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Owens Corning
c/o Norwest Engineering
4110 NE 122nd Avenue, Suite 207
Portland, Oregon 97210

Attention: Mr. John Deppa, P.E.

Geotechnical Engineering Evaluation
Trumbull Asphalt Plant Upgrades
Linnton, Oregon
GDI Project: OwensCorning-3

INTRODUCTION

This letter report presents the results of GeoDesign's geotechnical engineering evaluation for the upgrades at the Trumbull Asphalt Plant located in Linnton, Oregon. The site is located east of Highway 30 and west of the Willamette River, approximately ¼ mile north of Kingsley Park. The general location of the site relative to surrounding physical features is shown in Figure 1.

Previous work was completed at the site and presented in our "Report of Geotechnical Engineering Services" dated October 16, 1998 and in the Dames & Moore (D&M) report dated March 19, 1997. A review of these reports indicates no explorations were completed in the area of the proposed Pour Building. The location of the proposed plant upgrades are shown in Figure 2.

The proposed Pour Building will be a "pole building," with walls supported on timber columns and concrete piers embedded into the underlying soils. Estimated column loads are approximately 12 kips based on calculations provided by others. The Pour Building will be located near the southwest corner of the site between the existing loop road and railroad tracks. Based on conversations with Mr. John Deppa of Norwest Engineering, the building will be designed by others in accordance with the Uniform Building Code. Floor slab loads for the Pour Building will be approximately 250 pounds per square foot (psf), with wall and roof loads supported by the timber columns.

In addition to the proposed Pour Building, foundations for the relocation of tanks T-3, T-8, and T-9 will be constructed south and west of the existing location of tank T-7. The relocated tanks will be supported on mat foundations designed for a load of 2,500 psf, embedded a minimum of 1.5 feet, and supported on minimum 2-foot thick granular pads.

Our analyses were completed based on information presented in reports presented by GeoDesign, Inc., October 1998; Dames and Moore (D&M), January and March 1997; CH2M Hill, August 1992; and Foundation Services Inc., June 1981.

PURPOSE AND SCOPE

The purpose of our geotechnical engineering evaluation was to explore the area of the proposed new Pour Building and provide geotechnical engineering recommendations for foundation design and evaluate the "pole foundation system." The scope of our services was based on the preceding understanding of the project and discussions with the Mr. Deppa of Norwest Engineering. Our specific scope of our services is summarized below.

- Coordinate and manage the field investigations, including utility locates, access preparation and coordination, and scheduling of contractors and GeoDesign staff.
- Explore subsurface conditions at the site by drilling up to two borings to depths of up to 29.0 feet below the ground surface (bgs) using mud-rotary drilling techniques and a truck-mounted drill rig.
- Classify the materials encountered in the explorations. Maintain a detailed log of each exploration and obtain soil samples at select depths.
- Review boring logs presented in the D&M report dated March 19, 1997 to evaluate foundation settlement for tanks T-3, T-8, and T-9 and their affects on tank T-7.
- Provide recommendations for site preparation, grading, fill type for imported materials, compaction criteria, trench excavation and backfill, use of on-site soils, and dry and wet weather earthwork procedures.
- Provide recommendations for foundation drains as needed.
- Provide recommendations for design and construction of shallow spread foundations for tanks T-3, T-8, and T-9, including allowable design bearing pressures, minimum footing depth and width, and estimates for total and differential settlement.
- Provide recommendations for design and construction of pole foundations, including axial capacity, minimum embedment, and estimates for lateral deflections.
- Provide geotechnical engineering recommendations for the design and construction of concrete floor slabs, including an anticipated value for subgrade modulus.
- Provide four copies of the written report summarizing the results of our geotechnical evaluation.

SUBSURFACE CONDITIONS

We explored subsurface conditions in the area of the proposed Pour Building by advancing two borings, B-1 and B-2 to depths of up to 29.0 feet bgs. The approximate locations of the borings are shown in Figure 2. Descriptions of the field explorations, exploration logs, and laboratory procedures are included in Attachment A.

The subsurface conditions encountered were generally consistent with our previous explorations and those completed by others at the site. Subsurface conditions consisted of 3 inches of asphalt concrete (AC) and 24 inches of crushed base rock, underlain by sand fill, silty sand, and silt. Loose to medium dense sand fill containing woody debris and occasional gravel was encountered to a depth of approximately 10.5 feet bgs. Beneath the fill we encountered silty sand to sandy silt with trace woody debris to depths of up to 15 feet bgs. The underlying silt was generally soft to stiff with increasing amounts of sand with depth.

Based on previous explorations and laboratory testing completed at the site, groundwater is likely within 5 to 10 feet of the existing ground surface and consistent with the level of the adjacent Willamette River. We were unable to determine the depth of groundwater in our borings due to the drilling methods used.

CONCLUSIONS

Based on the results of explorations and laboratory testing completed at the site presented in the aforementioned reports, it is our opinion that the proposed structures can be constructed as planned. Specific recommendations for foundation support of the proposed upgrades are presented in the following sections.

RECOMMENDATIONS

SITE PREPARATION AND EROSION CONTROL

The existing thick root zone and existing AC should be stripped from all proposed building and pavement areas and for a 5-foot margin around such areas. Based on our explorations, the depth of stripping will be approximately 2 to 4 inches, although greater stripping depths may be required to remove localized zones of loose or organic soil. Actual stripping depths should be based on field observations at the time of construction. Stripped material should be transported off site for disposal or used in landscaped areas.

After stripping and required site cutting have been completed, we recommend proofrolling the subgrade with a fully loaded dump truck or similar-size, rubber-tire construction equipment to identify areas of excessive yielding. A member of our geotechnical staff, who will evaluate the subgrade, should observe the proofrolling. If areas of excessive yielding are identified, the material should be excavated and replaced with structural fill. Areas that appear to be too wet and soft to support proofrolling equipment should be prepared in accordance with the recommendations for construction in wet conditions.

Silt fences, hay bales, buffer zones of natural growth, sedimentation ponds, and granular haul roads should be used as required to reduce sediment transport during construction to acceptable levels. Measures to reduce erosion should be implemented in accordance with Oregon Administrative Rules 340-41-006 and 340-41-455, and the City of Linnton and Multnomah County regulations regarding erosion control.

CONSTRUCTION CONSIDERATIONS

Trafficability of the silty areas of the site will be difficult during wet conditions. When wet, the silty surficial soils are easily disturbed and will not provide adequate support for construction equipment. Proofrolling of the subgrade should not be performed during wet weather or if wet ground conditions exist. Instead, the subgrade should be evaluated by probing. Soils that have been disturbed during site preparation activities, or soft or loose zones identified during probing, should be removed and replaced with compacted structural fill.

Haul roads subject to repeated construction traffic will require a minimum of 18 inches of imported granular material or 16 inches of cement amended soil (see "Cement Amendment" section of this report) overlain by a 4-inch thick crushed rock wearing course. Twelve inches of imported granular material should be sufficient for light staging areas. The imported granular material should consist of crushed rock that is well graded and has less than 5 percent by weight passing the U.S. Standard No. 200 Sieve. A geotextile should be placed in the haul roads below the granular material and should have a minimum Mullen burst strength of 250 pounds per square inch for puncture resistance and an apparent opening size (AOS) between an U.S. Standard No. 70 and 100 Sieve.

We recommend that a few inches of granular material be placed in the bottom of footing excavations in wet conditions. The granular material reduces subgrade disturbance, prevents water softening of the upper surface, and provides a clean environment for reinforcing steel.

STRUCTURAL FILL

On-site Materials

The silty soils at the site are sensitive to small changes in moisture content and are highly susceptible to disturbance when wet. Laboratory testing indicates that the moisture content of the on-site silt is greater than the anticipated optimum moisture content required for satisfactory compaction. Therefore, moisture conditioning will be required to achieve adequate compaction. We recommend using imported granular material for structural fill if the on-site materials cannot be properly moisture-conditioned. As an alternative, use of the on-site silt for structural fill may be acceptable if it is properly amended with portland cement or lime. When used as structural fill, the on-site silty material should be placed in lifts with a maximum uncompacted thickness of 6 to 8 inches. The silt should be compacted to not less than 92 percent of the maximum dry density, as determined by American Society for Testing and Materials (ASTM) D 1557.

If construction is planned for completion during wet conditions then careful consideration of the construction methods and schedule should be made to reduce overexcavation of disturbed site soils. The project budget should reflect the recommendations for wet weather construction contained in this report.

Imported Granular Material

If imported granular material is used as structural fill, this material should consist of pit or quarry run rock, crushed rock, or crushed gravel and sand that is fairly well-graded between coarse and fine, contains no organic matter or other deleterious materials, has a maximum particle size of 3 inches, and has less than 7 percent passing the U.S. Standard No. 200 Sieve. Imported granular material should be moisture conditioned to the approximate optimum moisture content, placed in 12-inch-thick lifts, and compacted to not less than 95 percent of maximum dry density as determined by ASTM D 1557.

FOUNDATION DESIGN

General

We recommend that mat foundations be constructed on minimum 2-foot thick granular pads bearing on the medium dense silty sand or sand fill, or structural fill that is properly installed during construction, with the base of the mats founded at least 18 inches below the lowest adjacent grade. Spread footings used to support the pipe racks should be a minimum of 24 inches wide and embedded a minimum of 18 inches below the lowest adjacent grade.

Pour Building

Pole Foundation

The proposed Pour Building will be supported by wood columns founded in 2.5-foot diameter concrete piers, which are embedded to a depth of 6.5 feet bgs for the main frames and 4.0 feet for the end frames. The piers will be connected to the slab to provide constraint at the top of the piers. The floor will be slab-on-grade and support up to 250 psf resulting from temporary loads and forklift traffic.

Mr. Deppa of Norwest Engineering provided calculations completed by others, used to determine minimum post embedment. Based on the anticipated loads and constraint conditions, the minimum embedments are greater than the minimum required embedment of approximately 3.0 feet. For a 2.5-foot diameter pier supporting a load of 12 kips, the bearing pressure is approximately 2,500 psf, which is acceptable for the subsurface soils encountered in the area of the Pour Building.

Floor Slabs

Satisfactory subgrade support for building floor slabs supporting up to 250 psf areal loading can be obtained from recompacted sand fill, or from structural fill, when prepared in accordance with the recommendations presented in the "Site Preparation" and "Structural Fill" sections of this letter report. A minimum 6-inch-thick layer of base rock should be placed over the prepared subgrade to assist as a capillary break. A subgrade modulus of 150 pounds per cubic inch can be used for the design of the floor slab. Floor slabs constructed as recommended will likely settle less than ½ inch.

Floor Slab Base

Floor slab base rock should consist of crushed rock that is fairly well-graded between coarse and fine, contains no organic matter or other deleterious materials, has a maximum particle size of 1.5 inches, and has less than 5 percent passing the U.S. Standard No. 200 Sieve. The floor slab base rock should be placed in one lift and compacted to not less than 95 percent of maximum dry density, as determined by ASTM D 1557.

Relocated Tanks T-3, T-8, and T-9

We recommend that mat foundations bear on minimum 2-foot thick granular pads founded on the medium dense silty sand and sand fill, or structural fill that is properly installed during construction with the base of the mat founded at least 18 inches below the lowest adjacent grade.

Mat foundations founded as recommended should be proportioned for a maximum allowable bearing pressure of 2,500 psf. This bearing pressure is a net bearing pressure and applies to the total of dead and long-term live loads and may be increased by one-third when considering earthquake or wind loads.

We recommend that all piping be equipped with flexible connections that allow for the maximum amount of settlement anticipated. Leveling screws or jacks may also be required to maintain the orientation of the tank during its service life. The foundations should be surveyed twice a week during hydrotesting and once a week afterwards. A majority of the settlement will likely be completed within 2 to 3 months after applying the load of a full tank. This should be confirmed by a review of survey data collected by others.

Granular pads should extend 6 inches beyond the margins of the footings for every foot excavated below the footings base grade. The granular pads should consist of crushed rock or crushed gravel and sand that is fairly well-graded between coarse and fine, contain no organic matter or other deleterious materials, have a maximum particle size of 2 inches, and have less than 5 percent passing the U.S. Standard No. 200 Sieve. The imported granular material should be compacted to not less than 95 percent of the maximum dry density, as determined by ASTM D 1557, or, as determined by one of our geotechnical staff, until well-keyed. We recommend that a member of our geotechnical staff observe the prepared footing subgrade.

For mats founded as recommended, with a 2,500-psf design bearing pressure, total settlement is anticipated to be up to 7.5 inches at the center of the tank footing and 4.5 inches at the edge, resulting in differential settlements of approximately 3 inches. The amount of settlement calculated is based on loads associated with full tanks.

Pipe Racks

We recommend that spread foundations bear on minimum 2-foot thick granular pads founded on the medium dense silty sand and sand fill, or structural fill that is properly installed during construction, have a minimum width of 24 inches, and with the base of the footing founded at least 18 inches below the lowest adjacent grade.

Footings founded as recommended should be proportioned for a maximum allowable soil bearing pressure of 2,000 psf. This bearing pressure is a net bearing pressure and applies to the total of dead and long-term live loads and may be increased by one-third when considering earthquake or wind loads. The weight of the footing and overlying backfill can be ignored in calculating footing loads.

For a 2,000-psf design bearing pressure, total settlement of footings is anticipated to be less than about 2 inches. However, settlement will likely be on the order of 3 to 4 inches as a result of the closely founded mat foundations for tanks T-3, T-8, and T-9.

Leveling screws or jacks should be installed to account for any shifting or tilting resulting from settlement of the footings and the surrounding mats.

We recommend using a passive pressure of 300 pounds per cubic foot for design purposes for footings confined by silt and sand fill or structural fill. In order to develop this capacity, concrete must be poured neat in excavations or the adjacent confining structural fill must consist of granular soils compacted to 95 percent relative to ASTM D 1557. Adjacent floor slabs, pavements, or the upper 12-inch depth of adjacent, unpaved areas should not be considered when calculating passive resistance.

A coefficient of friction equal to 0.35 may be used when calculating resistance to sliding on the sand subgrades.

DRAINAGE CONSIDERATIONS

General

Based on the information provided in the reviewed reports, we estimate water could rise to within 5 to 10 feet of the existing ground surface.

Foundation Drains

Foundation drains should be provided for all foundations embedded more than 5 feet bgs. The foundation drains should be installed at least 2.0 feet below the finished floor grade and routed to a suitable discharge (e.g., connected to the storm drain system) at a minimum slope of ½ percent. The foundation drains should consist of 4-inch-diameter perforated drainpipe embedded in a minimum 3-foot-wide zone of drain rock. The drain rock should be wrapped in a non-woven geotextile filter. The drain rock should be uniformly graded, have a maximum particle size of 3 inches, and have less than 2 percent passing the U.S. Standard No. 200 Sieve. The non-woven geotextile should have an AOS between the U.S. Standard No. 70 and 100 Sieve and a water permittivity greater than 1.5 sec-1.

LIMITATIONS

We have prepared this report for use by Owens Corning, Norwest Engineering, and the design teams for the planned upgrades to the Trumbull Asphalt Plant in Linnton, Oregon. The data and report can be used for bidding or estimating purposes, but our report, conclusions, and interpretations should not be construed as a warranty of the subsurface conditions and are not applicable to other sites.

Our explorations indicate soil conditions only at specific locations and only to the depths penetrated. They do not necessarily reflect soil strata or water level variations that may exist between exploration locations. If subsurface conditions differing from those described are noted during the course of excavation and construction, reevaluation will be necessary.

GeoDesign takes no responsibility for the accuracy of the subsurface information obtained by other consultants.

The site development plans and design details were preliminary at the time this report was prepared. When the design has been finalized and if there are changes in the site grades, the conclusions and recommendations presented may not be applicable. If design changes are made, we should be retained to review our conclusions and recommendations and to provide a written evaluation or modification.

The scope of our services does not include services related to construction safety precautions, and our recommendations are not intended to direct the contractor's methods, techniques, sequences, or procedures, except as specifically described in our report for consideration in design.

Within the limitations of scope, schedule, and budget, our services have been executed in accordance with the generally accepted practices in this area at the time this report was prepared. No warranty or other conditions, expressed or implied, should be understood.

◆ ◆ ◆

We appreciate the opportunity to be of continued service to you. Please call if you have questions concerning this report or if we can provide additional services.

Sincerely,

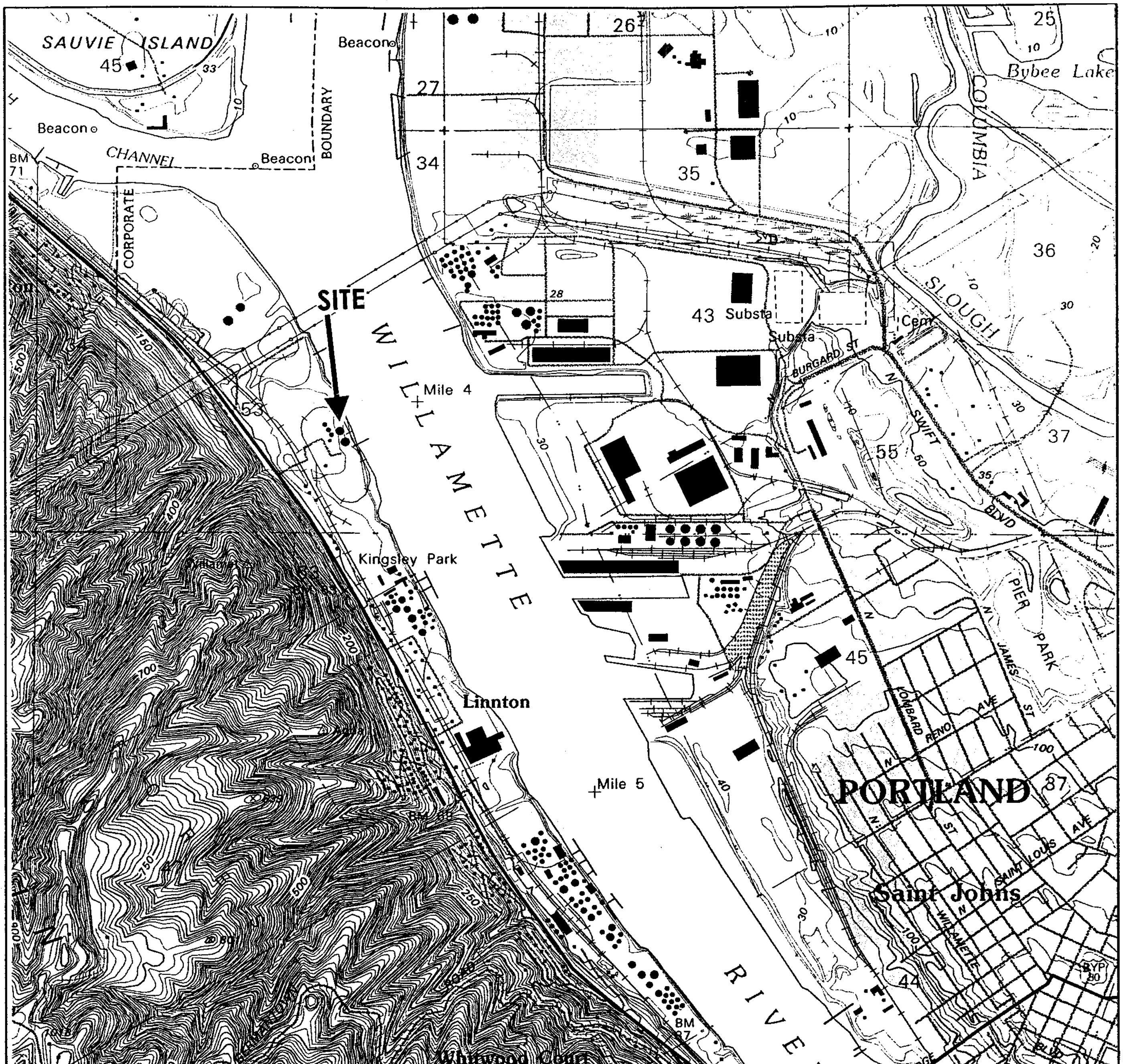
GeoDesign, Inc.

Ryan White, E.I.T.
Geotechnical Staff III

Scott V. Mills, P.E.
Senior Principal

REGISTERED PROFESSIONAL ENGINEER
13701PE
OREGON
July 16, 1987
SCOTT V. MILLS

RKW:SVM:kt
Attachments
Four copies submitted
Document ID: OwensCorning-3 geol2.doc



USGS TOPOGRAPHIC MAP
LINNTON, OR QUAD

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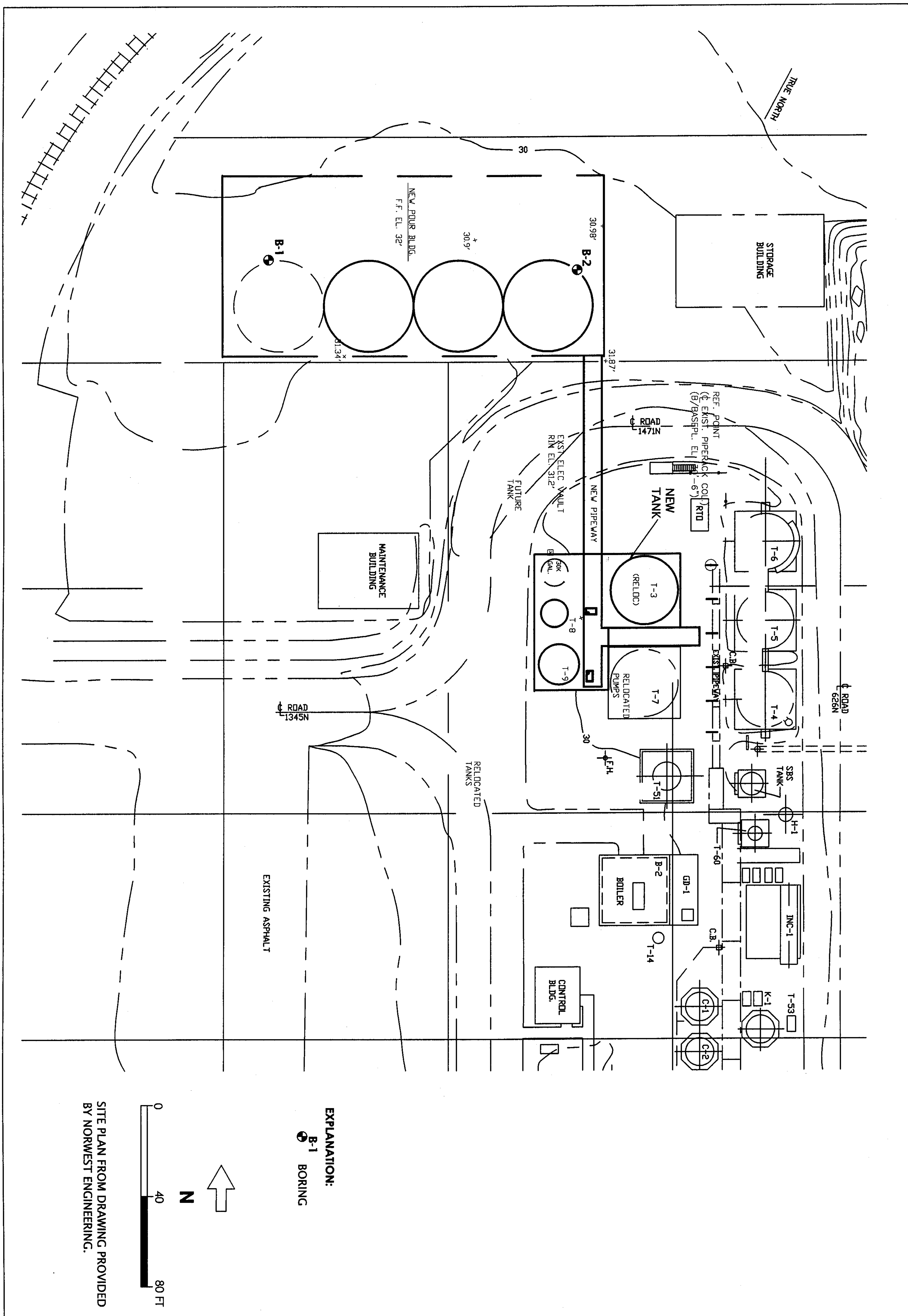
VICINITY MAP

OWENSCORNING-3	FEBRUARY 2001	FIGURE 1



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SITE PLAN

OWENSCORNING-3	FEBRUARY 2001	FIGURE 2

ATTACHMENT A

ATTACHMENT A

FIELD EXPLORATIONS

We explored subsurface conditions at the site by advancing two borings (B-1 through B-2) at the approximate locations shown in Figure 2. Subsurface Technologies of Banks, Oregon completed the explorations on January 24, 2001.

We chose the boring locations based on a site plan provided to our office by Mr. John Deppa of Norwest Engineering. We determined the boring locations in the field from existing site features. The locations shown on Figures 2 should be considered approximate. A qualified member of GeoDesign's staff observed and documented all field activities.

We obtained representative samples of the various soils encountered for geotechnical laboratory testing. Classifications and sampling intervals are shown on the logs included in this appendix.

We classified the materials present in the samplers in the field in accordance with the "Key to Test Pit and Boring Log Symbols" (Table A-1) and "Soil Classification System and Guidelines" (Table A-2), copies of which are included in this appendix. The explorations logs indicate the depths at which the soils or their characteristics change, although the change actually may be gradual. If the change occurred between sample locations, the depth was interpreted.

SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			SYMBOL	NAME
Coarse Grained Soils More than 50% retained on No. 200 Sieve	Gravel More than 50% of coarse fraction retained on No. 4 Sieve	Clean Gravel	GW	Well graded, fine to coarse gravel
			GP	Poorly graded gravel
		Gravel with Fines	GM	Silty gravel
			GC	Clayey gravel
	Sand More than 50% of coarse fraction passes No. 4 Sieve	Clean Sand	SW	Well graded, fine to coarse sand
			SP	Poorly graded sand
		Sand with Fines	SM	Silty sand
			SC	Clayey sand
Fine Grained Soils More than 50% passes No. 200 Sieve	Silt and Clay Liquid Limit less than 50%	Inorganic	ML	Low plasticity silt
			CL	Low plasticity clay
		Organic	OL	Organic silt, organic clay
	Silt and Clay Liquid Limit greater than 50%	Inorganic	MH	High plasticity silt
			CH	High plasticity clay, fat clay
		Organic	OH	Organic clay, organic silt
Highly Organic Soils			PT	Peat

SOIL CLASSIFICATION GUIDELINES

GRANULAR SOILS		COHESIVE SOILS		
Relative Density	**Standard Penetration Resistance**	**Consistency**	**Standard Penetration Resistance**	**Unconfined Compressive Strength (tsf)**
Very Loose	0 – 4	Very Soft	Less than 2	Less than 0.25
Loose	4 – 10	Soft	2 - 4	0.25 - 0.50
Medium Dense	10 – 30	Medium Stiff	4 - 8	0.50 - 1.0
Dense	30 – 50	Stiff	8 - 15	1.0 - 2.0
Very Dense	More than 50	Very Stiff	15 - 30	2.0 - 4.0
		Hard	More than 30	More than 4.0

GRAIN SIZE CLASSIFICATION

Boulders	12 - 36 inches
Cobbles	3 - 12 inches
Gravel	¾ - 3 inches (coarse) ¼ - ¾ inches (fine)
Sand	No. 10 - No. 4 Sieve (coarse) No. 10 - No. 40 Sieve (medium) No. 40 - No. 200 Sieve (fine)

Subclassifications

	Percentage of other material in sample
Clean	0 – 2
Trace	2 – 10
Some	10 - 30
Sandy, Silty, Clayey, etc.	30 - 50

Dry = very low moisture, dry to the touch; Moist = damp, without visible moisture; Wet = saturated, with visible free water.

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SOIL CLASSIFICATION SYSTEM AND GUIDELINES

TABLE A-2

KEY TO TEST PIT AND BORING LOG SYMBOLS

SYMBOL	SOIL DESCRIPTION
	Location of sample obtained in general accordance with ASTM D 1586 Standard Penetration Test
	Location of SPT sampling attempt with no sample recovery
	Location of sample obtained using thin wall, shelby tube, or Geoprobe® sampler in general accordance with ASTM D 1587
	Location of thin wall, shelby tube, or Geoprobe® sampling attempt with no sample recovery
	Location of sample obtained using Dames and Moore sampler and 300 pound hammer or pushed
	Location of Dames and Moore sampling attempt (300 pound hammer or pushed) with no sample recovery
	Location of grab sample
	Rock Coring Interval
	Water level

GEOTECHNICAL TESTING EXPLANATIONS

PP	Pocket Penetrometer	LL	Liquid Limit
TOR	Torvane	PI	Plasticity Index
CONSOL	Consolidation	PCF	Pounds Per Cubic Foot
DS	Direct Shear	PSF	Pounds Per Square Foot
P200	Percent Passing U.S. No. 200 Sieve	TSF	Tons Per Square Foot
W	Moisture Content	P	Pushed Sample
DD	Dry Density	OC	Organic Content

ENVIRONMENTAL TESTING EXPLANATIONS

CA	Sample Submitted for Chemical Analysis	ND	Not Detected
PID	Photoionization Detector Headspace Analysis	NS	No Visible Sheen
		SS	Slight Sheen
PPM	Parts Per Million	MS	Moderate Sheen
MG/KG	Milligrams Per Kilogram	HS	Heavy Sheen
P	Pushed Sample		

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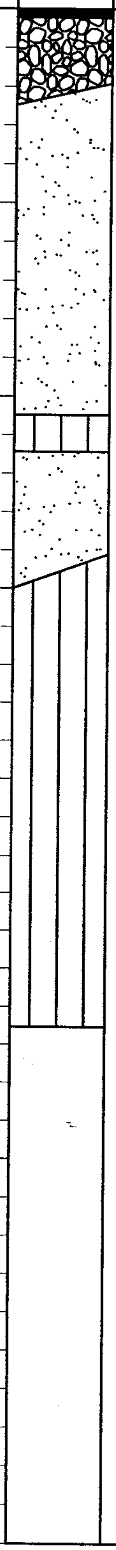
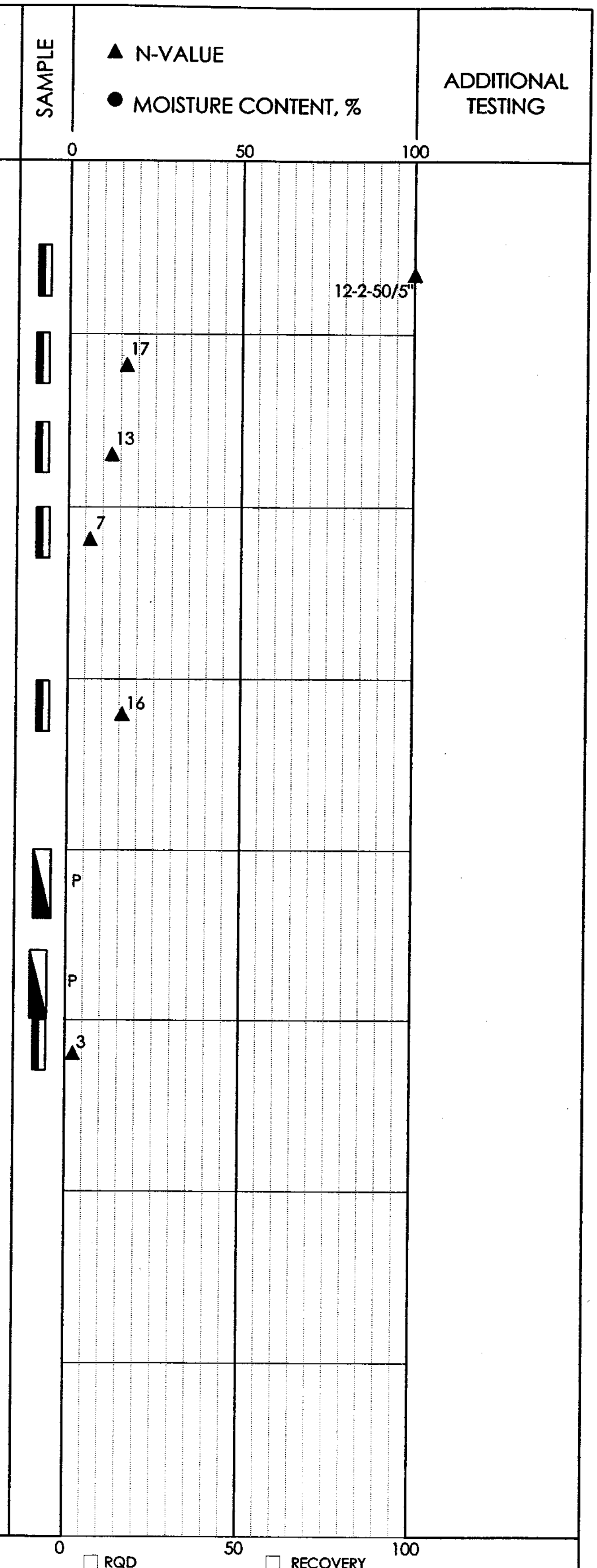
KEY TO TEST PIT AND BORING LOG SYMBOLS

TABLE A-1

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	N-VALUE / MOISTURE CONTENT, %	ADDITIONAL TESTING



Depth (feet)	Symbol	Material Description
0	AC	ASPHALT CONCRETE (3-inch thick).
	GP-FILL	Dense, gray GRAVEL FILL; moist.
	SP-FILL	Medium dense, light brown, medium SAND FILL with occasional gravel; moist. with occasional cobbles from 3.5 to 4.5 feet
	ML	Medium stiff, brown-gray, sandy SILT with trace organics (woody debris); moist.
	SP	Medium dense, gray, medium SAND; moist.
15	ML	Medium stiff, gray SILT with trace organics (woody debris) and clay; moist. becomes soft, brown-gray at 25.0 feet
		Boring completed at 26.5 feet on January 24, 2001.



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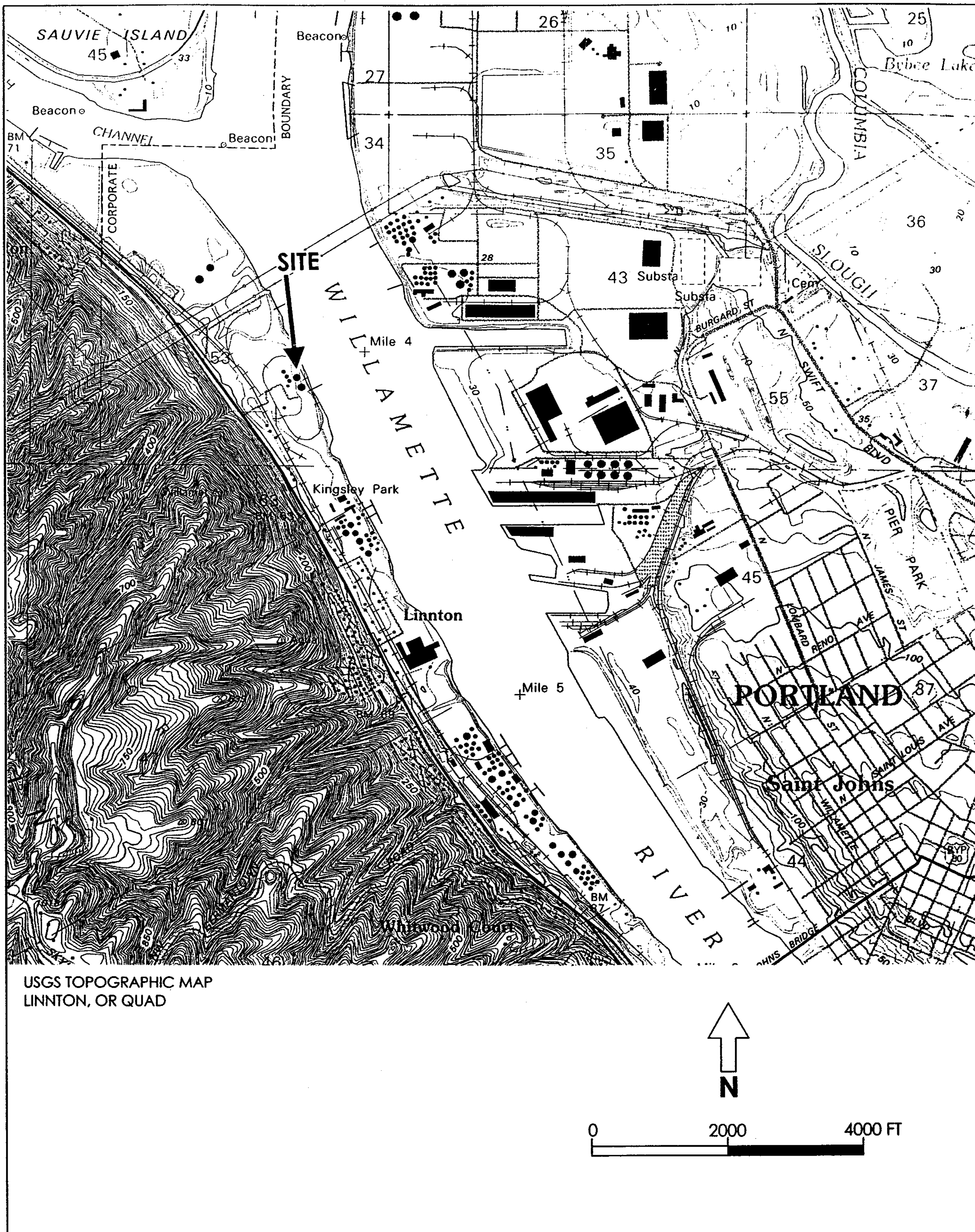
BORING B-2

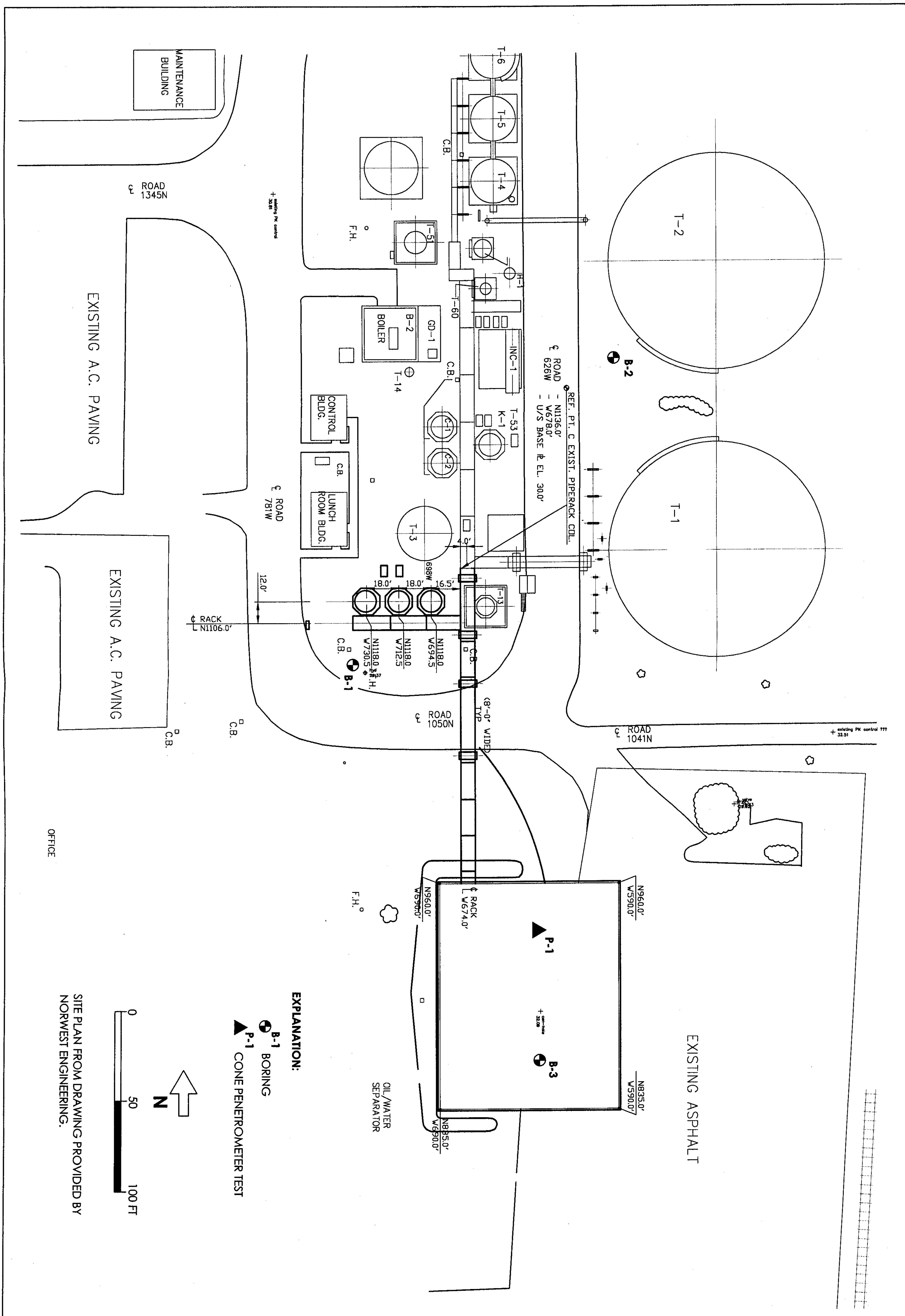
OWENSCORNING-3	FEBRUARY 2001	FIGURE A-2

ATTACHMENT B



USGS TOPOGRAPHIC MAP
LINNTON, OR QUAD

GEODESIGN, INC.	VICINITY MAP		
	OWENS CORNING-1	OCTOBER 1998	FIGURE 1



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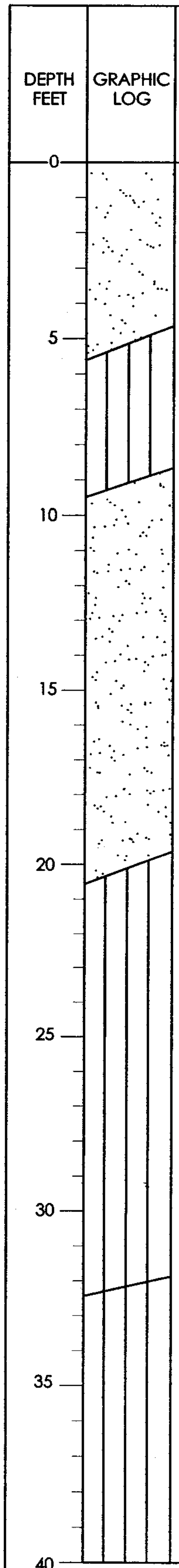
SITE PLAN

OWENS CORNING-1	OCTOBER 1998	FIGURE 2



MATERIAL DESCRIPTION

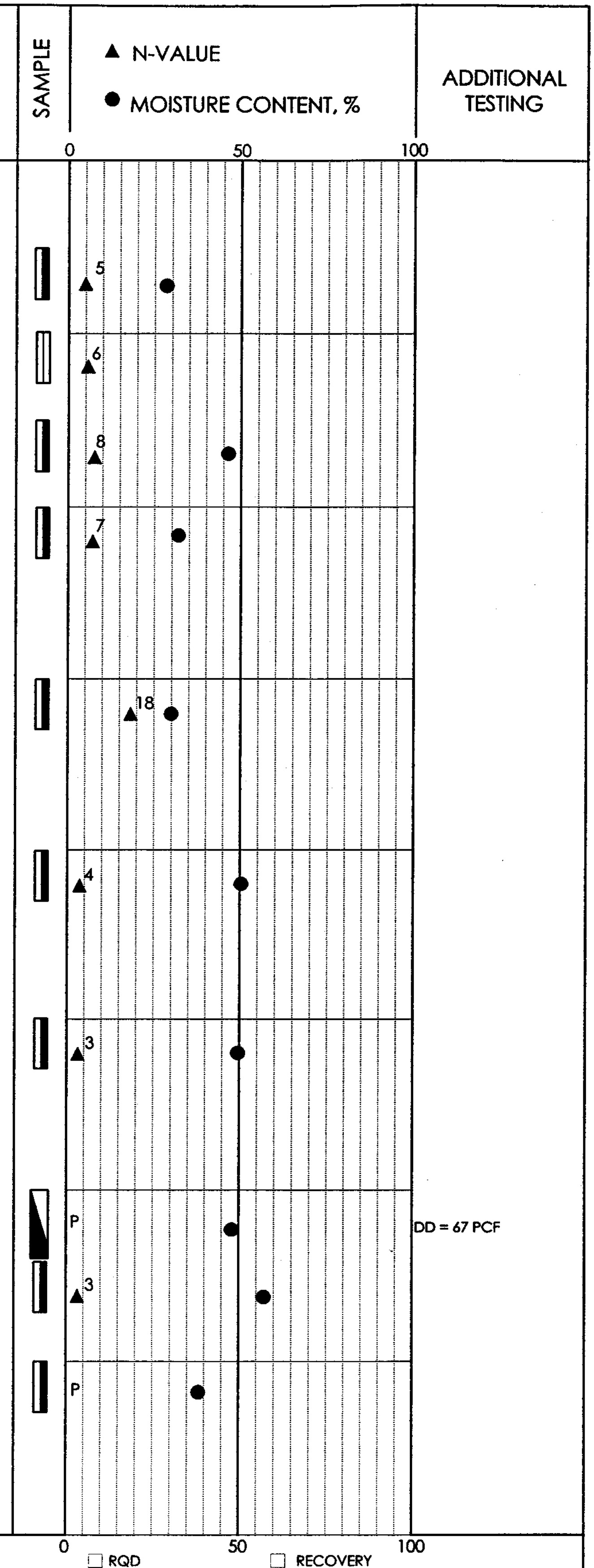
SP-FILL Loose, poorly graded, brown medium SAND FILL; moist.

ML-FILL Medium stiff to stiff, gray SILT FILL with some organics (wood chips): moist.

SP-FILL Loose, poorly graded, coarse black SAND FILL with some organics (wood chips); moist.

ML Soft to medium stiff, gray SILT; moist.

ML Soft, dark gray SILT with trace fine sand; moist (organic odor).



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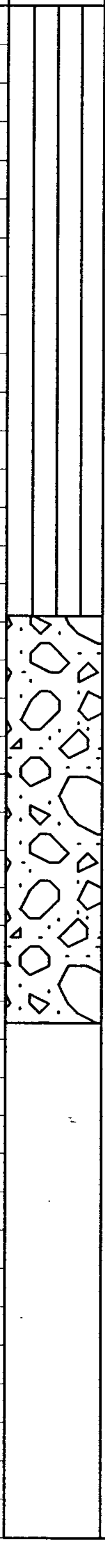
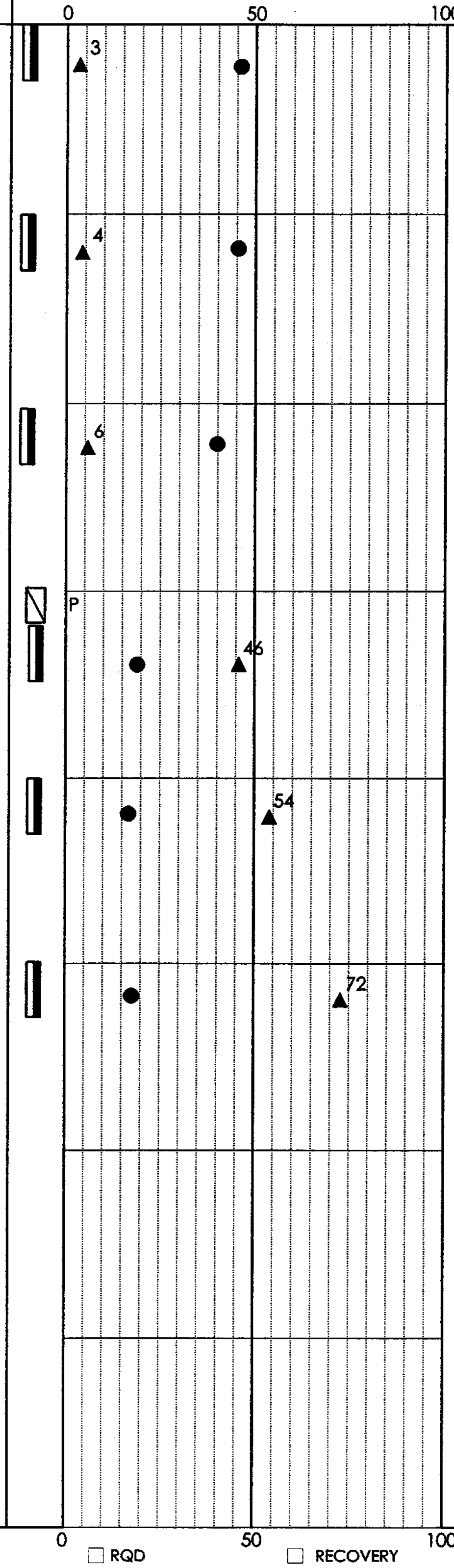
BORING B-1

OWENS CORNING-1	OCTOBER 1998	FIGURE A-1

DEPTH FEET	GRAPHIC LOG		MATERIAL DESCRIPTION	SAMPLE	▲ N-VALUE ● MOISTURE CONTENT, %	ADDITIONAL TESTING
40						
45			with trace organics at 45.0 feet			
50			grades to some sand at 50.0 feet			
55		**GW**	Dense, sub rounded GRAVEL, with trace coarse, black silty sand; moist.			
60						
65			Boring completed at 66.5 feet on September 14, 1998.			
70						
75						
80						





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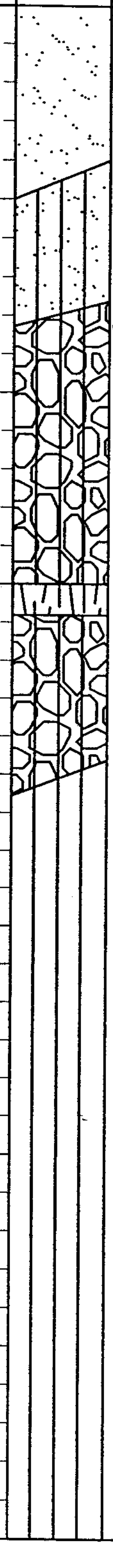
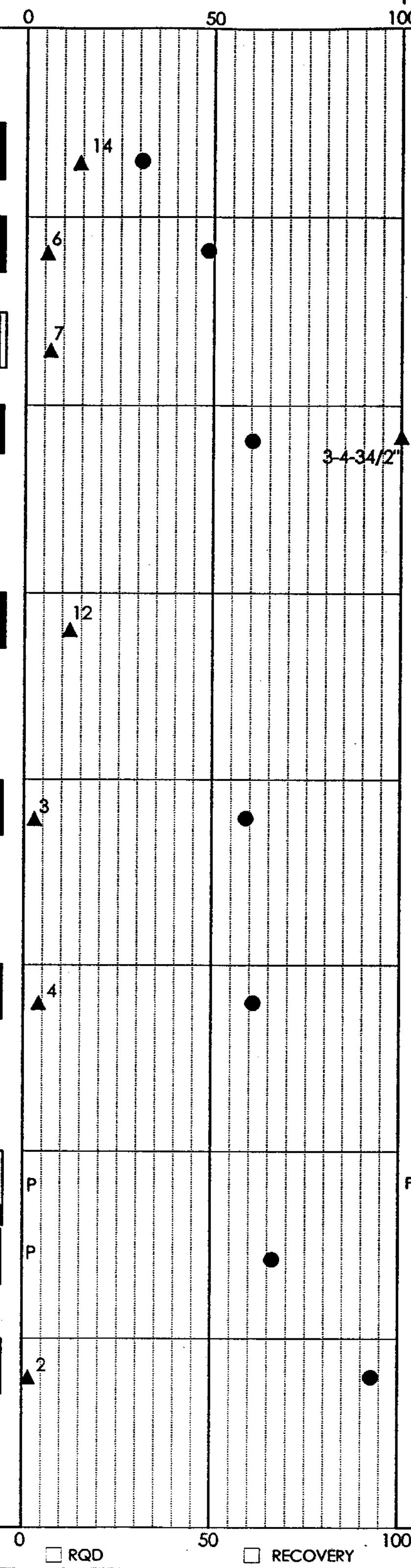
BORING B-1 (CONT.)

OWENS CORNING-1	OCTOBER 1998	FIGURE A-1

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	▲ N-VALUE ● MOISTURE CONTENT, %	ADDITIONAL TESTING
0		**SP-FILL** Loose, poorly graded, brown SAND FILL; moist.			
5		**SM-FILL** Loose, black silty SAND FILL with trace organics; moist.			
		GM-FILL Very dense, black silty GRAVEL FILL; moist (loosing drilling mud).			
10					
		with some wood chips in cuttings at 13.0 feet			
15		decaying sawdust (12-inch thick) at 15.0 feet			
20		**ML** Soft, gray SILT with some organics (wood chips); moist.			
25		becomes soft to medium stiff at 25.0 feet			
30		becomes stiff at 31.0 feet	P		PP = 1.8 TSF
		becomes very soft at 33.0 feet	P		
35					
40					





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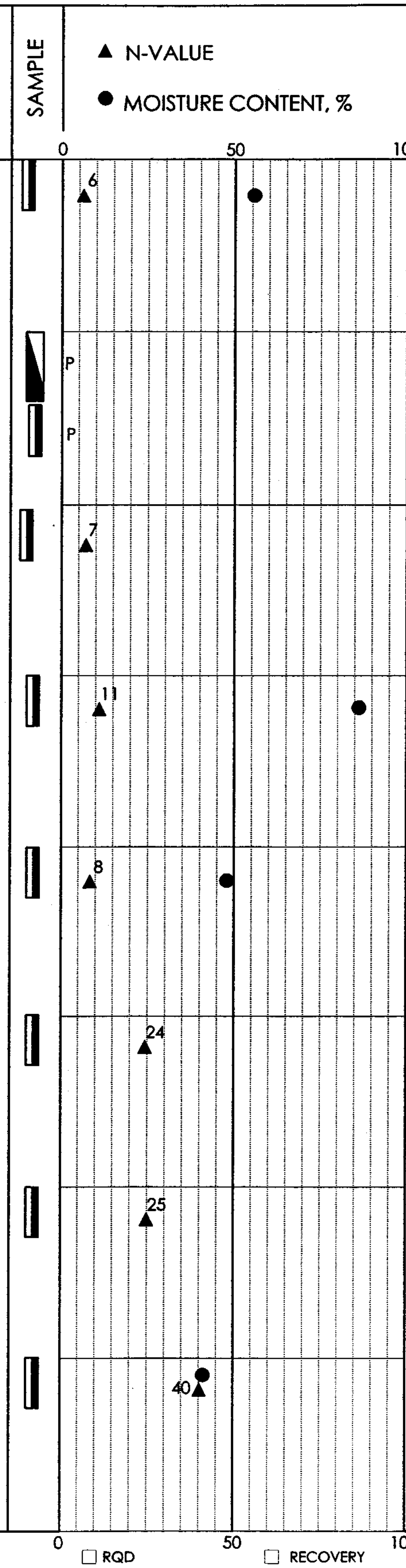
BORING B-2

OWENS CORNING-1	OCTOBER 1998	FIGURE A-2

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ADDITIONAL TESTING
40			
45			
		becomes very soft at 48.0 feet	
50		with trace organics at 50.0 feet	
		ML Stiff, blue-gray SILT; moist.	
55			
		ML Medium stiff to stiff, gray-brown SILT with trace fine sand; moist.	
60			
65		becomes sandy at 65.0 feet	
		gravel lens at 68.0 feet	
70			
75			
		SM Medium dense, dark gray silty SAND; moist.	
80			



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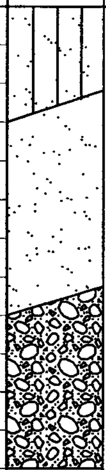
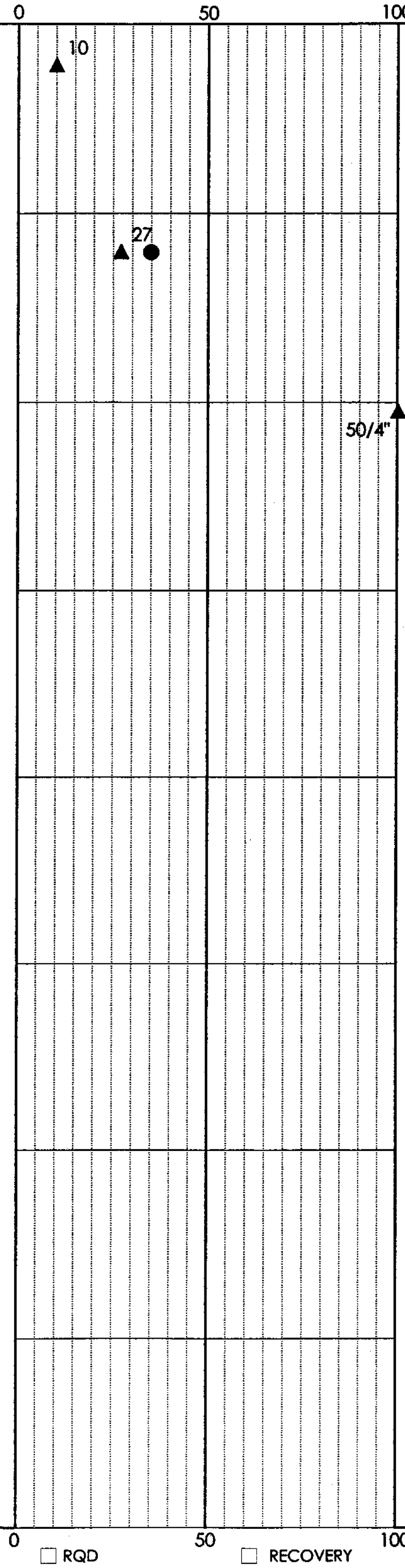
BORING B-2 (CONT.)

OWENS CORNING-1	OCTOBER 1998	FIGURE A-2

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	▲ N-VALUE ● MOISTURE CONTENT, %	ADDITIONAL TESTING
80					
		SP Medium dense, dark gray to black, poorly graded SAND; moist.			
85					
		GW Very dense, black gravel with trace SILT; moist.			
90					
		Boring completed at 92.0 feet on September 15, 1998.			
95					
100					
105					
110					
115					
120					





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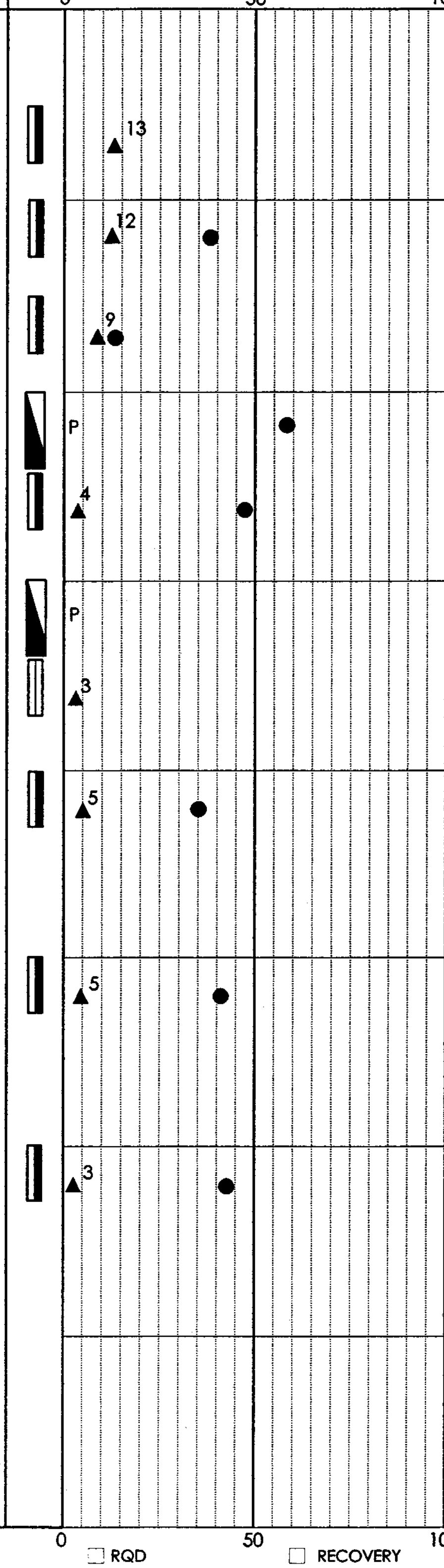
BORING B-2 (CONT.)

OWENS CORNING-1	OCTOBER 1998	FIGURE A-2

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	▲ N-VALUE ● MOISTURE CONTENT, % (0 – 50 – 100)	ADDITIONAL TESTING
0		**GW-FILL** Medium dense, angular GRAVEL FILL with some brown silt; moist.			
		SW-FILL Medium dense, gray-brown SAND FILL with trace brick fragments; moist.			
5		**ML-FILL** Medium stiff, gray SILT FILL; moist.			
		SP-FILL Loose, dark gray, poorly graded SAND FILL with trace silt; moist.			
10		**ML-FILL** Soft to medium stiff, gray SILT FILL; moist.			DD = 67 PCF
		decaying sawdust (4-inch thick)			
		SP Medium dense, poorly graded fine SAND with trace silt; moist.			
15		**SM** Dense, gray silty SAND; moist.			
		ML Medium stiff, gray SILT; moist.			
20					
		grades to brown with trace gray mottling at 23.0 feet			
25					
		becomes soft and sandy at 28.0 feet			
30					
		Boring completed at 31.5 feet on September 15, 1998.			
35					
40					



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BORING B-3

OWENS CORNING-1 | OCTOBER 1998 | FIGURE A-3