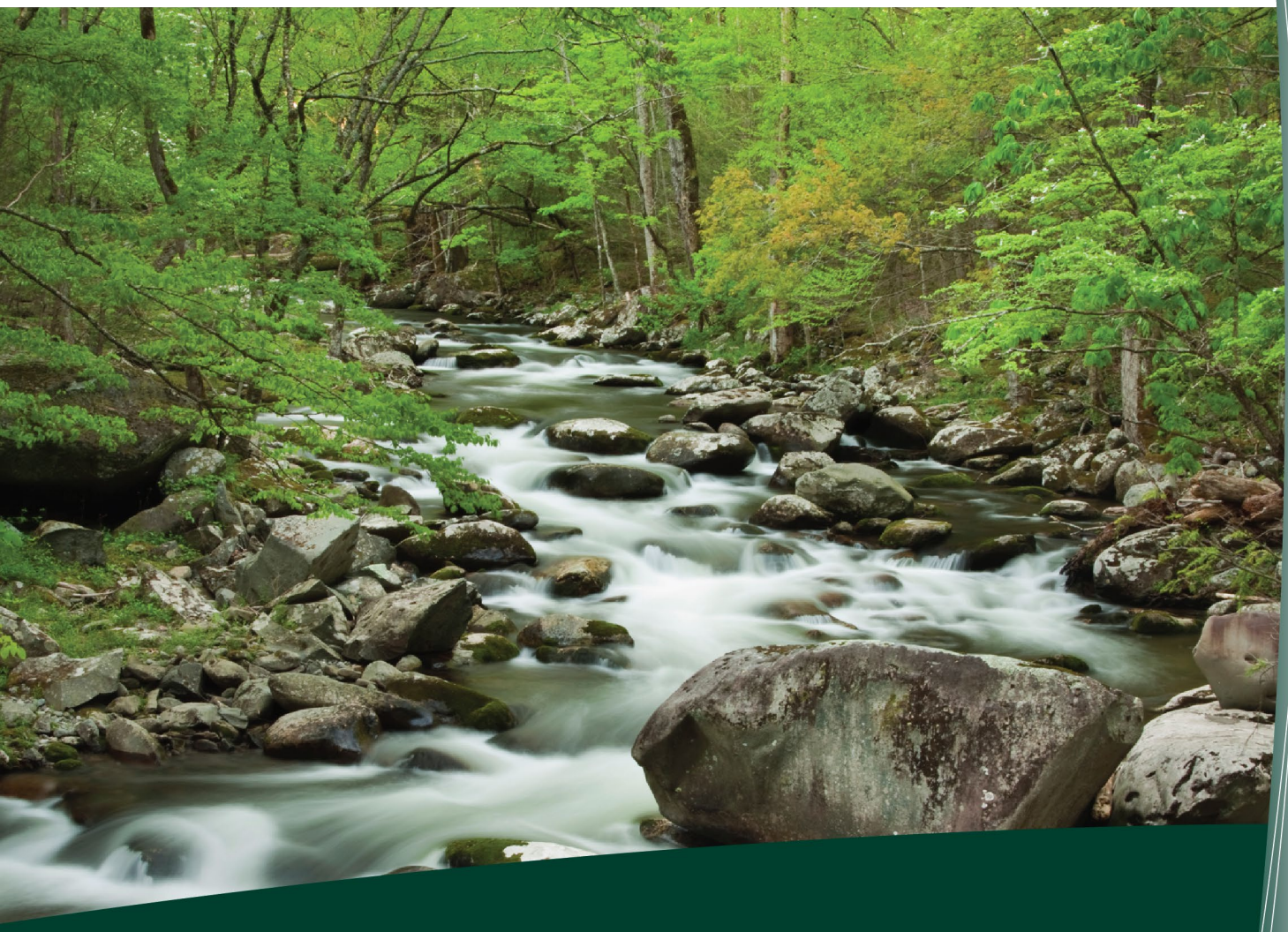
REI

CIVIL & ENVIRONMENTAL
ENGINEERING, SURVEYING

Quality Assurance/Quality Control Plan

Project:
Laundry Basket
300 S. Main Street
Luck, Wisconsin

REI Project #11003



COMPREHENSIVE SERVICES WITH PRACTICAL SOLUTIONS

QUALITY ASSURANCE/QUALITY CONTROL PLAN

LAUNDRY BASKET
300 S. MAIN STREET
LUCK, WISCONSIN

REI #11003

PREPARED FOR:

Wisconsin Department of Natural Resources
Attn: Mr. Phil Richard
875 South Fourth Street
Park Falls, WI 54552-1130

JULY 2023

QUALITY ASSURANCE/QUALITY CONTROL PLAN

LAUNDRY BASKET
300 S. MAIN STREET
LUCK, WISCONSIN 54494

REI #11003

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REI #11003

1.0 INTRODUCTION

This Quality Assurance/ Quality Control Plan (QA/QC) plan has been prepared by REI Engineering, Inc. (REI) for the Wisconsin Department of Natural Resources (WDNR) specifically for the Laundry Basket site (WDNR #02-49-544893) located at 300 S. Main Street, Luck, Polk County, Wisconsin. This plan addresses the steps and procedures for managing planned groundwater sampling activities for the ongoing investigation at this site.

2.0 PURPOSE

The purpose of this plan is to outline the sampling procedures used to plan and conduct the groundwater sampling event. These procedures generally follow the WDNR Groundwater Sampling and Field Manual guidance. If changes or modifications are requested following WDNR review, the plan will be amended and resubmitted.

3.0 SCOPE

This scope of this plan will specifically address the following:

1. Pre-sample collection planning
2. Coordination with the state certified laboratory for receipt of laboratory prepared sample containers
3. Techniques used for field sampling activities
4. Collection of field data including groundwater elevational data and field parameters
5. Sample collection
6. Measures taken to ensure sample integrity
7. Documentation and reporting

4.0 PROJECT PERSONNEL

The responsibility of the implementation of this plan will be the REI project team.

Name	Title	Responsibility	Contact
Brian Bailey	Department Manager	QA/QC Review	bbailey@reiengineering.com
David Larsen, P.G.	Senior Hydrogeologist	Project manager	dlarsen@reiengineering.com
Chase Kresl, P.G.	Hydrogeologist	Field work and documentation	ckresl@reiengineering.com

5.0 NOTIFICATIONS

REI will prepare and obtain access agreements for entering private properties to access wells. Upon receipt of signed access agreements, REI will provide notification to the WDNR project manager for the date of the scheduled well sampling event. Upon completion of fieldwork, samples will be submitted to the state certified laboratory for third party analysis. Analytical results should be received within ten (10) business days of submittal. REI will prepare and submit a groundwater investigation report to the WDNR within four (4) weeks of receiving the analytical results.

6.0 SAMPLING PROCEDURES

Groundwater Elevation Data

Groundwater elevation measurements are obtained by using an electronic measuring device which indicates when the probes measuring point contacts the surface of a conductive fluid. The probe is slowly lowered into the well until the instrument indicates that the water surface has been encountered, the distance from the top of the well casing to the probe is measured. All measurements are reported to the nearest 0.01 foot. The groundwater elevation and depth below land surface is calculated for all surveyed wells to the nearest 0.01 foot. A copy of the field sheet for each well is included in Appendix A.

Purging and Sampling

Disposable ¼" polyethylene tubing is inserted to the screen and connected to a peristaltic pump. The tubing is connected to a flow cell where a YSI multi-meter is inserted. The YSI multi-meter measures temperature, conductivity, dissolved oxygen, pH and redox potential. Water is pumped slowly and samples are collected after field measurements stabilize. The amount of water purged before sample collection along with sample time is recorded on the well specific data sheet.

Water samples are collected directly from the tubing. If the well is purged dry, it is allowed to recharge and then sampled. Samples are labeled and placed in a cooler to be preserved at approximately 4 degrees C. The coolers have sufficient ice to maintain temperature. The sample tubing is discarded after each sample and new tubing is used on each well.

Chain of Custody

Upon completion of a sample, a chain of custody log is initiated. The chain of custody record includes the following information: project name, work order number, shipped by, shipped to, sampling point, location, field ID number, date and time taken, sample type, number of containers, analysis required, sampler (s) signature (s), etc. As few people as possible handle the samples. A copy of the Chain of Custody is included in Appendix B.

Decontamination

Sampling and water level measuring equipment is decontaminated prior to sample collection. Disposable items are replaced after each sample collected. Equipment is placed in a clean 5-gallon plastic bucket containing a mixture of deionized water and Liquinox® prepared according to the manufacturer's instructions. The equipment is scrubbed with a clean nylon brush with special care taken to clean all areas which contact groundwater. Equipment is then rinsed in a separate clean 5-gallon buck containing deionized water to remove any remaining cleaning solution. The equipment is rinsed with deionized water and the rinse water is captured.

7.0 FIELD TECHNIQUES REFERENCE

The collection and use of environmental data collected during environmental investigations is completed using specific techniques. The WDNR has created several guidance documents for developing and following site-specific sampling plans, making thorough pre-sampling preparations, purging and sampling consistently while properly documenting all actions completed during the sampling event. The documents used as refence for this project area:

- Groundwater Sampling Desk Reference, September 1996
- Groundwater Sampling Field Manual, September 1996

The following Wisconsin Administrative Codes also pertain to the completion of field work and the collection of samples are:

- NR 140 Groundwater Quality
- NR 141 Groundwater monitoring well requirements
- NR 700.13 Sample Preservation and analysis
- NR 712 Personnel qualifications for conducting environmental response actions
- NR 716.13 Sampling and analysis requirements

The following administrative codes are related to analytical methods, quality control, laboratory certification program (instrument calibration and frequency) and data validation and usability:

- NR 148 Data collection and reporting requirements of chemical analysis
- NR 149 Laboratory certification and registration

8.0 EQUIPMENT AND SUPPLIES

REI will use labels for each sample container which will identify the following:

- Project Name
- REI Project Number
- Sample Identification
- Sample Collector

- Collection Date
- Collection Time
- Preservative

The following supplies and equipment will be used by REI staff for the collection of information

- Solinst water level meter
- Geopump peristalitic pump
- Poly tubing 0.17" ID x ¼" OD LDPE
- 5-gallon buckets and purge tanks for purged groundwater
- 55-gallon drums for containerization of purge water
- YSI water quality meter (temperature, dissolved oxygen, specific conductance, field pH) with flow cells
- Calibration solution for YSI meters
- Disposable gloves, DI water, paper toweling, extra pens, etc.
- Iced cooler(s)
- Well specific field sheets
- Sample containers ordered through Synergy Environmental Lab (Section 9.0)
- One-person team with field truck

9.0 LABORATORY ARRANGEMENTS

Synergy Environmental Lab, LLC will provide trip blanks and temperature blanks and laboratory prepared bottles. REI will transport these bottles in iced coolers with sufficient ice to maintain approximately four (4) degrees Celsius. Once collected, samples are placed into the iced coolers and transported back to REI's office. Samples are placed into a refrigerator to maintain consistent temperature until the samples are transferred back into iced coolers for courier to pick up and transport to the lab.

Synergy Environmental Lab, LLC
WDNR Lab ID#: 44503756
1990 Prospect Court
Appleton, WI 54914
920-830-2455
Lab Contact: Mike Ricker

Parameter/Method	Preservative	Bottle Set
Volatile Organic Compounds (CVOCs only) / EPA 8260	HCL	3- 40 ML VOA
Ethane, Ethene, Methane / RSK 175	HCL	1- 40 ML VOA
Nitrogen / SM 4500	None	250 ML Plastic
Sulfate / SM D516	None	250 ML Plastic
Ferrous Iron / EPA 6010	HNO3	250 or 500 ML Plastic
Total Organic Carbon – SM5310	H2SO4	250 ML Amber Glass

10.0 Sample QA/QC Requirements

After collection and labeling, the groundwater samples are placed in a cooler with ice to maintain a temperature of approximately four (4) degrees Celsius. Chain of custody (COC) is completed following the collection of a sample. The COC record includes the following information: project name, work order number, sample identification, site location, date and time collected, number of containers, analysis required, sampler(s) signature(s), shipped by, shipped to, etc. As few people as possible handled the samples.

- Field duplicates – one (1) sample for every approximately fifteen (15) field samples collected to ensure consistency and quality of the data
- Equipment blanks are collected when necessary
- Trip blanks – one (1) sample in a shipment shall be in the same cooler
- Temperature blank – one (1) sample in a shipment shall be in each cooler

11.0 Documentation

Well specific field sheet will be completed for each monitoring well onsite. A copy of the field sheet is included in Appendix A. Forms and records will be reviewed by REI project manager. Lab reports and the associated invoice for the analyses are reviewed by the project manager upon receipt from the lab. The project manager will complete the summary report as detailed below. Upon completion of the scope, REI will prepare and submit an invoice for services performed.

12.0 Reporting

The following information will be submitted to the WDNR after receiving the analytical results and completion of the summary report:

- Preparation of a groundwater investigation report
- Notes on any field or laboratory deviations from the approved QA/QC Plan.
- Laboratory analytical report and chain of custody forms
- Tabular data summarizing field parameters for each groundwater monitoring well
- Tabular data summarizing all NR 140 Enforcement Standard and Preventive Action Limit exceedances for each groundwater monitoring well
- Summary of all NR 140 Enforcement Standard and Preventive Action Limit exceedances for each groundwater monitoring well
- Documentation of any issues or comments on the condition of wells observed
- Updated figures including site location map, site detail map, groundwater table contour maps for monitoring wells and piezometers, groundwater iso-concentrations maps, for shallow, mid and deep monitoring wells
- Graphs with concentrations over time
- Cross sectional figure with COVC in groundwater
- Documentation of any repairs to wells, well cap and cover
- Field notes collected for each groundwater monitoring well
- Access agreements
- Wis Admin Code 712 certifications
- Report uploaded to the WDNR submittal portal

APPENDIX A

BLANK WELL SAMPLE COLLECTION FIELD SHEET

Low-Flow Minimal Drawdown Procedure Field Sheet

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Project:
Project Number:
Date:
Sampler:
Well ID:
Multi-meter:
Water Level:
Pump:
Pump Intake Depth: (ft bls)
Tubing Length (t): (ft) Tubing Diameter: (in)

Well Diameter: (in)
Well Depth (D): (ft BTOC)
Depth to Water (d): (ft BTOC)
Depth to Product: (ft BTOC)
Water Column: (D-d)= (ft)
Well Volume (V^w): (mL) x3= (mL)
(Water Column x Mulitplier)
Stabilized Water Depth (s): (ft BTOC)
Pump Start Drawdown (S): (d-s)= (ft)
Drawdown Volume (m): (mL)
Tubing Volume (T): (mL)
Minimum Purge (M): (m+T)= (mL)

Measurements begin after water level has stabilized in well.

Time	Depth to Water (ft BTOC)	Purge Volume (mL)	Flow Rate (mL/min)	pH	Temp (°F)	Specific Cond (µS/cm)	ORP (mV)	DO (mg/L)	Turbidity (NTU)	Visual Appearance
Stabilization is achieved when three (3) consecutive readings of field indicator parameters collected in three (3) to five (5) minute intervals [1] meet the following criteria:										
Stabilization:	<0.3 ft	<3xV^w	-	± 0.1	± 3%	± 3%	± 10mV	± 10% [2]	10% [3]	-

[1] - Pump flow rate must be able to turn over one (1) flow cell volume betweeen measurement. Flow cell ~250mL.
[2] - 10% for values greater than 0.5 mg/L, three (3) Dissolved Oxygen measurments less than 0.5 mg/L can be considered stabilized.
[3] - 10% for values greater than 5 NTU, three (3) Turbidity measurments less than 5 NTU can be considered stabilized.

Purge until all parameters stabilize or after three (3) Well Volumes are removed for Low-Flow Minimal Drawdown Procedure

Total Volume Purged (P): (mL)
Purge Time (T) (min)
Sample Time:
QC Sample Collected:
Well Integrity:

Final Average Flow Rate: (P/T) (mL/min)
- Flow rate generally between 100 mL/min to 500 mL/min.
- Flow rate can range between 50 mL/min to 1,000 mL/min.

Repairs Completed:
Repairs Needed:

Analysis

____ VOC (EPA 8260)	____ VOC DW (EPA 524.2)	____ Total Metals
____ PVOC+N (EPA8260)	____ Nitrate/Nitrite	____ Dissolved Metals - Field Filtered
____ PAH (EPA 8270)	____ Sulfate	____ pH - Field Filtered
____ GRO	____ Chloride	____ PFAS
____ DRO	____ TSS	____

Comments:

Stabilization and purge criteria established by EPA Low-Flow (Minimal Drawdown) Groundwater Sampling Procedures. Puls, R.P. & Barcelona, M.J. EPA/540/S-95/504, April 1996.

Well Volume

Well Casing Size (in)	Pipe Schedule	Inside Diameter (in)	Outside Diameter (in)	Well Volume per one foot of water well (mL)	(L)	(gal)	3 Well Volumes per one foot of water well (mL)	(L)	(gal)
1	40	1.03	1.32	87	0.087	0.043	260	0.26	0.13
1	80	0.94		72	0.072	0.036	216	0.22	0.11
1.5	40	1.59	1.9	206	0.21	0.10	619	0.62	0.31
1.5	80	1.48		179	0.18	0.089	536	0.54	0.27
2	40	2.05	2.38	343	0.34	0.17	1,029	1.0	0.51
2	80	1.91		298	0.30	0.15	893	0.89	0.45
4	40	4.00	4.50	1,306	1.3	0.65	3,917	3.9	2.0
4	80	3.79		1,172	1.2	0.59	3,516	3.5	1.8
6	40	6.03	6.63	2,967	3.0	1.5	8,901	8.9	4.5
6	80	5.71		2,660	2.7	1.3	7,981	8.0	4.0
8	40	7.94	8.63	5,144	5.1	2.6	15,433	15	7.7
8	80	7.57		4,676	4.7	2.3	14,028	14	7.0

Physical data form common pipe schedules from Johnson Screens Flush Thread PVC Well Screens, Casings, and Accessories.

Tubing Volume

Tubing Type	Inside Diameter (in)	Volume per one foot of tubing (mL)	Tubing Type	Inside Diameter (in)	Volume per one foot of tubing (mL)
1/4" HDPE	0.17	4.4	1/2" HDPE	0.38	22

Quality Control Samples

Trip Blank [Typically provided by laboratory]
- to be prepared with reagent (laboratory) grade water. (Do not prepare with distilled or deionized water)
- must be analyzed by the same lab analyzing volatile samples.
- should not be opened until analyzed at lab.
- one (1) trip blank per vehicle and one (1) trip blank per cooler.
- check age of trip blank on vial.

Field Blank (aka: field rinsate blank, decontamination blank, equipment blank)
- Collect field blank from equipment used at a site's most contaminated well if possible.
- Decontaminate sampling equipment after sample collection.
- Run reagent (laboratory) grade water through equipment.
- Collect a sample of reagent (laboratory) grade water run through equipment.
- Field blank should be analyzed for same parameters as samples.
- Field blanks are not required for dedicated equipment or disposable equipment.

Field Duplicate
- Field duplicate should be analyzed for same parameters as samples.
- When using a grab sampler (bailer), collect duplicate from the same bailer as the original sample, bailer volume permitting.

Equivalent Pumping Rate Table

Gallons per minute	mL per min	L per min	Gallons per minute	mL per min	L per min
0.0132	50	0.050	0.0264	100	0.100
0.0396	150	0.150	0.0528	200	0.200
0.0660	250	0.250	0.0793	300	0.300
0.0925	350	0.350	0.106	400	0.400
0.119	450	0.450	0.132	500	0.500
0.145	550	0.550	0.159	600	0.600
0.172	650	0.650	0.185	700	0.700
0.198	750	0.750	0.211	800	0.800
0.225	850	0.850	0.238	900	0.900
0.251	950	0.950	0.2642	1000	1.000
0.3963	1500	1.500	0.5283	2000	2.000
0.6604	2500	2.500	0.7925	3000	3.000
0.9246	3500	3.500	1.057	4000	4.000
1.189	4500	4.500	1.321	5000	5.000

Additional Comments:

APPENDIX B

SYNERGY ENVIRONMENTAL LAB CHAIN OF CUSTODY FORM

CHAIN OF CUSTODY RECORD

Synergy

Environmental Lab, Inc.

www.synergy-lab.net
1990 Prospect Ct. • Appleton, WI 54914
920-830-2455 • mrsynergy@wi.twcbc.com

Chain # No

Page ____ of ____

Lab I.D. #	
QUOTE # :	
Project #:	
Sampler: (signature)	

Sample Handling Request

____ Rush Analysis Date Required: _____
(Rushes accepted only with prior authorization)

____ Normal Turn Around

Project (Name / Location):	
Reports To:	Invoice To:
Company	Company
Address	Address
City State Zip	City State Zip
Phone	Phone
Email	Email

Analysis Requested | **Other Analysis**

Lab I.D.	Sample I.D.	Collection Date	Collection Time	Filtered Y/N	No. of Containers	Sample Type (Matrix)*	Preservation	DRO (Mod DRO Sep 95)	GRO (Mod GRO Sep 95)	LEAD	NITRATE/NITRITE	OIL & GREASE	PAH (EPA 8270)	PCB	PVOC (EPA 8021)	PVOC + NAPHTHALENE	SULFATE	TOTAL SUSPENDED SOLIDS	VOC DW (EPA 524.2)	VOC (EPA 8260)	VOC AIR (TO - 15)	8-RCRA METALS							PID/ FID

Comments/Special Instructions (*Specify groundwater "GW", Drinking Water "DW", Waste Water "WW", Soil "S", Air "A", Oil, Sludge, etc.)

Sample Integrity - To be completed by receiving lab.

Method of Shipment: _____

Temp. of Temp. Blank: _____ °C On Ice: _____

Cooler seal intact upon receipt: ____ Yes ____ No

Relinquished By: (sign)	Time	Date	Received By: (sign)	Time	Date

Received in Laboratory By: Time: Date: