MINNESOTA POLLUTION CONTROL AGENCY
520 Lafayette Road North
St. Paul, MN 55155-4194

Scenario B Workplan

Project Title: Investigation Work Plan for Scenario B, Western MN

1. Project Summary:

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2. Statement of Problems, Opportunities, and Existing Conditions

Environmental Troubleshooters, Inc. (ET) is providing this investigation work plan for the Petroleum Remediation Program (PRP) Scenario B based on information in the RFP and PRP Guidance Documents (GD). Site history and environmental conditions include:

- The fueling station was built in the 1950's. In the 1990's, a restaurant was built over the former underground storage tank (UST) basin when new tanks were installed elsewhere on site. The soils at the former UST basin below the restaurant had strong petroleum odors and photoionization detector (PID) reading of 1,263 ppm. Although little is known about these tanks, this contaminated area poses a potential vapor intrusion risk to the overlying restaurant building.
- Staining near the pump islands and a loss of product in the tank system over the last few months indicates a release from the active UST system. Although no staining is noted near the AST on the north side of the building, this is also

a potential release source, as it has been present since the station opened.

- The gas station/restaurant and businesses to the west and south have municipal services (water/sewer); however, lakeside homes to the east and north have domestic potable wells. Some of the residents have complained of petroleum odors in their drinking water, indicating potential contamination. Well logs indicate local soils are interbedded sand and gravel to a depth of 40 to 45 feet, where bedrock is present. Given the presence of the lake to the east, the lakeside potable wells are likely downgradient of the gas station.

3. Goals, Objectives, Tasks, and Subtasks

Goal: The environmental benefit provided by successfully investigating the release will be knowledge of the risk posed by site contamination to local receptors and ability to design an appropriate corrective action, if needed.

The purpose (and scope of work) of the investigation includes:

- Define the extent and magnitude of petroleum contamination;
- Identify and assess the potential health, safety and environmental risks; and
- Provide sufficient information to justify file closure, to design a monitoring plan, or select a corrective action, if needed.

ET personnel will take every opportunity to incorporate input from the site owner/RP, local residents, municipality to provide an effective and efficient investigation following the principals of Green and Sustainable Remediation (GSR). Best management practices (BMPs) will be incorporated in the investigation, and sufficient data will be collected to incorporate GSR into any potential corrective action.

If at any time during this investigation emergency conditions are encountered (explosive vapors, free product, etc.), ET will immediately contact the State Duty Officer and MPCA Project Manager and proceed with any other required or recommended actions

Objective 1: Identify and Assess Potential Health, Safety and Environmental Risks: Receptor Evaluation

Potential receptors will be evaluated in accordance with PRP GD 4-02 *Risk Evaluation and Site Management Decision at Petroleum Release Sites* and PRP GD 4-18 *Assessment of Sensitive Groundwater Conditions*. The information gathered in the receptor survey will influence the design of the contaminant investigation.

Task A: Records Review and Site Safety Plan

- Review any historic Phase I and Phase II reports and other project records, as available, to create a more detailed investigation work plan. This review will be limited, as to not delay sampling of local potable wells.
- Prepare a Site Health and Safety Plan (Attachment A) outlining potential hazards and safety procedures for use at the site.
- Complete the online PRP Field Notification 48 hours prior to the start of site work.
- Contact the site owner and neighboring properties (businesses to east and west, church to the south) to set up access for investigation work and gain additional detail regarding complaints of vapors or other impacts.
- Contact the City and/or County to obtain property maps and discuss locally reported contamination (product in sewer, vapors in buildings, etc.).

Responsible Party: Project Manager, Heath & Safety Officer

Task B: Water Well Receptor Survey and Risk Evaluation

Subtask 1: Minnesota Well Index and Records Review:

- The Minnesota Well Index (MWI) will be reviewed for information on well locations, groundwater usage, aquifers and geology within 1 mile of the site.
- A base map will be prepared using maps obtained from the municipality, county and/or aerial photos. PR Program Maps Online will also be reviewed to identify any wellhead protection areas (WPAs) and/or drinking water supply management areas (DWSMAs).

Subtask 2: 500-Foot Radius Walking Survey:

- ET will conduct a walking survey of the site and surrounding properties within a 500-foot radius. Personnel will observe, document and map the locations of relevant geographic features (e.g. roads, rivers, buildings, etc.), potable wells, basements, sumps, utility markers, manholes, and potential off-site contamination sources. ET personnel will attempt to contact residents/businesses directly during this walking survey – this is especially critical for the properties with water supply wells. ET personnel will discuss potential water supply sampling with residents during the walking survey.
- For those residents/property owners not contacted directly, ET personnel will leave self-addressed, stamped postcards with residents within 500 feet of the service station requesting specific information on the property's well/basement/sump/etc.
- As the depth to bedrock is less than 50 feet and a shallow aquifer exists, a sensitive groundwater condition is present. The six known off-site private wells will be sampled as part of the assessment described in Objective 2. This data will be analyzed in Objective 3 below in accordance with PRP GD 4-18 *Assessment of Sensitive Groundwater Conditions* and GD 4-02 *Risk Evaluation and Site Management Decision*.
- ET will contact the city water department to confirm city water supply connections at properties within 500 feet, and to obtain location and well log(s) for the municipal well(s).

Subtask 3: Compile Data and Input into Table

Responsible Party: Project Manager, Scientist I and GIS Technician

Task C: Vapor Receptor Survey and Risk Evaluation

Subtask 1: 500-Foot Walking Survey:

- ET will identify and map the locations of potential vapor receptors within 500 feet of the former service station. Features to be identified include: basements; manways; sanitary and storm sewers; private utilities including fuel lines, potable water line, and electric lines to the dispensers, tanks, and signage/lighting. Reasonable attempts will be made to obtain information on the depth, construction and condition of each utility.

Subtask 2: Vapor Survey in Buildings and Sewers:

- Given the proximity of multiple petroleum sources – especially the former tanks under the restaurant, ET will conduct a building vapor survey at the on-site gas station/restaurant building, and residences to the east – which will be checked for vapors during potable well sampling.
- If the vapor survey results in detections or later subsurface investigative work (e.g. soil gas sampling) suggests the existence of high-level petroleum soil and/or groundwater contamination near any of the buildings, sub-slab sampling and potentially indoor air quality summa sampling will be conducted.
- Similarly, if the condition of the sanitary sewer, storm sewer or buried water lines has been compromised or high-level groundwater contamination intersects backfilled utility trenches, a sewer vapor survey will be conducted. Given that the water and sanitary sewer lines likely extend adjacent to the dispensers where staining is present and/or near the active USTs, the potential for vapor migration along these lines exists (although potentially less due to more permeable native soils), and ET has included a sewer vapor survey in this scope of work. Figure 2 illustrates the potential location of utility lines. The vapor survey will be conducted in accordance with ET's standard methods and procedures (Attachment B).

Subtask 3: Compile Data and Input into Table

Responsible Party: Project Manager, Scientist I

Task D: Surface Water Receptor Survey and Risk Evaluation

Subtask 1: Surface Water Receptor Survey:

- ET will identify and map (to scale) the locations of all surface water and wetlands within ¼ mile of the site, including the lake east of the site and river 300 feet southwest of the site. ET will identify surface water receptors using topographic maps and aerial photos.
- The data will then be field verified during the 500 foot walking survey, and ET will note any potential pathways to the lake. ET will work with City personnel to identify any storm sewer discharge to the lake.
- Surface water receptor data, along with other receptor data, will be utilized in placement of temporary and permanent monitoring well locations. Given the proximity of the lake, which appears to be downgradient of the site, evaluation of this data is critical. If a well or boring located near the surface water receptor is contaminated, it will be assumed that groundwater contamination discharges to the

surface water. ET will evaluate impacts to the surface water during data analysis (Objective 3), including calculation of discharge, determining the surface water classification, evaluating according to Surface Water Pathway Evaluation User's Guide, and reporting in the LSI or RI Report (PRP GD 4-06).

Subtask 2: Compile Data and Input into Table

Responsible Party: Scientist I

Task E: Contaminated Surface Soil Survey: Areas of visible surface staining of exposed soil at the site will be observed and documented during the receptor surveys. Stained soil areas will be sampled during the drilling activities to delineate contamination (Objective 2).

Responsible Party: Scientist I

Task F: Water Line Permeation Receptor Survey: The construction details of the gas station water service line (and any others within the contaminated area) will be documented, including piping and gasket material, pipe diameter(s), daily water usage, flow direction, depth, backfill materials, age, distance to point of use, length of pipe in the impacted zone and owner. If this information is unavailable, it may be necessary to excavate a section of pipe to gain this information. As the water main is located south of the site in Main Street, the site's service line likely extends adjacent to the dispensers where staining is present and/or the active USTs. Given the proximity to a source area, obtaining water lateral construction information will be critical. Figure 2 illustrates a possible location for the water service line.

Responsible Party: Scientist I and Project Manager

Objective 1 Timeline: 5 Days

Objective 1 Deliverables: Access Agreements, Site Safety Plan, 500-Foot and ½ Mile Receptor Maps, Table of Properties within 500 Feet, Well Logs

Objective 2: Define the Extent and Magnitude of Petroleum Contamination

The contaminant investigation will be conducted in accordance with PRP GD 4-01 Soil and Groundwater Assessments Performed During Site Investigations. The soil and groundwater investigation activities are described below.

Task A: Soil Contaminant Investigation

Subtask 1: Review Source and Receptor Data and Develop Sampling Plan:

- The site has a known historic release from the former USTs and a suspected recent release indicated by the loss from the active UST system. Any available information related to the former USTs and the amount/type of petroleum product loss from the active UST system will be obtained and reviewed.
- Receptor data will be reviewed to aid in scoping the soil contaminant investigation.

Subtask 2: Push Probe Soil Sampling:

- Initial soil, groundwater and vapor intrusion investigation sampling will be conducted using dual tube push-probe sampling technology. For this work plan it is assumed that site soils do not prohibit the use of push probe technology to conduct the initial round of drilling and the groundwater table is present within the sand and gravel deposits.
- ET will assume that 12 on-site push probe soil borings will be sufficient to delineate adsorbed soil contamination: 4 soil borings advanced to 10 feet below contamination and/or 5 feet below the water table in the apparent source areas; and 8 peripheral soil borings advanced to 5 feet below the water table.
- A stratigraphy boring will be advanced to 20 feet beyond the water table. Dual-tube push probe sampling will be used to avoid drag down of contaminants and ensure discrete soil sampling. Soils will be classified, field screened with a photoionization detector (PID), and samples collected for laboratory analysis. Soil borings will be surveyed and sealed in accordance with MDH requirements. Soil sampling will be conducted in accordance with PRP GD 4-04 Soil Sample Collection and Analysis Procedures.

Assuming that groundwater is present in each soil boring, two soil samples per boring will be collected in the 4 source area borings for laboratory analysis, these include the samples that (1) exhibit the highest PID reading and

(2) are collected at the soil / water table interface. Outside the immediate source area, sampling will be reduced to one sample at the soil / water table interface. The specific samples collected and analyzed may change depending on site conditions and field screening data gathered during field activities. ET will submit selected soil samples to Pace Analytical Services (or certified lab preferred by MPCA/MDH) for analysis of the following parameters:

Parameter	Method	Bottle and Preservatives
Petroleum Volatile Organic Compounds (PVOCs)	MDH Method 465F/8260B	10 grams soil w/ 10 mL MeOH
Gasoline Range Organics (GRO)	WDNR Modified GRO Method	10 grams soil w/ 10 mL MeOH
Lead	EPA Method 200.7/6010	125 mL unpreserved
Diesel Range Organics (DRO)	WDNR Modified DRO Method	20- 30 grams unpreserved

Notes: ET typically limits the VOC analytical suite to PVOCs, as per MPCA guidance, assuming groundwater samples are analyzed for VOCs. Three soil samples from the source area will also be analyzed for total lead to provide data for any future potential excavation/soil removal work.

Quality assurance samples, including one methanol and one temperature blank per batch of samples will be collected to verify the quality of ET's field techniques including decontamination, handling, storage, and transportation procedures. In addition, one soil sample per each 10 samples will be collected in duplicate to submit to the laboratory as a blind duplicate to allow for evaluation of laboratory data quality.

A minimum of three soil samples will be collected and submitted for laboratory grain size analysis according to method ASTM D422 (hydrometer). Although well logs indicate sand and gravel soils, these can over-generalize. Both sieve and hydrometer analysis will be used to document coarse soils and any fines present. Samples will be collected from the most permeable stratum to assess hydraulic conductivity. Hydraulic conductivity calculations will be used in conjunction with aquifer thickness data to evaluate whether the saturated soils are considered an aquifer.

Subtask 3: Hand Auger Surface Soil Sampling: If needed, stained surface soil areas not sampled with push probe borings will be sampled using a hand auger. Soils will be classified, field screened with a PID, and examined for petroleum saturation using the petroleum sheen test. This is most likely not needed as the gas station area is paved, but will be conducted if staining is present in the unpaved/restaurant parking lot.

Responsible Party: Scientist I, Project Manager

Task B: Groundwater Contaminant Investigation

Subtask 1: Review Source and Receptor Data and Develop Sampling Plan:

- The source and lithology/aquifer data obtained from the receptor survey will be utilized to develop a sampling plan. Based on the presence of the sand and gravel soils, the groundwater contaminant investigation will be initially conducted using temporary monitoring wells set within push probe borings. The temporary monitoring well data will be utilized to determine the need for any further groundwater investigation and the placement of monitoring wells, if necessary.
- The plan will include sampling of nearby private wells.

Subtask 2: Push Probe Groundwater Sampling:

- Groundwater contaminant delineation and assessment will initially include push probe groundwater sampling, based on the presence of a silty clay unit from the surface to a depth of 25 to 30 feet bgs. If contamination extends into the underlying sand/gravel aquifer, the need for permanent monitoring wells will be re-evaluated.
- Fourteen (14) groundwater samples (12 temp wells, plus a duplicate and blank) will be collected and submitted to Pace Analytical Services (or other certified lab). The analytical methods and preservation requirements for each parameter analyzed at the site are summarized below:

Parameter	Method	Bottle and Preservatives
VOCs	MDH Method 465F/8260B	(3) 40 mL VOA with HCl
GRO	WDNR Modified GRO Method	(3) 40 mL VOA with HCl
Lead*	EPA Method 200.7/6010	(1) 250 mL plastic w/HNO3
DRO	WDNR Modified DRO Method	(1) 1 L Amber with HCl

*Note: Lead will only be analyzed for point of use/private well samples.

Quality assurance samples, including one field (equipment) blank each day and by each sampling crew, one trip blank, and one temperature blank per batch of samples will be collected to verify the quality of ET's field techniques including decontamination, handling, storage, and transportation procedures. In addition, one water sample per each 10 samples will be collected in duplicate to submit to the laboratory as a blind duplicate to allow for evaluation of laboratory data quality. Groundwater sampling will be conducted in accordance with PRP GD 4-05 Groundwater Sample Collection and Analysis Procedures.

Subtask 3: Private Well Sampling: The private wells located east of the site (within 500 feet) will be sampled, and analyzed for GRO, DRO, VOCs and lead. For purposes of this work plan, six private well samples will be collected. ET will discuss with the MPCA project manager whether water supply samples should be analyzed for VOCs by EPA Method 524.

Responsible Party: Scientist I, Project Manager

Task C: Vapor Intrusion Investigation

As surrounding residences/structures are over 100 feet from the release source(s), off-site soil gas sampling will not be conducted. However, sub-slab soil gas sampling will be conducted to assess vapor intrusion from the former USTs present below the on-site restaurant. Based on the square footage of the station/restaurant building, five soil sub-slab soil gas samples will be collected. Semi-permanent soil gas sample points will be installed for the collection of soil vapor using Summa Canister technology equipped with a manifold purging device. Soil gas sampling will follow PRP Guidance Document 4.01a and VI BMPs.

The vapor pins will be left in place to allow for a second round of sub-slab samples, which must be collected 30 days after the initial sampling, and during a different season (heating/non-heating season) from the initial sample. If results indicate sub-slab vapor concentrations exceed 33 X the ISV, then vapor mitigation may be required.

Responsible Party: Scientist I, Project Manager

Objective 2 Timeline: 5 Days field work, plus 10 days for lab analysis.

Objective 2 Deliverables: Laboratory Analytical Reports

Objective 3: Data Analysis and Report Preparation

ET will analyze the data to form a Site Conceptual Model (SCM), which will summarize the extent and magnitude of the petroleum contaminant phases (i.e. adsorbed, dissolved, NAPL, vapor) and risks posed to on- and off-site receptors. Site geology, land use, nature of the release and other factors will inform the SCM and recommendations regarding whether investigation goals have been met (e.g. contamination is delineated) and whether preparation of an investigation report, additional investigation or other action is appropriate. ET will provide a status update to the MPCA and, if appropriate, prepare a Limited Site Investigation (LSI) report or a monitoring plan.

Task A: Data Analysis and Status Update to MPCA

Subtask 1: Data Analysis: Laboratory analytical data and other site investigation data will be entered into tables in the Investigation Report Form (Guidance Doc 4-06). Preliminary site maps will be created to illustrate the distribution of soil, soil gas and groundwater contamination relative to receptors.

Subtask 2: MPCA Status Update: ET will update the MPCA with results of the investigation and discuss preliminary recommendations.

- If contamination is limited in extent, groundwater is not contaminated, and no receptors are impacted, then preparation of a Limited Site Investigation (LSI) Report may be appropriate.
- If site soils constitute an aquifer and groundwater is contaminated above HRLs or 1 mg/L DRO/GRO, or

surface water is likely to be impacted, or LNAPL is present, then an RI will be required. Design of a monitoring plan will be discussed with the MPCA PM.

- If potable water supply sampling indicates petroleum contamination is present, then emergency action may be required (e.g. installation of point of use carbon filtration and/or providing bottled water on a short-term basis). As municipal water is available in the area, a longer-term solution would be connection of these residences to the municipal water supply, possibly as part of a corrective action.

Subtask 3: Potable Sampling Letter Reports: Letters summarizing results will be written to residents whose water supplies were sampled. ET will also communicate with local residents at this time in accordance with Guidance Document 2-07: Petroleum Release Notification Follow-up.

Responsible Party: GIS Technician, Project Manager

Task B: Limited Site Investigation Report Preparation (if appropriate)

After field work is completed and analytical results from sampling are received, an LSI Report will be prepared on the Investigation Report Form (PRP GD 4-06)and submitted to the MPCA. If LSI activities do not accomplish the LSI objectives, recommendations for additional activities will be included in the report and supplemental reports will be submitted at significant milestones. The report will be a comprehensive document, including all field data and laboratory data reproduced in the appropriate tables and appendices. Figures in the LSI Report will include a topographic map (adapted from USGS quads); site plan showing all permanent structures, the area of investigation, and sampling or well locations; well receptor map; vapor survey map; vapor intrusion/soil gas sampling map; contaminant distribution maps; cross-sections; aerial photos; and Sanborn fire insurance maps. The report will document the extent of contamination in all phases, geology and hydrogeology, and details regarding the risk to local receptors. The LSI report will be completed on MPCA Guidance Document 4-06 Investigation Report Form.

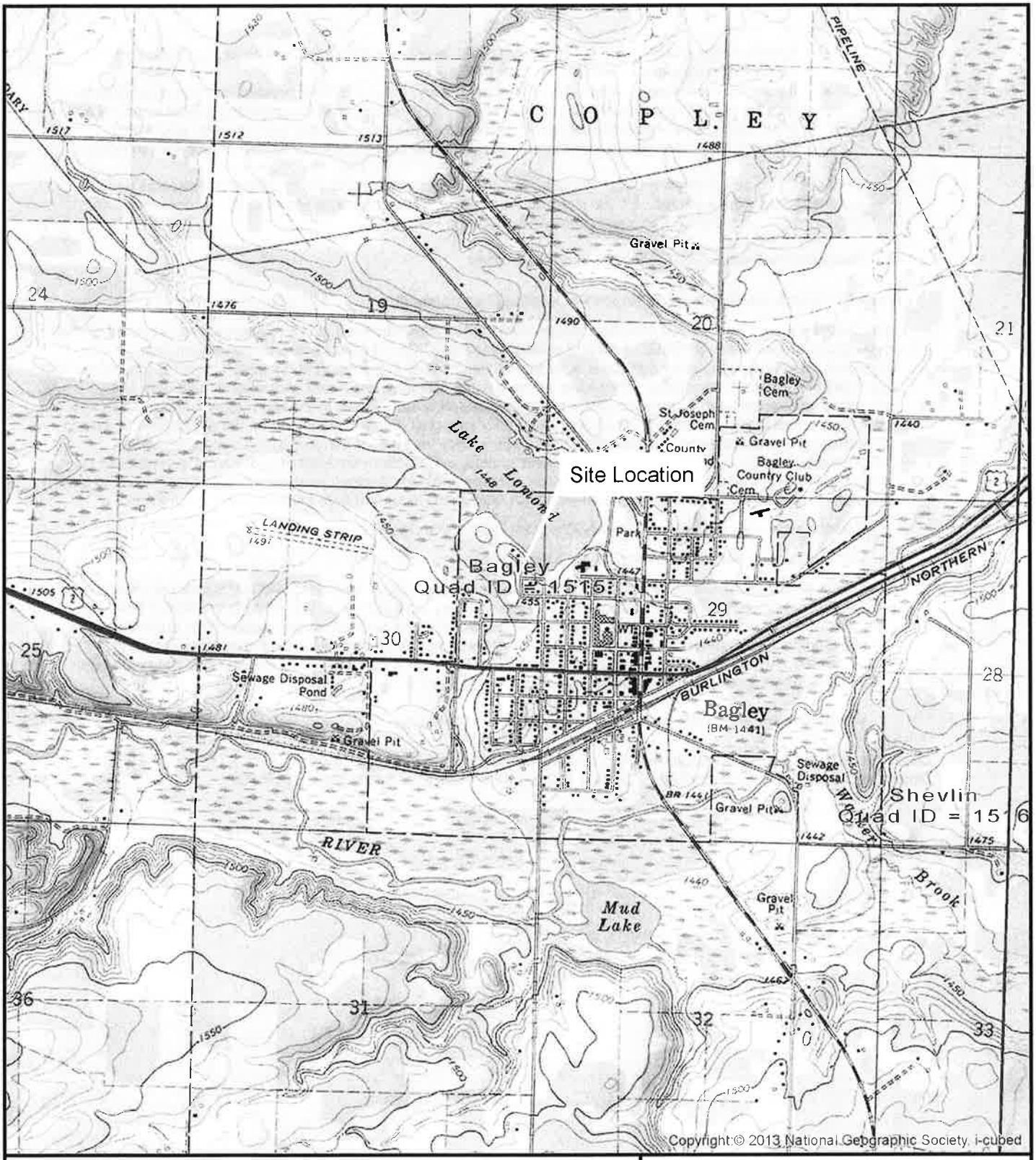
Responsible Party: GIS Technician, Consultant Project Manager

Task C: Additional Investigation Work Plan (if appropriate)

If the initial investigation results indicate that a remedial investigation (e.g. montoring well installation) or other additional sampling is required, ET personnel will prepare a brief work plan to be submitted to the MPCA PM. The work plan outline the proposed locations, depths and construction of a monitoring well network, any additional vapor intrusion sampling, soil sampling, potable well sampling, water line permeation assessment or other sampling recommended. An LSI report would not be submitted, and ET would include the initial investigation data along with additional monitoring results in a Remedial Investigation (RI) Report.

Responsible Party: GIS Technician, Consultant Project Manager

Objective 3 Timeline: 30 Days following receipt of analytical data
Objective 3 Deliverables: Email Status Update, LSI Report or Additional Investigation Work Plan



N

2,000 1,000 0 2,000 4,000 Feet

SCALE: 1/24000

1 inch = 2,000 feet

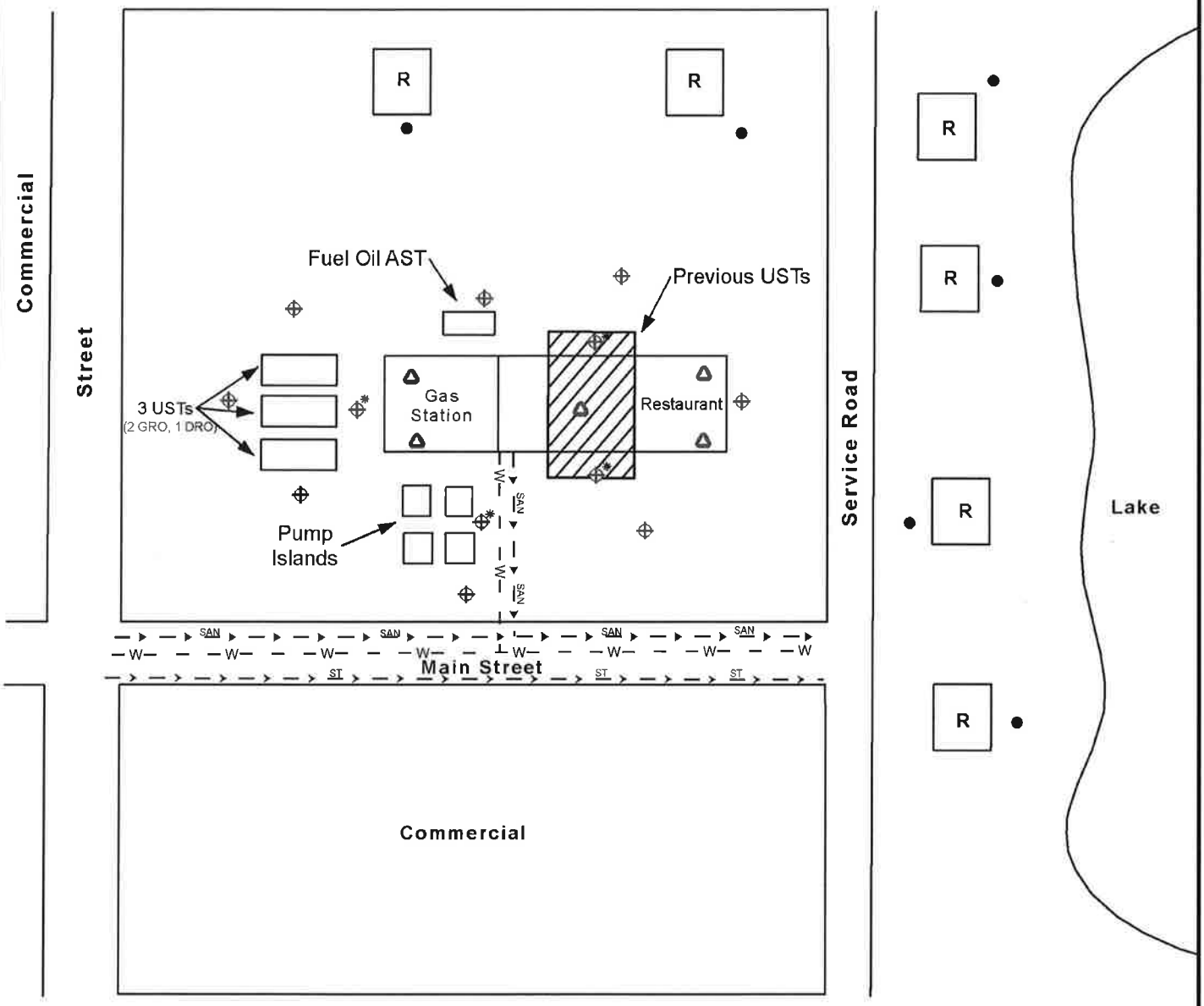
Source: USGS 7 1/2' Bagley Quadrangle Map

FIGURE 1

Site Location Map

PRP Scenario B
Western, Minnesota

PROJECT #: PRP	
DATE: 04/05/2018	**CREATED BY:** CGIS
FILE NAME:	//GIS/2018 Projects/PRP_Scenario /Projects/Figure1



Legend

- Domestic Well
- Residence
- Source Area Contaminated Boring
- Proposed Push Probe Boring
- Sub-Slab Soil Gas Sample
- —ST— Storm Sewer Line
- —SAN— Sanitary Sewer Line
- —W— Buried Water Line

100 50 0 100 200 Feet

SCALE: 1/1,200
1 inch = 100 feet

N

FIGURE 2
Site Plan View

PRP Scenario B
Western, Minnesota

PROJECT #: PRP	
DATE: 4/5/2018	**CREATED BY:** CGIS
FILE NAME: //GIS/2018 Projects/PRP_Scenario /Projects/Figure2	

MINNESOTA POLLUTION CONTROL AGENCY
520 Lafayette Road North
St. Paul, MN 55155-4194

Attachment B
Scenario B Project Spreadsheet

Project title: Investigation Work Plan for Scenario B, Western MN

	1. Personnel				2. Subcontracting	3. Equipment			4. Other Expenses			Totals (Extended)
Project Budget	Project Manager	Health & Safety Officer	Scientist I	GIS Tech.	Drilling	Soil Sampling Equipment (daily)	Water Sampling Equipment (daily)	Vapor sampling equipment (per point)	Lab Analysis	Vehicle Mileage Reimbursement		
	$137.52	$137.52	$78.09	$78.09		$99	$160	$199		Per commisioners plan.		X
Objective 1												
Task A	4	2										
Task B	1		4	4								
Task C	1		4									
Task D	0.5		2									
Task E			0.5									
Task F			0.5									
Total for Objective 1 Hrs	**6.5**	**2**	**11**	**4**								
Objective 2												
Task A	4	1	10		Two days @ $2,000 per day.	2			14 soil DRO, GRO, PVOCs, plus 3 lead.			
Task B	4		10				2		14 GW DRO, GRO& VOCs, plus 6 potable wells			
Task C	2		8					5	5 vapor for TO-15			
Task D												
Total for Objective 2 Hrs	**10**	**1**	**28**	**0**	**$4,000.00**	**$198.00**	**$320.00**	**$995.00**	**$4,650.00**			
Objective 3												
Task A	1		8	8								
Task B	1		12	2								
Total for Objective 3 Hrs	**2**	**0**	**20**	**10**								
Total Project Hours	**18.5**	**3**	**59**	**14**								