# LOG OF EXPLORATORY BORING

## Project Name
Riverbend Landfill

## Location
McMinnville, Oregon

## Drilled By
GooTech Explorations

## Drill Method
Hollow Stem Auger

## Logged By
Craig D. Fanshier

<table>
<thead>
<tr>
<th>Sample Number</th>
<th>Recovery Percent</th>
<th>Sample Type</th>
<th>Ground Water Level</th>
<th>Sample Number</th>
<th>Lithologic Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-1</td>
<td>60</td>
<td>CS</td>
<td></td>
<td></td>
<td>0-0.8 feet: Clayey Silt (ML), dark brown, 80-85% silt, 15% clay, 5% roots (2'-6' long), soft, moist, low plasticity, &lt;2% small gray mottles. (Alluvium)</td>
</tr>
<tr>
<td>S-2</td>
<td>76</td>
<td>CS</td>
<td></td>
<td></td>
<td>0.8-3.2 feet: Clayey Silt (ML), gray, 85-95% silt, 5-15% clay, firm, low plasticity, some roots.</td>
</tr>
<tr>
<td>S-3</td>
<td>56</td>
<td>CS</td>
<td></td>
<td></td>
<td>3.2-6.3 feet: Clayey Silt (ML), brown, 80-90% silt, 10% clay, approx. 5% gray mottles (1/4&quot; dia.), firm to soft, damp, low plasticity, 10-15% rusted mottles, trace water in macro pores, fewer roots with depth.</td>
</tr>
<tr>
<td>S-4</td>
<td>100</td>
<td>CS</td>
<td></td>
<td></td>
<td>© 8 feet: Hard tight drilling.</td>
</tr>
<tr>
<td>S-5</td>
<td>100</td>
<td>CS</td>
<td></td>
<td></td>
<td>8.3-19 feet: Clay (CL), light to dark gray, 80-90% high plasticity clay, firm to stiff, damp (texture and color is homogeneous from 12-19'), occasional black organic lenses and light rust brown mottles.</td>
</tr>
</tbody>
</table>

Total depth drilled 19 feet bgs.
Total depth sampled 19 feet bgs.

**Drilling Method:**
A CME 55 drill rig was used to advance the borehole using a 7.5-inch O.D. (4 1/4-inch I.D.) Hollow stem auger. A 5-foot long core barrel was used to continuously sample the boring.

**Piezometer construction details:**
+2.9-8 feet: 2-inch dia. schedule 40 PVC blank casing.

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**Remarks**
SS = Split spoon sample, CS = Continuous sample.
LOG OF EXPLORATORY BORING

PROJECT NAME: RIVERBEND LANDFILL  
LOCATION: McMinnville, Oregon  
DRILLED BY: GeoTech Explorations  
DRILL METHOD: Hollow Stem Auger  
LOGGED BY: Craig D. Fanshier

BORING NO. P-01  
PAGE 2 OF 2  
REFERENCE ELEV. 123.02'  
TOTAL DEPTH 19.00'  
DATE COMPLETED 12/21/92

<table>
<thead>
<tr>
<th>SAMPLE NUMBER</th>
<th>RECOVERY PERCENT</th>
<th>SAMPLE TYPE</th>
<th>GROUND WATER LEVEL</th>
<th>DEPTH</th>
<th>SAMPLES</th>
<th>WELL DETAILS</th>
<th>LITHOLOGIC DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

8-18 feet: 2-inch dia. schedule 40 PVC screen with 0.010-inch machined slots.
18-18.4 feet: 2-inch dia. schedule 40 PVC end cap. +0.5-2 feet: Concrete.
2-5.9 feet: 3/8-inch hydrated bentonite chips.
5.9-19 feet: 10x20 gradation Colorado silica sand pack.

PVC casing and screen couplings were flush threaded with "O"-rings.
The surface completion consisted of a protective cover constructed of a 6-inch dia. by 5-foot long steel pipe positioned over the piezometer, through the concrete and set into the bentonite seal. An expansion well cap was used to cap the piezometer. A steel cover was locked on the protective casing. Three 2-inch dia. by 5-foot long steel pipes anchored 2 feet into the ground with concrete were installed in a triangle pattern around the piezometer.

Groundwater sample P01-W-17 collected through the augers at a depth of 19 feet.

REMARKS:
SS=Split spoon sample. CS=Continuous sample.

EMCON Northwest, Inc.

0250001.10.25001.VE/1, 1/14/03
WELL DETAILS

PROJECT NUMBER 0258-001.19
PROJECT NAME Phase 2 Preliminary Assessment
LOCATION Riverhead Landfill
WELL PERMIT NO. NA

BORING / WELL NO. P - 01
TOP OF CASING ELEV. 125.92
GROUND SURFACE ELEV. 123.12
DATUM Mean Sea Level
INSTALLATION DATE 12-21-92

EXPLORATORY BORING

a. Total depth 19 ft.
b. Diameter 7.5 in.
   Drilling method Hollow Stem Auger

c. Total casing length 20.9 ft.
   Material Schedule 40 PVC

d. Diameter 2 in.
e. Depth to top perforations 8 ft.
f. Perforated length 10 ft.
   Perforated interval from 8 to 18 ft.
   Perforation type Machine Slotted
   Perforation size 0.010-Inch

g. Surface seal 2 ft.
   Seal material Concrete

h. Backfill 0 ft.
   Backfill material NA

i. Seal 3.9 ft.
   Seal material 3/8-Inch Bentonite Chips

j. Gravel pack 13.1 ft.
   Pack material 10 x 20 Gradation Sand

k. Bottom seal 0 ft.
   Seal material NA

l. Casing stickup 2.8 ft.
m. Protective casing diameter 6 in.

NA = Not Applicable

Prepared by:

Reviewed by: ___________________________ Date: ___________________________ Form F-11 Rev. 12/90
LOG OF EXPLORATORY BORING

PROJECT NAME: RIVERBEND LANDFILL
LOCATION: McMinnville, Oregon
DRILLED BY: GeoTech Explorations
DRILL METHOD: Hollow Stem Auger
LOGGED BY: Craig D. Fanshlor

BORING NO. P-02
PAGE 1 OF 2
REFERENCE ELEV. 120.86'
TOTAL DEPTH 18.00'
DATE COMPLETED 12/22/92

<table>
<thead>
<tr>
<th>SAMPLE NO.</th>
<th>RECOVERY RATE</th>
<th>SAMPLE TYPE</th>
<th>SUBSURFACE DATA</th>
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<tbody>
<tr>
<td>S-1</td>
<td>87</td>
<td>CS</td>
<td></td>
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<tr>
<td>S-2</td>
<td>40</td>
<td>CS</td>
<td>3.55'</td>
</tr>
<tr>
<td>S-3</td>
<td>86</td>
<td>CS</td>
<td>6.05'</td>
</tr>
<tr>
<td>S-4</td>
<td>100</td>
<td>CS</td>
<td></td>
</tr>
</tbody>
</table>

0-5 feet: CLAYEY SILT (ML), dark to medium reddish brown, 80-90% silt, 10-20% clay, firm (softer at top), damp to moist, abundant roots at top of interval, minor roots to 2 feet. (ALLUVIUM)

@ 2.7-3 feet: Trace gray mottling

5-6.5 feet: CLAYEY SILT (ML), reddish brown with 50% light gray mottling, 20% clay, soft to firm, moist to wet, medium plasticity, several horizontal black streaks across core, some horizontal orientation to the mottling.

6.5-9 feet: CLAY (CL), gray with 20-40% gray mottles, firm, moist, soft, wet at 9.5 feet. (ALLUVIUM)

9-18 feet: CLAY (CL), gray with 10-30% rust red mottles, 80% clay, 20% silt, firm to soft, wet, high to medium plasticity, red and gray horizontally oriented mottles.

@ 14-18 feet: Firm, some macro pores with water, approx. 15% rust red mottles.

Total depth drilled 18 feet bgs.
Total depth sampled 18 feet bgs.

DRILLING METHOD:
A CME 55 drill rig was used to advance the borehole using a 7.5-inch O.D. (4 1/4-inch I.D.) hollow stem auger. A 5-foot long core barrel was used to continuously sample the borehole.

PIEZOMETER CONSTRUCTION DETAILS:
- 3-6.8 feet: 2-inch dia. schedule 40 PVC blank casing.
- 6.8-16.8 feet: 2-inch dia. schedule 40 PVC screen with 0.010-inch machined slots.

REMARKS
SS=Split spoon sample, CS=Continuous sample.
<table>
<thead>
<tr>
<th>SAMPLE NUMBER</th>
<th>RECOVERY PERCENT</th>
<th>SAMPLE TYPE</th>
<th>GROUND WATER LEVELS</th>
<th>DEPTH IN FT.</th>
<th>WELL DETAILS</th>
<th>LITHOLOGIC COLUMN</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td>16.8-17.2 feet: 2-inch dia. schedule 40 PVC end cap. +0.5-1 feet: Concrete. 1-5 feet: 3/8-inch hydrated bentonite chips. 5-18 feet: 10x20 gradation Colorado silica sand pack. PVC casing and screen couplings were flush threaded with &quot;O&quot;-rings. The surface completion consisted of a protective cover constructed of a 6-inch dia. by 5-foot long steel pipe positioned over the piezometer, through the concrete and set into the bentonite seal. An expansion well cap was used to cap the piezometer. A steel cover was locked on the protective casing. Three 2-inch dia. by 5-foot long steel pipes anchored 2 feet into the ground with concrete were installed in a triangle pattern around the piezometer. Groundwater sample P02-W-10 collected through the augers at a depth of 10.2 feet.</td>
</tr>
</tbody>
</table>

**REMARKS**

SS = Split spoon sample, CS = Continuous sample.
**WELL DETAILS**

**PROJECT NUMBER** 0250-001.19
**BORING / WELL NO.** P-02
**PROJECT NAME** Phase 2 Preliminary Assessment
**LOCATION** Riverbend Landfill
**WELL PERMIT NO.** NA

**TOP OF CASING ELEV.** 123.86
**GROUND SURFACE ELEV.** 120.86
**DATUM** Mean Sea Level
**INSTALLATION DATE** 12-22-92

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**EXPLORATORY BORING**

a. Total depth 18.0 ft.
b. Diameter 7.5 in.
Drilling method: Hollow Stem Auger

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**WELL CONSTRUCTION**

c. Total casing length 19.8 ft.
Material: Schedule 40 PVC

d. Diameter 2 in.
e. Depth to top perforations 6.8 ft.
f. Perforated length 10 ft.
Perforated interval from 6.8 to 16.8 ft.
Perforation type: Machine Slotted
Perforation size: 0.010-Inch

g. Surface seal 1 ft.
Seal material: Concrete

h. Backfill 0 ft.
Backfill material: NA

i. Seal 4 ft.
Seal material: 3/8-Inch Bentonite Chips

j. Gravel pack 13 ft.
Pack material: 10 x 20 Gradation Sand

k. Bottom seal 0 ft.
Seal material: NA

l. Casing stickup 3 ft.
m. Protective casing diameter: 6 in.

NA = Not Applicable
# LOG OF EXPLORATORY BORING

**PROJECT NAME:** Remedial Investigation  
**LOCATION:** Riverbend Landfill; McMinnville, Oregon  
**DRILLED BY:** GeoTech Explorations  
**DRILL METHOD:** Hollow Stem Auger  
**LOGGED BY:** Craig D. Fanshier

<table>
<thead>
<tr>
<th>RECOVERY PERCENT</th>
<th>POCKET PENETRATION (Ton/200')</th>
<th>PENETRATION (Boreft)</th>
<th>GROUND WATER LEVEL</th>
<th>DEPTH IN FEET</th>
<th>SAMPLES</th>
<th>well details</th>
<th>lithologic column</th>
<th>lithologic description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

0 to 17.0 feet: **SILTY CLAY (CL),** dark reddish brown (5YR 3/2), 50% gray mottling; medium plasticity fines; some roots and rootlets to 4.5 feet; soil is crumbly; stiff to very stiff; damp.

@ 4.5 to 17.0 feet: strong gray and red mottling; low to medium plasticity fines; very abundant 1/8-inch diameter macro pores.

@ 7.5 feet: black organic streak; several 3/8 to 1/2-inch diameter macro pores.

@ 9.5 feet: core is wet; macro pores contain free water.

@ 14.5 to 17.0 feet: gradational contact with the underlying **SILT (ML) unit.**

17.0 to 19.5 feet: **CLAYEY SILT (ML),** dark reddish brown (5YR 3/2); low plasticity fines; soft to firm; wet.

**BORING TERMINATED AT 19.5 FEET.**

**REMARKS:** Drilled w/"B" (4.25" ID) HSA. Samples continuously collected w/"S"-long, 3" OD split barrel and 1.5"-long, 3" OD split spoon fitted w/hubs. A 2" piezometer was constructed in the borehole. Well construction information presented in Well Details. See explanation for definition of symbols.

EMCON Northwest, Inc.

0258-001.24.MCNR1474-2.03/27/93..ENWLSWWW2
# WELL DETAILS

**CLIENT** Riverbend Landfill Company, Inc.  
**PROJECT NUMBER** 0258-001.24  
**PROJECT NAME** Remedial Investigation  
**LOCATION** McMinnville, Oregon  
**WELL PERMIT NO.** 52011  
**BORING / WELL NO.** P-03  
**TOP OF CASING ELEV.** 123.63  
**GROUND SURFACE ELEV.** 121.1  
**DATUM** Feet-Mean Sea Level  
**INSTALLATION DATE** 6/23/93

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## EXPLORATORY BORING

a. Total depth 19.5 ft.  
b. Diameter 8 in.  
Drilling method Hollow Stem Auger

## WELL CONSTRUCTION

c. Total casing length 21.5 ft.  
Material Schedule 40 PVC  
d. Diameter 2 in.  
e. Depth to top perforations 9.3 ft.  
f. Perforated length 9.5 ft.  
Perforated interval from 9.3 to 18.8 ft.  
Perforation type Machine Slotted  
Perforation size 0.010 Inches  
g. Surface seal (0 to 2.0) 2.0 ft.  
Material Concrete  
h. Backfill NA ft.  
Material NA  
i. Seal (2.0 to 7.3) 5.3 ft.  
Material Bentonite Chips  
j. Gravel pack 12.2 ft.  
Gravel pack interval from 7.3 to 19.5 ft.  
Material 10-20 Gradation Sand  
k. Bottom seal/fill NA ft.  
Material NA  
l. Casing stickup 2.5 ft.  
m. Protective casing diameter 6.5 in.  

Prepared by: Craig Fanshier
**LOG OF EXPLORATORY BORING**

**PROJECT NAME:** Additional Hydrogeologic Investigation  
**LOCATION:** Riverbend Landfill; McMinnville, Oregon  
**DRILLED BY:** Geo-Tech Explorations, Inc.  
**DRILL METHOD:** Hollow Stem Auger  
**LOGGED BY:** Craig D. Fanshier  
**BORING NO:** P-04A  
**PAGE:** 1 OF 2  
**GROUND ELEV.:** 139.00'  
**TOTAL DEPTH:** 32.50'  
**DATE-COMPLETED:** 10/28/93

<table>
<thead>
<tr>
<th>RECOVERY PERCENT</th>
<th>POCKET PENETRATION (Tons/5F)</th>
<th>PENETRATION (Blows/Ft)</th>
<th>WATER LEVELS</th>
<th>DPTH IN FT</th>
<th>SAMPLES</th>
<th>LITHOLOGIC COLUMN</th>
<th>WELL DETAILS</th>
<th>LITHOLOGIC DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>95</td>
<td>3.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 to 12.75 feet: SILTY CLAY (CL), dark brown (7.5YR 3/2), patchy lenses of shades of brown and gray; medium plasticity fines; no macro pores; hard; damp. (FILL MATERIAL)</td>
</tr>
<tr>
<td>100</td>
<td>2.0</td>
<td>1.5</td>
<td></td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td>@ 6.5 feet: wood chips, 2-inch black organic layer.</td>
</tr>
<tr>
<td></td>
<td>1.5</td>
<td>2.5</td>
<td>3.0</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td>@ 6.7 feet: color changes to dark greenish gray (5GY 4/1) mixed with light olive brown motting; changes to a medium to high plasticity clay; no pores, no bedding structure.</td>
</tr>
<tr>
<td>100</td>
<td>2.5</td>
<td>2.75</td>
<td></td>
<td>15</td>
<td>1/5/94</td>
<td></td>
<td></td>
<td>12.75 to 29.0 feet: CLAYEY SILT (ML), brown (10YR 4/3), slight olive tint; low to medium plasticity fines; abundant macro pores (open), small 1/16- to 1/32-inch-diameter, some larger 1/8-inch vertical, trace of roots; very stiff; moist. (NATIVE SOIL)</td>
</tr>
<tr>
<td></td>
<td>2.5</td>
<td></td>
<td></td>
<td>20</td>
<td>10/26/93</td>
<td></td>
<td></td>
<td>@ 12.75 to 14.75 feet: dark grayish brown.</td>
</tr>
<tr>
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<td>1.5</td>
<td></td>
<td></td>
<td>1.5</td>
<td></td>
<td></td>
<td></td>
<td>@ 14.5 feet: moist.</td>
</tr>
<tr>
<td></td>
<td>2.0</td>
<td></td>
<td></td>
<td>1.5</td>
<td></td>
<td></td>
<td></td>
<td>@ 17.5 feet: wet (large macro pore approximately half full with free water) and along poorly developed granular soil pads.</td>
</tr>
<tr>
<td></td>
<td>2.0</td>
<td></td>
<td></td>
<td>1.5</td>
<td></td>
<td></td>
<td></td>
<td>@ 19.0 feet: minor interbedded CLAYEY SANDS (SC) and SILTY SANDS (SM) lenses.</td>
</tr>
<tr>
<td></td>
<td>2.0</td>
<td></td>
<td></td>
<td>1.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.0</td>
<td></td>
<td></td>
<td>1.5</td>
<td></td>
<td></td>
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</tbody>
</table>

**REMARKS**

Drilled with 8-inch O.D. 4.25-inch I.D.1 Hollow Stem Auger. Samples continuously collected with 5-foot long, 3-inch I.D. split barrel and 1.5-foot long, 3-inch O.D. split spoon fitted with rings. A 2-inch PVC monitoring well was constructed in the borehole. Well construction information presented in Well Details. See explanation for definition of soils.

EMCON Northwest, Inc.
## LOG OF EXPLORATORY BORING

**PROJECT NAME**  Additional Hydrogeologic Investigation  
**LOCATION**  Riverbend Landfill; McMinnville, Oregon  
**DRILLED BY**  Geo-Tech Explorations, Inc.  
**DRILL METHOD**  Hollow Stem Auger  
**LOGGED BY**  Craig D. Fanshier  
**BORING NO.**  P-04A  
**PAGE**  2 OF 2  
**GROUND ELEV.**  139.00'  
**TOTAL DEPTH**  32.50'  
**DATE COMPLETED**  10/28/93

<table>
<thead>
<tr>
<th>RECOVERY PERCENT</th>
<th>POCKET PENETRATOR (Tons/Ft)</th>
<th>PENETRATION (Bows/Ft)</th>
<th>GROUND WATER LEVEL</th>
<th>DEPTH (FT)</th>
<th>SAMPLES</th>
<th>LITHOLOGIC COLUMN</th>
<th>WELL DETAILS</th>
<th>LITHOLOGIC DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.75</td>
<td></td>
<td></td>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td>12.75 to 29.0 feet: CLAYEY SILT (ML), continued.</td>
</tr>
<tr>
<td></td>
<td>2.0</td>
<td></td>
<td></td>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td>@ 20.0 feet: slight mix of light, indistinct reddish brown and tan brown mottling, minor horizontal parting (weakly developed), trace fine sands, well rounded, spherical, minor amounts of mica, abundant (approximately 5 to 10 per square inch) macro pores; stiff; moist.</td>
</tr>
<tr>
<td></td>
<td>1.5</td>
<td></td>
<td></td>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td>@ 24.5 to 26.5 feet: well developed 3/8- to 1/2-inch-thick platy horizontal soil partings.</td>
</tr>
<tr>
<td></td>
<td>1.5</td>
<td></td>
<td></td>
<td>35</td>
<td></td>
<td></td>
<td></td>
<td>@ 27.5 feet: color changes to dark greenish gray (5G 4/1) with 50 percent indistinctly mottled light olive brown mottling (2.5Y 5/3), occurring at separate 0.3- to 0.5-foot-thick layers.</td>
</tr>
<tr>
<td></td>
<td>0.5</td>
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<td>40</td>
<td></td>
<td></td>
<td></td>
<td>29.0 to 32.5 feet: SILTY CLAY (CL), dark greenish gray (5GRY 4/1); medium to high plasticity fines; glazed (glistening) soil ped partings, irregular soil partings, stiff; wet.</td>
</tr>
<tr>
<td></td>
<td>1.0</td>
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<td>BORING TERMINATED AT 32.5 FEET.</td>
</tr>
</tbody>
</table>

**REMARKS**

Drilled with 8-inch O.D. (4.25-inch I.D.) Hollow Stem Auger. Samples continuously collected with 5-foot long, 3-inch I.D. split barrel and 1.5-foot long, 3-inch O.D. split spoon fitted with rings. A 2-inch PVC monitoring well was constructed in the borehole. Well construction information presented in Well Details. See explanation for definition of symbols.
WELL DETAILS

CLIENT: Riverbend Landfill Company, Inc.
PROJECT NUMBER: 0258-001.28
PROJECT NAME: Additional Hydrogeologic Inv.
LOCATION: McMinnville, Oregon
WELL PERMIT NO.: 59130
BORING / WELL NO.: P-04A
TOP OF CASING ELEV.: 141.15
GROUND SURFACE ELEV.: 139.0
DATUM: Feet-Mean Sea Level
INSTALLATION DATE: 10/28/93

EXPLORATORY BORING
a. Total depth: 32.5 ft.
b. Diameter: 8 in.
   Drilling method: Hollow Stem Auger

WELL CONSTRUCTION
c. Total casing length (+2.2 to 29.6): 31.8 ft.
   Material: Schedule 40 PVC

d. Diameter: 2 in.
e. Depth to top perforations: 19.3 ft.
f. Perforated length: 9.5 ft.
   Perforated interval from: 19.3 to 28.8 ft.
   Perforation type: Machine Slotted
   Perforation size: 0.010 Inches

g. Surface seal (0 to 2.0): 2.0 ft.
   Material: Concrete

h. Backfill: N.A. ft.
   Material: N.A.

i. Seal (2.0 to 15.9): 13.9 ft.
   Material: Bentonite

j. Gravel pack: 13.9 ft.
   Gravel pack interval from: 15.9 to 29.8 ft.
   Material: 10-20 Gradation Sand

k. Bottom seal/fill (29.8 to 32.5): 2.7 ft.
   Material: Bentonite

l. Casing stickup: 2.2 ft.
m. Protective casing diameter: 6.5 in.

Prepared by: Craig Fanshier
### LOG OF EXPLORATORY BORING

- **PROJECT NAME**: Additional Hydrogeologic Investigation
- **LOCATION**: Riverbend Landfill; McMinnville, Oregon
- **DRILLED BY**: Geo-Tech Explorations, Inc.
- **DRILL METHOD**: Hollow Stem Auger
- **LOGGED BY**: Craig D. Fanshier

#### Recovery Percent

<table>
<thead>
<tr>
<th>Recovery Percent</th>
<th>Pocket Penetration (Tons/SF)</th>
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<tbody>
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<td>9.2</td>
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<td>&gt; 4.5</td>
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<tr>
<td>&gt; 4.5</td>
<td></td>
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<td>&gt; 4.5</td>
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<td>100</td>
<td>3.5</td>
</tr>
<tr>
<td>100</td>
<td>3.5</td>
</tr>
<tr>
<td>80</td>
<td>3.5</td>
</tr>
<tr>
<td>100</td>
<td>1.5</td>
</tr>
<tr>
<td>94</td>
<td>1.5</td>
</tr>
<tr>
<td>100</td>
<td>1.5</td>
</tr>
</tbody>
</table>

#### Water Levels

- **TOTAL DEPTH**: 75.80'  
- **GROUN ELEV.**: 139.00'

#### Lithologic Description

- **0 to 12.5 feet**: SILTY CLAY (CL), dark reddish brown (5YR 3/3); medium plasticity fines; hard; damp. (FILL)

@ 7.5 feet: color changes to dark olive gray (5Y 3/2); slight odor.

@ 9.0 feet: very stiff.

- **12.5 to 21.0 feet**: CLAYEY SILT (ML), very dark grayish brown (10YR 3/2); very abundant small macro pores and some large vertical macro pores, some very fine roots; very stiff; damp.

@ 14.0 feet: moist.

@ 15.5 feet: color changes to dark brown (7.5YR 3/2).

@ 16.7 feet: wet.

@ 17.0 feet: approximately 10 percent gray mottling, as rinds around vertical macro pores.

@ 17.0 to 21.0 feet: approximately 10 percent light reddish brown mottling, approximately 10 percent black mottling.

#### REMARKS

Drilled with 10-inch O.D. (6.5-inch I.D.) Hollow Stem Auger. Samples continuously collected with 5-foot long, 3-inch I.D. split barrel and 1.5-foot long, 3-inch 0.D. split spoon fitted with rings. Bedrock cored with NX (3.5-inch 0.D.) diamond core. A 2-inch PVC monitoring well was constructed in the borehole. Well construction information presented in Wall Details. See explanation for definition of symbols.

EMCON Northwest, Inc.
<table>
<thead>
<tr>
<th>Recovery Percent</th>
<th>Pocket Penetration (Tons/SF)</th>
<th>Penetration (Bows/Ft)</th>
<th>Ground Water Levels (Ft)</th>
<th>Depth in Feet</th>
<th>Samples</th>
<th>Lithologic Column</th>
<th>Well Details</th>
<th>Lithologic Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.5 to 21.0 feet</td>
<td>2.5</td>
<td>67</td>
<td>17</td>
<td>25</td>
<td>1.0</td>
<td>1.0</td>
<td>21</td>
<td>CLAYEY Silt (ML), continued.</td>
</tr>
<tr>
<td>21.0 to 30.0 feet</td>
<td>2.5</td>
<td>100</td>
<td>2.5</td>
<td>25</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>SILT (ML), light yellowish brown (2.5Y 6/3); low plasticity fines; less macro pores than above (approximately 3 to 5 per square inch), no large ones; some 1/4-inch platy varves; stiff; wet.</td>
</tr>
<tr>
<td>@ 25.5 to 29.0 feet</td>
<td>1.0</td>
<td>100</td>
<td>1.0</td>
<td>30</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>approximately 1- to 3-inch-thick bands of grayish coloration.</td>
</tr>
<tr>
<td>@ 27.0 to 29.0 feet</td>
<td>2.5</td>
<td>100</td>
<td>2.5</td>
<td>30</td>
<td>1.25</td>
<td>1.25</td>
<td>1.25</td>
<td>abundant small bedding structures approximately 1/16- to 1/8-inch-thick, appears to have more clay than 13.0 to 25.0 feet zone above.</td>
</tr>
<tr>
<td>@ 29.0 feet</td>
<td>2.5</td>
<td>100</td>
<td>2.5</td>
<td>35</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>approximately 50 percent gray and 50 percent brown.</td>
</tr>
<tr>
<td>30.0 to 37.0 feet</td>
<td>2.5</td>
<td>100</td>
<td>2.5</td>
<td>35</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>SILTY CLAY (CL), dark bluish gray (5B 4/1); medium to high plasticity fines; approximately 1 to 2 macro pores per square inch (small), some vertical root traces; stiff; wet.</td>
</tr>
<tr>
<td>@ 32.0 feet</td>
<td>2.5</td>
<td>100</td>
<td>2.5</td>
<td>40</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>slightly harder/sticky drilling, smooth, glassy, glazed soil, ped surface.</td>
</tr>
<tr>
<td>37.0 to 38.0 feet</td>
<td>2.5</td>
<td>100</td>
<td>2.5</td>
<td>40</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>CLAYEY SAND (SC), dark bluish gray (5B 4/1), with 50 percent large oval shaped olive brown mottling; 20 to 25 percent low to medium plasticity fines; 75 to 80 percent fine sand, angular moderately well sorted; minor brown root hairs; appears medium, continues.</td>
</tr>
</tbody>
</table>

**Remarks:**
Drilled with 10-inch O.D. (6.5-inch I.D.) Hollow Stem Auger. Samples continuously collected with 5-foot long, 3-inch I.D. split barrel and 1.5-foot long, 3-inch O.D. split spoon fitted with rings. Bedrock was cored with NX (3.5-inch O.D.) diamond core. A 2-inch PVC monitoring well was constructed in the borehole. Well construction information presented in Well Details. See explanation for definition of symbols.
LOG OF EXPLORATORY BORING

PROJECT NAME  Additional Hydrogeologic Investigation  BORING NO.  P-04B
LOCATION  Riverbend Landfill, McMinnville, Oregon  PAGE  3 OF 4
DRILLED BY  Geo-Tech Explorations, Inc.  GROUND ELEV.  139.00’
DRILL METHOD  Hollow Stem Auger  TOTAL DEPTH  75.80’
LOGGED BY  Craig D. Fanshier  DATE COMPLETED  11/09/93

RECOVERY PERCENT  POCKET PENETRATION (Tone/SF)  PENETRATION (Bibers/Ft)

GROUND LEVEL  DEPTH IN FEET  SAMPLES  LITHOLOGIC COLUMN  WELL DETAILS  LITHOLOGIC DESCRIPTION

37.0 to 38.0 feet: CLAYEY SAND (SC), continued: dense; moist. Unit grades into the sand below.

38.0 to 39.0 feet: SAND (SP), dusty red (G5YR 3/3); 5 percent low plasticity fines; 95 percent fine to medium sand, angular; appears medium dense; moist.

39.0 to 41.0 feet: CLAYEY SAND (SC), light tannish brown; 30 percent low to medium plasticity fines; 70 percent fine sand; appears medium dense; moist.

41.0 to 45.0 feet: SAND (SP), and GRAVELLY SAND (SP), dusty red (10YR 3/3); little to no fines; 70 to 90 percent fine to coarse sand (F:M:C = 1:3:2); 10 to 30 percent gravels (F:C = 3:1); appears medium dense; wet.

@ 41.0 to 42.5 and 42.5 to 44.0 feet: two distinct fining upwards sequences, each grades from a fine sand at the top to a gravelly sand at the bottom.

@ 42.5 feet: 1 inch sand dense, color changes to brown (7.5YR 4/3).

@ 44.0 feet: large 2 to 3 inch gravels.

45.0 to 55.0 feet: CLAYEY GRAVEL (GC), dark yellowish brown (10YR 4/3); 20 percent low to medium plasticity fines (as matrix), sticky; 20 to 30 percent SAND (F:M:C = 1:1:1); 40 to 50 percent gravels (F:C = 1:2), rounded, matrix supported; appears dense; wet.

@ 55.0 feet: drillers note less gravels, hard dense drilling.

55.0 to 59.5 feet: SILTY SAND (SM), inferred from drilling action.

59.5 to 65.0 feet: SANDY SILT (SM), continues.

REMARKS
Drilled with 10-inch O.D. (6.5-inch I.D.) Hollow Stem Auger. Samples continuously collected with 5-foot long, 3-inch I.D. split barrel and 1.5-foot long, 3-inch O.D. split spoon fitted with rings. Bedrock was cored with NX (0.5-inch O.D.) diamond core. A 2-inch PVC monitoring well was constructed in the borehole. Well construction information presented in Well Details. See explanation for definition of symbols.

EMCON Northwest, Inc.
LOG OF EXPLORATORY BORING

PROJECT NAME: Additional Hydrogeologic Investigation
LOCATION: Riverbend Landfill; McMinnville, Oregon
DRILLED BY: Geo-Tech Explorations, Inc.
DRILL METHOD: Hollow Stem Auger
LOGGED BY: Craig D. Fanshier

BORING NO.: P-04B
PAGE: 4 OF 4
GROUND ELEV.: 139.00'
TOTAL DEPTH: 75.80'
DATE COMPLETED: 11/09/93

RECOVERY PERCENT
POCKET PENETRATION (Tone/SF)

<table>
<thead>
<tr>
<th>DEPTH IN FEET</th>
<th>SAMPLES</th>
<th>LITHOLOGIC COLUMN</th>
<th>WELL DETAILS</th>
<th>LITHOLOGIC DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>59.5 to 65.0 feet: SANDY SILT (SM), continued:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60.0 to 65.0 feet: BASALT, olive gray (5Y 3/2) (GSA rock color chart); medium grain; weathered zone approximately 1-inch-thick, drilled with hollow stem auger to 65.8 feet.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>65.8 to 68.5 feet: abundant fracture filling, quartz veining, zoëlites.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

BORING TERMINATED AT 75.8 FEET.

REMARKS
Drilled with 10-inch O.D. (6.5-inch I.D.) Hollow Stem Auger. Samples continuously collected with 5-foot long, 3-inch I.D. split barrel and 1.5-foot long, 3-inch O.D. split spoon fitted with rings. Bedrock was cored with NX (3.5-inch O.D.) diamond core. A 2-inch PVC monitoring well was constructed in the borehole. Well construction information presented in Well Details. See explanation for definition of symbols.

EMCON Northwest, Inc.
**WELL DETAILS**

**CLIENT**
Riverbend Landfill Company, Inc.

**PROJECT NUMBER**
0258-001.28

**PROJECT NAME**
Additional Hydrogeologic Inv.

**LOCATION**
McMinnville, Oregon

**WELL PERMIT NO.**
59135

**BORING / WELL NO.**
P-04B

**TOP OF CASING ELEV.**
141.65

**GROUND SURFACE ELEV.**
139.0

**DATUM**
Feet-Mean Sea Level

**INSTALLATION DATE**
11/10/93

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**EXPLORATORY BORING**

a. Total depth
75.6 ft.

b. Diameter
10 in.

Drilling method: Hollow Stem Auger

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**WELL CONSTRUCTION**

c. Total casing length (+2.7 to 52.6)
55.3 ft.

Material: Schedule 40 PVC

d. Diameter
2 in.

e. Depth to top perforations
42.3 ft.

f. Perforated length
9.5 ft.

Perforated interval from 42.3 to 51.8 ft.

Perforation type: Machine Slotted

Perforation size: 0.010 inches

g. Surface seal (0 to 2.0)
2.0 ft.

Material: Concrete

h. Backfill
N.A. ft.

Material: N.A.

i. Seal (2.0 to 39.0)
37.0 ft.

Material: Bentonite

j. Gravel pack
13.4 ft.

Gravel pack interval from 39.0 to 52.4 ft.

Material: 10-20 Gradation Sand

k. Bottom seal fill (52.4 to 75.8)
23.4 ft.

Material: Bentonite

l. Casing buildup
2.7 ft.

m. Protective casing diameter
6.5 in.

Centralizers at 15.0 and 41.0 feet bgs.