Table 1. Summary of Characteristics, Proposed Mine Areas 1 - 8

<table>
<thead>
<tr>
<th>Mine Area</th>
<th>Total Footprint (acres)</th>
<th>Average Depth to Water (ft)</th>
<th>Water Surface footprint (acres)</th>
<th>Aggregate above Water Table (yd³)</th>
<th>Aggregate below Water Table (yd³)</th>
<th>Total Aggregate (yd³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>45.05</td>
<td>17</td>
<td>40.10</td>
<td>1.1 million</td>
<td>2.5 million</td>
<td>3.6 million</td>
</tr>
<tr>
<td>2</td>
<td>4.49</td>
<td>16</td>
<td>3.03</td>
<td>97,000</td>
<td>86,000</td>
<td>183,000</td>
</tr>
<tr>
<td>3</td>
<td>37.38</td>
<td>14</td>
<td>32.47</td>
<td>790,000</td>
<td>2.1 million</td>
<td>2.9 million</td>
</tr>
<tr>
<td>4</td>
<td>34.21</td>
<td>12</td>
<td>31.65</td>
<td>640,000</td>
<td>3.1 million</td>
<td>3.7 million</td>
</tr>
<tr>
<td>5</td>
<td>49.02</td>
<td>10</td>
<td>46.73</td>
<td>770,000</td>
<td>5.1 million</td>
<td>5.8 million</td>
</tr>
<tr>
<td>6</td>
<td>41.07</td>
<td>15</td>
<td>36.30</td>
<td>980,000</td>
<td>2.6 million</td>
<td>3.6 million</td>
</tr>
<tr>
<td>7</td>
<td>40.95</td>
<td>10</td>
<td>36.94</td>
<td>625,000</td>
<td>1.2 million</td>
<td>1.8 million</td>
</tr>
<tr>
<td>8</td>
<td>27.47</td>
<td>12</td>
<td>24.57</td>
<td>500,000</td>
<td>700,000</td>
<td>1.2 million</td>
</tr>
<tr>
<td>Total, Areas 1 - 8</td>
<td>279.63</td>
<td>253.79</td>
<td>5.5 million</td>
<td>17.3 million</td>
<td>22.8 million</td>
<td></td>
</tr>
<tr>
<td>Water Station</td>
<td>Location</td>
<td>Elevation</td>
<td>Notes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>----------</td>
<td>-----------</td>
<td>-------</td>
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<tr>
<td>0.00</td>
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<td>211.75</td>
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<td>0.75</td>
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<td>211.75</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1.00</td>
<td></td>
<td>211.75</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Elevation is above mean sea level.

Additional notes:
- Note 1: Additional information.
- Note 2: Additional information.
- Note 3: Additional information.
<table>
<thead>
<tr>
<th>Station Name</th>
<th>Comment</th>
<th>Depth to Water (ft)</th>
<th>Water Flow Water Surface (cfs)</th>
<th>Elevation (ft)</th>
<th>MP Elevation</th>
<th>Measurement Date</th>
<th>Depth of Water (ft)</th>
<th>MP Water Level</th>
<th>Date of M (ft)</th>
<th>Depth of M (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>0.43</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Surface Water and Groundwater Flow and Elevation Data
<table>
<thead>
<tr>
<th>SCS Numbers</th>
<th>Unit Name</th>
<th>Description</th>
<th>Thurston County Aquifer Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, 3, and 4</td>
<td>Alderwood Gravelly Sandy Loam</td>
<td>&quot;...moderately well-drained soils underlain by consolidated glacial till (hardpan)...[and] formed in glacial deposits...&quot;</td>
<td>high to extreme</td>
</tr>
<tr>
<td>32 and 35</td>
<td>Everett Gravelly Sandy Loam</td>
<td>&quot;...somewhat excessively drained soils that are underlain by very gravelly sand. These soils formed in very gravelly glacial outwash deposits...[and] are found on terraces and terrace fronts, and are gently undulating to moderately steep.&quot;</td>
<td>high to extreme</td>
</tr>
<tr>
<td>70</td>
<td>Mukilteo Muck, drained</td>
<td>&quot;...very deep, very poorly-drained soils in upland depressions...[and] formed in organic material derived dominantly from sedges...&quot;</td>
<td>moderate</td>
</tr>
<tr>
<td>74</td>
<td>Nisqually Loamy Fine Sand</td>
<td>&quot;...very deep, somewhat excessively drained soil on terraces...[and] formed in sandy glacial outwash.&quot;</td>
<td>high to extreme</td>
</tr>
<tr>
<td>76</td>
<td>Norma Silt Loam</td>
<td>&quot;...very deep, poorly drained soil in depressions on till plains...[and] formed in alluvium.&quot;</td>
<td>moderate</td>
</tr>
<tr>
<td>110</td>
<td>Spanaway Gravelly Sandy Loam</td>
<td>&quot;...very deep, somewhat excessively drained soil on terraces...[and] formed in glacial outwash and volcanic ash...&quot;</td>
<td>high to extreme</td>
</tr>
<tr>
<td>114</td>
<td>Spanaway-Nisqually complex</td>
<td>&quot;The Spanaway soil is very deep and somewhat excessively drained. It formed in gravelly glacial outwash and volcanic ash. The Nisqually soil is deep and somewhat excessively drained. It formed in sandy glacial outwash.&quot;</td>
<td>high to extreme</td>
</tr>
<tr>
<td>120</td>
<td>Tisch Silt Loam</td>
<td>&quot;...deep very poorly drained soil in upland depressions and drainage ways. Drainage has been altered by subsurface drains. The soil formed in diatomaceous earth, volcanic ash, and alluvium.&quot;</td>
<td>moderate</td>
</tr>
</tbody>
</table>
### Table 5. Aquifer and Aquitard Parameters

<table>
<thead>
<tr>
<th>Hydrogeologic Unit</th>
<th>Parameter</th>
<th>Value</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Transmissivity Qv/Qp channel</td>
<td>K</td>
<td>3200 ft/day</td>
<td>model calibration</td>
</tr>
<tr>
<td>Qv/Qp aquifer</td>
<td>K</td>
<td>750 to 2100 ft/day</td>
<td>PP12 aquifer test</td>
</tr>
<tr>
<td>Qv/Qp aquifer</td>
<td>K</td>
<td>1300 ft/day</td>
<td>model calibration</td>
</tr>
<tr>
<td>Qp aquifer</td>
<td>K</td>
<td>86 ft/day</td>
<td>WIEC PW-1 aquifer test</td>
</tr>
<tr>
<td>glacial till</td>
<td>K</td>
<td>0.0283 ft/day</td>
<td>various work by others</td>
</tr>
</tbody>
</table>

K = hydraulic conductivity
### Table 6: Changes to Evapotranspiration

<table>
<thead>
<tr>
<th>0.12</th>
<th>0.08</th>
<th>0.07</th>
<th>0.06</th>
<th>0.05</th>
<th>0.04</th>
<th>0.03</th>
<th>0.02</th>
<th>0.01</th>
<th>0.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.12</td>
<td>0.08</td>
<td>0.07</td>
<td>0.06</td>
<td>0.05</td>
<td>0.04</td>
<td>0.03</td>
<td>0.02</td>
<td>0.01</td>
<td>0.00</td>
</tr>
<tr>
<td>0.12</td>
<td>0.08</td>
<td>0.07</td>
<td>0.06</td>
<td>0.05</td>
<td>0.04</td>
<td>0.03</td>
<td>0.02</td>
<td>0.01</td>
<td>0.00</td>
</tr>
<tr>
<td>0.12</td>
<td>0.08</td>
<td>0.07</td>
<td>0.06</td>
<td>0.05</td>
<td>0.04</td>
<td>0.03</td>
<td>0.02</td>
<td>0.01</td>
<td>0.00</td>
</tr>
<tr>
<td>0.12</td>
<td>0.08</td>
<td>0.07</td>
<td>0.06</td>
<td>0.05</td>
<td>0.04</td>
<td>0.03</td>
<td>0.02</td>
<td>0.01</td>
<td>0.00</td>
</tr>
<tr>
<td>0.12</td>
<td>0.08</td>
<td>0.07</td>
<td>0.06</td>
<td>0.05</td>
<td>0.04</td>
<td>0.03</td>
<td>0.02</td>
<td>0.01</td>
<td>0.00</td>
</tr>
</tbody>
</table>

**Note:** The table above represents changes in evapotranspiration rates. Each cell contains a specific value indicating the change in evapotranspiration under different conditions. The data is used to analyze and predict water usage trends in various environments.
Table 7. Sensitivity of Lake Effect to Side Wall Sediment

| Model (ac) Note 1 | Model (ac) Note 2 | Model (ac) Note 3 | Model (ac) Note 4 | Model (ac) Note 5 | Model (ac) Note 6 | Model (ac) Note 7 | Model (ac) Note 8 | Model (ac) Note 9 | Model (ac) Note 10 | Model (ac) Note 11 | Model (ac) Note 12 | Model (ac) Note 13 | Model (ac) Note 14 | Model (ac) Note 15 | Model (ac) Note 16 | Model (ac) Note 17 | Model (ac) Note 18 | Model (ac) Note 19 | Model (ac) Note 20 |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| 0.01             | 0.02             | 0.03             | 0.04             | 0.05             | 0.06             | 0.07             | 0.08             | 0.09             | 0.10             | 0.11             | 0.12             | 0.13             | 0.14             | 0.15             | 0.16             | 0.17             | 0.18             | 0.19             |
| 0.12             | 0.13             | 0.14             | 0.15             | 0.16             | 0.17             | 0.18             | 0.19             | 0.20             | 0.21             | 0.22             | 0.23             | 0.24             | 0.25             | 0.26             | 0.27             | 0.28             | 0.29             | 0.30             |
| 0.21             | 0.22             | 0.23             | 0.24             | 0.25             | 0.26             | 0.27             | 0.28             | 0.29             | 0.30             | 0.31             | 0.32             | 0.33             | 0.34             | 0.35             | 0.36             | 0.37             | 0.38             | 0.39             |

Note 1: Decreased further from well conductance.
Note 2: Third well with lenses.
Note 3: Second well with lenses.
Note 4: First well with lenses.
Note 5: Condition model.
Note 6: Corrected current.
Note 7: Conductivity (fkg/s).
Note 8: Lake sediment thickness.
Note 9: Change in groundwater levels.
Note 10: Compared to current condition.
Note 11: Change in groundwater levels.
Note 12: Compared to current condition.
Note 13: Change in groundwater levels.
Note 14: Compared to current condition.
Note 15: Change in groundwater levels.
Note 16: Compared to current condition.
Note 17: Change in groundwater levels.
Note 18: Compared to current condition.
Note 19: Change in groundwater levels.
Note 20: Compared to current condition.
Attachment A

Logs for On-Site Borings
### Table 1: Basic Well Data

<table>
<thead>
<tr>
<th>Well</th>
<th>Elev</th>
<th>Dimensions</th>
<th>SWL</th>
<th>Q</th>
<th>t</th>
<th>s</th>
<th>Q/s</th>
<th>PY</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>P01</td>
<td>210</td>
<td>12&quot; x 14'</td>
<td>7.2</td>
<td>23</td>
<td>60</td>
<td>1</td>
<td>23</td>
<td>107</td>
<td>1</td>
</tr>
<tr>
<td>P02</td>
<td>222</td>
<td>INACCESSIBLE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>P03</td>
<td>220</td>
<td>8&quot; x 19'</td>
<td>2.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>P04</td>
<td>220</td>
<td>20&quot; x 36'</td>
<td>3.4</td>
<td>?</td>
<td></td>
<td></td>
<td>0.2</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>P05</td>
<td>230</td>
<td>6&quot; x 27'</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CAN BE BAILED DRY</td>
</tr>
<tr>
<td>P06</td>
<td>225</td>
<td>20&quot; x 183'</td>
<td>13.3</td>
<td>14</td>
<td>40</td>
<td>7.4</td>
<td>1.9</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>P07</td>
<td>232</td>
<td>6&quot; x 58'</td>
<td>12.9</td>
<td>13</td>
<td>40</td>
<td>2.3</td>
<td>5.6</td>
<td>170</td>
<td>3</td>
</tr>
<tr>
<td>P08</td>
<td>220</td>
<td>6&quot; x 70'</td>
<td>16</td>
<td>10</td>
<td>50</td>
<td>10</td>
<td>1</td>
<td>36</td>
<td>3</td>
</tr>
<tr>
<td>P09</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NOT FOUND</td>
</tr>
<tr>
<td>P10</td>
<td>212</td>
<td>6&quot; x 29'</td>
<td>6.9</td>
<td>30</td>
<td>60</td>
<td>1.9</td>
<td>16</td>
<td>235</td>
<td>1</td>
</tr>
</tbody>
</table>

**Explanation to Table 1**

- **Elev**: Elevation of well (feet, MSL) as interpreted from USGS Maytown Quad.
- **Dimensions**: Observed casing diameter and measured depth to bottom, below local ground surface.
- **SWL**: Static water level in feet below local ground surface. See Table 2 for date of SWL.
- **Q**: Average discharge in gpm during well test.
- **s**: Time in minutes that well was tested.
- **Q/s**: Drawdown in feet below SWL measured during pumping.
- **PY**: Specific capacity in gpm/ft of drawdown.
- **Potential yield**: A predicted total yield based on specific capacity times a "safe" amount of drawdown, subject to actual further testing.

**Notes**

1. Well's yield would be less if SWL fell in late summer.
2. Changes at well head needed to improve testing.
3. Potential yield assumes that water entry is from near bottom of well. Well should be video-surveyed to determine accurate depth of water entry and type of completion.

*From Robinson and Noble, 1976*
DEPT (feet)  GEOLOGIC LOG  WELL CONSTRUCTION DETAILS (not to scale)

0  Damp, brown, clayey, gravelly SAND (TILL) grading to damp, brown, clayey, sandy GRAVEL.
10  Damp, brown, sandy GRAVEL.
20  Damp, brown, gravelly SAND.
20  Damp, brown, sandy GRAVEL.
30  Damp, brown, sandy GRAVEL with clean zone between 29 and 30 feet.
35  Blue-gray CLAY.
40  Glac. GRAVEL.
40  Damp, brown, fine to medium SAND.
40  Damp, brown, slightly silty, sandy GRAVEL with clean zone between 37.5 and 40 feet.
50  Damp, brown, fine to medium SAND.
50  Moist, brown, slightly silty, fine SAND.
50  Moist, gray, fine, sandy SILT.
60  Damp, gray, silty, gravelly SAND (TILL).
60  Damp, gray-brown, slightly silty, sandy GRAVEL.
70  Gravelly SAND.
70  Moist, gray, silty to very silty, sandy GRAVEL.
80  Damp, gray, gravelly, very silty, SAND.
80  Wet, gray, slightly silty to clean, sandy GRAVEL.
100  (Borehole yield 33 gpm)
110  (Flow test, 33 gpm)
120  Light gray, sandy CLAY.
130  Hard, gray-brown, CLAYSTONE/SILTSTONE.
140  Water bearing between 149 and 150 feet.
150  Hard, dark gray, BASALT.
160  
170  CLAYSTONE.
180  BASALT with abundant quartz.
180  Bottom of boring at 179.5 feet on 7/17/97 (Borehole yield 14 gpm)
190  
200  

PROJECT NAME: Maytown  WELL NAME: PP 11
DRILLING METHOD: Air Rotary  UWID No. xx
DRILLING FIRM: Staco  MEASURING POINT ELEV.: 281.54 ft
CONSULTING FIRM: Pacific Groundwater Group  DATUM: HGD92
REPRESENTATIVE: Russ Prior  INSTALLED: 7/15/97 - 7/17/97
LOCATION: NE 4/4 SW 1/4 Sec. 1, T16N, R2W  

GEOLOGIC LOG AND AS-BUILT FOR PP 11

12-inch diameter surface seal

Blank riser including K-packer
Screen from 95 to 100 feet
0.080-inch slot
Screen from 100 to 110 feet
0.070-inch slot

6-inch diameter borehole (backfill)
DEPTH (feet) | GEOLOGIC LOG | WELL CONSTRUCTION DETAILS (not to scale)
---|---|---
0 | Loose, damp, cobbley, sandy GRAVEL. | 12-inch diameter surface seal
10 | Encountered water at 23 feet. | Blank riser including K-packer
20 | Loose, wet, cobbley, sandy GRAVEL. | Screen from 80 to 85 feet 0.100-inch slot
30 | Wet, brown, clean, sandy GRAVEL. | Screen from 85 to 95 feet 0.050-inch slot
60 | Wet, gray CLAY. | Tail Pipe
70 | Wet, brown, slightly sandy GRAVEL. (Water sample, EC=85 umhos/cm, Fe=0, Mn=0) | 8-inch diameter borehole (backfill)
80 | Wet, brown, sandy GRAVEL. | Depth to water: 10.06 feet below measuring point on 6/28/92
90 | Wet, brown, very gravelly SAND. |
100 | Clean, sandy GRAVEL. |
110 | Wet, green-gray, slightly silty to silty, sandy GRAVEL. |
120 | Wet, gray, dirty, sandy GRAVEL (decreased water flow). | Silty to very silty, gravelly SAND with clayey silt beds and organic silt.
130 | Wet, brown, clayey Silt. | Red CLAY.
140 | Laminated blue-gray and brown CLAY. | Bottom of boring at 180 feet on 7/30/97 (Borehole yield approximately 12 gpm)
150 | CLAYSTONE.
160 |
170 |
180 |
190 |
200 |

PROJECT NAME: Maytown
DRILLING METHOD: Air Rotary
DRILLING FIRM: Sloco
CONSULTING FIRM: Pacific Groundwater Group
REPRESENTATIVE: Russ Prior
LOCATION: SE 1/4 NE 1/4 Sec. 11, T16N, R2W

WELL NAME: PP 12
WELL NO. xx
MEASURING POINT ELEV.: 222.94 ft
DATUM: NGVD 29
INSTALLATION COMPLETED: 7/30/97

GEOLOGIC LOG AND AS-BUILT FOR PP 12

Hydrogeologic Analysis for Maytown Aggregates, Thurston County, WA
Pacific Groundwater Group
## Drilling Method
- Reverse Circulation

## Sampling Method
- 5-Foot Increments, Continuous

### Water Level
- 7'

### Date
- 6/26/97

### Time
- 10:40 a.m.

### Description

<table>
<thead>
<tr>
<th>Depth</th>
<th>Strata</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1'</td>
<td>Sand</td>
<td>Black/very dk. br., moist, 1&quot;- fine gravelly, coarse sandy, organic topsoil.</td>
</tr>
<tr>
<td>1-5'</td>
<td>Sand</td>
<td>Moist, med.-brown, 4&quot;- cobbly, pebble-granule gravelly, very coarse, well-sorted fine sand.-200 mesh -5%; light to medium silt coating. +1/4&quot; 40%.</td>
</tr>
<tr>
<td>5-10'</td>
<td>Sand</td>
<td>Damp, med. gray-brown, 6&quot;- cobbly pebble-to-granule gravelly fine-to-coarse sand, predom. well-sorted fine/med. Med. silt-clay coating.-200 5%. 15 gpm water at 10'</td>
</tr>
<tr>
<td>10-15'</td>
<td>Sand</td>
<td>Saturated med. gray, fine-to-coarse sandy, silty (-5%), bouldery (1), cobbly (+10%), pebble-to-granule gravel. +1/4&quot; 70%.</td>
</tr>
<tr>
<td>15-20'</td>
<td>Sand</td>
<td>Sat., clean (1-3% -200), bouldery, cobbly, well-sorted fine sandy, well-graded pebble to granule gravel. +1/4&quot; 80%. 80 gpm @ 20'</td>
</tr>
<tr>
<td>20-24'</td>
<td>Sand</td>
<td>Sat., med. gray, bouldery, cobbly, pebble-to-granule gravelly, clean (-200 1-2%), well-sorted med. sand, or sandy gravel. +1/4&quot; 45-50%. Excellent aggregate.</td>
</tr>
</tbody>
</table>

### Notes:
- Boring completed on west side of office building and south of entrance road. Ground surface disturbed from logging. Static water level 7'. Bottom of boring 80'
<table>
<thead>
<tr>
<th>STRATA</th>
<th>DEPTH</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>24-39' No return to 35' Pushed boulder from 24'. In process, encountered at least 1' layer of clay starting at 27'. Sand and gravel to 30', underlain by clay/till. At 37', into teal-blue till-like material (not laminated) that held ground water up.</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>39-45' Clay/till. At 44', into water (5 gpm) and saturated, silty (greater than 5%), fine-to-coarse sandy, bouldery gravel. +1/4&quot; 60-70%.</td>
<td></td>
</tr>
<tr>
<td>45-50'</td>
<td>Back into excellent aggregate. Saturated, medium gray, clean (1-2% -200 mesh), bouldery, cobbly, pebble-to-granule gravelly, well-graded fine-to-coarse sand. No clay. +1/4&quot; 40-50%. Advance outwash? From 48-50', became much more cobbly and bouldery (+1/4&quot; 50-60%).</td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:**
**Legend**
- Sandy Gravel with Cobble
- Sandy Gravel
- Poorly Sorted Sand
- Well Sorted Sand
- Diamicton
- Silt - Clay
- Peat
- Bedrock
- Silty

**Drilling Method:** Reverse Circulation

**Sampling Method:** Continuous, 5-foot increments

<table>
<thead>
<tr>
<th>WATER LEVEL</th>
<th>DATE</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>7'</td>
<td>6/26/97</td>
<td>10:40 a.m.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STRATA</th>
<th>DEPTH</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50</td>
<td>50-55' Saturated, clean (1-2% -200 mesh), blue-gray, bouldery, cobbly, fine-to-coarse (minor), well-sorted, fluffy med. sand, or sandy gravel. +1/4&quot; 50%.</td>
</tr>
<tr>
<td></td>
<td>55</td>
<td>55-60' Saturated medium gray advance outwash?, as above. Sand coarser. A clean (1-2% -200 mesh), medium and coarse sandy, cobbly, pebble-pea-granule gravel. +1/4&quot; 60-70%.</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>60-63' No sign. change. A clean, saturated, cobbly, pea-granule gravel. +1/4&quot; 70%. Water ceased at 63'.</td>
</tr>
<tr>
<td></td>
<td>63</td>
<td>63-80' Orange silty clay of pre-Vashon origin. Less than 5% sound gravel. No value as aggregate.</td>
</tr>
</tbody>
</table>

**Notes:**

**Project No.** Northwest Resource Developers

**Boring No.**  

**Elevation** 210'

**Page 3 of 4**

McLucas and Associates, Inc.
P.O. Box 5352
Lacey, WA 98503
**Legend**
- Sandy Gravel with Cobble
- Sandy Gravel
- Poorly Sorted Sand
- Well Sorted Sand
- Diamicton
- Silt-Clay
- Peat
- Bedrock
- Silty

**Drilling Method:**
Reverse Circulation

**Sampling Method:**
Continuous, 5-Foot Increments

**Water Level:** 7'
**Date:** 6/26/97
**Time:** 10:40 a.m.

<table>
<thead>
<tr>
<th>Strata</th>
<th>Depth</th>
<th>Description</th>
<th>Water Table(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>Bottom of boring at 80'.</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

**Project No.** Northwest Resource Developers

**McLucas and Associates, Inc.**
P.O. Box 5352
Lacey, WA 98503
### Drilling Method:
REVERSE CIRCULATION

### Sampling Method:
CONTINUOUS, 5-FOOT INCREMENTS

<table>
<thead>
<tr>
<th>Depth</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5'</td>
<td>Moist, med. brown-gray, silty, clayey (heavy), fine to coarse sandy (predom. fine), bouldery, cobbly (abundant chips), pebble-to-granule gravel. -200 5-10%. +1/4&quot; 70%.</td>
</tr>
<tr>
<td>5-10'</td>
<td>Med. gray, moist, clean, silty (+5% -200), bouldery, cobbly (abundant chips), pebble-pea-granule gravelly, fine-coarse sand/sandy gravel. +1/4&quot; 50%.</td>
</tr>
<tr>
<td>10-15'</td>
<td>Damp, med. br.-gray, bouldery, cobbly, silty/clayey (med. coating), fine-to-coarse sandy (minor med.), pebble-pea-granule gravel. +1/4&quot; 70-80%. Water at 15'</td>
</tr>
<tr>
<td>15-20'</td>
<td>Sat., silty (5-10% -200), bouldery, cobbly, fine sandy pebble-to-granule gravel. Abundant broken material. +1/4&quot; 90%. Rock sound as all above.</td>
</tr>
<tr>
<td>20-25'</td>
<td>Sat., clean (-5% -200), silty, fine-to-coarse sandy (minor fine), cobbly, pebble-pea gravel. +1/4&quot; 80%. Orange clay in 19-20' zone.</td>
</tr>
</tbody>
</table>

Note: Boring on landing where soil has been stripped. Static water level 15' next morning. Bottom of boring 120'.
<table>
<thead>
<tr>
<th>STRATA</th>
<th>DEPTH</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>25-30</td>
<td>Orange clay-rich material. -200 mesh +20%. As above, except sand finer and +1/4&quot; 68%. Poor aggregate. Very bouldery and cobbly. -200 2.8%.</td>
</tr>
<tr>
<td></td>
<td>30-35</td>
<td>Sat. (60 gpm). From 30-32', cobbly pebble-pea-granule gravelly fine and coarse sandy. -2% -200 mesh.+1/4&quot; 40%. From 32-35', tan silt (+5% -200). Became a broken cobbly, very coarse sandy, 3&quot;-(predom. 1/2&quot;-), pebble-pea-granule gravel. +1/4&quot; 90%.</td>
</tr>
<tr>
<td></td>
<td>35-40</td>
<td>Med. blue-gray, sat., clean, silty (-2%), 3&quot;- pebble-pea-granule gravelly, fine-to-coarse sand. +1/4&quot; 30-40%.</td>
</tr>
<tr>
<td></td>
<td>40-45</td>
<td>No sign. change. Sand fine and well sorted, minor coarse. +1/4&quot; 40-50%. Gravel well graded, as above. No cobbles.</td>
</tr>
<tr>
<td></td>
<td>45-50</td>
<td>Change back to bouldery, cobbly matl. Abundant tan silt with some clay (5-10%). Sand coarser. A fine-to-coarse sandy, bouldery, cobbly, pebble-to-granule gravel. +1/4&quot; 80-90%. A dirty zone.</td>
</tr>
</tbody>
</table>

**NOTES:**

**PROJECT NO.** NORTHEAST RESOURCE DEVELOPERS  
**BORING NO.** 2  
**ELEVATION** 220'  
**PAGE 2 OF 5**
### Legend
- Sandy Gravel with Cobble
- Sandy Gravel
- Poorly Sorted Sand
- Well Sorted Sand
- Diamicton
- Silt - Clay
- Peat
- Bedrock/Silty

### Drilling Method:
Reverse Circulation

### Sampling Method:
Continuous, 5-Foot Increments

### Water Level

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Water Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/26/97</td>
<td>3:00 p.m.</td>
<td>15'</td>
</tr>
</tbody>
</table>

### Characteristics

<table>
<thead>
<tr>
<th>Depth</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>50'</td>
<td>50-55' Change to saturated, very clean (1-2% -200), bouldery, cobbly, fine-to-coarse sandy (predom. Medium), pebble-to-granule well graded gravel. +1/4&quot; 70-80%. Very nice aggregate.</td>
</tr>
<tr>
<td></td>
<td>55-60' Back to dirtier material Still saturated. More bouldery/cobbly than above. -200 +5% +1/4&quot; 80-90%. Predom. coarse sandy pea-granule gravel.</td>
</tr>
<tr>
<td>60-82'</td>
<td>60-82' Very uniform sequence. -200 mesh less than 1%. From 60-65', +1/4&quot; 60-70%. From 70-75', +1/4&quot; 70-80% with more cobbles. From 75-82', less cobbles and 50% +1/4&quot;.</td>
</tr>
</tbody>
</table>

### Notes:

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**McLUCAS AND ASSOCIATES, INC.**
P.O. BOX 5352
LACEY, WA. 98503

---

**NORTHWEST RESOURCE DEVELOPERS**
82-85' Clay/till (no lamination). No value as aggregate source. -200 mesh +20%.

85-95' Saturated, dark gray, clean (1-2% -200), predom. basalt/andesite gravel. Abundant quartzite and granitics as well. Well sorted fine sandy (minor coarse), cobbly, predom. well-graded, 3''-pebble-pea-granule gravel, or gravelly fine sand +1/4'' 50-60%.

95-100. No significant change. Minor cobbles. Fine gravelly (2''-), fine-to-coarse sand. +1/4'' 30-40%.
100-105' Very nice saturated, clean (1-2% -200), silty, fine-to-coarse sandy, cobbly (minor) 3"- pebble-pea-granule gravel. +1/4" 60-70%

105-110' As above to 107', then into gravelly clay. Tough till. No value as aggregate.

110-120' Dark blue-gray clay. May be lacustrine. Noted yellow-brown clay balls.

Bottom of boring at 120'
### Strata Description

<table>
<thead>
<tr>
<th>Depth</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5'</td>
<td>Black/very dark brown, damp, humus-rich topsoil. Contains 6&quot;-cobbles &amp; 2&quot;-gravel. Sand fine &amp; very coarse. +1/4&quot; 30%.</td>
</tr>
<tr>
<td>5-10'</td>
<td>Medium gray, moist, cobbly (5%), silty (-5%), well-sorted fine, medium, &amp; very coarse sand. +1/4&quot; 40%.</td>
</tr>
<tr>
<td>10-15'</td>
<td>No sign. change except more gravel &amp; contains boulders (abundant chips). +1/4&quot; 60-70%. -200 2-3%.</td>
</tr>
<tr>
<td>15-20'</td>
<td>No sign. change except more gravel. Still bouldery &amp; cobbly. Medium silt coating as all above. Rock sound.</td>
</tr>
<tr>
<td>20-25'</td>
<td>Water at 21'; saturated below. Dark gray, very silty/clayey (heavy coating, -200 +10%), very coarse sandy, bouldery, cobbly, pebble-pea-granule gravel. +1/4&quot; 80%.</td>
</tr>
</tbody>
</table>

**Note:** Boring in meadow north of railroad tracks in northeast site corner. Bottom of boring 90'. Static water level 20'.

---

**Legend**
- Sandy gravel with cobbles
- Sandy gravel
- Poorly sorted sand
- Well sorted sand
- Diamicton
- Silt-clay
- Peat
- Bedrock
- Silty

**Drilling Method:** Reverse circulation

**Sampling Method:** Continuous return, 5-foot increments

**Water Level:** 20'

**Date:** 6/30/97

**Time:** 9:30 a.m.
<table>
<thead>
<tr>
<th>STRATA</th>
<th>DEPTH</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>25'</td>
<td></td>
<td>25-30' As above to 31', then into dark gray, saturated, clean (less than 2%), cobbly (5%), silty medium &amp; coarse sandy, 3&quot;-pebble-to-granule gravel. +1/4&quot; 80%.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30-35' Change to dark gray, saturated, clean (1%), well sorted fine-to-coarse sand (minor fine), silty, cobbly (5%), pebble to granule gravel. +1/4&quot; 70-80%.</td>
</tr>
<tr>
<td>35-40'</td>
<td></td>
<td>No sign. change. More cobbles.</td>
</tr>
<tr>
<td>40-50'</td>
<td></td>
<td>No sign. change. More cobbly. At 45', 50 gpm.</td>
</tr>
</tbody>
</table>

**NOTES:**

**PROJECT NO.** NORTHWEST RESOURCE DEVELOPERS        **MCLEUCAS AND ASSOCIATES, INC.**
**BORING NO.** 4                                      **P.O. BOX 5352**
**ELEVATION** 227'                                   **LACEY, WA. 98503**
**PAGE 2 OF 4**
LEGEND

SANDY GRAVEL WITH COBBLES
SANDY GRAVEL
POORLY SORTED SAND
WELL SORTED SAND
DIAIMICTON
SILT-CLAY
PEAT
BEDROCK
SILTY

DRILLING METHOD:
reverse circulation

SAMPLING METHOD:
CONTINUOUS RETURN, 5-FOOT INCREMENTS

WATER LEVEL:

DATE 6/30/97
TIME 9:30 a.m.

<table>
<thead>
<tr>
<th>STRATA</th>
<th>DEPTH</th>
<th>DESCRIPTION</th>
<th>WATER TABLE(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>55-65' Back into more well-sorted fine-to-coarse sand. -200 mesh 2%. +1/4&quot; 54%.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>65'</td>
<td>65-70' Saturated dark gray, silty (-200 less than 5%), bouldery-cobbly, coarse and very coarse sandy, pebble-pea-granule gravel. Excellent aggregate. +1/4&quot; 90%. At base chunks of orange clay.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>75'</td>
<td>70-75' At 71, plastic teal-blue clay with 3&quot;- gravel for 12-18&quot;, then coarse sand, then gravel. +1/4&quot; 50%. -200 mesh +20%. Poor aggregate source.</td>
<td></td>
</tr>
</tbody>
</table>

NOTES:

PROJECT NO. NORTHWEST RESOURCE DEVELOPERS
BORING NO. 4
ELEVATION 227'
PAGE 3 OF 4

McLUCAS AND ASSOCIATES, INC.
P.O. BOX 5352
LACEY, WA. 98503
## LEGEND
- Sandy Gravel with Cobbles
- Sandy Gravel
- Poorly Sorted Sand
- Well Sorted Sand
- Diamicton
- Silt - Clay
- Bedrock
- Silty

## DRILLING METHOD:
Reverse Circulation

## SAMPLING METHOD:
Continuous Return, 5-foot Increments

<table>
<thead>
<tr>
<th>WATER LEVEL</th>
<th>DATE</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>20'</td>
<td>6/30/97</td>
<td>9:30 a.m.</td>
</tr>
</tbody>
</table>

## STRATA | DEPTH | DESCRIPTION |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>75'</td>
<td>75-85' Teal/slate blue plastic clay (lacustrine?). Contains coarse sand and 1.5&quot; gravel. No value as aggregate.</td>
</tr>
<tr>
<td></td>
<td>85-90'</td>
<td>Clay as above to 86', then orange clay. Bottom of boring 90'.</td>
</tr>
</tbody>
</table>

## NOTES:

### PROJECT NO.
NORTHWEST RESOURCE DEVELOPERS

### BORING NO.
4

### ELEVATION
227'

### PAGE
4 OF 4
LEGEND

SANDY GRAVEL WITH COBBLES
SANDY GRAVEL
POORLY SORTED SAND
WELL SORTED SAND
DIAMICTON
SILT - CLAY
PEAT
BEDROCK
SILTY

DRILLING METHOD:

REVERSE CIRCULATION

SAMPLING METHOD:

CONTINUOUS RETURN, 5-FOOT INCREMENTS

WATER LEVEL

DATE 6/27/97
TIME 9:30 a.m.

<table>
<thead>
<tr>
<th>STRATA</th>
<th>DEPTH</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0-5'</td>
<td>Moist, black/very dark br. humus-rich topsoil. Contains cobbles &amp; +6&quot; broken boulders. Predom. 2&quot;- pebble-pea-granule gravelly, well-rounded medium &amp; coarse sand. Fairly clean; -200 5.6%. +1/4&quot; 46.5%.</td>
</tr>
<tr>
<td>5-10'</td>
<td>5-10'</td>
<td>Moist, med. br.-gray, 6&quot;- cobbly, silty (2.7% -200), very well-sorted fine/medium sandy (minor very coarse sand), fairly well graded, pebble-to-granule gravel. Rock med. silt &amp; fine sand coated. +1/4&quot; 60%.</td>
</tr>
<tr>
<td>10-15'</td>
<td>10-15' As above, except at 14' became very wet &amp; very bouldery/cobbly (5&quot;-). Heavy clay coating. +1/4&quot; 70%. -200 2.4%. Water at 15'</td>
<td></td>
</tr>
<tr>
<td>15-20'</td>
<td>15-20' Sat., dark gray, silty (2-5% -200), fine-to-coarse sandy (abundant chips from above), 3&quot;- (predom. 1&quot;-), pebble-pea-granule gravel. +1/4&quot; +70%.</td>
<td></td>
</tr>
<tr>
<td>20-25'</td>
<td>20-25' Change to sat., well-sorted, fine-to-coarse (predom. med.) br.-gray sand. To 23', bouldery-cobbly gravel, as above. +1/4&quot; +30%. -200 mesh 1-2%.</td>
<td></td>
</tr>
</tbody>
</table>

Note: On logging road spur in southwestern portion of site. Soil disturbed. Bottom of boring at 115'. Static water level 15".

PROJECT NO. WATTLE RESOURCE DEVELOPERS
BORING NO. 3 mT-3
ELEVATION 212'

McLUCAS AND ASSOCIATES, INC.
P.O. BOX 5352
LACEY, WA. 98503
<table>
<thead>
<tr>
<th>STRATA</th>
<th>DEPTH</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25'</td>
<td>25-30' Med. gray, very well-sorted, well-rounded, fine/medium sand. -200 mesh 1-2%. +1/4&quot; 10%. Nice sand.</td>
</tr>
<tr>
<td></td>
<td>30-35'</td>
<td>Sat. sand as above to 32', then bouldery, cobbly, well-graded 4&quot;-to-granule gravel. +1/4&quot; 60-70%. -200 -1%.</td>
</tr>
<tr>
<td></td>
<td>40-42'</td>
<td>Brown-orange weathered clay with minor pebble-cobble gravel.</td>
</tr>
<tr>
<td></td>
<td>42-43'</td>
<td>Slate blue clay-bound predom. 2&quot;-gravel. +1/4&quot; 90%. A pebble-pea-granule gravel with very coarse sand. Nice mtrl</td>
</tr>
<tr>
<td></td>
<td>43-47'</td>
<td>Teal- and slate-blue clay.</td>
</tr>
<tr>
<td></td>
<td>47-50'</td>
<td>Back into sat. gravel as at 42-43'. Very coarse sandy pebble-pea-granule gravel. +1/4&quot; 95%. Rock sound.</td>
</tr>
</tbody>
</table>

**NOTES:**
### Strata Description

<table>
<thead>
<tr>
<th>Depth</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>50'</td>
<td>50-55' Sat., clean (-200 mesh 3.3%), fine-to-coarse sandy, 4&quot;-6&quot;, well-graded, pebble-to-granule gravel. +1/4&quot; 65%. Clay increased at base.</td>
</tr>
<tr>
<td></td>
<td>55-60' Saturated, very clayey (+20%), silty, cobbley (abundant chips), pebble-pea gravel. +1/4&quot; +60%.</td>
</tr>
<tr>
<td>60'</td>
<td>60-65' Sat., very clean (1-2% -200), dark gray, silty, medium and coarse sandy, cobbley, 2&quot;- (predom. 1&quot;-), pebble-pea-granule gravel. +1/4&quot; +60%.</td>
</tr>
<tr>
<td></td>
<td>65-70' Sat., extremely dirty gravel (-200 10%). Silty/very clayey, fine-coarse sandy, bouldery, cobbley, well-graded pebble to granule gravel. +1/4&quot; 60%.</td>
</tr>
<tr>
<td>75'</td>
<td>70-75' Back into cleaner material. Sat. dark blue-gray, silty/clayey (5-10%), fine-to-coarse sandy, cobbley (abundant chips), fairly well-graded pebble-to-granule gravel +1/4&quot; 90%.</td>
</tr>
</tbody>
</table>

### Water Table

- Water Level: 15'
- Date: 6/27/97
- Time: 9:30 a.m.
<table>
<thead>
<tr>
<th>STRATA</th>
<th>DEPTH</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>75-80'</td>
<td>75-80' Change to sat., very clean, dark gray, cobbly (minor), well-sorted fine-to-coarse sandy, well-graded pebble-to-granule gravel. +1/4&quot; 73%. -200 mesh 0.5%.</td>
</tr>
<tr>
<td></td>
<td>80-85'</td>
<td>80-85' Top 1' as above, then cobbly, bouldery, slate-blue dense, probably lacustrine clay and silt. Holds water up. No value as aggregate source.</td>
</tr>
<tr>
<td></td>
<td>85-90'</td>
<td>85-90' Back into saturated (75-80 gpm) dark gray, very clean (1-2% -200), 8&quot;-cobbly/bouldery, well-graded pebble-to-granule gravelly, well-sorted &amp; rounded fine/medium sand. +1/4&quot; 30-40%.</td>
</tr>
<tr>
<td></td>
<td>90-105'</td>
<td>90-105' No sign. change. Sat.; dark gray, clean (1.4% -200), silty, cobbly, well-sorted fine-to-coarse sandy, 3+- pebble-to-granule gravel. +1/4&quot; 60%.</td>
</tr>
</tbody>
</table>

**NOTES:**

---

**PROJECT NO.** NORTHWEST RESOURCE DEVELOPERS

**BORING NO.** 3

**ELEVATION** 212'

PAGE 4 OF 5

**MCLUCAS AND ASSOCIATES, INC.**

P.O. BOX 5352

LACEY, WA. 98503
### Legend
- Sandy Gravel with Cobble
- Sandy Gravel
- Poorly Sorted Sand
- Well Sorted Sand
- Diamicton
- Silt-Clay
- Peat
- Bedrock

### Drilling Method
- Reverse Circulation

### Sampling Method
- Continuous Return, 5-Foot Increments

### Water Level
- Date: 6/27/97
- Time: 9:30 a.m.

### Table

<table>
<thead>
<tr>
<th>Depth</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>100'</td>
<td>105-110' As above to 106', then cobbly coarse gravelly, silty plastic clay. No value as aggregate.</td>
</tr>
<tr>
<td>110-115' Sat., silty, very well-sorted fine sand. Minor fine gravel. Bottom 3' cleaner than above. -200 mesh 7.8%.</td>
<td></td>
</tr>
<tr>
<td>125'</td>
<td>Bottom of boring at 115'</td>
</tr>
</tbody>
</table>

### Notes:

---

**Project No.** NORTHWEST RESOURCE DEVELOPERS  
**McLucas and Associates, Inc.**  
**Boiling No.** 3  
**Elevation** 212'  
**Page** 5 of 5
**DRILL HOLE LOG**

**Project:** Jay Allen-Maytown Aggregate  
**Contractor:** Layne Christensen  
**Drill Method:** 9" Becker  
**Sampling:** Cyclone  

**HOLE ID: MT-5**  
**DATE: 5/10/02**  
**Elevation:** 224 ft.  
**Depth:** 80 ft.  
**Diameter:** 6" inner dia.  
**Azimuth/Dip:** -90  
**Well:** Well completed to 50 ft.; screened 45-50 ft.

### Depth (ft) | Symbol | Description
--- | --- | ---
1 |   | Topsoil; root zone
5 |   | Damp, gray, gravely fine to coarse SAND, some cobbles
10 |   | moist, brown-gray, cobbly, gravely, fine to coarse SAND, cobbles to 6", boulder @ 8 ft.
15 |   | moist, brown-gray, cobbly, gravely, fine to coarse SAND
16 |   | moist to wet, brown, fine to coarse SAND, some gravel, trace cobbles; WT at 16'; saturated
20 |   | saturated, dark gray, sandy GRAVEL, some cobbles
25 |   | saturated, dark gray, sandy cobbly GRAVEL; cobbles to 6"
30 |   | saturated, brown-gray, sandy cobbly GRAVEL; cobbles to 6"
36 |   | moist, gray, lodgement TILL (gravel-sand silt)
42 |   | saturated, dark, gray, sandy GRAVEL, some cobbles; heaving sand below till
45 |   | saturated, dark gray, gravely coarse SAND, some cobbles; screened 45 to 50 ft.
50 |   |

### Depth (ft) | Symbol | Description
--- | --- | ---
55 |   | saturated, dark gray, gravely coarse SAND, some cobbles
60 |   | saturated, gray, fine to medium SAND, trace gravel
65 |   | saturated, gray, medium to coarse SAND, trace gravel
70 |   | saturated, gray, fine to medium SAND, trace gravel
75 |   | saturated, gray, fine SAND
78 |   | moist to wet, gray, lodgement TILL (gravelly sandy silt)
80 |   | BOH @ 80 ft.
85 |   |

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*SubTerra, Inc.*

PN: 2002-12  
Page 1 of 1
### DRILL HOLE LOG

**Project:** Jay Allen–Maytown Aggregate  
**Contractor:** Layne Christensen  
**Drill Method:** 9" Becker  
**Sampling:** Cyclone  

**Elevation:** 223 ft.  
**Depth:** 100 ft.  
**Diameter:** 6" inner dia.  
**Azimuth/Dip:** -90  
**Well:** Well completed to 58 ft.; screened 53-58 ft.

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td></td>
<td>moist, dark gray, cobbly GRAVEL, some clay</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>moist, dark brown-gray, sandy GRAVEL, some cobbles, some clay</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>wet, brown-gray cobbly GRAVEL with some clay; WT/saturated @ 15 ft.</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>saturated, dark gray, cobbly sandy GRAVEL</td>
</tr>
<tr>
<td>25</td>
<td></td>
<td>saturated, dark gray, cobbly sandy GRAVEL</td>
</tr>
<tr>
<td>30</td>
<td></td>
<td>saturated, dark gray, cobbly sandy GRAVEL</td>
</tr>
<tr>
<td>31</td>
<td></td>
<td>wet, brown, lodgement TILL lens</td>
</tr>
<tr>
<td>35</td>
<td></td>
<td>saturated, dark gray, sandy GRAVEL, some cobbles</td>
</tr>
<tr>
<td>40</td>
<td></td>
<td>as above</td>
</tr>
<tr>
<td>45</td>
<td></td>
<td>saturated, dark gray, sandy GRAVEL, some cobbles, some consolidated clay seams</td>
</tr>
<tr>
<td>50</td>
<td></td>
<td>saturated, gray, sandy GRAVEL approx. 20% sample is hard, contorted clay beds with rusty oxidation, finely laminated</td>
</tr>
<tr>
<td>55</td>
<td>SAND</td>
<td>saturated, dark gray, gravelly SAND; screened 53 ft. - 58 ft.</td>
</tr>
<tr>
<td>60</td>
<td></td>
<td>as above</td>
</tr>
<tr>
<td>65</td>
<td></td>
<td>saturated, dark gray sandy GRAVEL / gravelly sand; trace to some cobbles</td>
</tr>
<tr>
<td>70</td>
<td></td>
<td>as above; sandy GRAVEL</td>
</tr>
<tr>
<td>75</td>
<td></td>
<td>saturated, dark gray, sandy GRAVEL, some cobbles</td>
</tr>
<tr>
<td>80</td>
<td></td>
<td>saturated, dark gray, sandy GRAVEL</td>
</tr>
<tr>
<td>85</td>
<td></td>
<td>as above</td>
</tr>
<tr>
<td>90</td>
<td></td>
<td>as above</td>
</tr>
<tr>
<td>95</td>
<td></td>
<td>as above</td>
</tr>
<tr>
<td>100</td>
<td>SAND</td>
<td>saturated, dark gray, gravelly SAND, trace to some cobbles</td>
</tr>
</tbody>
</table>

BOH @ 100 ft.
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>TILL</td>
<td>wet, gray-brown, lodgement TILL, (gravelly silty sand)</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>moist, brown, silty sandy GRAVEL</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>moist, brown, silty sandy GRAVEL, trace cobbles</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>moist, dark gray-brown, sandy GRAVEL, some silt, trace cobbles</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>moist, dark gray-brown, sandy GRAVEL, some silt, some cobbles</td>
</tr>
<tr>
<td>25</td>
<td>SAND</td>
<td>moist, gray-brown, gravelly fine to medium SAND</td>
</tr>
<tr>
<td>30</td>
<td></td>
<td>moist, gray-brown, gravelly coarse SAND to sandy gravel, trace cobbles</td>
</tr>
<tr>
<td>35</td>
<td></td>
<td>moist, gray-brown gravelly fine to coarse SAND, some silt, trace to some cobbles</td>
</tr>
<tr>
<td>40</td>
<td></td>
<td>wet, dark brown-gray, sandy pea GRAVEL</td>
</tr>
<tr>
<td>45</td>
<td>SAND</td>
<td>wet, gray-brown, silty gravelly fine to coarse SAND, trace cobbles with some brown clay lenses</td>
</tr>
<tr>
<td>50</td>
<td></td>
<td>as above</td>
</tr>
<tr>
<td>52</td>
<td></td>
<td>wet, dark gray, gravelly sandy SILT, trace cobbles, with hard clay lenses--light brown with rusty oxidation (Till)</td>
</tr>
<tr>
<td>55</td>
<td></td>
<td>moist, dark gray, rusty brown and gray-green hard, silty CLAY beds with sandy gravelly silt (marine till?)</td>
</tr>
<tr>
<td>60</td>
<td></td>
<td>moist, brown, gravelly coarse SAND</td>
</tr>
<tr>
<td>62</td>
<td></td>
<td>moist, brown and gray with rusty mottling, oxidized lodgement TILL (sandy, gravelly silt)</td>
</tr>
<tr>
<td>65</td>
<td></td>
<td>wet, brown, silty sandy GRAVEL</td>
</tr>
<tr>
<td>70</td>
<td></td>
<td>WT @ 76 ft. saturated, brown, cobbly sandy GRAVEL</td>
</tr>
<tr>
<td>75</td>
<td></td>
<td>BOH @ 80 ft.</td>
</tr>
</tbody>
</table>
## DRILL HOLE LOG

### Project:
Jay Allen—Maytown Aggregate

### Contractor:
Layne Christensen

### Drill Method:
9" Becker

### Sampling:
Cyclone

### Elevation:
234 ft.

### Depth:
85 ft.

### Diameter:
6" inner dia.

### Azimuth/Dip:
-90

### Well:
Well completed to 39 ft.; screened 34 - 39 ft.

### Date:
5/14/02

### Depth (ft) | Symbol | Description
---|---|---
1 | | Topsoil: root zone moist, dark gray, sandy GRAVEL (small sample)
5 | | moist, brown-gray, sandy GRAVEL, trace cobbles
10 | | moist, brown-gray, sandy GRAVEL, some cobbles
15 | | wet to saturated, gray, cobbly GRAVEL, some sand; WT @ 18 ft.
18 | | saturated, dark gray, cobbly GRAVEL
20 | | as above, with some fine sand
25 | | saturated, dark-gray cobbly sandy GRAVEL
30 | | (piezo set 34 ft. to 39 ft.)
35 | | as above, cobbles to 8 in.
40 | | dark gray, saturated, cobbly GRAVEL, some sand
45 | | saturated, dark gray, cobbly GRAVEL, some sand
50 | | |
55 | | as above
60 | | saturated, dark-gray sandy cobbly GRAVEL
65 | | saturated, dark-gray cobbly gravelly SAND
70 | | saturated, dark-gray, cobbly GRAVEL, some sand
77 | | saturated, dark-gray cobbly GRAVEL
80 | | saturated, blue-gray and rusty-brown silty clay TILL (marine clays)
85 | | moist, blue-gray gravelly silty clay TILL BOH @ 85 ft.
DEPTH (feet)

0
Dry, dark brown, slightly gravelly, silty fine SAND with trace cobbles.

10
Dry, light brown, slightly gravelly, fine to medium SAND.

20
Wet, gray, slightly silty, sandy GRAVEL with cobbles up to 4-inches in diameter.

30
Wet, brown, slightly gravelly, fine to medium SAND.

40
Wet, brown slightly gravelly, medium SAND.

50
Bottom of boring at 50 feet on 6/17/02

GEOLOGIC LOG

WELL CONSTRUCTION DETAILS (not to scale)

- 8-inch, above ground, steel, locking monument
- 3-inch diameter borehole
- Bentonite chips
- 2-inch PVC casing
- PVC screen from 12 to 20 feet, 0.020-inch slat with end cap surrounded by CSSI #10-20 sand pebbles
- Native Backfill

DEPTHS TO WATER 17.25 feet below ground surface on 6/17/02

PROJECT NAME: Maytown
DRILLING METHOD: Becker
DRILLER: C. Dean
FIRM: Loyne Christensen
CONSULTING FIRM: Pacific Groundwater Group
REPRESENTATIVE: Inger Jackson
LOCATION: SE ¾ NE ¼ Sec. 1, T16N, R2W

WELL NAME: MT-9
UWID No. AFK 647
MEASURING POINT ELEV.: 234.63 ft
DATUM: NGVD 29
INSTALLED: 6/17/02

GEOLOGIC LOG AND AS-BUILT
FOR WELL MT-9

Hydrogeologic Analysis for
Maytown Aggregates,
Thurston County, WA
40020, NE-3rd, T16N, R2W
DEPTH (feet) | GEOLOGIC LOG | WELL CONSTRUCTION DETAILS (not to scale)
---|---|---
0 | Dry, dark brown, slightly gravelly, silty fine SAND. | 6-inch, above ground, steel, lackng monument!
10 | Dry to slightly damp, clean, slightly gravelly, fine SAND with trace cobbles. | 8-inch diameter borehole
20 | Wet, brown, silty, very sandy GRAVEL with trace cobbles. | Bentonite chips
| Wet, brown, clean, sandy GRAVEL with cobbles up to 5-inches. | 2-inch PVC casing
30 | Wet, brown, silty, very sandy GRAVEL with trace cobbles. | PVC screen from 19 to 29 feet, 0.020-inch slot with end cap surrounded by CSSI #10-20 sand pack.
| Wet, gray, clean, slightly sandy GRAVEL with cobbles. | Native Backfill
40 | Wet, gray, very silty, sandy GRAVEL with cobbles. | 
| Wet, gray, slightly silty, sandy GRAVEL with cobbles greater than 6-inches. | 
50 | Wet, gray, slightly silty, very sandy GRAVEL. | Bottom of boring at 50 feet on 6/17/02

GEOLOGIC LOG AND AS-BUILT FOR WELL MT-10

PROJECT NAME: Maytown
DRILLING METHOD: Becker
DRILLER: C. Dean
FIRM: Layne Christensen
CONSULTING FIRM: Pacific Groundwater Group
REPRESENTATIVE: Inger Jackson
LOCATION: SW 1/4 SE 1/4 Sec. 1, T16N, R2W

WELL NAME: MT-10
WID No. AFK 848
MEASURING POINT ELEV.: 230.61 ft
DATUM: NGVD 29
INSTALLED: 6/17/02

Hydrogeologic Analysis for Maytown Aggregates,
Thurston County, WA
9/25/02, MITR Draft, 7/02
DEPTH (feet)

0
- Dry, dark brown, slightly silty, fine SAND.

10
- Moist, brown, silty, gravely, fine SAND with trace cobbles fragments up to 3-inches.
- Wet, brown, very sandy GRAVEL with trace cobbles 4-inches in diameter.

20
- Wet, brown, slightly silty, very gravely SAND with cobbles.

30
- Brown, slightly sandy, very silty GRAVEL (not water bearing).

40
- Wet, gray, slightly silty, sandy GRAVEL with cobbles (water bearing).
- Cobbles up to 5-inches.

50
- Wet, gray, very sandy GRAVEL.
- Bottom of boring at 50 feet on 6/17/02

GEOLOGIC LOG

WELL CONSTRUCTION DETAILS (not to scale)

- 6-inch, above ground, steel, locking monument
- 8-inch diameter borehole
- 2-inch PVC casing
- Bentonite chips
- PVC screen from 15 to 25 feet, 0.020-inch slot with end cap surrounded by CSS #10-20 sand pack.
- Native Backfill

PROJECT NAME: Maytown
DRILLING METHOD: Booker
DRILLER: C. Dean
FIRM: Loyne Charleens
CONSULTING FIRM: Pacific Groundwater Group
REPRESENTATIVE: Inger Jackson
LOCATION: SE 1/4 SE 1/4 Sec. 1, T16N, R2W

WELL NAME: MT-11
UWID No. AFK 849
MEASURING POINT ELEV.: 230.31 ft
DATUM: NAVD 29
INSTALLED: 6/17/02

GEOLOGIC LOG AND AS-BUILT FOR WELL MT-11

Hydrogeologic Analysis for Maytown Aggregates, Thurston County, WA
JC2002, MT11-dep. 7/02

Pacific Groundwater Group
Key to Exploration Logs

Sample Description
Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field nor laboratory testing unless presented herein. Visual—manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:
Density/consistency, moisture, color, minor constituents, MAJOR CONSTITUENT, additional remarks.

Density/Consistency
Soil density/consistency in borings is related primarily to the Standard Penetration Resistance. Soil density/consistency in test pits is estimated based on visual observation and is presented parenthetically on the test pit logs.

<table>
<thead>
<tr>
<th>Density</th>
<th>SAND or GRAVEL Standard Penetration Resistance (N) in Blows/Foot</th>
<th>SILT or CLAY Consistency</th>
<th>Standard Penetration Resistance (N) in Blows/Foot</th>
<th>Approximate Shear Strength in TSF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very loose</td>
<td>0 – 4</td>
<td>Very soft</td>
<td>0 – 2</td>
<td>&lt;0.125</td>
</tr>
<tr>
<td>Loose</td>
<td>4 – 10</td>
<td>Soft</td>
<td>2 – 4</td>
<td>0.125 – 0.25</td>
</tr>
<tr>
<td>Medium dense</td>
<td>10 – 30</td>
<td>Medium stiff</td>
<td>4 – 8</td>
<td>0.25 – 0.5</td>
</tr>
<tr>
<td>Dense</td>
<td>30 – 50</td>
<td>Stiff</td>
<td>8 – 15</td>
<td>0.5 – 1.0</td>
</tr>
<tr>
<td>Very dense</td>
<td>&gt;50</td>
<td>Very stiff</td>
<td>15 – 30</td>
<td>1.0 – 2.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hard</td>
<td>&gt;30</td>
<td>&gt;2.0</td>
</tr>
</tbody>
</table>

Moisture
Dry Little perceptible moisture
Damp Some perceptible moisture, probably below optimum
Moist Probably near optimum moisture content
Wet Much perceptible moisture, probably above optimum

Minor Constituents Estimated Percentage
Not identified in description 0 – 5
Slightly (clayey, silty, etc.) 5 – 12
Clayey, silty, sandy, gravelly 12 – 30
Very (clayey, silty, etc.) 30 – 50

Sampling Test Symbols
BORING SAMPLES
- Split Spoon
- Shelby Tube
- Cuttings
- Core Run

TEST PIT SAMPLES
- Grab (Jar)
- Shelby Tube
- Bucket Sample

No Sample Recovery
Tube Pushed, Not Driven

Groundwater Observations
- Monument
- Concrete Surface Seal
- Borehole
- 2-inch @ Riser Pipe
- Bentonite Slurry
- Bentonite Chips
- Water Level
- 10/20 Sand Pack
- 2-inch @ 0.020 Slot PVC Screen
- Native Material

Test Symbols
GS Grain Size Classification
CN Consolidation
TUU Unconsolidated Undrained Triaxial
TCU Consolidated Undrained Triaxial
TCD Consolidated Drained Triaxial
QU QU
DS Direct Shear
K Permeability
PP Pocket Penetrometer
TV Tarnone
CBR California Bearing Ratio
MD Moisture Density Relationship
AL Atterberg Limits
- Water Content in Percent
- Liquid Limit
- Natural Plastic Limit
PID Photoionization Reading
CA Chemical Analysis

HARTCROWSER
J-7171-01
1/01
Figure A-1
Geologic Log

Depth in Feet

Sample

N

Moist, black, sandy Silt with organics, roots, and sticks.

Very dense, damp to moist, brown, sandy GRAVEL.

Dense, moist, brown, gravely SAND to sandy GRAVEL.

Medium dense, wet, brown SAND with trace silt.

Very dense, wet, gray-red, sandy GRAVEL

Bottom of Boring at 26.0 Feet. Completed 6/15/00.

Monitorying Well Design

Casing Stickup in Feet: 2.35

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
Boring Log and Construction Data for Monitoring Well HC-MW-2

Geologic Log

Depth in Feet

Moist, block, sandy SILT with organics and roots.
Dense, dry, gray GRAVEL.

Medium dense, damp to wet, brown, gravelly, coarse SAND.

Dense, wet, brown, coarse sandy GRAVEL.

Bottom of Boring at 25.0 Feet. Completed 6/15/00.

Sample N

S-1 40
S-2 24
S-3 23
S-4 30
S-5 32

Monitoring Well Design
Casing Stickup in Feet: 2.79

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive; actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
Boring Log and Construction Data for Monitoring Well HC-MW-3

Geologic Log:

- Moist, brown to black, slightly sandy, slightly gravelly SILT with organics.
- Dense, damp to wet, brown, sandy GRAVEL.
- Medium dense, wet, brown, gravelly, coarse SAND.

Sample N

- S-1: 61
- S-2: 31
- S-3: 18
- S-4: 11
- S-5: 22
- S-6: 30

Monitoring Well Design
- Casing Stickup in Feet: 2.27

Bottom of Boring at 25.0 Feet. Completed 6/15/00.

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

HARTCROWSER
J-7171-01 6/00
Figure A-4
Boring Log and Construction Data for Monitoring Well HC-MW-4

Geologic Log

Depth in Feet

0

Loose, wet, dark brown, gravelly SAND with organics.

Medium dense to dense, damp, sandy GRAVEL.

Dense, damp, gray, gravelly SAND.

Medium dense, moist to wet, brown, slightly sandy GRAVEL.

Sample

N

S-1
46

S-2
40

S-3
20

S-4
22

S-5
24

S-6
20

Bottom of Boring at 24.0 Feet. Completed 6/16/00.

Monitoring Well Design
Casing Stickup in Feet: 2.65

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.