State of Michigan
Department of Environment, Great Lakes, and Energy
HAZARDOUS WASTE MANAGEMENT FACILITY POSTCLOSURE OPERATING LICENSE

NAME OF LICENSEE: Granger Land Development Company

NAME OF FACILITY OWNER: Watertown Development Corporation

NAME OF FACILITY OPERATOR: Granger Land Development Company

NAME OF TITLEHOLDER OF LAND: Watertown Development Corporation

FACILITY NAME: Granger Grand River Landfill

FACILITY LOCATION: 8550 West Grand River Highway, Grand Ledge, MI 48837

EPA IDENTIFICATION (ID) NUMBER: MID 082 771 700

REAPPLICATION DATE: March 28, 2033

EFFECTIVE: DATE: September 28, 2023
FIVE-YEAR REVIEW DATE: September 28, 2028
EXPIRATION DATE: September 28, 2033

AUTHORIZED ACTIVITIES
Pursuant to Part 111, Hazardous Waste Management, of Michigan's Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451), being §§324.11101 to 324.11153 of the Michigan Compiled Laws, and the hazardous waste management administrative rules (hereafter called the "rules") promulgated thereunder, being R 299.9101 *et. seq.* of the Michigan Administrative Code, by the Michigan Department of Environment, Great Lakes, and Energy (EGLE), a postclosure operating license (hereafter called the "license") is issued to Granger Land Development Company (hereafter called the "licensee") to operate a hazardous waste management facility (hereafter called the "facility") located at latitude 42.79228 and longitude -84.69536. The licensee is authorized to conduct the following hazardous waste management activities:

☐ STORAGE	☐ TREATMENT	☐ DISPOSAL	☒ POSTCLOSURE
☐ Container	☐ Container	☐ Landfill	☐ Tank
☐ Tank	☐ Tank	☐ Land Application	☐ Surface Impoundment
☐ Waste Pile	☐ Surface Impoundment	☐ Surface Impoundment	☒ Landfill
☐ Surface Impoundment	☐ Incinerator		☐ Waste Pile
☐ Drip Pad	☐ Other:		

APPLICABLE REGULATIONS AND LICENSE APPROVAL
The conditions of this license were developed in accordance with the applicable provisions of the rules, effective August 3, 2020. The licensee shall comply with all terms and conditions of this license, Part 111, and its rules. This license consists of 22 pages of conditions attached hereto as well as those in Attachments 1 through 5, and the applicable rules contained in R 299.9101 through R 299.11008, as specified in the license. For purposes of compliance with this license, applicable rules are those that are in effect on the date of issuance of this license in accordance with R 299.9521(3)(a).

This license is based on the information in the license application submitted on December 29, 2021 and any subsequent amendments (hereafter referred to as the "application"). Pursuant to R 299.9519(11)(c), the license may be revoked if the licensee fails, in the application or during the license issuance process, to disclose fully all relevant facts or, at any time, misrepresents any relevant facts. As specified in R 299.9519(1), the facility shall be constructed, operated, and maintained in accordance with Part 111 of Act 451, the rules, and this license.

This license is effective on the date of issuance and shall remain in effect for ten years from the date of issuance, unless revoked pursuant to R 299.9519 or continued in effect as provided by the Michigan Administrative Procedures Act, 1969 PA 306, as amended (Act 306). Pursuant to R 299.9516, this license shall be reviewed by the Director 5 years after the date of issuance and shall be modified as necessary in accordance with the provisions of R 299.9519 and R 299.9520.

Issued this 28th day of September 2023

By: Kimberly M. Tyson
Kimberly M. Tyson, Manager
Hazardous Waste Section
Materials Management Division

HAZARDOUS WASTE MANAGEMENT FACILITY POSTCLOSURE OPERATING LICENSE

GRANGER LAND DEVELOPMENT COMPANY
MID 082 771 700

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PART I
STANDARD CONDITIONS

A. TERMINOLOGY AND REFERENCES

Throughout this license, the term "Division" means the Materials Management Division, and any successor organization, within EGLE responsible for administering Part 111 of Act 451 and the rules. Throughout this license, "Director" means the Director of EGLE or the Director's duly authorized designee such as the Division Director. All of the provisions of Title 40 of the Code of Federal Regulations (CFR) referenced in this license are adopted by reference in Rule (R) 299.11003.

B. EFFECT OF LICENSE

Except as otherwise provided by law, any treatment, storage, or disposal of hazardous waste not specifically authorized in this license is prohibited. Issuance of this license does not authorize any injury to persons or property, any invasion of other private rights, or any infringement of federal, state, or local law or regulations {R 299.9516(8)}; nor does it obviate the necessity of obtaining such permits or approvals from other units of government as may be required by law. Compliance with the terms of this license does not constitute a warranty or representation of any kind by EGLE, nor does EGLE intend that compliance with this license constitutes a defense to any order issued or any action brought under Act 451 or any other applicable state statute or §106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) {42 U.S.C. 9606(a)}, the Resource Conservation and Recovery Act of 1976, as amended (RCRA), and its rules, or any other applicable federal statute. The licensee, however, does not represent that it will not argue that compliance with the terms of this license may be a defense to such future regulatory actions. Each attachment to this license is a part of, and is incorporated into, this license and is deemed an enforceable part of the license.

C. SEVERABILITY

The provisions of this license are severable, and if any provision of this license, or the application of any provision of this license to any circumstance, is held invalid, the application of such provision to other circumstances and the remainder of this license shall not be affected thereby.

D. RESPONSIBILITIES

1. The licensee shall comply with Part 111 of Act 451, the rules, and all conditions of this license, except to the extent authorized by EGLE pursuant to the terms of an emergency operating license. Any license noncompliance, except to the extent authorized by EGLE pursuant to the terms of an emergency operating license, constitutes a violation of Part 111 of Act 451, and is grounds for enforcement action, license revocation, license modification, or denial of a license renewal application. {§§11148, 11150, and 11151 of Act 451; R 299.9521(1)(a) and (c) and (3)(a) and (b); and 40 CFR §270.30(a)}

2. If the licensee wishes to continue an activity regulated by this license after the expiration date of this license, the licensee shall submit a complete application for a new license to the Division Director at least 180 days before this license expires,

March 28, 2033, unless an extension is granted pursuant to R 299.9510(5). To the extent the licensee makes a timely and sufficient application for renewal of this license, this license and all conditions herein will remain in effect beyond the license expiration date and shall not expire until a decision on the application is finally made by EGLE, and if the application is denied or the terms of the new license are limited, until the last day for applying for judicial review of the new license or a later date fixed by order of the reviewing court consistent with §91(2) of Act 306. {R 299.9521(1)(a) and (c) and (3)(a) and 40 CFR §270.30(b)}

3. The licensee shall comply with the conditions specified in R 299.9521(1)(b)(i) to (iii) and 40 CFR §270.30(c) through (k), (l)(2), (3), (5), (7), and (11), and (m). {§§11123(3), 11146(1) and (2), and 11148(1) of Act 451 and R 299.9501(1), R 299.9516, R 299.9519, R 299.9521(1)(a) and (b) and (3)(a) and (b), R 299.9522, and R 299.9525}

4. The licensee shall give notice to the Division Director as soon as possible prior to any planned physical alterations or additions to the licensed facility. {R 299.9501, R 299.9519(1), and Part 6 of the Part 111 Rules}

E. SUBMITTAL DEADLINES

When the deadline for submittals required under this license falls on a weekend or legal state holiday, the deadline shall be extended to the next regular business day. This extension does not apply to the deadline for financial mechanisms and associated renewals, replacements, and extensions of financial mechanisms required under this license. The licensee may request extension of the deadlines for submittals required under this license. The licensee shall submit such requests at least five business days prior to the existing deadline for review and approval by the Division Director. Written extension requests shall include justification for each extension. {R 299.9519 and R 299.9521(3)(a)}

PART II
GENERAL OPERATING CONDITIONS

A. DESIGN AND OPERATION OF FACILITY

The licensee shall maintain and operate the facility to minimize the possibility of fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to the environment, including air, soil, to waters of the state that could threaten human health or welfare or the environment. {R 299.9602, R 299.9606, and R 299.9607, and 40 CFR §§264.31 and 264.51}

B. QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

The licensee shall ensure that all samples collected for the purposes of waste characterization and environmental monitoring are collected, transported, analyzed, stored, and disposed of by trained and qualified individuals in accordance with their Quality Assurance/Quality Control (QA/QC) Plans. The QA/QC Plans shall be established using Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, United States Environmental Protection Agency (US EPA) Publication SW-846, Chapter 1, Update V (July 2014) as guidance, and any facility or contractor's written standard operating procedures (SOP) that are equivalent or more stringent than SW-846, Chapter 1. The licensee shall make the written QA/QC Plans available to the Division Director or an authorized representative upon request. {R 299.9521(3)(a) and (b) and R 299.9611(2)}

C. SECURITY

The licensee shall comply with the barrier, surveillance, and signage requirements of R 299.9605(1) and 40 CFR §264.14.

D. GENERAL INSPECTION REQUIREMENTS

The licensee shall inspect the facility, remedy any deterioration or malfunction of equipment or structures, and document inspections and remedies in accordance with the Inspection Schedule, Attachment 1, of this license, and comply with the inspection requirements of R 299.9605(1) and 40 CFR §264.15.

E. PERSONNEL TRAINING

The licensee shall comply with the personnel training requirements of R 299.9605 and 40 CFR §264.16. This training program shall, at a minimum, cover all items necessary to properly inspect, maintain, and monitor the facility during postclosure care.

F. PREPAREDNESS AND PREVENTION

The licensee shall comply with the preparedness and prevention requirements of R 299.9606 and 40 CFR Part 264, Subpart C.

G. CONTINGENCY PLAN

The licensee shall comply with the contingency plan requirements of R 299.9607 and 40 CFR Part 264, Subpart D. The Contingency Plan, Attachment 2 of this license, and the prescribed emergency procedures shall be immediately implemented by the licensee whenever there is a fire, explosion, or other release of hazardous waste or hazardous waste constituents that threatens or could threaten human health or the environment, or if the licensee has knowledge that a spill has reached surface water or groundwater.

H. **DUTY TO MITIGATE**

Upon notification from the Division Director or his or her designee that an activity at the facility may present an imminent and substantial endangerment to human health or the environment, the licensee shall immediately comply with an order issued by the Division Director pursuant to §11148(1) of Act 451 to halt such activity and conduct other activities as required by the Division Director to eliminate the said endangerment. The licensee shall not resume the halted activity without the prior written approval from the Division Director. {§11148 of Act 451 and R 299.9521(3)(b)}

I. **MANIFEST SYSTEM**

The licensee shall comply with the manifest requirements of Part 3 of the rules and R 299.9608.

J. **RECORD KEEPING AND REPORTING**

1. The licensee shall comply with the written operating record requirements of R 299.9609 and 40 CFR §264.73 and Part 264, Appendix I.

2. The licensee shall comply with the biennial report requirements of R 299.9610. {R 299.9521(1)(a) and 40 CFR §270.30(l)(9)}

3. The licensee shall submit the results of all environmental monitoring required by this license and any additional environmental sampling or analysis conducted beyond that required by this license to the Division Director within 60 days after any sample collection. The information shall be provided in the form of an Environmental Monitoring Report, using a format approved by the Division Director. The Report shall include, at a minimum, the laboratory report in pdf format and the data in an electronic spreadsheet format. {R 299.9521(1)(a) and R 299.9521(3)(b) and 40 CFR §270.30(l)(4)}

4. The licensee shall provide environmental monitoring information or data that is required pursuant to this license, to an authorized representative of an environmental or emergency response department of the Watertown Charter Township or Clinton County, who requests such information or data and that has jurisdiction over the facility. Such information or data shall be made available on the same day the licensee forwards this information to the Division Director. {R 299.9521(3)(b)}

5. The licensee shall immediately report to the Division Director any noncompliance with the license that may endanger human health or the environment by doing both of the following:

(a) The licensee shall immediately notify the Hazardous Waste Section at 517-284-6546, if the noncompliance occurs Monday through Friday during the period of 8:00 a.m. to 5:00 p.m., except state holidays, or by calling EGLE's Pollution Emergency Alerting System (PEAS) at 1-800-292-4706 during all other times. This notice shall include the following:

(i) Information concerning the fire, explosion, release, or discharge of any hazardous waste or hazardous waste constituent that could threaten human health or the environment, that has reached surface water or groundwater, or that may endanger public drinking water supplies or the environment; and

(ii) A description of the occurrence and its cause, including all of the information outlined in R 299.9607(2)(a)-(i).

(b) The licensee shall also follow up the verbal notice by providing a written report to the Division Director within five days of the time the licensee becomes aware of the circumstances. The written report shall contain all of the information in Condition II.J.5.(a)(i)-(ii) of this license along with a description of the noncompliance and its cause; the periods of noncompliance (including exact dates and times); whether the noncompliance has been corrected and, if not, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance and when those activities occurred or will occur. The Division Director may waive the 5-day written notice requirement in favor of submittal of a written report within 15 days of the time the licensee becomes aware of the circumstances.
{R 299.9521(1)(a) and R 299.9607 and 40 CFR §270.30(l)(6)}

6. The licensee shall report all other instances of noncompliance with this license, Part 111 of Act 451, the rules, and any other applicable environmental laws or rules that apply to the licensed facility, at the time monitoring reports required by this license are submitted or within 30 days, whichever is sooner. The reports shall contain the information listed in Condition II.J.5. of this license. {R 299.9521(1)(a) and 40 CFR §270.30(l)(10)}

7. The licensee may make minor modifications to the forms contained in the attachments to this license. The modifications may include changing the format, updating existing references and information, adding necessary information, and changing certification and notification information in accordance with Part 111 of Act 451 and its rules and RCRA and its regulations. The licensee shall submit the modifications to the Division Director prior to implementing the use of the modified form(s). If the Division Director does not reject or require revision of the modified form(s) within 14 days of receipt, the licensee shall implement use of the modified form(s) and the form(s) shall be incorporated into this license as a replacement for the existing form(s).

K. **POSTCLOSURE**

The licensee shall comply with the postclosure monitoring requirements of R 299.9613 and monitor and maintain the facility in accordance with the conditions of this license. The licensee shall submit a certification of postclosure in accordance with R 299.9613(5). {R 299.9613 and 40 CFR §§264.116 through 264.119}

L. **FINANCIAL ASSURANCE FOR POSTCLOSURE**

1. On the effective date of this license, the facility postclosure cost estimate is $1,066,244.94. This estimate includes a corrective action component for the ongoing groundwater remediation.

2. The licensee shall continuously maintain financial assurance for the current postclosure cost estimate as required under R 299.9703.

M. **FINANCIAL ASSURANCE FOR CORRECTIVE ACTION**

In accordance with R 299.9712, the licensee shall include a cost estimate as a part of any corrective action work plan required by Part V of this license. Within 60 days after approval of each work plan the licensee shall provide financial assurance to cover the costs associated with implementing such work plan in accordance with R 299.9713.

N. **LAND DISPOSAL RESTRICTIONS**

The licensee shall comply with all of the requirements of 40 CFR Part 268. {R 299.9627 and 40 CFR Part 268}

O. **AIR EMISSION STANDARDS**

1. No process vents, air emissions from equipment leaks, or air emissions from tanks, containers, and surface impoundments have been identified at the facility that are subject to 40 CFR Part 264, Subpart AA, BB, or CC, respectively, air emissions requirements at the time of this license renewal. If process vents, air emissions from equipment leaks, or air emissions from tanks, containers, and surface impoundments are identified or become subject to Subpart AA BB, or CC, respectively, requirements at the facility later, then a major modification of this license is required.

{R 299.9519, R 299.9630, R 299.9631, and R 299.9634, and 40 CFR Part 264, Subparts AA, BB, and CC}

P. **DOCUMENTS TO BE MAINTAINED AT THE FACILITY**

The licensee shall maintain at the facility the following documents and amendments required by this license, until closure/postclosure is completed, certified by an independent registered professional engineer, and the facility is released from financial assurance requirements for closure/postclosure by the Director:

1. Inspection Schedules and records.
2. Contingency Plan
3. Postclosure Plan
4. Cost estimates for facility postclosure and corrective action and copies of related financial assurance documents.
5. Operating record.
6. Site Security Plan.
7. Facility engineering plans and specifications.
8. Record keeping procedures.
9. Environmental monitoring plans, including sampling and analysis plans and QA/QC Plans.
10. Environmental monitoring data and statistical records.
11. Preventative procedures (Personnel Protection Plan).
12. Postclosure Notices.

{R 299.9521(3)(a)}

Q. **ENGINEERING PLANS**

The licensee shall construct, operate, and maintain the facility in accordance with the Engineering Plans, Attachment 3 of this license, and any modifications to those plans shall be made in accordance with this license.

PART III
LANDFILL POSTCLOSURE CONDITIONS

A. COVERAGE OF LICENSE

The hazardous waste landfill and the related appurtenances (piping, pumps, gas vents, operation and maintenance buildings, etc.) at the facility shown in the Engineering Plans, Attachment 3 are covered by this license, with the exception of the electric facility. {R 299.9521(1)(b)}

B. DESIGN AND RUN-ON, RUNOFF, AND CONTAMINANT CONTROL

1. The licensee shall operate and maintain the existing run-on and runoff management system for collection and control of storm water. {R 299.9604(1)(c)}

2. The licensee shall expeditiously empty or otherwise manage collection and holding facilities (e.g., tanks or catch basins) associated with run-on and runoff control systems after storms to maintain the design capacity of the system. {R 299.9619 and 40 CFR §264.301(h)}

3. The licensee shall operate and maintain a leachate collection and removal system in accordance with this license and the Engineering Plans, Attachment 3, of this license. The leachate captured by this system shall be discharged to the sewer system, operated by the Southern Clinton County Municipal Utilities Authority.

4. The licensee shall operate and maintain a gas collection system in accordance with this license and the Engineering Plans, Attachment 3, of this license.

5. A visual survey of the final cover will be performed in accordance with the criteria identified in the Inspection Schedule, Attachment 1, of this license. A topographical survey of the final cover will be performed annually. Following this survey, a contour map of the final cover shall be submitted to the Division Director with the annual report. {R 299.9619 and 40 CFR §264.310(b)(1), (5), and (6)}

C. ADDITIONAL REPORTING

The licensee shall submit an annual inspection and maintenance summary report to the Division Director by March 1 of each year during the active life of the landfill and the postclosure care period. The annual inspection and maintenance report shall include a summary of all maintenance activities performed by the licensee to maintain the integrity of the landfill and the final cover such as mowing, fertilization, and liming, and a copy of the associated inspection logs.

{R 299.9521(2)(a) and (b) and 40 CFR §270.31}

PART IV
ENVIRONMENTAL MONITORING CONDITIONS

A. GROUNDWATER MONITORING PROGRAM

1. The licensee shall conduct a detection monitoring program. Under this program, the licensee shall operate and maintain a groundwater monitoring system consisting of monitoring wells and piezometers labeled as shown in Figure F-1, of Attachment 4, of this license. {R 299.9611(2)(b) and R 299.9612}

   The licensee shall sample the monitoring wells in accordance with the Environmental Monitoring Sampling and Analysis Plan (SAP), Attachment 4, of this license and the procedures specified below:

   (a) Static water level measuring devices, pumps and/or sampling equipment shall be compatible with the parameters sampled and must be thoroughly cleaned and rinsed before use in each monitoring well. Sampling procedures shall assure that cross-contamination and changes in water chemistry do not occur. {R 299.9612 and 40 CFR §264.97(d) and (e)}

   (b) The static water elevation shall be determined by methods giving precision to 1/8 inch or 0.01 foot prior to purging water from the wells for sampling. Measurements shall be made from the top of the casing with the elevation of all casings in the monitoring well system related to a permanent reference point, using United States Geological Survey datum. {R 299.9612 and 40 CFR §264.97(f)}

   (c) To ensure representative groundwater samples are collected, the licensee shall purge and sample monitoring wells as specified Attachment 4, of this license. Wells shall be sampled immediately after purging where recovery rates allow. Where wells go dry during purging, recovery rates shall be determined, and samples taken as soon as sufficient recovery occurs. {R 299.9612 and 40 CFR §264.97(d) and (e)}

   (d) All monitoring wells shall be adequately protected from vehicular traffic, be clearly labeled, securely capped, and locked when not in use. {R 299.9612 and 40 CFR §264.97(c)-(e)}

2. Water removed from each monitoring well shall be managed as specified in Section 4.2.3 of Appendix F-2, of Attachment 4, of this license. {R 299.9521(3)(b)}

3. The licensee shall collect and analyze samples according to the schedule, parameters, and procedures specified in the Section 1, of Attachment 4, of this license. Data and evaluations must be submitted to the Division Director in accordance with the time frame specified in Condition II.J.3. of this license. The licensee shall submit proposed revisions to Attachment 4 to the Division Director for approval prior to implementation and shall revise any other affected document accordingly. If approved, the revisions shall become part of this license. {R 299.9519(5)(c)(ii), R 299.9611(2)(a), R 299.9612, 40 CFR §264.97(d) and (e), and 40 CFR §264.98}

4. The licensee shall submit an annual groundwater report to the Division Director no later than March 1 of each year for the previous calendar year's activities. At a minimum, the report shall include the following information:

   (a) A narrative summary of the previous calendar year's sampling events, including sampling event dates, the identification of any significant problems with respect to SAP procedures, and copies of field log sheets.

   (b) A determination of the groundwater flow rate and direction in the monitored zone, including the preparation of a groundwater level contour map for the Shallow Drift, Deep Drift, and Bedrock Aquifers form this data.

   (c) A summary of groundwater quality data results, including a narrative summary of results and trends, isochems, data graphs, and data tables.

   (d) A presentation of the statistical analysis of the data and the identification of any statistically significant increases pursuant to Condition IV.A.8. or IV.A.9. of this license.

   (e) An analysis and discussion of laboratory and field related QA/QC information. This shall include results of equipment, field, and trip blanks, and discussion and evaluation of the adequacy of the data with respect to SAP specifications and requirements.

   This annual report is in addition to the reporting requirement of Condition II.J.3. of this license. {R 299.9521(3)(b) and R 299.9612(1) and 40 CFR §264.97(j)}

5. The licensee shall establish background groundwater quality values at each monitoring well specified in Section 1.3.3, of Attachment 4, of this license.

   (a) Background values for the primary groundwater monitoring parameters, listed in Table 2, of Attachment 4, of this license, shall be the laboratory reporting limit(s) for the parameter(s), which are also listed in Table 2, of Attachment 4, of this license.

   (b) Background values for naturally occurring secondary parameters, listed in Table 3, of Attachment 4, of this license, have been established by the procedures specified in Appendix F-3, of Attachment 4, of this license. Background values shall be updated every two years, as described in Section 3.7 of Appendix F-3, of Attachment 4, of this license. The results of this update, including the mean background values, variance, and standard deviations for each monitored parameter, at each well, must be submitted with the Annual Groundwater Monitoring Report to the Division Director.

   {R 299.9612(1)(c), (d), and (e) and 40 CFR §264.97(a) and (g)}

6. Within 60 days of each sampling of each monitoring well, the licensee shall determine if a statistically significant increase has occurred compared to background levels for each

parameter listed in Table 2 and Table 3 of Attachment 4, of this license. For the primary parameters, any occurrence above the laboratory reporting limit(s) for the parameter(s) shall be considered statistically significant. {R 299.9612(1) (e) and 40 CFR §264.97(h) and (i)}

7. If a statistically significant increase is detected, the licensee shall notify the Hazardous Waste Section, by telephone at 517-284-6546, within one working day and arrange a resampling as soon as possible to confirm if a statistically significant increase exists. Resampling must include not less than four replicate samples at the affected well(s) for the parameter(s) in question. For the primary parameters, a statistically significant increase shall be confirmed if at least two of the four resample results are detected above the laboratory reporting limit(s) for the parameter(s), or if at least one of the resample results is detected at five times the laboratory reporting limit. For the secondary parameters, a statistically significant increase shall be confirmed if at least two of the four resample results exceed the prediction limit(s) for the parameter(s). {R 299.9612 and 40 CFR §264.97(g)}

8. If the licensee determines pursuant to Conditions IV.A.6. and IV.A.7. of this license that a statistically significant increase has been confirmed for any primary parameter, the licensee shall address the increase in accordance with the requirements specified in R 299.9612 and 40 CFR §264.98(f) and (g). Additionally, the licensee shall:

   (a) Notify the Division Director within one working day by calling the Materials Management Division project geologist or permit engineer for the site, the appropriate Materials Management Division District Supervisor, or in the event of their unavailability, the EGLE PEAS at 1-800-292-4706.

   (b) Provide follow-up notification to the Division Director in writing within seven calendar days after the telephone call. The notification shall indicate what parameters or constituents have shown statistically significant changes and the wells in which the changes have occurred.

   (c) As soon as possible, sample the groundwater in the affected well and the wells immediately adjacent, to be determined in coordination with MMD, of the affected well that are in the monitoring program listed in Condition IV.A.1. for parameters listed in Table 2, of Attachment 4, of this license.

   (d) The licensee shall immediately take steps to determine the cause of the contamination and eliminate the source of discharge. A report that explains the chronology of events, investigative methods, all laboratory analyses, calculations, field activities, and findings related to this determination shall be submitted within 60 days of a statistically significant determination under Condition IV.A.7. of this license.

   (e) Within 180 days after the determination, submit to the Division Director a detailed description of corrective actions that shall achieve compliance with applicable laws and rules, including a schedule of implementation. Corrective action shall also meet the requirements of R 299.9629 and include a plan for a groundwater monitoring program that shall demonstrate the effectiveness of the corrective action. Such a groundwater monitoring program may be based on a compliance monitoring program developed to meet the requirements of 40 CFR §264.99.

(f) Prior to a license modification requiring a compliance monitoring and corrective action program, the licensee shall provide the Division Director, or designee, with weekly telephone updates and written reports every two weeks regarding the progress to date in determining the cause of contamination and eliminating the discharge. The licensee shall include in the written report the results of all samples from environmental monitoring conducted by the licensee. {R 299.9521(3)(b)}

9. If the licensee determines pursuant to Conditions IV.A.6. and IV.A.7. of this license that a statistically significant increase has been confirmed for any secondary parameter, the licensee shall address the increase in accordance with the requirements specified in R 299.9612. Additionally, the licensee shall:

(a) As soon as possible, sample the groundwater in the affected well and the wells immediately adjacent, to be determined in coordination with MMD, of the affected well that are in the monitoring program listed in Condition IV.A.1. for parameters listed in Table 3, of Attachment 4, of this license.

(b) The licensee shall immediately take steps to determine the cause of the contamination and eliminate the source of discharge. A report that explains the chronology of events, investigative methods, all laboratory analyses, calculations, field activities, and findings related to this determination shall be submitted within 60 days of a statistically significant determination under Condition IV.A.7. of this license.

(c) The licensee may demonstrate that a source other than the licensed facility, or an error in sampling, analysis, or evaluation solely caused the increase. A report that contains the information in Condition IV.A.9. (b) of this license shall be submitted within 60 days of a statistically significant determination under Condition IV.A.7 of this license.

10. In the event that the Division Director determines from the findings of Conditions IV.A.6. and IV.A.7. of this license that a statistically significant increase in hazardous constituents has occurred in the groundwater, and the Division Director finds, in accordance with §11148 of Act 451, that the increase may present an imminent and substantial hazard to the health of persons or to the natural resources, or is endangering or causing damage to public health or the environment, the licensee shall immediately comply with an order issued by the Director pursuant to §11148(1) of Act 451 to conduct activities as required by the Director to eliminate the said endangerment. {R 299.9612(1)(g)}

B. **CORRECTIVE ACTION MONITORING PROGRAM**

1. The licensee shall conduct a quarterly corrective action groundwater monitoring program for the southwest corner volatile organic plume and north perimeter boron plume as described in Section 4, of Attachment 4, of this license. Under this program, the licensee shall operate and maintain a purge system consisting of PW-46 and PW-48 for the volatile organic plume and PW-49 and PW-50 for the boron plume.

2. The quarterly corrective action groundwater monitoring system will consist of the following monitoring wells and piezometers: MW-6R, MW-9R, MW-19R, MW-20R, MW-21SR, MW-23SR, MW-24DR, MW-35, MW-40R, MW-43SR, MW-43DR, MW-44DR, MW-45R, P-28, P-29R2, P-30, P-31, P-32, P-33, P-36, and P-37. These wells will be used for static water level measurements to assess the purge systems performance. The licensee shall provide quarterly groundwater contour maps of each purge system.

3. The licensee shall sample the following wells on a quarterly basis: MW-19R, MW-21SR, MW-23SR, MW-24DR, P-28R, P-29R2, PW-46, PW-48, PW-49, and PW-50. Additionally, the licensee shall perform graphical trend analysis on the data from the wells listed in this paragraph of this license. This information must be submitted annually on March 1 for the previous calendar year in the annual groundwater report, which is in addition to the reporting requirements of Condition II.J.3. of this license. {R 299.961 1(2)(a) and (b), R 299.9612, and R 299.9629 and 40 CFR Part 264, Subpart F, excluding 40 CFR §264.94(aX2) and (3), 264.94(b) and (c), 264.100, and 264.101}

C. **SURFACE WATER MONITORING PROGRAM**

1. The licensee shall conduct a semiannual surface water monitoring program as described in Section 2, of Attachment 4, of this license.

2. Within 60 days of each sampling, the licensee shall determine if an exceedance has occurred in accordance with the criteria identified in Section 2.3, of Attachment 4, of this license.

3. If an exceedance of any surface water monitoring program parameter is confirmed, the licensee must notify the Division Director immediately by telephone and within seven days in writing.

4. Within 30 days of the determination of the exceedance, the licensee shall determine whether a discharge to surface waters is occurring, determine the source, and take immediate steps to eliminate and prevent any such discharge.

5. The licensee shall report surface water monitoring results as required by Condition II.J.3. of this license.

{R 299.9521(3)(a) and (b) and R 299.9611(5)}

D. LEACHATE MONITORING PROGRAM

1. The licensee shall conduct an annual leachate monitoring program as described in Section 3, of Attachment 4, of this license.

2. The licensee shall monitor the level of leachate at the facility quarterly as described in Section 3, of Attachment 4, of this license and record the volume in the operating record. {R 299.9609(1)(b) and R 299.9619(4)(c)(iii)}

3. Any organic parameter that is added to the monitored parameters due to its elevated presence in the routine leachate monitoring conducted as specified in Section 3, of Attachment 4, of this license shall be added to the groundwater and surface water monitoring parameters by the licensee.

4. The licensee shall report leachate monitoring results, both hydraulic and analytical, as required by Condition II.J.3. of this license. Additionally, the licensee shall provide the information listed below in the leachate monitoring section of the annual groundwater report by March 1 for data from the previous calendar year.

   (a) Leachate level calculations.

   (b) A graphical presentation of the monthly and yearly levels of leachate being generated at the following monitoring locations: LMW-1R, LMW-2, LMW-3, LMW-4, LMW-5, and LMW-6.

   (c) A graphical comparison between leachate levels during the reported year and the leachate levels from previous years for each monitoring point within the landfill.

   (d) Reasons for increases/decreases in leachate levels. If there is an increase in leachate levels, the cause shall be indicated in the leachate monitoring report.

{R 299.9521(3)(a) and (b) and R 299.9611(5)}

E. EFFLUENT MONITORING PROGRAM

1. The licensee shall conduct monitoring of the treated effluent discharged to the sewer system in accordance with the permit issued to the facility by Southern Clinton County Municipal Utilities Authority. The licensee shall comply with the Southern Clinton County Municipal Utilities Authority Sewer System discharge limits.

2. The licensee shall provide written notification to the Division Director of any changes in the approved effluent monitoring program or discharge limitations and provide a copy of the revised approval from Southern Clinton County Municipal Utilities Authority. {R 299.9521(3)(a) and (b) and R 299.9611(5)}

PART V
CORRECTIVE ACTION CONDITIONS

A. CORRECTIVE ACTION AT THE FACILITY

1. The licensee shall implement corrective action for all releases of a contaminant from any waste management unit (WMU) at the facility, regardless of when the contaminant may have been placed in or released from the WMU. For the purposes of this license, the term "corrective action" means an action determined by the Division Director to be necessary to protect the public health, safety, welfare, or the environment, and includes, but is not limited to, investigation, evaluation, cleanup, removal, remediation, monitoring, containment, isolation, treatment, storage, management, the temporary relocation of people, and the provision of alternative water supplies, or any corrective action allowed under Title II of the federal Solid Waste Disposal Act, PL 89-272, as amended, or regulations promulgated pursuant to that act. For the purposes of this license, the process outlined in Part 111 of Act 451 and the environmental protection standards adopted in R 299.9629 shall be used to satisfy the corrective action obligations under this license. {§§11102 and 11115a of Act 451 and R 299.9629}

2. To the extent that a release of a hazardous substance, as defined in §20101(x) of Act 451, that is not also a contaminant, as defined in §11102(2) of Act 451, is discovered while performing corrective action under this license, the licensee shall take concurrent actions as necessary to address the Part 201, Environmental Remediation, of Act 451 remedial obligations for that release. {R 299.9521(3)(b)}

B. CORRECTIVE ACTION BEYOND THE FACILITY BOUNDARY

The licensee shall implement corrective action beyond the facility in accordance with §11115a of Act 451 and R 299.9629(2).

C. IDENTIFICATION OF WASTE MANAGEMENT UNITS

The WMUs at the facility are identified below and in Corrective Action Information, Attachment 5, of this license.

1. The following WMUs, identified in Corrective Action, Attachment 5, of this license, require further corrective action at this time that includes, at a minimum, further investigation to determine if a release of a contaminant has occurred and, if a release has occurred, the nature and extent of the release.

   (a) WMU #1: Type I Solid Waste Landfill

   Descriptions for these WMUs are provided in the Corrective Action Information, Attachment 5, of this license.

2. The following WMUs, do not require corrective action at this time:

   (a) The following WMUs, identified in the Interim Final Report for RCRA Facility Assessment, August 1993, that are currently operating pursuant to the act and its rules with no evidence of a release of any contaminants. Corrective action may be required when the unit undergoes final closure.

1. WMU #4: Type II Solid Waste Landfill

2. WMU #5: Leachate Pump Station

(b) The following WMUs, identified in the Interim Final Report for RCRA Facility Assessment, August 1993, based on the design of the units and available information that indicated that no known or suspected releases of contaminants from the units have occurred.

1. WMU #2: Openlander Drain

2. WMU #3: Catch Basin

Descriptions for these WMUs are provided in the Corrective Action Information, Attachment 5, of this license.

{§§11102 and 11115a of Act 451 and R 299.9521(3)(b) and R 299.9629}

3. Within 30 days of discovery of a new WMU, a release of a contaminant from a new WMU, or a release of a contaminant from an existing WMU, the licensee shall provide written notification to the Division Director. The written notification shall include all of the following information:

(a) The location of the unit on the facility topographic map.

(b) The designation of the type of unit.

(c) The general dimensions and structural description, including any available drawings of the unit.

(d) The date the unit was operated.

(e) Specification of all waste(s) that have been managed in the unit.

(f) All available information pertaining to any release of a contaminant from the unit.

4. Based on a review of all of the information provided in Condition V.C.3. of this license, the Division Director may require corrective action for the newly identified WMU. The licensee shall submit a written Corrective Action Investigation Work Plan to the Division Director within 60 days of written notification by the Division Director that corrective action for the unit is required.

{§§11102 and 11115a of Act 451 and R 299.9504(1), R 299.9508(1)(b), and R 299.9629 and 40 CFR §270.14(d)}

D. CORRECTIVE ACTION INVESTIGATION

The licensee shall conduct a Corrective Action Investigation to determine if a release of a contaminant(s) from any of the WMU identified in Condition V.C. of this license has occurred and, if a release(s) has occurred, evaluate the nature and extent of the release(s). The licensee shall submit a written Corrective Action Investigation Work Plan, Corrective Action Investigation Final Report documenting compliance with the approved Work Plan and supporting further corrective action at the facility, and Corrective Action Investigation progress reports to the Division Director for review and approval in accordance with Condition V.K of this license. The Division Director will approve, modify and approve, or provide a Notice of Deficiency (NOD) for the Work Plan and Final Report. Upon approval, the Work Plan and Final Report become enforceable conditions of this license. {§§11102 and 11115a of Act 451 and R 299.9629}

E. INTERIM MEASURES

The licensee shall conduct interim measures (IM) at the facility, if determined necessary by the licensee or the Division Director, to cleanup or remove a released contaminant or to take other actions, prior to the implementation of corrective measures, as may be necessary to prevent, minimize, or mitigate injury to the public health, safety, or welfare, or to the environment. The licensee shall submit a written IM Work Plan, an IM Final Report documenting compliance with the approved Work Plan and supporting further corrective action at the facility, and IM progress reports to the Division Director for review and approval in accordance with Condition V.K. of this license. The Division Director will approve, modify and approve, or provide an NOD for the Work Plan and Final Report. Upon approval, the Work Plan and Final Report become enforceable conditions of this license. {§§11102 and 11115a of Act 451 and R 299.9629}

F. DETERMINATION OF NO FURTHER ACTION

1. The licensee shall continue corrective action measures to the extent necessary to ensure that the applicable environmental protection standards adopted in Part 111 of Act 451, are met, if the limits are not less stringent than allowed pursuant to the provisions of RCRA.

2. Based on the results of the Corrective Action Investigation and other relevant information, the licensee shall submit a written request for a license minor modification to the Division Director if the licensee wishes to terminate corrective action for a specific WMU identified in Condition V.C. of this license. The licensee must demonstrate that there have been no releases of a contaminant(s) from the WMU and that the WMU does not pose a threat to public health, safety, welfare, or the environment.

3. Based on the results of the Corrective Action Investigation and other relevant information, the licensee shall submit a written request for a license major modification to the Division Director if the licensee wishes to terminate facility-wide corrective action. The licensee must conclusively demonstrate that there have been no releases of a

contaminant(s) from any of the WMU at the facility and that none of the WMUs pose a threat to public health, safety, welfare, or the environment.

4. If, based upon a review of the licensee's request for a license modification pursuant to Condition V.F.2. or V.F.3. of this license, the results of the completed Corrective Action Investigation, and other relevant information, the Division Director determines that the releases or suspected releases of a contaminant(s) do not exist and that the WMU(s) do not pose a threat to public health, safety, welfare, or the environment, the Division Director will approve the requested modification, subject to Conditions V.F.5. and V.F.6., below.

5. A determination of no further action shall not preclude the Division Director from requiring continued or periodic monitoring of air, soil, groundwater, or surface water, if necessary to protect public health, safety, welfare, or the environment, when facility-specific circumstances indicate that potential or actual releases of a contaminant(s) may occur.

6. A determination of no further action shall not preclude the Division Director from requiring further corrective action at a later date, if new information or subsequent analysis indicates that a release or potential release of a contaminant(s) from a WMU at the facility may pose a threat to public health, safety, welfare, or the environment. The Division Director will initiate the necessary license modifications if further corrective action is required at a later date.
{§§11102 and 11115a of Act 451 and R 299.9629(2)}

G. CORRECTIVE MEASURES STUDY

If the Division Director determines, based on the results of the Corrective Action Investigation and other relevant information, that remedial activities are necessary, the Division Director may notify the licensee in writing that a Corrective Measures Study (CMS) is required. If notified by the Division Director, the licensee shall conduct a CMS to develop and evaluate the corrective measures alternative(s) necessary to address the release(s) of a contaminant(s) or hazardous substances and the WMU(s) that are identified in the approved Corrective Action Investigation Final Report as requiring final remedial activities. The licensee shall submit a written CMS Work Plan, a CMS Final Report documenting compliance with the approved Work Plan and supporting further corrective action at the facility, and CMS progress reports to the Division Director for review and approval in accordance with Condition V.K. of this license. The Division Director will approve, modify and approve, or provide an NOD for the Work Plan and Final Report. Upon approval, the Work Plan and Final Report become enforceable conditions of this license. {§§11102 and 11115a of Act 451 and R 299.9629}

H. CORRECTIVE MEASURES IMPLEMENTATION PLAN

1. The licensee shall conduct final corrective measures based on the CMS Final Report approved by the Division Director. The licensee shall submit a written Corrective Measures Implementation (CMI) Work Plan to the Division Director for review and approval. The licensee shall also submit a written CMI Final Report documenting the

compliance with the approved CMI Work Plan and providing justification that the corrective actions may cease, and CMI progress reports to the Division Director for review and approval in accordance with Condition V.K. of this license. The Division Director will approve, modify and approve, or provide an NOD for the Work Plan and Final Report. Upon approval, the Work Plan and Final Report become enforceable conditions of this license.

2. The Division will provide notice of its draft decision on the CMI Work Plan to persons on the facility mailing list and provide an opportunity for a public hearing.

3. The licensee shall implement the approved CMI Work Plan within 60 days of receipt of the Division Director's written approval of the Work Plan.

{§§11102 and 11115a of Act 451 and R 299.9629}

I. CORRECTIVE ACTION MANAGEMENT UNITS

If applicable, the licensee shall comply with the requirements of R 299.9635 in order to designate an area at the facility as a corrective action management unit for implementation of corrective measures. {R 299.9521(3)(a)}

J. TEMPORARY UNITS

If applicable, the licensee shall comply with the requirements of R 299.9636 in order to designate tank or container storage units used for the treatment or storage of remediation wastes as temporary units for implementation of corrective measures. {R 299.9521(3)(a)}

K. SUMMARY OF CORRECTIVE ACTION SUBMITTALS

The licensee shall submit the required documents in accordance Conditions V.C., V.D., V.E., V.G., and V.H. of this license and the schedule below.

Document	Submittal Deadline
Written notification of a new release of a contaminant from an existing WMU, a new WMU, or a release of a contaminant from a new WMU	Within 30 days of discovery
Corrective Action Investigation (Investigation) Work Plan (Plan) for a newly identified release of a contaminant from an existing WMU, a new WMU, or a release of a contaminant from a new WMU	Within 60 days of receipt of notification that an Investigation is required
Revised Investigation Plan for WMUs and contaminant releases	Within 60 days of receipt of Investigation Plan NOD
Corrective Action Investigation progress reports	Within 90 days of Investigation initiation and every 90 days thereafter, unless otherwise approved.
Corrective Action Investigation Final Report (Report) for WMUs and contaminant releases	Within 60 days of Investigation completion.
Revised Investigation Report for WMUs and contaminant releases	Within 60 days of receipt of Investigation Report NOD
IM Work Plan (IM Plan) for WMUs and contaminant releases	Within 60 days of receipt of notification that IM Plan is required
Revised IM Plan for WMUs and contaminant releases	Within 60 days of receipt of IM Plan NOD
IM progress reports	Within 90 days of IM initiation and every 90 days thereafter, unless otherwise approved.
IM Final Report (IM Report) for WMUs and contaminant releases	Within 60 days of IM completion.
Revised IM Report for WMUs and contaminant releases	Within 60 days of receipt of IM Report NOD
CMS Work Plan (CMS Plan) for WMUs and contaminant releases	Within 60 days of receipt of notification that CMS is required
Revised CMS Plan for WMUs and contaminant releases	Within 60 days of receipt of CMS Plan NOD
CMS progress reports	Within 90 days of CMS initiation and every 90 days thereafter, unless otherwise approved.
CMS Final Report (CMS Report) for WMUs and contaminant releases	Within 60 days of CMS completion.
Revised CMS Report for WMUs and contaminant releases	Within 60 days of receipt of CMS Report NOD

Document	Submittal Deadline
CMI Work Plan (CMI Plan) for WMUs and contaminant releases	Within 60 days of approval of the CMS Report
Revised CMI Plan for WMUs and contaminant releases	Within 60 days of receipt of CMI Plan NOD
CMI progress reports	Within 90 days of CMI initiation and every 90 days thereafter, unless otherwise approved.
CMI Final Report (CMI Report) for remediated WMUs and contaminant releases	Within 60 days of completion of remedial actions meeting cleanup criteria.
Revised CMI Report for WMUs and contaminant releases	Within 60 days of receipt of CMI Report NOD

L. CORRECTIVE ACTION DOCUMENTS RETENTION

The licensee shall maintain all corrective action documents required by this license at the facility. The documents shall be maintained for the operating life of the facility or until the facility is released from financial assurance requirements for corrective action by the Division Director, whichever is longer. The licensee shall offer such documents to the Division Director prior to discarding those documents. {§§11102 and 11115a of Act 451 and R 299.9521(3)(b) and R 299.9629}

PART VI
SCHEDULE OF COMPLIANCE

A. SCHEDULE FOR AN UPDATED ENVIRONMENTAL MONITORING SAMPLING AND ANAYLSIS PLAN

Within 60 days of issuance of this License, the licensee shall submit to the Division Director an updated SAP. The approved SAP shall be incorporated into this license as Attachment 4.

B. SCHEDULE FOR A LEACHATE COLLECTION AND REMOVAL SYSTEM DEMONSTRATION

Within 90 days of issuance of this license, the licensee shall submit to the Division Director a technical demonstration pursuant to R 299.9619 (5). If the licensee does not submit an approvable demonstration, then the licensee shall comply with R 299.9619 (4).

Attachment 1

Inspection Schedule

INSPECTION AND MAINTENANCE
GRANGER GRAND RIVER MID LANDFILL (082 771 700)

Introduction: The Granger Grand River MID landfill has inspection programs for final cover, gas collection system, leachate collection system, purge system, and site security.

Written Schedule:

- Final cover: annual
- Gas collection system: annual/quarterly
- Leachate collection system: annual/monthly
- Purge system: annual/weekly
- Site security: annual

Types of Problems: The types of problems that are to be looked for during the inspections are noted in Sections 1 through 5 (below).

Frequency of Inspection: The frequency of the inspections is noted in the written schedule above.

Remedy Schedule: If an imminent hazard to human health and the environment is identified during an inspection, remedial actions will be taken immediately. Typical deficiencies noted during inspections are addressed during the summer-fall construction season. Repairs to deficiencies noted during inspections are documented and summarized in annual groundwater reports. A maintenance/corrective measure log is included in the enclosed forms.

Inspection Log or Summary: Inspections are documented in the enclosed forms. Inspections are summarized in annual groundwater reports.

1.0 FINAL COVER INSPECTION AND MAINTENANCE

Visual inspections of the final cover are performed each year.

Visual inspections are performed during a walk-over of the site. All problem areas are recorded on the observation form which is enclosed. The inspection will include observations relative to the following:

- areas of settlement and/or ponding;
- the possible presence of erosion, rifts or cracks;
- areas of stressed or dead vegetation;
- areas of sparse vegetation;
- evidence of burrowing animals:
- areas of slope failure;
- areas of exposed liner;
- areas characterized by gas emissions;
- leachate outbreaks;
- damage to any risers or pipes which extend through the cap;
- undesirable plant species capable of damaging the cap;

- damage to spillways or berms;

Maintenance activities will be directed by observations recorded on the inspection form. The activities will be performed as necessary such that the observations identified during the inspection are addressed and the integrity of the final cover is maintained. Survey benchmarks are no longer observed since Granger has incorporated GPS survey equipment and methods. Following completion of the inspection, the information will be given to the site manager for subsequent maintenance. Routine maintenance of the final cover will be performed during the summer/fall construction season.

2.0 GAS COLLECTION SYSTEM INSPECTION AND MAINTENANCE

During the inspections of final cover, the area will also be inspected for the possible presence of odors or gas emissions through the cap. In addition, the gas vents will be inspected for their structural integrity and the data obtained during the quarterly monitoring for possible gas migration will be reviewed. The site manager will be informed of any matters which require maintenance to facilitate their inclusion in the summer/fall construction season.

The landfill does not operate process vents (not subject to Subpart AA). The landfill gas is not classified as hazardous waste (not subject to Subpart BB). No hazardous waste was accepted after December 6, 1996 (not subject to Subpart CC).

3.0 LEACHATE COLLECTION SYSTEM INSPECTION AND MAINTENANCE

The volume of leachate/condensate is reported on a monthly basis to Southern Clinton County Municipal Utilities Authority (SCCMUA), or other comparable facility. The records of discharge volumes are be retained at the Granger Wood Street facility. These records are reviewed annually as part of the annual inspection.

The leachate manhole, the leachate pump house, and the leachate collection system along the east side are inspected on a monthly basis using the enclosed inspection form. The manhole is inspected for security and structural integrity. The pump house is inspected for any evidence of loose plumbing or electrical fittings and any evidence of leakage. Static elevations are at the following locations: LMW-1 through LWM-7, P-29R2, P-30, P-31 and P-33 to verify the effective operation of the pumps. Data obtained during the monthly inspections is maintained at the Granger Wood Street Office. Any problems requiring repair or maintenance are reported to the manager.

The quarterly monitoring of static leachate elevations will be reported to EGLE annually and maintained in the Operating Record. The data will be examined during each inspection event to assess if any significant change in elevation has occurred.

4.0 PURGE SYSTEM INSPECTION AND MAINTENANCE

The purge system will be inspected on a weekly basis. The purge wells will be inspected for any visible damage. The pump station will then be inspected for any leaks or loose fittings in the plumbing or electrical connections. The valves and gauges at the pump station will be inspected both for leaks and for general working condition. The data from the flow meter will be inspected to determine if the pump operation (cycles/day and discharge volume) are consistent. These discharge data will provide an overview of the effectiveness of the entire system (wells, piping, pumps, valves, meters, etc.) since they provide the composite effectiveness of all the separate components. Any problems encountered will be reported to the landfill manager for correction.

5.0 SITE SECURITY INSPECTION AND MAINTENANCE

The annual inspection of the landfill will include an examination of site security using the enclosed inspection form. The inspection will include a survey of the fences, gates, locks, and lockboxes. Any problems with any aspect of the security system will be reported to the site manager for repair.

LANDFILL CAP INSPECTION AND MAINTENANCE LOG

Date____________________________________ Facility____

Inspector________________________________ Weather Conditions____________________________________

A. Final Cover Inspection

ITEM#	ITEM DESCRIPTION	REMARKS	LOCATION
A-1	Check integrity of benchmarks		
A-2	What is the general condition of the cap?		
A-3	Are there areas of settlement or ponding?		
A-4	Is there evidence of erosion?		
A-5	Is there evidence of stressed vegetation?		
A-6	Is there evidence of burrowing animals?		
A-7	Is there evidence of slope failure?		
A-8	Is there any exposed liner?		
A-9	Is there evidence of leachate outbreaks?		
A-10	Is there damage to risers or pipes extending thru the cap?		
A-11	Are there undesirable plants capable of damaging the cap?		
A-12	Is there damage to spillways or berms?		
A-13	What was the date of the last post-closure inspection?		

LANDFILL CAP INSPECTION AND MAINTENANCE LOG (Continued)

Date______________________________ Facility______________________________________

Inspector___________________________ Weather Conditions______________________________

B. Gas Collection System Inspection

ITEM#	ITEM DESCRIPTION	REMARKS	LOCATION
B-1	Is there evidence of odors or gas emissions through the final cover?		
B-2	What is the condition of the gas vents?		
B-3	What was the date of the last inspection?		

LANDFILL CAP INSPECTION AND MAINTENANCE LOG (Continued)

Date____________________ Facility____________________

Inspector____________________ Weather Conditions____________________

C. Leachate Collection System Inspection

ITEM#	ITEM DESCRIPTION	REMARKS			LOCATION
C-1	Leachate manhole: • Is the manhole secure?				
	• Are there visible leaks or structural cracks present?				
C-2	Leachate Pump Station: • Is there evidence of leaks, loose plumbing or electrical connections?				
C-3	Flow Gauges: • Are flow gauges functional?				
	• Does the data indicate consistent operation?				
C-4	Leachate Elevations: • Change in static elevations over past six months	Prior Elevation	Current Elevation	Change	
	-P29				
	-P30				
	-P31				
	-P33				
	-LW-1				
	-LW-2				
	-LW-3				
	-LW-4				
	-LW-5				
	-LW-6				

LANDFILL CAP INSPECTION AND MAINTENANCE LOG (Continued)

Date________________________________ Facility________________________________

Inspector________________________________ Weather Conditions________________________________

D. Purge System Inspection

ITEM#	ITEM DESCRIPTION	REMARKS	LOCATION
D-1	Any evidence of loose fittings or leaks at the purge well manhole plumbing?		
D-2	Are pressure gauges in good working condition? (non-zeroed & cracked cover plate?)		
D-3	Is there any evidence of physical damage to the purge wells?		
D-4	Do the flow data (Cycles/day & cumulative volume) indicate consistent operation?		
D-5	Indicate flow meter reading.		

LANDFILL CAP INSPECTION AND MAINTENANCE LOG (Continued)

Date_______________________________ Facility_______________________________

Inspector_______________________________ Weather Conditions_______________________________

E Site Security Inspection

ITEM#	ITEM DESCRIPTION	REMARKS	LOCATION
E-1	Is the fence secure and in proper condition?		
E-2	Are gates in place and in working order?		
E-3	Are locks in place and in working order?		
E-4	Are lockboxes installed and in working order?		

Maintenance/Corrective Measure Log

Granger Grand River MID Landfill (MID 082 771 700)

Inspection Date	Inspector Name/ Signature	Description of Deficiency/Problem	Corrective Action Needed (Planned Date/Responsible Parties)	Date Action Taken/Responsible Party Name/Signature

Attachment 2

Contingency Plan

EMERGENCY ACTION PLAN
GRAND RIVER LANDFILL

EMERGENCY ACTION PLAN

Grand River Landfill

October 2021

GRANGER
WASTE SERVICES

TABLE OF CONTENTS

Introduction

Due to the unexpected and potentially dangerous nature of emergencies, it is critical that all Granger associates be prepared with a plan of action in case an emergency occurs. This plan provides a reference guide to help Granger associates choose the most appropriate, thorough and timely response in the event of an emergency.

Associates must review and understand the specific Emergency Action Plan for the facility in which they work.

Chain of Command

The Chain of Command was established to minimize confusion so associates will have no doubt about who has authority for making decisions. Due to the importance of emergency functions, adequate backup must be arranged to ensure trained personnel are always available. If the primary emergency coordinator is not available to oversee an emergency, another emergency coordinator or supervisor must take over. The duties of these coordinators include all the following:

1. Assessing the situation and determining whether an emergency requires activating the emergency response plan
2. Directing all efforts in the facility, including evacuating personnel and minimizing injury and property loss
3. Ensuring that outside emergency services, such as medical aid and local fire departments, are called in when necessary
4. Directing the shutdown of facility operations when necessary

Once emergency coordination has been established, the emergency coordinator or designee should make sure to contact Granger safety and operations management.

Name	Title	Office Phone	Cell Phone
Travis Owen	Emergency Coordinator (1)		517-819-4240
Pete Nichols	Emergency Coordinator (2)		517-819-4328
Kim Smelker	Emergency Coordinator (3)	517-371-9726	517-819-3196
Brian Grammer	Safety Manager	517-372-8351	517-525-0722

Media Communication

The media coordinator will select an appropriate spokesperson, preferably not the emergency coordinator (EC). This will enable the EC to concentrate on handling the emergency. The Customer Service Department should direct all inquiries about the emergency to the media coordinator, who will screen the calls and determine how and when to arrange interviews with the spokesperson, if deemed appropriate. The media coordinator will notify communications personnel to monitor media and social media outlets. The designated spokesperson should work with communication and management representatives to develop an appropriate media statement, if necessary.

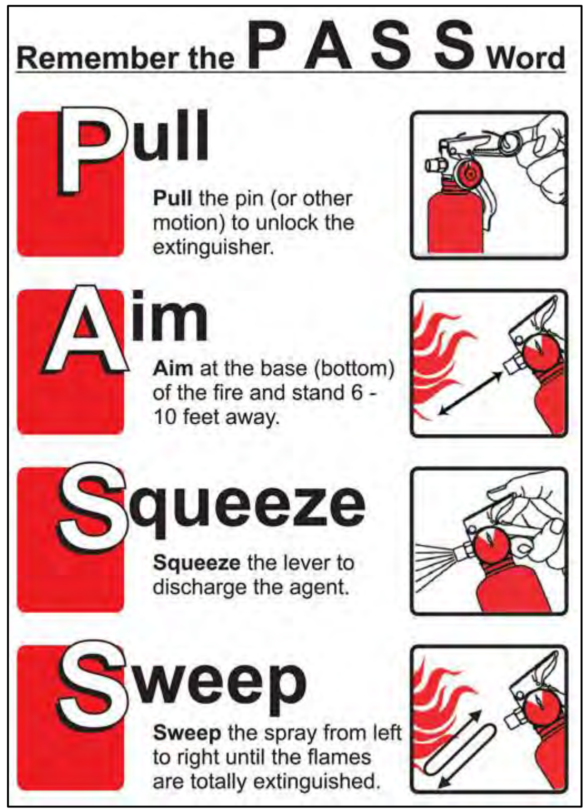
Name	Title	Office Phone	Cell Phone
Charles Hauser	Media Coordinator (1)	517-371-9775	989-430-3155
Andrea Davis	Media Coordinator (2)	517-371-9736	517-980-0442

Fire

In the event of a fire that takes place during operating hours, the following actions should be taken:

1. All associates in the surrounding area must be immediately notified. Associates and customers not directly involved in the emergency must evacuate to an area away from the hazard. Granger associates will assist in evacuating everyone not directly involved in the emergency. All temporary associates shall evacuate the area immediately.
2. A Granger associate should call 911 and provide the following information to the operator.

    - Caller's name
    - Facility name and address (Grand River Landfill, 8550 W Grand River Hwy, Grand Ledge)
    - Telephone number (517-372-2800)
    - Name of the nearest cross street (Grand River and Forest Hill Road)
    - Size and exact location of the fire
    - Action currently being taken by Granger associates and what assistance, if any, is required from the fire department



3. If the fire is small, anyone trained in the use of fire extinguishers may attempt to extinguish it with the appropriate fire extinguisher. (Water should not be used on a petroleum-based fire or electrical equipment; a CO_2 extinguisher should be used instead.) Landfill crew who are trained to extinguish fires using soil and equipment may be called on to help extinguish the fire. NOTE: Associates should only attempt to extinguish a fire if it can be done quickly and safely. If the fire cannot be extinguished quickly and safely using the equipment immediately available near the fire, the facility should be evacuated immediately.
4. Associates should evacuate immediately if any of the following occur: escape path is threatened, correct fire extinguisher is not available, fire cannot be fought with back toward the escape route, fire is spreading, fire extinguisher is ineffective.
5. The emergency coordinator should be notified, following the chain-of-command.
6. A Granger associate should be identified to be a spotter and wait at the main entrance (drive #7 for the landfill and drive #9 for the Disposal Center) for emergency personnel to arrive. This person will guide the responders to the location of the incident.

7. An incident report should be completed immediately and should document the situation using as specific and detailed information as possible. The information should include witness interviews, observations and photographs, if possible.

Severe Weather

When there is a chance of severe weather, associates should monitor weather reports for updated information. If a severe weather watch is issued, all on-site associates will be informed. If a tornado or severe thunderstorm warning is issued for the local area, all on-site associates shall be notified, and the actions listed below will be taken. (NOTE: The emergency coordinator may call for these actions without an official tornado or thunderstorm warning.)

1. If associates are on site, they should move to a secure area at the first indication of an approaching tornado or severe thunderstorm. High elevations and areas on or around equipment should be avoided. If a thunderstorm is approaching, any associates who are outside should take shelter.
2. The primary tornado shelter location for landfill and Disposal Center associates is Storage Room A, located on the Garden Level of the Main Office.
3. Customers and contractors on site during the event should be made aware of the weather conditions and asked to stop working or disposing of materials and take shelter. Depending on the severity, speed and location of the storm, customers and contractors should leave the site, shelter in their vehicles or be offered shelter inside.
4. If there are downed wires, the immediate area should be cleared of associates and any ignitable items which might be in jeopardy. No attempt should be made to move, cover or repair downed electrical lines. (Note: Direct contact with high power lines is not required to receive an electrical shock or electrocution. Always keep a safe distance of at least 20 feet from downed power lines.) Downed wires and other hazards should be marked with signs, barricades or other markers to identify them as hazards to unsuspecting associates and the public.
5. The Fire Department, medical authorities and electrical utilities should be notified as needed. All associates should be accounted for with a roll call.

Grand Ledge Police/Fire	**911**
Consumers Energy	**1-800-477-5050**

6. Details about the situation, such as names of witnesses and damage, should be documented.

Associate Injuries

1. If the injury is minor, basic first aid should be provided if it's appropriate and the area is safe. First aid supplies and the AED can be found in the associate break room. If appropriate, assign a staff member to transport the injured associate to Sparrow Occupational Health Services. Information for Sparrow Occupational Health Services is as follows:

SCAN FOR DIRECTIONS

Weekdays: 7 a.m. to 5 p.m.
Sparrow Occupational Health Services
Medical Arts Building
1322 E. Michigan Ave, Suite 101
Lansing
Phone: 517-364-3900
Fax: 517-364-3914

SCAN FOR DIRECTIONS

Weekdays: 5 p.m. to 8 p.m.
Weekends: 8 a.m. to 8 p.m.
Sparrow Urgent Care
Michigan Ave.
1120 E. Michigan Ave.
Lansing
Phone: 517-364-9790
Fax: 517-364-9794

SCAN FOR DIRECTIONS

Weekdays and weekends: 8 p.m. to 8 a.m.
Sparrow Hospital Emergency Room
1215 E. Michigan Ave.
Lansing
Phone: 517-364-1000

2. If the injury is serious*, EMS should be contacted by calling 911. Basic first aid should be provided if it's appropriate and the area is safe. The emergency operator should be informed of the exact location of the injured associate and what has occurred. One associate should stand outside to direct the ambulance when it arrives.

3. The emergency coordinator should be notified, following the chain of command notification. The injured person should be made comfortable and proper first aid procedures should be followed. The area where the accident occurred should be secured. An incident report which documents the situation using as specific and detailed information as possible should be completed immediately. The information should include witness interviews, observations and photographs, if possible.

4. If the injury is serious, the media coordinator should be notified. The media coordinator should notify the customer service department to direct all inquiries about the emergency to the designated spokesperson. The designated spokesperson should work with management representatives to develop an appropriate media statement, if necessary.

**Note: A serious injury can be defined as a cut requiring several stitches, significant loss of blood, a serious burn, asphyxiation, a head or eye injury, a broken bone or any condition that requires immediate medical attention or, if left unattended, could develop into a life-threatening condition.*

Visitor/Customer Injuries

1. If the injury is minor, basic first aid should be provided if it's appropriate and the area is safe. AEDs can be found in the landfill and Disposal Center gatehouses. First aid supplies can be found in the landfill and Disposal Center gatehouses, in some pickup trucks and in some equipment.
2. The Granger Main Office emergency coordinator, as well as the employer or person responsible for the visitor (e.g., if the visitor is a student, notify the school), should be notified. The injured person's name, organization and other significant information should be recorded. The injured person should be assisted with making arrangements for medical attention and/or to be picked up.
3. If the injury is serious, EMS should be contacted by calling 911. Basic first aid should be provided if it's appropriate and the area is safe. The emergency operator should be informed of the exact location of the injured person and what has occurred. An associate should stand outside to direct the ambulance when it arrives.
4. The emergency coordinator should be notified, following the chain of command notification. The injured person should be made comfortable and proper first aid procedures should be followed. The area where the accident occurred should be secured. An incident report which documents the situation using as specific and detailed information as possible should be completed immediately. The information should include witness interviews, observations and photographs if possible.
5. If the injury is serious, the media coordinator should be notified. The Customer Service Department should direct all inquiries about the emergency to the media coordinator, who will screen the calls and determine how and when to arrange interviews with the spokesperson, if deemed appropriate. The designated spokesperson should work with communication and management representatives to develop an appropriate media statement, if necessary.

Disruptive, Threatening or Violent Behavior

For Disruptive, but Not Threatening, Behavior

1. The associate should respond quietly and calmly. The associate should try to defuse the situation or set limits using statements like "Please lower your voice so I can understand what you need and try to help you."

2. Associates should ask questions and summarize what they hear the person saying in order to show respectful concern, interest and attention and to promote resolution of the concerns.

3. If this approach does not stop the disruption, but it is the associate's judgment that there is no immediate threat, he or she should seek assistance from supervisors or nearby colleagues.

For Crimes in Progress, Violent Incidents or Specific Threats of Imminent Violence

An associate should immediately call 911 or if an individual makes threats of physical harm toward others or him/herself, has a weapon or behaves in a manner that causes associates to fear for their own or another's safety.

1. Associates should not attempt to intervene physically or otherwise deal with the situation. If demands for money are made, associates should comply and explain what they are going to do before reaching or moving to do it.
2. If possible, a phone line should be kept open to police until they arrive. If the associate cannot stay on the line, 911 can be called and the dispatcher can direct the police to the caller. The more information the police receive, the more likely it is that they can bring a potentially violent situation to a safe conclusion. Associates should be observant of the threatening person and remember details about the person's physical appearance, height and clothing.
3. Whenever possible, associates should get themselves and others to safety.

Emergency Response Contact Information

Ambulance Police Fire 911

Address:

Grand River Landfill

8550 W Grand River Hwy

Major Utility-Related Emergency Numbers

Electrical	Consumers Energy	1-800-477-5050
Street Hydrants	Board of Water and Light	517-702-6490
Building Water	GWS Facilities	517-282-8290
Natural Gas	Consumers Energy	1-800-477-5050
Fuel Pumps	Leak Petroleum	517-669-1252
Spills Cleanup	Shultz Pumping	517-484-7989

Internal Granger Contact Numbers

Landfill Supervisor			
Travis Owen	517-819-4240		
Safety			
Brian Grammer	517-525-0722		
Operations Manager			
Kim Smelker	517-371-9726	517-819-3196 (cell)	
Environmental Compliance			
Steve Blayer	517-371-9724		
Facilities			
Nick Cook	517-282-8290		
Granger Spokespersons			
Charles Hauser	989-430-3155	Andrea Davis	517-980-0442

Non-emergency Agency Numbers

Clinton County Sheriff	989-224-8989
Grand Ledge Police	517-627-2115
Ingham County Sheriff	517-676-2431
Eaton County Sheriff	517-372-8215

STORMWATER POLLUTION PREVENTION PLAN
GRANGER GRAND RIVER AVENUE LANDFILL

FACILITY NAME:

GRANGER LAND DEVELOPMENT – GRAND LEDGE
GRANGER GRAND RIVER AVENUE LANDFILL

STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

Department of Environmental Quality (DEQ)
Water Resources Division (WRD)
Storm Water Pollution Prevention Plan (SWPPP) Template
Template Revision Date: 4/4/2022

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1.0 GENERAL FACILITY INFORMATION

Facility Information:

- Name of Facility: ***Granger Land Development – Grand Ledge***
- Facility Address: ***8550 West Grand River Avenue, Grand Ledge, MI 48837***
- County: ***Clinton***
- Standard Industrial Classification (SIC) Code: ***4953***
- Owner or Authorized Representative: ***Granger Land Development Company***

Facility Contact Information:

- Name: ***Tim Krause***
- Title: ***Director of Engineering***
- Telephone: ***517-372-8342***
- Email Address: ***tkrause@grangernet.com***
- Mailing Address: ***16980 Wood Road, Lansing, MI 48906***

Facility Contact information to be aware of:
The "Facility Contact" was specified in the application. The permittee may replace the facility contact at any time, and shall notify the Department in writing within 10 days after replacement (including the name, address, email address, if available, and telephone number of the new facility contact).

a) *The facility contact shall be (or a duly authorized representative of this person):*
   - *for a corporation, a principal executive officer of at least the level of vice president, or a designated representative, if the representative is responsible for the overall operation of the facility from which the discharge described in the permit application or other NPDES form originates,*
   - *for a partnership, a general partner,*
   - *for a sole proprietorship, the proprietor, or*
   - *for a municipal, state, or other public facility, either a principal executive officer, the mayor, village president, city or village manager, or other duly authorized employee.*

b) *A person is a duly authorized representative only if:*
   - *the authorization is made in writing to the Department by a person described in paragraph a. of this section; and*
   - *the authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the facility (a duly authorized representative may thus be either a named individual or any individual occupying a named position).*

Certified Storm Water Operator Information:

- Name: ***Tim Krause***
- Certification Number & Expiration Date: ***05879, Expiration Date 2022***
- Telephone: ***517-372-8342***
- Email Address: ***tkrause@grangernet.com***
- Is the Certified Operator an employee at the facility: ☒ Yes ☐ No
  - o If the answer to the above question is "No" then include the Certified Operator's business name and mailing address:

Permit Information:

- General Permit Number: ***MIS 410000***
- Certificate of Coverage (COC) or Individual Permit Number: ***MIS 410095***
- COC or Individual Permit Effective Date of Coverage: ***May 21, 2014***
- Receiving Waters: ***Openlander Drain***
- Required Monitoring: ☐ Yes ☒ No
- Identify the Total Daily Maximum Load (TMDL) listed on COC: ***N/A***

Brief Industrial Activity Description: ***Sanitary Landfill***

If this facility is a seasonal facility describe the seasonal operation and what months the facility will be operating:

2.0 STORM WATER POLLUTION PREVENTION TEAM

The storm water pollution prevention team is responsible for developing, implementing, maintaining, and revising this SWPPP. The members of the team and their primary responsibilities (i.e. implementing, maintaining, record keeping, submitting reports, conducting inspections, employee training, conducting the annual compliance evaluation, testing for non-storm water discharges, signing the required certifications) are as follows:

Name & Title	Responsibility
Tim Krause	***Certified Storm Water Operator***
Serenity Skillman	***Certified Storm Water Operator***
Steve Blayer	***Maintaining Documentation, Spill Kit Inventory, Sample Collection, Inspections***
Space to list additional members and their responsibility if necessary:	

3.0 SITE MAP

Preparing a site map or sketch is the first step in assessing the facility. See the DEQ Industrial Storm Water Certified Operator Training Manual for additional information.

The facility's site map includes all applicable items listed in the permit, which include:

1) Buildings and other permanent structures
2) Storage or disposal areas for significant materials
3) Secondary containment structures and descriptions of what they contain in the primary containment structures
4) Storm water discharge points (which include outfalls and points of discharge), numbered or otherwise labeled for reference
5) Location of storm water and non-storm water inlets (numbered or otherwise labeled for reference) contributing to each discharge point
6) Location of NPDES permitted discharges other than storm water
7) Outlines of the drainage areas contributing to each discharge point
8) Structural runoff controls or storm water treatment facilities
9) Areas of vegetation (with brief description such as lawn, old field, marsh, wooded, etc.)
10) Areas of exposed and/or erodible soils and gravel lots
11) Impervious surfaces (roofs, asphalt, concrete, etc.)
12) Name and location of receiving waters
13) Areas of known or suspected impacts on surface waters as designated under Par 201 (Environmental Response) of the NREPA.

SEE FIGURE 1 FOR FACILITY SITE MAP

4.0 SIGNIFICANT MATERIALS

Definition: Significant materials are any material which could degrade or impair water quality, including but not limited to:

- ✓ Raw Materials
- ✓ Fuels
- ✓ Solvents
- ✓ Detergents
- ✓ Plastic pellets

- ✓ Finished materials (i.e. metallic products)
- ✓ Hazardous Substances designated under section 101(14) of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), see 40 CFR 372.65
- ✓ Any chemical the facility is required to report pursuant to section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA)
- ✓ Polluting Materials – Oil and any material, in solid or liquid form, identified as polluting material under the Part 5 Rules (Rules 324.2001 through 324.2009 of the Michigan Administrative Code)
- ✓ Hazardous Wastes as defined in Part 111 of the Michigan Act
- ✓ Fertilizers
- ✓ Pesticides
- ✓ Waste Products (i.e. ashes, slag, sludge, plant waste, animal waste)

During the significant materials identification phase, all sources of potential storm water contamination need to be identified. Both the inside and outside of the facility must be inventoried to determine the materials and practices that may be sources of contamination to storm water runoff. Note the identification phase must address residual contaminants which may be found on items stored outside.

4.1 Inventory of Exposed Significant Materials

The permit requires a general inventory of significant materials that could enter storm water. For each material listed the SWPPP shall include the ways in which each type of material has been or has reasonable potential to become exposed to storm water (e.g. spillage during handling; leaks from pipes, pumps, or vessels; contact with storage piles, contaminated materials or soils; waste handling and disposal; deposits from dust or overspray; etc.). In addition, the SWPPP must identify the inlet(s) spilled significant materials may enter and the discharge point(s) through which the spilled significant material may be discharged.

SEE TABLE 1 FOR SIGNIFICANT MATERIAL INVENTORY

4.2 Description of Industrial Activities & Significant Material Storage Areas

The permit requires industrial facilities to evaluate the reasonable potential for contribution of significant materials to storm water runoff from at least the following areas or activities:

1) Loading, unloading, and other material handling operations
2) Outdoor storage including secondary containment structures
3) Outdoor manufacturing or processing activities
4) Significant dust or particulate generating processes
5) Discharge from vents, stacks, and air emission controls
6) On-site waste disposal practices
7) Maintenance and cleaning of vehicles, machines, and equipment
8) Areas of exposed and/or erodible soils
9) Sites of Environmental Contamination listed under Part 201 (Environmental Response) of the NREPA
10) Areas of significant material residues
11) Areas where animals congregate (wild or domestic) and deposit wastes
12) Other areas where storm water may contact significant materials

For each applicable item, the permit requires a written description of the specific activity or storage area. Along with the written description of the activities or storage areas, a description of the significant materials associated with those items must be included.

SEE TABLE 1 FOR INDUSTRIAL ACTIVITY AND SIGNIFICANT MATERIAL STORAGE AREA DESCRIPTIONS

4.3 List of Significant Spills

The permit requires a list of significant spills and significant leaks of polluting materials that occurred at areas that are exposed to precipitation or that otherwise discharge to a point source at the facility. The listing shall include spills that occurred over the three years prior to the effective date of a certificate of coverage authorizing discharge under the General Permit. The listing shall include the date, volume, exact location of release, and actions taken to clean up the material and/or prevent exposure to storm water runoff or contamination of surface waters of the state. Any release that occurs after the SWPPP has been developed shall be controlled in accordance with the SWPPP and is cause for the SWPPP to be updated as appropriate within 14 calendar days of obtaining knowledge of the spill or loss. If there have been no spills of polluting materials, state that in this section.

Question: Have there been any significant spills or significant leaks of polluting materials in the last 3 years?
☐ Yes ☒ No

4.4 Summary of Sampling Data

The permit requires a summary of existing storm water discharge sampling data (if available) describing pollutants in storm water discharges associated with industrial activity at the facility. The summary shall be accompanied by a description of the suspected sources of the pollutants detected. (If there is no storm water discharge sampling data, state that in this section.)

Question: Is there any storm water discharge sampling data available? ☒ Yes ☐ No

- If the answer to the above question is "Yes" then summarize the information below and maintain the data with the SWPPP file.

Summary of Sampling Information: ***Chloride, Sodium, and Potassium levels are slightly elevated due to salting and de-icing of adjacent highway.***

4.5 Actions Taken to Investigate Illicit Connections

The permit requires that the SWPPP include a description of the actions taken to identify and eliminate illicit connections to the storm sewer system. All illicit connections to Municipal Separate Storm Sewer Systems (MS4s) or waters of the state should be permanently plugged or re-routed to the sanitary sewer system, in accordance with the authorization from the local Wastewater Treatment Plant. Any discharge from an illicit connection is a violation of the conditions of this permit.

Actions taken to investigate and eliminate any illicit connections to the storm sewer system:

5.0 NON-STRUCTURAL CONTROLS

Non-structural controls are practices that are relatively simple, fairly inexpensive, and applicable to a wide variety of industries or activities. Non-structural controls are intended to reduce the amount of pollution getting into the surface waters of the state and are generally implemented to address the problem at the source. They do not require any structural changes to the facility. These are typically everyday types of activities undertaken by employees at the facility. Many facilities may already have nonstructural controls in place for other reasons. The permit requires that the SWPPP shall, at a minimum, include each of the following non-structural controls:

5.1 Preventative Maintenance Program (Routine Inspection Program)

The permit requires written procedures and a schedule for routine preventive maintenance which includes inspection and maintenance of storm water management and control devices (e.g. cleaning of oil/water separators and catch basins) as well as inspecting and testing plant equipment and systems to uncover conditions that could cause breakdowns or failures resulting in discharges of pollutants to surface waters. Generally the focus of this permit requirement is on exterior items. A written report of the inspection and corrective actions shall be maintained on file and shall be retained for three years. See the DEQ Industrial Storm Water Certified Operator Training Manual for additional information.

The Routine Inspection Form is in Section 16.0.

If this requirement is addressed in other facility procedures, reference those procedures here:

5.2 Housekeeping Procedures (Routine Inspection Program)

The permit requires that the SWPPP include written procedures and a schedule to implement routine good housekeeping inspections to maintain a clean, orderly facility. Good housekeeping inspections are intended to reduce the potential for significant materials to come in contact with storm water. The routine good housekeeping inspections should be combined with the routine inspection for the preventative maintenance program. Generally the focus of this permit requirement is on exterior areas. A written report of the inspection and corrective actions shall be maintained on file and shall be retained for three years. See the DEQ Industrial Storm Water Certified Operator Training Manual for additional information.

The Routine Inspection Form is in Section 16.0.

If this requirement is addressed in other facility procedures, reference those procedures here:

The table below describes the Routine Inspection Program Procedures:

Routine Inspection Program Procedures Table		
Description of Area or Equipment Inspected	Tasks Performed During Inspection	Frequency of Inspection
Leachate Pumping Stations	***Look for discharge and erosion of soils.***	***Monthly***
Spill Kits	***Ensure they are fully stocked.***	***Monthly***
Detention Basin and Outfall	***Ensure storm water controls are functioning properly, look for sedimentation.***	***Monthly***

5.3 Comprehensive Site Inspection & Visual Assessments of Storm Water Discharges

The permit requires written procedures and a schedule for comprehensive site inspection. The inspections shall include but not be limited to, the areas and equipment identified in the preventive maintenance program and good housekeeping procedures. The inspection shall also include a review of the routine preventive maintenance reports, good housekeeping inspections reports, and any other paperwork associated with the SWPPP. The comprehensive site inspection shall be conducted by the Industrial Storm Water Certified Operator quarterly. At a minimum one inspection shall be performed within each of the following quarters: January – March, April – June, July – September, and October – December.

The permittee may request Department approval of an alternate schedule for comprehensive site inspections. Such a request may be made if the permittee meets the following criteria: the permittee is in full compliance with the permit, the permittee has an acceptable SWPPP, the permittee has installed and/or implemented adequate structural controls at the facility, the permittee has all required inspection reports available at the facility, and the permittee has an Industrial Storm Water Certified Operator at the facility.

A report of the comprehensive site inspection results shall be prepared and retained for three years. The report shall include the following information:

- ✓ Date of the inspection
- ✓ Name(s), title(s), and certification number(s) of the personnel conducting the inspection
- ✓ Precipitation information (i.e. a description of recent rainfall or snow met events)
- ✓ All observations relating to the implementation of control measures
- ✓ Any required revisions to the SWPPP resulting from the inspection
- ✓ A certification stating the facility is in compliance with this permit and the SWPPP, or, if there are instances of noncompliance, they are identified

The Comprehensive Site Inspection Form is in Section 17.0.

Comprehensive site inspection schedule: ***Quarterly***

Comprehensive site inspection written procedures: ***The Industrial Storm Water Certified Operator will perform the comprehensive site inspections. All areas and items identified in Routine Inspection Procedures Table are included in the comprehensive site inspections. In addition, all paper work associated with the routine inspections will be reviewed. The comprehensive site inspection report form will include a compliance certification statement. List any additional details (if necessary) related to the comprehensive site inspection procedures here:***

Visual Assessments of Storm Water Discharges
****CHECK YOUR GENERAL PERMIT FOR APPLICABILITY****

The permit requires written procedures and a schedule for <u>quarterly visual assessments</u> of storm water discharges. The visual assessments shall be conducted by the Industrial Storm Water Certified Operator. At a minimum one visual assessment shall be performed within each of the following quarters: January – March, April – June, July – September, and October – December. If the Department has approved an alternate schedule for the comprehensive site inspection, the visual assessment may likewise be conducted in accordance with the same approved alternate schedule.

Visual assessment training/informational tutorials are available on the DEQ, WRD Industrial Storm Water webpage or by clicking on the following links:

- Part 1: https://www.youtube.com/watch?v=rhXbA1R_VZk&feature=youtu.be
- Part 2: https://www.youtube.com/watch?v=_AdGziksz_g&feature=youtu.be
- Part 3: https://www.youtube.com/watch?v=ZiajZM6Avlg&feature=youtu.be

The Visual Assessment Report Form is in Section 18.0.

Visual Assessment schedule: ***Quarterly***

SEE SECTION 14.0 FOR THE VISUAL ASSESSMENT PROCEDURES

5.4 Material Handling & Spill Prevention / Clean-Up Procedures

The permit requires a description of material handling procedures and storage requirements for significant materials. Equipment and procedures for cleaning up spills shall be identified in the SWPPP and made available to the appropriate personnel. The procedures shall identify measures to prevent spilled materials or material residues on the outside of the containers from being discharged into storm water.

The SWPPP may include, by reference, requirements of either a Pollution Incident Prevention Plan (PIPP) prepared in accordance with the Part 5 Rules (Rules 324.2001 through 324.2009 of the Michigan Administrative Code); a Hazardous Waste Contingency Plan (HWCP) prepared in accordance with 40 CFR

264 and 265 Subpart D, as required by Part 111 of the Michigan Act; or a Spill Prevention Control and Countermeasure (SPCC) plan prepared in accordance with 40 CFR 112.

Question: Does the facility have any additional material handling & spill / clean-up procedures on file in addition to the SWPPP? ☒ No ☐ Yes

- If the answer is “No” complete the table below
- If the answer is “Yes” then reference the procedures and where they are located here and complete the table below as necessary:

Spills and leaks together are the largest industrial source of storm water pollution. Thus, this SWPPP specifies material handling procedures and storage requirements for significant materials. Equipment and procedures necessary for cleaning up spills and preventing the spilled materials from being discharged have also been identified. All employees have been made aware of the proper procedures. See the DEQ Industrial Storm Water Certified Operator Training Manual for additional information.

The DEQ, WRD Industrial Storm Water program spill report compliance assistance document should be kept with the SWPPP. Download the document from the DEQ, WRD Industrial Storm Water webpage or by clicking on the following link: http://www.michigan.gov/documents/deq/wrd-isw-permit_info-spill-reporting_398791_7.pdf

If material handling and spill prevention / clean-up procedures are not addressed in other facility documents (referenced above) then the table below needs to be completed:

Material Handling & Spill Prevention / Clean-up Procedures Table		
Potential Spill Area	Material Handling & Storage Procedures	Spill Response Procedures & Equipment
Active face of landfill	***Any spill on the active face of landfill will be collected in Leachate Collection System.***	***Response consists of measures to ensure spills are contained within the solid waste boundary.***

SEE TABLE 2 FOR SPILL KIT INVENTORY

5.5 Soil Erosion & Sedimentation Control Measures

The permit requires the identification of areas which, due to topography, activities, or other factors, have a high potential for significant soil erosion. Areas commonly prone to soil erosion are: gravel lots, bare earth or gravel at material handling areas around storm water inlets, areas with concentrated storm water runoff into streams or ditches, and access roads over open streams or ditches. Control measures must be implemented in areas prone to soil erosion and sedimentation. More information on soil erosion and sedimentation control may be obtained from the DEQ, Water Resources Division District Office.

Question: Is dust suppression material used on site? ☐ Yes ☒ No

- If “Yes” then describe the actions implemented to prevent an unauthorized discharge to the storm sewer system or surface waters of the state:

Question: Are there areas of the site that are prone to soil erosion and/or sedimentation? ☐ Yes ☒ No

- If “Yes” then complete the table below:

Soil Erosion & Sedimentation Control Measures Table	
Areas Prone to Soil Erosion or Sedimentation	Control Measures Implemented
Space to list additional areas of concerns and control measures if necessary:	

5.6 Employee Training Program

The permit requires a description of employee training programs have been implemented to inform appropriate personnel at all levels of responsibility of the components and goals of the SWPPP. Recent modifications to the General Permits have included a requirement for annual employee training. An employee training video is available at the DEQ, WRD, Industrial Storm Water webpage or by clicking on the following link: https://www.youtube.com/watch?v=IGqvsztguRA&feature=youtu.be

Employee training will be a major component in ensuring the success of the facility's SWPPP. The more knowledgeable all employees are about the facility's SWPPP and what is expected of them, the greater the chance that the plan will be effective. The following is a description of the employee training programs to be implemented to inform appropriate personnel at all levels of responsibility of the components and goals of the SWPPP (i.e. good housekeeping practices, spill prevention and response procedures, waste minimization practices, informing customers of facility policies, etc.).

The Employee Training Form is in Section 19.0.

Employee Training Frequency: ***Yearly***

Employee Training Program Description: ***Spill Response Training is provided to all personnel on a yearly basis. The training is in conjunction with Waste Acceptance Training. These records can be found in the Wood Street SWPPP documents.***

5.7 TMDL Requirements

The permit requires that if there is a Total Maximum Daily Load (TMDL) established by the Department for the receiving water, which restricts the discharge of any of the identified significant materials or constituents of those materials, then the SWPPP shall identify the level of control for those materials necessary to comply with the TMDL.

The TMDL means the amount of pollutant load a water body, such as a lake or stream, can assimilate and still meet water quality standards. If a receiving water body does not meet the water quality standards for a specific pollutant, the DEQ will establish the appropriate daily maximum load for that pollutant to allow the water body to again meet water quality standards. If a permitted facility is expected to discharge that specific pollutant in its storm water to that water body, the General Permit requires the facility to list actions it will take to meet that TMDL requirement.

The applicable TMDLs will be identified on the Certificate of Coverage (COC).

See the DEQ, WRD, Industrial Storm Water Webpage for additional TMDL information or click this link for the TMDL compliance assistance document: http://www.michigan.gov/documents/deq/wrd-isw-permit-info-tmdl_398790_7.pdf

Question: Is there a TMDL Requirement listed on the COC? ☐ Yes ☒ No

5.8 List of Significant Materials Still Present

The permit requires the identification of significant materials expected to be present in storm water discharges following implementation of non-structural preventative measures and source controls. Non-structural controls are used to reduce pollutants at the source before they can get into the storm water runoff. In some cases, these types of controls will not be enough. A list of significant materials expected to be present in storm water discharges after implementation of nonstructural controls must be included in the SWPPP. The materials listed below will be addressed through the use of structural controls. (If there will be no significant materials present after the implementation of non-structural controls, state that in this section.)

Significant Material	Location and Control Measure:	Impacted Inlet(s):	Impacted Discharge Point(s):
Gasoline and Diesel Fuel	***Active face of Landfill, the fuels are within the solid waste boundary, so any leaks or spill are collected by the leachate collection system.***	***N/A***	***Openlander Drain***
Leachate	***Within solid waste boundary; leachate collection system.***	***N/A***	***Openlander Drain***
Space available to add addition information if necessary:			

6.0 STRUCTURAL CONTROLS

The permit requires that where implementation of non-structural controls does not control storm water discharges in accordance with water quality standards, the SWPPP shall provide a description of the location, function, and design criteria of structural controls for prevention and treatment.

Structural controls may be necessary:
1) To prevent uncontaminated storm water from contacting or being contacted by significant materials; or
2) If preventive measures are not feasible or are inadequate to keep significant materials at the site from contaminating storm water. Structural controls shall be used to treat, divert, isolate, recycle, reuse, or otherwise manage storm water in a manner that reduces the level of significant materials in the storm water and provides compliance with the Water Quality Standards

Examples of structural controls include the following:
- ✓ Signs and Labels
- ✓ Safety Posts
- ✓ Fences
- ✓ Security Systems
- ✓ Temporary and Permanent Coverings
- ✓ Storm Water Conveyances
- ✓ Diversion Dikes
- ✓ Grading
- ✓ Paving
- ✓ Curbing
- ✓ Drip Pans
- ✓ Secondary Containment
- ✓ Catch Basin Inserts
- ✓ Detention and Retention Ponds
- ✓ Vegetative Filters
- ✓ Oil/Water Separators

These types of controls are physical features that control and prevent storm water pollution. They can range from preventive measures to collection structures to treatment systems. Structural controls will typically require construction of a physical feature or barrier. Below is a description of the structural controls used at the facility. See the DEQ Industrial Storm Water Operator Training Manual for additional details on structural controls.

Question: Are structural control measures used at the facility? ☐ No ☒ Yes

- If answer above is “Yes” then complete the appropriate information in the table below.

Structural Controls Used at the Facility		
Description of structural control(s)	Location of structural control(s)	Significant Materials intended to be managed by the structural control(s)
Fences	***Around perimeter site***	***Security to prevent any illicit discharge***
Storm Water Swales	***Ditches conveying storm water to detention ponds***	***Control storm water to known locations***
Detention Pond	***North end of property***	***Sedimentation of solids in storm water***
Leachate Collection System	***Within solid waste boundary***	***Leachate, fuel stored on active face of landfill.***

7.0 NON-STORM WATER DISCHARGES

The permit requires that all discharge locations be evaluated for the presence of non-storm water discharges. Any unauthorized storm water discharges must be eliminated, or covered under another NPDES permit.

Storm water shall be defined to include all of the following non-storm water discharges provided pollution prevention controls for the non-storm water component are identified in the SWPPP.

Question: Is any of the 10 non-storm water discharges listed below applicable to the facility? ☒ No ☐ Yes

- If the answer is “Yes” then complete the appropriate sections of the table below:

Check the Applicable Non Storm Water Discharges at the Facility:		Pollution Prevention Controls Implemented:	Impacted Inlet(s):	Impacted Discharge Point(s):
☐	1. Discharges from fire hydrant flushing			
☐	2. Potable water sources including water line flushing			
☐	3. Water from fire system testing and fire fighting training without burned materials or chemical fire suppressants			
☐	4. Irrigation drainage			
☐	5. Lawn watering			
☐	6. Routine building wash-down that does not use detergents or other compounds			
☐	7. Pavement wash waters where contamination by toxic or hazardous materials has not occurred (unless all contamination by toxic or hazardous materials has			

	been removed) and where detergents are not used			
☐	8. Uncontaminated condensate from air conditioners, coolers, and other compressors and from the outside storage of refrigerated gases or liquids			
☐	9. Uncontaminated ground water			
☐	10. Foundation or footing drains where flows are not contaminated with process materials such as solvents			

Discharges from fire fighting activities are authorized by the permit, but are exempted from the requirement to be identified in the SWPPP.

8.0 ANNUAL REVIEW

The permit requires that the permittee shall review the SWPPP annually after it is developed and maintain written summaries of the reviews. Based on the review, the permittee shall amend the SWPPP as needed to ensure continued compliance with the terms and conditions of the permit. The annual review is to be retained on site for three years and depending on the general permit is required to be submitted to the DEQ district office on or before January 10th of each year.

The Annual Review Report Form is in Section 20.0.

Specify the month the Annual SWPPP Review will be performed: ***December***

9.0 INDUSTRIAL STORM WATER CERTIFIED OPERATOR UPDATE

The permit requires that if the Industrial Storm Water Certified Operator is changed or an additional Industrial Storm Water Certified Operator is added, the permittee shall provide the name and certification number of the new Industrial Storm Water Certified Operator to the Department. If a facility has multiple Industrial Storm Water Certified Operators, the name and certification number of the Industrial Storm Water Certified Operators shall be included in the SWPPP.

10.0 RECORD KEEPING

The permit requires that the permittee shall maintain records of all SWPPP related inspection and maintenance activities. Records shall also be kept describing incidents such as spills or other discharges that can affect the quality of storm water runoff. All such records shall be retained for three years. The following records are required by the permit:

- ✓ Routine preventive maintenance inspection reports
- ✓ Routine good housekeeping inspection reports
- ✓ Comprehensive site inspection reports
- ✓ Documentation of visual assessments
- ✓ Employee training records
- ✓ Written summaries of the annual SWPPP review
- ✓ Short Term Storm Water Characterization Study data

11.0 SWPPP CERTIFICATION

The permit requires that the SWPPP shall be reviewed and signed by the Certified Storm Water Operator(s) and by either the permittee or an authorized representative in accordance with 40 CFR 122.22. The SWPPP shall be retained on-site at the facility which generates the storm water discharge.

I certify under penalty of law that the storm water drainage system in this SWPPP has been tested or evaluated for the presence of non-storm water discharges either by me, or under my direction and supervision. I certify under penalty of law that this SWPPP has been developed in accordance with the General Permit and with good engineering practices. To the best of my knowledge and belief, the information submitted is true, accurate, and complete. At the time this plan was completed no unauthorized discharges were present. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment for knowing violations.

Permittee or Authorized Representative
Printed Name & Title: ***Tim Krause, Director of Engineering***
Signature & Date: 5/6/22

Industrial Storm Water Certified Operator
Printed Name & Certification Number: ***Tim Krause, 05879***
Signature & Date: 5/6/22

Space to list additional Industrial Storm Water Certified Operators if Necessary	
Printed Name & Certification Number	Signature & Date
Serenity Skillman, 15838	Serenity Skille 5/6/2022

12.0 FIGURE 1 – FACILITY SITE MAP (Use separate sheet if necessary)

13.0 TABLE 1 – SIGNIFICANT MATERIAL INVENTORY AND DESCRIPTION OF INDUSTRIAL ACTIVITY OR SIGNIFICANT MATERIAL STORAGE AREAS

Instructions - Fill out the applicable areas or activities in the corresponding sections. Add more lines as needed. Once you have described the area or activity, list the significant materials that are associated with the areas or activities, the exposure methods, and evaluate the level of exposure. Once that is completed indicate the inlet(s) and discharge point(s) that would be impacted if significant materials were discharged from the areas or activities described.

Section Listed in General Permit	Storage Areas / Activity Areas	Significant Materials	Exposure Method	Reasonable Potential Evaluation (high,medium,low)	Inlet(s)	Discharge Point(s)
1) Loading, unloading, and other material handling operations	***Refueling is done within the solid waste boundary.***	***Gasoline and Diesel Fuel***	***Leaks and spills when refueling***	***Low – all refueling done in SWB.***	***N/A***	***Open-lander Drain***
2) Outdoor storage including secondary containment structures	***All outdoor storage is within solid waste boundary.***	***Gasoline and Diesel Fuel***	***Leaking of containment structures***	***Low – storage within SWB.***	***N/A***	***Open-lander Drain***
3) Outdoor manufacturing or processing activities	***None***					
4) Significant dust or particulate generating processes	***Onsite Road Traffic***	***Dust particles***	***Inhalation or settling***	***Low***	***N/A***	***Open-lander Drain***
5) Discharge from vents, stacks, and air emission controls	***None***					
6) On-site waste disposal practices	***Working face of landfill***	***Waste consisting of asbestos, construction and demolition and non-household wastes.***	***Asbestos is disposed of in a pit, C&D is unloaded on working face.***	***Low – Liquids collected in Leachate System***	***N/A***	***Open-lander Drain***

13.0 TABLE 1 CONTINUED

Section Listed in General Permit	Storage Areas / Activity Areas	Significant Materials	Exposure Method	Reasonable Potential Evaluation (high,medium,low)	Inlet(s)	Discharge Point(s)
7) Maintenance and cleaning of vehicles, machines and equipment	***None – maintenance performed off-site***					
8) Areas of exposed and/or erodible soils	***Active face of landfill***	***Construction and demolition wastes and soils.***	***Soils on working face of landfill.***	***Low – Soils are within Leachate System***	***N/A***	***Open-lander Drain***
9) Sites of Environmental Contamination listed under Part 201	***None***					
10) Areas of significant material residues	***None***					
11) Areas where animals congregate (wild or domestic) and deposit wastes	***None***					
12) Other areas where storm water may contact significant materials	***None***					

14.0 VISUAL ASSESSMENT PROCEDURES

1. List the discharge point(s) (as indicated on the SWPPP map):
   Openlander Drain – The visual assessment will be completed within one month of the comprehensive site inspection.

   a) Is there substantially identical discharge points? ☐ Yes ☒ No
   If "Yes" then complete a) and b) below, if "No" go to Number 2.

   b) Describe the justification for the substantially identical discharge points determination?

   c) List the schedule for alternating the substantially identical discharge points:

2. Describe the monitoring (sampling) location for each discharge point:
   The outfall of the detention basin is right before the water flows under the highway.

3. List the Qualified Personnel that will collect the water sample:
   Steve Blayer

4. Training for the Qualified Personnel includes viewing the Visual Assessment Webinar and/or the 3 Visual Assessment Tutorials on the DEQ, WRD Industrial Storm Water webpage. Check the appropriate box below:

   ☒ Yes

   ☐ No, however a copy of the training materials used are included with this procedure.

5. List the sampling equipment used for the collecting the water sample(s):
   Sample jar

6. Complete a) through c) below to describe the storm event information.

   a) Describe how qualifying storm events are determined (including nature of the event):
   A qualifying storm event or snow melt is during working hours (Monday – Friday 7:00 am – 4:00pm) and is 72 hours from last rain event.

   b) Describe how each discharge point was evaluated to determine when a discharge would begin:
   Visual observation within 30 minutes of rainfall.

   c) Describe what would constitute an adverse weather condition that would prevent sample collection:
   Lightning, tornado watch, high winds, unsafe road conditions.

7. Describe how the samples will be collected (Determine the timing sequence for water sample collection from the discharge points): **Within 30 minutes of rainfall a sample is collected.**

8. Describe the water sampling instructions that the Qualified Personnel will follow: **Sample jar will be used to take sample. Top lid is labeled with marker. Label includes location, date, and time.**

9. Described how observations made by the Qualified Personnel will be documented during the discharge (include nature of the event): **Documentation is provided is Visual Assessment form.**

10. Describe the sample storage procedures if applicable: **The sample will be assessed in the office within one hour after collection, so no special storage is required.**

11. Describe the procedures the Industrial Storm Water Certified Operator will follow to perform the visual assessment(s) of the water sample(s): **After recording the sample event observations, the quart jar is gently swirled, and the jar is placed in front of a white background and photographed with the operator's camera. The sample is then observed, and the characteristics are recorded on the report form provided on the storm water website. Samples will be assessed in the office within one hour.**

12. List the name(s) of the Industrial Storm Water Certified Operator that will be performing the water sample visual assessment(s): **Serenity Skillman or Tim Krause**

13. The DEQ, WRD Visual Assessment Report form should be used to document each water sample visual assessment. Check the appropriate box below:

    ☒ Yes, the DEQ, WRD Visual Assessment Report form is used.

    ☐ No, the DEQ, WRD Visual Assessment Report form is not used however the form being used to meet this requirement is included with this procedure.

14. Colored Photos shall be used to record the visual assessment(s). If other methods of recording observations will be used describe those methods: **Electronic storage.**

15. All visual assessment documentation should be kept with the SWPPP file. If documentation will be kept at an alternate location state that location:

16. Describe the follow-up actions that will be taken if unusual characteristics are observed during the visual assessment(s): **Re-sample that quarter. Analytical testing may be required,**

15.0 TABLE 2 – SPILL KIT INVENTORY

List the spill response equipment that will be maintained in each location or locker (refer to MSDSs to determine recommended clean-up methods and supplies):

Person responsible for maintaining this inventory: ***Steve Blayer and Mike Marilla***

Locker number or location	Absorbents (pads, booms, kitty litter, etc.)	Tools (shovels, brooms, squeegees, etc.)	Personal Protective Equipment (rubber gloves, boots, masks, etc.)	Other Supplies (warning tape, labels, markers, MSDSs, etc.)

Label each spill kit with the words "SPILL KIT" and the necessary emergency telephone number(s) or pager number(s) of persons to be contacted in case of a spill or leak that is beyond the training and equipment available on or near each spill locker:

Facility Responsible Person/Phone Number: ***Steve Blayer/517-614-3655***
Spill Response Contractor (if any)/Phone Number:
DEQ District Office Phone Number: ***Danielle McLain, 517-899-7034***
DEQ 24-Hour Emergency Spill Reporting Hot-Line: ***1-800-292-4706 (PEAS Number)***

Stencil the following warning on each spill kit:

"WARNING: NEVER HOSE DOWN A SPILL!
CLEAN IT UP PROMPTLY AND DISPOSE OF THE WASTE PROPERLY."

16.0 ROUTINE INSPECTION FORM

Date:	Time:

Inspector Information	
Print Name:	Signature:

Areas Inspected	Observation	Corrective Actions Taken
Spill kits		
Leachate pump station		
Detention Basin		
Outfall		

17.0 COMPREHENSIVE SITE INSPECTION FORM

Date:	Time:

Certified Operator Information	
Print Name:	Signature:

Precipitation Information
Check the most appropriate box that represents the weather condition during the inspection: ☐ Dry ☐ Rain ☐ Snow ☐ Other, explain:

Compliance Certification Statement
Based on the results of this inspection the facility is in compliance with the general permit and the SWPPP: ☐ Yes ☐ No, explain:

Areas Inspected	Observation	Corrective Actions Taken
Routine Inspection Paperwork		
Outdoor oil storage		
Soils on working face		
Detention Basin		
Outfall		

18.0 VISUAL ASSESSMENT REPORT FORM

Visual Assessment Sample Information		
Facility Name:	COC No. or NPDES Permit No:	
Industrial Storm Water Certified Operator Name:		
Name / Title of person collecting sample if other than Cert. Operator:		
Date of Comprehensive Inspection:	Is this a substitute sample? ☐ No ☐ Yes Explain:	
Discharge Point # / Name:	Substantially Identical Discharge Point? ☐ No ☐ Yes List:	
Description of sample collection location:		
Date / Time Discharge Began:	Date / Time Sample Collected:	Date / Time Sample Examined:
For rain events - if sample was collected > 30 minutes from start of discharge, provide explanation:		
Snowmelt ☐	Rainfall ☐ Inches:	If rain event - previous storm ended > 72 hours prior to start of this event? ☐ No ☐ Yes

Observations	
Color: ☐ None ☐ Yes (describe):	Floating Solids: ☐ No ☐ Yes (describe):
Oil Films / Sheens: ☐ None ☐ Flecks ☐ Globs ☐ Sheen ☐ Other Describe appearance of film/sheen:	
Foam (gently shake sample): ☐ No ☐ Yes	Suspended Solids: ☐ No ☐ Yes (describe):
Settleable Solids: ☐ No ☐ Yes (describe):	
Odor: ☐ None ☐ Musty ☐ Sewage ☐ Sulfur ☐ Sour ☐ Hydrocarbons ☐ Chemical ☐ Other (describe):	
Turbidity/Clarity: ☐ Clear ☐ Slightly Cloudy ☐ Cloudy ☐ Milky ☐ Other (describe):	
Picture of sample taken (required): ☐ No ☐ Yes Storage location:	
Receiving waters observed? ☐ N/A ☐ No ☐ Yes (describe):	

Follow-up:
Based on the visual observation, are there unnatural characteristics in the discharge (cloudiness, color, sheen, etc.)? ☐ No ☐ Yes
Potential sources of observed unnatural characteristics ☐ N/A or describe:
Implemented / recommended corrective action(s) ☐ N/A or describe: Scheduled date for correction:

I certify that the above information is correct	
Certified Operator Signature	Date

RETAIN THIS FORM FOR A MINIMUM OF 3 YEARS

19.0 EMPLOYEE TRAINING FORM

Date of Session:

Trainer Information	
Print:	Signature:

Training Session Information
Topics Covered:

Attendee Name	Attendee Signature

20.0 ANNUAL SWPPP REVIEW REPORT FORM

Facility Information	
Designated Name:	Certificate of Coverage No. <u>or</u> Individual Permit No.:
Facility Address:	County:
Facility Contact Information	
Name:	Telephone No.:
Email Address:	Certification No.:
Backup Facility Contact Information	
Name:	Telephone No.:
Email Address:	Certification No.:
Industrial Storm Water Certified Operator Information	
Name:	Telephone No.:
Email Address:	Certification No.:
Space to list additional operators if applicable:	

The SWPPP Checklist on the DEQ, WRD Industrial Storm Water webpage should be used to review the facility's SWPPP and <u>before</u> the following 10 questions are completed.			
1. Facility general information is current and accurate	Yes ☐	No ☐	
2. Site map is current and accurate	Yes ☐	No ☐	
3. Significant material inventory is current and accurate	Yes ☐	No ☐	
4. New exposures, processes and related controls have been documented appropriately in the SWPPP	Yes ☐	No ☐	NA ☐
5. Spills have been recorded and reported as appropriate	Yes ☐	No ☐	NA ☐
6. Employee SWPPP training was conducted and documented	Yes ☐	No ☐	
7. Records of routine preventative maintenance and housekeeping inspections are available in the SWPPP file	Yes ☐	No ☐	
8. Comprehensive site inspections have been completed, certified and filed in the SWPPP file	Yes ☐	No ☐	
9. Visual Assessments have been completed and the reports have been filed in the SWPPP file	Yes ☐	No ☐	NA ☐
10. Corrective actions noted in the inspection reports have been completed	Yes ☐	No ☐	
11. The SWPPP is compliant with the permit and has been reviewed and signed by the Certified Storm Water Operator and the permittee or designated representative	Yes ☐	No ☐	
Additional Comments:			

I certify that the above information is correct:	
Name:	Signature / Date:

SUBMIT THIS FORM TO THE DEQ, WRD DISTRICT OFFICE IDENTIFIED ON YOUR CERTIFICATE OF COVERAGE ON OR BEFORE **<u>JANUARY 10TH</u>** OF EACH YEAR

21.0 DEQ SPILL OR RELEASE REPORT

DEQ

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

SPILL OR RELEASE REPORT

NOTE: Some regulations require a specific form to use and procedures to follow when reporting a release. Those forms and procedures **MUST** be used and followed if reporting under those regulations. This report form is to aid persons reporting releases under regulations that do not require a specific form. This report form is not required to be used. **To report a release, some regulations require a facility to call the PEAS Hotline at 800-292-4706, or DEQ District Office that oversees the county where it occurred, and other regulating agencies and provide the following information. A follow-up written report may be required. Keep a copy of this report as documentation that the release was reported. If you prefer to submit this report electronically by FAX or e-mail, contact the regulating agency for the correct telephone number or e-mail address.** See the DEQ website on Spill/Release Reporting for more reporting information.

Please print or type all information.

NAME AND TITLE OF PERSON SUBMITTING WRITTEN REPORT			TELEPHONE NUMBER (provide area code)		
NAME OF BUSINESS			RELEASE LOCATION (provide address if different than business, if known, and give directions to the spill location. Include nearest highway, town, road intersection, etc.)		
STREET ADDRESS					
CITY	STATE	ZIP CODE			
BUSINESS TELEPHONE NUMBER (provide area code)					
SITE IDENTIFICATION NUMBER AND OTHER IDENTIFYING NUMBERS (if applicable)			COUNTY	TOWNSHIP	TIER/RANGE/SECTION (if known)

RELEASE DATA. Complete all applicable categories. Check all the boxes that apply to the release. Provide the best available information regarding the release and its impacts. Attach additional pages if necessary.

DATE & TIME OF RELEASE (if known)	DATE & TIME OF DISCOVERY	DURATION OF RELEASE (if known)	TYPE OF INCIDENT
____/____/____ __________am/pm	____/____/____ __________am/pm	__________ days __________ hours __________ minutes	☐ Explosion ☐ Fire ☐ Leaking container ☐ Loading/unloading release ☐ Pipe/valve leak or rupture ☐ Vehicle accident ☐ Other __________

MATERIAL RELEASED (Chemical or trade name) ☐ CHECK HERE IF ADDITIONAL MATERIALS LISTED ON ATTACHED PAGE.	CAS NUMBER or HAZARDOUS WASTE CODE	ESTIMATED QUANTITY RELEASED (indicate unit e.g. lbs, gals, cu ft or yds)	PHYSICAL STATE RELEASED (indicate if solid, liquid, or gas)

FACTORS CONTRIBUTING TO RELEASE

☐ Equipment failure
☐ Operator error
☐ Faulty process design
☐ Training deficiencies
☐ Unusual weather conditions
☐ Other __________

SOURCE OF LOSS

☐ Container
☐ Railroad car
☐ Pipeline
☐ Ship
☐ Tank
☐ Tanker
☐ Truck
☐ Other __________

TYPE OF MATERIAL RELEASED

☐ Agricultural: manure, pesticide, fertilizer
☐ Chemicals
☐ Flammable or combustible liquid
☐ Hazardous waste
☐ Liquid industrial waste
☐ Oil/petroleum products or waste
☐ Salt
☐ Sewage
☐ Other__________
☐ Unknown

MATERIAL LISTED ON or DEFINED BY

☐ CAA Section 112(r) list (40 CFR Part 68)
☐ CERCLA Table 302.4 (40 CFR Part 302)
☐ EPCRA Extremely Hazardous Substance (40 CFR Part 355)
☐ Michigan Critical Materials Register or permit
☐ NREPA Part 31, Part 5 Rules polluting material
☐ NREPA Part 111 or RCRA hazardous waste
☐ NREPA Part 121 liquid industrial waste
☐ Other list __________
☐ Unknown

IMMEDIATE ACTIONS TAKEN

☐ Containment
☐ Dilution
☐ Evacuation
☐ Hazard removal
☐ Neutralization
☐ System shut down
☐ Diversion of release to treatment
☐ Decontamination of persons or equipment
☐ Monitoring
☐ Other __________

RELEASE REACHED

☐ Surface waters (include name of river, lake, drain involved) __________ Distance from spill location to surface water, in feet__________
☐ Drain connected to sanitary sewer (include name of wastewater treatment plant and/or street drain, if known) __________
☐ Drain connected to storm sewer (include name of drain or water body it discharges into, if known) __________
☐ Groundwater (indicate if it is a known or suspected drinking water source and include name of aquifer, if known) __________
☐ Soils (include type e.g. clay, sand, loam, etc.) __________
☐ Ambient Air
☐ Spill contained on impervious surface

EXTENT OF INJURIES, IF ANY	WAS ANYONE HOSPITALIZED? ☐ Yes NUMBER HOSPITALIZED:____ ☐ No	TOTAL NUMBER OF INJURIES TREATED ON-SITE:

DESCRIBE THE INCIDENT, THE TYPE OF EQUIPMENT INVOLVED IN THE RELEASE, HOW THE VOLUME OF LOSS WAS DETERMINED, ALONG WITH ANY RESULTING ENVIRONMENTAL DAMAGE CAUSED BY THE RELEASE. IDENTIFY WHO IMMEDIATELY RESPONDED TO THE INCIDENT (own employees or contractor — include cleanup company name, contact person, and telephone number). ALSO IDENTIFY WHO DID FURTHER CLEANUP ACTIVITIES, IF PERFORMED OR KNOWN WHEN REPORT SUBMITTED

☐ CHECK HERE IF DESCRIPTION OR ADDITIONAL COMMENTS ARE INCLUDED ON ATTACHED PAGE

ESTIMATED QUANTITY OF ANY RECOVERED MATERIALS AND A DESCRIPTION OF HOW THOSE MATERIALS WERE MANAGED (include disposal method if applicable)

☐ CHECK HERE IF DESCRIPTION OR ADDITIONAL COMMENTS ARE INCLUDED ON ATTACHED PAGE

ASSESSMENT OF ACTUAL OR POTENTIAL HAZARDS TO HUMAN HEALTH (include known acute or immediate and chronic or delayed effects, and where appropriate, advice regarding medical attention necessary for exposed individuals.)

☐ CHECK HERE IF DESCRIPTION OR ADDITIONAL COMMENTS ARE INCLUDED ON ATTACHED PAGE

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY NOTIFIED:

INITIAL CONTACT BY: ☐ Telephone ☐ Fax ☐ Email ☐ Other

DATE/TIME INITIAL CONTACT:______________________

☐ PEAS: 800-292-4706 Log Number Assigned ______________

☐ DEQ District or Field Office

		Divisions or Offices Contacted:
☐ Baraga	☐ Gwinn	☐ Air Quality
☐ Bay City	☐ Jackson	☐ Land & Water Management
☐ Cadillac	☐ Kalamazoo	☐ Office Geological Survey
☐ Crystal Falls	☐ Lansing	☐ Remediation and Redevelopment
☐ Detroit	☐ Newberry	
☐ Gaylord	☐ Warren	☐ Waste and Hazardous Materials
☐ Grand Rapids	☐ Wyoming	
		☐ Water Bureau

DEQ Office locations are subject to change

NAME AND TITLE OF PERSON MAKING INITIAL REPORT:

____

DEQ STAFF CONTACTED & PHONE NUMBER:

____

____

OTHER ENTITIES NOTIFIED:

	Date:	Time:
☐ National Response Center (NRC): 800-424-8802		
☐ US Coast Guard Office: ☐ Detroit ☐ Grand Haven ☐ Sault Ste. Marie		
☐ US Department of Transportation		
☐ US Environmental Protection Agency		
☐ 911 (or primary public safety answering point)		
☐ Local Fire Department		
☐ Local Police and/or State Police		
☐ Local Emergency Planning Committee		
☐ State Emergency Response Commission via MI SARA Title III Program		
☐ Wastewater Treatment Plant Authority		
☐ Hazmat Team		
☐ Local Health Department		
☐ Department of Labor & Economic Growth MIOSHA		
☐ Department of Labor & Economic Growth Fire Safety		
☐ Michigan Department of Agriculture: 800-405-0101		
☐ Other ______________________		

PERSON CONTACTED & PHONE NUMBER:

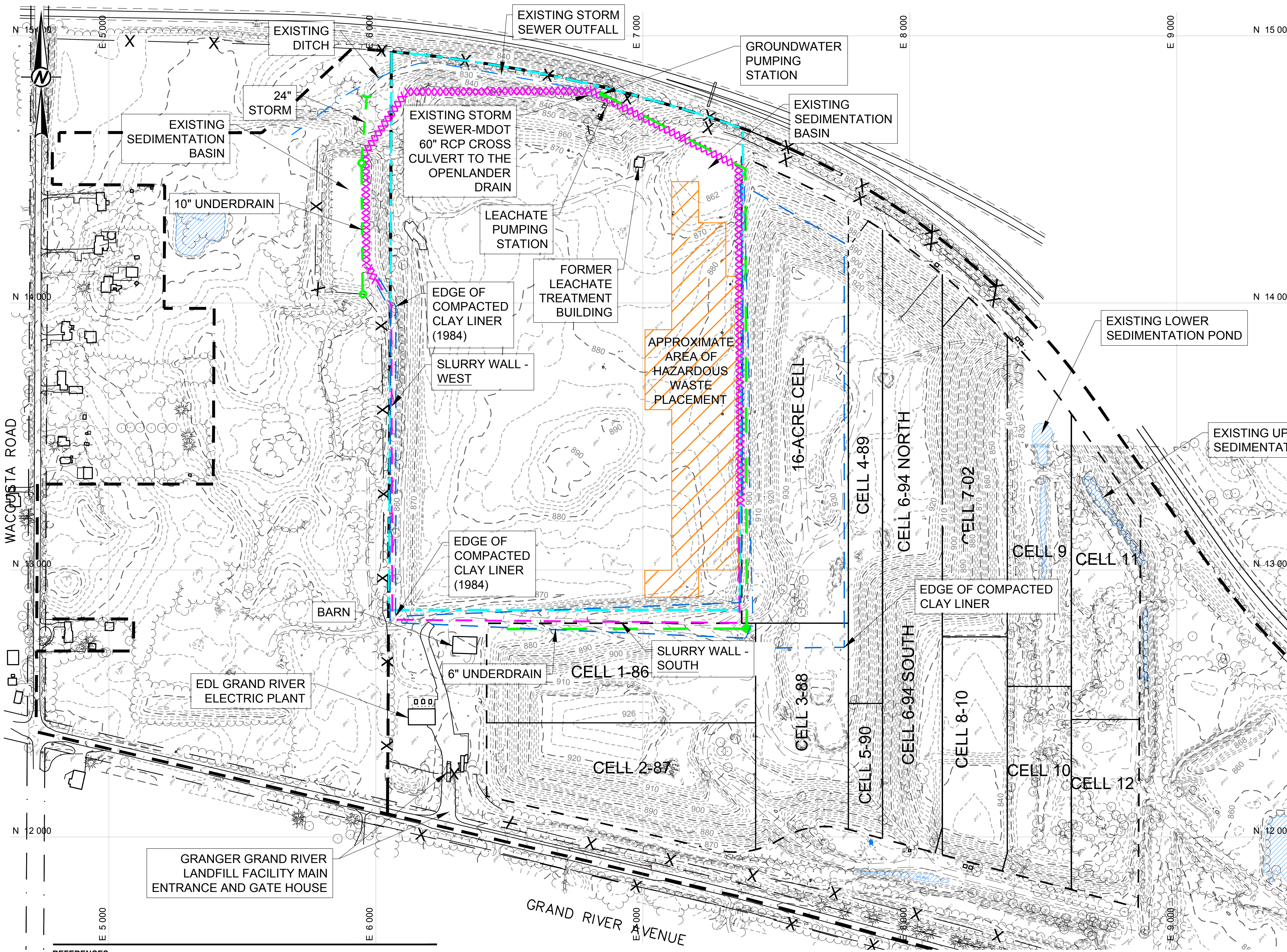
____

____

DATE WRITTEN REPORT SUBMITTED	SIGNATURE OF PERSON SUBMITTING WRITTEN REPORT

Attachment 3

Engineering Plans



LEGEND

	PROPERTY BOUNDARY
	APPROXIMATE GRANGER MID LANDFILL BOUNDARY
	APPROXIMATE AREA OF HAZARDOUS WASTE PLACEMENT (REFERENCE 2)
	UNDERDRAIN PIPING (REFERENCE 3)
	CLAY WALL DIKE (REFERENCE 3)
	EDGE OF COMPACTED CLAY LINER - 1984 (REFERENCE 4)

0 200 400
1" = 400' FEET

REFERENCES

1. EXISTING TOPOGRAPHY BASED ON NOVEMBER 24, 2019 AERIAL FLYOVER, PROVIDED BY GRANGER, DATED 1/21/2020.
2. APPROXIMATE AREA OF HAZARDOUS WASTE PLACEMENT TAKEN FROM "FINAL CONTOURS ON EXISTING FILLED SITE," DATED 9-28-84, PROVIDED BY GRANGER WASTE MANAGEMENT.
3. APPROXIMATE UNDERDRAIN AND CLAY WALL DIKE LOCATIONS TAKEN FROM "MONITORING WELL AND GROUNDWATER DATA SURVEY," DATED 5-9-86, PROVIDED BY GRANGER WASTE MANAGEMENT.
4. APPROXIMATE LEACHATE PIPING LOCATIONS TAKEN FROM "SITE PLAN AS-BIULT - 1984," BY STS CONSULTANTS LTD., PROVIDED BY GRANGER WASTE MANAGEMENT.

GRANGER WASTE MANAGEMENT
GRAND RIVER LANDFILL
LANSING, MICHIGAN

OPERATING PERMIT LICENSE APPLICATION

WSP GOLDER

2021-11-17
SFS
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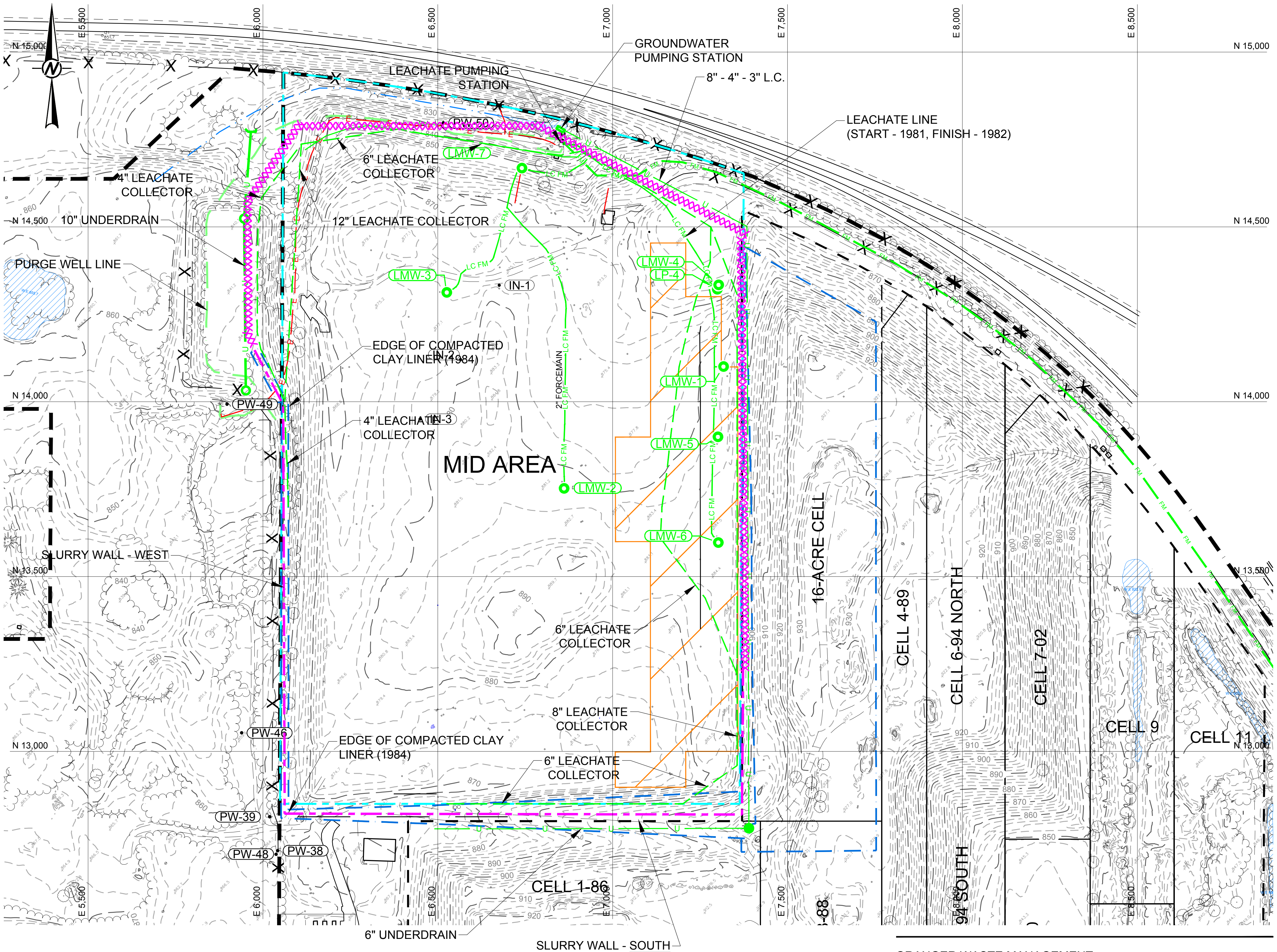
DML

FACILITY LAYOUT

	CONTROL		FIGURE
21494044		0	2



LEGEND

- UNDERGROUND LEACHATE COLLECTION PIPING
- UNDERGROUND LEACHATE COLLECTION FORCEMAIN
- LMW-X — LEACHATE MANAGEMENT WELL
- PW-X — PURGE WELL
- EDGE OF COMPACTED CLAY LINER (1984) (REFERENCE 3)
- SLURRY WALL (REFERENCE 3)
- 6" UNDERDRAIN (REFERENCE 3)
- CLAY WALL DIKE (REFERENCE 3)

REFERENCES

1. EXISTING TOPOGRAPHY BASED ON NOVEMBER 16, 2021 AERIAL FLYOVER, PROVIDED BY GRANGER, ON 4/28/2022.
2. APPROXIMATE AREA OF HAZARDOUS WASTE PLACEMENT TAKEN FROM "FINAL CONTOURS ON EXISTING FILLED SITE," DATED 9-28-84, PROVIDED BY GRANGER WASTE MANAGEMENT.
3. APPROXIMATE UNDERDRAIN AND CLAY WALL DIKE LOCATIONS TAKEN FROM "MONITORING WELL AND GROUNDWATER DATA SURVEY," DATED 5-9-86, PROVIDED BY GRANGER WASTE MANAGEMENT.
4. APPROXIMATE LEACHATE PIPING LOCATIONS TAKEN FROM "SITE PLAN AS-BUILT - 1984," BY STS CONSULTANTS LTD., PROVIDED BY GRANGER WASTE MANAGEMENT.
5. BASE MAP TAKEN FROM "GLD-W2.DWG", DATED 6-26-2019, PROVIDED BY GRANGER.

GRANGER WASTE MANAGEMENT
GRAND RIVER LANDFILL
LANSING, MICHIGAN

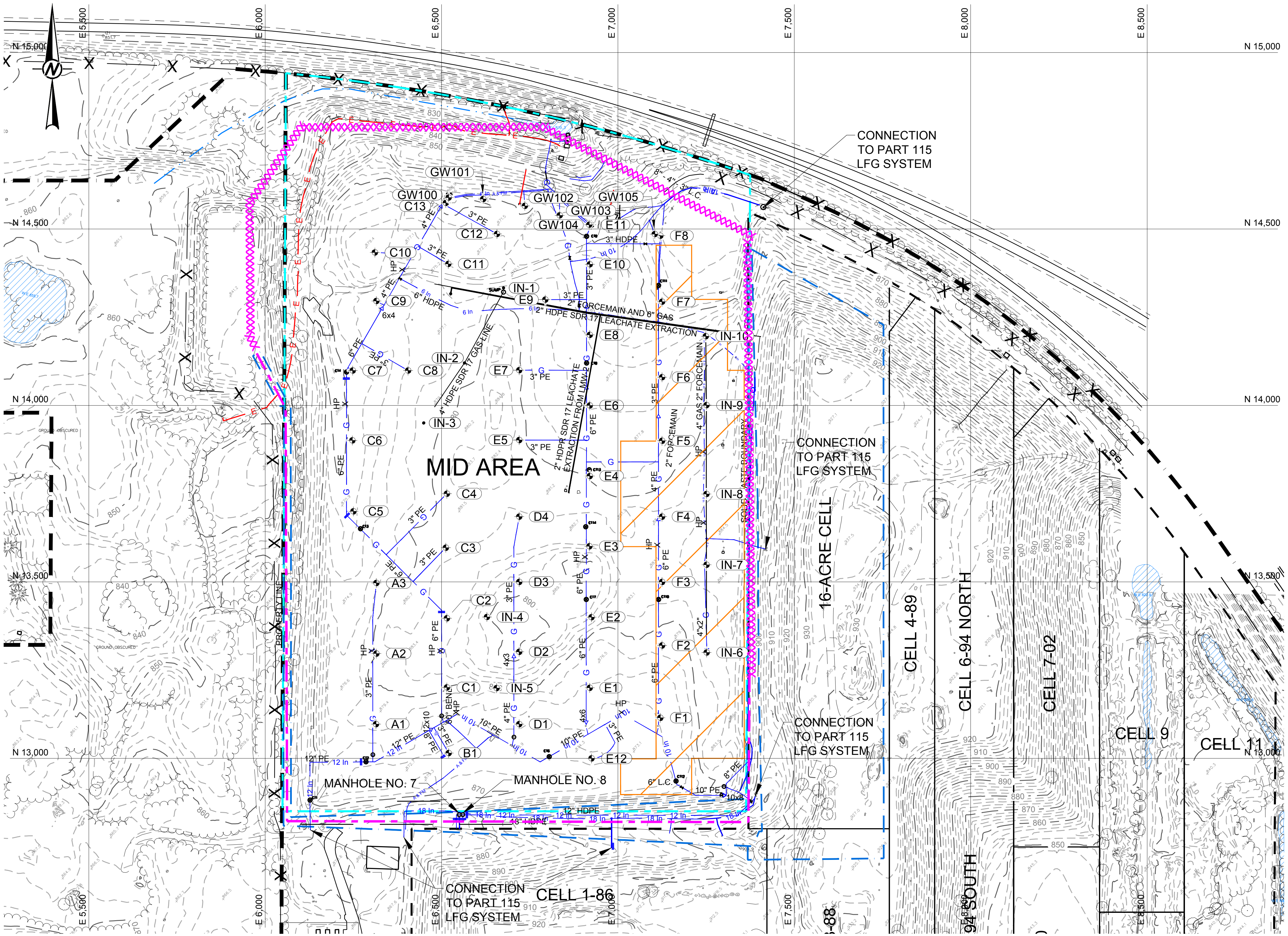
OPERATING PERMIT LICENSE APPLICATION

2022-08-12
SFS
JJS

WSP GOLDER

EXISTING LEACHATE COLLECTION PLAN

	CONTROL		FIGURE
21494044		0	4



LEGEND

- AS-BUILT GAS LINES
- AS-BUILT GAS WELL
- AS-BUILT UNCONTROLLED - BELOW GRADE GAS WELL
- U-TRAP
- VALVE
- MANHOLE

REFERENCES

1. EXISTING TOPOGRAPHY BASED ON NOVEMBER 16, 2021 AERIAL FLYOVER, PROVIDED BY GRANGER, ON 4/28/2022.
2. APPROXIMATE AREA OF HAZARDOUS WASTE PLACEMENT TAKEN FROM "FINAL CONTOURS ON EXISTING FILLED SITE," DATED 9-28-84, PROVIDED BY GRANGER WASTE MANAGEMENT.
3. APPROXIMATE UNDERDRAIN AND CLAY WALL DIKE LOCATIONS TAKEN FROM "MONITORING WELL AND GROUNDWATER DATA SURVEY," DATED 5-9-86, PROVIDED BY GRANGER WASTE MANAGEMENT.
5. BASE MAP TAKEN FROM "Gld-w2.dwg", DATED 6-26-2019, PROVIDED BY GRANGER.

0 150 300
1" = 300' FEET

GRANGER WASTE MANAGEMENT
GRAND RIVER LANDFILL
LANSING, MICHIGAN

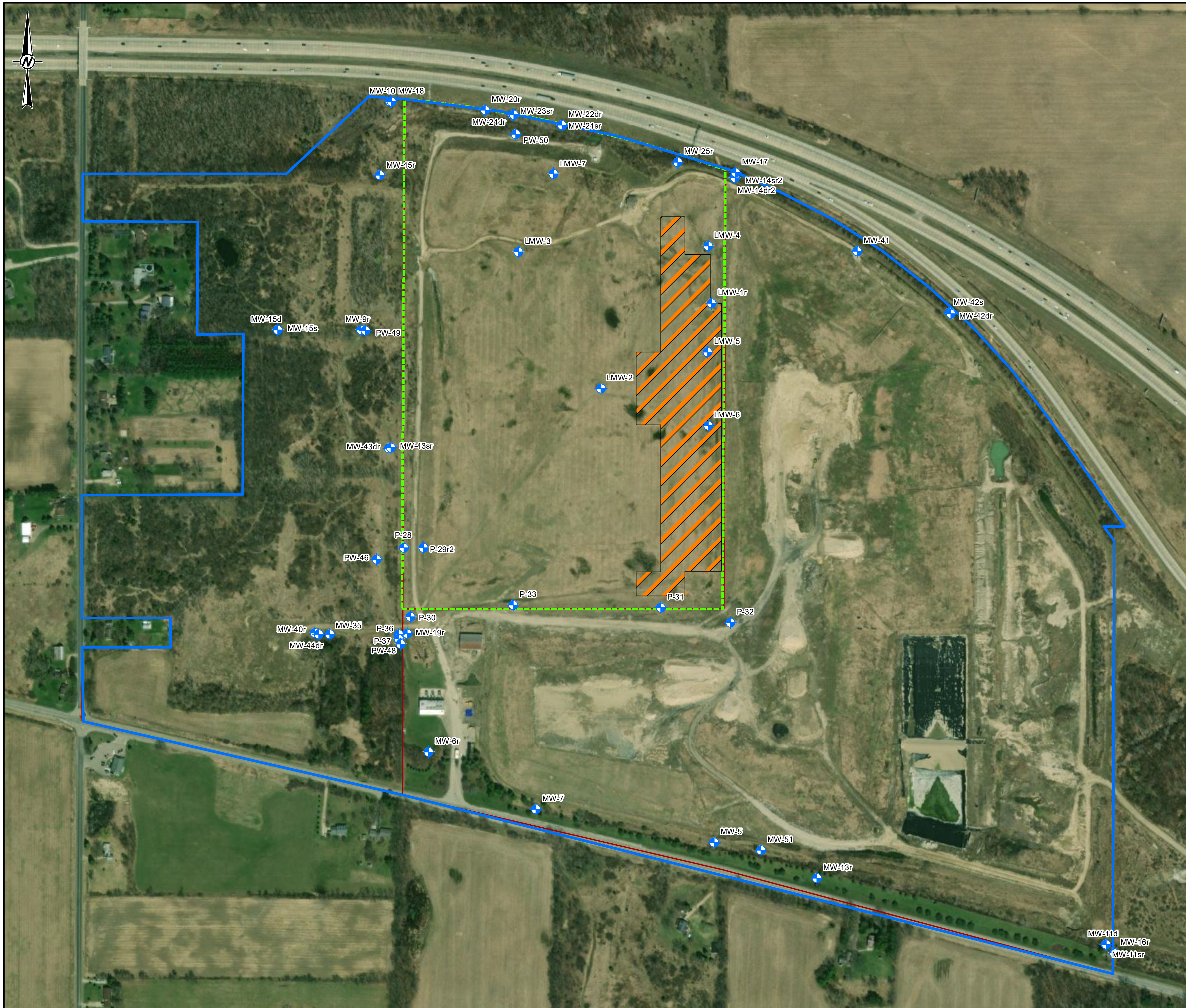
2022-08-12
SFS
JJS

WSP GOLDER

OPERATING PERMIT LICENSE APPLICATION

EXISTING GAS SYSTEM PLAN

CONTROL		FIGURE
21494044	0	5



LEGEND

WELL LOCATION

PROPERTY BOUNDARY

APPROXIMATE HAZARDOUS WASTE PLACEMENT

CLOSED MID LANDFILL BOUNDARY

PARCELS

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

400 200 0 400
Feet

CLIENT
GRANGER WASTE MANAGEMENT
GRAND RIVER LANDFILL
LANSING, MICHIGAN

PROJECT
OPERATING PERMIT LICENSE APPLICATION

TITLE
AERIAL PHOTOGRAPH

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-08-09
PREPARED	DJC
DESIGN	SFS
REVIEW	SFS
APPROVED	DML

PROJECT No.	CONTROL	Rev.	FIGURE
GL21494044	GL21494044B002-GIS.mxd	0	3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:

Attachment 4

Environmental Monitoring Sampling and Analysis Plan

REPORT

Monitoring Plan

Granger MID 082 771 700

Submitted to:

Granger Land Development Company

Lansing, MI

Submitted by:

Golder Associates USA Inc.

15851 South US 27, Suite 50, Lansing, Michigan, USA 48906

+1 517 482 2262

21494044

December 2021, Rev. August 2022, Rev. December 2022

Table of Contents

TABLES

No table of figures entries found.FIGURES

APPENDICES

1.0 GROUNDWATER MONITORING PROGRAM

This post-closure groundwater monitoring program has been designed in accordance with the requirements listed in Part 111 of the 1994 Public Act 451, as amended, 40 CFR 265 .118 and other sections referenced therein. The groundwater monitoring system has been designed to provide the capability of determining if any significant impact has occurred to the groundwater at the site. The monitoring system has been designed and installed in accordance with the criteria listed in 40 CFR 265.91.

1.1 Monitoring Well Network

The monitoring well network for the MID landfill is summarized in Table 1. Monitoring well locations are shown on **Figure F-1**.

Table 1: Monitoring Well Network

Unit	Monitoring Wells
Shallow Glacial Drift:	MW-6R, MW-9R, MW-14SR2, MW-21SR, MW-23SR, MW-40R, MW-43SR
Deep Glacial Drift:	, MW-14DR2, MW-20R, MW-22DR, MW-24DR, MW-25R, MW-41, MW-43DR, MW-44DR, MW-45R
Bedrock:	MW-16R, MW-17, MW-18
Purge/Recovery Area:	MW-19R, P-28, P-29R2,
Piezometers/Water Level Only:	MW-5, MW-7, MW-10, MW-11SR, MW-11D, MW-13R, MW-15S, MW-15D, P-30, P-31, P-32, P-33, MW-35, P-36, P-37, MW-42S, MW-42DR,

1.2 Static Groundwater Level Measurements

During each semi-annual monitoring event, static groundwater level measurements will be collected from all monitoring wells and piezometers (MW-5, MW-6R, MW-7, MW-9R, MW-10, MW-11SR, MW-11D, MW-13R, MW-14SR2, MW-14DR2, MW-15S, MW-15D, MW-16R, MW-17, MW-18, MW-19R, MW-20R, MW-21SR, MW-22DR, MW-23SR, MW-24DR, MW-25R, P-28, P-29R2, P-30, P-31, P-32, P-33, MW-35, P-36, P-37, , MW-40R, MW-41, MW-42S, MW-42DR, MW-43SR, MW-43DR, MW-44DR, MW-45R, PW-46, PW-48, PW-49, PW-50 and MW-51).

During each quarterly purge system sampling event, static groundwater levels will be collected from the following piezometers and wells: MW-19R, P-28, P-29R2, P-30, P-31, P-32, P-33, MW-35, P-36, P-37, MW-40R and MW-44DR.

Static water level measurements from all wells and piezometers must be collected within a 24-hour period to maintain data integrity. At the time of static water level measurement, the well must be inspected to verify that each monitor well is clearly labelled, visible, undamaged, properly vented, capped and locked when it is first encountered. When leaving the well, verification will be made to ensure that the well is capped and locked. Any problems identified should be recorded and scheduled for maintenance.

Groundwater contour maps from the 2020 Annual Groundwater Report are provided in **Appendix F-1**.

1.3 Sampling and Analysis

A Sampling and Analysis Plan (SAP) is included in **Appendix F-2**. This document identifies techniques for collection, preservation, transport and storage of samples as well as the Quality Assurance/Quality Control (QA/QC) measures.

1.3.1 Groundwater Sample Collection

The appropriate groundwater monitoring wells will be sampled in an order such that the unimpacted wells are sampled first, progressing to the most impacted well as the last well sampled. Purge water from contaminated wells will be contained and disposed of in the leachate collection system.

On a semi-annual basis the wells sampled will include: MW-6R, MW-9R, MW-14SR2, MW-14DR2, MW-19R, MW-20R, MW-21SR, MW-22DR, MW-23SR, MW-24DR, MW-25R, MW-40R, MW-41, MW-43SR, MW-43DR, MW-45R, P-28, and P-29R2. The bedrock aquifer wells will be sampled annually, including: MW-16R, MW-17, MW-18.

Temperature, pH and specific conductance will be measured in the field using portable meters that have been standardized at the beginning of each day in accordance with the protocol described in the SAP. The field data sheets will provide for identification and notation of the standardization.

Each piece of sampling equipment (either Teflon bailers, stainless steel bailers or submersible pumps) will be thoroughly decontaminated after each well sampled as described in the SAP. These procedures are designed to minimize the potential for any cross-contamination and interference with the analytical processes.

All samples obtained shall be representative of groundwater quality. To ensure a representative sample is collected, one of the following must occur:

- Field parameter (pH, specific conductance and temperature) measurements must stabilize to within 10 percent;
- Volume of groundwater equal to at least three times the amount of groundwater in the well casing will be evacuated;
- or until the well is dry.

Wells will be sampled immediately after purging where recovery rates allow. Wells evacuated to dryness will be allowed sufficient time for recovery prior to sampling such that the necessary volume can be collected.

As described in the SAP, groundwater evacuated from any monitoring well or purge well which has been identified as impacted will be discharged to the leachate collection system or handled in an alternative manner which is consistent with all applicable regulations. Purged groundwater from unimpacted monitoring wells will be discharged to the ground at least ten feet downgradient from the well. The collection of samples from wells which are designated for volatile organic analyses will be obtained using the protocol described in the SAP.

1.3.2 Groundwater Analyses

Groundwater samples will be analysed for the parameters listed in Tables 2, 3, 4, and 5, below.

Table 2: - Primary Groundwater Analytical Parameters

Primary Parameter	Analytical Method	Reporting Limit (µg/L)
Bromodichloromethane	EPA 8260D	1
Bromoform	EPA 8260D	1
Carbon Tetrachloride	EPA 8260D	1
Chlorobenzene	EPA 8260D	1
Chloroethane	EPA 8260D	1
Chloroform	EPA 8260D	1
Dibromochloromethane	EPA 8260D	1
o-dichlorobenzene	EPA 8260D	1
p-dichlorobenzene	EPA 8260D	1
1, 1-dichloroethane	EPA 8260D	1
1,2-dichloroethene	EPA 8260D	1
1, 1-dichloeoethene	EPA 8260D	1
cis-1,2-dichloroethene	EPA 8260D	1
trans-1,2-dichloroethene	EPA 8260D	1
1,2-dichloropropane	EPA 8260D	1
cis-1,3-dichloropropene	EPA 8260D	1
trans-1,3-dichloropropene	EPA 8260D	1
Methyl Bromide	EPA 8260D	5
Methyl Chloride	EPA 8260D	5
Methylene Bromide	EPA 8260D	1
Methylene Chloride	EPA 8260D	5
Methyl Iodide	EPA 8260D	1
T-Butanol	EPA 8260D	50
1, 1, 1,2-tetrachloroethane	EPA 8260D	1
1, 1,2,2-tetrachloroethane	EPA 8260D	1
Tetrachloroethene	EPA 8260D	1
Tetrahydrofuran	EPA 8260D	5
1, 1, l-Trichloroethane	EPA 8260D	1
1, 1,2-Trichloroethane	EPA 8260D	1
Trichloroethene	EPA 8260D	1
Trichlorofluoromethane	EPA 8260D	5
1,2,3-trichloropropane	EPA 8260D	1
1,2,4-trimethylbenzene	EPA 8260D	1
Vinyl Chloride	EPA 8260D	5
Benzene	EPA 8260D	1

Primary Parameter	Analytical Method	Reporting Limit (µg/L)
Ethyl benzene	EPA 8260D	1
Styrene	EPA 8260D	1
Toluene	EPA 8260D	1
Xylenes	EPA 8260D	2

Table 3: Secondary Groundwater Analytical Parameters

Secondary Parameter	Analytical Method	Reporting Limit (µg/L)
Cadmium (dissolved)*	EPA 6020A	0.2
Chromium (dissolved)*	EPA 6020A	1
Lead (dissolved)*	EPA 6020A	1
Boron (dissolved)*	EPA 6020A	20
Arsenic (dissolved)*	EPA 6020A	1

* - metals samples from bedrock aquifer will be analysed for total metals annually

Table 4: Tertiary Groundwater Analytical Parameters

Tertiary Parameter	Analytical Method	Reporting Limit (µg/L)
Ammonia Nitrogen	SM 4500-NH3 G-2011	10
Nitrate Nitrogen	EPA 9056A	10
Bicarbonate Alkalinity	SM 2320 B-2011	10,000 µg/L as $CaCO_3$
Chloride	EPA 9056A	1,000
Sodium (dissolved)*	EPA 6020A	1,000
Potassium (dissolved)*	EPA 6020A	100
Calcium (dissolved)*	EPA 6020A	1,000
Iron (dissolved)*	EPA 6020A	20
Magnesium (dissolved)*	EPA 6020A	1,000
Manganese (dissolved)*	EPA 6020A	5
Sulfate	EPA 9056A	2,000

* - metals samples from bedrock aquifer will be analysed for total metals annually

Table 5: Field Groundwater Parameters

Field Parameter	Analytical Method	Reporting Limit
pH (Field)	EPA 9040C	-1 SU
Specific Conductance (Field)	SM 2510 B-2011	1 umhos/cm
Temperature (Field)	EPA 9040C	0 Celsius

1.3.3 Statistical Analysis

The site is utilizing the Post-Closure Groundwater Statistical Evaluation Program prepared by RMT, Inc dated January 2006 (Revision 3) which is provided in **Attachment F-3**. The statistical program utilizes an intra-well approach as previously approved by the State. [(Section 2.1 of Attachment F-3.)]

Statistical comparisons will be made for the primary parameters (Table 2) for each of the monitoring wells identified in Section 3.2 of the Statistical Program as being associated with the shallow glacial aquifer, the deep glacial aquifer, or the bedrock aquifer, as listed below:

- Shallow glacial aquifer: MW-9R, MW-14SR2, MW-21SR, MW-23SR, MW-40R, MW-43SR
- Deep glacial aquifer: MW-44DR, MW-14DR2, MW-20R, MW-22DR, MW-24DR, MW-25R, MW-41, MW-43DR, MW-45R
- Bedrock aquifer: MW-16R, MW-17, MW-18
- Recover Area: MW-19R, P-28, P-29R2, PW-46, PW-48

Statistical comparisons will also be performed for the secondary parameters (Table 3) for the same monitoring wells.

The tertiary parameters provide information regarding the general chemistry of the groundwater and to assist in determining if a release has occurred or if other factors, such as well seal or grout contamination are issues.

1.4 Assessment Monitoring Program

If a statistically significant increase is determined to have occurred for a primary groundwater parameter, Granger will address the increase in accordance with R299.9612 and 40 CFR §264.98(f) and (g), and Postclosure Operating License conditions.

If a statistically significant increase is determined to have occurred for a secondary groundwater parameter, Granger will address the increase in accordance with R299.9612 and Postclosure Operating License conditions.

1.5 Groundwater Monitoring Reporting and Recordkeeping

Results of the analytical results will be submitted to EGLE within 60 days of the sampling event. Chain-of-Custody and sampling data sheets will be completed by field sampling personnel. These records will be stored at the Granger Wood Street office as part of the Operating Record.

2.0 SURFACE WATER MONITORING PLAN

2.1 Introduction

The following post-closure surface water monitoring program has been designed in compliance with the requirements listed in Part 111 of the 1994 Public Act 451, as amended, and 40 CFR 264.118 and other sections referenced therein. The detection monitoring system has been designed to provide the capability of determining if any significant impact has occurred to the surface water at the site. Stormwater runoff from the site travels through the ditches along the west and north sides of the landfill and, after leaving the site and traveling under Interstate I-96, empties into the Openlander Drain. An area of deeper excavation of the ditch on the north end just adjacent to the culvert running under the Interstate represents the only surface water body at the site. Samples of the surface water in the ditch are obtained at this location as shown on **Figure F-1**.

2.2 Surface Water Sampling

Monitoring of the surface water in the ditch leading to the Openlander Drain will be performed on a semi-annual basis. Because of the variability of the surface water, each monitoring event will entail the collection of three discrete samples within a 24-hour period. Each sample will be analyzed for the parameters identified in **Table 6** using the analytical methods and detection limits listed. These monitoring parameters have been identified based on an examination of prior monitoring results of leachate, groundwater, and surface water, as well as toxicities of parameters, and absorbabilities.

Representative samples will be obtained by avoiding a disturbance of the sediments prior to sampling, and by obtaining the sample below the water surface and away from the shore and sediments. Each piece of sampling equipment will be thoroughly decontaminated in accordance with the Sampling and Analysis Plan.

Field measurements of pH, specific conductance, and temperature will be obtained using field instruments that have been calibrated at the time of sampling.

Samples collected for analysis of metals will not be field filtered. Each sample container will be labeled with sampling location, time and date, and the sampler's initials. After collection the samples will be preserved according to the appropriate protocol, placed in coolers, and kept on ice. The coolers will be stored in a secure location at all times, and will be delivered to the laboratory on the same day they were collected. A chain of custody form will identify each sample and will accompany each cooler. Each person responsible for the handling of the coolers will sign and date the form.

Table 6: Surface Water Monitoring Parameters

Parameter	Analytical Method	Reporting Limit (μg/L)
Primary Parameters		
VOCs	EPA 8260D	(Note 1)
Secondary Parameters		
Ammonia nitrogen	SM 4500-NH3 G-2011	10
Nitrate nitrogen	EPA 0300.0	10
Cadmium (total)	EPA 0200.8	0.2
Chromium (total	EPA 0200.8	1
Lead (total)	EPA 0200.8	1

Parameter	Analytical Method	Reporting Limit (µg/L)
Arsenic (total)	EPA 0200.8	1
Copper (total)	EPA 0200.8	1
Boron (total)	EPA 0200.8	20
Tertiary Parameters		
Calcium	EPA 0200.8	1,000
Magnesium	EPA 0200.8	1,000
Sodium	EPA 0200.8	1,000
Chloride	EPA 0300.0	1,000
Bicarbonate alkalinity	SM 2320 B-2011	10,000 µg/L as $CaCO_3$
Field Parameters		
pH (field)	SM 4500-H+B-2011	-1 SU
Specific conductance (field)	SM 2510 B-2011	1 umchos/cm

1 – VOC analytes and PQL/RDLs defined in Table 2.

2.3 Surface Water Data Evaluation

Evaluation of the surface water data will be performed in accordance with the Postclosure Operating License conditions and the procedures outlined below. Within 60 days of sampling, Granger will determine if an exceedance of surface water quality criteria has occurred. If an exceedance is confirmed, EGLE will be notified and within 30 days, Granger will determine whether a discharge to surface water is occurring, determine the source, and take steps to eliminate and prevent further discharge.

The surface water data evaluation program is designed to signal concentrations of monitoring parameters which are in excess of the specified standards. Different techniques are used for different parameters which have been divided into four categories: Primary; Secondary; Tertiary; and Field Parameters.

The list of Primary Parameters will be comprised of volatile organic compounds included in Method 8260. This analytical method contains all the compounds that have been detected in prior characterization of the leachate from the site. Since these compounds are not naturally occurring, a confirmed detection for any single compound will be considered an exceedance. Within 10 days of verification of an exceedance (as evidenced by their continued detection in the follow-up sampling), an "incident Specific Assessment Monitoring Plan" will be submitted to the Department.

The Secondary Parameters are mainly inorganic parameters that are found in elevated concentrations in the leachate. Since these parameters are naturally occurring, their presence in surface water may or may not be an indication of a release. In this program, Secondary Parameters are used to detect a possible release in the following way:

> The analytical results will be compared directly to the non-drinking water "Water Quality Values" published for Rule 57 in Part 31 of 1994 Public Act 452, as amended. Water quality criteria will be calculated in accordance with the methods and equations specified in Rule 57, as appropriate. Analytical results in excess of the Rule 57 water quality values for any two or more Secondary Parameters observed in at least

two of the three discrete samples will be considered an exceedance. This approach is designed to detect relatively subtle changes in surface water quality as evidenced by several parameters at once.

The Tertiary Parameters are those parameters that will be measured during detection monitoring, but will not be subjected to the compliance evaluation. The analytical results for parameters in the Tertiary list will be used to evaluate potential non-release related surface water quality. These parameters will not be analysed statistically because they are poor indicators of a release due to low relative concentrations within the landfill leachate.

Field Parameters are those parameters measured and recorded in the field during sample collection. These parameters will not be analysed statistically.

3.0 LEACHATE MONITORING PLAN

3.1 Introduction

The site has an internal perimeter leachate collection system. In addition, a slurry wall has been constructed along the entire south border of the landfill, and extended north along the east and west borders. The landfill has also been capped in accordance with an encapsulation plan approved by the State, and a separation wall constructed along the east border of the landfill.

Those efforts resulted in a 1984 determination by the MDNR that the actions had accomplished the goal of "permanently and completely encapsulating the portion of its landfill site where hazardous wastes have been disposed of in the past on or before May 2, 1983". This understanding was confirmed when the State approved Closure of the site on April 13, 1990.

In addition, as part of the post-closure maintenance and operation of the leachate collection system, six 4-inch diameter leachate piezometers (LMW-1 through LMW-6) were installed in 1995-1996. Each piezometer was designed to have a pumping capacity to reduce the leachate static elevations. Following installation, all of the piezometers had pumping systems installed and the piezometers were connected by a forcemain that resulted in the leachate being discharged to the leachate pump station manhole on the north side of the site. In 2020, a gas extraction well was converted to an extraction well, LMW-7.

The following post-closure leachate monitoring program has been designed in compliance with the requirements listed in 40 CFR 265.118 and other sections referenced therein. In addition, post-closure monitoring of the leachate will be performed in accordance with the monitoring required under the terms of the discharge permit issued by the Southern Clinton County Municipal Utility Authority (SCCMUA).

Monitoring of the character of the leachate discharged to the SCCMUA treatment facility will be performed by an independent consultant and laboratory on an annual basis. Following receipt of monitoring data from the consultant and laboratory, the data will be provided to EGLE.

3.2 Monitoring Locations

The leachate monitoring stations are identified in **Figure F-1**. These stations include the leachate manhole located on the north end of the property, the leachate manhole on the west line, and the piezometers located within the fill area (P-29R2, P-30, P-31, P-33, LMW-1R, LMW-2, LMW-3, LMW-4, LMW-5, LMW-6, and LMW-7).

3.3 Monitoring Schedule

Monitoring of the leachate will be performed on an annual basis.

3.4 Static Leachate Level Measurement

Leachate level monitoring is necessary to ensure that the leachate collection systems were functioning properly, which results in controlling the hydraulic head on the landfill base. Leachate level measurements in the piezometers are performed on a quarterly basis. Along the eastern edge of the landfill, a head of no more than one foot is acceptable, while no more than four feet of head is acceptable in the interior of the landfill. Aside from times of normal maintenance of pumping systems, should these levels be exceeded, the Department will be notified immediately. In addition, within 5 business days, the Department will be provided with an outline of steps to be taken to mediate the head exceedances. Static leachate level measurements will also be obtained quarterly from P-29R2, P-30, P-31, and P-33.

3.5 Sample Collection

Leachate samples are collected from the one-inch line at the pump station manhole. A grab sample using a 5-gallon bucket is done prior to the MID leachate mixing with leachate from the Grand River Avenue Landfill. Approximately 5 gallons will be purged from the forcemain prior to sample collection and care will be taken to collect samples during times of pumping operation. Granger's general leachate sampling procedures are outlined below (may be subject to change):

a) Turn off all leachate wells the night prior to the sampling event.

b) On the day of the sampling event:

   i) Turn on leachate wells for approximately 15 minutes while collecting samples;

   ii) Turn off leachate wells for approximately 15 minutes so that the wells can recover; and

   iii) Repeat until an adequate volume of leachate for a composite sample characteristic of the leachate collection wells has been collected.

3.6 Sample Analysis

Leachate samples will be analysed for the parameters listed in **Table 7** and **Table 8**. Unfiltered samples will be analysed.

Table 7: Leachate Annual Monitoring Schedule

Parameter	Method	Reporting Limit (µg/L)	Schedule
1,2,4-trimethylbenzene	EPA 8260D	0.5	Annual
pH	SM 4500-H+B-2011	-1 SU	Annual
Specific Conductance	SM 2510 B-2011	1 umhos/cm	Annual
Ammonia	SM 4500-NH3 G-2011	1000	Annual
Cyanide	ASTM D7511-12	5	Annual
Nitrate/Nitrite	EPA 9056A	10	Annual
Bicarbonate alkalinity	SM 2320 B-2011	20,000	Annual
Calcium	EPA 6020A	1,000	Annual
Sodium	EPA 6020A	1,000	Annual
Chloride	EPA 9056A	10	Annual
Magnesium	EPA 6020A	1,000	Annual
Sulfate	EPA 9056A	2,000	Annual
BOD	SM 5210 B-2011	2,000	Annual
Phenols	EPA 9065	10	Annual
Total arsenic	EPA 6020A	1	Annual
Total boron	EPA 6020A	5	Annual
Total cadmium	EPA 6020A	0.2	Annual
Total chromium	EPA 6020A	5	Annual

Parameter	Method	Reporting Limit (µg/L)	Schedule
Total copper	EPA 6020A	1	Annual
Total lead	EPA 6020A	1	Annual
Total mercury	EPA 7470A	1	Annual
Total nickel	EPA 6020A	50	Annual
Total zinc	EPA 6020A	50	Annual
1,1,1,2-Tetrachloroethane	SW-846 8260B	5	Annual
1,1,1-Trichloroethane	SW-846 8260B	5	Annual
1,1,2,2-Tetrachloroethane	SW-846 8260B	5	Annual
1,1,2-Trichloroethane	SW-846 8260B	5	Annual
1,1-Dichloroethane	SW-846 8260B	5	Annual
1,1-Dichloroethylene	SW-846 8260B	5	Annual
1,2,3-Trichloropropane	SW-846 8260B	25	Annual
1,2-Dibromo-3-chloropropane	SW-846 8260B	25	Annual
1,2-Dibromoethane	SW-846 8260B	5	Annual
1,2-Dichloroethane	SW-846 8260B	25	Annual
1,2-Dichloropropane	SW-846 8260B	5	Annual
1,4-Dioxane	SW-846 8260B	25	Annual
2-Hexanone	SW-846 8260B	50	Annual
4-Methyl-2-pentanone	SW-846 8260B	50	Annual
Acetone	SW-846 8260B	100	Annual
Acetonitrile	SW-846 8260B	500	Annual
Acrolein	SW-846 8260B	500	Annual
Acrylonitrile	SW-846 8260B	100	Annual
Allyl chloride	SW-846 8260B	25	Annual
Benzene	SW-846 8260B	5	Annual
Bromodichloromethane	SW-846 8260B	5	Annual
Bromoform	SW-846 8260B	25	Annual
Carbon disulfide	SW-846 8260B	25	Annual
Carbon tetrachloride	SW-846 8260B	5	Annual
Chlorobenzene	SW-846 8260B	5	Annual
Chloroethane	SW-846 8260B	5	Annual
Chloroform	SW-846 8260B	5	Annual
Chloroprene	SW-846 8260B	25	Annual
cis-1,3-Dichloropropene	SW-846 8260B	5	Annual
Dibromochloromethane	SW-846 8260B	5	Annual
Dichlorodifluoromethane	SW-846 8260B	5	Annual

Parameter	Method	PQL/RDL (µg/L)	Schedule
Ethyl methacrylate	SW-846 8260B	25	Annual
Ethylbenzene	SW-846 8260B	5	Annual
Isobutyl alcohol	SW-846 8260B	1300	Annual
Methacrylonitrile	SW-846 8260B	250	Annual
Methyl bromide; Bromomethane	SW-846 8260B	5	Annual
Methyl chloride; Chloromethane	SW-846 8260B	5	Annual
Methyl ethyl ketone	SW-846 8260B	50	Annual
Methyl iodide	SW-846 8260B	5	Annual
Methyl methacrylate	SW-846 8260B	25	Annual
Methylene bromide	SW-846 8260B	5	Annual
Methylene chloride	SW-846 8260B	5	Annual
Pentachloroethane	SW-846 8260B	25	Annual
Propionitrile	SW-846 8260B	500	Annual
Styrene	SW-846 8260B	25	Annual
Tetrachloroethylene	SW-846 8260B	5	Annual
Toluene	SW-846 8260B	5	Annual
trans-1,2-Dichloroethylene	SW-846 8260B	5	Annual
trans-1,3-Dichloropropene	SW-846 8260B	5	Annual
trans-1,4-Dichloro-2-butene	SW-846 8260B	250	Annual
Trichloroethylene	SW-846 8260B	5	Annual
Trichlorofluoromethane	SW-846 8260B	5	Annual
Vinyl acetate	SW-846 8260B	50	Annual
Vinyl chloride	SW-846 8260B	5	Annual
Xylene (total)	SW-846 8260B	25	Annual
Tetrahydrofuran	SW-846 8260D	5	Annual
1,2-Dichlorobenzene	SW-846 8260D	1	Annual
1,4-Dichlorobenzene	SW-846 8260D	1	Annual

Table 8: Leachate Odd-Year Monitoring Schedule (Modified Appendix IX List)

Parameter	Method	Reporting Limit (µg/L)	Schedule
1,1,1,2-Tetrachloroethane	SW-846 8260B	5	Odd-Years
1,1,1-Trichloroethane	SW-846 8260B	5	Odd-Years
1,1,2,2-Tetrachloroethane	SW-846 8260B	5	Odd-Years
1,1,2-Trichloroethane	SW-846 8260B	5	Odd-Years
1,1-Dichloroethane	SW-846 8260B	5	Odd-Years
1,1-Dichloroethylene;	SW-846 8260B	5	Odd-Years
1,2,3-Trichloropropane	SW-846 8260B	25	Odd-Years
1,2,4,5-Tetrachlorobenzene	SW-846 8270C	2	Odd-Years
1,2,4-Trichlorobenzene	SW-846 8270C	2	Odd-Years
1,2-Dibromo-3-chloropropane; DBCP	SW-846 8260B	25	Odd-Years
1,2-Dibromoethane;	SW-846 8260B	5	Odd-Years
1,2-Dichloroethane	SW-846 8260B	25	Odd-Years
1,2-Dichloropropane	SW-846 8260B	5	Odd-Years
1,4-Dioxane	SW-846 8260B	25	Odd-Years
1,4-Naphthoquinone	SW-846 8270C	68	Odd-Years
1-Naphthylamine	SW-846 8270C	24	Odd-Years
2,3,4,6-Tetrachlorophenol	SW-846 8270C	11	Odd-Years
2,4,5-T; 2,4,5-Trichlorophenoxyacetic acid	SW-846 8151A	0.18	Odd-Years
2,4,5-Trichlorophenol	SW-846 8270C	2	Odd-Years
2,4,6-Trichlorophenol	SW-846 8270C	2	Odd-Years
2,4-D; 2,4-Dichlorophenoxyacetic acid	SW-846 8151A	0.72	Odd-Years
2,4-Dichlorophenol	SW-846 8270C	2	Odd-Years
2,4-Dimethylphenol	SW-846 8270C	11	Odd-Years
2,4-Dinitrophenol	SW-846 8270C	34	Odd-Years
2,4-Dinitrotoluene	SW-846 8270C	6	Odd-Years
2,6-Dichlorophenol	SW-846 8270C	2	Odd-Years
2,6-Dinitrotoluene	SW-846 8270C	2	Odd-Years
2-Acetylaminofluorene	SW-846 8270C	24	Odd-Years
2-Chloronaphthalene	SW-846 8270C	1	Odd-Years
2-Chlorophenol	SW-846 8270C	2	Odd-Years
2-Hexanone	SW-846 8260B	50	Odd-Years
2-Methylnaphthalene	SW-846 8270C	0.6	Odd-Years
2-Naphthylamine	SW-846 8270C	24	Odd-Years
2-Picoline	SW-846 8270C	6	Odd-Years
3,3′-Dichlorobenzidine	SW-846 8270C	11	Odd-Years
3,3′-Dimethylbenzidine	SW-846 8270C	84	Odd-Years
3-Methylcholanthrene	SW-846 8270C	11	Odd-Years
4,4′-DDD	SW-846 8151A	0.024	Odd-Years

Parameter	Method	Reporting Limit (µg/L)	Schedule
4,4′-DDE	SW-846 8151A	0.024	Odd-Years
4,4′-DDT	SW-846 8151A	0.024	Odd-Years
4,6-Dinitro-o-cresol	SW-846 8270C	24	Odd-Years
4-Aminobiphenyl	SW-846 8270C	12	Odd-Years
4-Bromophenyl phenyl ether	SW-846 8270C	2	Odd-Years
4-Chloroaniline	SW-846 8270C	11	Odd-Years
4-Chlorophenyl phenyl ether	SW-846 8270C	2	Odd-Years
4-Methyl-2-pentanone;	SW-846 8260B	50	Odd-Years
4-Nitroquinoline 1-oxide	SW-846 8270C	68	Odd-Years
5-Nitro-o-toluidine	SW-846 8270C	11	Odd-Years
7,12-Dimethylbenz[a]anthracene	SW-846 8270C	12	Odd-Years
Acenaphthene	SW-846 8270C	0.6	Odd-Years
Acenaphthylene	SW-846 8270C	0.6	Odd-Years
Acetone	SW-846 8260B	100	Odd-Years
Acetonitrile; Methyl cyanide	SW-846 8260B	500	Odd-Years
Acetophenone	SW-846 8270C	11	Odd-Years
Acrolein	SW-846 8260B	500	Odd-Years
Acrylonitrile	SW-846 8260B	100	Odd-Years
Aldrin	SW-846 8081B	0.012	Odd-Years
Alkalinity	SM 2320 B-2011	40	Odd-Years
Allyl chloride	SW-846 8260B	25	Odd-Years
alpha, alpha-Dimethylphenethylamine			Odd-Years
alpha-BHC	SW-846 8151A	0.012	Odd-Years
Ammonia Nitrogen	SM 4500-NH3 G2011	500	Odd-Years
Aniline	SW-846 8270C	11	Odd-Years
Anthracene	SW-846 8270C	0.6	Odd-Years
Antimony	EPA 3005A/ EPA 6020A	1	Odd-Years
Aramite			Odd-Years
Arsenic	EPA 3005A/ EPA 6020A	1	Odd-Years
Barium	EPA 3005A/ EPA 6020A	5	Odd-Years
Benzene	SW-846 8260B	5	Odd-Years
Benzo[a]anthracene	SW-846 8270C	0.6	Odd-Years
Benzo[a]pyrene	SW-846 8270C	0.6	Odd-Years
Benzo[b]fluoranthene	SW-846 8270C	0.6	Odd-Years
Benzo[ghi]perylene	SW-846 8270C	0.6	Odd-Years
Benzo[k]fluoranthene	SW-846 8270C	0.6	Odd-Years
Benzyl alcohol	SW-846 8270C	34	Odd-Years
Beryllium	EPA 3005A/ EPA 6020A	1	Odd-Years

Parameter	Method	Reporting Limit (µg/L)	Schedule
beta-BHC	SW-846 8081B	0.1	Odd-Years
Biochemical oxygen demand	SM 5210 B-2011	20000	Odd-Years
Bis(2-chloro-1-methylethyl) ether	SW-846 8270C	2	Odd-Years
Bis(2-chloroethoxy)methane	SW-846 8270C	2	Odd-Years
Bis(2-chloroethyl)ether	SW-846 8270C	2	Odd-Years
Bis(2-ethylhexyl) phthalate	SW-846 8270C	11	Odd-Years
Bromodichloromethane	SW-846 8260B	5	Odd-Years
Bromoform; Tribromomethane	SW-846 8260B	25	Odd-Years
Butyl benzyl phthalate	SW-846 8270C	6	Odd-Years
Cadmium	EPA 3005A/ EPA 6020A	0.2	Odd-Years
Carbon disulfide	SW-846 8260B	25	Odd-Years
Carbon tetrachloride	SW-846 8260B	5	Odd-Years
Chlordane	SW-846 8081B	0.6	Odd-Years
Chloride	EPA 9056A	20000	Odd-Years
Chlorobenzene	SW-846 8260B	5	Odd-Years
Chlorobenzilate	SW-846 8270C	11	Odd-Years
Chloroethane	SW-846 8260B	5	Odd-Years
Chloroform	SW-846 8260B	5	Odd-Years
Chloroprene	SW-846 8260B	25	Odd-Years
Chromium	EPA 3005A/ EPA 6020A	1	Odd-Years
Chrysene	SW-846 8270C	0.6	Odd-Years
cis-1,3-Dichloropropene	SW-846 8260B	5	Odd-Years
Cobalt	EPA 3005A/ EPA 6020A	15	Odd-Years
Copper	EPA 3005A/ EPA 6020A	1	Odd-Years
Cyanide	ASTM D7511-12	5	Odd-Years
delta-BHC	SW-846 8151A	0.012	Odd-Years
Diallate	SW-846 8270C	6	Odd-Years
Dibenz[a,h]anthracene	SW-846 8270C	0.6	Odd-Years
Dibenzofuran	SW-846 8270C	2	Odd-Years
Dibromochloromethane	SW-846 8260B	5	Odd-Years
Dichlorodifluoromethane	SW-846 8260B	5	Odd-Years
Dieldrin	SW-846 8081B	0.024	Odd-Years
Diethyl phthalate	SW-846 8270C	6	Odd-Years
Dimethoate	SW-846 8270C	11	Odd-Years
Dimethyl phthalate	SW-846 8270C	6	Odd-Years
Di-n-butyl phthalate	SW-846 8270C	6	Odd-Years
Di-n-octyl phthalate	SW-846 8270C	12	Odd-Years
Dinoseb; 2-sec-Butyl-4,6-dinitrophenol	SW-846 8151A	0.6	Odd-Years

Parameter	Method	Reporting Limit (µg/L)	Schedule
Diphenylamine	SW-846 8270C	3	Odd-Years
Disulfoton	SW-846 8141B	5.1	Odd-Years
Endosulfan I	SW-846 8081B	0.012	Odd-Years
Endosulfan II	SW-846 8081B	0.036	Odd-Years
Endosulfan sulfate	SW-846 8081B	0.03	Odd-Years
Endrin	SW-846 8081B	0.024	Odd-Years
Endrin aldehyde	SW-846 8081B	0.12	Odd-Years
Ethyl methacrylate	SW-846 8260B	25	Odd-Years
Ethyl methanesulfonate	SW-846 8270C	2	Odd-Years
Ethylbenzene	SW-846 8260B	5	Odd-Years
Famphur	SW-846 8141B	5.1	Odd-Years
Fluoranthene	SW-846 8270C	0.6	Odd-Years
Fluorene	SW-846 8270C	0.6	Odd-Years
gamma-BHC; Lindane	SW-846 8151A	0.012	Odd-Years
Heptachlor	SW-846 8081B	0.012	Odd-Years
Heptachlor epoxide	SW-846 8081B	0.012	Odd-Years
Hexachlorobenzene	SW-846 8270C	0.6	Odd-Years
Hexachlorobutadiene	SW-846 8270C	2	Odd-Years
Hexachlorocyclopentadiene	SW-846 8270C	12	Odd-Years
Hexachloroethane	SW-846 8270C	6	Odd-Years
Hexachlorophene	SW-846 8081B	24	Odd-Years
Hexachloropropene	SW-846 8270C	6	Odd-Years
Indeno(1,2,3-cd)pyrene	SW-846 8270C	0.6	Odd-Years
Isobutyl alcohol	SW-846 8260B	1300	Odd-Years
Isodrin	SW-846 8270C	2	Odd-Years
Isophorone	SW-846 8270C	2	Odd-Years
Isosafrole	SW-846 8270C	11	Odd-Years
Kepone	SW-846 8081B	0.24	Odd-Years
Lead	EPA 3005A/ EPA 6020A	1	Odd-Years
m-Cresol	SW-846 8270C	2	Odd-Years
m-Dichlorobenzene	SW-846 8270C	2	Odd-Years
m-Dinitrobenzene	SW-846 8270C	6	Odd-Years
Mercury	EPA 7470A	1	Odd-Years
Methacrylonitrile	SW-846 8260B	250	Odd-Years
Methapyrilene	SW-846 8270C	56	Odd-Years
Methoxychlor	SW-846 8081B	0.12	Odd-Years
Methyl bromide	SW-846 8260B	5	Odd-Years
Methyl chloride	SW-846 8260B	5	Odd-Years

Parameter	Method	Reporting Limit (µg/L)	Schedule
Methyl ethyl ketone	SW-846 8260B	50	Odd-Years
Methyl iodide	SW-846 8260B	5	Odd-Years
Methyl methacrylate	SW-846 8260B	25	Odd-Years
Methyl methanesulfonate	SW-846 8270C	6	Odd-Years
Methyl parathion	SW-846 8141B	5.1	Odd-Years
Methylene bromide	SW-846 8260B	5	Odd-Years
Methylene chloride	SW-846 8260B	5	Odd-Years
m-Nitroaniline	SW-846 8270C	8	Odd-Years
Naphthalene	SW-846 8270C	0.6	Odd-Years
Nickel	EPA 3005A/ EPA 6020A	50	Odd-Years
Nitrate/Nitrite Nitrogen	EPA 9056A	10	Odd-Years
Nitrobenzene	SW-846 8270C	2	Odd-Years
N-Nitrosodiethylamine	SW-846 8270C	2	Odd-Years
N-Nitrosodimethylamine	SW-846 8270C	6	Odd-Years
N-Nitrosodi-n-butylamine	SW-846 8270C	28	Odd-Years
N-Nitrosodiphenylamine	SW-846 8270C	3	Odd-Years
N-Nitrosodipropylamine	SW-846 8270C	3	Odd-Years
N-Nitrosomethylethalamine	SW-846 8270C	6	Odd-Years
N-Nitrosomorpholine	SW-846 8270C	6	Odd-Years
N-Nitrosopiperidine	SW-846 8270C	2	Odd-Years
N-Nitrosopyrrolidine	SW-846 8270C	2	Odd-Years
O,O,O-Triethyl phosphorothioate	SW-846 8270C	6	Odd-Years
O,O-Diethyl O-2-pyrazinyl phosphorothioate	SW-846 8270C	6	Odd-Years
o-Cresol	SW-846 8270C	2	Odd-Years
o-Dichlorobenzene	SW-846 8270C	2	Odd-Years
o-Nitroaniline	SW-846 8270C	6	Odd-Years
o-Nitrophenol	SW-846 8270C	11	Odd-Years
o-Toluidine	SW-846 8270C	11	Odd-Years
p-(Dimethylamino)azobenzene	SW-846 8270C	12	Odd-Years
Parathion	Sw-846 8141B	5.1	Odd-Years
p-Chloroaniline	SW-846 8270C	11	Odd-Years
p-Chloro-m-cresol	SW-846 8270C	2	Odd-Years
p-Cresol	SW-846 8270C	2	Odd-Years
p-Dichlorobenzene	SW-846 8270C	2	Odd-Years
Pentachlorobenzene	SW-846 8270C	2	Odd-Years
Pentachloroethane	SW-846 8260B	25	Odd-Years
Pentachloronitrobenzene	SW-846 8270C	6	Odd-Years
Pentachlorophenol	SW-846 8270C	6	Odd-Years

Parameter	Method	Reporting Limit (µg/L)	Schedule
pH	SM 4500-H+ B-2011	-1 SU	Odd-Years
Phenacetin	SW-846 8270C	2	Odd-Years
Phenanthrene	SW-846 8270C	0.6	Odd-Years
Phenol	SW-846 8270C	2	Odd-Years
Phorate	SW-846 8141B	5.1	Odd-Years
p-Nitroaniline	SW-846 8270C	3	Odd-Years
p-Nitrophenol	SW-846 8270C	34	Odd-Years
p-Phenylenediamine	SW-846 8270C	340	Odd-Years
Pronamide	SW-846 8270C	2	Odd-Years
Propionitrile	SW-846 8260B	500	Odd-Years
Pyrene	SW-846 8270C	0.6	Odd-Years
Pyridine	SW-846 8270C	6	Odd-Years
Safrole	SW-846 8270C	6	Odd-Years
Selenium	EPA 3005A/ EPA 6020A	1	Odd-Years
Silver	EPA 3005A/ EPA 6020A	0.5	Odd-Years
Silvex; 2,4,5-TP	SW-846 8151A	0.06	Odd-Years
Specific Conductance	EPA 9050A	1 uhmos/cm	Odd-Years
Styrene	SW-846 8260B	25	Odd-Years
Sulfide	HACH 8131	20	Odd-Years
sym-Trinitrobenzene	SW-846 8270C	230	Odd-Years
Tetrachloroethylene	SW-846 8260B	5	Odd-Years
Tetraethyl dithiopyrophosphate	SW-846 8270C	6	Odd-Years
Thallium	EPA 3005A/ EPA 6020A	2	Odd-Years
Tin	EPA 3005A/ EPA 6020A	10	Odd-Years
Toluene	SW-846 8260B	5	Odd-Years
Total Boron	EPA 3005A/ EPA 6020A	200	Odd-Years
Total Sulfate	EPA 9056A	2000	Odd-Years
Toxaphene	SW-846 8081B	1.2	Odd-Years
trans-1,2-Dichloroethylene	SW-846 8260B	5	Odd-Years
trans-1,3-Dichloropropene	SW-846 8260B	5	Odd-Years
trans-1,4-Dichloro-2-butene	SW-846 8260B	250	Odd-Years
Trichloroethylene	SW-846 8260B	5	Odd-Years
Trichlorofluoromethane	SW-846 8260B	5	Odd-Years
Vanadium	EPA 3005A/ EPA 6020A	10	Odd-Years
Vinyl acetate	SW-846 8260B	50	Odd-Years
Vinyl chloride	SW-846 8260B	5	Odd-Years
Xylene (total)	SW-846 8260B	25	Odd-Years
Zinc	EPA 3005A/ EPA 6020A	50	Odd-Years

Parameter	Method	Reporting Limit (µg/L)	Schedule
Aroclor-1016	EPA 8020A	0.20	Odd-Years
Aroclor-1221	EPA 8020A	0.20	Odd-Years
Aroclor-1232	EPA 8020A	0.20	Odd-Years
Aroclor-1242	EPA 8020A	0.20	Odd-Years
Aroclor-1248	EPA 8020A	0.20	Odd-Years
Aroclor-1254	EPA 8020A	0.20	Odd-Years
Aroclor-1260	EPA 8020A	0.20	Odd-Years
Aroclor-1262	EPA 8020A	0.20	Odd-Years
Aroclor-1268	EPA 8020A	0.20	Odd-Years

3.6.1 Record Keeping

Laboratory analytical results and leachate elevation measurements will be submitted to EGLE along with the quarterly leachate measurements within 60 days of the annual sampling event. Field sampling forms and chain-of-custody will be completed by field sampling personnel. Sampling records will be stored as part of the Operating Record at the Granger Wood Street office.

4.0 PURGE SYSTEM MONITORING AND OPERATION

4.1 Introduction

Corrective actions have been implemented to address VOC concentrations in the southwest corner of the site and boron concentrations on the north and west of the site.

A system of two purge wells (PW-38 and PW-39) were installed in the southwest corner of the site in late 1987 after low concentrations of VOCs were detected in shallow groundwater. The original purge wells were replaced by PW-46 and PW-48 in 2004-2005 and the system has consistently operated. Purge water is discharged to the Southern Clinton County Municipal Utilities Authority sanitary sewer system through the leachate system.

Following the identification of concentrations of boron in groundwater on the west and north side of the site, purge wells PW-49 and PW-50 were installed in September 2006 to address the impacted groundwater. In addition to the groundwater purge system, extensive source remediation was performed which included excavation of boron-containing materials present in the ditches as documented in submittals to EGLE dated May 4, 2007, September 14, 2007, November 29, 2007, March 19, 2008, June 13, 2008, and September 17, 2008.

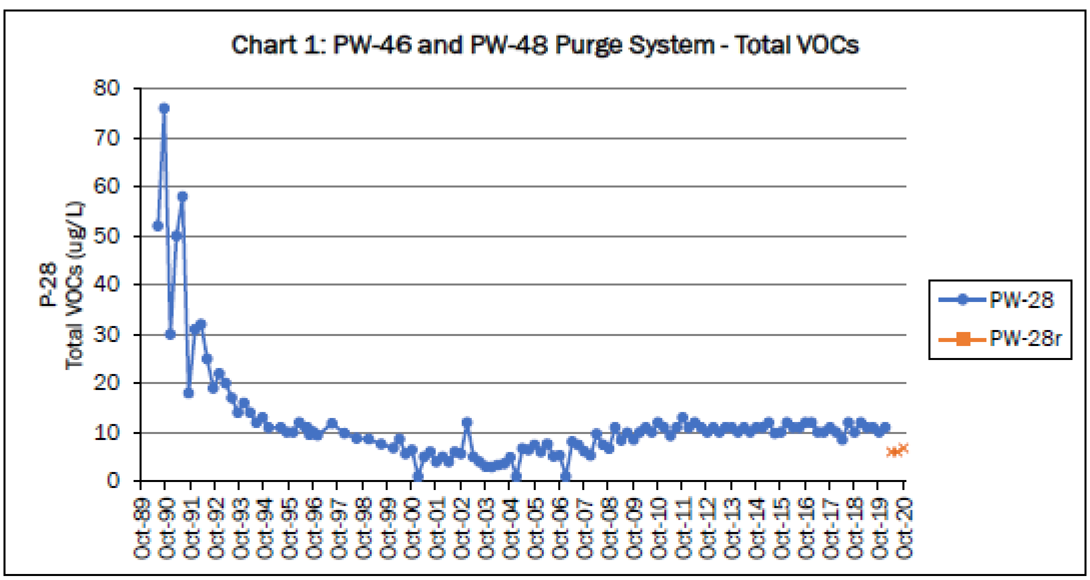
Updated extents of groundwater plumes are provided on **Figure F-2A** (January 2022) and **Figure F-2B** (July 2022).

4.2 VOC Purge System

4.2.1 Capture Zone Analysis and Effectiveness

Static groundwater elevations are obtained during quarterly monitoring events to evaluate if the purge system is maintaining a cone of depression. Recent annual reports indicate the system is producing a cone of depression.

Well P-28 is located within the influence of the purge system where there is a detection of low concentrations of tetrachloroethene. A historical summary is provided in **Chart 1**, below. The VOC concentration data show a sharp reduction in total VOCs following by sustained lower concentration. In April 2020, P-28 was abandoned and replaced with P-28R.



Both the static groundwater elevations and groundwater data (annual groundwater reports) reflect the effectiveness of the VOC purge system.

4.2.2 Monitoring Schedule

Static groundwater elevations are collected during quarterly monitoring events from the following wells and piezometers: MW-6R, MW-19R, P-28, P-29R2, P-30, P-31, P-32, P-33, MW-35, P-36, P-37, MW-40R, MW-43SR, MW-43DR and MW-44DR. The static groundwater elevations will be determined using methods giving precision to 0.01-feet and will be measured prior to any purging. Measurements will be made from the top of the casing, with the elevation of the casings being related to a permanent on-site reference point.

Details on the measurement of elevations as well as sampling protocols are included in the SAP. As described in that protocol, each piece of sampling equipment will be thoroughly decontaminated before use in the monitoring well to minimize the potential for any cross-contamination and interference with the analytical processes.

The quarterly purge system monitoring will involve the collection of samples from MW-19R, P-28, P-29R2 and purge wells PW-46 and PW-48. Samples will be analysed for VOCs listed in **Table 2**.

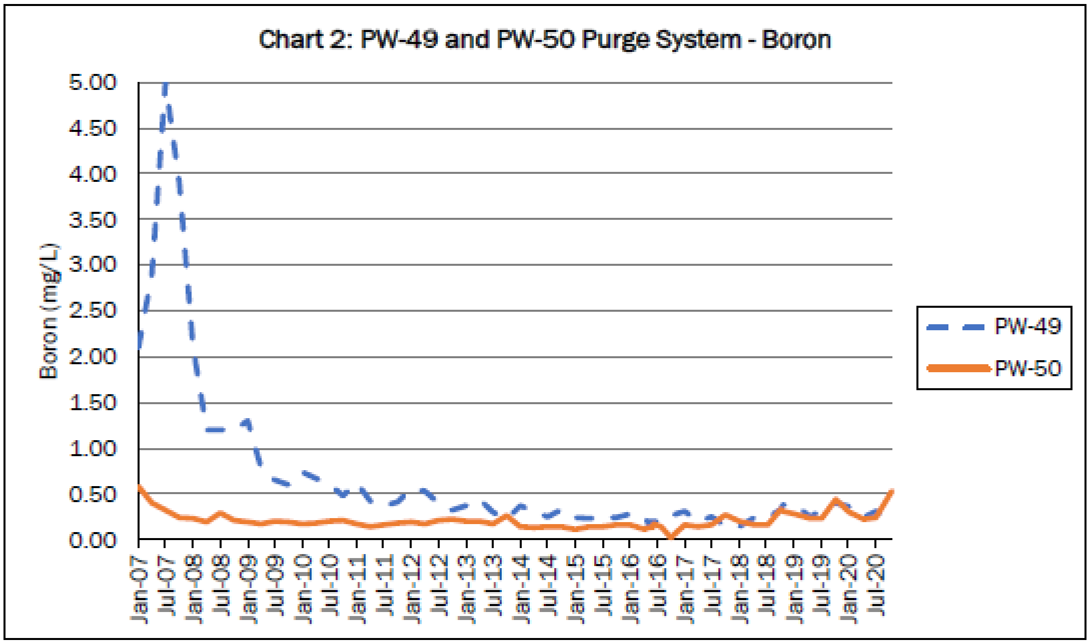
4.2.3 Record Keeping

Laboratory analytical results and static groundwater elevation measurements will be submitted to EGLE within 60 days of the sampling event. Field sampling forms and chain-of-custody will be completed by field sampling personnel. Sampling records will be stored as part of the Operating Record at the Granger Wood Street office.

4.3 Boron Purge System

4.3.1 Capture Zone Analysis and Effectiveness

Recent annual groundwater monitoring reports document the effectiveness of the boron purge system. In recent years, there were no exceedances of any primary parameters, including boron. The purge wells effectively reduce the concentrations of boron in the surrounding wells, groundwater and purge water. Consistent evacuation from PW-49 (645,180 gallons in 2020) and PW-50 (3,818,870 gallons is 2020) have resulted in the creation of a potentially larger than necessary capture zone in the vicinity of the purge wells. The improvement in groundwater quality in the purge wells is demonstrated in **Chart 2**, below.



Recent data indicate that: 1) the entire west side of the site is influenced by the purge system and the effectiveness of the capture zones is clearly seen in the groundwater quality data; 2) the purge system on the north side has a significant impact on both the hydrogeologic conditions and the quality of the groundwater; and 3) the impacted groundwater on both the west and north side is being effectively remediated.

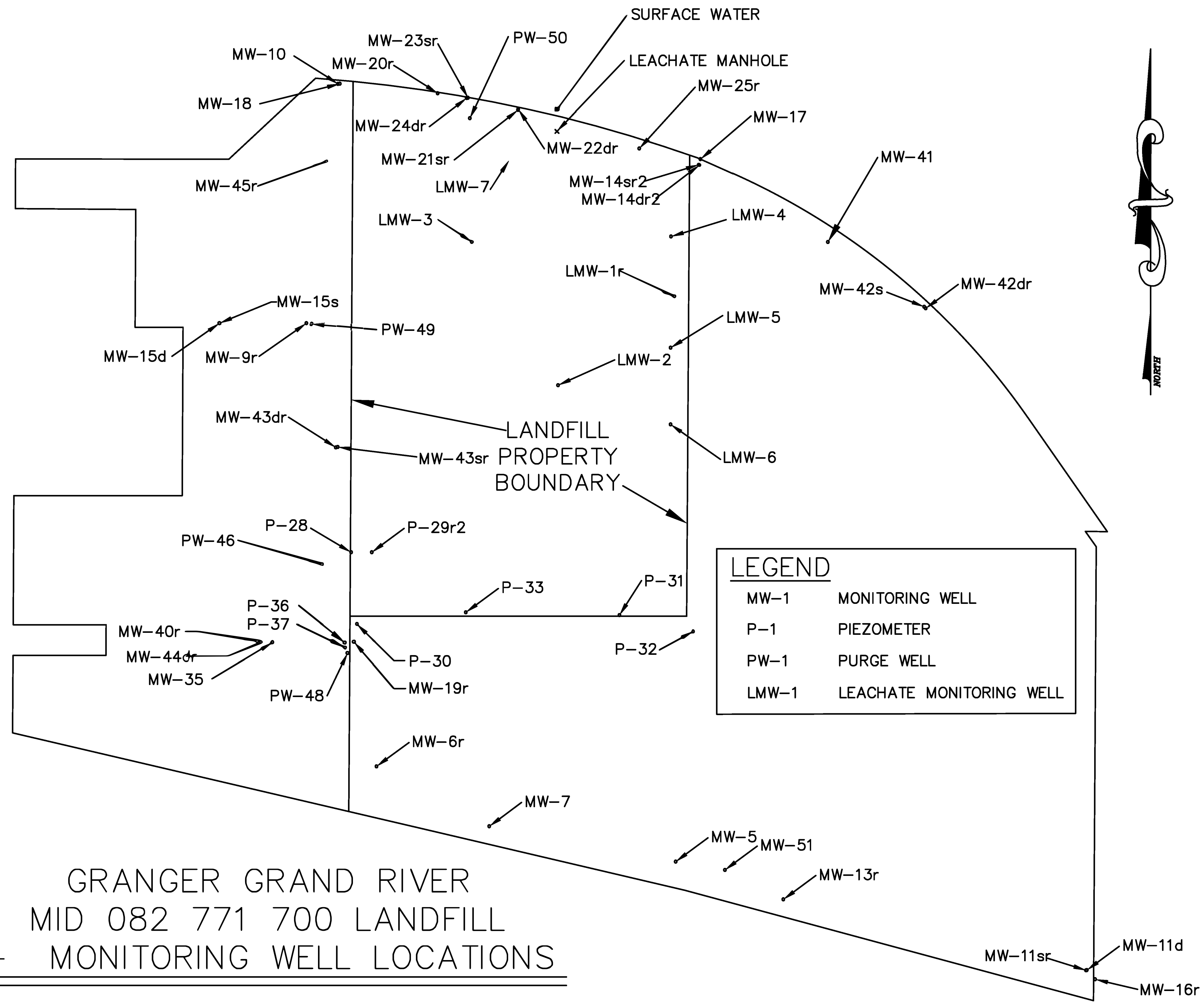
4.3.2 Monitoring Schedule

During each quarterly monitoring event static groundwater elevations will be measured in the following monitoring wells: MW-9R, MW-45R, MW-20R, MW-23SR, MW-24DR, and MW-21SR. The static groundwater elevations will be determined using methods giving precision to 0.01 feet and will be measured prior to any purging. Measurements will be made from the top of casing, with the elevation of the casing being related to a permanent on-site reference point.

The quarterly purge system monitoring will involve the collection of samples from MW-21SR, MW-23SR, and MW-24DR. In addition, a sample of the purge water will be obtained from both PW-49 and PW-50. Samples will be collected from the purge lines at the individual pump stations. Both the groundwater and purge water samples will be analysed for boron utilizing the analytical method and detection limit identified in **Table 3**.

4.3.3 Record Keeping

Laboratory analytical results and static groundwater elevation measurements will be submitted to EGLE along with the quarterly sampling reports of the sampling event within 60 days of the sampling event. Field sampling forms and chain-of-custody will be completed by field sampling personnel. Sampling records will be stored as part of the Operating Record at the Granger Wood Street office.



GRANGER GRAND RIVER MID 082 771 700 LANDFILL – MONITORING WELL LOCATIONS

SCALE: 1"=200'

FIGURE F–1 – MONITORING LOCATIONS

MONITORING WELLS LOCATIONS			
Description	Northing	Easting	Top of Casing Elevation
MW–5	11890	7320	871.62
MW–6r	12263	6151	871.99
MW–7	12028	6592	868.71
MW–9r	13966	5876	852.99
MW–10	14932	6000	839.88
MW–11sr	11446	8941	868.38
MW–11d	11467	8927	867.63
MW–13r	11765	7752	871.75
MW–14sr2	14623	7409	866.70
MW–14dr2	14621	7416	866.87
MW–15s	13996	5533	859.81
MW–15d	13996	5533	859.67
MW–16r	11436	8941	862.07
MW–17	14632	7414	866.30
MW–18	14932	6007	840.56
MW–19r	12749	6072	871.56
MW–20r	14872	6411	836.28
MW–21sr	14807	6725	826.62
MW–22dr	14811	6727	826.89
MW–23sr	14859	6529	833.48
MW–24dr	14854	6524	834.40
MW–25r	14679	7178	869.10
P–28	13100	6051	866.04
P–29r2	13091	6131	870.51
P–30	12818	6075	869.65
P–31	12854	7100	887.29
P–32	12790	7390	918.69
P–33	12865	6500	874.95
MW–35	12748	5746	864.22
P–36	12747	6028	867.51
P–37	12727	6030	868.56
MW–40r	12754	5692	866.12
MW–41	14313	7915	872.74
MW–42s	14060	8292	873.46
MW–42dr	14054	8295	876.24
MW–43sr	13511	5999	855.59
MW–43dr	13519	5998	849.95
MW–44dr	12756	5702	865.75
MW–45r	14629	5956	843.17
PW–46	13053	5939	862.51
PW–48	12706	6037	–
PW–49	13993	5897	–
PW–50	14797	6515	–
MW–51	11857	7512	875.45
LMW–1r	14102	7317	886.97
LMW–2	13753	6860	885.61
LMW–3	14313	6525	882.58
LMW–4	14335	7302	867.93
LMW–5	13900	7300	888.66
LMW–6	13598	7301	890.83
LMW–7	14322	7279	867.23

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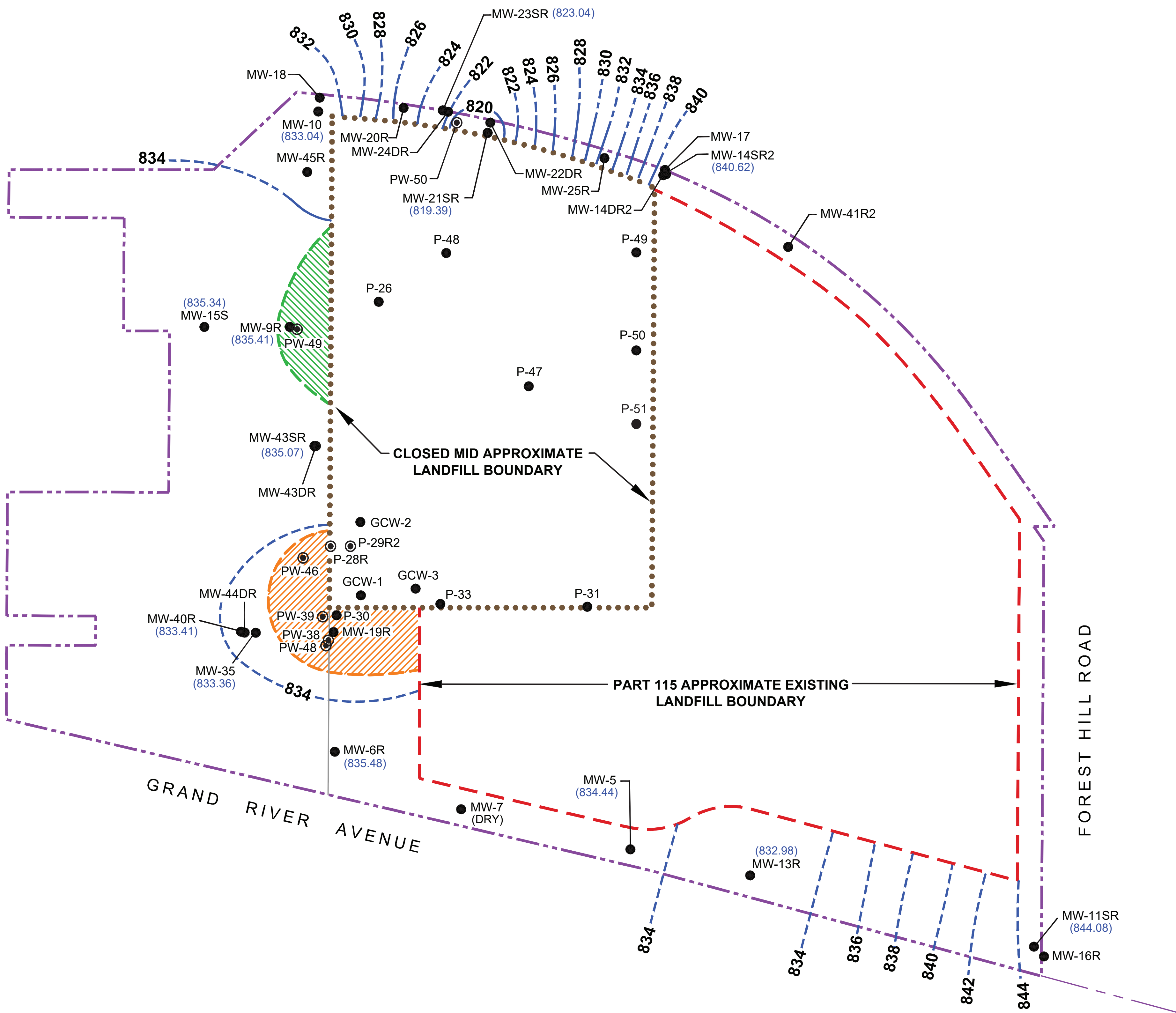
SCALE: 1" = 300'
DRAWN BY: RSF
APPROVED BY: CSA

REVISED: 08/10/2022 at 14:45:08



LEGEND

MW-1 ● MONITORING WELL LOCATION AND NUMBER

P-1 ● PIEZOMETER LOCATION AND NUMBER

PW-39 ◎ PURGE WELL LOCATION AND NUMBER

GCW-1 ● GAS COLLECTION WELL LOCATION AND NUMBER

CLOSED MID APPROXIMATE LANDFILL BOUNDARY

PART 115 APPROXIMATE EXISTING LANDFILL BOUNDARY

APPROXIMATE PROPERTY LINE

838 LINE OF EQUAL ELEVATION

(840.34) GROUNDWATER ELEVATION

PLUME KEY

EXTENT OF BORON ABOVE MICHIGAN PART 201 DRINKING WATER CRITERIA (0.5 mg/L)

EXTENT OF DETECTED VOLATILE ORGANIC COMPOUNDS (VOCs)

NOTES

1. BASE MAP DEVELOPED FROM SITE PLAN PROVIDED BY GRANGER CO., DATED 05-04-2007, FIGURE 1 GENERAL LOCATIONS.DWG.
2. CONTOURS REPRESENT INTERPRETATIONS OF GROUNDWATER ELEVATION BASED UPON MEASUREMENTS AT A LIMITED NUMBER OF MONITORING WELLS.

N

0 500 1000

APPROXIMATE SCALE IN FEET

PROJECT: GRANGER GRAND RIVER
MID 082 771 700 LANDFILL
LANSING, MICHIGAN

TITLE: EXTENT OF BORON AND VOLATILE ORGANIC COMPOUND PLUMES
JANUARY 2022

DRAWN BY:	SJL / D.STEHLE	PROJ NO.:	482525.0002.01
CHECKED BY:	K. LOWERY		FIGURE F-2A
APPROVED BY:	S.HOLMSTROM		
DATE:	JULY 2022		

TRC

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Ann Arbor, MI 48108
Phone: 734.971.7080
www.trccompanies.com

FILE NO.: 482525.0002.01.01 2022 3Q Plume Maps.dwg

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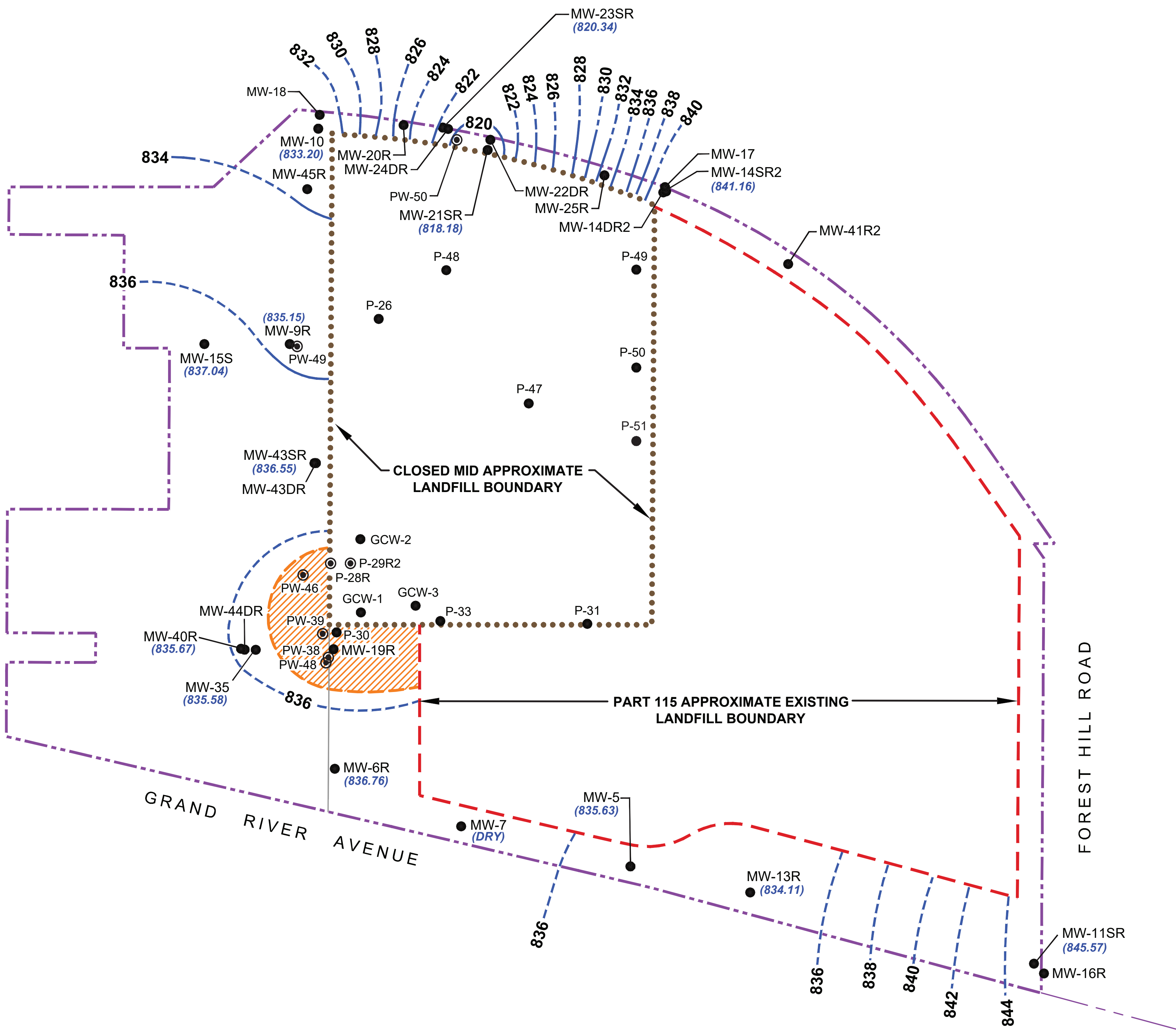
DRAWING NAME: J:_TRC\Granger LF\482525\0002\01_2022 3Q Plume Maps\ 482525.0002.01.01 2022 3Q Plume Maps.dwg --- PLOT DATE: August 12, 2022 - 7:00AM --- LAYOUT: FIG01 January 2022



LEGEND

- MW-1 ● MONITORING WELL LOCATION AND NUMBER
- P-1 ● PIEZOMETER LOCATION AND NUMBER
- PW-39 ◎ PURGE WELL LOCATION AND NUMBER
- GCW-1 ● GAS COLLECTION WELL LOCATION AND NUMBER
- CLOSED MID APPROXIMATE LANDFILL BOUNDARY
- PART 115 APPROXIMATE EXISTING LANDFILL BOUNDARY
- APPROXIMATE PROPERTY LINE
- 838 LINE OF EQUAL ELEVATION
- (840.34) GROUNDWATER ELEVATION

PLUME KEY

- EXTENT OF BORON ABOVE MICHIGAN PART 201 DRINKING WATER CRITERIA (0.5 mg/L)
- EXTENT OF DETECTED VOLATILE ORGANIC COMPOUNDS (VOCs)

NOTES

1. BASE MAP DEVELOPED FROM SITE PLAN PROVIDED BY GRANGER CO., DATED 05-04-2007, FIGURE 1 GENERAL LOCATIONS.DWG.
2. CONTOURS REPRESENT INTERPRETATIONS OF GROUNDWATER ELEVATION BASED UPON MEASUREMENTS AT A LIMITED NUMBER OF MONITORING WELLS.

N

0 500 1000

APPROXIMATE SCALE IN FEET

PROJECT:
GRANGER GRAND RIVER
MID 082 771 700 LANDFILL
LANSING, MICHIGAN

TITLE:
EXTENT OF BORON AND VOLATILE ORGANIC COMPOUND PLUMES
JULY 2022

DRAWN BY:	SJL / D.STEHLE	PROJ NO.:	482525.0002.01
CHECKED BY:	K. LOWERY		**FIGURE F-2B**
APPROVED BY:	S.HOLMSTROM		
DATE:	AUGUST 2022		

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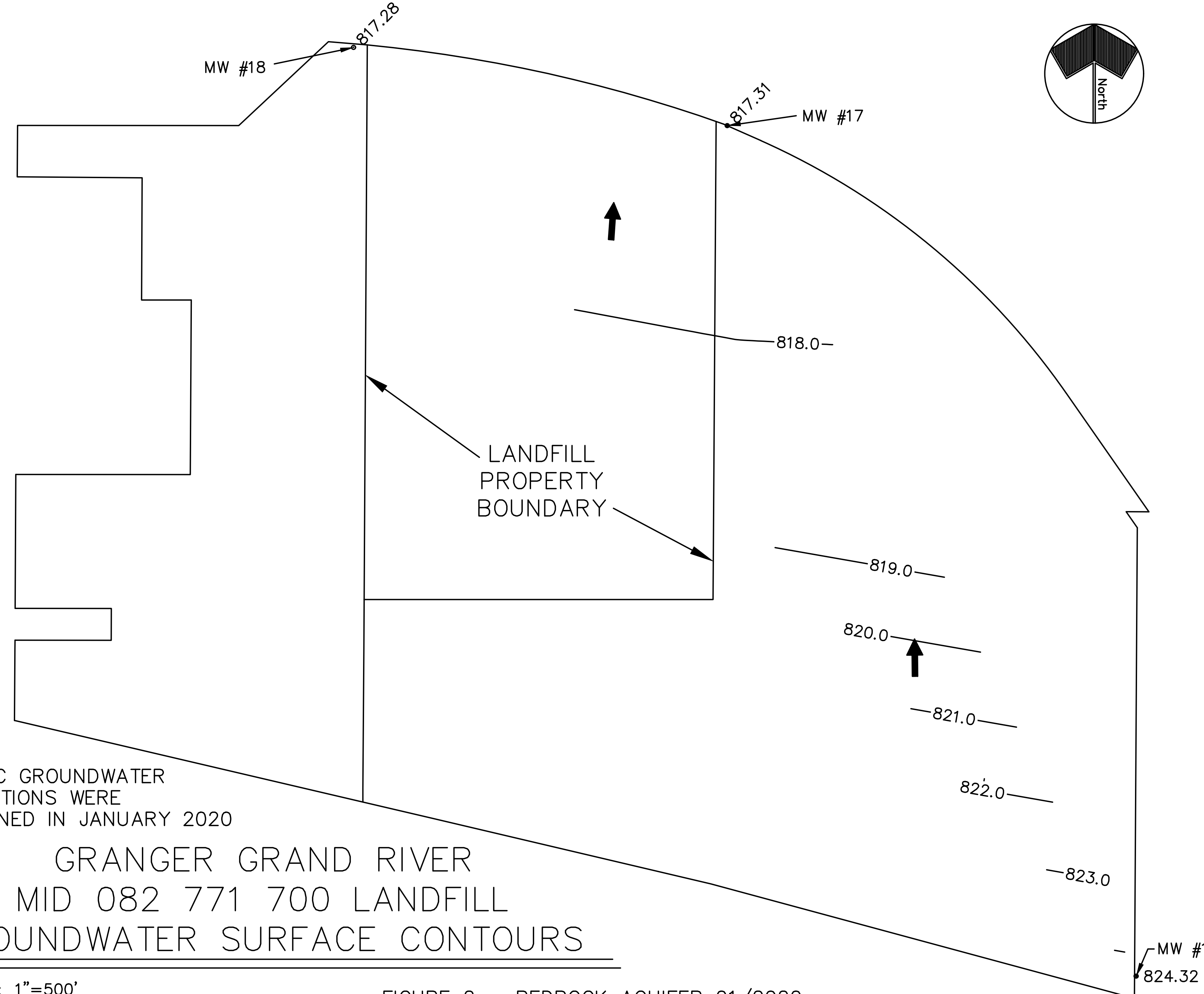
FILE NO.: 482525.0002.01.02 2022 3Q Plume Maps.dwg

APPENDIX F-1

Groundwater Contour Maps

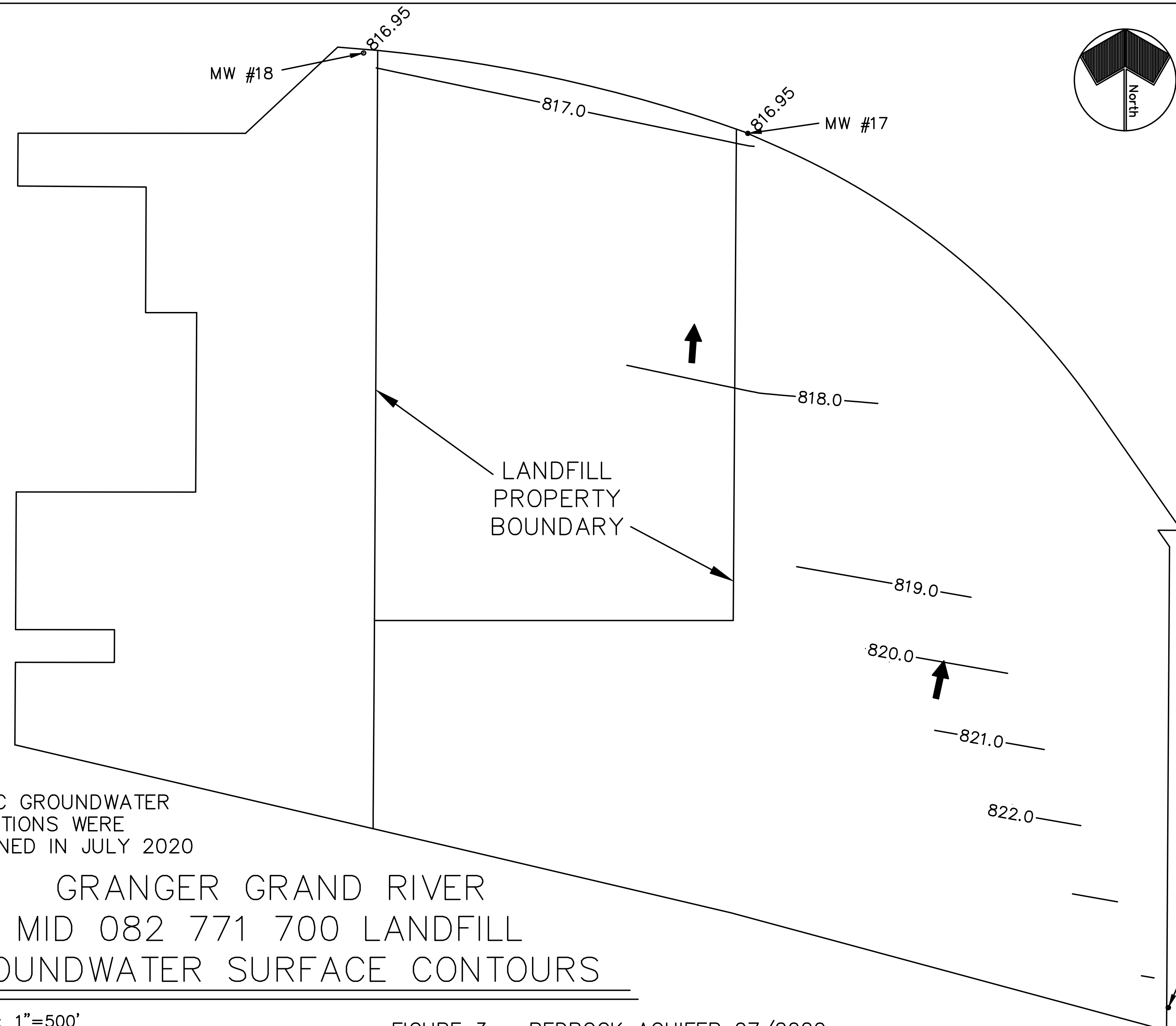


STATIC GROUNDWATER
ELEVATIONS WERE
OBTAINED IN JANUARY 2020

GRANGER GRAND RIVER
MID 082 771 700 LANDFILL
GROUNDWATER SURFACE CONTOURS

SCALE: 1"=500'

FIGURE 2 – BEDROCK AQUIFER 01/2020

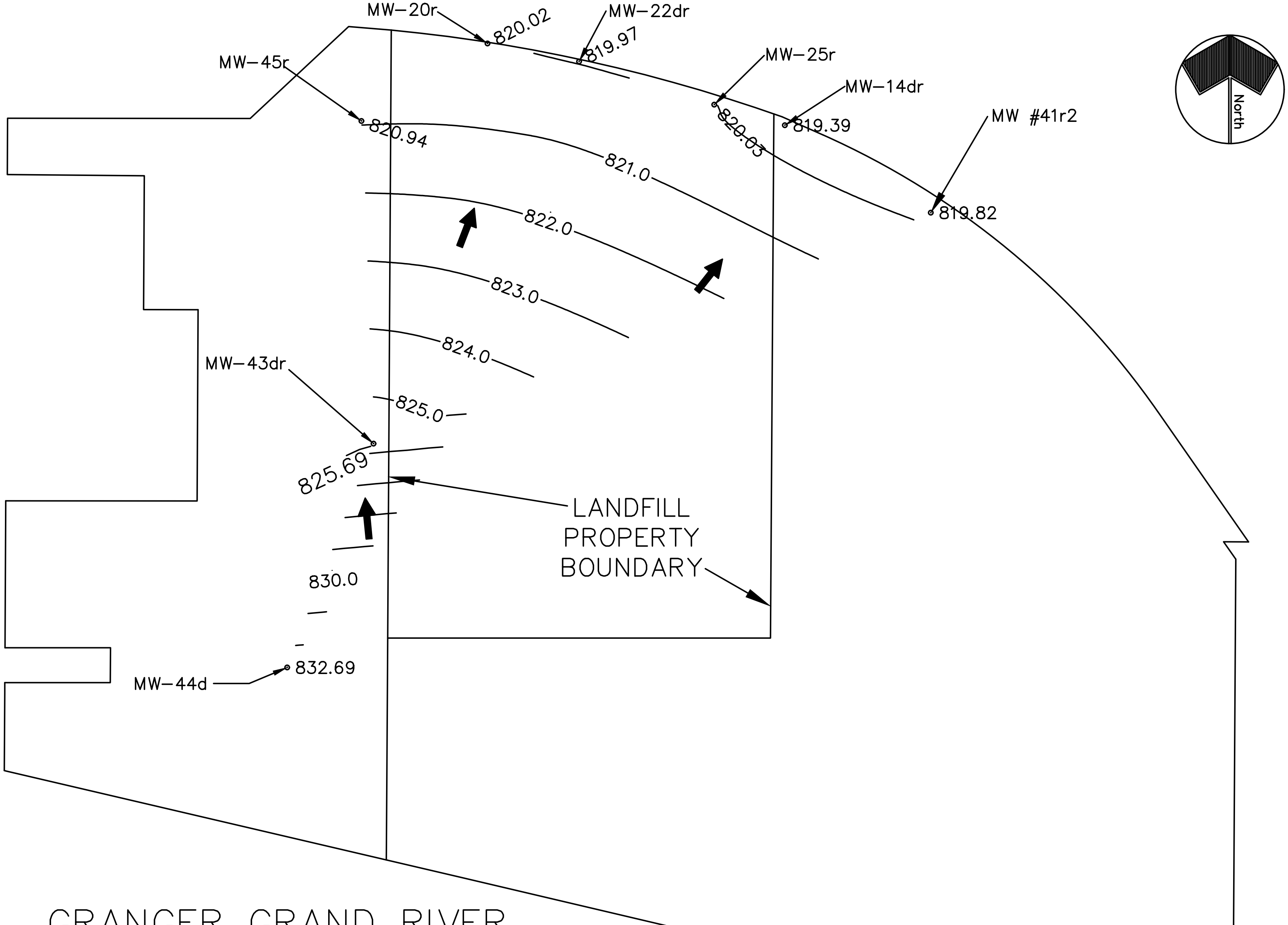


STATIC GROUNDWATER
ELEVATIONS WERE
OBTAINED IN JULY 2020

GRANGER GRAND RIVER
MID 082 771 700 LANDFILL
GROUNDWATER SURFACE CONTOURS

SCALE: 1"=500'

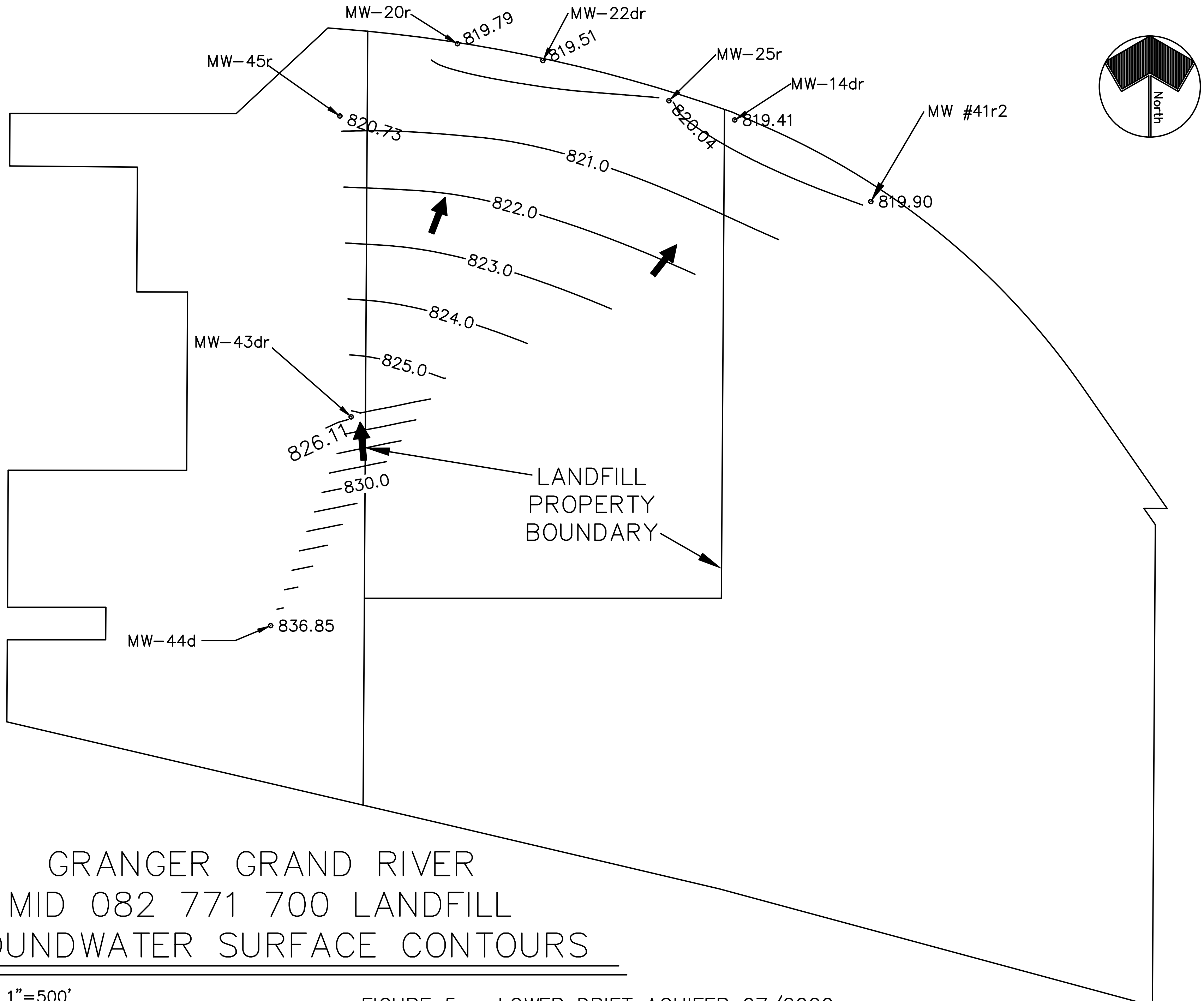
FIGURE 3 – BEDROCK AQUIFER 07/2020



GRANGER GRAND RIVER
MID 082 771 700 LANDFILL
GROUNDWATER SURFACE CONTOURS

SCALE: 1"=500'

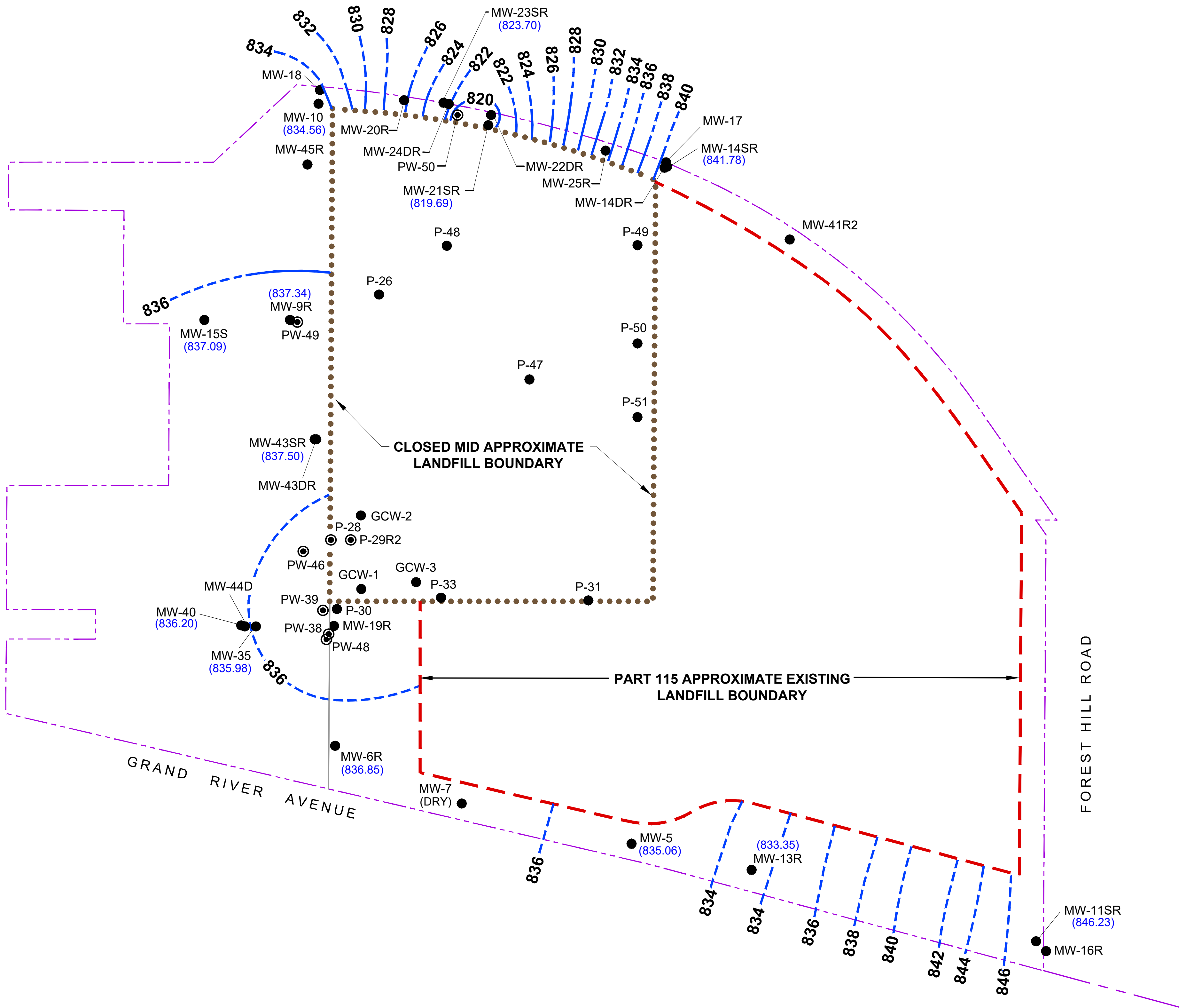
FIGURE 4 – LOWER DRIFT AQUIFER 01/2020



GRANGER GRAND RIVER
MID 082 771 700 LANDFILL
GROUNDWATER SURFACE CONTOURS

SCALE: 1"=500'

FIGURE 5 – LOWER DRIFT AQUIFER 07/2020



LEGEND

MW-1 ● MONITORING WELL LOCATION AND NUMBER

P-1 ● PIEZOMETER LOCATION AND NUMBER

PW-39 ◎ PURGE WELL LOCATION AND NUMBER

GCW-1 ● GAS COLLECTION WELL LOCATION AND NUMBER

CLOSED MID APPROXIMATE LANDFILL BOUNDARY

PART 115 APPROXIMATE EXISTING LANDFILL BOUNDARY

APPROXIMATE PROPERTY LINE

838 LINE OF EQUAL ELEVATION

(840.34) GROUNDWATER ELEVATION

NOTES

1. BASE MAP DEVELOPED FROM SITE PLAN PROVIDED BY GRANGER CO., DATED 05-04-2007, FIGURE 1 GENERAL LOCATIONS.DWG.
2. CONTOURS REPRESENT INTERPRETATIONS OF GROUNDWATER ELEVATION BASED UPON MEASUREMENTS AT A LIMITED NUMBER OF MONITORING WELLS.

N

0 500 1000

APPROXIMATE SCALE IN FEET

PROJECT:

GRANGER GRAND RIVER
MID 082 771 700 LANDFILL
LANSING, MICHIGAN

TITLE:

GROUNDWATER CONTOURS
SHALLOW GLACIAL AQUIFER
JANUARY 2020

DRAWN BY:	SJL / D.STEHLE	PROJ NO.:	382620.0002
CHECKED BY:	K. LOWERY	**FIGURE 6**	
APPROVED BY:	S.HOLMSTROM		
DATE:	FEBRUARY 2021		

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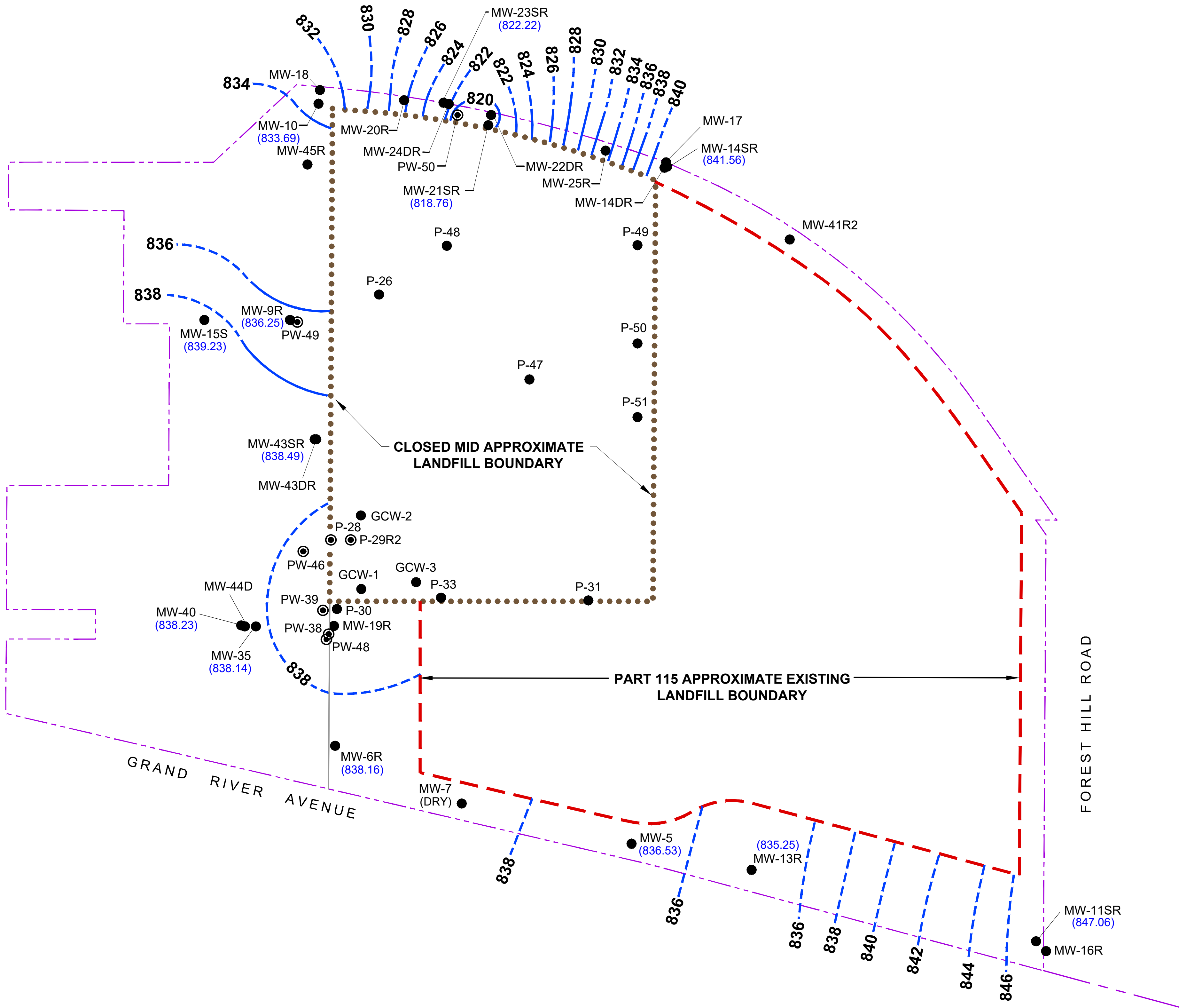
FILE NO.: 382620.0002.06 (002) 2020 AR.dwg



LEGEND

MW-1 ● MONITORING WELL LOCATION AND NUMBER

P-1 ● PIEZOMETER LOCATION AND NUMBER

PW-39 ◎ PURGE WELL LOCATION AND NUMBER

GCW-1 ● GAS COLLECTION WELL LOCATION AND NUMBER

CLOSED MID APPROXIMATE LANDFILL BOUNDARY

PART 115 APPROXIMATE EXISTING LANDFILL BOUNDARY

APPROXIMATE PROPERTY LINE

838 LINE OF EQUAL ELEVATION

(840.34) GROUNDWATER ELEVATION

NOTES

1. BASE MAP DEVELOPED FROM SITE PLAN PROVIDED BY GRANGER CO., DATED 05-04-2007, FIGURE 1 GENERAL LOCATIONS.DWG.
2. CONTOURS REPRESENT INTERPRETATIONS OF GROUNDWATER ELEVATION BASED UPON MEASUREMENTS AT A LIMITED NUMBER OF MONITORING WELLS.

N

0 500 1000

APPROXIMATE SCALE IN FEET

PROJECT:

GRANGER GRAND RIVER
MID 082 771 700 LANDFILL
LANSING, MICHIGAN

TITLE:

GROUNDWATER CONTOURS
SHALLOW GLACIAL AQUIFER
JULY 2020

DRAWN BY:	SJL / D.STEHLE	PROJ NO.:	382620.0002
CHECKED BY:	K. LOWERY	**FIGURE 7**	
APPROVED BY:	S.HOLMSTROM		
DATE:	FEBRUARY 2021		

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FILE NO.: 382620.0002.07 (002) 2020 AR.dwg

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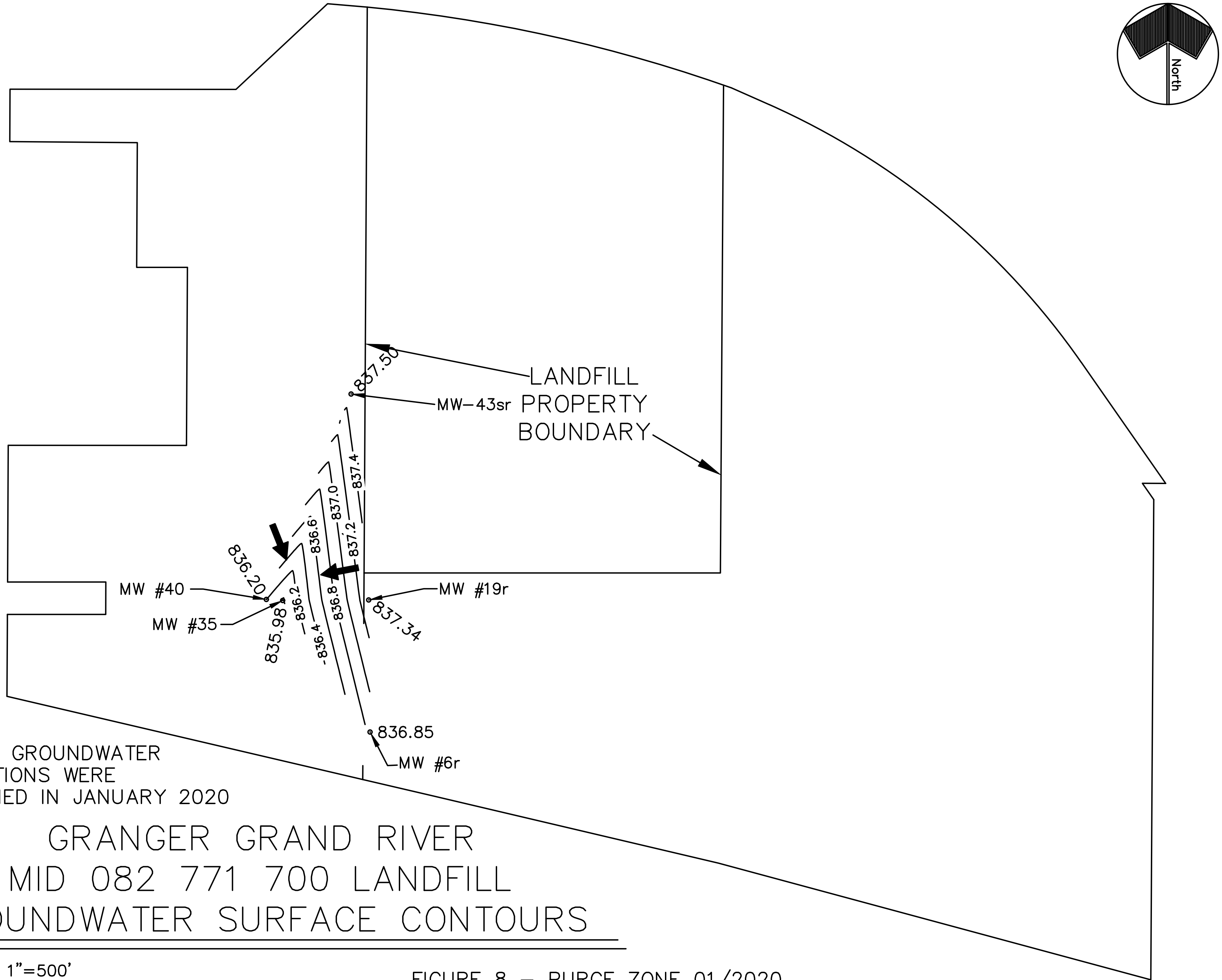
DRAWING NAME: \\Annarbor-fp2\cadd\PJT100_TRC\Granger LF\382620\0002\01_2020 Annual Rpt\ 382620.0002.07 (002) 2020 AR.dwg --- PLOT DATE: February 15, 2021 - 3:12AM --- LAYOUT: FIG07 GW Contours Shallow 2020 Jul

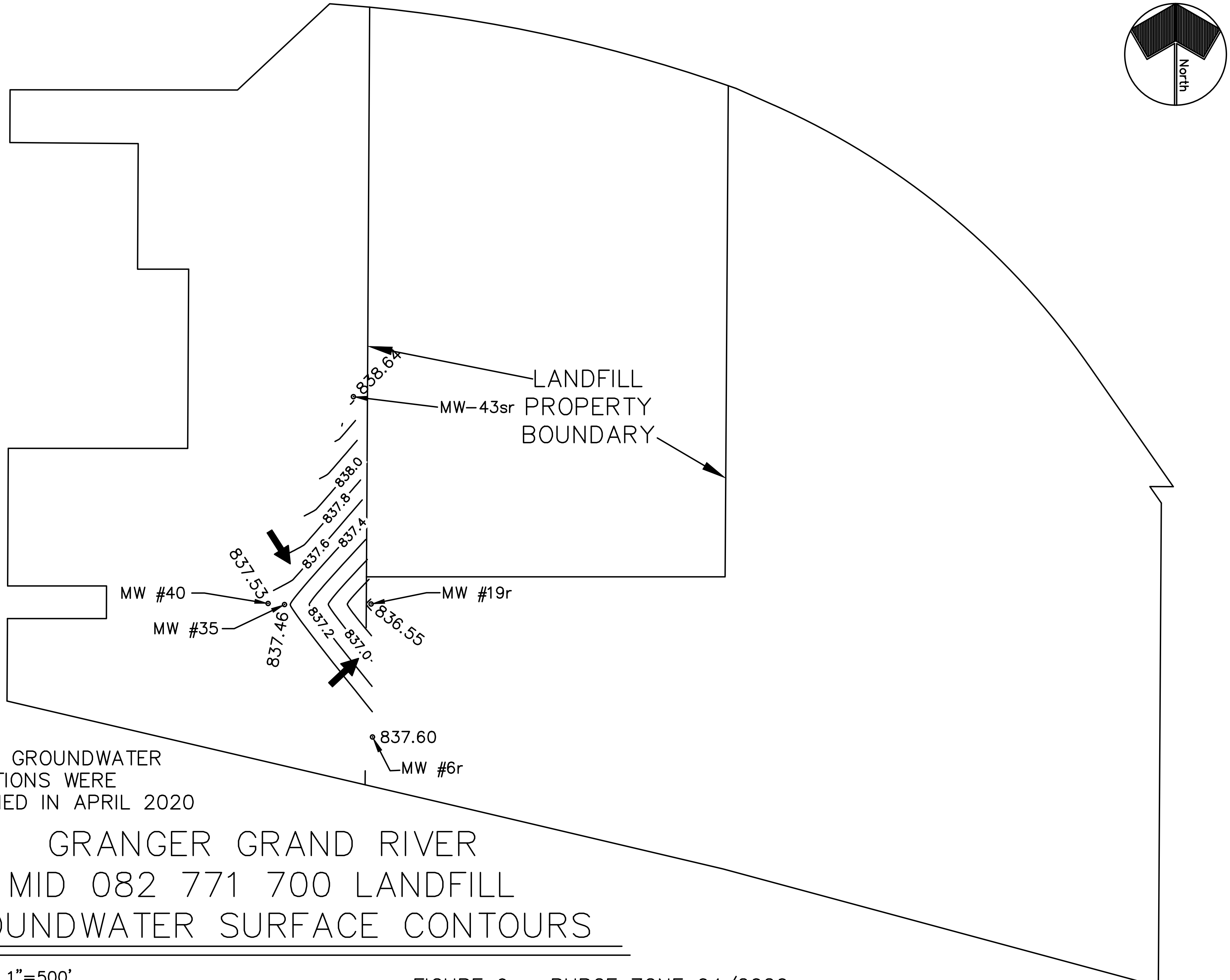


STATIC GROUNDWATER
ELEVATIONS WERE
OBTAINED IN JANUARY 2020

GRANGER GRAND RIVER
MID 082 771 700 LANDFILL
GROUNDWATER SURFACE CONTOURS

SCALE: 1"=500'

FIGURE 8 – PURGE ZONE 01/2020

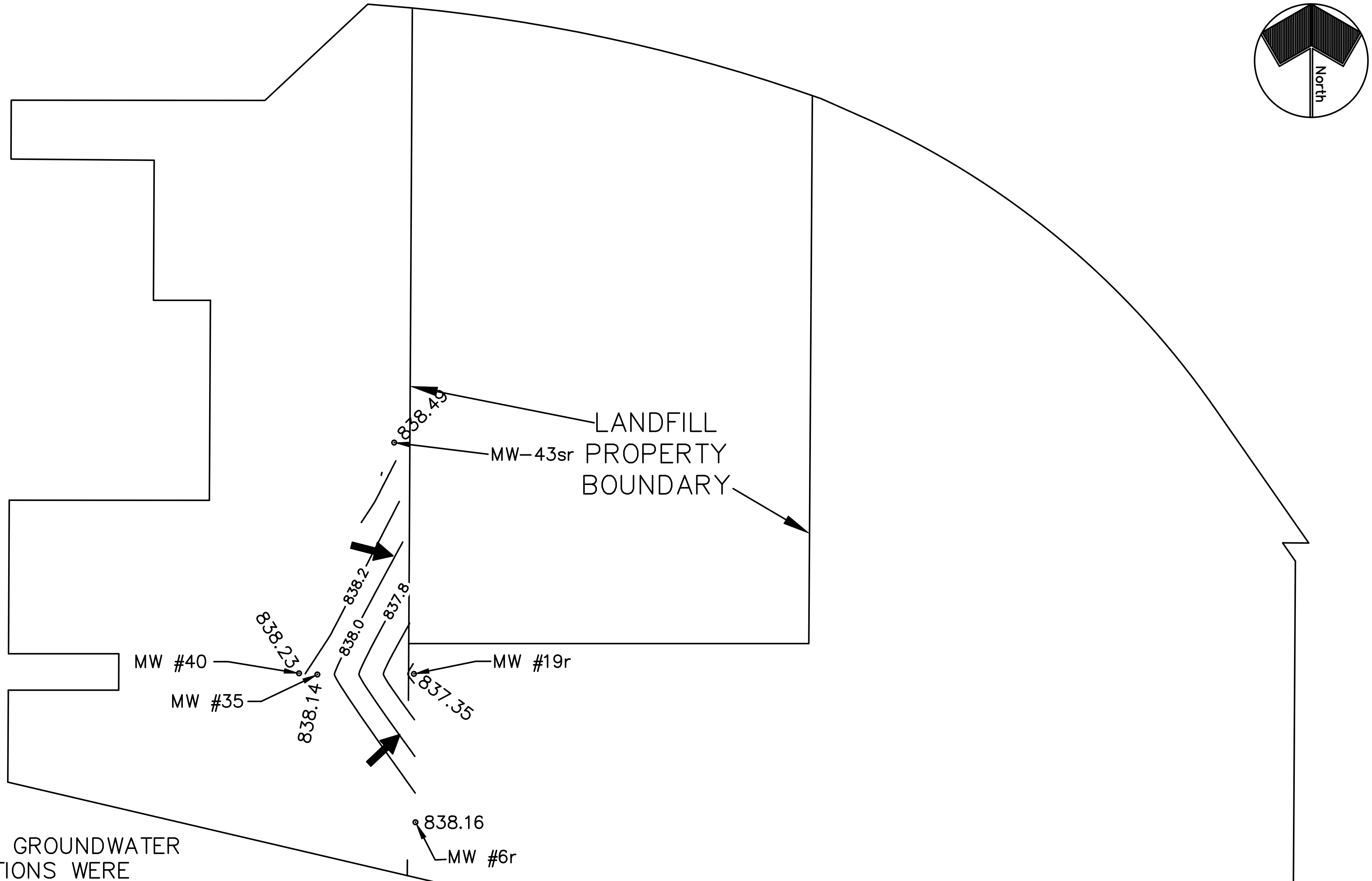


STATIC GROUNDWATER
ELEVATIONS WERE
OBTAINED IN APRIL 2020

GRANGER GRAND RIVER
MID 082 771 700 LANDFILL
GROUNDWATER SURFACE CONTOURS

SCALE: 1"=500'

FIGURE 9 – PURGE ZONE 04/2020

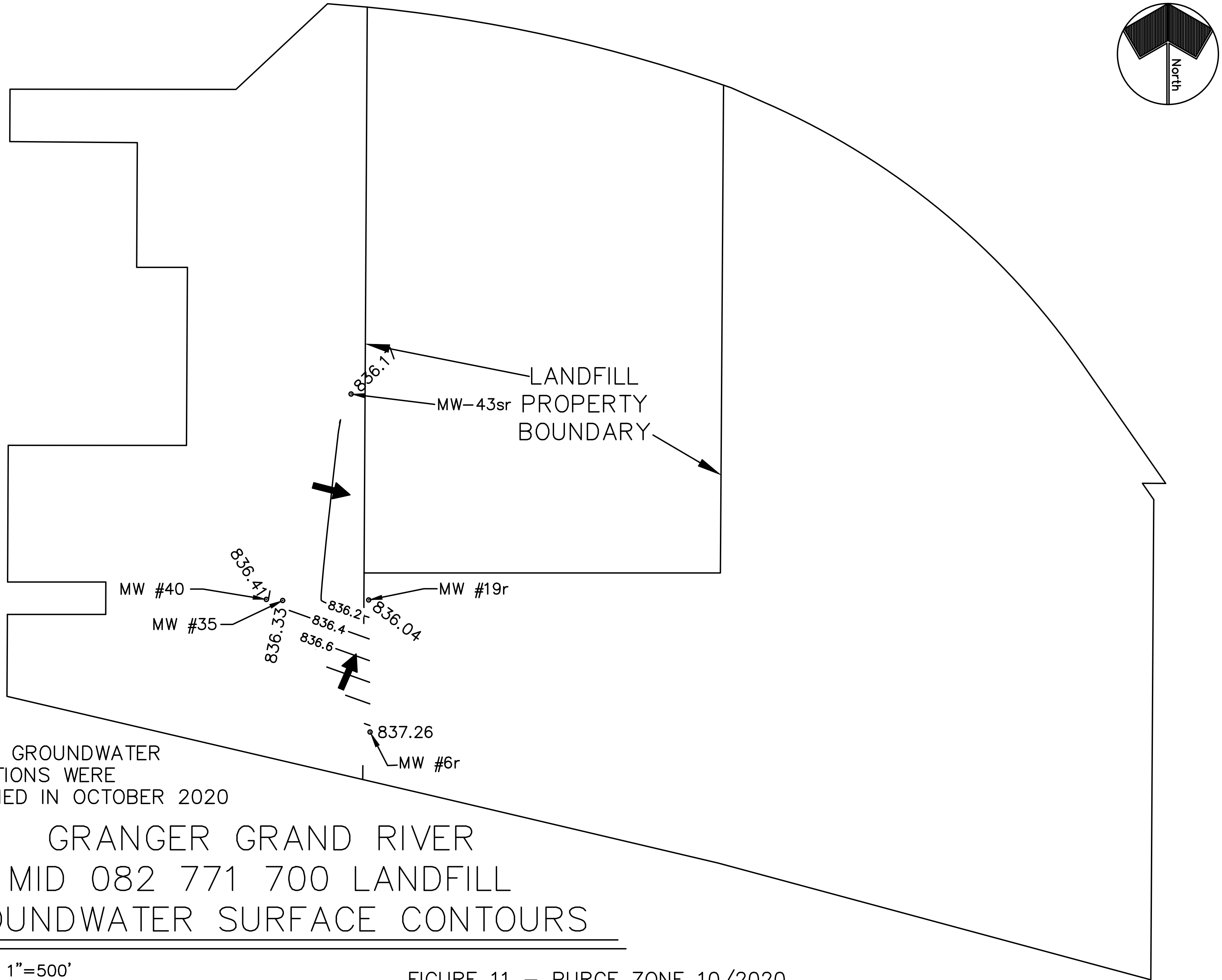


STATIC GROUNDWATER
ELEVATIONS WERE
OBTAINED IN JULY 2020

GRANGER GRAND RIVER
MID 082 771 700 LANDFILL
GROUNDWATER SURFACE CONTOURS

SCALE: 1"=500'

FIGURE 10 – PURGE ZONE 07/2020



STATIC GROUNDWATER
ELEVATIONS WERE
OBTAINED IN OCTOBER 2020

GRANGER GRAND RIVER
MID 082 771 700 LANDFILL
GROUNDWATER SURFACE CONTOURS

SCALE: 1"=500'

FIGURE 11 – PURGE ZONE 10/2020

APPENDIX F-2

Sampling and Analysis Plan

GRANGER MID 082 771 700 LANDFILL

SAMPLING AND ANALYSIS PLAN

MARCH 30, 2009

Revised
December 16, 2010

TABLE OF CONTENTS

TABLE OF CONTENTS

Continued

ATTACHMENTS

1.0 INTRODUCTION

Federal, state and local regulations require the establishment of environmental monitoring programs at various facilities. The objective of the program is to assess the hydrogeologic conditions at the facility. The nature and extent of the investigative program is based upon site-specific criteria and may include sampling and analysis of soil, groundwater, surface water, wastewater and/or stormwater.

This site-specific plan has been prepared to outline the procedures that must be followed when performing sampling for environmental monitoring programs at facilities associated with Granger. The objective of the Sampling and Analysis Plan (SAP) is to obtain a sample that meets the requirements of the environmental investigative program and to ensure the integrity of the sample until it is ready to be analyzed. Therefore, samples must be collected which provide a representation of actual conditions and are handled in such a manner to avoid factors that could affect analytical results. This document has been written in accordance with guidelines provided by "RCRA Ground Water Monitoring Technical Enforcement Guidance Document', U.S. EPA, September, 1986 and "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods (SW-846)" and "ASTM Standards on Ground Water and Vadose Zone Investigations," to ensure this degree of quality.

This SAP addresses each aspect of sample collection including:

- health and safety guidelines
- preparation, use and types of sampling equipment
- sample preservation, storage and handling
- sampling methodology
- documentation and record keeping,

The material presented in this SAP represents the standards to be maintained for sampling associated with environmental sampling and monitoring program. Increased levels of quality assurance/quality control may be instituted following internal review and approval.

2.0 HEALTH AND SAFETY PROGRAM

Personal Protective Equipment (PPE)

Persons performing water sampling must take appropriate precautions that will maximize personal protection and minimize the probability of sample contamination. The following procedures must be implemented by personnel during a sampling event to maintain these standards.

At a minimum, personnel are required to wear the following Personal Protection Equipment (PPE) during performance of duties:

- safety glasses or goggles;
- disposable gloves (non-powdered) or reusable gloves (decontaminated) manufactured of appropriate material;
- safety shoes;
- hard hats and hearing protection when in close proximity to heavy equipment

The presence of known hazardous contamination may require additional PPE or additional protective measures including, but not limited to, the following: a Tyvek suit, appropriate respirator, heavy duty gloves or other equipment. Field personnel will be informed of the known hazardous contaminants prior to the sampling event. The required equipment will be determined on a site-specific basis by the corporate health and safety officer.

At a minimum, the sampling personnel will have available for immediate emergency use:

- clean, potable water
- soap (Alconox, Liquinox)
- portable emergency eye wash
- basic first aid kit

<u>General Procedures</u>

Sampling personnel will wear protective gloves at all times when handling sampling equipment and sample containers. This will minimize direct contact with solids, liquids or equipment which may have been affected and will prevent cross-contamination of samples.

A clean, new pair of disposable gloves will be worn at each sample location to prevent cross contamination and will be replaced whenever their integrity has been compromised, such as by tears or contact with possible contaminants. Re-usable gloves must be thoroughly washed with soap (Alconox, Liquinox) and rinsed with deionized water before and after use at each sample point and must never be used for sampling purposes. Disposable gloves are the preferred gloves for sampling and will always be used when sampling soils, groundwater, surface water and leachate collection and/or secondary leachate collection samples.

If skin contact is made with leachate or equipment having been in contact with leachate, personnel will immediately and thoroughly wash and rinse the exposed area.

If skin or personal clothing contact is made with known hazardous material, the clothing should be removed immediately and affected skin areas thoroughly washed and/or rinsed as appropriate. Eye contact with liquids requires the use of potable eye wash and thorough, repeated rinsing.

Personnel who experience continued skin or eye irritation must seek medical attention immediately.

Personnel are to avoid hand to mouth contact at all times during sampling procedures. Smoking, eating and drinking during performance of sampling duties is strictly prohibited. Personnel will thoroughly wash and rinse hands and face, if appropriate, immediately following completion of facility sampling or whenever sampling is interrupted and prior to leaving the facility (where applicable).

Personnel will operate motorized vehicles in a safe manner consistent with site conditions, site requirements, and state motor vehicle operator rules and regulations.

Persons conducting sampling must receive health and safety training prior to conducting actual field activities. Training requirements are outlined in Section 3.0 of this manual.

3.0 TRAINING

Proper training of field sampling personnel is required by this program. This training will minimize risks to personal health and safety while ensuring accurate, high quality sampling events. These aspects are discussed in the following sections. Certification of training is required by all investigative field personnel including subcontractors.

3.1 Health and Safety:

Sampling personnel must be properly trained in the health and safety aspects of hydrogeologic investigations. The training must include the identification of possible sources of personal injury and contamination as well as the selection and use of specific personal protection procedures and equipment to reduce or eliminate these risks. Training must also include specific response procedures to be followed during emergency situations.

All personnel who conduct field activities must receive this training prior to actual field work. If sampling is conducted for hazardous materials, health and safety training and experience must comply with 29 CFR 1910.120, 29 CFR 1910.134 and 29 CFR 1910.1200

3.2 Sampling

Personnel engaged in sampling activities must be trained in the proper selection and use of sampling equipment, as well as sampling procedures and techniques that include requirements of regulatory agencies and this manual.

4.0 SAMPLE COLLECTION

The following section describes the procedures for soil, ground water, surface water, leachate, leachate detection, and/or secondary leachate collection and stormwater detention pond discharge samples. In general, samples should be obtained in the following order:

a. Ground water
b. Surface water
c. Leachate
d. Stormwater discharge

4.1 Preliminary Procedures

Prior to the sampling event, a number of preliminary tasks must be accomplished. These preliminary procedures include identifying the sampling locations and establishing the sampling order and preparing equipment. These preliminary procedures will ensure identification of all samples that are required to be sampled. These requirements will be specified in the site-specific work plan.

The first step in the program is to establish the sampling points. For ground water monitoring wells it is also necessary to establish well depth, top of casing elevation and ground surface elevations.

After identifying the sample location, the sampling order must be established. Monitoring wells must be sampled in order from wells installed up-gradient of the facility to wells installed down-gradient of the facility unless dedicated ground water sampling equipment is utilized. From sites having known contamination, wells must be sampled in order from least contaminated to most contaminated unless dedicated ground water sampling equipment is utilized. Surface water samples must be collected in upstream to downstream sequence. Leachate and other wastewater samples must be segregated from other environmental samples (i.e., ground water, soil, surface water, stormwater discharge). Under no circumstances will sample holding times be exceeded. Deviations from this established protocol are only allowed when authorized by the project coordinator.

All equipment necessary for the sampling event must be cleaned, checked and calibrated prior to going into the field. Equipment cleaning must be performed in accordance with manufacturers' specifications and industry standards in an area free of potential contaminants.

4.2 Ground Water Sampling Using Non-Dedicated Sampling Equipment

The following are the minimum procedures for the collection of ground water samples in order to protect samples and sampling locations from potential sources of contamination.

4.2.1 Well Condition

The condition of the well and surrounding area is to be observed and documented upon arrival at the well. The following information shall be noted on environmental monitoring field data sheet: condition of ground surface around the well; security (is the well locked; does the cap on the well casing seal the riser pipe properly); condition of the well including protective cover, lock, cap, casing and concrete pad; and evidence of potential contamination (well recently painted, animal or insect parts in well, vandalism, etc.).

Weather conditions, temperature and wind are to be noted on the environmental monitoring field data sheet.

If unusual conditions or problems exist with a given sampling point, notification is required to the project coordinator. Where possible, notification of the unusual conditions must be made prior to leaving the site during the particular sampling event.

4.2.2 Water Level Measurement

The static water level must be measured prior to purging and sampling at each ground water sampling location. All on-site static water level measurements for a given site must be obtained within a twenty-four (24) hour period. The measurement must be obtained no longer than 24 hours prior to purging the ground water monitoring well. The static groundwater measurements for each well will be taken from the north side of the casing. The north-side reference location has been utilized to identify the top of casing to the nearest 0.01 feet and referenced to mean sea level (MSL). All ground water monitoring wells will be clearly labeled and identified.

The measurement should be taken using an electronic water level meter capable of accuracy of 0.01 feet. The meter must be decontaminated with an approved detergent soap (i.e., Alconox, Liquinox) and rinsed completely with deionized water prior to each measurement. Minimum contact of the tape and probe/sounder and the water in the well is required to decrease the potential for cross contamination. Disposable latex gloves must be used while determining the static water level. The elevation of each ground water monitoring well shall be reported to the nearest 0.01 foot and can then be determined by the following equation:

GWE = TOC - DIW

Where: GWE - Ground water Elevation (ft. MSL)
TOC Top of Casing Elevation (ft. MSL)
DTW Depth to Water below TOC (ft.)

The depth to ground water and ground water elevation must be calculated and documented on the environmental monitoring field data sheet (Attachment 1). Ground water measurements for all sampling locations on a given site must be accomplished within a 24-hour period. The measurement must be compared in the field to historical data to ensure representative elevation data are obtained prior to sample collection.

The expandable plastic cap or galvanized screw-on cap must have a vent in order to ensure representative ground water elevations are obtained prior to purging the well.

4.2.3 Well Purging

The monitoring wells must be purged to ensure that a sample representative of the groundwater within the aquifer being monitored is collected. A minimum of three times the volume of standing water within the well must be evacuated. For wells in which the screens are placed in low yielding formations, they must be purged three volumes or until dry. If sufficient volume cannot be obtained within 24 hours of purging, the ground water monitoring well will be considered dry for the sampling-event. Groundwater monitoring wells must be sampled immediately after purging where recovery rates allow. Where wells are pumped dry during purging the ground water will be sampled as soon as sufficient recovery occurs to allow collection of the necessary volume.

The following equation should be used to determine the volume of water to purge:

PV = (TWD - DTW) x GFD x 3

Where: PV - Purge Volume
TWD - Total Well Depth (ft)
DTW Depth To Water (ft)
GFD gallons per foot of depth
2-inch diameter well, GFD = 0. 163 gal/ft
4-inch diameter well, GFD = 0.653 gal/ft

The calculated volume is to be documented on the environmental monitoring field data sheet (Attachment 1)

After the purge volume is determined, the purge process can begin. Shallow wells (well depths <20 ft) should be purged using a disposable bailer. Deep wells (well depths >20 ft) should be purged using an electric submersible pump. Very low yield deep wells should also be purged utilizing a disposable weighted bailer. All rope utilized during the purging and sampling process must be disposable and not used for more than one sampling location. Wells that are purged on one day and sampled on the following day must use new rope and bailer for the following days sampling event. Vehicle engines must not be running, during purging and sampling activities.

An important concern while purging is to minimize the potential for cross contamination. Pumps must be decontaminated prior to insertion into the well by cleansing with an appropriate detergent soap (i.e., Alconox, Liquinox) and a thorough rinse with deionized water sufficient to remove all traces of detergent. If non-disposable type bailers are utilized on any sampling event at any facility, then the bailer must be of the type that can be 'dismantled' to further ensure that proper decontamination is accomplished. As a general rule, disposable bailers will be used when purging and sampling unless permission to use non-disposable bailers is obtained from the project coordinator prior to the sampling event or required, based on the analytical parameters being tested. During bailer insertion and removal in the monitoring well extreme care must be taken to prevent the bailer rope from contacting the ground or other sources of potential contamination. Necessary precautions must be taken to eliminate any contact of purging equipment with potential contaminants.

During purging, the extracted water must be collected to determine the volume of water purged. The purge volume must be documented on the environmental monitoring field data sheet (Attachment 1).

Purge water must be discharged at least 10 feet from the well footing. For wells having known ground water contamination, the purge water must be collected and disposed in the leachate collection system.

During purging, a minimum of three field measurements of specific conductance, pH and temperature will be made. Stabilized values will indicate that proper evacuation of the casing has been achieved. If, after a maximum of five (5) well volumes have been evacuated, the field measurements have not stabilize this must be noted on the environmental monitoring field data sheet (Attachment 1), and within the field report. All measurements must be recorded on the environmental monitoring field data sheet. At no time are these measurements to be obtained from bottles designated for laboratory analysis. The beaker/bottle being utilized for the measurement of the above three parameters must be cleaned and rinsed with deionized water between measurements.

4.2.4 Sample Collection

After purging the appropriate volume, the well can be sampled with the appropriate approved equipment. Prior to sampling (if non-disposable equipment is utilized), the equipment must be decontaminated by washing with an appropriate detergent soap (Alconox, Liquinox) and thoroughly rinsed with deionized water to remove all traces of detergent. Precautions should be taken to ensure that decontamination equipment does not come in contact with potential sources of contamination. No vehicle engines should be running during purging and sampling.

In general, shallow wells or very low yielding wells should be sampled with a disposable bailer. Disposable nylon bailer string should be used. Bailer string must be removed and properly disposed of, between sampling locations and care must be taken to ensure that the bailer string does not come into contact with potential sources of contamination.

Deep wells and wells requiring a large volume of water to be removed should be sampled using an electric submersible pump. The pump should be placed below the static water level head and, if possible, above the screened interval of the well. Care should be taken to ensure that the pump hose does not contact the ground surface. The submersible pump is not an appropriate sampling device for volatile organic compounds.

All samples being analyzed for volatile organic compounds (EPA Method 8021 or 8260) must be stored in containers which allow for zero head-space (i.e., 40 ml VOA vials) unless otherwise specified by SW-846 or by a U.S. EPA or State regulatory approved laboratory technique for the given analysis. Use of a preservative for volatile organic parameter analysis is allowed provided it is in accordance with SW-846, U.S. EPA, and state regulatory requirements.

Volatile organic compounds will be sampled with a disposable bailer prior to any other samples. In addition, an appropriate "VOC sampling" attachment must be used while filling the sample vials to prevent excessive agitation of the sample. The bailer must be lowered slowly into the well so as not to enhance chemical volatilization of the sample. Minimal sample contact with the air is required in order to ensure that representative samples are obtained.

Certain samples, in accordance with U.S. EPA and State regulatory requirements, will require field filtration. Filtration should be performed in the field immediately upon collection of the samples. When sampling with non-dedicated sampling equipment, it is preferred that all samples requiring field filtration be sampled with a submersible pump. A 0.45 micron membrane pressure filter should be attached at the end of the pump discharge hose to perform field filtration. The filter attachment must not be attached prior to the evacuation of the required purge volume. After filtration is complete, sample collected for dissolved metals analysis should be preserved to a pH of less than 2.0 with nitric acid. Other samples which may require filtration according to SW-846 should be preserved appropriately. Disposable filters must be disposed of properly after each sampling location.

If a bailer is used to collect samples requiring field filtration, the samples must be transferred directly or by using laboratory cleaned sample bottles to an appropriate field filtration device. Field filtering equipment should be cleansed with a HCL solution, in accordance with manufacturer's specifications, and thoroughly rinsed with deionized water to remove any metal contaminants from the filtering equipment. A minimum of 500 ml of deionized water should be used to rinse the filtering apparatus and equipment. In all cases the filters must be changed between each sampling point and they must be disposed of properly. If samples are obtained that are too silty for effective field filtration, and therefore the potential exists for the sample to be exposed to the atmosphere for extended periods of time, they may be filtered under laboratory conditions. Confirmation of field filtration should be noted on the environmental monitoring field data sheet (Attachment 1), chain-of-custody form, and field report. Filtration must be accomplished within 24 hours after sample collection.

If a monitoring well is screened in a very low yield formation, the well can be allowed to recharge 24 hours after purging. If there is insufficient water for sampling any parameter, then the well is considered dry for the sampling event and documented as such. If the volume available is insufficient for filling all of the sample containers, as many sample containers as possible should be filled. The priority of sample container filling is as follows:

- Volatile Organic Constituents (VOCS) (40 ml vials)
- Unpreserved bottles
- Preserved bottles

If samples are "split' among regulatory agency representatives, the minimum volume of sample, as specified in SW-846 or by the analytical laboratory must be placed in sample bottles destined for analysis by the analytical laboratory prior to dispersing any sample to those same representatives.

Documentation of sample collection procedures shall be noted on the environmental monitoring field data sheet (Attachment 1). Observations regarding the color, odor and turbidity of the samples are to be recorded. Sampling and handling procedures must be documented and followed (Sections 5.0 and 6.0). Samples must be immediately placed into a cooler and maintained at a temperature of 4 degrees Celsius upon collection until delivery to the laboratory. Chain-of-custody protocol must be strictly adhered to as described in Section 6.0.

<u>4.2.5. Groundwater Underdrains</u>

Groundwater underdrains are sampled by lowering a bailer or discreet water sampling apparatus (which is capable of sampling below the water surface) down an access manhole, or under the surface of the water. When using a bailer, a disposable bailer is required unless approved by the project coordinator (where feasible the discrete water sampler is the preferred method). If a "multiple" use discrete sampling apparatus is used to sample, the apparatus must be decontaminated in accordance with manufacturer's specification and, at a minimum, decontaminated by an appropriate detergent soap (i.e., Alconox, Liquinox) and thoroughly rinsed with deionized water to remove all traces of detergent. If the discrete sampling apparatus is utilized, it must be used for each sampling event in order to obtain consistent historical data. The discrete water sample must be obtained within the central portion of the column of water. <u>Under no conditions should personnel enter any access manhole</u>.

Where required by the site specific operating license, ground water underdrains can be sampled at the drain outlets. Sample collection will be consistent with Section 4.4.

Sample collection procedures must be documented on the environmental monitoring field data sheet (Attachment 1). Observations regarding the color, odor and turbidity of the samples must be recorded. Sample handling procedures must be followed in accordance with Section 5.0. Chain-of-custody protocol must be strictly adhered to as described in Section 6.0.

4.3 Sampling Collection Using Dedicated Sampling Equipment

The following are the minimum procedures for the collection of groundwater samples at facilities utilizing dedicated ground water sampling equipment (i.e., QED Well Wizard dedicated bladder pumps) in order to protect samples and sampling locations from potential sources of contamination.

All sampling crews that are sampling groundwater will be familiar with the operation and general maintenance of the dedicated QED Well Wizard sampling pumps and associated equipment. All crews must be trained to operate the equipment in a safe and efficient manner and be familiar with the Operations and Maintenance Manual. If technical problems are experienced in the field with respect to the dedicated ground water sampling equipment, notification to the project coordinator is required.

4.3.1 Well Condition

The condition of the well and surrounding area is to be observed and documented on the environmental monitoring field data sheet (Attachment 1) upon arrival at the well. As with ground water wells which are sampled with non-dedicated ground water sampling equipment, the steps that were specified in Section 4.2.1 also apply to sampling ground water with dedicated sampling equipment.

4.3.2 Water Level Measurement

The static water level must be measured at each ground water sampling location prior to purging and sampling. If a ground water monitoring well is equipped with a dedicated sampling pump and not with a pneumatic pressure transducer, the static water level measurement should be obtained through the access hole in the well cap. The static water level measurement must be obtained as specified in this Section.

For each well that is equipped with a pneumatic pressure transducer, the depth of water below the top-of-casing can be calculated by the following equation:

$$C = A - B$$

Where:

C = Depth of water below the top-of-casing.
A = Probe length measured during the time of pump installation.
B = Probe submergence measured in the field prior to well purging.

The top-of-casing reference point has been surveyed to the nearest 0. 0 1 feet prior to the installation of dedicated ground water sampling pumps.

The static ground water elevation of each ground water monitoring well shall be calculated in the field and compared to historical data to ensure that representative static water level data was obtained. The static water elevation must be reported at the nearest 0.01 foot and is to be reported as feet mean sea level (MSL). The equation for determining the static water elevation can be determined by the following equation:

$$GWE = TOC - DTW$$

Where:

GWE = Ground water Elevation (ft. MSL)
TOC = Top-of-Casing Elevation (ft.MSL)
DTW = Depth to Water below the TOC (ft.)

The depth to ground water and ground water elevation must be documented on the environmental monitoring field data sheet (Attachment 1). The measurement must be compared in the field to historical data to ensure a representative elevation is obtained. Ground water elevation measurements for all sampling locations on a given site must be accomplished during a 24 hour period.

All QED protective caps must have a vent in order to ensure representative ground water elevations are obtained prior to purging the well. Disposable non-powder latex gloves must be worn while determining the static water level.

4.3.3 Well Purging

The ground water monitoring wells must be purged to ensure that a representative sample of the ground water within the aquifer is collected. A minimum of 3 times the volume of standing water within the well must be evacuated. For wells in which the screens are placed in low yielding formations, they must be purged three volumes or until dry. The pump inlet for the dedicated sampling pump systems have been specifically located so that ground water monitoring wells in which screens are placed in low yielding formations can be purged dry (i.e., the pump inlet screen is within inches of bottom of the ground water monitoring well casing) to obtain the most representative samples possible.

The following equation should be used to determine the volume of water to purge:

PV = (TWD - DTW) x GFD x 3

Where: PV = Purge

Volume = Total Well Depth

DTW = Depth to Water

GFD = gallons per foot to depth

2 inch diameter well, GFD = 0. 163 gal/ft

4 inch diameter well, GFD = 0.653 gal/ft

The calculated volume is to be documented on the environmental monitoring field data sheet (Attachment 1).

After the purge volume is determined, the purge process can begin. Vehicle engines must not be running during purging and sampling activities. The Controller/Driver and air compressor unit must be placed the maximum distance allowed by the length of hose downwind of the ground water monitoring well during purging and sampling activities.

The gasoline can which the sampling crew utilizes for filling the compressor engine gasoline tank must be a DOT approved container and transported in accordance with state and federal guidelines. The gasoline container must be in good condition and stored in a manner as to not cause any spillage on, or contamination to, sample containers or sampling equipment. Refilling the compressor tank must not be accomplished in the proximity of any sample containers or sampling equipment or sampling points.

An important concern while purging is to minimize the potential for cross contamination. Necessary precautions (i.e., wearing, disposable latex gloves when handling any of the dedicated sampling equipment, Controller/Driver and Compressor) must be taken to eliminate any contact of purging equipment with potential contaminants.

During purging, the extracted water must be collected to determine the volume of water purged. To measure the volume of water being removed, a calibrated bucket or a container of known volume must be used. The purge volume must be documented on the environmental monitoring field data sheet (Attachment 1).

Purge water must be discharged at least 10 feet from the well footing. For wells having known ground water contamination, the purge water must be collected, stored, and disposed in accordance with applicable regulations. Storage and disposal of contaminated ground water will be coordinated by the project coordinator.

During purging, a minimum of three field measurements of specific conductance, pH and temperature will be made. Stabilized values will indicate that proper evacuation of the casing has been achieved. If the field measurements fail to stabilize after purging five (5) well volumes, it should be noted on the environmental monitoring field data sheet (Attachment 1) and in the field report. These measurements must be recorded on the environmental monitoring field data sheet (Attachment 1). At no time are these measurements to be obtained from bottles designated for laboratory analysis. Between measurements, the beaker/bottle being utilized for the measurement of the above three parameters must be rinsed with deionized water.

4.3.4 Sample Collection

After purging the appropriate volume, the well can be sampled. Precautions should be taken to ensure equipment does not come in contact with potential sources of contamination. No vehicle engines should be running during purging and sampling. The air compressor unit that drives the pump controller must be placed the maximum distance allowed by the length of hose downwind of the ground water monitoring well.

During sampling the Controller/Driver should be adjusted to lower the ground water discharge volume and flow rate to minimize volatilization of the ground water sample.

All samples being analyzed for volatile organic compounds (EPA Method 8021 or 8260) must be stored in containers which allow for zero headspace (i.e., 40 ml VOA vials) unless otherwise specified in SW-846 or by an EPA and State regulatory approved laboratory technique for the given analysis (must be approved by project coordinator). Use of a preservative for volatile organic parameter analysis is allowed provided it is in accordance with SW-846 requirements.

Certain samples, in accordance with U.S. EPA and State regulatory requirements, will require field filtration. Filtration should be performed in the field immediately upon collection of the samples. All samples requiring field filtration (i.e., dissolved metals) should be accomplished utilizing a 0.45 micron membrane pressure filter which should be attached at the end of the pump discharge hose to perform field filtration. The filter attachment must not be attached prior to the evacuation of the required purge volume. After filtration is complete, samples being collected for dissolved metals analysis should be preserved to a pH of less than 2.0 with nitric acid. Other samples which may require filtration according to SW 846 should be preserved appropriately. Disposable filters must be disposed of properly after each sampling location and these filters cannot be reused in subsequent sampling events.

If samples are obtained that are too silty for effective field filtration and therefore, the potential exists for the sample to be exposed to the atmosphere for extended periods of time, they may be filtered under laboratory conditions. Filtration must be accomplished within 24 hours after sample collection. Confirmation of field filtration should be noted on the environmental monitoring field data sheet (Attachment 1), chain-of-custody form, and the field report.

If a well is screened in a formation with very low yield, the well can be allowed to recharge 24 hours after purging unless otherwise specified by the project coordinator. If there is insufficient water for sampling any parameter, then the well is considered dry for the sampling event and documented as such. If the volume available is insufficient for filling all of the sample containers, as many sample containers as possible should be filled. Notation of insufficient sample volume should be placed on the environmental monitoring field data sheet (Attachment 1) and in the field report. The priority of sample container filling is as follows:

- VOCs (40 ml vials)
- Unpreserved bottles
- Preserved bottles

If samples are "split" among regulatory agency representatives, the minimum volume of samples, in accordance with SW-846 guidelines and specific analytical laboratory requirements, must be placed in sample bottles destined for analysis by the analytical laboratory prior to dispersing any sample to those same representatives.

Documentation of sample collection procedures shall be noted on the environmental monitoring field data sheet (Attachment 1). Observations regarding the color, odor and turbidity of the samples are to be recorded. Sampling and handling procedures must be documented and followed (Sections 5.0 and 6.0). Samples must be immediately placed into a cooler and maintained at a temperature of 4 degrees Celsius upon collection until delivery to the laboratory. Chain-of-custody protocol must be strictly adhered to as described in Section 6.0.

4.4 Surface Water Sampling

For surface water sampling of ditches, stormwater retention basins, or other surface water bodies, it is necessary to obtain a fresh, representative sample. Where possible, samples must be collected from the center of the body of water at mid-depth. Surface water samples must be collected in an upstream to downstream sequence. Handling of surface water samples must also be documented in accordance with Sections 5.0 and 6.0. If sampling occurs during flood/storm conditions, it should be so noted on the environmental monitoring field data sheet (Attachment 1) and the field report.

If samples are to be collected during flood/storm conditions, the samples should be obtained as close as practical to the appropriate sampling location without compromising the health and safety of sampling personnel.

Surface water samples must be collected, where possible, by dipping the appropriate sample container into the water. Unless the sample bottle contains preservatives, the sample container must be lowered into the water while capped, uncapped under water to allow the sample bottle to fill, and then recapped before removing from the water. The mouth of the sample bottle must face into the flow of the water. Containers must be lowered slowly into the water so as not to disturb the bottom sediment. If samples require preservation, samples shall be poured slowly into the bottles containing the preservatives from clean sample bottles.

A dipper, or the discrete water sampling apparatus, must be used when a surface water sample cannot be collected directly into the sample container. A dipper consists of a glass or Teflon beaker clamped to the end of an aluminum, fiber-lass or plastic pole. The dipper and pole must be decontaminated by an appropriate detergent solution and rinsed with deionized -water prior to sampling. Collected samples must be transferred directly from the dipper to the appropriate sample containers.

If during a sampling event, the surface water location is dry or frozen and no sample can be obtained, then this must be documented on the environmental monitoring field data sheet (Attachment 1) and in the field report.

Surface water samples must not be field filtered. If collected properly, the samples will not contain sufficient suspended solids to warrant filtration. If sufficient suspended solids are present, documentation should be provided as such on the environmental field data sheets (Attachment 1).

Documentation of sample collection procedures shall be noted on the environmental monitoring field data sheet (Attachment 1). Observations regarding the color, odor and turbidity of the samples should be recorded. Sampling and handling procedures must be documented and followed (Section 6.0). Samples must be immediately placed into a dedicated cooler and maintained at a temperature of 4 degrees Celsius upon collection. Chain-of-custody protocol must be strictly adhered to as described in Section 6.0.

4.5 Leachate Collection Sampling

Leachate samples obtained from leachate wells, holding tanks, pump stations, or manholes must be collected using a disposable high density polyethylene (HDPE) bailer or via the leachate collection pump station. Rubber gloves and other appropriate PPE must be worn whenever handling leachate samples. Under no condition should personnel enter an access manhole.

Documentation of sample collection procedures shall be noted on the environmental monitoring field data sheet (Attachment 1). Observations regarding the color, odor and turbidity of the samples should be recorded. Sampling and handling procedures must be documented and followed (Section 5.0). Samples must be immediately placed into a dedicated cooler and maintained at a temperature of 4 degrees Celsius upon collection. Chain-of-custody protocol must be strictly adhered to as described in Section 6.0.

4.5.1 Leachate Collection Sampling With Non-Dedicated Sampling Devices

As specified above, leachate samples from leachate holding tanks and leachate manholes should be sampled with disposable HDPE bailers. Nylon disposable bailer string must be used. Care must be taken to ensure that the bailer string does not come in contact with potential sources of contamination (i.e., manhole covers and manholes) or personal clothing.

Volatile organic compounds will be sampled with a disposable bailer prior to any other samples. In addition, an appropriate "VOC sampling" attachment must be attached while filling the sample vials to prevent excessive agitation of the sample. The bailer must be lowered slowly into the well so as not to enhance chemical volatilization of the sample. Minimal contact with the air is required in order to ensure that a representative sample is obtained.

No filtration, purging or water level measurements are required unless specified in the Site Specific Work Plan.

Once the sampling is complete, the disposable bailer and string must be disposed of properly. Equipment used for leachate monitoring and sampling must not be used for any other type of monitoring.

4.5.2 Leachate Collection Sampling From leachate Collection Pump Discharge

Leachate samples collected from leachate collection pump discharge points (i.e., outlets from submersible pumps) or sampling ports should be collected directly into the respective sample bottles in a manner that will cause minimal agitation, and volatilization of the sample (i.e., if possible, lower the pump discharge rate, and hold the bottle at an angle). Care must be taken not to allow any leachate to flow freely onto the ground's surface.

No filtration, purging, or water level measurements are required unless specified in the Site Specific Work Plan.

4.6 Secondary Leachate Detection Collection

Secondary Leachate Detection Collection sumps will be equipped with dedicated sampling equipment such as submersible Grundfos or Leachator pumps. Samples shall be obtained by collecting the samples directly into the respective sample container unless field filtration is required.

Documentation of sample collection procedures shall be noted on the environmental monitoring field data sheet (Attachment 1). Observations regarding the color, odor and turbidity of the samples should be recorded. Sampling and handling procedures must be documented and followed (Section 5.0). Samples must be immediately placed into a dedicated cooler, segregated from other environmental samples and maintained at a temperature of 4 degrees Celsius upon collection. Chain-of-custody protocol must be strictly adhered to as described in Section 6.0.

4.7 Storm Water Sampling

Due to the large numbers of variables affecting stormwater discharges, sampling protocol will develop on a site-specific basis. This information will normally consist of, at a minimum: 1) number of outfall locations, 2) type of outfall structure (i.e., pipe, channel, trough, weir, etc.) physical characteristics, (i.e. construction, size, slope, condition, etc.) and analytical testing requirements. It is expected that sampling at this site will be limited to the collection of a sample at the ditch on the north side leading to the Openlander Drain. Specific criteria for the sampling are provided in Section 4.4 "Surface Water Sampling".

4.8 Field Measurements

Field measurements for temperature, pH and specific conductivity must be collected as required at each sampling point using the appropriate field probe or meter. A clean bottle or beaker must be used for these measurements. The measurements must be documented on the environmental monitoring field data sheet (Attachment 1). Containers and probes must be properly cleansed between sample locations.

Probes must be calibrated at the beginning of each sampling day and every four hours thereafter using, fresh standards. Calibration standards must be of value similar to those values expected at the sampling location. Calibration must be in accordance with the manufacturer's specification for each probe. Calibration results must be recorded in a field log book.

5.0 SAMPLE CONTAINERS, PRESERVATION AND HANDLING

Sample containers, preservations and handling procedures are dependent upon the type of laboratory analysis requested. Attachment 2 provides a list of the sample container types and methods of preservation by the type of laboratory analysis. The list has been prepared according to U.S. EPA and State regulatory requirements.

Glass sample containers will be pre-cleaned by the laboratory in accordance with SW-846 procedures. Plastic containers may not be reused. The standard operating, procedure for cleaning of sample containers should consist of, at a minimum, the items discussed in Attachment 2.

Collected samples will be transported to the laboratory via shipping coolers. Internal cooler temperature must be maintained at 4 degrees Celsius.

6.0 CHAIN-OF-CUSTODY PROTOCOL

Chain-of-custody protocol is necessary to ensure the integrity of samples from the time of collection to data reporting. Chain-of-custody protocol includes proper sample labeling, sample sealing, sample storage and the chain-of-custody record.

6.1 Sample Labeling

Specific sample labeling procedures are necessary to prevent misidentification of samples. Sample labeling may include project name, project number, sample location, sample identification number, name of sampler, parameter to be analyzed, preservative, sampling date and sampling time.

6.2 Chain-of-Custody

Chain-of-custody records are completed to document sample possession. A written record of sample container possession and transfer must be documented using the chain-of-custody record provided in Attachment 3.

The chain-of-custody form must be signed, including date and time, when the following activities occur:

- samples are transferred to the responsibility of another person;
- samples are submitted to the laboratory for analysis.

Samples and/or sample containers must be in the custody of an assigned sampler. The samples must be in sight of the sampler or locked in a tamper proof location, and secured with a tamper proof seal. Failure to complete the chain-of-custody form for any sampling event will render the data suspect.

7.0 LABORATORY ANALYSIS

Collected samples will be submitted to the laboratory for analysis. Each site will have provided a list of the sampling points, parameters, analytical methods and detection limits to the respective facility.

8.0 QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

Quality assurance/quality control (QA/QC) procedures are performed to document the accuracy and precision of the sampling analysis. QA/QC procedures include both field and laboratory programs. Duplicates, field blanks, trip blanks, and decontamination blanks are essential features of a QA/QC program.

8.1 Field Program

QA/QC procedures implemented during sampling include decontamination water blanks, trip blanks, and field/equipment blanks.

Decontamination Water Blank - A sample of the deionized water which is used during decontamination procedures must be collected. The sample must be submitted to the laboratory with collected samples, but not immediately analyzed. The sample must be retained by the laboratory until the results for the sampling event are received and verified. If there is a discrepancy in the analytical results and the integrity of the decontamination water is questioned, the sample must be analyzed for the particular parameter in question, providing the holding time for the decontamination water blank has not been exceeded. Decontamination water blanks shall be collected at the end of the sampling event.

Trip Blank - One trip blank is collected for each sampling event to detect any contamination due to the sampling containers or sample transport. Trip blanks are utilized and analyzed whenever VOCs are sampled. A trip blank involves filling the sample container with reagent grade water and transporting the blank with the sample containers used for field sampling. Trip blanks must be prepared by the analytical laboratory prior to the sampler picking up the sample containers. Trip blanks are never opened in the field. Trip blanks are analyzed for volatile organic compounds.

Field/Equipment Blanks - One field/equipment blank is collected during each sampling event to detect any contamination from the sampling equipment. A field/equipment blank involves passing reagent grade water through each type (except dedicated) of sampling device and into sample bottles in the field. The field/equipment blank can be collected at any time after the first field sample is obtained. The blank is submitted with collected samples for laboratory analysis.
A minimum of one field/equipment blank is required for each sampling event even if disposable sampling equipment is used unless otherwise specified.

Duplicates - A duplicate is required on a daily basis to determine the variability of a particular sample point. The duplicate is collected at the same time and location of one of the sampling locations. If possible, the duplicate sample is collected from the same bailer sample as the regular sample. Time and sample locations are not recorded on the chain-of-custody or sample label in order to mask the sample location from which the duplicate was obtained. One duplicate per sampling event is required. A minimum of one duplicate will be analyzed for the same parameters for ground water monitoring requirements as described in the site specific sampling and analyses plan.

If sample contamination from sampling methodology or equipment decontamination is suspected through review of analytical results, blanks will be sampled in the following order (if holding times have not been exceeded):

a. Trip blank
b. Decontamination blank

8.2 Laboratory Program

A contract laboratory must adhere to a strict QA/QC program developed to meet or exceed those requirements suggested by the U.S. EPA "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans". Daily QA/QC practices must include performing method blank analysis, 10 % sample duplicates, 10% matrix spike evaluations and known reference sample analysis for each parameter sample set.

9.0 REPORT PREPARATION

9.1 Field and Analytical Reports

A complete report of field activities which will summarize the events that took place during the sampling event must be submitted to the Project Coordinator for review. At a minimum, the report should include methods used in purging and sampling for each well location, order of sampling, method of field filtration, location where duplicates were obtained and other information pertinent to the field activity. This report will consist of, at a minimum, environmental monitoring field data sheets (Attachment 1), sample chain-of-custody (Attachment 3) and field testing results.

Unless specified, a summary table of field measured data will be included in the report which will include sample location, top-of-casing, elevation depth to water, ground water elevation (referenced to USGS datum), volume of water in casing, volume purged, sampling method, temperature, specified conductivity and pH.

10.0 CONFIDENTIALITY AGREEMENT

The following procedures cover all verbal and/or written correspondence with regulatory personnel, or any third party, regarding site activities:

All consultants will hold confidential all business or technical information obtained or generated in the performance of services for this project. Consultants will not disclose project related information without Granger consent except to the extent required for: 1) compliance with any court order or governmental directive; 2) compliance with professional standards of conduct for preservation of safety, health and welfare; and or 3) protection of the consultant against claims or liability arising from the performance of services under this agreement.

Again, disclosure shall not be made without first notifying Granger as to the necessity.

ATTACHMENT 1

ENVIRONMENTAL MONITORING FIELD DATA SHEET

STRATA ENVIRONMENTAL SERVICES, INC.

GROUND WATER MONITORING FIELD DATA SHEET

SITE LOCATION: **MID Site**

Well Number:

Period of Sampling: ______

Facility: **Granger #2**

Address: **Grand River** — **Watertown Twp.** — **MI**

Street Number (PO Box) — City — State — Zip

Contact: **Dr. Charles Annett** (Name) — **372-2800** (Telephone:)

Personnel Present: ______

WELL DATA:

Well Secure Upon Arrival: Yes ☐ No ☐

TOC Survey Mark: North

Well Conditions: Good ☐ Fair ☐ Poor ☐

Casing Material: Galvanized Steel

Casing Diameter: 2"

Concrete Pad: Yes ☐ No ☐

Screen: —

Frost Heave: Yes ☐ No ☐

TOC Elevation:

Static Water Level (ft.) ______

Ground Water Elevation: ______ feet

Well Depth:TOC Reference:

Standing Water: Yes ☐ No ☐

Secured Upon Departure: Yes ☐ No ☐

Well ID Present/Readable: Yes ☐ No ☐

PURGING DATA:

Date of Purge: ______

Time of Purge: ______

Volume of Water in Casing: ______ gals.

Purge Volume 3X ☐ 5X ☐ Other ☐ ______ gals.

Purge Water Appearance:

Fate of Purge Water: ☐ Ground ☐ 10'+ ☐ Contained

Purge Method: ☐ Disposable Bailer

Purge Method: ☐ S.S. Submersible Pump

Purge Method: ☐ Peristaltic Pump

Decon: Yes ☐ No ☐

Type: Liquinox & Water Wash ☐ Water Rinse ☐ Distilled Rinse ☐

SAMPLING DATA:

Date of Sampling: ______

Time of Sampling: ______

Field Filtration?: Yes ☐ No ☐

Weather: ______

Sample Appearance: ______

Sampling Method: ☐ Bailer ☐ Pump

Decon?: Yes ☐ No ☐

Sp. Conductance: ______

Temperature °C: ______

pH: ______

PURGE DATA:

Volume Removed	pH	Temperature °C	Specific Conductance micro Siemons
gal.			
gal.			
gal.			
gal.			
gal.			
gal.			
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COMMENTS: ______

ATTACHMENT 2

SAMPLE CONTAINERS, PRESERVATION METHODS AND HOLDING TIMES

SAMPLE HANDLING GUIDE

Inorganic and Conventional Parameters

Parameters	EPA Method*	Container	Recommended Quantity (mL)	Preservative	Holding Time
Specific Conductance	120.1, 9050	P,G	100	4°C	28 days
Sulfate	300.0, 375.1, 375.3, 375.4, 9035/36, 9038, 9056	P,G	200	4°C	28 days
Sulfide	376.1, 376.2, 9030, 9031, 9215	P,G	500	4°C, Zn acetate, NaOH to pH > 9	7 days
Sulfite	377.1	P,G	200	None	Immediately
Surfactants (MBAS)	425.1	P,G	250	4°C	48 hours
Total Organic Carbon (TOC)	415.1, 415.2, 9060	P,G	100	4°C, H_2SO_4 or H_3PO_4 to pH < 2	28 days
Total Organic Halides (TOX)	9020	G-TLC (amber)	100	4°C, H_2SO_4 to pH < 2	28 days
Total Petroleum Hydrocarbon (TPH)	418.1, 1664, 8440	G-TLC	1000	4°C, H_2SO_4 or HCl to pH < 2	28 days
Turbidity	180.1	P,G	100	4°C	48 hours

Organic Parameters

Parameters	EPA Method*	Container	Minimum Quantity (mL)	Preservative	Holding Time
Purgeable Halocarbons	601, 8021	G-TLS	2 x 40	4°C	14 days
…rgeable Aromatics	602, 8021	G-TLS	2 x 40	4°C, HCl to pH < 2	14 days
…latile Organics	524, 624, 8260, CLP	G-TLS	2 x 40	4°C, H_2SO_4, HCl or $NaHSO_4$ to pH < 2	14 days 10 days for CLP
Pesticides (Organochlorine or Organophosphorous) and PCBs	608, 8081, 8082, 8141	G-TLC (amber)	1000	4°C, pH 5-8	7/40 days
Chlorinated Herbicides	615, 8151	G-TLC (amber)	1000	4°C	7/40 days
Semivolatile Organics (BNA), Polynuclear Aromatics	525, 625, 8270, 8310, CLP	G-TLC (amber)	1000	4°C	7/40 days 5/35 days for CLP

TCLP Parameters

Parameters	Holding Time from Collection to TCLP Extraction (days)	Holding Time from TCLP Extraction to Preparative Extraction (days)	Holding Time from TCLP/Preparative Extraction to Analysis (days)	Total Elapsed Time (days)
Volatiles	14	Not Applicable	14	28
Semivolatiles	14	7	40	61
Mercury	28	Not Applicable	28	56
Metals	180	Not Applicable	180	360

References: 40CFR Part 136 Tables IA, IB, IC, ID & IE and Table II, and others.

*The methods listed are for typical EPA references, except for SM, which refers to Standard Methods for the Examination of Water and Wastewater (18th Edition).

For bacteriological and organic parameters, add sodium thiosulfate if residual chlorine is present. Soil samples should be collected in 4-8 oz glass containers with a Teflon®-lined cap and preserved at 4°C. No preservative required for waste samples except 4°C for volatiles. Teflon® is a registered trademark of E.I. du Pont.

…nymn Definitions:

…	Polyethylene	G-TLS	Glass with Teflon®-lined septum
G	Glass	PTFE	Fluoropolymer Resin / Teflon®
G-TLC	Glass with Teflon®-lined cap	CLP	EPA Contract Laboratory Program

SAMPLE HANDLING GUIDE

Inorganic and Conventional Parameters

Parameters	EPA Method	Container	Recommended Quantity (mL)	Preservative	Holding Time
Acidity	305.1	P,G	100	4°C	14 days
Alkalinity	310.1, 310.2	P,G	100	4°C	14 days
Ammonia	350.1, 350.2, 350.3	P,G	500	4°C, H_2SO_4 to pH <2	28 days
Biochemical Oxygen Demand (BOD)	405.1, SM 5210	P,G	1000	4°C	48 hours
Boron	200.7, 212.3	P, PTFE, Quartz	200	HNO_3 to pH <2	6 months
Bromide	300.0, 320.1, 9056, 9211	P,G	200	None	28 days
Chemical Oxygen Demand (COD)	410.1, 410.2, 410.3, 410.4, Hach 8000	P,G	100	4°C H_2SO_4 to pH <2	28 days
Chloride	300.0, 325.1, 325.2, 325.3, 9056, 9212, 9250/51, 9253	P,G	200	None	28 days
Chlorine, Residual	330.1, 330.2, 330.3, 330.4, 330.5	P,G	200	None	Immediately
Chromium VI	218.4, 7195, 7196, 7197, 7198, 7199	P,G	250	4°C	24 hours
Coliform, Fecal/Total	SM 9221, 9222	P,G (sterile)	100	4°C	6 hours
Color	110.1, 110.2, 110.3	P,G	100	4°C	48 hours
Cyanide	335.2, 335.3, 9010, 9012, 9013, 9213	P,G	1000	4°C, ascorbic acid, NaOH to pH > 12	14 days
Fluoride	300.0, 340.1, 340.2, 340.3, 9056, 9214	P	500	None	28 days
Hardness	130.1, 130.2	P,G	100	HNO_3 or H_2SO_4 to pH < 2	6 months
Iodide	345.1	P,G	200	4°C	24 hours
Metals	6010, 200, 7000 series	P,G	500	HNO_3 to pH < 2	6 months
Mercury	245.1, 245.2, 7470, 7471, 7472	P,G	500	HNO_3 to pH < 2	28 days
Nitrogen, Kjeldahl (TKN)	351.1, 351.2, 351.3, 351.4	P,G	500	4°C, H_2SO_4 to pH < 2	28 days
Nitrate	300.0, 352.1, 9056, 9210	P,G	100	4°C	48 hours
Nitrite	300.0, 354.1, 9056	P,G	100	4°C	48 hours
Nitrate + Nitrite	353.1, 353.2, 353.3	P,G	200	4°C, H_2SO_4 to pH < 2	28 days
Oil and Grease	413.1, 1664, 9070	G	1000	4°C, H_2SO_4 or HCl to pH < 2	28 days
Phenols	420.1, 420.2, 9065, 9066, 9067	G	1000	4°C, H_2SO_4 to pH < 2	28 days
Phosphorus, Total	365.1, 365.2, 365.3, 365.4, 6010	P,G	200	4°C, H_2SO_4 to pH < 2	28 days
Phosphate, Ortho	300.0, 365.1, 365.2, 365.3	P,G	200	4°C	48 hours
PH	150.1, 9040, 9045	P,G	100	None	Immediately
Radiochemistry Alpha, Beta, Radium Tritium Radon I-131	900 & 9000 series	 P G (amber) G P, G	 2000 100 3 x 40 1000	 HNO_3 to pH < 2 None None NaOH to pH>8	 6 months 6 months 4 days 16 days
Silica	370.1, 200.7, SM1311D	P, PTFE, Quartz	100	4°C	28 days
Solids, Dissolved (TDS)	160.1	P,G	100	4°C	7 days
Solids, Suspended (TSS)	160.2	P,G	500	4°C	7 days
Solids, Volatile (TVS)	160.4	P,G	100	4°C	7 days
Solids, Total (TS)	160.3	P,G	100	4°C	7 days

Sampling and Analysis Plan

Laboratory QA/QC Information

Fibertec Environmental Services

The following information identifies the details of the Quality Control Requirements of Fibertec Environmental Services. This information is provided for inclusion with the Sampling and Analysis Plan (Section 8.2) which has been included as Appendix 8-A of the Application.

3.4 *Essential Quality Control Requirements*

Decisions about how much data to collect and the criteria for decision making are established during the DQO process of the field project ultimately found in the QAPP. This process consists of developing qualitative and quantitative statements that help specify the quality of data required to support decisions during field activities. Data of known or acceptable precision, accuracy, completeness, representativeness, and comparability are necessary for the construction of defensible decisions. The Method Blank, Lab Control Sample, Matrix Spike, Matrix Spike Duplicate indicate levels of precision and accuracy from the samples.

Completeness, representativeness and comparability is within the control of the field project manager who can verify sufficient samples, representing the sampling area, were taken and submitted to the laboratory without contamination.

The following section defines the required quality control that must be performed with each analytical batch. These quality control indicators serve as the basis for confidence in the accuracy, precision, and validity of test results.

Laboratory policy is to complete the quality control requirements for each test method, recognizing that the nature of some tests prevent the measurement of certain elements (i.e., reagent blank for pH analysis). Therefore, the laboratory will define the required quality control indicators for all tests, and delineate them in the method manual. In addition, test method manuals shall contain method-specific corrective action guidelines to follow in the event of unacceptable results for quality control indicators.

3.4.1 Control of Nonconforming Work

A laboratory staff member may recognize the need for a departure from an approved procedure due to client request, sample related issue or other extenuating circumstance. The staff member then obtains a "departure from SOP" form from the QA Office and documents the project, sample(s), date, applicable SOP, client identification, reason for departure from standard procedure, describe the departure. The form is then approved by a laboratory manager and QA Officer. The client then is notified of the need to depart from standard procedure and is informed of the potential impact the change will have in the results generated. The client approval, date and time is recorded. The completed form is kept with the project folder.

During the review of data, quality control sample results, performance samples, internal or external audit, if the Quality Control Officer detects any analytical system, analyst or technician unable to produce acceptable analytical results, the Quality Control Officer, at his discretion, may halt work until the analytical system, analyst or technician is brought into compliance with current acceptance criterion.

If impacted data has lead to reports that have left the lab before a problem has been recognized, the client is notified within 24 hours of the recognition and verification of the problem.

3.4.2 Basic Control Parameters

The following is from: National Environmental Laboratory Accreditation Conference, "Quality Systems", Revision 15, Will 2001, Appendix D – Essential Quality Control Requirements, Sections D.1 through D.1.6.

D.1 CHEMICAL TESTING

D.1.1 **Positive and Negative Controls**

a) **Negative Control – Method Performance**

Purpose: The method blank is used to assess the preparation batch for possible contamination during the preparation and processing steps. The method blank shall be processed along with and under the same conditions as the associated samples to include all steps of the analytical procedure. Procedures shall be in place to determine of the method blank is contaminated. Any affected samples associated with a contaminated method blank shall be reprocessed for analysis or the results reported with the appropriate data qualifying codes.

Frequency: The method blank shall be analyzed at a minimum of 1 per preparation batch. In those instances for which no separate preparation batch is used (example: volatiles in water) the batch shall be defined as environmental samples that are analyzed together with the same method and personnel, using the same lots of reagents, not to exceed the analysis of 20 environmental samples.

Composition: The method blank shall consist of a matrix that is similar to the associated samples and is known to be free of the analytes of interest.

Evaluation Criteria and Corrective Action: While the goal is to have no detectable contaminants, each method blank must be critically evaluated as to the nature of the interference and the effect on the analysis of each sample within the batch. The source of contamination shall be investigated and measures taken to minimize or eliminate the problem and affected sample reprocessed or data shall be appropriately qualified if:

1. The concentration of a targeted analyte in the blank is at or above the reporting limit as

established by the test method or by regulation, AND is greater than 1/10 of the amount of any measured sample.

2. The blank contamination otherwise affects the sample results as per the test method requirements or the individual project data quality objectives.

b) Positive Control - Method Performance

1) Laboratory Control Sample (LCS)

Purpose: The LCS is used to evaluate the performance of the total analytical system, including all preparation and analytical steps. Results of the LCS are compared to established criteria and, if found to be outside of these criteria, indicates that the analytical system is "out of control". Any affected samples associated with an out of control LCS shall be reprocessed for re-analysis or the results reported with appropriate data qualifying codes.

Frequency: The LCS shall be analyzed at a minimum of 1 per preparation batch. Exceptions would be for those analytes for which no spiking solutions are available such as total suspended solids, total dissolved solids, total volatile solids, total solids, pH, color, odor, temperature, dissolved oxygen or turbidity. In those instances for which no separate preparation method is used (example: volatiles in water) the batch shall be defined as environmental samples that are analyzed together with the same method and personnel, using the same lots of reagents, not to exceed the analysis of 20 environmental samples. If there is insufficient sample to include a MS/MSD in the preparation batch, prepare a second LCS to assess batch precision.

Composition: The LCS is a controlled matrix, known to be free of the analytes of interest, spiked with known and verified concentrations of analytes. NOTE: the matrix spike will be used in place of this control as long as the acceptance criteria are as stringent as for the LCS. Alternatively, the LCS will consist of a media containing known and verified concentrations of analytes or as Certified Reference Material (CRM). All analyte concentrations shall be within the calibration range of the methods. The following shall be used in choosing components for the spike mixtures:

The components to be spiked shall be as specified by the mandated test method or other regulatory requirement as requested by the client. In the absence of specified spiking components the laboratory shall spike for the following:

For those components that interfere with an accurate assessment such as spiking simultaneously with technical Chlordane, Toxaphene and PCBs, the spike must be chosen that represents the chemistries and elution patterns of the components to be reported.

For those test methods that have extremely long lists of analytes, a representative number will be chosen. The analytes selected should be representative of all analytes reported. The following criteria shall be used to determine the minimum number of analytes to be spiked. However, the laboratory shall insure that all targeted components are included in the spike mixture over a 2 year period.

a) For methods that include 1-10 targets, spike all components;

b) For methods that include 11-20 targets, spike at least 10 or 80%, whichever is greater;

c) For methods with more than 20 targets, spike at least 16 components.

Evaluation Criteria and Corrective Action: The results of the individual batch LCS are calculated in percent recovery. The laboratory shall document the calculation for percent recovery.

The individual LCS is compared to the laboratory established acceptance criteria or utilize client specified assessment criteria. If these criteria do not exist, use criteria as published in the mandated test method.

A LCS that is determined to be within the criteria effectively establishes that the analytical system is in control and validates system performance for the samples in the associated batch. Samples analyzed along with a LCS determined to be "out of control" must be considered suspect and the samples reprocessed and re-analyzed or the data reported with appropriate data qualifying codes. If the LCS indicates a potential high bias and the associated samples "non-detect", the samples will be reported without flags.

c) **Sample Specific Controls**

The laboratory must document the procedures for determining the effect of the sample matrix on method performance. These procedures relate to the analysis of matrix specific Quality Control (QC) samples and are designed as data quality indicators for a specific sample using the designated test method. These controls alone are not used to judge laboratory performance.

Examples of the matrix specific QC include: Matrix Spike (MS); Matrix Spike Duplicate (MSD); sample duplicates; and surrogate spikes. The laboratory shall have procedures in place for tracking, managing, and handling matrix specific QC criteria including spiking appropriate components at appropriate concentrations, calculating recoveries and relative percent difference, evaluating and reporting results based on performance of the QC samples.

Matrix Spike; Matrix Spike Duplicates

Purpose: Matrix specific QC samples indicate the effect of the sample matrix on the precision and accuracy of the results generated using the selected method. The information from these controls is sample/matrix specific and would not normally be used to determine the validity of the entire batch.

Frequency: The frequency of the analysis of matrix specific samples shall be determined as part of a systematic planning process (e.g. Data Quality Objectives) or as specified by the required mandated test method. If sufficient sample is available, a MS/MSD pair is prepared at least once every 20 samples.

Composition: The components to be spiked shall be as specified by the mandated test method. Any permit specified analytes, as specified by regulation or client requested analytes shall also be included. If there are no specified components, the laboratory shall spike per the following:
For those components that interfere with an accurate assessment such as spiking simultaneously with technical chlordane, Toxaphene and PCBs, the spike must be chosen that represents the chemistries and elution patterns of the components to be reported.

For those test methods that have extremely long lists of analytes, a representative number will be chosen. The analytes selected should be representative of all analytes reported. The following criteria shall be used to determine the minimum number of analytes to be spiked. However, the laboratory shall insure that all targeted components are included in the spike mixture over a 2 year period.

a) For methods that include 1-10 targets, spike all components;

b) For methods that include 11-20 targets, spike at least 10 or 80%, whichever is greater;

c) For methods with more than 20 targets, spike at least 16 components.

Evaluation Criteria and Corrective Action: The results from matrix spike/matrix spike duplicate are primarily designed to assess the precision and accuracy of analytical results in a given matrix and are expressed as percent recovery (%R) and relative percent difference (RPD). The laboratory shall document the calculation for relative percent difference.

Results are compared to the laboratory established acceptance criteria, or client specified criteria. If these criteria do not exist, use criteria as published in the mandated test method. For matrix spike results outside established criteria corrective action shall be documented or the data reported with appropriate data qualifying flags.

d) **Matrix Duplicates**

Purpose: Matrix duplicates are defined as replicate aliquots of the same sample taken through the entire analytical process. The results from this analysis indicate the precision of the results and for the specific sample using the selected method. The matrix duplicate provides a usable measure of precision only when target analytes are found in the sample chosen for duplication.

Frequency:	The frequency of the analysis of matrix duplicates will be determined as part of a systematic planning process (e.g. Data Quality Objectives) or as specified by the required mandated test method.
Composition:	Matrix duplicates are performed on replicate aliquots of actual samples. The composition is usually not known.
Evaluation Criteria and Corrective Action:	The results from matrix duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD) or other statistical treatment (e.g., absolute differences). The laboratory shall document the calculation for relative percent difference or other statistical treatments. Results are compared to the laboratory established acceptance criteria. Where there are no established criteria, the laboratory shall use method specified acceptance ranges. For matrix duplicates results outside established criteria corrective action shall be documented or the data reported with appropriate data qualifying flags.

e) Surrogate Spikes

Purpose:	Surrogates are used most often in chromatographic test methods and are chosen to reflect the chemistries of the targeted components of the method. Added prior to sample preparation/extraction, they provide a measure of recovery for every sample matrix.
Frequency:	Except where the matrix precludes its use or when not available, surrogate compounds must be added to all samples, standards, and blanks for all appropriate test methods.
Composition:	Surrogate compounds are chosen to represent the various chemistries of the target analytes in the method. They are often specified by the mandated method and are deliberately chosen for their being unlikely to occur as an environmental contaminant. Often this is accomplished by using deuterated analogs of selected compounds.
Evaluation Criteria and Corrective Action:	The results are compared to the laboratory established acceptance criteria. Where there are no established criteria, the laboratory will determine internal criteria and document the method used to establish the limits. Surrogates outside the acceptance criteria must be evaluated for the effect indicated for the individual sample results. The appropriate corrective action will be guided by the data quality objectives or other site specific requirements. Results reported from analyses with surrogate recoveries outside the acceptance criteria should include appropriate data qualifiers.

D.1.2 Detection Limits

The laboratory shall utilize a test method that provides a detection limit that is appropriate and relevant for the intended use of the data. Detection limits shall be determined by the protocol in the mandated test method or applicable regulation, e.g., Method Detection Limit (MDL). If the protocol for determining detection limits is not specified, the selection of the procedure must reflect instrument limitations and the intended application of the test method.

a) A detection limit study is not required for any component for which spiking solutions or quality control samples are not available such as temperature.

b) The detection limit shall be initially determined for the compounds of interest in each test method in a matrix in which there are not target analytes nor interferences at a concentration that would impact the results or the detection limit must be determined in the matrix of interest (see definition of matrix).

c) Detection limits must be determined each time there is a change in the test method that affects how the test is performed, or when a change in instrumentation occurs that affects the sensitivity of the analysis.

d) All sample processing steps of the analytical method shall be included in the determination of the detection limit.

e) All procedures used must be documented. Documentation must include the matrix type. All supporting data must be retained.

f) The laboratory must have established procedures to relate detection limits with quantitation limits.

g) The test method's reporting limits must be established and must be above the detection limits.

D.1.3 Data Reduction

The procedures for data reduction, such as the use of linear regression shall be documented.

D.1.4 Quality of Standards and Reagents

a) The source of standards shall comply with 6.3. Calibration is verified with standards from a second source or lot number.

b) Reagent Quality, Water Quality and Checks

1) Reagents – In methods where the purity of reagents is not specified, analytical reagent grade shall be used. Reagents of lesser purity than those specified by the test method shall not be used. The labels on the container must be checked to verify that the purity of the reagents meets the requirements of the particular test method. Such information shall be documented.

2) Water – The quality of water sources shall be monitored and documented and shall meet method specified requirements. Conductivity is evaluated every work day and the reagent water is used for Method Blanks when ever batches are prepared.

3) The laboratory will verify the concentration of titrants in accordance with written laboratory procedures.

D.1.5 Selectivity

a) Absolute retention time and relative retention time aid in the identification of components in chromatographic analyses and to evaluate the effectiveness of a column to separate constituents. The laboratory shall develop and document acceptance criteria for retention time windows.

b) A confirmation shall be performed to verify the compound identification when positive results are detected on a sample from a location that has not been previously tested by the laboratory. Such confirmations shall be performed on organic tests such as pesticides, herbicides, or acid extractable or when recommended by the analytical test method except when the analysis involves the use of a mass spectrometer. Confirmation is required unless stipulated in writing by the client. All confirmation shall be documented.

c) The laboratory shall document acceptance criteria for mass spectral tuning.

D.1.6 Constant and Consistent Test Conditions

a) The laboratory shall assure that the test instruments consistently operate within the specifications required of the application for which the instrument is used.

b) Glassware Cleaning – Glassware shall be cleaned to meet the sensitivity of the test method.

d) Any cleaning and storage procedures that are not specified by the test method shall be documented in laboratory records and SOPs.

The preceding sections are from the NELAC standard and provide guidance to the laboratory regarding routine analytical procedure. Additional method requirements or client requirements will supersede or add to this guidance. The following are additional requirements.

1 For VAP projects, Method Blank at or above the reporting limit will require re-preparation and re-analysis if sufficient sample is available, depending on client requirement. If insufficient sample was supplied for re-preparation, the results are reported with appropriate flag.
2 For VAP projects, all client targets will be spiked in the LCS and evaluated.
3 For VAP (Ohio) projects, the MS/MSD must not be used to replace a failed LCS in the batch. The corrective action for failed LCS targets is re-preparing and reanalyzing the associated samples if sufficient sample is available. Otherwise, the failed parameters are clearly flagged in the final report.

ATTACHMENT 3

CHAIN-OF-CUSTODY FORM

STRATA ENVIRONMENTAL SERVICES, INC.

585 Jewett Road • Mason, Michigan 48854
Phone (517) 676-6900   Fax (517) 676-8834

CHAIN OF CUSTODY

Air	A
Drinking Water	D
Groundwater	W
Soil	S
Sludge	L
Oil	O
Other	X

Client:
Project Name:
Project #:
Send Results to:
Sampling Personnel:

Lab Use	Sample Information					Preservative						Analysis Requested														
Lab Sample ID #	Date	Time	Sample Description and Location (e.g. MW-1)	PID	MATRIX	None	H2SO4	HNO3	HC1	NaOH	Other															

Comments:

Relinquished by Signature:	Date	Time	Received by: (Signature)	Date	Time	Relinquished by Signature:	Date	Time	Received by: (Signature)	Date	Time
Relinquished by Signature:	Date	Time	Received by: (Signature)	Date	Time	Method of Shipment:			Bill of Lading:		
Received for Laboratory by:	Date	Time	Data Package Relinquished by:	Date	Time	Data Received by:	Date	Time			

APPENDIX F-3

Post-Closure Groundwater Statistical Evaluation Program

3754 Ranchero Drive
Ann Arbor, MI 48108-2771
Telephone (734) 971-7080
Fax (734) 971-9022

Post Closure Groundwater Statistical Evaluation Program

Granger Grand River Landfill Hazardous Waste Management Unit MID 082-771-700

Watertown Township, Michigan

Original – July 2000
Revision 01 – January 2004
Revision 02 – November 2005
Revision 03 – January 2006

Prepared For
Granger Land Development Company

Graham Crockford
Project Manager

Shayne Wiesemann
Hydrogeologist

RMT, Inc., Michigan
Rev. 03 Final
I:\WPAAM\PJT\00-04065\04\R000406504-001 REV03.DOC

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Section 1
Introduction

This *Post-Closure Groundwater Statistical Evaluation Program (Program)* was prepared by RMT, Inc., Michigan (RMT) on behalf of the Granger Land Development Company (Granger) for the closed regulated hazardous waste management unit referred to as the Granger Grand River MID 082-771-700 (regulated unit), located in T5N, R3W, Watertown Township, Section 29, Clinton County, Michigan. The regulated unit currently performs post closure monitoring under Part 111.

Granger retained RMT to assist in implementing Condition E of the Hazardous Waste Management Facility Post-Closure Operating License dated September 30, 1999, and the outcome of a meeting held between Granger, RMT, and the Michigan Department of Environmental Quality (MDEQ), Waste and Hazardous Materials Division (W&HMD) on December 2, 1999 regarding statistical evaluation of groundwater data for the regulated unit.

Based on the December 2, 1999 meeting, it was agreed that intra-well statistical procedures would be appropriate for the shallow drift aquifer because of the known effects of the purge well system and the lack of a uniform upgradient to downgradient hydrogeologic relationship. However, it was necessary to perform analysis on the deep drift and bedrock aquifers to determine the degree of spatial variability as outlined in Condition E (1) of the operating license.

Condition E (1) stipulates that the first phase of the evaluation was to evaluate existing groundwater data for statistical distribution to be submitted within 120 days from license issuance. The purpose of determining the distribution of the data was to ascertain whether the degree of spatial variability between groundwater monitoring wells at the site is significant, thus determining whether intra-well or inter-well statistical procedures are appropriate for detection monitoring.

Granger submitted the Evaluation of Groundwater Spatial Variance (RMT, January 2000) to fulfill Condition E (1) of the September 30, 1999 operating license. The W&HMD responded on May 9, 2000, and concurred with the conclusions of the Evaluation of Groundwater Spatial Variance. Therefore, this Program is the second of two submittals and fulfills Condition E (2) of the September 30, 1999 operating license, consisting of a statistical program that provides specific details regarding the statistical approach chosen for the site. This Program was originally submitted to MDEQ in July 2000. The MDEQ Waste and Hazardous Materials Division

(W&HMD) provided a review and comment of the Program in a letter dated October 20, 2003. This revised Program (Revision 01, January 14, 2004) addresses MDEQ comments.

The MDEQ responded to the January 2004 revision in their July 5, 2005 email. This revision is a response to their July 2005 comments.

This Program was prepared by RMT utilizing the guidelines outlined in the 1988 Interim Final Guidance of the Statistical Analysis of Groundwater Data at RCRA Facilities (Interim Final Guidance), and the 1992 Addendum to the Statistical Analysis of Groundwater Data at RCRA Facilities (Addendum). The procedures proposed herein are generally accepted procedures that have gained both State and Federal regulatory acceptance.

The objective of this Program is to provide a statistical Program that is capable of determining statistically significant changes in groundwater chemistry and will assist Granger in ascertaining whether the regulated unit is impacting groundwater quality. This Program was prepared to fulfill a portion of the post closure plan requirements outlined in Part 111, and the requirements for post-closure plans as outlined in 40 CFR 264.118. This document is not intended to serve as a groundwater detection monitoring program but provides detail as to how groundwater data collected as part of the groundwater detection monitoring program will be statistically evaluated.

This Program is intended to be a dynamic document, and as such, modifications to this Program will be prepared and submitted to the MDEQ according to applicable regulations, when data becomes available that necessitates such revisions.

Section 2
Statistical Methods and Programs

2.1 Selection of Statistical Methods

The goal of this Program is to provide a basis for evaluating a large volume of groundwater data to determine if changes in chemistry are occurring at the site. In order to accomplish this goal, the facility history must be evaluated so that the statistical methods utilized do not result in an improper balance between false indications that the regulated unit is causing background values to be exceeded, or that the procedures will fail to indicate that background values or concentrations are being exceeded. This goal can be accomplished very effectively by evaluating whether groundwater chemistry is changing at a particular well using intra-well comparisons.

Intra-well comparisons are superior to upgradient to downgradient comparisons because they effectively reduce the largest variable in detection monitoring by reducing the effect of spatial variability on the evaluation. Intra-well statistical approach is especially effective at sites that have a limited number of regulatory acceptable upgradient "background" wells. Inter-well statistical tests are not recommended for the regulated unit statistical evaluation program because only one regulatory acceptable upgradient well is established for the deep drift and bedrock aquifers as compared to the large volume of downgradient compliance wells. In these cases, spatial variability, which commonly comprises the highest percentage of total population variability, is totally unaccounted for in inter-well procedures.

Intra-well methods are the statistical test of choice based upon the following factors:

- Because of the inability to find regulatory acceptable locations for additional monitoring wells upgradient of the regulated unit upgradient-to-downgradient comparisons (inter-well) are not recommended. Potential upgradient locations are suspected as being impacted by off-site activities including agricultural impacts and road de-icing. Additionally, the presence of the on-site VOC impacted groundwater limited to a small area of the shallow drift aquifer, the presence of a slurry wall, and a groundwater extraction system support the use of intra-well procedures.
- According to reviewed reports, thickness of the soils that represent the upper drift aquifer and lower drift aquifer vary from several feet up to 30 feet. Because of the lack of uniform thickness, spatial variability is anticipated to be relatively high.
- A groundwater recovery and treatment system is operating in the southwestern corner of the site to recover volatile organic constituents (VOCs) identified in a limited area of the

shallow drift in the 1980s. The location of the VOCs is presumed to be hydraulically upgradient of the landfill in the shallow drift aquifer.

2.2 Groundwater Recovery System Effectiveness Monitoring

Granger maintains a groundwater recovery system in the southwestern corner of the site. The groundwater recovery system is designed to hydraulically control and recover groundwater that contains low level VOCs from the granular deposits which comprise the upper drift aquifer. In general, the recovery system-monitoring program consists of groundwater samples obtained quarterly for EPA Method 8260 parameters from wells MW-19, P-28, P-29, PW-38, PW-39, PW-46, and PW-48. Additionally, a trend analysis will also be conducted whereby detected VOCs will be evaluated quarterly and graphically plotted on an annual basis.

2.3 Parametric and Non-Parametric Intra-Well Statistical Evaluations

Intra-well procedures will be utilized in the shallow drift, deep drift, and bedrock aquifers. Parametric prediction limits will be used for constituents that do not have excessive proportions of non-detect data points, where the data are determined to be normally distributed, or where data can be reasonably transformed to a normal distribution. Constituents with high proportions of non-detects will be statistically analyzed using non-parametric prediction limits. These methods will be employed assuming data evaluations indicate that the assumptions of the proposed methods are not violated.

2.4 Total Non-Detect Data Populations

For VOC data populations that consist of 100 percent non-detect in a given data set, statistical evaluation will not be performed on the data per the requirements of the September 30, 1999 operating license. The detection limit is considered the background standard for these wells and parameters. For these data, analytical results that are reported above the detection limits are considered triggers for confirmation resample events.

Section 3
Groundwater Detection Monitoring

The following provides a brief discussion of the groundwater detection monitoring program as specified in the Operating License (September 30, 1999) which should be referenced for detailed information regarding site geology, hydrogeology, and operational history.

3.1 Site Geology and Hydrogeology

Based upon review of site information, there have been a number of hydrogeologic investigations conducted during the period between 1976 through 1996. These studies have provided a relatively comprehensive understanding of site geology and hydrogeology. As described in these investigative reports, site geology generally consists of the following stratigraphic units at increasing depth:

- A surficial granular deposit, which varies in thickness from several feet up to 30 feet. Portions of this deposit have been excavated in some of the areas of the landfill and have been hydraulically separated through the construction of a low permeable clay barrier system and a slurry wall.
- A silty clay deposit characterized as a till which acts as a hydraulic barrier to varying degrees across the site. The deposit is considered a confining layer in the southern portion of the site and a leaky confining layer in northern portions.
- A lower granular deposit which varies in thickness between several feet up to 30 feet.
- A lower silty clay characterized as a till.
- Sandstone bedrock consisting of the Saginaw Formation.

Within these stratum (hydrostratographic units), three water bearing zones capable of yielding water sufficient for the purposes of groundwater sampling have been identified and consist of:

- A shallow drift aquifer, which is present in the near surface granular deposit. A groundwater recovery system is also modifying groundwater flow in these deposits.
- A deep drift aquifer, which is present in the lower granular deposit between the two till sequences. The groundwater flow in this unit appears to vary but generally flows from the southwest to northeast.
- A sandstone bedrock aquifer.

3.2 Groundwater Detection Monitoring Network

During the implementation of the subsurface investigations, numerous monitoring wells and piezometers have been installed to obtain an understanding of groundwater movement. The wells that are selected to serve as detection monitoring wells for the regulated unit include the following:

- **Shallow Glacial Detection Monitoring Wells**

MW-9	MW-14S	MW-21S
MW-23S	MW-40	MW-43S

- **Deep Glacial Detection Monitoring Wells**

MW-44	MW-14D	MW-20
MW-22D	MW-24D	MW-25
MW-41	MW-43D	MW-45

- **Bedrock Detection Monitor Wells**

MW-16	MW-17	MW-18

- **Recovery Area Monitoring Program**

MW-19	P-28	P-29
PW-38	PW-39	PW-46
PW-48		

3.3 Groundwater Monitoring Parameters

Five (5) categories of parameters have been established for detection monitoring purposes. Some categories require statistical evaluation while others provide information regarding recovery system effectiveness and geochemical information useful in evaluation of possible statistical exceedances.

3.3.1 Recovery System Monitoring Program Parameters

The groundwater monitoring well/recovery well parameters will consist of VOCs tested according to EPA method 8260. A list of the parameters and detection limits for the parameters included as part of the EPA Method 8260 analysis is included in Appendix A. No statistical evaluation will be conducted on these parameters. Trend analysis will be performed on the detected 8260 parameters, when appropriate.

3.3.2 Primary Parameters

The primary parameter list currently consists of the 8260 VOCs (Appendix A). This list may be modified in the future (with MDEQ approval) to include only the VOCs detected in discrete leachate samples obtained from the regulated unit. The shortened 8260 list will significantly reduce the facility-wide false positive rate and increase the statistical power of the program. A list of the current primary parameters, test methods, and detection levels are included in Appendix A. These parameters will not be statistically evaluated. A detection of any one of these parameters in groundwater samples will trigger a resample event as discussed in Section 6.1.1.

3.3.3 Secondary Parameters

These inorganic parameters are commonly found to be naturally occurring at varying concentrations in groundwater and their presence in groundwater alone is not an indication of a release from the regulated unit. The secondary parameters, test methods, and detection levels are included in Appendix A. The secondary parameters consist of mainly inorganic indicator parameters that exhibit a high contrast between leachate in the regulated unit and groundwater. However, these secondary parameters should also exhibit a high degree of statistical sensitivity. For example, parameters can exhibit a relatively high groundwater/leachate contrast but exhibit a high degree of variability in the background groundwater data set. This variability will result in higher standard deviations than those parameters that exhibit lesser degrees of variability. Higher standard deviations can reduce the ability for the parameter to become an effective monitoring parameter. For this reason, the secondary parameters should be evaluated and chosen based upon good groundwater/leachate contrasts, and based upon the statistical sensitivity of the parameter. However, the secondary parameters are prescribed in the Operating License, and require statistical evaluation without regards to sensitivity or leachate comparisons.

3.3.4 Tertiary Parameters

Granger will use tertiary parameters to provide information regarding general chemistry and to assist in determining if groundwater chemistry is being affected by factors other than releases from the regulated unit (i.e., well seal failure, grout contamination). A list of the parameters, test methods and detection levels are included in Appendix A. These parameters will not be statistically evaluated because they presumably lack the degree of leachate to groundwater contrasts or sensitivity in determining impacts on groundwater chemistry. Tertiary parameters will also assist in determining if prediction limits should be updated based upon non-release factors such as natural variability.

3.3.5 Field Parameters

Field parameters are those parameters measured in the field during sample collection, mainly for demonstrating that groundwater quality has stabilized and that representative groundwater samples are being obtained. These parameters will not be statistically evaluated.

3.4 Groundwater Monitoring Frequency

Background will be established on a quarterly basis for all of the primary, secondary, tertiary, and field parameters until the necessary background data set is established. Once background has been established for a given parameter or location, groundwater will be sampled semiannually from the shallow drift wells, deep drift wells, and the bedrock well monitoring programs.

Groundwater samples will be obtained quarterly from the recovery system monitoring program wells for 8260 VOCs.

3.5 Collection and Evaluation of Background Data

The purpose of obtaining adequate background groundwater data is to approximate the true range of concentrations of targeted compounds in the groundwater flow system being monitored. In other words, background groundwater quality should eliminate, to the extent possible, all potential causes of statistically significant changes in groundwater chemistry not attributable to the monitored unit. Representative background data that accurately approximate the true range of variability are obtained by monitoring a sufficient number of wells upgradient of the monitored unit (for inter-well comparisons), or wells downgradient of the monitored unit not previously impacted by the unit (for intra-well comparisons).

Three major considerations must be appropriately evaluated to successfully achieve the goals of obtaining background samples that reasonably approximate ambient concentrations:

1. Collecting the minimum number of samples that satisfy the requirements of the statistical methods being used (e.g. that result in adequate statistical sensitivity).

2. Incorporating seasonal or temporal variability into the background data set. This can only be accomplished through the collection of data over a duration of time that sufficiently incorporates these components of variability into the data set and is directly linked to the hydrogeologic properties of the groundwater unit being monitored. Arbitrary frequencies based upon regulatory requirements often do not allow for these components to be accounted for in the background data set. Oftentimes, it is necessary to supplement the

existing data set with additional data so that these components can be accounted for in the background population.

3. Incorporating the spatial component of variability into the background data set (i.e., the variability that comes with obtaining samples from different locations from the same groundwater monitoring zones). The spatial component of variability constitutes a large percentage of the overall variability within environmental statistics. Eliminating the spatial component of variability (through the use of intra-well comparisons), or by adequately incorporating it into the background data set (through the use of multiple upgradient wells in inter-well comparisons) is critical in developing an effective monitoring program.

Due to the lack of a sufficient number of regulatory acceptable background groundwater monitoring well locations, inter-well statistics is not proposed. Because of the site history and the operation of the groundwater recovery system, data will be evaluated during implementation of the statistical program to verify that the background data used in the intra-well statistical calculations is not impacted by the regulated unit.

3.6 Background Database

RMT evaluated the groundwater database to determine if at least eight (8) background samples were available for each parameter before that well's data should be used for making determinations of statistical exceedances for the given parameter. Sufficient background is not available for all of the parameters identified in Section 3.3 at all locations. Granger is in the process of determining the presence of additional pre-existing groundwater data. Recent revisions to the detection monitoring program means that new wells have insufficient data to proceed with the statistical evaluation. Also, more than eight (8) background samples may be necessary if the initial samples from an existing or new well indicate residual effects or instabilities resulting from well installation.

Currently the MDEQ requires that if data is obtained to complete background, it should be conducted at a minimum frequency of quarterly. This frequency implies that background would be established over a two-year period if eight (8) background measurements were necessary. Granger has elected to comply with this frequency, but experience at the Granger Act 641 site, and groundwater data at other sites in Michigan have concluded that two years to establish background is commonly insufficient duration to account for the natural variability in groundwater. Data collected over a two-year period will be compared to compliance data (data collected after the background events). If it is determined that the duration of background was insufficient, Granger will petition the MDEQ to allow for the recalculation of statistical limits to incorporate the additional data, as long as it can be demonstrated that the data requested to be incorporated into background is not being impacted by the regulated unit.

3.7 Updating Statistical Limits

It will be necessary to periodically calculate the statistical limits to include the parameters and locations where background data are currently insufficient. These updates will be provided to the MDEQ with the next monitoring report submitted subsequent to the collection of each of the events once sufficient background data are established for a given parameter or well.

In accordance with the prediction limit statistical method, it is necessary to recalculate prediction limits at pre-determined intervals. Granger has chosen to utilize prediction limits that take into account the next four sampling events. Therefore, as the sampling schedule is semi-annual, Granger will update prediction limits every two years. Prior to updating the prediction limits, Granger will compare the background data (from which the prediction limits are calculated) to the data collected after background was established. The analysis will compare the two data sets to determine if they are from the same, or different populations. If the data sets are determined to be from the same population, then Granger will proceed with updating the prediction limits. If the data sets are determined to be from different populations, then Granger will confer with the MDEQ WHMD prior to proceeding with further statistical analyses.

In the event that groundwater quality shows a significant change which can be attributed to factors other that the regulated unit, a petition may be submitted by Granger to the MDEQ to re-establish background and update prediction limits at an alternate time.

Section 4
Data Review and Evaluation

4.1 Evaluation of Existing Data and Distribution Analysis

In accordance with the Evaluation of Groundwater Spatial Variance (RMT, January 2000), based on the knowledge of site history, and because there is a statistical evaluation program successfully being implemented under Part 115 at the Granger Grand River 641 site, intra-well prediction limits are most appropriate.

Once compiled into the database, RMT evaluated the available data as a first step in a step-wise process, prior to making final statistical method decisions, and statistical limit calculations. We also conducted data evaluations in order to observe trends in data, reviewed distributional assumptions, identified any data that appeared to be outliers, ensured that the data did not violate the statistical methods assumptions, and generally determined that the data were sufficient to continue with the statistical evaluation. RMT performed data evaluation using ChemStat® software (Appendix B).

4.1.1 Time Concentration Trend Analysis

Initially, time concentration trends were plotted to provide an overview of the data. The data were reviewed and compared to identify any unusual outliers, trends, or otherwise unusual observations. This was accomplished prior to further in-depth review of the data sets to identify any obvious field or laboratory anomalies, and obvious non-normal data sets. Typically, outliers are constituted of anomalous data (or detection limits in the case of non-detect data) that are at least one order of magnitude above background concentrations. The inclusion of unusual outliers would lead to variable standard deviations and increased prediction limits. Outliers removed from the data set and the basis for removal are summarized on Table 1.

4.1.2 Percentage of Non-Detect Data

Data summaries were prepared for each parameter and each well. Only the parameters having eight rounds of data will undergo further evaluation. The data sets were reviewed for total number of non-detects per constituent per location, and the percentage of non-detects. The percentage of non-detects was used to aid in the determination of which statistical method and the types of normality tests were used.

4.1.3 Coefficient of Skewness

RMT calculated the Coefficient of Skewness in accordance with the procedures outlined in the Addendum to indicate to what degree the data are skewed. Normal distributions have a Skewness Coefficient of zero, and asymmetric data have a positive or negative Skewness Coefficient. A Skewness Coefficient of greater than one, or less than negative one, indicates that normal based tests are less powerful.

4.1.4 Probability Plots

Probability Plots are recommended in the Addendum and were reviewed for normality and identification of outliers if the skewness coefficient indicated further evaluation was necessary. Probability Plots can visually illustrate departures from normality and identify the location of the non-normal data occurrence. These locations could be in the middle of the distributional range, or at extreme tails.

If the normal distributional assumptions are not valid, then the parameter was considered a candidate for non-parametric statistical evaluation.

Section 5
Parametric and Non Parametric Prediction Limit Calculations

5.1 Prediction Limits Defined

Prediction limits or intervals are constructed to contain the next sample value from a population within a specified probability. In other words, after establishing a background population, a prediction limit is constructed utilizing the background population that will contain the next sample(s) within a specified probability. Essentially, prediction limits predict the results of a future event(s) based upon a background data set, assuming there is no change in the distribution of the data.

There are two types of prediction limits - parametric and nonparametric. Prediction limits were calculated using generally accepted statistical procedures for data that exhibit a wide range in censorship. Parametric prediction limits should be used with data which is or can be transformed (log, ln, etc.) to have a distribution that is not too far from normal. Nonparametric prediction limits are effective for data consisting entirely, or to a large degree, of non-detects, or when data sets are not normal, or can not be transformed to a normal distribution.

Data evaluation was conducted to determine the percentage of censored (non-detected) data to ascertain the appropriate statistical method for a given data set. Several different criteria for performing statistical evaluations and dealing with non-detect data were applied to the data sets based upon the degree of data censorship:

- For the 0-15% non-detects, parametric methods were utilized.
- For the 16-50% non-detects, Aichison's Adjustment was performed on the mean and standard deviation, followed by the calculation of parametric limits.
- For the 51-99% non-detects, nonparametric limits were utilized.
- For the 100% non-detects, no statistical method will be applied and the detection limit will be utilized for determination of exceedances.

5.2 Parametric Prediction Limits

The prediction limit was calculated to include the next observation from the same population with a 95 percent confidence as recommended in the Addendum, or a 5 percent chance that the next observation is above the prediction limit. The prediction limits were constructed utilizing normally or log-normally distributed data, as detailed above.

The prediction limit (PL) calculations for intra-well comparisons were calculated utilizing the guidelines outlined in the Addendum using Chemstat® software (Appendix B). The mean (Mn) and the standard deviation (SD) of the data set were calculated. The "K" value is derived from the tables provided in the Interim Final Guidance. The choice of "K" value from the Interim Final Guidance is based upon the following calculation:

$$K = \nu_{(n-1)} \text{ at 95\% confidence}$$

where:

ν = degrees of freedom
n = background observations

The prediction limit calculation is as follows:

$$PL = Mn + SD \times K(1/m + 1/n)^{0.5}$$

where:

PL =	Prediction Limit
Mn =	Mean of Data Set
SD =	Standard Deviation of Data Set
m =	Mean of observation to compare to PL (for intra-well comparisons, m=1)
n =	number of background observations

The prediction limits were calculated using the transformed data, and subsequently un-transformed to normal units on the Prediction Limit summary table (Table 2).

The prediction limit calculation and choice of "K" value was selected so that the site maintains a 5 percent false positive rate. In accordance with maintaining a 5 percent false positive rate, it is likely that false positives may occur. However, this does not necessarily indicate groundwater impact from regulated units, and although a deviation from the prediction limit should be reported in accordance with procedures in this Program, a confirmation sequential sample will take place to confirm the result reported above the prediction limit.

5.3 Non-Parametric Prediction Limits

Parameters that inherently consist of mainly non-detect data usually violate the assumptions needed for normal based parametric prediction intervals. Therefore, as detailed in the Addendum, the non-parametric prediction limit method is chosen.

The data were reviewed to ensure that the assumptions required for non-parametric analyses are valid. To calculate the non-parametric prediction limit, it must be valid to assume that all observations are independently and identically distributed. There must be no spatial or systematic temporal variability, and furthermore, there must be no evidence of prior contamination.

The aim of the non-parametric prediction limit, as with the parametric prediction limit, is to meet the 5% false positive rate. Chemstat® calculates the confidence level and false positive rate by the following equations:

- False Positive Rate = 1 – [n/(n + k)]

- Confidence Level = n/(n + k)

where:
- n = number of background observations
- k = number of comparisons

The intra-well non-parametric prediction limit compares a selected number of future samples to a specified number of historical baseline samples from the same well. This method requires a relatively large number of historical samples to achieve a reasonable statistical power. To achieve a 95% confidence level and therefore to meet the 5% false positive rate, approximately 20 historical samples are required for each future sample to be compared. Currently the groundwater database for each parameter at each well varies from less than eight data points, to greater than 20 data points.

Therefore, a five percent false positive rate can not be maintained during sampling events for all constituents without allowing for the collection of sequential samples, which will reduce the false positive rate to acceptable levels.

5.4 Total Non-Detect Data Populations

For data populations that consist of 100 percent non-detect in a given data set, they are considered zero threshold parameters (ZTP). The detection limit is the background standard for these wells and parameters. For these data, analytical results reported above the detection limits are considered triggers for a confirmation resample event as described in Section 6.

5.5 Definition of Initial Exceedances

As with most statistical methods used to evaluate environmental data, prediction limit calculations typically conclude that a five percent false positive rate can not be maintained during sampling events without allowing for the collection of sequential samples. This is typically a function of the 1) amount of background data available at current detection limits, 2) the large amount of parameters that are typically required to be statistically analyzed, and 3) the numerous wells typically included in a detection monitoring program. Even if the facility-wide false positive rate is controlled at 0.05 as recommended in the Addendum, there will be exceedances of the prediction intervals based upon statistical probability (up to 5 per every 100 measurements). For example, if Granger samples 20 wells per quarter for 10 constituents, conceivably there could be up to 10 exceedances per event just based upon statistical probability of chance. These exceedances will occur in addition to possible exceedances due to variability in laboratory and sampling activities, effects from off-site land use, and natural variability not represented in the background data set, among other factors.

Because of these factors, and to meet the recommended false positive rates, the first occurrence of a secondary parameter reported above the prediction interval, or the first occurrence of a primary parameter above the detection level will be defined as an initial exceedance. It will be necessary to collect a sequential sample to reduce the frequency of these chance occurrences and confirm the initial exceedance. The collection of sequential samples and reporting the results of the initial exceedances are described in Section 6.1.

Section 6
Evaluating and Reporting Results of Statistical Evaluations

6.1 Data Evaluation Procedures

Granger will follow the procedures detailed below in declaring and reporting the presence of statistical exceedances. These procedures are summarized from the Operating License for the MID Landfill site. The purpose of this section is to describe what will be conducted by Granger to identify, confirm, and report statistically significant exceedances in groundwater data. This section does not describe assessment monitoring protocols, which are described in the Operating License.

6.1.1 Primary Parameters

Routine Comparisons and Initial Exceedances

Within 60 days of completion of each sampling event, Granger will determine if a detection of any of the primary parameters has occurred in any monitoring well listed in this Program, with the exception of the wells in the "purge well" category.

If a primary parameter is detected, Granger will:

- Notify the Director within one working day by calling the Chief of the W&HMD or the appropriate W&HMD District Supervisor, and
- Arrange a resample as soon as possible to confirm the detection. Resampling will include collecting a minimum of four replicate samples at the affected well(s) for the primary parameter(s) in question.

Confirmed Exceedances

If Granger confirms that a detection has occurred for any primary parameter once the resampling data are evaluated, Granger will:

- Notify the Director within one working day by calling the Chief of the W&HMD or the appropriate W&HMD District Supervisor, or in the event of unavailability, the MDEQ PEAS at 1-800-292-4706.
- Follow up in writing to the Chief of the W&HMD within seven calendar days of the telephone call and indicate:

- What parameters or constituents have shown confirmed detections, and
- The well(s) in which the changes have occurred.
- As soon as possible, sample the groundwater in facility monitoring wells within 500 feet of the affected well in all aquifers for primary, secondary, and tertiary parameters, and determine the concentration of all constituents identified in Appendix IX of 40 CFR Part 261, or a modified Appendix IX list approved by the Chief of the W&HMD. Granger shall also establish background values of Appendix IX or modified Appendix IX list constituents.
- Immediately take steps to determine the cause of the confirmed change, and begin procedures to control the source of the discharge.
- Within 90 days of the determination, submit an application for a license modification to the Chief of the W&HMD in accordance with Operating License Part IV A. 8. (e) that establishes compliance monitoring and a corrective action program to include the following:
    - An identification of the concentration of all Appendix IX constituents found in groundwater.
    - Proposed changes to the groundwater monitoring system at the facility to meet the requirements of Rule 299.9612.
    - Proposed changes to the monitoring frequency, sampling and analysis procedures or methods, or statistical procedures.
- Within 180 days, submit to the Chief of the W&HMD a description of the corrective action and a schedule of implementation.
- Prior to a license modification described above, Granger shall provide the Chief of the W&HMD (or designee) with weekly telephone updates and written reports every two weeks. The schedule may be adjusted by the Chief if appropriate.

■ If Granger determines that the increase is not due to the licensed facility, Granger will:

- Notify the Chief of the W&HMD within 7 days of the confirmed detection that it intends to make a demonstration.
- Within 90 days of the detection submit a report to the Chief of the W&HMD that demonstrates that a source other than the licensed facility solely caused the increase, or that the increase was caused by error in sampling, analysis, or evaluation.

- Within 30 days of W&HMD approval of the demonstration, Granger will submit to the Chief of the W&HMD an application for a license modification to make any appropriate changes to the groundwater monitoring program at the facility.
- Continue to monitor groundwater in compliance with the license.

6.1.2 Secondary Parameters

Routine Comparisons and Initial Exceedances

Within 60 days of completion of each sampling event, Granger will determine if a statistically significant initial increase has occurred compared to background levels for each secondary parameter. If a statistically significant initial increase is reported for any secondary parameter, Granger will:

- Notify the Director within one working day by calling the Chief of the W&HMD or the appropriate W&HMD District Supervisor.
- Resample for both primary and secondary parameters from the affected well(s), taking not less than four samples at each well.
- Redetermine if a statistically significant result has occurred for the replicate samples, and notify the Chief of the W&HMD within one working day of the determination.
- If no statistically significant result is confirmed, routine detection monitoring will continue.

Confirmed Exceedances

If Granger confirms that a statistically significant increase has occurred for a secondary parameter, once the resampling data are evaluated, Granger will:

- Determine if the confirmed exceedance is due to the licensed facility. If Granger determines the confirmed exceedance is due to the licensed facility, they will:
  - Immediately take steps to determine the cause of the statistically significant increase, and begin procedures to control the source of the discharge; and
  - Within 60 days of the determination, submit a report to the Chief of the W&HMD detailing the chronology of events, investigative methods, lab analyses, calculations, field sheets, and findings and conclusions; or
  - Determine if the increase is not due to the licensed facility. If Granger determines the increase is not due to the licensed facility, they will, within 60 days of the confirmed exceedance, submit a report to the Chief of the W&HMD that demonstrates that a source other than the licensed facility

caused the increase, or that the increase was caused by error in sampling, analysis, or evaluation.

6.2 Annual Reports – Statistical Reporting Requirements

Granger will submit an annual groundwater monitoring report to the MDEQ by March 1 for the previous calendar year's activities. The results of the statistical evaluations will be included in the report along with groundwater quality data, isochems, data graphs of trend analysis, data tables, statistical analyses, and identification of any confirmed statistically significant increases.

Section 7
References

Department of Environmental Quality, Waste Management Division. September 30, 1999. Granger Grand River Landfill (MID 082 771 700) Hazardous Waste Management Facility Post-Closure Operating License.

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Davis, Charles B. and Roger J. McNichols. 1994. Groundwater monitoring statistics update: Part II: Non-Parametric prediction limits, *Groundwater Monitoring and Remediation,* vol. 14, no. 3.

USEPA. 1989. Statistical analysis of ground water data at RCRA facilities: interim final guidance. *Washington DC, Office of Solid Waste, USEPA.*

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Tables

Table 1
Granger Grand River Landfill
MID 082 771 700
Summary of Outliers Removed

Monitoring Well	Sample Date	Outlier Concentration (mg/L)	Basis for Removal of Outlier
Arsenic, dissolved			
MW-17	07/27/01	0.01	Anomalously high lab result relative to background - one order of magnitude too high
MW-21SR	07/25/01	0.01	Anomalously high lab result relative to background - one order of magnitude too high
MW-25	01/20/03	0.01	Anomalously high lab result relative to background - one order of magnitude too high
Cadmium, dissolved			
MW-17	07/17/02	0.00513	Anomalously high lab result relative to background - one order of magnitude too high
MW-20R	01/12/01	0.00959	Anomalously high lab result relative to background - one half order of magnitude too high
MW-22DR	01/25/05	0.028	Anomalously high lab result relative to background - one order of magnitude too high
MW-23DR	01/12/01	0.0206	Anomalously high lab result relative to background - one order of magnitude too high
MW-24DR	01/12/01	0.0332	Anomalously high lab result relative to background - one order of magnitude too high
MW-45	07/25/01	0.0075	Anomalously high lab result relative to background - one order of magnitude too high
Chromium, dissolved			
MW-17	07/17/02	0.018	Anomalously high lab result relative to background - one order of magnitude too high
MW-20R	01/12/01	0.012	Anomalously high lab result relative to background - one order of magnitude too high
MW-23SR	01/12/01	0.036	Anomalously high lab result relative to background - one half order of magnitude too high
MW-24DR	01/12/01	0.098	Anomalously high lab result relative to background - one order of magnitude too high
MW-25	01/20/03	0.031	Anomalously high lab result relative to background - one order of magnitude too high
MW-41	07/26/01	0.04	Anomalously high lab result relative to background - one order of magnitude too high
Lead, dissolved			
MW-17	07/27/01	0.04	Anomalously high lab result relative to background - one order of magnitude too high
MW-17	07/17/02	0.105	Anomalously high lab result relative to background - two orders of magnitude too high
MW-18	07/18/02	0.025	Anomalously high lab result relative to background - one order of magnitude too high
MW-20R	01/12/01	0.024	Anomalously high lab result relative to background - one order of magnitude too high
MW-21SR	07/08/03	0.029	Anomalously high lab result relative to background - one order of magnitude too high
MW-23SR	01/12/01	0.068	Anomalously high lab result relative to background - one order of magnitude too high
MW-24DR	01/05/00	0.048	Anomalously high lab result relative to background - one order of magnitude too high
MW-24DR	07/06/00	0.08	Anomalously high lab result relative to background - one order of magnitude too high
MW-24DR	01/12/01	0.07	Anomalously high lab result relative to background - one order of magnitude too high
MW-41	01/16/01	0.018	Anomalously high lab result relative to background - one order of magnitude too high

Table 2
Granger Grand River Landfill
MID 082 771 700
Summary of Prediction Limits
Secondary Indicator Parameters

Monitoring Well	Secondary Indicator Parameters				
	Arsenic (mg/L)	Boron (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Lead (mg/L)
MW-6/R	n < 8	n < 8	n < 8	n < 8	n < 8
MW-9/R	0.001	0.71	0.0011	0.005	0.005
MW-14D/R	0.006	0.08	0.0006	0.004	0.003
MW-14S/R	0.004	0.12	0.0089	0.056	0.009
MW-16	0.018	0.10	0.0010	0.007	0.013
MW-17	0.004	0.14	0.0012	0.008	0.004
MW-18	0.004	0.11	0.0010	0.007	0.004
MW-19	0.002	0.21	0.0003	0.027	0.001
MW-20/R	0.006	0.19	0.0009	0.005	0.002
MW-21S/R	n < 8	0.24	0.0030	0.010	0.001
MW-22D/R	0.002	0.17	0.0051	0.010	0.003
MW-23S/R	0.007	0.14	0.0019	0.016	0.006
MW-24D/R	0.009	0.31	0.0011	0.006	0.003
MW-25	0.003	0.08	0.0029	0.008	0.004
MW-40	0.001	0.08	0.0022	0.009	0.009
MW-41	0.006	0.10	0.0038	0.007	0.004
MW-43D	0.011	0.08	0.0013	0.007	0.001
MW-43S	0.001	0.09	0.0039	0.033	0.004
MW-44	0.001	0.08	0.0026	0.006	0.002
MW-45	0.004	0.08	0.0012	0.006	0.001

Appendix A
Analytical Parameters, Test Methods, and Detection Limits

Attachment I

Groundwater Monitoring Parameter List

Primary Parameters	Analytical Method	Detection Limit (ug/l)
Bromodichloromethane	8260	1
Bromoform	8260	1
Carbon Tetrachloride	8260	1
Chlorobenzene	8260	1
Chloroethane	8260	1
Chloroform	8260	1
Dibromochloromethane	8260	1
o-dichlorobenzene	8260	1
p-dichlorobenzene	8260	1
1,1-dichloroethane	8260	1
1,2-dichloroethene	8260	1
1,1-dichloroethene	8260	1
cis-1,2-dichloroethene	8260	1
trans-1,2-dichloroethene	8260	1
1,2-dichloropropane	8260	1
cis-1,3-dichloropropene	8260	1
trans-1,3-dichloropropene	8260	1
Methyl Bromide	8260	5
Methyl Chloride	8260	5
Methylene Bromide	8260	1
Methylene Chloride	8260	5
Methyl Iodide	8260	1
1,1,1,2-tetrachloroethane	8260	1
1,1,2,2-tetrachloroethane	8260	1
Tetrachloroethene	8260	1
1,1,1-Trichloroethane	8260	1
1,1,2-Trichloroethane	8260	1
Trichloroethene	8260	1
Trichlorofluoromethane	8260	5
1,2,3-trichloropropane	8260	1
Vinyl Chloride	8260	5
Benzene	8260	1
Ethyl benzene	8260	1
Styrene	8260	1
Toluene	8260	1
Xylenes	8260	1

Attachment I—Continued

Groundwater Monitoring Parameter List

Secondary Parameters	Analytical Method	Detection Limit (ug/l)
*Dissolved Cadmium	6010B	5
*Dissolved Chromium	6010B	20
*Dissolved Lead	6010B	1
*Dissolved Boron	6010B	20
*Dissolved Arsenic	6010B	1

Tertiary Parameters	Analytical Method	Detection Limit (ug/l)
Ammonia Nitrogen	450-NH_3-g	10
Nitrate Nitrogen	4500-NO_3-f	10
Alkalinity	310.1	20,000
Bicarbonate Alkalinity	Calculate	5,000
Carbonate Alkalinity	Calculate	20,000
Chloride	4500-Cl-B	1,000
Sulfate	4500-SO_4-e	2,000
*Dissolved Sodium	6010B	1,000
*Dissolved Potassium	6010B	100
Chemical Oxygen Demand	5220d	5,000
*Dissolved Calcium	6010B	1,000
*Dissolved iron	6010B	20
*Dissolved Magnesium	6010B	1,000
*Dissolved Manganese	6010B	5
*Dissolved Zinc	6010B	4

Field Parameters	Analytical Method	Detection Limit (ug/l)
pH (Field)	4500-H-B	pH units
Specific Conductance	2510	umhos/cm
Temperature		

* Additionally, metals samples from the bedrock aquifer shall be analyzed for total metals annually.

Appendix B
Data Evaluation and Prediction Limit Calculations

Outlier Evaluation

Concentrations (mg/L)
Parameter: Arsenic
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Measurements: 327
Total Non-Detect: 122
Percent Non-Detects: 37.3089%
Total Background Measurements: 327
There are 20 background locations

Loc.	Meas.	ND	Date	Conc.	Original
MW-06/R	4	4 (100%)	7/10/2003	ND<0.001	ND<0.001
			7/30/2004	ND<0.001	ND<0.001
			7/30/2004	ND<0.001	ND<0.001
			7/7/2005	ND<0.001	ND<0.001
MW-09/R	29	28 (96.5517%)	6/7/1995	ND<0.001	ND<0.001
			9/8/1995	ND<0.001	ND<0.001
			10/23/1995	ND<0.001	ND<0.001
			11/27/1995	ND<0.001	ND<0.001
			1/22/1996	ND<0.001	ND<0.001
			3/6/1996	ND<0.001	ND<0.001
			4/24/1996	ND<0.001	ND<0.001
			6/4/1996	ND<0.001	ND<0.001
			7/15/1996	ND<0.001	ND<0.001
			9/1/1996	ND<0.001	ND<0.001
			12/1/1996	ND<0.001	ND<0.001
			1/1/1997	ND<0.001	ND<0.001
			7/1/1997	ND<0.001	ND<0.001
			1/5/1998	ND<0.001	ND<0.001
			7/1/1998	ND<0.001	ND<0.001
			1/5/1999	ND<0.001	ND<0.001
			7/6/1999	ND<0.001	ND<0.001
			1/5/2000	ND<0.001	ND<0.001
			7/6/2000	ND<0.001	ND<0.001
			1/16/2001	ND<0.001	ND<0.001
			7/26/2001	ND<0.001	ND<0.001
			7/18/2002	ND<0.001	ND<0.001
			1/17/2003	0.001	0.001
			7/9/2003	ND<0.001	ND<0.001
			7/9/2003	ND<0.001	ND<0.001
			1/21/2004	ND<0.001	ND<0.001
			7/27/2004	ND<0.001	ND<0.001
			7/8/2005	ND<0.001	ND<0.001
			7/8/2005	ND<0.001	ND<0.001
MW-14D/R	11	4 (36.3636%)	1/5/2000	ND<0.001	ND<0.001
			7/6/2000	ND<0.001	ND<0.001
			1/15/2001	ND<0.001	ND<0.001
			7/26/2001	ND<0.001	ND<0.001
			1/17/2002	0.001	0.001
			7/17/2002	0.002	0.002
			1/17/2003	0.004	0.004
			7/9/2003	0.004	0.004
			1/22/2004	0.001	0.001

			1/20/2004	0.0027	0.0027
			7/30/2004	0.0042	0.0042
			7/7/2005	0.0045	0.0045
MW-25	30	3 (10%)	6/7/1995	0.002	0.002
			9/8/1995	0.002	0.002
			10/23/1995	0.002	0.002
			11/27/1995	0.002	0.002
			1/22/1996	0.002	0.002
			3/6/1996	0.002	0.002
			4/24/1996	0.002	0.002
			6/4/1996	0.002	0.002
			7/15/1996	0.002	0.002
			9/1/1996	0.002	0.002
			12/1/1996	0.002	0.002
			1/1/1997	0.002	0.002
			7/1/1997	0.002	0.002
			1/5/1998	0.002	0.002
			7/1/1998	0.002	0.002
			1/5/1999	0.001	0.001
			7/6/1999	0.002	0.002
			1/5/2000	0.002	0.002
			7/6/2000	0.002	0.002
			1/15/2001	0.001	0.001
			7/26/2001	ND<0.001	ND<0.001
			1/17/2002	0.002	0.002
			7/17/2002	0.002	0.002
			1/20/2003	0.01	0.01
			7/9/2003	ND<0.001	ND<0.001
			7/9/2003	ND<0.001	ND<0.001
			1/22/2004	0.003	0.003
			7/26/2004	0.0028	0.0028
			7/11/2005	0.0027	0.0027
			7/11/2005	0.0031	0.0031
MW-40	18	17 (94.4444%)	6/4/1996	ND<0.001	ND<0.001
			1/1/1997	ND<0.001	ND<0.001
			7/1/1997	ND<0.001	ND<0.001
			1/5/1998	ND<0.001	ND<0.001
			7/1/1998	ND<0.001	ND<0.001
			1/5/1999	ND<0.001	ND<0.001
			7/6/1999	ND<0.001	ND<0.001
			1/5/2000	ND<0.001	ND<0.001
			7/6/2000	ND<0.001	ND<0.001
			1/15/2001	ND<0.001	ND<0.001
			7/25/2001	ND<0.001	ND<0.001
			1/16/2002	ND<0.001	ND<0.001
			7/18/2002	ND<0.001	ND<0.001
			1/15/2003	0.001	0.001
			7/8/2003	ND<0.001	ND<0.001
			1/21/2004	ND<0.001	ND<0.001
			7/29/2004	ND<0.001	ND<0.001
			7/12/2005	ND<0.001	ND<0.001
MW-41	30	3 (10%)	6/7/1995	0.002	0.002
			9/8/1995	0.001	0.001
			10/23/1995	0.002	0.002

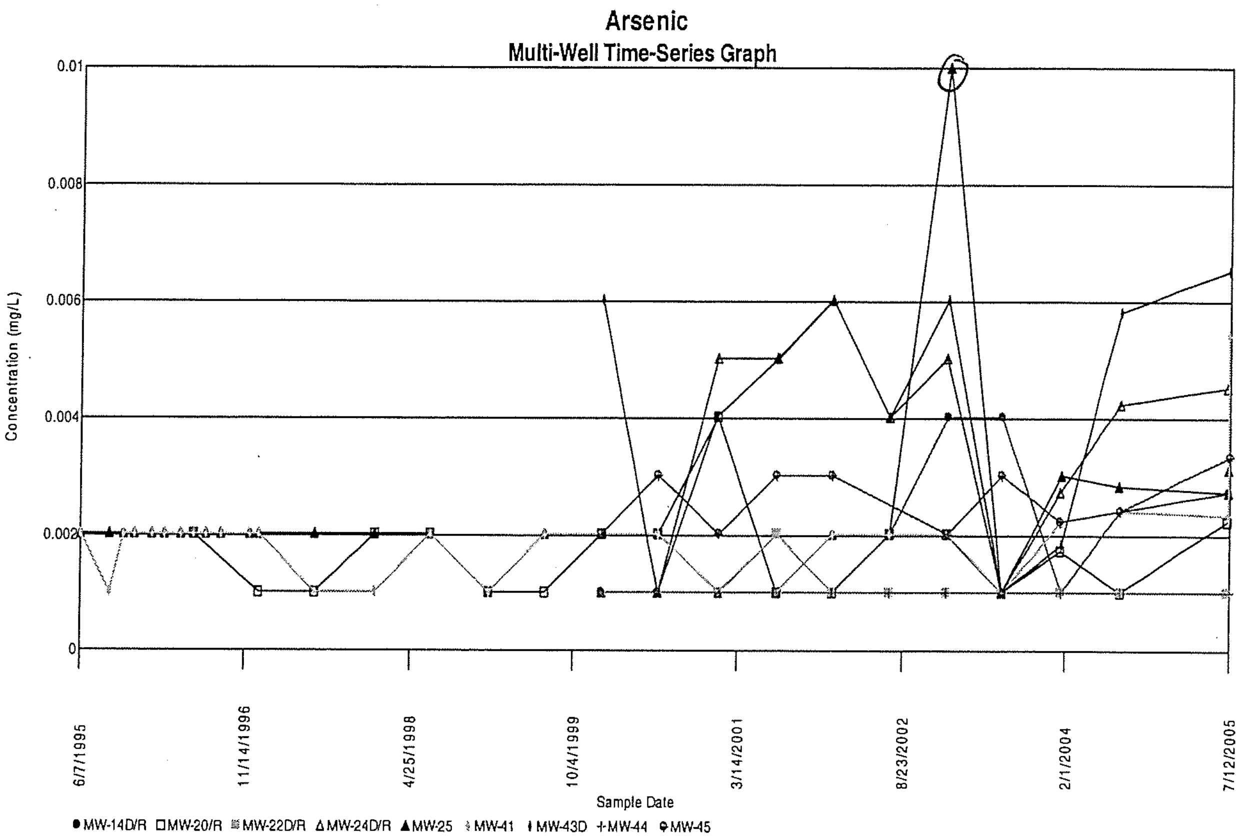
			7/18/2002	ND<0.001	ND<0.001
			1/15/2003	ND<0.001	ND<0.001
			7/8/2003	ND<0.001	ND<0.001
			1/21/2004	ND<0.001	ND<0.001
			7/29/2004	ND<0.001	ND<0.001
			7/12/2005	ND<0.001	ND<0.001
MW-45	10	0 (0%)	1/5/2000	0.002	0.002
			7/6/2000	0.003	0.003
			1/15/2001	0.002	0.002
			7/25/2001	0.003	0.003
			1/16/2002	0.003	0.003
			1/17/2003	0.002	0.002
			7/9/2003	0.003	0.003
			1/20/2004	0.0022	0.0022
			7/29/2004	0.0024	0.0024
			7/12/2005	0.0033	0.0033

There are 0 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original


Arsenic
Multi-Well Time-Series Graph
Concentration (mg/L)
0.01
0.008
0.006
0.004
0.002
0
6/7/1995
11/14/1996
4/25/1998
10/4/1999
3/14/2001
8/23/2002
2/1/2004
7/12/2005
Sample Date
MW-14D/R MW-20/R MW-22D/R MW-24D/R MW-25 MW-41 MW-43D MW-44 MW-45

Concentrations (mg/L)

Parameter: Boron

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Measurements: 245
Total Non-Detect: 72
Percent Non-Detects: 29.3878%
Total Background Measurements: 245
There are 20 background locations

Loc.	Meas.	ND	Date	Conc.	Original
MW-06/R	5	0 (0%)	7/10/2003	0.036	0.036
			7/30/2004	0.041	0.041
			7/30/2004	0.083	0.083
			1/19/2005	0.066	0.066
			7/7/2005	0.051	0.051
MW-09/R	14	1 (7.14286%)	1/5/2000	0.055	0.055
			7/6/2000	ND<0.05	ND<0.05
			1/16/2001	0.071	0.071
			7/26/2001	0.09	0.09
			7/18/2002	0.114	0.114
			1/17/2003	0.079	0.079
			7/9/2003	0.129	0.129
			7/9/2003	0.132	0.132
			1/21/2004	0.17	0.17
			7/27/2004	0.36	0.36
			1/20/2005	0.47	0.47
			1/20/2005	0.46	0.46
			7/8/2005	0.51	0.51
			7/8/2005	0.49	0.49
MW-14D/R	11	4 (36.3636%)	1/5/2000	ND<0.05	ND<0.05
			7/6/2000	ND<0.05	ND<0.05
			1/15/2001	0.019	0.019
			7/26/2001	0.024	0.024
			1/17/2002	ND<0.01	ND<0.01
			7/17/2002	0.023	0.023
			1/17/2003	ND<0.01	ND<0.01
			7/9/2003	0.052	0.052
			1/22/2004	0.036	0.036
			7/29/2004	0.053	0.053
			7/11/2005	0.043	0.043
MW-14S/R	10	4 (40%)	1/5/2000	ND<0.05	ND<0.05
			7/6/2000	ND<0.05	ND<0.05
			1/15/2001	ND<0.01	ND<0.01
			7/26/2001	0.034	0.034
			1/17/2002	0.02	0.02
			1/17/2003	ND<0.01	ND<0.01
			7/9/2003	0.057	0.057
			1/22/2004	0.041	0.041
			7/29/2004	0.1	0.1
			7/11/2005	0.047	0.047

			7/18/2002	0.093	0.093
			1/15/2003	0.093	0.093
			7/10/2003	0.102	0.102
			1/21/2004	0.16	0.16
			7/29/2004	0.14	0.14
			1/20/2005	0.14	0.14
			7/12/2005	0.16	0.16
MW-20/R	12	6 (50%)	1/5/2000	ND<0.05	ND<0.05
			7/6/2000	ND<0.05	ND<0.05
			1/12/2001	ND<0.01	ND<0.01
			7/25/2001	0.018	0.018
			1/16/2002	0.015	0.015
			7/16/2002	0.021	0.021
			1/16/2003	ND<0.01	ND<0.01
			7/8/2003	0.108	0.108
			1/20/2004	0.029	0.029
			7/30/2004	0.038	0.038
			1/25/2005	ND<0.05	ND<0.05
			7/7/2005	ND<0.02	ND<0.02
MW-21SR	9	1 (11.1111%)	1/12/2001	0.054	0.054
			7/25/2001	0.074	0.074
			1/16/2002	0.028	0.028
			7/16/2002	ND<0.01	ND<0.01
			1/15/2003	0.044	0.044
			7/8/2003	0.124	0.124
			7/30/2004	0.12	0.12
			1/25/2005	0.169	0.169
			7/7/2005	0.13	0.13
MW-22D/R	10	0 (0%)	1/16/2001	0.043	0.043
			7/25/2001	0.082	0.082
			1/16/2002	0.042	0.042
			7/16/2002	0.014	0.014
			1/15/2003	0.028	0.028
			7/8/2003	0.14	0.14
			1/20/2004	0.073	0.073
			7/30/2004	0.096	0.096
			1/25/2005	0.079	0.079
			7/7/2005	0.077	0.077
MW-23S/R	11	2 (18.1818%)	7/6/2000	ND<0.05	ND<0.05
			1/12/2001	0.101	0.101
			7/25/2001	0.048	0.048
			1/16/2002	0.013	0.013
			7/16/2002	ND<0.01	ND<0.01
			1/16/2003	0.042	0.042
			7/8/2003	0.096	0.096
			1/20/2004	0.057	0.057
			7/30/2004	0.062	0.062
			1/25/2005	0.059	0.059
			7/7/2005	0.072	0.072
MW-24D/R	12	2 (16.6667%)	1/5/2000	ND<0.05	ND<0.05
			7/6/2000	ND<0.05	ND<0.05
			1/12/2001	0.11	0.11

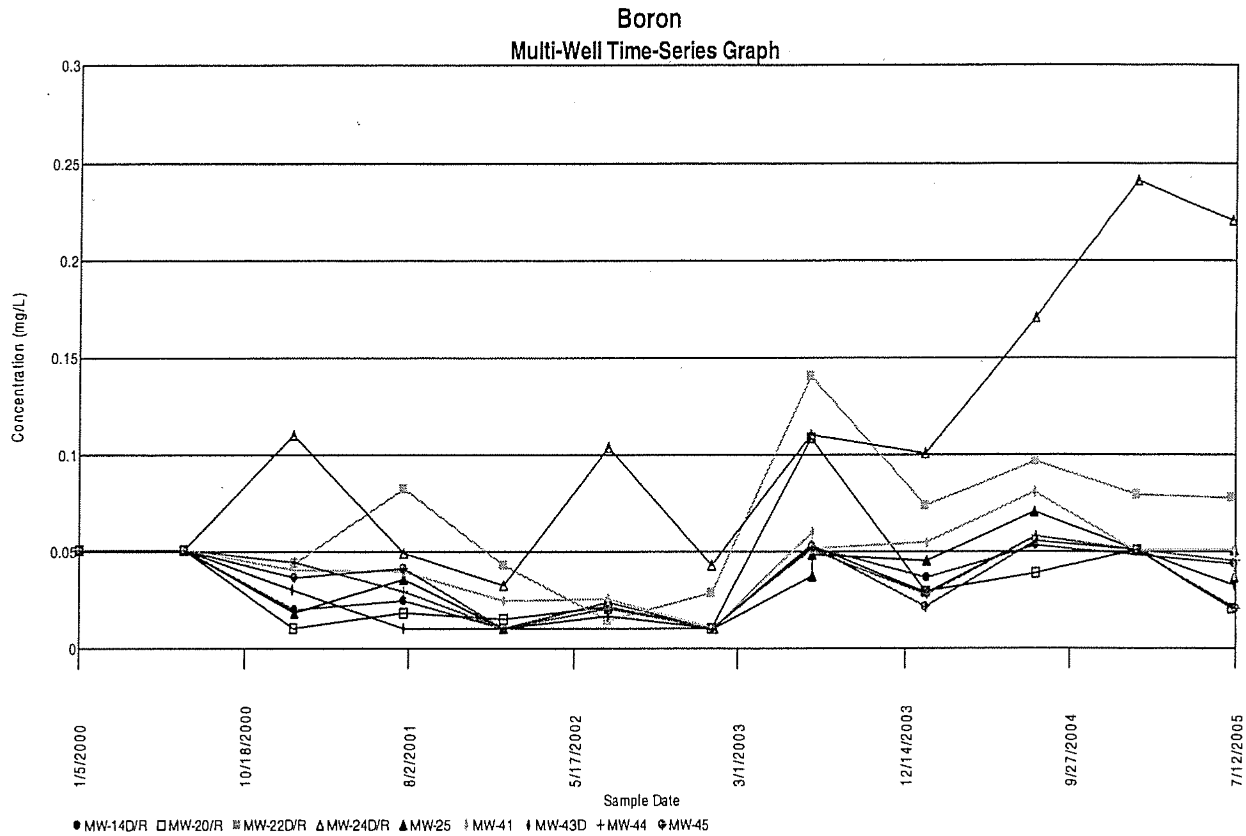
			1/10/2001	0.03	0.03
			7/27/2001	0.01	0.01
			1/16/2002	ND<0.01	ND<0.01
			7/17/2002	0.016	0.016
			1/17/2003	ND<0.01	ND<0.01
			7/8/2003	0.053	0.053
			1/21/2004	0.028	0.028
			7/29/2004	0.057	0.057
			1/25/2005	ND<0.05	ND<0.05
			7/11/2005	0.032	0.032
MW-43S	12	4 (33.3333%)	1/5/2000	ND<0.05	ND<0.05
			7/6/2000	ND<0.05	ND<0.05
			1/15/2001	0.039	0.039
			7/25/2001	0.06	0.06
			1/16/2002	0.011	0.011
			7/17/2002	0.017	0.017
			1/17/2003	ND<0.01	ND<0.01
			7/8/2003	0.054	0.054
			1/21/2004	0.037	0.037
			7/29/2004	0.053	0.053
			1/20/2005	ND<0.05	ND<0.05
			7/11/2005	0.036	0.036
MW-44	12	5 (41.6667%)	1/5/2000	ND<0.05	ND<0.05
			7/6/2000	ND<0.05	ND<0.05
			1/15/2001	0.044	0.044
			7/25/2001	0.029	0.029
			1/16/2002	ND<0.01	ND<0.01
			7/18/2002	0.02	0.02
			1/15/2003	ND<0.01	ND<0.01
			7/8/2003	0.05	0.05
			1/21/2004	0.027	0.027
			7/29/2004	0.057	0.057
			1/20/2005	ND<0.05	ND<0.05
			7/12/2005	0.045	0.045
MW-45	12	6 (50%)	1/5/2000	ND<0.05	ND<0.05
			7/6/2000	ND<0.05	ND<0.05
			1/15/2001	0.036	0.036
			7/25/2001	0.041	0.041
			1/16/2002	ND<0.01	ND<0.01
			1/17/2003	ND<0.01	ND<0.01
			7/9/2003	0.052	0.052
			1/20/2004	0.021	0.021
			1/20/2004	0.021	0.021
			7/29/2004	0.055	0.055
			1/25/2005	ND<0.05	ND<0.05
			7/12/2005	ND<0.02	ND<0.02

There are 0 compliance locations

Loc.	**Meas.**	**ND**	**Date**	**Conc.**	**Original**

There are 0 unused locations

Loc.	**Meas.**	**ND**	**Date**	**Conc.**	**Original**



Boron
Multi-Well Time-Series Graph
Concentration (mg/L)
0.3
0.25
0.2
0.15
0.1
0.05
0
1/5/2000
10/18/2000
8/2/2001
5/17/2002
3/1/2003
12/14/2003
9/27/2004
7/12/2005
Sample Date
MW-14D/R
MW-20/R
MW-22D/R
MW-24D/R
MW-25
MW-41
MW-43D
MW-44
MW-45

Concentrations (mg/L)
Parameter: Cadmium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Measurements: 359
Total Non-Detect: 237
Percent Non-Detects: 66.0167%
Total Background Measurements: 359
There are 20 background locations

Loc.	Meas.	ND	Date	Conc.	Original
MW-06/R	5	1 (20%)	7/10/2003	ND<0.0002	ND<0.0002
			7/30/2004	0.00026	0.00026
			7/30/2004	0.00024	0.00024
			1/19/2005	0.001	0.001
			7/7/2005	0.00051	0.00051
MW-09/R	31	17 (54.8387%)	6/7/1995	0.0006	0.0006
			9/8/1995	0.0003	0.0003
			10/23/1995	ND<0.0002	ND<0.0002
			11/27/1995	ND<0.0002	ND<0.0002
			1/22/1996	0.0002	0.0002
			3/6/1996	0.0002	0.0002
			4/24/1996	0.0005	0.0005
			6/4/1996	0.0004	0.0004
			7/15/1996	0.0002	0.0002
			9/1/1996	0.0011	0.0011
			12/1/1996	ND<0.0002	ND<0.0002
			1/1/1997	ND<0.0002	ND<0.0002
			7/1/1997	0.0007	0.0007
			1/5/1998	ND<0.0002	ND<0.0002
			7/1/1998	ND<0.0002	ND<0.0002
			1/5/1999	ND<0.0002	ND<0.0002
			7/6/1999	ND<0.0002	ND<0.0002
			1/5/2000	ND<0.0002	ND<0.0002
			7/6/2000	ND<0.0002	ND<0.0002
			1/16/2001	0.00103	0.00103
			7/26/2001	0.00084	0.00084
			7/18/2002	ND<0.0002	ND<0.0002
			1/17/2003	0.00056	0.00056
			7/9/2003	ND<0.0002	ND<0.0002
			7/9/2003	ND<0.0002	ND<0.0002
			1/21/2004	ND<0.0002	ND<0.0002
			7/27/2004	0.00033	0.00033
			1/20/2005	0.00039	0.00039
			1/20/2005	ND<0.0002	ND<0.0002
			7/8/2005	ND<0.0002	ND<0.0002
			7/8/2005	ND<0.0002	ND<0.0002
MW-14D/R	11	7 (63.6364%)	1/5/2000	ND<0.0002	ND<0.0002
			7/6/2000	ND<0.0002	ND<0.0002
			1/15/2001	0.0004	0.0004
			7/26/2001	0.00023	0.00023
			1/17/2002	0.00057	0.00057
			7/17/2002	ND<0.0002	ND<0.0002

			7/15/1996	ND<0.0002	ND<0.0002
			9/1/1996	ND<0.0002	ND<0.0002
			12/1/1996	ND<0.0002	ND<0.0002
			7/1/1997	ND<0.0002	ND<0.0002
			7/1/1998	ND<0.0002	ND<0.0002
			7/6/1999	ND<0.0002	ND<0.0002
			1/5/2000	ND<0.0002	ND<0.0002
			7/6/2000	ND<0.0002	ND<0.0002
			1/11/2001	ND<0.0002	ND<0.0002
			7/27/2001	0.00121	0.00121
			7/27/2001	ND<0.0002	ND<0.0002
			7/17/2002	0.00513	0.00513
			7/17/2002	0.00038	0.00038
			1/20/2003	0.00065	0.00065
			7/9/2003	ND<0.0002	ND<0.0002
			7/9/2003	ND<0.0002	ND<0.0002
			1/20/2004	0.00033	0.00033
			1/20/2004	0.00033	0.00033
			7/26/2004	0.00029	0.00029
			1/24/2005	ND<0.0002	ND<0.0002
			7/8/2005	ND<0.0002	ND<0.0002
			7/8/2005	ND<0.0002	ND<0.0002
MW-18	30	24 (80%)	6/7/1995	ND<0.0002	ND<0.0002
			9/8/1995	ND<0.0002	ND<0.0002
			10/23/1995	ND<0.0002	ND<0.0002
			11/27/1995	ND<0.0002	ND<0.0002
			1/22/1996	ND<0.0002	ND<0.0002
			3/6/1996	ND<0.0002	ND<0.0002
			4/24/1996	ND<0.0002	ND<0.0002
			6/4/1996	ND<0.0002	ND<0.0002
			7/15/1996	ND<0.0002	ND<0.0002
			9/1/1996	ND<0.0002	ND<0.0002
			12/1/1996	ND<0.0002	ND<0.0002
			7/1/1997	ND<0.0002	ND<0.0002
			7/1/1998	ND<0.0002	ND<0.0002
			7/6/1999	ND<0.0002	ND<0.0002
			1/5/2000	ND<0.0002	ND<0.0002
			7/6/2000	ND<0.0002	ND<0.0002
			1/10/2001	ND<0.0002	ND<0.0002
			7/27/2001	ND<0.0002	ND<0.0002
			7/27/2001	ND<0.0002	ND<0.0002
			7/18/2002	0.0008	0.0008
			7/18/2002	ND<0.0002	ND<0.0002
			1/14/2003	0.00099	0.00099
			7/9/2003	0.000262	0.000262
			7/9/2003	ND<0.0002	ND<0.0002
			1/20/2004	0.00051	0.00051
			1/20/2004	0.00051	0.00051
			7/28/2004	0.00082	0.00082
			1/24/2005	ND<0.0002	ND<0.0002
			7/7/2005	ND<0.0002	ND<0.0002
			7/7/2005	ND<0.0002	ND<0.0002
MW-19	12	10 (83.3333%)	1/5/2000	ND<0.0002	ND<0.0002
			7/6/2000	ND<0.0002	ND<0.0002
			1/15/2001	0.0003	0.0003

			7/16/2002	0.00106	0.00106
			1/16/2003	0.00079	0.00079
			7/8/2003	ND<0.0002	ND<0.0002
			1/20/2004	0.00055	0.00055
			7/30/2004	ND<0.0002	ND<0.0002
			1/25/2005	0.00065	0.00065
			7/7/2005	0.00039	0.00039
MW-24D/R	12	7 (58.3333%)	1/5/2000	ND<0.0002	ND<0.0002
			7/6/2000	0.0002	0.0002
			1/12/2001	0.0332	0.0332
			7/25/2001	0.00105	0.00105
			1/16/2002	0.00086	0.00086
			7/16/2002	ND<0.0002	ND<0.0002
			1/16/2003	ND<0.0002	ND<0.0002
			7/8/2003	ND<0.0002	ND<0.0002
			1/20/2004	0.00047	0.00047
			7/30/2004	ND<0.0002	ND<0.0002
			1/25/2005	ND<0.0002	ND<0.0002
			7/7/2005	ND<0.0002	ND<0.0002
MW-25	32	25 (78.125%)	6/7/1995	ND<0.0002	ND<0.0002
			9/8/1995	ND<0.0002	ND<0.0002
			10/23/1995	ND<0.0002	ND<0.0002
			11/27/1995	ND<0.0002	ND<0.0002
			1/22/1996	ND<0.0002	ND<0.0002
			3/6/1996	ND<0.0002	ND<0.0002
			4/24/1996	ND<0.0002	ND<0.0002
			6/4/1996	ND<0.0002	ND<0.0002
			7/15/1996	ND<0.0002	ND<0.0002
			9/1/1996	ND<0.0002	ND<0.0002
			12/1/1996	ND<0.0002	ND<0.0002
			1/1/1997	ND<0.0002	ND<0.0002
			7/1/1997	ND<0.0002	ND<0.0002
			1/5/1998	ND<0.0002	ND<0.0002
			7/1/1998	ND<0.0002	ND<0.0002
			1/5/1999	ND<0.0002	ND<0.0002
			7/6/1999	ND<0.0002	ND<0.0002
			1/5/2000	ND<0.0002	ND<0.0002
			7/6/2000	ND<0.0002	ND<0.0002
			1/15/2001	0.00291	0.00291
			7/26/2001	0.00181	0.00181
			1/17/2002	ND<0.0002	ND<0.0002
			7/17/2002	0.00051	0.00051
			1/20/2003	ND<0.0002	ND<0.0002
			7/9/2003	0.000801	0.000801
			7/9/2003	0.000942	0.000942
			1/22/2004	0.00026	0.00026
			7/26/2004	0.0009	0.0009
			1/24/2005	ND<0.0002	ND<0.0002
			1/24/2005	ND<0.0002	ND<0.0002
			7/11/2005	ND<0.0002	ND<0.0002
			7/11/2005	ND<0.0002	ND<0.0002
MW-40	21	10 (47.619%)	11/27/1995	ND<0.0002	ND<0.0002
			6/4/1996	ND<0.0002	ND<0.0002
			12/1/1996	0.0003	0.0003

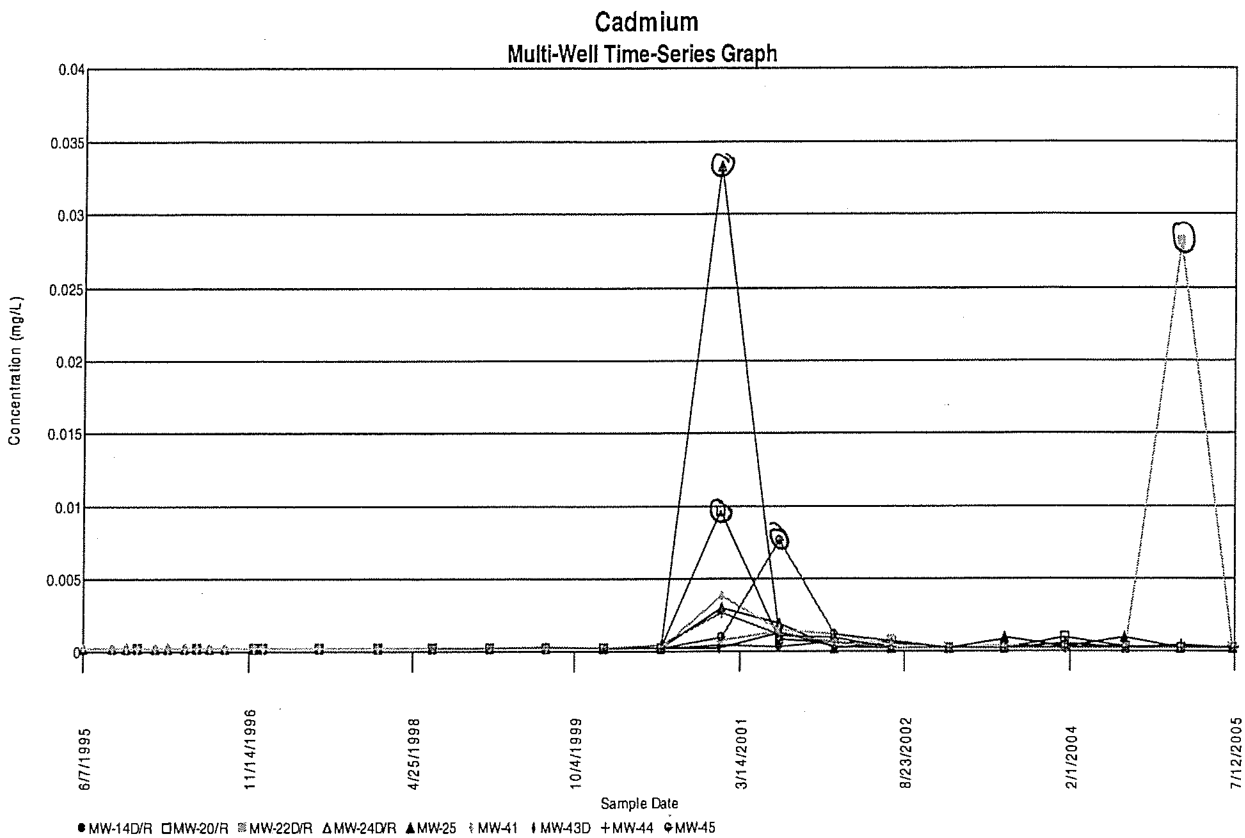
			7/17/2002	ND<0.0002	ND<0.0002
			1/17/2003	ND<0.0002	ND<0.0002
			7/8/2003	ND<0.0002	ND<0.0002
			1/21/2004	0.00045	0.00045
			7/29/2004	ND<0.0002	ND<0.0002
			1/25/2005	0.00037	0.00037
			7/11/2005	ND<0.0002	ND<0.0002
MW-43S	12	6 (50%)	1/5/2000	0.0002	0.0002
			7/6/2000	0.0005	0.0005
			1/15/2001	0.00389	0.00389
			7/25/2001	0.00128	0.00128
			1/16/2002	ND<0.0002	ND<0.0002
			7/17/2002	0.0002	0.0002
			1/17/2003	ND<0.0002	ND<0.0002
			7/8/2003	ND<0.0002	ND<0.0002
			1/21/2004	0.00022	0.00022
			7/29/2004	ND<0.0002	ND<0.0002
			1/20/2005	ND<0.0002	ND<0.0002
			7/11/2005	ND<0.0002	ND<0.0002
MW-44	15	9 (60%)	7/1/1998	ND<0.0002	ND<0.0002
			1/5/1999	ND<0.0002	ND<0.0002
			7/6/1999	0.0003	0.0003
			1/5/2000	ND<0.0002	ND<0.0002
			7/6/2000	0.0004	0.0004
			1/15/2001	0.00259	0.00259
			7/25/2001	0.00107	0.00107
			1/16/2002	0.000545	0.000545
			7/18/2002	ND<0.0002	ND<0.0002
			1/15/2003	ND<0.0002	ND<0.0002
			7/8/2003	ND<0.0002	ND<0.0002
			1/21/2004	ND<0.0002	ND<0.0002
			7/29/2004	ND<0.0002	ND<0.0002
			1/20/2005	ND<0.0002	ND<0.0002
			7/12/2005	0.00026	0.00026
MW-45	12	9 (75%)	1/5/2000	ND<0.0002	ND<0.0002
			7/6/2000	ND<0.0002	ND<0.0002
			1/15/2001	0.00093	0.00093
			7/25/2001	0.0075	0.0075
			1/16/2002	0.00116	0.00116
			1/17/2003	ND<0.0002	ND<0.0002
			7/9/2003	ND<0.0002	ND<0.0002
			1/20/2004	ND<0.0002	ND<0.0002
			1/20/2004	ND<0.0002	ND<0.0002
			7/29/2004	ND<0.0002	ND<0.0002
			1/25/2005	ND<0.0002	ND<0.0002
			7/12/2005	ND<0.0002	ND<0.0002

There are 0 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original



Cadmium
Multi-Well Time-Series Graph
Concentration (mg/L)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
6/7/1995
11/14/1996
4/25/1998
10/4/1999
3/14/2001
8/23/2002
2/1/2004
7/12/2005
Sample Date
MW-14D/R
MW-20/R
MW-22D/R
MW-24D/R
MW-25
MW-41
MW-43D
MW-44
MW-45

Concentrations (mg/L)

Parameter: Chromium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Measurements: 361
Total Non-Detect: 221
Percent Non-Detects: 61.2188%
Total Background Measurements: 361
There are 20 background locations

Loc.	Meas.	ND	Date	Conc.	Original
MW-06/R	5	1 (20%)	7/10/2003	ND<0.001	ND<0.001
			7/30/2004	0.0035	0.0035
			7/30/2004	0.0016	0.0016
			1/19/2005	0.0024	0.0024
			7/7/2005	0.0086	0.0086
MW-09/R	32	24 (75%)	6/7/1995	ND<0.001	ND<0.001
			9/8/1995	ND<0.001	ND<0.001
			10/23/1995	ND<0.001	ND<0.001
			11/27/1995	ND<0.001	ND<0.001
			1/22/1996	ND<0.001	ND<0.001
			3/6/1996	ND<0.001	ND<0.001
			4/24/1996	ND<0.001	ND<0.001
			6/4/1996	ND<0.001	ND<0.001
			7/15/1996	ND<0.001	ND<0.001
			9/1/1996	ND<0.001	ND<0.001
			12/1/1996	ND<0.001	ND<0.001
			1/1/1997	ND<0.001	ND<0.001
			7/1/1997	ND<0.001	ND<0.001
			1/5/1998	ND<0.001	ND<0.001
			7/1/1998	ND<0.001	ND<0.001
			1/5/1999	ND<0.001	ND<0.001
			1/5/2000	ND<0.001	ND<0.001
			7/6/2000	ND<0.001	ND<0.001
			1/16/2001	ND<0.001	ND<0.001
			7/26/2001	0.001	0.001
			7/18/2002	ND<0.001	ND<0.001
			1/17/2003	0.001	0.001
			7/9/2003	ND<0.001	ND<0.001
			7/9/2003	ND<0.001	ND<0.001
			1/21/2004	0.0027	0.0027
			7/27/2004	ND<0.001	ND<0.001
			1/20/2005	0.0018	0.0018
			1/20/2005	0.0013	0.0013
			4/15/2005	ND<0.001	ND<0.001
			4/15/2005	0.0014	0.0014
			7/8/2005	0.0048	0.0048
			7/8/2005	0.0051	0.0051
MW-14D/R	11	6 (54.5455%)	1/5/2000	ND<0.001	ND<0.001
			7/6/2000	ND<0.001	ND<0.001
			1/15/2001	ND<0.001	ND<0.001
			7/26/2001	0.002	0.002
			1/17/2002	0.001	0.001

			6/4/1996	ND<0.001	ND<0.001
			7/15/1996	ND<0.001	ND<0.001
			9/1/1996	ND<0.001	ND<0.001
			12/1/1996	ND<0.001	ND<0.001
			7/1/1997	ND<0.001	ND<0.001
			7/1/1998	ND<0.001	ND<0.001
			7/6/1999	ND<0.001	ND<0.001
			1/5/2000	ND<0.001	ND<0.001
			7/6/2000	ND<0.001	ND<0.001
			1/11/2001	ND<0.001	ND<0.001
			7/27/2001	0.007	0.007
			7/27/2001	0.003	0.003
			7/17/2002	0.018	0.018
			7/17/2002	ND<0.001	ND<0.001
			1/20/2003	ND<0.001	ND<0.001
			7/9/2003	ND<0.001	ND<0.001
			7/9/2003	ND<0.001	ND<0.001
			1/20/2004	0.0061	0.0061
			1/20/2004	0.0061	0.0061
			7/26/2004	0.001	0.001
			1/24/2005	0.001	0.001
			7/8/2005	0.0076	0.0076
			7/8/2005	0.0052	0.0052
MW-18	30	23 (76.6667%)	6/7/1995	ND<0.001	ND<0.001
			9/8/1995	ND<0.001	ND<0.001
			10/23/1995	ND<0.001	ND<0.001
			11/27/1995	ND<0.001	ND<0.001
			1/22/1996	ND<0.001	ND<0.001
			3/6/1996	ND<0.001	ND<0.001
			4/24/1996	ND<0.001	ND<0.001
			6/4/1996	ND<0.001	ND<0.001
			7/15/1996	ND<0.001	ND<0.001
			9/1/1996	ND<0.001	ND<0.001
			12/1/1996	ND<0.001	ND<0.001
			7/1/1997	ND<0.001	ND<0.001
			7/1/1998	ND<0.001	ND<0.001
			7/6/1999	ND<0.001	ND<0.001
			1/5/2000	ND<0.001	ND<0.001
			7/6/2000	ND<0.001	ND<0.001
			1/10/2001	ND<0.001	ND<0.001
			7/27/2001	ND<0.001	ND<0.001
			7/27/2001	0.002	0.002
			7/18/2002	0.007	0.007
			7/18/2002	0.002	0.002
			1/14/2003	ND<0.001	ND<0.001
			7/9/2003	ND<0.001	ND<0.001
			7/9/2003	ND<0.001	ND<0.001
			1/20/2004	0.0063	0.0063
			1/20/2004	0.0063	0.0063
			7/28/2004	ND<0.001	ND<0.001
			1/24/2005	ND<0.001	ND<0.001
			7/7/2005	0.0044	0.0044
			7/7/2005	0.0053	0.0053
MW-19	12	7 (58.3333%)	1/5/2000	ND<0.001	ND<0.001
			7/6/2000	ND<0.001	ND<0.001

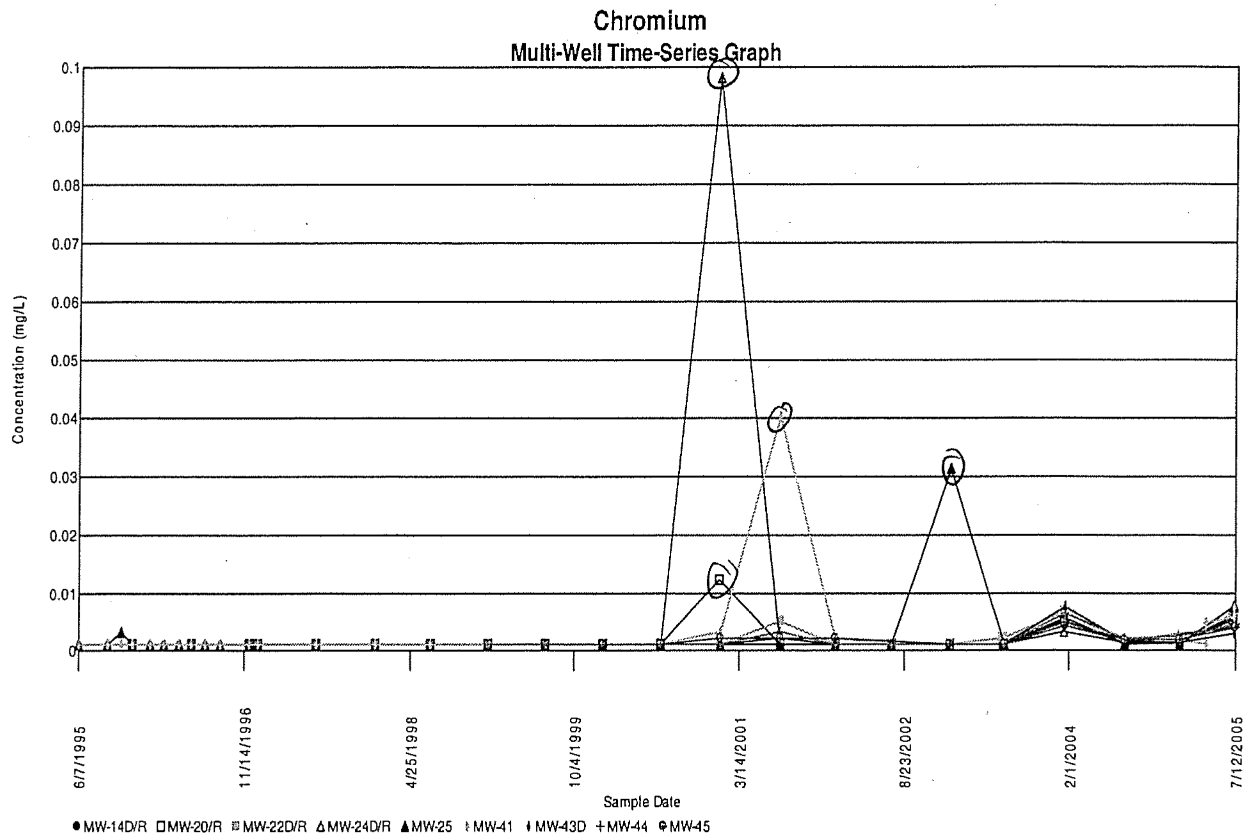
			1/16/2002	0.001	0.001
			7/16/2002	ND<0.001	ND<0.001
			1/16/2003	0.001	0.001
			7/8/2003	ND<0.001	ND<0.001
			1/20/2004	0.0067	0.0067
			7/30/2004	0.0012	0.0012
			1/25/2005	0.0011	0.0011
			7/7/2005	0.0034	0.0034
MW-24D/R	12	7 (58.3333%)	1/5/2000	ND<0.001	ND<0.001
			7/6/2000	ND<0.001	ND<0.001
			1/12/2001	0.098	0.098
			7/25/2001	ND<0.001	ND<0.001
			1/16/2002	ND<0.001	ND<0.001
			7/16/2002	ND<0.001	ND<0.001
			1/16/2003	ND<0.001	ND<0.001
			7/8/2003	ND<0.001	ND<0.001
			1/20/2004	0.003	0.003
			7/30/2004	0.0011	0.0011
			1/25/2005	0.0011	0.0011
			7/7/2005	0.0058	0.0058
MW-25	32	25 (78.125%)	6/7/1995	ND<0.001	ND<0.001
			9/8/1995	ND<0.001	ND<0.001
			10/23/1995	0.003	0.003
			11/27/1995	ND<0.001	ND<0.001
			1/22/1996	ND<0.001	ND<0.001
			3/6/1996	ND<0.001	ND<0.001
			4/24/1996	ND<0.001	ND<0.001
			6/4/1996	ND<0.001	ND<0.001
			7/15/1996	ND<0.001	ND<0.001
			9/1/1996	ND<0.001	ND<0.001
			12/1/1996	ND<0.001	ND<0.001
			1/1/1997	ND<0.001	ND<0.001
			7/1/1997	ND<0.001	ND<0.001
			1/5/1998	ND<0.001	ND<0.001
			7/1/1998	ND<0.001	ND<0.001
			1/5/1999	ND<0.001	ND<0.001
			7/6/1999	ND<0.001	ND<0.001
			1/5/2000	ND<0.001	ND<0.001
			7/6/2000	ND<0.001	ND<0.001
			1/15/2001	ND<0.001	ND<0.001
			7/26/2001	0.001	0.001
			1/17/2002	ND<0.001	ND<0.001
			7/17/2002	ND<0.001	ND<0.001
			1/20/2003	0.031	0.031
			7/9/2003	ND<0.001	ND<0.001
			7/9/2003	ND<0.001	ND<0.001
			1/22/2004	0.0054	0.0054
			7/26/2004	ND<0.001	ND<0.001
			1/24/2005	0.0013	0.0013
			1/24/2005	ND<0.001	ND<0.001
			7/11/2005	0.0075	0.0075
			7/11/2005	0.0072	0.0072
MW-40	21	12 (57.1429%)	11/27/1995	ND<0.001	ND<0.001
			6/4/1996	ND<0.001	ND<0.001

			1/10/2001	ND<0.001	ND<0.001
			7/27/2001	0.002	0.002
			1/16/2002	ND<0.001	ND<0.001
			7/17/2002	ND<0.001	ND<0.001
			1/17/2003	ND<0.001	ND<0.001
			7/8/2003	ND<0.001	ND<0.001
			1/21/2004	0.0073	0.0073
			7/29/2004	0.0014	0.0014
			1/25/2005	0.0013	0.0013
			7/11/2005	0.0027	0.0027
MW-43S	12	4 (33.3333%)	1/5/2000	ND<0.001	ND<0.001
			7/6/2000	ND<0.001	ND<0.001
			1/15/2001	0.002	0.002
			7/25/2001	0.003	0.003
			1/16/2002	0.001	0.001
			7/17/2002	0.003	0.003
			1/17/2003	ND<0.001	ND<0.001
			7/8/2003	ND<0.001	ND<0.001
			1/21/2004	0.0073	0.0073
			7/29/2004	0.002	0.002
			1/20/2005	0.01	0.01
			7/11/2005	0.0044	0.0044
MW-44	14	8 (57.1429%)	1/5/1999	ND<0.001	ND<0.001
			7/6/1999	ND<0.001	ND<0.001
			1/5/2000	ND<0.001	ND<0.001
			7/6/2000	ND<0.001	ND<0.001
			1/15/2001	0.001	0.001
			7/25/2001	0.003	0.003
			1/16/2002	ND<0.001	ND<0.001
			7/18/2002	ND<0.001	ND<0.001
			1/15/2003	ND<0.001	ND<0.001
			7/8/2003	ND<0.001	ND<0.001
			1/21/2004	0.0062	0.0062
			7/29/2004	0.0021	0.0021
			1/20/2005	0.0022	0.0022
			7/12/2005	0.0043	0.0043
MW-45	12	4 (33.3333%)	1/5/2000	ND<0.001	ND<0.001
			7/6/2000	ND<0.001	ND<0.001
			1/15/2001	0.002	0.002
			7/25/2001	0.002	0.002
			1/16/2002	0.002	0.002
			1/17/2003	ND<0.001	ND<0.001
			7/9/2003	ND<0.001	ND<0.001
			1/20/2004	0.0045	0.0045
			1/20/2004	0.0045	0.0045
			7/29/2004	0.0017	0.0017
			1/25/2005	0.0016	0.0016
			7/12/2005	0.0038	0.0038

There are 0 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original

There are 0 unused locations



Chromium
Multi-Well Time-Series Graph
Concentration (mg/L)
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
6/7/1995
11/14/1996
4/25/1998
10/4/1999
3/14/2001
8/23/2002
2/1/2004
7/12/2005
Sample Date
MW-14D/R MW-20/R MW-22D/R MW-24D/R MW-25 MW-41 MW-43D MW-44 MW-45

Concentrations (mg/L)

Parameter: Lead

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Measurements: 358
Total Non-Detect: 289
Percent Non-Detects: 80.7263%
Total Background Measurements: 358
There are 20 background locations

Loc.	Meas.	ND	Date	Conc.	Original
MW-06/R	5	5 (100%)	7/10/2003	ND<0.001	ND<0.001
			7/30/2004	ND<0.001	ND<0.001
			7/30/2004	ND<0.001	ND<0.001
			1/19/2005	ND<0.001	ND<0.001
			7/7/2005	ND<0.001	ND<0.001
MW-09/R	30	27 (90%)	6/7/1995	ND<0.001	ND<0.001
			9/8/1995	ND<0.001	ND<0.001
			10/23/1995	ND<0.001	ND<0.001
			11/27/1995	ND<0.001	ND<0.001
			1/22/1996	ND<0.001	ND<0.001
			3/6/1996	ND<0.001	ND<0.001
			4/24/1996	ND<0.001	ND<0.001
			6/4/1996	ND<0.001	ND<0.001
			7/15/1996	ND<0.001	ND<0.001
			9/1/1996	ND<0.001	ND<0.001
			12/1/1996	ND<0.001	ND<0.001
			1/1/1997	ND<0.001	ND<0.001
			7/1/1997	ND<0.001	ND<0.001
			1/5/1998	ND<0.001	ND<0.001
			7/1/1998	ND<0.001	ND<0.001
			1/5/1999	ND<0.001	ND<0.001
			1/5/2000	ND<0.001	ND<0.001
			7/6/2000	ND<0.001	ND<0.001
			1/16/2001	0.005	0.005
			7/26/2001	0.002	0.002
			7/18/2002	ND<0.001	ND<0.001
			1/17/2003	0.001	0.001
			7/9/2003	ND<0.001	ND<0.001
			7/9/2003	ND<0.001	ND<0.001
			1/21/2004	ND<0.001	ND<0.001
			7/27/2004	ND<0.001	ND<0.001
			1/20/2005	ND<0.001	ND<0.001
			1/20/2005	ND<0.001	ND<0.001
			7/8/2005	ND<0.001	ND<0.001
			7/8/2005	ND<0.001	ND<0.001
MW-14D/R	11	8 (72.7273%)	1/5/2000	0.002	0.002
			7/6/2000	0.003	0.003
			1/15/2001	ND<0.001	ND<0.001
			7/26/2001	ND<0.001	ND<0.001
			1/17/2002	ND<0.001	ND<0.001
			7/17/2002	ND<0.001	ND<0.001
			1/17/2003	ND<0.001	ND<0.001

			9/1/1996	ND<0.001	ND<0.001
			12/1/1996	ND<0.001	ND<0.001
			7/1/1997	ND<0.001	ND<0.001
			7/1/1998	ND<0.001	ND<0.001
			7/6/1999	ND<0.001	ND<0.001
			1/5/2000	ND<0.001	ND<0.001
			7/6/2000	ND<0.001	ND<0.001
			1/11/2001	ND<0.001	ND<0.001
			7/27/2001	0.04	0.04
			~~7/27/2001~~	~~ND<0.001~~	~~ND<0.001~~
			7/17/2002	0.105	0.105
			~~7/17/2002~~	~~0.001~~	~~0.001~~
			1/20/2003	ND<0.001	ND<0.001
			7/9/2003	0.004	0.004
			7/9/2003	ND<0.001	ND<0.001
			1/20/2004	ND<0.001	ND<0.001
			1/20/2004	ND<0.001	ND<0.001
			7/26/2004	0.0016	0.0016
			1/24/2005	ND<0.001	ND<0.001
			7/8/2005	ND<0.001	ND<0.001
			7/8/2005	ND<0.001	ND<0.001
MW-18	30	26 (86.6667%)	6/7/1995	ND<0.001	ND<0.001
			9/8/1995	ND<0.001	ND<0.001
			10/23/1995	ND<0.001	ND<0.001
			11/27/1995	ND<0.001	ND<0.001
			1/22/1996	ND<0.001	ND<0.001
			3/6/1996	ND<0.001	ND<0.001
			4/24/1996	ND<0.001	ND<0.001
			6/4/1996	ND<0.001	ND<0.001
			7/15/1996	ND<0.001	ND<0.001
			9/1/1996	ND<0.001	ND<0.001
			12/1/1996	ND<0.001	ND<0.001
			7/1/1997	ND<0.001	ND<0.001
			7/1/1998	ND<0.001	ND<0.001
			7/6/1999	ND<0.001	ND<0.001
			1/5/2000	ND<0.001	ND<0.001
			7/6/2000	ND<0.001	ND<0.001
			1/10/2001	ND<0.001	ND<0.001
			7/27/2001	0.004	0.004
			7/27/2001	0.001	0.001
			7/18/2002	0.025	0.025
			7/18/2002	ND<0.001	ND<0.001
			1/14/2003	ND<0.001	ND<0.001
			7/9/2003	0.001	0.001
			7/9/2003	ND<0.001	ND<0.001
			1/20/2004	ND<0.001	ND<0.001
			1/20/2004	ND<0.001	ND<0.001
			7/28/2004	ND<0.001	ND<0.001
			1/24/2005	ND<0.001	ND<0.001
			7/7/2005	ND<0.001	ND<0.001
			7/7/2005	ND<0.001	ND<0.001
MW-19	12	7 (58.3333%)	1/5/2000	ND<0.001	ND<0.001
			7/6/2000	ND<0.001	ND<0.001
			1/15/2001	0.001	0.001
			7/26/2001	0.001	0.001

			1/16/2003	0.001	0.001
			7/8/2003	0.006	0.006
			1/20/2004	0.001	0.001
			7/30/2004	ND<0.001	ND<0.001
			1/25/2005	ND<0.001	ND<0.001
			7/7/2005	ND<0.001	ND<0.001
MW-24D/R	12	8 (66.6667%)	1/5/2000	0.048	0.048
			~~7/6/2000~~	~~0.08~~	~~0.08~~
			~~1/12/2001~~	~~0.07~~	~~0.07~~
			7/25/2001	ND<0.001	ND<0.001
			1/16/2002	ND<0.001	ND<0.001
			7/16/2002	ND<0.001	ND<0.001
			1/16/2003	ND<0.001	ND<0.001
			7/8/2003	0.003	0.003
			1/20/2004	ND<0.001	ND<0.001
			7/30/2004	ND<0.001	ND<0.001
			1/25/2005	ND<0.001	ND<0.001
			7/7/2005	ND<0.001	ND<0.001
MW-25	32	28 (87.5%)	6/7/1995	ND<0.001	ND<0.001
			9/8/1995	ND<0.001	ND<0.001
			10/23/1995	ND<0.001	ND<0.001
			11/27/1995	ND<0.001	ND<0.001
			1/22/1996	ND<0.001	ND<0.001
			3/6/1996	ND<0.001	ND<0.001
			4/24/1996	ND<0.001	ND<0.001
			6/4/1996	ND<0.001	ND<0.001
			7/15/1996	ND<0.001	ND<0.001
			9/1/1996	ND<0.001	ND<0.001
			12/1/1996	ND<0.001	ND<0.001
			1/1/1997	ND<0.001	ND<0.001
			7/1/1997	ND<0.001	ND<0.001
			1/5/1998	ND<0.001	ND<0.001
			7/1/1998	ND<0.001	ND<0.001
			1/5/1999	ND<0.001	ND<0.001
			7/6/1999	ND<0.001	ND<0.001
			1/5/2000	ND<0.001	ND<0.001
			7/6/2000	ND<0.001	ND<0.001
			1/15/2001	0.004	0.004
			7/26/2001	ND<0.001	ND<0.001
			1/17/2002	ND<0.001	ND<0.001
			7/17/2002	ND<0.001	ND<0.001
			1/20/2003	ND<0.001	ND<0.001
			7/9/2003	0.004	0.004
			7/9/2003	0.003	0.003
			1/22/2004	0.0024	0.0024
			7/26/2004	ND<0.001	ND<0.001
			1/24/2005	ND<0.001	ND<0.001
			1/24/2005	ND<0.001	ND<0.001
			7/11/2005	ND<0.001	ND<0.001
			7/11/2005	ND<0.001	ND<0.001
MW-40	21	15 (71.4286%)	11/27/1995	0.001	0.001
			6/4/1996	ND<0.001	ND<0.001
			12/1/1996	ND<0.001	ND<0.001
			1/1/1997	ND<0.001	ND<0.001

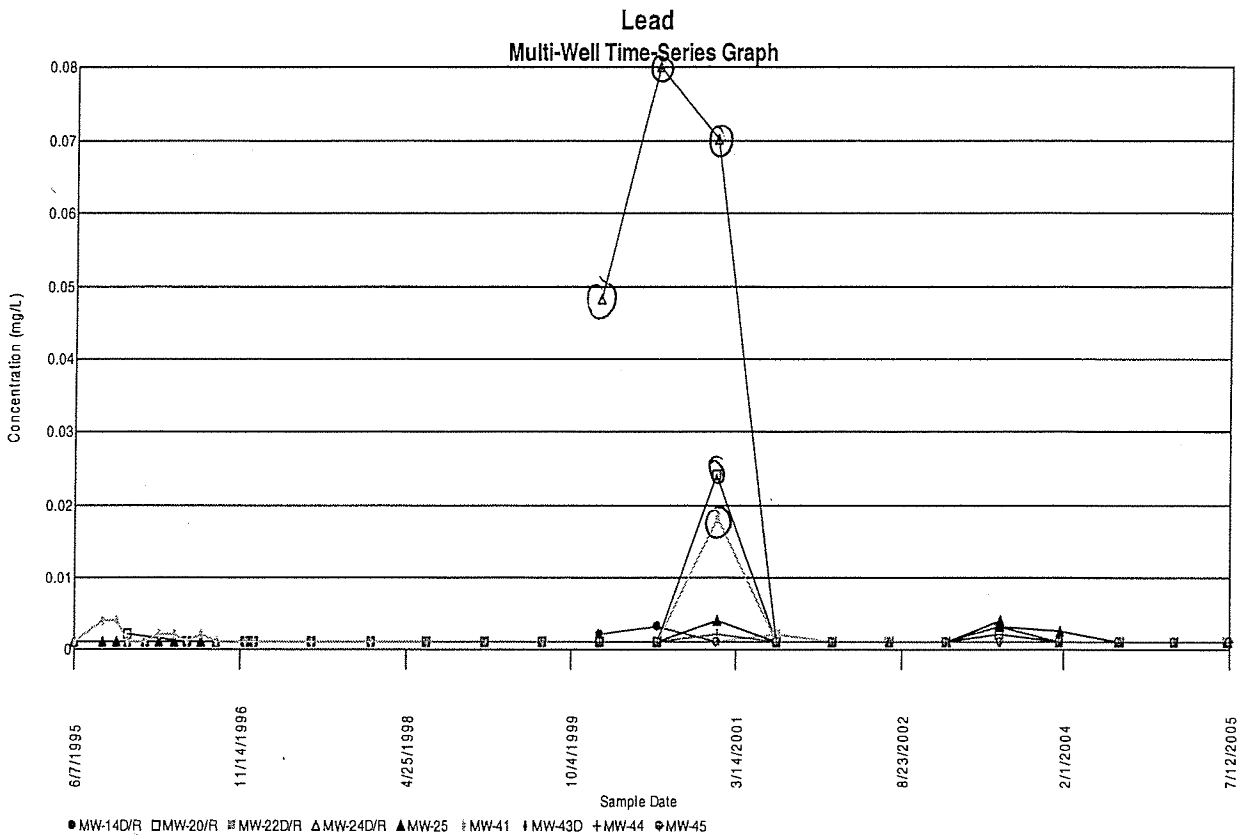
			1/17/2003	ND<0.001	ND<0.001
			7/8/2003	ND<0.001	ND<0.001
			1/21/2004	ND<0.001	ND<0.001
			7/29/2004	ND<0.001	ND<0.001
			1/25/2005	ND<0.001	ND<0.001
			7/11/2005	ND<0.001	ND<0.001
MW-43S	12	9 (75%)	1/5/2000	ND<0.001	ND<0.001
			7/6/2000	ND<0.001	ND<0.001
			1/15/2001	0.001	0.001
			7/25/2001	0.001	0.001
			1/16/2002	ND<0.001	ND<0.001
			7/17/2002	ND<0.001	ND<0.001
			1/17/2003	ND<0.001	ND<0.001
			7/8/2003	0.004	0.004
			1/21/2004	ND<0.001	ND<0.001
			7/29/2004	ND<0.001	ND<0.001
			1/20/2005	ND<0.001	ND<0.001
			7/11/2005	ND<0.001	ND<0.001
MW-44	15	12 (80%)	7/1/1998	ND<0.001	ND<0.001
			1/5/1999	ND<0.001	ND<0.001
			7/6/1999	ND<0.001	ND<0.001
			1/5/2000	ND<0.001	ND<0.001
			7/6/2000	ND<0.001	ND<0.001
			1/15/2001	0.002	0.002
			7/25/2001	0.001	0.001
			1/16/2002	ND<0.001	ND<0.001
			7/18/2002	ND<0.001	ND<0.001
			1/15/2003	ND<0.001	ND<0.001
			7/8/2003	0.001	0.001
			1/21/2004	ND<0.001	ND<0.001
			7/29/2004	ND<0.001	ND<0.001
			1/20/2005	ND<0.001	ND<0.001
			7/12/2005	ND<0.001	ND<0.001
MW-45	12	11 (91.6667%)	1/5/2000	ND<0.001	ND<0.001
			7/6/2000	ND<0.001	ND<0.001
			1/15/2001	0.001	0.001
			7/25/2001	ND<0.001	ND<0.001
			1/16/2002	ND<0.001	ND<0.001
			1/17/2003	ND<0.001	ND<0.001
			7/9/2003	ND<0.001	ND<0.001
			1/20/2004	ND<0.001	ND<0.001
			1/20/2004	ND<0.001	ND<0.001
			7/29/2004	ND<0.001	ND<0.001
			1/25/2005	ND<0.001	ND<0.001
			7/12/2005	ND<0.001	ND<0.001

There are 0 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original



Lead
Multi-Well Time-Series Graph
Concentration (mg/L)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
6/7/1995
11/14/1996
4/25/1998
10/4/1999
3/14/2001
8/23/2002
2/1/2004
7/12/2005
Sample Date
MW-14D/R
MW-20/R
MW-22D/R
MW-24D/R
MW-25
MW-41
MW-43D
MW-44
MW-45

Outlier List

Arsenic

MW-17	7/27/2001	0.01
MW-21SR	7/25/2001	0.01
MW-25	1/20/2003	0.01

Cadmium

MW-20/R	1/12/2001	0.00959
MW-22D/R	1/25/2005	0.028
MW-23S/R	1/12/2001	0.0206
MW-24D/R	1/12/2001	0.0332
MW-45	7/25/2001	0.0075

Chromium

MW-17	7/17/2002	0.018
MW-20/R	1/12/2001	0.012
MW-23S/R	1/12/2001	0.036
MW-24D/R	1/12/2001	0.098
MW-25	1/20/2003	0.031
MW-41	7/26/2001	0.04

Lead

MW-17	7/27/2001	0.04
MW-17	7/17/2002	0.105
MW-18	7/18/2002	0.025
MW-20/R	1/12/2001	0.024
MW-21SR	7/8/2003	0.029
MW-23S/R	1/12/2001	0.068
MW-24D/R	1/5/2000	0.048
MW-24D/R	7/6/2000	0.08
MW-24D/R	1/12/2001	0.07
MW-41	1/16/2001	0.018

Distribution Analysis

Basic Statistics
Parameter: Arsenic
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Measurements	325
Total Non-Detects	122 (37.5385%)
Pooled Mean	0.002292
Pooled Std Dev	0.00230394
Compliance Meas.	0
Compliance Mean	0
Compliance Std Dev	0
Background Meas.	325
Background Mean	0.002292
Background Std Dev	0.00230394

Background Locations
There are 20 background location

Location	Meas.	Non-Detects	% ND	Total
MW-06/R	4	4	100	0.004
MW-09/R	29	28	96.5517	0.029
MW-14D/R	11	4	36.3636	0.0211
MW-14S/R	10	7	70	0.0163
MW-16	29	2	6.89655	0.2074
MW-17	28 27?	5	17.8571	0.0487
MW-18	28	4	14.2857	0.0682
MW-19	11	7	63.6364	0.0124
MW-20/R	18	4	22.2222	0.0299
MW-21SR	7	3	42.8571	0.0121
MW-22D/R	9	6	66.6667	0.01
MW-23S/R	10	0	0	0.0202
MW-24D/R	11	2	18.1818	0.0394
MW-25	29	3	10.3448	0.0566
MW-40	18	17	94.4444	0.018
MW-41	30	3	10	0.0563
MW-43D	11	2	18.1818	0.0471
MW-43S	11	10	90.9091	0.0113
MW-44	11	11	100	0.011
MW-45	10	0	0	0.0259

Location	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-06/R	0.001	0	0	246	61.5
MW-09/R	0.001	6.62036e-019	0	1845	63.6207
MW-14D/R	0.00191818	0.00120733	0	1719	156.273
MW-14S/R	0.00163	0.00115089	0	1141.5	114.15
MW-16	0.00715172	0.00435518	0	7894	272.207
MW-17	0.00173929	0.00170649	0	4091.5	146.125
MW-18	0.00243571	0.000737972	0	6022	215.071
MW-19	0.00112727	0.000296954	0	1078.5	98.0455
MW-20/R	0.00166111	0.000769369	0	2813	156.278
MW-21SR	0.00172857	0.000939351	0	1075.5	153.643
MW-22D/R	0.00111111	0.000333333	0	843	93.6667
MW-23S/R	0.00202	0.00121179	0	1921	192.1

Basic Statistics
Parameter: Boron
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Measurements	245
Total Non-Detects	72 (29.3878%)
Pooled Mean	0.0617673
Pooled Std Dev	0.0683638
Compliance Meas.	0
Compliance Mean	0
Compliance Std Dev	0
Background Meas.	245
Background Mean	0.0617673
Background Std Dev	0.0683638

Background Locations
There are 20 background location

Location	Meas.	Non-Detects	% ND	Total
MW-06/R	5	0	0	0.277
MW-09/R	14	1	7.14286	3.18
MW-14D/R	11	4	36.3636	0.37
MW-14S/R	10	4	40	0.419
MW-16	17	8	47.0588	0.676
MW-17	16	1	6.25	1.136
MW-18	16	5	31.25	0.741
MW-19	12	1	8.33333	1.179
MW-20/R	12	6	50	0.419
MW-21SR	9	1	11.1111	0.753
MW-22D/R	10	0	0	0.674
MW-23S/R	11	2	18.1818	0.61
MW-24D/R	12	2	16.6667	1.276
MW-25	15	7	46.6667	0.579
MW-40	12	4	33.3333	0.454
MW-41	15	6	40	0.669
MW-43D	12	5	41.6667	0.396
MW-43S	12	4	33.3333	0.467
MW-44	12	5	41.6667	0.442
MW-45	12	6	50	0.416

Location	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-06/R	0.0554	0.0192172	0	783	156.6
MW-09/R	0.227143	0.184152	0	2934.5	209.607
MW-14D/R	0.0336364	0.0169663	0	979	89
MW-14S/R	0.0419	0.0265391	0	1001	100.1
MW-16	0.0397647	0.0220781	0	1585	93.2353
MW-17	0.071	0.0256047	0	2864.5	179.031
MW-18	0.0463125	0.0198048	0	1787.5	111.719
MW-19	0.09825	0.0423022	0	2301.5	191.792
MW-20/R	0.0349167	0.0276486	0	918	76.5
MW-21SR	0.0836667	0.0541387	0	1554.5	172.722
MW-22D/R	0.0674	0.0368245	0	1691	169.1
MW-23S/R	0.0554545	0.028609	0	1579	143.545

Basic Statistics
Parameter: Cadmium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Measurements	354
Total Non-Detects	237 (66.9492%)
Pooled Mean	0.0003985
Pooled Std Dev	0.000533289
Compliance Meas.	0
Compliance Mean	0
Compliance Std Dev	0
Background Meas.	354
Background Mean	0.0003985
Background Std Dev	0.000533289

Background Locations
There are 20 background location

Location	Meas.	Non-Detects	% ND	Total
MW-06/R	5	1	20	0.00221
MW-09/R	31	17	54.8387	0.01075
MW-14D/R	11	7	63.6364	0.00282
MW-14S/R	10	3	30	0.00686
MW-16	31	26	83.871	0.00775
MW-17	30	23	76.6667	0.01292
MW-18	30	24	80	0.008692
MW-19	12	10	83.3333	0.00263
MW-20/R	20	15	75	0.00593
MW-21SR	9	2	22.2222	0.009289
MW-22D/R	9	4	44.4444	0.004162
MW-23S/R	10	3	30	0.006285
MW-24D/R	11	7	63.6364	0.00398
MW-25	32	25	78.125	0.013133
MW-40	21	10	47.619	0.009143
MW-41	32	28	87.5	0.01227
MW-43D	12	8	66.6667	0.0039
MW-43S	12	6	50	0.00749
MW-44	15	9	60	0.006965
MW-45	11	9	81.8182	0.00389

Location	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-06/R	0.000442	0.000334843	0	1243	248.6
MW-09/R	0.000346774	0.000256468	0	6001	193.581
MW-14D/R	0.000256364	0.000119689	0	1909	173.545
MW-14S/R	0.000686	0.000799642	0	2450	245
MW-16	0.00025	0.000162706	0	4514	145.613
MW-17	0.000430667	0.000909824	0	4805	160.167
MW-18	0.000289733	0.000213589	0	4654	155.133
MW-19	0.000219167	4.52183e-005	0	1722	143.5
MW-20/R	0.0002965	0.000205766	0	3249	162.45
MW-21SR	0.00103211	0.00064338	0	2552	283.556
MW-22D/R	0.000462444	0.000383326	0	1972	219.111
MW-23S/R	0.0006285	0.000408765	0	2540	254

Basic Statistics
Parameter: Chromium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Measurements	355
Total Non-Detects	221 (62.2535%)
Pooled Mean	0.00205408
Pooled Std Dev	0.00239168
Compliance Meas.	0
Compliance Mean	0
Compliance Std Dev	0
Background Meas.	355
Background Mean	0.00205408
Background Std Dev	0.00239168

Background Locations
There are 20 background location

Location	Meas.	Non-Detects	% ND	Total
MW-06/R	5	1	20	0.0171
MW-09/R	32	24	75	0.0431
MW-14D/R	11	6	54.5455	0.0186
MW-14S/R	10	4	40	0.035
MW-16	31	22	70.9677	0.0611
MW-17	29	21	72.4138	0.058
MW-18	30	23	76.6667	0.0563
MW-19	12	7	58.3333	0.0586
MW-20/R	20	15	75	0.0284
MW-21SR	9	1	11.1111	0.0291
MW-22D/R	10	4	40	0.0259
MW-23S/R	10	3	30	0.0204
MW-24D/R	11	7	63.6364	0.018
MW-25	31	25	80.6452	0.0504
MW-40	21	12	57.1429	0.0384
MW-41	33	23	69.697	0.0595
MW-43D	12	7	58.3333	0.0217
MW-43S	12	4	33.3333	0.0367
MW-44	14	8	57.1429	0.0268
MW-45	12	4	33.3333	0.0261

Location	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-06/R	0.00342	0.00304335	0	1301	260.2
MW-09/R	0.00134688	0.00100289	0	4783	149.469
MW-14D/R	0.00169091	0.00121033	0	2014	183.091
MW-14S/R	0.0035	0.00362093	0	2264	226.4
MW-16	0.00197097	0.00201746	0	5113	164.935
MW-17	0.002	0.00210628	0	4733	163.207
MW-18	0.00187667	0.00186782	0	4711	157.033
MW-19	0.00488333	0.0077162	0	2402	200.167
MW-20/R	0.00142	0.00124334	0	3012	150.6
MW-21SR	0.00323333	0.002504	0	2377	264.111
MW-22D/R	0.00259	0.00230962	0	2169	216.9
MW-23S/R	0.00204	0.00187035	0	2213	221.3

Basic Statistics
Parameter: Lead
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Measurements	348
Total Non-Detects	289 (83.046%)
Pooled Mean	0.00125977
Pooled Std Dev	0.00110401
Compliance Meas.	0
Compliance Mean	0
Compliance Std Dev	0
Background Meas.	348
Background Mean	0.00125977
Background Std Dev	0.00110401

Background Locations
There are 20 background location

Location	Meas.	Non-Detects	% ND	Total
MW-06/R	5	5	100	0.005
MW-09/R	30	27	90	0.035
MW-14D/R	11	8	72.7273	0.014
MW-14S/R	10	8	80	0.018
MW-16	31	26	83.871	0.047
MW-17	28	25	89.2857	0.0316
MW-18	29	26	89.6552	0.032
MW-19	12	7	58.3333	0.0124
MW-20/R	20	18	90	0.022
MW-21SR	8	6	75	0.008
MW-22D/R	10	6	60	0.013
MW-23S/R	10	7	70	0.015
MW-24D/R	9	8	88.8889	0.011
MW-25	32	28	87.5	0.0414
MW-40	21	15	71.4286	0.038
MW-41	31	26	83.871	0.04
MW-43D	12	11	91.6667	0.012
MW-43S	12	9	75	0.015
MW-44	15	12	80	0.016
MW-45	12	11	91.6667	0.012

Location	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-06/R	0.001	0	0	725	145
MW-09/R	0.00116667	0.00074664	0	4865	162.167
MW-14D/R	0.00127273	0.00064667	0	2100	190.909
MW-14S/R	0.0018	0.00252982	0	1798	179.8
MW-16	0.00151613	0.0022041	0	5359	172.871
MW-17	0.00112857	0.000574042	0	4572	163.286
MW-18	0.00110345	0.000557086	0	4699	162.034
MW-19	0.00103333	8.87625e-005	0	2543	211.917
MW-20/R	0.0011	0.000307794	0	3253	162.65
MW-21SR	0.001	0	0	1473	184.125
MW-22D/R	0.0013	0.000674949	0	2131	213.1
MW-23S/R	0.0015	0.00158114	0	1971	197.1

Skewness Coefficient
Parameter: Arsenic
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Skewness > 1 indicates positively skewed data
Skewness < -1 indicates negatively skewed data

Background Locations

Location	Obs.	Mean	Std. Dev.	Skewness
MW-06/R	4	0.001	0	**Div 0**
MW-09/R	29	0.001	6.62036e-019	**-1**
MW-14D/R	11	0.00191818	0.00120733	0.83381
MW-14S/R	10	0.00163	0.00115089	**1.52937**
MW-16	29	0.00715172	0.00435518	0.362546
MW-17	28	0.00173929	0.00170649	**4.24957**
MW-18	28	0.00243571	0.000737972	-0.894791
MW-19	11	0.00112727	0.000296954	**2.60592**
MW-20/R	18	0.00166111	0.000769369	**1.45033**
MW-21SR	7	0.00172857	0.000939351	0.591198
MW-22D/R	9	0.00111111	0.000333333	**2.47487**
MW-23S/R	10	0.00202	0.00121179	**1.59867**
MW-24D/R	11	0.00358182	0.00184544	-0.476175
MW-25	29	0.00195172	0.000543547	-0.138667
MW-40	18	0.001	4.46254e-019	-1
MW-41	30	0.00187667	0.00081777	**2.47771**
MW-43D	11	0.00428182	0.00210847	-0.626848
MW-43S	11	0.00102727	9.04534e-005	**2.84605**
MW-44	11	0.001	2.27424e-019	**-1**
MW-45	10	0.00259	0.000517365	-0.0412052

All Locations

Obs.	Mean	Std. Dev.	Skewness
325	0.002292	0.00230394	**3.17042**

Skewness Coefficient

Parameter: Cadmium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Skewness > 1 indicates positively skewed data
Skewness < -1 indicates negatively skewed data

Background Locations

Location	Obs.	Mean	Std. Dev.	Skewness
MW-06/R	5	0.000442	0.000334843	1.0841
MW-09/R	31	0.000346774	0.000256468	1.76105
MW-14D/R	11	0.000256364	0.000119689	1.98772
MW-14S/R	10	0.000686	0.000799642	2.06543
MW-16	31	0.00025	0.000162706	3.70327
MW-17	30	0.000430667	0.000909824	4.84198
MW-18	30	0.000289733	0.000213589	2.26533
MW-19	12	0.000219167	4.52183e-005	1.8683
MW-20/R	20	0.0002965	0.000205766	1.83668
MW-21SR	9	0.00103211	0.00064338	0.11822
MW-22D/R	9	0.000462444	0.000383326	1.5067
MW-23S/R	10	0.0006285	0.000408765	0.610217
MW-24D/R	11	0.000361818	0.000307077	1.51013
MW-25	32	0.000410406	0.000568558	3.29022
MW-40	21	0.000435381	0.000536896	2.56326
MW-41	32	0.000383438	0.000673712	4.28781
MW-43D	12	0.000325	0.000305688	2.66807
MW-43S	12	0.000624167	0.00107509	2.63139
MW-44	15	0.000464333	0.000632091	2.82456
MW-45	11	0.000353636	0.000345667	1.73474

All Locations

Obs.	Mean	Std. Dev.	Skewness
354	0.0003985	0.000533289	4.7595

Skewness Coefficient
Parameter: Lead
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Skewness > 1 indicates positively skewed data
Skewness < -1 indicates negatively skewed data

Background Locations

Location	Obs.	Mean	Std. Dev.	Skewness
MW-06/R	5	0.001	0	**Div 0**
MW-09/R	30	0.00116667	0.00074664	**4.78419**
MW-14D/R	11	0.00127273	0.00064667	**2.07701**
MW-14S/R	10	0.0018	0.00252982	**2.66667**
MW-16	31	0.00151613	0.0022041	**4.82925**
MW-17	28	0.00112857	0.000574042	**4.73047**
MW-18	29	0.00110345	0.000557086	**5.10252**
MW-19	12	0.00103333	8.87625e-005	**2.5646**
MW-20/R	20	0.0011	0.000307794	**2.66667**
MW-21SR	8	0.001	0	**Div 0**
MW-22D/R	10	0.0013	0.000674949	**1.91979**
MW-23S/R	10	0.0015	0.00158114	**2.66667**
MW-24D/R	9	0.00122222	0.000666667	**2.47487**
MW-25	32	0.00129375	0.000826941	**2.62266**
MW-40	21	0.00180952	0.00204007	**2.58093**
MW-41	31	0.00129032	0.000782881	**2.84071**
MW-43D	12	0.001	2.26482e-019	**-1**
MW-43S	12	0.00125	0.000866025	**3.01511**
MW-44	15	0.00106667	0.000258199	**3.4744**
MW-45	12	0.001	2.26482e-019	**-1**

All Locations

Obs.	Mean	Std. Dev.	Skewness
348	0.00125977	0.00110401	**6.42463**

Skewness Coefficient
Parameter: Boron
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL

Skewness > 1 indicates positively skewed data
Skewness < -1 indicates negatively skewed data

Background Locations

Location	Obs.	Mean	Std. Dev.	Skewness
MW-06/R	5	-2.94027	0.341414	0.209981
MW-09/R	14	-1.86692	0.952378	-0.148857
MW-14D/R	11	-3.8004	0.815829	-0.983524
MW-14S/R	10	-3.66869	0.975543	-0.661305
MW-16	17	-3.75523	0.957998	-0.698498
MW-17	16	-2.7943	0.725491	**-2.74522**
MW-18	16	-3.42515	0.737757	**-1.08009**
MW-19	12	-2.46794	0.562654	-0.730146
MW-20/R	12	-3.94875	0.849999	0.0518091
MW-21SR	9	-2.83841	1.09424	**-1.29539**
MW-22D/R	10	-2.8691	0.676484	-0.806146
MW-23S/R	11	-3.20721	0.909986	**-1.24471**
MW-24D/R	12	-2.5591	0.814778	-0.120983
MW-25	15	-3.71606	0.734761	**-1.12743**
MW-40	12	-3.6258	0.655175	**-1.22472**
MW-41	15	-3.47883	0.638217	**-1.30756**
MW-43D	12	-3.89416	0.801396	-0.689035
MW-43S	12	-3.62369	0.724292	**-1.04028**
MW-44	12	-3.7344	0.801036	**-1.12755**
MW-45	12	-3.86419	0.811726	-0.743623

All Locations

Obs.	Mean	Std. Dev.	Skewness
245	-3.31729	0.960498	-0.243924

Skewness Coefficient
Parameter: Chromium
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL

Skewness > 1 indicates positively skewed data
Skewness < -1 indicates negatively skewed data

Background Locations

Location	Obs.	Mean	Std. Dev.	Skewness
MW-06/R	5	-6.09639	1.04591	-0.232297
MW-09/R	32	-7.25956	0.67679	**1.88299**
MW-14D/R	11	-6.93177	0.862146	0.722362
MW-14S/R	10	-6.36997	1.23609	0.309795
MW-16	31	-7.0377	0.983363	**1.33287**
MW-17	29	-7.05321	0.997152	**1.4146**
MW-18	30	-7.10041	0.95477	**1.45992**
MW-19	12	-6.48963	1.486	0.776584
MW-20/R	20	-7.25184	0.729996	**2.05064**
MW-21SR	9	-6.12095	0.967719	-0.100183
MW-22D/R	10	-6.56043	1.08678	0.379884
MW-23S/R	10	-6.66549	0.895627	0.596538
MW-24D/R	11	-7.07184	0.859197	**1.34119**
MW-25	31	-7.23977	0.830075	**2.09789**
MW-40	21	-6.9559	0.889501	**1.12367**
MW-41	33	-7.06254	0.909144	**1.34503**
MW-43D	12	-6.956	0.901309	**1.06183**
MW-43S	12	-6.35917	1.0927	0.124109
MW-44	14	-6.88154	0.947451	0.73394
MW-45	12	-6.5202	0.872301	-0.18959

All Locations

Obs.	Mean	Std. Dev.	Skewness
355	-6.94211	0.964124	**1.14261**

Prediction Limit Calculations

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-14D/R
Parameter: Arsenic

Original Data (Not Transformed)
Aitchison's Adjustment

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/15/2001	ND<0.001
	7/26/2001	ND<0.001
	1/17/2002	0.001
	7/17/2002	0.002
	1/17/2003	0.004
	7/9/2003	0.004
	1/22/2004	0.001
	7/29/2004	0.0024
	7/11/2005	0.0027

From 11 baseline samples
Baseline mean = 0.00155455
Baseline std Dev = 0.0015642

For 4 recent sampling event(s)
95% confidence t = 2.63377 at 10 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/11/2005	1	0.0027	[0, 0.00585748]	FALSE
7/29/2004	1	0.0024	[0, 0.00585748]	FALSE
1/22/2004	1	0.001	[0, 0.00585748]	FALSE
7/9/2003	1	0.004	[0, 0.00585748]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-16
Parameter: Arsenic
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	6/7/1995	0.006
	9/8/1995	ND<0.001
	10/23/1995	0.007
	11/27/1995	0.004
	1/22/1996	0.006
	3/6/1996	0.005
	4/24/1996	0.002
	6/4/1996	0.004
	7/15/1996	0.005
	9/1/1996	0.006
	12/1/1996	0.005
	7/1/1997	0.004
	7/1/1998	0.002
	7/6/1999	0.002
	1/5/2000	0.002
	7/6/2000	ND<0.001
	1/11/2001	0.006
	7/27/2001	0.009
	7/27/2001	0.012
	7/18/2002	0.012
	7/18/2002	0.01
	1/20/2003	0.009
	7/10/2003	0.01
	7/10/2003	0.016
	7/10/2003	0.011
	1/20/2004	0.0094
	7/28/2004	0.015
	7/11/2005	0.014
	7/11/2005	0.012

From 29 baseline samples
Baseline mean = 0.00715172
Baseline std Dev = 0.00435518

For 4 recent sampling event(s)
95% confidence t = 2.36845 at 28 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/11/2005	2	0.013	[0, 0.0146929]	FALSE
7/28/2004	1	0.015	[0, 0.0176431]	FALSE
1/20/2004	1	0.0094	[0, 0.0176431]	FALSE
7/10/2003	3	0.0123333	[0, 0.0134076]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-17
Parameter: Arsenic

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	6/7/1995	-6.90776
	9/8/1995	-6.21461
	10/23/1995	-6.90776
	11/27/1995	-6.90776
	1/22/1996	-6.21461
	3/6/1996	-6.90776
	4/24/1996	-6.90776
	6/4/1996	-6.90776
	7/15/1996	-6.90776
	9/1/1996	-6.21461
	12/1/1996	-6.90776
	7/1/1997	-6.21461
	7/1/1998	-6.21461
	7/6/1999	-6.21461
	1/5/2000	-6.90776
	7/6/2000	-6.21461
	1/11/2001	ND<-7.6009
	7/27/2001	ND<-7.6009
	7/17/2002	-6.21461
	7/17/2002	ND<-7.6009
	1/20/2003	-5.80914
	7/9/2003	ND<-7.6009
	7/9/2003	ND<-7.6009
	1/20/2004	-6.31997
	7/26/2004	-6.64539
	7/8/2005	-6.57128
	7/8/2005	-6.72543

From 27 baseline samples
Baseline mean = -6.73935
Baseline std Dev = 0.527981

For 4 recent sampling event(s)
95% confidence t = 2.37878 at 26 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/8/2005	2	-6.64836	[0, -5.81895]	FALSE
7/26/2004	1	-6.64539	[0, -5.46035]	FALSE
1/20/2004	1	-6.31997	[0, -5.46035]	FALSE
7/9/2003	2	-7.6009	[0, -5.81895]	FALSE LA

0.0042520673

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-18
Parameter: Arsenic
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	6/7/1995	0.003
	9/8/1995	0.003
	10/23/1995	0.003
	11/27/1995	0.003
	1/22/1996	0.003
	3/6/1996	0.003
	4/24/1996	0.003
	6/4/1996	0.003
	7/15/1996	0.003
	9/1/1996	0.003
	12/1/1996	0.002
	7/1/1997	0.003
	7/1/1998	0.003
	7/6/1999	0.003
	1/5/2000	0.003
	7/6/2000	0.003
	1/10/2001	0.002
	7/27/2001	0.002
	7/27/2001	0.002
	7/18/2002	0.002
	7/18/2002	ND<0.001
	1/14/2003	0.003
	7/9/2003	ND<0.001
	7/9/2003	ND<0.001
	1/20/2004	ND<0.001
	7/28/2004	0.002
	7/7/2005	0.0021
	7/7/2005	0.0021

From 28 baseline samples
Baseline mean = 0.00243571
Baseline std Dev = 0.000737972

For 4 recent sampling event(s)
95% confidence t = 2.37342 at 27 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/7/2005	2	0.0021	[0, 0.00371769]	FALSE
7/28/2004	1	0.002	[0, 0.00421823]	FALSE
1/20/2004	1	0.001	[0, 0.00421823]	FALSE
7/9/2003	2	0.001	[0, 0.00371769]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-20/R
Parameter: Arsenic
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	6/4/1996	-6.21461
	1/1/1997	-6.90776
	7/1/1997	-6.90776
	1/5/1998	-6.21461
	7/1/1998	-6.21461
	1/5/1999	ND<-7.6009
	7/6/1999	-6.90776
	1/5/2000	-6.21461
	7/6/2000	-6.21461
	1/12/2001	-5.52146
	7/25/2001	ND<-7.6009
	1/16/2002	ND<-7.6009
	7/16/2002	-6.21461
	1/16/2003	-6.21461
	7/8/2003	ND<-7.6009
	1/20/2004	-6.37713
	7/30/2004	-6.90776
	7/7/2005	-6.1193

From 18 baseline samples
Baseline mean = -6.64193
Baseline std Dev = 0.634225

For 4 recent sampling event(s)
95% confidence t = 2.45805 at 17 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/7/2005	1	-6.1193	[0, -5.04025]	FALSE
7/30/2004	1	-6.90776	[0, -5.04025]	FALSE
1/20/2004	1	-6.37713	[0, -5.04025]	FALSE
7/8/2003	1	-7.6009	[0, -5.04025]	FALSE

0.006472130

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-23S/R
Parameter: Arsenic
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	7/6/2000	-6.90776
	1/12/2001	-6.90776
	7/25/2001	-6.21461
	1/16/2002	-5.80914
	7/16/2002	-6.21461
	1/16/2003	-5.29832
	7/8/2003	-6.21461
	1/20/2004	-6.43775
	7/30/2004	-6.50229
	7/7/2005	-6.81245

From 10 baseline samples
Baseline mean = -6.33193
Baseline std Dev = 0.507414

For 4 recent sampling event(s)
95% confidence t = 2.68501 at 9 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/7/2005	1	-6.81245	[0, -4.90302]	FALSE
7/30/2004	1	-6.50229	[0, -4.90302]	FALSE
1/20/2004	1	-6.43775	[0, -4.90302]	FALSE
7/8/2003	1	-6.21461	[0, -4.90302]	FALSE

✓
0.0074241283

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-24D/R
Parameter: Arsenic

Original Data (Not Transformed)
Aitchison's Adjustment

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/12/2001	0.005
	7/25/2001	0.005
	1/16/2002	0.006
	7/16/2002	0.004
	1/16/2003	0.005
	7/8/2003	0.001
	1/20/2004	0.0027
	7/30/2004	0.0042
✓	7/7/2005	0.0045

From 11 baseline samples
Baseline mean = 0.0034
Baseline std Dev = 0.00214523

For 4 recent sampling event(s)
95% confidence t = 2.63377 at 10 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/7/2005	1	0.0045	[0, 0.00930127]	FALSE
7/30/2004	1	0.0042	[0, 0.00930127]	FALSE
1/20/2004	1	0.0027	[0, 0.00930127]	FALSE
7/8/2003	1	0.001	[0, 0.00930127]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-25
Parameter: Arsenic
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	6/7/1995	0.002
	9/8/1995	0.002
	10/23/1995	0.002
	11/27/1995	0.002
	1/22/1996	0.002
	3/6/1996	0.002
	4/24/1996	0.002
	6/4/1996	0.002
	7/15/1996	0.002
	9/1/1996	0.002
	12/1/1996	0.002
	1/1/1997	0.002
	7/1/1997	0.002
	1/5/1998	0.002
	7/1/1998	0.002
	1/5/1999	0.001
	7/6/1999	0.002
	1/5/2000	0.002
	7/6/2000	0.002
	1/15/2001	0.001
	7/26/2001	ND<0.001
	1/17/2002	0.002
	7/17/2002	0.002
	7/9/2003	ND<0.001
	7/9/2003	ND<0.001
	1/22/2004	0.003
	7/26/2004	0.0028
	7/11/2005	0.0027
	7/11/2005	0.0031

From 29 baseline samples
Baseline mean = 0.00195172
Baseline std Dev = 0.000543547

For 4 recent sampling event(s)
95% confidence t = 2.36845 at 28 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/11/2005	**2**	**0.0029**	**[0, 0.00289289]**	**TRUE**
7/26/2004	1	0.0028	[0, 0.0032611]	FALSE
1/22/2004	1	0.003	[0, 0.0032611]	FALSE
7/9/2003	2	0.001	[0, 0.00289289]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-41
Parameter: Arsenic
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	6/7/1995	-6.21461
	9/8/1995	-6.90776
	10/23/1995	-6.21461
	11/27/1995	-6.21461
	1/22/1996	-6.21461
	3/6/1996	-6.21461
	4/24/1996	-6.21461
	6/4/1996	-6.21461
	7/15/1996	-6.21461
	9/1/1996	-6.21461
	12/1/1996	-6.21461
	1/1/1997	-6.21461
	7/1/1997	-6.90776
	1/5/1998	-6.90776
	7/1/1998	-6.21461
	1/5/1999	-6.90776
	7/6/1999	-6.21461
	1/5/2000	-6.21461
	7/6/2000	-6.21461
	1/16/2001	-6.90776
	7/26/2001	ND<-7.6009
	1/17/2002	-6.21461
	7/17/2002	-6.21461
	1/20/2003	-6.21461
	7/9/2003	ND<-7.6009
	7/9/2003	ND<-7.6009
	1/22/2004	-6.1193
	7/26/2004	-6.03229
	7/11/2005	-6.07485
	7/11/2005	-5.22136

From 30 baseline samples
Baseline mean = -6.42174
Baseline std Dev = 0.52289

For 4 recent sampling event(s)
95% confidence t = 2.36385 at 29 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/11/2005	2	-5.6481	[0, -5.51907]	FALSE
7/26/2004	1	-6.03229	[0, -5.16528]	FALSE
1/22/2004	1	-6.1193	[0, -5.16528]	FALSE
7/9/2003	2	-7.6009	[0, -5.51907]	FALSE

0,0057 114634

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-43D
Parameter: Arsenic
Original Data (Not Transformed)
Aitchison's Adjustment

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/5/2000	0.006
	7/6/2000	ND<0.001
	1/10/2001	0.004
	7/27/2001	0.005
	1/16/2002	0.006
	7/17/2002	0.004
	1/17/2003	0.006
	7/8/2003	ND<0.001
	1/21/2004	0.0018
	7/29/2004	0.0058
	7/11/2005	0.0065

From 11 baseline samples
Baseline mean = 0.0041
Baseline std Dev = 0.00243352

For 4 recent sampling event(s)
95% confidence t = 2.63377 at 10 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/11/2005	1	0.0065	[0, 0.0107943]	FALSE
7/29/2004	1	0.0058	[0, 0.0107943]	FALSE
1/21/2004	1	0.0018	[0, 0.0107943]	FALSE
7/8/2003	1	0.001	[0, 0.0107943]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-45
Parameter: Arsenic
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/5/2000	0.002
	7/6/2000	0.003
	1/15/2001	0.002
	7/25/2001	0.003
	1/16/2002	0.003
	1/17/2003	0.002
	7/9/2003	0.003
	1/20/2004	0.0022
	7/29/2004	0.0024
	7/12/2005	0.0033

From 10 baseline samples
Baseline mean = 0.00259
Baseline std Dev = 0.000517365

For 4 recent sampling event(s)
95% confidence t = 2.68501 at 9 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/12/2005	1	0.0033	[0, 0.00404693]	FALSE
7/29/2004	1	0.0024	[0, 0.00404693]	FALSE
1/20/2004	1	0.0022	[0, 0.00404693]	FALSE
7/9/2003	1	0.003	[0, 0.00404693]	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-09/R
Parameter: Arsenic
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 96.5517%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 29
Maximum Baseline Concentration = 0.001
Confidence Level = 87.9%
False Positive Rate = 12.1%

Baseline Measurements	Date	Value
	6/7/1995	ND<0.001
	9/8/1995	ND<0.001
	10/23/1995	ND<0.001
	11/27/1995	ND<0.001
	1/22/1996	ND<0.001
	3/6/1996	ND<0.001
	4/24/1996	ND<0.001
	6/4/1996	ND<0.001
	7/15/1996	ND<0.001
	9/1/1996	ND<0.001
	12/1/1996	ND<0.001
	1/1/1997	ND<0.001
	7/1/1997	ND<0.001
	1/5/1998	ND<0.001
	7/1/1998	ND<0.001
	1/5/1999	ND<0.001
	7/6/1999	ND<0.001
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/16/2001	ND<0.001
	7/26/2001	ND<0.001
	7/18/2002	ND<0.001
	1/17/2003	0.001
	7/9/2003	ND<0.001
	7/9/2003	ND<0.001
	1/21/2004	ND<0.001
	7/27/2004	ND<0.001
	7/8/2005	ND<0.001
	7/8/2005	ND<0.001

Date	Count	Mean	Significant
7/8/2005	2	0.001	FALSE
7/27/2004	1	0.001	FALSE
1/21/2004	1	0.001	FALSE
7/9/2003	2	0.001	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-14S/R
Parameter: Arsenic
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 70%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 10
Maximum Baseline Concentration = 0.0043
Confidence Level = 71.4%
False Positive Rate = 28.6%

Baseline Measurements	Date	Value
	1/5/2000	0.003
	7/6/2000	0.002
	1/15/2001	ND<0.001
	7/26/2001	ND<0.001
	1/17/2002	ND<0.001
	1/17/2003	ND<0.001
	7/9/2003	ND<0.001
	1/22/2004	ND<0.001
	7/29/2004	ND<0.001
	7/11/2005	0.0043

Date	Count	Mean	Significant
7/11/2005	1	0.0043	FALSE
7/29/2004	1	0.001	FALSE
1/22/2004	1	0.001	FALSE
7/9/2003	1	0.001	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-19
Parameter: Arsenic
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 63.6364%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 11
Maximum Baseline Concentration = 0.002
Confidence Level = 73.3%
False Positive Rate = 26.7%

Baseline Measurements	Date	Value
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/15/2001	ND<0.001
	7/26/2001	ND<0.001
	1/15/2002	ND<0.001
	7/18/2002	ND<0.001
	1/15/2003	0.002
	7/10/2003	ND<0.001
	1/21/2004	0.0011
	7/29/2004	0.0012
	7/12/2005	0.0011

Date	Count	Mean	Significant
7/12/2005	1	0.0011	FALSE
7/29/2004	1	0.0012	FALSE
1/21/2004	1	0.0011	FALSE
7/10/2003	1	0.001	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-22D/R
Parameter: Arsenic
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 66.6667%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 9
Maximum Baseline Concentration = 0.002
Confidence Level = 69.2%
False Positive Rate = 30.8%

Baseline Measurements	Date	Value
	1/16/2001	ND<0.001
	7/25/2001	0.002
	1/16/2002	ND<0.001
	7/16/2002	ND<0.001
	1/15/2003	0.001
	7/8/2003	ND<0.001
	1/20/2004	0.001
	7/30/2004	ND<0.001
	7/7/2005	ND<0.001

Date	Count	Mean	Significant
7/7/2005	1	0.001	FALSE
7/30/2004	1	0.001	FALSE
1/20/2004	1	0.001	FALSE
7/8/2003	1	0.001	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-40
Parameter: Arsenic
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 94.4444%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 18
Maximum Baseline Concentration = 0.001
Confidence Level = 81.8%
False Positive Rate = 18.2%

Baseline Measurements	Date	Value
	6/4/1996	ND<0.001
	1/1/1997	ND<0.001
	7/1/1997	ND<0.001
	1/5/1998	ND<0.001
	7/1/1998	ND<0.001
	1/5/1999	ND<0.001
	7/6/1999	ND<0.001
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/15/2001	ND<0.001
	7/25/2001	ND<0.001
	1/16/2002	ND<0.001
	7/18/2002	ND<0.001
	1/15/2003	0.001
	7/8/2003	ND<0.001
	1/21/2004	ND<0.001
	7/29/2004	ND<0.001
	7/12/2005	ND<0.001

Date	Count	Mean	Significant
7/12/2005	1	0.001	FALSE
7/29/2004	1	0.001	FALSE
1/21/2004	1	0.001	FALSE
7/8/2003	1	0.001	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-43S
Parameter: Arsenic
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 90.9091%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 11
Maximum Baseline Concentration = 0.0013
Confidence Level = 73.3%
False Positive Rate = 26.7%

Baseline Measurements	Date	Value
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/15/2001	ND<0.001
	7/25/2001	ND<0.001
	1/16/2002	ND<0.001
	7/17/2002	ND<0.001
	1/17/2003	ND<0.001
	7/8/2003	ND<0.001
	1/21/2004	ND<0.001
	7/29/2004	ND<0.001
	7/11/2005	0.0013

Date	Count	Mean	Significant
7/11/2005	1	0.0013	FALSE
7/29/2004	1	0.001	FALSE
1/21/2004	1	0.001	FALSE
7/8/2003	1	0.001	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-44
Parameter: Arsenic
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit.

Total Percent Non-Detects = 100%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 11
Maximum Baseline Concentration = 0.001
Confidence Level = 73.3%
False Positive Rate = 26.7%

Baseline Measurements	Date	Value
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/15/2001	ND<0.001
	7/25/2001	ND<0.001
	1/16/2002	ND<0.001
	7/18/2002	ND<0.001
	1/15/2003	ND<0.001
	7/8/2003	ND<0.001
	1/21/2004	ND<0.001
	7/29/2004	ND<0.001
	7/12/2005	ND<0.001

Date	Count	Mean	Significant
7/12/2005	1	0.001	FALSE
7/29/2004	1	0.001	FALSE
1/21/2004	1	0.001	FALSE
7/8/2003	1	0.001	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-09/R
Parameter: Boron

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/5/2000	0.055
	7/6/2000	ND<0.05
	1/16/2001	0.071
	7/26/2001	0.09
	7/18/2002	0.114
	1/17/2003	0.079
	7/9/2003	0.129
	7/9/2003	0.132
	1/21/2004	0.17
	7/27/2004	0.36
	1/20/2005	0.47
	1/20/2005	0.46
	7/8/2005	0.51
	7/8/2005	0.49

From 14 baseline samples
Baseline mean = 0.227143
Baseline std Dev = 0.184152

For 4 recent sampling event(s)
95% confidence t = 2.53263 at 13 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/8/2005	2	0.5	[0, 0.579699]	FALSE
1/20/2005	2	0.465	[0, 0.579699]	FALSE
7/27/2004	1	0.36	[0, 0.709901]	FALSE
1/21/2004	1	0.17	[0, 0.709901]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-14D/R
Parameter: Boron
Original Data (Not Transformed)
Aitchison's Adjustment

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/5/2000	ND<0.05
	7/6/2000	ND<0.05
	1/15/2001	0.019
	7/26/2001	0.024
	1/17/2002	ND<0.01
	7/17/2002	0.023
	1/17/2003	ND<0.01
	7/9/2003	0.052
	1/22/2004	0.036
	7/29/2004	0.053
	7/11/2005	0.043

From 11 baseline samples
Baseline mean = 0.0227273
Baseline std Dev = 0.0210765

For 4 recent sampling event(s)
95% confidence t = 2.63377 at 10 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/11/2005	1	0.043	[0, 0.0807062]	FALSE
7/29/2004	1	0.053	[0, 0.0807062]	FALSE
1/22/2004	1	0.036	[0, 0.0807062]	FALSE
7/9/2003	1	0.052	[0, 0.0807062]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-14S/R
Parameter: Boron
Original Data (Not Transformed)
Aitchison's Adjustment

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/5/2000	ND<0.05
	7/6/2000	ND<0.05
	1/15/2001	ND<0.01
	7/26/2001	0.034
	1/17/2002	0.02
	1/17/2003	ND<0.01
	7/9/2003	0.057
	1/22/2004	0.041
	7/29/2004	0.1
	7/11/2005	0.047

From 10 baseline samples
Baseline mean = 0.0299
Baseline std Dev = 0.0329223

For 4 recent sampling event(s)
95% confidence t = 2.68501 at 9 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/11/2005	1	0.047	[0, 0.122611]	FALSE
7/29/2004	1	0.1	[0, 0.122611]	FALSE
1/22/2004	1	0.041	[0, 0.122611]	FALSE
7/9/2003	1	0.057	[0, 0.122611]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-16
Parameter: Boron
Original Data (Not Transformed)
Aitchison's Adjustment

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/5/2000	ND<0.05
	7/6/2000	ND<0.05
	1/11/2001	0.027
	7/27/2001	ND<0.01
	7/27/2001	0.046
	7/18/2002	0.084
	7/18/2002	0.044
	1/20/2003	ND<0.01
	7/10/2003	0.071
	7/10/2003	ND<0.01
	7/10/2003	ND<0.01
	1/20/2004	0.036
	1/20/2004	0.036
	7/28/2004	0.063
	1/24/2005	ND<0.05
	7/11/2005	ND<0.05
	7/11/2005	0.029

From 17 baseline samples
Baseline mean = 0.0256471
Baseline std Dev = 0.0286115

For 4 recent sampling event(s)
95% confidence t = 2.47288 at 16 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/11/2005	2	0.0395	[0, 0.078538]	FALSE
1/24/2005	1	0.05	[0, 0.0984511]	FALSE
7/28/2004	1	0.063	[0, 0.0984511]	FALSE
1/20/2004	2	0.036	[0, 0.078538]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-17
Parameter: Boron

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/5/2000	0.066
	7/6/2000	0.05
	1/11/2001	ND<0.01
	7/27/2001	0.038
	7/27/2001	0.068
	7/17/2002	0.098
	7/17/2002	0.068
	1/20/2003	0.05
	7/9/2003	0.071
	7/9/2003	0.103
	1/20/2004	0.089
	1/20/2004	0.089
	7/26/2004	0.11
	1/24/2005	0.073
	7/8/2005	0.069
	7/8/2005	0.084

From 16 baseline samples
Baseline mean = 0.071
Baseline std Dev = 0.0256047

For 4 recent sampling event(s)
95% confidence t = 2.48988 at 15 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/8/2005	2	0.0765	[0, 0.118814]	FALSE
1/24/2005	1	0.073	[0, 0.136715]	FALSE
7/26/2004	1	0.11	[0, 0.136715]	FALSE
1/20/2004	2	0.089	[0, 0.118814]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-18
Parameter: Boron
Original Data (Not Transformed)
Aitchison's Adjustment

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/5/2000	ND<0.05
	7/6/2000	ND<0.05
	1/10/2001	0.034
	7/27/2001	0.01
	7/27/2001	0.057
	7/18/2002	0.082
	7/18/2002	0.052
	1/14/2003	ND<0.01
	7/9/2003	0.023
	7/9/2003	0.057
	1/20/2004	0.053
	1/20/2004	0.053
	7/28/2004	0.074
	1/24/2005	ND<0.05
	7/7/2005	ND<0.05
	7/7/2005	0.036

From 16 baseline samples
Baseline mean = 0.0331875
Baseline std Dev = 0.0288426

For 4 recent sampling event(s)
95% confidence t = 2.48988 at 15 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/7/2005	2	0.043	[0, 0.0870484]	FALSE
1/24/2005	1	0.05	[0, 0.107212]	FALSE
7/28/2004	1	0.074	[0, 0.107212]	FALSE
1/20/2004	2	0.053	[0, 0.0870484]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-19
Parameter: Boron
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/5/2000	0.061
	7/6/2000	ND<0.05
	1/15/2001	0.073
	7/26/2001	0.062
	1/15/2002	0.045
	7/18/2002	0.093
	1/15/2003	0.093
	7/10/2003	0.102
	1/21/2004	0.16
	7/29/2004	0.14
	1/20/2005	0.14
	7/12/2005	0.16

From 12 baseline samples
Baseline mean = 0.09825
Baseline std Dev = 0.0423022

For 4 recent sampling event(s)
95% confidence t = 2.5931 at 11 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/12/2005	1	0.16	[0, 0.212423]	FALSE
1/20/2005	1	0.14	[0, 0.212423]	FALSE
7/29/2004	1	0.14	[0, 0.212423]	FALSE
1/21/2004	1	0.16	[0, 0.212423]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-20/R
Parameter: Boron

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/5/2000	ND<-3.68888
	7/6/2000	ND<-3.68888
	1/12/2001	ND<-5.29832
	7/25/2001	-4.01738
	1/16/2002	-4.19971
	7/16/2002	-3.86323
	1/16/2003	ND<-5.29832
	7/8/2003	-2.22562
	1/20/2004	-3.54046
	7/30/2004	-3.27017
	1/25/2005	ND<-3.68888
	7/7/2005	ND<-4.60517

From 12 baseline samples
Baseline mean = -3.94875
Baseline std Dev = 0.849999

For 4 recent sampling event(s)
95% confidence t = 2.5931 at 11 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/7/2005	1	-4.60517	[0, -1.65462]	FALSE
1/25/2005	1	-3.68888	[0, -1.65462]	FALSE
7/30/2004	1	-3.27017	[0, -1.65462]	FALSE
1/20/2004	1	-3.54046	[0, -1.65462]	FALSE

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0.1911646845

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-21SR
Parameter: Boron

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/12/2001	0.054
	7/25/2001	0.074
	1/16/2002	0.028
	7/16/2002	ND<0.01
	1/15/2003	0.044
	7/8/2003	0.124
	7/30/2004	0.12
	1/25/2005	0.169
	7/7/2005	0.13

From 9 baseline samples
Baseline mean = 0.0836667
Baseline std Dev = 0.0541387

For 4 recent sampling event(s)
95% confidence t = 2.75153 at 8 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/7/2005	1	0.13	[0, 0.240689]	FALSE
1/25/2005	1	0.169	[0, 0.240689]	FALSE
7/30/2004	1	0.12	[0, 0.240689]	FALSE
7/8/2003	1	0.124	[0, 0.240689]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-22D/R
Parameter: Boron
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/16/2001	0.043
	7/25/2001	0.082
	1/16/2002	0.042
	7/16/2002	0.014
	1/15/2003	0.028
	7/8/2003	0.14
	1/20/2004	0.073
	7/30/2004	0.096
	1/25/2005	0.079
	7/7/2005	0.077

From 10 baseline samples
Baseline mean = 0.0674
Baseline std Dev = 0.0368245

For 4 recent sampling event(s)
95% confidence t = 2.68501 at 9 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/7/2005	1	0.077	[0, 0.1711]	FALSE
1/25/2005	1	0.079	[0, 0.1711]	FALSE
7/30/2004	1	0.096	[0, 0.1711]	FALSE
1/20/2004	1	0.073	[0, 0.1711]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-23S/R
Parameter: Boron
Original Data (Not Transformed)
Aitchison's Adjustment

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	7/6/2000	ND<0.05
	1/12/2001	0.101
	7/25/2001	0.048
	1/16/2002	0.013
	7/16/2002	ND<0.01
	1/16/2003	0.042
	7/8/2003	0.096
	1/20/2004	0.057
	7/30/2004	0.062
	1/25/2005	0.059
	7/7/2005	0.072

From 11 baseline samples
Baseline mean = 0.05
Baseline std Dev = 0.0345138

For 4 recent sampling event(s)
95% confidence t = 2.63377 at 10 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/7/2005	1	0.072	[0, 0.144943]	FALSE
1/25/2005	1	0.059	[0, 0.144943]	FALSE
7/30/2004	1	0.062	[0, 0.144943]	FALSE
1/20/2004	1	0.057	[0, 0.144943]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-24D/R
Parameter: Boron

Original Data (Not Transformed)
Aitchison's Adjustment

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/5/2000	ND<0.05
	7/6/2000	ND<0.05
	1/12/2001	0.11
	7/25/2001	0.049
	1/16/2002	0.032
	7/16/2002	0.103
	1/16/2003	0.042
	7/8/2003	0.11
	1/20/2004	0.1
	7/30/2004	0.17
	1/25/2005	0.24
	7/7/2005	0.22

From 12 baseline samples
Baseline mean = 0.098
Baseline std Dev = 0.0795727

For 4 recent sampling event(s)
95% confidence t = 2.5931 at 11 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/7/2005	1	0.22	[0, 0.312765]	FALSE
1/25/2005	1	0.24	[0, 0.312765]	FALSE
7/30/2004	1	0.17	[0, 0.312765]	FALSE
1/20/2004	1	0.1	[0, 0.312765]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-25
Parameter: Boron
Original Data (Not Transformed)
Aitchison's Adjustment

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/5/2000	ND<0.05
	7/6/2000	ND<0.05
	1/15/2001	0.018
	7/26/2001	0.035
	1/17/2002	ND<0.01
	7/17/2002	0.02
	1/20/2003	ND<0.01
	7/9/2003	0.037
	7/9/2003	0.048
	1/22/2004	0.045
	7/26/2004	0.07
	1/24/2005	ND<0.05
	1/24/2005	ND<0.05
	7/11/2005	ND<0.05
	7/11/2005	0.036

From 15 baseline samples
Baseline mean = 0.0206
Baseline std Dev = 0.0231109

For 4 recent sampling event(s)
95% confidence t = 2.50957 at 14 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/11/2005	2	0.043	[0, 0.0642596]	FALSE
1/24/2005	2	0.05	[0, 0.0642596]	FALSE
7/26/2004	1	0.07	[0, 0.0805005]	FALSE
1/22/2004	1	0.045	[0, 0.0805005]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-40
Parameter: Boron
Original Data (Not Transformed)
Aitchison's Adjustment

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/5/2000	ND<0.05
	7/6/2000	ND<0.05
	1/15/2001	0.041
	7/25/2001	0.036
	1/16/2002	0.016
	7/18/2002	0.026
	1/15/2003	ND<0.01
	7/8/2003	0.061
	1/21/2004	0.032
	7/29/2004	0.059
	1/20/2005	ND<0.05
	7/12/2005	0.023

From 12 baseline samples
Baseline mean = 0.0245
Baseline std Dev = 0.0222813

For 4 recent sampling event(s)
95% confidence t = 2.5931 at 11 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/12/2005	1	0.023	[0, 0.0846367]	FALSE
1/20/2005	1	0.05	[0, 0.0846367]	FALSE
7/29/2004	1	0.059	[0, 0.0846367]	FALSE
1/21/2004	1	0.032	[0, 0.0846367]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-41
Parameter: Boron
Original Data (Not Transformed)
Aitchison's Adjustment

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/5/2000	ND<0.05
	7/6/2000	ND<0.05
	1/16/2001	0.04
	7/26/2001	0.039
	1/17/2002	0.024
	7/17/2002	0.025
	1/20/2003	ND<0.01
	7/9/2003	0.06
	7/9/2003	0.051
	1/22/2004	0.054
	7/26/2004	0.08
	1/20/2005	ND<0.05
	1/20/2005	ND<0.05
	7/11/2005	ND<0.05
	7/11/2005	0.036

From 15 baseline samples
Baseline mean = 0.0272667
Baseline std Dev = 0.0267033

For 4 recent sampling event(s)
95% confidence t = 2.50957 at 14 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/11/2005	2	0.043	[0, 0.0777128]	FALSE
1/20/2005	2	0.05	[0, 0.0777128]	FALSE
7/26/2004	1	0.08	[0, 0.0964782]	FALSE
1/22/2004	1	0.054	[0, 0.0964782]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-43D
Parameter: Boron
Original Data (Not Transformed)
Aitchison's Adjustment

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/5/2000	ND<0.05
	7/6/2000	ND<0.05
	1/10/2001	0.03
	7/27/2001	0.01
	1/16/2002	ND<0.01
	7/17/2002	0.016
	1/17/2003	ND<0.01
	7/8/2003	0.053
	1/21/2004	0.028
	7/29/2004	0.057
	1/25/2005	ND<0.05
	7/11/2005	0.032

From 12 baseline samples
Baseline mean = 0.0188333
Baseline std Dev = 0.0210317

For 4 recent sampling event(s)
95% confidence t = 2.5931 at 11 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/11/2005	1	0.032	[0, 0.0755975]	FALSE
1/25/2005	1	0.05	[0, 0.0755975]	FALSE
7/29/2004	1	0.057	[0, 0.0755975]	FALSE
1/21/2004	1	0.028	[0, 0.0755975]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-43S
Parameter: Boron
Original Data (Not Transformed)
Aitchison's Adjustment

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/5/2000	ND<0.05
	7/6/2000	ND<0.05
	1/15/2001	0.039
	7/25/2001	0.06
	1/16/2002	0.011
	7/17/2002	0.017
	1/17/2003	ND<0.01
	7/8/2003	0.054
	1/21/2004	0.037
	7/29/2004	0.053
	1/20/2005	ND<0.05
	7/11/2005	0.036

From 12 baseline samples
Baseline mean = 0.0255833
Baseline std Dev = 0.0234848

For 4 recent sampling event(s)
95% confidence t = 2.5931 at 11 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/11/2005	1	0.036	[0, 0.0889685]	FALSE
1/20/2005	1	0.05	[0, 0.0889685]	FALSE
7/29/2004	1	0.053	[0, 0.0889685]	FALSE
1/21/2004	1	0.037	[0, 0.0889685]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-44
Parameter: Boron
Original Data (Not Transformed)
Aitchison's Adjustment

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/5/2000	ND<0.05
	7/6/2000	ND<0.05
	1/15/2001	0.044
	7/25/2001	0.029
	1/16/2002	ND<0.01
	7/18/2002	0.02
	1/15/2003	ND<0.01
	7/8/2003	0.05
	1/21/2004	0.027
	7/29/2004	0.057
	1/20/2005	ND<0.05
	7/12/2005	0.045

From 12 baseline samples
Baseline mean = 0.0226667
Baseline std Dev = 0.0223905

For 4 recent sampling event(s)
95% confidence t = 2.5931 at 11 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/12/2005	1	0.045	[0, 0.0830981]	FALSE
1/20/2005	1	0.05	[0, 0.0830981]	FALSE
7/29/2004	1	0.057	[0, 0.0830981]	FALSE
1/21/2004	1	0.027	[0, 0.0830981]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-45
Parameter: Boron
Original Data (Not Transformed)
Aitchison's Adjustment

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/5/2000	ND<0.05
	7/6/2000	ND<0.05
	1/15/2001	0.036
	7/25/2001	0.041
	1/16/2002	ND<0.01
	1/17/2003	ND<0.01
	7/9/2003	0.052
	1/20/2004	0.021
	1/20/2004	0.021
	7/29/2004	0.055
	1/25/2005	ND<0.05
	7/12/2005	ND<0.02

From 12 baseline samples
Baseline mean = 0.0188333
Baseline std Dev = 0.0220158

For 4 recent sampling event(s)
95% confidence t = 2.5931 at 11 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/12/2005	1	0.02	[0, 0.0782536]	FALSE
1/25/2005	1	0.05	[0, 0.0782536]	FALSE
7/29/2004	1	0.055	[0, 0.0782536]	FALSE
1/20/2004	2	0.021	[0, 0.0624359]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-14S/R
Parameter: Cadmium
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/5/2000	-5.87814
	7/6/2000	ND<-9.21034
	1/15/2001	-7.16912
	7/26/2001	-7.54263
	1/17/2002	-7.62111
	1/17/2003	ND<-9.21034
	7/9/2003	ND<-9.21034
	1/22/2004	-7.90201
	7/29/2004	-6.81245
	7/11/2005	-8.51719

From 10 baseline samples
Baseline mean = -7.90737
Baseline std Dev = 1.13244

For 4 recent sampling event(s)
95% confidence t = 2.68501 at 9 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/11/2005	1	-8.51719	[0, -4.71835]	FALSE
7/29/2004	1	-6.81245	[0, -4.71835]	FALSE
1/22/2004	1	-7.90201	[0, -4.71835]	FALSE
7/9/2003	1	-9.21034	[0, -4.71835]	FALSE

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0.008939607

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-21SR
Parameter: Cadmium

Original Data (Not Transformed)
Aitchison's Adjustment

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/12/2001	0.0021
	7/25/2001	0.0015
	1/16/2002	ND<0.0002
	7/16/2002	0.00149
	1/15/2003	0.00099
	7/8/2003	0.000759
	7/30/2004	ND<0.0002
	1/25/2005	0.00065
	7/7/2005	0.0014

From 9 baseline samples
Baseline mean = 0.000987667
Baseline std Dev = 0.000710582

For 4 recent sampling event(s)
95% confidence t = 2.75153 at 8 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/7/2005	1	0.0014	[0, 0.00304862]	FALSE
1/25/2005	1	0.00065	[0, 0.00304862]	FALSE
7/30/2004	1	0.0002	[0, 0.00304862]	FALSE
7/8/2003	1	0.000759	[0, 0.00304862]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-22D/R
Parameter: Cadmium

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/16/2001	-7.29342
	7/25/2001	-6.60765
	1/16/2002	-8.01642
	7/16/2002	-7.33854
	1/15/2003	ND<-9.21034
	7/8/2003	-7.95188
	1/20/2004	ND<-9.21034
	7/30/2004	ND<-9.21034
	7/7/2005	ND<-9.21034

From 9 baseline samples
Baseline mean = -8.2277
Baseline std Dev = 1.0168

For 4 recent sampling event(s)
95% confidence t = 2.75153 at 8 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/7/2005	1	-9.21034	[0, -5.27859]	FALSE
7/30/2004	1	-9.21034	[0, -5.27859]	FALSE
1/20/2004	1	-9.21034	[0, -5.27859]	FALSE
7/8/2003	1	-7.95188	[0, -5.27859]	FALSE

0.005099662

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-23S/R
Parameter: Cadmium
Original Data (Not Transformed)
Aitchison's Adjustment

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	7/6/2000	ND<0.0002
	7/25/2001	0.00143
	1/16/2002	0.000815
	7/16/2002	0.00106
	1/16/2003	0.00079
	7/8/2003	ND<0.0002
	1/20/2004	0.00055
	7/30/2004	ND<0.0002
	1/25/2005	0.00065
	7/7/2005	0.00039

From 10 baseline samples
Baseline mean = 0.0005685
Baseline std Dev = 0.000483276

For 4 recent sampling event(s)
95% confidence t = 2.68501 at 9 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/7/2005	1	0.00039	[0, 0.00192944]	FALSE
1/25/2005	1	0.00065	[0, 0.00192944]	FALSE
7/30/2004	1	0.0002	[0, 0.00192944]	FALSE
1/20/2004	1	0.00055	[0, 0.00192944]	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-09/R
Parameter: Cadmium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 54.8387%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 31
Maximum Baseline Concentration = 0.0011
Confidence Level = 88.6%
False Positive Rate = 11.4%

Baseline Measurements	Date	Value
	6/7/1995	0.0006
	9/8/1995	0.0003
	10/23/1995	ND<0.0002
	11/27/1995	ND<0.0002
	1/22/1996	0.0002
	3/6/1996	0.0002
	4/24/1996	0.0005
	6/4/1996	0.0004
	7/15/1996	0.0002
	9/1/1996	0.0011
	12/1/1996	ND<0.0002
	1/1/1997	ND<0.0002
	7/1/1997	0.0007
	1/5/1998	ND<0.0002
	7/1/1998	ND<0.0002
	1/5/1999	ND<0.0002
	7/6/1999	ND<0.0002
	1/5/2000	ND<0.0002
	7/6/2000	ND<0.0002
	1/16/2001	0.00103
	7/26/2001	0.00084
	7/18/2002	ND<0.0002
	1/17/2003	0.00056
	7/9/2003	ND<0.0002
	7/9/2003	ND<0.0002
	1/21/2004	ND<0.0002
	7/27/2004	0.00033
	1/20/2005	0.00039
	1/20/2005	ND<0.0002
	7/8/2005	ND<0.0002
	7/8/2005	ND<0.0002

Date	Count	Mean	Significant
7/8/2005	2	0.0002	FALSE
1/20/2005	2	0.000295	FALSE
7/27/2004	1	0.00033	FALSE
1/21/2004	1	0.0002	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-14D/R
Parameter: Cadmium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 63.6364%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 11
Maximum Baseline Concentration = 0.00057
Confidence Level = 73.3%
False Positive Rate = 26.7%

Baseline Measurements	Date	Value
	1/5/2000	ND<0.0002
	7/6/2000	ND<0.0002
	1/15/2001	0.0004
	7/26/2001	0.00023
	1/17/2002	0.00057
	7/17/2002	ND<0.0002
	1/17/2003	ND<0.0002
	7/9/2003	ND<0.0002
	1/22/2004	0.00022
	7/29/2004	ND<0.0002
	7/11/2005	ND<0.0002

Date	Count	Mean	Significant
7/11/2005	1	0.0002	FALSE
7/29/2004	1	0.0002	FALSE
1/22/2004	1	0.00022	FALSE
7/9/2003	1	0.0002	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-16
Parameter: Cadmium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 83.871%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 31
Maximum Baseline Concentration = 0.001
Confidence Level = 88.6%
False Positive Rate = 11.4%

Baseline Measurements	Date	Value
	6/7/1995	ND<0.0002
	9/8/1995	ND<0.0002
	10/23/1995	ND<0.0002
	11/27/1995	ND<0.0002
	1/22/1996	ND<0.0002
	3/6/1996	ND<0.0002
	4/24/1996	ND<0.0002
	6/4/1996	ND<0.0002
	7/15/1996	ND<0.0002
	9/1/1996	ND<0.0002
	12/1/1996	ND<0.0002
	7/1/1997	ND<0.0002
	7/1/1998	ND<0.0002
	7/6/1999	ND<0.0002
	1/5/2000	ND<0.0002
	7/6/2000	ND<0.0002
	1/11/2001	ND<0.0002
	7/27/2001	0.0006
	7/27/2001	ND<0.0002
	7/18/2002	0.00024
	7/18/2002	ND<0.0002
	1/20/2003	0.00046
	7/10/2003	0.001
	7/10/2003	ND<0.0002
	7/10/2003	ND<0.0002
	1/20/2004	ND<0.0002
	1/20/2004	ND<0.0002
	7/28/2004	ND<0.0002
	1/24/2005	0.00025
	7/11/2005	ND<0.0002
	7/11/2005	ND<0.0002

Date	Count	Mean	Significant
7/11/2005	2	0.0002	FALSE
1/24/2005	1	0.00025	FALSE
7/28/2004	1	0.0002	FALSE
1/20/2004	2	0.0002	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-17
Parameter: Cadmium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 78.5714%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 28
Maximum Baseline Concentration = 0.00121
Confidence Level = 87.5%
False Positive Rate = 12.5%

Baseline Measurements	Date	Value
	6/7/1995	ND<0.0002
	9/8/1995	ND<0.0002
	10/23/1995	ND<0.0002
	11/27/1995	ND<0.0002
	1/22/1996	ND<0.0002
	3/6/1996	ND<0.0002
	4/24/1996	ND<0.0002
	6/4/1996	ND<0.0002
	7/15/1996	ND<0.0002
	9/1/1996	ND<0.0002
	12/1/1996	ND<0.0002
	7/1/1997	ND<0.0002
	7/1/1998	ND<0.0002
	7/6/1999	ND<0.0002
	1/5/2000	ND<0.0002
	7/6/2000	ND<0.0002
	1/11/2001	ND<0.0002
	7/27/2001	0.00121
	7/27/2001	ND<0.0002
	7/17/2002	0.00038
	1/20/2003	0.00065
	7/9/2003	ND<0.0002
	7/9/2003	ND<0.0002
	1/20/2004	0.00033
	1/20/2004	0.00033
	7/26/2004	0.00029
	1/24/2005	ND<0.0002
	7/8/2005	ND<0.0002

Date	Count	Mean	Significant
7/8/2005	2	0.0002	FALSE
1/24/2005	1	0.0002	FALSE
7/26/2004	1	0.00029	FALSE
1/20/2004	2	0.00033	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-18
Parameter: Cadmium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 80%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 30
Maximum Baseline Concentration = 0.00099
Confidence Level = 88.2%
False Positive Rate = 11.8%

Baseline Measurements	Date	Value
	6/7/1995	ND<0.0002
	9/8/1995	ND<0.0002
	10/23/1995	ND<0.0002
	11/27/1995	ND<0.0002
	1/22/1996	ND<0.0002
	3/6/1996	ND<0.0002
	4/24/1996	ND<0.0002
	6/4/1996	ND<0.0002
	7/15/1996	ND<0.0002
	9/1/1996	ND<0.0002
	12/1/1996	ND<0.0002
	7/1/1997	ND<0.0002
	7/1/1998	ND<0.0002
	7/6/1999	ND<0.0002
	1/5/2000	ND<0.0002
	7/6/2000	ND<0.0002
	1/10/2001	ND<0.0002
	7/27/2001	ND<0.0002
	7/27/2001	ND<0.0002
	7/18/2002	0.0008
	7/18/2002	ND<0.0002
	1/14/2003	0.00099
	7/9/2003	0.000262
	7/9/2003	ND<0.0002
	1/20/2004	0.00051
	1/20/2004	0.00051
	7/28/2004	0.00082
	1/24/2005	ND<0.0002
	7/7/2005	ND<0.0002
	7/7/2005	ND<0.0002

Date	Count	Mean	Significant
7/7/2005	2	0.0002	FALSE
1/24/2005	1	0.0002	FALSE
7/28/2004	1	0.00082	FALSE
1/20/2004	2	0.00051	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-19
Parameter: Cadmium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 83.3333%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 12
Maximum Baseline Concentration = 0.00033
Confidence Level = 75%
False Positive Rate = 25%

Baseline Measurements	Date	Value
	1/5/2000	ND<0.0002
	7/6/2000	ND<0.0002
	1/15/2001	0.0003
	7/26/2001	0.00033
	1/15/2002	ND<0.0002
	7/18/2002	ND<0.0002
	1/15/2003	ND<0.0002
	7/10/2003	ND<0.0002
	1/21/2004	ND<0.0002
	7/29/2004	ND<0.0002
	1/20/2005	ND<0.0002
	7/12/2005	ND<0.0002

Date	Count	Mean	Significant
7/12/2005	1	0.0002	FALSE
1/20/2005	1	0.0002	FALSE
7/29/2004	1	0.0002	FALSE
1/21/2004	1	0.0002	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-20/R
Parameter: Cadmium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 75%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 20
Maximum Baseline Concentration = 0.00086
Confidence Level = 83.3%
False Positive Rate = 16.7%

Baseline Measurements	Date	Value
	11/27/1995	ND<0.0002
	6/4/1996	ND<0.0002
	12/1/1996	ND<0.0002
	1/1/1997	ND<0.0002
	7/1/1997	ND<0.0002
	1/5/1998	ND<0.0002
	7/1/1998	ND<0.0002
	1/5/1999	ND<0.0002
	7/6/1999	ND<0.0002
	1/5/2000	ND<0.0002
	7/6/2000	ND<0.0002
	7/25/2001	0.00075
	1/16/2002	0.00049
	7/16/2002	0.00061
	1/16/2003	ND<0.0002
	7/8/2003	ND<0.0002
	1/20/2004	0.00086
	7/30/2004	0.00022
	1/25/2005	ND<0.0002
	7/7/2005	ND<0.0002

Date	Count	Mean	Significant
7/7/2005	1	0.0002	FALSE
1/25/2005	1	0.0002	FALSE
7/30/2004	1	0.00022	FALSE
1/20/2004	1	0.00086	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-24D/R
Parameter: Cadmium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 63.6364%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 11
Maximum Baseline Concentration = 0.00105
Confidence Level = 73.3%
False Positive Rate = 26.7%

Baseline Measurements	Date	Value
	1/5/2000	ND<0.0002
	7/6/2000	0.0002
	7/25/2001	0.00105
	1/16/2002	0.00086
	7/16/2002	ND<0.0002
	1/16/2003	ND<0.0002
	7/8/2003	ND<0.0002
	1/20/2004	0.00047
	7/30/2004	ND<0.0002
	1/25/2005	ND<0.0002
	7/7/2005	ND<0.0002

Date	Count	Mean	Significant
7/7/2005	1	0.0002	FALSE
1/25/2005	1	0.0002	FALSE
7/30/2004	1	0.0002	FALSE
1/20/2004	1	0.00047	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-25
Parameter: Cadmium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 78.125%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 32
Maximum Baseline Concentration = 0.00291
Confidence Level = 88.9%
False Positive Rate = 11.1%

Baseline Measurements	Date	Value
	6/7/1995	ND<0.0002
	9/8/1995	ND<0.0002
	10/23/1995	ND<0.0002
	11/27/1995	ND<0.0002
	1/22/1996	ND<0.0002
	3/6/1996	ND<0.0002
	4/24/1996	ND<0.0002
	6/4/1996	ND<0.0002
	7/15/1996	ND<0.0002
	9/1/1996	ND<0.0002
	12/1/1996	ND<0.0002
	1/1/1997	ND<0.0002
	7/1/1997	ND<0.0002
	1/5/1998	ND<0.0002
	7/1/1998	ND<0.0002
	1/5/1999	ND<0.0002
	7/6/1999	ND<0.0002
	1/5/2000	ND<0.0002
	7/6/2000	ND<0.0002
	1/15/2001	0.00291
	7/26/2001	0.00181
	1/17/2002	ND<0.0002
	7/17/2002	0.00051
	1/20/2003	ND<0.0002
	7/9/2003	0.000801
	7/9/2003	0.000942
	1/22/2004	0.00026
	7/26/2004	0.0009
	1/24/2005	ND<0.0002
	1/24/2005	ND<0.0002
	7/11/2005	ND<0.0002
	7/11/2005	ND<0.0002

Date	Count	Mean	Significant
7/11/2005	2	0.0002	FALSE
1/24/2005	2	0.0002	FALSE
7/26/2004	1	0.0009	FALSE
1/22/2004	1	0.00026	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-40
Parameter: Cadmium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 47.619%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 21
Maximum Baseline Concentration = 0.00215
Confidence Level = 84%
False Positive Rate = 16%

Baseline Measurements	Date	Value
	11/27/1995	ND<0.0002
	6/4/1996	ND<0.0002
	12/1/1996	0.0003
	1/1/1997	ND<0.0002
	7/1/1997	ND<0.0002
	1/5/1998	ND<0.0002
	7/1/1998	ND<0.0002
	1/5/1999	ND<0.0002
	7/6/1999	ND<0.0002
	1/5/2000	ND<0.0002
	7/6/2000	ND<0.0002
	1/15/2001	0.00215
	7/25/2001	0.00185
	1/16/2002	0.0003
	7/18/2002	0.00035
	1/15/2003	0.00075
	7/8/2003	0.000373
	1/21/2004	0.00035
	7/29/2004	0.00027
	1/20/2005	0.00022
	7/12/2005	0.00023

Date	Count	Mean	Significant
7/12/2005	1	0.00023	FALSE
1/20/2005	1	0.00022	FALSE
7/29/2004	1	0.00027	FALSE
1/21/2004	1	0.00035	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-41
Parameter: Cadmium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 87.5%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 32
Maximum Baseline Concentration = 0.00376
Confidence Level = 88.9%
False Positive Rate = 11.1%

Baseline Measurements	Date	Value
	6/7/1995	ND<0.0002
	9/8/1995	ND<0.0002
	10/23/1995	ND<0.0002
	11/27/1995	ND<0.0002
	1/22/1996	ND<0.0002
	3/6/1996	ND<0.0002
	4/24/1996	ND<0.0002
	6/4/1996	ND<0.0002
	7/15/1996	ND<0.0002
	9/1/1996	ND<0.0002
	12/1/1996	ND<0.0002
	1/1/1997	ND<0.0002
	7/1/1997	ND<0.0002
	1/5/1998	ND<0.0002
	7/1/1998	ND<0.0002
	1/5/1999	ND<0.0002
	7/6/1999	ND<0.0002
	1/5/2000	ND<0.0002
	7/6/2000	ND<0.0002
	1/16/2001	0.00376
	7/26/2001	0.00147
	1/17/2002	0.00112
	7/17/2002	0.00032
	1/20/2003	ND<0.0002
	7/9/2003	ND<0.0002
	7/9/2003	ND<0.0002
	1/22/2004	ND<0.0002
	7/26/2004	ND<0.0002
	1/20/2005	ND<0.0002
	1/20/2005	ND<0.0002
	7/11/2005	ND<0.0002
	7/11/2005	ND<0.0002

Date	Count	Mean	Significant
7/11/2005	2	0.0002	FALSE
1/20/2005	2	0.0002	FALSE
7/26/2004	1	0.0002	FALSE
1/22/2004	1	0.0002	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-43D
Parameter: Cadmium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 66.6667%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 12
Maximum Baseline Concentration = 0.00126
Confidence Level = 75%
False Positive Rate = 25%

Baseline Measurements	Date	Value
	1/5/2000	ND<0.0002
	7/6/2000	ND<0.0002
	1/10/2001	ND<0.0002
	7/27/2001	0.00126
	1/16/2002	0.00022
	7/17/2002	ND<0.0002
	1/17/2003	ND<0.0002
	7/8/2003	ND<0.0002
	1/21/2004	0.00045
	7/29/2004	ND<0.0002
	1/25/2005	0.00037
	7/11/2005	ND<0.0002

Date	Count	Mean	Significant
7/11/2005	1	0.0002	FALSE
1/25/2005	1	0.00037	FALSE
7/29/2004	1	0.0002	FALSE
1/21/2004	1	0.00045	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-43S
Parameter: Cadmium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 50%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 12
Maximum Baseline Concentration = 0.00389
Confidence Level = 75%
False Positive Rate = 25%

Baseline Measurements	Date	Value
	1/5/2000	0.0002
	7/6/2000	0.0005
	1/15/2001	0.00389
	7/25/2001	0.00128
	1/16/2002	ND<0.0002
	7/17/2002	0.0002
	1/17/2003	ND<0.0002
	7/8/2003	ND<0.0002
	1/21/2004	0.00022
	7/29/2004	ND<0.0002
	1/20/2005	ND<0.0002
	7/11/2005	ND<0.0002

Date	Count	Mean	Significant
7/11/2005	1	0.0002	FALSE
1/20/2005	1	0.0002	FALSE
7/29/2004	1	0.0002	FALSE
1/21/2004	1	0.00022	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-44
Parameter: Cadmium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 60%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 15
Maximum Baseline Concentration = 0.00259
Confidence Level = 78.9%
False Positive Rate = 21.1%

Baseline Measurements	Date	Value
	7/1/1998	ND<0.0002
	1/5/1999	ND<0.0002
	7/6/1999	0.0003
	1/5/2000	ND<0.0002
	7/6/2000	0.0004
	1/15/2001	0.00259
	7/25/2001	0.00107
	1/16/2002	0.000545
	7/18/2002	ND<0.0002
	1/15/2003	ND<0.0002
	7/8/2003	ND<0.0002
	1/21/2004	ND<0.0002
	7/29/2004	ND<0.0002
	1/20/2005	ND<0.0002
	7/12/2005	0.00026

Date	Count	Mean	Significant
7/12/2005	1	0.00026	FALSE
1/20/2005	1	0.0002	FALSE
7/29/2004	1	0.0002	FALSE
1/21/2004	1	0.0002	FALSE

Non-Parametric Prediction Interval

Intra-Well Comparison for MW-45

Parameter: Cadmium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 81.8182%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 11
Maximum Baseline Concentration = 0.00116
Confidence Level = 73.3%
False Positive Rate = 26.7%

Baseline Measurements	Date	Value
	1/5/2000	ND<0.0002
	7/6/2000	ND<0.0002
	1/15/2001	0.00093
	1/16/2002	0.00116
	1/17/2003	ND<0.0002
	7/9/2003	ND<0.0002
	1/20/2004	ND<0.0002
	1/20/2004	ND<0.0002
	7/29/2004	ND<0.0002
	1/25/2005	ND<0.0002
	7/12/2005	ND<0.0002

Date	Count	Mean	Significant
7/12/2005	1	0.0002	FALSE
1/25/2005	1	0.0002	FALSE
7/29/2004	1	0.0002	FALSE
1/20/2004	2	0.0002	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-14S/R
Parameter: Chromium

Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/5/2000	ND<-7.6009
	7/6/2000	ND<-7.6009
	1/15/2001	-6.21461
	7/26/2001	-4.96185
	1/17/2002	-6.21461
	1/17/2003	ND<-7.6009
	7/9/2003	ND<-7.6009
	1/22/2004	-4.89285
	7/29/2004	-6.50229
	7/11/2005	-4.50986

From 10 baseline samples
Baseline mean = -6.36997
Baseline std Dev = 1.23609

For 4 recent sampling event(s)
95% confidence t = 2.68501 at 9 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/11/2005	1	-4.50986	[0, -2.88906]	FALSE
7/29/2004	1	-6.50229	[0, -2.88906]	FALSE
1/22/2004	1	-4.89285	[0, -2.88906]	FALSE
7/9/2003	1	-7.6009	[0, -2.88906]	FALSE

✓

0.0556284766

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-21SR
Parameter: Chromium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/12/2001	0.006
	7/25/2001	0.004
	1/16/2002	ND<0.001
	7/16/2002	0.001
	1/15/2003	0.007
	7/8/2003	0.001
	7/30/2004	0.002
	1/25/2005	0.0012
	7/7/2005	0.0059

From 9 baseline samples
Baseline mean = 0.00323333
Baseline std Dev = 0.002504

For 4 recent sampling event(s)
95% confidence t = 2.75153 at 8 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/7/2005	1	0.0059	[0, 0.0104958]	FALSE
1/25/2005	1	0.0012	[0, 0.0104958]	FALSE
7/30/2004	1	0.002	[0, 0.0104958]	FALSE
7/8/2003	1	0.001	[0, 0.0104958]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-22D/R
Parameter: Chromium

Original Data (Not Transformed)
Aitchison's Adjustment

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/16/2001	ND<0.001
	7/25/2001	0.005
	1/16/2002	ND<0.001
	7/16/2002	0.001
	1/15/2003	ND<0.001
	7/8/2003	0.002
	1/20/2004	0.0064
	7/30/2004	0.0013
	1/25/2005	ND<0.001
	7/7/2005	0.0062

From 10 baseline samples
Baseline mean = 0.00219
Baseline std Dev = 0.00264846

For 4 recent sampling event(s)
95% confidence t = 2.68501 at 9 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/7/2005	1	0.0062	[0, 0.00964823]	FALSE
1/25/2005	1	0.001	[0, 0.00964823]	FALSE
7/30/2004	1	0.0013	[0, 0.00964823]	FALSE
1/20/2004	1	0.0064	[0, 0.00964823]	FALSE

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-23S/R
Parameter: Chromium
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	7/6/2000	ND<-7.6009
	7/25/2001	-5.80914
	1/16/2002	-6.90776
	7/16/2002	ND<-7.6009
	1/16/2003	-6.90776
	7/8/2003	ND<-7.6009
	1/20/2004	-5.00565
	7/30/2004	-6.72543
	1/25/2005	-6.81245
	7/7/2005	-5.68398

From 10 baseline samples
Baseline mean = -6.66549
Baseline std Dev = 0.895627

For 4 recent sampling event(s)
95% confidence t = 2.68501 at 9 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/7/2005	1	-5.68398	[0, -4.14334]	FALSE
1/25/2005	1	-6.81245	[0, -4.14334]	FALSE
7/30/2004	1	-6.72543	[0, -4.14334]	FALSE
1/20/2004	1	-5.00565	[0, -4.14334]	FALSE

0.0158697579
✓

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-43S
Parameter: Chromium
Natural Logarithm Transformation
Non-Detects Replaced with 1/2 DL

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/5/2000	ND<-7.6009
	7/6/2000	ND<-7.6009
	1/15/2001	-6.21461
	7/25/2001	-5.80914
	1/16/2002	-6.90776
	7/17/2002	-5.80914
	1/17/2003	ND<-7.6009
	7/8/2003	ND<-7.6009
	1/21/2004	-4.91988
	7/29/2004	-6.21461
	1/20/2005	-4.60517
	7/11/2005	-5.42615

From 12 baseline samples
Baseline mean = -6.35917
Baseline std Dev = 1.0927

For 4 recent sampling event(s)
95% confidence t = 2.5931 at 11 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/11/2005	1	-5.42615	[0, -3.40999]	FALSE
1/20/2005	1	-4.60517	[0, -3.40999]	FALSE
7/29/2004	1	-6.21461	[0, -3.40999]	FALSE
1/21/2004	1	-4.91988	[0, -3.40999]	FALSE

0.6336415348

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-45
Parameter: Chromium
Original Data (Not Transformed)
Aitchison's Adjustment

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/15/2001	0.002
	7/25/2001	0.002
	1/16/2002	0.002
	1/17/2003	ND<0.001
	7/9/2003	ND<0.001
	1/20/2004	0.0045
	1/20/2004	0.0045
	7/29/2004	0.0017
	1/25/2005	0.0016
	7/12/2005	0.0038

From 12 baseline samples
Baseline mean = 0.00184167
Baseline std Dev = 0.0016973

For 4 recent sampling event(s)
95% confidence t = 2.5931 at 11 degrees of freedom

Date	Samples	Mean	Interval	Significant
7/12/2005	1	0.0038	[0, 0.00642265]	FALSE
1/25/2005	1	0.0016	[0, 0.00642265]	FALSE
7/29/2004	1	0.0017	[0, 0.00642265]	FALSE
1/20/2004	2	0.0045	[0, 0.00520319]	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-09/R
Parameter: Chromium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 75%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 32
Maximum Baseline Concentration = 0.0051
Confidence Level = 88.9%
False Positive Rate = 11.1%

Baseline Measurements	Date	Value
	6/7/1995	ND<0.001
	9/8/1995	ND<0.001
	10/23/1995	ND<0.001
	11/27/1995	ND<0.001
	1/22/1996	ND<0.001
	3/6/1996	ND<0.001
	4/24/1996	ND<0.001
	6/4/1996	ND<0.001
	7/15/1996	ND<0.001
	9/1/1996	ND<0.001
	12/1/1996	ND<0.001
	1/1/1997	ND<0.001
	7/1/1997	ND<0.001
	1/5/1998	ND<0.001
	7/1/1998	ND<0.001
	1/5/1999	ND<0.001
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/16/2001	ND<0.001
	7/26/2001	0.001
	7/18/2002	ND<0.001
	1/17/2003	0.001
	7/9/2003	ND<0.001
	7/9/2003	ND<0.001
	1/21/2004	0.0027
	7/27/2004	ND<0.001
	1/20/2005	0.0018
	1/20/2005	0.0013
	4/15/2005	ND<0.001
	4/15/2005	0.0014
	7/8/2005	0.0048
	7/8/2005	0.0051

Date	Count	Mean	Significant
7/8/2005	2	0.00495	FALSE
4/15/2005	2	0.0012	FALSE
1/20/2005	2	0.00155	FALSE
7/27/2004	1	0.001	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-14D/R
Parameter: Chromium

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 54.5455%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 11
Maximum Baseline Concentration = 0.0042
Confidence Level = 73.3%
False Positive Rate = 26.7%

Baseline Measurements	Date	Value
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/15/2001	ND<0.001
	7/26/2001	0.002
	1/17/2002	0.001
	7/17/2002	ND<0.001
	1/17/2003	ND<0.001
	7/9/2003	ND<0.001
	1/22/2004	0.0042
	7/29/2004	0.0015
	7/11/2005	0.0039

Date	Count	Mean	Significant
7/11/2005	1	0.0039	FALSE
7/29/2004	1	0.0015	FALSE
1/22/2004	1	0.0042	FALSE
7/9/2003	1	0.001	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-16
Parameter: Chromium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 70.9677%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 31
Maximum Baseline Concentration = 0.0072
Confidence Level = 88.6%
False Positive Rate = 11.4%

Baseline Measurements	Date	Value
	6/7/1995	ND<0.001
	9/8/1995	ND<0.001
	10/23/1995	0.001
	11/27/1995	ND<0.001
	1/22/1996	ND<0.001
	3/6/1996	ND<0.001
	4/24/1996	ND<0.001
	6/4/1996	ND<0.001
	7/15/1996	ND<0.001
	9/1/1996	ND<0.001
	12/1/1996	ND<0.001
	7/1/1997	ND<0.001
	7/1/1998	ND<0.001
	7/6/1999	ND<0.001
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/11/2001	ND<0.001
	7/27/2001	ND<0.001
	7/27/2001	0.005
	7/18/2002	0.007
	7/18/2002	0.001
	1/20/2003	ND<0.001
	7/10/2003	0.003
	7/10/2003	ND<0.001
	7/10/2003	ND<0.001
	1/20/2004	0.0072
	1/20/2004	0.0072
	7/28/2004	ND<0.001
	1/24/2005	ND<0.001
	7/11/2005	0.0049
	7/11/2005	0.0028

Date	Count	Mean	Significant
7/11/2005	2	0.00385	FALSE
1/24/2005	1	0.001	FALSE
7/28/2004	1	0.001	FALSE
1/20/2004	2	0.0072	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-17
Parameter: Chromium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 72.4138%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 29
Maximum Baseline Concentration = 0.0076
Confidence Level = 87.9%
False Positive Rate = 12.1%

Baseline Measurements	Date	Value
	6/7/1995	ND<0.001
	9/8/1995	ND<0.001
	10/23/1995	ND<0.001
	11/27/1995	ND<0.001
	1/22/1996	ND<0.001
	3/6/1996	ND<0.001
	4/24/1996	ND<0.001
	6/4/1996	ND<0.001
	7/15/1996	ND<0.001
	9/1/1996	ND<0.001
	12/1/1996	ND<0.001
	7/1/1997	ND<0.001
	7/1/1998	ND<0.001
	7/6/1999	ND<0.001
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/11/2001	ND<0.001
	7/27/2001	0.007
	7/27/2001	0.003
	7/17/2002	ND<0.001
	1/20/2003	ND<0.001
	7/9/2003	ND<0.001
	7/9/2003	ND<0.001
	1/20/2004	0.0061
	1/20/2004	0.0061
	7/26/2004	0.001
	1/24/2005	0.001
	7/8/2005	0.0076
	7/8/2005	0.0052

Date	Count	Mean	Significant
7/8/2005	2	0.0064	FALSE
1/24/2005	1	0.001	FALSE
7/26/2004	1	0.001	FALSE
1/20/2004	2	0.0061	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-18
Parameter: Chromium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 76.6667%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 30
Maximum Baseline Concentration = 0.007
Confidence Level = 88.2%
False Positive Rate = 11.8%

Baseline Measurements	Date	Value
	6/7/1995	ND<0.001
	9/8/1995	ND<0.001
	10/23/1995	ND<0.001
	11/27/1995	ND<0.001
	1/22/1996	ND<0.001
	3/6/1996	ND<0.001
	4/24/1996	ND<0.001
	6/4/1996	ND<0.001
	7/15/1996	ND<0.001
	9/1/1996	ND<0.001
	12/1/1996	ND<0.001
	7/1/1997	ND<0.001
	7/1/1998	ND<0.001
	7/6/1999	ND<0.001
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/10/2001	ND<0.001
	7/27/2001	ND<0.001
	7/27/2001	0.002
	7/18/2002	0.007
	7/18/2002	0.002
	1/14/2003	ND<0.001
	7/9/2003	ND<0.001
	7/9/2003	ND<0.001
	1/20/2004	0.0063
	1/20/2004	0.0063
	7/28/2004	ND<0.001
	1/24/2005	ND<0.001
	7/7/2005	0.0044
	7/7/2005	0.0053

Date	Count	Mean	Significant
7/7/2005	2	0.00485	FALSE
1/24/2005	1	0.001	FALSE
7/28/2004	1	0.001	FALSE
1/20/2004	2	0.0063	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-19
Parameter: Chromium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 58.3333%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 12
Maximum Baseline Concentration = 0.027
Confidence Level = 75%
False Positive Rate = 25%

Baseline Measurements	Date	Value
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/15/2001	ND<0.001
	7/26/2001	0.027
	1/15/2002	ND<0.001
	7/18/2002	ND<0.001
	1/15/2003	ND<0.001
	7/10/2003	ND<0.001
	1/21/2004	0.012
	7/29/2004	0.0027
	1/20/2005	0.0034
	7/12/2005	0.0065

Date	Count	Mean	Significant
7/12/2005	1	0.0065	FALSE
1/20/2005	1	0.0034	FALSE
7/29/2004	1	0.0027	FALSE
1/21/2004	1	0.012	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-20/R
Parameter: Chromium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 75%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 20
Maximum Baseline Concentration = 0.0052
Confidence Level = 83.3%
False Positive Rate = 16.7%

Baseline Measurements	Date	Value
	11/27/1995	ND<0.001
	6/4/1996	ND<0.001
	12/1/1996	ND<0.001
	1/1/1997	ND<0.001
	7/1/1997	ND<0.001
	1/5/1998	ND<0.001
	7/1/1998	ND<0.001
	1/5/1999	ND<0.001
	7/6/1999	ND<0.001
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	7/25/2001	ND<0.001
	1/16/2002	ND<0.001
	7/16/2002	0.001
	1/16/2003	ND<0.001
	7/8/2003	ND<0.001
	1/20/2004	0.0049
	7/30/2004	0.0012
	1/25/2005	0.0011
	7/7/2005	0.0052

Date	Count	Mean	Significant
7/7/2005	1	0.0052	FALSE
1/25/2005	1	0.0011	FALSE
7/30/2004	1	0.0012	FALSE
1/20/2004	1	0.0049	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-24D/R
Parameter: Chromium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 63.6364%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 11
Maximum Baseline Concentration = 0.0058
Confidence Level = 73.3%
False Positive Rate = 26.7%

Baseline Measurements	Date	Value
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	7/25/2001	ND<0.001
	1/16/2002	ND<0.001
	7/16/2002	ND<0.001
	1/16/2003	ND<0.001
	7/8/2003	ND<0.001
	1/20/2004	0.003
	7/30/2004	0.0011
	1/25/2005	0.0011
	7/7/2005	0.0058

Date	Count	Mean	Significant
7/7/2005	1	0.0058	FALSE
1/25/2005	1	0.0011	FALSE
7/30/2004	1	0.0011	FALSE
1/20/2004	1	0.003	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-25
Parameter: Chromium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 80.6452%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 31
Maximum Baseline Concentration = 0.0075
Confidence Level = 88.6%
False Positive Rate = 11.4%

Baseline Measurements	Date	Value
	6/7/1995	ND<0.001
	9/8/1995	ND<0.001
	10/23/1995	0.003
	11/27/1995	ND<0.001
	1/22/1996	ND<0.001
	3/6/1996	ND<0.001
	4/24/1996	ND<0.001
	6/4/1996	ND<0.001
	7/15/1996	ND<0.001
	9/1/1996	ND<0.001
	12/1/1996	ND<0.001
	1/1/1997	ND<0.001
	7/1/1997	ND<0.001
	1/5/1998	ND<0.001
	7/1/1998	ND<0.001
	1/5/1999	ND<0.001
	7/6/1999	ND<0.001
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/15/2001	ND<0.001
	7/26/2001	0.001
	1/17/2002	ND<0.001
	7/17/2002	ND<0.001
	7/9/2003	ND<0.001
	7/9/2003	ND<0.001
	1/22/2004	0.0054
	7/26/2004	ND<0.001
	1/24/2005	0.0013
	1/24/2005	ND<0.001
	7/11/2005	0.0075
	7/11/2005	0.0072

Date	Count	Mean	Significant
7/11/2005	2	0.00735	FALSE
1/24/2005	2	0.00115	FALSE
7/26/2004	1	0.001	FALSE
1/22/2004	1	0.0054	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-40
Parameter: Chromium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 57.1429%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 21
Maximum Baseline Concentration = 0.0092
Confidence Level = 84%
False Positive Rate = 16%

Baseline Measurements	Date	Value
	11/27/1995	ND<0.001
	6/4/1996	ND<0.001
	12/1/1996	0.001
	1/1/1997	ND<0.001
	7/1/1997	ND<0.001
	1/5/1998	ND<0.001
	7/1/1998	ND<0.001
	1/5/1999	ND<0.001
	7/6/1999	ND<0.001
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/15/2001	0.002
	7/25/2001	0.002
	1/16/2002	ND<0.001
	7/18/2002	0.001
	1/15/2003	0.002
	7/8/2003	ND<0.001
	1/21/2004	0.0092
	7/29/2004	0.0027
	1/20/2005	0.0015
	7/12/2005	0.005

Date	Count	Mean	Significant
7/12/2005	1	0.005	FALSE
1/20/2005	1	0.0015	FALSE
7/29/2004	1	0.0027	FALSE
1/21/2004	1	0.0092	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-41
Parameter: Chromium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 69.697%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 33
Maximum Baseline Concentration = 0.0074
Confidence Level = 89.2%
False Positive Rate = 10.8%

Baseline Measurements	Date	Value
	6/7/1995	0.001
	9/8/1995	ND<0.001
	10/23/1995	ND<0.001
	11/27/1995	ND<0.001
	1/22/1996	ND<0.001
	3/6/1996	ND<0.001
	4/24/1996	ND<0.001
	6/4/1996	ND<0.001
	7/15/1996	ND<0.001
	9/1/1996	ND<0.001
	12/1/1996	ND<0.001
	1/1/1997	ND<0.001
	7/1/1997	ND<0.001
	1/5/1998	ND<0.001
	7/1/1998	ND<0.001
	1/5/1999	ND<0.001
	7/6/1999	ND<0.001
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/16/2001	0.003
	1/17/2002	0.002
	7/17/2002	ND<0.001
	1/20/2003	ND<0.001
	7/9/2003	ND<0.001
	7/9/2003	ND<0.001
	1/22/2004	0.0074
	7/26/2004	0.0014
	1/20/2005	0.0026
	1/20/2005	0.0017
	4/15/2005	ND<0.001
	4/15/2005	0.0045
	7/11/2005	0.0057
	7/11/2005	0.0072

Date	Count	Mean	Significant
7/11/2005	2	0.00645	FALSE
4/15/2005	2	0.00275	FALSE
1/20/2005	2	0.00215	FALSE
7/26/2004	1	0.0014	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-43D
Parameter: Chromium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 58.3333%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 12
Maximum Baseline Concentration = 0.0073
Confidence Level = 75%
False Positive Rate = 25%

Baseline Measurements	Date	Value
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/10/2001	ND<0.001
	7/27/2001	0.002
	1/16/2002	ND<0.001
	7/17/2002	ND<0.001
	1/17/2003	ND<0.001
	7/8/2003	ND<0.001
	1/21/2004	0.0073
	7/29/2004	0.0014
	1/25/2005	0.0013
	7/11/2005	0.0027

Date	Count	Mean	Significant
7/11/2005	1	0.0027	FALSE
1/25/2005	1	0.0013	FALSE
7/29/2004	1	0.0014	FALSE
1/21/2004	1	0.0073	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-44
Parameter: Chromium
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 57.1429%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 14
Maximum Baseline Concentration = 0.0062
Confidence Level = 77.8%
False Positive Rate = 22.2%

Baseline Measurements	Date	Value
	1/5/1999	ND<0.001
	7/6/1999	ND<0.001
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/15/2001	0.001
	7/25/2001	0.003
	1/16/2002	ND<0.001
	7/18/2002	ND<0.001
	1/15/2003	ND<0.001
	7/8/2003	ND<0.001
	1/21/2004	0.0062
	7/29/2004	0.0021
	1/20/2005	0.0022
	7/12/2005	0.0043

Date	Count	Mean	Significant
7/12/2005	1	0.0043	FALSE
1/20/2005	1	0.0022	FALSE
7/29/2004	1	0.0021	FALSE
1/21/2004	1	0.0062	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-09/R
Parameter: Lead
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 90%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 30
Maximum Baseline Concentration = 0.005
Confidence Level = 88.2%
False Positive Rate = 11.8%

Baseline Measurements	Date	Value
	6/7/1995	ND<0.001
	9/8/1995	ND<0.001
	10/23/1995	ND<0.001
	11/27/1995	ND<0.001
	1/22/1996	ND<0.001
	3/6/1996	ND<0.001
	4/24/1996	ND<0.001
	6/4/1996	ND<0.001
	7/15/1996	ND<0.001
	9/1/1996	ND<0.001
	12/1/1996	ND<0.001
	1/1/1997	ND<0.001
	7/1/1997	ND<0.001
	1/5/1998	ND<0.001
	7/1/1998	ND<0.001
	1/5/1999	ND<0.001
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/16/2001	0.005
	7/26/2001	0.002
	7/18/2002	ND<0.001
	1/17/2003	0.001
	7/9/2003	ND<0.001
	7/9/2003	ND<0.001
	1/21/2004	ND<0.001
	7/27/2004	ND<0.001
	1/20/2005	ND<0.001
	1/20/2005	ND<0.001
	7/8/2005	ND<0.001
	7/8/2005	ND<0.001

Date	Count	Mean	Significant
7/8/2005	2	0.001	FALSE
1/20/2005	2	0.001	FALSE
7/27/2004	1	0.001	FALSE
1/21/2004	1	0.001	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-14S/R
Parameter: Lead
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 80%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 10
Maximum Baseline Concentration = 0.009
Confidence Level = 71.4%
False Positive Rate = 28.6%

Baseline Measurements	Date	Value
	1/5/2000	0.001
	7/6/2000	ND<0.001
	1/15/2001	0.009
	7/26/2001	ND<0.001
	1/17/2002	ND<0.001
	1/17/2003	ND<0.001
	7/9/2003	ND<0.001
	1/22/2004	ND<0.001
	7/29/2004	ND<0.001
	7/11/2005	ND<0.001

Date	Count	Mean	Significant
7/11/2005	1	0.001	FALSE
7/29/2004	1	0.001	FALSE
1/22/2004	1	0.001	FALSE
7/9/2003	1	0.001	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-17
Parameter: Lead
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 89.2857%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 28
Maximum Baseline Concentration = 0.004
Confidence Level = 87.5%
False Positive Rate = 12.5%

Baseline Measurements	Date	Value
	6/7/1995	ND<0.001
	9/8/1995	ND<0.001
	10/23/1995	ND<0.001
	11/27/1995	ND<0.001
	1/22/1996	ND<0.001
	3/6/1996	ND<0.001
	4/24/1996	ND<0.001
	6/4/1996	ND<0.001
	7/15/1996	ND<0.001
	9/1/1996	ND<0.001
	12/1/1996	ND<0.001
	7/1/1997	ND<0.001
	7/1/1998	ND<0.001
	7/6/1999	ND<0.001
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/11/2001	ND<0.001
	7/27/2001	ND<0.001
	7/17/2002	0.001
	1/20/2003	ND<0.001
	7/9/2003	0.004
	7/9/2003	ND<0.001
	1/20/2004	ND<0.001
	1/20/2004	ND<0.001
	7/26/2004	0.0016
	1/24/2005	ND<0.001
	7/8/2005	ND<0.001
	7/8/2005	ND<0.001

Date	Count	Mean	Significant
7/8/2005	2	0.001	FALSE
1/24/2005	1	0.001	FALSE
7/26/2004	1	0.0016	FALSE
1/20/2004	2	0.001	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-19
Parameter: Lead
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 58.3333%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 12
Maximum Baseline Concentration = 0.0013
Confidence Level = 75%
False Positive Rate = 25%

Baseline Measurements	Date	Value
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/15/2001	0.001
	7/26/2001	0.001
	1/15/2002	0.001
	7/18/2002	ND<0.001
	1/15/2003	ND<0.001
	7/10/2003	ND<0.001
	1/21/2004	0.0013
	7/29/2004	ND<0.001
	1/20/2005	ND<0.001
	7/12/2005	0.0011

Date	Count	Mean	Significant
7/12/2005	1	0.0011	FALSE
1/20/2005	1	0.001	FALSE
7/29/2004	1	0.001	FALSE
1/21/2004	1	0.0013	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-21SR
Parameter: Lead

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 75%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 8
Maximum Baseline Concentration = 0.001
Confidence Level = 66.7%
False Positive Rate = 33.3%

Baseline Measurements	Date	Value
	1/12/2001	0.001
	7/25/2001	ND<0.001
	1/16/2002	ND<0.001
	7/16/2002	ND<0.001
	1/15/2003	0.001
	7/30/2004	ND<0.001
	1/25/2005	ND<0.001
	7/7/2005	ND<0.001

Date	Count	Mean	Significant
7/7/2005	1	0.001	FALSE
1/25/2005	1	0.001	FALSE
7/30/2004	1	0.001	FALSE
1/15/2003	1	0.001	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-23S/R
Parameter: Lead

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 70%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 10
Maximum Baseline Concentration = 0.006
Confidence Level = 71.4%
False Positive Rate = 28.6%

Baseline Measurements	Date	Value
	7/6/2000	ND<0.001
	7/25/2001	ND<0.001
	1/16/2002	ND<0.001
	7/16/2002	ND<0.001
	1/16/2003	0.001
	7/8/2003	0.006
	1/20/2004	0.001
	7/30/2004	ND<0.001
	1/25/2005	ND<0.001
	7/7/2005	ND<0.001

Date	Count	Mean	Significant
7/7/2005	1	0.001	FALSE
1/25/2005	1	0.001	FALSE
7/30/2004	1	0.001	FALSE
1/20/2004	1	0.001	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-25
Parameter: Lead
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 87.5%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 32
Maximum Baseline Concentration = 0.004
Confidence Level = 88.9%
False Positive Rate = 11.1%

Baseline Measurements	Date	Value
	6/7/1995	ND<0.001
	9/8/1995	ND<0.001
	10/23/1995	ND<0.001
	11/27/1995	ND<0.001
	1/22/1996	ND<0.001
	3/6/1996	ND<0.001
	4/24/1996	ND<0.001
	6/4/1996	ND<0.001
	7/15/1996	ND<0.001
	9/1/1996	ND<0.001
	12/1/1996	ND<0.001
	1/1/1997	ND<0.001
	7/1/1997	ND<0.001
	1/5/1998	ND<0.001
	7/1/1998	ND<0.001
	1/5/1999	ND<0.001
	7/6/1999	ND<0.001
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/15/2001	0.004
	7/26/2001	ND<0.001
	1/17/2002	ND<0.001
	7/17/2002	ND<0.001
	1/20/2003	ND<0.001
	7/9/2003	0.004
	7/9/2003	0.003
	1/22/2004	0.0024
	7/26/2004	ND<0.001
	1/24/2005	ND<0.001
	1/24/2005	ND<0.001
	7/11/2005	ND<0.001
	7/11/2005	ND<0.001

Date	Count	Mean	Significant
7/11/2005	2	0.001	FALSE
1/24/2005	2	0.001	FALSE
7/26/2004	1	0.001	FALSE
1/22/2004	1	0.0024	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-41
Parameter: Lead
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 83.871%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 31
Maximum Baseline Concentration = 0.004
Confidence Level = 88.6%
False Positive Rate = 11.4%

Baseline Measurements	Date	Value
	6/7/1995	ND<0.001
	9/8/1995	0.004
	10/23/1995	0.004
	11/27/1995	ND<0.001
	1/22/1996	ND<0.001
	3/6/1996	0.002
	4/24/1996	0.002
	6/4/1996	ND<0.001
	7/15/1996	0.002
	9/1/1996	ND<0.001
	12/1/1996	ND<0.001
	1/1/1997	ND<0.001
	7/1/1997	ND<0.001
	1/5/1998	ND<0.001
	7/1/1998	ND<0.001
	1/5/1999	ND<0.001
	7/6/1999	ND<0.001
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	7/26/2001	ND<0.001
	1/17/2002	ND<0.001
	7/17/2002	ND<0.001
	1/20/2003	ND<0.001
	7/9/2003	ND<0.001
	7/9/2003	ND<0.001
	1/22/2004	ND<0.001
	7/26/2004	ND<0.001
	1/20/2005	ND<0.001
	1/20/2005	ND<0.001
	7/11/2005	ND<0.001
	7/11/2005	ND<0.001

Date	Count	Mean	Significant
7/11/2005	2	0.001	FALSE
1/20/2005	2	0.001	FALSE
7/26/2004	1	0.001	FALSE
1/22/2004	1	0.001	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-43S
Parameter: Lead
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 75%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 12
Maximum Baseline Concentration = 0.004
Confidence Level = 75%
False Positive Rate = 25%

Baseline Measurements	Date	Value
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/15/2001	0.001
	7/25/2001	0.001
	1/16/2002	ND<0.001
	7/17/2002	ND<0.001
	1/17/2003	ND<0.001
	7/8/2003	0.004
	1/21/2004	ND<0.001
	7/29/2004	ND<0.001
	1/20/2005	ND<0.001
	7/11/2005	ND<0.001

Date	Count	Mean	Significant
7/11/2005	1	0.001	FALSE
1/20/2005	1	0.001	FALSE
7/29/2004	1	0.001	FALSE
1/21/2004	1	0.001	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-45
Parameter: Lead
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 91.6667%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 12
Maximum Baseline Concentration = 0.001
Confidence Level = 75%
False Positive Rate = 25%

Baseline Measurements	Date	Value
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/15/2001	0.001
	7/25/2001	ND<0.001
	1/16/2002	ND<0.001
	1/17/2003	ND<0.001
	7/9/2003	ND<0.001
	1/20/2004	ND<0.001
	1/20/2004	ND<0.001
	7/29/2004	ND<0.001
	1/25/2005	ND<0.001
	7/12/2005	ND<0.001

Date	Count	Mean	Significant
7/12/2005	1	0.001	FALSE
1/25/2005	1	0.001	FALSE
7/29/2004	1	0.001	FALSE
1/20/2004	2	0.001	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-14D/R
Parameter: Lead
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 62.5%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 8
Maximum Baseline Concentration = 0.003
Confidence Level = 66.7%
False Positive Rate = 33.3%

Baseline Measurements	Date	Value
	1/5/2000	0.002
	7/6/2000	0.003
	1/15/2001	ND<0.001
	7/26/2001	ND<0.001
	1/17/2002	ND<0.001
	7/17/2002	ND<0.001
	1/17/2003	ND<0.001
	7/9/2003	0.001

Date	Count	Mean	Significant
7/11/2005	1	0.001	FALSE
7/29/2004	1	0.001	FALSE
1/22/2004	1	0.001	FALSE
7/9/2003	1	0.001	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-16
Parameter: Lead
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 100%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 8
Maximum Baseline Concentration = 0.001
Confidence Level = 66.7%
False Positive Rate = 33.3%

Baseline Measurements	Date	Value
	6/7/1995	ND<0.001
	9/8/1995	ND<0.001
	10/23/1995	ND<0.001
	11/27/1995	ND<0.001
	1/22/1996	ND<0.001
	3/6/1996	ND<0.001
	4/24/1996	ND<0.001
	6/4/1996	ND<0.001

Date	Count	Mean	Significant
7/11/2005	2	0.001	FALSE
1/24/2005	1	0.001	FALSE
7/28/2004	1	0.001	FALSE
1/20/2004	2	0.001	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-18
Parameter: Lead
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 100%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 8
Maximum Baseline Concentration = 0.001
Confidence Level = 66.7%
False Positive Rate = 33.3%

Baseline Measurements	Date	Value
	6/7/1995	ND<0.001
	9/8/1995	ND<0.001
	10/23/1995	ND<0.001
	11/27/1995	ND<0.001
	1/22/1996	ND<0.001
	3/6/1996	ND<0.001
	4/24/1996	ND<0.001
	6/4/1996	ND<0.001

Date	Count	Mean	Significant
7/7/2005	2	0.001	FALSE
1/24/2005	1	0.001	FALSE
7/28/2004	1	0.001	FALSE
1/20/2004	2	0.001	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-20/R
Parameter: Lead
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 87.5%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 8
Maximum Baseline Concentration = 0.002
Confidence Level = 66.7%
False Positive Rate = 33.3%

Baseline Measurements	Date	Value
	11/27/1995	0.002
	6/4/1996	ND<0.001
	12/1/1996	ND<0.001
	1/1/1997	ND<0.001
	7/1/1997	ND<0.001
	1/5/1998	ND<0.001
	7/1/1998	ND<0.001
	1/5/1999	ND<0.001

Date	Count	Mean	Significant
7/7/2005	1	0.001	FALSE
1/25/2005	1	0.001	FALSE
7/30/2004	1	0.001	FALSE
1/20/2004	1	0.001	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-22D/R
Parameter: Lead
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 50%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 8
Maximum Baseline Concentration = 0.003
Confidence Level = 66.7%
False Positive Rate = 33.3%

Baseline Measurements	Date	Value
	1/16/2001	0.001
	7/25/2001	0.002
	1/16/2002	ND<0.001
	7/16/2002	ND<0.001
	1/15/2003	0.001
	7/8/2003	0.003
	1/20/2004	ND<0.001
	7/30/2004	ND<0.001

Date	Count	Mean	Significant
7/7/2005	1	0.001	FALSE
1/25/2005	1	0.001	FALSE
7/30/2004	1	0.001	FALSE
1/20/2004	1	0.001	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-24D/R
Parameter: Lead
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 87.5%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 8
Maximum Baseline Concentration = 0.003
Confidence Level = 66.7%
False Positive Rate = 33.3%

Baseline Measurements	Date	Value
	7/25/2001	ND<0.001
	1/16/2002	ND<0.001
	7/16/2002	ND<0.001
	1/16/2003	ND<0.001
	7/8/2003	0.003
	1/20/2004	ND<0.001
	7/30/2004	ND<0.001
	1/25/2005	ND<0.001

Date	Count	Mean	Significant
7/7/2005	1	0.001	FALSE
1/25/2005	1	0.001	FALSE
7/30/2004	1	0.001	FALSE
1/20/2004	1	0.001	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-40
Parameter: Lead
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 87.5%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 8
Maximum Baseline Concentration = 0.001
Confidence Level = 66.7%
False Positive Rate = 33.3%

Baseline Measurements	Date	Value
	11/27/1995	0.001
	6/4/1996	ND<0.001
	12/1/1996	ND<0.001
	1/1/1997	ND<0.001
	7/1/1997	ND<0.001
	1/5/1998	ND<0.001
	7/1/1998	ND<0.001
	1/5/1999	ND<0.001

Date	Count	Mean	Significant
7/12/2005	**1**	**0.002**	**TRUE**
1/20/2005	1	0.001	FALSE
7/29/2004	1	0.001	FALSE
1/21/2004	1	0.001	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-43D
Parameter: Lead
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 87.5%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 8
Maximum Baseline Concentration = 0.001
Confidence Level = 66.7%
False Positive Rate = 33.3%

Baseline Measurements	Date	Value
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/10/2001	ND<0.001
	7/27/2001	ND<0.001
	1/16/2002	0.001
	7/17/2002	ND<0.001
	1/17/2003	ND<0.001
	7/8/2003	ND<0.001

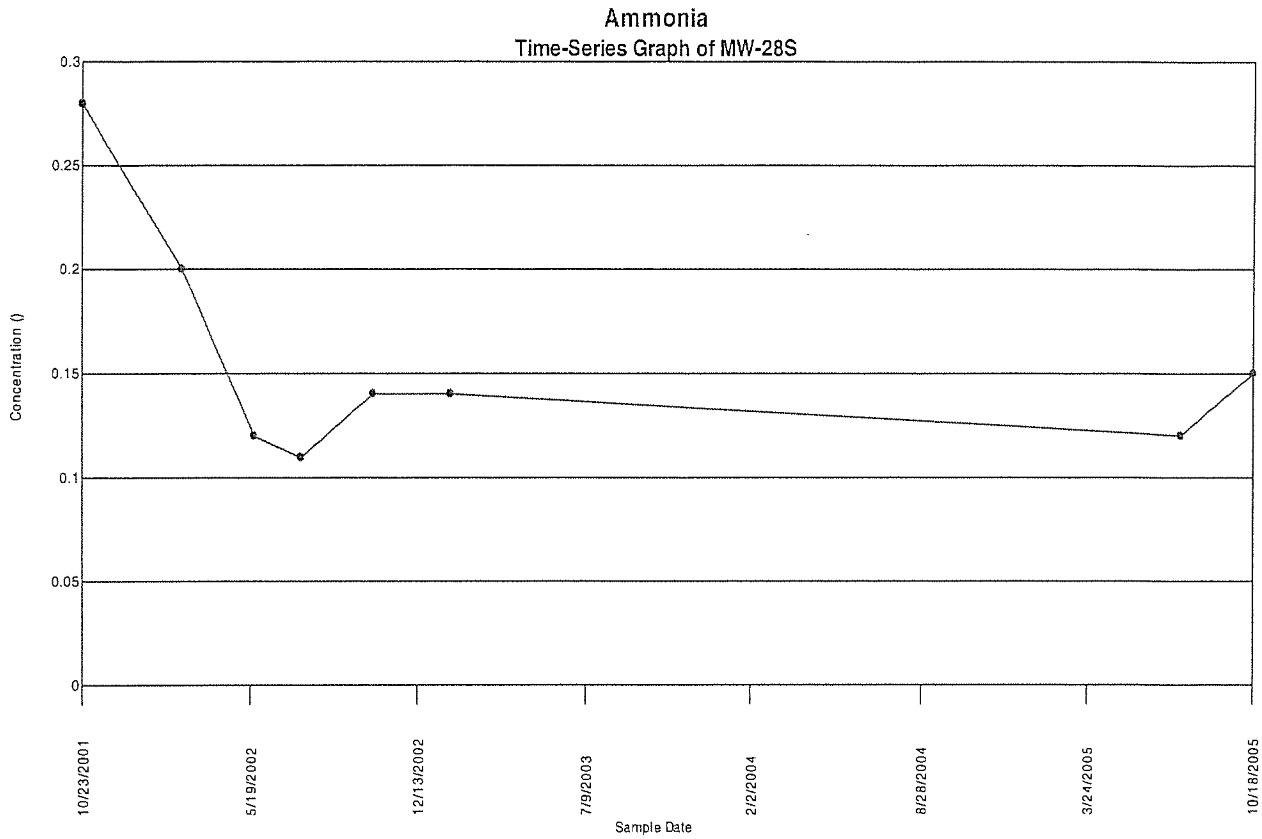
Date	Count	Mean	Significant
7/11/2005	1	0.001	FALSE
1/25/2005	1	0.001	FALSE
7/29/2004	1	0.001	FALSE
1/21/2004	1	0.001	FALSE

Non-Parametric Prediction Interval
Intra-Well Comparison for MW-44
Parameter: Lead
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Total Percent Non-Detects = 75%
Future Samples (k) = 4
Recent Dates = 4
Baseline Measurements (n) = 8
Maximum Baseline Concentration = 0.002
Confidence Level = 66.7%
False Positive Rate = 33.3%

Baseline Measurements	Date	Value
	7/1/1998	ND<0.001
	1/5/1999	ND<0.001
	7/6/1999	ND<0.001
	1/5/2000	ND<0.001
	7/6/2000	ND<0.001
	1/15/2001	0.002
	7/25/2001	0.001
	1/16/2002	ND<0.001

Date	Count	Mean	Significant
7/12/2005	1	0.001	FALSE
1/20/2005	1	0.001	FALSE
7/29/2004	1	0.001	FALSE
1/21/2004	1	0.001	FALSE



Ammonia
Time-Series Graph of MW-28S
Concentration ()
0.3
0.25
0.2
0.15
0.1
0.05
0
10/23/2001
5/19/2002
12/13/2002
7/9/2003
2/2/2004
8/28/2004
3/24/2005
10/18/2005
Sample Date

Concentrations

Parameter: Ammonia

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
Total Measurements: 16
Total Non-Detect: 1
Percent Non-Detects: 6.25%
Total Background Measurements: 16
There are 2 background locations

Loc.	Meas.	ND	Date	Conc.	Original
MW-28D	8	1 (12.5%)	10/23/2001	0.39	0.39
			2/22/2002	0.2	0.2
			5/23/2002	ND<0.01	ND<0.01
			7/23/2002	0.15	0.15
			10/21/2002	0.14	0.14
			1/23/2003	0.15	0.15
			7/18/2005	0.14	0.14
			10/18/2005	0.2	0.2
MW-28S	8	0 (0%)	10/23/2001	0.28	0.28
			2/22/2002	0.2	0.2
			5/23/2002	0.12	0.12
			7/23/2002	0.11	0.11
			10/21/2002	0.14	0.14
			1/23/2003	0.14	0.14
			7/18/2005	0.12	0.12
			10/18/2005	0.15	0.15

There are 0 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original

Skewness Coefficient

Parameter: Ammonia

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

Skewness > 1 indicates positively skewed data
Skewness < -1 indicates negatively skewed data

Background Locations

Location	Obs.	Mean	Std. Dev.	Skewness
MW-28D	8	0.1725	0.105796	0.767142
MW-28S	8	0.1575	0.0567576	**1.41264**

All Locations

Obs.	Mean	Std. Dev.	Skewness
16	0.165	0.0823812	**1.09543**

Shapiro-Wilks Test of Normality
Parameter: Ammonia
Location: MW-28S
Normality Test of Parameter Concentrations

Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit
K = 4 for 8 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	0.11	0.28	0.17	0.6052	0.102884
2	0.12	0.2	0.08	0.3164	0.025312
3	0.12	0.15	0.03	0.1743	0.005229
4	0.14	0.14	0	0.0561	0
5	0.14	0.14	0		
6	0.15	0.12	-0.03		
7	0.2	0.12	-0.08		
8	0.28	0.11	-0.17		

Sum of b values = 0.133425
Sample Standard Deviation = 0.0567576
W Statistic = 0.789456

5% Critical value of 0.818 exceeds 0.789456
Evidence of non-normality at 95% level of significance

1% Critical value of 0.749 is less than 0.789456
Data is normally distributed at 99% level of significance

Parametric Prediction Interval Analysis
Intra-Well Comparison for MW-28S
Parameter: Ammonia
Natural Logarithm Transformation
Non-Detects Replaced with Detection Limit

Intra-Well USEPA (1989/1992) Formula 95% Comparison

Baseline Samples	Date	Result
	10/23/2001	-1.27297
	2/22/2002	-1.60944
	5/23/2002	-2.12026
	7/23/2002	-2.20727
	10/21/2002	-1.96611
	1/23/2003	-1.96611
	7/18/2005	-2.12026
	10/18/2005	-1.89712

From 8 baseline samples
Baseline mean = -1.89494
Baseline std Dev = 0.311126

For 5 recent sampling event(s)
95% confidence t = 2.99795 at 7 degrees of freedom

Date	Samples	Mean	Interval	Significant
10/18/2005	1	-1.89712	[0, -0.905625]	FALSE
7/18/2005	1	-2.12026	[0, -0.905625]	FALSE
1/23/2003	1	-1.96611	[0, -0.905625]	FALSE
10/21/2002	1	-1.96611	[0, -0.905625]	FALSE
7/23/2002	1	-2.20727	[0, -0.905625]	FALSE

e ^ -0.905625 = 0.404259154

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Attachment 5

Corrective Action Information

4.0 DESCRIPTION OF SOLID WASTE MANAGEMENT UNITS (SWMUs)

This section contains file review information supplemented by results of the VSI and telephone conversations with facility representatives.

4.1 Unit Type: Type I Solid Waste Landfill

Regulatory Status: SWMU. This area is an inactive disposal area. Closure certification was submitted to MDNR by GLDC. On April 13, 1990, MDNR released GLDC from financial capability requirements for closure of the Type I Solid Waste Landfill (155). The Type I Solid Waste Landfill received hazardous waste under RCRA interim status until 1983 (11).

A. Unit Description: The Type I Solid Waste Landfill was used for solid municipal and hazardous waste disposal. The hazardous waste consisted primarily of contaminated soil (47). The landfill does not have a constructed clay liner. Instead, the natural clay deposits serve as the liner material. In addition, there is no internal construction barrier between the solid and hazardous waste portions of the landfills (59). A clay wall has been constructed around the Type I Solid Waste Landfill. In addition, a leachate collection system has been constructed on the landfill side of the clay wall around three quarters of the site (73). Figures 3 and 7 show the Type I Solid Waste Landfill. Photographs 1, 2, 3, 4, and 5 in Appendix A show the Type I Solid Waste Landfill.

B. Period of Operation: 1970 - 1986

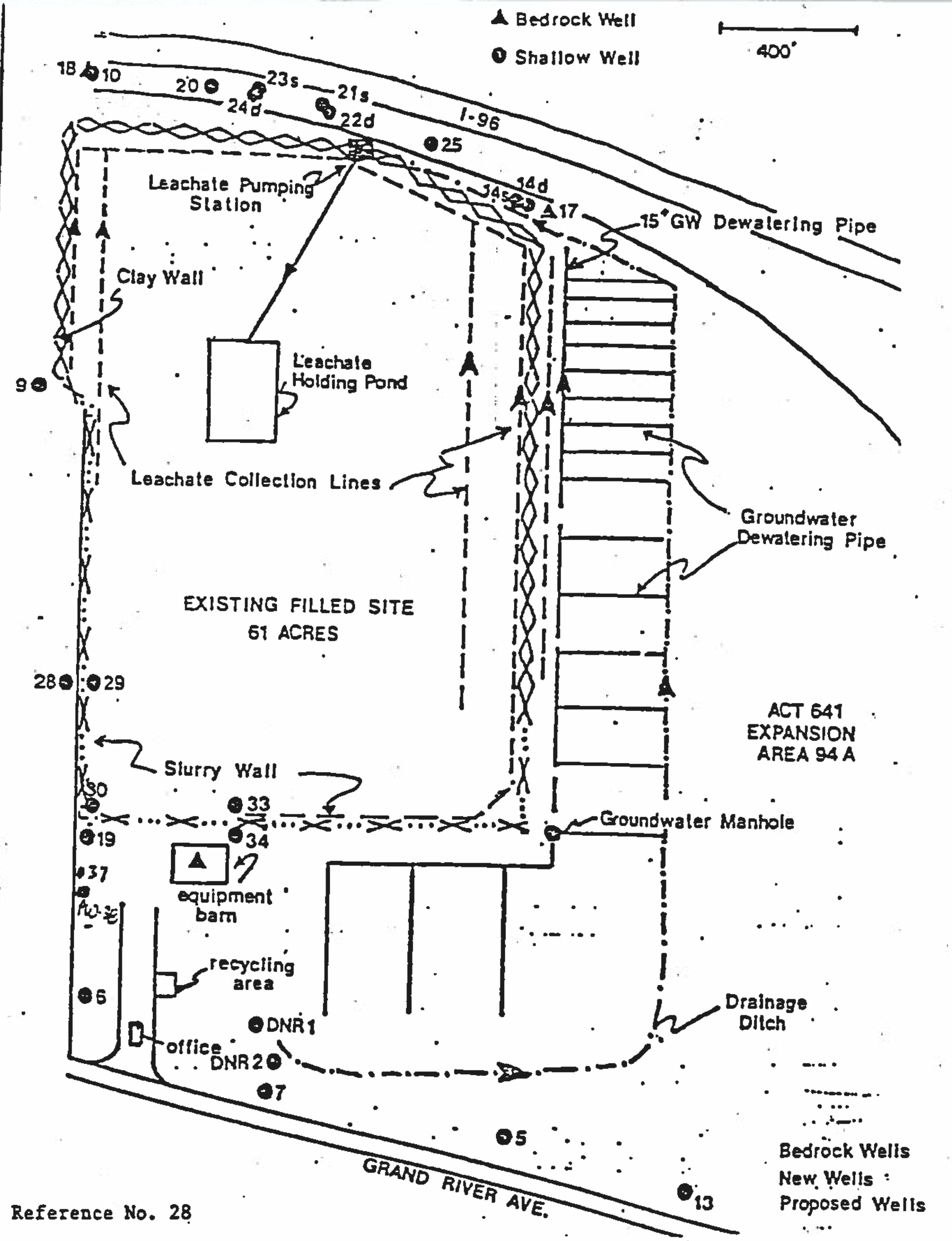
C. Waste Type: Solid waste classified as D001, D003, D005, D006, D007, D008, F006, F008, F014, F017, F018, K056, K058, K059, K079, U013, U080, U122, U154, U155, U210, U220, U226 and U228 wastes.

Waste Volume/Capacity: 61 acres (1,200,000 tons of solid municipal solid waste, 6,651 tons of RCRA hazardous waste).

Waste Constituents: Solid municipal waste and hazardous waste. The hazardous waste consisted primarily of EP Toxic wastes for heavy metals only and contaminated soil generated from spill cleanups (73). EP Toxic waste consisted of air pollution control equipment dusts and junk yard sludge. Other hazardous wastes approved for disposal included paint sludge, polyester resins, nylon production sludge, and aluminum hydroxide sludge (149).

D. Release Controls: A clay wall has been constructed around the Type I Solid Waste Landfill. In addition, a leachate collection system has been constructed on the landfill side of the clay wall around three quarters of the site (73).

E. Release History: In 1982 and 1983, an uncontrolled discharge of water containing VOCs, (maximum of 0.270 mg/L of methylene chloride) including methylene chloride, 1,1,1-trichoroethane, and 1,1-dichloroethane were discovered in the Openlander Drain and subsequently in the Looking Glass River (40). The presence of VOCs (maximum of 0.220 mg/L of trans-1,2-dichloroethene) in the groundwater, including chloroethene, 1,1-dichloroethane, 1,2-dichloroethane, 1,2-dichloropropane, trans-1,2-dichloroethene, methylene chloride, TCE, benzene, and toluene were detected in the southwest corner of the landfill, outside the clay wall in 1985 and 1986 (13). In addition, trans-1,2-dichloroethene and trichloroethene were detected during a soil gas analysis in 1986 at the above mentioned area (maximum of 52 ppb of trans-1,2-



Reference No. 28

METCALF & EDDY

FIGURE 7: Type I Solid Waste Landfill

SCALE: NONE

dichloroethene) (34, 35).

F. VSI Observations: The cover of the Type I Solid Waste Landfill has been revegetated.

G. Sample Results: Groundwater samples obtained from MW-19 and MW-28 detected the following constituents: 1.9 to 50 μg/L of chloroethane, 42 to 86 μg/L of 1,1-dichloroethane, nondetectable to 6.2 μg/L of 1,2-dichloropropane, 1.2 to 4.9 μg/L of trans-1,2-dichloroethene, nondetectable to 10 μg/L of methylene chloride, nondetectable to 20 μg/L of chloromethane, nondetectable to 66 μg/L of vinyl chloride, nondetectable to 5 μg/L of 1,1-dichloroethane, nondetectable to 15 μg/L 1,1,1-trichloroethane, and nondetectable to 5.2 μg/L of trichlorothene (154). Surface water samples obtained from the Openlander Drain detected the following constituents: 0.0087 mg/L of 1,1-dichloroethane, 0.0086 mg/L of 1,1,1-trichloroethane and 0.270 mg/L of methylene chloride (115). Soil gas analysis samples obtained from the area bounded by MW-19, P-28, and MW-35 detected the following constituents: Nondetectable to 52 ppb of trans-1,2-dichloroethene and nondetectable to 3.1 ppb of trichloroethene (35).

4.2 Unit Type: Leachate Surface Impoundment

Regulatory Status: SWMU. This area is inactive and has been closed. Closure certification was submitted to MDNR by GLDC. On April 13, 1990, MDNR released GLDC from financial capability requirements for closure of the Leachate Surface Impoundment (155). Interim status for this unit was granted in 1983 by the U.S. EPA (42, 45). The leachate contained in the surface impoundment was managed as a hazardous waste until it was delisted.

A. Unit Description: The leachate surface impoundment was located on a portion of the closed 61 acre Type I Solid Waste Landfill. The leachate was pumped to the surface impoundment via the onsite pump station. Leachate contained in the leachate surface impoundment was periodically disposed of at the Lansing Wastewater Treatment Plant (40). During closure, approximately one foot of material was excavated from the bottom of the 150 foot by 300 foot surface impoundment and disposed of in a Type II landfill. In addition, 18 inches of top soil was placed over the surface impoundment (5). Currently, landfill leachate is discharged to the Southern Clinton County Municipal Utility Authority's (SCCMUA) Wastewater Treatment Plant (WWTP) via a force main in accordance with a Waste Water Discharge Permit (5, 24). Figures 3 and 8 show the Leachate Surface Impoundment. Photographs 1, 2, and 4 in Appendix A show the Leachate Surface Impoundment.

B. Period of Operation: 1983 to 1987.

C. Waste Type: Liquid waste classified as D80 and D83 wastes.

Waste Volume/Capacity: 300 feet by 150 feet/40 day storage capacity.

Waste Constituents: Heavy metals, halocarbons, aromatic hydrocarbons, chlorinated hydrocarbons, phthalate esters, polynuclear aromatic hydrocarbons and phenols (40).

D. Release Controls: The leachate surface impoundment was located directly above the Type I Solid Waste Landfill. Thus, all vertical releases of leachate would be contained in the Type I Solid Waste Landfill. In addition, approximately two feet of freeboard was provided.

E. Release History: None known.

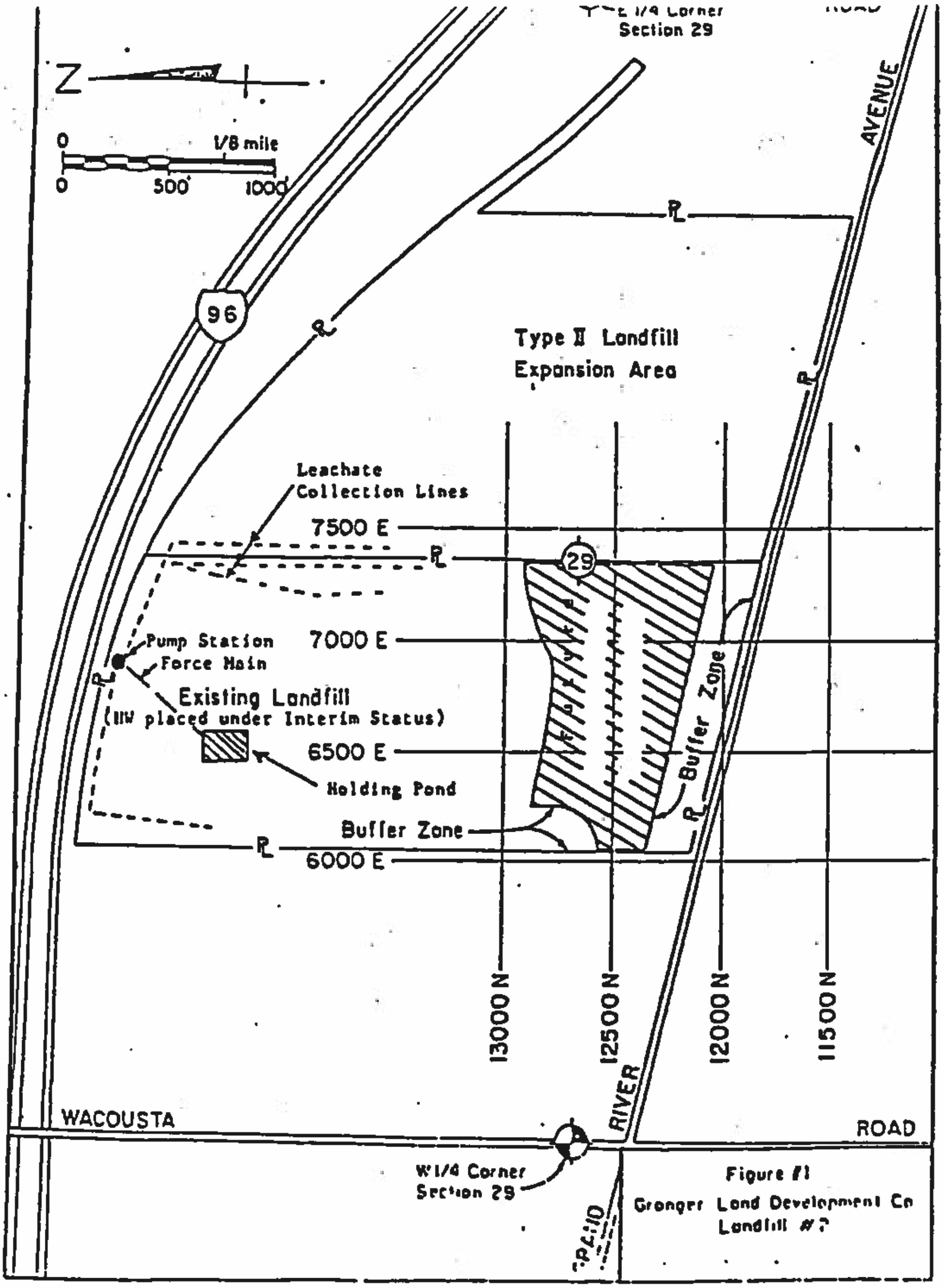
F. VSI Observations: The area above the leachate surface impoundment has been revegetated.

G. Sample Results: During an MDNR inspection on July 15, 1988, random soil sample results taken from the excavation indicated that the metal levels were within two standard deviations of the mean for typical soils of similar soil type in the Saginaw Lobe. Organic compounds were nondetectable in the soil samples (20).

4.3 Unit Type: Openlander Drain

Regulatory Status: SWMU. The Openlander Drain is used to discharge GLDC landfill's surface runoff to the Looking Glass River.

A. Unit Description: The majority of the surface runoff from the closed and existing portions of the



Reference No. 104

METCALF & EDDY

FIGURE 8: Leachate Surface Impoundment And Pump Station

SCALE: NONE

landfill at the GLDC facility drains into the Openlander Drain. Surface runoff water is collected from a series of collection ditches that are located around the perimeter of the landfill facility. The collection ditches discharge into a collection area. The collection area discharges the effluent to the Openlander Drain. The Openlander Drain is a tributary of the Looking Glass River, which is located approximately 1.5 miles to the north of the landfill facility (73). Photographs 15 through 23 in Appendix A show the surface runoff collection areas and drainage ditches.

B. Period of Operation: 1970 to present.

C. Waste Type: Landfill surface runoff.

Waste Volume/Capacity: No information is available.

Waste Constituents: No information is available.

D. Release Controls: None known.

E. Release History: In 1982 and 1983, approximately 100,000 gallons of surface water containing methylene chloride, 1,1,1-trichoroethane and 1,1-dichloroethane was discharged to the Openlander Drain (maximum of 0.270 mg/L of methylene chloride) (40, 45, 52, 113, 115).

F. VSI Observations: During the VSI, an oil film was identified in a collection ditch. Photograph 19 in Appendix A shows the oil film.

G. Sample Results: Current sample results are not available from this area. However, surface water samples obtained from the Openlander Drain in 1983 contained the following constituents: 0.0087 mg/L of 1,1-dichloroethane, 0.0086 mg/L of 1,1,1-trichloroethane, and 0.270 mg/L of methylene chloride (115).

4.4 Unit Type: Catch Pond

Regulatory Status: SWMU. The catch pond is used to discharge GLDC landfill's surface runoff to the groundwater and/or surface water.

A. Unit Description: The catch pond is used to retain surface runoff from the large berm on the south side of the landfill to prevent flooding on Grand River Avenue (14). Surface runoff is retained by a small berm and collected with a tile collection line. Collected water is routed under Grand River Avenue to the catch pond. Water is usually discharged from the catch pond by percolation into the soil. However, if the water level in the catch pond reaches a certain level, effluent is discharged to the ultimate outlet via the outlet pipe to the surface water. Photographs 27 and 28 in Appendix A show the catch pond.

B. Period of Operation: Unknown to present.

C. Waste Type: Surface runoff.

Waste Volume/Capacity: 200 feet by 50 feet.

Waste Constituents: No information is available.

D. Release Controls: None known.

E. Release History: None known.

F. Observations: The catch pond area consists of a depressed area that is covered with mowed vegetation.

G. Sample Results: Sample results are not available from this area.

4.5 Unit Type: Type II Solid Waste Landfill

Regulatory Status: <u>SWMU</u>. This area is an active disposal area. On December 8, 1989, GLDC renewed the required Act 641 operating license (3).

A. Unit Description: The Type II Solid Waste Landfill is an expansion to the closed Type I Solid Waste Landfill. The use of this landfill is limited to the disposal of residential and commercial refuse and non-hazardous industrial waste delivered by private individuals, contract haulers and municipal corporations (73). The Type II Solid Waste Landfill expansion areas are illustrated in Figure 3. Photographs 6, 7, 8, 9, 10, and 11 in Appendix A show the Type II Solid Waste Landfill.

B. Period of Operation: 1986 to present.

C. Waste Type: Residential and commercial refuse and non-hazardous industrial waste.

Waste Volume/Capacity: 94 acres; 15 year design life.

Waste Constituents: Residential and commercial refuse and non-hazardous industrial waste.

D. Release Controls: A clay liner and leachate collection system are utilized to contain contaminants. Monitoring wells are located upgradient and downgradient of the landfill in both the shallow and bedrock aquifer (128).

E. Release History: None known.

F. VSI Observations: Residential and commercial refuse and non-hazardous industrial waste is disposed of in the Type II Solid Waste Landfill. The areas of the landfill not in active use appeared to have adequate cover.

G. Sample Results: Sample results are not available from this area.

4.6 Unit Type: Leachate Pump Station

Regulatory Status: SWMU. This is an active pumping unit.

A. Unit Description: The leachate pump station is used to pump landfill leachate generated at the closed Type I Solid Waste Landfill, the existing Type II Solid Waste Landfill, and the purge wells to the SCCMUA WWTP via a force main in accordance with GLDC's wastewater discharge permit (5, 60). The above mentioned leachate disposal system was initiated on November 24, 1987 (22). Prior to leachate discharge to the SCCMUA system, landfill leachate was disposed of at the Lansing WWTP via tanker trucks (40). The Leachate Pump Station is illustrated on Figure 8. Photographs 12, 13, 14, 25, and 26 in Appendix A show the Leachate Pump Station.

B. Period of Operation: 1987 to present.

C. Waste Type: Landfill leachate.

Waste Volume/Capacity: 20,000 gallons/day

Waste Constituents: Heavy metals, halocarbons, aromatic hydrocarbons, chlorinated hydrocarbons, phthalate esters, polynuclear aromatic hydrocarbons, and phenols(40).

D. Release Controls: An automatic float system located in the concrete wet well controls the water elevation of the Leachate Pump Station.

E. Release History: None known.

F. VSI Observations: The leachate pump station consists of a single wet well. The pumps are located in an adjacent dry well.

G. Sample Results: Sample results are not available from this area.