/QC procedures.

5.1 Field Documentation

A written log will be used to document field procedures and conditions. The written log will be kept in a bound field book with pre-numbered pages. Field notes will be entered daily when activities occur. The field notes will include at least the following information:

- Date
- Field personnel (including owner, consultants, subcontractors, regulatory agency)
- Weather (temperature, cloud cover, wind, precipitation)
- Equipment (including screening, sampling, subcontractor equipment)
- Calibrations performed, calibration curves or standards
- Results and techniques used for field screening
- Sampling locations (this requires an accurate map)
- Methods and/or devices used in sampling.
- Decontamination procedures used.
- Time and date of sample collection.
- Type of sample (soil, groundwater, surface water, etc.)
- Field preservation performed
- Field QC data associated with the sample
- Sample ID (must clearly correlate to sample locations shown on a map)
- Any deviations from work plan, SOP or special conditions

In addition to the written log, a photographic log may also be prepared documenting pertinent field conditions and sampling procedures. The photographs will be labeled to indicate the subject, date, time, direction and other relevant information. Upon completion of the field activities, the photographs will be assembled and placed in the project file.

5.2 QA/QC

For this project, quality assurance is the overall program for assuring reliability of field and analytical data. Quality control is the routine application of procedures for obtaining prescribed standards of performance during the field activities.

Sampling equipment will be stainless steel and decontaminated prior to use in the field. Otherwise equipment will be disposable and dedicated to a single sample. When field equipment will be reused in the field (i.e., collect samples at different depths or locations), the non-disposable equipment will be decontaminated prior to reuse. The decontamination method involves a detergent or trisodium phosphate (TSP) wash, and a triple rinse with deionized water. The sampling equipment for the project will include a stainless steel split spoon, stainless steel or disposable spatulas, and stainless steel or disposable groundwater sampling equipment. All down-hole drilling equipment will be cleaned with a high-pressure, hot-water washer prior to use on the site and between borings. Groundwater sample collection will begin at the point of assumed least contamination and continue to monitoring wells with potentially higher contamination. Samples will be transferred directly into laboratory clean glass bottles with Teflon caps.

Individual labels describing the sample, number, location, sampler's name, date, preservatives, and other relevant information will be attached to the bottles upon collection. All samples will be tracked using strict chain of custody procedures. Sample bottles will be tracked from the laboratory, to the field and back to the analytical laboratory. The chain of custody will also document relevant sampling and preservation.

Field QA samples will include the following:

- Temperature blanks are additional water samples collected in the same manner as samples, used to determine the temperature of samples on receipt by the lab.
- Field blanks are water samples processed through the same sampling and filtering equipment, used as a check on decontamination procedures (not collected when sampling with disposal bailers or other disposable sampling equipment).
- Trip blanks are reagent water samples analyzed before leaving the lab and on their return as a check on contamination from sources outside samples (unless otherwise specified).

Field QA samples will be handled and stored in an identical manner as actual samples. Results of the analysis of duplicates, temperature, field, and trip blanks will be included in the report.

5.3 Laboratory Methods

Laboratory methodologies for sample analysis will follow the latest accepted WDNR protocol. At this time, the following methodologies apply to parameters anticipated at the site.

Method Name	Method Reference	Method Detection Limit (MDL)	Bottle Preservation
Polynuclear Aromatic Hydrocarbons	EPA Method 8310	Varies	None
Total Dissolved Lead	EPA Method 239.2	1.0 μg/l	Nitric Acid to pH 2

6.0 Report

Following completion of field activities and laboratory analyses, SEH will prepare a report for the subject site and submit the report to the WDNR. The report will describe the estimated extent of contamination, site geology and hydrogeology, potential receptors of contamination, and results of a groundwater investigation. The degree and extent of contamination at the subject site will be determined by comparing groundwater analytical results from the hydraulic probe and monitoring well sampling locations. The results of the SI as well as recommendations for appropriate further action in the vicinity of MW-5 and AOC #5 will be included in the narrative section of the report.

7.0 Site Health and Safety Plan

All field activities performed by SEH will be done in accordance with the existing Site Health and Safety Plan for the site.

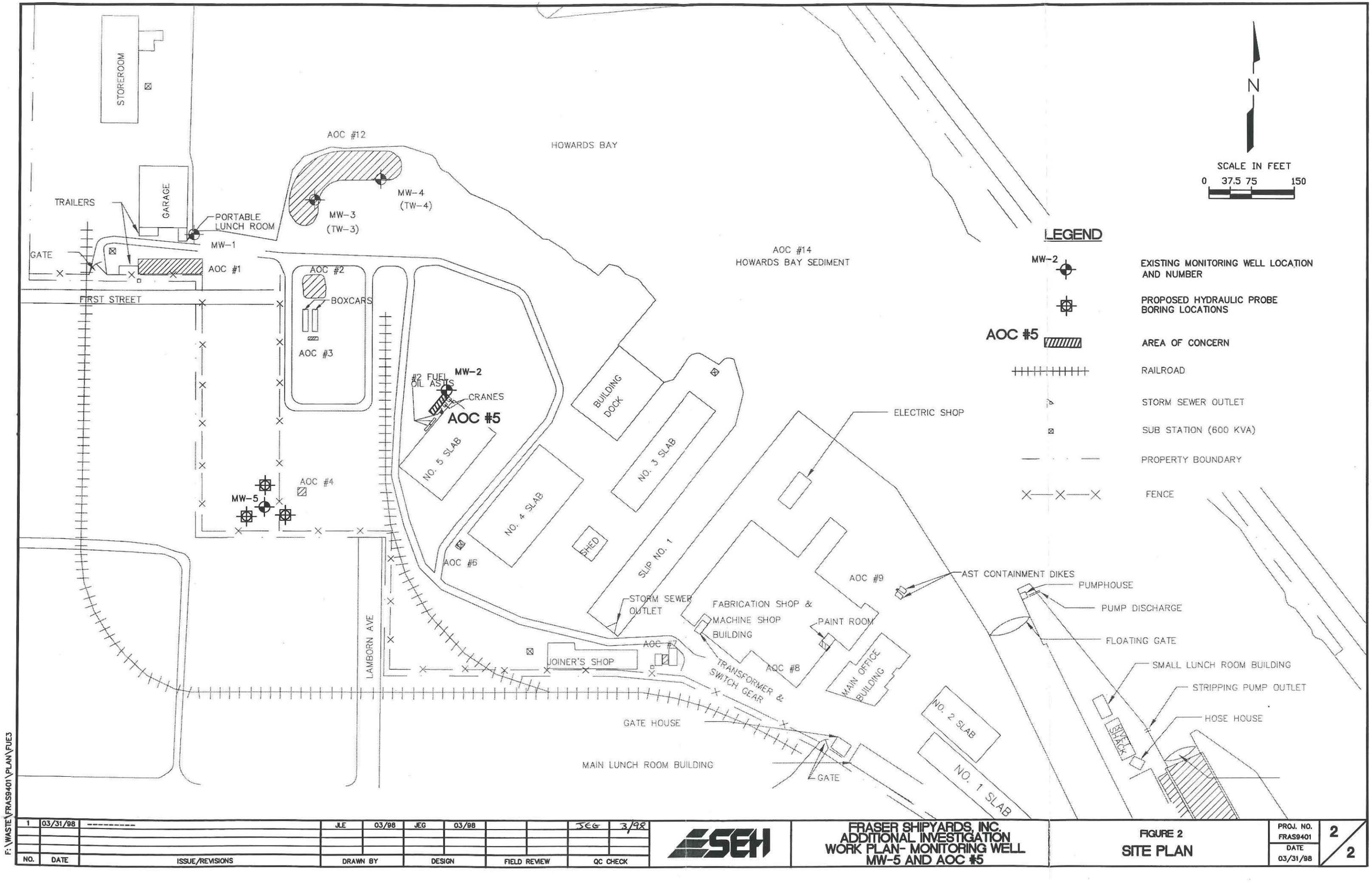
8.0 Project Schedule

A proposed schedule of activities at the subject site is as follows:

Task	Estimated Date for Task Completion
1. Site Investigation	April 1998
2. Site Investigation Report	June 1998

JEG/ls/cwt

Figures



NO.	DATE	ISSUE/REVISIONS	DRAWN BY	DESIGN	FIELD REVIEW	QC CHECK
1	03/31/98	----------	JLE 03/98	JEG 03/98		JEG 3/98

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SEH

FRASER SHIPYARDS, INC.
ADDITIONAL INVESTIGATION
WORK PLAN- MONITORING WELL MW-5 AND AOC #5

FIGURE 2
SITE PLAN

PROJ. NO. FRAS9401
DATE 03/31/98

REPRODUCED FROM

USGS SUPERIOR QUADRANGLE

WISCONSIN – DOUGLAS CO. 7.5 MINUTE SERIES

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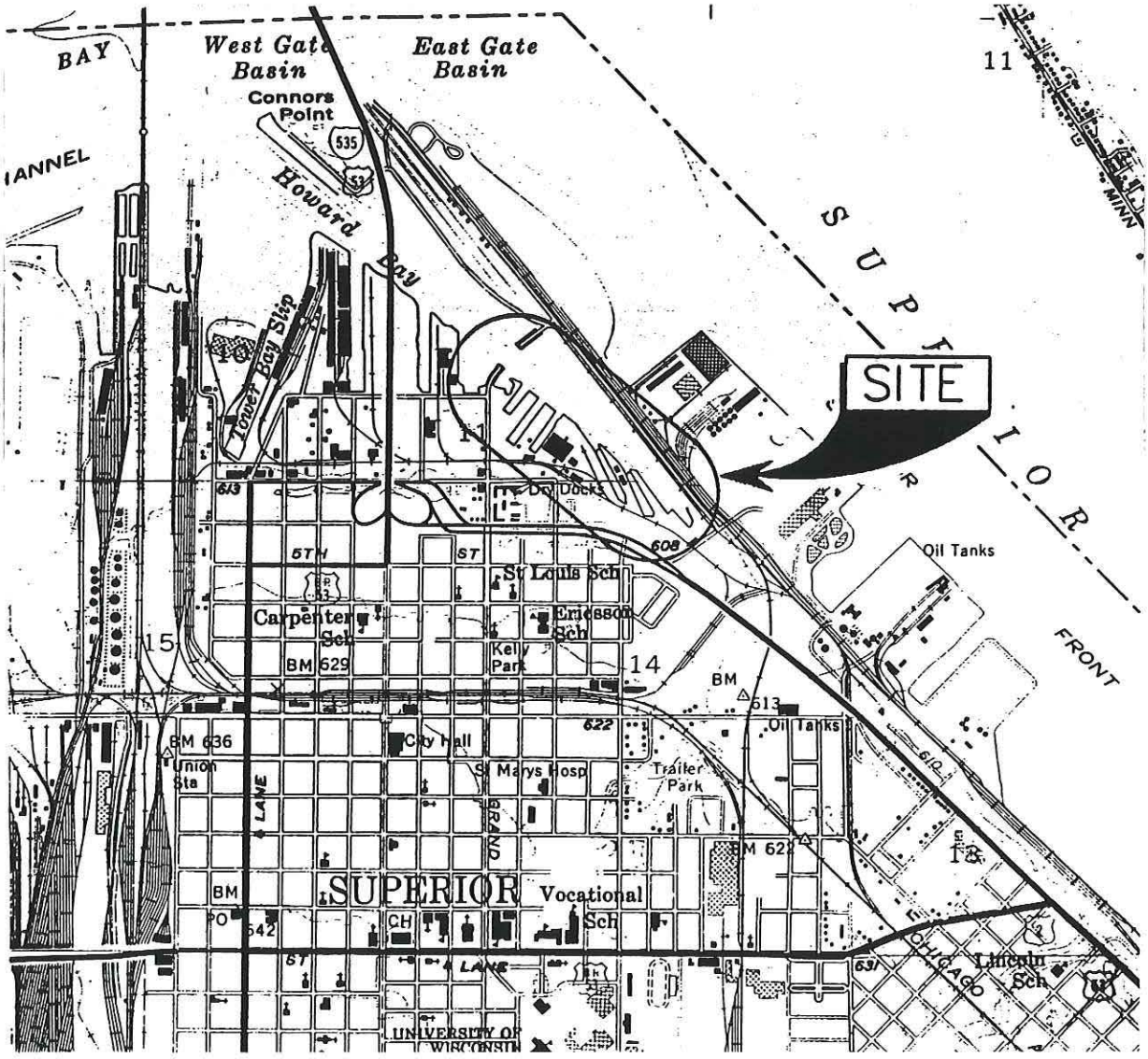

NO.	DATE	ISSUE/REVISIONS	DRAWN BY		DESIGN		FIELD REVIEW		QC CHECK	
1	03/31/98	----------	JLE	03/98	JEG	03/98			JEG	3/98

SEH

FRASER SHIPYARDS, INC.
ADDITIONAL INVESTIGATION
WORK PLAN- MONITORING WELL MW-5 AND AOC #5

FIGURE 1
SITE LOCATION

PROJ. NO. FRAS9401

DATE 03/31/98

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