REQUEST FOR PROPOSALS FOR
ENVIRONMENTAL MONITORING SERVICES
AT THE SOLID WASTE LANDFILL
CITY OF GRAND ISLAND, NEBRASKA:

I. SUBJECT: REQUEST FOR PROPOSALS ("RFP") FOR ENVIRONMENTAL MONITORING SERVICES

The City of Grand Island, Nebraska wishes to select a firm to assist them in monitoring groundwater at the Grand Island Regional Landfill (Site). The requested services must be conducted in accordance with the attached Scope of Service, Standard Operating Procedures and applicable Federal, State and Local Law, Regulations and Permit Requirements.

The selected firm's services shall generally consist of:

1. Collecting groundwater samples
2. Packaging, shipping and handling water samples
3. Laboratory analysis of water samples
4. Statistical analysis of analytical results
5. Documentation, Quality Control/Quality Assurance and Reporting
6. Any necessary actions to provide for groundwater monitoring

II. PREPARATION & SUBMISSION OF PROPOSALS

The Proposer agrees that the preparation of all responses to this RFP shall be at the sole cost and expense of Proposer and any and all claims to reimbursement for the cost and expense of preparation shall be waived.

Questions concerning the selection and its schedule, as well as questions concerning the scope of work and the technical aspects of the project, should be directed to Mr. Jeff Wattier, Solid Waste Superintendent at (308) 385-5433, Extension 4.

Respondents to this RFP must deliver five (5) copies of their proposal to:

City of Grand Island
City Hall, 100 East First Street
P.O. Box 1968
Grand Island, NE 68802-1968
Attn.: City Clerk

Proposals should be marked "Proposal for Environmental Monitoring Services" and shall be delivered to the Office of the City Clerk no later than **2:30 p.m. on Tuesday, March 20, 2012.**

The City reserves, at its sole discretion, the following rights and options with respect to all proposals submitted in response to this RFP:

1. To select and enter into an agreement with the firm whose proposal, in the judgment of the City, best satisfies its work requirements and interests.

2. To reject any and all proposals.

3. To cancel this RFP with or without the substitution of another Request for Proposals.

4. To issue additional and subsequent requests for statements of qualification, and to conduct further investigations of the qualifications of each firm submitting a proposal.

5. To amend or otherwise modify or alter the proposed scope of work as contemplated by this RFP.

6. To enter into an agreement as contemplated by this RFP.

7. To negotiate with each firm for amendments or other modifications to its proposal.

8. To enter into an agreement with the firm submitting the proposal which serves the best interest of the City and not necessarily at the lowest costs.

9. To designate another agency, group, entity or public body to act on behalf of the City in the evaluation of proposals.

The Content of the proposal should include:

1. The training and experience of your firm, subcontractors and selected members who will be used on the project.

2. Detailed documentation and references supporting the firm's experience with groundwater, surface water, landfill gas, analytical laboratory services and statistical analyses, completed or now in progress, of similar sizes, nature and complexity.

3. Information on the firm's cost for these services based on a unit amount to perform each task, with a total estimated project cost for each task and for all services and other ancillary services. Unit amounts shall assume total compensation on a unit price basis. The City will use price as one of the selection criteria.

4. Any proposed variances or deviations from the Scope of Services and Standard Operating Procedures attached to this RFP.

III. EVALUATION OF PROPOSALS

The City will review all proposals received and may elect to further interview selected firms.

The evaluation of proposals in response to this RFP and selection of a firm shall be based primarily on:

1. Costs (as it relates to scope) for completing the subject work. (20%)

2. Responsiveness and completeness of the proposal with respect to this RFP. (20%)

3. Experience, qualifications and references of firm. (20%)

4. Proposed team members and qualifications. (20%)

5. Experience with the City of Grand Island pertaining to engineering and/or groundwater monitoring. (10%)

6. Proposed agreement. (10%)

After reviewing information regarding the recommended firm, the City will select a firm and an agreement will then be negotiated with such selected firm. Because the City is anxious to minimize the time and variability in proposals and processes, this RFP contains a Scope of Work and Standard Operating Practices which will serve as the basis for the actual agreement between the selected firm and the City subsequent to the final selection process.

The City's current estimate of the implementation schedule calls for the following milestone dates:

- Proposals Due City Clerk..... March 20, 2012
- Completion of Agreement for Services in Attached Scope ... April 2, 2012
- First Sampling Event - NO LATER THAN..... September 12, 2012

The firm shall be experienced with monitoring and analyzing groundwater and surface water and landfill gas migration monitoring, as well as, applicable Federal, State and Local Laws, Regulations and Permit Requirements, environmental permitting practices and local practices. The firm shall be capable of undertaking the project in an expeditious manner and will be expected to take appropriate steps to meet the above schedule.

IV. SCOPE OF SERVICES

The attached Scope of Services describes activities to be undertaken by the selected proposer. Standard Operating Procedures (SOP) have been developed for major tasks within the Scope of Service. The proposer shall clearly identify all anticipated deviations from the Scope of Service or SOP's with their proposal submittal.

V. PROPOSAL FORM

The Proposers shall complete the attached Proposal Form and include it with their "Proposal for Environmental Monitoring Services". All blanks on the Proposal Form must be completed. No partial proposals will be considered. The City anticipates that some savings may be realized if different field activities can be conducted simultaneously.

The City will pay for all services based on the unit prices in the Proposal Form and the activities requested. Each unit price is intended to include all required services necessary for, or incident to, completing the specified sampling, analysis and reporting event.

All unit prices shall be valid for five (5) years following signing of the agreement.

Proposer shall also furnish a laboratory analysis rate sheet and a unit price rate sheet which the City can use to request additional sampling or analysis not covered by the Scope of Services or itemized on the Proposal Form.

Proposer shall, without additional compensation, re-perform all sampling, tests, analyses and other Services which do not conform to the requirements of the agreement with the City. In addition, Proposer shall be responsible for all costs, charges and damages incurred by City in connection with a re-sampling, re-testing and modified documentation program required as a result of Proposer's failure to comply with one or more of its obligations in the Scope of Services. Such re-sampling and re-testing program shall include, but shall not be limited to, obtaining additional water or other samples, packaging, handling, transportation, storage, processing, testing and analyzing of samples, statistical analysis, and reporting of results.

Proposer shall be responsible for re-sampling and re-testing to the same extent as provided in the Scope of Services in the event of loss of, damage to, or contamination of samples.

Should Proposer determine that specified protocols are not appropriate for collection, handling, testing or analysis of sample(s), Proposer shall notify City within 48 hours and Proposer shall agree on proper protocols to be applied to said samples(s).

The City reserves the right to withhold compensation if field or laboratory analytical results are not supported by valid quality assurance information, as described in the attachments to the RFP.

The City or its agents may at any time conduct an inspection, audit or review of the performance of all services. The Proposer shall warrant that the methods, accuracy and completeness of the sampling, tests, analyses and reports are in accordance with all applicable laws, regulations, specifications and protocols.

VI. REPORTING

Proposer shall report results in a format acceptable to City and shall submit a proposed reporting procedure to City prior to initiation of the analytical work. Submit analytical reports to City within thirty (30) calendar days of sampling date.

Proposer shall retain (in legible form) all laboratory logs, custody documents, laboratory data, records of analyses, calculations, notes and other records relating to analytical services for a period of five (5) years following completion or termination of laboratory services.

VII. QUALITY ASSURANCE

Proposer is responsible for assuring the quality of all results of laboratory services. Quality assurance provisions may include requirements such as traceability of weights and measures to the National Bureau of Standards, use of Environmental Protection Agency standards, calibration of instruments, and standardization of equipment. City reserves the right to make appropriate observations to review quality control provisions. Observations or the absence of observations, by City or tests of Proposer to discover deficient practices or provisions shall not relieve Proposer of any responsibilities. The payment of compensation shall not constitute an acceptance of deficient tests or services.

The acceptability of the laboratory services are contingent upon acceptable completion of laboratory quality control practices and procedures. For the purposes of this RFP (and subsequent contract), acceptable laboratory quality control practices are those which meet or exceed the requirements of the respective analytical methods requirements.

Laboratory quality control for standard methods (e.g., EPA, ASTM, Water Pollution Control Federation methods) is agreed to be acceptable standard practice and not a separate billable item. Analytical requirements shall include, at a minimum, the laboratory quality control described below and in the Scope of Services:

(1) Adhere to standard laboratory practices concerning chemicals, reagents, standards, solvents and laboratory glassware and apparatus cleanliness. Apparatus and equipment must be kept in good repair and a standard maintenance schedule must be followed and documented.

(2) Maintain proper records of all incoming samples and sample tracking from initial sample receipt until final data submittal. The laboratory is required to collect and maintain sample chain-of-custody forms. Proper handling of samples is understood to include the customary requirements of sample handling described in documents listed above.

(3) Provide laboratory quality control samples. Unless otherwise provided for, laboratory quality control samples will not be a separate billable item under the contract. Minimum required number of laboratory quality control samples, instrument calibrations, and instrument tuning are specified in "Test Methods for the Evaluating Solid Waste," SW-846, November, 1986, as revised December 1987 and Revision 2, December 1996; and "Methods for Chemical Analysis of Water and Wastes," EPA-600/4-79-020, March, 1983.

(4) Comply with the holding times contained in its respective methods procedure. If holding times are exceeded, the cost of re-sampling and subsequent analysis shall be the responsibility of the Proposer.

(5) Documentation of proper sampling shall be made available upon request. A copy of the chain-of-custody form shall be attached to the corresponding analytical results report. Documentation of proper sample handling shall include sufficient information to show the physical conditions of samples during the period of time from initial receipt of sample until final report of analytical results.

(6) Comply with the method detection limits specified with the respective analytical method.

(7) All analytical results shall be reported in a clear and concise format. Reporting shall include a brief yet complete summary (e.g., CLP Summary report forms) of quality control sample results. Any unusual observations or difficulties associated with the samples shall also be reported.

(8) Unless noted elsewhere in this agreement, provide sample bottles and shipping containers acceptable to EPA & DOT for sample containment and shipping.

(9) Field Technicians should minimize draw down to 0.3 ft or less, as much as possible, as outlined in SOP No. 204.

GRATUITIES AND KICKBACKS

City Code states that it is unethical for any person to offer, give or agree to give any City employee or former City employee, or for any City employee or former City employee to solicit, demand, accept, or agree to accept from another person, a gratuity or an offer of employment in connection with any decision, approval, disapproval, recommendation, or preparation of any part of a program requirement or a purchase request, influencing the content of any specification or procurement standard, rendering of advice, investigation, auditing, or in any other advisory capacity in any proceeding or application, request for ruling, determination, claim or controversy, or other particular matter, pertaining to any program requirement or a contract or subcontract, or to any solicitation or proposal therefore. It shall be unethical for any payment, gratuity, or offer of employment to be made by or on behalf of a subcontractor under a contract to the prime contractor or higher tier subcontractor or any person associated therewith, as an inducement for the award of a subcontract or order.

INSURANCE COVERAGE

The proposer shall purchase and maintain at his expense as a minimum insurance coverage of such types and in such amounts as are specified herein to protect proposer and the interest of Owner and others from claims which may arise out of or result from proposer's operations under the Contract Documents, whether such operations be by proposer or by any Subcontractor or anyone directly or indirectly employed by any of them or for whose acts any of them may be legally liable. Failure of proposer to maintain proper insurance coverage shall not relieve him of any contractual responsibility or obligation.

WORKERS' COMPENSATION AND EMPLOYER'S LIABILITY

1. "Worker's Compensation and Employer's Liability." This insurance shall protect the Contractor against all claims under applicable State worker's compensation laws. This insurance shall provide coverage in every state in which work for this project might be conducted. The Contractor shall also be protected against claims for injury, disease, or death of employees which, for any reason, may not fall within the provisions of a worker's compensation law. This policy shall include an "all states" endorsement. The liability limits shall be not less than the following:

Worker's Compensation	Statutory Limits
Employer's Liability	$100,000 each accident
	$100,000 each employee
	$500,000 policy limit

2. "Business Automobile Liability." This insurance shall be written in comprehensive form and shall protect the Contractor, Contractor's employees, or subcontractors from claims due to the ownership, maintenance, or use of a motor vehicle. The liability limits shall be not less than the following:

Bodily Injury & Property Damage	$500,000 Combined Single Limit

3. "Comprehensive General Liability." The comprehensive general liability coverage shall contain no exclusion relative to explosion, collapse, or underground property. The liability limits shall be not less than the following:

Bodily Injury & Property Damage	$ 500,000 each occurrence
	$1,000,000 aggregate

4. "Umbrella Liability Insurance." This insurance shall protect the Contractor against claims in excess of the limits provided under employer's liability, comprehensive automobile liability, and commercial general liability policies. The umbrella policy shall follow the form of the primary insurance, including the application of the primary limits. The liability limits shall not be less than the following:

Bodily Injury & Property Damage	$1,000,000 each occurrence
	$1,000,000 general aggregate

5. Additional Requirements. The City may require insurance covering a Contractor or Subcontractor more or less than the standard requirements set forth herein depending upon the character and extent of the work to be performed by such Contractor or Subcontractor.

Insurance as herein required shall be maintained in force until the City releases the Contractor of all obligations under the contract.

The Contractor shall provide and carry any additional insurance as may be required by special provisions of these specifications.

6. Certificate of Insurance. Satisfactory certificates of insurance shall be filed with the City prior to starting any work on this contract. The certificates shall show the City as an additional insured on all coverage except Workers Compensation. The certificate shall state that thirty (30) days written notice shall be given to the City before any policy is cancelled (strike the "endeavor to" wording often shown on certificate forms). If the Contractor cannot have the "endeavor to" language stricken, the Contractor may elect to provide a new certificate of insurance every thirty (30) days during the contract. The Contractor shall immediately notify the City if there is any reduction of coverage because of revised limits or claims paid which affect the aggregate of any policy.

FAIR EMPLOYMENT PRACTICES

Each proposer agrees that they will not discriminate against any employee or applicant for employment because of age, race, color, religious creed, ancestry, handicap, sex or political affiliation.

LB 403

Every public contractor and his, her or its subcontractors who are awarded a contract by the City for the physical performance of services within the State of Nebraska shall register with and use a federal immigration verification system to determine the work eligibility status of new employees physically performing services within the State of Nebraska.

FISCAL YEARS

The City of Grand Island, Nebraska operates on a fiscal year beginning October 1st and ending on the following September 30th. It is understood and agreed that any portion of this agreement which

will be performed in a future fiscal year is contingent upon the City Council adopting budget statements and appropriations sufficient to fund such performance.

TITLE VI

The City of Grand Island, in accordance with Title VI of the Civil Rights Act of 1964, 78 Stat. 252, 42 U.S.C 2000d to 2000d-4 and Title 49, Code of Federal Regulations, Department of Transportation, Subtitle A, Office the Secretary, Part 21, Nondiscrimination in Federally assisted programs of the Department of Transportation issued pursuant to such Act, hereby notified all bidden that it will affirmatively insure that in any contact entered into pursuant to this advertisement, minority business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin, sex, age and disability/handicap in consideration for an award.

SECTION 504/ADA NOTICE TO THE PUBLIC

The City of Grand Island does not discriminate on the basis of disability in admission of its programs, services, or activities, in access to them, in treatment of individuals with disabilities, or in any aspect of their operations. The City of Grand Island also does not discriminate on the basis of disability in its hiring or employment practices.

This notice is provided as required by Title II of the Americans with Disabilities Act of 1990 and Section 504 of the Rehabilitation Act of 1973. Questions, complaints, or requests for additional information or accommodation regarding the ADA and Section 504 may be forwarded to the designated ADA and Section 504 compliance coordinator.

Mary Lou Brown
308-385-5444, extension 140
100 East First Street, Grand Island, NE 68801
Monday through Friday; 8:00 a.m. to 5:00 p.m.

PROPOSAL TERMS AND CONDITIONS

The City will not pay any costs incurred by the firm in preparing or submitting the proposal. The City reserves the right to modify or cancel, in part or in its entirety, this RFP. The City reserves the right to reject any or all proposals, to waive defects or informalities, and to offer to contract with any firm in response to any RFP. This RFP does not constitute any form of offer to contract.

ENVIRONMENTAL MONITORING PROPOSAL FORM

A. BASIC SERVICES

Item	Description	Unit Price (Per Event)
1	Groundwater Sampling Event for Indicator Parameters: water levels (12 monitoring wells), groundwater sampling (9 monitoring wells), laboratory testing (Table 4, Indicator Parameters), data statistical analysis and reporting. (State unit price in words)	_____
2	Groundwater Sampling Event for Appendix I and Indicator Parameters: water levels (12 monitoring wells), groundwater sampling (9 monitoring wells), laboratory testing (Table 3, Appendix I Parameters and Table 4, Indicator Parameters), data statistical analysis and reporting. (State unit price in words)	_____

B. ADDITIONAL SERVICES

Attach the following (for service not covered by Scope of Services):

- Rate Sheet for Laboratory Analytical Services
- Rate Sheet for Field Services

SCOPE OF SERVICES

GROUNDWATER MONITORING SERVICES

GRAND ISLAND REGIONAL LANDFILL

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GRAND ISLAND REGIONAL LANDFILL
SUMMARY OF WORK

SECTION 1.0
SCOPE

The scope of sampling and testing services anticipated under this contract includes:

- Measurement of water levels in monitoring wells and piezometers.
- Sampling of ground water in monitoring wells.
- Preservation, handling and transport of water samples.
- Laboratory analytical testing and data validation.
- Statistical analysis of analytical results.
- Quality control/quality assurance.
- Develop and furnish groundwater contour maps.
- Documentation and reporting.

SECTION 2.0

EXISTING CONDITIONS

The sampling locations are shown on Figure 1. Pertinent data for each location and sample medium are presented on Table 1.

The current approved groundwater detection monitoring system is composed of nine monitoring wells: MW-17, MW-18, MW-19, MW-20B, MW-5a, MW-16a, PZ-2, PZ-3, and PZ-4, as shown in Figure 1. [Note: MW-21 and PZ-1 have been replaced by MW-5a and MW-16a in September 2006 in the detection monitoring system. MW-20a is replaced by MW-20B installed in May 2007.] PZ-3 and MW-18 are considered upgradient wells. MW-17 through MW-20B, MW-5a, and MW-16a monitor the water table horizon. Wells PZ-2 through PZ-4 monitor the next underlying high conductivity zone.

As of September 2006, MW-12, MW-21and PZ-1 are used as piezometers for groundwater level measurements only.

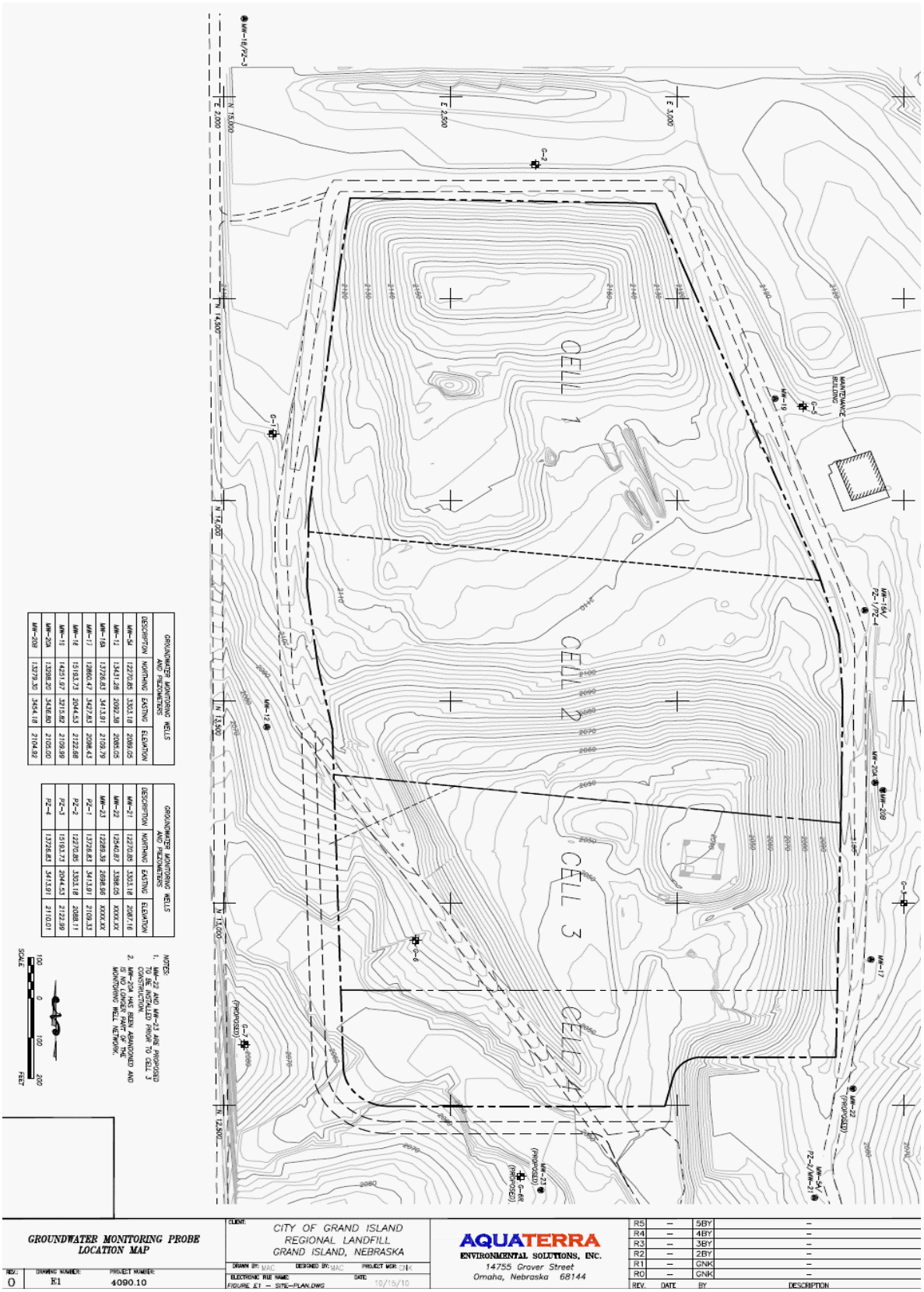
The monitoring wells are equipped with dedicated bladder pumps for purging and sampling the groundwater. As shown in Table 1, below, dedicated bladder pumps for MW-19, MW-20B, and PZ-4 have been positioned vertically in the approximate center of the well screen. Records of bladder pump depths for the remaining monitoring wells and piezometers are not available. SOP No. 204 (Attachment 1) includes general procedures for operating the bladder pumps.

Table 1
Groundwater Monitoring Wells

Well Designation	Gradient	Ground Elev.	TOC Elev.	Total Depth	Screen Interval	Pump Depth	Current Status
Shallow							
MW-5A	Downgradient	2085.90	2088.40	135'	115'-135'	126.93'	Detection monitoring
MW-12	Upgradient	2081.73	2084.23	121'	100'-120'	NA	Water level only
MW-16A	Downgradient	2106.82	2109.32	140'	120'-140'	138.40'	Detection monitoring
MW-17	Downgradient	2095.63	2098.13	130'	110'-130'	133.40'	Detection monitoring
MW-18	Upgradient	2119.92	2122.42	155'	135'-155'	156.40'	Detection monitoring
MW-19	Downgradient	2107.01	2109.51	150'	130'-150'	139.50'	Detection monitoring
MW-20A	Downgradient	NA	NA	NA	NA	NA	Abandoned
MW-20B	Downgradient	2102.02	2104.2	143.5'	128.5'-143.5'	137.10'	Detection Monitoring
MW-21	Downgradient	2087.16		120'	102'-112'	108'-111'	Water level only
MW-22*	Downgradient	NA	NA	NA	NA	NA	Proposed
MW-23*	Downgradient	NA	NA	NA	NA	NA	Proposed
PZ-1	Downgradient	2106.47	2108.97	134'	122'-132'	130'-134'	Water level only
Deep							
PZ-2	Downgradient	2085.03	2087.53	153'	143'-153'	128.12'	Detection monitoring
PZ-3	Upgradient	2120.22	2122.72	185'	175'-185'	182.55'	Detection monitoring
PZ-4	Downgradient	2107.15	2109.65	175'	170'-175'	168.60'	Detection monitoring

Note: Sampling depth and pump depth are equivalent for detection monitoring wells.
NA = not available
* Wells are proposed to be installed prior to Cell 3 construction

FIGURE 1



GROUNDWATER MONITORING AND PIEZOMETERS WELLS			
DESCRIPTION	NORTHING	EASTING	ELEVATION
MW-24	13270.85	3303.18	2089.05
MW-12	13431.28	2092.38	2085.05
MW-19A	13726.83	3413.91	2109.79
MW-17	13860.47	4427.83	2098.43
MW-18	15163.73	2044.53	2122.88
MW-16	14251.97	3215.82	2109.89
MW-20A	13398.20	3436.80	2105.00
MW-20B	13279.30	3454.18	2104.92

GROUNDWATER MONITORING AND PIEZOMETERS WELLS			
DESCRIPTION	NORTHING	EASTING	ELEVATION
MW-21	13270.85	3303.18	2087.16
MW-22	12540.87	3386.05	XXXX.XX
MW-23	12288.39	2698.96	XXXX.XX
PZ-1	13726.83	3413.91	2109.33
PZ-2	13270.85	3303.18	2088.11
PZ-3	15163.73	2044.53	2122.89
PZ-4	13726.83	3413.91	2110.01

GROUNDWATER MONITORING PROBE LOCATION MAP

REV.: 0 | DRAWING NUMBER: E1 | PROJECT NUMBER: 4090.10

CLIENT: CITY OF GRAND ISLAND
REGIONAL LANDFILL
GRAND ISLAND, NEBRASKA

DRAWN BY: MAC | DESIGNED BY: MAC | PROJECT MGR: CNK
ELECTRONIC FILE NAME: FIGURE E1 – SITE–PLAN.DWG | DATE: 10/15/10

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.
14755 Grover Street
Omaha, Nebraska 68144

REV.	DATE	BY	DESCRIPTION
R5	–	SBY	–
R4	–	4BY	–
R3	–	3BY	–
R2	–	2BY	–
R1	–	CNK	–
R0	–	CNK	–

SECTION 3.0
FIELD PROCEDURES

The field procedures presented in this section provide a reliable and consistent means of obtaining groundwater samples at the Site. Field activities will be conducted by personnel who have satisfied the requirements and certification as a water well monitoring technician in accordance with Nebraska Department of Health Title 178, Chapter 10.

3.1 General Considerations

This Scope of Services has been developed for use in the absence of constituents of concern, including methane. If there is a known or suspected presence of constituents of concern in the work area, a health and safety plan, in accordance with OSHA 1910.120, will be developed by the proposer and implemented prior to additional fieldwork.

Purging and sampling activities shall proceed from the least contaminated well to the worst contaminated well. In the absence of detectable concentrations of contaminants in historical samples, sampling shall proceed from the furthest upgradient well to the downgradient wells. When collecting from downgradient wells, sampling should proceed from the farthest downgradient well to the downgradient well closest to the disposal area.

3.2 Procedures

The procedures to be followed during sampling activities are presented in SOP No. 204 (Attachment 1). In general, each well shall be unlocked, the protective cap removed, and the atmosphere of the well casing monitored with an organic vapor monitoring instrument (i.e., photoionization detector [PID] or flame ionization detector [FID]) to verify that organic vapors are not present. If a health and safety plan is in effect, the use of a PID may not be allowed.

The static water levels of all wells to be sampled shall be recorded prior to initiation of purging activities.

Purge water shall be monitored with a PID or FID. If purge water is not anticipated to exceed 1,000 gallons from a given well and organic vapors are not detected above background levels, then the water may be discharged on-Site in the vicinity of the well. Otherwise, a permit or approval is required by NDEQ and the City for alternatives to discharging.

The wells shall be sampled immediately after purging. Field sampling personnel shall preserve each sample collected for laboratory analysis according to the specified preservation requirements outlined in Section 4.0. The laboratory shall be required to provide the required preservatives in labeled containers designated for each specific analysis.

3.3 Health and Safety

This Scope of Services requires field-sampling personnel to conduct activities adjacent to an active landfill area. Precautions shall be taken while on-Site to avoid risk of injury. Additional health and safety plans may be required to be developed and implemented by the proposer if groundwater degradation is subsequently detected.

All sampling activities will be conducted in Level D personal protective equipment (e.g., safety glasses, deconnable steel-toe boots, nitrile gloves). If conditions warrant an upgrade in level of protection (i.e., VOC detection above previously established background limits or limits established by contractor), work will cease and the City's Project Manager will be contacted immediately.

The laboratory shall be responsible for maintaining an appropriate health and safety program for all laboratory activities.

SECTION 4.0
SAMPLE HANDLING

4.1 General

The integrity of the groundwater samples must be maintained from the time the samples are obtained through the time the samples are received by the laboratory. This is accomplished by: 1) labeling each sample container with unique identification numbers; 2) packing the samples to prevent breakage during shipping; and 3) maintaining proper temperature of samples.

4.2 Sample Identification/Labeling/Packing/Shipping

Each sample is assigned a unique sample identification number to allow for proper data management. These sample identification numbers are included on: 1) the sample label, which is affixed to each sample container; 2) in the daily field log book to identify notes pertaining to the sample; 3) on the sample collection log sheets; and 4) on the chain-of-custody records. The sample label also includes: 1) the date and time of sample collection; 2) the sampler(s) name(s); 3) the parameters to be analyzed; and 4) the preservative. Procedures for labeling, packaging, and shipping samples are presented in SOP No. 224, Packing, Shipping, and Labeling (Attachment 3).

4.2.1 Sample Identification

All samples obtained as part of this investigation will be assigned unique sample identification numbers that consist of three fields, separated by dashes, in the following format:

_____	-	_____	-	_____
Project ID		Location		Sample Number ID

4.2.1.1 Project ID

The Project ID is a four-character code that identifies the project (Site) from which the samples are obtained, i.e., GILF for Grand Island Regional Landfill.

4.2.1.2 Location ID

The Location ID specifies the type of location (monitoring well) from where samples are obtained. The Location ID consists of a location type plus number. The Location ID string can be a six character alphanumeric code plus a hyphen. The first two characters are alphabetic characters specifying the location type, e.g., “MW” for monitoring well.

The remaining characters are the same as the Well ID number. This well ID number should include a dash as shown in the example.

Example: MW-18 = Monitoring Well MW-18

4.2.1.3 Sample Number

The Sample Number string consists of three alphanumeric characters made up of: 1) sample type; and 2) number of the sample obtained from a particular location during a given sampling event. The sample type is defined as a two-digit code and is used for QA/QC samples such as trip blanks, rinsate blanks, and field blanks. For normal samples, "00" is used in place of a sample type (e.g., RB1 designates the first rinsate blank obtained at a particular location; 001 designates the first sample from a given well during a given sampling event).

4.2.2 Duplicate Samples

Duplicate samples should be submitted to the laboratory as blind samples (i.e., not labeled as a duplicate sample, duplicate location number, or duplicate sample number) so the analyses can be used as a quality control check of the precision of the lab results. The Location ID and Sample Number portions of the Sample ID should be "disguised" so the sample appears to be a normal sample from a monitoring well. The Sample ID used for duplicates (and all samples) shall be recorded in the field logbook.

SECTION 5.0
DOCUMENTATION

5.1 General

Documentation of the field activities allows the events and conditions of the sampling effort to be recorded and retrieved. It also provides a way for the purge and sample data to be recorded, sample shipment to be documented, and the documentation transferred to the laboratory along with the samples. The forms of documentation required by this Scope of Services are: 1) field logbook; 2) sample collection log sheets; and 3) chain-of-custody (COC) records.

5.2 Field Logbook

A dedicated field logbook with sequentially numbered pages is used to document all field activities. The purpose of the field logbook is to provide a complete and permanent record that will allow reconstruction of field activities, thereby validating the data collected. Logbooks are kept in accordance with the requirements outlined in SOP No. 204, Groundwater Sampling (Attachment 1).

5.3 Sample Collection Logsheets

The sample collection logsheets contain a record of all samples sent off-site for analysis as well as samples being held by the laboratory. Additionally, logsheets contain information on: 1) field analyses of purge parameters; 2) information concerning the site; and 3) information concerning the individual samples.

Sample collection logsheets are completed at the time the sample is collected and prepared for shipment. These records are kept in accordance with the requirements outlined in SOP No. 204, Groundwater Sampling (Attachment 1).

5.4 Chain-of-Custody Records

COC records allow for the tracking of possession and handling of the samples from the time of field collection through laboratory analysis. The requirements for completing COC records are described in SOP No. 222, Project Custody Documentation (Attachment 2).

SECTION 6.0
ANALYTICAL REQUIREMENTS

6.1 Sample Analyses and Schedule

The anticipated schedule of analyses for the regulatory life of the Site is presented in Table 2. The schedule is based on requirements for Detection Monitoring as established by NDEQ Title 132, Chapter 7, and Option 2 of NDEQ's "Ground Water Monitoring Program for Municipal Solid Waste Disposal Areas," effective date March 1994, Section 2.0, page 4. The individual lists of parameters for which the samples will be analyzed (i.e., Appendix I and Indicator Parameters) are presented in Tables 3 and 4.

The analytical methodology, associated sampling containers, and required preservatives are presented in Table 5. Table 6 indicates the number of samples, including field blanks and duplicates, required for each parameter.

Deviations from the frequency of sampling and/or schedule of analyses will require the City and NDEQ approval, based on the need for subsequent actions discussed in Section 7.0. Alternative analytical methods, or deviations from the analytical methods presented, must be approved by the City and NDEQ prior to incorporating into the Scope of Services.

Table 2
Sampling Schedule[1][3]

Groundwater Monitoring Wells	Year	Appendix I Parameters	Indicator List
Cells 1 and 2			
MW-17, 18, 19, 20B, 21 or 5A, and PZ-1 or 16A, PZ-2, 3, 4	Background – previously established Following background through post-closure	Quarterly Annually	Quarterly Semi-annually[2]
Cell 3 and 4			
Add MW-22 and MW-23[5]	Background sampling initiated at least 1 year prior to Cell 3 liner construction	Quarterly	Quarterly[4]
MW-17, 18, 19, 20B or 20B, 21 or 5A, 22 and PZ-1 or 16A, PZ-2, 3, 4	Following background through post-closure	Annually	Semi-annually[2]

Notes:

(1) The individual parameter lists are presented in Tables 3 and 4.

(2) Semi-annual sampling shall be conducted during 1st and 3rd quarters of each calendar year, unless the City shifts the semi-annual sampling events to the 2nd and 4th quarters due to potential higher seasonal water table if supported by water level measurements taken during quarterly sampling events. Reports will be submitted within 30 days after the end of the quarter when sampling occurred or within 60 days of the sampling event, whichever is shorter.

(3) The sampling schedule is based on requirements for a Detection Monitoring program, as established by NDEQ Title 132, Chapter 7. If an Assessment Monitoring program is initiated, this schedule will be revised for sampling frequency and parameter lists.

(4) Collected as part of the Appendix I sampling event.

(5) Groundwater elevations will be collected monthly during the 1-year period following installation of new wells and piezometers.

Table 3
Appendix I Parameters

Volatile Organics

Parameter	CAS Number	Method[1]	Parameter	CAS Number	Method[1]
Acetone	67-61-4	8260B	trans-1,3-	10061-02-	8260B
Acrylonitrile	107-13-1	8260B	Ethylbenzene	100-41-4	8260B
Benzene	71-43-2	8260B	2-Hexanone	591-78-6	8260B
Bromochloromethane	74-94-5	8260B	Methyl bromide	74-83-9	8260B
Bromodichloromethan	75-27-4	8260B	Methyl chloride	74-87-3	8260B
Bromoform	75-25-2	8260B	Methyl ethyl ketone	78-93-3	8260B
Carbon disulfide	75-15-0	8260B	Methyl iodide	74-88-4	8260B
Carbon tetrachloride	56-23-5	8260B	Methyl isobutyl ketone	108-10-1	8260B
Chlorobenzene	108-90-7	8260B	Methylene bromide	74-95-3	8260B
Chloroethane	75-00-3	8260B	Methylene chloride	75-09-2	8260B
Chloroform	67-66-3	8260B	Styrene	100-42-5	8260B
Chlorodibromoethane	124-48-1	8260B	1,1,1,2-	630-20-6	8260B
1,2-Dibromo-3-	96-12-8	8260B	1,1,2,2-	79-34-5	8260B
1,2-Dibromoethane	106-93-4	8260B	Tetrachloroethene	127-18-4	8260B
1,2-Dichlorobenzene	95-50-1	8260B	Toluene	108-88-3	8260B
1,4-Dichlorobenzene	106-46-7	8260B	1,1,1-Trichloroethane	71-55-6	8260B
trans-1,4-Dichloro-2-	110-57-6	8260B	1,1,2-Trichloroethane	79-00-5	8260B
1,1-Dichloroethane	75-34-3	8260B	Trichloroethene	79-01-6	8260B
1,2-Dichloroethane	107-06-2	8260B	Trichlorofluoromethane	75-69-4	8260B
1,1-Dichloroethene	75-35-4	8260B	1,2,3-Trichloropropane	96-18-4	8260B
cis-1,2-dichloroethene	156-59-2	8260B	Vinyl acetate	108-05-4	8260B
trans-1,2-	156-60-5	8260B	Vinyl chloride	75-01-4	8260B
1,2-Dichloropropane	78-87-5	8260B	Xylenes	1330-20-7	8260B
cis-1,3-	10061-	8260B			

Total Metals

Parameter	Method[1]	Parameter	Method[1]
Antimony	200.8	Lead	200.8
Arsenic	200.8	Nickel	200.7
Barium	200.7	Selenium	200.8
Beryllium	200.7	Silver	200.7
Cadmium	200.8	Thallium	200.8
Chromium	200.7	Vanadium	200.7
Cobalt	200.7	Zinc	200.7
Copper	200.7		

Note:
(1) Analytical methods were obtained from EPA Report SW-846, Test Methods for Evaluating Solid Waste, Revision 2, December 1996.

Table 4
Indicator Parameters

Parameter	EPA Method[1]
Ammonia as Nitrogen	350.2
Chemical Oxygen Demand (COD)	410.4
Chloride	325.2
Iron, Total	200.7
Sodium, Total	200.7
Total Dissolved Solids (TDS)	160.1
Total Organic Carbon (TOC)	415.1
Total Organic Halogens (TOX)	9020

Note:

(1) Methods were obtained from EPA 600/4-79-020, Methods for Chemical Analysis of Water and Wastes, revised March 1983 and 1979 where applicable and "Standard Methods for the Examination of Water and Waste Water," 18th,19th, 20th editions 1992, 1995 and 1998.

Table 5
Analytical Methodology for the Appendix I, Indicator List, and Dissolved Metals Parameters

Sample Analyte[1]	Number of Containers/Sample	Analytical Method[2]	Minimum Sample Size	Preservative	Holding Time[3]
Volatile Organics[4]	3-40 ml glass vials with Teflon septa	SW-846, Method 8260B	40 ml	HCl to pH□2, Cool 4°C	14 days
Total Metals[5]	1-1L HDPE[6]	SW-846, Method 200.7/200.8[7]	100 ml	HNO3 to pH□2, Cool 4° C	6 months
Ammonia as Nitrogen	500-ml glass	EPA Method 350.1	500 ml	H2SO4 to pH□2, Cool 4° C	28 days
Chemical Oxygen Demand (COD)	500-ml glass	EPA Method 410.4	50 ml	H2SO4 to pH□2, Cool 4° C	28 days
Chloride	1-1L HDPE[6]	EPA Method 325.2	500 ml	Cool 4° C	28 days
Total Dissolved Solids (TDS)		EPA Method 160.1		Cool	7 days
Iron (Total) Sodium (Total)	1-1L HDPE[6]	EPA Method 200.7	500 ml	HNO_3 to pH□2, Cool 4° C	6 months
Total Organic Carbon (TOC)	500-ml glass	EPA Method 415.1	500 ml	HCl to pH□2, Cool 4°C	28 days
Total Organic Halogens (TOX)	1-1L amber glass	SW-846, Method 9020	250 ml	H2SO4 to pH□2, Cool 4° C	28 days

Notes:

(1) Analytes shown are those to be analyzed in the laboratory. In addition, the following determinations will be performed in the field at the time of sample collection: groundwater elevation, pH, conductivity, temperature, turbidity, dissolved oxygen, redox potential, color, and odor. Color is field observation on filtered and unfiltered samples. The filtered sample should be monitored for at least 30 minutes in a clear glass jar to check for oxidation changes that may occur.

(2) Methods were obtained from "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, revised March 1983 and 1979 where applicable; SW-846, "Test Methods for Evaluating Solid Wastes", 3rd Edition; or Standard Methods for the Examination of Water/Wastewater, 18th Edition, unless noted otherwise.

(3) Time given as days/months from sample collection.

(4) Includes the complete list of volatile organics as shown in Table 5-2, Appendix I Parameters, and contained in the NDEQ document Title 132 "Integrated Solid Waste Management Regulations".

(5) Includes the complete list of metals as shown in Table 5-2, Appendix I Parameters, and contained in NDEQ Title 132, "Integrated Solid Waste Management Regulations".

(6) HDPE = High Density Polyethylene

(7) Methods for individual metals may be from the 7000-series of methods. Refer to Table 5-2, Appendix I Parameters, for a listing of appropriate methods.

Table 6
Groundwater Sampling Summary[1]

Matrix	Laboratory Parameters	Samples[3]	Duplicate[3]	FB[6]	RB[6]	TB[4]
Groundwater	VOC's	9	1	-	-	1
Groundwater	Total Metals[5]	9	1	-	-	-
Groundwater	Ammonia as Nitrogen	9	1	-	-	-
Groundwater	COD	9	1	-	-	-
Groundwater	Chloride	9	1	-	-	-
	TDS	9				
Groundwater	Iron Sodium	9	1	-	-	-
Groundwater	TOC	9	1	-	-	-
Groundwater	TOX	9	1	-	-	-

Notes:
FB = Field Blank
RB = Rinsate Blank
TB = Trip Blank

(1) The following determinations will be performed in the field at the time of sample collection: groundwater elevation, pH, conductivity, turbidity, dissolved oxygen, redox potential, temperature, color and odor. Color is the field observation on filtered and unfiltered sample.

(2) Number of samples may vary based on actual number of monitoring wells at time of sampling activities. One sample per well is anticipated; 9 wells are currently proposed to be included in the detection monitoring system.

(3) Duplicate samples to be collected at a minimum frequency of one in every 10 samples.

(4) One TB to be submitted with each cooler containing VOC samples per sampling event.

(5) Includes the complete list of metals as shown in Table 5-2, Appendix I parameters, and contained in NDEQ Title 132.

(6) Required when non-dedicated sampling equipment (e.g., teflon bailer) is used.

6.2 Laboratory QA/QC

The laboratory is responsible for assuring the quality of all results obtained in the laboratory. The laboratory quality control practices shall meet or exceed the requirements of the methods previously presented in this section. The analytical laboratory report shall include a complete summary of quality control sample results.

Laboratory QA/QC activities shall include the use of standards, laboratory blanks, duplicates, and spiked samples for calibration and identification of potential matrix interferences in accordance with the requirements of the methods presented by Tables 3 and 4. Data from QA/QC samples (e.g., blanks, surrogates, spiked samples) shall be used as a measure of performance (e.g., accuracy and precision) and as an indicator of potential sources of cross-contamination but will not be used to alter or correct analytical data. The analytical laboratory must report the method blank, laboratory control and duplicate control sample, surrogate, and matrix spike/matrix spike duplicate QA/QC data with the groundwater monitoring analytical results to enable the data to be partially validated. The laboratory shall be required to provide a discussion of any problems encountered during the analysis and reporting process.

Additional QA/QC data and information (instrument calibration procedures, standard curve generation, etc.) shall be retained by the laboratory and made available to the City for a period of 3 years beyond the date of analysis in case complete data validation is required.

The laboratory QA/QC program for alternative analytical methods shall be at least as stringent as the requirements for those methods presented by Tables 3 and 4. In all cases, the reporting limits shall be equal to or less than the maximum contaminant levels (MCLs) established by NDEQ.

SECTION 7.0
RESULTS

7.1 General

Subsequent actions to be initiated in response to the discovery of a statistically significant increase in parameter concentration(s) are based on requirements of NDEQ Title 132, Chapter 7. Similarly, the statistical methods used to analyze the laboratory analytical results conform to NDEQ Title 132, Chapter 7. The analytical results must be reported to the City within 30 days of each sampling event. Each report shall contain the results of laboratory analysis, laboratory quality control data, field sampling documentation, and statistical analysis results.

7.2 Report Contents

The results of each groundwater-sampling event are anticipated to be submitted to NDEQ within 60 days of each field-sampling event. Each report is anticipated to contain, at a minimum, the following data and information:

- *General overview/purpose*
- *Sampling dates and conditions*
- *Wells sampled/parameters analyzed*
- *Key findings*
- *Summary of analytes by well*
- *Groundwater contour map with monitoring well locations showing groundwater gradients*
- *Monitoring well field notes by well*
- *Field/laboratory quality control*
- *Laboratory analytical results (hard copy and disk in NDEQ format)*
- *Statistical analysis report*

If statistically significant changes from background quality are observed, then verification sampling will be performed to confirm the statistically significant change. The procedures for verification sampling are discussed in Section 7.3.2 of this Scope of Services.

7.3 Statistical Analyses – Intra-Well

Title 132, Chapter 7 requires that a statistical analysis be used to analyze groundwater monitoring data. The statistical methods presented below are specified based on appropriateness and performance criteria established by Title 132 and use guidelines established by the U.S. Environmental Protection Agency (EPA) for statistical analysis of groundwater.

Once laboratory and field quality control data have been reviewed and data validation is completed, the groundwater monitoring data will be evaluated by statistical methods to determine whether statistically significant changes in the data have occurred.

The following discussion also presents information regarding verification sampling, handling outliers, and updating of historic data (background).

7.3.1 Statistical Analysis Methods

Background groundwater constituent concentrations have been established based on background data from each well. The approach to the statistical analysis of the data will involve an intra-well analysis. The intra-well analysis methods use Prediction Limits and/or Shewhart-Cumulative Sum (CUSUM) control charts.

Intra-well comparisons will be conducted by one of the following methods:

1. Use of combined Shewhart-Cumulative Sum (CUSUM) control charts requires the background data to be independent, normally distributed with a constant mean, X, and constant variance, S^2, and the assumption that a release from the landfill has not occurred. Normality will be tested by the Shapiro-Wilk test when there are 50 or fewer observations and by the Shapiro-Francia test for greater than 50 observations. The "…three Shewart-CUSUM parameters h (the value against which the cumulative sum will be compared), k (a parameter related to the displacement that should be quickly detected), and SCL (the upper Shewart limit which is the number of standard deviation units for an immediate release)" (Gibbons, 1994) will be set at h = SCL = 4.5 and k = 1 to provide approximately 95 percent confidence. Transformation of data will be limited to no more than log transformation.
2. Prediction limits for data with less than 15 percent nondetects.
3. Parametric prediction limits for data with between 15 and 50 percent nondetects and normal or transformed normal distribution.
4. Nonparametric prediction limits for data with between 50 and 90 percent nondects with non-normal distribution.
5. One-half the PQL's (Practical Quantitation Limit) as the prediction limit for data with greater than 90 percent nondetects.

A statistical decision tree is presented in Attachment 4. This decision tree presents a general procedure to follow when evaluating the data and selecting a statistical method.

7.3.1.1 Data with Less Than 15 Percent Nondetects

The full data set (detects and nondetects) is tested for normality using the Shapiro-Wilk method with 50 or fewer observations and by Shapiro-Francia method for greater than 50 observations. These two methods test how well the data fit normal distribution. Test statistic results are compared to tabulated values at the 95 percent confidence level. Data sets that are normally distributed will be analyzed by using parametric methods. If the data cannot be normalized even after appropriate transformations, then nonparametric methods are used.

Tabulated values depend on the number of background samples and range from 0 (randomly distributed data) to 1 (normally distributed data). If the test statistic is greater than the tabulated value, the data are considered to be normally distributed.

Combined Shewhart-CUSUM control charts and/or prediction limits will be constructed for each sampling event.

7.3.1.2 Results With Between 15 and 50 Percent Nondetects

Combined Shewhart-CUSUM control charts or parametric prediction limits are used with parameters that have less than 50 percent nondetects in the data set and the background data have a normal or transformed normal distribution. Transformation of the data will be limited to no more than log transformation. For the prediction interval analysis, a parametric approach establishes the prediction limit based on the mean plus the statistical value t (n-1, K, (1-α)) (Table 3 in Appendix B of the EPA April 1989 Guidance Document) multiplied by the standard deviation. The expression t (n-1, K, (1-α)) is based on a specified confidence level, the number of compliance points being compared, and the number of samples collected for background.

If the background data does not have a normal or transformed normal distribution using normality tests, then a nonparametric approach will be used.

7.3.1.3 Results With Between 50 and 90 Percent Nondetects

Parameters with between 50 and 90 percent nondetects have their background groundwater quality prediction limits determined by nonparametric statistical methods. Nonparametric methods are used because there are not enough detects results to determine the statistical distribution of the data. The nonparametric groundwater quality prediction limit is set at the highest of the reported background results based on EPA "Statistical Analysis of Groundwater Monitoring Data At RCRA Facilities, Interim Final Guidance."

The statistical confidence interval provided by nonparametric prediction limits depend on the number of background samples. Nonparametric prediction limits will be established after a total of four rounds of background samples from the background wells have been collected.

7.3.1.4 Results Greater than 90 Percent Nondetects

If at least 90 percent of the background results for a parameter are nondetect, one-half the PQL will be the groundwater quality prediction limit. Once all background results are collected, a table will be prepared listing the analytes not detected, the number of results, the detection limits used in the analyses, and the PQLs.

7.3.2 Verification Sampling

If statistical test results indicate a statistically significant change in the concentration from background data in downgradient wells, verification sampling will be performed as follows:

- For Appendix I parameters (Table 3) – Collect an additional sample and submit results within 90 days from the date of the original sample collection.
- For indicator parameters (Table 4) – Verification sampling will be considered the next Detection Monitoring event.

If verification sampling confirms that a statistically significant change is present, then an alternate source demonstration is recommended. The alternate source demonstration can include, but not be limited to, the following demonstrations: error in sampling, data entry error, source other than the landfill, statistical evaluation, landfill gas migration, or natural variation in groundwater quality caused the increase. If the alternate source demonstration explains, to the satisfaction of the NDEQ, the cause of the statistically significant change, then the Detection Monitoring program will continue. If NDEQ does not concur with the explanation, then Assessment Monitoring will be implemented.

7.3.3 Outliers

Based on EPA guidance, an evaluation of an outlier will be done only if an observation seems particularly high (several orders of magnitude) compared to the remainder of the data set. If a sample value is suspect, then an outlier test will be performed. The outlier test is performed on log-transformed data rather than the original observation data because lognormal distributed measurements can contain one or more values that appear high relative to the remainder of the data. An outlier should not be excluded from the data set unless a specific reason for the abnormal value can be determined. Explanations for the potential outlier could include lab instrument failure, field collection problems, or data entry errors. An outlier could also occur naturally as a result of temporal variability in the data. An outlier that cannot be explained as an erroneous value will be included in the data set.

7.3.4 Updating Historical Database

The recommended procedure by NDEQ for updating the historical database will be to add data from the semi-annual monitoring program events no more frequently than every 2 years for Indicator Parameters and every 4 years for Appendix I Parameters. Since the sampling program is on a semi-annual basis, this means that groups of four data points will be added to the historical database for each update period. Before the database is updated, the data to be added to the historical database will be evaluated for variability with the historical database. If the mean of the data to be added are not statistically different than the mean of the historical database, then the historical database will be updated. If the means of the two sets of data are statistically different, then the database will not be updated and subsequent semi-annual monitoring events will be evaluated for future updates of the historical database.

7.3.5 Other Analysis of Groundwater Data

Groundwater elevations at the Site may change over time. A periodic review of viable hydrogeologic data will be performed to determine if the above characterization and groundwater monitoring plan remain accurate. This will primarily involve constructing maps of potentiometric surfaces based on groundwater elevation data gathered from the piezometers and monitoring wells.

7.4 Assessment Monitoring

If required by NDEQ, assessment monitoring at the Site will be done in accordance with Title 132. Assessment monitoring will be initiated in the event that a verified statistically significant change by a specific chemical constituent (i.e., a verified detection of a VOC above its PQL or an inorganic monitoring parameter) occurs during the course of detection monitoring, and if alternate sources for the exceeded constituent are ruled out. Upon commencement of assessment monitoring, a groundwater sample will be collected only from the well (or wells) for which the verified statistically significant changes(s) was reported. This sampling will occur within a period of 90 days from the verified statistically significant change or failed alternate source demonstration.

Samples collected for assessment monitoring will be analyzed for the parameters listed in Table 7. In the event that no NDEQ Title 132, Appendix II parameters are detected in samples collected under assessment monitoring for two consecutive sampling events, then the well(s) will be reintroduced into the Detection Monitoring Program. Alternatively, if one or more of the parameters listed in Appendix II are verified to be present in collected groundwater samples, then routine (semi-annual) and annual assessment monitoring will consist of the detected Appendix II parameters and the approved detection monitoring parameters, in accordance with NDEQ regulations.

Table 7
Assessment Groundwater Monitoring Parameters

(1) Nebraska Title 132, Appendix II

(2) Agricultural chemical parameters from Section 3.0 of *Ground Water Monitoring Program for Municipal Solid Waste Disposal Areas*, including:

atrazine
alachlor
aldicarb
aldicarb sulfone
aldicarb sulfoxide
carbofuran
dalapon
diquat
endothall
glyphosate
oxamyl (vydate)
picloram (pichloroham)
simazine

ATTACHMENT 1

SOP NO. 204, GROUNDWATER SAMPLING

CITY OF GRAND ISLAND
GRAND ISLAND REGIONAL LANDFILL

STANDARD OPERATING PROCEDURES

FOR

GROUNDWATER SAMPLING

PROCEDURE NO. 204

GROUNDWATER SAMPLING

1.0 PURPOSE

The purpose of this procedure is to describe the groundwater micropurge sampling technique to be followed to establish that the groundwater samples obtained are representative of the environment they are intended to characterize.

2.0 APPLICABILITY AND SCOPE

The requirements of this procedure are applicable to the sampling of groundwater from a monitoring well. The scope of this document is limited to project activities involving the withdrawal, preparation, and delivery of groundwater samples from monitoring wells.

3.0 REFERENCES

3.1 SOP No. 222, Project Custody Documentation

3.2 SOP No. 224, Packing, Shipping, and Labeling

3.3 Scope of Services

3.4 Installation, Operation and Maintenance User's Guide, Well Wizard Dedicated Sampling Systems, QED Ground Water Specialists

3.5 Well Wizard Programmable Controller User's Guide, QED Ground Water Specialists

4.0 DEFINITIONS

4.1 Site Coordinator – Manages field operations, executes the work plan and schedule, enforces site control, and documents field activities and sample collection.

5.0 REQUIREMENTS

5.1 Prerequisites (Prior to Mobilization for Sampling Site)

5.1.1 Obtain all necessary equipment, identified in Attachment 6.1 or otherwise identified, prior to leaving for the site.

5.1.2 Obtain and read References 3.1 through 3.5 above.

5.2 Site Information

5.2.1 Obtain the information in Attachment 6.2 for each well. This information will be provided in a data packet prior to the first sampling event.

5.2.2 Contact the City's Representative in advance of sampling activities (if required).

5.2.3 Verify sample identification numbers; check numbers using the Scope of Services, Table 1.

Verify analytes to be analyzed.

Verify wells where duplicates or QC samples are to be taken.

Verify that the laboratory has supplied the trip blanks appropriate number and type of sample containers with preservatives. Adjust the number of bottles required for sampling. Where duplicate sample is required, two or more sets of samples are to be taken (sample and duplicate).

5.2.4 Review site-specific issues.

5.2.5 Obtain up-to-date site map with wells and other sampling locations marked.

5.2.6 Determine whether State or other regulatory agency representatives are expected for the sampling event. Discuss approaches for split samples or other requirements.

5.2.7 Obtain a list of the most recent depth-to-water measurements and use them as a guide. This may cut down on decontamination time for the water level measuring devices.

5.2.8 Obtain the proper quality of water for decon, if needed. Water sources containing analytes in excess of laboratory reporting levels will not be used for final rinse decontamination (e.g., use of distilled/deionized water is recommended).

5.3 Arrival On Sampling Site

Upon arriving at the site, identify yourselves to the City's Representative and sign-in (if required).

5.4 Approach to Well

Unlock well cap using graphite lubricant on the lock, if necessary. Refer to criteria listed in the Scope of Services; operate bladder pump according to manufacturer's recommendations. Calibrate all field measuring equipment (pH, conductivity, and turbidity in formation) according to manufacturer's specifications prior to each sampling event. Record instrument number or

serial number, calibration dates, time and person performing calibration, and measurements in the field logbook.

Record in the field logbook whether the cap or lock have been damaged or opened. Also, note any other conditions affecting well integrity. Notify the City's Representative as soon as possible to inform of the well's deficiencies.

5.5 Measure Depth To Water

The objective is to determine the depth to water to the nearest one hundredth of a foot (0.01 ft) at the wells. The elevation of the static water level can be calculated using the depth to water. Measurements may be obtained by using a static water level indicator (Tape) or dedicated pneumatic water level probe.

Measure and record the depth to water at each well before purging begins in any well. Depth-to-water measurements will be collected from all on-site monitoring wells within an 8-hour period of time.

5.5.1 Measurement Using Static Water Level Indicator

Measure the depth to water from the reference point provided in the data packet. Measurements should be taken to the point on the inner casing adjacent to a marking on the outer casing, if the inner casing is not marked. If the casing has a flush-mount cap for dedicated pump, then measurement is taken through the small diameter hole located in the middle of the cap.

The depth from the reference mark (or hole) needs to be calculated and recorded.

Rinse the standard electronic depth-to-water measuring device with DI water before lowering into well. Use care in lowering the probe so as not to tangle the water level probe in the dedicated pump tubing.

Decontaminate those parts of the measuring device that contacted the water with Alconox and rinse with DI water.

5.5.2 Record the depth to water (to the nearest one hundredth [0.01] of a foot) in the field logbook and on a Groundwater Monitoring/Sampling Log Form (see sample in Attachment 6.3), and compare to the last reading. Generally, the depth to water is anticipated to show similar changes between wells (i.e., higher or lower) and by similar amounts. Note unusual changes in the depth to water.

5.5.3 Measurement Using Dedicated Pneumatic Water Level Probe

If dedicated water level probes are installed in the monitoring wells, they will be QED Ground Water Specialists Model 6010E or similar. Refer to the User's Guide, available through the City.

Properly connect the water level control unit to water level probe air line fitting on well cap.

Begin controller operation according to the User's Guide.

Wait for instrument reading to stabilize (approximately 2 to 4 minutes). The reading is the depth of submergence of the water level probe tip below the static water level.

Record submergence level of water level probe tip.

5.5.4 Record the depth to water (to the nearest one hundredth [0.01] of a foot) in the field logbook and on a Groundwater Monitoring/Sampling Log Form (see sample in Attachment 6.3), and compare to the last reading. Generally, the depth of water is anticipated to show similar changes between wells (i.e., higher or lower) and by similar amounts. Note unusual changes in the depth to water.

5.6 Sampling Wells

5.6.1 Prerequisites, Set-up for Purging and Sampling

Plan to purge and sample in order to proceed from the most contaminated to the least contaminated or where no history of groundwater degradation exists, from the furthest upgradient well to the downgradient wells. When collecting downgradient, purge and sample from the farthest downgradient well to the downgradient well closest to the disposal area.

5.6.2 Low Flow/Micropurging Procedures

Micropurging involves pumping for a period of time in order to obtain a sample that is representative of the groundwater within the geologic formation.

If a bladder pump does not perform to its expected discharge rate (1.0 L/min), then one of the following conclusions can be made: the pump is not being operated properly, the water level is at the pump intake, or the pump is faulty. If the pump is determined to be faulty, discontinue purging until faulty equipment can be repaired or replaced.

To implement the micropurging strategy, several critical criteria must be met:

1. Grab sampling devices, such as bailers, cannot be used for micropurging.

2. The bladder pump will be operated at a low flow rate to minimize well drawdown to 0.3 foot or less, as much as possible. Some of the wells at the Grand Island Regional Landfill have slow recharge, making it difficult to achieve less than 0.3 feet of drawdown even at the low-flow pumping. The actual pumping rate used in any individual well will be dependent on well hydraulics, but this rate should be 1.0 L/min. or less.

3. Water quality parameters shall be monitored from the pump discharge tube to determine when stabilization of water chemistry occurs. The parameters of conductivity (or specific conductance), turbidity, temperature, pH, dissolved oxygen, redox potential, color, and odor will be monitored. Parameters shall be considered stabilized when measured values are within 10 percent variance or less for a period of 10 minutes for three successive readings. The amount of water purged prior to parameter stabilization will vary with well diameter but is typically less than one half of a bore volume.

4. The discharge rate, field parameters, and depth to water should be measured and recorded during purging. These values will be collected: 1) upon start of purging; 2) immediately prior to sampling; and 3) at 5 minute intervals during low-flow sampling. The values will be reported in a Groundwater Monitoring Sampling Log Form (see sample in Attachment 6.3).

To calculate discharge rate for bladder pumps, measure the time required to fill a bucket or other container of known volume.

Record the time in minutes and volume in gallons.

Record pump discharge rates and pump settings in the field logbook and on a Groundwater Monitoring Sampling Log Form (see sample in Attachment 6.3). Also, record any changes in the pump settings and the time at which the changes are made. This should eliminate much of the effort required to optimize the flow to eliminate well drawdown during the next sampling activity.

Detach and rinse extended purge tubing that extends from the well head. Use deionized/distilled water to decontaminate.

Do not sample through the extended purge tubing.

5.6.2.1 Bladder Pump

The bladder pump is an air or nitrogen gas driven device that pumps water to the land surface in pulses. The key to its use is to optimize the flow rate by correctly timing the pulses.

The purging system is powered by a driver/controller assembly, which is an oiless air compressor or nitrogen gas that sends filtered gas through a pneumatically-powered controller. An air line

runs from the controller to an air intake quick-connect nipple that protrudes from the well head adjacent to the discharge line.

During operation, drive gas is forced through the controller at 100 psi. During the pressure phase, the forced drive gas compresses the bladder that is driving the water toward the land surface. The drive gas does not contact the well water. During the vent cycle, the formation water refills the bladder. Five to 15 pumping cycles are typically required to purge the air from the pump and tubing before water begins to flow from the sample discharge line.

The setup procedure is as follows:

Inspect both the controller air hose and the water discharge lines. Verify that the exhaust valve is connected to the controller air hose. The air lines should be tightly connected and the well discharge should lead into a 5-gallon bucket. The well discharge tubing and elbow should be located on the well cap, with the elbow resting on the plate and the tubing within the well.

The compressor air tank should be full. Compressor pressure must be limited to a maximum of 120 psig to prevent damage to the controller limit.

Bottled gas should consist of compressed Nitrogen, of commercial/industrial grade or higher. The gas bottle must be equipped with a pressure regulator set to a maximum of 120 psig to prevent damage to the controller unit.

The greatest potential flow rate occurs when the air pulse (discharge) interval is exactly long enough to squeeze the total amount of water from the bladder and the intake interval equals the exact time necessary to fill the bladder.

To optimize pumping efficiency, do the following:

Adjust the refill and discharge cycles to 10 to 15 seconds each. Measure the water volume discharged during a single discharge cycle. The actual pumping rate used in any individual well will be dependent on well hydraulics, but this rate is typically 1.0 L/min. or less. Adjust the refill cycle time as appropriate.

Shorten the discharge cycle period (counter-clockwise knob adjustment) until the end of the discharge cycle begins to coincide with the end of the water flow from the pump outlet tube.

Shorten the refill cycle until the water volume of the discharge cycle decreases noticeably. Important -- a lag of two to three cycles precedes each noticeable change; therefore, care should be taken not to change the settings quickly. Also, these settings may have to be readjusted periodically to account for the changing water level above the pump during purging.

Measure and record the discharge rates and all pump settings in the field logbook and on a Groundwater Monitoring/Sampling Log Form (see sample in Attachment 6.3).

Detach and rinse the extended purge tubing prior to sampling.

5.6.3 Measure Depth to Water During Micropurging

Periodic depth to water measurements (Section 5.5) will be taken and recorded during purging to minimize drawdown to approximately 0.3 foot or less, as much as possible. Some wells have slow recharge making it difficult to achieve less than 0.3 feet of drawdown.

5.6.4 Sampling Procedures

NOTE: Personnel handling gasoline/motor oil will not be permitted to take samples or handle sample containers.

For slowly recovering wells, the well will be sampled as soon as a sufficient volume of groundwater has entered the well to enable the collection of groundwater samples. If a low-yielding well is encountered, the pumping rate should be adjusted to prevent evacuating the well to dryness.

If the well becomes dry prior to completion of the sampling event, the sampler will return to the well no more than 24 hours later. Upon return, the sampler will measure the depth of water in the well and calculate the volume of water present in the well casing. If this volume is sufficient, sampling will be completed. If the volume of water in the well casing is not sufficient, no additional sampling will be attempted, and any samples obtained will be sent to the laboratory. Whether or not sampling is completed, all occurrences and conditions will be recorded on the Sampling Log Form.

5.6.4.1 Sampling with a Bladder Pump

Sample discharge lines shall be Teflon.

Obtain sample immediately after purge parameters (conductivity, temperature, pH, dissolved oxygen, and redox potential) indicate stability.

5.6.4.2 Sampling Requirements

NOTE: Record the bottle lot numbers in the field logbook.

The sample bottles should be filled at a pumping rate of 100 mL/min. or less at each well in the order of the parameters' volatilization sensitivity:

1. Volatile Organics (VOCs)
2. Total Organic Halogens (TOX)

3. Total Organic Carbon (TOC)
4. Chemical Oxygen Demand (COD)
5. Total Metals
6. Chloride
7. Total Dissolved Solids (TDS)
8. Ammonia

Preserve sample in accordance with procedures outlined in Scope of Services, Table 5.

Seal and label the sample container.

Fill out the labels using the numbers provided by the Site Coordinator (on the chain-of-custody).

Attach labels and custody seals.

Place in a Ziploc plastic bag.

Record all pertinent information in the field logbook.

Complete the chain-of-custody form in accordance with SOP No. 222, Project Custody Documentation (Reference 3.1). Parameters requested on the chain-of-custody form should be the same as the labels on the samples bottles.

Verify that QC samples, such as duplicates, have been collected, as required. Try to return QC samples during the first shipment of samples from the site, particularly if sampling is to last more than 1 day.

Place the samples on ice in the coolers for shipping. See SOP No. 224 for additional shipping and packing information. Groundwater samples are to be considered environmental samples.

5.6.5 Duplicate Samples

Collect at least one set of duplicates for every 10 field samples. Field samples include samples of groundwater collected from wells.

Collect duplicates at a well selected by the Site Coordinator. If possible, the well should show previous degradation or have had questionable results.

To collect a duplicate, fill one set of bottles in addition to those required for the field sample.

5.6.6 Split Samples

Where NDEQ, EPA, or other regulatory agency representatives are expected to participate in sampling or are expected to take split samples, they should:

Abide by these sampling procedures; and,
Provide their own personal protective gear and sample containers.

Split samples will be relinquished when NDEQ, EPA, or other regulatory agency representatives are on site and provide the sample container. The Site Coordinator should document which samples were split, the agency, and the agency sample numbers in the field logbook. Also note the location and sample numbers for any additional samples collected by the agency.

5.7 Sampling Demobilization

During cold weather, check to see that the purge tubing from the bladder pump to the surface is draining. Lift the well plate and watch for the fluid level to drop in the tubing.

5.7.1 Packing, Shipping, and Labeling Samples

Groundwater samples collected from monitoring wells as described in this procedure are to be handled as environmental samples.

Follow instructions in SOP No. 224, Packing, Shipping, and Labeling (Reference 3.2).

5.7.2 Daily Reports (if required)

Meet with the Site Coordinator and discuss the daily sampling activities that occurred at the site and those scheduled for the next day.

Daily report will include:

Work completed (wells sampled)
Sample shipment
Equipment resupply requirements
Problems technical, personnel
Schedule for next day

Describe any operations that deviate from those described in this manual.

5.7.3 The Site Coordinator needs to check the field logbook(s) and Groundwater Monitoring/Sampling Form(s) (see sample in Attachment 6.3) daily to see that data have been clearly and accurately recorded.

5.7.4 Leave the site in good condition. Pick up disposable products and all supplies.

5.7.5 Sign out and notify site personnel that the team is leaving (if required).

5.8 Field Documentation

Carefully document each aspect of groundwater sampling. Use the field logbook and a Groundwater Monitoring/Sampling Log Form(s) (see sample in Attachment 6.3), if possible. Fill in the requested observations and measurements, most of which are also discussed in sections of this operating procedure.

Field logbooks will contain the following:

Name and location of site

Date(s) and times of sample collection or event

Names and affiliation of field team members

Field observations

Summary of equipment preparation procedures

Number and type of samples taken and sample identification numbers

A cross-reference of sample identification numbers to sampling points that are indicated on annotated maps

A description of sampling methodology by reference to the Scope of Services and/or appropriate SOP(s).

6.0 ATTACHMENTS

6.1 Equipment Checklist for Groundwater Sampling

6.2 Sample, Well, and Pump Specification Checklist

6.3 Groundwater Monitoring/Sampling Log Form

ATTACHMENT 6.1

EQUIPMENT CHECKLIST FOR GROUNDWATER SAMPLING

---

1. **Logistical Items**

_____ Personal protective gear
_____ Site map - showing wells, sampling order if any noted
_____ Well keys
_____ Graphite - for locks
_____ Toolbox - chisel, hammer and tape
_____ Watch/clock
_____ Rinse bottle
_____ Trash bags
_____ Paper towels
_____ DI water
_____ Carboy for transporting decontamination water (if required)

2. **Paper Work**

_____ Sample, Well and Pump Specifications Packet
_____ Field logbook and indelible marker, preferably ball point pen (black ink), do not use Pilot pens

3. **Measuring Equipment**

_____ Water level probes
_____ Purging instrumentation with calibrated pH, conductivity, temperature, dissolved oxygen and redox potential electrodes
_____ Graduated cylinder
_____ 5-gallon plastic bucket

4. **Sampling Equipment**

_____ Sample bottles - including trip blanks and bottles for QC samples
_____ Air compressor or bottled Nitrogen gas for bladder pump
_____ Air supply line
_____ Maintenance materials (spare bladders etc.)
_____ Extended purging tubing: tubing for bladder pumps (if needed)
_____ Shipping materials - including: Coolers
_____ Labels
_____ Ice
_____ Chain-of-Custody forms
_____ Ziploc bags
_____ Packing tape

ATTACHMENT 6.2

SAMPLE, WELL, AND PUMP SPECIFICATIONS CHECKLIST

Verify the following for all wells at the site.

Personnel Data -

City's Representative

___ Name
___ Phone, office
___ Phone, evening

Site Coordinator

___ Name
___ Phone, office
___ Phone, evening

Environmental Technician

___ Name
___ Phone, office
___ Phone, evening

Well Data - All wells

___ Well identification
___ Recent Depth to water
___ Analyses
___ Purge water disposal
___ Well depth (TOC) (ft)
___ Inner casing depth (TOC) (ft)
___ Inner casing diameter (in)
___ Open borehole diameter (in)
___ Screened interval (top-bottom)
___ Sample pump depth
___ Max depth to water during purging
___ Other Data
___ Locations
___ Identification
___ Analytes
___ Sampling procedure
___ Domestic Well Water Samples
___ Location
___ Identification
___ Analytes
___ Sampling procedure

ATTACHMENT 6.3
GROUNDWATER MONITORING/SAMPLING LOG FORM

Facility Name:	Sampler Name(s):
Monitoring Well Identification/Number:	Date/Time:
Sample Number:	Weather Conditions:
PID Readings:	Wellhead inspection (note conditions):

Visual Inspection:

1. Survey Mark Present: (Yes/No) _____
2. Collision/Vandalism Damage: (Yes/No) _____
3. Casing Degradation: (Yes/No) _____
4. Well Subsidence: (Yes/No) _____
5. Standing/Ponded Water (Yes/No) _____
6. Frost Heaving (Yes/No) _____
7. Lock in Place (Yes/No) _____

Ground Water Measurements and Purge Data:

1. Static Water Level (±0.01 ft.) _____
2. Bottom of casing (±0.01 ft.) _____
3. Casing Diameter (inches) _____
4. Casing Volume (gal) _____
5. 3 X Casing Volume (gal) _____
6. Actual Volume of Water Purged (gal) _____

6a. Purge Water Characteristics: Odor _____
Color _____
Turbidity _____

7. Water Level Measuring Equipment _____
8. Purge Equipment Used _____
9. Dedicated? (Yes/No) _____
10. Purge rate (if pump used)(gpm) _____
11. Time to purge well _____
12. Immiscible layer observed (Yes/No) _____
13. Thickness of immiscible layer (if present) _____
14. Drive Gas (Air/Nitrogen) _____

Time	Volume Purged (gal)	Temperature (˚C)	Conductivity (µS/cm)	ORP (mV)	D.O. (mg/L)	pH	Turbidity (NTU)	Notes

Well evacuated to dryness? (Yes/No) _____ Time to recharge _____ hrs. _____ min.

1. Sample Filtered? (Yes/No) _____
2. Sampling Equipment Used _____
3. Drive Gas (Air/Nitrogen) _____
4. Pump Rate _____
5. Sample Appearance _____
   Turbidity (High/Med/Low/Clear) _____
   Color _____
   Odor _____
6. Method of Sample Preservation:

Notes:

Other Information:

Decontamination Procedures _____
_____
Instrument Type: _____
Instrument Calibration Date: _____
Instrument Calibration Time: _____
pH Standard (S.U.) _____
Reading (S.U.) _____
Adjustment (S.U.) _____
Conductivity Standard (µS/cm) _____
Reading (µS/cm) _____
ORP Standard (mV) _____
Reading (mV) _____
D.O. Standard Slope _____
Reading _____
Turbidity Standard (NTU) _____
Reading (NTU) _____

ATTACHMENT 2

SOP NO. 222, PROJECT CUSTODY DOCUMENTATION

CITY OF GRAND ISLAND
GRAND ISLAND REGIONAL LANDFILL

STANDARD OPERATING PROCEDURES

FOR

PROJECT CUSTODY DOCUMENTATION

PROCEDURE NO. 222

PROJECT CUSTODY DOCUMENTATION

1.0 PURPOSE

The purpose of this document is to describe the requirements for completing a chain-of-custody form in order to verify that there is an accurate and complete record of the chain-of-custody for all samples collected.

2.0 APPLICABILITY AND SCOPE

The requirements of this procedure are applicable to those project activities involved with the acquisition of samples for laboratory analysis. The scope of activities identified by this procedure is limited to work performed under the Scope of Services.

Procedures described in this SOP may include activities beyond those required for regulatory compliance monitoring.

3.0 REFERENCES

3.1 Scope of Services

3.2 SOP No. 224, Packing, Shipping, and Labeling

4.0 DEFINITIONS

4.1 Chain-of-Custody

The method of documenting sample identification, location, specific considerations, and the sample custodian from the time the sample is collected until samples are received by the laboratory.

5.0 REQUIREMENTS

5.1 Custody Transfer Record

5.1.1 A Chain-of-Custody form (see sample in Attachment 6.1) will be initiated and completed during collection of the sample.

5.1.2 Possession of every sample will be recorded from the time of collection until the analytical results are received by the laboratory.

5.1.3 The Site Coordinator will be responsible for proper completion of the Chain-of-Custody form.

5.2 Completing the Chain-of-Custody Form

5.2.1 Use a black ball point pen as blue does not photocopy as well. Press firmly because the form has multiple pages.

5.2.2 Record the Project name in the spaces designated for "Project name" (see Attachment 6.1).

5.2.3 Record the appropriate Project number in the space designated for "Project No."

5.2.4 Complete field sample identification code (see Reference 3.1) in the block labeled "Field Sample Number." List each sample once and only once. Be especially careful when more than one bottle is required to meet analytical requirements. Distinguish the number zero from the letter O by drawing a slash through the number zero (Ø).

5.2.5 Field duplicate samples and QC samples are assigned unique sample identification numbers and are considered separate samples; therefore, record each field duplicate sample and QC sample on a separate line.

5.2.6 Record the collection date for each sample.

5.2.7 Record the number of sample containers under "No. of Containers."

5.2.8 Record the preservation methods. This includes the addition of ice to coolers (i.e., "40C").

5.2.9 List the specific analyses requested. Use a separate column for each analysis. If extra space is needed, use an asterisk and list the additional analyses under the heading "Remarks."

5.2.10 Record the number of sample bottles submitted for each analysis under the appropriate "Parameter" for each sample identification number. The total of the sample bottles listed under the individual parameters should equal the number of containers listed under "No. of Containers."

5.3 Documenting Changes and Errors Prior to Custody Transfer

5.3.1 Cross out with a single line and initial any information incorrectly entered on the Chain-of-Custody form, such as for samples that have not actually been collected or will not be included in that particular shipment.

5.3.2 Cross out and initial any entries that have errors or are illegible. Legibility is very important. Rewrite the correct and legible entry on a separate line.

5.3.3 Verify all numbers. Call laboratory for any changes noted after shipment.

5.4 Quality Review in the Field

5.4.1 Cross-check the sample identification numbers on the Chain-of-Custody form with those entered on the labels of the sample containers.

5.4.2 The Site Coordinator is to perform a detailed review of the completed Chain-of-Custody form.

5.4.3 Verify the legibility of the last (bottom) page of the Chain-of-Custody form.

5.5 Documenting Transfer of Sample Custody

5.5.1 In the case of more than one cooler per shipment, the coolers to be prepared for shipment should be numbered and recorded in the field logbook. The Chain-of-Custody form(s) associated with each cooler should indicate the cooler number and the forms should be given sheet numbers (i.e., Sheet 1 of 3).

5.5.2 The Chain-of-Custody form will accompany the samples at all times while the samples are in transit.

5.5.3 All individuals relinquishing and receiving samples will sign, date, and indicate the time in the lower portion of the Chain-of-Custody form.

5.5.4 Maintain the last page of the form set as a record of field custody transfer.

5.6 Custody Transfer in the Laboratory

5.6.1 A designated lab employee will receive the samples at the laboratory. The individual relinquishing the samples will sign and date the release, and the lab representative will sign the Chain-of-Custody form, indicating acceptance of the samples.

5.6.2 The Chain-of-Custody form will accompany samples sent to laboratories for analysis. Sample custody will be documented by individuals relinquishing and receiving samples.

5.6.3 The original of the completed Chain-of-Custody form will be maintained at the laboratory. A copy of the completed Chain-of-Custody form will be maintained by the project.

5.7 Documenting Changes After Custody Transfer

5.7.1 Errors on the Chain-of-Custody form, discovered after custody transfer, can be corrected by contacting Site Coordinator and notifying the laboratory as soon as possible.

6.0 ATTACHMENTS

6.1 Example of Chain-of-Custody form

ATTACHMENT 3

SOP NO. 224, PACKING, SHIPPING, AND LABELING
CITY OF GRAND ISLAND
GRAND ISLAND REGIONAL LANDFILL

STANDARD OPERATING PROCEDURES

FOR

PACKING, SHIPPING, AND LABELING

PROCEDURE NO. 224

PACKING, SHIPPING, AND LABELING

1.0 PURPOSE

The purpose of this document is to describe the requirements to verify proper packing for sample preservation and compliance with International Air Transportation Association (IATA) Dangerous Goods Regulations.

2.0 APPLICABILITY AND SCOPE

This procedure is applicable only to samples shipped under IATA regulations for environmental samples or other regulated substances and under Department of Transportation (DOT) regulations for compressed non-flammable gases. Environmental samples that are to be shipped locally should receive the same packing, shipping, and labeling procedures as those defined by this SOP.

The scope includes requirements for labeling, packing, and shipping of environmental samples, hazardous materials samples, and/or compressed non-flammable gases.

This procedure is not applicable to shipments of poisons, radioactive materials, explosives, biological hazards, flammable gases, etc.

Procedures described in this SOP may include activities beyond those required for regulatory compliance monitoring. The extent of project activities identified by this procedure is under the direction of the Site Coordinator.

3.0 REFERENCES

3.1 IATA Dangerous Goods, Regulations

3.2 SOP No. 222, Project Custody Documentation

3.3 Scope of Services

4.0 DEFINITIONS

4.1 Environmental Samples

In general, environmental samples are collected from the monitoring wells and surface waters.

4.2 Hazardous Material Samples

No hazardous material samples are anticipated to be collected.

5.0 REQUIREMENTS

5.1 Prerequisites

5.1.1 Check with the Site Coordinator regarding the sample types, compounds, concentration ranges anticipated, and questions about shipping samples.

5.1.2 Verify classification of samples with the Site Coordinator.

5.1.3 Obtain packing, shipping, and labeling materials (examples are listed in Appendix 6.1).

5.1.4 Verify holding times and preservatives required.

5.2 Environmental Samples

Environmental samples should be prepared for shipment in the following manner. Hand delivery should follow similar packing procedures.

5.2.1 Collect sample in specified container and provide complete sample identification information required on the label; refer to Scope of Services. Wipe sample containers with disposable wipe, if appropriate.

** NOTE: BE SURE YOU HAVE RECORDED THE BOTTLE LOT NUMBER IN THE FIELD LOGBOOK.

5.2.2 Place labeled sample container in Ziploc bag and seal. Use one bag per sample container.

5.2.3 Place samples in a cooler. Surround samples with packing material for stability during transport.

5.2.4 Place sufficient ice (approximately 10 lbs) in the cooler for sample preservation.

5.2.5 Secure the Chain-of-Custody form as described in Section 5.2.10 when shipping the samples by a public carrier.

5.2.6 Secure the cooler lid with packing tape.

5.2.7 Place completed custody seal on two opposite sides of the lid.

5.2.8 Place upward pointing arrow label on all four sides of the cooler (see Attachment 6.2).

5.2.9 Ship samples to the attention of:

"Environmental Samples"

Name of Laboratory
Address of Laboratory
Contact: Name of Person

IMPORTANT: Before samples are relinquished, record date and time on Chain-of-Custody and obtain the signature of the person to whom samples will be relinquished (see SOP No. 222, Project Custody Documentation [Reference 3.2]), if possible.

5.2.10 Shipping by Public Carrier

If the cooler is being shipped by a public carrier, such as Federal Express or UPS, seal the Chain-of-Custody inside a Ziploc bag and tape it to the inside of the cooler lid.

IMPORTANT: Record date, time, and name of carrier that samples will be relinquished to on the completed Chain-of-Custody before sealing it in the cooler (see SOP No. 222, Project Custody Documentation [Reference 3.2]).

5.2.11 Document activities related to shipping in the field logbook. This includes:

- Method of transportation, such as Federal Express, UPS, etc.
- Freight bill number and a copy of the invoice.
- Number of coolers and associated Chain-of-Custody forms.

6.0 ATTACHMENTS

6.1 Materials Checklist

6.2 Shipping Container Label Placement for Shipment of "Environmental Sample" and "Hazardous Material Samples" Class Samples

ATTACHMENT 6.1

MATERIALS CHECKLIST

_____ Duct Tape

_____ Packing Tapes

_____ Custody Seals

_____ Metal Cans

_____ Coolers

_____ Ice (10 lbs. min.)

_____ Permanent Markers

_____ Mailing Labels

_____ Vermiculite

_____ Ziploc Bags (gallon and pint sizes)

_____ Labels:

Up Arrows
"This End Up"
"Other Regulated Substances, UN#8027, Class #9
"Inside Packages Comply with Prescribed Specifications"
"Cargo Aircraft Only"

_____ Shipping Form (i.e., Federal Express)

_____ Dangerous Goods Form (i.e., Federal Express)

_____ Dangerous Goods Shipping Form (General)

ATTACHMENT 4

Statistical Decision Tree

Statistical Decision Tree