LIMITED SITE INVESTIGATION REPORT

For:

United Grain & Energy
Hector, MN 55342

Prepared for:

United Grain & Energy
P.O. Box 338
Hector, MN

MPCA Leak Site ID# 14337

Pinnacle Engineering, Inc.
101 Broadway Street West
Suite 100
Minneapolis, MN 55369

1500 First Avenue NE
Rochester, MN 55906

Pinnacle Engineering

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August 23, 2002

Ms. Denise Oakes
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

RE: Limited Site Investigation Report
MPCA Leak #14337
United Grain & Energy, 260 Main St., Hector
Pinnacle Project No. MN02221.00

Dear Ms. Oakes:

Please find enclosed the Limited Site Investigation Report for the United Grain & Energy site in Hector, MN. Pinnacle Engineering is submitting this material on behalf of our client, John Washburn.

If you have any questions or require additional information, please contact me at 763-315-4501.

Sincerely,

PINNACLE ENGINEERING, INC.

Roy L. Hill
Geologist

Enclosures

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August 23, 2002

Mr. John Washburn
United Grain & Energy
P.O. Box 338
Hector, Minnesota 55342

RE: Remedial Investigation/Corrective Action Design (RI/CAD) Report Proposal
Above Ground Storage Tank Closure, 100 Highway Avenue, Hector
Pinnacle Project No: MN02229.00

Dear Mr. Washburn:

Pinnacle Engineering has completed a review of the information collected during the Initial Site Assessment (ISA) at the site located at 100 Highway Avenue, Hector. This work included the collection of soil and groundwater samples from 5 soil borings. Delineation of the petroleum hydrocarbon contamination was completed with these borings. Therefore, a Remedial Investigation/ Corrective Action Design (RI/CAD) Report can be submitted to the MPCA at this time. This report is required by the MPCA for leak site closure to be granted. It will detail the result of the field investigation and evaluate risks associated with the contamination according to MPCA guidelines. Because of the limited amount of contamination found, it is likely that the MPCA will close this site upon review of the RI/CAD report.

Enclosed is an RI/CAD bid sheet for the completion of the report. Please review this proposal and return the signed and notarized original. Upon receipt of the signed proposal, Pinnacle will begin working on the report.

I have also enclosed the completed RI/CAD Report for the site located at 260 Main Street. This report has been submitted to the Minnesota Pollution Control Agency for review. After the monthly invoices have been generated for the completion of the report, Pinnacle will prepare your Petrofund reimbursement application for this project.

If you have any questions regarding the bid or the report, please contact me at (763) 315-4501.

Sincerely,

PINNACLE ENGINEERING, INC.

Roy L. Hill
Geologist

enclosures

Pinnacle Engineering, Inc. **REMEDIAL INVESTIGATION / CORRECTIVE ACTION DESIGN REPORT** Site Name: Hector - AST

Task No.	Task Description	Qty.	Unit	Maximum Cost or Hours	Professional Services SLP Hrs.	SLP Rate Per Hour	MLP Hrs.	MLP Rate Per Hour	ELP Hrs.	ELP Rate Per Hour	Technical Services FT Hrs.	FT Rate Per Hour	DP Hrs.	DP Rate Per Hour	WP Hrs.	WP Rate Per Hour	PROPOSAL TOTAL Total Hours	TOTAL TASK AMOUNT	ACTUAL INVOICE AMOUNT
4.1	Project Management & Admin.		hour	see rules		90		80		60		50		45		35			
4.2	Aquifer Test		test	24 hrs/test															
4.3	-Well Oversight and Development		well	4 hrs/well															
4.4	-Well Permitting		well	0.5 hrs/well															
4.5	-Hydraulic Conductivity Estimate		test	4 hrs/test															
4.6	-Data Reduction		test	6 hrs/test															
4.7	Piezometer Installation Oversight		piez.	4 hrs/piez.															
4.8	Venting Test		hour	16 hrs/site															
4.9	-Vent Point Installation Oversight		vent	2 hrs/vent															
4.10	-Data Reduction		test	6 hrs/test															
4.11	Sparging Test		hour	16 hrs/site															
4.12	-Well Oversight and Development		well	4 hrs/well															
4.13	-Data Reduction		test	6 hrs/test															
4.14	Infiltration Test		test	1 hr/test															
4.15	Groundwater Sampling		well	1.5 hrs/well															
4.16	Surveying		hour	2 hrs/step															
4.17	Data Reduction		hour	6 hrs/step															
4.18	Corrective Action Alternative		hour	$1,000															
4.19	Passive Bioremediation Risk Assessment		hour	$1,000															
4.20	Site Monitoring Worksheet		wk. sheet	4 hrs/worksheet															
4.21	MPCA Conference Call		hour	2 hrs/site															
4.22	Travel Time		hour	actual hours															
4.23	Mileage		mile	IRS rate															
4.24	Vehicle Cost		mile or day	$0.35/mile or $50/day															
4.25	Per Diem		day	actual cost up to $70/day															
4.26	Equipment		See MN Rules Chapter 2890.0073, subp. 13 and 2890.0076, subp. 5 for breakdown																
	RI/CAD REPORT																		
4.27	-recommending no further action		hour	50 hrs/site	4	$90	32	$80	10	$60								$3,520	
4.28	-recommending further action		hour	65 hrs/site															
4.29	Waste Disposal		hour	3 hrs/site															
4.30	*Other		Specify on back page																
	SUBTOTAL		**Tasks 4.1 - 4.30**															**$3,520**	
	If any of the items listed below are subcontracted, please attach the subcontractor invoices to this document																		
4.31	a. Soil boring drilling		boring	see rules															
4.32	b. Piezometer installation		piez.	see rules															
4.33	c. Well installation		well	see rules															
4.34	d. Soil and G.W. sampling analysis			bid price															
4.35	e. *Other		Specify on back of this page																

*Please use the back of this page to explain tasks entered in the "Other" task description. Attach additional sheets if necessary. GRAND TOTAL $3,520

SLP-*Senior Level Professional* **MLP**-*Midlevel Professional* **ELP**-*Entry Level Professional* **FT**-*Field Technician* **DP**-*Draftsperson* **WP**-*Word Processor*

Please highlight all costs that exceed the Maximum Cost or Hours and any deviations from the standard assumptions in the rules.
Please use the back of this page to explain the assumptions underlying this proposal and any variances from the standard tasks or maximum costs.

Leaking Petroleum Storage Tanks

Minnesota Pollution Control Agency

http://www.pca.state.mn.us/programs/lust_p.html

Investigation Report Form

Fact Sheet #3.24

Complete this form to document remedial investigation (RI) activities, including Limited Site Investigations (LSIs) and full RIs. Do not revise or delete any text or questions from this report form. Include any additional information that is important for making a site cleanup decision. If only a LSI is necessary, you may skip Section 6 and Section 7 of this report form.

Refer to Minnesota Pollution Control Agency (MPCA) fact sheet 3.1 *Leaking Underground Storage Tank Program* for the overall RI objectives, and to other MPCA fact sheets for details on investigation methods. When a tank has been excavated, refer to fact sheets 3.6 *Excavation of Petroleum Contaminated Soil During Tank Removal* and 3.7 *Excavation Report Worksheet for Petroleum Release Sites* for reporting requirements. Document the occurrence of free product using fact sheet 3.3 *Free Product: Evaluation and Recover,* and fact sheet 3.4 *Free Product Recovery Report Worksheet.*

MPCA Site ID: Leak: **00014337** Date: **August 23, 2002**

Responsible Party: **United Grain & Energy** R.P. phone #: **1-800-547-5576**

Consultant: **Pinnacle Engineering** Consultant phone #: **763-315-4501**

Facility Name: **United Grain & Energy**

Facility Address: **260 Main St.** City: **Hector**

County: **Renville** Zip Code: **55342**

Site location: The required coordinate scheme for reporting site location is Universal Transverse Mercator (UTM), Extended Zone 15, 1983 North American Datum (NAD83). Refer to **http://www.ot.state.mn.us/ot_files/handbook/standard/std17-1.html** for Minnesota spatial data standards, or **http://mac.usgs.gov/mac/isb/pubs/factsheets/fs15799.html** for more information about UTM Coordinates.

X coordinate (Easting) **364,169** meters
Y coordinate (Northing) **4,955,642** meters

What feature does the coordinate represent? (i.e. center of parcel, approximate center of source area, etc. Please describe) **center of source**

What method was used to determine the coordinate? (i.e. GPS receiver, map interpolation, address matching, etc. Please describe) **map interpolation**

If a paper map, digital map, aerial photo or digital orthophotoquad was used to find the site location, please provide the scale of the map or photo (i.e. 1:24,000, etc.)
1:24,000

Section 1: Emergency and High Priority Sites

1. Is an existing drinking water well impacted or likely to be impacted within a two-year travel time? ☐ *Yes* ☒ *No*

2. Are there existing vapor impacts? ☐ *Yes* ☒ *No*

3. Is there an existing surface water impact as indicated by 1) a product sheen on the surface water or 2) a product sheen or volatile organic compounds in the part per million (ppm) range in ground water in a well located close to the surface water. ☐ *Yes* ☒ *No*

4. Has the release occurred in the last 30 days? ☐ *Yes* ☒ *No*

5. Has free product been detected at the site? **If *YES***, attach fact sheet 3.4 *Free Product Recovery Report Worksheet.* ☐ *Yes* ☒ *No*

6. Is sand or gravel aquifer impacted which is tapped by water wells within or potentially within 500 feet from the release source **or** does impacted soil overlie a geologically sensitive area? **If *YES***, explain: ☐ *Yes* ☒ *No*

If you answered *YES* to any of questions 1 through 6 above describe below the actions taken to date to reduce or eliminate the risk posed by the release.

Section 2: Site and Release Information

2.1 Attach Table 1 - Tank Information. Describe the status of the other components of the tank system(s), (i.e., piping and dispensers).

All Components have been removed.

2.2a Describe the land use and pertinent geographic features within 1,000 feet of the site.

The site is located in a mixed residential and commercial area in the city of Hector. The surrounding land is level.

2.2b List other potential leak sources within 500 feet of the site.

The subject tank basin is located in the northwestern portion of former leak site #68

2.3 Identify and describe the source or suspected source(s) of the release.

The source is likely a former diesel underground storage tank. The contamination may also be from former leak site #68.

2.4 What was the volume of the release? (if known): **unknown** gallons

2.5 When did the release occur? (if known): **unknown**

Section 3: Excavated Soil Information

3.1 Include the Fact Sheet 3.7 *Excavation Report Worksheet* in Appendix A

3.2 Was soil excavated for off-site treatment? ☐ *Yes* ☒ *No*

Date excavated:

Volume removed: cubic yards

3.3 Indicate soil treatment type:

☐ land treatment
☐ thermal treatment
☐ composting/biopiling
☐ other ( )

Name and location of treatment facility:

Section 4: Extent and Magnitude of Soil Contamination

4.1 Were soil borings conducted in or immediately adjacent to all likely sources including:

	YES	*NO*	*NOT PRESENT*
dispensers,	☐	☐	☒
underground storage tank basins,	☒	☐	☐
above ground storage tank areas,	☐	☐	☒
piping,	☐	☐	☒
remote fill pipes,	☐	☐	☒
and known spill areas	☐	☐	☒

4.2 To adequately define the vertical extent of contamination, soil borings should be completed at least five feet below the water table or ten feet below the deepest measurable (field screening and visual observation) contamination, whichever is deeper. Were all soil borings completed to the required depth? ☐ *YES* ☒ *NO*

4.3 To adequately evaluate site stratigraphy complete at least one boring to 20 feet below the water table, or to 20 feet below the deepest site contamination, whichever is deeper. If a confining layer is present, drill the boring in an uncontaminated area. Was this done? ☐ *YES* ☒ *NO*

If you answered *NO* to any of the three previous questions, explain why the borings were not conducted in the required locations or to the required depths (see fact sheet #3.19, *Soil and Ground Water Investigations Performed During Remedial Investigations* regarding exceptions and MPCA approval for depth of drilling):

Not all borings were advanced to 10 feet below the deepest contamination. Field vapor readings below the water table dropped to non-detectable levels, indicating that the clay rich soil limited the vertical extent of the contamination.

Stratigraphic information was already available for the site from the MPCA leak #68 investigation.

4.4 Indicate the drilling method:

- ☐ hollow-stem auger
- ☐ sonic drilling
- ☒ push probes
- ☐ other .

Note: MPCA staff hydrologist approval is required before use of flight augers

4.5 Discuss soil borings drilled and provide rationale for their locations. Attach boring logs in Appendix D.

The initial site assessment (ISA) consisted of five soil borings. One boring was advanced through the former tank basin and four delineation borings were placed to the north, south and west of the former basin. A boring was not located to the east of the former basin because of the proximity of a building. To complete delineation of the contamination identified by the ISA, three additional borings were advanced. One boring was placed northward to delineate contamination detected at SB-3, and two borings were placed to the west to delineate contamination detected in SB-4 and SB-5. Additional investigation was not conducted to the southeast of the former tank basin because of the proximity of former leak site #68.

4.6 Attach Table 2 - Results of Soil Headspace Screening, In Appendix C, discuss soil headspace screening method and describe any deviation from recommended and/or required methods and procedures.

4.7 Attach Table 3 - Analytical Results of Soil Samples. Provide analytical results in Appendix B. In Appendix C, discuss soil sampling and analytical methods used and describe any deviation from recommended and/or required methods and procedures

4.8 Describe the vertical and horizontal extent and magnitude of soil contamination. Provide a plan-view map and two cross-sections that illustrate both soil head space and laboratory analytical results. See Section 13.

Soil contamination appears to extend approximately 40 feet outward from the source area. The primary contaminant is DRO with low levels of ethylbenzene and xylenes being detected locally. The highest DRO concentration (326 ppm) was found at SB-3, 12 feet below grade. DRO contamination was also found at SB-2 (94.7 ppm, 12'), SB-4 (102 ppm, 12') and SB-5 (14.9 ppm, 12'). These results suggest that the contamination spread mainly to the north, but has also moved laterally to the south and west. The borings completed during the Additional Site Assessment delineated the horizontal extent of the soil contamination to the north and west. Delineation borings were not completed to the south and east of the former tank basin because of the proximity of former leak site #68.

The DRO contamination extends to less than 20 feet below grade. Analytical results for samples taken from 20 feet below grade in borings SB-1 through SB-4 were all below detection limits, with the exception of xylenes at 0.504 ppm and 0.460 ppm at 20 feet in SB-2 and SB-4, respectively.

4.9 Attach Table 4 - Other Contaminants Detected in Soils (Petroleum or Non-petroleum Derived). Discuss the possible sources of these compounds.

4.10 Is contaminated soil in contact with ground water? ☒ *Yes* ☐ *No*

If *YES* or if ground water contamination appears likely, then complete Section 5.

If *NO* (contaminated soil is not in contact with ground water), what is the distance separating the deepest contamination from the surface of the water table? Was this distance measured during site activities, referenced from geologic information, or estimated based on professional opinion during a site visit? feet

4.10 Describe observations of any evidence of a fluctuating water table and a seasonal high water table (e.g., mottling). Also, from other sources of information describe the range of natural water table fluctuations in the area.

No evidence was observed. No other information is available.

4.12 In your judgment, is there a sufficient distance separating the petroleum contaminated soil (or an impacted non- aquifer) from the underlying aquifer to prevent petroleum contamination of the aquifer? Please explain in detail. In your explanation, consider the data and information of this section as well as the nature of the petroleum release (i.e., volume, when it occurred, petroleum product). ☐ *Yes* ☒ *No*

If *YES,* a ground water contamination assessment is not necessary as part of the LSI.

If *NO*, a ground water contamination assessment is necessary. Complete Section 5.

The groundwater sample collected from the former tank basin indicates that the near surface aquifer is contaminated.

Section 5: Aquifer Characteristics/Ground Water Contamination Assessment

Complete Section 5 if groundwater has been contaminated or may become contaminated. Aquifer determination is made during the LSI. It is based upon the stratigraphy and a hydraulic conductivity measurement calculated from grain size distribution analysis. The site stratigraphy gives the context within which the hydraulic conductivity measurement can be interpreted. Please refer to Fact Sheet 3.19, *Soil and Ground Water Investigations Performed During Remedial Investigations* for methods and requirements.

5.1 Provide an average hydraulic conductivity value (K) measured:

K = **0.2834** ft/day

Indicate the method of measurement (i.e., Hazen, Masch and Denny, Kozeny-Carmen, etc.): Grain-size distribution approximations by method(s).

Hydraulic conductivity was estimated from published conductivity ranges for glacial till (Freeze & Cherry, 1979).

Indicate the locations and depths of soil samples submitted for grain size analyses. Provide the results of grain size analyses and other information used for the determination of K-values in Appendix F.

Grain size analyses were not performed. Soils were predominantly clay rich glacial till with stringers of sand. Boring logs indicate that the sand stringers tend to be one to two feet thick and therefore will produce little water. The clay rich till contained varying amounts of silt and sand, therefore, a general K value for glacial till was used to calculate the transmissivity.

5.2 Calculate a range for aquifer transmissivity (T) using the equation T = Kb, where b is the thickness of the aquifer:

T_{High} = **28.34** ft^2/day
T_{Low} = **2.834** ft^2/day

Determine the aquifer thickness (b) from geologic logs of soil borings, water well logs, and available published information. Attach water well logs in Appendix D. If the transmissivity of a contaminated hydrogeologic unit is greater than 50 ft^2/day, it is

considered an aquifer (for the purpose of the LUST program), and monitoring wells will be necessary.

Because clay rich soil underlies the site, it is assumed that a continuous, hydraulically connected unit would not be greater than 100 feet thick. Soil borings at the site suggest that the near surface groundwater extends at least 10 feet below the vadose zone.

5.3 Discuss in detail the site geology and stratigraphy, including a discussion of local and regional hydrogeology, using soil boring data and cross sections, geologic logs of near-by water wells, and available published information.

Boring logs from wells in the area indicate that glacial till consisting of interbedded sandy clay and sand extends to roughly 400 feet below the surface. The till rests on Precambrian igneous and metamorphic bedrock.

Published information indicates that groundwater in shallow till (<100 feet below grade) tends to flow from higher morainal areas toward stream valleys. Buffalo Creek is approximately 4 miles north of Hector, so shallow groundwater flow is likely to the north. Groundwater that penetrates into deeper till follows the regional flow to the south.

REFERENCES:

***Lindholm, G.F. et al., Water Resources Crow River Watershed, south-Central Minnesota, Atlas HA-528,* Minnesota Department of Natural Resources, St. Paul, Minnesota, 1974.**

5.4 Attach Table 5- Water Level Measurements and Depths of Water Samples Collected from Borings. Indicate the method used to measure the water levels in borings, and the depth water samples were collected from borings. Allow water levels in borings to equilibrate to static conditions, and the adjust the effective screened intervals in borings to intercept the static water table prior to water sample collection. Discuss groundwater flow direction.

Groundwater ranged between 7 and 21 feet below grade, depending on where sand lenses were intersected. Depth to water was determined by identifying where saturated soil was present in the soil cores as they were screened and logged. After determining the depth to water, a four-foot screen was lowered to intersect the water table for groundwater sample collection.

Based on data from former monitoring wells at leak site #68, groundwater flow is to the west and southwest.

5.5 Attach Table 6 - Analytical Results of Water Samples Collected from Borings. Summarize the analytical results of groundwater samples collected as part of an LSI. Discuss the extent and magnitude of groundwater contamination. Also provide a discussion on QA/QC, including information on the samples collected and laboratory analyses performed.

Groundwater collected from the source area boring (SB-1) contained 14.8 ppb benzene, 1.69 ppb toluene, 41.1 ethylbenzene, 220 ppb xylenes and 725,000 ppb DRO. All other groundwater samples collected from delineation borings contained below detection levels of BTEX. Low levels of DRO were detected in SB-6 (104 ppb), SB-7 (105 ppb) and SB-8 (75 ppb). Therefore, it appears that the clay rich glacial till underlying the site has limited the movement of contaminated groundwater.

QA/QC information for soil and groundwater samples collected on April 18, 2002 is provided in Appendix B.

5.6 Attach Table 7 - Other Contaminants Detected in Water Samples Collected from Borings (Petroleum or Non-petroleum Derived). Discuss the possible sources of these contaminants and provide a discussion of QA/QC information.

Other contaminants detected in SB-1 were benzene derivatives and naphthalene and are likely from the subject release or from former leak site #68. Delineation boring SB-7 contained 1.2 ppb 1,1-Dichloroethene and SB-8 contained 0.86 ppb trichlorofluoromethane. The source of these compounds is unknown.

5.7 Laboratory certification number: **027-059-156**

Additional Ground Water Investigation

Complete **Section 6** only if: 1*) an aquifer has been impacted at or above Minnesota Department of Health HRLs, 2) an aquifer has been impacted below the HRLs, but the levels are likely to reach the HRLs, or 3) there is an insufficient distance separating the petroleum contaminated soil (or an impacted non- aquifer) from the underlying aquifer.* Complete **Section 7** only if remediation is anticipated. Regardless of whether you are submitting a *LSI* or a *full RI*, all sections following Section 7 must be completed.

Section 6. Extent and Magnitude of Ground Water Contamination

6.1 Discuss drilling and installation of wells, including the rationale for their locations. Attach boring logs in Appendix D.

6.2 Attach Table 8 - Monitoring Well Completion Information.

6.3 Attach Table 9 - Summary of Water Levels Measured in Wells.

6.4 Attach Table 10 - Analytical Results of Water Samples Collected from Wells. Indicate here whether samples were purged or unpurged (see fact sheet 3.23). If purged, indicate purging method.

6.5 Attach Table 11 - Other Contaminants Detected in Water Samples Collected from Wells (Petroleum or Non-Petroleum Derived). Indicate here whether samples were purged or unpurged (see fact sheet 3.23). If purged, indicate purging method.

6.6 Describe the extent and magnitude of the ground water contamination. Discuss the presence of non-petroleum compounds, if detected, and identify possible sources of these compounds. Also provide a discussion on QA/QC, including information on the samples collected and laboratory analyses performed.

6.7 Is there a clean or nearly clean (below HRLs) down-gradient monitoring well located along the longitudinal axis of the contaminant plume? (approximately 20 degrees plus or minus the axis) ☐ *Yes* ☐ *No*

6.8 Is there a worst case well completed through the source area(s) of the ☐ *Yes* ☐ *No*

release?

If you have answered *NO* to any of the above two questions, please explain why a well was not completed in the required location.

6.9 Provide an estimate of the longitudinal length of the dissolved contaminant plume: feet

6.10 Calculate groundwater flow velocity (based on Darcy's Law) using the average K-value, average horizontal hydraulic gradient, and effective porosity. Provide documentation in Appendix F.

Hydraulic Conductivity (K) = Method
Porosity (n) = method/reference
Average horizontal gradient (dh/dl) =
Calculated GW velocity (v) = cm/s ft/day

6.11 Using the calculated groundwater flow velocity (above), is there a receptor within a five-year travel time? ☐*Yes* ☐*No*

If *YES*, provide the unique well number and identify the location of the receptor(s).

6.12 Were any deep monitoring wells completed at the site? ☐*Yes* ☐*No*

If *YES*, list them and indicate their depths:

Contact the MPCA project hydrologist before installing a deep monitoring well. A deep monitoring well may be necessary if: 1) Contamination exists more than 10 feet below the water table or 2) the impacted aquifer is a drinking water aquifer or is hydraulically connected to the aquifer(s) presently utilized by a water supply well located within 500 feet of the release source.

If contamination is present at depth in the aquifer or in deeper aquifers, additional deep wells may be required. Provide the following information if deep wells are installed:

Vertical Gradient (dv/dl)
Inferred GW Flow Direction

Provide the following information for the deep aquifer unit if it appears to be hydrogeologically distinct from the upper unit.

Porosity (n):
Hydraulic Conductivity (K)

Submit this RI report after completing a minimum of *two quarterly sampling events.* Groundwater monitoring should continue until MPCA response is received.

Section 7: Evaluation of Natural Attenuation

Refer to the fact sheet #3.21 *Assessment of Natural Attenuation at Petroleum Release Sites.*
Note: Evaluation of natural attenuation is not required unless requested by MPCA staff.

7.1 Attach Table 12 - Natural Attenuation Parameters. Discuss the results. Specifically, compare the concentrations of the inorganic parameters inside and outside the plume.

7.2 In your judgment, is natural biodegradation occurring at this site? Please Explain. ☐ *Yes* ☐ *No*

If active remediation is anticipated, discuss reasons why natural attenuation (including biodegradation) can not adequately remediate the contaminants to acceptable risk levels.

Section 8: Well Receptor Information/Assessment

Include in Appendix E, copies of the water supply well logs obtained from MGS, MDH, drillers, and where applicable, from County well management authorities.

8.1 Attach Table 13 - Properties Located Within 500 Feet of the Release Source. Provide a map identifying the features listed in Table 13.

8.2 Were all property owners within 500 feet of the release source successfully contacted to determine if water wells are present? ☐ *Yes* ☒ *No*

If *NO*, please explain.

A risk assessment was conducted in association with former leak #68, which was closed in August 2001. Based on this recent closure, we assume that risks to receptors in the area have been evaluated. Because municipal water is available to residences in the area, development of new private wells near the release since the initial risk assessment is unlikely.

8.3 Attach Table 14 - Water Supply Wells Located within 500 Feet of the Release Source and Municipal or Industrial Wells Within ½ Mile.

8.4 Discuss the results of the ground water receptor survey and any analytical results from sampling conducted at nearby water wells. Comment on the risks to water supply wells identified within 500 feet from the release source as well as the risk posed by or to any municipal or industrial wells found within ½ mile. Specifically indicate whether water supply wells identified utilize the impacted aquifer. (Note: an impacted aquifer separated from another aquifer by a clay lens may not be considered a separate aquifer).

One water supply well may be located within 500 feet of the source at the Hector Creamery (unique #244382). An address for the well is not available, so the exact location is not known. The hatched area on Figure 3, Well Receptor Survey Map, outlines the subsection listed on the well record. This well is 400 feet deep and is cased to 360 feet. It is unlikely that the near surface contamination identified could impact this well.

Two municipal wells supply the city of Hector with drinking water. One is located approximately two miles north of the site and the other is approximately ¾ mile northeast of the site.

An emergency municipal well (unique #241566) is located 750 feet to the northeast of the site. This well is 400 feet deep and is cased to 377 feet. The water & wastewater superintendent, Mr. Jerome Schuller, indicated that he does not expect that the well will be used because the active supply wells now have backup power systems.

8.5 Is municipal water available in the area? ☒ *Yes* ☐ *No*

8.6 Are there any plans for ground water development in the impacted aquifer within 1/2 mile of the site, or one mile down-gradient of the site if the aquifer is fractured? Please give the name, title and telephone number of the person that was contacted for this information (below). ☐ *Yes* ☒ *No*

Jerome Schuller, Water & Wastewater Superintendent
Telephone 320-848-2122

Section 9: Surface Water Risk Assessment

9.1 Are there any surface waters or wetlands located within ¼ mile of the site? ☐ *Yes* ☒ *No*

If *YES*, list them: _____

9.2 If surface water is present down-gradient of the site, is there a clean down-gradient monitoring well (temporary or permanent) located between the site and the surface water?

☐ *YES*
☐ *NO*
☒ *N/A*

9.3 If you answered *NO* to question 9.2, we assume that contamination discharges to surface water. Therefore, complete the following information:

Name of receiving water:	
Receiving water classification	
ORVW?	☐ *Yes* ☐ *No*
Plume width, (W):	feet
Plume thickness, (H):	feet
Hydraulic conductivity, (K):	gal/day/ft^2
Horizontal gradient, (dh/dl):	(unitless)
Discharge, (Q) = H*W*K*(dh/dl)/1440	gal/min
Applicable chronic standard (7050 or 7052)	
Applicable max. standard (7050 or 7052)	
Applicable FAV (7050 or 7052)	
Contaminant concentration in ground water	

9.4 If you answered *YES* to question 9.2, identify the clean down-gradient boring or monitoring well, the distance to the surface water feature, and discuss the contamination risk potential.

Section 10: Vapor Risk Assessment/Survey

10.1 Is there a history of vapor impacts in the vicinity of the site ? ☐*Yes*☒*No*

If *YES*, describe:

10.2 Is there any indication that free product or contaminated ground water may be traveling off-site within the utility corridors? ☐*Yes*☒*No*

If *YES*, utility backfill investigation is required (refer to Fact Sheet 3.19). Discuss the investigation rationale and results.

10.3 Discuss the potential for vapor migration/accumulation near the site. Your discussion should consider: Soil types, product type, presence and distribution of free product or high concentrations of dissolved product. Also, using cross-sections to illustrate the relationship, compare the depth of contamination with the location of underground utility lines, location and depth of storm and sanitary sewers, and location of nearby basements and sumps.

The risk of vapor migration or accumulation is low. The clay rich soil underlying the site will limit the migration of any vapors that may be present. The UST that was removed contained fuel oil, which would not be expected to produce a large amount of vapors. Vapors detected during soil screening were minor and did not extend greater than 40 feet beyond the former tank basin.

10.4 Conduct a vapor survey if the vapor risk assessment indicated a risk of vapor impacts to buildings or utilities. Ask occupants of nearby buildings if they have smelled petroleum odors. See fact sheet 3.20 *Potential Receptor Surveys and Risk Evaluation Procedures at Petroleum Release Sites*. Identify all vapor monitoring locations on an attached site map by labeling each monitoring location with a number. Tabulate the list of vapor monitoring locations in Table 15. Vapor monitoring methods, including instruments used, must be discussed in Appendix C. Provide a detailed description of each vapor monitoring location and an interpretation of the vapor monitoring results below.

Attach Table 15 - Results of Vapor Monitoring.

Section 11: Discussion

11.1 Discuss the risks associated with the remaining soil contamination:

The risks associated with the identified soil contamination are low. Concentrations of BTEX in the soil are very low and do not pose a health risk. Elevated DRO contamination is limited to within 40 feet of the former tank basin. Low levels of DRO in the groundwater suggest that the contaminated soil is not acting as a significant source of dissolved hydrocarbons. Given the levels of DRO detected in the soil, hydrocarbon vapors would not be expected to pose any risks.

11.2 Discuss the risks associated with the impacted ground water:

Risks associated with the impacted groundwater are low. Although moderate levels of DRO and BTEX were detected at the source area, the clay rich soil underlying the site has limited contaminant migration. Groundwater samples collected from delineation borings show that low levels of DRO have extended outward from the source area. Water supply wells near the site are cased to 360 and 377 feet, making impact to the wells unlikely.

11.3 Discuss other concerns not mentioned above:

The suspected source is on the property of former MPCA leak #68, which was closed in August 2001.

Section 12: Conclusions and Recommendations

12.1 Recommendation for site:

- [x] site closure
- [ ] additional vapor monitoring
- [ ] additional ground water monitoring
- [ ] active remediation

12.2 Base the recommendation above on fact sheet #3.1 *Leaking Underground Storage Tank Program.* Describe below how you applied the policy to support your recommendation. If closure is recommended, please summarize significant site investigative events and describe how site specific risk issues have been adequately addressed or minimized to acceptable low risk levels.

Following the closure of a diesel UST, an Initial Site Assessment (ISA) was conducted to determine the extent of soil and groundwater impact in the area of the tank basin. One boring was advanced into the former tank basin and four borings were placed around the basin. The groundwater sample collected from the source area contained moderate to low levels of BTEX and DRO. Soil samples collected from the surrounding borings also contained DRO contamination and very low levels of ethylbenzene and xylenes.

Based on these findings, an Additional Site Assessment (ASA) was conducted to delineate the soil and groundwater contamination. Three soil borings were placed to the north and west of the borings advanced during the ISA. Samples collected from these borings completed delineation of the impacted soil. Groundwater samples collected from the borings delineated BTEX contamination to below detection limit levels and DRO contamination to approximately 100 ppb.

Based on these findings, closure is recommended for this site. Risks to human health and the environment appear to be low. The soils at the site consist of clay rich glacial till, which will limit the migration of soil vapors and contaminated groundwater. One water supply well is located within 500 feet of the source area and one unused municipal well is located approximately 750 feet away from the source. These wells are 400 feet deep, so there is little risk of impact.

12.3 If additional monitoring is recommended, indicate the proposed monitoring schedule and frequency. Conduct quarterly monitoring until the MPCA responds to this report.

12.4 If active remediation is proposed, then recommend a conceptual approach by listing the remedial technologies or combination of technologies that are likely feasible. MPCA staff will review this RI report at a higher than normal priority to determine if active remediation is required. We will respond with either a request for proposal for additional monitoring or a Corrective Action Design report.

Section 13: Figures

Attach the following figures in order of discussion in the text:

☒ Site location map using a U.S. Geological Survey 7.5 minute quadrangle map.

☒ One or more site map showing:

- Structures
- Locations and depths of on-site buried utilities
- All past and present petroleum storage tanks, piping, and dispensers
- Extent of soil excavation
- Boring and well locations (including any drinking water wells on site)
- Horizontal extent of soil contamination
- Horizontal extent of ground water contamination
- Location of end points for all geologic cross sections.

Distinguish sequential elements of investigations by dates, symbols, etc. in the key.

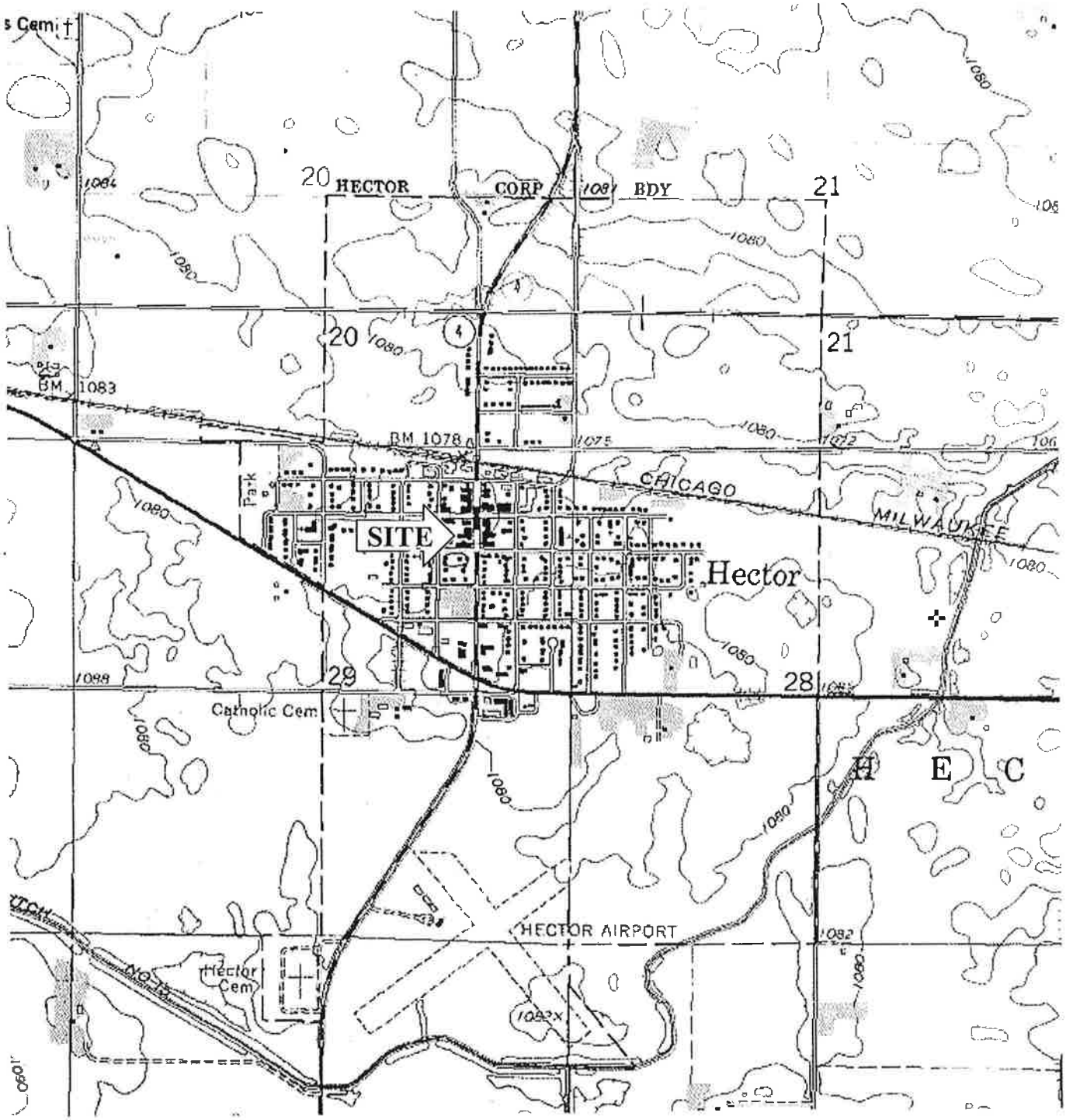
☐ Ground water gradient contour maps (for sites with monitoring wells) for each gauging event.

☒ Well receptor survey map showing 1/2 mile radius, 500 foot radius, water supply wells, other potential sources of contamination, using a U.S. Geological Survey 7.5 minute quadrangle.

☐ Vapor survey map showing utilities and buildings with basements and monitoring locations (if a survey was required).

☒ Provide at least two (2) geologic cross sections, including utilities.

FIGURES



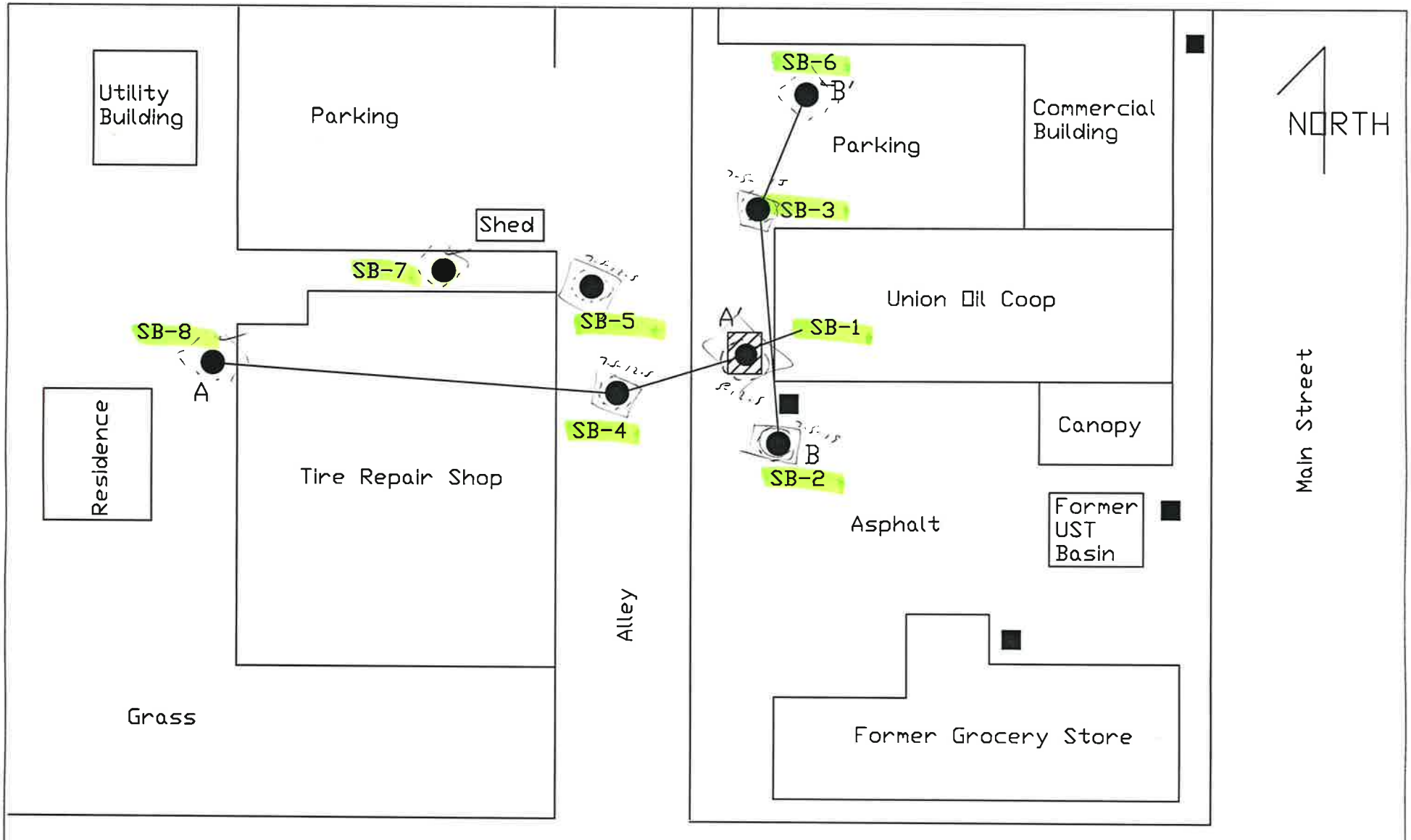
Pinnacle Engineering

Pinnacle Engineering, Inc.
101 Broadway Street West, Suite 100
Minneapolis, MN 55369
Phone: (763) 315-4501
Fax: (763) 315-4507

Figure 1.

Site Location Map
United Grain & Energy - Hector
260 Main Street
Hector, Minnesota

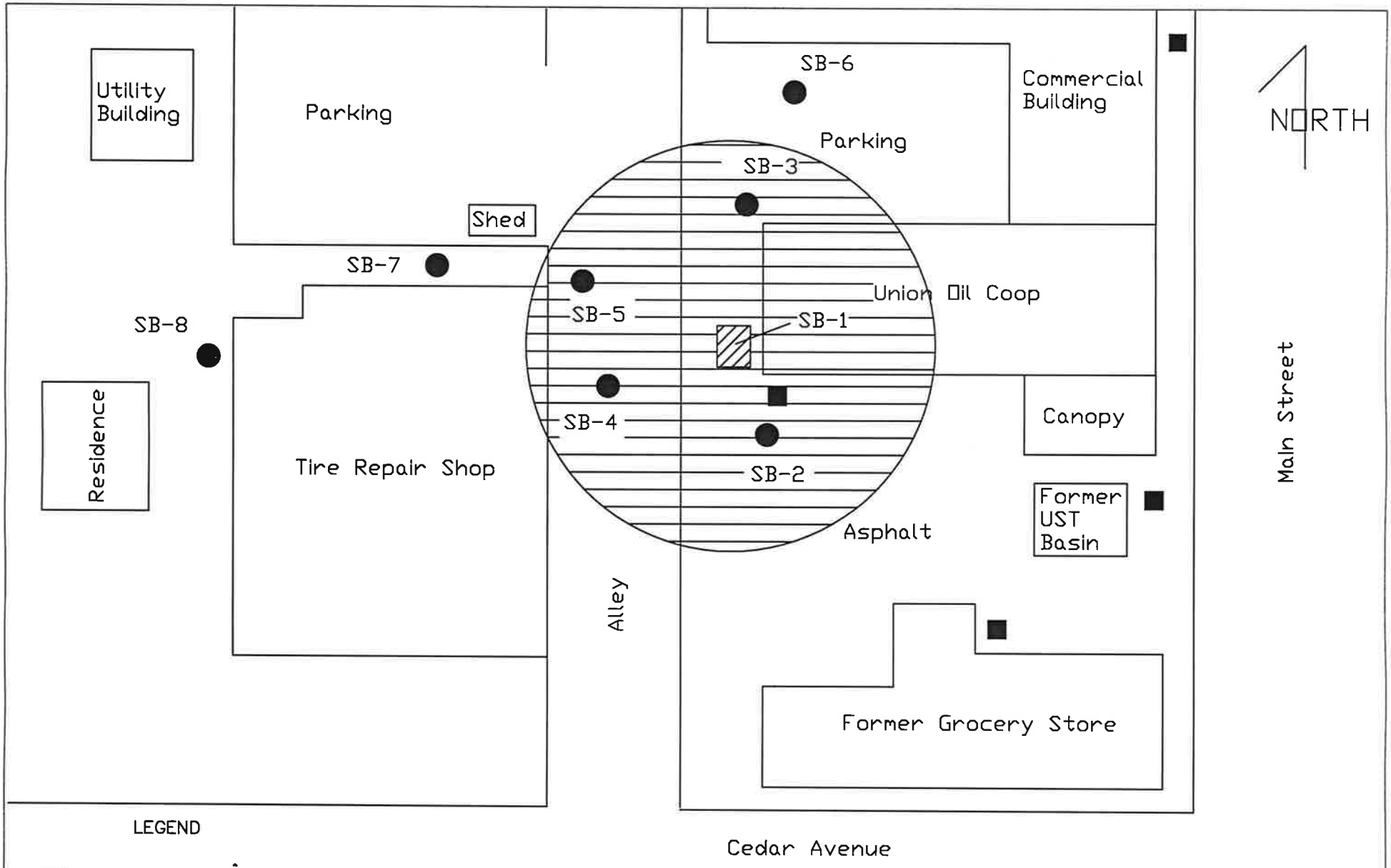
Date: June 24, 2002	Prepared By: R. Hill
Scale: 1:24,000	Reviewed By: M. Hultgren



Pinnacle Engineering
101 Broadway Street, Suite 100
MINNEAPOLIS, MN 55369
(763) 315-4501

FIGURE 2A
Site Map
United Grain & Energy
Hector, Minnesota

PREPARED BY: RH
DATE: 6/13/02
Scale: 1" = 40'



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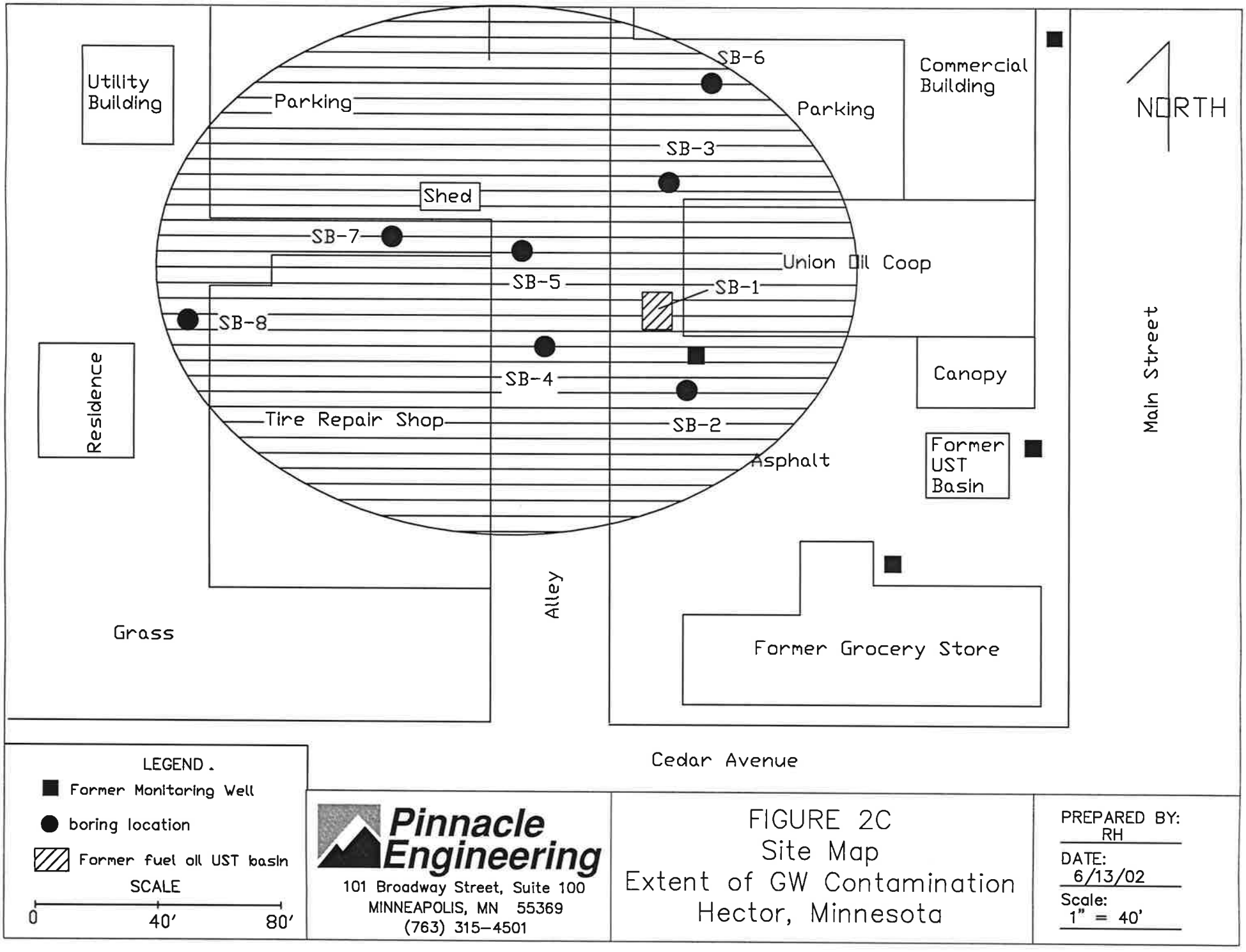
101 Broadway Street, Suite 100
MINNEAPOLIS, MN 55369
(763) 315-4501

FIGURE 2B
Extent of soil Contamination
United Grain & Energy
Hector, Minnesota

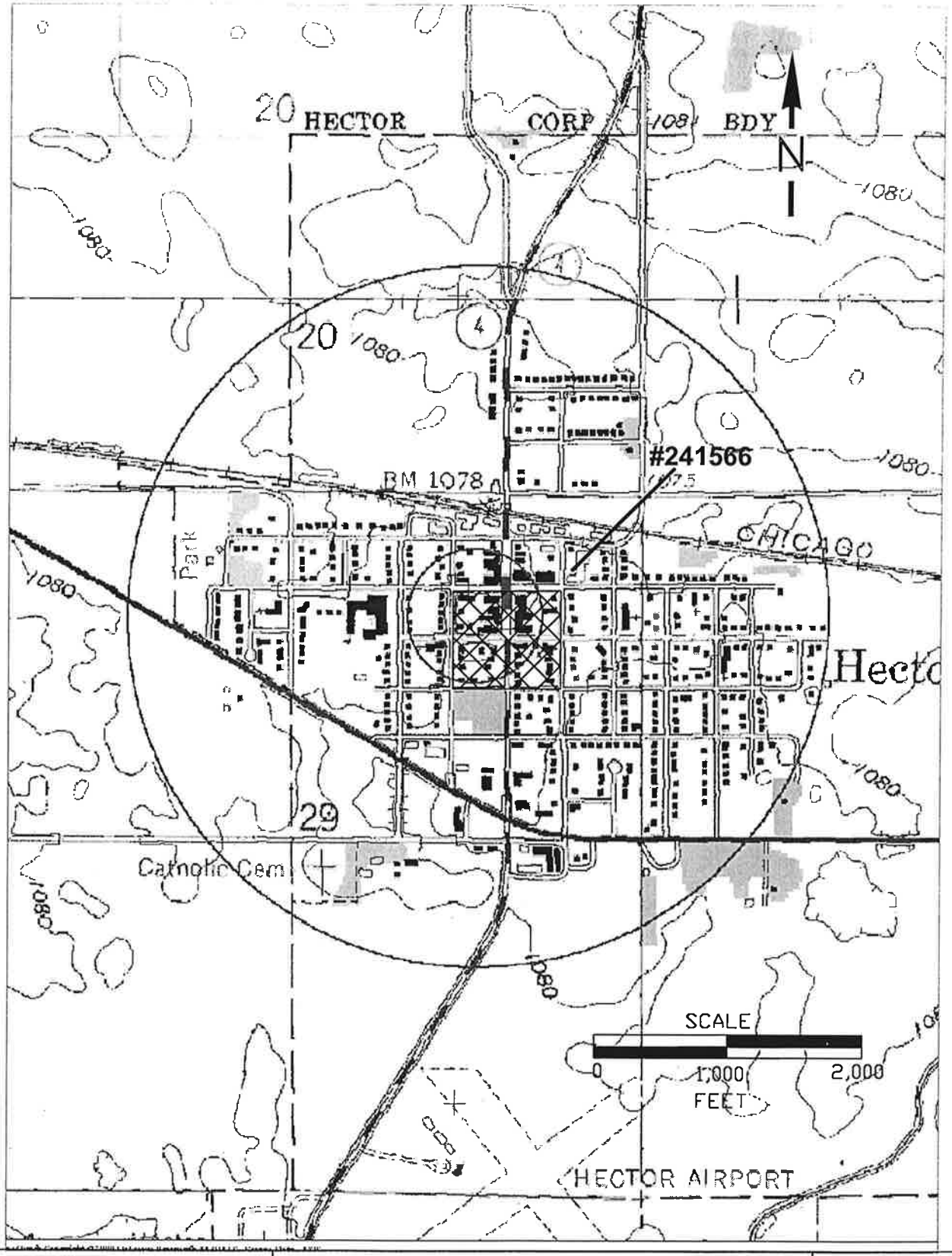
PREPARED BY: RH
DATE: 6/13/02
Scale: 1" = 40'



Pinnacle Engineering
101 Broadway Street, Suite 100
MINNEAPOLIS, MN 55369
(763) 315-4501

FIGURE 2C
Site Map
Extent of GW Contamination
Hector, Minnesota

PREPARED BY: RH
DATE: 6/13/02
Scale: 1" = 40'

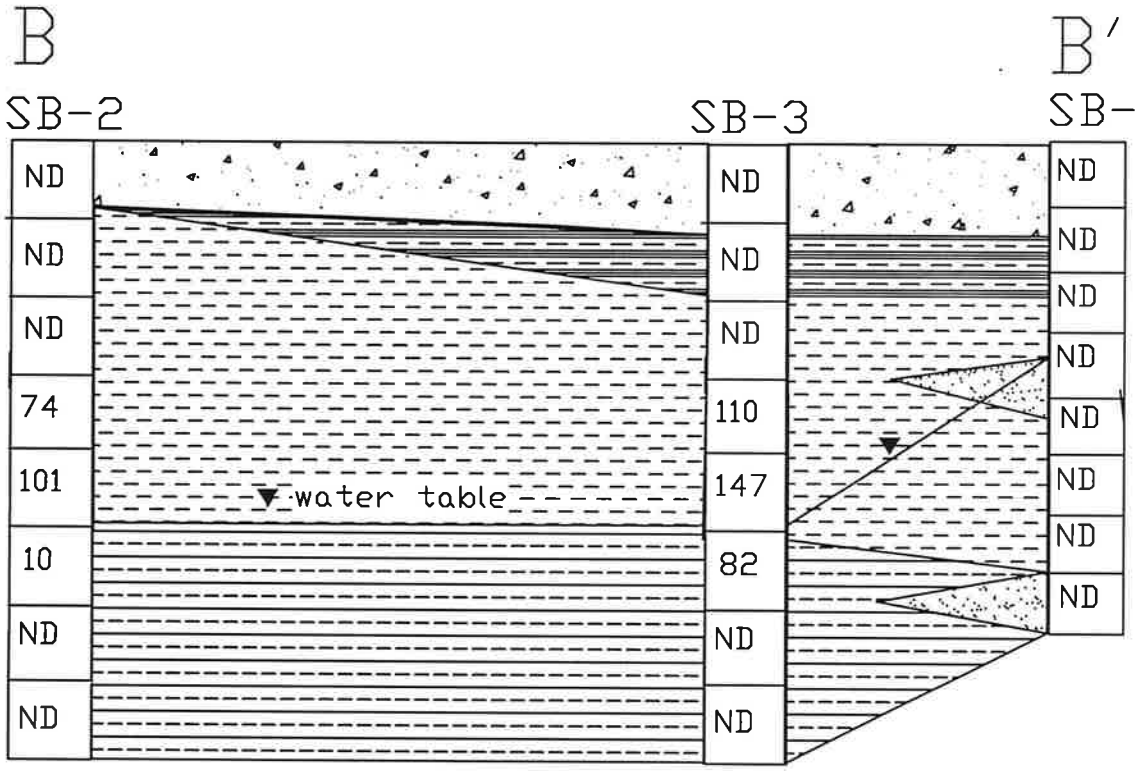


Pinnacle Engineering

101 Broadway Street West
MAINNEAPOLIS, MN 55369
(763) 315-4501

Figure 3
Well Receptor Survey Map
United Grain & Energy
Hector, MN

PREPARED BY: RH
DATE: 7/25/02
FILE NAME: siteloc



Sand and Gravel Fill

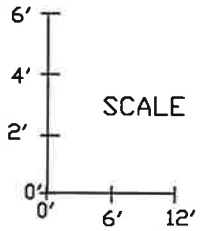
Black, Organic Clay

Brown/Gray Clay, Little Silt, Trace Gravel

Sand and Gravel

Dark Gray Clay, Little Silt, Trace Gravel

20 PID Reading
ND = Not Detected



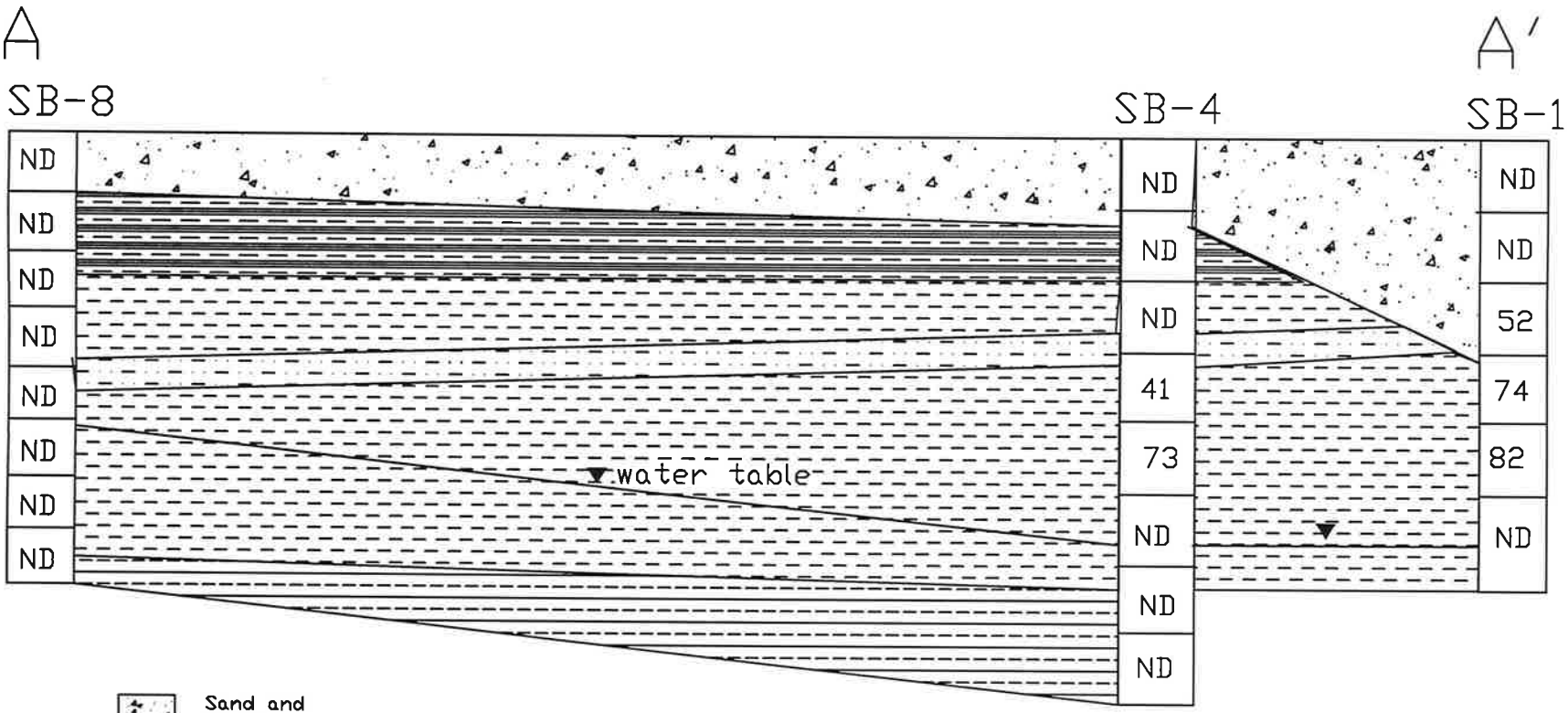
Pinnacle Engineering
101 BROADWAY STREET WEST
MINNEAPOLIS, MN 55369
(763) 315-4501

FIGURE 4A
CROSS SECTION A-A'
United Grain & Energy
Hector, MN

PREPARED BY: RH

DATE: 6/24/02

FILE NAME: sectionb-b'.dwg



Pinnacle Engineering
101 BROADWAY STREET WEST
MINNEAPOLIS, MN 55369
(763) 315-4501

FIGURE 4A
CROSS SECTION A-A'
United Grain & Energy
Hector, MN

PREPARED BY: RH
DATE: 6/24/01
FILE NAME: sectionb-b'.dwg

Section 14: Tables

Table 1
Tank Information

Tank #	UST or AST	Capacity	Contents	Year Installed	Status*	Condition
001	UST	500 gal.	diesel	unknown	removed, 2001	fair
		1000 gal			1999	

*Indicate: *removed **(date)**, abandoned in place **(date)**, or currently used*
Notes:

Table 2
Results of Soil Headspace Screening

Depth (ft)	Soil Boring 1	2	3	4	5	6	7	8	9
0-2.5	ND	ND	ND	ND	ND	ND	ND	ND	
2.5-5	ND	ND	ND	ND	ND	ND	ND	ND	
5-7.5	52	ND	ND	ND	ND	ND	ND	ND	
7.5-10	74	74	110	41	10.2	ND	ND	ND	
10-12.5	82	101	147	73	20	ND	ND	ND	
12.5-15	ND	10	82	ND	ND	ND	ND	ND	
15-17.5	ND	ND	ND	ND	ND	ND	ND	ND	
17.5-20	ND	ND	ND	ND	ND		ND		
20-22							ND		
22-24							ND		

List instruments used and discuss field methods and procedures in Appendix C.
Notes:

Table 3
Analytical Results of Soil Samples

Boring, Depth(ft)	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylenes	GRO	DRO	Lab Type
SB-1, 20'	11/20/01	<0.064	<0.064	<0.064	<0.192	NA	<10.7	Fixed
SB-2, 12'	11/20/01	<0.115	<0.115	<0.115	1.44	NA	94.7	Fixed
SB-2, 20'	11/20/01	<0.067	<0.067	<0.067	0.504	NA	<10.6	Fixed
SB-3, 12'	11/20/01	<0.065	<0.065	0.261	0.383	NA	326	Fixed
SB-3, 20'	11/20/01	<0.061	<0.061	<0.061	<0.182	NA	<10.6	Fixed
SB-4, 12'	11/20/01	<0.061	<0.061	0.104	<0.183	NA	102	Fixed
SB-4, 20'	11/20/01	<0.061	<0.061	<0.061	0.460	NA	<9.59	Fixed
SB-5, 12'	11/20/01	<0.076	<0.076	0.517	0.714	NA	14.9	Fixed
SB-6, 7'	4/18/02	<0.062	<0.062	<0.062	<0.185	NA	<12.3	Fixed
SB-7, 21'	4/18/02	<0.062	<0.062	<0.062	<0.186	NA	<11.9	Fixed
SB-8, 8'	4/18/02	<0.048	<0.048	<0.048	<0.144	NA	<11.7	Fixed

Report results in mg/kg. Use less than symbols to show detection limit. Indicate mobile or fixed based in the lab type column.
Notes:

Table 4
Other Contaminants Detected in Soils (Petroleum or Non-petroleum Derived)

Boring, Depth (ft)	Date Sampled						Lab Type

Report results in mg/kg. Indicate other contaminants (either petroleum or non-petroleum derived) detected in soil collected from borings.
Notes:

Table 5
Water Level Measurements and Depths of Water Samples Collected from Borings

	Soil Boring									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Static Water level depth (ft)	12.5	12	12	12.5	12	7	21	8		
Sampled Depth (ft)	10-15	NS	NS	NS	NS	8-12	20-24	8-12		

Describe in Appendix C, the methods and procedures used to measure water levels in borings.
Notes: ***NS = not sampled***

Table 6
Analytical Results of Water Samples Collected from Borings

Boring Number	Date Sampled	Sampled Depth	Benzene	Toluene	Ethyl benzene	Xylenes	MTBE	GRO	DRO	Lab Type
SB-1	11/20/01	10-15	14.8	1.69	41.1	220	<15	NA	725,000	Fixed
SB-6	4/18/02	8-12	<0.5	<0.4	<0.4	<0.8	<0.3	NA	104	Fixed
SB-7	4/18/02	20-24	<0.5	<0.4	<0.4	<0.8	<0.3	NA	105	Fixed
SB-8	4/18/02	8-12	<0.5	<0.4	<0.4	<0.8	<0.3	NA	75	Fixed
Trip Blank										
Field Blank										
Lab Blank										
HRL			10	1000	700	10000				

Report results in ug/L. Use less than symbols to show detection limit. Indicate mobile or fixed based in the lab type column.
Notes

Table 7
Other Contaminants Detected in Water Samples
Collected from Borings (Petroleum or Non-petroleum Derived)

Boring Number	Date Sampled	Chloro benzene	Isopropyl benzene	n-Propyl benzene	1,3,5-Trimethyl benzene	tert-Butyl benzene	1,2,4-Trimethyl benzene
SB-1	11/20/01	53.0	551	248	1540	749	3660
Trip Blank							
Field Blank							
Lab Blank							
HRL (ug/L)							

Report results in ug/L. Indicate other contaminants (either petroleum or non-petroleum derived) detected in water samples collected from the borings, temporary wells or push probes.
Notes:

Table 7 (Continued)
Other Contaminants Detected in Water Samples
Collected from Borings (Petroleum or Non-petroleum Derived)

Boring Number	Date Sampled	1,4-Dichloro benzene	p-Isopropyl toluene	n-Butyl benzene	1,2,4-Trichloro benzene	Naphthalene	1,2,3-Trichloro benzene
SB-1	11/20/01	698	1510	3430	4160	3320	4380
Trip Blank							
Field Blank							
Lab Blank							
HRL (ug/L)							

Report results in ug/L. Indicate other contaminants (either petroleum or non-petroleum derived) detected in water samples collected from the borings, temporary wells or push probes.
Notes:

Table 7 (Continued)
Other Contaminants Detected in Water Samples
Collected from Borings (Petroleum or Non-petroleum Derived)

Boring Number	Date Sampled	1,1-Dichloro ethene	Trichlorofluoro methane				
SB-7	4/18/02	1.20					
SB-8	4/18/02		0.860				
Trip Blank							
Field Blank							
Lab Blank							
HRL (ug/L)							

Report results in ug/L. Indicate other contaminants (either petroleum or non-petroleum derived) detected in water samples collected from the borings, temporary wells or push probes.
Notes:

Pinnacle Engineering

LOG OF TEST BORING

PROJECT :
United Grain & Energy
260 Main Street, Hector, MN
Pinnacle Project No. MN02221.00
LOGGED BY: Jason Coyle
DRILLING METHOD: Push Probe
DRILLING DATE: November 20, 2001

BORING NAME/LOCATION:
SB-1
See attached site map

SURFACE ELEV: not available
DRILLING CONTRACTOR: Agassiz

SCALE:
1 in. = 4 ft.

Depth	Sample Int.	Graphic log	Description - ASTM D:2488	PID ppm	Water Level	Moist. Content	Comments
			Fill - Gravel & Clay	ND			
				ND			
				52			
8.0							
			Olive, Clay Till	74			
12.0				82	W.T.		
			Brown, Clay Till	ND			
				ND			
				ND			
20.0							

Remarks: Boring was advanced to 20 feet below grade.

Boring was abandoned with bentonite on 11/20/01.

PID is the headspace organic vapor concentration in parts per million.

ND means not detected

Pinnacle Engineering

LOG OF TEST BORING

PROJECT :
United Grain & Energy
260 Main Street, Hector, MN
Pinnacle Project No. MN02221.00
LOGGED BY: Jason Coyle
DRILLING METHOD: Push Probe
DRILLING DATE: November 20, 2001

BORING NAME/LOCATION:
SB-2
See attached site map

SURFACE ELEV: not available
DRILLING CONTRACTOR: Agassiz

SCALE:
1 in. = 4 ft.

Depth	Sample Int.	Graphic log	Description - ASTM D:2488	PID ppm	Water Level	Moist. Content	Comments
2.0			Fill - Gravel	ND			
			Brown, Clay Till, Staining @ 10'	ND			
				ND			
				74			
13.0				101	W.T. ▼		
			Gray, Clay Till	10			
				ND			
20.0				ND			

Remarks: Boring was advanced to 20 feet below grade.

Boring was abandoned with bentonite on 11/20/01.

PID is the headspace organic vapor concentration in parts per million.

ND means not detected

Pinnacle Engineering

LOG OF TEST BORING

PROJECT :
United Grain & Energy
260 Main Street, Hector, MN
Pinnacle Project No. MN02221.00
LOGGED BY: Jason Coyle
DRILLING METHOD: Push Probe
DRILLING DATE: November 20, 2001

BORING NAME/LOCATION:
SB-3
See attached site map

SURFACE ELEV: not available
DRILLING CONTRACTOR: Agassiz

SCALE:
1 in. = 4 ft.

Depth	Sample Int.	Graphic log	Description - ASTM D:2488	PID ppm	Water Level	Moist. Content	Comments
3.0			Fill - Gravel	ND			
5.0			Black, Organic Clay	ND			
13.0			Brown, Clay Till, Green Staining @ 8'	ND 110 147	W.T. ▼		
20.0			Gray, Clay Till	82 ND ND			

Remarks: Boring was advanced to 20 feet below grade.

Boring was abandoned with bentonite on 11/20/01.

PID is the headspace organic vapor concentration in parts per million.

ND means not detected

Pinnacle Engineering

LOG OF TEST BORING

PROJECT :
United Grain & Energy
260 Main Street, Hector, MN
Pinnacle Project No. MN02221.00
LOGGED BY: Jason Coyle
DRILLING METHOD: Push Probe
DRILLING DATE: November 20, 2001

BORING NAME/LOCATION:
SB-4
See attached site map

SURFACE ELEV: not available
DRILLING CONTRACTOR: Agassiz

SCALE:
1 in. = 4 ft.

Depth	Sample Int.	Graphic log	Description - ASTM D:2488	PID ppm	Water Level	Moist. Content	Comments
3.0			Asphalt Surface/Gravel Fill	ND			
5.0			Black, Organic Clay	ND			
7.0			Brown, Clay Till	ND			
8.0			Sandy Clay Till, Moist				
16.0			Brown, Clay Till, Staining @ 15-16'	41 73 ND	W.T. ▼		
20.0			Gray, Clay Till	ND ND			

Remarks: Boring was advanced to 20 feet below grade.

Boring was abandoned with bentonite on 11/20/01.

PID is the headspace organic vapor concentration in parts per million.

ND means not detected

Pinnacle Engineering

LOG OF TEST BORING

PROJECT :
United Grain & Energy
260 Main Street, Hector, MN
Pinnacle Project No. MN02221.00
LOGGED BY: Jason Coyle
DRILLING METHOD: Push Probe
DRILLING DATE: November 20, 2001

BORING NAME/LOCATION:
SB-5
See attached site map

SURFACE ELEV: not available
DRILLING CONTRACTOR: Agassiz

SCALE:
1 in. = 4 ft.

Depth	Sample Int.	Graphic log	Description - ASTM D:2488	PID ppm	Water Level	Moist. Content	Comments
2.0			Asphalt Surface/Gravel Fill	ND			
			Brown, Clay Till	ND			
				ND			
				10.2			
				20	W.T. ▼		
13.0							
			Gray, Clay Till	ND			
				ND			
20.0				ND			

Remarks: Boring was advanced to 20 feet below grade.

Boring was abandoned with bentonite on 11/20/01.

PID is the headspace organic vapor concentration in parts per million.

ND means not detected

Pinnacle Engineering

LOG OF TEST BORING

PROJECT :
United Grain & Energy
260 Main Street, Hector, MN
Pinnacle Project No. MN02221.00
LOGGED BY: Roy Hill
DRILLING METHOD: Push Probe
DRILLING DATE: April 18, 2002

BORING NAME/LOCATION:
SB-6
See attached site map

SCALE:
1 in. = 4 ft.

SURFACE ELEV: not available
DRILLING CONTRACTOR: Agassiz

Depth	Sample Int.	Graphic log	Description - ASTM D:2488	PID ppm	Water Level	Moist. Content	Comments
3.0			Sand and Gravel Fill	ND			
5.0			Black, Organic Clay, Little Silt	ND			
7.0			Mottled Lt. Brown/Gray Clay, Little Silt	ND	W.T. ▼		
9.0			Medium to Coarse Sand	ND			
14.0			Mottled Lt. Brown/Gray Clay, Little Silt	ND ND ND			
16.0			Sand and Gravel, Little Silt	ND			

Remarks: Boring was advanced to 16 feet below grade.

Boring was abandoned with bentonite on 14/18/02.

PID is the headspace organic vapor concentration in parts per million.

ND means not detected

Pinnacle Engineering

LOG OF TEST BORING

PROJECT :
United Grain & Energy
260 Main Street, Hector, MN
Pinnacle Project No. MN02221.00
LOGGED BY: Roy Hill
DRILLING METHOD: Push Probe
DRILLING DATE: April 18, 2002

BORING NAME/LOCATION:
SB-7
See attached site map

SCALE:
1 in. = 4 ft.

SURFACE ELEV: not available
DRILLING CONTRACTOR: Agassiz

Depth	Sample Int.	Graphic log	Description - ASTM D:2488	PID ppm	Water Level	Moist. Content	Comments
2.0			Sand and Gravel Fill	ND			
4.0			Lt. Brown Clay, Little Silt	ND			
15.0			Mottled Lt. Brown/Gray Clay, Little silt, Trace Gravel	ND ND ND ND ND ND			
24.0			Dark Gray Clay, Trace silt and Gravel		W.T. ▼		

Remarks: Boring was advanced to 24 feet below grade.

Boring was abandoned with bentonite on 14/18/02.

PID is the headspace organic vapor concentration in parts per million.

ND means not detected

Pinnacle Engineering

LOG OF TEST BORING

PROJECT :
United Grain & Energy
260 Main Street, Hector, MN
Pinnacle Project No. MN02221.00
LOGGED BY: Roy Hill
DRILLING METHOD: Push Probe
DRILLING DATE: April 18, 2002

BORING NAME/LOCATION:
SB-8
See attached site map

SURFACE ELEV: not available
DRILLING CONTRACTOR: Agassiz

SCALE:
1 in. = 4 ft.

Depth	Sample Int.	Graphic log	Description - ASTM D:2488	PID ppm	Water Level	Moist. Content	Comments
2.0			Top soil, Sand and Gravel Fill	ND			
4.0			Black, Organic Clay, Little Silt	ND			
8.0			Mottled Lt. Brown/Gray Clay, Little Silt, Trace Gravel	ND ND	W.T. ▼		
9.0			Medium Sand and Clay	ND			
15.0			Mottled Lt. Brown/Gray Clay, Little Silt, Trace Gravel	ND ND ND			
16.0			Dark Gray Clay, Little Silt, Trace Gravel				

Remarks: Boring was advanced to 16 feet below grade.

Boring was abandoned with bentonite on 14/18/02.

PID is the headspace organic vapor concentration in parts per million.

ND means not detected