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GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

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October 28, 2011

Mr. Ty M. Johnson, P.E.
HDR Engineering, Inc.
626 Columbia Street NW
Olympia, WA 98501

RE: REVISED RECOMMENDATIONS FOR HOQUIAM WASTEWATER TREATMENT PLANT FORCE MAIN REPLACEMENT, ADAMS STREET TO AIRPORT WAY, HOQUIAM, WASHINGTON

Dear Ty:

This letter presents the results of subsurface explorations and our recommendations for the Hoquiam Wastewater Treatment Plant (WWTP) force main replacement project in Hoquiam, Washington. Our scope of services for this project included:

- Observing four test pits;
- Performing geotechnical laboratory testing;
- Performing engineering analyses; and
- Preparing this letter report.

We performed these services in general accordance with our proposal dated July 22, 2011. This letter revises our October 21, 2011, letter. Revisions include updating the project description and backfill recommendations.

PROJECT DESCRIPTION

The proposed force main would extend along Airport Way, from about Paulson Road to S Adams Street. The proposed force main would connect to another force main (currently under construction) which extends to the WWTP. The proposed force main would be polyvinyl chloride, 24 inches in diameter, and would convey wastewater to the WWTP. The invert of the pipe will be about 6 feet below the existing grade. Figure 1 shows the proposed location of the force main.

Revised 10/28/2011
21-1-21000-004

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SUBSURFACE EXPLORATIONS AND LABORATORY TESTING

We observed excavation of four test pits to evaluate the subsurface conditions along the force main. The City of Hoquiam provided a backhoe and operator, and excavated the test pits on September 20, 2011. The test pits extended to about 8 feet below ground surface (bgs).

A Shannon & Wilson representative logged and obtained selected soil samples from each test pit. Figure 1 shows the approximate test pit locations, Figure 2 presents a soil classification key for the test pits, and Figures 3 through 6 present the test pit logs.

We performed geotechnical laboratory tests on selected soil samples. The soil tests included visual classification, natural water content, and fines content analyses. The Shannon & Wilson laboratory in Seattle, Washington, performed the tests in general accordance with ASTM International standards. Figure 7 presents the laboratory testing results.

SUBSURFACE CONDITIONS

Test pits TP-1 and TP-2 encountered:

- Loose to dense, silty sand and gravel from the ground surface to about 3 to 4 feet bgs; and
- Soft to medium stiff, gray silt and clay from 3 to 4 feet bgs to the bottom of the test pits (about 8 feet).

Test pits TP-3 and TP-4 encountered:

- Dense sand and gravel from the ground surface to about 4 feet bgs;
- Two (2)- to 3-foot-diameter boulders at about 4 to 5 feet bgs; and
- Loose sand and gravel from about 4 to 5 feet bgs to the bottom of the test pits (about 8 feet).

Test pits TP-1 and TP-2 encountered groundwater seepage at about 8 feet bgs. Test pit TP-3 encountered groundwater seepage at about 6 feet bgs. Test pit TP-4 did not encounter groundwater.

ENGINEERING CONCLUSIONS AND RECOMMENDATIONS

Utility Trenching

Utility trenching should be accomplished in accordance with the Washington State Department of Transportation (WSDOT) and American Public Works Association (APWA) 2010 Standard Specifications. We anticipate that conventional equipment such as a backhoe or excavator will be appropriate for excavating the trenches. Test pits TP-3 and TP-4 encountered 2- to 3-foot diameter boulders about 4 to 5 feet bgs; however, the test pit excavator was able to remove the boulders and continue excavating. We recommend removing boulders encountered within 1 foot of the pipe invert elevation, and replacing the boulders with compacted pipe bedding.

We observed groundwater seepage at a depth of 6 to 8 feet bgs. The groundwater depth will likely vary seasonally. Trenching will likely encounter groundwater seeping at a relatively low rate along most of the trench alignment. However, the groundwater seepage rate into the trench may be locally greater (e.g, test pit TP-3 encountered a higher flow rate).

If groundwater seepage is encountered, excavation equipment may disturb exposed subgrade soil. The contractor should take precautions to prevent subgrade disturbance. If the subgrade becomes disturbed due to wet conditions, we recommend:

- Using sumps or other methods to remove water from the trenches;
- Excavating and removing disturbed soil below the utility bedding level; and
- Using 2- to 4-inch quarry spalls to backfill the overexcavation and stabilize the subgrade.

Backfill utility trenches with structural fill compacted as described below. Leave sufficient cover over the pipe so that heavy compactors do not damage the pipe during backfill compaction.

Temporary shoring, such as trench boxes, will likely be required for the utility trench excavations. Trench boxes do not provide lateral support for excavations because they are inserted in the trench after it is excavated and generally are not placed tight against the trench walls. Therefore, the soil of the trench walls could slough and cave against the trench box. Ground surface settlement could occur about as far from the trench edge as the depth of the trench. Trench boxes or other similar protection systems should be designed for an active earth pressure of 40 pounds per cubic foot.

Pipe Bedding and Backfill

Based on the laboratory testing results and the soil exposed in the test pits, the existing sand and gravel soil (from the ground surface to about 4 feet bgs) could be re-used as backfill during dry weather. The sand and gravel should not be used as pipe bedding. Other site soil, including the silt and clay in TP-1 and TP-2 and the boulders in TP-3 and TP-4, is unsuitable for re-use as backfill or pipe bedding.

We recommend using imported structural fill as pipe bedding. We recommend using imported structural fill as backfill if native material is not used. Imported structural fill should:

- Consist of a well-graded mixture of sand and gravel;
- Be free of organics and debris;
- Have a moisture content within ±2 percent of its optimum; and
- Have a maximum particle size of 1½ inches.

An example of a suitable fill soil gradation from the WSDOT and APWA 2010 Standard Specifications is Gravel Backfill for Pipe Zone Bedding, Section 9-03.12(3).

Fill Placement and Compaction

Before placing structural fill, we recommend removing water from the trench. We recommend placing structural fill in uniform lifts, and compacting the fill to a dense and unyielding condition, at least 95 percent of the Modified Proctor maximum dry density (ASTM International D 1557-70).

Lift thickness should not exceed 12 inches for heavy equipment compactors or 6 inches for hand-operated mechanical compactors.

LIMITATIONS

This letter report was prepared for the exclusive use of HDR Engineering, Inc. and the Hoquiam WWTP design team. It should be made available to prospective contractors for information on factual data only, and not as a warranty of subsurface conditions such as those interpreted from the exploration logs and presented in the discussions of subsurface conditions included in this report.

Within the limitations of the scope, schedule, and budget, the analyses, conclusions, and recommendations presented in this letter report were prepared in accordance with generally accepted professional geotechnical engineering principles and practice in this area at the time this letter report was prepared. We make no other warranty, either expressed or implied.

The analyses, conclusions, and recommendations contained in this letter report are based on site conditions as they presently exist, and further assume that the explorations are representative of the subsurface conditions throughout the project site; that is, the subsurface conditions everywhere are not significantly different from those disclosed by the explorations. Our conclusions and recommendations are based on our understanding of the project as described in this report and the site conditions as interpreted from the explorations.

If, during final design and construction, subsurface conditions different from those encountered in the field explorations are observed or appear to be present, we should be advised at once so that we could review these conditions and reconsider our recommendations where necessary. If there is substantial lapse of time between the submission of this letter report and the start of work at the site, or if conditions have changed because of natural forces or construction operations at or adjacent to the site, we recommend that this letter report be reviewed to determine the applicability of the conclusions and recommendations concerning the changed conditions or the time lapse.

Unanticipated soil conditions are commonly encountered and cannot fully be determined merely by taking soil samples from a limited number of soil test pits. Such unexpected conditions frequently require that additional expenditures be made to attain properly constructed projects. Therefore, some contingency fund is recommended to accommodate such potential extra costs.

The scope of our geotechnical services did not include any environmental assessment or evaluation regarding the presence or absence of hazardous or toxic materials in the soil, surface water, groundwater, or air on or below the site, or any evaluation for disposal of contaminated soils or groundwater.

Shannon & Wilson, Inc. has prepared a document, "Important Information About Your Geotechnical/Environmental Report," to assist you and others in understanding the use and limitations of our reports. This document is enclosed with this letter report.

We trust that this information meets your current needs. Please call if you have questions.

Sincerely,

SHANNON & WILSON, INC.

JEREMY NICHOLAS BUTKOVICH
STATE OF WASHINGTON
45197
REGISTERED
PROFESSIONAL ENGINEER
10/28/2011

Jeremy N. Butkovich, P.E.
Principal Engineer

JNB:MWP/jnb

Enc: Figure 1 – Site and Exploration Plan
Figure 2 – Soil Classification and Log Key
Figure 3 – Log of Test Pit TP-1
Figure 4 – Log of Test Pit TP-2
Figure 5 – Log of Test Pit TP-3
Figure 6 – Log of Test Pit TP-4
Figure 7 – Grain Size Distribution
Important Information About Your Geotechnical/Environmental Report

Filename: J:\211\21000-004\21-1-21000-004 Fig 1 Site.dwg Date: 10-20-2011 Login: lr

0 500 1000

Approximate Scale in Feet

LEGEND

TP-1 Test Pit Designation and Approximate Location

NOTE

Map adapted from aerial imagery provided by Google Earth Pro, reproduced by permission granted by Google Earth ™ Mapping Service.

Hoquiam Wastewater Treatment Plant
Adams Street to Airport Way Force Main
Hoquiam, Washington

SITE AND EXPLORATION PLAN

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FIG. 1

FIG. 1

Shannon & Wilson, Inc. (S&W), uses a soil classification system modified from the Unified Soil Classification System (USCS). Elements of the USCS and other definitions are provided on this page. Soil descriptions are based on visual-manual procedures (ASTM D 2488) unless otherwise noted.

S&W CLASSIFICATION OF SOIL CONSTITUENTS

- MAJOR constituents compose more than 40 percent, by weight, of the soil. Major consituents are capitalized (i.e., SAND).
- Minor constituents compose 12 to 50 percent of the soil and precede the major constituents (i.e., silty SAND). Minor constituents preceded by "slightly" compose 5 to 12 percent of the soil (i.e., slightly silty SAND).
- Trace constituents compose 0 to 5 percent of the soil (i.e., slightly silty SAND, trace of gravel).

GRAIN SIZE DEFINITION

DESCRIPTION	SIEVE NUMBER AND/OR SIZE
FINES	< #200 (0.8 mm)
SAND*	
- Fine	#200 to #40 (0.8 to 0.4 mm)
- Medium	#40 to #10 (0.4 to 2 mm)
- Coarse	#10 to #4 (2 to 5 mm)
GRAVEL*	
- Fine	#4 to 3/4 inch (5 to 19 mm)
- Coarse	3/4 to 3 inches (19 to 76 mm)
COBBLES	3 to 12 inches (76 to 305 mm)
BOULDERS	> 12 inches (305 mm)

** Unless otherwise noted, grain size varies from fine to coarse.*

MOISTURE CONTENT DEFINITIONS

Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, from below water table

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) (From USACE Tech Memo 3-357)

MAJOR DIVISIONS			GROUP/GRAPHIC SYMBOL		TYPICAL DESCRIPTION
COARSE-GRAINED SOILS *(more than 50% retained on No. 200 sieve)*	Gravels *(more than 50% of coarse fraction retained on No. 4 sieve)*	Clean Gravels *(less than 5% fines)*	GW		Well-graded gravels, gravels, gravel/sand mixtures, little or no fines
			GP		Poorly graded gravels, gravel-sand mixtures, little or no fines
		Gravels with Fines *(more than 12% fines)*	GC		Silty gravels, gravel-sand-silt mixtures
			GW		Clayey gravels, gravel-sand-clay mixtures
	Sands *(50% or more of coarse fraction passes the No. 4 sieve)*	Clean Sands *(less than 5% fines)*	SW		Well-graded sands, gravelly sands, little or no fines
			SP		Poorly graded sand, gravelly sands, little or no fines
		Sands with Fines *(more than 12% fines)*	SM		Silty sands, sand-silt mixtures
			SC		Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS *(50% or more passes the No. 200 sieve)*	Silts and Clays *(liquid limit less than 50)*	Inorganic	ML		Inorganic silts of low to medium plasticity, rock flour, sandy silts, gravelly silts, or clayey silts with slight plasticity
			CL		Inorganic clayss of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		Organic	OL		Organic silts and organic silty clays of low plasticity
	Silts and Clays *(liquid limit 50 or more)*	Inorganic	MH		Inorganic clays or medium to high plasticity, sandy fat clay, or gravelly fat clay
			CH		Inorganic silts, micaceous or diatomaceous fine sands or silty soils, elastic silt
		Organic	OH		Organic clays of medium to high plasticity, organic silts
HIGHLY-ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor		PT		Peat, humus, swamp soils with high organic content (see ASTM D 4427)

NOTES

1. Dual symbols *(symbols separated by a hyphen, i.e., SP-SM, slightly silty fine SAND)* are used for soils with between 5% and 12% fines or when the liquid limit and plasticity index values plot in the CL-ML area of the plasticity chart.

2. Borderline symbols *(symbols separated by a slash, i.e., CL/ML, silty CLAY/clayey SILT; GW/SW, sandy GRAVEL/ gravelly SAND)* indicate that the soil may fall into one of two possible basic groups.

Hoquiam Wastewater Treatment Plant
Adams Street to Airport Way Force Main
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SOIL CLASSIFICATION AND LOG KEY

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FIG. 2

Filename: J:\211\21000-004\21-1-21000-004 TPs.dwg Date: 10-20-2011 Login: lr

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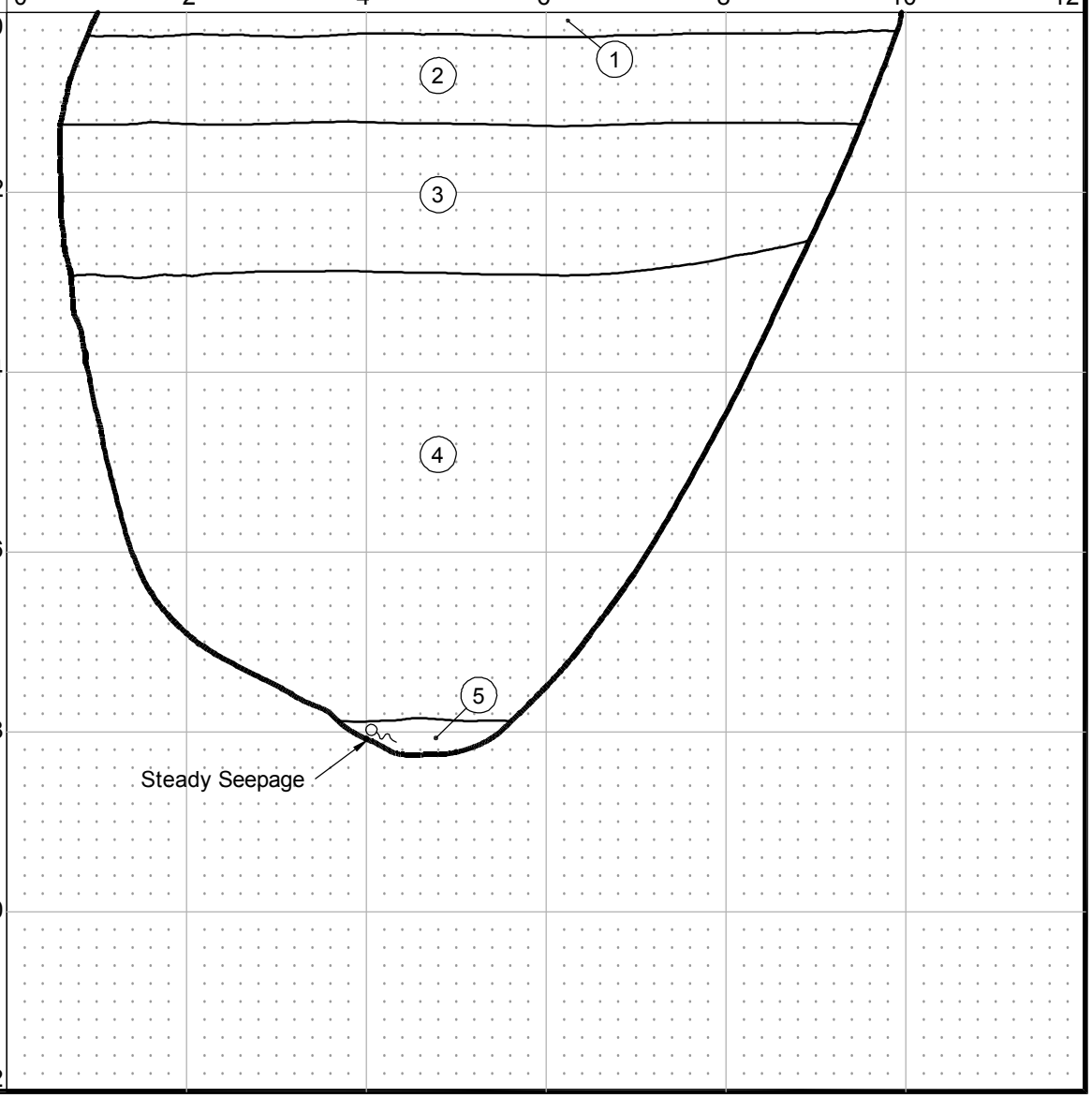
LOG OF TEST PIT TP-1

JOB NO: 21-1-21000-004 DATE: 9-20-2011 LOCATION: See Site and Exploration Plan

PROJECT: Lagoon Biosolids Management Project Adams Street to Airport Way

SOIL DESCRIPTION	Ground Water	% Water Content	Samples	Depth, Ft.
(1) Loose, brown, fine sandy SILT; moist; abundant roots.			S-1 (Jar)	0
(2) Dense, brown, slightly silty, gravelly SAND; moist.		11.5	S-2 (Jar)	2
(3) Loose, brown, trace to slightly silty, fine to medium SAND, trace gravel; moist; scattered organics and wood debris.				
(4) Soft, gray, fine to medium sandy SILT; wet.			S-3 (Jar)	4
(5) Loose, gray, slightly silty to silty, fine to medium SAND; wet.				6
	▽		S-4 (Jar)	8
				10
				12

Sketch of South Pit Side Surface Elevation:



NOTE

City of Hoquiam provided backhoe for excavations.

FIG. 3

Filename: J:\211\21000-004\21-1-21000-004 TPs.dwg Date: 10-20-2011 Login: lr

SHANNON & WILSON, INC.
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LOG OF TEST PIT TP-2

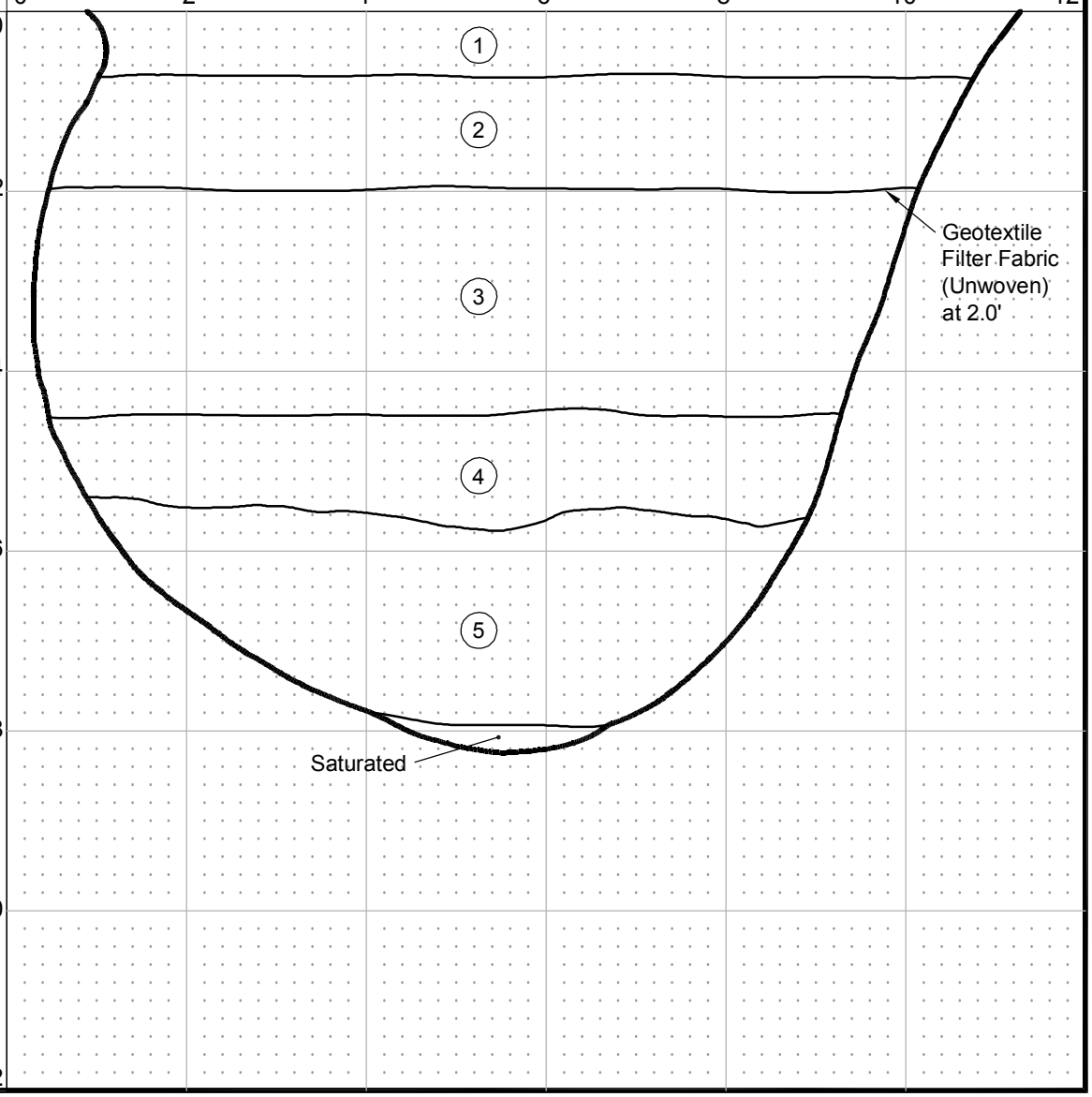
JOB NO: 21-1-21000-004 DATE: 9-20-2011 LOCATION: See Site and Exploration Plan

PROJECT: Lagoon Biosolids Management Project Adams Street to Airport Way

SOIL DESCRIPTION	Ground Water	% Water Content	Samples	Depth, Ft.
(1) Dense, brown, slightly silty, gravelly SAND; moist.			S-1 (Jar)	0
(2) Dense, brown, slightly silty, sandy GRAVEL, scattered cobbles; moist.		5.2	S-2 (Bag)	
(3) Dense, brown, silty, sandy GRAVEL, frequent cobbles; moist.				2
(4) Medium stiff, brown, slightly gravelly, slightly fine sandy, silty CLAY; wet; scattered organics.				4
(5) Loose, silty, fine to medium SAND; wet.			S-3 (Jar)	6
	▽		S-4 (Jar)	8
				10
				12

Sketch of South Pit Side Surface Elevation:

Horizontal Distance in Feet



NOTE

City of Hoquiam provided backhoe for excavations.

FIG. 4

Filename: J:\211\21000-004\21-1-21000-004 TPs.dwg Date: 10-20-2011 Login: lr

SHANNON & WILSON, INC.
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LOG OF TEST PIT TP-3

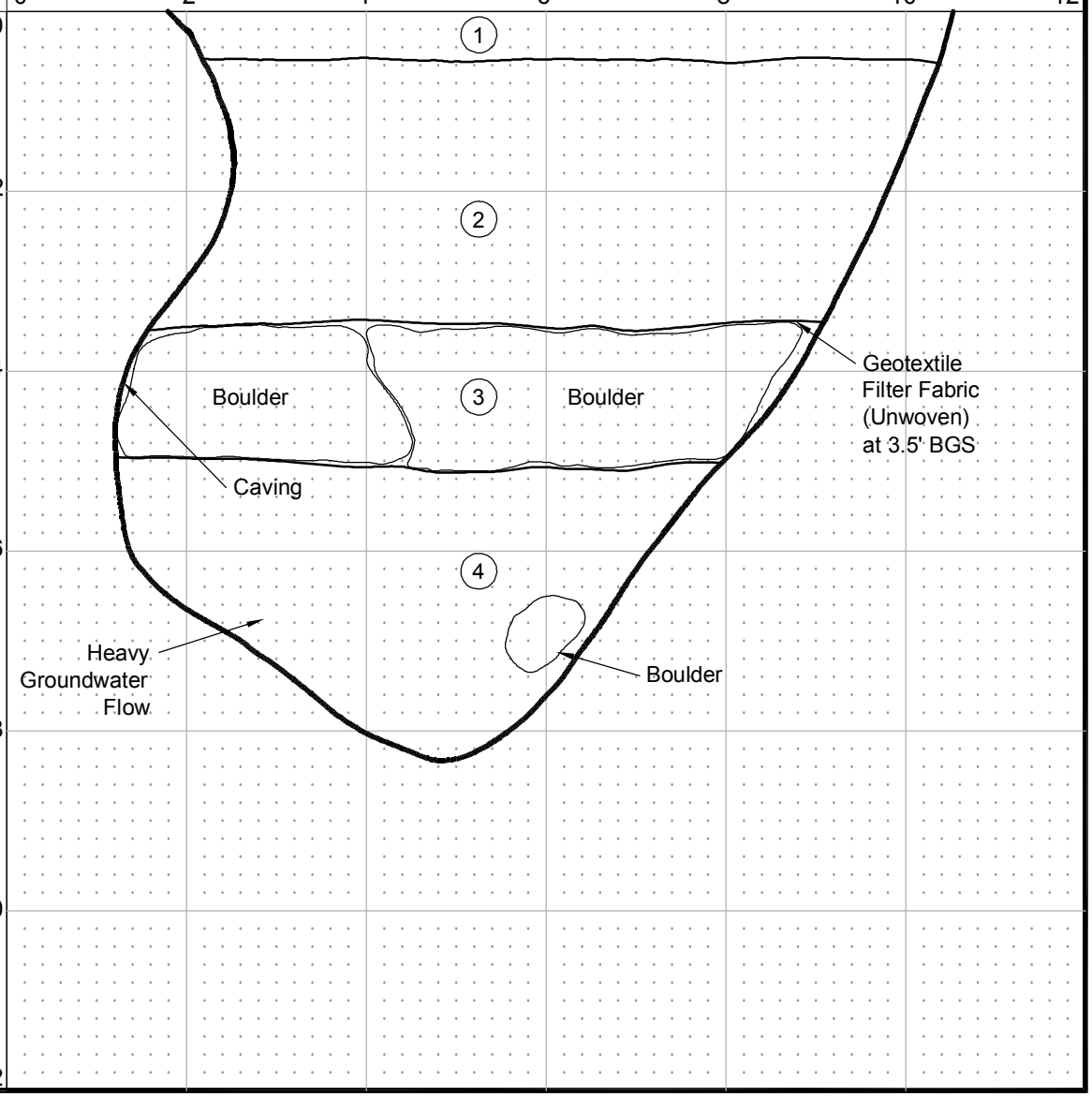
JOB NO: 21-1-21000-004 DATE: 9-20-2011 LOCATION: See Site and Exploration Plan

PROJECT: Lagoon Biosolids Management Project Adams Street to Airport Way

SOIL DESCRIPTION	Ground Water	% Water Content	Samples	Depth, Ft.
(1) Dense, brown, slightly silty, gravelly SAND; dry to moist.			S-1 (Jar)	0
(2) Dense, brown, silty, sandy, cobbly GRAVEL; moist.		6.9	S-2 (Bag)	2
(3) Gray, siltstone Boulders.				
(4) Loose, gray, silty, fine sandy, cobbly GRAVEL, scattered boulders; wet.			S-3 (Bag)	4
	▽	16.8	S-4 (Bag)	6
				8
				10
				12

Sketch of North Pit Side Surface Elevation:

Horizontal Distance in Feet



NOTE

City of Hoquiam provided backhoe for excavations.

FIG. 5

Filename: J:\211\21000-004\21-1-21000-004 TPs.dwg Date: 10-20-2011 Login: lr

SHANNON & WILSON, INC.
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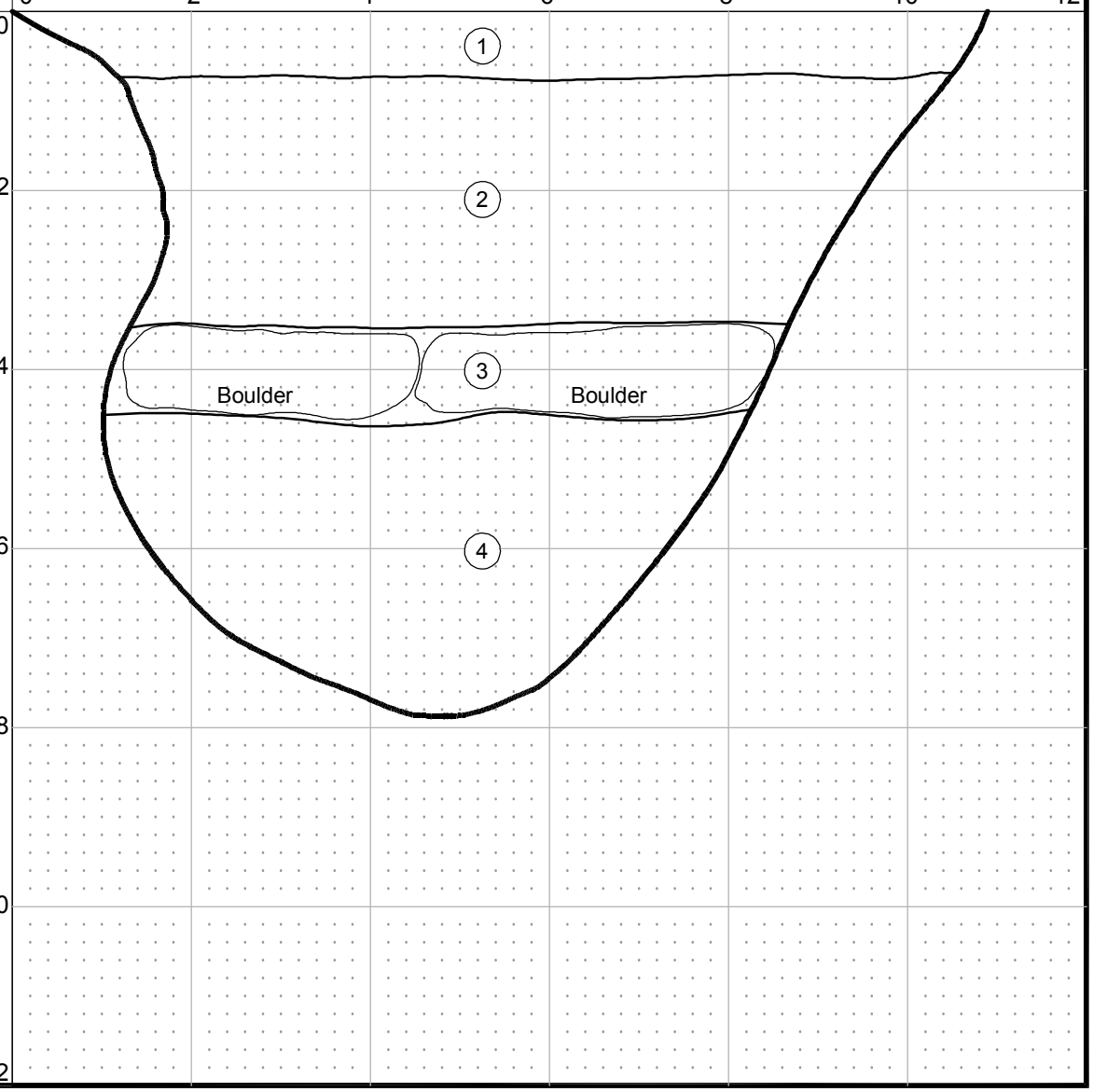
LOG OF TEST PIT TP-4

JOB NO: 21-1-21000-004 DATE: 9-20-2011 LOCATION: See Site and Exploration Plan

PROJECT: Lagoon Biosolids Management Project Adams Street to Airport Way

SOIL DESCRIPTION	Ground Water	% Water Content	Samples	Depth, Ft.
(1) Dense, brown, slightly silty, gravelly SAND; dry to moist.	None Observed		S-1 (Jar)	0
(2) Dense, brown, silty, sandy, cobbly GRAVEL; moist.		4.6	S-2 (Bag)	2
(3) Gray, siltstone Boulders.				4
(4) Loose, brown, slightly silty, fine to medium SAND, trace of gravel; moist.		10.9	S-3 (Jar)	6
				8
				10
				12

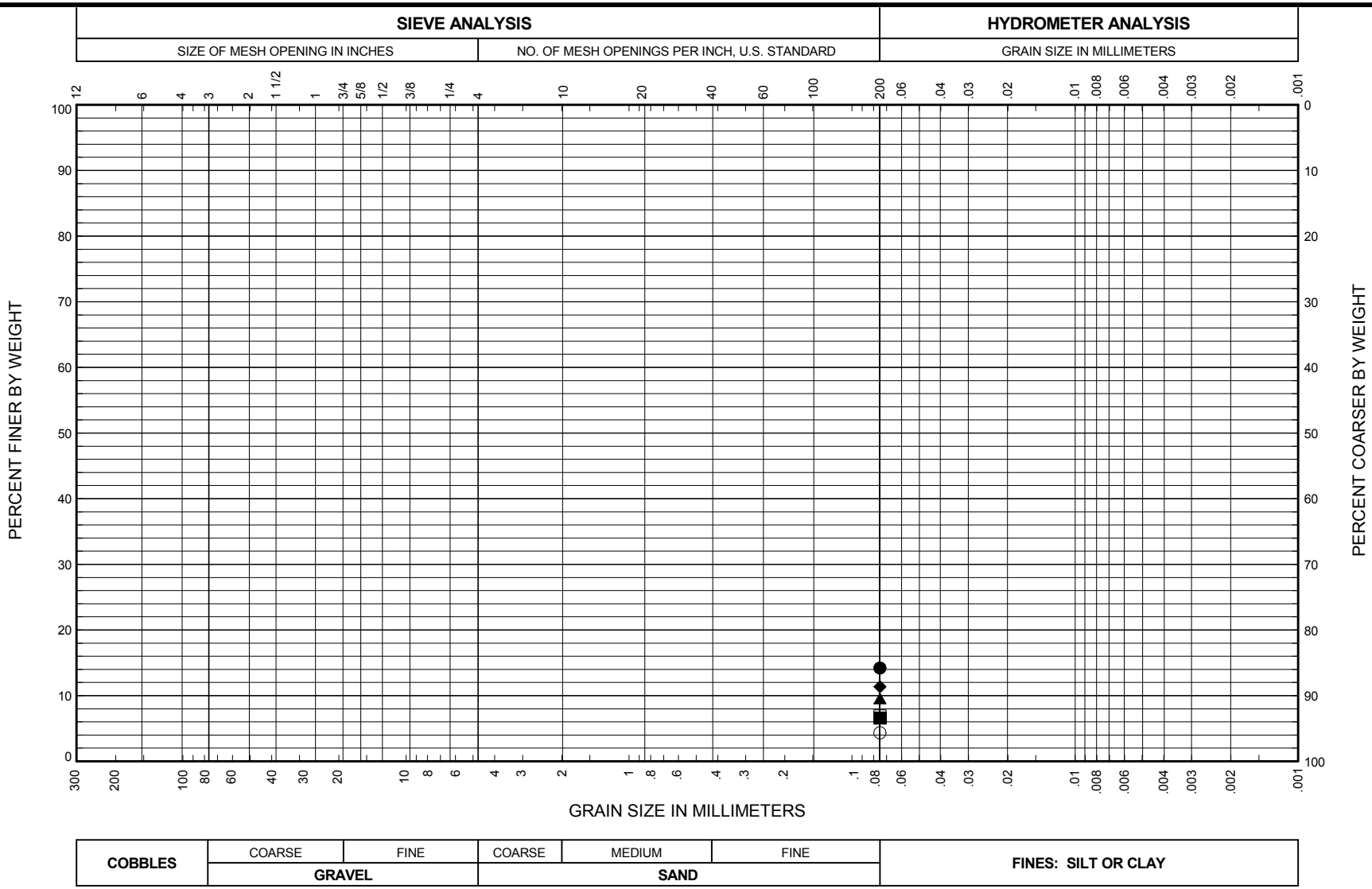
Sketch of South Pit Side Surface Elevation:



NOTES

1. City of Hoquiam provided backhoe for excavations.
2. No groundwater encountered.

FIG. 6



BORING AND SAMPLE NO.	DEPTH (feet)	U.S.C.S. SYMBOL	SAMPLE DESCRIPTION	FINES %	NAT. W.C. %	LL %	PL %	PI %
● TP-1 9/20/11, S-2	0.8	SM	Brown, silty, gravelly SAND; trace to scattered organics	14.2	11.5			
■ TP-2 9/20/11, S-2	1.0	GP-GM	Brown, slightly silty, sandy GRAVEL; trace to scattered organics	6.6	5.2			
▲ TP-3 9/20/11, S-2	1.5	GP-GM	Brown, slightly silty, sandy GRAVEL, trace of clay; trace to scattered organics	9.6	6.9			
◆ TP-3 9/20/11, S-4	6.0	GP-GM	Gray, slightly silty, sandy GRAVEL	11.4	16.8			
○ TP-4 9/20/11, S-2	1.0	GP	Brown, sandy GRAVEL, trace of silt; trace to scattered organics	4.3	4.6			
□ TP-4 9/20/11, S-3	4.0	SP-SM	Brown, slightly silty, gravelly SAND; trace to scattered organics	6.9	10.9			

Hoquiam Wastewater Treatment Plant
Adams Street to Airport Way Force Main
Hoquiam, Washington

GRAIN SIZE DISTRIBUTION

October 2011 21-1-21000-004

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FIG. 7

FIG. 7

GSA_MAIN_21-21000.GPJ SHAN_WIL.GDT 10/17/11

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include: the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors which were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland