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Table 3. Analyses Not Performed

SDG	Sample No.	Note
1032224	1. CC066SS01 2. CC066BS01 3. CC066BS02	Samples arrived in CT&E Alaska laboratory on day 13 after collection. TPH-G, VOC, & herbicide analyses cancelled.
1032225	1. CC063SS01 2. CC063BS01 3. CC058SS01 4. CC158SS01 5. CC058BS01 6. CC056SS01 7. CC055SS01 8. CC051SS01 9. CC057SS01 10. CC157SS01 11. CC059SS01 12. CC067SS01 13. CC069SS01 14. CC070SS01	Samples arrived in CT&E Alaska laboratory past hold time for all analyses. None of the samples were analyzed.
1033197	1. CC059SS01 2. CC056SS01 3. CC037BS03 4. CC037BS04 5. CC037BS05 6. CC037BS06 7. CC137BS06 8. CC037BS07	Samples arrived in Columbia Analytical Services, Redding, but were not logged in. No herbicide analysis was performed on these 8 samples.

Table 4. List of Laboratory QC Data

	Date of extraction & analysis	Method blank	Surrogate recovery	Laboratory control sample	Matrix spike
TPH-G	x	x	x	x	x
TPH-D & O	x	x	x	x	x
SVOC	x	x	x	x	x
Pesticides	x	x	x	x	x
PCBs	x	x	x	x	x
Herbicides	x	x	x	x	x
RCRA 8 Metals	x	x		x	x
Dioxin	x	x		x	x
VOC	x	x	x	x	x
Malathion	x	x	x	x	x

3.2 Method Blanks

The method blank data were assessed to determine possible laboratory contamination. No method blank problems were encountered for the mercury, TPH-G, pesticides, PCBs, herbicides, and malathion analyses; however, detectable quantities of analytes were found in the following SGS sample delivery groups:

- Chromium and/or barium in metals method blanks for the SDGs 1033166, 1033197, 1033200, 1033211, and 1033224
- TPH-D in method blank samples for the SDGs 1031851, 1031972, 1032164, 1032180, 1032224, 1033071, 1033105, 1033166, 1033197, 1033200, 1033211, and 1033224
- TPH-O in method blank samples for 1032224, 1033071, 1033105, 1033200, and 1033211
- SVOC [bis-(2-ethylhexyl)phthalate] in method blank samples for 1033071, 1033105, 1033166, 1033197, 1033200, 1033211, and 1033224
- VOC (2-butanone and/or methylene chloride) in method blank samples for 1031972, 1032133, 1032164, and 1032180
- Dioxins in method blank samples for 1031851, 1031972, 1032133, 1032164, 1032180, 1033071, 1033166, 1033197, and 1033211

STL's method blank sample results were not reviewed. The final assessment report will include the review results.

3.3 Laboratory Control Samples

The overall LCS results for metals, TPH, pesticides, PCBs, VOC, herbicides, dioxins, and malathion indicated reasonable precision and reproducibility in the sample results; however, a few LCS failures were found in the SDGs as shown below:

- TPH-D in 1033105
- SVOC in 1032133, 1032164, 1032180, 1032224, and 1033166
- Malathion in 1033105

Laboratory control data not provided in the data packages:

- Herbicides in 1032133, 1032164, and 1032180
- Dioxins in 1032164

STL's laboratory control sample data were not reviewed. The final assessment report will include the review results.

3.4 Matrix Spike Samples

The overall matrix spike recovery results for metals, TPH-G, PCBs, VOC, and malathion indicated reasonable precision and reproducibility in the sample results; however, matrix spike failures were found in the SDGs as shown below:

- Metals in 1032224
- TPH-D in 1031972 and 1032224
- TPH-O in 1031972
- Pesticides in 1031851, 1031972, 1032164, 1032180, and 1033224
- SVOC in all SDGs
- VOC in 1031851, 1032133, and 1033164
- Herbicides in 1033166, 1033200, and 1033211

Matrix spike recovery data not provided in the data packages:

- TPH-D in 1033071, 1033105, 1033166, 1033200, and 1033211
- TPH-O in 1032180, 1033071, 1033105, 1033166, 1033200, and 1033211
- TPH-G in 1032180
- Pesticides in 1033071, 1033105, 1033166, 1033200, and 1033211
- PCBs in 1033071, 1033105, 1033166, 1033200, and 1033211
- SVOC in 1033105, 1033166, and 1033211
- VOC in 1031972, 1033166, 1033200, and 1033211
- Herbicides in 1031972, 1032133, 1032164, 1032180, 1033071, and 1033105
- Dioxin in all SDGs

STL's matrix spike results were not reviewed. The final assessment report will include the review results.

3.5 Surrogate Recoveries

Surrogate recovery data indicate the ability of the laboratory to execute a particular method with reasonable proficiency. The overall recovery results were good; however, surrogate failures were found in nine pesticide, one TPH-D&O, and one SVOC analyses.

Surrogate recovery failures:

- Pesticides - CC030SS01, CC031SS01, CC066SS0, CC040SS01, CC051SS01, CC055SS01, CC059SS01, CC056SS01, and CC037BS03
- TPH-D&O - CC066SS01
- SVOC - CC039WS01

STL's surrogate data were not reviewed. The final assessment report will include the review results.

4. OVERALL DATA QUALITY

SGS Laboratory Data: The matrix spike recovery failures were not clearly explained by the laboratory; however, laboratory control sample results indicated reasonable precision and reproducibility in the sample results. The surrogate recovery failures do have negative impact on the sample results; therefore, the following results should be considered not usable.

- Pesticides - CC030SS01, CC031SS01, CC066SS0, CC040SS01, CC051SS01, CC055SS01, CC059SS01, CC056SS01, and CC037BS03
- TPH-D&O - CC066SS01
- SVOC - CC039WS01

STL Laboratory Data: STL's laboratory quality control data were not reviewed for this draft report. The final assessment report will include the review results.

Appendix H

Response to Review Comments

1005

Response to Review Comments
Camp Carroll Area D and Area 41 Site Investigations – Final Draft
Dated September 2003

Item No.	Page No.	Comment	Response
1	General	The report should be separated into two parts: Area D and Area 41 unless those areas have identical environmental situation and/or close enough to consider as one spatial regime.	Each of the areas was discussed separately under specific headings. Spatial regime is one of many considerations for the report organization. We chose our format based on the similarity of objectives, site conditions, and target contaminants, etc.
2	General	Avoid repetition unless it's very important to emphasize on the matter repeatedly.	Comment noted.
3	Executive Summary	The executive summary must be concise and summarize what is the scope and what is the purpose of work and what you got from the investigation, and recommendation. Site background and site history should be removed here in executive summary, those are repeatedly appeared in other sections.	The scope of work has been added to the executive summary as requested. The background material was left intact so the executive summary would stand-alone for readers.
4	ES-4	Conceptual Site Model, 2nd par. line 2: the term "aqueous phase contaminants", does it mean the contaminants are liquid phase? Or dissolved in groundwater? Clarify this.	The term "aqueous phase" refers to compounds dissolved in water. The term "non-aqueous phase liquid" or "NAPL" is generally used for liquid phase contaminants. The term "dissolved" has been substituted for the term "aqueous phase" in the text as requested.
5	1-6	1.2. Scope and Objectives, line 3: Change to read to as "as drum storage yard (Area	Text changed as suggested.

		41) and hazardous waste landfill (Area D), respectively."	
6	1-6 to 1-10	Section 1.2.1 and 1.2.2: these sections should be removed because those are appeared in the field activities again. Introduction section is necessarily to cover the scope of work, historic and existing information, not detail for the field and sampling activities. The activities seem to describe detail in other sections.	Text deleted as suggested.
7	1-11	Figure 1-1. Not legible, and replace with a Base map.	Figure 1-1 has been replaced as suggested.
8	Fig. 2-2 and 2-3	The number in the grid cell is not legible in both graphics. Legend should explain all objectives in the graphics too, ie., red and yellow in both figures.	The figures have been revised as suggested.
9	2-5	2.4. Geophysical survey: Was the survey performed prior to the Site Reconnaissance? Did you have clear information where the land fill locates before? If then, describe how the survey was able to perform beforchand. Also be clear when the field activity was started.	The text has been revised to indicate that the landfill boundary was delineated on the basis of information provided by DPW of Camp Carroll.
10	2-6	section 2.5, 2.6 and 2.7: Those field activities seem to be happened at same time with the preliminary site reconnaissance. Is that correct understanding?	The text has been revised to indicate that the site reconnaissance started before the geophysical survey to establish a grid system and site clearance for field activities.
11	2-6	Section 2.5: what was the purpose of trenching? Was the trenching performed for both areas? On the Figures 2-1 and 2-2, it appears that the trenching was only at Area	The text has been revised to indicate that trenching was performed only for Area D to identify and locate potential remaining buried objects.

		D.	
12	2-7	Section 2.7 Rotary Borehole Drilling, 2nd par.: Clarify the CME drill rig does not use an acrylic sleeve for soil sample, it's just a stainless split spoon.	Text revised as suggested.
13	2-6 and 2-7	Describe why the different two sampling equipments were utilized if there is a reason.	The text has been revised to indicate that direct push technology was used to obtain shallow samples quickly and the CME drill rig was used to obtain deeper samples and to install groundwater monitoring wells.
14	General for Section 2	Present a table that show X-Y-Z coordinate for boreholes and monitoring wells, a top of pipe should be appeared for monitoring wells.	The table provided in the text describes the location of monitoring wells by the grid cell identifier. The surveyed well coordinates are provided in the appendices. The "top of pipe" elevation is provided in Table 2-1 as top of casing (TOC) elevation.
15	General for Section 2	For field sampling activities, was the decontamination process performed during each sampling activity? Was any rinsate or duplicate sample collected for QA/QC purpose? If not, describe the reason.	The text has been revised to indicate that Samsung collected duplicate samples and conducted decontamination for all sampling equipment prior to each sampling event. Rinsate samples were not collected because a liner was used during soil sampling activities.
16	ES-1	Spell it out for "WWC"	The acronym WWC has been defined as "Woodward-Clyde Consultants" in the text.
17	3-1	3.1 Geology and Soils: Please double check the basement rock of Camp Carroll. It's known as a Mesozoic Granite if you consider only the Carroll area. And it's hard to believe that granitic gneiss appears intercalation with sedimentary rocks such as schists and limestones.	Text revised to indicate that the basement rock in the vicinity of Camp Carroll is a Mesozoic granite. Text has been revised to indicate other geologic descriptions were reported in previous site assessment reports provided by the client.

		Please get a correct geologic information for the area, and describe the subsurface geology according to that information.	
18	3-3	Section 3.3.3 Aquifer Testing: This section needs to move to appendix, and provide a summary table for the testing instead of the algorithm.	A summary table of calculated aquifer parameters has been added to the text as requested. The aquifer testing discussion has been retained to document the analytical methods and assumptions used.
19	3-5	Section 3.3.4. Groundwater elevations and gradients: Provide a summary table for the groundwater level measurement and it's variation according to the time.	Summary tables of the groundwater elevations are provided in Appendix E.
20	3-7	Section 3.4. Geophysical Survey: Remove the 1st paragraph, it's mentioned previously (Section 2.4.) already. Avoid repetition!!!	Text revised as suggested.
21	3-9 to 3-14	Improve the figures, the numbers are not legible at all. Put a background drawing in order to see where the wells are located with respect to buildings or any identifiable objects. Use the scaled topo site maps with coordinates system.	The figures have been revised as suggested.
22	4-17 to 4-34	Refer to the comments #21.	Refer to response #21.
23	General for Section 4	Appendix F does not have laboratory data, there is only sample COC. You have to present the lab method detection limit at some place else.	The raw laboratory data was submitted with the draft report. The laboratory detection limits are provided in the companion QAPP document.
24	4-49	Table 4-3: Does the residual range mean "oil range"?	The term "residual" has been changed to "oil".
25	5-5	Summary table: indicate which region's PRG was applied for	The summary table has been modified to indicate that USEPA Region 9 PRGs were used.
26	6-1	Section 6: 4th para: it's not	Text revised to indicate that

		clear which area you mention here. Is it for both area? Or one of those?	discussion refers to Area D.
27	6-1	No action: This could not be a recommendation if you know the contaminants could possibly impact to site workers. It does not make sense in terms of reducing potential human health risk by exposure to contaminants.	The text has been revised to indicate that to prevent exposure to site contaminants, site access would need to restricted to workers wearing appropriate personal protective equipment (PPE) if the no-action alternative was adopted. In addition, the text and recommendations in this section have been revised in accordance with the results of the PRE conducted and discussed in Section 5.
28	General	Table 4-3 to 4-14: The chemical results should be presented with the sample depth, not in the order but actual depth of sample retrieved.	The summary tables have been revised to include the sample depth information.
29	6-3	Removal of Contaminated Soils: Is this section describing only for Area D? or including both areas? Why was dioxin-contaminates soil only considered for remediation or removal?	Text revised to indicate that the discussion refers to Area D only. The section has also been revised in accordance with the results of the PRE conducted and discussed in Section 5.
30	General	In the SOW for this project, it should be included the extent of contamination for each contaminants. It does not seem to meet the one of Scope. In order to clarify the vertical extent of contamination the sample depth should be presented along with the chemical results. Also all the figures presented in the report can not easily be legible, and need to put an index map at each figure to recognize where the project sites are located with respect to	The summary tables have been revised to include the depth that each sample was obtained. The figures have been revised, providing for clearer viewing.

		known objectives.	
31	ES-5	5th par. It is suggested that the title be changed to Capping with Clay Liner. What is the Subtitle C criteria?	Title changed to "Cap with Clay Liner". Text revised to cite "RCRA Title 35 Subtitle C".
32	ES-2	2nd par. Line 3, Correct typo to read as "through".	Text corrected as suggested.
33	ES-2	2nd par. The contaminated areas appear to be in the confined areas only, two locations at Area 41 and Area D respectively. If this is the case, shouldn't the contaminants be widespread out instead of confining in the two areas only. What is the contaminant of concerns here to address? Dioxin?	Text refers to other potential sources of contamination that may exist the sites in question. The text has been revised to note that all detections of these compounds may not necessarily reflect isolated site conditions and should also be reviewed with respect to local background conditions.
34	ES-2	3rd par. Line 2 referenced the personnel reports. Is the statement here from the results of interviews? Personnel reports sound the personnel records. If Interviews were made, they should be included in this report as a part of report. Who was the eye-witness?	The text has been revised to indicate that the information was provided by interviews with onsite personnel. However, the persons interviewed do not want to be identified by name.
35	ES-5	Aren't the part of surface areas covered with pavement? Do those areas still require liner? The areas recommended for the liner should be either highlighted or located on drawings.	The asphalt paving covering portions of the site was not designed and is not maintained to act as a permanent barrier to the infiltration of water at the ground surface. While these areas may provide some protection, the adequacy of existing structures would need to be evaluated by an engineer during the design process.
36	ES-5	Provide a typical cross section for the capping system.	Typical cross sections have been provided for the two proposed capping systems.
37	ES-6	2nd par., Shipping wastes to the States side is unrealistic and not feasible. Remedial	On-site thermal incineration could be considered but would be a regulatory issue too.

		alternatives must be economically and technically feasible. What about thermal incineration?	
38	ES-6 and 7-4	Although the selection of remedial alternatives are not required for the Area 41, isn't it reasonable to assume almost same recommendations for the Area 41 as well?	The selection of remedial alternatives for Area 41 was not part of the scope of work for this project. The report recommends additional site investigation activities in Area 41 to define the limits of the contaminants. If the findings indicate similar concentrations and distributions of contaminants as in Area D, then the same remedial alternatives may be appropriate. However, it should be noted that the remedial alternatives for Area D were predicated on the nature of this site as a former landfill.
39	6-6	Change title to read as "Cap with Geosynthetic Liner"	Title revised as suggested.
40	6-7	Change title to read as "Cap with Caly Liner"	Title revised as suggested.
Additional Review Comments dated June 4, 2004			
1	5-5 & summary tables	**For the criteria of PRG applying for soils** - before applying the PRG numbers for the data, describe what pathway(s) to human was considered for the contaminants. Based on that you could have different PRG numbers, should clarify in the text why you are considering. Only looking at the number at the summary tables, the PRG numbers seem to be from "the table of direct contact exposure pathways" in PRG Region 9.	This portion of Section 5 has been rewritten and now includes the results of a PRE conducted for the sites. The evaluation criteria has been clarified.
2	5-5 & summary tables	**For the risk factor of 1.0E-04,** - Multiplying the cancer	This portion of Section 5 has been rewritten to include the results of a PRE conducted for

		PRG concentrations by 10 or 100 to set "action levels" for triggering remediation or to set less stringent cleanup levels, this practice could lead one to overlook serious noncancer health threats and it is strongly recommended "**consult with a toxicologist or regional risk assessor before doing this**". - following issues also need to discuss in the text because the Risk Factor 1.0 E-04 gives a lot higher than PRG. For example, the concentration of Arsenic in the Area D exceeds the PRG, but no action was recommended. So it should be clear why this level of Arsenic contents can be discarded in remedial action. 1) Are there potential ecological concerns? 2) Is there potential for land use other than those covered by the PRGs (that is, residential and industrial)? 3) Are there other likely human exposure pathways that were not considered in development of the PRGs (e.g. impact to groundwater, local fish consumption, raising beef, dairy, or other livestock)? 4) Are there unusual site conditions (e.g. large areas of contamination, high fugitive dust levels, potential for indoor air contamination)? 5) If any metals should be considered as a target for remediation, should provide	the sites.

		a site-specific background level.	
3	5-5 & summary tables	**For the PRG number for dioxins** - The table seems not to provide the PRG numbers for whole dioxin compounds. Only for 2,3,7,8-TCDD is provided with the number of 1.6E-05 mg/kg in an industrial soil (in the case of direct contact exposure). We prefer to have a summary table of the PRG numbers for dioxins if available as you did for other contaminants.	This portion of Section 5 has been rewritten to include the results of a PRE conducted for the sites.

Appendix A

Geophysical Survey Results

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Final Report

Geophysical assessment to a landfill site in Camp Carroll, Waegwan, Korea

May 2003

Submitted to:

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1016

Geophysical assessment to a landfill site in Camp Carroll, Waegwan, Korea

Signature Sheet

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LIST OF ILLUSTRATIONS

1. Introduction

Area D (Figure 1) in Camp Carroll has been identified as a former hazardous waste landfill. Numerous hazardous materials were disposed in this landfill between the years of 1977 and 1982. Personnel interviews indicated that many drummed hazardous materials were transported from Area 41. The landfill dimensions were approximately 500 feet by 250 feet in area; and 20 to 30 feet deep (Figure 2). Reportedly, much of the filled materials and surrounding soil was excavated between 1982 and 1983 and placed into 55-gallon drums. Despite the removal activity, residual amounts of contaminated material may have remained.

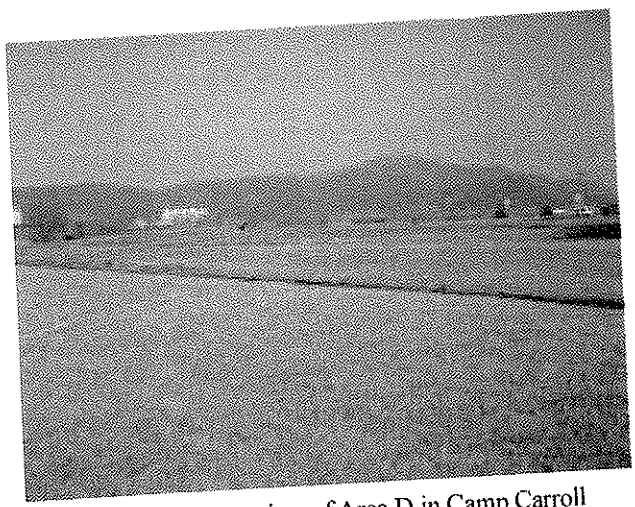


Figure 1. An overview of Area D in Camp Carroll

In this project, two different geophysical approaches have been made to characterize the landfill site. The objectives of geophysical survey can be summarized by following two; 1) defining the thickness of the landfill or the depth to the bedrock, and 2) locating the buried metallic objects such as drums, if they still remains. Two different approaches have been made for each objective; DC resistivity method for the former, and horizontal loop electromagnetic (HLEM) method for the latter.

Electrical properties of a medium are mainly dependent on the ion contents of pore fluid as well as clay contents of the soil (Keller, 1988). Typical waste disposal site shows three layered structure; the landfill on top, residual soil on the middle, and the bedrock on the bottom. Usually the resistivity of the landfill and the residual soil is smaller to the bedrock. Residual soil shows lowest resistivity among them. Residual soils commonly contain much of clay rather than sand. The

landfill, however, commonly contains plenty of sand other than clay, which makes its resistivity larger than that of the residual soils underneath the landfill. DC resistivity method shows very strong features to map the layered earth model (Dobrin, 1976).

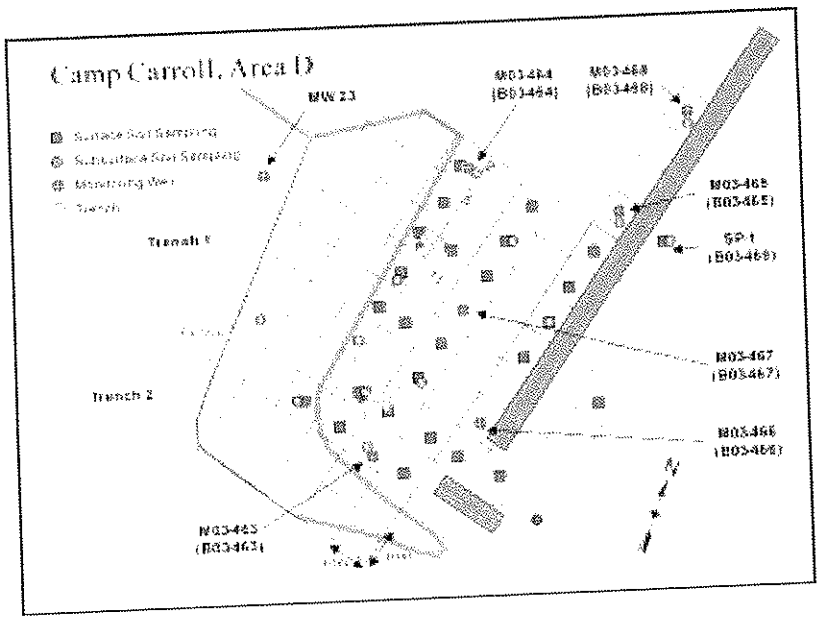


Figure 2. Site map of Camp Carroll landfill area

Electromagnetic (EM) survey, horizontal loop EM (HLEM), can give us an useful information about the location of the metallic objects, if they are within the landfill. The depth of investigation of HLEM ranges up to 20 m depending on the frequency it uses and the conductivity of the medium (Song et al., 2001).

By integrating the two methods in this project, geo-electrical structures for the landfill site as well as the position of potential buried metallic objects (e.g., drums or other containers) can be identified.

2. Theories & Methods

2.1 Horizontal Loop Electro-Magnetic method (HLEM)

HLEM transmits HF band (kHz ~ tens of kHz) electromagnetic waves. The transmitted primary electromagnetic (EM) fields induce the eddy currents in the metallic (conductive) objects beneath the earth. The eddy currents, in turn, make secondary EM fields as shown in figure 3. Measuring the secondary field with small loops on the surface, one can figure out the location of the anomalous body as well as the conductivity of the ground.

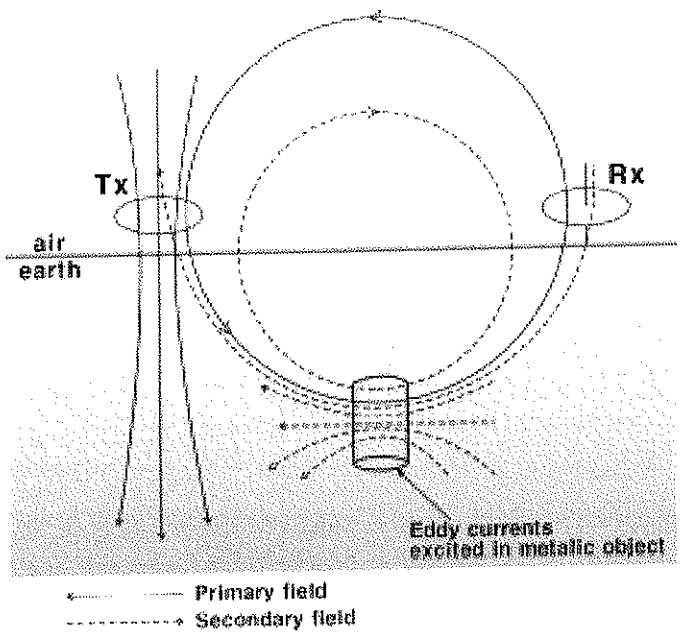


Figure 3. Theory of horizontal loop electromagnetic (HLEM) method.

Figure 4 and Figure 5 shows typical HLEM survey procedure and typical responses of buried metallic sphere, respectively. EM31 provides two types of measurements; i.e., horizontal coplanar (HCP) and vertical coplanar (VCP) arrays. Apparent conductivity can be calculated from both modes but HCP configuration is a little more sensitive to the buried targets than VCP configuration (Frischknecht et al., 1991). Note that the minimum or maximum peaks at the right position of the buried objects.

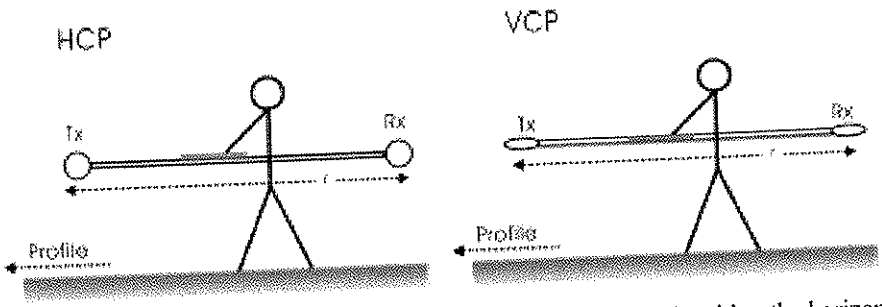


Figure 4. Schematic diagram for typical HLEM survey. The survey can be either the horizontal co-planar (HCP) or the vertical co-planar (VCP) configuration.

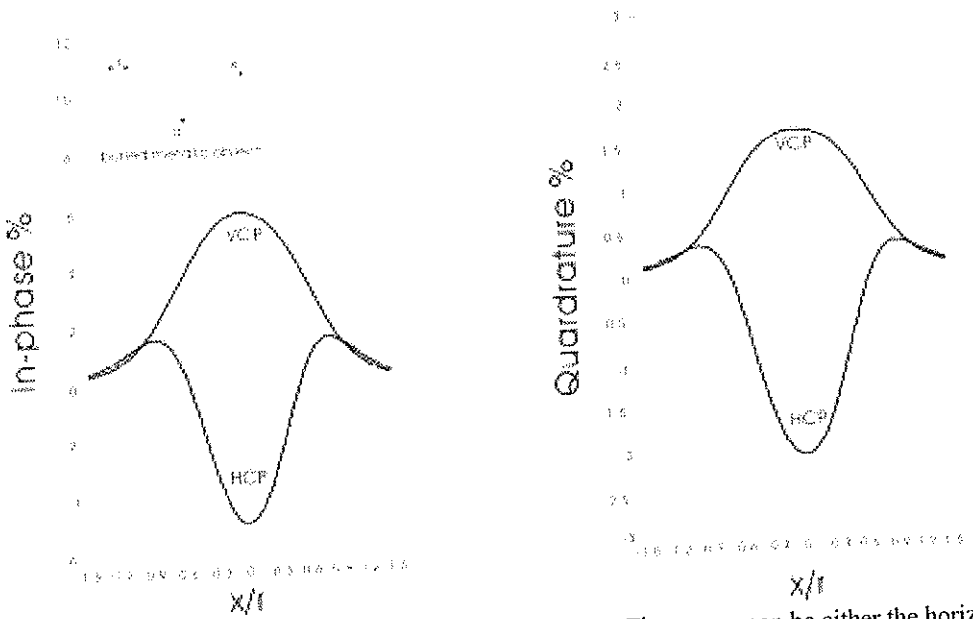


Figure 5. Schematic diagram for typical HLEM survey. The survey can be either the horizontal coplanar (HCP) or the vertical coplanar (VCP) configuration.

Apparent resistivity (ρ_a) can be calculated from both configurations by

$$\frac{1}{\rho_a} \approx \frac{4}{\mu_0 \omega r^2} \times (Quardrature\ reading) \qquad (1)$$

where, ω is angular frequency, μ_0 is magnetic permeability in free space, and r is the distance between the transmitter and the receiver.

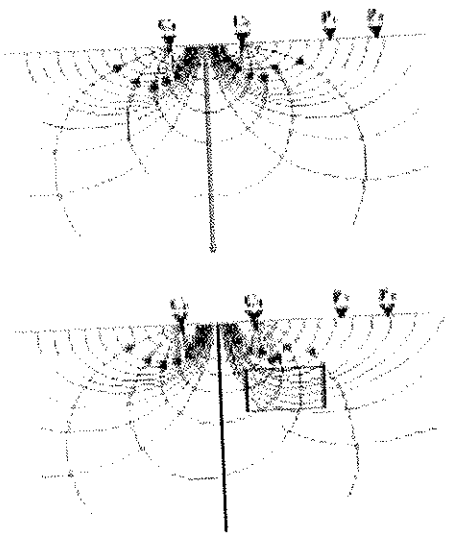
2.2 DC resistivity (dipole-dipole) survey

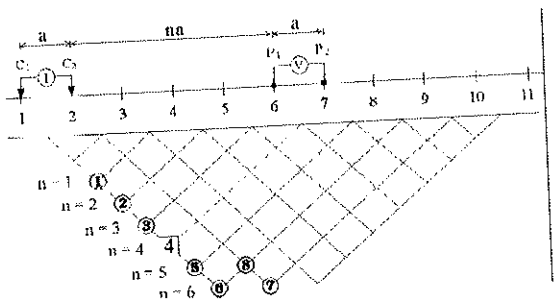
Dipole-dipole survey needs two current electrodes and two potential electrodes. The potential induced by transmitted current is disturbed by underground inhomogeneities (Figure 6). Dipole-dipole survey measures the potential distribution on the surface with fixed current/potential electrode spacing. The bigger the separation between the current electrodes and the potential electrodes is, the deeper information the data carries. With moving the potential electrodes with fixed separation, normalized potential with applied current ($\Delta V / I$) is measured (Figure 7). The measured data is converted to apparent resistivity by multiplying the geometric factor (G):

$$\rho_a = G\frac{\Delta V}{I} \tag{2}$$

$$G = -2\pi(n-1)n(n+1)a$$

The geometric factor is dependant on the electrode spacing (a) and the spread number (n) illustrated in Figure 7. Two-dimensional resistivity image can be gathered by inversion process using the apparent resistivity. A commercial software Dipro4Win was used for inversion of the data.





Stacking will improve signal to noise (S/N) ratio. Maximizing transmitting power (current) is another good way of improving S/N ratio. ABEM Terrameter (model SAS300C) provides 2mA to 500mA transmitting currents selectable depending on the resistivity of the earth. In most of cases, 20mA of currents were transmitted in this survey.

3. Geophysical survey design

Twelve HLEM survey lines were set up to from two-dimensional grid on the surface as shown in Figure 8. The main purpose of the HLEM survey is to detect any metallic objects (drums) beneath the earth. When plotting 2-dimensional contours of the resistivity measured, closed contours will be concentrated on the right place where a metallic objects is buried.

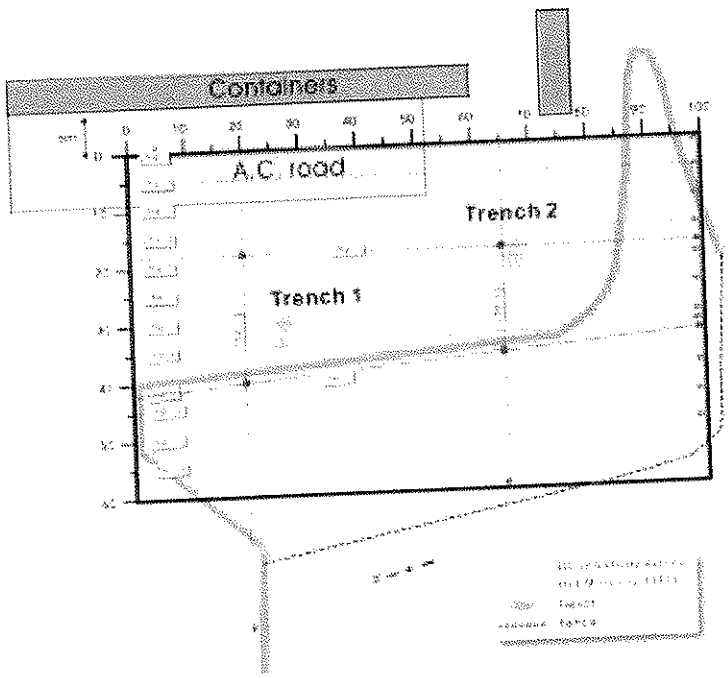


Figure 8. Survey lines for HLEM (blue) and DC resistivity method (red)

At every survey line, the HLEM data have been collected at every 2m for both vertical co-planer (VCP) and horizontal co-planer (HCP) configuration of the source and receiver coils. Though, in-line configuration of the coils (the TX coil and RX coils are in-line with the survey lines) was used to minimize the interferences by the containers and by the fences around the survey area, they will inevitably affect the data near to them.

Four DC resistivity survey lines are set up to find out the depth to the residual soils and/or bedrock; two of them are in N-S directions and the other two are perpendicular to them (red lines in Figure 8). The dipole spacing for Line-1 and Line-2 are set to 5m, and for Line-3 and Line 4 to 3m, of which maximum penetration depth is 25m and 15m, respectively.

4. Results and Interpretations

4.1 DC resistivity (dipole-dipole) survey

Figure 9 shows the inversion results of the four DC resistivity surveys. Generally speaking, the resistivity sections show the characteristics of the two-layered earth. The top layer shows high resistivity and the bottom shows relatively low resistivity for all the four sections. The top layer with high resistivity (ranged from 100 ~500 ohm-m) can be the landfill material over the groundwater level, while the bottom layer with lower resistivity (below 100 ohm-m) can be the residual soil below the groundwater level. They say that the area used to be an agricultural field before the landfill. The residual soil in agricultural fields shows the characteristics of fine-grained, low permeability, high water contents, and thus low resistivity. Estimated boundary between the landfill materials and the residual soils are overlain in each resistivity sections. The boundary shows almost flat except for Line-3 and the thickness of the landfill ranges 3 to 7 m.

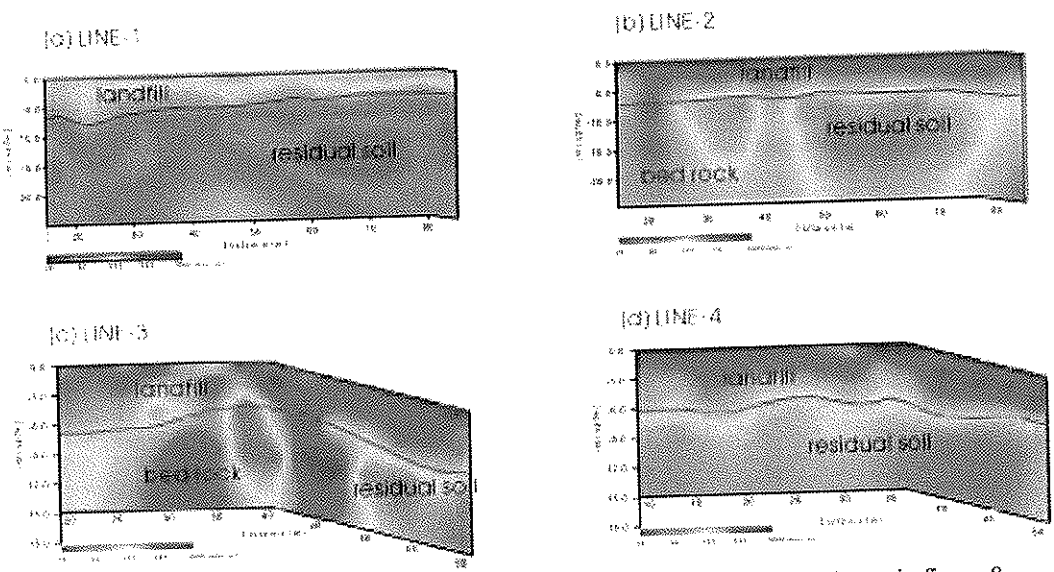


Figure 9. Resistivity sections from DC resistivity survey for the four lines shown in figure 8.

High resistivity below 10m (a few hundred ohm-m) can be the bedrock underneath the residual soils. Note that it appears only at the left side in Line-2 and at the center of Line-3. One cannot find such layer from Line-1 and Line-4. The bedrock can lie deeper than 20 m in Line-1 and Line-4.

The resistivity of groundwater normally shows from about 50 ohm-m to a few hundreds ohm-m depending on its mineral contents. The more the groundwater contains the metallic mineral, the smaller the resistivity of the groundwater. From the extra-ordinarily low resistivity of the second layer (especially at around 70m in Line-1), which shows 30 ~80 ohm-m, we have a doubt that the groundwater may contains various kind of metallic mineral or be contaminated.

Figure 10 shows a 3-D view of the DC resistivity results. Note that high resistivity zone of 3rd layer is concentrated to the NW part of the site. We assumed that this high resistivity zone indicates the bedrock. The bedrock is seated deeper than 20 m in SE part, while at around 10m in NW part of the survey area (marked A in the figure).

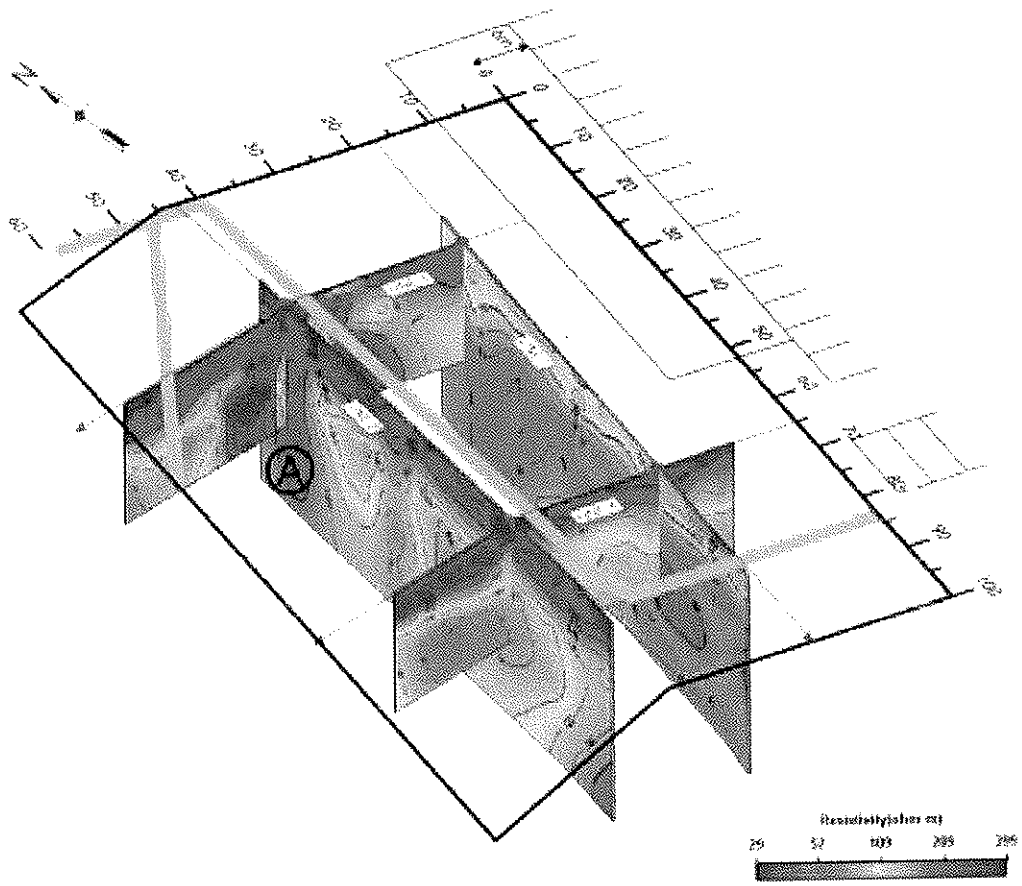


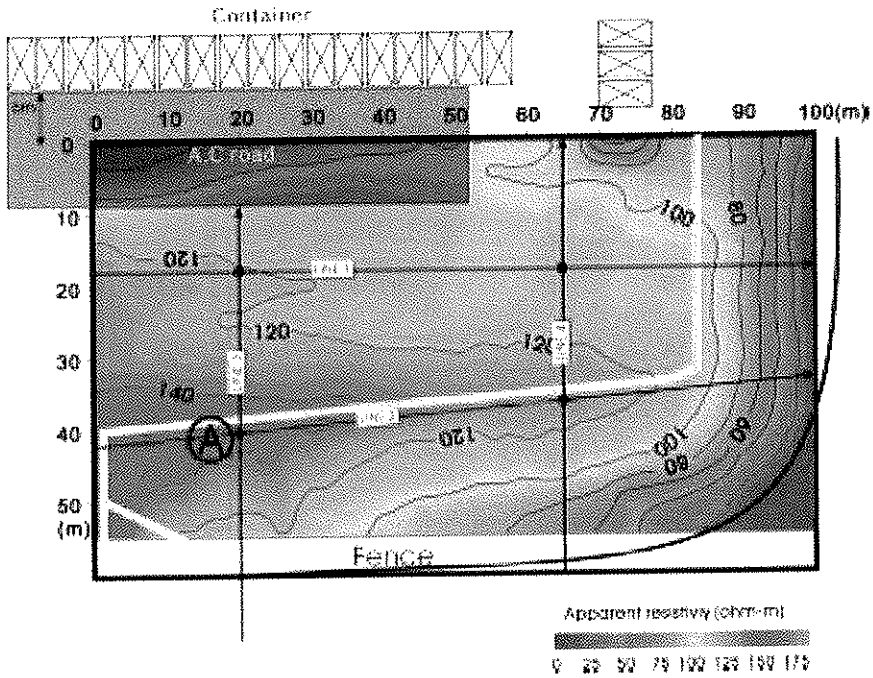
Figure 10. 3-D view of electrical resistivity distribution from DC resistivity survey

4.2 HLEM survey

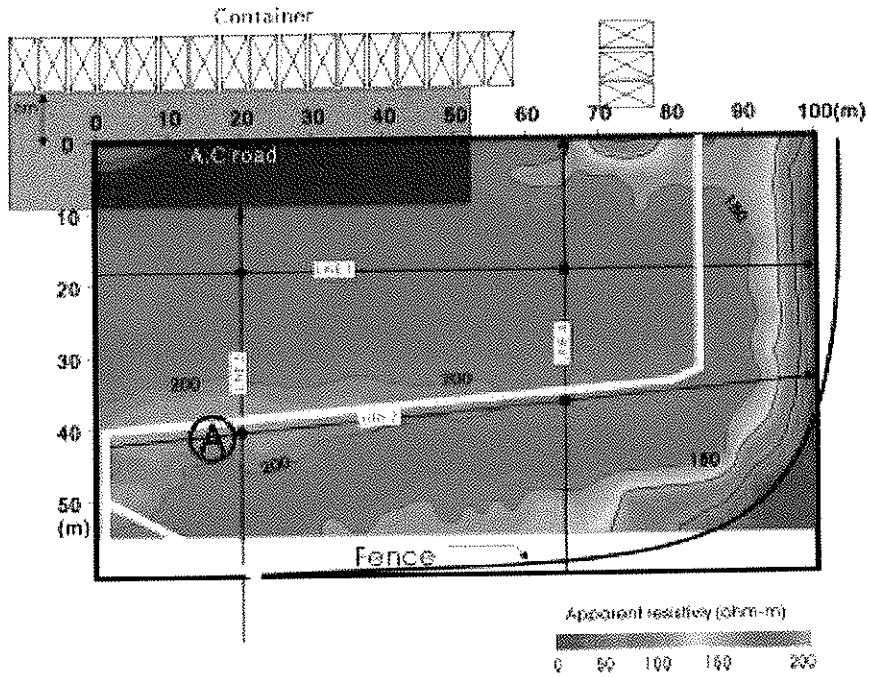
Figure 11 shows the apparent resistivity contours from the HLEM survey. Apparent resistivity contours from VCP and HCP shows very similar results, except for the resistivity values. VCP shows slightly high apparent resistivity values than HCP.

The HLEM methods are very sensitive to the nearby metallic objects. Note that the fences and the containers affect the HLEM data and appear as low resistivity anomalies (below 100 ohm-m) surrounding the survey area. Excluding them, any conductive anomaly couldn't be found within the region. This, in turn, implies us that no more metallic drums are exists within the survey area. Overall apparent resistivity of the ground lies at around 100 ohm-m.

Note the high resistivity anomaly at the marking point (A). This high resistivity anomaly is consistent with the high resistivity zone in DC resistivity survey above. As mentioned in DC resistivity section, the bedrock seems to lie in shallow depth (about 10 m) at the marking point A. Shallow bedrock will affect the HLEM data and appears as high resistivity anomaly.



(a) HCP



(b) VCP

Figure 11. Apparent resistivity contours from HLEM survey

4.3 Integrated interpretations

Backhoe excavation has been carried out on two spots indicated in Figure 2. Figure 12 shows the resistivity sections from two different geophysical methods, HLEM and DC resistivity, with the pictures after the excavation. As expected in Trench 1, the residual soil came out at the depth of about 4~ 4.5 m from the surface, which is right depth where it shows low resistivity anomaly in resistivity section of Line-3 as indicated in the figure. The upper part of the residual soil (the landfill) showed almost homogeneous sand layer, which forms the high resistivity top layers in resistivity sections. Residual soils, however, has not been found in Trench 2 through about 5m from the surface. As can be seen from the resistivity section from Line-4, the boundary to the residual soil layer lies in around 6m in depth, which is somewhat deeper than at Trench 1.

Any drums or metallic objects could not been found, which, in turn, shows us why any conductive anomaly did not appear in HLEM data.

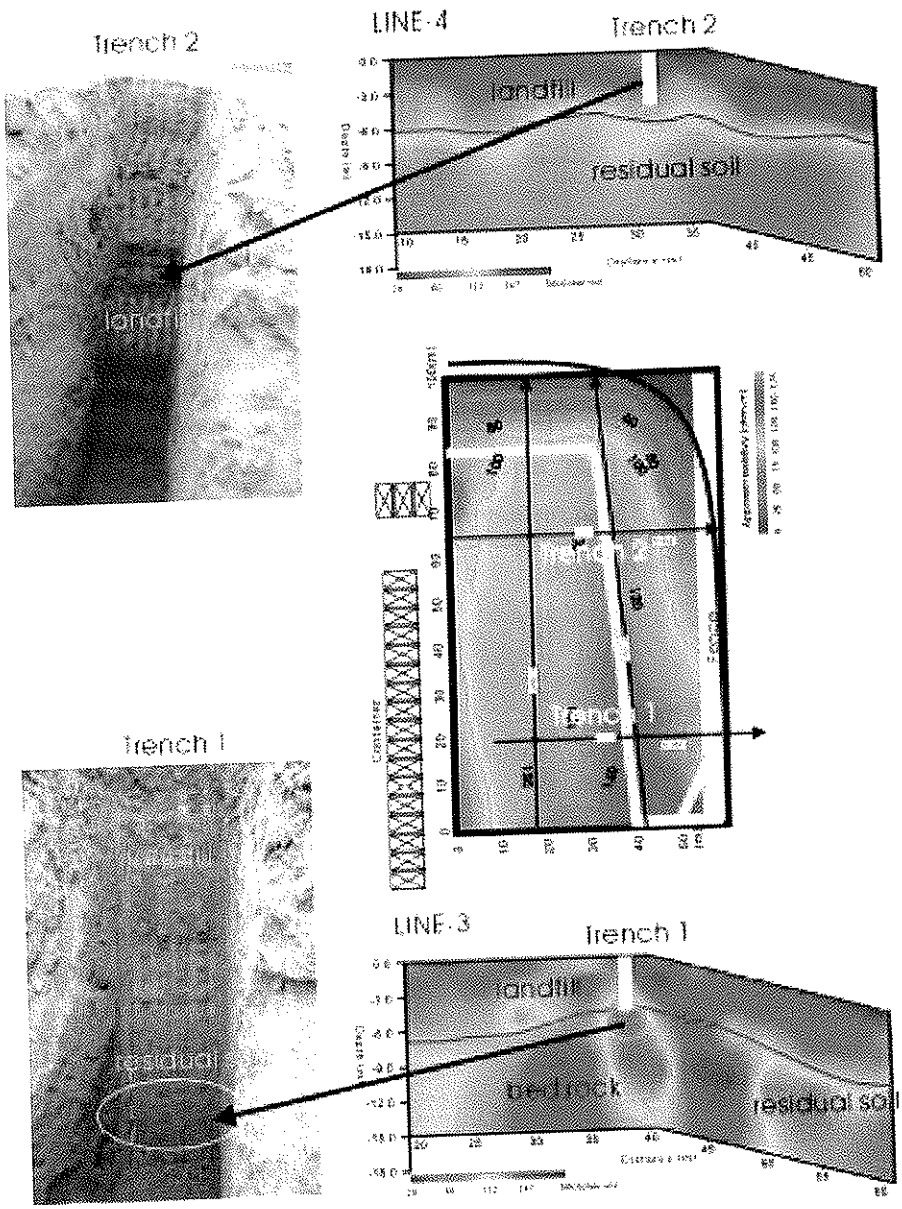


Figure 12. Integrated interpretation of geophysical methods (HLEM and DC resistivity) with backhoe excavation.

5. Conclusions and remarks

Horizontal loop electromagnetic method (HLEM) and DC resistivity survey has been carried out to characterize the landfill and potential buried drums or metallic objects. Both of the geophysical data showed very consistent results with each other. The resistivity of the landfill ranges from 100 ~ 250 ohm-m, while that of residual soils is a few tens of ohm-m. The bedrock in this area seems to reach deeper than 20m in most parts of the area. An exception is NW part, where the bedrock depth seems to be within 10 m.

Two-dimensional resistivity section clearly showed the boundary between the landfill and the residual soils. The boundary lies between 3 to 6 m in depth. Backhoe excavation also confirmed it. No conductive anomaly by any buried metallic objects was found in 2-dimensional apparent resistivity contour map from HLEM survey. Ground resistivity showed homogeneous feature all through the area.

Though we couldn't find any proof that metallic drums are still remains within the landfill, careful attention should be paid to the extra-ordinal low resistivity anomaly (below 50 ohm-m) in the resistivity section from DC resistivity survey, see 70m from left in Line-2 section in Figure 9. This can be either some kind of conductive objects including metallic drums or the groundwater contaminated by various ionic solutions as well as heavy metallic ions. The latter is more consistent with *a-priori* information of the site as well as geophysical interpretation in following two reasons;

1) The anomaly doesn't appear within the landfill layer, but in depth over 15m below the residual soils. There is no reason that metallic drums are buried within the residual soil layer.

2) The anomaly only appears in DC resistivity. The HLEM method, which is more sensitive to the concentrated metallic objects than DC resistivity, couldn't show the anomaly. In HLEM data, the resistivity in that part shows slightly lower than other parts instead. This suggests us that the anomaly is not any concentrated body but spread widely.

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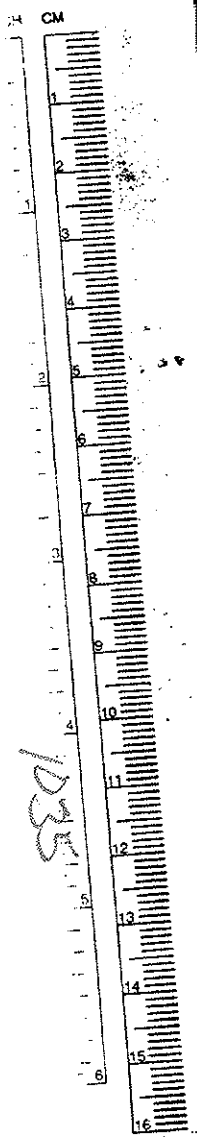
Frischknecht, F. C., Labson, V. F., Spies, B. R., and Anderson, W. L., 1991, Profiling methods using small sources, in Nabighian, M. N., ed., *Electromagnetic methods in applied geophysics*, v. 2., part A, Soc. Expl. Geophys.

Keller, G. V., 1988, Rock and Mineral Properties, in Nabighian, M. N., ed., *Electromagnetic methods in applied geophysics – Theory*, Soc. Expl. Geophys.

Song, Y., Park, S. G., Seol, S. J., Cho, S. J., and Chung, S. H, 2001, A geophysical survey result over a hydrocarbon contaminated site, *Application of Geophysical Techniquest to the Evaluation of Contaminated Site, Abstract from the 3rd Special symposium of KSEG*, Korean Society of Exploration Geophysicists, p.122-140.

Appendix B

Field Logbook and Notes



MEASUREMENT CONVERSIONS

IF YOU KNOW	MULTIPLY BY	TO FIND
LENGTH		
inches	2.540	centimeters
feet	30.480	centimeters
yards	0.914	meters
miles	1.609	kilometers
millimeters	0.039	inches
centimeters	0.393	inches
meters	3.280	feet
meters	1.093	yards
kilometers	0.621	miles
WEIGHT		
ounces	28.350	grams
pounds	0.453	kilograms
grams	0.035	ounces
kilograms	2.204	pounds
VOLUME		
fluid ounces	29.573	milliliters
pints	0.473	liters
quarts	0.946	liters
gallons (U.S.)	3.785	liters
milliliters	0.033	fluid ounces
liters	1.056	quarts
liters	0.264	gallons (U.S.)
TEMPERATURE		

°C = (°F - 32) x .555
°F = (°C x 1.8) + 32

Inches	Decimals of 1.00	Milli-meters
1/16	.0052	1.5875
1/8	.0104	3.1750
3/16	.0156	4.7625
1/4	.0208	6.3500
5/16	.0260	7.9350
3/8	.0313	9.5250
1/2	.0417	12.700
5/8	.0521	15.875
3/4	.0625	19.050
7/8	.0729	22.225
1"	.0833	25.400
2"	.1667	50.800
3"	.2500	76.200
4"	.3333	101.60
5"	.4167	127.00
6"	.5000	152.40
7"	.5833	177.80
8"	.6667	203.20
9"	.7500	228.60
10"	.8333	254.00
11"	.9167	279.40
1 foot	1.0000	304.80

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Camp Carroll, Korea
4/01/03
On site 8:00 AM. Area D
ARCC = [redacted] (PS)
Samsung [redacted] = Principal Investigator = Dr. Lee
Field Mgr = [redacted]
[redacted] = QA/QC
+ Samsung field technicians & drillers
BEC (Beaudrot Environmental) = drillers for soil borings. (FED for wells)
Preparing for surface soil sampling
Selected grid locations to sample -
will collect 27 surface samples
on regular grid with 10-meter
centers. Some locations limited
by site conditions (drainage
ditch, asphalt paving.) Surface
soil samples will actually be
collected between 0 & 2 cm soils
to land fill if this can be
determined using a backhoe.
0915 Excursion zone marked
off. Each soil sampling grid
node has been assigned a location
number: 001 → 027. The

4/1/03

SAME grid location number will be used for both surface soil samples and subsurface soil samples.

Sample numbers will be assigned as follows:

CC001 SS 01
aa bbb cc dd

where aa = CC for Camp Carroll
bbb = 001 - 027 for sample location ID
cc = SS for surface soil or BS for boring
dd = 01, 02, etc. for sample number (consecutive)

Subsurface soil borings & sampling will be conducted at 6 of these locations: tentatively at 006, 010, 017, 022, ~~25~~ 026, and 027.

Exploratory trenching will be conducted starting tomorrow to investigate geophysical anomalies and observe subsurface conditions.

0920 Begin subsurface boring location 010 - direct push, split spoon sample.

Core 1 = 0.3 - 0.9 m

1037

Boring 1 - location 010

0.3 - 0.9 m: moist, strong brown 7.5YR 5/6, silty fine to coarse sand (SM), (100% recovery) PID = 0.0 ppm, medium dense, some cobbles at 0.8 m 10:10 AM.

10:20: 0.9 m - 2.0 m: 80% recovery same as 0.3 - 0.9 m w/ trace clay & more cobbles (decomposing granite & quartzite, ~~some fine~~) & gneiss) some fine gravels [5% G / 80% S / 15% F] dense

collected surface sample at 1.0 - 2.0 m CC010SS01 (beneath fill cover)

Note: surface soil sampling using backhoe began at 10:30

10:50: 2.0 m - 3.2 m, 80% recovery

2.0 - 2.6 m = same as above w/ ↑ clay.

2.6 - 3.2 m = moist fine to medium sandy clay, 7.5YR 5/6 strong brown with white 10YR 8/1 inclusions, firm, low to medium plasticity (CL) some cobbles, increased moisture

(some manganese oxide on faces at 2.1 m)

(5% G / 35% S / 60% F)

[white inclusions = silty to fine sandy clay (CL)]

(4) 4/1/03

11:03 = 3.2m - 4.5m, 80% Recovery
3.2m - 4.0m = moist, clayey to silty fine to medium SAND (SC-SM) 7.5YR 5/6 strong brown (65% S / 35% F), dense
4.0 - 4.5m = moist, fine to medium sandy clay, medium plasticity (CL) (40% S / 60% F) 7.5YR 5/6 strong brown; firm
entire section appears to be saprolite - decomposed granite w/ quartz & feldspar, no cobbles.
11:30 = 4.7m - 5.8m, 95% Recovery
4.7 - 5.2m = moist, clayey f-m SAND (65% S / 35% F) (SC) dense 7.5YR 5/6 strong brown
5.2 5.5 = moist, AS 4.7-5.2 m but olive gray 5Y 4/2
5.5-5.8 = SAME but 7.5YR 5/8 strong brown, with some coarse sands.
entire section appears to be saprolite.
collected soil sample (CC010BS01)

(5) 4/1/03

12:00 = 5.8m - 7.3m, 100% Recovery
5.8 - 6.3m moist 10YR 5/4 yellowish brown, clayey fine to med. sand, dense, (some metal shavings, could be slough)
6.3 - 6.8m = moist, variegated, (65% S / 35% F) clayey f-m SAND (saprolite) (SC) color varies in bands & patches from red 2.5YR 4/6 to olive brown 2.5Y 4/4 - quartz & feldspar clasts, angular
6.8m - 7.3m = moist to wet f-m SANDY clay (CL) medium plasticity, micaceous, (35% S / 65% F) dark yellowish brown 10YR 4/4
12:24 - 7.3m - 8.6m, 100% Recovery
collect sample (CC010BS02)
moist to wet saprolite = clayey f-m sand (SC) to f-m sandy clay (CL) low to medium plasticity, approx (50% S 50% F)
12:30 Lunch break

(6)

4/1/03

1420 Begin drilling Boring 2 at Location 06 :

14:29 : 1.0 m - 2.5 m 80% Recovery
moist, strong brown 7.5YR 5/6, clayey, f-m SAND (SC) with some coarse sd. & fine gravels. medium-dense, [5% G / 70% S / 25% F] some cobbles at 2.3 m. PID = 0.0 ppm

14:40 : 2.5 m - 4.0 m, 90% Recovery.
moist, strong brown 7.5YR 5/6 silty to clayey f-m sand. (SM - SC). Appears to be weathered granite (saprolite) angular quartz & feldspar, mica.
PID = 0.0 ppm

1500 : 4.0 m - 5.5 m, 80% Recovery
4.0 - 5.0 m = same as 2.5 - 4.0
5.0 - 5.2 m = moist, clayey f-m sd. (SC), red 2.5YR 4/6
(65% S / 35% F)
5.2 - 5.3 m = silty f-m sd (SM) w/ trace clay, yell-wish brown 10YR 5/4
5.3 - 5.5 m = clayey f-m sd (SC)

1039

(7)

4/1/03
[60% S / 40% F]
yellowish red 5YR 4.5/6
collect sample CC006BS01

1518 : 5.5 m - 7.0 m, 100% Recovery
moist, clayey f-m sd. (SC)
some large quartz grains sub-rounded to sub angular. strong brown 7.5YR 5/6, dense
PID = 0.0 ppm [60% S / 40% F]

~~1545 - 7.0 m - 8.5 m~~

Collect sample CC006BS02

15:45 - 7.0 m - 8.5 m, 65% Recovery
7.0 m - 7.1 m - same as 5.5 - 7.0 m
at 7.1 m : moist to wet clayey f-m SAND (SC), dark grayish brown 2.5Y 4/2 (saprolite)
at 8.3 m = wet, f-m sandy clay (CL) medium plasticity, dark grayish brown 2.5Y 4/2.
PID = 0.0 ppm

1600 : Begin Boring #3 at location 026.

1615 : 1.0 m - 2.5 m.
moist, clayey f-c sand (SC), strong brown 7.5YR 5/6,

(8)

4/1/03

with some gravels. [5% G/65% S/30% F]
collected SAMPLE CC026SS01

1630: 2.5m - 4.0m ; 100% Recovery
2.5 - 3.5m = moist, clayey fine to coarse SAND with some gravel (SC)
10% G/ 60% S/ 30% F
strong brown 7.5YR 4/6
PID = 0.0 ppm
3.5m - 4.0m = same but olive gray 5Y 4/2. // SAMPLE CC026BS01

1700 attempted sample at 4.0 - 5.5m - NO Recovery due to lg. gravel clast in shoe. will attempt again.
NO Recovery

1714: 5.5m - 7.0m // 90% Recovery
5.5-6.0: moist, SAPROLITE - clayey fine SAND (SC), [60% S / 40% F]
mottled color: dark greenish gray 5GY 4/1 and yellowish brown 10YR 5/4.
granite gravel at 6.0

6.0-6.5 = same but dark greenish gray 5G 4.5/1 with some coarse sand.

(9)

4/1/03

6.5-7.0: moist, firm SANDY clay (CL), [15% S / 85% F]
medium plasticity - dark greyish brown (2.5Y 3.5/2
collected SAMPLE CC026BS02

1733 = 7.0 - 8.5m, 100% Recovery
wet, high plasticity clay with some fine to med SAND (5%) (CH) - dark brown 10YR 3/3
Less SAND at 7.5m
becomes 10YR 3.5/3 at 8.0m (dark brown)

All borings filled with bentonite chips.

Trench soils general description:
moist, strong brown 7.5YR 5/6, silty to clayey fine to coarse sand (SM) with approx 20% gravels and cobbles to 6" diam. (trench depths ~ 2 meters.)
medium dense. (Fill materials)

1800 Packing samples for shipment.
1900 Site secured. Leaving Site.

[redacted] 66

4/2/03

0800 on site Area D.
Note: All trenches excavated yesterday were backfilled prior to leaving site.

0820 Setting up on boring #4 (at location 017.

0835 Begin drilling. Using direct-push (geo-probe) rig on tread mounting. 2" diameter sampler fitted with acrylic tube liner.

0845: Core 1.0m-2.5m. Moist clayey f-c sand with some fine to med gravels (SC) [10% G, 70% S, 20% F] strong brown 7.5YR 5/6, Recovery 70%, gravel angular, Fill soils. PID 0.0 ppm. Collect sample CC017SS01.

0855 Core 2.5m-4.0m, Recovery 80%.
2.5-3.0m: same as above but yellowish brown 10YR 5/6
3.0-3.5m = moist f-c sandy clay (CL) with angular f-m gravels. Strong brown 7.5YR 5/8, Low-med. plasticity.

1041

4/2/03

3.5-4.0m = moist, f-c sandy clay (CL) with f-m angular gravels. Yellowish Red 5YR 5/8. Fill soils. (quartzite gravels)

09:15: Core 4.0m to 5.5m. Recovery = 80%.
4.0m-5.1m = moist, clayey f-c sand (SC) with some fine gravels. [5% G, 60% S, 35% F] Sands: quartz & feldspar sub-angular to sub rounded. Looks much like saprolite but gravel inclusions indicate fill soils.
5.1m-5.5m = moist, ~~[illegible]~~ clayey f-c sand. [55% S/45% F] clays low-mod. plasticity. Strong brown 7.5YR 5/6. Fill soils

09:35 Core 5.5m-7.0m, Recovery 70%.
5.5m-6.6m = same as 5.1m to 5.5m
6.6m-6.7m = gneissic f-m gravels & silty sands (GM). Dark brown 10YR 3/3 (angular gravels)
6.7-7.0m = f-c clayey sands (SC) with f-m quartzite gravels. Strong brown 7.5YR 5/6 (Fill)
Collected sample CC017BS01.

(12) 4/2/03

09:55 : core 7.0 – 8.5m, Recovery 60%. Moist, clayey f-c SAND (SC) with trace fine gravels. Strong brown 7.5YR 5/6. (Fill Soils)

At 8.4m = dark greenish gray 5G 4/1 fine & medium stiff clay (CL), low plasticity, increased moisture content.

10:25 : core 8.5m – 10.0m, Recovery = 90%.

8.5-9.0m = wet, f-m sandy clay, high plasticity (CH) - Yellowish Red 5YR 5/8 [30% S / 70% F] (soft)

9.0 - 9.8m = becomes olive brown 2.5Y 3.5/2

9.8 – 10.0 = becomes dark brown 10YR 3.5/3 less sands [20% S / 80% F] medium stiff. manganese nodules.

Collected Sample CC017BS02

10:40 Move to Boring #5 : Location 018.

10:45 Begin drilling.

10:55 0.0 – 1.0m : moist, strong brown 7.5YR 4/6, fine & coarse clayey Sands (SC) with some fine gravels. (Fill Soils) medium dense to dense. [10% G, 60% S, 30% F]

(13) 4/2/03

11:10 core 1.0m - 2.5m, Recovery 70%. Same as 0.0 – 1.0m with increased f-m gravels. [Sample CC018SS01] [20% G, 55% S, 25% F] very dense.

11:30 core 2.5m – 4.0m → no recovery. drilling difficult appears to be pushing coarse grains or cobble between samplers will try breaking with hammer.

11:45 Lunch break

12:45 Resume drilling.

13:25 core 4.5m – 6.0m, Recovery = 80%. moist, medium dense, clayey f-c SANDS (SC) with some fine gravels [5% G, 50% S, 45% F], strong brown, 7.5YR 4.5/6. c[asts] of quartz & feldspar, minor [illegible]. Possibly saprolite with granite parent bed some angular clasts could indicate fill materials. [Sample CC018BS01]

13:45 core 6.0 – 7.5m. Recovery 55%. increased gravels (quartz!te) at 7.0m becomes f-c sandy clay (CL) with increased water content (Fill Soils).

(14) 4/2/03

1400 Core 7.5m – 9.0 m, Recovery = 60 %
SAME AS 4.5m – 6.0m → appears to be Fill.
Collect Sample CC018B502

1410 Begin drilling Boring 6: Location 022

1420 Core 0.0m – 1.0m: moist, strong brown 7.5 YR, medium dense, clayey f-c SANDS (SC) [60%S/40% F] (Fill Soils.)

14:30 Core 1.0m – 2.5m, Recovery = 80 %
SAME AS 0.0m – 1.0m. [Sample CC022B501]

14:40 Core 2.5m – 4.0m, Recov. 65%
SAME AS @ 1.0 – 2.5m

1500 Core 4.0m – 5.5m Recov. = 80 %
SAME AS 2.5m – 4.0m but more consolidated. Could be saprolite or may be fill. [Sample CC022B501]

1510 Core 5.5m – 6.2m, Recovery 30 %
SAME AS 5.5m – 6.2m. with very small plant Roots at 6.1 m → indicates = fill material.
(Core short because encountered cobble.)

1545 Core 6.5 – 8.0m, Recov. 80 %

(15) 4/2/03

~~SAME AS 5.5 – 6.2m~~
Moist f-c SANDY clay (CL), Low plasticity [45% S/55% F] strong brown 7.5 YR 5/8 (Fill)
Becomes wet clayey SAND (SC) at 7.5m. [75% S/25% F]
[Sample SS022B502]

1605 Core 8.0m – 9.5m, Recov. = 65%
moist to wet f-c Sandy clay (CL)
Low-med plasticity [40% S/60% F]
Strong brown 7.5YR 5/8

1615 Begin drilling Boring 7: Location 028

1620 Core 0.0m – ~~2.5m~~ 1.0m, Recov. = 100%
moist, strong brown 7.5 YR loose, clayey f-c SANDS (SC) [60% S/40% F]
Fill Soils. (trace fine gravels)

16:30 Core 1.0 – 2.5m, Recov. = 80 %
SAME AS 0.0–1.0m with 15% f-m gravels. [15% G/55% S/30% F] (SC) (Fill)

1640 Core ~~Test~~ 2.5m – 4.0m, Recov. = 90 %
SAME AS 0.0 – 1.0m with trace fine gravels. (FILL)
At 3.5m becomes f-c sandy clay (CL) [20% S/80% F]

(16) 4/2/03

Low plasticity, strong brown 7.5 YR 4.5/6 (F, CL)

1655 core 4.0m - 5.5m, 90% Recov.
4.0m - 4.3m = same as 3.5 - 4.0 m
4.3m - 5.5m = moist, clayey f-c sand (SC) [65% S/35% F]
Strong brown 7.5 YR 5/6, (Fill) dense. [Sample CC028BS01]

1804: core 5.5m - 7.0m, 40% Recov. moist, clayey f-c sand (SC) (Fill) [55% S/45% F] strong brown 7.5YR 4.5/6
At 6.6 - 6.9 m = root inclusions color changes to dark greenish gray 5GY 4/1 & fine angular gravel.

1825 core 7.0m - 8.5m, 65% Recov. moist f-c sandy clay (CL) [45% S/55% F] strong brown 7.5YR 4.5/6 with some dark greenish gray 5GY 4/1 at 7.0 - 7.2 m
[Sample CC028BS02]

1830 Leaving Site

[redacted] bb

4/3/03 (17)

ONsite 0745 - Area D.
Begin drilling Boring # - location 027
0750: core 0.0 - 1.0m. 100% Recovery. moist, clayey f-c sands (SC) with some fine - medium gravels. [57% G, 75% S, 20% F] ; dark yellowish brown 10 YR 4.5/6. (Fill Soils)

0755 core 1.0 - 2.5m, Recov. = 40 % moist, f-c sandy clay (CL), low plasticity [45% S/55% F] yellowish Red 5YR 5/8

0811 core 2.5m - 4.0m, Recov = 60 %
2.5-3.5 moist, f-c sandy clay (CL) low-med. plasticity [40% S/60% F] strong brown 7.5YR 4.5/6
~~3.5-4.0~~ [Sample, CC027BS01]
3.5-4.0 = contact, moist f-c sandy clay (CL) med-plasticity [40% S/60% F] dark greenish gray 5GY 4/1 high mica content (muscovite) grading to fine sandy clay (CL) [20% S/80% F], med-high plasticity (CL) (micaceous)

0820 core 4.0 - 4.5m, 20% Recov

4/01

(18)

4/3/03

(encountered cobble (quartzite)
moist, sandy clay (CL)
medium plasticity - ~~variegated~~
~~(with strata)~~ - firm
variegated greenish gray 5G 6/1
and olive 5Y 4.5/4,

08:47 core 5.0 - 6.5m, Recov: 55%
moist f-m sandy clay (CL)
med plasticity. micaceous
(biotite - muscovite).
variegated olive 5Y 4/3,
reddish brown 5YR 5/6, and
yellowish brown 10YR 5/8.
[Sample CC027B502]

09:05 core 6.5m - 7.0m, Recov. 50%
saprolite - ~~clear~~ angular quartz,
highly weathered feldspar → clay.
low mica, some manganese.
moist, f-m sandy clay (CL)
Low plasticity variegated
7.5YR 6/8 to 10YR 6/8
reddish yellow to brownish
yellow.

0930 Packing up site to move to Area 41.

1045

(19)

4/3/03

0945 Leaving Area D
0955 Onsite Area 41
locating sample areas
10:41 : Water Level BW14 = 6.472m TOC
→ well located in adjacent zone near
hazardous materials storage area.
~~area~~ 3 meters lower than site
ground surface.
1105 Boring & well locations marked.
1130 Lunch Break
1215 On site - waiting for
utility clearance.
1330 Begin drilling 1st Boring
at Area 41. - Location = 05E
1340 core, 0.0m - 1.0m Recovery = 70%
material in core looks like
decomposed granite - saprolite -
can see grain structure of
interlocking quartz & feldspar with
biotite mica and other mafics.
when crushed, feldspars disintegrate
to clays and material becomes:
moist, clayey f-c sands.
[60% S / 40% F] = strong brown

4/3/03

2.5 YR 4/6, dense

1350: Core 1.0 – 2.5 m, Recov = 90%, same as 0.0 – 1.0 m but more friable. color = 7.5 YR 5/6.
[Sample at 0.2 – 1.5 m = CC052SS01]

1400 Core 2.5 – 3.0 m, Recovery = 90%. difficult drilling / Refusal at 3.0 m same as 1.0 – 2.5 m.

1410 Begin 2nd Boring at location 061.

1420 Core 0.0 – 1.0 m, Recov = 60%
0.0 m – 0.5 m = fill materials, moist, Red 2.5 YR 4/6, f-c Sandy clay (CL) and Yellowish Red 5YR 4/6 clayey f-c sands (SC) – materials appear to be decomposed granitic source, some manganese!
0.5 m – 1.0 m: contact at 0.5 m with Saprolite = same as Boring 052 – granitic structure visible.

1430: Core 1.0 – 2.0 m, Recov = 90%. Same as 0.5 – 1.0 m, but more friable. [Sample CC061SS01]

1440: changed to (AIR) percussion bit to

4/3/03

advance boring. Sample collected from cuttings at 4.0 – 5.0 m: CC061BS01: Saprolite.

1505 Boring 3rd: Location 062
0.0 – 1.0 m core.
0.0 – 0.1 = fill soil as before.
0.1 – 1.0 = Saprolite (granitic) mottled 10YR 8/4 pale brown to 10YR 5/4 yellowish brown
Sample CC062SS01

1510 Boring 4th. Location 065
Core 0.0 – 0.7 m –
0.0 – 0.3 = fill: some dark staining (0.2–0.3) Sample CC065SS01
0.3 – 0.7 = Saprolite: strong brown 7.5YR 5/6, dense.

1520 Core 0.7 m – 1.5 m = Saprolite as 0.3 – 0.7 m.
Sample combined 0.3 m – 1.5 m CC065BS01

Boring 5 → Location 060

1530 Core 0.1 m – 0.8 m = fill soils → SC materials with gravels at 0.7 – 0.8 (SC)

1046

4/3/03

Strong brown 7.5YR 5/6.

1540: Core - 0.8 - 1.5 m.

0.8 - 0.9 = same as above. (SC)

0.9 - 1.2 = fill = Red 2.5YR 4/6

~~1.2 - 1.5~~ fine - med sandy clay (CL)

1.2 - 1.5 m = Native soil =

Silt (ML) Brownish yellow

10YR 6/5. Fine [illegible]

silt with manganese carbon

1545: core 1.5 m - 2.2 m - silt (ML)

same as above.

Combined cores for 2 samples:

0.1 - 1.2 = CC0603SS01

1.2 - 2.2 = CC0603BS01

1608: core 2.5 m - 4.0 m, Recov = 100%

= silt (ML) - same as above.

1425 Area secured - Leaving Area 41

1530 Leaving site [illegible] sampling

66

1047

4/4/03

08:30 Onsite Area 41

09:00 continue [illegible]

core 4.0 m - 4.7 m =

same as above but [illegible]

some clay - low plasticity (ML)

09:10 Moved to Boring Location 063

Core 0.1 - 0.8 m [Sample CC063SS01]

0.1 - 0.6 = Fill materials - DG (SC)

0.6 - 0.8 - Fill materials - clayey gravels. (GC)

0918: core 0.8 - 2.3 m, Recovery = 70%

Saprolite (DG), when weather = moist, clayey f-c sand with some clayey gravels (SC)

[5% G / 95% S / 20% F] [Sample]

Strong brown 7.5YR 4.5/6

09:25 Moved to Boring Location 058

core 0.1 - 0.8 m : Fill material

moist, f-m sandy clay (CL)

Low plasticity, Red 2.5YR 4/6

0935 = Core 0.8 - 2.4 m, Recov = 80%

0.8 - 1.1 m = same as above

1.1 - 2.4 m = highly weathered [illegible] rock (saprolite), yellowish brown

Sample 0.8 - 1.4 m CC058SS01

Sample 1.4 - 2.4 m CC058BS01

4/4/03
10YR 5/6, crushes to clayey
f-c sand (SC) [55%/45% F]
0945 Move to Boring #8, Location 056
0950 Core 0.1-0.8m = weathered
granite - as boring 58 1.2m
Sample CC056SS01
Core 0.8-2.3m = highly weathered
granite (saprolite)
strong brown 7.5YR 4.5/6
1000 Move to Boring #9, Location 55
Core 0.1-0.8m = fill as in 058
Core 0.8-2.3m = Recov. = 60%
saprolite as in #56
1010 Move to Boring #10, Location 051
Core 0.1-1.0m = fill soils
0.1-0.6m = weathered granite fill
0.6-1.0m = fill - clay (CL/CH)
med. high plasticity & cracks
brown 10YR 4/3 [Sample CC051SS01]
organic material at 1.0m = wood
10:25 Core 1.0-2.3 : saprolite at 1.3m
1030 Move to Boring #11, Location 057
Core 0.1-0.8m = saprolite

4/4/03
strong brown 7.5YR / 5/6
[Sample CC057SS01 at 0.1-1.3m]
Core 0.8-2.0m = same as above
10:45 Move to Boring #12, Location 064
Core 0.1-0.8m, saprolite
(weathered granite rock)
quartz veining at 0.1-0.4m
strong brown 7.5YR 5/6
(not sampled)
Move to Boring #13, Location 059
10:50 Core 0.1-0.8m = fill soils
(clean weathered granite rock)
7.5YR 5/6
1100 Core 0.8-2.4m = saprolite
(granite)
Sample 0.1-1.6m [CC059SS01]
1200 Lunch Break.
1300 Set up on boring #14 Location 067
1305 Core 0.1-0.8m = fill soils
moist f-c sandy clay (CL)
strong brown 7.5YR 4/6 [Sampled]
1315 Core 0.8m-2.2m, recovery 70%
0.8-2.0m = fill (CL)
2.0m-2.2m = saprolite

1048

(26)

4/4/03

13:27 Core 2.2m – 4.0m = Saprolite
very wet thereof.

Move to Boring #16, Location 068

13:40 core 0.1m of 0.8m =
0.1 – 0.3m = fill (cl)
0.3 – 0.8m = Saprolite

13:48 core 0.8m – 2.2m = Saprolite

Move to Boring #16, Location 069

1400 core 0.1m – 0.8m = fill [Sample 68]

1408 core 0.8 – 2.2m = Saprolite
Sample

Move to Boring #17, Location 070

1416 Core 0.1 – 0.8m = fill

1428 Core 0.8 – 2.2m
0.8 – 1.5m = fill [Sample]
1.5m – 2.2m = Saprolite
Note: upper 30 cm of ~~0.8~~ 0.1 →
0.8 core color = dark greenish gray 5GY 4/1

(2)

4/8/03

On Site Area D 08:00

START DRILLING @ LOCATION 24.
WILL UTILIZE H2O & AIR
ROTARY AS NEEDED FED
DRILLING USING CME DRILL RIG
4 WORKER + SUPERVISOR, SAM SIMS 4
WORKERS

1050 BORING INSTALLED TO 45'
CONTINUOUS CORE TO 14'
@ 15 → 40' 2' SAMPLE
EVERY 5'. LET WELL SET TIL
AFTER LUNCH WL @ 37'

1210 WL @ 27' INSTALL WELL, 40'
20' BELOW CASING

1445 BENTONITE SEAL INSTALLED MOBILIZE
TO LOCATION # 01 & START DRILLING

1600 STOPPED DRILLING 001 @ 10'

(30)

AFTER LU SET UP ON LOCATION #54
COLLECT SURFACE SOIL SAMPLES @ LOC.

1600 BOR #54 @ 35', ENCOUNTERING REFUSAL WITH AUGER FED MAY SWITCH TO ROCK CORING. AREA LU IS SECURED @ 1630, WORK MUST STOP @ 1600.
FED HAS MUCH PROD WORK RIG (CLUTCH) MAY NOT BE ABLE TO AUGER FURTHER. WILL LET SITE SIT & CHECK WL TOMORROW.

1630 OFF SITE.

COLLECTED SAMPLES

CC-C01 BS-002
CC-054 BS-001
CC-054 BS-002

LAST ENTRY

b6
4/8/03

(31)

4/10/03

AREA D MW 1, 8.14'M @ 0830 (TOC)
MW 24, 8.3'M @ 0835 (TOC)

0730 ONSITE PREP. EQUIP
0800 FED CHECKS WL, NO WATER BUT AUGER BIT IS MOIST-WET
OPTION A: SWITCH TO CORING
B: SWITCH TO SMALLER DIA AUGER.
OPT. TO TRY SMALLER AUGERS BORING @ 35'.
0900 FED REMOVED AUGERS, WORKING ON RIG
0930 SMOKE BREAK.
1045 START DRILLING. FED ESTIMATES WL @ 38' NOW USING 6" AUGERS
1045 @ 45' WL @ 44'. ESTIMATE WL WILL REBOUND TO ~36' DUE TO INTRUSIVE ACTIVITY & FRACTURE
WL @ 40' AFTER 5MIN. WILL WAIT FOR WL TO STABILIZE THEN REAM OUT BORING WITH 8" AUGER & INSTALL WELL

WL @ 37' @ 11:00, FED WILL REMOVE AUGERS & PREP FOR REAMING.

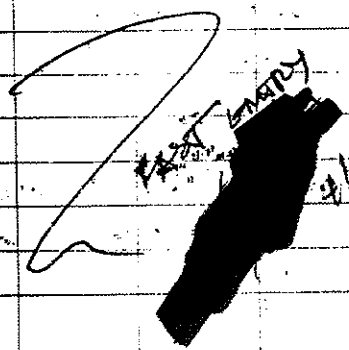
1145 LUNCH

1300 RESUME WORK. FED START REAMING OUT BOREHOLE TO 8" DIA.
WL @ 36' @ 1300

1650 NEW INSTALLED BOREHOLE COMPLETED TO 45' WILL GROUT REMAINDER 4/11/03. FED DOES UP ON BOR #66." NOTED THAT SELECTED LOC WAS WITHIN 10-15' OF OVERHEAD UTILITIES INSTRUCTED FED TO MOVE 15' STREETSIDE OF OVER HEAD LINES BECAUSE OF SAFETY CONCERNS.

ANALYSES:
FED SAMPLES COLLECTED TODAY.

150'



4/11/03 CAMP CARROLL AREA 41

0730 ONSITE PRIOR TO START BORING #66. NOTE CONDITIONS ARE COLD & RAINY

0800 MR. JAR OF FED, INDICATES THAT THE DRILLERS WILL START THIS BORING USING 6" HSA. IF SITE CONDITIONS ALLOW THE WELL WILL BE INSTALLED IN THE OPEN 6" BORING. IF HOLE COLLAPSES TO LESS THAN REQ'D. BORING WILL BE REAMED WITH 8" HSA.

1130 MINIMAL SAMPLE RECOVERY DUE TO SPLIT SPOON REFUSAL. PULL BORE TO 45' & CHECK WL / COLLECT SPLIT SPOON SAMPLE.

1230 LUNCH

1330 RESUME WORK.

1455 SAMPLER REFUSAL @ 45'. NO WATER ENCOUNTERED. FED DECIDES TO DRILL TO 50' & RECHECK WL.

(34)

1440 @ 50' SAMPLER REFUSAL
WL @ 50' @ 1440, @ 40' @ 1455

Boring / well #66 complete
Decided to use 25' screen due
to slow recovery of boring
Expect ... WL to rise to loc
54 WL ~35', so extra screen
should cover well req.

Collected samples:
CC-066 SS-01
CC-066 SB-02
CC-066 SB-03.

Note: Fed crew will be down ...
for weekend. Mr Kim will be
the primary POC. Will drill
Area D because Area 41 will be
secured over the weekend.

LA ... [redacted] b6

(35)

4/12/03 Camp Carroll Area D

0730 Onsite, sunny, clear,
Set up on location #37
@ Area D.

0812 Start drilling

0900 Noted chemical odor @ ~20' - 30'

1045 Boring #37 complete, well inst.
to follow (2 analytical samp. collected)

1145 Well installed (filter pack & bent.
seal

1200 Lunch break

1300 Resume work setup on loc #39
Grout MW # 37

1605 Boring #39 complete to 41'
Install well 4/13/03.
Note Loc # 36 no access this
weekend install on Mon/Tues
On 4/13 work: install #39, drill/
install #12.

1052

COLLECTED ANALYTICAL SAMPLES :

CC-03766-01
CC-03788-02

TODAY NO SOIL COLLECTED
FROM #39.

1605 SECURE SITE.

LAST ENTRY 4/12/08 [redacted] 6

4/12/08 CAMP CARROLL AREA "D" R1

0730 ONSITE W/ @ 2ER IN #39
BEGIN WELL INSTALLATION.

0915 INSTALLATION COMPLETE
SET UP ON LOC #12

1105 BORING COMPLETE TO 41'

1210 LUNCH BREAK.

1300 RESUME WORK

1403 WELL #12 INSTALLED. (FILTER PACK
& SEAL) INSTALLING GROUT.
NOTED THAT IDW CUTTINGS ARE
BEING BAGGED IN PREP FOR
TRANSPORT TO LANDFARM FACILITY
NEAR AREA D (ADJACENT TO
SMALL ARMS RANGE.) CUTTINGS
FROM AREA D WELL #1, 24
WERE "DISPOSED OF" ~~BAGGED~~ BACKFILLED
DURING TRENCHING INVESTIGATION
NEAR #1 @ AREA D.

1500 SAMPLES IN AREA D WILL BE
COLLECTED FROM AREAS WITH

NOTED ODOR OBJECTIONABLE IMPACT.
NO ANALYTICAL SAMPLES COLLECTED
TODAY. WORK WILL RESUME @
AREA D # 38 OR AREA #41 #53.

~~ERROR~~ [redacted] 66
4/15/03

1054

4/14/03 CAMP CARROLL AREA D & 41 R1

0730 — CH2M HILL AREA D SAM SUNG RELOCATED LOCATION #38 FROM THE BOTTOM OF THE HILL TO ~~AN~~ A NEW LOCATION 30 M NORTH OF #37. THIS CHANGE IS DUE TO SUSPECTED CONTAMINATION IN LOCATION #37. I NOTED ~~THE~~ TO SAM SUNG THAT THE CHANGE WILL LEAVE NO ~~BORING~~ GW INFO BY AT ELEV. BELOW AREA D. HOWEVER THE CONCERN ~~TO~~ IS IF CONT IS ENCOUNTERED IN #37, THE CONT / REL MAY EXTEND OUTSIDE OF AREA D. DR. LEE ~~ROBERT~~ MADE THIS DECISION TO RELOCATE #38.

0805 — START BORING #38, AREA D.

0900 — NATIVE MATERIAL ENCOUNTERED @ FORMATION BECOMES INCREASINGLY DENSE WITH DEPTH, FED SWITCH TO 6" AUGERS.

(40)

1100 @ 31' LITHOLOGY IS VERY DENSE. FED DRILLER MR. JUNG, INDICATES THAT HE CANNOT PROGRESS WITH 6" HSA. FED WILL USE CORING TO COMPLETE THE BORING. SET UP CORING EQUIP.

1130 LUNCH BREAK

1232 RESUME WORK. NOTE: FED IS USING WATER AS A CIRCULATION FLUID & THIS WILL SKEW GW LEVELS IN THE LOCAL VIC. GW MEASUREMENT SHOULD BE TAKEN AFTER GW LEVELS HAVE STABILIZED.

1500 WELL INSTALLED, MOBILIZE TO AREA 41. IF BORING IS COMPLETED [illegible] WILL RETURN TO COLLECT A SAMPLE NEAR BORING/WELL # 37

1522 ONSITE AREA 41, SET UP ON #53

1650 #53 COMPLETE TO W/

LAST ENTRY 4/16/03 [redacted] 66

4/15/03 CAMP CARROLL AREA D + AREA 41

0730 ONSITE AREA 41, LOCATION # 53. WL IN LOC # 53 @ 15' DEPTH. WL DATA FROM LOC 54 + 66 INDICATE WL SHOULD BE ABOUT 30' DEPTH. NOTED THE PROXIMITY OF A OPEN DRAINAGE TRENCH, AND THE SIZE OF THE PARKING LOT THAT IT DRAINS. THE HIGHER WL MAY BE A PERCHED ZONE, OR A LARGE VOLUME OF WATER MAY BE INFILTRATING TO THE 30' WL, OR A CONFINED LAYER. INSTRUCTED FED TO SET WELL @ 40' BUT SCREEN TO 10' (30' SCREEN SECTION) TO CAPTURE ALL POSSIBILITIES.

0945 LOCATION #53 COMPLETE. MOBILIZE BACK TO AREA "D" TO COLLECT SUBSURFACE SOIL SAMPLE.

1000 ON SITE AREA "D" SET UP ON LOC # 40

1200 LUNCH BREAK @ 17' IN LOC #40

1300 RESUME WORK

1330 NATIVE MATERIAL ENCOUNTERED

1055

COLLECTED 2 ANALYTICAL SAMPLES

TODAY

CC-04C BS-01

CC-04 BS-02

1345 [illegible] COMPLETE MO WELL INSTALLED

BEING BACK FILLED WITH BENTONITE

& SAND.

Appendix C

Boring Logs, Well Completion Diagrams, Well Development Logs,

and Groundwater Sampling Logs

Soil Sampling PID Checking AREA D

Point NO./ Soil NO.		Date	Time(1st sampling) Collected Time	Measured Time	Depth	PID (ppm)	REMARK	Date	Time(2nd sampling) Collected Time	Measured Time	Depth	PID (ppm)	REMARK
CC001	SS01	2003.04.01	11:03	-	1m	-	ascon at 9ft	2003.5.27	11:05	-	1m	-	
	BS01	2003.04.09	8:25	8:45	20~22ft	57.6		2003.5.27	12:15	-	6.6m	-	
			8:35	8:50	25~27ft	465							
			8:55	9:20	35~37ft	16.1							
			9:20	9:45	40~42ft	N.D							
CC003	SS01	2003.04.01	14:40	14:58	2m	N.D		2003.6.2	10:31	10:50	1~2.2m	0	
CC004	SS01	2003.04.01	10:53	-	1m	-		2003.5.27	13:55		1m	-	
CC006	SS01	2003.04.01	14:29	-	1~2.5m	-		2003.5.28	15:10	-	2~3m	-	
	BS01		15:00	-	4~5.5m	-			15:28		3.5~4.5m	-	
	BS02		15:15	-	5.5~7m	-			15:52	-	5~6m	-	
CC007	SS01	2003.04.01	11:15	11:27	2m	0.1		2003.6.2	10:59	11:15	1~2.2m	5.1	
CC008	SS01	2003.04.01	11:30	11:45	2m	0.1	BG=0 mg/l	2003.5.28	14:12	14:35	2~3m	0	
CC009	SS01	2003.04.01	11:45	12:00	2.1m	0.2		2003.5.28	14:40	-	2~3m	-	
CC010	SS01	2003.04.01	10:28	11:02	1m	0.2		2003.5.27	14:20	-	1~2m	-	
	BS01		11:40	-	4.7~5.8m	-			15:30	-	4.7~5.8m	-	
	BS02		12:20	-	7.3~8.6m	-	grab		15:56	-	7.3~8.6m	-	
CC012		2003.04.13	9:35	10:00	0~2ft	N.D							
			9:45	10:00	2~4ft	N.D							
			9:50	10:10	4~6ft	2.6							
			10:00	10:20	6~7.5ft	2.3							
			10:05	10:40	8~10ft	40.6							
			10:10	10:40	10~12ft	7.4							
			10:15	10:45	12~14ft	453							
			10:20	10:45	15 17ft	40.7							
			10:25	10:50	20~22ft	236							
			10:50	11:20	25~27ft	8.1							
			11:05	11:25	30~32ft	284							
			11:25	12:15	35~37ft	5.5							
			11:45	12:15	40~42ft	6.6							
CC013	SS01	2003.04.01	12:00	12:13	2m	0.5		2003.5.27	14:48	-	2~3m	-	
CC014	SS01	2003.04.02	14:00	-	1.9m	-		2003.6.2	11:22	11:35	1~2.2m	0	
CC015	SS01	2003.04.01	14:20	14:55	2m	N.D	T.P: 68.1, lots of ascon	2003.5.28	12:25	12:40	2~3m	0	
CC017	SS01	2003.04.02	8:43	9:13	1~2.5	N.D		2003.6.2	13:05	13:30	1~2.2m	2.5	
	BS01		8:55	9:15	2.5~4m	0.1			15:16	15:40	4~5.2m	2.6	
	BS02		9:35	10:40	5.5~7m	0.8			16:15	16:40	5.5~6.7m	1.2	
	BS03		9:55	10:47	7~8.5m	0.7			16:15	16:50	7.0~8.2m	2.7	
CC018	SS01	2003.04.02	11:10	-	1~1.25m	-		2003.6.2	16:58	17:20	1~2.2m	2.9	
	BS01		13:20	13:40	4.5~6.0m	1.3	CH4 ConC: 89.3mg/kg		17:17	17:40	4.5~5.7m	3.4	
	BS02		14:00	14:18	7.5~9m	0.2	CH4 ConC: 152.2mg/kg		17:46	18:10	7.5~8.7m	5.1	
CC019	SS01	2003.04.01	15:15	15:29	1.7m	0.1		2003.5.27	17:57	-	1.2~2.2m	-	
CC020	SS01	2003.04.01	16:20	16:34	2m	N.D		2003.5.29	15:56	16:15	1.5~2.5m	5.3	
CC021	SS01	2003.04.01	16:58	17:15	1.9m	N.D		2003.5.29	15:36	15:50	1.5~2.5m	4.1	
CC022	SS01	2003.04.02	11:30	-	1~2.5m	-		2003.6.3	9:10	9:40	1.0~2.2m	3.4	
	BS01		15:45	16:05	6.5~8m	0.1			10:20	10:36	6.3~7.7m	0.7	
CC023	SS01	2003.04.01	17:15	17:23	2m	N.D		2003.5.27	17:02	-	2~3m	-	
CC024	BS01	2003.04.08	9:50	10:05	20~22ft	83.8		2003.6.2	18:20	18:40	5.5~6.7m	2	
	BS02		10:30	10:52	30~32ft	1605			18:40	19:30	8.5~9.7m	3.5	
	BS03		10:40	11:10	35~37ft	325	BG : 2.1		19:20	19:50	9.7~10.8m	0	

Point NO./ Soil NO.		Date	Time		Depth	PID (ppm)	REMARK	Date	Time		Depth	PID (ppm)	REMARK
			Collected Time	Measured Time					Collected Time	Measured Time			
CC039		2003.04.12	14:05	14:25	8~10ft	N.D							
			14:10	14:30	10~12ft	N.D							
			14:15	14:40	15~17ft	N.D							
			14:27	15:00	20~22ft	N.D							
			14:45	15:10	25~27ft	N.D							
			15:25	16:00	30~32ft	N.D							
			15:35	16:00	35~37ft	N.D							
CC040		2003.04.15	10:30	10:55	0~2ft	42		2003.5.29					
			10:35	10:55	2~4ft	22							
	SS01		10:45	11:05	4~6ft	14.7			11:48	12:10	1.2~2.2m	4.8	
			11:05	11:35	6~7.5ft	3.2							
			11:15	11:35	8~10ft	8.8							
			11:20	11:35	10~12ft	106							
			11:25	11:40	12~14ft	190							
			11:30	11:40	15~17ft	72.1							
	BS01		13:15	13:30	20~22ft	94.7			13:22	13:33	6~6.7m	4.3	
			13:20	13:35	25~27ft	26.5							
			13:40	13:50	30~32ft	5.4							
CC080	BS01	2003.04.09	10:40	-	4.5m	-		2003.6.3	11:45	12:00	4.5~5.7m	1.4	

Point NO./ Soil NO.		Date	Time(1st sampling) Collected Time	Time(1st sampling) Measured Time	Depth	PID (ppm)	REMARK	Date	Time(2nd sampling) Collected Time	Time(2nd sampling) Measured Time	Depth	PID (ppm)	REMARK
CC066	SS01	2003.4.11	8:30	8:53	0~2ft	113		2003.6.4	10:05	10:20	0.5~1.7m	6	
			8:30	9:05	2~4ft	53.6							
			8:40	9:10	6~7.5ft	44.6							
			8:45	9:20	8~10ft	15.2							
	BS01		8:50	9:20	10~12ft	2			10:35	10:48	3~4.2m	4.1	
			9:05	9:30	12~14ft	1.8							
			9:45	10:15	15~17ft	9.5							
			10:05	10:40	20~21.5ft	25.3							
			10:30	10:50	25~27ft	30.2							
	BS02		11:05	11:30	30~32ft	6							
			11:35	12:05	35~35'4"	5.9			11:25	11:50	9~10.0m	0.5	
CC067	SS01	2003.04.04	13:05	13:35	0.1~0.8m	0.8		2003.6.4	12:15	12:40	0.5~1.7m	1.4	
CC069	SS01	2003.04.04	14:00	14:35	0.1~0.8m	0.2	T.P: 23.3 CO2: 1831						
CC070	SS01	2003.04.04	14:16	14:38	0.1~0.8m	0.1	T.P:70.2 CO2 :5300.2						

LOG OF WELL AREA 41 #53

BOREHOLE / WELL LOCATION SKETCH MAP

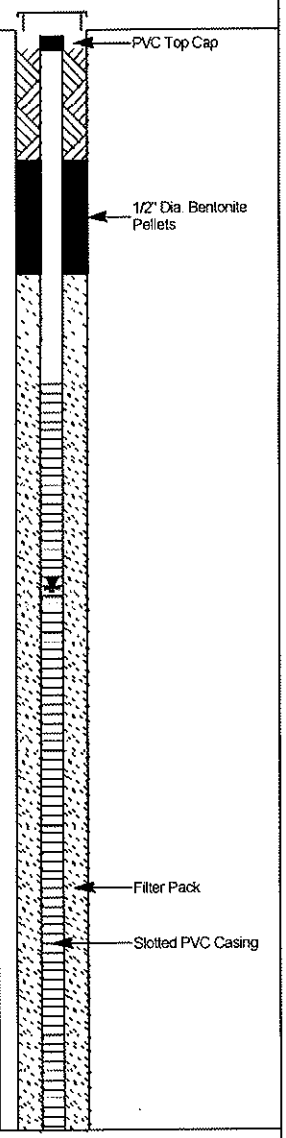
N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/14/03 15:22
LOGGED BY: [redacted] b6	REVIEWED BY:
DATE & TIME FINISHED: 4/15/03 09:00	
DRILLING CONTRACTOR / DRILLER: FED / [redacted] b6	DRILLING METHOD: Hollow-Stem Auger
COORDINATES	
SAMPLING METHOD: Split-Spoon Sampler	SAMPLE HAMMER TYPE: Hydraulic Hammer
SIZE / TYPE OF BIT: 6"	SURFACE ELEVATION / DATUM: mean sea level
WELL INSTALLED? YES ☒ NO	CASING MATERIAL / DIAMETER: Sch 40 PVC / 2"
SCREEN: Type: Slotted Material: PVC Length: 6.1 m Diameter: 2" Slot Size:	
ELEVATION OF (msl): WELL COVER / TOP OF WELL CASING / TOP & BOTTOM OF SCREEN: m / m / PRODUCT SURFACE / GROUNDWATER SURFACE	DATE: 4/15/2003

SURFACE CONDITION:

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
		4/4/6/7	0.6098 / 83					SC		CLAYEY SAND (SC): reddish yellow(7.5YR 6/6), ~70% medium to coarse sand, ~30% fines, moist, medium dense.
1		5/9/10/12	0.6098 / 88				1	SM		SILTY, CLAYEY SAND (SM): reddish yellow(7.5YR 6/6) 30% grades to light brown (7.5YR 6/3), ~70% sand, ~30% fines, dense.
		12/12/16/22	0.6098 / 100							
2		18/23/25	0.6098 / 67				2			
		19/26/37/50	0.6098 / 52							
3		15/40/41/50	0.6098 / 87				3			
								CL		SILTY, CLAYEY SAND (CL): light yellowish brown (10YR 6/4), ~20% very fine to fine sand, ~80% fines, moist.
4		16/40/45/50	0.6098 / 91				4	SM		SILTY SAND (SM): reddish yellow(7.5YR 6/6) 40% grades to reddish yellow(7.5YR 6/8), ~70% medium to coarse sand, ~30% fines, wet, very dense; increased sand at 9.1 meters bgs (80% sand, 20% fines).
		31/50	0.6098 / 100							
5							5			
6							6			
7							7			
		50	0.1524 / 100							
8							8			

WELL CONSTRUCTION DETAILS



This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

BORING_OG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1835.GDT 13/9/03

1062

LOG OF WELL AREA 41 #53

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME	
	Camp Carroll Area D and Area 41 RI	
LOCATION		DATE & TIME STARTED
Camp Carroll, Taegu, Republic of Korea		4/14/03 15:22
LOGGED BY [redacted] bb	REVIEWED BY	DATE & TIME FINISHED
		4/15/03 09:00

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
10		47	0.1524				10				10	
11							11				11	
12							12				12	Threaded PVC End Cap
13							13			End of Borehole at 12.2 m.	13	
14							14				14	
15							15				15	
16							16				16	
17							17				17	
18							18				18	
19							19				19	

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1E3E.GDT 16/9/03

1063

LOG OF WELL AREA 41 #54

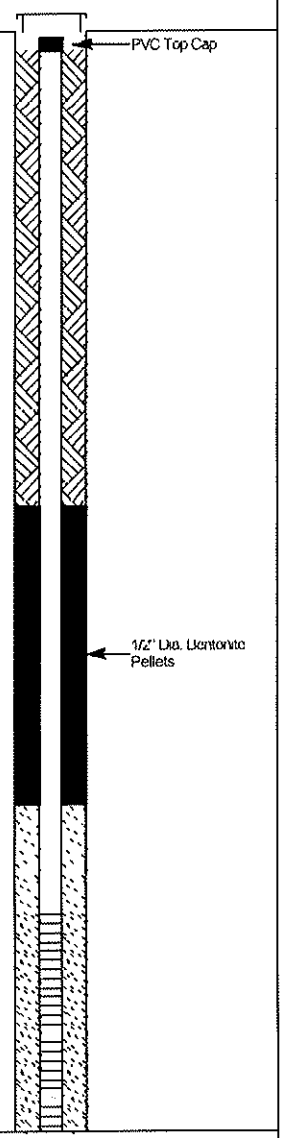
BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/9/03 13:40
LOGGED BY: [redacted] b6	REVIEWED BY:
	DATE & TIME FINISHED: 4/10/03 14:05
DRILLING CONTRACTOR / DRILLER: FED / [redacted] b6	DRILLING METHOD: Hollow-Stem Auger
SAMPLING METHOD: Split-Spoon Sampler	SAMPLE HAMMER TYPE: Hydraulic Hammer
	SIZE / TYPE OF BIT: 8"
COORDINATES	SURFACE ELEVATION / DATUM: mean sea level
WELL INSTALLED? YES ☒ NO	CASING MATERIAL / DIAMETER: Sch 40 PVC / 2"
SCREEN: Type: Slotted Material: PVC Length: 6.1 m Diameter: 2" Slot Size:	
ELEVATION OF (msl): WELL COVER: m / TOP OF WELL CASING: m / TOP & BOTTOM OF SCREEN: m / m / PRODUCT SURFACE / GROUNDWATER SURFACE	DATE: 4/10/2003

DEPTH (meters bgs)	PID (ppmv)	B_OWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: / LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)
0		1/3/5/4	0.6098 / 70	CC-054SB-01		SS	0	SC		SANDY LEAN CLAY (SC): greenish gray (GLEY1 5/5GY), ~10% gravel, ~30% sand, ~60% fines, loose.	0
1		2/3/6/10	0.6098 / 80				1	SC		CLAYEY SAND (SC): strong brown (7.5YR 4/6) 50% grades to reddish yellow(7.5YR 6/6), ~50% medium to coarse sand, ~50% fines, loose.	1
		7/9/11/15	0.6098 / 90								
2		8/11/14	0.4573				2	SC		CLAYEY SAND (SC): strong brown (7.5YR 5/8), ~60% coarse sand, ~40% fines, loose.	2
		10/15/15/15	0.6098 / 70								
3							3	SC		CLAYEY SAND (SC): light reddish brown(5YR 6/4) 40% grades to brown (7.5YR 5/4), ~60% coarse to medium sand, ~40% fines, moist; medium dense.	3
4		4/12/15/20	1.2195 / 80				4				4
5		4/7/11/20/3	0.0000 / 70				5	SM		SILTY SAND (SM): pink (7.6YR 7/3), ~70% coarse to medium sand, ~30% fines, dense.	6
6		18/20/40/50	0.6098 / 100				6	SM		SILTY SAND (SM): reddish brown(5YR 5/3) 50% grades to reddish brown(5YR 5/4), ~70% coarse to medium sand, ~30% fines, dry; very dense; increased clay content at 7.6 meters bgs (60% sand, 40% fines).	6
7							7				7
		25/50	0.3049 / 100								
8							8				8

WELL CONSTRUCTION DETAILS



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BORING_LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1836.GDT 12/9/03

1064

LOG OF WELL AREA 41 #54

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME
	Camp Carroll Area D and Area 41 RI

LOCATION	DATE & TIME STARTED
Camp Carroll, Taegu, Republic of Korea	4/9/03 13:40

LOGGED BY	REVIEWED BY	DATE & TIME FINISHED
[redacted] bG		4/10/03 14:05

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
10		16/43/50	0.4573 / 100	CC-054SB-02		SS	10	SM		SILTY SAND (SM): reddish brown(5YR 5/3), ~60% coarse to medium sand, ~40% fines, very dense.	10	Filter Pack; Slotted PVC Casing
11		40/50	0.3049 / 0				11			Preprobe. No recovery	11	
12							12				12	
13		50	0.1524 / 100				13	SM		SILTY, CLAYEY SAND (SM): yellowish brown (10YR 5/4), ~60% coarse to medium sand, ~40% fines, no odor, wet, very dense.	13	Threaded PVC End Cap
14							14			End of Borehole at 13.7 m.	14	
15							15				15	
16							16				16	
17							17				17	
18							18				18	
19							19				19	

BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1835.GDT 16/9/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

1065

LOG OF WELL AREA 41 #66

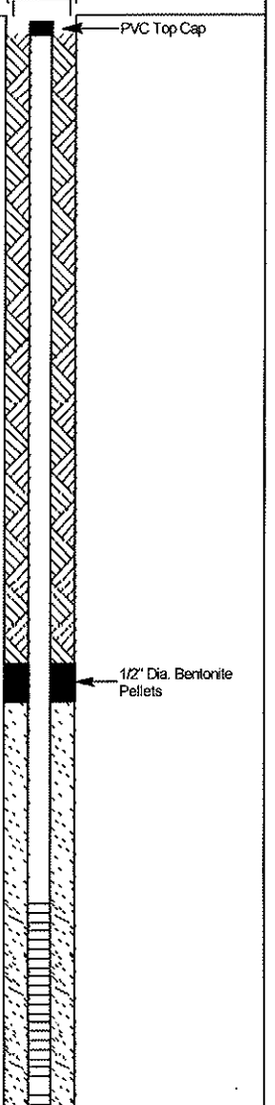
BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/11/03 08:15
LOGGED BY: [redacted] b6	REVIEWED BY:
DRILLING CONTRACTOR / DRILLER: FED / [redacted] b6	DATE & TIME FINISHED: 4/11/03 16:30
SAMPLING METHOD: Split-Spoon Sampler	SAMPLE HAMMER TYPE: Hydraulic Hammer
DRILLING METHOD: Hollow-Stem Auger	SIZE / TYPE OF BIT: 6"
COORDINATES	SURFACE ELEVATION / DATUM: mean sea level
WELL INSTALLED? YES ☒ NO	CASING MATERIAL / DIAMETER: Sch 40 PVC / 2"
SCREEN: Type: Slotted Material: PVC Length: 6.1 m Diameter: 2" Slot Size:	
ELEVATION OF (msl) / WELL COVER / TOP OF WELL CASING / TOP & BOTTOM OF SCREEN: m / m / PRODUCT SURFACE / GROUNDWATER SURFACE / DATE: 4/11/2003	

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)
0		2/4/4/4	0.6098 / 80	CC-066SS-01		SS	0	SC		SANDY LEAN CLAY (SC): strong brown (7.5YR 4/6) 20% grades to reddish yellow(7.5YR 6/6) and 50% grades to strong brown (7.5YR 5/6), ~40% medium to coarse sand, ~60% fines, petroleum odor, odor noted at 0.9 meters bgs.	0
1		1/3/3/3	0.6098 / 50				1				1
		2/4/4/5	0.6098 / 80								
2		2/4/7	0.4573				2	CL		CLAYEY SILT (CL): light yellowish brown (2.5Y 6/4) 60% grades to light olive brown (2.5Y 5/4), ~100% fines, petroleum odor, stiff to very stiff, odor noted at 1.8 meters bgs.	2
		4/6/11/15	0.6098 / 100								
3		2/6/9/12	0.3049 / 0				3				3
						SS					
4		4/7/11/12	0.9146	CC-066SB-02			4				4
5		6/18/22/27	0.6098 / 90				5	SC		CLAYEY SAND (SC): dark reddish brown(5YR 3/2), ~70% coarse to medium sand, ~30% fines, no odor, moist, medium dense.	5
6		26/31/50	0.4573 / 100				6	SC		CLAYEY SAND (SC): reddish yellow(5YR 7/8), ~60% coarse to medium sand, ~40% fines, no odor, moist, very dense	6
7							7				7
8		5/20/38/50	0.6098				8	SC		CLAYEY SAND (SC): light brown(7.5YR 6/4), ~70% coarse to medium sand, ~30% fines, moist.	8

WELL CONSTRUCTION DETAILS



BORING LOG METRIC_JNITS_CAMP CARROLL AREA D AND AREA 41.GPJ_ACE_1636.GDT 16/9/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

1066

LOG OF WELL AREA 41 #66

BOREHOLE / WELL LOCATION SKETCH MAP

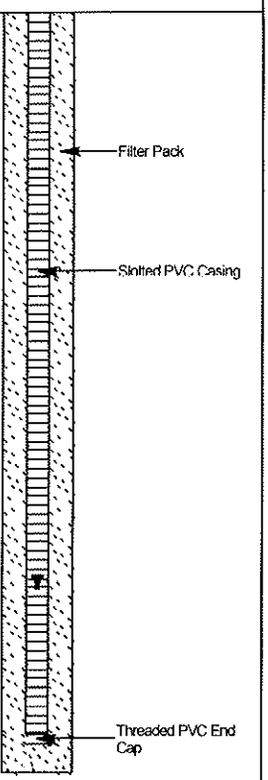
N

PROJECT NO.	PROJECT NAME	
	Camp Carroll Area D and Area 41 RI	
LOCATION		DATE & TIME STARTED
Camp Carroll, Taegu, Republic of Korea		4/11/03 08:15
LOGGED BY [redacted] 66	REVIEWED BY	DATE & TIME FINISHED
		4/11/03 16:30

SURFACE CONDITION:

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)
10		36/44/29/40	0.9146	CC-066SB-03		SS	10	CL		SANDY LEAN CLAY (CL): light brown(7.5YR 6/4), ~40% coarse to medium sand, ~60% fines.	10
11		50	0.1524			SS	11	SM		SILTY SAND (SM): brown (7.5YR 5/4), ~70% coarse to medium sand, ~30% fines, very dense.	11
12							12			Preprobe. No recovery.	12
13							13				13
14		50	0.1524				14				14
15		100	0.1524 / 100				15	SM		SILTY SAND (SM): brown (7.5YR 5/3), ~70% coarse to medium sand, ~30% fines, no odor. End of Borehole at 15.2 m.	15
16							16				16
17							17				17
18							18				18
19							19				19

WELL CONSTRUCTION DETAILS



BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1536.GDT 16/9/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

1067

LOG OF BORING AREA 41 B-051

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/4/03 10:10
LOGGED BY: [redacted] 66	REVIEWED BY:
	DATE & TIME FINISHED: 4/4/03 10:27
DRILLING CONTRACTOR / DRILLER: Beautiful Environmental Corp	DRILLING METHOD: Direct-Push
COORDINATES:	
SAMPLING METHOD: Geoprobe Sampler	SAMPLE HAMMER TYPE:
SIZE / TYPE OF BIT:	SURFACE ELEVATION: DATUM: mean sea level
WELL INSTALLED? YES NO ☒	CASING MATERIAL / DIAMETER:
SCREEN Type: Material: Length: Diameter: Slot Size:	
ELEVATION OF (msl): WELL COVER: TOP OF WELL CASING: TOP & BOTTOM OF SCREEN: PRODUCT SURFACE: GROUNDWATER SURFACE: DATE:	

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: / LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
								SC		CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~5% gravel, ~55% fine to coarse sand, ~40% fines, moist; dense; fill soil.		NO WELL INSTALLED
			0.9 / 80	SS051SS01		SS		CL		LEAN CLAY (CL): dark grayish brown (10YR 4/3), ~100% fines, medium to high, moist; stiff.		
			0.4					SC		CLAYEY SAND (SC): yellowish brown (10YR 5/6), ~55% fine to medium sand, ~45% fines, moist; dense.		
			1.3 / 80							End of Borehole at 2.3 m.		

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1835.GDT 10/9/03

1068

LOG OF BORING AREA 41 B-052

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/3/03 13:30
LOGGED BY: [redacted] bb	REVIEWED BY / DATE & TIME FINISHED: 4/3/03 14:05
DRILLING CONTRACTOR / DRILLER: Beautiful Environmental Corp	DRILLING METHOD: Direct-Push; COORDINATES
SAMPLING METHOD: Geoprobe Sampler	SAMPLE HAMMER TYPE; SIZE / TYPE OF BIT; SURFACE ELEVATION; DATUM: mean sea level
WELL INSTALLED? YES NO ☒	CASING MATERIAL / DIAMETER; SCREEN Type: Material: Length: Diameter: Slot Size:
ELEVATION OF (msl)	WELL COVER; TOP OF WELL CASING; TOP & BOTTOM OF SCREEN; PRODUCT SURFACE; GROUNDWATER SURFACE; DATE

DEPTH (meters bgs)	PID (ppmv)	B_OWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: / LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
0			1 / 70	CC052SS01		SS	0	SC		CLAYEY SAND (SC): (7.5YR 4.5/6), ~60% fine to coarse sand, ~40% fines, moist; dense.	0	NO WELL INSTALLED
1			1.3				1	SC		CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~60% fine to coarse sand, ~40% fines, moist; more friable.	1	
2			1.5 / 70				2				2	
3			0.5 / 90				3			Refusal. End of Borehole at 3.0 m.	3	
4							4				4	
5							5				5	
6							6				6	
7							7				7	
8							8				8	

BORING_LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1835.GDT 15/9/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

PAGE 1 OF 1

LOG OF BORING AREA 41 B-055

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/4/03 10:00
LOGGED BY: [redacted] bb	REVIEWED BY:
	DATE & TIME FINISHED: 4/4/03 10:09
DRILLING CONTRACTOR / DRILLER: Beautiful Environmental Corp	DRILLING METHOD: Direct-Push
COORDINATES:	
SAMPLING METHOD: Geoprobe Sampler	SAMPLE HAMMER TYPE:
SIZE / TYPE OF BIT:	SURFACE ELEVATION: DATUM: mean sea level
WELL INSTALLED? YES NO ☒	CASING MATERIAL / DIAMETER:
SCREEN Type: Material: Length: Diameter: Slot Size:	
ELEVATION OF (msl): WELL COVER: TOP OF WELL CASING: TOP & BOTTOM OF SCREEN: PRODUCT SURFACE: GROUNDWATER SURFACE: DATE:	

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: / LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
												NO WELL INSTALLED
			0.7 / 80					CL		SANDY LEAN CLAY (CL): red (2.5YR 4/6), ~30% fine to medium sand, ~70% fines, low, moist; firm; fill soil.		
1							1	SC		CLAYEY SAND (SC): yellowish brown (10YR 5/6), ~55% fine to medium sand, ~45% fines, moist; dense.	1	
			1.5 / 60									
2							2			End of Borehole at 2.3 m.	2	
3							3				3	
4							4				4	
5							5				5	
6							6				6	
7							7				7	
8							8				8	

BORING LOG METR C UNITS CAMP CARROLL AREA D AND AREA 41.GP. ACE_1836.GDT 1E/9/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

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LOG OF BORING AREA 41 B-056

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI	
LOCATION: Camp Carroll, Taegu, Republic of Korea		DATE & TIME STARTED: 4/4/03 09:45
LOGGED BY: [redacted] 66	REVIEWED BY	DATE & TIME FINISHED: 4/4/03 09:57
DRILLING CONTRACTOR / DRILLER: Beautiful Environmental Corp		DRILLING METHOD: Direct-Push
SAMPLING METHOD: Geoprobe Sampler	SAMPLE HAMMER TYPE	SIZE / TYPE OF BIT
		SURFACE ELEVATION / DATUM: mean sea level
WELL INSTALLED? YES / NO ☒	CASING MATERIAL / DIAMETER	SCREEN Type: Material: Length: Diameter: Slot Size:

ELEVATION OF (msl) | WELL COVER | TOP OF WELL CASING | TOP & BOTTOM OF SCREEN | PRODUCT SURFACE | GROUNDWATER SURFACE | DATE

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: / LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
			0.7 / 80	CC056SS01		SS		SC		CLAYEY SAND (SC): yellowish brown (10YR 5/6), ~55% fine to medium sand, ~45% fines, moist; dense.		NO WELL INSTALLED
1							1	SC		CLAYEY SAND (SC): strong brown(7.5YR 4.5/6), ~55% fine to medium sand, ~45% fines, moist; dense.	1	
			1.5 / 80									
2							2			End of Borehole at 2.3 m.	2	
3							3				3	
4							4				4	
5							5				5	
6							6				6	
7							7				7	
8							8				8	

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1836.GDT 16/9/03

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LOG OF BORING AREA 41 B-057

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI		
LOCATION: Camp Carroll, Taegu, Republic of Korea		DATE & TIME STARTED: 4/4/03 10:30	
LOGGED BY: [redacted] bb	REVIEWED BY	DATE & TIME FINISHED: 4/4/03 10:40	
DRILLING CONTRACTOR / DRILLER: Beautiful Environmental Corp		DRILLING METHOD: Direct-Push	COORDINATES
SAMPLING METHOD: Geoprobe Sampler	SAMPLE HAMMER TYPE	SIZE / TYPE OF BIT	SURFACE ELEVATION / DATUM: mean sea level
WELL INSTALLED? YES / NO ☒	CASING MATERIAL / DIAMETER	SCREEN Type: Material: Length: Diameter: Slot Size:	
ELEVATION OF (msl)	WELL COVER	TOP OF WELL CASING	TOP & BOTTOM OF SCREEN / PRODUCT SURFACE / GROUNDWATER SURFACE / DATE

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: / LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
0			0.7 / 80	CC057SS01		SS	0	SC		CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~55% fine to medium sand, ~45% fines, moist; dense.	0	NO WELL INSTALLED
1			1.2				1				1	
2			1.1 / 80				2			End of Borehole at 2.0 m.	2	
3							3				3	
4							4				4	
5							5				5	
6							6				6	
7							7				7	
8							8				8	

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

BORING LOG METRIC JNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1836.GDT 16/9/03

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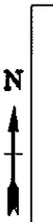
LOG OF BORING AREA 41 B-058

BOREHOLE / WELL LOCATION SKETCH MAP



PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/4/03 09:25
LOGGED BY: [redacted] b6	REVIEWED BY:
	DATE & TIME FINISHED: 4/4/03 09:40
DRILLING CONTRACTOR / DRILLER: Beautiful Environmental Corp	DRILLING METHOD: Direct-Push
SAMPLING METHOD: Geoprobe Sampler	SAMPLE HAMMER TYPE:
	SIZE / TYPE OF BIT:
COORDINATES	SURFACE ELEVATION / DATUM: mean sea level
WELL INSTALLED? YES / NO ☒	CASING MATERIAL / DIAMETER:
SCREEN Type: Material: Length: Diameter: Slot Size:	
ELEVATION OF (msl): WELL COVER / TOP OF WELL CASING / TOP & BOTTOM OF SCREEN / PRODUCT SURFACE / GROUNDWATER SURFACE / DATE	

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: / LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
			0.7 / 80			SS		CL		SANDY LEAN CLAY (CL): red (2.5YR 4/6), ~30% fine to medium sand, ~70% fines, low, moist; firm; fill soil.		NO WELL INSTALLED
1			0.6	CC058SS01			1				1	
			1.4 / 80			SS		SC		CLAYEY SAND (SC): yellowish brown (10YR 5/6), ~55% fine to medium sand, ~45% fines, moist; dense.		
2			1	CC058BS01			2				2	
										End of Borehole at 2.4 m.		
3							3				3	
4							4				4	
5							5				5	
6							6				6	
7							7				7	
8							8				8	

BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_2-836.GDT 1/6/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

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LOG OF BORING AREA 41 B-059

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/4/03 10:50
LOGGED BY: [redacted] bb	REVIEWED BY:
	DATE & TIME FINISHED: 4/4/03 11:05
DRILLING CONTRACTOR / DRILLER: Beautiful Environmental Corp	DRILLING METHOD: Direct-Push
COORDINATES:	
SAMPLING METHOD: Geoprobe Sampler	SAMPLE HAMMER TYPE:
SIZE / TYPE OF BIT:	SURFACE ELEVATION: DATUM: mean sea level
WELL INSTALLED? YES NO ☒	CASING MATERIAL / DIAMETER:
SCREEN Type: Material: Length: Diameter: Slot Size:	
ELEVATION OF (msl): WELL COVER: TOP OF WELL CASING: TOP & BOTTOM OF SCREEN: PRODUCT SURFACE: GROUNDWATER SURFACE: DATE:	

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: / LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
			0.7 / 80	CO059SS01		SS		SC		CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~60% fine to coarse sand, ~40% fines, moist; dense; fill soil.		NO WELL INSTALLED
1			1.5				1	SC		CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~55% fine to medium sand, ~45% fines, moist; dense.	1	
2			1.6 / 80				2			End of Borehole at 2.4 m.	2	
3							3				3	
4							4				4	
5							5				5	
6							6				6	
7							7				7	
8							8				8	

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1936.GDT 16/9/03

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LOG OF BORING AREA 41 B-060

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/3/03 15:30
LOGGED BY: [redacted] bg	REVIEWED BY / DATE & TIME FINISHED: 4/3/03 21:05
DRILLING CONTRACTOR / DRILLER: Beautiful Environmental Corp	DRILLING METHOD: Direct-Push
SAMPLING METHOD: Geoprobe Sampler	SAMPLE HAMMER TYPE / SIZE / TYPE OF BIT
COORDINATES	SURFACE ELEVATION / DATUM: mean sea level
WELL INSTALLED? YES / NO ☒	CASING MATERIAL / DIAMETER
SCREEN Type: Material: Length: Diameter: Slot Size:	
ELEVATION OF (msl)	WELL COVER / TOP OF WELL CASING / TOP & BOTTOM OF SCREEN / PRODUCT SURFACE / GROUNDWATER SURFACE / DATE

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: / LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
			0.7 / 80	CC060SS01		SS		SC		CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~5% gravel, ~55% fine to coarse sand, ~40% fines, moist, dense; fill soil.		NO WELL INSTALLED
1			1.1				1				1	
			0.7 / 80			SS		CL		LEAN CLAY with Sand (CL): red (2.5YR 4/6), ~20% fine to medium sand, ~80% fines, moist; stiff; fill soil.		
				CC060BS01				ML		SILT (ML): brownish yellow (10YR 6/6), ~100% fines, moist; medium dense; native soil.		
2			1 / 0.7 / 90				2				2	
3			1.5 / 100				3				3	
4			0.7 / 100				4			End of Borehole at 4.7 m.	4	
5							5				5	
6							6				6	
7							7				7	
8							8				8	

BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1836.GDT 16/9/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

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LOG OF BORING AREA 41 B-061

BOREHOLE / WELL LOCATION SKETCH MAP

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/3/03 14:10
LOGGED BY: [redacted] bb	REVIEWED BY / DATE & TIME FINISHED: 4/3/03 15:00
DRILLING CONTRACTOR / DRILLER: Beautiful Environmental Corp	DRILLING METHOD: Direct-Push / COORDINATES
SAMPLING METHOD: Geoprobe Sampler / SAMPLE HAMMER TYPE / SIZE / TYPE OF BIT	SURFACE ELEVATION / DATUM: mean sea level
WELL INSTALLED? YES / NO ☒	CASING MATERIAL / DIAMETER / SCREEN Type: Material: Length: Diameter: Slot Size:
ELEVATION OF (msl)	WELL COVER / TOP OF WELL CASING / TOP & BOTTOM OF SCREEN / PRODUCT SURFACE / GROUNDWATER SURFACE / DATE

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: / LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
												NO WELL INSTALLED
0							0	CL		SANDY LEAN CLAY (CL): red (2.5YR 4/6) 50% mottled with yellowish red (5YR 4/6), ~50% fine to coarse sand, ~50% fines, moist; medium stiff; dense; fill soil.	0	
			1 / 60					SC		CLAYEY SAND (SC): strong brown(7.5YR 4.5/6), ~60% fine to coarse sand, ~40% fines, moist; dense; becomes more friable at 1.0 meter bgs.		
1			1 / 90				1				1	
2							2				2	
3			3				3				3	
4			1	CC061BS0		SS	4				4	
5							5			End of Borehole at 5.0 m.	5	
6							6				6	
7							7				7	
8							8				8	

BORING LOG METR C:\UNITS CAMP CARROLL AREA D AND AREA 41.GP, ACE_1836.GDT 1/6/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

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LOG OF BORING AREA 41 B-062

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/3/03 15:05
LOGGED BY: [redacted] b6	REVIEWED BY:
	DATE & TIME FINISHED: 4/3/03 15:09
DRILLING CONTRACTOR / DRILLER: Beautiful Environmental Corp	DRILLING METHOD: Direct-Push
	COORDINATES:
SAMPLING METHOD: Geoprobe Sampler	SAMPLE HAMMER TYPE:
SIZE / TYPE OF BIT:	SURFACE ELEVATION: DATUM: mean sea level
WELL INSTALLED? YES NO ☒	CASING MATERIAL / DIAMETER:
SCREEN Type: Material: Length: Diameter: Slot Size:	
ELEVATION OF (msl): WELL COVER: TOP OF WELL CASING: TOP & BOTTOM OF SCREEN: PRODUCT SURFACE: GROUNDWATER SURFACE: DATE:	

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: / LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
												NO WELL INSTALLED
			1 / 90	CO062SS01		SS		CL / SC		SANDY LEAN CLAY (CL): red (2.5YR 4/6), ~50% fine to coarse sand, ~50% fines, fill soil. CLAYEY SAND (SC): very pale brown (10YR 8/4) 50% mottled with yellowish brown (10YR 5/4), ~60% fine to coarse sand, ~40% fines, moist; dense.		
1							1			End of Borehole at 1.0 m.	1	
2							2				2	
3							3				3	
4							4				4	
5							5				5	
6							6				6	
7							7				7	
8							8				8	

BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1636.GDT 6/9/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

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LOG OF BORING AREA 41 B-063

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/4/03 09:10
LOGGED BY: [redacted] b6	REVIEWED BY:
	DATE & TIME FINISHED: 4/4/03 09:20
DRILLING CONTRACTOR / DRILLER: Beautiful Environmental Corp	DRILLING METHOD: Direct-Push
COORDINATES:	
SAMPLING METHOD: Geoprobe Sampler	SAMPLE HAMMER TYPE:
SIZE / TYPE OF BIT:	SURFACE ELEVATION: DATUM: mean sea level
WELL INSTALLED? YES / NO ☒	CASING MATERIAL / DIAMETER:
SCREEN Type: Material: Length: Diameter: Slot Size:	
ELEVATION OF (msl): WELL COVER: TOP OF WELL CASING: TOP & BOTTOM OF SCREEN: PRODUCT SURFACE: GROUNDWATER SURFACE: DATE:	

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: / LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
						SS		SC		CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~5% gravel, ~55% fine to coarse sand, ~40% fines, moist; dense; fill soil.		NO WELL INSTALLED
			0.7 / 80	CC063SS01				GC		CLAYEY GRAVEL with Sand (GC): strong brown (7.5YR 5/6), ~60% gravel, ~20% sand, ~20% fines, moist; dense; fill soil.		
1							1	SC		CLAYEY SAND (SC): strong brown(7.5YR 4.5/6), ~5% fine gravel, ~75% fine to coarse sand, ~20% fines, moist; dense.	1	
			1.5 / 70									
2							2			End of Borehole at 2.3 m.	2	
3							3				3	
4							4				4	
5							5				5	
6							6				6	
7							7				7	
8							8				8	

BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1233.GDT 16/9/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

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LOG OF BORING AREA 41 B-064

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/4/03 10:45
LOGGED BY: [redacted]	REVIEWED BY:
	DATE & TIME FINISHED: 4/4/03 10:48
DRILLING CONTRACTOR/DRILLER: Beautiful Environmental Corp	DRILLING METHOD: Direct-Push
COORDINATES:	
SAMPLING METHOD: Geoprobe Sampler	SAMPLE HAMMER TYPE:
SIZE / TYPE OF BIT:	SURFACE ELEVATION: DATUM: mean sea level
WELL INSTALLED? YES NO ☒	CASING MATERIAL / DIAMETER:
SCREEN Type: Material: Length: Diameter: Slot Size:	
ELEVATION OF (msl): WELL COVER: TOP OF WELL CASING: TOP & BOTTOM OF SCREEN: PRODUCT SURFACE: GROUNDWATER SURFACE: DATE:	

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: / LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
0			0.7 / 80	Not sampled			0	SC		CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~55% fine to medium sand, ~45% fines, moist; dense; quartz veining at 0.1 to 0.4 meters bgs.	0	NO WELL INSTALLED
										End of Borehole at 0.8 m.		
1							1				1	
2							2				2	
3							3				3	
4							4				4	
5							5				5	
6							6				6	
7							7				7	
8							8				8	

BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1336.GDT 1/9/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

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LOG OF BORING AREA 41 B-065

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/3/03 15:10
LOGGED BY: [redacted] b6	REVIEWED BY / DATE & TIME FINISHED: 4/3/03 15:25
DRILLING CONTRACTOR / DRILLER: Beautiful Environmental Corp	DRILLING METHOD: Direct-Push / COORDINATES
SAMPLING METHOD: Geoprobe Sampler	SAMPLE HAMMER TYPE / SIZE / TYPE OF BIT / SURFACE ELEVATION / DATUM: mean sea level
WELL INSTALLED? YES / NO ☒	CASING MATERIAL / DIAMETER / SCREEN Type: Material: Length: Diameter: Slot Size:
ELEVATION OF (msl)	WELL COVER / TOP OF WELL CASING / TOP & BOTTOM OF SCREEN / PRODUCT SURFACE / GROUNDWATER SURFACE / DATE

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: / LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
			0.1 0.7 / 80	CC065SS01		SS SS		CL SC		SANDY LEAN CLAY (CL): red (2.5YR 4/6) 50% mottled with yellowish red (5YR 4/6), ~50% fine to coarse sand, ~50% fines, some dark staining at 0.2 to 0.3 meters bgs; fill soil. CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~60% fine to coarse sand, ~40% fines, moist; dense.		NO WELL INSTALLED
1			1.2 0.8 / 80	CC065BS01			1				1	
										End of Borehole at 1.5 m.		
2							2				2	
3							3				3	
4							4				4	
5							5				5	
6							6				6	
7							7				7	
8							8				8	

BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1336.GDT 16/9/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

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LOG OF BORING AREA 41 B-067

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI		
LOCATION: Camp Carroll, Taegu, Republic of Korea		DATE & TIME STARTED: 4/4/03 13:00	
LOGGED BY: [redacted] b6	REVIEWED BY	DATE & TIME FINISHED: 4/4/03 13:30	
DRILLING CONTRACTOR / DRILLER: Beautiful Environmental Corp		DRILLING METHOD: Direct-Push	COORDINATES
SAMPLING METHOD: Geoprobe Sampler	SAMPLE HAMMER TYPE	SIZE / TYPE OF BIT	SURFACE ELEVATION / DATUM: mean sea level
WELL INSTALLED? YES / NO ☒	CASING MATERIAL / DIAMETER	SCREEN Type: Material: Length: Diameter: Slot Size:	
ELEVATION OF (msl)	WELL COVER	TOP OF WELL CASING	TOP & BOTTOM OF SCREEN / PRODUCT SURFACE / GROUNDWATER SURFACE / DATE

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: / LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
0			0.7 / 80	CC067SS01		SS	0	CL		SANDY LEAN CLAY (CL): strong brown (7.5YR 4/6), ~40% fine to coarse sand, ~60% fines, moist; stiff.	0	NO WELL INSTALLED
1			1.4 / 70				1				1	
2							2	SC		CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~55% fine to medium sand, ~45% fines, moist; dense; highly weathered.	2	
3			1.0 / 00				3				3	
4							4			End of Borehole at 4.0 m.	4	
5							5				5	
6							6				6	
7							7				7	
8							8				8	

BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1836.GDT 16/5/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

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LOG OF BORING AREA 41 B-068

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/4/03 13:40
LOGGED BY: [redacted] bG	REVIEWED BY
	DATE & TIME FINISHED: 4/4/03 13:50
DRILLING CONTRACTOR / DRILLER: Beautiful Environmental Corp	DRILLING METHOD: Direct-Push
SAMPLING METHOD: Geoprobe Sampler	SAMPLE HAMMER TYPE
SIZE / TYPE OF BIT	COORDINATES
SURFACE ELEVATION	DATUM: mean sea level
WELL INSTALLED? YES NO ☒	CASING MATERIAL / DIAMETER
SCREEN Type: Material: Length: Diameter: Slot Size:	
ELEVATION OF (msl)	WELL COVER
TOP OF WELL CASING	TOP & BOTTOM OF SCREEN
PRODUCT SURFACE	GROUNDWATER SURFACE
DATE	

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: / LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
										SURFACE CONDITION:		WELL CONSTRUCTION DETAILS
										LITHOLOGIC DESCRIPTION		NO WELL INSTALLED
			0.7 / 80					CL		SANDY LEAN CLAY (CL): strong brown (7.5YR 4/6), ~40% fine to coarse sand, ~60% fines, moist; stiff; fill soil.		
								SC		CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~55% fine to medium sand, ~45% fines, moist; dense; highly weathered.		
1			1.4 / 80				1				1	
2							2			End of Borehole at 2.2 m.	2	
3							3				3	
4							4				4	
5							5				5	
6							6				0	
7							7				7	
8							8				8	

BORING LOG METR C UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1836.GDT 1/9/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

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LOG OF BORING AREA 41 B-069

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/4/03 14:00
LOGGED BY: [redacted] b6	REVIEWED BY:
	DATE & TIME FINISHED: 4/4/03 14:10
DRILLING CONTRACTOR / DRILLER: Beautiful Environmental Corp	DRILLING METHOD: Direct-Push
COORDINATES	
SAMPLING METHOD: Geoprobe Sampler	SAMPLE HAMMER TYPE:
SIZE / TYPE OF BIT	SURFACE ELEVATION / DATUM: mean sea level
WELL INSTALLED? YES / NO ☒	CASING MATERIAL / DIAMETER
SCREEN Type: Material: Length: Diameter: Slot Size:	
ELEVATION OF (msl): WELL COVER / TOP OF WELL CASING / TOP & BOTTOM OF SCREEN / PRODUCT SURFACE / GROUNDWATER SURFACE / DATE	

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: / LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
										SURFACE CONDITION:		WELL CONSTRUCTION DETAILS
										LITHOLOGIC DESCRIPTION		NO WELL INSTALLED
0			0.7 / 80	CC069SS01		SS	0	SC		CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~60% fine to coarse sand, ~40% fines, moist; dense; fill soil.	0	
1			1.4 / 80				1	SC		CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~55% fine to medium sand, ~45% fines, moist; dense; highly weathered.	1	
2							2			End of Borehole at 2.2 m.	2	
3							3				3	
4							4				4	
5							5				5	
6							6				6	
7							7				7	
8							8				8	

BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ eCE_*.835.GDT 16/6/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

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LOG OF BORING AREA 41 B-070

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/4/03 14:16
LOGGED BY: [redacted] bb	REVIEWED BY:
	DATE & TIME FINISHED: 4/4/03 14:30
DRILLING CONTRACTOR / DRILLER: Beautiful Environmental Corp	DRILLING METHOD: Direct-Push
COORDINATES:	
SAMPLING METHOD: Geoprobe Sampler	SAMPLE HAMMER TYPE:
SIZE / TYPE OF BIT:	SURFACE ELEVATION: DATUM: mean sea level
WELL INSTALLED? YES NO ☒	CASING MATERIAL / DIAMETER:
SCREEN Type: Material: Length: Diameter: Slot Size:	
ELEVATION OF (msl): WELL COVER: TOP OF WELL CASING: TOP & BOTTOM OF SCREEN: PRODUCT SURFACE: GROUNDWATER SURFACE: DATE:	

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: / LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
												NO WELL INSTALLED
								SC		CLAYEY SAND (SC), dark greenish gray(5GY 4/1), ~60% fine to coarse sand, ~40% fines, moist; dense; fill soil.		
			0.7 / 80			SS		SC		CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~60% fine to coarse sand, ~40% fines, moist; dense; fill soil.		
1							1				1	
			1.4 / 80	CC070SS01				SC		CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~55% fine to medium sand, ~45% fines, moist; dense; highly weathered.		
2							2			End of Borehole at 2.2 m.	2	
3							3				3	
4							4				4	
5							5				5	
6							6				6	
7							7				7	
8							8				8	

BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ 4DE_1306.GDT 16/9/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

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LOG OF WELL AREA D #12

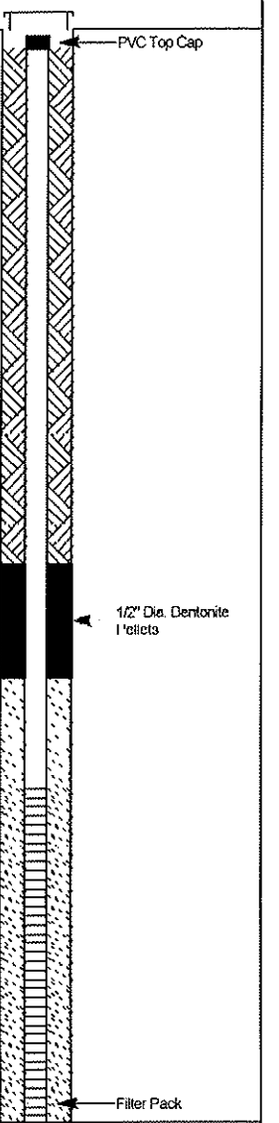
BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/13/03 09:29
LOGGED BY: [redacted] b6	REVIEWED BY:	DATE & TIME FINISHED: 4/13/03 11:40
DRILLING CONTRACTOR / DRILLER: FED / [redacted] b6	DRILLING METHOD: Hollow-Stem Auger	COORDINATES:
SAMPLING METHOD: Split-Spoon Sampler	SAMPLE HAMMER TYPE: Hydraulic Hammer	SIZE / TYPE OF BIT: 8"	SURFACE ELEVATION:	DATUM: mean sea level
WELL INSTALLED? YES ☒ NO	CASING MATERIAL / DIAMETER: Sch 40 PVC / 2"	SCREEN: Type: Slotted Material: PVC Length: 6.1 m Diameter: 2" Slot Size:
ELEVATION OF (msl):	WELL COVER:	TOP OF WELL CASING:	TOP & BOTTOM OF SCREEN: m / m	PRODUCT SURFACE:	GROUNDWATER SURFACE:	DATE: 4/13/2003

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)
		12/18/20/20	0.6098 / 75					SC		CLAYEY SAND with Gravel (SC): strong brown (7.5YR 5/6) 50% mottled with reddish yellow(7.5YR 7/6), ~15% gravel, ~50% sand, ~35% fines, low, moist; dense; fill material.	
1		11/14/9/9	0.6098 / 100				1	SC		CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~10% gravel, ~60% medium to coarse sand, ~30% fines, moist; dense.	1
		4/6/9/9	0.6098 / 100					CL		SANDY LEAN CLAY (CL): reddish yellow(7.5YR 7/8), ~30% sand, ~70% fines, stiff to very stiff.	
2		6/6/5	0.6098 / 78				2	SC		CLAYEY SAND (SC): brown (7.5YR 5/4), ~10% gravel, ~60% medium to coarse sand, ~30% fines, moist; medium dense.	2
		4/5/8/8	0.6098 / 91					CL		SANDY LEAN CLAY (CL): yellowish red (5YR 5/6), ~20% sand, ~80% fines, medium to low, moist; stiff.	
3		2/8/7/7	0.6098 / 88				3	SC		CLAYEY SAND (SC): brown (7.5YR 4/4), ~10% fine gravel, ~70% sand, ~20% fines, medium dense.	3
4		4/5/3/5	0.6098 / 88				4	SC		CLAYEY SAND (SC): dark reddish brown(5YR 2.5/2), ~70% medium to fine sand, ~30% fines, moist; medium dense.	4
5		2/2/2/6	0.6098 / 71				5	CL		SANDY LEAN CLAY (CL): yellowish red (5YR 5/6), moist; soft.	5
6							6	CL		SANDY LEAN CLAY (CL): yellowish red (5YR 5/6), ~20% sand, ~80% fines, medium to low, moist; very stiff.	6
		9/10/7/6	0.6098 / 88					SC		CLAYEY SAND (SC): olive (5Y 5/3), ~70% sand, ~30% fines, stiff; fill material.	
7							7				7
								CL		SILTY CLAY with Sand (CL): dark yellowish brown (10YR 3/4), ~20% sand, ~80% fines, fill material.	
8		1/3/2/3	0.6098 / 100				8	CL		SILTY CLAY with Sand (CL): olive brown (2.5Y 4/4), ~20% sand, ~80% fines, wet; fill material.	8

WELL CONSTRUCTION DETAILS



BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1836.GDT 16/9/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

1085

LOG OF WELL AREA D #12

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME	
	Camp Carroll Area D and Area 41 RI	
LOCATION		DATE & TIME STARTED
Camp Carroll, Taegu, Republic of Korea		4/13/03 09:29
LOGGED BY [redacted] b6	REVIEWED BY	DATE & TIME FINISHED 4/13/03 11:40

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
10		2/3/6/5	0.6098 / 96				10	CL		SANDY SILTY CLAY (CL): strong brown (7.5YR 5/8), ~20% sand, ~80% fines, wet; native soil.	10	Slotted PVC Casing
11		3/4/8/10	0.6098 / 75				11	SC		CLAYEY SAND (SC): brownish yellow (10YR 6/6), ~60% fine to medium sand, ~40% fines, wet.	11	
12		2/3/5/9	0.6098 / 0				12			End of Borehole at 12.5 m.	12	Threaded PVC End Cap
13							13				13	
14							14				14	
15							15				15	
16							16				16	
17							17				17	
18							18				18	
19							19				19	

BOPING LOG METRIC UNITS CAMP CARROLL AREA D ANC AREA 41.GF, ACE_1836.GDT 16/9/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

1086

LOG OF WELL AREA D #24

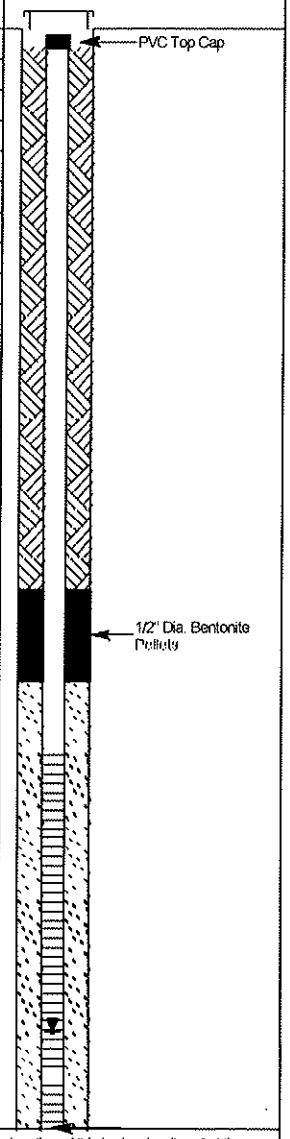
BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/8/03 09:00
LOGGED BY: [redacted] b6	REVIEWED BY:	DATE & TIME FINISHED: 4/8/03 11:00
DRILLING CONTRACTOR / DRILLER: FED / [redacted] b6	DRILLING METHOD: Hollow-Stem Auger	COORDINATES:
SAMPLING METHOD: Split-Spoon Sampler	SAMPLE HAMMER TYPE: Hydraulic Hammer	SIZE / TYPE OF BIT: 8"	SURFACE ELEVATION / DATUM: mean sea level
WELL INSTALLED? YES ☒ NO	CASING MATERIAL / DIAMETER: Sch 40 PVC / 2"	SCREEN: Type: Slotted Material: PVC Length: 6.1 m Diameter: 2" Slot Size:
ELEVATION OF (msl)	WELL COVER	TOP OF WELL CASING	TOP & BOTTOM OF SCREEN: m / m	PRODUCT SURFACE	GROUNDWATER SURFACE	DATE: 4/10/2003

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
		7/5/6/11	0.6098 / 75					SC		SILTY, CLAYEY SAND (SC): strong brown (7.5YR 4/6) 50% mottled with strong brown (7.5YR 5/6), ~5% gravel, ~65% fine to coarse sand, ~30% fines, moist; medium dense; fill material.
1		12/15/12/9	0.6098 / 75				1	SC		SILTY, CLAYEY SAND (SC): yellowish brown (10YR 5/4) 50% mottled with yellowish brown (10YR 5/6), ~5% gravel, ~60% sand, ~35% fines, medium dense; fill material.
		7/6/5/5	0.6098 / 70					SC		SILTY, CLAYEY SAND (SC): dark yellowish brown (10YR 4/6), ~20% fine to coarse, subangular gravel, ~50% sand, ~30% fines, medium dense; fill material.
2		4/6/5/10	0.6098 / 80				2	SC		SILTY, CLAYEY SAND (SC): dark yellowish brown (10YR 4/6), ~35% fine to coarse, subangular gravel, ~40% sand, ~25% fines, medium dense; fill material.
		6/6/7/13	0.6098 / 65					SC		SILTY, CLAYEY SAND (SC): dark yellowish brown (10YR 4/6), ~10% fine to coarse, subangular gravel, ~60% sand, ~30% fines, medium dense.
3		5/11/8/5	0.6098 / 0				3	SC		SILTY, CLAYEY SAND (SC): strong brown (7.5YR 5/6) 50% mottled with strong brown (7.5YR 5/8), ~10% fine to coarse, subangular gravel, ~60% sand, ~30% fines, medium stiff.
		1/4/0/6	0.6098 / 50					CL		SILTY CLAY with Sand (CL): strong brown (7.5YR 5/8), ~25% sand, ~75% fines, stiff
4							4	SC		SILTY, CLAYEY SAND (SC): yellowish red (5YR 4/6) 50% mottled with yellowish red (5YR 5/6), ~60% sand, ~40% fines, medium dense.
		2/8/9/11	0.6098 / 100							
5							5			
6							6			
		4/4/3/4	0.6098 / 80 0.4878 / 100	CC-024DS-01		SS		SC		SILTY, CLAYEY SAND (SC): yellowish red (5YR 5/6), ~60% sand, ~40% fines.
7							7	SC		SILTY, CLAYEY SAND (SC): brown (7.5YR 5/4), ~60% sand, ~40% fines, loose to dense.
8		2/4/8/8	0.6098 / 70				8			

WELL CONSTRUCTION DETAILS



BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1336.GDT 16/9/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

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LOG OF WELL AREA D #24

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME	
	Camp Carroll Area D and Area 41 RI	
LOCATION		DATE & TIME STARTED
Camp Carroll, Taegu, Republic of Korea		4/8/03 09:00
LOGGED BY [redacted] bc	REVIEWED BY	DATE & TIME FINISHED
		4/8/03 11:00

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
						SS		SC		SILTY, CLAYEY SAND (SC): olive brown (2.5Y 4/4).		Slotted PVC Casing
		1/3/4/5	0.6098 / 100	CC-024BS-02				CL		SILTY CLAY with Sand (CL): dark yellowish brown (10YR 4/4), ~15% fine to medium sand, ~85% fines, medium, soft to medium stiff.		Filter Pack
10							10	SC		SILTY, CLAYEY SAND (SC): yellowish brown (10YR 5/4) 50% mottled with yellowish brown (10YR 5/6), ~60% sand, ~40% fines, medium dense.	10	
11		3/10/15/12	0.6098 / 70				11				11	
12							12	CL		SILTY CLAY with Sand (CL): yellow (10YR 7/6), ~20% coarse to fine sand, ~80% fines, medium stiff, native soil.	12	Threaded PVC End Cap
		3/6/9/12	0.6098 / 60									
13							13				13	
										End of Borehole at 13.7 m.		
14							14				14	
15							15				15	
16							16				16	
17							17				17	
18							18				18	
19							19				19	

BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1836.GDT 16/9/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

1088

LOG OF WELL AREA D #37

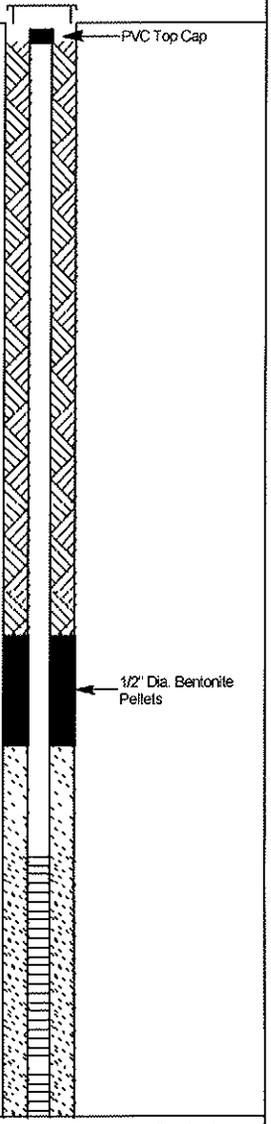
BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/12/03 08:12
LOGGED BY: [redacted] b6	REVIEWED BY:
	DATE & TIME FINISHED: 4/12/03 10:45
DRILLING CONTRACTOR / DRILLER: FED / [redacted] b6	DRILLING METHOD: Hollow-Stem Auger
SAMPLING METHOD: Split-Spoon Sampler	SAMPLE HAMMER TYPE: Hydraulic Hammer
SIZE / TYPE OF BIT: 8"	SURFACE ELEVATION / DATUM: mean sea level
WELL INSTALLED? YES ☒ NO	CASING MATERIAL / DIAMETER: Sch 40 PVC / 2"
SCREEN: Type: Slotted Material: PVC Length: 6.1 m Diameter: 2" Slot Size:	
ELEVATION OF (msl) / WELL COVER / TOP OF WELL CASING / TOP & BOTTOM OF SCREEN: m / m / PRODUCT SURFACE / GROUNDWATER SURFACE / DATE: 4/12/2003	

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: / LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)
		10/13/11/8	0.6098 / 60					SC		SILTY, CLAYEY SAND with Gravel (SC): yellowish brown (10YR 5/4), ~20% fine to coarse gravel, ~50% sand, ~30% fines.	
								SC		SILTY, CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~10% fine to coarse gravel, ~60% sand, ~30% fines, moist; medium dense.	
1		8/10/15/14	0.6098 / 100				1	SC		SILTY, CLAYEY SAND (SC): dark brown (7.5YR 3/3), ~10% gravel, ~60% sand, ~30% fines, medium dense; fill material.	1
		8/7/8/7	0.6098 / 100					SC		SILTY, CLAYEY SAND with Gravel (SC): brown (7.5YR 4/4), ~20% fine gravel, ~50% sand, ~30% fines, medium dense; fill material.	
2						SS	2				2
		9/11/7	0.6098 / 50	CC-037SB-01				SM		SILTY, CLAYEY SAND with Gravel (SM): greenish gray (GLEY1 5/5GY), ~20% gravel, ~80% medium to coarse sand, ~20% fines, medium dense; fill material.	
						SS					
		4/6/6/9	0.6098 / 100	CC-037SB-01				CL		SILTY CLAY (CL): yellowish red (5YR 5/6), ~100% fines, stiff.	
3							3	SM		SILTY, CLAYEY SAND (SM): greenish gray (GLEY1 5/5GY), ~70% medium to coarse sand, ~30% fines, moist; stiff; fill material.	3
		7/9/6/10	0.6098 / 90								
		5/6/7/7	0.6098 / 80					CL		SILTY CLAY (CL): greenish gray (GLEY1 5/5GY), ~70% medium to coarse sand, ~30% fines, moist; stiff; fill material	
4							4				4
		2/4/4/5	0.6098 / 10								
5							5				5
6							6				0
		4/7/7/8	0.6098 / 85 0.3964 / 100	CC-03/SB-02		SS		CL		SILTY CLAY (CL): olive brown (2.5Y 4/3), ~10% sand, ~90% fines, chemical odor; soil staining noted at 20 feet bgs; fill material.	
								CL		SILTY CLAY (CL): reddish yellow(5YR 6/8) 50% grades to olive brown (2.5Y 4/3), ~10% sand, ~90% fines, stiff; fill material.	
7							7				7
								CL		SILTY CLAY (CL): reddish yellow(5YR 6/8), ~100% fines, medium, chemical odor; moist; medium stiff.	
8		1/3/2/3	0.6098 / 60				8	CL		SANDY LEAN CLAY (CL): light yellowish brown (10YR 6/4), ~30% sand, ~70% fines, medium, moist.	8

WELL CONSTRUCTION DETAILS



BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1-336.GDT 16/9/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

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LOG OF WELL AREA D #37

BOREHOLE / WELL LOCATION SKETCH MAP

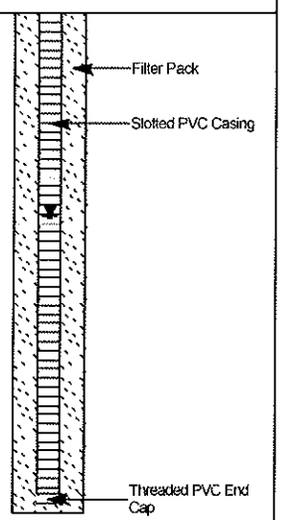
N

PROJECT NO.	PROJECT NAME	
	Camp Carroll Area D and Area 41 RI	
LOCATION		DATE & TIME STARTED
Camp Carroll, Taegu, Republic of Korea		4/12/03 08:12
LOGGED BY [redacted] b6	REVIEWED BY	DATE & TIME FINISHED
		4/12/03 10:45

SURFACE CONDITION:

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)
10		10/15/18/2	0.6098 / 55				10	SC		CLAYEY SAND (SC): greenish gray (GLEY1 5/5GY), ~60% sand, ~40% fines, low, moist; medium dense.	10
11		10/18/27/2	0.6098 / 50				11	SC		CLAYEY SAND (SC): yellowish brown (10YR 5/4), ~60% sand, ~40% fines, wet; medium dense.	11
12		15/20/28/3	0.6098 / 60				12	SC		CLAYEY SAND (SC): yellowish brown (10YR 5/4), ~70% fine to medium sand, ~30% fines, wet; dense.	12
13							13			End of Borehole at 13.1 m.	13

WELL CONSTRUCTION DETAILS



BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ 4CE_1336.GDT 16.9.03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

LOG OF WELL AREA D #38

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/14/03 08:05
LOGGED BY: [redacted] b6	REVIEWED BY:
	DATE & TIME FINISHED: 4/14/03 14:00
DRILLING CONTRACTOR / DRILLER: FED / [redacted] b6	DRILLING METHOD: Hollow-Stem Auger
SAMPLING METHOD: Split-Spoon Sampler	SAMPLE HAMMER TYPE: Hydraulic Hammer
	SIZE / TYPE OF BIT: 8"
COORDINATES	SURFACE ELEVATION / DATUM: mean sea level
WELL INSTALLED? YES ☒ NO	CASING MATERIAL / DIAMETER: Sch 40 PVC / 2"
SCREEN: Type: Slotted Material: PVC Length: 6.1 m Diameter: 2" Slot Size:	
ELEVATION OF (msl): WELL COVER: TOP OF WELL CASING: TOP & BOTTOM OF SCREEN: m / m PRODUCT SURFACE: GROUNDWATER SURFACE:	DATE: 4/14/2003

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: / LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
0		8/11/9/6	0.6098 / 54				0	SC		CLAYEY SAND (SC): dark grayish brown(10YR 4/2), ~10% gravel, ~60% medium to coarse sand, ~30% fines, moist.	0	PVC Top Cap
1		5/9/6/5	0.6098 / 75				1	CL		SANDY LEAN CLAY (CL): strong brown (7.5YR 5/8), ~0% gravel, ~30% medium sand, ~70% fines, moist; increasing sand content at 0.9 meters bgs (40%sand, 60% fines).	1	
2		2/5/10/11	0.6098 / 62			SS	2	SC		CLAYEY SAND (SC): reddish yellow(7.5YR 6/6) 20% grades to reddish yellow(7.5YR 6/6), ~0% gravel, ~60% medium to coarse sand, ~40% fines, moist; very dense.	2	
		7/12/15	0.6098 / 78	CC-038BS-01								
				CC-038BS-01		SS						
3		9/14/15/20	0.6098 / 83				3				3	
		7/18/23/26	0.6098 / 83									
4		23/28/27/2	0.6098 / 92				4				4	
		14/31/14/3	0.6098									
5		15/50	0.3048 / 45				5				5	
6							6				6	1/2" Dia. Bentonite Pellets
		14/30/35/50	0.6098 / 82									
7							7				7	
								SM		SILTY, CLAYEY SAND (SM): reddish yellow(7.5YR 6/8) 0%, ~0% gravel, ~60% medium to coarse sand, ~40% fines, moist.		
8							8				8	

BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1836.GDT 16/9/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

LOG OF WELL AREA D #38

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME
	Camp Carroll Area D and Area 41 RI
LOCATION	DATE & TIME STARTED
Camp Carroll, Taegu, Republic of Korea	4/14/03 08:05
LOGGED BY [redacted] bb	DATE & TIME FINISHED 4/14/03 14:00
REVIEWED BY	

SURFACE CONDITION:

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
			0.3049 / 100							Refusal. No Recovery.		Filter Pack; Slotted PVC Casing; Threaded PVC End Cap
										End of Borehole at 13.7 m.		

BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ JCE_1636.GDT 6/9/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

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LOG OF WELL AREA D #39

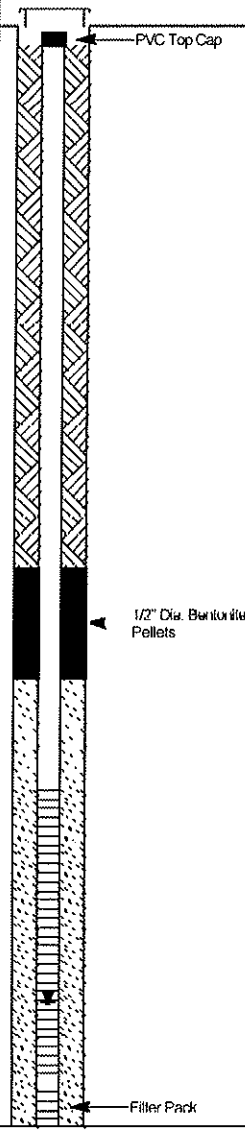
BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/12/03 13:21
LOGGED BY: [redacted] b6	REVIEWED BY:
	DATE & TIME FINISHED: 4/12/03 16:05
DRILLING CONTRACTOR / DRILLER: FED / [redacted] b6	DRILLING METHOD: Hollow-Stem Auger
COORDINATES:	
SAMPLING METHOD: Split-Spoon Sampler	SAMPLE HAMMER TYPE: Hydraulic Hammer
SIZE / TYPE OF BIT: 8"	SURFACE ELEVATION: DATUM: mean sea level
WELL INSTALLED? YES ☒ NO	CASING MATERIAL / DIAMETER: Sch 40 PVC / 2"
SCREEN: Type: Slotted Material: PVC Length: 6.1 m Diameter: 2" Slot Size:	
ELEVATION OF (msl): WELL COVER: TOP OF WELL CASING: TOP & BOTTOM OF SCREEN: m / m PRODUCT SURFACE: GROUNDWATER SURFACE: DATE: 4/13/2003	

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: / LITHOLOGIC DESCRIPTION
0		11/20/20/15	0.6098 / 90				0	SC		CLAYEY SAND (SC): yellow (10YR 7/6), ~10% gravel, ~60% medium to coarse sand, ~30% fines, low, moist; dense; fill material.
1		7/9/7/8	0.6098 / 100				1	SC		CLAYEY SAND (SC): brownish yellow (10YR 6/6), ~50% sand, ~50% fines, moist; medium dense; fill material.
		6/12/13/12	0.6098 / 70					SC		CLAYEY SAND with Gravel (SC): brownish yellow (10YR 6/6), ~20% gravel, ~50% sand, ~50% fines, moist; fill material.
2		10/10/11	0.6098				2	SC		CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~10% gravel, ~60% medium to coarse sand, ~30% fines, moist; medium dense; fill material.
		3/9/8/5	0.6098 / 60					CL		SILTY CLAY (CL): strong brown (7.5YR 5/6), ~20% sand, ~80% fines, medium, moist; stiff; fill material.
3		4/7/9/11	0.6098 / 100				3	SC		CLAYEY SAND (SC): yellowish brown (10YR 5/4), ~60% medium to coarse sand, ~40% fines, medium dense; fill material.
								SC		CLAYEY SAND (SC): reddish yellow(5YR 6/6) 60% grades to yellow (10YR 7/6), ~50% sand, ~50% fines, low to medium, dry; fill material
4		4/6/5/7	0.6098 / 70				4			
		4/5/5/4	0.6098 / 40					SC		CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~60% medium to coarse sand, ~10% fines, low, medium dense, fill material.
5							5			
6		6/7/7/6	0.6098 / 0				6	SC		CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~10% fine gravel, ~60% sand, ~30% fines, no odor; moist; medium dense; fill material.
7							7			
		3/3/4/5	0.6098 / 40					CL		SANDY LEAN CLAY (CL): dark greenish gray (GLEY1 4/5GY), ~30% medium to fine sand, ~70% fines, moist to wet; medium stiff.
8							8			

WELL CONSTRUCTION DETAILS



BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1836.GDT 12/9/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

1093

LOG OF WELL AREA D #39

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME	
	Camp Carroll Area D and Area 41 RI	
LOCATION		DATE & TIME STARTED
Camp Carroll, Taegu, Republic of Korea		4/12/03 13:21
LOGGED BY [redacted] b6	REVIEWED BY	DATE & TIME FINISHED 4/12/03 16:05

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
10		1/2/4/5	0.6098 / 100				10	CL		SILTY CLAY (CL): yellowish brown (10YR 5/8) 20% with secondary mineralization gray(2.5Y 6/1), ~10% fine to very fine sand, ~90% fines, medium, wet; medium stiff.	10	Slotted PVC Casing
11		8/8/9/11	0.6098 / 70				11	CL		SANDY LEAN CLAY (CL): brownish yellow (10YR 6/8) 20% grades to yellowish brown (10YR 5/4), ~30% fine to medium sand, ~70% fines, no odor; wet; very stiff.	11	
12		2/3/6/7	0.6098 / 0				12	CL		SANDY LEAN CLAY (CL): pale yellow (2.5Y 7/4), ~20% medium to coarse sand, ~80% fines, wet; stiff.	12	Threaded PVC End Cap
										End of Borehole at 12.5 m.		
13							13				13	
14							14				14	
15							15				15	
16							16				16	
17							17				17	
18							18				18	
19							19				19	

BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ 4CE_1836.GDT 16/9/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

1094

LOG OF BORING AREA D #40

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/15/03 10:25
LOGGED BY: [redacted] b6	REVIEWED BY:
	DATE & TIME FINISHED: 4/15/03 13:30
DRILLING CONTRACTOR / DRILLER: FED [redacted] b6	DRILLING METHOD: Hollow-Stem Auger
COORDINATES	
SAMPLING METHOD: Split-Spoon Sampler	SAMPLE HAMMER TYPE: Hydraulic Hammer
SIZE / TYPE OF BIT: 8"	SURFACE ELEVATION / DATUM: mean sea level
WELL INSTALLED? YES / NO ☒	CASING MATERIAL / DIAMETER
SCREEN Type: Material: Length: Diameter: Slot Size:	
ELEVATION OF (msl)	WELL COVER / TOP OF WELL CASING / TOP & BOTTOM OF SCREEN / PRODUCT SURFACE / GROUNDWATER SURFACE / DATE

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: / LITHOLOGIC DESCRIPTION
0		7/7/10/17	0.6098 / 70				0	SC		CLAYEY SAND (SC): strong brown (7.5YR 5/6) 20% grades to brownish yellow (10YR 6/6), ~70% medium to coarse sand, ~30% fines, slight chemical odor; moist; medium dense; increasing clay content at 1.22 meters bgs (60% sand, 40% fines).
1		10/6/7/7	0.6098 / 100			SS	1			
2		6/12/13/12 9/10/6	1.067 1.067 / 90	CC-040SS-01			2			
3		7/10/10/11	0.6098 / 100				3	CL		SANDY LEAN CLAY (CL): strong brown (7.5YR 5/6) 50% grades to strong brown (7.5YR 5/8), ~40% medium to fine sand, ~60% fines, stiff to soft; increasing clay content at 3.5 meters bgs (30% sand, 70% fines).
4		10/11/7/8	0.6098 / 50				4			
5		2/2/3/4	0.6098 / 50				5	SM		SILTY SAND (SM): yellowish brown (10YR 5/6), ~80% medium sand, ~20% fines, medium stiff.
6		1/4/5/5	0.6098 / 0				6	CL		SANDY LEAN CLAY (CL): yellowish brown (10YR 5/4) 50% grades to dark grayish brown(2.5Y 4/2), ~30% medium sand, ~70% fines, medium stiff to soft; increasing clay content at 6.1 meters bgs (20% sand, 80% fines).
7		2/2/4/5	0.6098 / 0 0.6098 / 0	CC-040BS-02		SS	7	SC		CLAYEY SAND (SC): reddish yellow(7.5YR 6/6), ~60% medium sand, ~40% fines, medium dense to dense.
8		4/6/11/14	0.6098 / 0				8			

WELL CONSTRUCTION DETAILS

NO WELL INSTALLED

BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1836.GDT 15/5/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

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LOG OF BORING AREA D #40

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME	
	Camp Carroll Area D and Area 41 RI	
LOCATION		DATE & TIME STARTED
Camp Carroll, Taegu, Republic of Korea		4/15/03 10:25
LOGGED BY [redacted] 66	REVIEWED BY	DATE & TIME FINISHED
		4/15/03 13:30

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
		11/18/25/32	0.6098 / 0									NO WELL INSTALLED
										End of Borehole at 9.8 m.		

BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ JCE_1836.GDT 6/9/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

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PAGE 1 OF 1

LOG OF BORING AREA D B-006

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/1/03 14:20
LOGGED BY: [redacted] bb	REVIEWED BY / DATE & TIME FINISHED: 4/1/03 15:50
DRILLING CONTRACTOR / DRILLER: Beautiful Environmental Corp	DRILLING METHOD: Direct-Push
SAMPLING METHOD: Geoprobe Sampler	SAMPLE HAMMER TYPE / SIZE / TYPE OF BIT
COORDINATES	SURFACE ELEVATION / DATUM: mean sea level
WELL INSTALLED? YES / NO ☒	CASING MATERIAL / DIAMETER
SCREEN Type: Material: Length: Diameter: Slot Size:	
ELEVATION OF (msl)	WELL COVER / TOP OF WELL CASING / TOP & BOTTOM OF SCREEN / PRODUCT SURFACE / GROUNDWATER SURFACE / DATE

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
										SURFACE CONDITION:		NO WELL INSTALLED
										Preprobe. No recovery.		
1	<0.1						1	SC		SILTY, CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~5% fine gravel, ~70% fine to medium sand, ~25% fines, moist; medium dense; contains some coarse sand.	1	
2			1.5 / 80				2				2	
	<0.1							SC		SILTY, CLAYEY SAND (SC): strong brown (7.5YR 5/6), with some cobbles at 2.3 meters.		
3							3	SC-SM		SILTY, CLAYEY SAND (SC-SM): strong brown (7.5YR 5/6), ~70% fine to medium, angular sand, ~30% fines, moist; dense; appears to be weathered granite (saprolite) with angular quartz and feldspars, mica..	3	
			1.5 / 90									
4						SS	4				4	
			1.6 / 80	CC006BS0								
5			1.2 / 100				5	SC		SILTY, CLAYEY SAND (SC): red (2.5YR 4/6), ~65% fine to medium sand, ~35% fines, moist; dense.	5	
								SM		SILTY SAND (SM): yellowish brown (10YR 5/4), ~65% fine to medium sand, ~35% fines, moist		
	<0.1					SS		SC		CLAYEY SAND (SC): yellowish red (5YR 4/6) 50% to yellowish red (5YR 5/6), ~60% fine to medium sand, ~40% fines, moist; dense.		
6							6	SC		CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~60% fine to medium, subrounded to subangular sand, ~40% fines, moist; dense.	6	
			1.5 / 100	CC006BS02								
7	<0.1						7	SC		CLAYEY SAND (SC): dark grayish brown(2.5Y 4/2), ~60% fine to medium sand, ~40% fines, moist to wet; dense.	7	
8			1.5 / 65				8	CL		SANDY LEAN CLAY (CL): dark grayish brown(2.5Y 4/2), ~40% fine to medium sand, ~60% fines, medium, wet.	8	
										End of Borehole at 8.5 m.		

BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1836.GDT 16/9/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

LOG OF BORING AREA D B-010

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/1/03 09:20
LOGGED BY: [redacted] LG	REVIEWED BY
	DATE & TIME FINISHED: 4/1/03 12:30
DRILLING CONTRACTOR / DRILLER: Beautiful Environmental Corp	DRILLING METHOD: Direct-Push
COORDINATES	
SAMPLING METHOD: Geoprobe Sampler	SAMPLE HAMMER TYPE
SIZE / TYPE OF BIT	SURFACE ELEVATION / DATUM: mean sea level
WELL INSTALLED? YES / NO ☒	CASING MATERIAL / DIAMETER
SCREEN Type: Material: Length: Diameter: Slot Size:	
ELEVATION OF (msl): WELL COVER / TOP OF WELL CASING / TOP & BOTTOM OF SCREEN / PRODUCT SURFACE / GROUNDWATER SURFACE / DATE	

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
										Preprobe. No recovery.		NO WELL INSTALLED
	<0.1		0.6					SM		SILTY SAND (SM): strong brown (7.5YR 5/6), ~0% gravel, ~80% fine to coarse sand, ~15% fines, moist; medium dense, some cobbles at 0.8 to 0.9 meters.		
1						SS	1	SM		SILTY SAND (SM): strong brown (7.5YR 5/6), ~5% gravel, ~80% fine to coarse sand, ~15% fines, moist; dense, manganese oxide noted at 2.1 meters.	1	
			1.1 / 80 1 / 100	CC010SS01								
2							2				2	
			1.2 / 80					CL		SANDY LEAN CLAY (CL): strong brown (7.5YR 5/6) 10% mottled with white (10YR 8/1), ~5% gravel, ~35% fine to medium sand, ~60% fines, low to medium, moist; firm.		
3							3				3	
								SC-SM		SILTY, CLAYEY SAND (SC-SM): strong brown (7.5YR 5/6), ~65% fine to medium sand, ~35% fines, moist; dense.		
			1.3 / 80					CL		SANDY LEAN CLAY (CL): strong brown (7.5YR 5/6), ~35% fine to medium sand, ~65% fines, medium, moist; firm.		
4							4				4	
						SS		SC		SILTY, CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~65% fine to medium sand, ~35% fines, moist; dense.		
5			1.1 / 95 1 / 100	CC010BS01			5	SC		SILTY, CLAYEY SAND (SC): olive gray(5Y 4/2), ~65% fine to medium sand, ~35% fines, moist; dense.	5	
								SC		SILTY, CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~65% medium to coarse sand, ~35% fines, moist; dense.		
								SC		SILTY, CLAYEY SAND (SC): yellowish brown (10YR 5/4), ~65% fine to medium sand, ~35% fines, moist; dense.		
6							6				6	
			1.5 / 100					SC		SILTY, CLAYEY SAND (SC): red (2.5YR 4/6) 50% and olive brown (2.5Y 4/4), ~65% fine to medium sand, ~35% fines, moist; donco.		
7							7	CL		SANDY LEAN CLAY (CL): dark yellowish brown (10YR 4/4), ~35% fine to medium sand, ~65% fines, medium, moist, micaceous.	7	
						SS		SC		SANDY LEAN CLAY (SC): dark yellowish brown (10YR 4/4), ~50% fine to medium sand, ~50% fines, low to medium, moist to wet.		
8			1.3 / 100 1 / 100	CC010BS02			8				8	
										End of Borehole at 8.5 m.		

BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ 4CE_1836.GDT 16/9/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

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LOG OF BORING AREA D B-017

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME: Camp Carroll Area D and Area 41 RI
LOCATION: Camp Carroll, Taegu, Republic of Korea	DATE & TIME STARTED: 4/2/03 08:20
LOGGED BY: [redacted] b6	REVIEWED BY:
	DATE & TIME FINISHED: 4/2/03 10:30
DRILLING CONTRACTOR / DRILLER: Beautiful Environmental Corp	DRILLING METHOD: Direct-Push
COORDINATES:	
SAMPLING METHOD: Geoprobe Sampler	SAMPLE HAMMER TYPE:
SIZE / TYPE OF BIT:	SURFACE ELEVATION: DATUM: mean sea level
WELL INSTALLED? YES NO ☒	CASING MATERIAL / DIAMETER:
SCREEN Type: Material: Length: Diameter: Slot Size:	
ELEVATION OF (msl): WELL COVER: TOP OF WELL CASING: TOP & BOTTOM OF SCREEN: PRODUCT SURFACE: GROUNDWATER SURFACE: DATE:	

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS: NO WELL INSTALLED
										Preprobe. No recovery.		
1	<0.1		1.5 / 70	CC017SS01		SS	1	SC		SILTY, CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~10% fine to coarse, angular gravel, ~70% fine to coarse sand, ~20% fines, moist; dense; fill soil.	1	
2			1.05 / 100				2	SC		SILTY, CLAYEY SAND (SC): yellowish brown (10YR 5/6), ~10% fine to coarse, angular gravel, ~70% fine to coarse sand, ~20% fines, moist; dense; fill soil.	2	
3			1.5 / 80				3	CL		SILTY CLAY with Sand (CL): strong brown (7.5YR 5/8), ~10% fine to coarse, angular gravel, ~70% fine to coarse sand, ~20% fines, low to medium, moist; firm; fill soil.	3	
								CL		SILTY CLAY with Sand (CL): yellowish red (5YR 5/8), ~10% fine to coarse, angular gravel, ~70% fine to coarse sand, ~20% fines, low to medium, moist; firm; fill soil.		
4							4	SC		SILTY, CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~5% fine gravel, ~60% fine to coarse, subangular to subrounded sand, ~35% fines, moist; dense; fill soil.	4	
5			1.5 / 80				5	SC		SILTY, CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~55% fine to coarse sand, ~45% fines, moist; firm; fill soil.	5	
6			1.5 / 70				6	GM / SC		GRAVEL with Silt and Sand (GM): dark brown (10YR 3/3), ~50% fine to coarse, angular gravel, ~30% sand, ~20% fines.	6	
7							7	SC		SILTY, CLAYEY SAND (SC): strong brown (7.5YR 5/6), fill soil. SILTY, CLAYEY SAND (SC): strong brown (7.5YR 5/6), ~5% fine gravel, ~60% fine to coarse sand, ~35% fines, moist; dense.	7	
8			1.5 / 60				8	CL / CH		SILTY CLAY with Sand (CL): dark greenish gray(5G 4/1), fine to medium sand, low, moist. SANDY LEAN CLAY (CH): yellowish red (5YR 5/8), ~30% fine to medium sand, ~70% fines, high, wet	8	

BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1636.GDT 6/9/03

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LOG OF BORING AREA D B-017

BOREHOLE / WELL LOCATION SKETCH MAP

N

PROJECT NO.	PROJECT NAME	
	Camp Carroll Area D and Area 41 RI	
LOCATION		DATE & TIME STARTED
Camp Carroll, Taegu, Republic of Korea		4/2/03 08:20
LOGGED BY [redacted] /66	REVIEWED BY	DATE & TIME FINISHED 4/2/03 10:30

DEPTH (meters bgs)	PID (ppmv)	BLOWS / DRIVE	DRIVE / RECOVERY (meters / %)	LAB SAMPLE ID	EXTENT	SAMPLE TYPE	DEPTH (meters bgs)	USCS	GRAPHIC LOG	SURFACE CONDITION: LITHOLOGIC DESCRIPTION	DEPTH (meters bgs)	WELL CONSTRUCTION DETAILS
			1.5 / 90					CH		SANDY LEAN CLAY (CH): olive brown (2.5Y 4/3), ~30% fine to medium sand, ~70% fines, high, wet.		NO WELL INSTALLED
10							10	CH		SANDY LEAN CLAY (CH): dark brown (10YR 3/3), ~20% fine to medium sand, ~80% fines, high, wet.	10	
										End of Borehole at 10.0 m.		
11							11				11	
12							12				12	
13							13				13	
14							14				14	
15							15				15	
16							16				16	
17							17				17	
18							18				18	
19							19				19	

BORING LOG METRIC UNITS CAMP CARROLL AREA D AND AREA 41.GPJ ACE_1536.GDT 16/3/03

This log is part of the report prepared for the named project and should be read together with that report for complete information. This summary applies only at the location of this boring / well and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

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